

Attachment A

Boring and Piezometer Logs

CDM

2521-42275

DRILLING LOG

DIVISION
SWD

INSTALLATION

Ft. Worth, Tarrant County, Texas

Hole No. B-1

SHEET 1
OF 2 SHEETS

1. PROJECT

Fort Worth Central City Project

2. LOCATION (Coordinates or Station)

Ft. Worth, Texas N 6,965,698.9 E 2,324,271.3

3. DRILLING AGENCY

USACE

4. HOLE NO. (As shown on drawing title and file number)

B-1

5. NAME OF DRILLER

Salik, James

6. DIRECTION OF HOLE

VERTICAL

INCLINED

DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN

-

8. DEPTH DRILLED INTO ROCK

-

9. TOTAL DEPTH OF HOLE

12.0

10. SIZE AND TYPE OF BIT

* see remarks

11. DATUM FOR ELEVATION SHOWN (TBM or MSL)

MSL

12. MANUFACTURER'S DESIGNATION OF DRILL

13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN

DISTURBED

0

UNDISTURBED

2

14. TOTAL NUMBER CORE BOXES

0

15. ELEVATION GROUND WATER

16. DATE HOLE

STARTED

6/10/2004

COMPLETED

6/10/2004

17. ELEVATION TOP OF HOLE

+532.9

18. TOTAL CORE RECOVERY FOR BORING

0 %

19. GEOLOGIST

RAM

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+532.9	0.0		0.6-ft-thick CONCRETE PAVEMENT.			
+532.3	0.6		0.5-ft-thick GRAVEL BASE , coarse to fine grained, moist, sandy and clayey, brown.			
+531.8	1.1		SAND FILL , fine grained, medium dense, moist, silty, mostly brown and some light brown. Scattered gravels and cobbles up to 4.5-in diameter.			
+529.9	3.0		SAND (SC-CL) , moist, clayey, brown, and CLAY , moist, sandy, dark gray.	100	ST-1 3.0 5.0	Field Pocket Pen. reading = 1.75 tsf. Lab Pocket Pen. reading = 2.0 tsf.
+527.9	5.0		CLAY (CH) , high plasticity, sandy and silty, black to gray-brown.			Strong chemical odor at 5 to 7 ft-bgs. PID reads every 1 ft interval are 0 (zero) until 5 to 7 ft-bgs reading. PID reading = 41 ppm (top of the hole) > 10 ppm (limit).
+525.5	7.4		SAND (SC) , fine grained, slightly damp, clayey and silty, and CLAY (CL) , slightly damp, sandy, dark yellowish brown.			Strong chemical odor.
+520.9	12.0		SAND (SC) , fine grained, slightly damp, clayey, brown and light gray.	100	ST-2 10.0 12.0	
			Boring terminated at 12 ft-bgs.			Note: 1. PID reading = 38 ppm (inside the jar) and 25 to 32 ppm (top of the hole). Hole drilling aborted, drill cuttings placed in barrel and sealed. Hole grouted to ground surface.

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE
532.9

Hole No. B-1

PROJECT

Fort Worth Central City Project

INSTALLATION

Ft. Worth, Tarrant County, Texas

Hole No. B-1

SHEET 2
OF 2 SHEETS

ELEVATION

a

DEPTH

b

LEGEND

c

CLASSIFICATION OF MATERIALS

(Description)

d

% CORE

RECOV-

ERY

e

BOX OR

SAMPLE

NO.

f

REMARKS

(Drilling time, water loss, depth

weathering, etc., if significant)

g

2. * Drilling
0 to 0.6 ft-bgs = 10-in dia. core.
0.6 to 12 ft-bgs = 8-in dia. auger and 3-in
dia. shelby tube.

3. Field Pocket Penetrometer reading
taken at the bottom of undisturbed
sample.
Lab Pocket Peneterometer reading is
average of reading throughout 2 ft
sample.

4. The boring log based on visual
classification in the field, the laboratory,
and laboratory test results (undisturbed
sample inside the shelby tube).

DRILLING LOG		DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 1
1. PROJECT Fort Worth Central City Project		10. SIZE AND TYPE OF BIT * see remarks		OF 2 SHEETS	
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,965,107.8 E 2,324,599.4		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL			
3. DRILLING AGENCY USACE		12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing title and file number) B-2		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 0	UNDISTURBED 2	
5. NAME OF DRILLER Salik, James		14. TOTAL NUMBER CORE BOXES 0		15. ELEVATION GROUND WATER 520.8	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED _____ DEG. FROM VERT.		16. DATE HOLE STARTED 7/6/2004		COMPLETED 7/6/2004	
7. THICKNESS OF OVERBURDEN -		17. ELEVATION TOP OF HOLE +530.8		18. TOTAL CORE RECOVERY FOR BORING 0 %	
8. DEPTH DRILLED INTO ROCK -		19. GEOLOGIST RAM			
9. TOTAL DEPTH OF HOLE 13.0					

ELEVATION <small>a</small>	DEPTH <small>b</small>	LEGEND <small>c</small>	CLASSIFICATION OF MATERIALS (Description) <small>d</small>	% CORE RECOVERY <small>e</small>	BOX OR SAMPLE NO. <small>f</small>	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) <small>g</small>
+530.8	0.0		0.65-ft thick CONCRETE PAVEMENT.			
+530.2	0.7		0.35-ft thick GRAVEL BASE , coarse to fine grained, moist, clayey and sandy, gray-brown.			
+529.8	1.0		CLAY (CH) , high plasticity, sandy and silty, calcareous, moist, dark brown.			
			CLAY (CH) , high plasticity, very firm, moist, sandy, dark brown.	100	ST-1 4.0 6.0	Shelby Tube-1 (ST-1) Field Rocket Pen. reading = >4.5 tsf. Lab Pocket Pen. reading = 2.25 tsf.
+522.0	8.8		SAND (SM) , mostly fine grained, moist to wet, very silty and clayey, strong brown.			
			SAND (SM) , fine grained, moist, silty and gravelly, tan and gray. - gravelly by 12 ft-bgs.	100	ST-2 11.0 13.0	Shelby Tube-1 (ST-1). Lab Pocket Pen. reading = 2.2 tsf.
+517.8	13.0					

Note:
1. PID read every 1 ft increment.
The readings are 0 (zero) ppm from 0 to

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE
530.8

Hole No. B-2

PROJECT
Fort Worth Central City Project

INSTALLATION
Ft. Worth, Tarrant County, Texas

SHEET 2
OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Boring terminated at 13 ft-bgs.			<p>10 ft-bgs.</p> <p>2. ** Free water and chemical odor first noted at 11 to 13 ft-bgs. Water raised up to 10 ft-bgs immediately after drilling stopped. CDM PID reading = 92 ppm (auger outside the hole) and 199 ppm (jar). Drilling halted, hole grouted to ground surface and drill cuttings placed in barrel (as per Joe Carris - CDM requested). Jar from auger 12 to 13 ft-bgs was placed inside the barrel.</p> <p>3. * Drilling 0 to 0.65 ft-bgs - 10-in dia. core. 0.65 to 13 ft-bgs - 8-in dia. auger and 3-in dia. shelly tube.</p> <p>4. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample.</p> <p>5. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelly tube).</p>

DRILLING LOG		DIVISION SWD		INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 1 OF 2 SHEETS	
1. PROJECT Fort Worth Central City Project				10. SIZE AND TYPE OF BIT * see remarks			
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,962,172.0 E 2,322,670.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL			
3. DRILLING AGENCY USACE				12. MANUFACTURER'S DESIGNATION OF DRILL			
4. HOLE NO. (As shown on drawing title and file number) B-3				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 0	
5. NAME OF DRILLER Salik, James				14. TOTAL NUMBER CORE BOXES		UNDISTURBED 3	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER		0	
7. THICKNESS OF OVERBURDEN -				16. DATE HOLE STARTED		6/2/2004	
8. DEPTH DRILLED INTO ROCK -				17. ELEVATION TOP OF HOLE		+537.9	
9. TOTAL DEPTH OF HOLE 20.0				18. TOTAL CORE RECOVERY FOR BORING		0 %	
				19. GEOLOGIST		RAM	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
+537.9	0.0		CLAY (CH) , high plasticity, slightly moist, sandy/ silty, calcareous, dark brown.				
			CLAY (CH) , high plasticity, hard, slightly moist, brown and gray.	100	ST-1 3.0 5.0	Shelby Tube-1 (ST-1). Field and Lab Pocket Pen. reading = >4.5 tsf.	
			CLAY (CH) , high plasticity, hard, slightly moist, slightly sandy, brown.	200	ST-2 10.0 11.0	Field and Lab Pocket Pen. reading = >4.5 tsf. Auger refusal at 11 ft-bgs.	

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE
537.9

Hole No. B-3

PROJECT
Fort Worth Central City Project

INSTALLATION
Ft. Worth, Tarrant County, Texas

Hole No. B-3

SHEET 2
OF 2 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
----------------	------------	-------------	---	----------------------	------------------------	---

+520.9

17.0

CLAY (CH), high plasticity, slightly moist, sandy/silty, calcareous, dark brown. (continued)

CLAY (CL), low plasticity, very firm, moist with wet seams, sand and slightly silty, yellowish brown and light brown.

100

ST-3
17.0
19.0

Field and Lab Pocket Pen. reading = 3.5 tsf.

+517.9





20.0

Boring terminated at 20 ft-bgs.

Note:

1. Chemical odor noted after 16 ft-bgs, very light at the beginning but after 1 hr water entering the borings and HNU reading over 110 ppm. Jar taken from drilling cuttings pile (with odor) was placed inside the barrel and sealed. All drill cuttings placed inside the barrel for CDM to claim later. Hole grouted to ground surface.
2. ** Free water first noted at 16 ft-bgs, after 3 hrs at 14.5 ft-bgs.
3. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample.
4. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelly tube).

DRILLING LOG		DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1 OF 4 SHEETS
1. PROJECT Fort Worth Central City Project			10. SIZE AND TYPE OF BIT * see remarks	
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,961,412.0 E 2,323,453.6			11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USACE			12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and file number) B-4			13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN : 1 : 5	
5. NAME OF DRILLER Salik, James			14. TOTAL NUMBER CORE BOXES : 1	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.			15. ELEVATION GROUND WATER : 522.1	
7. THICKNESS OF OVERBURDEN : 43.5			16. DATE HOLE : STARTED : COMPLETED 5/19/2004 : 5/20/2004	
8. DEPTH DRILLED INTO ROCK : 5.0			17. ELEVATION TOP OF HOLE : +535.7	
9. TOTAL DEPTH OF HOLE : 48.5			18. TOTAL CORE RECOVERY FOR BORING : see remarks %	
			19. GEOLOGIST : RAM	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+535.5	0.2		0.2-ft-thick ASPHALT .			
+535.2	0.5		0.3-ft-thick GRAVEL BASE , coarse to fine grained, dry, sandy, dark brown.			
			CLAY (CH) , high plasticity, very firm to hard, slightly moist, slightly sandy and silty, calcareous, dark brown. CLAY (CH) , high plasticity, slightly moist, slightly silty, brown.	100	ST-1 2.0 4.0	Shelby Tube-1 (ST-1). Field Pocket Pen. reading = >4.5 tsf. Lab Pocket Pen. reading = 4.0 tsf.
+531.7	4.0		CLAY (CL) , low plasticity, moist with wet seams, silty, brown. CLAY (CL) , low plasticity, firm, moist with wet seams, silty, light brown.	100	ST-2 9.0 11.0	Field Pocket Penetrometer reading= 4.5 tsf. Lab Pocket Penetrometer reading = 1.5 tsf. wc = 18.6%. γ _{dry} = 109.1 pcf.

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE
535.7

Hole No. B-4

PROJECT
Fort Worth Central City Project

INSTALLATION
Ft. Worth, Tarrant County, Texas

Hole No. B-4

SHEET 2
OF 4 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			CLAY (CL) , low plasticity, moist with wet seams, silty, brown. (continued)			
			CLAY (CL) , low plasticity, medium to firm, moist, silty, light brown.	100	ST-3 16.0 18.0	Field Pocket Pen. reading = 1.5 tsf. Lab Pocket Pen. reading = 1.0 tsf.
			CLAY (CL) , low plasticity, medium, moist, silty, brown.	100	ST-4 23.0 25.0	Field Pocket Pen. reading = 1.5 tsf. Lab Pocket Pen. reading = 0.75 tsf. wc = 22.1%. $\gamma_{dry} = 104.7$ pcf.
+507.7	28.0		CLAY (CL) , low plasticity, medium, very moist to wet, sandy, brown and gray.			
				100	ST-5 30.0 32.0	Field Pocket Pen. reading = 1.2 tsf. Lab Pocket Pen. reading = 0.75 tsf.

DRILLING LOG (Cont Sheet)


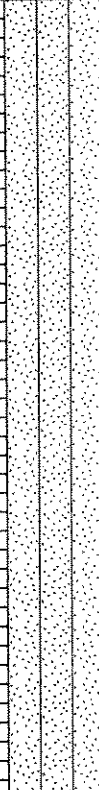
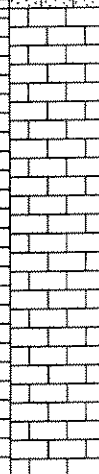
ELEVATION TOP OF HOLE
535.7

Hole No. B-4

PROJECT
Fort Worth Central City Project

INSTALLATION
Ft. Worth, Tarrant County, Texas

SHEET 3
OF 4 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+500.7	35.0		CLAY (CL) , low plasticity, medium, very moist to wet, sandy, brown and gray. (continued)			
+492.2	43.5		SAND (SM) , fine grained, wet, very silty and clayey zones, yellowish brown. SAND (SM) , fine grained, medium dense, wet, silty, tan.	133	SS-1 37.0 38.5	Split Spoon-1 (SS-1). 4/5/8 N = 13. wc = 21.3 %
+487.2	48.5		LIMESTONE , no apparent of weathering, gray, jointed, healed joints, massive, hard/very hard (RX classification), shaly stringers throughout, fossiliferous (shells & ammonites), well cemented	62	Run 1 43.5 48.5	RQD = 62%. Carton-1 = 47.6 to 45.4 ft-bgs. wc = 3.8%. $\gamma_{dry} = 150.6$ pcf.
			Boring terminated at 48.5 ft-bgs.			<p>Note:</p> <p>1. All HNU reads every foot are 0 (zero).</p> <p>2. * Drilling 0 to 43.5 ft-bgs = 8-in dia. auger, 3-in dia.</p>

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE
535.7

Hole No. B-4

PROJECT

Fort Worth Central City Project

INSTALLATION

Ft. Worth, Tarrant County, Texas





SHEET

4

OF 4 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
						<p>shelby tube, 2-in dia. split spoon. Auger refusal at 43.5 ft-bgs, set 2 ft by 8-in casing/ pan and mud drill, 4-in dia. core to 48.5 ft-bgs.</p> <p>3. ** Free water first noted at 9 to 11 ft-bgs during shelby push, heavy caving by 20 ft-bgs after drilling to 43.5 ft-bgs. The next day the water at 13.6 ft-bgs and the hole caved up to 20 ft-bgs.</p> <p>4. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample.</p> <p>5. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelby tube).</p>

DRILLING LOG		DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1 OF 4 SHEETS
1. PROJECT Fort Worth Central City Project			10. SIZE AND TYPE OF BIT * see remarks	
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,960,646.4 E 2,322,683.6			11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USACE			12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and file number) B-5			13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED: 0 UNDISTURBED: 6	
5. NAME OF DRILLER Salik, James			14. TOTAL NUMBER CORE BOXES 1	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.			15. ELEVATION GROUND WATER 524.0	
7. THICKNESS OF OVERBURDEN 44.5			16. DATE HOLE STARTED COMPLETED 3/6/2004 3/6/2004	
8. DEPTH DRILLED INTO ROCK 5.8			17. ELEVATION TOP OF HOLE +536.8	
9. TOTAL DEPTH OF HOLE 50.3			18. TOTAL CORE RECOVERY FOR BORING see remarks %	
			19. GEOLOGIST RAM	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+536.7	0.1		0.1-ft thick ASPHALT.			
+536.3	0.5		0.4-ft thick GRAVEL BASE, coarse to fine grained, moist, very clayey and sandy, yellowish brown.			
			CLAY (CL), low plasticity, moist, mostly slightly sandy with tiny sand stringers, dark brown to brown.	100	ST-1 1.5 3.5	Shelby Tube-1 (ST-1). Field Pocket Pen. reading = 3.7 tsf. Lab Pocket Pen. reading = 2.5 tsf.
			CLAY (CL), low plasticity, very firm, moist, slightly sandy, brown.	100	ST-2 9.0 11.0	Field Pocket Pen. reading = 4.1 tsf. Lab Pocket Pen. reading = 3.75 tsf. wc = 18.9%.

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE
536.8

Hole No. B-5





PROJECT


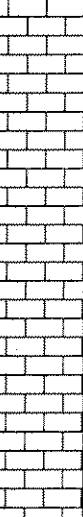
Fort Worth Central City Project

INSTALLATION

Ft. Worth, Tarrant County, Texas

SHEET 2
OF 4 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+520.8	16.0		CLAY (CL) , low plasticity, moist, mostly slightly sandy with tiny sand stringers, dark brown to brown. (continued)			
			CLAY (CL) , low plasticity, medium to firm, wet, sandy, brown.	100	ST-3 16.0 18.0	Field Pocket Pen. reading = 1.1 tsf. Lab Pocket Pen. reading = 1.0 tsf. wc = 21.3%. $\gamma_{dry} = 105.7$ pcf.
+513.8	23.0		CLAY (CL) , low plasticity, very soft, wet to moist, silty, brown.	100	ST-4 23.0 25.0	Field Pocket Pen. reading = 1.5 tsf. Lab Pocket Pen. reading = < 0.25 tsf.
			CLAY (CL) , low plasticity, soft to medium, wet to moist, silty brown.	100	ST-5 30.0 32.0	Field Pocket Pen. reading = 1.7 tsf. Lab Pocket Pen. reading = 0.5 tsf. wc = 24.6%. $\gamma_{dry} = 101.4$ pcf.
+504.8	32.0					

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 536.8		Hole No. B-5		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 3 OF 4 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			<p>SAND (SC), fine grained, moist, silty, gray, and CLAY (CL), low plasticity, moist, silty, gray.</p> <p>SAND (SC), fine grained, moist, silty and clayey, gravelly after 39 ft-bgs, few shell fragments, yellowish brown.</p> <p>SAND (SC), fine grained, very loose, moist, clayey, tan.</p>	100	ST-6 38.0 40.0	Lab Pocket Pen. reading = < 0.25 tsf. wc = 20.6%.
+492.3	44.5		<p>LIMESTONE, weathered stained at 44.5 to 45.2 ft-bgs, followed by unweathered, light gray/ gray/ dark gray, hard/ very hard (RX classification), massive, with scattered joints about every 2 to 3 ft, shale stringers throughout, slightly fossiliferous (shells), silty, arenaceous zones.</p>	71	Run 1 44.5 49.3	RQD = 63%. Carton-1 = 49.4 to 50.3 ft-bgs. wc = 4.9%. $\gamma_{dry} = 149.1$ pcf.

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE
536.8

Hole No. B-5

PROJECT

Fort Worth Central City Project

INSTALLATION

Ft. Worth, Tarrant County, Texas

SHEET 4

OF 4 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
----------------	------------	-------------	---	----------------------	------------------------	---

+486.5


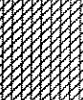

50.3

Boring terminated at 50.3 ft-bgs.

Note:

1. All HNU reads every foot are 0 (zero).
2. * Drilling
0 to 44.7 ft-bgs = 8-in dia. auger, 3-in dia. shelby tube.
Auger refusal at 44.7 ft-bgs, set 2 ft casing/ pan.
44.7 to 50.3 ft-bgs = 4-in dia. diamond bit (core).
3. ** Free water first noted at 13 to 15 ft-bgs.
Water at 12.8 ft-bgs 18 hrs after drilling completion.
4. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample.
Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample.
5. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelby tube).

DRILLING LOG		DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1 OF 4 SHEETS
1. PROJECT Fort Worth Central City Project			10. SIZE AND TYPE OF BIT * see remarks	
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,960,454.7 E 2,322,939.5			11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USACE			12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and file number) B-6			13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN : 2 : 7	
5. NAME OF DRILLER Salik, James			14. TOTAL NUMBER CORE BOXES : 0	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.			15. ELEVATION GROUND WATER : 520.0	
7. THICKNESS OF OVERBURDEN : 47.5			16. DATE HOLE : STARTED 5/20/2004 COMPLETED 5/21/2004	
8. DEPTH DRILLED INTO ROCK : 3.0			17. ELEVATION TOP OF HOLE : +537.2	
9. TOTAL DEPTH OF HOLE : 50.5			18. TOTAL CORE RECOVERY FOR BORING : 0 %	
			19. GEOLOGIST : RAM	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+537.2	0.0		CLAY (CL) , low plasticity, slightly moist to moist by 6 ft-bgs, wet seams, sandy/silty, calcareous, dark brown to brown by 8 ft-bgs and yellowish brown by 29 ft-bgs.			
			CLAY (CL) , low plasticity, hard, slightly moist to moist, silty, brown.	100	ST-1 2.0 4.0	Shelby Tube-1 (ST-1). Field Pocket Pen. reading = >4.5 tsf. Lab Pocket Pen. reading = 4.25 tsf.
			CLAY (CL) , low plasticity, very firm, wet seams, silty, brown.	100	ST-2 10.0 12.0	Field Pocket Pen. reading = >4.5 tsf. Lab Pocket Pen. reading = 4.0 tsf. wc = 19.6%. $\gamma_{dry} = 106.9$ pcf.

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 537.2		Hole No. B-6		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas			SHEET 2 OF 4 SHEETS
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			CLAY (CL) , low plasticity, slightly moist to moist by 6 ft-bgs, wet seams, sandy/ silty, calcareous, dark brown to brown by 8 ft-bgs and yellowish brown by 29 ft-bgs. (continued)			
			CLAY (CL) , low plasticity, medium to firm, wet, silty, brown.	100	ST-3 18.0 20.0	Field Pocket Pen. reading = >4.5 tsf. Lab Pocket Pen. reading = 1.0 tsf. wc = 21.6%.
			CLAY (CL) , low plasticity, firm, wet, silty, brown.	100	ST-4 25.0 27.0	Field Pocket Pen. reading = 2.2 tsf. Lab Pocket Pen. reading = 1.25 tsf. wc = 21.5%.
+505.2	32.0					

DRILLING LOG (Cont Sheet)

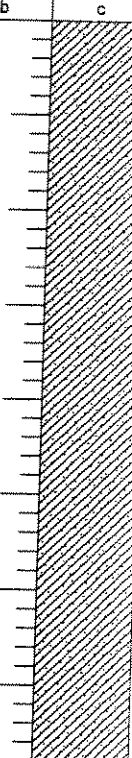
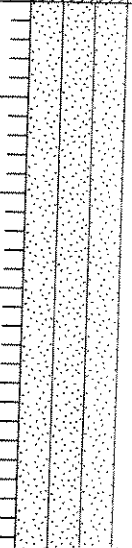
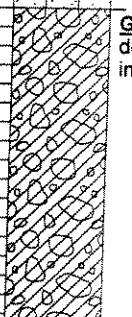

ELEVATION TOP OF HOLE
537.2


Hole No. B-6

PROJECT
Fort Worth Central City Project

INSTALLATION
Ft. Worth, Tarrant County, Texas

SHEET 3
OF 4 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+497.2	40.0		CLAY (CL) , low plasticity, soft to medium, wet, sandy, brown.	100	ST-5 32.0 34.0	Field Pocket Pen. reading = 1.5 tsf. Lab Pocket Pen. reading = 0.5 tsf. wc = 23.3 %. $\gamma_{dry} = 104.2$ pcf.
+491.2	46.0		SAND (SM) , fine grained, loose, slightly moist to moist, very silty/ clayey, weak cementation, light brown, tan, and light gray.	100	ST-6 40.0 42.0	Field Pocket Pen. reading = 4.1 tsf. Lab Pocket Pen. reading = 0.75 tsf. wc = 19.2%.
+487.7	49.5		GRAVEL (GC) , coarse to fine, medium dense, dry to moist, brown, and CLAY (CL) , interbedded, firm to very firm, wet, dark gray.	100	ST-7 48.0 50.0	Field Pocket Pen. reading = > 4.5 tsf. Lab Pocket Pen. reading = 2.0 tsf.
			CLAY (CL) , low plasticity, hard, moist, silty, gray, and SHALE , unweathered, soft	133	SS-1 49.5	Split Spoon-1 (SS-1). 10/ 50/1"

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 537.2		Hole No. B-6		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 4 OF 4 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+486.8	50.4		(RX classification), silty, massive, calcareous, few shells fragments.		51.0	N = 50/1"
+486.7	50.5					<p>Note:</p> <ol style="list-style-type: none"> All HNU reads are 0 (zero). * Drilling 0 to 48 ft-bgs = 8-in dia. auger, 3-in dia. shelby tube, 2-in dia. spoon. Caved up to 40 ft-bgs. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Peneterometer reading is average of reading throughout 2 ft sample. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelby tube).
			Boring terminated at 50.5 ft-bgs.			

DRILLING LOG		DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1 OF 4 SHEETS
1. PROJECT Fort Worth Central City Project		10. SIZE AND TYPE OF BIT * see remarks		
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,967,358.0 E 2,325,046.4		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL		
3. DRILLING AGENCY USACE		12. MANUFACTURER'S DESIGNATION OF DRILL		
4. HOLE NO. (As shown on drawing title and file number) C-1		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 2	UNDISTURBED 6
5. NAME OF DRILLER Salik, James		14. TOTAL NUMBER CORE BOXES 0		
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER 502.2		
7. THICKNESS OF OVERBURDEN -		16. DATE HOLE STARTED 4/26/2004 COMPLETED 4/26/2004		
8. DEPTH DRILLED INTO ROCK -		17. ELEVATION TOP OF HOLE +531.7		
9. TOTAL DEPTH OF HOLE 57.5		18. TOTAL CORE RECOVERY FOR BORING 0 %		
		19. GEOLOGIST RAM		



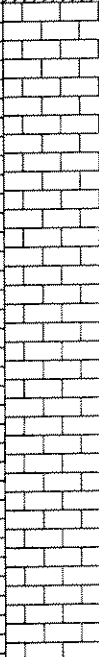
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+531.7	0.0		CLAY (CL) , low plasticity, moist, sandy, dark brown and gray.	50	BS-1 0.0 4.0	Bag Sample-1 (BS-1). wc = 20.8%.
			CLAY (CL) , low plasticity, very firm, moist, sandy, gray and brown.	100	ST-1 1.0 3.0	Shelby Tube-1 (ST-1) Lab Pocket Pen. reading = 3.0 tsf. wc = 13.9%. $\gamma_{dry} = 108.7$ pcf.
+527.7	4.0		CLAY (CH) , high plasticity, moist, dark brown.			
			CLAY (CH) , high plasticity, very firm, moist, gray and brown.	133	SS-1 5.0 6.5	Split Spoon-1 (SS-1). 7/9/12 N = 21. qu = 2.8 tsf. wc = 17.6%.
			CLAY (CH) , high plasticity, hard, moist, brown.	100	ST-2 8.0 10.0	Field Pocket Pen. reading = 3.5 tsf. Lab Pocket Pen. reading = >4.5 tsf.

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 531.7		Hole No. C-1		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas			
			SHEET OF 4 SHEETS		2	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+516.7	15.0		CLAY (CH) , high plasticity, moist, dark brown. <i>(continued)</i>			
			CLAY (CL) , low plasticity, very firm, slightly moist, sandy and silty, calcareous, dark yellowish brown and brown.	100	ST-3 15.0 17.0	Field Pocket Pen. reading = 3.5 tsf. Lab Pocket Pen. reading = 4.0 tsf. wc = 17%. $\gamma_{dry} = 109.2$ pcf.
			CLAY (CL) , low plasticity, very firm, slightly moist, silty, light brown.	100	ST-4 20.0 22.0	Field Pocket Pen. reading = 3.5 tsf. Lab Pocket Pen. reading = 3.25 tsf. wc = 16.2%. $\gamma_{dry} = 108.6$ pcf.
			CLAY (CL) , low plasticity, firm, moist, silty, light brown.	100	ST-5 25.0 27.0	Field Pocket Pen. reading = 2.7 tsf. Lab Pocket Pen. reading = 1.5 tsf. wc = 17.6%. $\gamma_{dry} = 109.9$ pcf.
			CLAY (CL) , low plasticity, very soft to soft, moist, silty, light brown.	100	ST-6 30.0 32.0	Pocket Pen. reading = 1.1 tsf. Pocket Pen. reading = 0.25 tsf. wc = 19.3%. $\gamma_{dry} = 108.2$ pcf.

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 531.7		Hole No. C-1		SHEET 3 OF 4 SHEETS	
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas				
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
			CLAY (CL) , low plasticity, very firm, slightly moist, sandy and silty, calcareous, dark yellowish brown and brown. (continued)				
+494.4	37.3						
			SAND (SM-SC) , fine grained, wet seams to very moist, silty and clayey, calcareous, gravels at 56.5 to 57.5 ft-bgs, brown and gray seams. SAND (SM-SC) , fine grained, loose, wet, silty and slightly clayey, tan.	100	SS-2 38.0 39.5	3/2/3 N = 5. wc = 20.8%.	
+492.2	39.5		SAND (SC) , fine grained, loose, wet, clayey, calcareous, tan and light gray.				
			SAND (SC) , fine grained, medium dense, wet, clayey, tan and light gray.	100	SS-3 45.0 46.5	4/3/4 N = 7.	

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 531.7		Hole No. C-1		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 4 OF 4 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			SAND (SC), fine grained, loose, wet, clayey, calcareous, tan and light gray. (continued)	100	SS-4 50.0 51.5	5/6/6 N = 12.
			SAND (SC), fine grained, dense, wet, clayey and slightly gravelly, tan.	100	SS-5 56.0 57.5	10/14/27 N = 41. wc = 16.8%.
+474.2	57.5					<p>Note:</p> <ol style="list-style-type: none"> All HNU reads every foot are 0 (zero). ** Free water at 29.5 ft-bgs, 18 hrs after drilling completion and the hole caved at 30 ft-bgs. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelly tube).
			Boring terminated at 57.5 ft-bgs.			

DRILLING LOG	DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1 OF 3 SHEETS
	1. PROJECT Fort Worth Central City Project		10. SIZE AND TYPE OF BIT * see remarks
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,966,212.0 E 2,324,872.8		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USACE		12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and file number) C-2		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 2 UNDISTURBED 1
5. NAME OF DRILLER Salik, James		14. TOTAL NUMBER CORE BOXES 4	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER 513.1	
7. THICKNESS OF OVERBURDEN 7.0		16. DATE HOLE	STARTED 4/28/2004 COMPLETED 4/28/2004
8. DEPTH DRILLED INTO ROCK 23.0		17. ELEVATION TOP OF HOLE +519.6	
9. TOTAL DEPTH OF HOLE 30.0		18. TOTAL CORE RECOVERY FOR BORING 0 %	
		19. GEOLOGIST RAM	


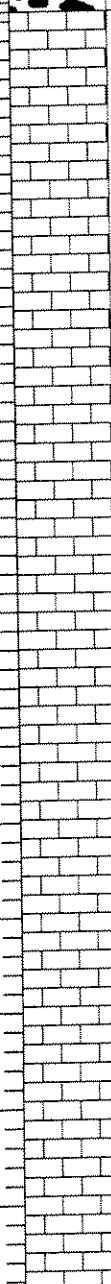
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+519.6	0.0		CLAY (CL), low plasticity, hard, dry, sandy, silty, calcareous.	100	ST-1 0.0 2.0	Shelby Tube-1 (ST-1). Field and Lab Pocket Pen. Reading = >4.5 tsf.
			CLAY (CL), low plasticity, dry, sandy, brown.	100	BS-1 4.0 5.0	Bag Sample-1 (BS-1).
+512.6	7.0		LIMESTONE, mostly unweathered, with minor weathered stains until 13 ft-bgs, massive, very hard (rock classification), well cemented, solid, slightly fossiliferous (shells), scattered low angle slickensided noted, within mostly healed fractures or joints, arenaceous seams scattered, cherty lenses scattered, gray and dark gray, mostly dark gray after 23.3 ft-bgs.	100	Run 1 7.0 11.5	RQD = 89%. Carton-1 (C-1) from 7.8 to 8.9 ft-bgs.
				100	Run 2 11.5 16.5	RQD = 100%. C-2 from 15.7 to 16.5 ft-bgs. wc = 6.7% γ _{dry} = 141.1 pcf.

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 519.6		Hole No. C-2		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 2 OF 3 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			LIMESTONE , mostly unweathered, with minor weathered stains until 13 ft-bgs, massive, very hard (rock classification), well cemented, solid, slightly fossiliferous (shells), scattered low angle slickensided noted, within mostly healed fractures or joints, arenaceous seams scattered, cherty lenses scattered, gray and dark gray, mostly dark gray after 23.3 ft-bgs. (continued)	98	Run 3 16.5 20.5	RQD = 97%.
				88	Run 4 20.5 25.5	RQD = 73%. C-3 from 22.4 to 23.4 ft-bgs.
+494.2	25.4			Shale zones with limestone seams at 23.4 to 25.4 ft-bgs.		
				100	Run 5 25.5 30.0	RQD = 100%. C-4 from 29 to 30 ft-bgs.
+489.6	30.0					
			Boring terminated at 30 ft-bgs.			Note: 1. * Drilling 0 to 7 ft-bgs = 8-in dia. auger, 3-in dia. shelby tube. 7 to 30 ft-bgs = 4-in dia. diamond bit

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 519.6		Hole No. C-2		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 3 OF 3 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
						(core). 2. ** Water noted at 6 to 7 ft-bgs, set 2 ft by 8-in dia. casing and circulation pan. Bail hole after drilling completion. 3. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample. 4. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelby tube).

DRILLING LOG		DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1 OF 3 SHEETS
1. PROJECT Fort Worth Central City Project			10. SIZE AND TYPE OF BIT * see remarks	
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,964,966.6 E 2,324,385.7			11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USACE			12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	
4. HOLE NO. (As shown on drawing title and file number) C-3			13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED: 0 UNDISTURBED: 2	
5. NAME OF DRILLER Salik, James			14. TOTAL NUMBER CORE BOXES 4	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED _____ DEG. FROM VERT.			15. ELEVATION GROUND WATER 519.1	
7. THICKNESS OF OVERBURDEN 18.5			16. DATE HOLE STARTED: 5/12/2004 COMPLETED: 5/13/2004	
8. DEPTH DRILLED INTO ROCK 21.5			17. ELEVATION TOP OF HOLE +530.6	
9. TOTAL DEPTH OF HOLE 40.0			18. TOTAL CORE RECOVERY FOR BORING see remarks %	
			19. GEOLOGIST RAM	

ELEVATION a'	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+530.6	0.0		GRAVEL FILL, coarse to fine grained, dry, very sandy and clayey, calcareous, cobbles to 5-in, dark brown.			
+528.6	2.0		CLAY (CL), low plasticity, moist, slightly sandy to sandy, calcareous, brown to 7 ft-bgs, with gray. CLAY (CL), low plasticity, very firm, moist, dark brown.	100	ST-1 3.0 5.0	Shelby Tube-1 (ST-1). Field and Lab Pocket Pen. reading = 3.5 tsf. wc = 19.5%. $\gamma_{dry} = 106.7$ pcf.
+519.6	11.0		CLAY (CL), low plasticity, firm, moist, sandy, light brown.	100	ST-2 10.0 12.0	Field Pocket Pen. reading = 3.5 tsf. Lab Pocket Pen. reading = 1.5 tsf. wc = 16.4%. $\gamma_{dry} = 111.6$ pcf.
+517.1	13.5		SAND (SC), fine grained, moist to wet, very clayey/ silty, calcareous, light brown.			

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 530.6		Hole No. C-3		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas			
			SHEET 2 OF 3 SHEETS			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			GRAVEL (GW) , coarse to fine grained, up to 3-in dia., very sandy, clay seams, light brown with yellowish brown seams. (continued)			
+512.1	18.5		LIMESTONE , no apparent of weathering, hard/ very hard (rock classification), massive, solid, few scattered slickensided noted after break aged, shaly throughout with thin seams/stringers, shale zone from 36 to 37 ft-bgs, slightly fossiliferous (shells), arenaceous zones, gray/ dark gray.	100	Run 1 19.0 25.0	RQD = 70%. Carton-1 (C-1) from 20.7 to 21.5 ft-bgs. wc = 6.3%. $\gamma_{dry} = 139.8$ pcf. Limestone core lost 1.8-ft-long.
				150	Run 2 25.0 30.0	RQD = 78%. Gain limestone core 1.7-ft-long. C-2 from 28.1 to 28.8 ft-bgs.
				97	Run 3 30.0 35.0	RQD = 97%. C-3 from 32 to 32.9 ft-bgs. wc = 6.4%. $\gamma_{dry} = 143.1$ pcf.

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 530.6		Hole No. C-3		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas			SHEET 3 OF 3 SHEETS
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+497.6	33.0		LIMESTONE, no apparent of weathering, hard/ very hard (rock classification), massive, solid, few scattered slickensided noted after break aged, shaly throughout with thin seams/ stringers, shale zone from 36 to 37 ft-bgs, slightly fossiliferous (shells), arrenaceous zones, gray/ dark gray. (continued) Shale lense.			
			Shale zone from 36 to 37 ft-bgs.	88	Run 4 35.0 40.0	RQD = 88%. C-4 from 38.5 to 39.4 ft-bgs. Limestone core lost 0.6-ft-long.
+493.6	37.0		Thin shale lense.			
+491.1	39.5		Thin shale lense.			
+490.6	40.0		Boring terminated at 40 ft-bgs.			<p>Note:</p> <ol style="list-style-type: none"> All HNU reads every foot are (zero) from 0 to 19 ft-bgs. * Drilling 0 to 19 ft-bgs = 8-in dia. auger, 3-in dia. shelly tube. Auger refusal at 19 ft-bgs, set 9 ft of 8-in casing (drive in due to heavy caving/ gravels, set pan again. 19 to 40 ft-bgs = 4-in dia. core bit. ** Free water first noted at 12 to 13 ft-bgs, after 21 ft-bgs and bailed, overnight check at 11.5 ft-bgs. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelly tube).

DRILLING LOG		DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1 OF 3 SHEETS
1. PROJECT Fort Worth Central City Project			10. SIZE AND TYPE OF BIT * see remarks	
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,964,057.4 E 2,324,508.6			11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USACE			12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	
4. HOLE NO. (As shown on drawing title and file number) C-4			13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED: 2 UNDISTURBED: 1	
5. NAME OF DRILLER Salik, James			14. TOTAL NUMBER CORE BOXES 4	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED _____ DEG. FROM VERT.			15. ELEVATION GROUND WATER 519.6	
7. THICKNESS OF OVERBURDEN 16.0			16. DATE HOLE STARTED: 5/17/2004 COMPLETED: 5/19/2004	
8. DEPTH DRILLED INTO ROCK 24.0			17. ELEVATION TOP OF HOLE +531.8	
9. TOTAL DEPTH OF HOLE 40.2			18. TOTAL CORE RECOVERY FOR BORING see remarks %	
			19. GEOLOGIST RAM	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+531.8	0.0		0.5-ft thick CONCRETE .			
+531.3	0.5		0.6-ft thick GRAVEL BASE , coarse to fine grained, moist, sandy/ clayey, dark brown.			
+530.7	1.1		CLAY (CL) , low plasticity, moist, very silty, dark gray. Probably subbase.			
			CLAY (CL) , low plasticity, very firm, moist, silty.	100	ST-1 4.0 6.0	Shelby Tube-1 (ST-1). Field Pocket Pen. reading = 3.7 tsf. Lab Pocket Pen. reading = 2.75 tsf. wc = 18.5%. $\gamma_{dry} = 108$ pcf
+524.8	7.0		SAND (SC) , fine grained, moist to wet, silty, clay zones, calcareous, dark brown.			
			SAND (SC) , fine grained, medium dense, wet, silty and slightly clayey, light brown. (Bag sample: CLAY (CL) , low plasticity, wet, sandy, brown)	100	SS-1 7 & BS-1 11.0 12.5	Split Spoon-1 (SS-1). 6/5/21 N = 26. Bag Sample-1 (BS-1). 11 to 13 ft-bgs.
+519.3	12.5		GRAVEL (GC) , coarse to fine grained, wet, sandy and clayey, cobbles to 5-in. dia., brown.			


DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 531.8		Hole No. C-4		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas			SHEET 2 OF 3 SHEETS
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+515.8	16.0		GRAVEL (GC), coarse to fine grained, wet, sandy and clayey, cobbles to 5-in. dia., brown. (continued)			
			LIMESTONE, some white weathered staining from 16 to 18 ft-bgs, jointed, massive, mostly no apparent of weathering, hard/ very hard (RX classification) fossiliferous, mostly shell and shaly throughout, (mostly) very thin stringers and seams, shale seams at 29.4 to 29.6 ft-bgs, 30 to 30.3 ft-bgs, 30.8 to 31.4 ft-bgs, 36.4 to 38.5 ft-bgs, very fossiliferous (with Ammonites) after 30 ft-bgs, shale is soft (RX classification), gray/ dark gray.	100	Run 1 16.0 20.0	RQD = 80% Carton-1 (C-1) from 20.2 to 20.9 ft-bgs. wc = 5.2% $\gamma_{dry} = 143.3$ pcf
				100	Run 2 22.0 27.0	RQD = 100% C-2 from 25.5 to 26.5 ft-bgs. wc = 6.0% $\gamma_{dry} = 144.6$ pcf
				94	Run 3 27.0 32.0	RQD = 86%.
+502.2	29.6		Shale seams from 29.4 to 29.6 ft-bgs.			
+501.5	30.3		Shale seams from 30 to 30.3 ft-bgs.			
+500.4	31.4		Shale seams from 30.8 to 31.4 ft-bgs.			

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 531.8		Hole No. C-4		SHEET 3 OF 3 SHEETS	
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas				
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
			LIMESTONE, some white weathered staining from 16 to 18 ft-bgs, jointed, massive, mostly no apparent of weathering, hard/ very hard (RX classification) fossiliferous, mostly shell and shaly throughout, (mostly) very thin stringers and seams, shale seams at 29.4 to 29.6 ft-bgs, 30 to 30.3 ft-bgs, 30.8 to 31.4 ft-bgs, 36.4 to 38.5 ft-bgs, very fossiliferous (with Ammonites) after 30 ft-bgs, shale is soft (RX classification), gray/ dark gray. (continued)	100	Run 4 32.0 36.0	RQD = 100%. C-3 from 31.9 to 32.7 ft-bgs.	
				Shale seams from 36.4 to 38.5 ft-bgs.	125	Run 5 36.0 40.0	RQD = 100%. C-4 from 37.6 to 38.5 ft-bgs.
+493.3	38.5						
+491.6	40.2						
			Boring terminated at 40.2 ft-bgs.			<p>Note:</p> <ol style="list-style-type: none"> * Drilling 0 to 0.5 ft-bgs = 10-in dia. core. 0.5 to 2 ft-bgs - 8-in dia. auger. Set 2 ft of 8-in dia. casing. 2 to 16 ft-bgs = 7 7/8-in dia. auger. pull 2 ft casing. Set at 16 ft-bgs 8-in dia. casing, pan and mud. 16 to 40 ft-bgs = 4-in dia. core bit, bail hole after drilling completion. ** 18 hours ground water level check at 12.2 ft-bgs. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the Shelby tube). 	

DRILLING LOG		DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1 OF 3 SHEETS
1. PROJECT Fort Worth Central City Project			10. SIZE AND TYPE OF BIT * see remarks	
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,963,055.6 E 2,323,782.4			11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USACE			12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	
4. HOLE NO. (As shown on drawing title and file number) C-6			13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED: 1 UNDISTURBED: 6	
5. NAME OF DRILLER Salik, James			14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.			15. ELEVATION GROUND WATER 517.6	
7. THICKNESS OF OVERBURDEN -			16. DATE HOLE STARTED: 5/6/2004 COMPLETED: 5/6/2004	
8. DEPTH DRILLED INTO ROCK -			17. ELEVATION TOP OF HOLE +525.7	
9. TOTAL DEPTH OF HOLE 40.0			18. TOTAL CORE RECOVERY FOR BORING 0 %	
			19. GEOLOGIST RAM	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+525.7	0.0		<u>SAND (SP)</u> , fine grained, damp, silty, calcareous, brown.			
+521.2	4.5		<u>CLAY (CL)</u> , low plasticity, medium to firm, moist, moist with thin wet seams at 26 ft-bgs, sandy, silty, calcareous, sand zones at 18 to 21 ft-bgs, dark brown, dark brown to yellowish brown after 25 ft-bgs, <u>CLAY (CL)</u> , low plasticity, moist, silty, light gray and brown.	100	ST-1 5.0 7.0	Shelby Tube-1 (ST-1). Field Pocket Pen. reading = 2.0 tsf. Lab Pocket Pen. reading = 1.0 tsf. wc = 27.2%. $\gamma_{dry} = 96.6$ pcf.
			<u>CLAY (CL)</u> , low plasticity, firm, moist, silty, gray and brown.	100	ST-2 12.0 14.0	Field Pocket Pen. reading = 2.0 tsf. Lab Pocket Pen. reading = 1.75 tsf. wc = 28%. $\gamma_{dry} = 98.7$ pcf.



DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 525.7		Hole No. C-6		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 2 OF 3 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			<u>CLAY (CL)</u> , low plasticity, medium to firm, moist, moist with thin wet seams at 26 ft-bgs, sandy, silty, calcareous, sand zones at 18 to 21 ft-bgs, dark brown, dark brown to yellowish brown after 25 ft-bgs, (continued)			
			<u>CLAY (CL)</u> , low plasticity, medium, moist, sandy, grayish brown.	100	ST-3 & BS-1 17.0 19.0	Shelby Tube-1 (ST-1) . Lab Pocket Pen. reading = 0.75 tsf. Bag Sample-1 (BS-1).
			<u>CLAY (CL)</u> , low plasticity, firm, sandy, light brown.	100	ST-4 24.0 26.0	Field Pocket Pen. reading = 2.7 tsf. Lab Pocket Pen. reading = 1.5 tsf. wc = 20.3%. $\gamma_{dry} = 107$ pcf.
			<u>CLAY (CL)</u> , low plasticity, medium, sandy, gray and brown.	100	ST-5 31.0 33.0	Field Pocket Pen. reading = 3.0 tsf. Lab Pocket Pen. reading = 0.75 tsf. wc = 19.8%. $\gamma_{dry} = 108$ pcf.

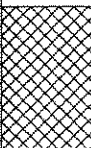

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 525.7		Hole No. C-6		SHEET 3 OF 3 SHEETS	
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas				
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
+492.7	33.0		SAND (SC), mostly medium to fine grained, with both fine seams and coarse to fine seams, wet to moist, very clayey and silty, gravels at 37 to 38 ft-bgs, calcareous, dark yellowish brown.				
+487.7	38.0		Gravel at 37 to 38 ft-bgs.				
+485.7	40.0		SAND (SC), fine grained, loose to very loose, moist, clayey, gray.		100	ST-6 38.0 40.0	Field Pocket Pen. reading = 2.0 tsf. Lab Pocket Pen. reading = 0.5 tsf.
			Boring terminated at 40 ft-bgs.			<p>Note:</p> <ol style="list-style-type: none"> All HNU read every foot are 0 (zero) * Drilling 0 to 40 ft-bgs = 8-in dia. auger with 3-in dia. shelly tube. Bailed hole after completion. ** Free water at 8.1 ft-bgs 18 hrs after drilling completion. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelly tube). 	

DRILLING LOG		DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1 OF 3 SHEETS
1. PROJECT Fort Worth Central City Project			10. SIZE AND TYPE OF BIT * see remarks	
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,962,454.8 E 2,323,446.0			11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USACE			12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	
4. HOLE NO. (As shown on drawing title and file number) C-7			13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED: 0 UNDISTURBED: 6	
5. NAME OF DRILLER Salik, James			14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.			15. ELEVATION GROUND WATER 521.6	
7. THICKNESS OF OVERBURDEN -			16. DATE HOLE STARTED 5/11/2004 COMPLETED 5/12/2004	
8. DEPTH DRILLED INTO ROCK -			17. ELEVATION TOP OF HOLE +534.1	
9. TOTAL DEPTH OF HOLE 40.0			18. TOTAL CORE RECOVERY FOR BORING 0 %	
			19. GEOLOGIST RAM	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+534.1	0.0		CLAY (CL), low plasticity, wet with moist seams, slightly sandy to very sandy/ silty, sand seams after 14 ft-bgs, calcareous, dark brown to brown by 6 ft-bgs.			Field Pocket Pen. reading = 3.5 tsf. Lab Pocket Pen. reading = 2.0 tsf. wc = 17.7%. $\gamma_{dry} = 108.1$ pcf.
			CLAY (CL), low plasticity, firm to very firm, wet, silty, brown.	100	ST-1 2.0 4.0	
+524.1	10.0		CLAY (CL), low plasticity, very firm, wet, sandy, brown.	100	ST-2 10.0 12.0	Field Pocket Pen. reading = 4.0 tsf. Lab Pocket Pen. reading = 3.5 tsf. wc = 19.0%. $\gamma_{dry} = 109.7$ pcf.

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 534.1		Hole No. C-7		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 2 OF 3 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+517.1	17.0		CLAY (CL), low plasticity, very firm, wet, sandy, brown. (continued)			
+510.1	24.0		CLAY (CL), low plasticity, firm, wet, silty, light brown.	100	ST-3 17.0 19.0	Field and Lab Pocket Pen. reading = 1.5 tsf. wc = 21.5%. $\gamma_{dry} = 105.9$ pcf.
+504.1	30.0		CLAY (CL), low plasticity, firm, wet, brown.	100	ST-4 24.0 26.0	Field Pocket Pen. reading = 2.0 tsf. Lab Pocket Pen. reading = 1.75 tsf. wc = 19.4%. $\gamma_{dry} = 109.6$ pcf.
			SAND (SC), mostly fine grained, wet/moist, very silty, clayey, very clayey at 36 to 40 ft-bgs, calcareous, gray.			
			SAND (SC), fine grained, loose to medium dense, wet, clayey, gray and tan.	100	ST-5 31.0 33.0	Field Pocket Pen. reading = 3.5 tsf. Lab Pocket Pen. reading = 1.5 tsf. wc = 18.9%. $\gamma_{dry} = 102.4$ pcf.

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 534.1		Hole No. C-7		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 3 OF 3 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+498.1	36.0		SAND (SC) , mostly fine grained, wet/moist, very silty, clayey, very clayey at 36 to 40 ft-bgs, calcareous, gray. (continued)			
+494.1	40.0		CLAY (CL) , low plasticity, wet, sandy, gray. CLAY (CL) , low plasticity, very soft, wet, sandy and slightly silty, tan.	100	ST-6 38.0 40.0	Field Pocket Pen. reading = 1.0 tsf. Lab Pocket Pen. reading = <0.25 tsf.
			Boring terminated at 40 ft-bgs.			<p>Note:</p> <ol style="list-style-type: none"> All HNU reads every foot are 0 (zero). * Drilling 0 to 40 ft-bgs = 8-in dia. auger and 3-in dia. shelby tube. ** Free water first noted at 13 to 14 ft-bgs. After 18 hrs the ground water at 12.5 ft-bgs and hole caved up to 16 ft-bgs. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelby tube).

DRILLING LOG		DIVISION SWD		INSTALLATION Ft. Worth, Tarrant County, Texas			SHEET 1 OF 3 SHEETS	
1. PROJECT Fort Worth Central City Project				10. SIZE AND TYPE OF BIT * see remarks				
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,960,886.0 E 2,322,996.1				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL				
3. DRILLING AGENCY USACE				12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500				
4. HOLE NO. (As shown on drawing title and file number) C-8				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 0		UNDISTURBED 6
5. NAME OF DRILLER Saik, James				14. TOTAL NUMBER CORE BOXES 0				
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER 522.7		16. DATE HOLE STARTED COMPLETED 5/11/2004 5/11/2004		
7. THICKNESS OF OVERBURDEN -				17. ELEVATION TOP OF HOLE +535.5				
8. DEPTH DRILLED INTO ROCK -				18. TOTAL CORE RECOVERY FOR BORING 0 %				
9. TOTAL DEPTH OF HOLE 40.0				19. GEOLOGIST RAM				
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g		
+535.5	0.0		GRAVEL/ CLAY FILL, dry, dark brown.					
+534.0	1.5		CLAY (CL), low plasticity, moist, slightly sandy, silty, calcareous, dark brown.					
			CLAY (CL), low plasticity, hard, moist, sandy, brown.	100	ST-1 4.0 6.0	Shelby Tube-1 (ST-1) Field Pocket Pen. reading = 3.7 tsf. Lab Pocket Pen. reading = >4.5 tsf. wc = 16.6%. $\gamma_{dry} = 112.6$ pcf.		
			CLAY (CL), low plasticity, very firm, moist, sandy, reddish brown.	100	ST-2 11.0 13.0	Field Pocket Pen. reading = 2.2 tsf. Lab Pocket Pen. reading = 2.25 tsf. wc = 18.8%. $\gamma_{dry} = 107.9$ pcf.		

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE
535.5

Hole No. C-8

PROJECT
Fort Worth Central City Project

INSTALLATION
Ft. Worth, Tarrant County, Texas

SHEET 2
OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
		[Hatched Pattern]	<u>CLAY (CL)</u> , low plasticity, moist, slightly sandy, silty, calcareous, dark brown. (continued)			
+517.5	18.0	[Hatched Pattern]	<u>CLAY (CL)</u> , low plasticity, medium to firm, moist, silty, brown.	100	ST-3 18.0 20.0	Field Pocket Pen. reading = 2.2 tsf. Lab Pocket Pen. reading = 1.25 tsf. wc = 21.5%. $\gamma_{dry} = 107.3$ pcf.
		[Hatched Pattern]	<u>CLAY (CL)</u> , low plasticity, medium to firm, moist, silty, brown.	100	ST-4 25.0 27.0	Field Pocket Pen. reading = 2.2 tsf. Lab Pocket Pen. reading = 1.0 tsf. wc = 21.6%. $\gamma_{dry} = 103.8$ pcf.

DRILLING LOG (Cont Sheet)


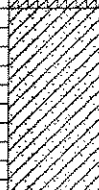
ELEVATION TOP OF HOLE
535.5

Hole No. C-8

PROJECT
Fort Worth Central City Project

INSTALLATION
Ft. Worth, Tarrant County, Texas

SHEET 3
OF 3 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			<p><u>CLAY (CL)</u>, low plasticity, medium to firm, moist, silty, brown. <i>(continued)</i> <u>CLAY (CL)</u>, low plasticity, moist, silty, gray and brown.</p>	100	ST-5 32.0 34.0	Field Pocket Pen. reading = 1.1 tsf. Lab Pocket Pen. reading = 0.5 tsf.
+497.5	38.0		<u>SAND (SC)</u> , fine grained, wet, clayey, slightly silty, calcareous, light brown and tan.	100	ST-6 38.0 40.0	Field Pocket Pen. reading = >4.5 tsf. Lab Pocket Pen. reading = 2.0 tsf. wc = 24%. $\gamma_{dry} = 100.1$ pcf.
+495.5	40.0		Boring terminated at 40 ft-bgs.			<p>Note:</p> <ol style="list-style-type: none"> All HNU reading every foot are 0 (zero). * Drilling 0 to 40 ft-bgs = 8-in dia. auger, 3-in dia. shelly tube. Bailed hole after drilling completion. ** Free water at 12.8 ft-bgs. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelly tube).

DRILLING LOG		DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1 OF 3 SHEETS
1. PROJECT Fort Worth Central City Project			10. SIZE AND TYPE OF BIT * see remarks	
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,959,701.9 E 2,322,926.7			11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USACE			12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	
4. HOLE NO. (As shown on drawing title and file number) C-9			13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN : 1 : 4	
5. NAME OF DRILLER Salik, James			14. TOTAL NUMBER CORE BOXES : 0	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.			15. ELEVATION GROUND WATER : 523.0	
7. THICKNESS OF OVERBURDEN : -			16. DATE HOLE : STARTED : COMPLETED 5/10/2004 : 5/10/2004	
8. DEPTH DRILLED INTO ROCK : -			17. ELEVATION TOP OF HOLE : +537.5	
9. TOTAL DEPTH OF HOLE : 40.0			18. TOTAL CORE RECOVERY FOR BORING : 0 %	
			19. GEOLOGIST RAM	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+537.5	0.0		CLAY (CL), low plasticity, moist, slightly sandy and silty, calcareous, dark brown.			Shelby Tube-1 (ST-1) Field and Lab Pocket Pen. reading => 4.5 tsf. wc = 18.1%. γ _{dry} = 109.9 pcf.
			CLAY (CL), low plasticity, hard, moist, dark gray.	100	ST-1 1.0 3.0	
+532.5	5.0		CLAY (CH-CL), high to low plasticity, dry to moist by 12 ft-bgs, wet by 17 to 18 ft-bgs, sandy, silty, calcareous, brown to yellowish brown.			Bag Sample-1 (BS-1).
			CLAY (CL-CH), low to high plasticity, dry to moist, slightly sandy, light brown.	100	BS-1 8.0 11.0	

DRILLING LOG (Cont Sheet)



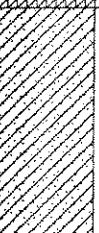
ELEVATION TOP OF HOLE
537.5

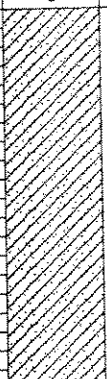

Hole No. C-9

PROJECT
Fort Worth Central City Project

INSTALLATION
Ft. Worth, Tarrant County, Texas

SHEET 2
OF 3 SHEETS



ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+522.5	15.0		CLAY (CL) , low plasticity, firm, wet, silty, light brown to brown.	100	ST-2 15.0 17.0	Field Pocket Pen. reading = 2.3 tsf. Lab Pocket Pen. reading = 1.5 tsf. wc = 18.8%. $\gamma_{dry} = 110.8$ pcf.
			CLAY (CL) , low plasticity, firm, wet, silty, calcareous, brown.	100	ST-3 22.0 24.0	Field Pocket Pen. reading = 2.5 tsf. Lab Pocket Pen. reading = 1.25 tsf. wc = 20.3%. $\gamma_{dry} = 107$ pcf.
+508.0	29.5		SAND (SC) , fine grained, wet, very clayey, silty, calcareous, yellowish brown. SAND (SC) , fine grained, very loose, wet, clayey, light brown.	100	ST-4 30.0 32.0	Field Pocket Pen. reading = 2.5 tsf. Lab Pocket Pen. reading = 0.25 tsf. wc = 20.7%. $\gamma_{dry} = 104.1$ pcf.

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 537.5		Hole No. C-9		SHEET 3 OF 3 SHEETS	
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas				
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
			SAND (SC), fine grained, wet, very clayey, silty, calcareous, yellowish brown. (continued)				
+501.5	36.0						
			GRAVEL (GP), coarse to fine, very dense, moist/ wet, very sandy, silty/ clayey, light brown.	100	SS-1 36.0 37.5	Split Spoon-1 (SS-1). 23/28/35 N = 62.	
+497.5	40.0						
			Boring terminated at 40 ft-bgs.			<p>Note:</p> <ol style="list-style-type: none"> * Drilling 0 to 40 ft-bgs = 8-in dia. auger, 3-in dia. shelly tube. Bail hole afterdrilling completion. ** Free water at 14.5 ft-bgs. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelly tube). 	

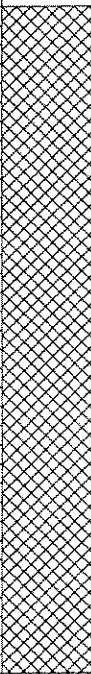

DRILLING LOG		DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1 OF 3 SHEETS
1. PROJECT Fort Worth Central City Project			10. SIZE AND TYPE OF BIT * see remarks	
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,958,514.3 E 2,323,074.0			11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USACE			12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	
4. HOLE NO. (As shown on drawing title and file number) C-10			13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN : 1 : 5	
5. NAME OF DRILLER Salik, James			14. TOTAL NUMBER CORE BOXES : 0	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.			15. ELEVATION GROUND WATER : 519.3	
7. THICKNESS OF OVERBURDEN : -			16. DATE HOLE : STARTED : COMPLETED 5/3/2004 : 5/3/2004	
8. DEPTH DRILLED INTO ROCK : -			17. ELEVATION TOP OF HOLE : +531.3	
9. TOTAL DEPTH OF HOLE : 40.0			18. TOTAL CORE RECOVERY FOR BORING : 0 %	
			19. GEOLOGIST RAM	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+531.3	0.0		SAND (SC), fine grained, moist, very clayey, silty, calcareous, dark brown.			
			SAND (SC), fine grained, medium dense, moist, clayey, brown.	100	ST-1 3.0 5.0	Shelby Tube-1 (ST-1). Field Pocket Pen. reading = 4.2 tsf. Lab Pocket Pen. reading = 2.25 tsf. wc = 16.2%. $\gamma_{dry} = 107.7$ pcf.
+524.3	7.0		SAND (SC-SM), fine grained, very moist, very silty/ clayey with clay seams, calcareous, dark gray.			
			SAND (SC-SM), coarse to fine grained, very loose to loose, wet, silty/ clayey, calcareous, fine gravels (throughout), dark brown and brown.	100	ST-2 10.0 12.0	Field Pocket Pen. reading = 0.6 tsf. Lab Pocket Pen. reading = 0.5 tsf. wc = 23.5%. $\gamma_{dry} = 99.6$ pcf.
+517.3	14.0					

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 531.3		Hole No. C-10		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas			SHEET 2 OF 3 SHEETS
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+512.8	18.5		GRAVEL (GC), coarse to fine grained, cobbles (up to 4-in), dense, wet, sandy/ silty and slightly clayey, gray.	133	SS-1 14.0 15.5	Split Spoon-1 (SS-1). 16/19/29 N = 48.
						Chemical odor at 15 to 15.5 ft-bgs, PID read at 15.5 ft-bgs = up to 1.4 ppm. All other HNU readings taken every foot were 0 (zero).
			CLAY (CL), low plasticity, moist, sandy/ silty, calcareous, gray and yellowish brown.			
			CLAY (CL), low plasticity, medium, moist, silty, brown.	100	ST-3 20.0 22.0	Field Pocket Pen. reading = 1.5 tsf. Lab Pocket Pen. reading = 0.75 tsf. wc = 24.5%. $\gamma_{dry} = 100.3$ pcf.
			CLAY (CL), low plasticity, very soft to soft, sandy, light brown.	100	ST-4 27.0 29.0	Field Pocket Pen. reading = 1.7 tsf. Lab Pocket Pen. reading = 0.25 tsf. wc = 24.5%. $\gamma_{dry} = 102.9$ pcf.

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 531.3		Hole No. C-10		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 3 OF 3 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+495.3	36.0		CLAY (CL) , low plasticity, moist, sandy/silty, calcareous, gray and yellowish brown. (continued)			
+491.3	40.0		GRAVEL (SM-GM) , coarse to fine grained, loose, moist/ wet, sandy/ silty, clayey zones, sand seams, calcareous, wood fragments, scattered clay seams, light brown and gray.	100	ST-5 36.0 38.0	Field Pocket Pen. reading = 2.7 tsf. Lab Pocket Pen. reading = 0.75 tsf.
			Boring terminated at 40 ft-bgs.			<p>Material got abruptly hard at 39 to 40 ft-bgs could be weathered rock.</p> <p>Note:</p> <ol style="list-style-type: none"> * Drilling 0 to 19 ft-bgs = 8-in dia. auger, 3-in dia. shelly tube. Set 2 ft of 8-in dia. casing and pan/ mud. 19 to 40 ft-bgs fishtail = all above with 2-in spoons and 3-in dia. shelly tube. Bail hole after drilling completion. ** Free water noted at 12 ft-bgs. Sand caved to 12.5 ft-bgs. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelly tube).

DRILLING LOG	DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1 OF 5 SHEETS
	1. PROJECT Fort Worth Central City Project		10. SIZE AND TYPE OF BIT * see remarks
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,970,018.4 E 2,326,801.1		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USACE		12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	
4. HOLE NO. (As shown on drawing title and file number) D-1		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 2 UNDISTURBED 2
5. NAME OF DRILLER Saik, James		14. TOTAL NUMBER CORE BOXES 1	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER 498.6	
7. THICKNESS OF OVERBURDEN 53.0		16. DATE HOLE STARTED 5/24/2004 COMPLETED 5/26/2004	
8. DEPTH DRILLED INTO ROCK 8.0		17. ELEVATION TOP OF HOLE +522.6	
9. TOTAL DEPTH OF HOLE 61.0		18. TOTAL CORE RECOVERY FOR BORING see remarks %	
		19. GEOLOGIST RAM	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+522.6	0.0		GRAVEL FILL , coarse to fine grained, dry, sandy/ silty, brown to dark brown.			
+515.6	7.0		CLAY (CL) , low plasticity, moist, sandy, slightly silty, gray to brown and gray. CLAY (CL) , low plasticity, very firm, moist, sandy, slightly silty, gray and tan.	133	ST-1 8.0 9.5	Shelby Tube-1 (ST-1). Field Pocket Pen. reading = >4.5 tsf. Lab Pocket Pen. reading = 2.75 tsf. wc = 18.3%.

DRILLING LOG (Cont Sheet)


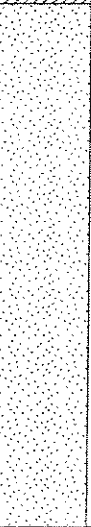

ELEVATION TOP OF HOLE
522.6

Hole No. D-1

PROJECT
Fort Worth Central City Project

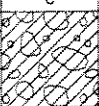
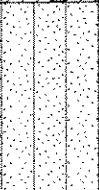
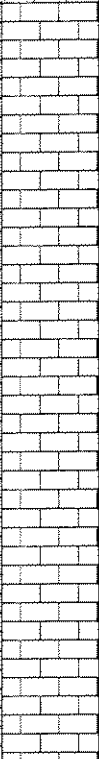
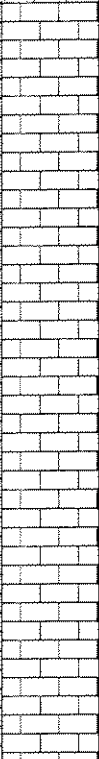
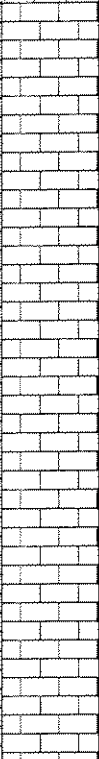


INSTALLATION
Ft. Worth, Tarrant County, Texas

SHEET 2
OF 5 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+505.6	17.0		<p><u>CLAY (CL)</u>, low plasticity, moist, sandy, slightly silty, gray to brown and gray. (continued)</p> <p><u>CLAY (CL)</u>, low plasticity, very firm to hard, moist, sandy, brown and gray.</p>	100	ST-2 15.0 17.0	Field Pocket Pen. reading = >4.5 tsf. Lab Pocket Pen. reading = 3.25 tsf. wc = 16.4%.
+500.1	22.5		<u>SAND</u> , fine grained, moist, very silty, clayey to very clayey with clay seams, calcareous, gray to brown-gray.			
			<u>GRAVEL (GC)</u> , coarse to fine grained, cobbles to 6-in dia. from hole, boulders noted by drill action, very moist to wet, very sandy, slightly clayey zones, brown.			



DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 522.6		Hole No. D-1		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 3 OF 5 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			GRAVEL (GC) , coarse to fine grained, cobbles to 6-in dia. from hole, boulders noted by drill action, very moist to wet, very sandy, slightly clayey zones, brown. <i>(continued)</i>			
			GRAVEL (GC) , fine to coarse grained, wet, light brown and gray.			
			Attempted rock coring from 36 to 41 ft-bgs but no recovery, possible large boulder.	0	Run 1 36.0 41.0	RQD = 0% (Attempted rock coring)
			GRAVEL (GC) , coarse to fine grained, moist/ wet, very silty, clayey, dark gray.			
			GRAVEL (GC) , coarse to fine grained, medium dense, wet, sandy, slightly clayey, gray.	56	SS-1 41.0 42.5	Split Spoon-1 (SS-1). 6/11/14 N = 25 wc = 13.8%
		Attempted rock coring from 47 to 51 ft-bgs but no recovery, possible another large boulder.	0	Run 2 47.0 51.0	RQD = 0% (Attempted rock coring)	

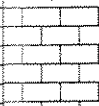
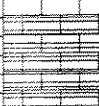
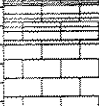
DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 522.6		Hole No. D-1		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas			SHEET 4 OF 5 SHEETS
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+471.6	51.0					
			SAND (SM) , fine grained, very dense, moist/ wet, gravelly and slightly silty, tan.	36	SS-2 51.0 52.4	15/30/50/1" N = 50/1" wc = 10%
+469.6	53.0					
			LIMESTONE , no apparent of weathering, massive, few fossil shells, hard/ very hard (RX classification) and well cemented, scattered open joints, light gray, gray to dark gray. Becomes light gray from 53.6 to 54.5 ft-bgs.	97	Run 3 53.0 56.0	RQD = 97% Carton-1 (C-1) from 53.6 to 54.5 ft-bgs. wc = 5.7%. $\gamma_{dry} = 144$ pcf.
				100	Run 4 56.0 61.0	RQD = 100%
+461.6	61.0					
			Boring terminated at 61 ft-bgs.			<p>Note:</p> <ol style="list-style-type: none"> All HNU reading every foot are 0 (zero). * Drilling 0 to 33 ft-bgs - 8-in auger with 3-in dia. shelby tube. Heavy caving after 30 ft-bgs. Set casing and circulation pan/ mud. 30 to 36 ft-bgs - 7 7/8" RX bit. 36 to 41 ft-bgs - 4-in dia. core bit, mistook large boulder. 41 to 47 ft-bgs - 7 7/8" RX bit and 2-in dia. spoon. 47 to 51 ft-bgs - 4-in dia. core bit. 51 to 53 ft-bgs - 7 7/8" RX bit. 53 to 61 ft-bgs - 4-in. dia core bit. Auger refusal at 22 ft-bgs. ** Water at 24 ft-bgs, 18 hrs after drilling completion. Set well after drilling completion and 24 hrs water reading. See well diagram for detail.

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 522.6		Hole No. D-1		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 5 OF 5 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
						<p>6. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Peneterometer reading is average of reading throughout 2 ft sample.</p> <p>7. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelby tube).</p>

DRILLING LOG	DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1
			OF 3 SHEETS
1. PROJECT Fort Worth Central City Project		10. SIZE AND TYPE OF BIT * see remarks	
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,970,464.6 E 2,326,766.0		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USACE		12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	
4. HOLE NO. (As shown on drawing title and file number) D-2		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 2 UNDISTURBED 1
5. NAME OF DRILLER Salik, James		14. TOTAL NUMBER CORE BOXES 1	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER 513.1	
7. THICKNESS OF OVERBURDEN 17.0		16. DATE HOLE	STARTED 5/26/2004 COMPLETED 6/1/2004
8. DEPTH DRILLED INTO ROCK 20.0		17. ELEVATION TOP OF HOLE +527.5	
9. TOTAL DEPTH OF HOLE 37.0		18. TOTAL CORE RECOVERY FOR BORING see remarks %	
		19. GEOLOGIST RAM	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+527.5	0.0		CLAY FILL (CL) , high plasticity, dry, slightly sandy and silty, brick debris, dark brown. Gravelly from 0 to 2 ft-bgs.			
			CLAY (CH) , high plasticity, hard, dry, slightly sandy, dark gray and brown.	100	ST-1 3.5 5.5	Shelby Tube-1 (ST-1) Field and Lab Pocket Pen. reading = >4.5 tsf. wc = 13.5%.
+521.9	5.6		SAND (SM) , coarse to fine grained, dry, very silty, gravelly (by 9 ft-bgs), yellowish brown with light gray and dark brown.			
			SAND (SM) , fine grained, very dense, dry, silty, tan.	75	SS-1 9.0 10.5	Split Spoon-1 (SS-1) 12/27/50/1.5" N = 50/1.5" wc = 5.5%.
+517.0	10.5		GRAVEL (GC) , coarse to fine grained, cobbles up to 6-in dia., moist/ wet, very sandy, silty, light brown and yellowish brown.	11	BS-1 10.5 15.0	Bag Sample-1 (BS-1). wc = 5.0%.

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 527.5		Hole No. D-2		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas			SHEET 2 OF 3 SHEETS
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			GRAVEL (GC) , coarse to fine grained, cobbles up to 6-in dia., moist/ wet, very sandy, silty, light brown and yellowish brown. (continued)			
+510.5	17.0					
+510.1	17.4		LIMESTONE , some weathered staining at 17 to 17.2 ft-bgs, followed by unweathered, massive, mostly hard/ very hard (RX classification) and well cemented with soft (RX classification) shale stringers/ seams (all less than 0.2-in thick), arenaceous zones, slightly fossiliferous, shale seams at 17.2 to 17.4 ft-bgs, tight joints/ fractures scattered throughout, shale seams at 33.4 to 33.8 ft-bgs, 34 to 34.6 ft-bgs, gray and dark gray. Shale seams.	100	Run 1 17.0 18.2	RQD = 100%. Carton-1 (C-1) from 17.4 to 18.2 ft-bgs. wc = 2.2%. $\gamma_{dry} = 143.9$ pcf.
				98	Run 2 18.2 23.5	RQD = 98%.
				100	Run 3 23.5 28.0	RQD = 100%. C-2 from 24.9 to 25.7 ft-bgs.
				90	Run 4 28.0 33.0	RQD = 78% C-3 from 30.5 to 31.4 ft-bgs Limestone core lost 0.5-ft-long.

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 527.5		Hole No. D-2		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 3 OF 3 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+493.5	34.0		LIMESTONE , some weathered staining at 17 to 17.2 ft-bgs, followed by unweathered, massive, mostly hard/ very hard (RX classification) and well cemented with soft (RX classification) shale stringers/ seams (all less than 0.2-in thick), arenaceous zones, slightly fossiliferous, shale seams at 17.2 to 17.4 ft-bgs, tight joints/ fractures scattered throughout, shale seams at 33.4 to 33.8 ft-bgs, 34 to 34.6 ft-bgs, gray and dark gray. (continued) Shale seams. Shale seams.	98	Run 5 33.0 37.0	RQD = 98%. C-4 from 33.2 to 34 ft-bgs. Limestone core lost 0.1-ft-long. Note: Material dries to white.
+492.9	34.6					
+490.5	37.0					
			Boring terminated at 37 ft-bgs.			Note: 1. All HNU reading every foot are 0 (zero). 2. * Drilling 0 to 17 ft-bgs = 8-in dia. auger. Auger refusal at 17 ft-bgs. Open hole with 10-in dia. auger at 17 ft-bgs. 8-in dia. casing, pan, and mud. 17 to 37 ft-bgs = 4-in dia. core bit. 3. ** Free water first noted at 14 to 15 ft-bgs. 24 hrs after drilling completion water at 14.4 ft-bgs. 4. Set well after drilling completion and last water reading. See well diagram for detail. 5. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample. 6. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelly tube).

DRILLING LOG	DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1 OF 4 SHEETS
1. PROJECT Fort Worth Central City Project		10. SIZE AND TYPE OF BIT * see remarks	
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,965,895.9 E 2,325,899.0		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY USACE		12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	
4. HOLE NO. (As shown on drawing title and file number) F-1		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED: 3 UNDISTURBED: 5	
5. NAME OF DRILLER Salik, James		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED DEG. FROM VERT. --- ---		15. ELEVATION GROUND WATER 506.5	
7. THICKNESS OF OVERBURDEN -		16. DATE HOLE STARTED: 4/27/2004 COMPLETED: 4/27/2004	
8. DEPTH DRILLED INTO ROCK -		17. ELEVATION TOP OF HOLE +526.8	
9. TOTAL DEPTH OF HOLE 49.0		18. TOTAL CORE RECOVERY FOR BORING 0 %	
		19. GEOLOGIST RAM	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+526.8	0.0		CLAY (CL) , low plasticity, very firm, dry, very sandy and gravelly, calcareous, dark brown and brown.	100	ST-1 0.0 2.0	Shelby Tube-1 (ST-1) Field Pocket Pen. reading = 4.5 tsf. Lab Pocket Pen. reading = 2.75 tsf wc = 13.5%. $\gamma_{dry} = 115.7$ pcf.
			CLAY (CL) , low plasticity, hard, slightly moist, sandy, brown.	100	ST-2 7.0 9.0	Field Pocket Pen. reading = 4.5 tsf. Lab Pocket Pen reading =>4.5 tsf. wc = 16.3%. $\gamma_{dry} = 112.5$ pcf.

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 526.8		Hole No. F-1		SHEET 2 OF 4 SHEETS	
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas				
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	
			CLAY (CL) , low plasticity, very firm, dry, very sandy and gravelly, calcareous, dark brown and brown. (continued)				
			CLAY (CL) , low plasticity, very soft to soft, slightly moist, sandy, brown.	100	ST-3 15.0 17.0	Field Pocket Pen. reading = 2.5 tsf. Lab Pocket Pen reading = 0.5 tsf.	
			Wet zones at 19.5 to 21 ft-bgs.				
			CLAY (CL) , low plasticity, very firm, slightly moist to wet, sandy, brown.	100	ST-4 22.0 24.0	Field Pocket Pen. reading = 1.5 tsf. Lab Pocket Pen reading = 2.75 tsf.	
			CLAY (CL) , low plasticity, very soft, wet, sandy, light brown.	100	ST-5 30.0 32.0	Field Pocket Pen. reading = 0.75 tsf. Lab Pocket Pen reading = 0.5 tsf. wc = 20.3%.	

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 526.8		Hole No. F-1		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 3 OF 4 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			<u>CLAY (CL)</u> , low plasticity, very firm, dry, very sandy and gravelly, calcareous, dark brown and brown. (continued)			
			<u>CLAY (CL)</u> , low plasticity, medium, wet, slightly sandy, light brown.	67	SS-1 34.0 35.5	Split Spoon-1 (SS-1) 2/3/4 N = 7. qu = 0.9 tsf. wc = 20.6%.
			<u>CLAY (CL)</u> , low plasticity, firm, wet, sandy, brown.	67	SS-2 39.0 40.5	6/5/7 N = 11. qu = 1.4 tsf.
			<u>CLAY (CL)</u> , low plasticity, wet, sandy, light gray and brown.	67	SS-3 43.5 45.0	1/5/4 N = 9. qu = 1.1 tsf.
+481.8	45.0					
			<u>SAND (SM)</u> , fine grained with some medium/ coarse grained, very moist, wet, very clayey and silty, calcareous, gravel seams (up to 1.5-in dia.) and generally less than 0.5-ft-thick scattered after 40 ft-bgs, denser gravel zones after 48 ft-bgs, yellowish brown and gray seams.			
+478.3	48.5					
+477.8	49.0		<u>GRAVEL (GP)</u> , very dense. Split spoon refusal, no recovery, possible limestone formation started at this depth.	0	SS-4 48.5 54.5	50/0" (Auger refusal) N = 50/0" Note: 1. All HNU reading every foot are 0 (zero).

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE
526.8

Hole No. F-1

PROJECT
Fort Worth Central City Project

INSTALLATION
Ft. Worth, Tarrant County, Texas


SHEET 4
OF 4 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Boring terminated at 49 ft-bgs.			<p>2. * Drilling 0 to 39 ft-bgs = 8-in dia. auger. Squeezing/ caving at 21 ft-bgs. Set 2 ft of 8-in dia. casing and circulation pan, add mud. 39 to 49 ft-bgs = 7 7/8" fish tail - all above with 3-in dia. shelby tube and 2-in spoon.</p> <p>3. ** Water first noted at 19 to 20 ft-bgs. Before well set at 25 ft-bg and one hour later, water at 20.3 ft-bgs and hole caved to 21 ft-bgs.</p> <p>4. Set well after drilling completion and last water reading. Bailed hole to 30 ft-bgs. See well diagram and installation.</p> <p>5. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample.</p> <p>6. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelby tube).</p> <p>Well installation: Set tip (0.43-ft-long) at 27.43 ft-bgs, screen at 27 to 17 ft-bgs, riser with locking plug, sand up to 15 ft-bgs, fill the hole with bentonite seal up to 13 ft-bgs, fill the hole with drill cuttings up to 2 ft-bgs, installed concrete and flush mount protector to the ground surface.</p>

DRILLING LOG		DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1 OF 4 SHEETS
1. PROJECT Fort Worth Central City Project			10. SIZE AND TYPE OF BIT * see remarks	
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,962,856.6 E 2,324,189.9			11. DATUM FOR ELEVATION SHOWN(TBM or MSL) MSL	
3. DRILLING AGENCY USACE			12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	
4. HOLE NO. (As shown on drawing title and file number) F-2			13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN : 0 : 6	
5. NAME OF DRILLER Salik, James/ Netherland, Rick			14. TOTAL NUMBER CORE BOXES : 0	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED _____ DEG. FROM VERT.			15. ELEVATION GROUND WATER : 519.7	
7. THICKNESS OF OVERBURDEN : -			16. DATE HOLE : STARTED : COMPLETED 4/29/2004 : 5/3/2004	
8. DEPTH DRILLED INTO ROCK : -			17. ELEVATION TOP OF HOLE : +525.5	
9. TOTAL DEPTH OF HOLE : 40.0			18. TOTAL CORE RECOVERY FOR BORING : 0 %	
			19. GEOLOGIST RAM	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+525.5	0.0		SAND (SC) , fine grained, dry, very silty, slightly clayey, brown.			Shelby Tube-1 (ST-1). Field Pocket Pen. reading = 2.2 tsf. Lab Pocket Pen. reading = 1.25 tsf. wc = 14.0%.
			SAND (SC) , fine grained, loose to medium dense, dry, clayey, brown.	100	ST-1 1.0 3.0	
+520.5	5.0		CLAY (CL) , low plasticity, moist with wet seams, sandy, silty to slightly sandy, brown to gray with dark brown.			Field Pocket Pen. reading = 1.2 tsf. Lab Pocket Pen. reading = 1.0 tsf. wc = 19.5%. γ _{dry} = 102.7 pcf.
			CLAY (CL) , low plasticity, medium to firm, moist, silty and slightly sandy, light brown.	100	ST-2 8.0 10.0	

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 525.5		Hole No. F-2		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 2 OF 4 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			CLAY (CL) , low plasticity, moist with wet seams, sandy, silty to slightly sandy, brown to gray with dark brown. <i>(continued)</i>			Field Pocket Pen. reading = 2.5 tsf. Lab Pocket Pen. reading = 0.5 tsf. wc = 20.0%. $\gamma_{dry} = 108.6$ pcf.
			CLAY (CL) , low plasticity, soft to medium, moist, silty and slightly sandy, brown and gray.	100	ST-3 15.0 17.0	
			CLAY (CL) , low plasticity, medium, very moist, sandy, brown and gray.	100	ST-4 21.5 23.5	Field Pocket Pen. reading = 2.6 tsf. Lab Pocket Pen. reading = 0.75 tsf.
			CLAY (CL) , low plasticity, soft to medium, very moist, silty, gray.	100	ST-5 30.0 32.0	Field Pocket Pen. reading = 1.5 tsf. Lab Pocket Pen. reading = 1.0 tsf. wc = 24.2%. $\gamma_{dry} = 103.2$ pcf.

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 525.5		Hole No. F-2		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 3 OF 4 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			CLAY (CL) , low plasticity, moist with wet seams, sandy, silty to slightly sandy, brown to gray with dark brown. <i>(continued)</i>			
			CLAY (CL) , low plasticity, soft to medium, silty and slightly sandy, gray.	100	ST-6 38.0 40.0	Field Pocket Pen. reading = 2.6 tsf. Lab Pocket Pen. reading = 0.5 tsf.
+485.5	40.0					Note: 1. All HNU reading every foot are 0 (zero). 2. *Drilling 0 to 30 ft-bgs = 8-in dia. auger. Set 2 ft of 8-in dia. casing and circulation pan. 30 to 38 ft-bgs = 7 7/8" fishtail and mud, 3-in dia. shelby tube throughout. 3. ** Water first noted at 5.8 ft-bgs (overnight check), hole squeezing/caving by 12 ft-bgs. 4. Set well after drilling completion and last water reading. See well diagram detail. 5. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Penetrometer reading is average of reading throughout 2 ft sample. 6. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelby tube). Well instalation: Offset 8.5 ft N30 W from F-2 - drilled to 16 ft-bgs, with 8-in dia. auger. Set well point to 15.5 ft-bgs. Note: Added collar between point and screen because of pipe damage, cut riser below ground level and added lock cap, sand
			Boring terminated at 40 ft-bgs.			

DRILLING LOG (Cont Sheet)

ELEVATION TOP OF HOLE
525.5

Hole No. F-2

PROJECT
Fort Worth Central City Project

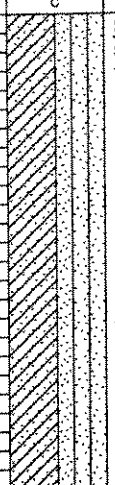

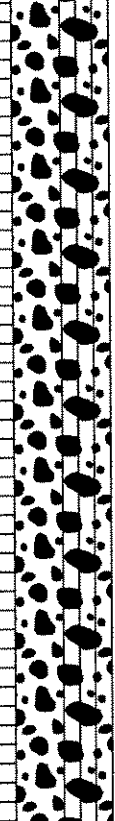


INSTALLATION
Ft. Worth, Tarrant County, Texas

SHEET 4
OF 4 SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
						up to 3.5 ft-bgs, fill in with bentonite pellets to 1.5 ft-bgs, will cement in flush mount protector cover with bolts. All well pipe 2-in dia. PVC.

DRILLING LOG		DIVISION SWD	INSTALLATION Ft. Worth, Tarrant County, Texas	SHEET 1 OF 3 SHEETS
1. PROJECT Fort Worth Central City Project			10. SIZE AND TYPE OF BIT * see remarks	
2. LOCATION (Coordinates or Station) Ft. Worth, Texas N 6,959,789.4 E 2,323,576.2			11. DATUM FOR ELEVATION SHOWN(TBM or MSL) MSL	
3. DRILLING AGENCY USACE			12. MANUFACTURER'S DESIGNATION OF DRILL Failing 1500	
4. HOLE NO. (As shown on drawing title and file number) F-3			13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED: 4 UNDISTURBED: 2	
5. NAME OF DRILLER Salik, James			14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.			15. ELEVATION GROUND WATER 519.0	
7. THICKNESS OF OVERBURDEN 39.0			16. DATE HOLE STARTED: 5/5/2004 COMPLETED: 5/5/2004	
8. DEPTH DRILLED INTO ROCK 1.0			17. ELEVATION TOP OF HOLE +531.2	
9. TOTAL DEPTH OF HOLE 40.0			18. TOTAL CORE RECOVERY FOR BORING 0 %	
			19. GEOLOGIST RAM	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
+531.2	0.0		CLAY (CL) , low plasticity, moist/ dry, sandy/ silty, dark brown.			
			CLAY (CL) , low plasticity, hard, dry, sandy, calcarous, brown.	100	ST-1 3.0 5.0	Field Pocket Pen. reading = > 4.5 tsf. Lab Pocket Pen. reading = 4.5 tsf. wc = 13.0 %. $\gamma_{dry} = 123.1$ pcf.
			CLAY (CL) , low plasticity, soft to medium, moist, sandy, brown.	100	ST-2 10.0 12.0	Field Pocket Pen. reading = 1.5 tsf. Lab Pocket Pen. reading = 0.5 tsf. wc = 25.6%. $\gamma_{dry} = 91.1$ pcf.
+519.2	12.0		SAND (SM-SC) , coarse to fine, wet, very silty and clayey with clay seams, gravelly (up to 1.5-in dia.) after 15 ft-bgs, gray-brown.			

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 531.2		Hole No. F-3		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas			
			SHEET 2 OF 3 SHEETS			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			SAND (SM-SC) , coarse to fine, wet, very silty and clayey with clay seams, gravelly (up to 1.5-in dia.) after 15 ft-bgs, gray-brown. (continued)			
			SAND (SM-SC) , fine to coarse, loose to medium dense, wet, gravelly, slightly clayey, tan.	67	SS-1 17.0 18.5	Split Spoon-1 (SS-1). 7/8/12 N = 10. wc = 13.8%.
+512.2	19.0		GRAVEL (GW-GM) , coarse to fine grained, wet, sandy, clay seams, calcareous, scattered wood fragments, dark gray/ gray.			
			GRAVEL (GW-GM) , coarse to fine grained, medium dense, wet, sandy, calcareous, tan and gray.	56	SS-2 22.0 23.5	13/16/9 N = 25. wc = 14.4%.
+503.2	28.0		GRAVEL (GC) , coarse to fine grained, dense, wet, sandy, slightly clayey, tan and gray.	56	SS-3 28.0 29.5	4/15/20 N = 35.

DRILLING LOG (Cont Sheet)		ELEVATION TOP OF HOLE 531.2		Hole No. F-3		
PROJECT Fort Worth Central City Project			INSTALLATION Ft. Worth, Tarrant County, Texas		SHEET 3 OF 3 SHEETS	
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			GRAVEL (GC) , coarse to fine grained, dense, wet, sandy, slightly clayey, tan and gray. (continued)			
				67	SS-4 38.0 39.5	13/6/28 N = 34. wc = 10.3%.
+491.7	39.5		GRAVEL (GC) , coarse to fine grained, dense, wet, sandy, slightly clayey, tan and gray.			<p>Note:</p> <ol style="list-style-type: none"> All HNU reading every foot are 0 (zero). * Drilling 0 to 17 ft-bgs = 8-in dia. auger. Caving after 12 ft, set 2 ft of 8-in casing and circulation pan/ mud. 17 to 40 ft-bgs = 7 7/8" fishtail, all above with 2-in spoon and 3-in dia. shelby tube. Bail hole after completion of drilling. ** Free water at 12.2 ft-bgs 18 hrs after drilling completion. Set well after drilling completion and last water reading. See well diagram detail. Field Pocket Penetrometer reading taken at the bottom of undisturbed sample. Lab Pocket Peneterometer reading is average of reading throughout 2 ft sample. The boring log based on visual classification in the field, the laboratory, and laboratory test results (undisturbed sample inside the shelby tube). <p>Well installation: Offset 7.7 ft- S28 E from F-3 and drill to 18 ft-bgs with 8-in dia. auger. 2-in dia. PVC (10-ft-long screen 0.01 slotted). Sand up to 5 ft-bgs with screen at 7 to 17 ft-bgs. Fill with bentonite pellet up to 3 ft-bgs. Lock cap and flush mount protector.</p>
+491.2	40.0		SANDSTONE and SILTSTONE , wet, moderate hard (rock classification), moderately cemented, dark brown.			
			Boring terminated at 40 ft-bgs.			

Attachment B
Team Consultants, Inc.
Laboratory Test Results

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES

TRINITY VISION / CENTRAL CITY PROJECT (FY 04)

FORT WORTH, TEXAS

Boring No.	Sample No.	Sample Depth (ft.)	Penetrometer Value (tsf)	Visual Description & Unified Soil Classification (ASTM D-2488)	Percent Passing Sieves									
					#4	#10	#20	#40	#60	#80	#100	#200		
B-1	ST-1	3-5	2.0	Brown clayey sand to dark gray sandy clay	SC-CL									
	ST-2	10-12	n/a	Brown and light gray clayey sanc	SC									
B-2	ST-1	4-6	2.25	Dark brown clay with sand	CH									
	ST-2	11-13	n/a	Tan and gray silty sand with gravel	SM									
B-3	ST-1	3-5	>4.5	Brown and gray clay	CH									
	ST-2	10-11	>4.5	Brown clay with sand	CH									
	ST-3	17-19	3.5	Light brown sandy clay	CL									
B-4	ST-1	2-4	4.0	Brown clay with silt	CH									
	ST-2	9-11	1.5	Brown silty clay	CL									
	ST-3	16-18	1.0	Light brown silty clay	CL									
	ST-4	23-25	0.75	Brown silty clay	CL									
B-5	ST-5	30-32	0.75	Brown and gray sandy clay	CL									
	A	37.0-38.5	n/a	Tan silty sand	SM									
	C-4	44.6-45.4	n/a	Light gray limestone										
	ST-1	1.5-3.5	2.5	Brown clay with silt	CL									
B-6	ST-2	9-11	3.75	Brown clay with sand	CL									
	ST-3	16-18	1.0	Brown sandy clay	CL									
	ST-4	23-25	<0.25	Brown silty clay	CL									
	ST-5	30-32	0.5	Brown silty clay	CL									
	ST-6	38-40	<0.25	Tan clayey sand	SC									
B-7	C-1	49.4-50.3	n/a	Light gray limestone										
	ST-1	2-4	4.25	Brown silty clay	CL									
	ST-2	10-12	4.0	Brown silty clay	CL									
	ST-3	18-20	1.0	Brown silty clay	CL									
	ST-4	25-27	1.25	Brown silty clay	CL									
	ST-5	32-34	0.5	Light brown sandy clay	CL									
	ST-6	40-42	0.75	Tan and light gray silty sand	SM									
D-1	ST-7	48-49.5	2.0	Brown gravel with clay	GC									
	A	49.5-50.5	n/a	Gray silty clay, shaley	CL									
	ST-1	8.0-9.5	2.75	Gray and tan sandy clay with silt	CL	100.0	99.9	99.8	99.5	99.1	97.2	94.8	71.3	
D-2	ST-2	15.0-17.0	3.25	Brown and gray sandy clay	CL	100.0	100.0	100.0	99.8	98.9	93.7	88.7	67.7	
	A	41.0-42.5	n/a	Gray sandy gravel with clay	GC	64.7	57.6	54.2	51.9	47.9	42.2	39.8	33.1	
	B	51.0-52.4	n/a	Tan gravelly sand with silt	SM	60.8	48.2	37.5	29.6	25.8	23.5	22.6	20.3	
D-3	C-1	53.6-54.5	n/a	Light gray limestone										

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES
 TRINITY VISION / CENTRAL CITY PROJECT (FY 04)
 FORT WORTH, TEXAS

Boring No.	Sample No.	Sample Depth (ft.)	Penetrometer Value (tsf)	Visual Description & Unified Soil Classification (ASTM D-2488)	Percent Passing Sieve							
					#4	#10	#20	#40	#60	#80	#100	#200
D-2	ST-1	3.5-5.5	>4.5	Dark gray and brown clay with sanc	100	99.7	99.5	98.8	96.6	92.1	88.7	70.7
	A	9.0-10.5	n/a	Tan silty sand	87.7	82.2	71.9	89.1	50.6	44.3	41.2	30.0
	B	10.5-15.0	n/a	Light brown sandy gravel with clay								
	C-1	17.4-18.2	n/a	Light gray limestone								
C-1	C-2	24.9-25.7	n/a	Gray limestone								
	C-3	30.5-31.4	n/a	Gray shale with limestone seams								
	C-4	33.2-34.0	n/a	Gray and brown sandy clay								
	ST-1	0.0-4.0	n/a	Dark brown sandy clay								
C-2	ST-1	1.0-3.0	3.0	Brown and gray clay								
	A	5.0-6.5	n/a	Brown clay								
	ST-2	8.0-10.0	>4.5	Light brown silty clay								
	ST-3	15-17	4.0	Light brown silty clay								
	ST-4	20-22	3.25	Light brown silty clay								
	ST-5	25-27	1.5	Light brown silty clay								
	ST-6	30-32	0.25	Light brown clay								
	B	38-39.5	n/a	Tan silty sand with clay								
	C	45-46.5	n/a	Tan and light gray clayey sanc								
	D	55-57.5	n/a	Tan clayey sand with gravel								
	ST-1	0-2	>4.5	Brown and gray sandy clay								
	C-3	B-1	4-5	n/a	Brown sandy clay							
C-1		7.9-8.9	n/a	Gray limestone								
C-2		15.7-16.5	n/a	Gray limestone								
C-3		22.4-23.4	n/a	Gray limestone with shale seams								
C-4	C-4	29-30	n/a	Gray limestone with shale seams								
	ST-1	3-5	2.0	Dark brown clay								
	ST-2	10-12	1.5	Light brown sandy clay								
	C-1	20.7-21.5	n/a	Light gray limestone								
C-4	C-2	26.1-28.8	n/a	Light gray limestone								
	C-3	32.0-32.9	n/a	Gray limestone with shale lenses								
	C-4	38.5-39.4	n/a	Gray limestone with shale lenses								
	ST-1	4-6	2.75	Brown silty clay								
C-4	A	11-12.5	n/a	Light brown silty sand with clay								
	B-1	11-13	n/a	Reddish brown sandy clay								
	C-1	20.2-20.9	n/a	Gray limestone								
	C-2	25.5-26.5	n/a	Light gray limestone								
C-4	C-3	31.9-32.7	n/a	Gray limestone with shale lenses								
	C-4	37.6-38.5	n/a	Gray limestone with shale lenses								

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES

TRINITY VISION / CENTRAL CITY PROJECT (FY 04)

FORT WORTH, TEXAS

Boring No.	Sample No.	Sample Depth (ft.)	Penetrometer Value (tsf)	Visual Description & Unified Soil Classification (ASTM D-2488)	Percent Passing Sieve															
					#4	#10	#20	#40	#60	#80	#100	#200								
C-6	ST-1	5-7	1.0	Light gray and brown silty clay	CL															
	ST-2	12-14	1.75	Gray and brown silty clay	CL															
	ST-3	17-19	0.75	Grayish-brown sandy clay	CL															
	B-1	17-19	n/a	Grayish-brown sandy clay	CL															
	ST-4	24-26	1.5	Light brown sandy clay	CL															
	ST-5	31-33	0.75	Gray and brown sandy clay	CL															
C-7	ST-6	36-40	0.5	Gray silty sand with clay	SC															
	ST-1	2-4	2.0	Brown silty clay	CL															
	ST-2	10-12	3.5	Brown sandy clay	CL															
	ST-3	17-19	1.5	Light brown silty clay	CL															
	ST-4	24-26	1.75	Light brown clay	CL															
	ST-5	31-33	1.5	Gray and tan clayey sanc	SC															
C-8	ST-6	36-40	<0.25	Tan sandy clay with silt	CL															
	ST-1	4-6	>4.5	Brown sandy clay	CL															
	ST-2	11-13	2.25	Reddish brown sandy clay	CL															
	ST-3	18-20	1.25	Brown silty clay	CL															
	ST-4	25-27	1.0	Brown silty clay	CL															
	ST-5	32-34	0.5	Gray and brown silty clay	CL															
C-9	ST-6	36-40	2.0	Tan clayey sand	SC															
	ST-1	1-3	>4.5	Dark gray clay	CL															
	B-1	8-11	n/a	Light brown clay with sand	CL-OH															
	ST-2	15-17	1.5	Light brown silty clay	CL															
	ST-3	22-24	1.25	Brown silty clay with calcareous nodules	CL															
	ST-4	30-32	0.25	Light brown clayey sand	SC															
C-10	A	36.0-37.5	n/a	Tan sandy gravel	GP															
	ST-1	3-5	2.25	Brown clayey sand	SC															
	ST-2	10-12	0.5	Brown silty sand with clay	SC-SM															
	A	14-15.5	n/a	Gray sandy gravel with clay	GC															
	ST-3	20-22	0.75	Brown silty clay	CL															
	ST-4	27-29	0.25	Light brown sandy clay	CL															
F-1	ST-5	36-38	0.75	Light gray silty sand with gravel and clay	SM-GM															
	ST-1	0-2.0	2.75	Brown sandy clay with gravel	CL															
	ST-2	7.0-9.0	>4.5	Brown sandy clay	CL															
	ST-3	15-17	0.5	Brown sandy clay	CL															
	ST-4	22-24	2.75	Brown sandy clay	CL															
	ST-5	30-32	0.5	Light brown sandy clay	CL															
A		34-35.5	n/a	Light brown clay with sand	CL	100.0	100.0	99.7	99.1	97.8	94.8	91.9	67.6							
	B	39-40.5	n/a	Brown sandy clay with occasional gravel	CL	100.0	99.9	98.6	96.8	94.5	91.8	89.5	72.8							
	C	43.5-45	n/a	Light gray and brown sandy clay	CL															

SUMMARY OF LABORATORY TEST RESULTS
LABORATORY TESTING SERVICES
TRINITY VISION / CENTRAL CITY PROJECT (FY 04)
FORT WORTH, TEXAS

Boring No.	Sample No.	Sample Depth (ft.)	Penetrometer Value (tsf)	Visual Description & Unified Soil Classification (ASTM D-2488)	Percent Passing Sieve								
					#4	#10	#20	#40	#60	#100	#200		
F-2	ST-1	1.0-3.0	1.25	Brown clayey sand									
	ST-2	8-10	1.0	Light brown silty clay with sanc									
	ST-3	15-17	0.5	Brown and gray silty clay with sanc									
	ST-4	21.5-23.5	0.75	Brown and gray sandy clay									
	ST-5	30-32	1.0	Gray silty clay									
	ST-6	38-40	0.5	Gray silty clay with sanc									
F-3	ST-1	3-5	4.5	Brown sandy clay with calcareous nodules									
	ST-2	10-12	0.5	Brown sandy clay									
	A	17-18.5	n/a	Tan gravelly sand with clay	76.5	63.1	50.9	36.1	24.8	19.6	18.2	15.0	
	B	22-23.5	n/a	Light brown sandy gravel	39.8	15.8	11.0	7.9	6.6	6.0	5.8	5.1	
	C	28-29.5	n/a	Tan and gray sandy gravel with clay seams									
	D	38-39.5	n/a	Tan and gray sandy gravel with clay seams	41.1	31.9	26.3	22.5	20.3	19.0	18.5	16.8	

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES

TRINITY VISION / CENTRAL CITY PROJECT (FY 04)

FORT WORTH, TEXAS

Boring No.	Sample No.	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2488)	Moisture Content (%)	Unit Dry Weight (pcf)	Atterberg Limits		Remarks
						LL	PL	
B-1	ST-1	3-5	Brown clayey sand to dark gray sandy clay	SC-CL				
	ST-2	10-12	Brown and light gray clayey, sanc	SC				
B-2	ST-1	4-6	Dark brown clay with sand	CH				
	ST-2	11-13	Tan and gray silty sand with gravel	SM				
B-3	ST-1	3-5	Brown and gray clay	CH				
	ST-2	10-11	Brown clay with sand	CH				
	ST-3	17-19	Light brown sandy clay	CL				
B-4	ST-1	2-4	Brown clay with silt	CH				
	ST-2	9-11	Brown silty clay	CL	18.6	42	19	23
	ST-3	16-18	Light brown silty clay	CL	21.2			
	ST-4	23-25	Brown silty clay	CL	22.1	36	15	21
	ST-5	30-32	Brown and gray sandy clay	CL				
A		37.0-38.5	Tan silty sand	SM	21.3			
	C-4	44.6-45.4	Light gray limestone		3.8			
B-5	ST-1	1.5-3.5	Brown clay with silt	CL				
	ST-2	9-11	Brown clay with sand	CL	18.9			
	ST-3	16-18	Brown sandy clay	CL	21.3	36	16	20
	ST-4	23-25	Brown silty clay	CL				
	ST-5	30-32	Brown silty clay	CL	24.6	34	16	18
	ST-6	38-40	Tan clayey sand	SC	20.6			
C-1		49.4-50.3	Light gray limestone		4.9			
					149.1			
B-6	ST-1	2-4	Brown silty clay	CL				
	ST-2	10-12	Brown silty clay	CL	19.6	46	17	29
	ST-3	18-20	Brown silty clay	CL	21.6			
	ST-4	25-27	Brown silty clay	CL	21.5			
	ST-5	32-34	Light brown sandy clay	CL	23.3	34	14	20
	ST-6	40-42	Tan and light gray silty sand	SM	19.2			
ST-7		48-49.5	Brown gravel with clay	GC				
	A	49.5-50.5	Gray silty clay, shaley	CL				
D-1	ST-1	8.0-9.5	Gray and tan sandy clay with silt	CL	18.3			
	ST-2	15.0-17.0	Brown and gray sandy clay	CL	16.4			
	A	41.0-42.5	Gray sandy gravel with clay	GC	13.8			
	B	51.0-52.4	Tan gravelly sand with silt	SM	10.0			
	C-1	53.6-54.5	Light gray limestone		5.7	144.0		

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES
TRINITY VISION / CENTRAL CITY PROJECT (FY 04)
FORT WORTH, TEXAS

Boring No.	Sample No.	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2488)	Moisture Content (%)	Unit Dry Weight (pcf)	Atterberg Limits			Remarks	
						LL	PL	PI		
D-2	ST-1	3.5-5.5	Dark gray and brown clay with sanc	13.5						
	A	9.0-10.5	Tan silty sand	5.5						
	B	10.5-15.0	Light brown sandy gravel with clay	5.0	25	12	13			
	C-1	17.4-18.2	Light gray limestone	2.2	143.9					
C-2	C-2	24.9-25.7	Gray limestone							
	C-3	30.5-31.4	Gray limestone							
	C-4	33.2-34.0	Gray shale with limestone seams							
	B-1	0.0-4.0	Gray and brown sandy clay							
C-1	ST-1	1.0-3.0	Dark brown sandy clay	13.9	108.7	33	16	17		
	A	5.0-6.5	Brown and gray clay	17.6		51	18	33		
	ST-2	8.0-10.0	Brown clay							
	ST-3	15-17	Light brown silty clay	17.0	109.2	41	17	24		
	ST-4	20-22	Light brown silty clay	16.2	108.6	34	15	19	(1)	
	ST-5	25-27	Light brown silty clay	17.6	109.9	32	13	19		
	ST-6	30-32	Light brown clay	19.3	108.2	31	14	17	(3)	
	B	38-39.5	Tan silty sand with clay	SM-SC	20.8	19	15	4		
	C	45-46.5	Tan and light gray clayey sanc	SC						
	D	55-57.5	Tan clayey sand with gravel	SC	16.8	20	16	4		
	C-2	ST-1	0-2	Brown and gray sandy clay						
		B-1	4-5	Brown sandy clay						
C-1		7.9-8.9	Gray limestone			37	14	23	(1),(2)	
C-2		15.7-16.5	Gray limestone	6.7	141.1					
C-3	C-3	22.4-23.4	Gray limestone with shale seams							
	C-4	29-30	Gray limestone with shale seams							
	ST-1	3-5	Dark brown clay	19.5	106.7	48	19	29	(3)	
	ST-2	10-12	Light brown sandy clay	16.4	111.6	28	15	13	(1)	
C-4	C-1	20.7-21.5	Light gray limestone	6.3	139.8					
	C-2	28.1-28.8	Light gray limestone	6.4	143.1					
	C-3	32.0-32.9	Gray limestone with shale lenses							
	C-4	38.5-39.4	Gray limestone with shale lenses							
C-4	ST-1	4-6	Brown silty clay	18.5	108.0	39	16	23	(1)	
	A	11-12.5	Light brown silty sand with clay							
	B-1	11-13	Reddish brown sandy clay			27	17	10	(1),(2)	
	C-1	20.2-20.9	Gray limestone	5.2	143.3					
C-4	C-2	25.5-26.5	Light gray limestone	6.0	144.6					
	C-3	31.9-32.7	Gray limestone with shale lenses							
C-4	37.6-38.5	Gray limestone with shale lenses								

Notes:
 (1) See attached Plates for results of Falling Head Permeability Test.
 (2) See attached Plates for results of Standard Proctor Test.
 (3) See attached Plates for results of Consolidated-Undrained Triaxial Series

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES

TRINITY VISION / CENTRAL CITY PROJECT (FY 04)

FORT WORTH, TEXAS

Boring No.	Sample No.	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2488)	Moisture Content (%)	Unit Dry Weight (pcf)	Atterberg Limits			Remarks
						LL	PL	PI	
C-6	ST-1	5-7	Light gray and brown silty clay	27.2	96.6	41	17	24	
	ST-2	12-14	Gray and brown silty clay	22.8	98.7	44	16	28	
	ST-3	17-19	Grayish-brown sandy clay	****	****	****	****	****	
	B-1	17-19	Grayish-brown sandy clay	****	****	****	****	****	
	ST-4	24-26	Light brown sandy clay	20.3	107.0	34	13	21	(1),(2),(3)
	ST-5	31-33	Gray and brown sandy clay	19.8	108.0	43	19	24	
C-7	ST-6	38-40	Gray silty sand with clay	****	****	****	****	****	
	ST-1	2-4	Brown silty clay	17.7	108.1	42	21	21	
	ST-2	10-12	Brown sandy clay	19.0	109.7	48	18	30	(1)
	ST-3	17-19	Light brown silty clay	21.5	105.9	40	16	24	
	ST-4	24-26	Light brown clay	19.4	109.6	39	15	24	(3)
	ST-5	31-33	Gray and tan clayey sanc	18.9	102.4	29	15	14	
C-8	ST-6	38-40	Tan sandy clay with silt	****	****	****	****	****	
	ST-1	4-6	Brown sandy clay	16.6	112.6	44	18	26	
	ST-2	11-13	Reddish brown sandy clay	18.8	107.9	39	17	22	
	ST-3	18-20	Brown silty clay	21.5	107.3	41	17	24	
	ST-4	25-27	Brown silty clay	21.6	103.8	36	15	21	
	ST-5	32-34	Gray and brown silty clay	24.0	100.1	36	17	19	
C-9	ST-6	38-40	Tan clayey sand	****	****	****	****	****	
	ST-1	1-3	Dark gray clay	18.1	109.9	47	17	30	(3)
	B-1	8-11	Light brown clay with sand	****	****	****	****	****	
	ST-2	15-17	Light brown silty clay	18.8	110.8	50	17	33	(1),(2),(3)
	ST-3	22-24	Brown silty clay with calcareous nodules	20.3	107.0	38	17	21	
	ST-4	30-32	Light brown clayey sand	20.7	104.1	23	16	7	
C-10	A	36.0-37.5	Tan sandy gravel	****	****	****	****	****	
	ST-1	3-5	Brown clayey sand	16.2	107.7	29	17	12	(1)
	ST-2	10-12	Brown silty sand with clay	23.5	99.6	21	16	5	
	A	14-15.5	Gray sandy gravel with clay	****	****	****	****	****	
	ST-3	20-22	Brown silty clay	24.5	100.3	39	17	22	
	ST-4	27-29	Light brown sandy clay	24.5	102.9	27	17	10	
F-1	ST-5	36-38	Light gray silty sand with gravel and clay	****	****	****	****	****	
	SM-GM								
	ST-1	0-2.0	Brown sandy clay with gravel	13.5	115.7	36	17	19	
	ST-2	7.0-9.0	Brown sandy clay	16.3	112.5	42	16	26	
	ST-3	15-17	Brown sandy clay	****	****	****	****	****	
	ST-4	22-24	Brown sandy clay	****	****	****	****	****	
B	ST-5	30-32	Light brown sandy clay	20.3	****	****	****	****	
	A	34-35.5	Light brown clay with sand	20.6	****	****	****	****	
	B	39-40.5	Brown sandy clay with occasional grave	****	****	****	****	****	
	C	43.5-45	Light gray and brown sandy clay	****	****	****	****	****	
				****	****	****	****	****	
				****	****	****	****	****	
Notes:									
				(1) See attached Plates for results of Falling Head Permeability Test.					
				(2) See attached Plates for results of Standard Proctor Test.					
				(3) See attached Plates for results of Consolidated-Undrained Triaxial Series					

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES

TRINITY VISION / CENTRAL CITY PROJECT (FY 04)

FORT WORTH, TEXAS

Boring No.	Sample No.	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2485)	Moisture Content (%)	Unit Dry Weight (pcf)	Atterberg Limits		Remarks
						LL	PL	
F-2	ST-1	1.0-3.0	Brown clayey sand	14.0	102.7	35	18	
	ST-2	8-10	Light brown silty clay with sanc	19.5	108.6	35	15	
	ST-3	15-17	Brown and gray silty clay with sanc	20.0		32	16	
	ST-4	21.5-23.5	Brown and gray sandy clay					
	ST-5	30-32	Gray silty clay					
	ST-6	38-40	Gray silty clay with sanc	24.2	103.2	35	15	
F-3	ST-1	3-5	Brown sandy clay with calcareous nodules					
	ST-2	10-12	Brown sandy clay	13.0	123.1	42	16	
	A	17-18.5	Tan gravelly sand with clay	25.6	91.1	35	19	
	B	22-23.5	Light brown sandy gravel	13.8				
	C	28-29.5	Tan and gray sandy gravel with clay seams	14.4				
	D	38-39.5	Tan and gray sandy gravel with clay seams					

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES

TRINITY VISION / CENTRAL CITY PROJECT (FY 04)

FORT WORTH, TEXAS

Boring No.	Sample No.	Sample Depth (ft)	Visual Description & Unified Soil Classification (ASTM D-2488)	Moisture Content (%)	Unit Dry Weight (pcf)	Confining Pressure (tsf)	Q _y (tsf)	Strain @ Failure (%)	Type Failure
B-1	ST-1	3-5	Brown clayey sand to dark gray sandy clay	SC-CL					
	ST-2	10-12	Brown and light gray clayey sand	SC					
B-2	ST-1	4-6	Dark brown clay with sand	CH					
	ST-2	11-13	Tan and gray silty sand with gravel	SM					
B-3	ST-1	3-5	Brown and gray clay	CH					
	ST-2	10-11	Brown clay with sand	CH					
	ST-3	17-19	Light brown sandy clay	CL					
B-4	ST-1	2-4	Brown clay with silt	CH					
	ST-2	9-11	Brown silty clay	CL	18.6	109.1	0	1,948	3.0
	ST-3	16-18	Light brown silty clay	CL	21.2				
	ST-4	23-25	Brown silty clay	CL	22.1	104.7	0	0,764	3.0
	ST-5	30-32	Brown and gray sandy clay	CL					
C-4	A	37.0-38.5	Tan silty sand	SM	21.3				
	C-4	44.6-45.4	Light gray limestone		3.8	150.6	0	377	
B-5	ST-1	1.5-3.5	Brown clay with silt	CL					
	ST-2	9-11	Brown clay with sand	CL	18.9				
	ST-3	16-18	Brown sandy clay	CL	21.3	105.7	0	0,933	3.3
	ST-4	23-25	Brown silty clay	CL					
	ST-5	30-32	Brown silty clay	CL	24.6	101.4	0	0,609	15.0
	ST-6	38-40	Tan clayey sand	SC	20.6				
B-6	C-1	49.4-50.3	Light gray limestone		4.9	149.1	0	228	
	ST-1	2-4	Brown silty clay	CL					
	ST-2	10-12	Brown silty clay	CL	19.6	106.9	0	2,51	3.7
	ST-3	16-20	Brown silty clay	CL	21.6				
	ST-4	25-27	Brown silty clay	CL	21.5				
	ST-5	32-34	Light brown sandy clay	CL	23.3	104.2	0	0,447	15.0
	ST-6	40-42	Tan and light gray silty sand	SM	19.2				
ST-7	48-49.5	Brown gravel with clay	GC						
D-1	A	49.5-50.5	Gray silty clay, shaley	CL					
	ST-1	8.0-9.5	Gray and tan sandy clay with silt	CL	18.3				
B	ST-2	15.0-17.0	Brown and gray sandy clay	CL	18.4				
	A	41.0-42.5	Gray sandy gravel with clay	GC	13.8				
	B	51.0-52.4	Tan gravelly sand with silt	SM	10.0				
	C-1	53.6-54.5	Light gray limestone		5.7	144.0	0	121.1	

* Strain measurements were not recorded for this test. This sample was an intact core of rock which was sawed square, ends capped with Hydrostone high strength gypsum, and tested for compressive strength in accordance with ASTM D-2938 "Unconfined Compressive Strength of Intact Rock Core Specimens".

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES

TRINITY VISION / CENTRAL CITY PROJECT (FY 04)

FORT WORTH, TEXAS

Boring No.	Sample No.	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2488)	Moisture Content (%)	Unit Dry Weight (pcf)	Confining Pressure (tsf)	C_u (tsf)	Strain @ Failure (%)	Failure Type
D-2	ST-1	3.5-5.5	Dark gray and brown clay with sanc	13.5	CH				
	A	9.0-10.5	Tan silty sand	5.5	SM				
	B	10.5-15.0	Light brown sandy gravel with clay	5.0	GC				
	C-1	17.4-18.2	Light gray limestone	2.2		0	311	*	Vertical Fracture
C-2	C-2	24.9-25.7	Gray limestone						
	C-3	30.5-31.4	Gray limestone						
	C-4	33.2-34.0	Gray shale with limestone seams						
C-1	B-1	0.0-4.0	Gray and brown sandy clay		CL				
	ST-1	1.0-3.0	Dark brown sandy clay	13.9	CL	0	1,955	2.9	Angular (75°)
	A	5.0-6.5	Brown and gray clay	17.6	CH				
	ST-2	8.0-10.0	Brown clay		CH				
C-2	ST-3	15-17	Light brown silty clay	17.0	CL	0	3.60	5.5	Vertical Shear
	ST-4	20-22	Light brown silty clay	16.2	CL				
	ST-5	25-27	Light brown silty clay	17.6	CL				
	ST-6	30-32	Light brown clay	19.3	#REF!				
C-3	B	38-39.5	Tan silty sand with clay	20.8	SM-SC				
	C	45-46.5	Tan and light gray clayey sanc		SC				
	D	55-57.5	Tan clayey sand with gravel	16.8	SC				
C-4	ST-1	0-2	Brown and gray sandy clay		CL				
	B-1	4-5	Brown sandy clay	18.3	CL	0	1,213	15.0	Internal Shear (Remolded Sample)
	C-1	7.9-8.9	Gray limestone						
	C-2	15.7-16.5	Gray limestone	6.7		0	177.6	*	Vertical Fracture
C-3	C-3	22.4-23.4	Gray limestone with shale seams						
	C-4	29-30	Gray limestone with shale seams						
	ST-1	3-5	Dark brown clay	19.5	CL				
	ST-2	10-12	Light brown sandy clay	16.4	CL	0	0.584	2.2	Angular (50°)
C-4	C-1	20.7-21.5	Light gray limestone	6.3		0	184.7	*	Vertical Fracture
	C-2	28.1-28.8	Light gray limestone	6.4		0	184.7	*	Vertical Fracture
	C-3	32.0-32.9	Gray limestone with shale lenses						
	C-4	38.5-39.4	Gray limestone with shale lenses						
C-1	ST-1	4-6	Brown silty clay	18.5	CL				
	A	11-12.5	Light brown silty sand with clay		SC				
	B-1	11-13	Reddish brown sandy clay	13.6	CL	0	0.722	9.3	Angular (65°) (Remolded Sample)
	C-1	20.2-20.9	Gray limestone	5.2		0	237	*	Vertical Fracture
C-2	C-2	25.5-26.5	Light gray limestone	6.0		0	144.2	*	Vertical Fracture
	C-3	31.9-32.7	Gray limestone with shale lenses						
	C-4	37.6-38.5	Gray limestone with shale lenses						

* Strain measurements were not recorded for this test. This sample was an intact core of rock which was sawed square, ends capped with Hydrostone high strength gypsum, and tested for compressive strength in accordance with ASTM D-2938 "Unconfined Compressive Strength of Intact Rock Core Specimens".

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES

TRINITY VISION / CENTRAL CITY PROJECT (FY 04)

FORT WORTH, TEXAS

Boring No.	Sample No.	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2488)	Moisture Content (%)	Unit Dry Weight (pcf)	Confining Pressure (tsf)	Q _u (tsf)	Strain @ Failure (%)	Type Failure
C-6	ST-1	5-7	Light gray and brown silty clay	27.2	96.6	0	0.892	7.4	Angular (80°)
	ST-2	12-14	Gray and brown silty clay	22.8	98.7				
	ST-3	17-19	Grayish-brown sandy clay						
	B-1	17-19	Grayish-brown sandy clay						
	ST-4	24-26	Light brown sandy clay	20.3	107.0	0	1.677	15.0	Internal Shear
	ST-5	31-33	Gray and brown sandy clay	19.8	108				
C-7	ST-6	38-40	Gray silty sand with clay						
	ST-1	2-4	Brown silty clay	17.7	108.1	0	1.920	1.8	Vertical Shear
	ST-2	10-12	Brown sandy clay	19	109.7				
	ST-3	17-19	Light brown silty clay	21.5	105.9	0	1.025	9.2	Internal Shear
	ST-4	24-26	Light brown clay	19.4	109.6				
	ST-5	31-33	Gray and tan clayey sand	18.9	102.4				
C-8	ST-6	38-40	Tan sandy clay with silt						
	ST-1	4-6	Brown sandy clay	16.6	112.6	0	6.37	15.0	Internal Shear
	ST-2	11-13	Reddish brown sandy clay	18.8	107.9	0	2.22	12.8	Internal Shear
	ST-3	18-20	Brown silty clay	21.5	107.3				
	ST-4	25-27	Brown silty clay	21.6	103.8	0	0.878	5.9	Angular (70°)
	ST-5	32-34	Gray and brown silty clay	24	100.1				
C-9	ST-6	38-40	Tan clayey sand						
	ST-1	1-3	Dark gray clay	18.1	109.9				
	B-1	8-11	Light brown clay with sand						
	ST-2	15-17	Light brown silty clay	18.8	110.8	0	1.901	15.0	Internal Shear
	ST-3	22-24	Brown silty clay with calcareous nodules	20.3	107				
	ST-4	30-32	Light brown clayey sand	20.7	104.1				
C-10	A	36.0-37.5	Tan sandy gravel						
	ST-1	3-5	Brown clayey sand	16.2	107.7				
	ST-2	10-12	Brown silty sand with clay	23.5	99.6	0	0.250	15.0	Internal Shear
	A	14-15.5	Gray sandy gravel with clay						
	ST-3	20-22	Brown silty clay	24.5	100.3				
	ST-4	27-29	Light brown sandy clay	24.5	102.9				
F-1	ST-5	36-38	Light gray silty sand with gravel and clay						
	ST-1	0-2.0	Brown sandy clay with gravel	13.5	115.7				
	ST-2	7.0-9.0	Brown sandy clay	16.3	112.5	0	4.10	6.6	Angular (80°)
	ST-3	15-17	Brown sandy clay						
	ST-4	22-24	Brown sandy clay						
	ST-5	30-32	Light brown sandy clay	20.3					
A	A	34-35.5	Light brown clay with sand	20.6					
	B	39-40.5	Brown sandy clay with occasional gravel						
	C	43.5-45	Light gray and brown sandy clay						

SUMMARY OF LABORATORY TEST RESULTS

LABORATORY TESTING SERVICES
TRINITY VISION / CENTRAL CITY PROJECT (FY 04)
FORT WORTH, TEXAS

Boring No.	Sample No.	Sample Depth (ft.)	Visual Description & Unified Soil Classification (ASTM D-2489)	Moisture Content (%)	Unit Dry Weight (pcf)	Confining Pressure (tsf)	Q _u (tsf)	Strain @ Failure (%)	Type Failure
F-2	ST-1	1.0-3.0	Brown clayey sand	SC	14				
	ST-2	8-10	Light brown silty clay with sanc	CL	19.5	0	1.201	7.7	Vertical Shear
	ST-3	15-17	Brown and gray silty clay with sanc	CL	20				
	ST-4	21.5-23.5	Brown and gray sandy clay	CL					
	ST-5	30-32	Gray silty clay	CL	24.2	103.2			
	ST-6	38-40	Gray silty clay with sanc	CL					
F-3	ST-1	3-5	Brown sandy clay with calcareous nodules	CL	13	123.1			
	ST-2	10-12	Brown sandy clay	CL	25.6	91.1	0	15.0	Internal Shear
	A	17-18.5	Tan gravelly sand with clay	SM-SC	13.8				
	B	22-23.5	Light brown sandy gravel	GW-GM	14.4				
	C	28-29.5	Tan and gray sandy gravel with clay seams	GC					
	D	36-39.5	Tan and gray sandy gravel with clay seams	GC	10.3				

PERMEABILITY TEST

(EM 1110-2-1906 30 NOV 70)

Project: Trinity River Vision Project No.: 042023 Date: 7/14/2004
 Sample No: C-1, ST-4, 20-22' Date Sampled: 4/26/2004
 Material Description: Light brown silty clay

SAMPLE MEASUREMENTS			MOISTURE CONTENT		
Wet weight sample+ring:	<u>183.1</u>	<u>g</u>	Tare No.:	<u>487</u>	
Ring weight:	<u>68.9</u>	<u>g</u>	Wet weight+tare:	<u>416.8</u>	<u>g</u>
Wet weight of sample:	<u>114.2</u>	<u>g</u>	Dry weight+tare:	<u>379.0</u>	<u>g</u>
Diameter:	<u>6.35</u>	<u>cm</u>	Tare weight:	<u>146.2</u>	<u>g</u>
Area:	<u>31.67</u>	<u>cm²</u>	Dry weight of sample:	<u>232.8</u>	<u>g</u>
Thickness:	<u>1.783</u>	<u>cm</u>	Weight of moisture:	<u>37.8</u>	<u>g</u>
Unit dry weight:	<u>108.6</u>	<u>pcf</u>	Percent moisture:	<u>16.2</u>	<u>%</u>

PERMEABILITY DATA

Date & Time	Elapsed Time (t) sec	Burette Readings		Permeability (k)	
		(H ₀) cm	(H ₁) cm	Single	Cumulative
7/15/04 02:15 PM		66.4			
7/16/04 08:30 AM	65,700		55.2	1.31E-08	
7/16/04 11:30 AM	10,800		53.6	1.27E-08	
7/16/04 04:00 PM	16,200		51.2	1.32E-08	
7/19/04 08:30 AM	232,200		27.2	1.27E-08	
	324,900				1.28E-08

Tube No.: 2
 Area of Tube: 0.0829 cm²
 Confining Load: 0.625 tsf

$$K = \left[\frac{axL}{A_{xt}} \right] \times \ln \left[\frac{H_0}{H_1} \right] \times R_T$$

K = 1.28E-08 cm/sec

Remarks: A temperature correction factor (R_T) of 1.00 is used
as this test was performed within a laboratory environment
maintained at or slightly above 68°F.

Tested by: A. Bennett

Computed by: J. Hutt

Checked by: J. Hutt

PERMEABILITY TEST

(EM 1110-2-1906 30 NOV 70)

Project: Trinity River Vision Project No.: 042023 Date: 7/14/2004
 Sample No: C-2, B-1, 4-5' Date Sampled: 4/29/2004
 Material Description: Brown sandy clay (Remolded in Laboratory)

SAMPLE MEASUREMENTS			MOISTURE CONTENT		
Wet weight sample+ring:	<u>186.7</u>	<u>g</u>	Tare No.:	<u>484</u>	
Ring weight:	<u>68.7</u>	<u>g</u>	Wet weight+tare:	<u>359.4</u>	<u>g</u>
Wet weight of sample:	<u>118.0</u>	<u>g</u>	Dry weight+tare:	<u>328.6</u>	<u>g</u>
Diameter:	<u>6.35</u>	<u>cm</u>	Tare weight:	<u>157.3</u>	<u>g</u>
Area:	<u>31.67</u>	<u>cm²</u>	Dry weight of sample:	<u>171.3</u>	<u>g</u>
Thickness:	<u>1.808</u>	<u>cm</u>	Weight of moisture:	<u>30.8</u>	<u>g</u>
Unit dry weight:	<u>109.0</u>	<u>pcf</u>	Percent moisture:	<u>18.0</u>	<u>%</u>

PERMEABILITY DATA

Date & Time	Elapsed Time (t) sec	Burette Readings		Permeability (k)	
		(H ₀) cm	(H ₁) cm	Single	Cumulative
7/15/04 02:15 PM		72.1			
7/16/04 08:30 AM	65,700		69.8	2.34E-09	
7/16/04 11:30 AM	10,800		69.4	2.52E-09	
7/16/04 04:00 PM	16,200		68.8	2.54E-09	
7/19/04 08:30 AM	232,200		60.6	2.59E-09	
	324,900				2.53E-09

Tube No.: 6
 Area of Tube: 0.0829 cm²
 Confining Load: 0.625 tsf

$$K = \left[\frac{axL}{Axt} \right] \times \ln \left[\frac{H_0}{H_1} \right] \times R_T$$

K = 2.53E-09 cm/sec

Remarks: A temperature correction factor (R_T) of 1.00 is used
as this test was performed within a laboratory environment
maintained at or slightly above 68°F.

Tested by: B. Weddell

Computed by: J. Hutt

Checked by: J. Hutt

PERMEABILITY TEST

(EM 1110-2-1906 30 NOV 70)

Project: Trinity River Vision Project No.: 042023 Date: 7/14/2004
 Sample No: C-3, ST-2, 10-12' Date Sampled: 5/13/2004
 Material Description: Light brown sandy clay

SAMPLE MEASUREMENTS			MOISTURE CONTENT		
Wet weight sample+ring:	<u>186.7</u>	<u>g</u>	Tare No.:	<u>460</u>	
Ring weight:	<u>68.9</u>	<u>g</u>	Wet weight+tare:	<u>582.1</u>	<u>g</u>
Wet weight of sample:	<u>117.8</u>	<u>g</u>	Dry weight+tare:	<u>524.9</u>	<u>g</u>
Diameter:	<u>6.35</u>	<u>cm</u>	Tare weight:	<u>175.4</u>	<u>g</u>
Area:	<u>31.67</u>	<u>cm²</u>	Dry weight of sample:	<u>349.5</u>	<u>g</u>
Thickness:	<u>1.791</u>	<u>cm</u>	Weight of moisture:	<u>57.2</u>	<u>g</u>
Unit dry weight:	<u>111.4</u>	<u>pcf</u>	Percent moisture:	<u>16.4</u>	<u>%</u>

PERMEABILITY DATA

Date & Time	Elapsed Time (t) sec	Burette Readings		Permeability (k)	
		(H ₀) cm	(H ₁) cm	Single	Cumulative
7/16/04 08:30 AM		71.5			
7/16/04 11:30 AM	10,800		58.6	8.64E-08	
7/16/04 04:00 PM	16,200		45.4	7.38E-08	
7/16/04 07:00 PM	10,800		37.5	8.30E-08	
7/17/04 08:30 AM	48,600		16.8	7.74E-08	
	86,400				7.86E-08

Tube No.: 2
 Area of Tube: 0.0829 cm²
 Confining Load: 0.625 tsf

$$K = \left[\frac{axL}{Axt} \right] x \ln \left[\frac{H_0}{H_1} \right] x R_T$$

K = 7.86E-08 cm/sec

Remarks: A temperature correction factor (R_T) of 1.00 is used
as this test was performed within a laboratory environment
maintained at or slightly above 68°F.

Tested by: A. Bennett

Computed by: J. Hutt

Checked by: J. Hutt

PERMEABILITY TEST

(EM 1110-2-1906 30 NOV 70)

Project: Trinity River Vision Project No.: 042023 Date: 7/14/2004

Sample No: C-4, ST-1, 4-6' Date Sampled: 5/17/2004

Material Description: Brown silty clay

SAMPLE MEASUREMENTS			MOISTURE CONTENT		
Wet weight sample+ring:	<u>187.0</u>	<u>g</u>	Tare No.:	<u>490</u>	
Ring weight:	<u>68.9</u>	<u>g</u>	Wet weight+tare:	<u>432.7</u>	<u>g</u>
Wet weight of sample:	<u>118.1</u>	<u>g</u>	Dry weight+tare:	<u>387.5</u>	<u>g</u>
Diameter:	<u>6.35</u>	<u>cm</u>	Tare weight:	<u>143.0</u>	<u>g</u>
Area:	<u>31.67</u>	<u>cm²</u>	Dry weight of sample:	<u>244.5</u>	<u>g</u>
Thickness:	<u>1.816</u>	<u>cm</u>	Weight of moisture:	<u>45.2</u>	<u>g</u>
Unit dry weight:	<u>108.2</u>	<u>pcf</u>	Percent moisture:	<u>18.5</u>	<u>%</u>

PERMEABILITY DATA

Date & Time	Elapsed Time (t) sec	Burette Readings		Permeability (k)	
		(H ₀) cm	(H ₁) cm	Single	Cumulative
7/15/04 09:15 AM		68.5			
7/15/04 02:15 PM	18,000		59.8	3.59E-08	
7/16/04 08:30 AM	65,700		35.5	3.77E-08	
7/16/04 11:30 AM	10,800		33.0	3.21E-08	
7/16/04 04:00 PM	16,200		29.3	3.49E-08	
	110,700				3.65E-08

Tube No.: 3
 Area of Tube: 0.0829 cm²
 Confining Load: 0.625 tsf

$$K = \left[\frac{axL}{A_{xt}} \right] \times \ln \left[\frac{H_0}{H_1} \right] \times R_T$$

K = 3.65E-08 cm/sec

Remarks: A temperature correction factor (R_T) of 1.00 is used
as this test was performed within a laboratory environment
maintained at or slightly above 68°F.

Tested by: A. Bennett

Computed by: J. Hutt

Checked by: J. Hutt

PERMEABILITY TEST

(EM 1110-2-1906 30 NOV 70)

Project: Trinity River Vision Project No.: 042023 Date: 7/14/2004

Sample No: C-4, B-1, 11-13' Date Sampled: 5/19/2004

Material Description: Reddish brown sandy clay (Remolded in Laboratory)

SAMPLE MEASUREMENTS			MOISTURE CONTENT		
Wet weight sample+ring:	<u>192.0</u>	g	Tare No.:	<u>481</u>	
Ring weight:	<u>68.7</u>	g	Wet weight+tare:	<u>454.6</u>	g
Wet weight of sample:	<u>123.3</u>	g	Dry weight+tare:	<u>422.6</u>	g
Diameter:	<u>6.35</u>	cm	Tare weight:	<u>187.6</u>	g
Area:	<u>31.67</u>	cm ²	Dry weight of sample:	<u>235.0</u>	g
Thickness:	<u>1.811</u>	cm	Weight of moisture:	<u>32.0</u>	g
Unit dry weight:	<u>118.1</u>	pcf	Percent moisture:	<u>13.6</u>	%

PERMEABILITY DATA

Date & Time	Elapsed Time (t) sec	Burette Readings		Permeability (k)	
		(H ₀) cm	(H ₁) cm	Single	Cumulative
7/15/04 02:15 PM		49.0			
7/16/04 08:30 AM	65,700		45.3	5.67E-09	
7/16/04 11:30 AM	10,800		44.7	5.85E-09	
7/16/04 04:00 PM	16,200		43.9	5.28E-09	
7/19/04 08:30 AM	232,200		32.9	5.89E-09	
	324,900				5.81E-09

Tube No.: 7

Area of Tube: 0.0829 cm²

Confining Load: 0.625 tsf

$$K = \left[\frac{axL}{A_{xt}} \right] \times \ln \left[\frac{H_0}{H_1} \right] \times R_T$$

K = 5.81E-09 cm/sec

Remarks: A temperature correction factor (R_T) of 1.00 is used
as this test was performed within a laboratory environment
maintained at or slightly above 68°F.

Tested by: B. Weddell

Computed by: J. Hutt

Checked by: J. Hutt

PERMEABILITY TEST

(EM 1110-2-1906 30 NOV 70)

Project: Trinity River Vision Project No.: 042023 Date: 7/14/2004
 Sample No: C-6, B-1, 17-19' Date Sampled: 5/6/2004
 Material Description: Grayish brown sandy clay (Remolded in Laboratory)

SAMPLE MEASUREMENTS			MOISTURE CONTENT		
Wet weight sample+ring:	<u>187.0</u>	<u>g</u>	Tare No.:	<u>483</u>	
Ring weight:	<u>68.7</u>	<u>g</u>	Wet weight+tare:	<u>580.1</u>	<u>g</u>
Wet weight of sample:	<u>118.3</u>	<u>g</u>	Dry weight+tare:	<u>516.9</u>	<u>g</u>
Diameter:	<u>6.35</u>	<u>cm</u>	Tare weight:	<u>156.3</u>	<u>g</u>
Area:	<u>31.67</u>	<u>cm²</u>	Dry weight of sample:	<u>360.6</u>	<u>g</u>
Thickness:	<u>1.814</u>	<u>cm</u>	Weight of moisture:	<u>63.2</u>	<u>g</u>
Unit dry weight:	<u>109.4</u>	<u>pcf</u>	Percent moisture:	<u>17.5</u>	<u>%</u>

PERMEABILITY DATA

Date & Time	Elapsed Time (t) sec	Burette Readings		Permeability (k)	
		(H ₀) cm	(H ₁) cm	Single	Cumulative
7/15/04 02:15 PM		69.2			
7/16/04 08:30 AM	65,700		67.9	1.37E-09	
7/16/04 11:30 AM	10,800		67.6	1.95E-09	
7/16/04 04:00 PM	16,200		67.3	1.30E-09	
7/19/04 08:30 AM	232,200		62.9	1.38E-09	
	324,900				1.39E-09

Tube No.: 8
 Area of Tube: 0.0829 cm²
 Confining Load: 0.625 tsf

$$K = \left[\frac{axL}{Axt} \right] \times \ln \left[\frac{H_0}{H_1} \right] \times R_T$$

K = 1.39E-09 cm/sec

Remarks: A temperature correction factor (R_T) of 1.00 is used
as this test was performed within a laboratory environment
maintained at or slightly above 68°F.

Tested by: B. Weddell

Computed by: J. Hutt

Checked by: J. Hutt

PERMEABILITY TEST

(EM 1110-2-1906 30 NOV 70)

Project: Trinity River Vision Project No.: 042023 Date: 7/14/2004
 Sample No: C-7, ST-2, 10-12' Date Sampled: 5/11/2004
 Material Description: Brown sandy clay

SAMPLE MEASUREMENTS			MOISTURE CONTENT		
Wet weight sample+ring:	189.1	g	Tare No.:	488	
Ring weight:	68.9	g	Wet weight+tare:	373.8	g
Wet weight of sample:	120.2	g	Dry weight+tare:	337.3	g
Diameter:	6.35	cm	Tare weight:	145.3	g
Area:	31.67	cm ²	Dry weight of sample:	192.0	g
Thickness:	1.808	cm	Weight of moisture:	36.5	g
Unit dry weight:	110.1	pcf	Percent moisture:	19.0	%

PERMEABILITY DATA

Date & Time	Elapsed Time (t) sec	Burette Readings		Permeability (k)	
		(H ₀) cm	(H ₁) cm	Single	Cumulative
7/15/04 02:15 PM		68.1			
7/16/04 08:30 AM	65,700		62.2	6.53E-09	
7/16/04 11:30 AM	10,800		61.3	6.39E-09	
7/16/04 04:00 PM	16,200		59.9	6.75E-09	
7/19/04 08:30 AM	232,200		43.8	6.38E-09	
	324,900				6.43E-09

Tube No.: 1
 Area of Tube: 0.0829 cm²
 Confining Load: 0.625 tsf

$$K = \left[\frac{axL}{A_{xt}} \right] \times \ln \left[\frac{H_0}{H_1} \right] \times R_T$$

K = 6.43E-09 cm/sec

Remarks: A temperature correction factor (R_T) of 1.00 is used
as this test was performed within a laboratory environment
maintained at or slightly above 68°F.

Tested by: A. Bennett

Computed by: J. Hutt

Checked by: J. Hutt

PERMEABILITY TEST

(EM 1110-2-1906 30 NOV 70)

Project: Trinity River Vision Project No.: 042023 Date: 7/14/2004
 Sample No: C-9, B-1, 8-11' Date Sampled: 5/10/2004
 Material Description: Light brown clay with sand (Remolded in Laboratory)

SAMPLE MEASUREMENTS			MOISTURE CONTENT		
Wet weight sample+ring:	<u>185.3</u>	<u>g</u>	Tare No.:	<u>463</u>	
Ring weight:	<u>68.7</u>	<u>g</u>	Wet weight+tare:	<u>555.6</u>	<u>g</u>
Wet weight of sample:	<u>116.6</u>	<u>g</u>	Dry weight+tare:	<u>494.9</u>	<u>g</u>
Diameter:	<u>6.35</u>	<u>cm</u>	Tare weight:	<u>189.0</u>	<u>g</u>
Area:	<u>31.67</u>	<u>cm²</u>	Dry weight of sample:	<u>305.9</u>	<u>g</u>
Thickness:	<u>1.811</u>	<u>cm</u>	Weight of moisture:	<u>60.7</u>	<u>g</u>
Unit dry weight:	<u>105.9</u>	<u>pcf</u>	Percent moisture:	<u>19.8</u>	<u>%</u>

PERMEABILITY DATA

Date & Time	Elapsed Time (t) sec	Burette Readings		Permeability (k)	
		(H ₀) cm	(H ₁) cm	Single	Cumulative
7/15/04 02:15 PM		69.0			
7/16/04 08:30 AM	65,700		68.2	8.41E-10	
7/16/04 11:30 AM	10,800		68.1	6.44E-10	
7/16/04 04:00 PM	16,200		67.9	8.61E-10	
7/19/04 08:30 AM	232,200		65.6	7.04E-10	
	324,900				7.37E-10

Tube No.: 9
 Area of Tube: 0.0829 cm²
 Confining Load: 0.625 tsf

$$K = \left[\frac{axL}{Axt} \right] \times \ln \left[\frac{H_0}{H_1} \right] \times R_T$$

K = 7.37E-10 cm/sec

Remarks: A temperature correction factor (R_T) of 1.00 is used
as this test was performed within a laboratory environment
maintained at or slightly above 68°F.

Tested by: B. Weddell

Computed by: J. Hutt

Checked by: J. Hutt

PERMEABILITY TEST

(EM 1110-2-1906 30 NOV 70)

Project: Trinity River Vision Project No.: 042023 Date: 7/14/2004
 Sample No: C-10, ST-1, 3-5' Date Sampled: 5/3/2004
 Material Description: Brown clayey sand

SAMPLE MEASUREMENTS			MOISTURE CONTENT		
Wet weight sample+ring:	<u>183.2</u>	<u>g</u>	Tare No.:	<u>486</u>	
Ring weight:	<u>68.9</u>	<u>g</u>	Wet weight+tare:	<u>465.0</u>	<u>g</u>
Wet weight of sample:	<u>114.3</u>	<u>g</u>	Dry weight+tare:	<u>419.9</u>	<u>g</u>
Diameter:	<u>6.35</u>	<u>cm</u>	Tare weight:	<u>141.6</u>	<u>g</u>
Area:	<u>31.67</u>	<u>cm²</u>	Dry weight of sample:	<u>278.3</u>	<u>g</u>
Thickness:	<u>1.803</u>	<u>cm</u>	Weight of moisture:	<u>45.1</u>	<u>g</u>
Unit dry weight:	<u>107.5</u>	<u>pcf</u>	Percent moisture:	<u>16.2</u>	<u>%</u>

PERMEABILITY DATA

Date & Time	Elapsed Time (t) sec	Burette Readings		Permeability (k)	
		(H ₀) cm	(H ₁) cm	Single	Cumulative
<u>7/16/04 08:30 AM</u>		<u>67.2</u>			
<u>7/16/04 11:30 AM</u>	<u>10,800</u>		<u>48.9</u>	<u>1.39E-07</u>	
<u>7/16/04 02:15 PM</u>	<u>9,900</u>		<u>36.8</u>	<u>1.36E-07</u>	
<u>7/16/04 04:00 PM</u>	<u>6,300</u>		<u>31.8</u>	<u>1.09E-07</u>	
<u>7/16/04 07:00 PM</u>	<u>10,800</u>		<u>24.5</u>	<u>1.14E-07</u>	
	<u>37,800</u>				<u>1.26E-07</u>

Tube No.: 1
 Area of Tube: 0.0829 cm²
 Confining Load: 0.625 tsf

$$K = \left[\frac{axL}{A_{xt}} \right] \times \ln \left[\frac{H_0}{H_1} \right] \times R_T$$

K = 1.26E-07 cm/sec

Remarks: A temperature correction factor (R_T) of 1.00 is used
as this test was performed within a laboratory environment
maintained at or slightly above 68°F.

Tested by: A. Bennett

Computed by: J. Hutt

Checked by: J. Hutt

TEAM Consultants, Inc.

Geotechnical, Environmental, Construction Materials Testing

August 4, 2004
TEAM Project No. 042023
Report No. 2

U.S. Army Corps of Engineers
CESWF-EC-DG
PO Box 17300
Fort Worth, Texas 76102-0300

Attn: Mr. Doug Massoth, P.E.

Re: Laboratory Testing Services
Central City/ Trinity River Vision, Fort Worth, TX
BPA Number W9126-04-A-0001-0017

Dear Mr. Massoth:

Submitted here are the Consolidated Undrained Triaxial Tests completed to date by Henley Johnston and Associates, Inc. We have attached the data sheets and graphical presentations that were prepared and reviewed by Mr. John Johnston, P.E. This submittal includes the insitu tests completed for Borings C-1 and C-3. As additional tests are completed, the results will be forwarded for your use.

We appreciate the opportunity to be of assistance to you with this project. Should you have any questions, or if we may be of further assistance, please call the undersigned at (817) 467-5500.

Very truly yours,
TEAM Consultants, Inc.



James Hutt
Technical Services Manager



Daryl Bennett, P.E.
Senior Project Engineer

JH/DB/lw

Attachments:

Test Data Sheets, Boring C-1, 30.0-31.5'
Test Data Sheets, Boring C-3, 3.0-4.5'



**HENLEY
JOHNSTON
& ASSOCIATES, INC.**
engineering geoscience consultants
235 Morgan Ave., Dallas, Texas 75203 - 1088

Letter of Transmittal
(214) 941-3808
fax (214) 943-7645

To: Team Consultants, Inc.
3101 Pleasant Valley
Suite 101
Arlington, Texas 76015

Date: 04 August 2004
Project: Team No. 042023 & 042030
Attn: Mr. Jim Hutt

We are pleased to send you:

- reports plans logs change orders
 copies invoice specs

Identity	Dated	Qty	Description
		1	Set of originals of illustrations and
			one set of copies of data sheets for
			two CU triaxial compression tests, 042023
		1	Set of copies of data sheets for 042030

- as requested for comment to be returned for approval
 for your use returned with correction returned approved as is

Comments _____

Sincerely yours,

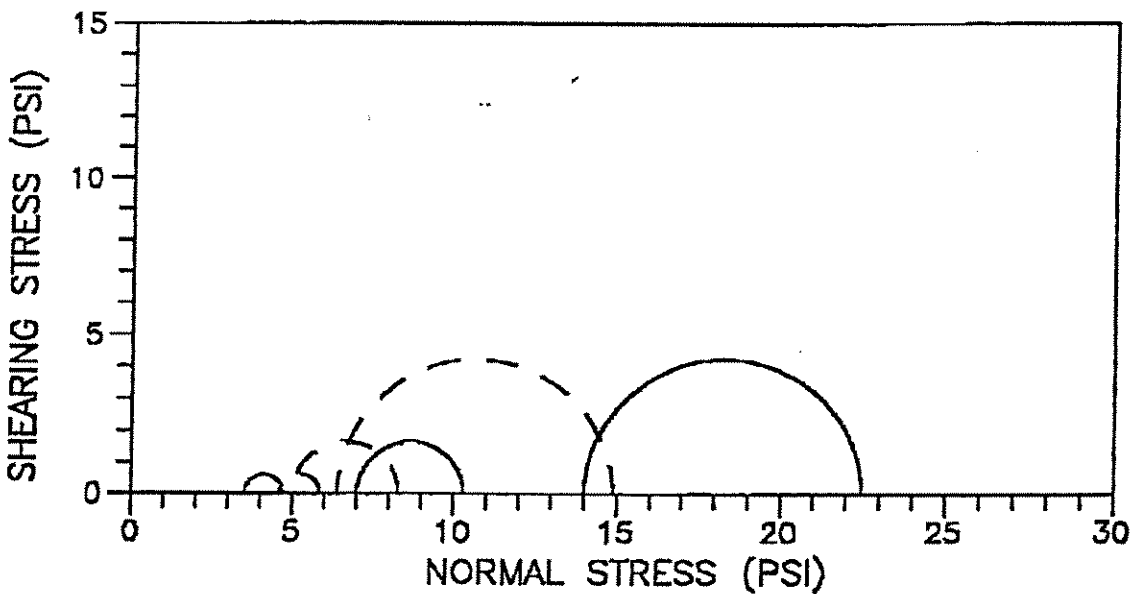
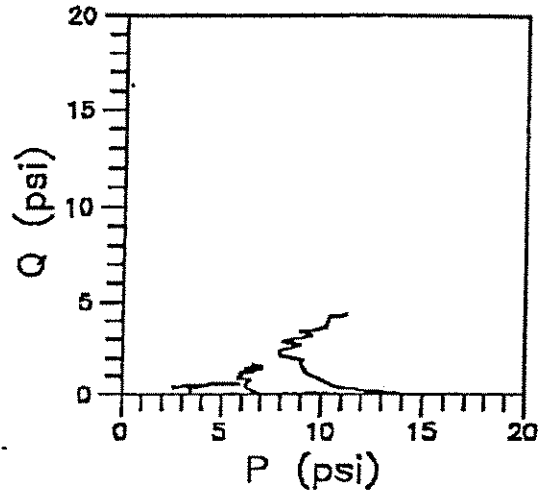
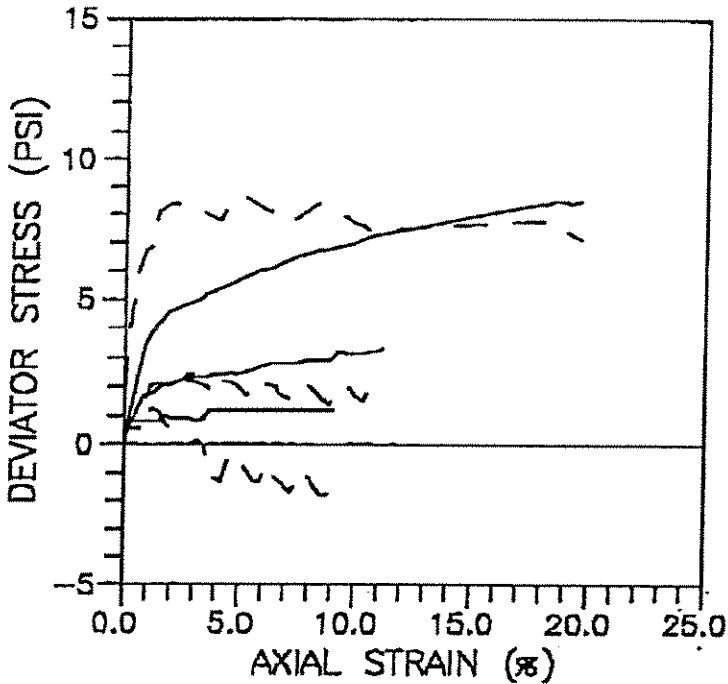
John W. Johnston, P.E.

Henley - Johnston & Associates, Inc.
Project:

HJA7630

BORING NO.: C-1
 DEPTH (FT): (A) 30.0-30.5
 (B) 30.5-31.0
 (C) 31.0-31.5

CLAY, sandy, silty,
 yellowish-brown



SAMPLE :	A	B	C
MOISTURE CONTENT (%):	23.0	22.8	20.6
DRY UNIT WEIGHT (PCF):	107.3	102.0	106.1
DEG. OF SATURATION (%):	102.4	93.4	90.5
CONFINING PRESSURE (PSI):	3.5	7.0	14.0
FAILURE DESCRIPTION:	BULGE	BULGE	BULGE
ASSUMED SPECIFIC GRAVITY:	2.65		
TEST TYPE:	CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION (ASTM D 4767)		

TEAM CONSULTANTS, INC. PROJECT No. 042023	
TRIAXIAL COMPRESSION TEST STRESS-STRAIN PLOT	
HENLEY-JOHNSTON & ASSOCIATES, INC. engineering geoscience consultants	
HJA NO.: 7830	PLATE
DATE TESTED: 07/13/04	


 * CONSOLIDATED-LNDRAINED *
 * TRIAXIAL COMPRESSION TEST *
 * ASTM D 4767 *

PROJECT NAME: TEAM PROJECT No. 042023
 JOB NUMBER: 7630
 BORING NUMBER: C-1
 SAMPLE DEPTH: 30.0-30.5

SAMPLE DESCRIPTION: CLAY, sandy, silty, yellowish-brown

CONFINING PRESSURES: 3.5

FILE NAME: CUSOLPR ENT DATE: 08/03/04
 FILE TYPE: LAB DATA COMP BY: HMM
 DATA SOURCE: HJA LAB TEST DATE: 07/14/04

CHK DATE: 08/04/04
 CHK BY: 

DIAMETER OF SAMPLE (in.): 2.7790
 AREA OF SAMPLE (in.²): 6.0655
 LENGTH OF SPECIMEN (in.): 5.6020
 (BEFORE) (AFTER)
 WEIGHT OF SAMPLE (gm.): 1177.00 1162.1
 WET WEIGHT + TARE (gm.): 99.36 1236.6
 DRY WEIGHT + TARE (gm.): 89.68 1039.5
 TARE WEIGHT (gm.): 47.59 74.51
 SPECIFIC GRAVITY: 2.65 ASSUMED
 MOISTURE CONTENT (%): 23.0 20.4
 DRY UNIT WEIGHT (pcf): 107.3 108.2
 SATURATION OF SAMPLE (%): 112.6 102.4
 SAMPLE HEIGHT/DIAM. RATIO: 2.02

COUNT # DATA: 33

AXIAL DIAL (in.)	PROVING RING (div.)	PORE PRESSURE (psf)	AXIAL LOAD (lbs.)	AXIAL STRAIN (%)	DEVIATOR STRESS (psf)	PORE PRESSURE (psf)	P	Q
CONFIN. PRESS. (STAGE 1):			3.5					
0.000	0	32.2	0	0.0000	0.0	0	3.5	0
0.008	5	32.7	4.9	0.1428	0.8	0.5	3.403347	0.403347
0.018	5	32.8	4.9	0.3392	0.8	0.6	3.302554	0.402554
0.032	5	32.8	4.9	0.5712	0.8	0.6	3.301618	0.401618
0.044	5	32.7	4.9	0.7854	0.8	0.5	3.400751	0.400751
0.050	5	32.6	4.9	0.8925	0.8	0.4	3.500318	0.400318
0.071	5	33.5	4.9	1.2574	0.8	1.3	2.598804	0.398804
0.087	5	33.3	4.9	1.5530	0.8	1.1	2.79785	0.39785
0.102	6	32.9	5.88	1.8208	1.0	0.7	3.275883	0.475883
0.118	6	32.7	5.88	2.1084	0.9	0.5	3.474498	0.474498
0.133	6	32.4	5.88	2.3742	0.9	0.2	3.7732	0.4732
0.145	6	32.2	5.88	2.5884	0.9	0	3.972162	0.472162
0.161	6	32.2	5.88	2.8740	0.9	0	3.970778	0.470778
0.177	5	32.4	4.9	3.1596	0.8	0.2	3.691181	0.391181
0.192	6	32.2	5.88	3.4273	0.9	0	3.968096	0.468096
0.208	8	31.1	7.84	3.7130	1.2	-1.1	5.222282	0.822282
0.223	8	31	7.84	3.9807	1.2	-1.2	5.320551	0.820551
0.236	8	30.8	7.84	4.1849	1.2	-1.3	5.419167	0.819167
0.256	8	31.9	7.84	4.5898	1.2	-0.3	4.416744	0.616744
0.273	8	31.7	7.84	4.8733	1.2	-0.5	4.814783	0.814783
0.289	8	31.4	7.84	5.1589	1.2	-0.8	4.912937	0.812937
0.312	8	30.9	7.84	5.5684	1.2	-1.3	5.410284	0.610284
0.328	8	30.9	7.84	5.8551	1.2	-1.3	5.408438	0.608438
0.348	8	31.5	7.84	6.2121	1.2	-0.7	4.80613	0.60613
0.362	8	31.1	7.84	6.4620	1.2	-1.1	5.204515	0.604515
0.378	8	30.9	7.84	6.7478	1.2	-1.3	5.402689	0.602689
0.403	8	30.5	7.84	7.1939	1.2	-1.7	5.799785	0.599785
0.427	8	31.3	7.84	7.8223	1.2	-0.9	4.997017	0.597017
0.449	8	31	7.84	8.0150	1.2	-1.2	5.294478	0.594478
0.462	8	30.7	7.84	8.2471	1.2	-1.5	5.592979	0.592979
0.481	8	30.4	7.84	8.5862	1.2	-1.8	5.890787	0.590787
0.496	8	30.5	7.84	8.8540	1.2	-1.7	5.789056	0.589056
0.507	8	31.2	7.84	9.0503	1.2	-1	5.087787	0.587787

CONSOLIDATED-UNDRAINED
 TRIAXIAL COMPRESSION TEST
 ASTM D 4767

PROJECT NAME: TEAM PROJECT No. 042023
 JOB NUMBER: 7630
 BORING NUMBER: C-1
 SAMPLE DEPTH: 30.5-31.0

SAMPLE DESCRIPTION: CLAY, sandy, alty, yellowish-brown

CONFINING PRESSURES: 7

FILE NAME: C-10305 ENT DATE: 08/03/04
 FILE TYPE: LAB DATA COMP BY: HMM
 DATA SOURCE: HJA LAB TEST DATE: 07/16/04
 CHK DATE: 08/04/04
 CHK BY: [Signature]

DIAMETER OF SAMPLE (in.): 2.8710
 AREA OF SAMPLE (in.²): 6.4738
 LENGTH OF SPECIMEN (in.): 5.7180
 WEIGHT OF SAMPLE (gm.): 1217.40 (BEFORE) 1215.2 (AFTER)
 WET WEIGHT + TARE (gm.): 82.83 1292.3
 DRY WEIGHT + TARE (gm.): 78.12 1079.2
 TARE WEIGHT (gm.): 46.23 77.14
 SPECIFIC GRAVITY: 2.85 ASSUMED
 MOISTURE CONTENT (%): 22.8 21.3
 DRY UNIT WEIGHT (pcf): 102.0 103.1
 SATURATION OF SAMPLE (%): 97.3 93.4
 SAMPLE HEIGHT/DIAM. RATIO: 1.99

COUNT # DATA: 30

AXIAL DIAL (in.)	PROVING RING (dth.)	PORE PRESSURE (psf)	AXIAL LOAD (lbs.)	AXIAL STRAIN (%)	DEVIATOR STRESS (psi)	PORE PRESSURE (psi)	P	Q
CONFIN. PRESS. (STAGE 1):								
0.000	0	31.2	0	0.0000	0.0	0	7	0
0.008	3	31.9	2.94	0.1399	0.5	0.7	6.526753	0.226753
0.017	5	32.3	4.9	0.2973	0.8	1.1	6.277326	0.377326
0.025	6	32.4	5.88	0.4372	0.9	1.2	6.252156	0.452156
0.037	9	32.6	8.82	0.6471	1.4	1.4	6.276804	0.676804
0.050	11	32.6	10.78	0.8744	1.7	1.4	6.425312	0.825312
0.087	12	33.3	11.76	1.1717	1.8	2.1	5.79764	0.89764
0.091	13	33.3	12.74	1.4168	1.9	2.1	5.870034	0.970034
0.100	14	33.3	13.72	1.7489	2.1	2.1	5.941131	1.041131
0.115	14	33.2	13.72	2.0112	2.1	2	6.036351	1.036351
0.169	16	33.5	15.88	2.9568	2.4	2.3	5.87525	1.17525
0.155	16	33.4	15.88	2.7107	2.4	2.2	5.978215	1.178215
0.174	16	33.4	15.88	3.0430	2.3	2.2	5.974191	1.174191
0.180	16	33.3	15.88	3.3228	2.3	2.1	6.070803	1.170803
0.204	16	33.2	15.88	3.5877	2.3	2	6.167837	1.167837
0.220	16.5	32.0	16.17	3.8475	2.4	1.7	6.500838	1.200838
0.233	16.5	33.4	16.17	4.0749	2.4	2.2	5.997998	1.197998
0.251	16.5	33.4	16.17	4.3886	2.4	2.2	5.994087	1.194087
0.263	17	33.4	16.68	4.5935	2.5	2.2	6.02755	1.22755
0.275	17	33.3	16.68	4.8094	2.4	2.1	6.12485	1.22485
0.287	17.5	33	17.15	5.1841	2.5	1.8	6.455779	1.255779
0.318	18	32.8	17.64	5.5614	2.5	1.6	6.586654	1.286654
0.335	19	33.3	18.82	6.8587	2.7	2.1	6.25386	1.35386
0.348	19	33.3	18.82	6.0860	2.7	2.1	6.25059	1.35059
0.359	20	33.3	18.6	6.2784	2.8	2.1	6.318782	1.418782
0.372	20	33.2	19.8	6.5068	2.8	2	6.41532	1.41532
0.384	20	33	19.6	6.7156	2.8	1.8	6.612143	1.412143
0.404	20	32.8	18.8	7.0654	2.8	1.6	6.806848	1.406848
0.422	20	33.3	19.8	7.3802	2.8	2.1	6.302083	1.402083
0.451	20.5	33.3	20.09	7.8874	2.9	2.1	6.329265	1.429265
0.476	21	33	20.58	8.3246	2.9	1.8	6.557176	1.457176
0.507	21	32.6	20.58	8.8667	2.9	1.4	7.048558	1.448558
0.528	23	33.2	22.54	9.2340	3.2	2	6.580123	1.580123
0.550	23	33.2	22.54	9.8187	3.1	2	6.573425	1.573425
0.572	23	32.9	22.54	10.0035	3.1	1.7	6.666727	1.566727
0.590	23	32.7	22.54	10.3183	3.1	1.5	7.061247	1.581247
0.608	23.5	33.2	23.03	10.6331	3.2	2	6.588587	1.588587
0.622	23.5	33.1	23.03	10.8779	3.2	1.9	6.68232	1.58232
0.638	24.5	33.2	24.01	11.1577	3.3	2	6.6475	1.6475

 * CONSOLIDATED-UNDRAINED *
 * TRIAXIAL COMPRESSION TEST *
 * ASTM D 4767 *

PROJECT NAME: TEAM PROJECT No. 042023
 JOB NUMBER: 7630
 BORING NUMBER: C-1
 SAMPLE DEPTH: 31.0-31.5

SAMPLE DESCRIPTION: CLAY, sandy, silty, yellowish-brown

CONFINING PRESSURES: 14

FILE NAME: C-10305 ENT DATE: 08/03/04
 FILE TYPE: LAB DATA COMP BY: HMM
 DATA SOURCE: HJA LAB TEST DATE: 07/14/04

CHK DATE: 08/04/04
 CHK BY: *[Signature]*

DIAMETER OF SAMPLE (In.): 2.8330
 AREA OF SAMPLE (In.sq.): 8.3035
 LENGTH OF SPECIMEN (In.): 5.7130
 (BEFORE) (AFTER)
 WEIGHT OF SAMPLE (gm.): 1210.40 1193
 WET WEIGHT + TARE (gm.): 89.70 1270.5
 DRY WEIGHT + TARE (gm.): 82.48 1078.5
 TARE WEIGHT (gm.): 47.51 77.46

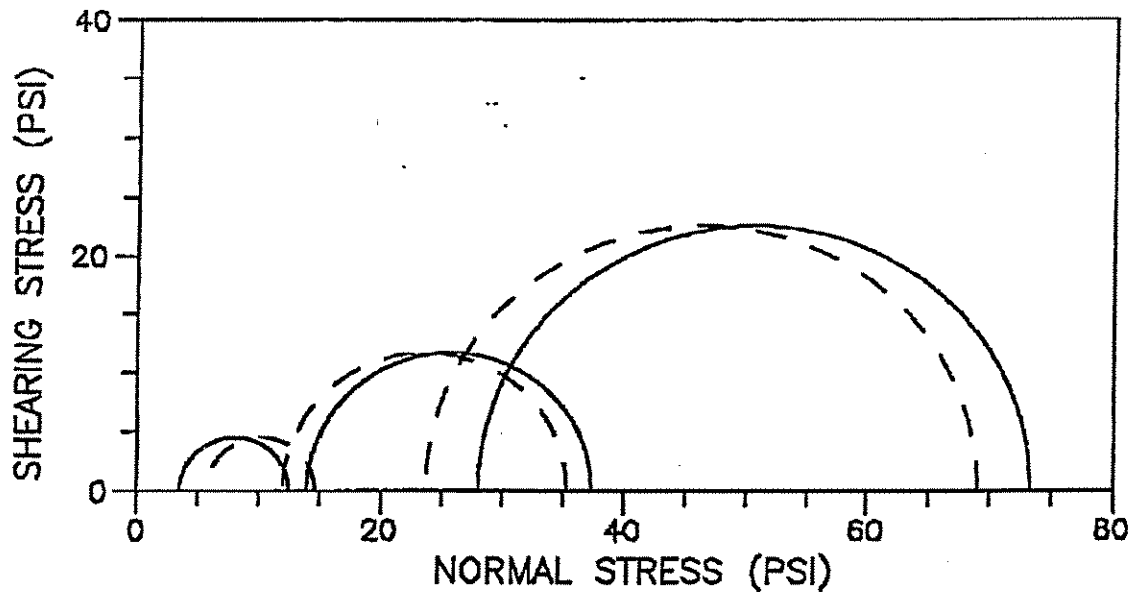
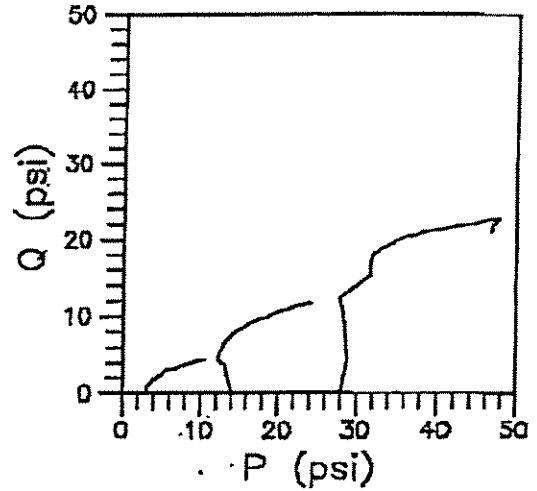
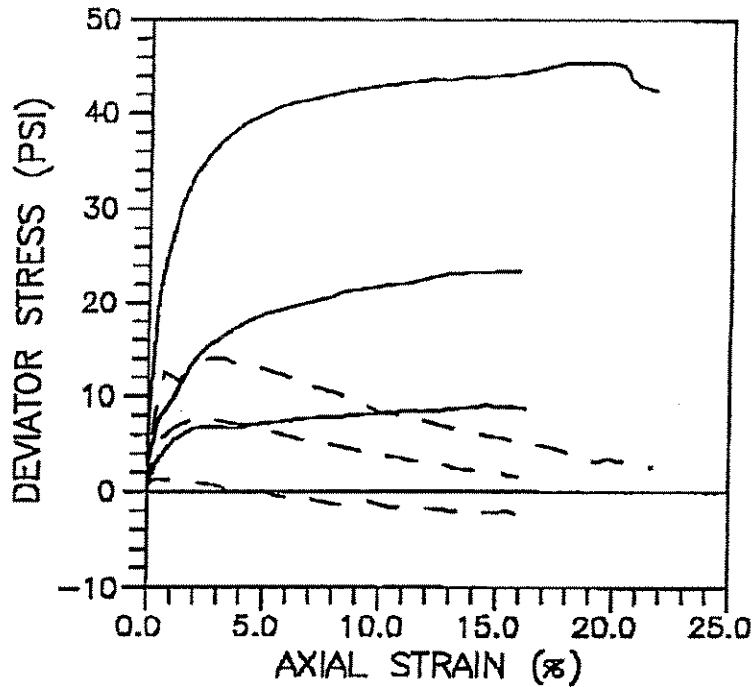
SPECIFIC GRAVITY: 2.65 ASSUMED
 MOISTURE CONTENT (%): 20.6 19.2
 DRY UNIT WEIGHT (pcf): 106.1 105.0
 SATURATION OF SAMPLE (%): 98.0 90.5
 SAMPLE HEIGHT/DIAM. RATIO: 2.02

COUNT # DATA: 30

AXIAL DIAL (In.)	PROVING RING (div.)	PORE PRESSURE (psi)	AXIAL LOAD (lba.)	AXIAL STRAIN (%)	DEVIATOR STRESS (psi)	PORE PRESSURE (psi)	P	Q
CONFIN. PRESS. (STAGE 1):								
0.000	0	27.9	0	0.0000	0.0	0	14	0
0.010	5	31.4	4.9	0.1750	0.8	3.5	10.88799	0.387991
0.035	16	34	15.88	0.6126	2.5	6.1	9.13613	1.23613
0.053	22	34.6	21.56	0.9277	3.4	6.7	8.994291	1.694291
0.066	25	34.8	24.5	1.1553	3.8	6.9	9.020908	1.920908
0.082	27	36	26.48	1.4353	4.1	8.1	7.988703	2.068703
0.114	30	36.3	29.4	1.9954	4.8	8.4	7.885496	2.285496
0.147	32	36.2	31.36	2.5731	4.8	8.3	8.123494	2.423494
0.185	33.5	36	32.83	3.2382	5.0	8.1	8.419774	2.519774
0.203	34.5	35.9	33.81	3.5533	5.2	8	8.586542	2.586542
0.233	36	35.7	35.28	4.0784	5.4	7.8	8.884306	2.684306
0.270	38	36.8	37.24	4.7261	5.8	8.7	8.114302	2.814302
0.295	39	38.5	38.22	5.1837	5.8	8.8	8.275097	2.875097
0.326	41	36.2	40.18	5.7063	6.0	8.3	8.705243	3.005243
0.359	42	36	41.16	6.2839	6.1	8.1	8.959683	3.059683
0.404	44	35.6	43.12	7.0716	6.4	7.7	9.478442	3.178442
0.473	47	36.3	46.08	8.2794	6.7	8.4	8.951027	3.351027
0.493	47	36.2	46.06	8.6294	6.7	8.3	9.038237	3.338237
0.514	48	36	47.04	8.9970	6.8	8.1	8.295548	3.395548
0.543	49	35.8	48.02	9.5048	6.9	7.9	9.546954	3.446954
0.585	50	35.6	49	9.8897	7.0	7.7	9.802332	3.502332
0.585	51	35.5	49.97	10.2388	7.1	7.8	9.957788	3.557788
0.601	52	35.3	50.94	10.5199	7.2	7.4	10.21553	3.615535
1.026	66	35.7	64.52	17.9590	8.4	7.8	10.39867	4.198673
1.034	66.5	35.7	65.005	18.0881	8.4	7.8	10.42301	4.223014
1.041	66.5	35.6	65.005	18.2216	8.4	7.7	10.5167	4.216697
1.058	67	35.5	65.49	18.4842	8.5	7.6	10.63452	4.234518
1.072	67.2	35.4	65.584	18.7642	8.5	7.5	10.73247	4.23247
1.098	67.3	35.2	65.781	19.2193	8.4	7.3	10.91497	4.214974
1.120	68.5	35	66.945	19.6044	8.5	7.1	11.16911	4.26911

BORING NO.: C-3
 DEPTH (FT): (A) 3.0-3.5
 (B) 3.5-4.0
 (C) 4.0-5.0

CLAY, slightly sandy,
 dark brown



SAMPLE :	A	B	C
MOISTURE CONTENT (%):	19.3	19.5	18.2
DRY UNIT WEIGHT (PCF):	105.1	107.1	110.2
DEG. OF SATURATION (%):	107.1	102.5	103.1
CONFINING PRESSURE (PSI):	3.5	14.0	28.0
FAILURE DESCRIPTION:	BULGE	BULGE	BULGE
ASSUMED SPECIFIC GRAVITY:	2.65		
TEST TYPE:	CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION (ASTM D 4767)		

TEAM CONSULTANTS, INC. PROJECT No. 042023	
TRIAXIAL COMPRESSION TEST STRESS-STRAIN PLOT	
HENLEY-JOHNSTON & ASSOCIATES, INC. engineering geoscience consultants	
HJA NO.: 7630	PLATE
DATE TESTED: 07/19/04	

 * CONSOLIDATED-UNDRAINED *
 * TRIAXIAL COMPRESSION TEST *
 * ASTM D 4767 *


PROJECT NAME: TEAM PROJECT No. 042023
 JOB NUMBER: 7630
 BORING NUMBER: C-3
 SAMPLE DEPTH: 3.0-3.5

SAMPLE DESCRIPTION: CLAY, slightly sandy, dark brown

CONFINING PRESSURES: 3.5

FILE NAME: G-30030
 FILE TYPE: LAB DATA
 DATA SOURCE: HJA LAB

ENT DATE: 08/03/04
 COMP BY: HMM
 TEST DATE: 07/19/04

CHK DATE: 08/04/04
 CHK BY: 

DIAMETER OF SAMPLE (in.):	2.8600	
AREA OF SAMPLE (in.sq.):	6.4242	
LENGTH OF SPECIMEN (in.):	4.7070	
	(BEFORE)	(AFTER)
WEIGHT OF SAMPLE (gm.):	995.20	1020.7
WET WEIGHT + TARE (gm.):	66.59	1092.3
DRY WEIGHT + TARE (gm.):	63.30	894.2
TARE WEIGHT (gm.):	46.27	71.65
SPECIFIC GRAVITY:	2.65	ASSUMED
MOISTURE CONTENT (%):	19.3	24.1
DRY UNIT WEIGHT (pcf):	105.1	103.6
SATURATION OF SAMPLE (%):	89.2	107.1
SAMPLE HEIGHT/DIAM. RATIO:	1.65	

COUNT # DATA: 24

AXIAL DIAL (in.)	PROVING RING (dlv.)	PORE PRESSURE (psf)	AXIAL LOAD (lbs.)	AXIAL STRAIN (%)	DEVIATOR STRESS (psi)	PORE PRESSURE (psf)	P	Q
CONFIN. PRESS. (STAGE 1):			3.5					
0.000	0	28.6	0	0.0000	0.0	0	3.5	0
0.007	8	29.6	7.84	0.1487	1.2	1	3.109281	0.609281
0.022	22	29.9	21.56	0.4674	3.3	1.3	3.870176	1.670176
0.053	36	29.6	35.28	1.1260	5.4	1	5.214931	2.714931
0.093	44	29.6	43.12	1.9758	6.6	1	5.78973	3.28973
0.118	45	29.4	44.1	2.5069	6.7	0.8	6.046266	3.346266
0.135	45	29.2	44.1	2.8681	6.7	0.6	6.23387	3.33387
0.179	45	28.6	44.1	3.8028	6.6	0	6.801786	3.301786
0.216	48	28.6	47.04	4.5889	7.0	0	6.993126	3.493126
0.240	50	28.5	49	5.0988	7.2	-0.1	7.219228	3.619228
0.260	51	28.1	49.97	5.5237	7.3	-0.5	7.574348	3.674348
0.302	53	28	51.91	6.4150	7.6	-0.6	7.880949	3.780949
0.354	55	27.5	53.85	7.5207	7.8	-1.1	8.475951	3.875951
0.389	56	27.2	54.82	8.2643	7.8	-1.4	8.814042	3.914042
0.410	57.5	27.4	56.275	8.7104	8.0	-1.2	8.698386	3.998386
0.451	59	27.5	57.73	9.5815	8.1	-1.1	8.662628	4.062628
0.489	61	27	59.67	10.3888	8.3	-1.6	9.261659	4.161659
0.543	62	26.8	60.64	11.5360	8.4	-1.8	9.475166	4.175166
0.617	65	26.6	63.55	13.1081	8.6	-2	9.797766	4.297766
0.640	66.5	26.3	65.005	13.5968	8.7	-2.3	10.17144	4.371443
0.688	69	26.4	67.43	14.6165	9.0	-2.2	10.181	4.481001
0.701	69	26.4	67.43	14.8927	8.9	-2.2	10.16651	4.466506
0.730	69	26.5	67.43	15.5088	8.9	-2.1	10.03417	4.434173
0.760	69	26	67.43	16.1462	8.8	-2.6	10.50072	4.400724

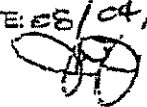
* CONSOLIDATED-UNDRAINED *
* TRIAXIAL COMPRESSION TEST *
* ASTM D 4767 *

PROJECT NAME: TEAM PROJECT No. 042023
JOB NUMBER: 7830
BORING NUMBER: C-3
SAMPLE DEPTH: 3.5-4.0

SAMPLE DESCRIPTION: CLAY, slightly sandy, dark brown

CONFINING PRESSURES: 14

FILE NAME: C-30035 ENT DATE: 08/03/04
FILE TYPE: LAB DATA COMP BY: HMM
DATA SOURCE: HJA LAB TEST DATE: 07/22/04

CHK DATE: 08/04/04
CHK BY: 

DIAMETER OF SAMPLE (in.): 2.8520
AREA OF SAMPLE (in.²): 6.3884
LENGTH OF SPECIMEN (in.): 4.7480
(BEFORE) (AFTER)
WEIGHT OF SAMPLE (gm.): 1017.90 1029.7
WET WEIGHT + TARE (gm.): 89.22 1109.1
DRY WEIGHT + TARE (gm.): 65.52 928.4
TARE WEIGHT (gm.): 46.50 79.38

SPECIFIC GRAVITY: 2.65 ASSUMED
MOISTURE CONTENT (%): 19.5 21.3
DRY UNIT WEIGHT (pcf): 107.1 106.7
SATURATION OF SAMPLE (%): 94.7 102.5
SAMPLE HEIGHT/DIAM. RATIO: 1.66

COUNT # DATA: 33

AXIAL DIAL (in.)	PROVING RING (dlv.)	PORE PRESSURE (psi)	AXIAL LOAD (lbs.)	AXIAL STRAIN (%)	DEVIATOR STRESS (psi)	PORE PRESSURE (psi)	P	Q
CONFIN. PRESS. (STAGE 1): 14								
0.000	0	33.2	0	0.0000	0.0	0	14	0
0.005	19	34.9	18.62	0.1054	2.9	1.7	13.7558	1.455804
0.025	51	38.1	48.97	0.5268	7.8	4.9	12.99042	3.890422
0.034	54	38.9	52.88	0.7164	8.2	5.7	12.40913	4.109132
0.048	63	39.7	61.61	1.0114	9.5	6.5	12.27329	4.773287
0.066	75	40.2	73.25	1.3908	11.3	7	12.65336	5.653362
0.089	89	40.8	86.83	1.8753	13.3	7.4	13.26852	6.668519
0.107	97	40.6	94.59	2.2545	14.5	7.4	13.83641	7.236406
0.125	104	40.7	101.26	2.6338	15.4	7.5	14.21882	7.718822
0.152	111	40.5	107.84	3.2027	16.3	7.3	14.87004	8.170041
0.170	116	40.3	112.54	3.5820	17.0	7.1	15.39271	8.49271
0.207	125	40	121	4.3818	18.1	6.8	16.2573	9.057303
0.238	130	39.8	125.7	5.0147	18.7	6.4	16.94485	9.344854
0.257	133	39.4	128.52	5.4151	19.0	6.2	17.31423	9.514231
0.305	139	38.7	134.16	6.4265	19.7	5.5	18.92556	9.825557
0.328	142	38.5	138.98	6.9111	20.0	5.3	18.68013	9.98013
0.343	144	38.3	138.86	7.2271	20.2	5.1	18.98275	10.08275
0.369	147	38.1	141.88	7.7750	20.5	4.9	19.32877	10.22877
0.397	153	37.8	147.35	8.3649	21.1	4.6	19.968	10.568
0.427	155	37.5	149.25	8.9971	21.3	4.3	20.33043	10.63043
0.45	158	37.3	152.1	9.4817	21.6	4.1	20.67573	10.77573
0.483	161	36.9	154.95	10.1770	21.8	3.7	21.19332	10.89332
0.514	164	36.7	157.8	10.8302	22.0	3.5	21.51301	11.01301
0.529	165	36.5	158.75	11.1462	22.1	3.3	21.74004	11.04004
0.584	173	36.1	166.35	12.3051	22.8	2.9	22.51768	11.41768
0.606	175	35.9	168.25	12.7686	23.0	2.7	22.78706	11.48706
0.628	176	35.6	169.2	13.2322	23.0	2.4	23.09053	11.49053
0.658	179	35.4	172.05	13.8643	23.2	2.2	23.39896	11.59896
0.673	179	35.3	172.05	14.1804	23.1	2.1	23.4584	11.5584
0.699	181	35.2	173.95	14.7282	23.2	2	23.60943	11.60943
0.712	182	35.2	174.9	15.0021	23.3	2	23.69534	11.69534
0.736	183	34.9	175.85	15.6078	23.3	1.7	23.92894	11.62894
0.754	184	34.7	178.8	15.8871	23.3	1.5	24.13928	11.63928

 * CONSOLIDATED-UNDRAINED *
 * TRIAXIAL COMPRESSION TEST *
 * ASTM D 4767 *

PROJECT NAME: TEAM PROJECT No. 042023
 JOB NUMBER: 7630
 BORING NUMBER: C-3
 SAMPLE DEPTH: 4.0-4.5

SAMPLE DESCRIPTION: CLAY, slightly sandy, dark brown

CONFINING PRESSURES: 28

FILE NAME: C-30040
 FILE TYPE: LAB DATA
 DATA SOURCE: HJA LAB

ENT DATE: 08/03/04
 COMP BY: HMM
 TEST DATE: 07/29/04

CHK DATE: 08/04/04
 CHK BY: 

DIAMETER OF SAMPLE (in.): 2.8500
 AREA OF SAMPLE (in.sq.): 8.3794
 LENGTH OF SPECIMEN (in.): 4.9050
 (BEFORE) (AFTER)
 WEIGHT OF SAMPLE (gm.): 1069.80 1074.8
 WET WEIGHT + TARE (gm.): 63.46 1150.5
 DRY WEIGHT + TARE (gm.): 60.82 970
 TARE WEIGHT (gm.): 48.29 75.72
 SPECIFIC GRAVITY: 2.65 ASSUMED
 MOISTURE CONTENT (%): 18.2 20.2
 DRY UNIT WEIGHT (pcf): 110.2 108.9
 SATURATION OF SAMPLE (%): 96.2 103.1
 SAMPLE HEIGHT/DIAM. RATIO: 1.72

COUNT # DATA: 33

AXIAL DIAL (in.)	PROVING RING (div)	PORE PRESSURE (psi)	AXIAL LOAD (lbs.)	AXIAL STRAIN (%)	DEVIATOR STRESS (psi)	PORE PRESSURE (psi)	P	Q
CONFIN. PRESS. (STAGE 1): 28								
0.000	0	32.1	0	0.0000	0.0	0	28	0
0.006	58	35.8	56.76	0.1223	8.9	3.7	28.74325	4.443255
0.023	137	42.2	132.28	0.4889	20.6	10.1	28.21914	10.31914
0.036	164	44.6	157.8	0.7339	24.6	12.5	27.77717	12.27717
0.067	205	43.7	196.5	1.3860	30.4	11.8	31.59077	15.18077
0.095	228	45.2	217.2	1.9368	33.4	13.1	31.59384	18.89384
0.131	248	46.1	235.2	2.6707	35.9	14	31.94201	17.94201
0.166	262	46	248.04	3.3843	37.6	13.9	32.88278	18.78278
0.196	272	45.1	257.24	3.9959	38.7	13	34.35613	19.35613
0.226	280	46.2	264.6	4.6076	39.6	13.1	34.6831	19.7831
0.282	289	44.8	272.88	5.3415	40.5	12.5	35.74519	20.24519
0.299	295	44	278.4	6.0958	41.0	11.9	36.59012	20.49012
0.318	298	43.1	281.18	6.4832	41.2	11	37.6079	20.6079
0.358	305	43	287.25	7.2987	41.7	10.9	37.97067	20.87067
0.422	315	42	295.75	8.6035	42.4	9.9	39.2858	21.1858
0.488	325	40.4	304.25	9.9490	42.9	8.3	41.17382	21.47382
0.531	331	40.2	309.35	10.8257	43.2	8.1	41.52122	21.62122
0.591	338	39.4	315.3	12.0489	43.5	7.3	42.43479	21.73479
0.628	342	38.9	318.7	12.8033	43.6	6.8	42.98074	21.78074
0.664	347	38.5	322.95	13.5372	43.8	6.4	43.48542	21.88542
0.695	350	38.1	325.5	14.1692	43.8	6	43.89689	21.89689
0.722	352	37.9	328.1	14.7197	43.9	5.8	44.13035	21.93035
0.750	355	37.6	332	15.2905	44.1	5.5	44.54248	22.04248
0.817	362	37	341.1	16.8565	44.6	4.9	45.38148	22.28148
0.870	370	36.4	351.5	17.7370	45.3	4.3	46.36316	22.66316
0.945	375	35.1	358	19.2661	45.3	3	47.6532	22.6532
0.987	376.4	35.5	359.82	19.7146	46.3	3.4	47.24188	22.64188
0.981	377	35.3	360.6	20.2039	45.1	3.2	47.35267	22.55267
1.004	374	35.1	356.7	20.4689	44.5	3	47.23466	22.23466
1.009	370	35	351.5	20.5708	43.8	2.9	48.98244	21.88244
1.028	368	34.9	348.3	20.9582	42.9	2.8	46.65358	21.45358
1.048	365.5	34.7	345.65	21.3252	42.6	2.6	46.71389	21.31389
1.062	365	34.6	345	21.6514	42.4	2.5	46.68561	21.18561

TEAM Consultants, Inc.

2970 S. Walton Walker, Suite 101
Dallas, Texas 75211
Phone: (214) 331-4395
Fax: (214) 331-4458

3101 Pleasant Valley Lane, Suite 101
Arlington, Texas 76015
Phone: (817) 467-5500
Fax: (817) 468-9920

To: USACOE
Fort Worth District

Job No.: 042023

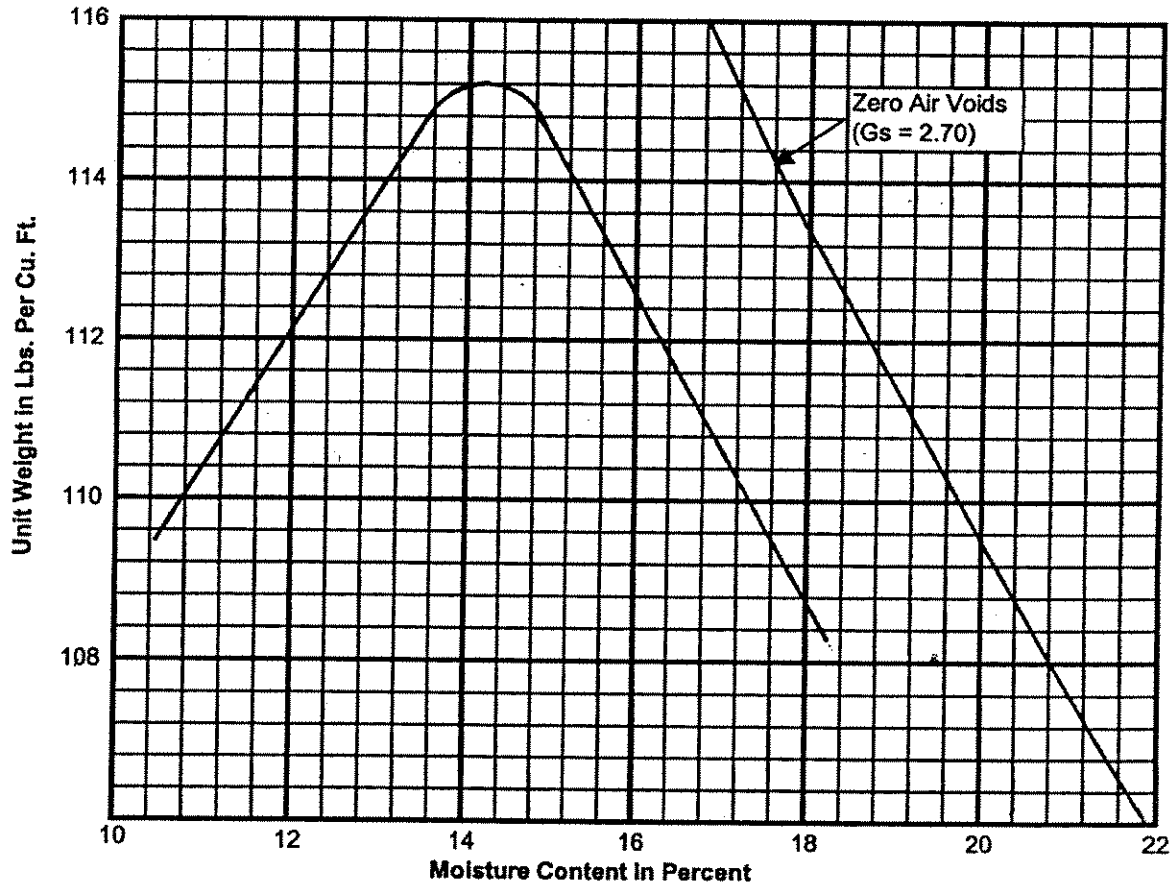
Date: 7/29/04

Project: Trinity River Vision
Test Method: ASTM-D-698
Mold: 1/30 cu. ft.
Hammer: 5.5#
Drop: 12"
Blows: 25
Layers: 3

Sample: Boring C-6, Bag 1, 17-19'

Description: Grayish brown sandy clay

Liquid Limit: 34
Plasticity Index: 21
Optimum Moisture: 14.2 %
Max. Unit Dry Weight: 115.2 Lbs./Cu. Ft.



OPTIMUM MOISTURE TEST

TEAM Consultants, Inc.

TEAM Consultants, Inc.

2970 S. Walton Walker, Suite 101
Dallas, Texas 75211
Phone: (214) 331-4395
Fax: (214) 331-4458

3101 Pleasant Valley Lane, Suite 101
Arlington, Texas 76015
Phone: (817) 467-5500
Fax: (817) 468-9920

To: USACOE
Fort Worth District

Job No.: 042023

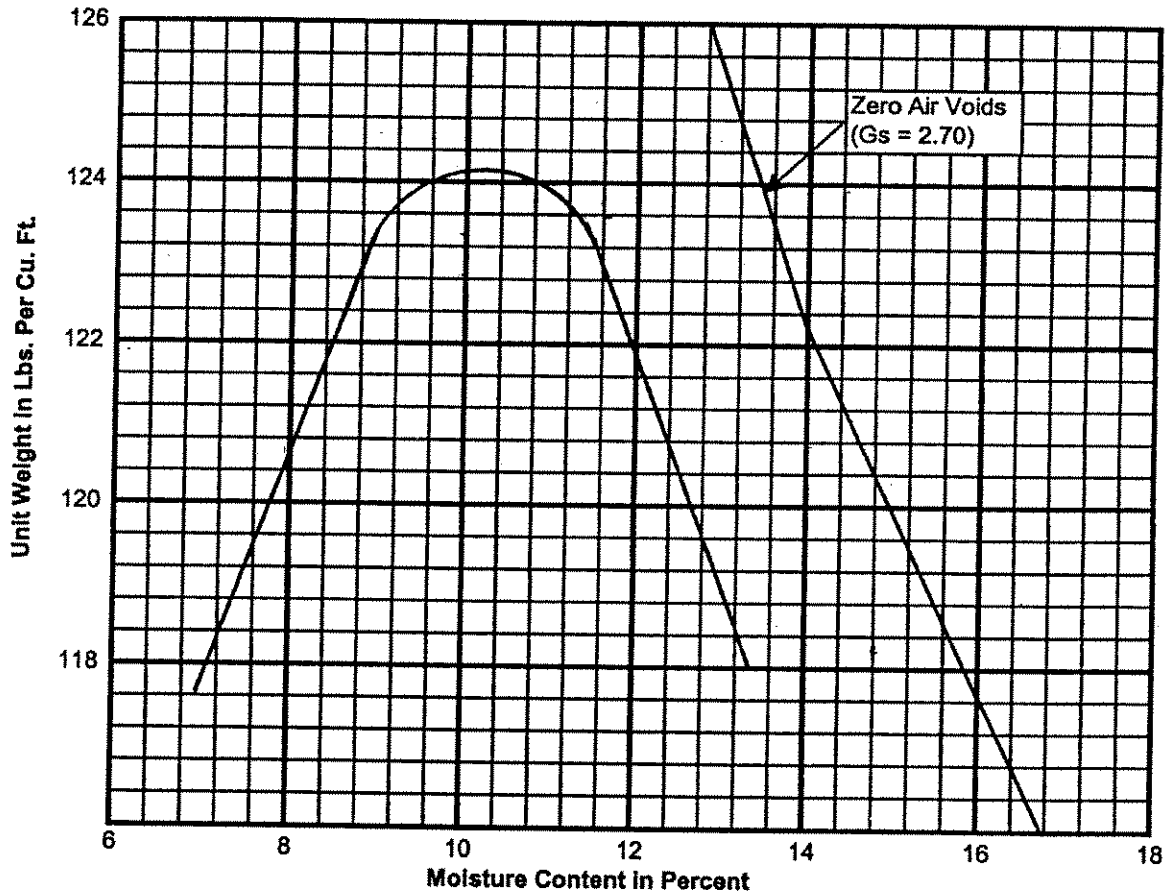
Date: 7/29/04

Project: Trinity River Vision
Test Method: ASTM-D-698
Mold: 1/30 cu. ft.
Hammer: 5.5#
Drop: 12"
Blows: 25
Layers: 3

Sample: Boring C-4, Bag 1, 11-13'

Description: Reddish brown sandy clay

Liquid Limit: 27
Plasticity Index: 10
Optimum Moisture: 10.2 %
Max. Unit Dry Weight: 124.1 Lbs./Cu. Ft.



OPTIMUM MOISTURE TEST

TEAM Consultants, Inc.

TEAM Consultants, Inc.

2970 S. Walton Walker, Suite 101
Dallas, Texas 75211
Phone: (214) 331-4395
Fax: (214) 331-4458

3101 Pleasant Valley Lane, Suite 101
Arlington, Texas 76015
Phone: (817) 467-5500
Fax: (817) 468-9920

To: USACOE
Fort Worth District

Job No.: 042023

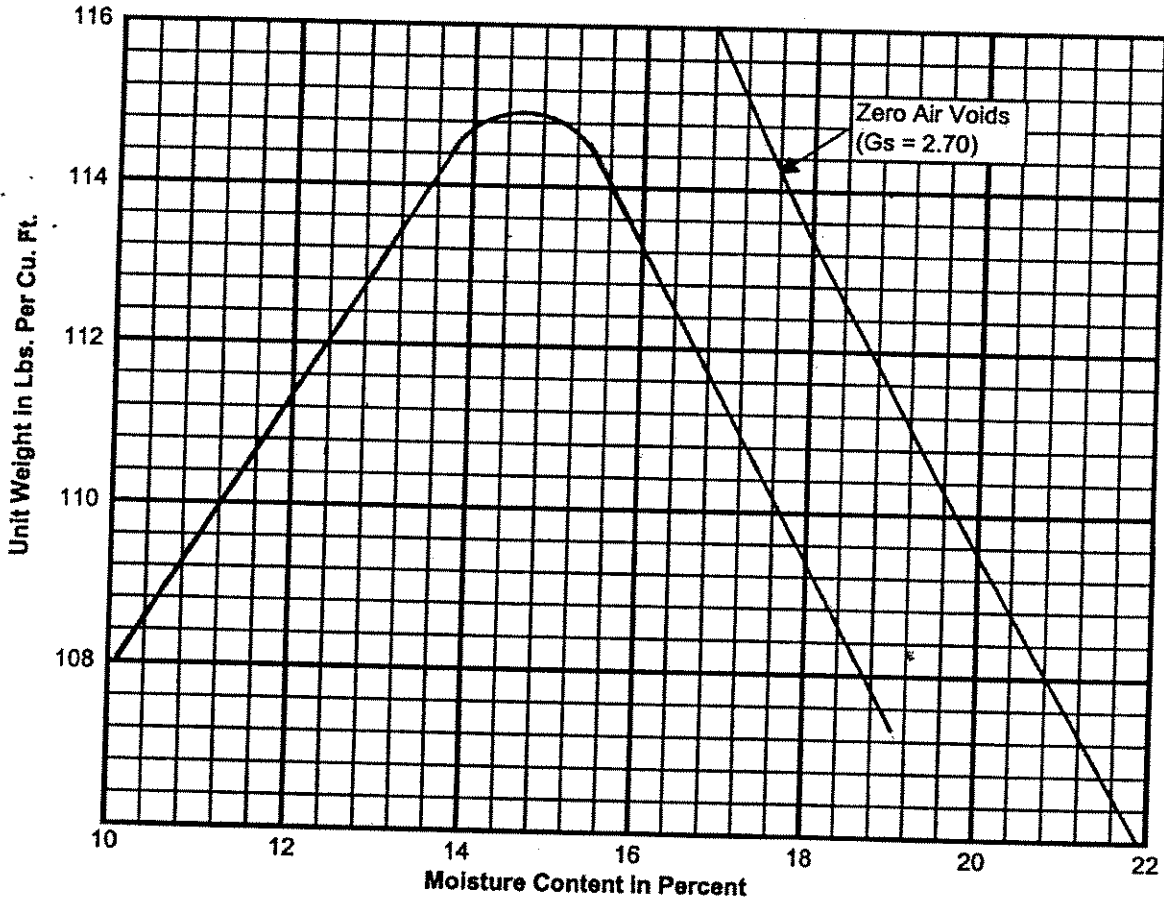
Date: 7/29/04

Project: Trinity River Vision
Test Method: ASTM-D-698
Mold: 1/30 cu. ft.
Hammer: 5.5#
Drop: 12"
Blows: 25
Layers: 3

Sample: Boring C-2, Bag 1, 4-5'

Description: Brown sandy clay

Liquid Limit: 37
Plasticity Index: 23
Optimum Moisture: 14.6 %
Max. Unit Dry Weight: 114.9 Lbs./Cu. Ft.



OPTIMUM MOISTURE TEST

TEAM Consultants, Inc.

TEAM Consultants, Inc.

2970 S. Walton Walker, Suite 101
Dallas, Texas 75211
Phone: (214) 331-4395
Fax: (214) 331-4458

3101 Pleasant Valley Lane, Suite 101
Arlington, Texas 76015
Phone: (817) 467-5500
Fax: (817) 468-9920

To: USACOE
Fort Worth District

Job No.: 042023

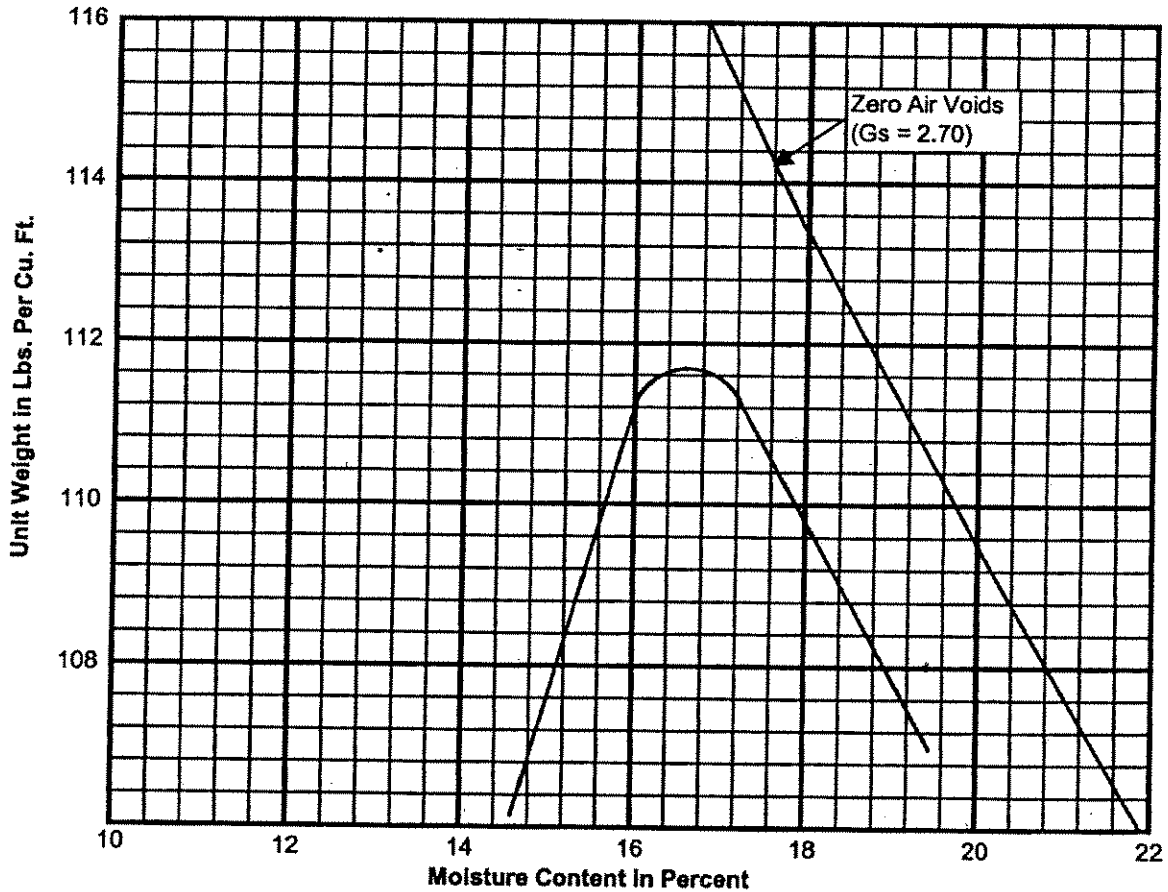
Date: 7/29/04

Project: Trinity River Vision
Test Method: ASTM-D-698
Mold: 1/30 cu. ft.
Hammer: 5.5#
Drop: 12"
Blows: 25
Layers: 3

Sample: Boring C-9, Bag 1, 8-11'

Description: Light brown clay with sand

Liquid Limit: 50
Plasticity Index: 33
Optimum Moisture: 16.6 %
Max. Unit Dry Weight: 111.7 Lbs./Cu. Ft.



OPTIMUM MOISTURE TEST

TEAM Consultants, Inc.

Attachment C

Summary of Laboratory Test Results

Fort Worth Central City Preliminary Design

Table C-1

Laboratory Afterberg Limit Results

Boring No.	Sample No.	Ground Surface Elevation (ft) ⁽¹⁾	Sample Depth (ft)	Sample Elevation (ft)	Moisture Content (%)	Dry Unit Weight (pcf)	Afterberg Limits				USCS	Visual Description
							LL	PI	PL	PL		
B-4	ST-2	535.7	9 - 11	526.7 - 524.7	18.6	109.1	42	23	19	CL	Brown silty clay	
B-4	ST-4	535.7	23 - 25	512.7 - 510.7	22.1	104.7	36	21	15	CL	Brown silty clay	
B-5	ST-3	536.8	16 - 18	520.8 - 518.8	21.3	105.7	36	20	16	CL	Brown sandy clay	
B-5	ST-5	536.8	30 - 32	506.8 - 504.8	24.6	101.4	34	18	16	CL	Brown silty clay	
B-6	ST-2	537.2	10 - 12	527.2 - 525.2	19.6	106.9	46	29	17	CL	Brown silty clay	
B-6	ST-5	537.2	32 - 34	505.2 - 503.2	23.3	104.2	34	20	14	CL	Light brown sandy clay	
D-2	B	527.5	10.5 - 15	517.0 - 512.5	5.0	-	25	13	12	GC	Light brown sandy gravel with clay	
C-1	ST-1	531.7	1 - 3	530.7 - 528.7	13.9	108.7	33	17	16	CL	Dark brown sandy clay	
C-1	A	531.7	5 - 6.5	526.7 - 525.2	17.6	---	51	33	18	CH	Brown and gray clay	
C-1	ST-3	531.7	15 - 17	516.7 - 514.7	17.0	109.2	41	24	17	CL	Light brown silty clay	
C-1	ST-4	531.7	20 - 22	511.7 - 509.7	16.2	108.6	34	19	15	CL	Light brown silty clay	
C-1	ST-5	531.7	25 - 27	506.7 - 504.7	17.6	109.9	32	19	13	CL	Light brown silty clay	
C-1	ST-6	531.7	30 - 32	501.7 - 499.7	19.3	108.2	31	17	14	CL	Light brown clay	
C-1	B	531.7	38 - 39.5	493.7 - 492.2	20.8	-	19	4	15	SM-SC	Tan silty sand with clay	
C-1	D	531.7	55 - 57.5	476.7 - 474.2	16.8	-	20	4	16	SC	Tan clayey sand with gravel	
C-2	B-1	519.6	4 - 5	515.6 - 514.6	18.3	109.5	37	23	14	CL	Brown sandy clay	
C-3	ST-1	530.6	3 - 5	527.6 - 525.6	19.5	106.7	48	29	19	CL	Dark brown clay	
C-3	ST-2	530.6	10 - 12	520.6 - 518.6	16.4	111.6	28	13	15	CL	Light brown sandy clay	
C-4	ST-1	531.8	4 - 6	527.8 - 525.8	18.5	108.0	39	23	16	CL	Brown silty clay	
C-4	B-1	531.8	11 - 13	520.8 - 518.8	13.6	118.3	27	10	17	CL	Reddish brown sandy clay	
C-6	ST-1	525.7	5 - 7	520.7 - 518.7	27.2	96.6	41	24	17	CL	Light gray and brown silty clay	
C-6	ST-2	525.7	12 - 14	513.7 - 511.7	22.8	98.7	44	28	16	CL	Gray and brown silty clay	
C-6	B-1	525.7	17 - 19	508.7 - 506.7	-	-	34	21	13	CL	Grayish-brown sandy clay	
C-6	ST-4	525.7	24 - 26	501.7 - 499.7	20.3	107.0	43	24	19	CL	Light brown sandy clay	
C-6	ST-5	525.7	31 - 33	494.7 - 492.7	19.8	108.0	25	10	15	CL	Gray and brown sandy clay	
C-7	ST-1	534.1	2 - 4	532.1 - 530.1	17.7	108.1	42	21	21	CL	Brown silty clay	
C-7	ST-2	534.1	10 - 12	524.1 - 522.1	19.0	109.7	48	30	18	CL	Brown sandy clay	
C-7	ST-3	534.1	17 - 19	517.1 - 515.1	21.5	105.9	40	24	16	CL	Light brown silty clay	
C-7	ST-4	534.1	24 - 26	510.1 - 508.1	19.4	109.6	39	24	15	CL	Light brown clay	
C-7	ST-5	534.1	31 - 33	503.1 - 501.1	18.9	102.4	29	14	15	SC	Gray and tan clayey sand	
C-8	ST-1	535.5	4 - 6	531.5 - 529.5	16.6	112.6	44	26	18	CL	Brown sandy clay	

Fort Worth Central City Preliminary Design

Table C-1
Laboratory Afterberg Limit Results

Boring No.	Sample No.	Ground Surface Elevation (ft) ⁽¹⁾	Sample Depth (ft)	Sample Elevation (ft)	Moisture Content (%)	Dry Unit Weight (pcf)	Afterberg Limits				USCS	Visual Description
							LL	PI	PL	PL		
C-8	ST-2	535.5	11 - 13	524.5 - 522.5	18.8	107.9	39	22	17	CL	Reddish brown sandy clay	
C-8	ST-3	535.5	18 - 20	517.5 - 515.5	21.5	107.3	41	24	17	CL	Brown silty clay	
C-8	ST-4	535.5	25 - 27	510.5 - 508.5	21.6	103.8	36	21	15	CL	Brown silty clay	
C-8	ST-5	535.5	32 - 34	503.5 - 501.5	24.0	100.1	36	19	17	CL	Gray and brown silty clay	
C-9	ST-1	537.5	3 - 3	536.5 - 534.5	18.1	109.9	47	30	17	CL	Dark gray clay	
C-9	B-1	537.5	8 - 11	529.5 - 526.5	-	-	30	33	17	CL-CH	Light brown clay with sand	
C-9	ST-2	537.5	15 - 17	522.5 - 520.5	18.8	110.8	38	20	18	CL	Light brown silty clay	
C-9	ST-3	537.5	22 - 24	515.5 - 513.5	20.3	107.0	38	21	17	CL	Brown silty clay with calcareous nodules	
C-9	ST-4	537.5	30 - 32	507.5 - 505.5	20.7	104.1	23	7	16	SC	Light brown clayey sand	
C-10	ST-1	531.3	3 - 5	528.3 - 526.3	16.2	107.7	29	12	17	SC	Brown clayey sand	
C-10	ST-2	531.3	10 - 12	521.3 - 519.3	23.5	99.6	21	5	16	SC-SM	Brown silty sand with clay	
C-10	ST-3	531.3	20 - 22	511.3 - 509.3	24.5	100.3	39	22	17	CL	Brown silty clay	
C-10	ST-4	531.3	27 - 29	504.3 - 502.3	24.5	102.9	27	10	17	CL	Light brown sandy clay	
D-2	B	527.5	10.5 - 15	517.0 - 512.5	5.0	-	25	13	12	CC	Light brown sandy gravel with clay	
F-1	ST-1	526.8	0 - 2	526.8 - 524.8	13.5	115.7	36	19	17	CL	Brown sandy clay with gravel	
F-1	ST-2	526.8	7 - 9	519.8 - 517.8	16.3	112.5	42	26	16	CL	Brown sandy clay	
F-1	ST-5	526.8	30 - 32	496.8 - 494.8	20.3	-	27	12	15	CL	Light brown sandy clay	
F-2	ST-1	525.5	1 - 3	524.5 - 522.5	14.0	-	35	17	18	SC	Brown clayey sand	
F-2	ST-2	525.5	8 - 10	517.5 - 515.5	19.5	102.7	35	20	15	CL	Light brown silty clay with sand	
F-2	ST-3	525.5	15 - 17	510.5 - 508.5	20.0	108.6	32	16	16	CL	Brown and gray silty clay with sand	
F-2	ST-5	525.5	30 - 32	495.5 - 493.5	24.2	103.2	35	20	15	CL	Gray silty clay	
F-3	ST-1	531.2	3 - 5	528.2 - 526.2	13.0	123.1	42	26	16	CL	Brown sandy clay with calcareous nodules	
F-3	ST-2	531.2	10 - 12	521.2 - 519.2	25.6	91.1	35	16	19	CL	Brown sandy clay	

Notes:

1. Elevations based on the North American Vertical Datum (NAVD) of 1988 and are reported in feet.

Abbreviations:

- Not Available/ Not Encountered

Fort Worth Central City Preliminary Design

Table C-2:

Summary of Unconfined Compressive Strength

Boring No.	Sample No.	Ground Surface Elevation (ft) ⁽¹⁾	Sample Depth (ft)	Sample Elevation (ft)	Strata	Unconfined Compressive Strength ⁽²⁾ (tsf)	
						Field	Laboratory
B-1	ST-1	532.9	3 - 5	529.9 - 527.9	SC-CL	1.75	2.0
B-2	ST-1	530.8	4 - 6	526.8 - 524.8	CH	> 4.50	2.25
B-2	ST-2	530.8	11 - 13	519.8 - 517.8	SM	-	2.2
B-3	ST-1	537.9	3 - 5	534.9 - 532.9	CH	> 4.5	> 4.5
B-3	ST-2	537.9	10 - 11	527.9 - 526.9	CH	> 4.5	> 4.5
B-3	ST-3	537.9	17 - 19	520.9 - 518.9	CL	3.5	3.5
B-4	ST-1	535.7	2 - 4	533.7 - 531.7	CH	> 4.5	4.0
B-4	ST-2	535.7	9 - 11	526.7 - 524.7	CL	4.5	1.5
B-4	ST-3	535.7	16 - 18	519.7 - 517.7	CL	1.5	1.0
B-4	ST-4	535.7	23 - 25	512.7 - 510.7	CL	1.5	0.75
B-4	ST-5	535.7	30 - 32	505.7 - 503.7	CL	1.2	0.75
B-5	ST-1	536.8	1.5 - 3.5	535.3 - 533.3	CL	3.7	2.5
B-5	ST-2	536.8	9 - 11	527.8 - 525.8	CL	4.1	3.75
B-5	ST-3	536.8	16 - 18	520.8 - 518.8	CL	1.1	1.0
B-5	ST-4	536.8	23 - 25	513.8 - 511.8	CL	1.5	< 0.25
B-5	ST-5	536.8	30 - 32	506.8 - 504.8	CL	1.7	0.5
B-5	ST-6	536.8	38 - 40	498.8 - 496.8	CL	-	< 0.25
B-6	ST-1	537.2	2 - 4	535.2 - 533.2	CL	> 4.5	4.25
B-6	ST-2	537.2	10 - 12	527.2 - 525.2	CL	> 4.5	4.0
B-6	ST-3	537.2	18 - 20	519.2 - 517.2	CL	> 4.5	1.0
B-6	ST-4	537.2	25 - 27	512.2 - 510.2	CL	2.2	1.25
B-6	ST-5	537.2	32 - 34	505.2 - 503.2	CL	1.5	0.5
B-6	ST-6	537.2	40 - 42	497.2 - 495.2	SM	4.1	0.75
B-6	ST-7	537.2	48 - 50	489.2 - 487.2	GC	> 4.5	2.0
C-1	ST-1	531.7	1 - 3	530.7 - 528.7	CL	-	3.0
C-1	ST-2	531.7	8 - 10	523.7 - 521.7	CH	3.5	> 4.5
C-1	ST-3	531.7	15 - 17	516.7 - 514.7	CL	3.5	4.0
C-1	ST-4	531.7	20 - 22	511.7 - 509.7	CL	3.5	3.25
C-1	ST-5	531.7	25 - 27	506.7 - 504.7	CL	2.7	1.5
C-1	ST-6	531.7	30 - 32	501.7 - 499.7	CL	1.1	0.25
C-2	ST-1	519.6	0 - 2	519.6 - 517.6	CL	> 4.5	> 4.5
C-3	ST-1	530.6	3 - 5	527.6 - 525.6	CL	3.5	3.5
C-3	ST-2	530.6	10 - 12	520.6 - 518.6	CL	3.5	1.5
C-4	ST-1	531.8	4 - 6	527.8 - 525.8	CL	3.7	2.75
C-6	ST-1	525.7	5 - 7	520.7 - 518.7	CL	2.0	1.0
C-6	ST-2	525.7	12 - 14	513.7 - 511.7	CL	2.0	1.75
C-6	ST-3	525.7	17 - 19	508.7 - 506.7	CL	-	0.75

Fort Worth Central City Preliminary Design

Table C-2:

Summary of Unconfined Compressive Strength

Boring No.	Sample No.	Ground Surface Elevation (ft) ⁽¹⁾	Sample Depth (ft)	Sample Elevation (ft)	Strata	Unconfined Compressive Strength ⁽²⁾ (tsf)	
						Field	Laboratory
C-6	ST-4	525.7	24 - 26	501.7 - 499.7	CL	2.7	1.5
C-6	ST-5	525.7	31 - 33	494.7 - 492.7	CL	3.0	0.75
C-6	ST-6	525.7	38 - 40	487.7 - 485.7	SC	2.0	0.5
C-7	ST-1	534.1	2 - 4	532.1 - 530.1	CL	3.5	2.0
C-7	ST-2	534.1	10 - 12	524.1 - 522.1	CL	4.0	3.5
C-7	ST-3	534.1	17 - 19	517.1 - 515.1	CL	1.5	1.5
C-7	ST-4	534.1	24 - 26	510.1 - 508.1	CL	2.0	1.75
C-7	ST-5	534.1	31 - 33	503.1 - 501.1	SC	3.5	1.5
C-7	ST-6	534.1	38 - 40	496.1 - 494.1	CL	1.0	< 0.25
C-8	ST-1	535.5	4 - 6	531.5 - 529.5	CL	3.7	> 4.5
C-8	ST-2	535.5	11 - 13	524.5 - 522.5	CL	2.2	2.25
C-8	ST-3	535.5	18 - 20	517.5 - 515.5	CL	2.2	1.25
C-8	ST-4	535.5	25 - 27	510.5 - 508.5	CL	2.2	1.0
C-8	ST-5	535.5	32 - 34	503.5 - 501.5	CL	1.1	0.5
C-8	ST-6	535.5	38 - 40	497.5 - 495.5	SC	> 4.5	2.0
C-9	ST-1	537.5	1 - 3	536.5 - 534.5	CL	> 4.5	> 4.5
C-9	ST-2	537.5	15 - 17	522.5 - 520.5	CL	2.3	1.5
C-9	ST-3	537.5	22 - 24	515.5 - 513.5	CL	2.5	1.25
C-9	ST-4	537.5	30 - 32	507.5 - 505.5	SC	2.5	0.25
C-10	ST-1	531.3	3 - 5	528.3 - 526.3	SC	4.2	2.25
C-10	ST-2	531.3	10 - 12	521.3 - 519.3	SC-SM	0.6	0.5
C-10	ST-3	531.3	20 - 22	511.3 - 509.3	CL	1.5	0.75
C-10	ST-4	531.3	27 - 29	504.3 - 502.3	CL	1.7	0.25
C-10	ST-5	531.3	36 - 38	495.3 - 493.3	SM-GM	2.7	0.75
D-1	ST-1	522.6	8 - 9.5	514.6 - 513.1	CL	> 4.5	2.75
D-1	ST-2	522.6	15 - 17	507.6 - 505.6	CL	> 4.5	3.25
D-2	ST-1	527.5	3.5 - 5.5	524.0 - 522.0	CH	> 4.5	> 4.5
F-1	ST-1	526.8	0 - 2	526.8 - 524.8	CL	4.5	2.75
F-1	ST-2	526.8	7 - 9	519.8 - 517.8	CL	4.5	> 4.5
F-1	ST-3	526.8	15 - 17	511.8 - 509.8	CL	2.5	0.5
F-1	ST-4	526.8	22 - 24	504.8 - 502.8	CL	1.5	2.75
F-1	ST-5	526.8	30 - 32	496.8 - 494.8	CL	0.75	0.5
F-2	ST-1	525.5	1 - 3	524.5 - 522.5	SC	2.2	1.25
F-2	ST-2	525.5	8 - 10	517.5 - 515.5	CL	1.2	1.0
F-2	ST-3	525.5	15 - 17	510.5 - 508.5	CL	2.5	0.5
F-2	ST-4	525.5	21.5 - 23.5	504.0 - 502.0	CL	2.6	0.75
F-2	ST-5	525.5	30 - 32	495.5 - 493.5	CL	1.5	1.0
F-2	ST-6	525.5	38 - 40	487.5 - 485.5	CL	2.6	0.5
F-3	ST-1	531.2	3 - 5	528.2 - 526.2	CL	> 4.5	4.5

Fort Worth Central City Preliminary Design

Table C-2:

Summary of Unconfined Compressive Strength

Boring No.	Sample No.	Ground Surface Elevation (ft) ⁽¹⁾	Sample Depth (ft)	Sample Elevation (ft)	Strata	Unconfined Compressive Strength ⁽²⁾ (tsf)	
						Field	Laboratory
F-3	ST-2	531.2	10 - 12	521.2 - 519.2	CL	1.5	0.5
Notes:							
1	Elevation are based on North American Vertical Datum (NAVD) 88 system (Surveyor: Lopez-Garcia Group) and reported in feet						
2	Pocket penetrometer tests were performed in accordance with the manufacturer's recommendations.						
-	Not available						

Fort Worth Central City Preliminary Design

Table C-3
Unconfined Compressive Strength - Direct Methods ⁽¹⁾

Boring No.	Sample No.	Ground Surface Elevation (ft)	Sample Depth (ft)	Sample Elevation (ft)	q _w pocket	Unconfined compressive strength test (ASTM D2186)			USCS	Visual Description (ASTM D 2486)
						q _u (tsf)	Strain @ Failure (%)	Type Failure		
B-4	ST-2	535.7	9 - 11	526.7 - 524.7	1.5	1.95	3.0	Vertical Shear	CL	Brown silty clay
B-4	ST-4	535.7	23 - 25	512.7 - 510.7	0.75	0.76	3.0	Vertical Shear	CL	Brown silty clay
B-4	C-4	535.7	44.6 - 45.4	491.1 - 490.3	n/a	377.00	*	Vertical Fracture	-	Light gray limestone
B-5	ST-3	536.8	16 - 18	520.8 - 518.8	1.0	0.83	3.3	Vertical Shear	CL	Brown sandy clay
B-5	ST-5	536.8	30 - 32	506.8 - 504.8	0.5	0.61	15.0	Internal Shear	CL	Brown silty clay
B-5	C-1	536.8	49.4 - 50.3	487.4 - 486.5	n/a	228.00	*	Vertical Fracture	-	Light gray limestone
B-6	ST-2	537.2	10 - 12	527.2 - 525.2	4.0	2.51	3.7	Angular (80°)	CL	Brown silty clay
B-6	ST-5	537.2	32 - 34	505.2 - 503.2	0.5	0.45	15.0	Angular (80°)	CL	Light brown sandy clay
C-1	ST-1	531.7	1 - 1	530.7 - 530.7	3.0	1.96	2.9	Angular (75°)	CL	Dark brown sandy clay
C-1	ST-3	531.7	15 - 15	516.7 - 516.7	4.0	3.60	5.5	Vertical Shear	CL	Light brown silty clay
C-2	B-1	519.6	4 - 5	515.6 - 514.6	n/a	1.21	15.0	Internal Shear (Remolded Sample)	CL	Brown sandy clay
C-2	C-2	519.6	15.7 - 16.5	503.9 - 503.1	n/a	177.60	*	Vertical Fracture	-	Gray limestone
C-3	ST-2	530.6	10 - 12	520.6 - 518.6	1.5	0.58	2.2	Angular (50°)	CL	Light brown sandy clay
C-3	C-1	530.6	20.7 - 21.5	509.9 - 509.1	n/a	164.70	*	Vertical Fracture	-	Light gray limestone
C-3	C-2	530.6	28.1 - 28.8	502.5 - 501.8	n/a	184.70	*	Vertical Fracture	-	Light gray limestone
C-4	B-1	531.8	11 - 13	520.8 - 518.8	n/a	0.72	9.3	Angular (65°) (Remolded Sample)	CL	Reddish brown sandy clay
C-4	C-1	531.8	20.2 - 20.9	511.6 - 510.9	n/a	237.00	*	Vertical Fracture	-	Gray limestone
C-4	C-2	531.8	25.5 - 26.3	506.3 - 505.3	n/a	144.20	*	Vertical Fracture	-	Light gray limestone
C-6	ST-1	525.7	5 - 7	520.7 - 518.7	1.0	0.69	7.4	Angular (60°)	CL	Light gray and brown silty clay
C-6	ST-4	525.7	24 - 26	501.7 - 499.7	1.5	1.68	15.0	Internal Shear	CL	Light brown sandy clay
C-7	ST-1	534.1	2 - 4	532.1 - 530.1	2.0	1.92	1.8	Vertical Shear	CL	Brown silty clay
C-7	ST-3	534.1	17 - 19	517.1 - 515.1	1.5	1.03	9.2	Internal Shear	CL	Light brown silty clay
C-8	ST-1	535.5	4 - 6	531.5 - 529.5	>4.5	6.37	13.0	Internal Shear	CL	Brown sandy clay
C-8	ST-2	535.5	11 - 13	524.5 - 522.5	2.25	2.22	12.8	Internal Shear	CL	Reddish brown sandy clay
C-8	ST-4	535.5	25 - 27	510.5 - 508.5	1.0	0.88	5.9	Angular (70°)	CL	Brown silty clay
C-9	ST-2	537.5	15 - 17	522.5 - 520.5	1.5	1.90	15.0	Internal Shear	CL	Light brown silty clay
C-10	ST-2	531.3	10 - 12	521.3 - 519.3	0.5	0.25	15.0	Internal Shear	SC-5M	Brown silty sand with clay
D-1	C-1	522.6	53.6 - 54.5	469.0 - 468.1	n/a	121.10	*	Vertical Fracture	-	Light gray limestone
D-2	C-1	527.5	17.4 - 18.2	510.1 - 509.3	n/a	311.00	*	Vertical Fracture	-	Light gray limestone

Fort Worth Central City Preliminary Design

Table C-3

Unconfined Compressive Strength - Direct Methods ⁽¹⁾

Boring No.	Sample No.	Ground Surface Elevation (ft)	Sample Depth (ft)	Sample Elevation (ft)	q _u , pocket	Unconfined compressive strength test (ASTM D2166)			USCS	Visual Description (ASTM D 2488)
						q _u (tsf)	Strain @ Failure (%)	Type Failure		
F-1	ST-2	526.8	7 - 9	519.8 - 517.8	>4.5	4.10	6.6	Angular (80°)	CL	Brown sandy clay
F-2	ST-2	525.5	8 - 10	517.5 - 515.5	1.0	1.20	7.7	Vertical Shear	CL	Light brown silty clay with sand
F-3	ST-2	531.2	10 - 12	521.2 - 519.2	0.5	0.52	15.0	Internal Shear	CL	Brown sandy clay

Note:

- (1) Unconfined compressive strength values were measured by direct method in the laboratory in accordance with ASTM D2166.
- (2) Unconfined compressive strength, q_u, was measured in laboratory using standard methods with calibrated pocket penetrometer.
- (3) Elevation are based on North American Vertical Datum (NAVD) 88 system (Surveyor: Lopez-Garcia Group) and reported in feet

Abbreviations:

. Not Available/ Not Encountered

Fort Worth Central City Preliminary Design

**Table C-4
Laboratory Grain Size Test Results**

Boring No.	Sample No.	Ground Surface Elevation (ft) ^(b)	Sample Depth (ft)	Sample Elevation (ft)	Grain Size Analysis (%)			Moisture Content (%)	USCS	Visual Description (ASTM D2488)
					Gravel	Sand	Fines			
D-1	ST-1	522.6	8 - 9.5	514.6 - 513.1	0.0	28.7	71.3	18.3	CL	Gray and tan sandy clay with silt
D-1	ST-2	522.6	15 - 17.0	507.6 - 505.6	0.0	33.3	67.7	16.4	CL	Brown and gray sandy clay
D-1	A	522.6	41 - 42.5	481.6 - 480.1	32.3	34.6	33.1	13.8	CC	Gray sandy gravel with clay
D-1	B	522.6	51 - 52.4	471.6 - 470.2	39.2	40.5	20.3	10.0	SM	Tan gravelly sand with silt
D-2	ST-1	527.5	4 - 5.5	534.0 - 522.0	0	29.3	70.7	13.5	CH	Dark gray and brown clay with sand
D-2	A	527.5	9 - 10.5	518.5 - 517.0	12.3	57.7	30.0	5.5	SM	Tan silty sand
F-1	ST-5	526.8	30 - 32.0	496.8 - 494.8	0.0	32.4	67.6	20.3	CL	Light brown sandy clay
F-1	A	526.8	34 - 35.5	492.8 - 491.3	0.0	27.2	72.8	20.6	CL	Light brown clay with sand
F-3	A	531.2	17 - 18.5	514.2 - 512.7	23.5	61.5	15.0	13.8	SM-SC	Tan gravelly sand with clay
F-3	B	531.2	22 - 23.5	509.2 - 507.7	60.2	34.7	5.1	14.4	GW-GM	Light brown sandy gravel
F-3	D	531.2	38 - 39.5	493.2 - 491.7	59.9	24.3	16.8	10.3	GC	Tan and gray sandy gravel with clay seams

Note:

1 Elevation are based on North American Vertical Datum (NAVD) 88 system (Surveyor: Lopez-Garcia Group) and reported in feet

Permeability Test Results

Boring No.	Sample No.	Ground Surface Elevation (ft) ^(b)	Sample Depth (ft)	Sample Elevation (ft)	Dry Unit Weight (pcf)	Moisture Content (%)	Permeability (cm/sec)	USCS	Visual Description (ASTM D2488)
C-1	ST-4	531.7	20 - 22	511.7 - 509.7	108.6	16.2	1.28E-08	CL	Light brown silty clay
C-2	B-1	519.6	4 - 5	515.6 - 514.6	109.5	18.3	2.53E-09	CL	Brown sandy clay
C-3	ST-2	530.6	10 - 12	520.6 - 518.6	111.6	16.4	7.86E-08	CL	Light brown sandy clay
C-4	ST-1	531.8	4 - 6	527.8 - 525.8	108.0	18.5	3.65E-08	CL	Brown silty clay
C-4	B-1	531.8	11 - 13	520.8 - 518.8	118.3	13.6	5.81E-09	CL	Reddish brown sandy clay
C-6	B-1	525.7	17 - 19	508.7 - 506.7	-	-	1.39E-09	CL	Grayish-brown sandy clay
C-7	ST-2	534.1	10 - 12	524.1 - 522.1	109.7	19.0	6.43E-09	CL	Brown sandy clay
C-9	B-1	537.5	8 - 11	529.5 - 526.5	-	-	7.37E-10	CL-CH	Light brown clay with sand
C-10	ST-1	531.3	3 - 5	528.3 - 526.3	107.7	16.2	1.26E-07	SC	Brown clayey sand

Fort Worth Central City Preliminary Design

Standard Proctor Compaction Test Results

Boring No.	Sample No.	Ground Surface Elevation (ft) ⁽¹⁾	Sample Depth (ft)	Sample Elevation (ft)	Moisture Content (%)	Standard Proctor Test ⁽³⁾		USCS	Visual Description (ASTM D2488)
						Optimum Moisture (%)	Max. Dry Unit Weight (lbs/ft ³)		
C-2	B-1	519.6	4 - 5	515.6 - 514.6	18.3	14.6	114.9	CL	Brown sandy clay
C-4	B-1	531.8	13 - 13	518.8 - 518.8	13.6	10.2	124.1	CL	Reddish brown sandy clay
C-6	B-1	525.7	17 - 19	508.7 - 506.7	-	14.2	115.2	CL	Grayish brown sandy clay
C-9	B-1	537.5	11 - 13	526.5 - 524.5	-	16.6	111.7	CL-CH	Light brown clay with sand

Note: (1) Specific Gravity of 2.70 was assumed for Proctor Tests.

Fort Worth Central City Preliminary Design

Table C-5:
Laboratory Consolidated Undrained Triaxial Test Results

Boring No.	Sample No.	Ground Surface Elevation (ft) ⁽¹⁾	Sample Depth (ft)	Sample Elevation (ft)	Penetrometer Value (tsf)	Moisture Content (%)	Dry Unit Weight (pcf)	Atterberg Limits			Friction Angle, ϕ (°)	USCS	Visual Description	Remarks
								LL	PI	PL				
C-3	ST-1	530.6	3.0 - 5.0	527.6 - 525.6	2.0	19.5	106.7	48	29	19	25	CL	Dark brown clay	remolded sample,
C-6	B-1	525.7	17.0 - 19.0	508.7 - 506.7	N/A	0.0	115.2	34	21	13	23	CL	Grayish-brown sandy clay	
C-7	ST-4	534.1	24.0 - 26.0	510.1 - 508.1	1.75	19.4	109.6	39	24	15	27	CL	Light brown clay	
C-9	ST-1	537.5	1.0 - 3.0	536.5 - 534.5	> 4.5	18.1	109.9	47	30	17	29	CL	Dark gray clay	remolded sample, omit first loading.
C-9	B-1	537.5	8.0 - 11.0	529.5 - 526.5	N/A	18.9	107.6	50	33	17	30	CL-CH	Light brown clay with sand	

Notes:

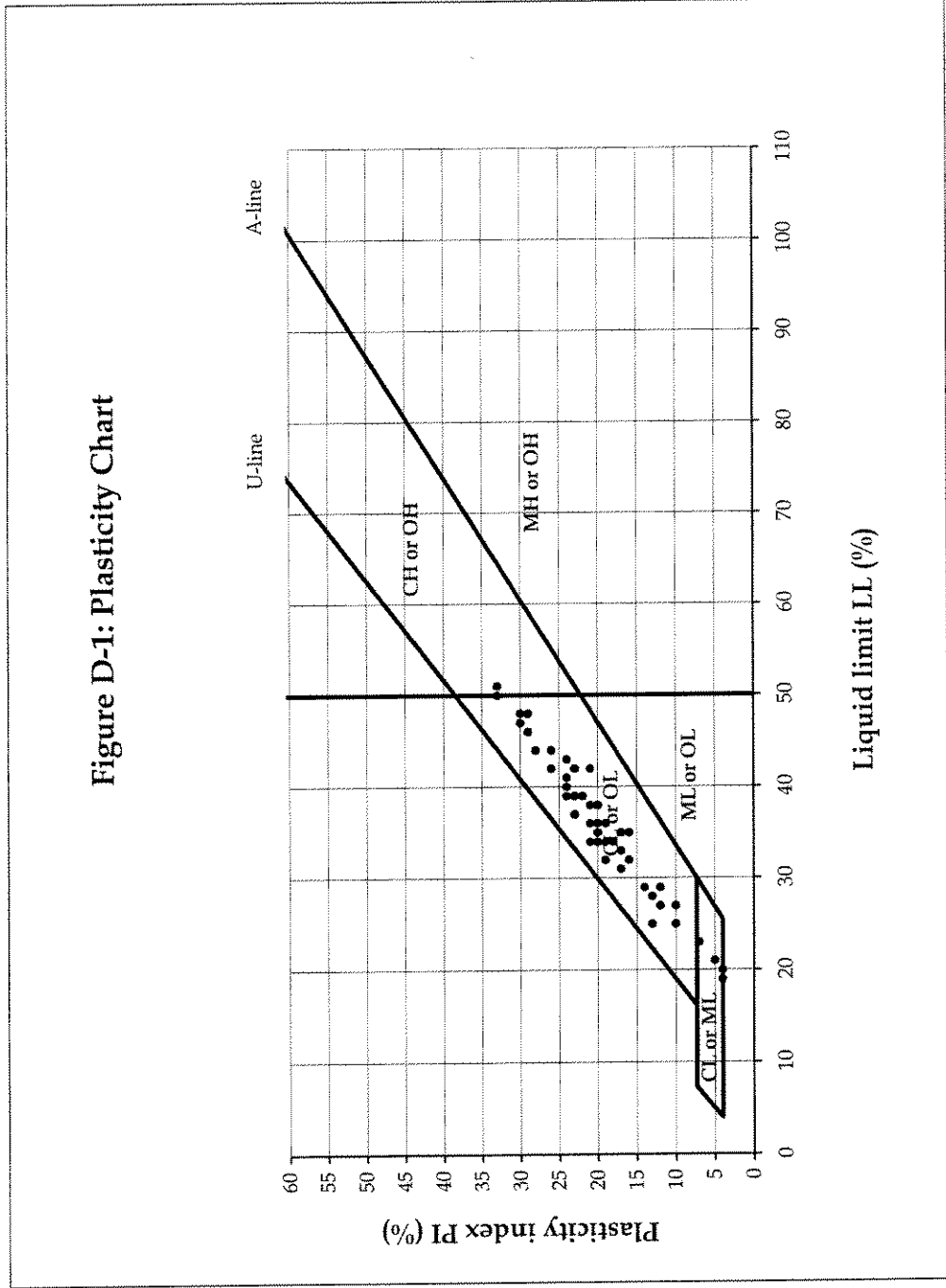
- Elevations based on the North American Vertical Datum (NAVD) of 1988 and are reported in feet.
- Triaxial test conducted at three confining stresses (σ_3) for each sample. The confining stresses are as follows
 - C-3, σ_3 = 500, 2000, 4000 psf (overconsolidated sample)
 - C-6, σ_3 = 200, 500, 1000 psf
 - C-7, σ_3 = 500, 100, 2000 psf
 - C-9, ST-1, σ_3 = 500, 2000, 4000 psf (overconsolidated sample)
 - C-9, B-1, σ_3 = 200, 500, 1000 psf

Attachment D

Figures

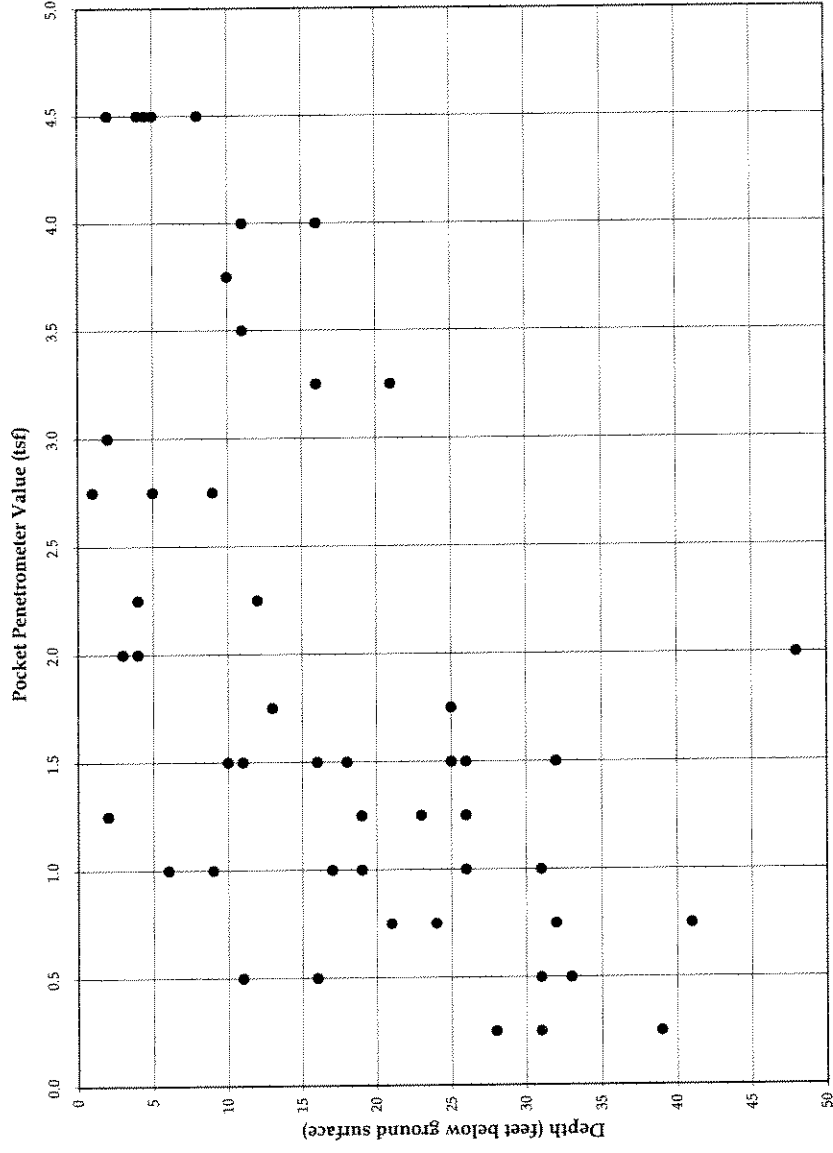
Fort Worth Central City Preliminary Design

Figure D-1: Plasticity Chart



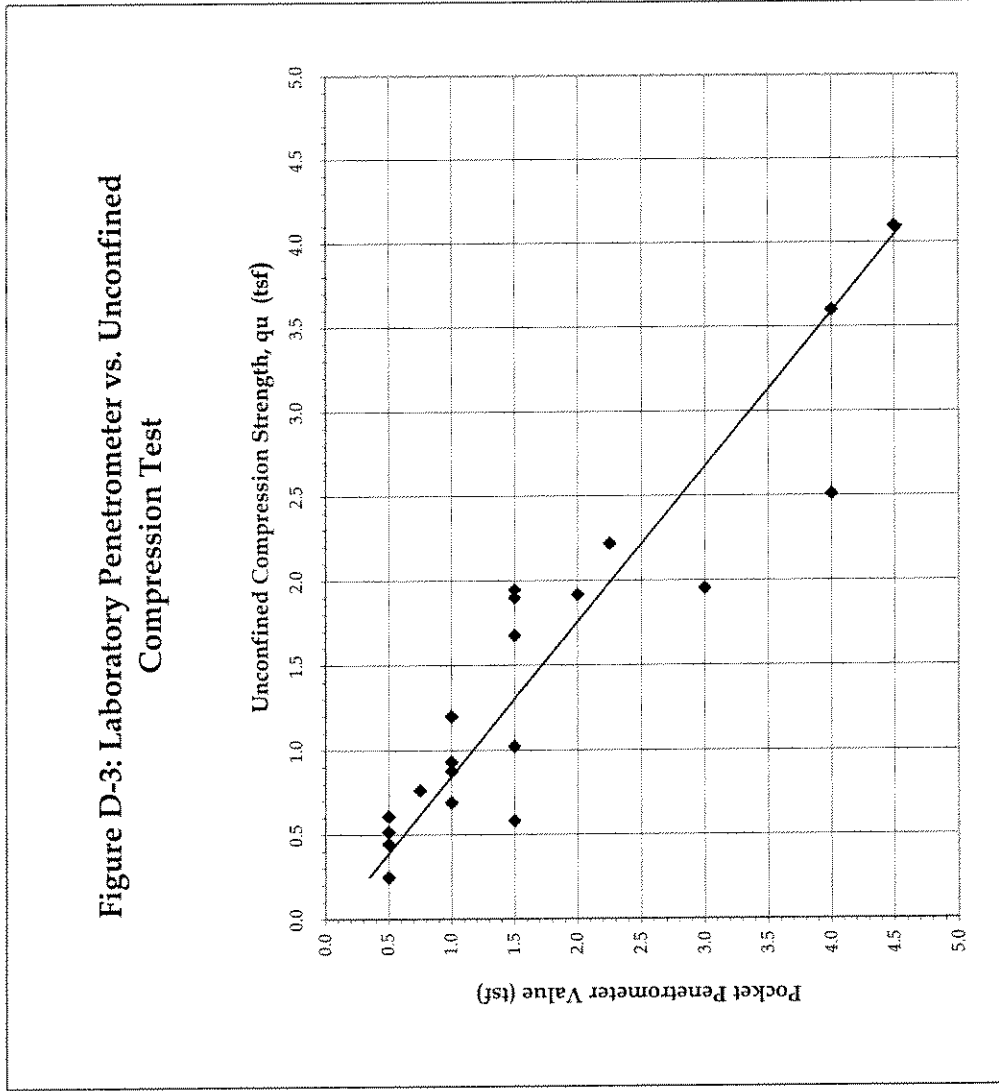
Fort Worth Cental City Preliminary Design

Figure D-2: Pocket Penetrometer Value vs. Depth



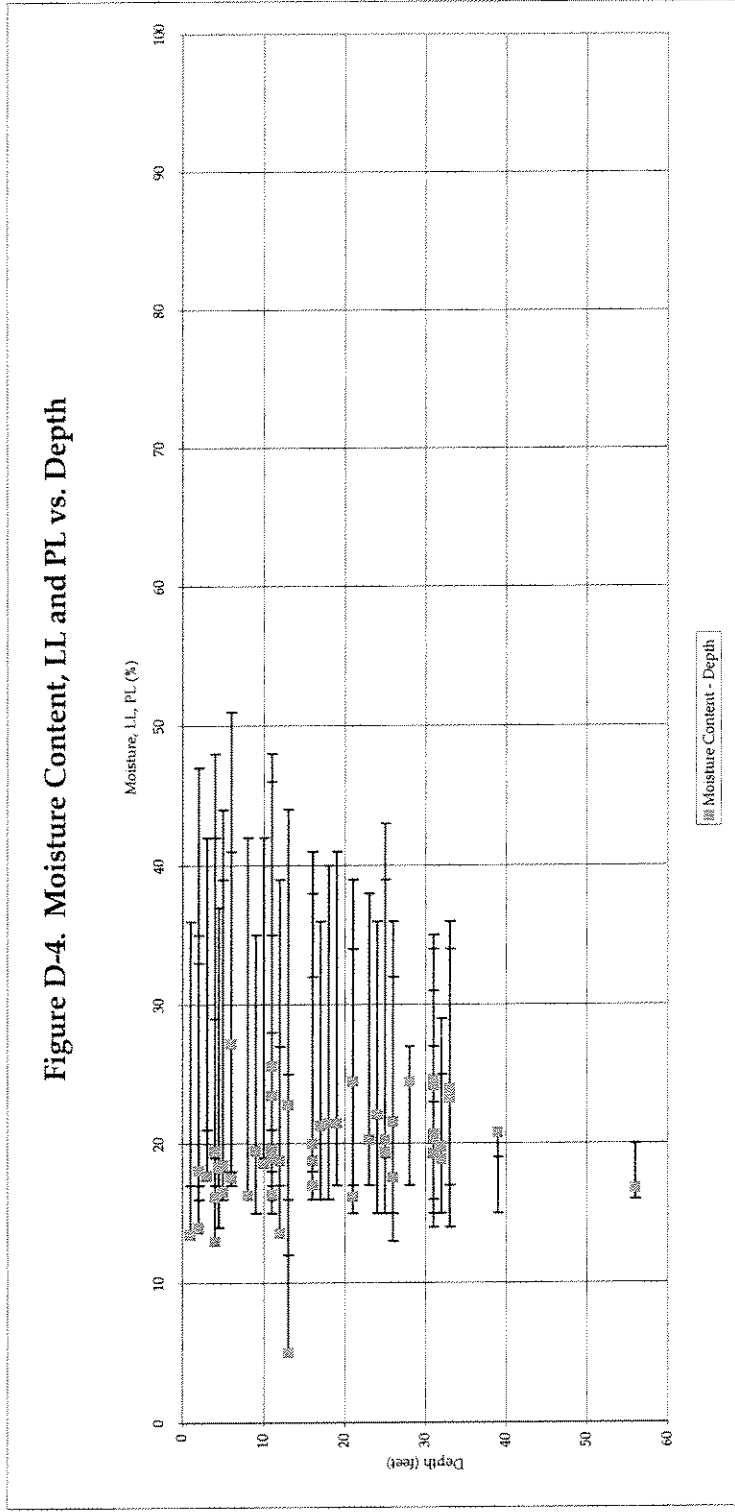
Fort Worth Central City Preliminary Design

Figure D-3: Laboratory Penetrometer vs. Unconfined Compression Test



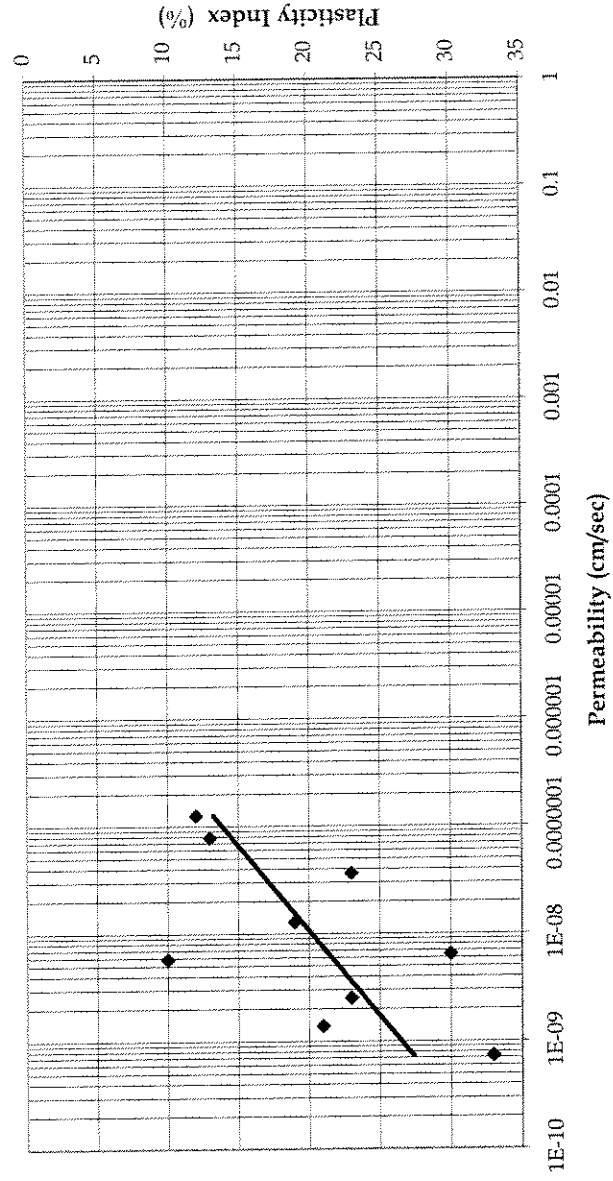
Fort Worth Central City Preliminary Design

Figure D-4. Moisture Content, LL and PL vs. Depth



Fort Worth Central City Preliminary Design

Figure D-5: Plasticity Index vs. Permeability



Client: TWRD
 Project: Fort Worth Central City Preliminary Design
 Project No.: 2521-42275
 Computed by: EDM

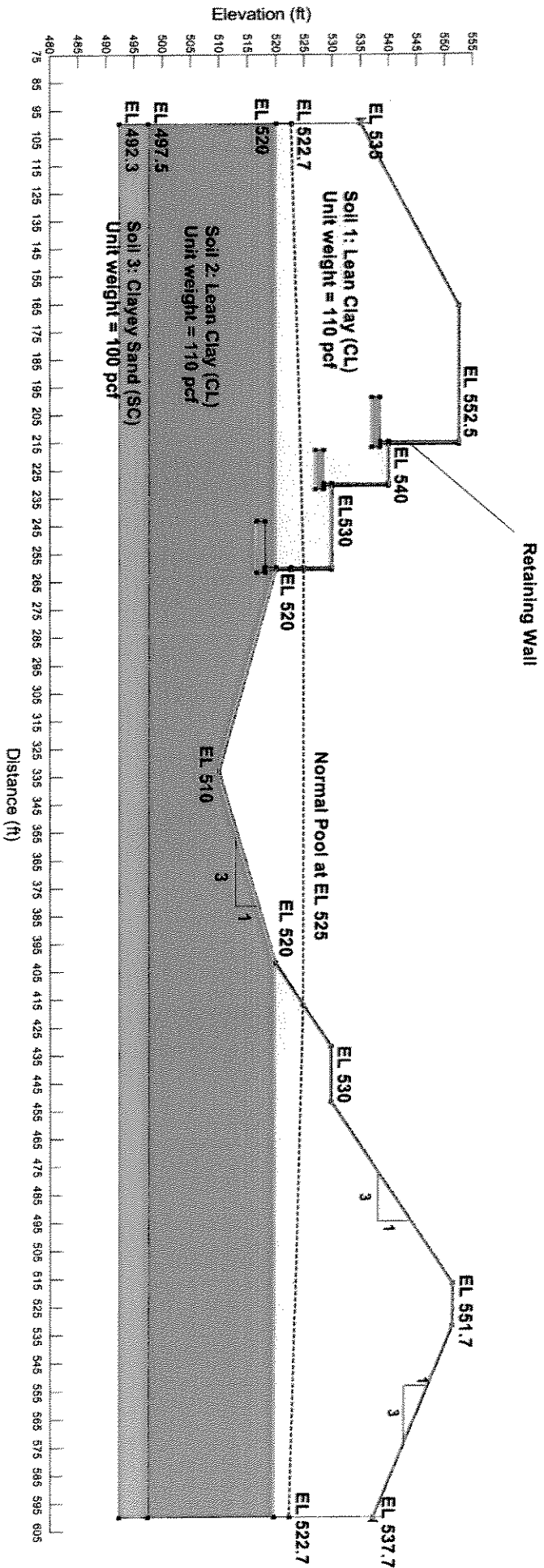


Figure D-6: Typical Cross Section

Attachment E

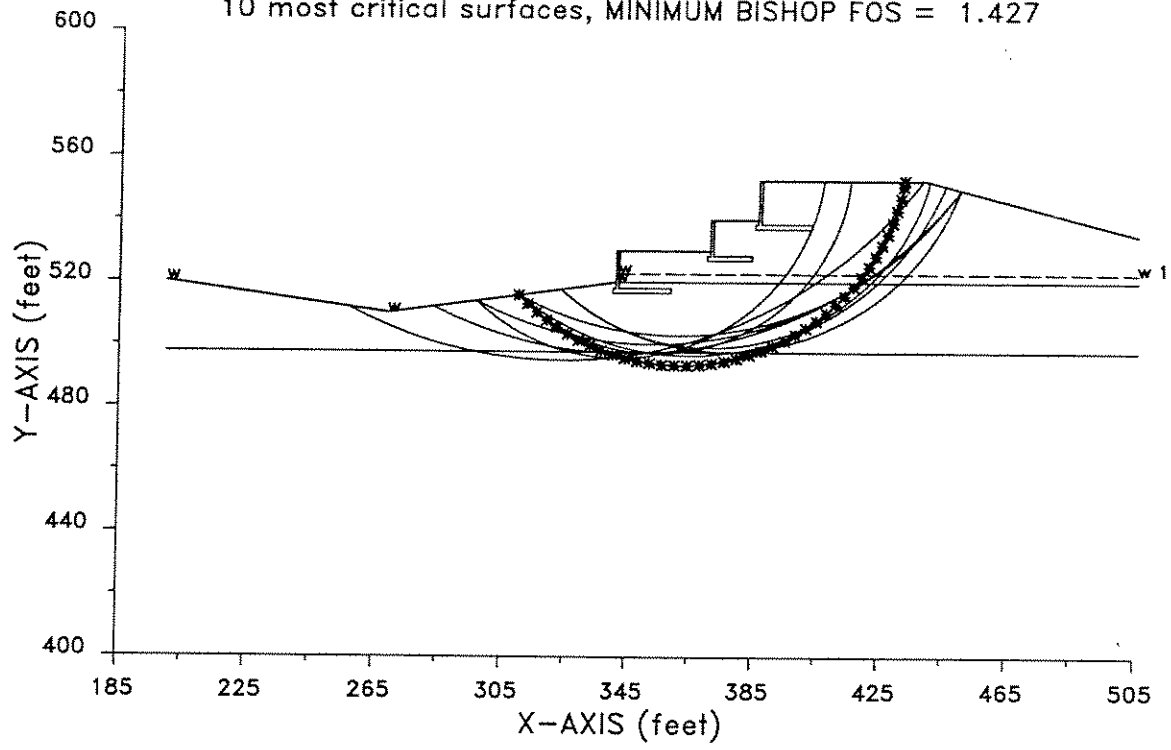
Stability Analyses

Legend

TR-STL1S = Short Term, Left Channel & Levee
TR-LTL1T = Long Term, Left Channel & Levee
TR-RDL1S = Rapid Drawdown, Left Channel & Levee
TR-LTL1E = Long Term, Left Channel & Levee, Earthquake Loading
TR-STR1S = Short Term, Right Channel & Levee
TR-LTR1S = Long Term, Right Channel & Levee
TR-RDR1S = Rapid Drawdown, Right Channel & Levee
TR-LTR1E = Long Term, Right Channel & Levee, Earthquake Loading

Trinity River Realignment, Texas

10 most critical surfaces, MINIMUM BISHOP FOS = 1.427



```

*****
*           X S T A B L           *
*           *                     *
*           Slope Stability Analysis *
*           using the               *
*           Method of Slices        *
*           *                     *
*           Copyright (C) 1992 - 99 *
*           Interactive Software Designs, Inc. *
*           Moscow, ID 83843, U.S.A. *
*           *                     *
*           All Rights Reserved     *
*           *                     *
*           Ver. 5.203              96 Å 1718 *
*****
    
```

Problem Description : Trinity River Realignment, Texas

 SEGMENT BOUNDARY COORDINATES

12 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	520.0	269.0	510.0	2
2	269.0	510.0	341.0	520.0	2
3	341.0	520.0	341.1	530.0	4
4	341.1	530.0	342.1	530.0	4
5	342.1	530.0	371.0	530.0	1
6	371.0	530.0	371.1	540.0	4
7	371.1	540.0	372.1	540.0	4
8	372.1	540.0	386.0	540.0	1
9	386.0	540.0	386.1	552.5	4
10	386.1	552.5	387.1	552.5	4
11	387.1	552.5	439.0	552.5	1
12	439.0	552.5	505.0	535.0	1

24 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	384.9	537.0	385.0	538.5	4
2	385.0	538.5	385.9	538.5	4
3	385.9	538.5	386.0	540.0	4
4	387.0	538.5	387.1	552.5	1
5	387.0	538.5	403.0	538.5	4
6	384.9	537.0	402.9	537.0	1
7	402.9	537.0	403.0	538.5	1
8	369.9	527.0	370.0	528.5	4
9	370.0	528.5	370.9	528.5	4
10	370.9	528.5	371.0	530.0	4
11	372.0	528.5	372.1	540.0	1
12	372.0	528.5	384.0	528.5	4
13	369.9	527.0	383.9	527.0	1
14	383.9	527.0	384.0	528.5	1
15	341.9	518.0	342.1	530.0	1
16	342.0	520.0	505.0	520.0	2
17	339.9	516.5	340.0	518.0	4
18	340.0	518.0	340.9	518.0	4
19	340.9	518.0	341.0	520.0	4

20	341.9	518.0	342.0	520.0	2
21	341.9	518.0	358.5	518.0	4
22	339.9	516.5	358.4	516.5	2
23	358.4	516.5	358.5	518.0	2
24	200.0	497.5	505.0	497.5	3

ISOTROPIC Soil Parameters

4 Soil unit(s) specified

Soil Unit No.	Unit Moist (pcf)	Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pressure Constant (psf)	Water Surface No.
1	130.0	130.0	2000.0	.00	.000	.0	1
2	130.0	130.0	1000.0	.00	.000	.0	1
3	130.0	130.0	500.0	.00	.000	.0	1
4	150.0	150.0	5000.0	.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

PHREATIC SURFACE,

Point No.	x-water (ft)	y-water (ft)
1	200.00	520.00
2	269.00	510.00
3	341.00	520.00
4	342.00	522.70
5	505.00	522.70

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

100 trial surfaces will be generated and analyzed.

10 Surfaces initiate from each of 10 points equally spaced along the ground surface between x = 230.0 ft and x = 350.0 ft

Each surface terminates between x = 380.0 ft and x = 450.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 493.2 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

4.0 ft line segments define each trial failure surface.

 ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
 Upper angular limit := (slope angle - 5.0) degrees

 -- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)

 USER SELECTED option to maintain strength greater than zero

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface is specified by 41 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	310.00	515.69
2	312.83	512.87
3	315.81	510.20
4	318.94	507.71
5	322.20	505.39
6	325.59	503.27
7	329.09	501.33
8	332.69	499.59
9	336.39	498.06
10	340.16	496.74
11	344.01	495.63
12	347.91	494.74
13	351.85	494.07
14	355.83	493.62
15	359.82	493.40
16	363.82	493.40
17	367.81	493.62
18	371.79	494.06
19	375.73	494.73
20	379.63	495.62
21	383.48	496.73
22	387.25	498.04
23	390.95	499.57
24	394.55	501.31
25	398.06	503.24
26	401.44	505.36
27	404.71	507.68
28	407.84	510.17
29	410.82	512.83
30	413.65	515.66
31	416.32	518.64
32	418.82	521.76
33	421.14	525.02
34	423.27	528.40
35	425.21	531.90

36	426.95	535.51
37	428.48	539.20
38	429.81	542.97
39	430.92	546.81
40	431.82	550.71
41	432.12	552.50

**** Simplified BISHOP FOS = 1.427 ****

The following is a summary of the TEN most critical surfaces

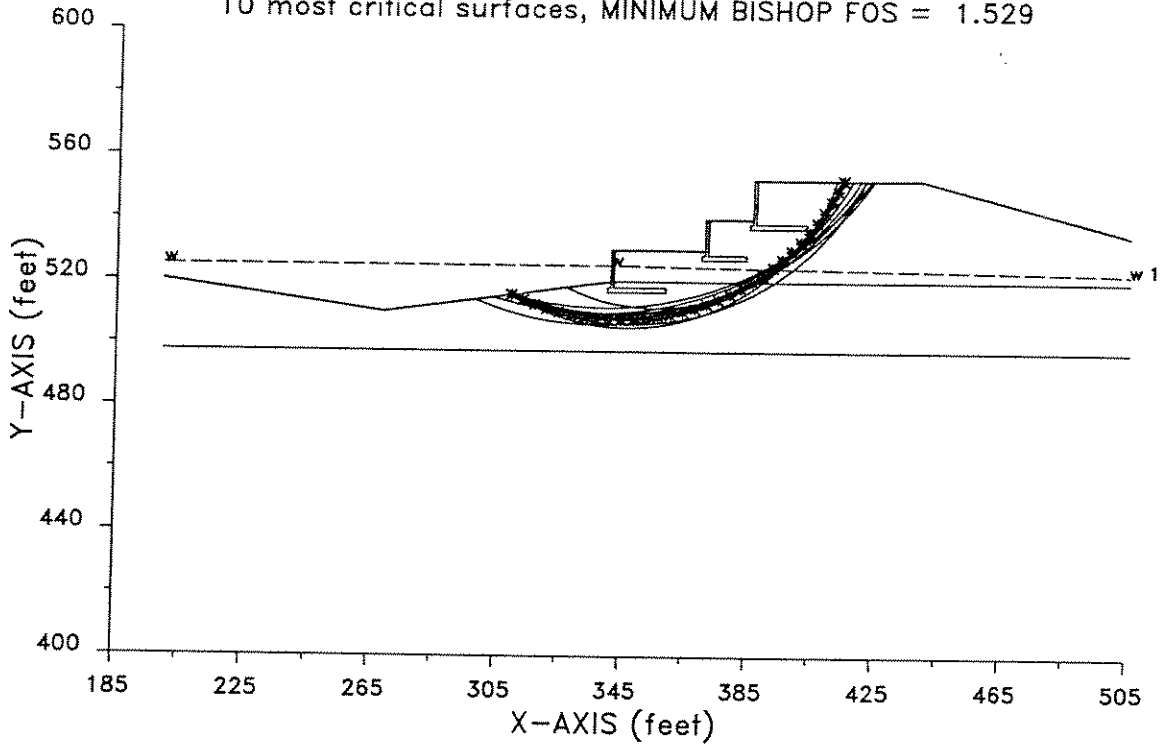
Problem Description : Trinity River Realignment, Texas

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.427	361.84	564.72	71.35	310.00	432.12	1.210E+07
2.	1.515	364.47	583.52	86.99	310.00	445.07	1.626E+07
3.	1.609	344.22	629.81	132.62	283.33	449.85	2.915E+07
4.	1.645	323.79	636.47	141.60	256.67	437.77	3.144E+07
5.	1.723	352.48	620.88	120.72	296.67	449.94	2.591E+07
6.	1.731	375.63	576.67	78.93	323.33	449.79	1.493E+07
7.	1.739	353.94	558.61	61.42	310.00	415.05	1.038E+07
8.	1.757	371.24	570.12	71.13	323.33	440.03	1.306E+07
9.	1.782	341.88	561.12	65.41	296.67	406.74	1.091E+07
10.	1.788	360.85	610.85	107.89	310.00	449.70	2.161E+07

* * * END OF FILE * * *

Trinity River Realignment, Texas

10 most critical surfaces, MINIMUM BISHOP FOS = 1.529




```

*****
*           X S T A B L           *
*                               *
*      Slope Stability Analysis   *
*      using the                 *
*      Method of Slices         *
*                               *
*      Copyright (C) 1992 - 99   *
*      Interactive Software Designs, Inc. *
*      Moscow, ID 83843, U.S.A.   *
*                               *
*      All Rights Reserved       *
*                               *
*      Ver. 5.203                 96 Å 1718 *
*****
    
```

Problem Description : Trinity River Realignment, Texas

 SEGMENT BOUNDARY COORDINATES

12 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	520.0	269.0	510.0	2
2	269.0	510.0	341.0	520.0	2
3	341.0	520.0	341.1	530.0	4
4	341.1	530.0	342.1	530.0	4
5	342.1	530.0	371.0	530.0	1
6	371.0	530.0	371.1	540.0	4
7	371.1	540.0	372.1	540.0	4
8	372.1	540.0	386.0	540.0	1
9	386.0	540.0	386.1	552.5	4
10	386.1	552.5	387.1	552.5	4
11	387.1	552.5	439.0	552.5	1
12	439.0	552.5	505.0	535.0	1

24 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	384.9	537.0	385.0	538.5	4
2	385.0	538.5	385.9	538.5	4
3	385.9	538.5	386.0	540.0	4
4	387.0	538.5	387.1	552.5	1
5	387.0	538.5	403.0	538.5	4
6	384.9	537.0	402.9	537.0	1
7	402.9	537.0	403.0	538.5	1
8	369.9	527.0	370.0	528.5	4
9	370.0	528.5	370.9	528.5	4
10	370.9	528.5	371.0	530.0	4
11	372.0	528.5	372.1	540.0	1
12	372.0	528.5	384.0	528.5	4
13	369.9	527.0	383.9	527.0	1
14	383.9	527.0	384.0	528.5	1
15	341.9	518.0	342.1	530.0	1
16	342.0	520.0	505.0	520.0	2
17	339.9	516.5	340.0	518.0	4
18	340.0	518.0	340.9	518.0	4
19	340.9	518.0	341.0	520.0	4

20	341.9	518.0	342.0	520.0	2
21	341.9	518.0	358.5	518.0	4
22	339.9	516.5	358.4	516.5	2
23	358.4	516.5	358.5	518.0	2
24	200.0	497.5	505.0	497.5	3

ISOTROPIC Soil Parameters

4 Soil unit(s) specified

Soil Unit No.	Unit Weight		Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure		Water Surface No.
	Moist (pcf)	Sat. (pcf)			Parameter Ru	Constant (psf)	
1	130.0	130.0	250.0	27.00	.000	.0	1
2	130.0	130.0	100.0	27.00	.000	.0	1
3	125.0	125.0	.0	28.00	.000	.0	1
4	150.0	150.0	5000.0	.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 3 coordinate points

PHREATIC SURFACE,

Point No.	x-water (ft)	y-water (ft)
1	200.00	525.00
2	341.00	525.00
3	505.00	522.70

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

1000 trial surfaces will be generated and analyzed.

50 Surfaces initiate from each of 20 points equally spaced along the ground surface between x = 240.0 ft and x = 350.0 ft

Each surface terminates between x = 360.0 ft and x = 430.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 493.2 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

4.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

-- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)

USER SELECTED option to maintain strength greater than zero

** Factor of safety calculation for surface # 901 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 352.37
ycenter = 537.35 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 906 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 357.02
ycenter = 540.20 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 907 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 352.74
ycenter = 547.23 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 908 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 353.22
ycenter = 540.64 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****  
** Factor of safety calculation for surface # 909 **  
** failed to converge within FIFTY iterations **  
**  
** The last calculated value of the FOS was***** **  
** This will be ignored for final summary of results **  
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 354.58
ycenter = 537.55 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****  
** Factor of safety calculation for surface # 912 **  
** failed to converge within FIFTY iterations **  
**  
** The last calculated value of the FOS was***** **  
** This will be ignored for final summary of results **  
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 355.38
ycenter = 628.76 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****  
** Factor of safety calculation for surface # 914 **  
** failed to converge within FIFTY iterations **  
**  
** The last calculated value of the FOS was5910.2750 **  
** This will be ignored for final summary of results **  
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 355.00
ycenter = 538.46 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****  
** Factor of safety calculation for surface # 915 **  
** failed to converge within FIFTY iterations **  
**  
** The last calculated value of the FOS was***** **  
** This will be ignored for final summary of results **  
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 355.79
ycenter = 538.76 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****  
** Factor of safety calculation for surface # 920 **  
** failed to converge within FIFTY iterations **  
**  
** The last calculated value of the FOS was3367.9390 **  
** This will be ignored for final summary of results **  
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 353.13
ycenter = 536.11 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 921 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was3817.1040 **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 353.13
ycenter = 536.79 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 924 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 354.17
ycenter = 539.99 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 928 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 353.49
ycenter = 555.06 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 929 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 354.43
ycenter = 550.85 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 932 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was7215.5040 **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 353.66

ycenter = 539.44 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 933 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 352.73
ycenter = 537.56 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 934 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 353.89
ycenter = 537.62 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 938 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 356.91
ycenter = 539.88 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 939 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 354.63
ycenter = 539.15 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 944 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 354.92
ycenter = 555.24 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 945 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 353.14
ycenter = 539.27 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 947 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 357.28
ycenter = 560.20 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 954 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 357.22
ycenter = 540.03 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 961 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 357.19
ycenter = 539.69 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 962 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was***** **
** This will be ignored for final summary of results **

Circular surface (FOS=*****) is defined by: xcenter = 355.91
ycenter = 534.13 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 965  **
**      failed to converge within FIFTY iterations      **
**                                                     **
**      The last calculated value of the FOS was***** **
**      This will be ignored for final summary of results **
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 360.41
ycenter = 545.07 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 966  **
**      failed to converge within FIFTY iterations      **
**                                                     **
**      The last calculated value of the FOS was***** **
**      This will be ignored for final summary of results **
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 357.03
ycenter = 543.59 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 967  **
**      failed to converge within FIFTY iterations      **
**                                                     **
**      The last calculated value of the FOS was***** **
**      This will be ignored for final summary of results **
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 359.18
ycenter = 543.58 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 970  **
**      failed to converge within FIFTY iterations      **
**                                                     **
**      The last calculated value of the FOS was***** **
**      This will be ignored for final summary of results **
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 356.73
ycenter = 536.88 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 971  **
**      failed to converge within FIFTY iterations      **
**                                                     **
**      The last calculated value of the FOS was***** **
**      This will be ignored for final summary of results **
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 358.60
ycenter = 561.10 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 972      **
**      failed to converge within FIFTY iterations          **
**                                                         **
**      The last calculated value of the FOS was*****     **
**      This will be ignored for final summary of results   **
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 356.71
ycenter = 535.44 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 976      **
**      failed to converge within FIFTY iterations          **
**                                                         **
**      The last calculated value of the FOS was-927.2201   **
**      This will be ignored for final summary of results   **
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 356.36
ycenter = 534.83 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 978      **
**      failed to converge within FIFTY iterations          **
**                                                         **
**      The last calculated value of the FOS was6680.0880   **
**      This will be ignored for final summary of results   **
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 357.50
ycenter = 538.55 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 979      **
**      failed to converge within FIFTY iterations          **
**                                                         **
**      The last calculated value of the FOS was*****     **
**      This will be ignored for final summary of results   **
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 360.35
ycenter = 541.19 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 980      **
**      failed to converge within FIFTY iterations          **
**                                                         **
**      The last calculated value of the FOS was*****     **
**      This will be ignored for final summary of results   **
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 356.13
ycenter = 536.08 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface #   982   **
**      failed to converge within FIFTY iterations        **
**                                                         **
**      The last calculated value of the FOS was*****   **
**      This will be ignored for final summary of results **
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 358.76
ycenter = 538.06 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface #   983   **
**      failed to converge within FIFTY iterations        **
**                                                         **
**      The last calculated value of the FOS was5300.5120 **
**      This will be ignored for final summary of results **
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 359.11
ycenter = 538.19 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface #   985   **
**      failed to converge within FIFTY iterations        **
**                                                         **
**      The last calculated value of the FOS was*****   **
**      This will be ignored for final summary of results **
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 360.39
ycenter = 552.98 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface #   989   **
**      failed to converge within FIFTY iterations        **
**                                                         **
**      The last calculated value of the FOS was*****   **
**      This will be ignored for final summary of results **
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 356.98
ycenter = 535.88 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface #   996   **
**      failed to converge within FIFTY iterations        **
**                                                         **
**      The last calculated value of the FOS was*****   **
**      This will be ignored for final summary of results **
*****
```

Circular surface (FOS=*****) is defined by: xcenter = 359.09
ycenter = 569.94 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
```

```

**      Factor of safety calculation for surface #  997      **
**      failed to converge within FIFTY iterations          **
**                                                         **
**      The last calculated value of the FOS was*****     **
**      This will be ignored for final summary of results  **
*****

```

Circular surface (FOS=*****) is defined by: xcenter = 355.60
ycenter = 532.99 Init. Pt. = 350.00 Seg. Length = 4.00

```

*****
**      Factor of safety calculation for surface #  999      **
**      failed to converge within FIFTY iterations          **
**                                                         **
**      The last calculated value of the FOS was3865.6270   **
**      This will be ignored for final summary of results  **
*****

```

Circular surface (FOS=*****) is defined by: xcenter = 358.73
ycenter = 536.04 Init. Pt. = 350.00 Seg. Length = 4.00

```

*****
**      Factor of safety calculation for surface # 1000     **
**      failed to converge within FIFTY iterations          **
**                                                         **
**      The last calculated value of the FOS was2268.7710   **
**      This will be ignored for final summary of results  **
*****

```

Circular surface (FOS=*****) is defined by: xcenter = 357.24
ycenter = 534.84 Init. Pt. = 350.00 Seg. Length = 4.00

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 32 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	309.47	515.62
2	313.11	513.96
3	316.83	512.48
4	320.62	511.19
5	324.46	510.10
6	328.36	509.21
7	332.30	508.53
8	336.27	508.04
9	340.26	507.76
10	344.26	507.68
11	348.26	507.81
12	352.25	508.15
13	356.21	508.68
14	360.14	509.43
15	364.03	510.37
16	367.86	511.51
17	371.64	512.84

18	375.33	514.37
19	378.95	516.08
20	382.47	517.98
21	385.89	520.05
22	389.20	522.30
23	392.38	524.72
24	395.45	527.29
25	398.37	530.02
26	401.15	532.90
27	403.78	535.91
28	406.25	539.06
29	408.56	542.32
30	410.70	545.71
31	412.66	549.19
32	414.30	552.50

**** Simplified BISHOP FOS = 1.529 ****

```
*****
**
** Out of the 1000 surfaces generated and analyzed by XSTABL, **
** 42 surfaces were found to have MISLEADING FOS values. **
**
*****
```

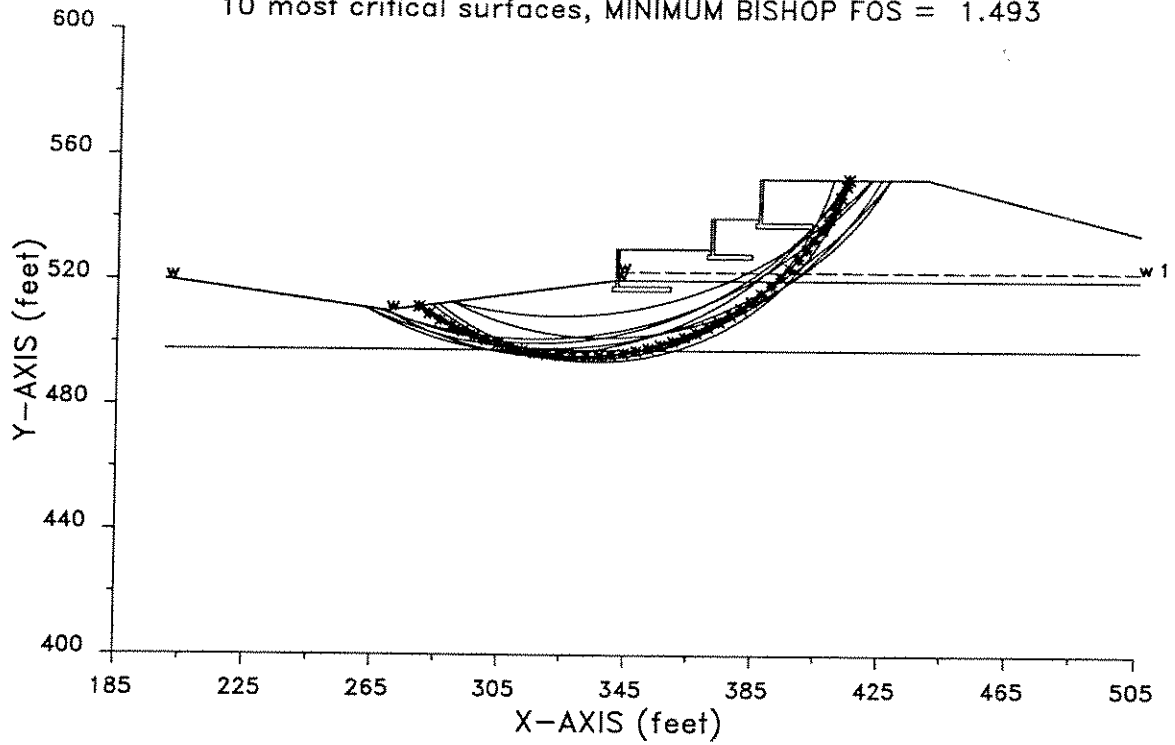
The following is a summary of the TEN most critical surfaces

Problem Description : Trinity River Realignment, Texas

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.529	343.76	585.65	77.97	309.47	414.30	8.404E+06
2.	1.535	343.40	592.22	83.77	309.47	417.15	9.183E+06
3.	1.547	342.74	599.33	90.08	309.47	419.64	9.951E+06
4.	1.568	346.20	574.77	69.62	309.47	412.15	8.054E+06
5.	1.572	354.79	575.17	63.61	326.84	414.19	6.294E+06
6.	1.574	336.86	606.09	99.98	297.89	421.25	1.241E+07
7.	1.580	336.46	619.22	109.43	303.68	423.18	1.224E+07
8.	1.581	342.88	608.23	98.45	309.47	424.00	1.144E+07
9.	1.585	338.78	619.69	108.12	309.47	423.48	1.150E+07
10.	1.586	347.51	588.27	82.00	309.47	421.29	1.049E+07

* * * END OF FILE * * *

Trinity River Realignment, Texas
10 most critical surfaces, MINIMUM BISHOP FOS = 1.493



```

*****
*                               *
*           X S T A B L         *
*                               *
*           Slope Stability Analysis *
*           using the           *
*           Method of Slices     *
*                               *
*           Copyright (C) 1992 - 99 *
*           Interactive Software Designs, Inc. *
*           Moscow, ID 83843, U.S.A. *
*                               *
*           All Rights Reserved   *
*                               *
*           Ver. 5.203           96 Å 1718 *
*****
    
```

Problem Description : Trinity River Realignment, Texas

 SEGMENT BOUNDARY COORDINATES

12 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	520.0	269.0	510.0	2
2	269.0	510.0	341.0	520.0	2
3	341.0	520.0	341.1	530.0	4
4	341.1	530.0	342.1	530.0	4
5	342.1	530.0	371.0	530.0	1
6	371.0	530.0	371.1	540.0	4
7	371.1	540.0	372.1	540.0	4
8	372.1	540.0	386.0	540.0	1
9	386.0	540.0	386.1	552.5	4
10	386.1	552.5	387.1	552.5	4
11	387.1	552.5	439.0	552.5	1
12	439.0	552.5	505.0	535.0	1

24 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	384.9	537.0	385.0	538.5	4
2	385.0	538.5	385.9	538.5	4
3	385.9	538.5	386.0	540.0	4
4	387.0	538.5	387.1	552.5	1
5	387.0	538.5	403.0	538.5	4
6	384.9	537.0	402.9	537.0	1
7	402.9	537.0	403.0	538.5	1
8	369.9	527.0	370.0	528.5	4
9	370.0	528.5	370.9	528.5	4
10	370.9	528.5	371.0	530.0	4
11	372.0	528.5	372.1	540.0	1
12	372.0	528.5	384.0	528.5	4
13	369.9	527.0	383.9	527.0	1
14	383.9	527.0	384.0	528.5	1
15	341.9	518.0	342.1	530.0	1
16	342.0	520.0	505.0	520.0	2
17	339.9	516.5	340.0	518.0	4
18	340.0	518.0	340.9	518.0	4
19	340.9	518.0	341.0	520.0	4

20	341.9	518.0	342.0	520.0	2
21	341.9	518.0	358.5	518.0	4
22	339.9	516.5	358.4	516.5	2
23	358.4	516.5	358.5	518.0	2
24	200.0	497.5	505.0	497.5	3

ISOTROPIC Soil Parameters

4 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	130.0	130.0	250.0	27.00	.000	.0	1
2	130.0	130.0	100.0	27.00	.000	.0	1
3	125.0	125.0	.0	28.00	.000	.0	1
4	150.0	150.0	5000.0	.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

PHREATIC SURFACE,

Point No.	x-water (ft)	y-water (ft)
1	200.00	520.00
2	269.00	510.00
3	341.00	520.00
4	342.00	522.70
5	505.00	522.70

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally spaced along the ground surface between x = 260.0 ft and x = 300.0 ft

Each surface terminates between x = 320.0 ft and x = 480.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 493.2 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

4.0 ft line segments define each trial failure surface.

 ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined
 within the angular range defined by :

Lower angular limit := -45.0 degrees
 Upper angular limit := (slope angle - 5.0) degrees

 -- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)

 USER SELECTED option to maintain strength greater than zero

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
 is specified by 42 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	278.95	511.38
2	282.30	509.21
3	285.75	507.18
4	289.29	505.31
5	292.90	503.59
6	296.59	502.04
7	300.34	500.65
8	304.15	499.42
9	308.00	498.37
10	311.90	497.48
11	315.84	496.77
12	319.80	496.23
13	323.79	495.87
14	327.78	495.68
15	331.78	495.67
16	335.78	495.83
17	339.77	496.17
18	343.73	496.69
19	347.67	497.37
20	351.58	498.24
21	355.44	499.27
22	359.26	500.47
23	363.02	501.84
24	366.71	503.37
25	370.34	505.06
26	373.88	506.91
27	377.34	508.92
28	380.71	511.07
29	383.98	513.38
30	387.15	515.82
31	390.21	518.40
32	393.15	521.11
33	395.97	523.95
34	398.66	526.91
35	401.21	529.99

36	403.63	533.17
37	405.91	536.46
38	408.04	539.84
39	410.02	543.32
40	411.85	546.88
41	413.51	550.52
42	414.32	552.50

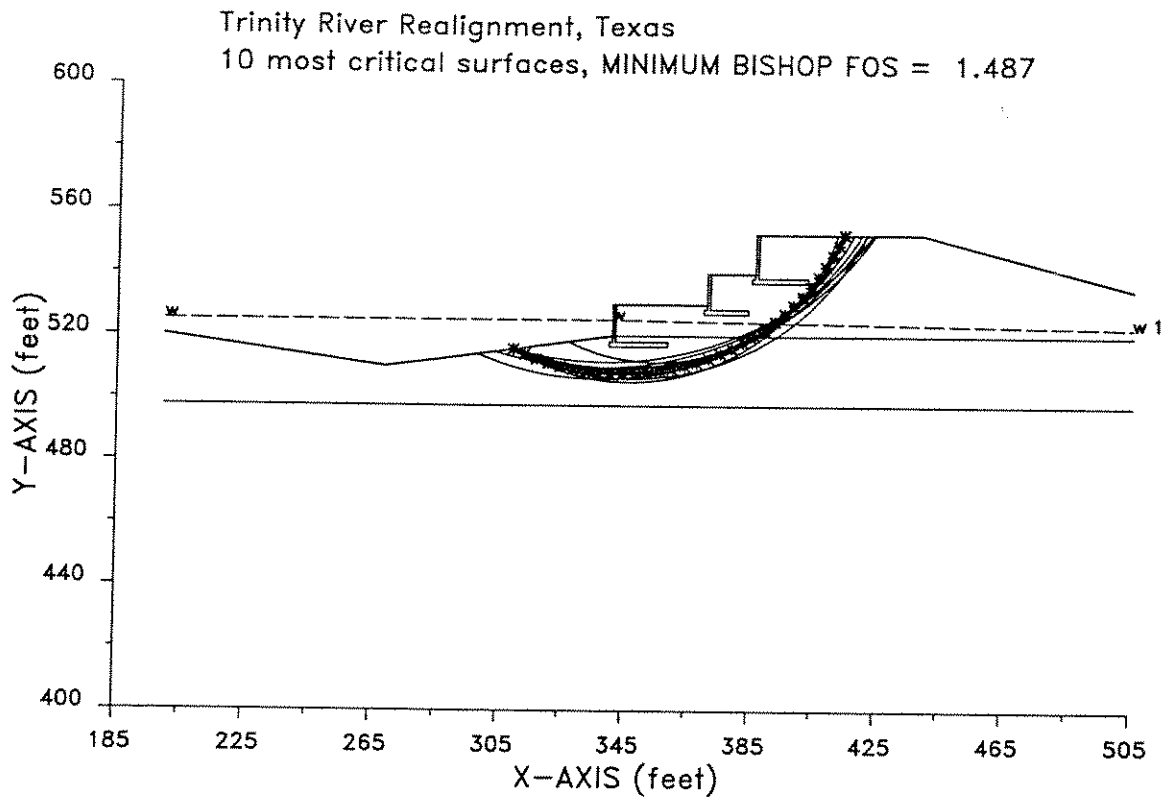
**** Simplified BISHOP FOS = 1.493 ****

The following is a summary of the TEN most critical surfaces

Problem Description : Trinity River Realignment, Texas

	FOS (BISHOP)	Circle x-coord (ft)	Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.493	330.06	586.55	90.90	278.95	414.32	1.448E+07
2.	1.496	317.13	606.95	110.60	262.11	413.41	1.669E+07
3.	1.501	325.09	610.06	114.92	268.42	424.56	2.087E+07
4.	1.505	315.60	636.04	134.97	266.32	421.63	1.940E+07
5.	1.511	323.22	638.91	130.51	289.47	421.02	1.442E+07
6.	1.514	316.65	617.39	117.65	268.42	414.77	1.642E+07
7.	1.522	337.11	606.84	105.38	289.47	427.39	1.697E+07
8.	1.527	334.22	572.91	77.95	285.26	409.44	1.202E+07
9.	1.532	335.11	577.15	83.35	283.16	414.69	1.426E+07
10.	1.533	319.51	631.77	133.72	262.11	427.17	2.318E+07

* * * END OF FILE * * *



```

*****
*                               *
*           X S T A B L         *
*                               *
*       Slope Stability Analysis *
*       using the               *
*       Method of Slices       *
*                               *
*       Copyright (C) 1992 - 99 *
*       Interactive Software Designs, Inc. *
*       Moscow, ID 83843, U.S.A. *
*                               *
*       All Rights Reserved     *
*                               *
*       Ver. 5.203              *
*                               *
*****
    
```

Problem Description : Trinity River Realignment, Texas

 SEGMENT BOUNDARY COORDINATES

12 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	520.0	269.0	510.0	2
2	269.0	510.0	341.0	520.0	2
3	341.0	520.0	341.1	530.0	4
4	341.1	530.0	342.1	530.0	4
5	342.1	530.0	371.0	530.0	1
6	371.0	530.0	371.1	540.0	4
7	371.1	540.0	372.1	540.0	4
8	372.1	540.0	386.0	540.0	1
9	386.0	540.0	386.1	552.5	4
10	386.1	552.5	387.1	552.5	4
11	387.1	552.5	439.0	552.5	1
12	439.0	552.5	505.0	535.0	1

24 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	384.9	537.0	385.0	538.5	4
2	385.0	538.5	385.9	538.5	4
3	385.9	538.5	386.0	540.0	4
4	387.0	538.5	387.1	552.5	1
5	387.0	538.5	403.0	538.5	4
6	384.9	537.0	402.9	537.0	1
7	402.9	537.0	403.0	538.5	1
8	369.9	527.0	370.0	528.5	4
9	370.0	528.5	370.9	528.5	4
10	370.9	528.5	371.0	530.0	4
11	372.0	528.5	372.1	540.0	1
12	372.0	528.5	384.0	528.5	4
13	369.9	527.0	383.9	527.0	1
14	383.9	527.0	384.0	528.5	1
15	341.9	518.0	342.1	530.0	1
16	342.0	520.0	505.0	520.0	2
17	339.9	516.5	340.0	518.0	4
18	340.0	518.0	340.9	518.0	4
19	340.9	518.0	341.0	520.0	4

20	341.9	518.0	342.0	520.0	2
21	341.9	518.0	358.5	518.0	4
22	339.9	516.5	358.4	516.5	2
23	358.4	516.5	358.5	518.0	2
24	200.0	497.5	505.0	497.5	3

ISOTROPIC Soil Parameters

4 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	130.0	130.0	250.0	27.00	.000	.0	1
2	130.0	130.0	100.0	27.00	.000	.0	1
3	125.0	125.0	.0	28.00	.000	.0	1
4	150.0	150.0	5000.0	.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 3 coordinate points

PHREATIC SURFACE,

Point No.	x-water (ft)	y-water (ft)
1	200.00	525.00
2	341.00	525.00
3	505.00	522.70

A horizontal earthquake loading coefficient of .010 has been assigned

A vertical earthquake loading coefficient of .000 has been assigned

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

1000 trial surfaces will be generated and analyzed.

50 Surfaces initiate from each of 20 points equally spaced along the ground surface between x = 240.0 ft and x = 350.0 ft

Each surface terminates between x = 360.0 ft and x = 430.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 493.2 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

4.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

-- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)

USER SELECTED option to maintain strength greater than zero

** Factor of safety calculation for surface # 901 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 190.6655 **
** This will be ignored for final summary of results **

Circular surface (FOS=190.6655) is defined by: xcenter = 352.37
ycenter = 537.35 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 906 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 135.0751 **
** This will be ignored for final summary of results **

Circular surface (FOS=135.0751) is defined by: xcenter = 357.02
ycenter = 540.20 Init. Pt. = 344.21 Seg. Length = 4.00

** Factor of safety calculation for surface # 907 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 220.5673 **
** This will be ignored for final summary of results **

Circular surface (FOS=220.5673) is defined by: xcenter = 352.74
ycenter = 547.23 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 908  **
**      failed to converge within FIFTY iterations      **
**                                                     **
**      The last calculated value of the FOS was 178.7252 **
**      This will be ignored for final summary of results **
*****
```

Circular surface (FOS=178.7252) is defined by: xcenter = 353.22
ycenter = 540.64 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 909  **
**      failed to converge within FIFTY iterations      **
**                                                     **
**      The last calculated value of the FOS was 154.7368 **
**      This will be ignored for final summary of results **
*****
```

Circular surface (FOS=154.7368) is defined by: xcenter = 354.58
ycenter = 537.55 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 912  **
**      failed to converge within FIFTY iterations      **
**                                                     **
**      The last calculated value of the FOS was 523.4754 **
**      This will be ignored for final summary of results **
*****
```

Circular surface (FOS=523.4754) is defined by: xcenter = 355.38
ycenter = 628.76 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 914  **
**      failed to converge within FIFTY iterations      **
**                                                     **
**      The last calculated value of the FOS was 147.2967 **
**      This will be ignored for final summary of results **
*****
```

Circular surface (FOS=147.2967) is defined by: xcenter = 355.00
ycenter = 538.46 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 915  **
**      failed to converge within FIFTY iterations      **
**                                                     **
**      The last calculated value of the FOS was 149.4206 **
**      This will be ignored for final summary of results **
*****
```

Circular surface (FOS=149.4206) is defined by: xcenter = 355.79
ycenter = 538.76 Init. Pt. = 344.21 Seg. Length = 4.00

```
** Factor of safety calculation for surface # 920 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 161.5123 **
** This will be ignored for final summary of results **
*****
```

Circular surface (FOS=161.5123) is defined by: xcenter = 353.13
ycenter = 536.11 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
** Factor of safety calculation for surface # 921 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 161.6032 **
** This will be ignored for final summary of results **
*****
```

Circular surface (FOS=161.6032) is defined by: xcenter = 353.13
ycenter = 536.79 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
** Factor of safety calculation for surface # 924 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 161.5273 **
** This will be ignored for final summary of results **
*****
```

Circular surface (FOS=161.5273) is defined by: xcenter = 354.17
ycenter = 539.99 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
** Factor of safety calculation for surface # 928 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 244.4498 **
** This will be ignored for final summary of results **
*****
```

Circular surface (FOS=244.4498) is defined by: xcenter = 353.49
ycenter = 555.06 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
** Factor of safety calculation for surface # 929 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 191.5292 **
** This will be ignored for final summary of results **
*****
```

Circular surface (FOS=191.5292) is defined by: xcenter = 354.43
ycenter = 550.85 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
** Factor of safety calculation for surface # 932 **
```

```
**      failed to converge within FIFTY iterations      **
**
**      The last calculated value of the FOS was 160.3227      **
**      This will be ignored for final summary of results      **
*****
```

Circular surface (FOS=160.3227) is defined by: xcenter = 353.66
ycenter = 539.44 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 933      **
**      failed to converge within FIFTY iterations          **
**
**      The last calculated value of the FOS was 187.2333      **
**      This will be ignored for final summary of results      **
*****
```

Circular surface (FOS=187.2333) is defined by: xcenter = 352.73
ycenter = 537.56 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 934      **
**      failed to converge within FIFTY iterations          **
**
**      The last calculated value of the FOS was 165.6794      **
**      This will be ignored for final summary of results      **
*****
```

Circular surface (FOS=165.6794) is defined by: xcenter = 353.89
ycenter = 537.62 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 938      **
**      failed to converge within FIFTY iterations          **
**
**      The last calculated value of the FOS was 135.3351      **
**      This will be ignored for final summary of results      **
*****
```

Circular surface (FOS=135.3351) is defined by: xcenter = 356.91
ycenter = 539.88 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 939      **
**      failed to converge within FIFTY iterations          **
**
**      The last calculated value of the FOS was 158.4301      **
**      This will be ignored for final summary of results      **
*****
```

Circular surface (FOS=158.4301) is defined by: xcenter = 354.63
ycenter = 539.15 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
**      Factor of safety calculation for surface # 944      **
**      failed to converge within FIFTY iterations          **
```



```
**
** The last calculated value of the FOS was 200.1909 **
** This will be ignored for final summary of results **
*****
```

Circular surface (FOS=200.1909) is defined by: xcenter = 354.92
ycenter = 555.24 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
** Factor of safety calculation for surface # 945 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 176.2210 **
** This will be ignored for final summary of results **
*****
```

Circular surface (FOS=176.2210) is defined by: xcenter = 353.14
ycenter = 539.27 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
** Factor of safety calculation for surface # 947 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 171.2646 **
** This will be ignored for final summary of results **
*****
```

Circular surface (FOS=171.2646) is defined by: xcenter = 357.28
ycenter = 560.20 Init. Pt. = 344.21 Seg. Length = 4.00

```
*****
** Factor of safety calculation for surface # 954 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 226.4821 **
** This will be ignored for final summary of results **
*****
```

Circular surface (FOS=226.4821) is defined by: xcenter = 357.22
ycenter = 540.03 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
** Factor of safety calculation for surface # 961 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 225.9289 **
** This will be ignored for final summary of results **
*****
```

Circular surface (FOS=225.9289) is defined by: xcenter = 357.19
ycenter = 539.69 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****
** Factor of safety calculation for surface # 962 **
** failed to converge within FIFTY iterations **
**
```

** The last calculated value of the FOS was 242.2134 **
** This will be ignored for final summary of results **

Circular surface (FOS=242.2134) is defined by: xcenter = 355.91
ycenter = 534.13 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 965 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 166.8696 **
** This will be ignored for final summary of results **

Circular surface (FOS=166.8696) is defined by: xcenter = 360.41
ycenter = 545.07 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 966 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 261.6371 **
** This will be ignored for final summary of results **

Circular surface (FOS=261.6371) is defined by: xcenter = 357.03
ycenter = 543.59 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 967 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 185.8726 **
** This will be ignored for final summary of results **

Circular surface (FOS=185.8726) is defined by: xcenter = 359.18
ycenter = 543.58 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 970 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 242.1926 **
** This will be ignored for final summary of results **

Circular surface (FOS=242.1926) is defined by: xcenter = 356.73
ycenter = 536.88 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 971 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 318.1587 **

** This will be ignored for final summary of results **

Circular surface (FOS=318.1587) is defined by: xcenter = 358.60
ycenter = 561.10 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 972 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 245.6517 **
** This will be ignored for final summary of results **

Circular surface (FOS=245.6517) is defined by: xcenter = 356.71
ycenter = 535.44 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 976 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 273.7591 **
** This will be ignored for final summary of results **

Circular surface (FOS=273.7591) is defined by: xcenter = 356.36
ycenter = 534.83 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 978 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 191.4522 **
** This will be ignored for final summary of results **

Circular surface (FOS=191.4522) is defined by: xcenter = 357.50
ycenter = 538.55 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 979 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 160.6776 **
** This will be ignored for final summary of results **

Circular surface (FOS=160.6776) is defined by: xcenter = 360.35
ycenter = 541.19 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 980 **
** failed to converge within FIFTY iterations **
**
** The last calculated value of the FOS was 230.9886 **
** This will be ignored for final summary of results **

Circular surface (FOS=230.9886) is defined by: xcenter = 356.13
ycenter = 536.08 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 982 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 177.4474 **
** This will be ignored for final summary of results **

Circular surface (FOS=177.4474) is defined by: xcenter = 358.78
ycenter = 538.06 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 983 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 161.7065 **
** This will be ignored for final summary of results **

Circular surface (FOS=161.7065) is defined by: xcenter = 359.11
ycenter = 538.19 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 985 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 197.4024 **
** This will be ignored for final summary of results **

Circular surface (FOS=197.4024) is defined by: xcenter = 360.39
ycenter = 552.98 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 989 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 212.1362 **
** This will be ignored for final summary of results **

Circular surface (FOS=212.1362) is defined by: xcenter = 356.98
ycenter = 535.88 Init. Pt. = 350.00 Seg. Length = 4.00

** Factor of safety calculation for surface # 996 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 351.3414 **
** This will be ignored for final summary of results **

Circular surface (FOS=351.3414) is defined by: xcenter = 359.09
ycenter = 569.94 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****  
** Factor of safety calculation for surface # 997 **  
** failed to converge within FIFTY iterations **  
**  
** The last calculated value of the FOS was 231.2362 **  
** This will be ignored for final summary of results **  
*****
```

Circular surface (FOS=231.2362) is defined by: xcenter = 355.60
ycenter = 532.99 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****  
** Factor of safety calculation for surface # 999 **  
** failed to converge within FIFTY iterations **  
**  
** The last calculated value of the FOS was 164.5754 **  
** This will be ignored for final summary of results **  
*****
```

Circular surface (FOS=164.5754) is defined by: xcenter = 358.73
ycenter = 536.04 Init. Pt. = 350.00 Seg. Length = 4.00

```
*****  
** Factor of safety calculation for surface # 1000 **  
** failed to converge within FIFTY iterations **  
**  
** The last calculated value of the FOS was 178.0523 **  
** This will be ignored for final summary of results **  
*****
```

Circular surface (FOS=178.0523) is defined by: xcenter = 357.24
ycenter = 534.84 Init. Pt. = 350.00 Seg. Length = 4.00

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 32 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	309.47	515.62
2	313.11	513.96
3	316.83	512.48
4	320.62	511.19
5	324.46	510.10
6	328.36	509.21
7	332.30	508.53
8	336.27	508.04
9	340.26	507.76

10	344.26	507.68
11	348.26	507.81
12	352.25	508.15
13	356.21	508.68
14	360.14	509.43
15	364.03	510.37
16	367.86	511.51
17	371.64	512.84
18	375.33	514.37
19	378.95	516.08
20	382.47	517.98
21	385.89	520.05
22	389.20	522.30
23	392.38	524.72
24	395.45	527.29
25	398.37	530.02
26	401.15	532.90
27	403.78	535.91
28	406.25	539.06
29	408.56	542.32
30	410.70	545.71
31	412.66	549.19
32	414.30	552.50

**** Simplified BISHOP FOS = 1.487 ****

```

*****
**
** Out of the 1000 surfaces generated and analyzed by XSTABL, **
** 42 surfaces were found to have MISLEADING FOS values. **
**
*****

```

The following is a summary of the TEN most critical surfaces

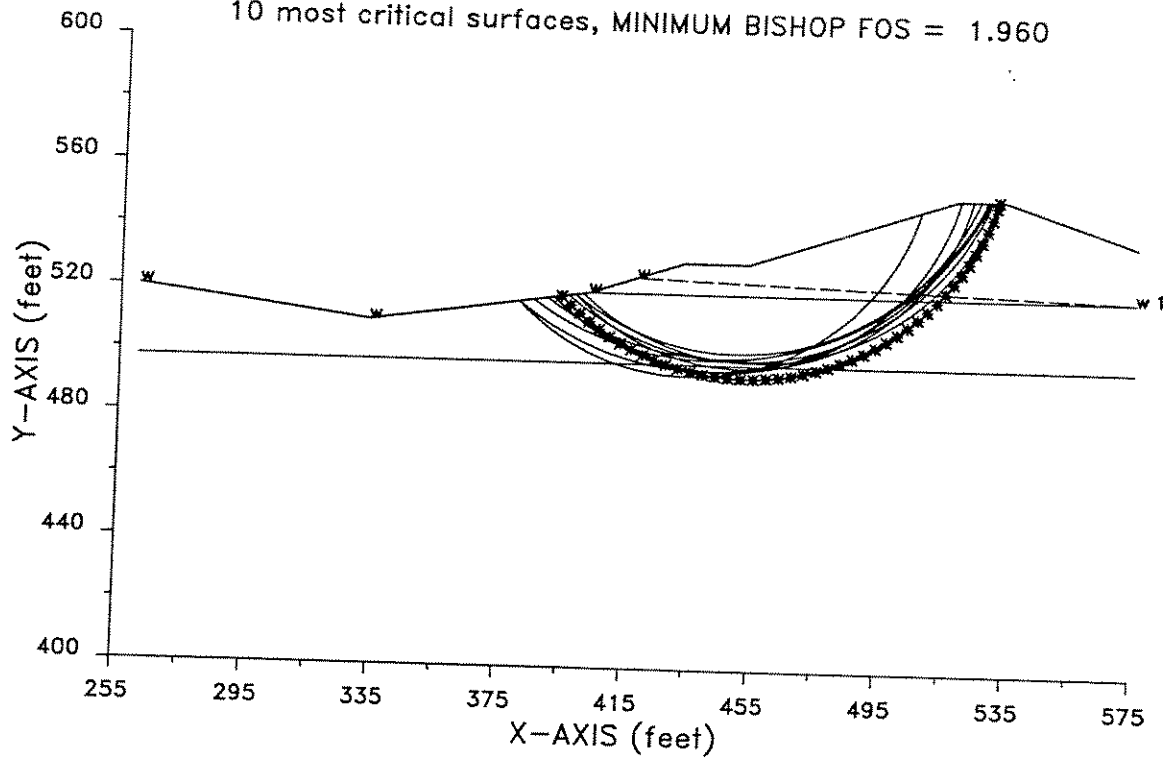
Problem Description : Trinity River Realignment, Texas

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.487	343.76	585.65	77.97	309.47	414.30	8.371E+06
2.	1.492	343.40	592.22	83.77	309.47	417.15	9.148E+06
3.	1.503	342.74	599.33	90.08	309.47	419.64	9.913E+06
4.	1.524	346.20	574.77	69.62	309.47	412.15	8.023E+06
5.	1.526	336.86	606.09	99.98	297.89	421.25	1.236E+07
6.	1.532	354.79	575.17	63.61	326.84	414.19	6.272E+06
7.	1.533	336.46	619.22	109.43	303.68	423.18	1.219E+07
8.	1.535	342.88	608.23	98.45	309.47	424.00	1.140E+07
9.	1.539	338.78	619.69	108.12	309.47	423.48	1.146E+07
10.	1.540	347.51	588.27	82.00	309.47	421.29	1.045E+07

* * * END OF FILE * * *

Trinity River, Ft. Worth, Texas.

10 most critical surfaces, MINIMUM BISHOP FOS = 1.960



```

*****
*           X S T A B L           *
*           *                     *
*           Slope Stability Analysis *
*           using the               *
*           Method of Slices        *
*           *                     *
*           Copyright (C) 1992 - 99 *
*           Interactive Software Designs, Inc. *
*           Moscow, ID 83843, U.S.A. *
*           *                     *
*           All Rights Reserved     *
*           *                     *
*           Ver. 5.203               96 Å 1718 *
*****
    
```

Problem Description : Trinity River, Ft. Worth, Texas.

 SEGMENT BOUNDARY COORDINATES

8 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	261.0	520.0	333.0	510.0	2
2	333.0	510.0	402.0	520.0	2
3	402.0	520.0	417.0	525.0	1
4	417.0	525.0	432.0	530.0	1
5	432.0	530.0	452.0	530.0	1
6	452.0	530.0	517.1	551.7	1
7	517.1	551.7	532.1	551.7	1
8	532.1	551.7	574.1	537.7	1

2 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	402.0	520.0	574.1	520.0	2
2	261.0	497.5	574.1	497.5	3

 ISOTROPIC Soil Parameters

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	130.0	130.0	2000.0	.00	.000	.0	1
2	130.0	130.0	1000.0	.00	.000	.0	1
3	125.0	125.0	500.0	.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

PHREATIC SURFACE,

Point No.	x-water (ft)	y-water (ft)
1	261.00	520.00
2	333.00	510.00
3	402.00	520.00
4	417.00	525.00
5	574.00	520.00

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

50 trial surfaces will be generated and analyzed.

5 Surfaces initiate from each of 10 points equally spaced along the ground surface between x = 380.0 ft and x = 400.0 ft

Each surface terminates between x = 490.0 ft and x = 530.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 493.2 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

4.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

-- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)

USER SELECTED option to maintain strength greater than zero

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 44 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	393.33	518.74
2	396.16	515.92
3	399.13	513.23
4	402.22	510.69
5	405.43	508.31
6	408.76	506.09
7	412.19	504.04
8	415.72	502.16
9	419.34	500.45
10	423.04	498.93
11	426.81	497.59
12	430.64	496.43
13	434.52	495.47
14	438.45	494.70
15	442.40	494.12
16	446.39	493.74
17	450.38	493.55
18	454.38	493.56
19	458.38	493.77
20	462.36	494.17
21	466.31	494.77
22	470.23	495.57
23	474.11	496.55
24	477.93	497.73
25	481.69	499.09
26	485.38	500.64
27	488.99	502.36
28	492.51	504.26
29	495.93	506.34
30	499.24	508.57
31	502.45	510.97
32	505.52	513.53
33	508.47	516.23
34	511.29	519.07
35	513.96	522.05
36	516.48	525.16
37	518.84	528.38
38	521.04	531.72
39	523.08	535.17
40	524.94	538.71
41	526.63	542.33
42	528.13	546.04
43	529.45	549.82
44	530.01	551.70

**** Simplified BISHOP FOS = 1.960 ****

The following is a summary of the TEN most critical surfaces

Problem Description : Trinity River, Ft. Worth, Texas.

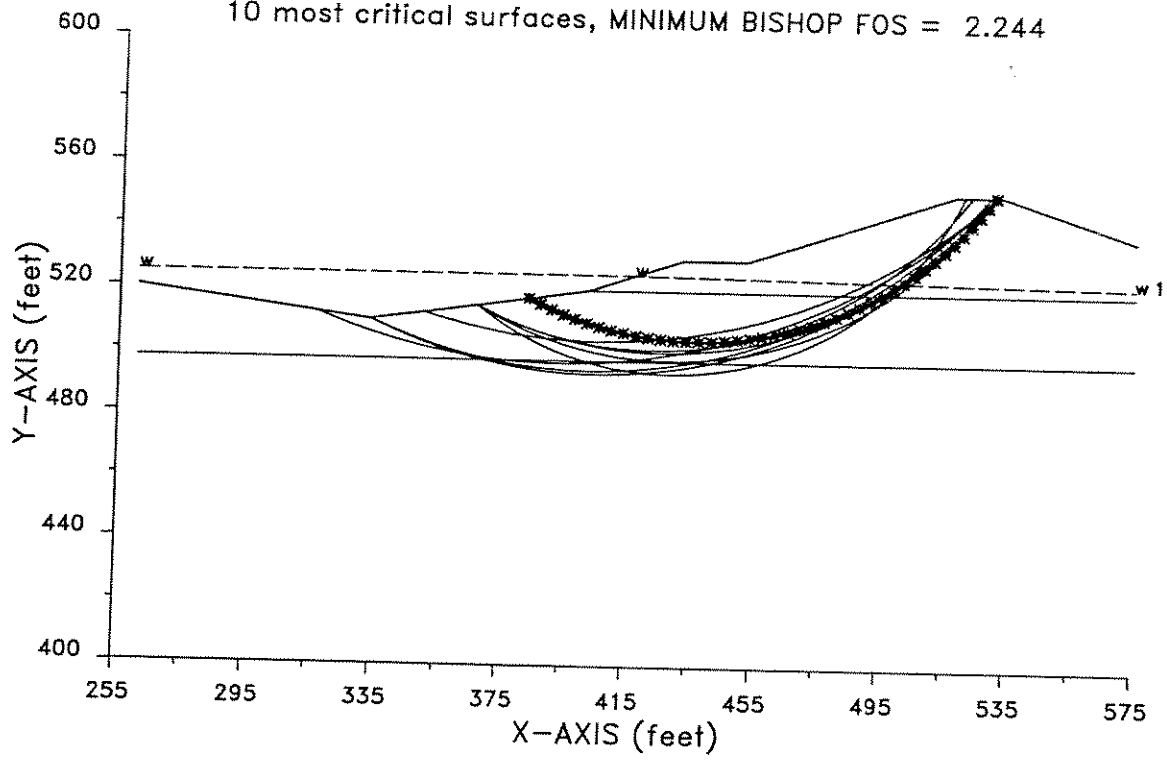
	FOS (BISHOP)	Circle Center		Radius	Initial	Terminal	Resisting
		x-coord (ft)	y-coord (ft)	(ft)	x-coord (ft)	x-coord (ft)	Moment (ft-lb)
1.	1.960	452.14	574.74	81.20	393.33	530.01	1.472E+07
2.	2.096	439.77	590.47	94.86	380.00	526.36	1.843E+07

3.	2.318	445.18	570.77	75.26	391.11	517.96	1.343E+07
4.	2.366	433.90	568.49	74.68	380.00	505.68	1.232E+07
5.	2.371	450.87	570.08	73.40	397.78	521.91	1.334E+07
6.	2.405	454.31	579.02	80.42	400.00	529.94	1.580E+07
7.	2.427	449.99	582.81	83.82	395.56	527.85	1.661E+07
8.	2.437	441.02	595.59	96.47	384.44	526.85	2.003E+07
9.	2.451	444.25	592.26	92.55	388.89	527.39	1.884E+07
10.	2.612	448.89	582.84	81.48	397.78	524.20	1.557E+07

* * * END OF FILE * * *

Trinity River, Ft. Worth, Texas.

10 most critical surfaces, MINIMUM BISHOP FOS = 2.244



```

*****
*                               *
*           X S T A B L         *
*                               *
*      Slope Stability Analysis  *
*      using the                 *
*      Method of Slices         *
*                               *
*      Copyright (C) 1992 - 99   *
*      Interactive Software Designs, Inc. *
*      Moscow, ID 83843, U.S.A.   *
*                               *
*      All Rights Reserved       *
*                               *
*      Ver. 5.203                *
*                               *
*                               *
*****
    
```

Problem Description : Trinity River, Ft. Worth, Texas.

 SEGMENT BOUNDARY COORDINATES

8 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	261.0	520.0	333.0	510.0	2
2	333.0	510.0	402.0	520.0	2
3	402.0	520.0	417.0	525.0	1
4	417.0	525.0	432.0	530.0	1
5	432.0	530.0	452.0	530.0	1
6	452.0	530.0	517.1	551.7	1
7	517.1	551.7	532.1	551.7	1
8	532.1	551.7	574.1	537.7	1

2 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	402.0	520.0	574.1	520.0	2
2	261.0	497.5	574.1	497.5	3

 ISOTROPIC Soil Parameters

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Soil Pressure Constant (psf)	Water Surface No.
1	130.0	130.0	250.0	27.00	.000	.0	1
2	130.0	130.0	100.0	27.00	.000	.0	1
3	125.0	125.0	.0	28.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 3 coordinate points

PHREATIC SURFACE,

Point No.	x-water (ft)	y-water (ft)
1	261.00	525.00
2	417.00	525.00
3	574.10	522.70

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

100 trial surfaces will be generated and analyzed.

10 Surfaces initiate from each of 10 points equally spaced along the ground surface between x = 300.0 ft and x = 450.0 ft

Each surface terminates between x = 490.0 ft and x = 530.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 493.2 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

4.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface is specified by 43 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	383.33	517.29

2	386.91	515.51
3	390.55	513.86
4	394.25	512.32
5	398.00	510.92
6	401.79	509.65
7	405.62	508.51
8	409.50	507.51
9	413.40	506.64
10	417.33	505.90
11	421.29	505.30
12	425.26	504.84
13	429.25	504.51
14	433.24	504.33
15	437.24	504.28
16	441.24	504.37
17	445.23	504.60
18	449.22	504.97
19	453.18	505.47
20	457.13	506.11
21	461.06	506.89
22	464.95	507.80
23	468.81	508.85
24	472.63	510.03
25	476.41	511.34
26	480.14	512.78
27	483.82	514.35
28	487.45	516.05
29	491.01	517.87
30	494.50	519.81
31	497.93	521.87
32	501.29	524.05
33	504.56	526.34
34	507.76	528.75
35	510.87	531.26
36	513.89	533.89
37	516.82	536.61
38	519.65	539.43
39	522.39	542.35
40	525.02	545.37
41	527.54	548.47
42	529.96	551.66
43	529.99	551.70

**** Simplified BISHOP FOS = 2.244 ****

The following is a summary of the TEN most critical surfaces

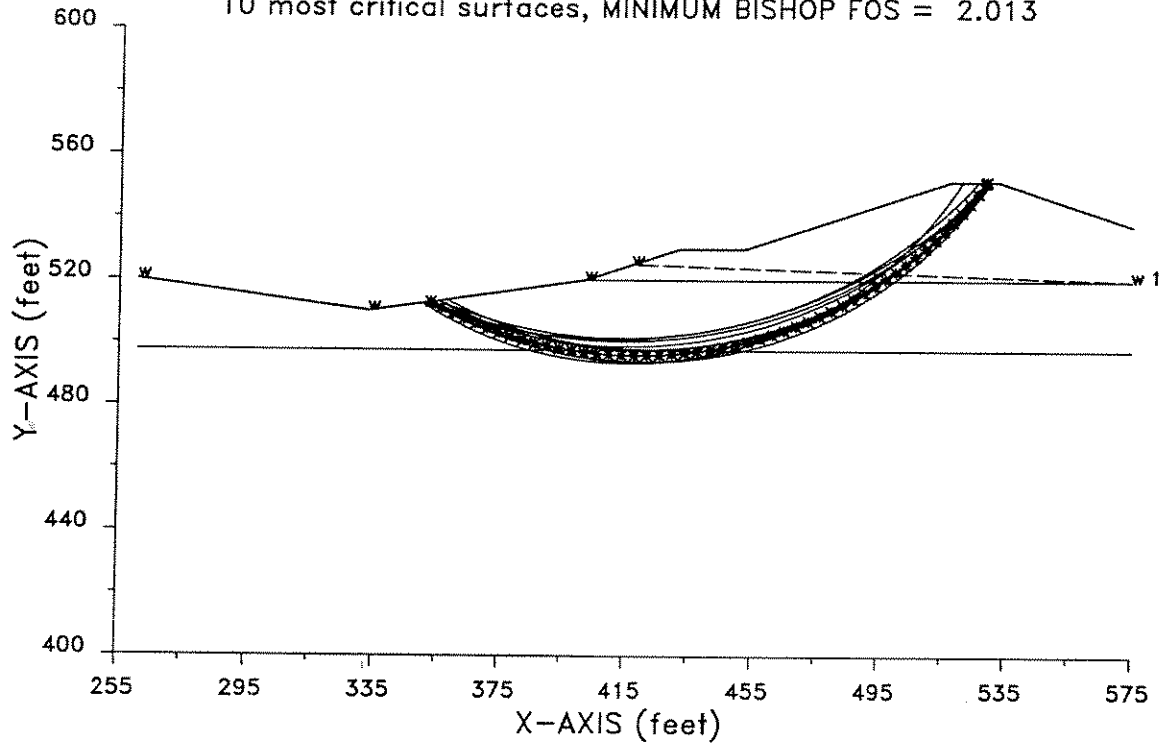
Problem Description : Trinity River, Ft. Worth, Texas.

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	2.244	436.63	619.89	115.61	383.33	529.99	1.883E+07
2.	2.246	436.92	618.36	114.39	383.33	529.89	1.880E+07
3.	2.256	426.29	630.84	130.39	366.67	529.93	2.368E+07
4.	2.280	428.53	618.83	120.97	366.67	529.22	2.361E+07
5.	2.294	422.92	623.71	122.51	366.67	522.06	1.968E+07
6.	2.308	404.94	655.36	161.99	333.33	529.46	3.499E+07
7.	2.316	403.35	658.45	164.09	333.33	527.97	3.389E+07
8.	2.327	405.84	688.45	184.63	350.00	529.88	2.918E+07
9.	2.384	428.58	594.62	100.96	366.67	519.93	1.980E+07
10.	2.394	393.42	693.87	197.16	316.67	529.99	3.902E+07

* * * END OF FILE * * *

Trinity River, Ft. Worth, Texas.

10 most critical surfaces, MINIMUM BISHOP FOS = 2.013




```

*****
*                               *
*           X S T A B L         *
*                               *
*       Slope Stability Analysis *
*             using the         *
*             Method of Slices  *
*                               *
*       Copyright (C) 1992 - 99 *
*       Interactive Software Designs, Inc. *
*       Moscow, ID 83843, U.S.A. *
*                               *
*       All Rights Reserved     *
*                               *
*       Ver. 5.203              *
*                               *
*****
    
```

Problem Description : Trinity River, Ft. Worth, Texas.

 SEGMENT BOUNDARY COORDINATES

8 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	261.0	520.0	333.0	510.0	2
2	333.0	510.0	402.0	520.0	2
3	402.0	520.0	417.0	525.0	1
4	417.0	525.0	432.0	530.0	1
5	432.0	530.0	452.0	530.0	1
6	452.0	530.0	517.1	551.7	1
7	517.1	551.7	532.1	551.7	1
8	532.1	551.7	574.1	537.7	1

2 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	402.0	520.0	574.1	520.0	2
2	261.0	497.5	574.1	497.5	3

 ISOTROPIC Soil Parameters

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Water Surface Constant (psf)	Water Surface No.
1	130.0	130.0	250.0	27.00	.000	.0	1
2	130.0	130.0	100.0	27.00	.000	.0	1
3	125.0	125.0	.0	28.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

PHREATIC SURFACE,

Point No.	x-water (ft)	y-water (ft)
1	261.00	520.00
2	333.00	510.00
3	402.00	520.00
4	417.00	525.00
5	574.10	520.00

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally spaced along the ground surface between x = 350.0 ft
and x = 400.0 ft

Each surface terminates between x = 490.0 ft
and x = 530.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = 493.2 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

4.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface is specified by 51 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
--------------	----------------	----------------

1	352.63	512.85
2	356.16	510.97
3	359.75	509.19
4	363.38	507.52
5	367.06	505.96
6	370.79	504.51
7	374.56	503.16
8	378.36	501.93
9	382.20	500.81
10	386.08	499.80
11	389.97	498.91
12	393.90	498.13
13	397.84	497.47
14	401.81	496.92
15	405.78	496.49
16	409.77	496.18
17	413.76	495.98
18	417.76	495.91
19	421.76	495.95
20	425.76	496.10
21	429.75	496.38
22	433.73	496.77
23	437.70	497.27
24	441.65	497.90
25	445.58	498.64
26	449.49	499.49
27	453.37	500.46
28	457.22	501.54
29	461.04	502.73
30	464.82	504.04
31	468.56	505.46
32	472.26	506.98
33	475.91	508.62
34	479.51	510.36
35	483.06	512.20
36	486.55	514.15
37	489.99	516.20
38	493.36	518.35
39	496.67	520.60
40	499.91	522.94
41	503.08	525.38
42	506.18	527.91
43	509.20	530.53
44	512.15	533.24
45	515.01	536.03
46	517.79	538.90
47	520.49	541.86
48	523.09	544.89
49	525.61	548.00
50	528.04	551.18
51	528.41	551.70

**** Simplified BISHOP FOS = 2.013 ****

The following is a summary of the TEN most critical surfaces

Problem Description : Trinity River, Ft. Worth, Texas.

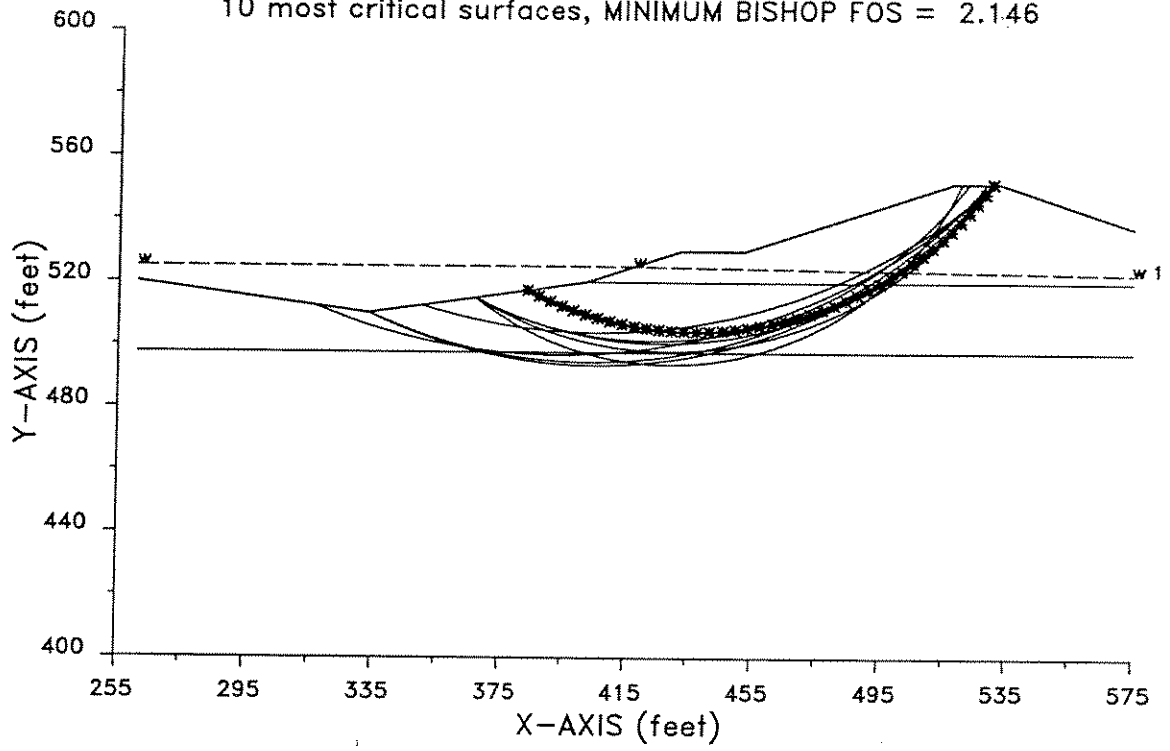
	FOS (BISHOP)	Circle Center x-coord (ft)	y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	2.013	418.42	632.16	136.25	352.63	528.41	2.772E+07
2.	2.020	420.74	625.07	131.28	352.63	529.62	2.866E+07
3.	2.024	415.25	645.06	146.29	352.63	527.89	2.736E+07

4.	2.025	413.79	657.41	156.97	352.63	529.79	2.839E+07
5.	2.025	410.43	666.26	165.24	350.00	529.50	2.910E+07
6.	2.031	413.68	651.47	150.08	355.26	525.77	2.505E+07
7.	2.033	415.86	616.90	123.47	350.00	520.68	2.461E+07
8.	2.034	419.33	638.17	140.41	355.26	529.93	2.783E+07
9.	2.034	419.47	637.75	140.11	355.26	529.97	2.787E+07
10.	2.041	421.41	634.21	136.31	357.89	529.89	2.692E+07

* * * END OF FILE * * *

Trinity River, Ft. Worth, Texas.

10 most critical surfaces, MINIMUM BISHOP FOS = 2.146



```

*****
*                               *
*           X S T A B L         *
*                               *
*   Slope Stability Analysis   *
*   using the                  *
*   Method of Slices          *
*                               *
*   Copyright (C) 1992 - 99    *
*   Interactive Software Designs, Inc. *
*   Moscow, ID 83843, U.S.A.   *
*                               *
*   All Rights Reserved       *
*                               *
*   Ver. 5.203                *
*                               *
*****
    
```

Problem Description : Trinity River, Ft. Worth, Texas.

 SEGMENT BOUNDARY COORDINATES

8 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	261.0	520.0	333.0	510.0	2
2	333.0	510.0	402.0	520.0	2
3	402.0	520.0	417.0	525.0	1
4	417.0	525.0	432.0	530.0	1
5	432.0	530.0	452.0	530.0	1
6	452.0	530.0	517.1	551.7	1
7	517.1	551.7	532.1	551.7	1
8	532.1	551.7	574.1	537.7	1

2 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	402.0	520.0	574.1	520.0	2
2	261.0	497.5	574.1	497.5	3

 ISOTROPIC Soil Parameters

3 Soil unit(s) specified

Soil Unit No.	Unit Moist (pcf)	Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Constant (psf)	Water Surface No.
1	130.0	130.0	250.0	27.00	.000	.0	1
2	130.0	130.0	100.0	27.00	.000	.0	1
3	125.0	125.0	.0	28.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 3 coordinate points

PHREATIC SURFACE,

Point No.	x-water (ft)	y-water (ft)
1	261.00	525.00
2	417.00	525.00
3	574.10	522.70

A horizontal earthquake loading coefficient
of .010 has been assigned

A vertical earthquake loading coefficient
of .000 has been assigned

A critical failure surface searching method, using a random
technique for generating CIRCULAR surfaces has been specified.

100 trial surfaces will be generated and analyzed.

10 Surfaces initiate from each of 10 points equally spaced
along the ground surface between x = 300.0 ft
and x = 450.0 ft

Each surface terminates between x = 490.0 ft
and x = 530.0 ft

Unless further limitations were imposed, the minimum elevation
at which a surface extends is y = 493.2 ft

* * * * * DEFAULT SEGMENT LENGTH SELECTED BY XSTABL * * * * *

4.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined
within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 43 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	383.33	517.29
2	385.91	515.51
3	390.55	513.86
4	394.25	512.32
5	398.00	510.92
6	401.79	509.65
7	405.62	508.51
8	409.50	507.51
9	413.40	506.64
10	417.33	505.90
11	421.29	505.30
12	425.26	504.84
13	429.25	504.51
14	433.24	504.33
15	437.24	504.28
16	441.24	504.37
17	445.23	504.60
18	449.22	504.97
19	453.18	505.47
20	457.13	506.11
21	461.06	506.89
22	464.95	507.80
23	468.81	508.85
24	472.63	510.03
25	476.41	511.34
26	480.14	512.78
27	483.82	514.35
28	487.45	516.05
29	491.01	517.87
30	494.50	519.81
31	497.93	521.87
32	501.29	524.05
33	504.56	526.34
34	507.76	528.75
35	510.87	531.26
36	513.89	533.89
37	516.82	536.61
38	519.65	539.43
39	522.39	542.35
40	525.02	545.37
41	527.54	548.47
42	529.96	551.66
43	529.99	551.70

**** Simplified BISHOP FOS = 2.146 ****

The following is a summary of the TEN most critical surfaces

Problem Description : Trinity River, Ft. Worth, Texas.

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	2.146	436.63	619.89	115.61	383.33	529.99	1.877E+07
2.	2.148	436.92	618.36	114.39	383.33	529.89	1.874E+07
3.	2.152	426.29	630.84	130.39	366.67	529.93	2.360E+07
4.	2.174	428.53	618.83	120.97	366.67	529.22	2.354E+07
5.	2.186	404.94	655.36	161.99	333.33	529.46	3.487E+07

6.	2.187	422.92	623.71	122.51	366.67	522.06	1.962E+07
7.	2.194	403.35	658.45	164.09	333.33	527.97	3.378E+07
8.	2.213	405.84	688.45	184.63	350.00	529.88	2.909E+07
9.	2.264	393.42	693.87	197.16	316.67	529.99	3.890E+07
10.	2.271	428.58	594.62	100.96	366.67	519.93	1.974E+07

* * * END OF FILE * * *

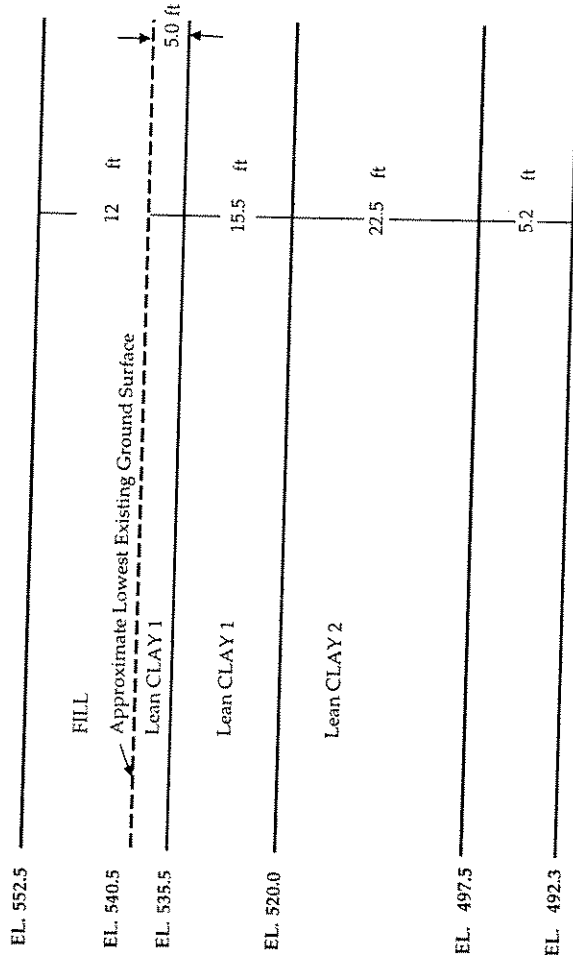
Attachment F Settlement Analyses

Trinity River Realignment Project Ft. Worth, Texas

Settlement Calculation

Channel, Levee and Retaining Wall Typical Cross Section.

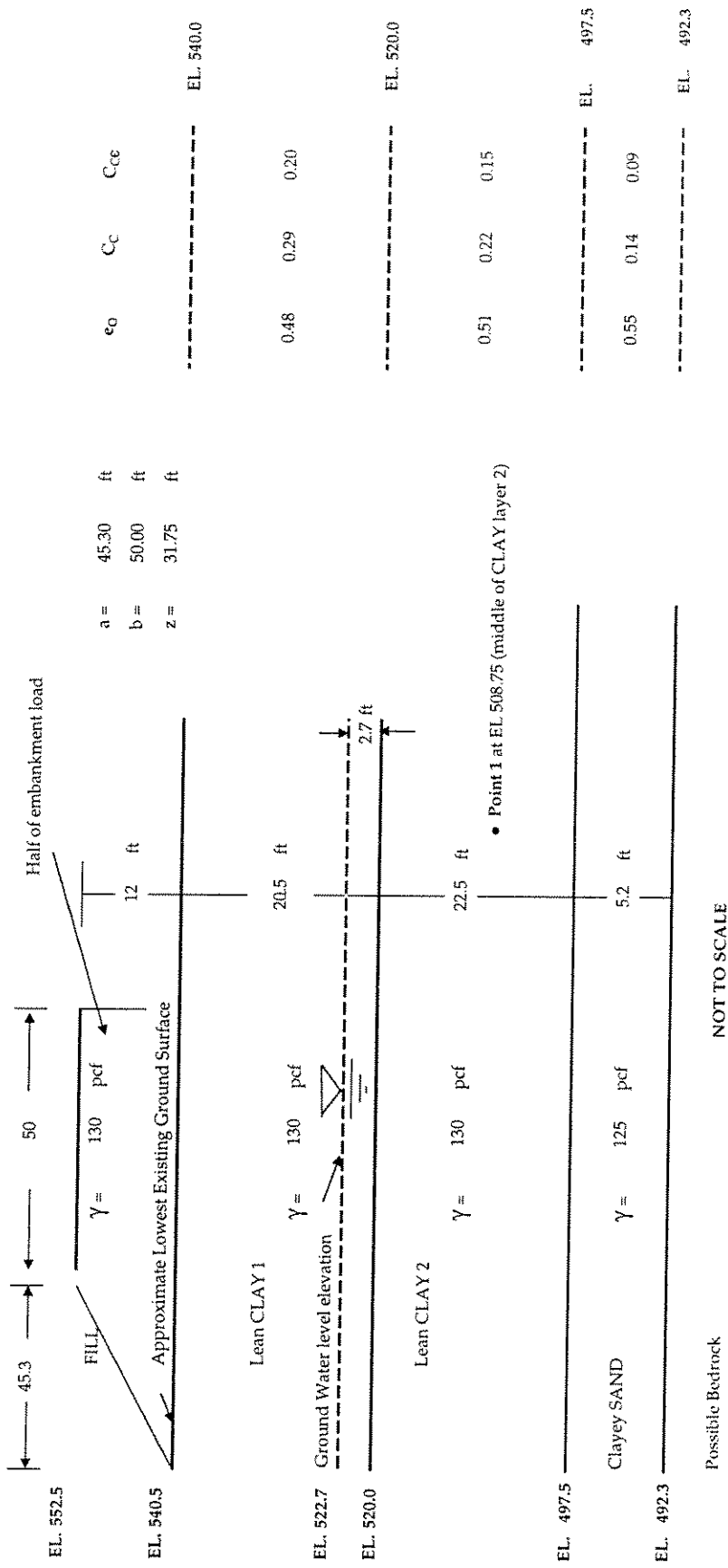
Typical Soil Stratum



γ (pcf)	(average value)		
	e ₀	C _c	C _{ce}
129	0.47	0.31	0.21
128	0.49	0.26	0.18
128	0.49	0.23	0.15
126	0.53	0.21	0.14
129			

NOT TO SCALE

EL. 475.0



1. → Left Side of Channel

Note:

1. Fill thickness range from 3 to 12 ft thick, for this calculation as conservative approach CDM will use 12 ft thick FILL as a load.
2. Settlement will be calculate using average value.

Equations:

For Normally Consolidated clay;

$$S_c = C_{cc} * H_o * \log \frac{\sigma'_{vo} + \Delta\sigma_v}{\sigma'_{vo}}$$

S_c = settlement

C_{cc} = compression ratio

H_o = thickness of soil layer

σ'_{vo} = vertical effective overburden stress

$\Delta\sigma_v$ = additional stress due to loading above ground surface/ foundation soil layer

(Source: An Introduction to Geotechnical Engineering, Robert D. Holtz & William Kovacs, Prentice Hall, page 317)

Settlement at Point 1 at EL. 508.75 (middle of clay layer 1).

H_o = 22.5 ft

$$\sigma'_{vo} = (20.5 - 2.7) * 130 + 2.7 * (130 - 62.4) + (22.5 / 2) * (130 - 62.4)$$

$$= 3,257.0 \text{ psf}$$

Additional Loading

a = 45.30 ft

b = 50.00 ft

z = 31.75 ft

$\frac{a}{z}$ = 1.4

$\frac{b}{z}$ = 1.6

Determine influence values using Figure 8.23.

Client: Tarrant Regional Water District
Project: Trinity River Realignment Project
Job Number: 2521-42775-Geotech.PHSI

Computed by: EDM
Date: 10/5/2004
Checked by:
Date:

$I = 0.48$ for half embankment

(Source: An Introduction to Geotechnical Engineering, Robert D. Holtz & William Kovacs, Prentice Hall, page 355, Figure 8.23 Influences Values for Vertical Stress Under a Very Long Embankment; Length = ∞ (from US Navy, 1971, after Osterberg, 1957))

$$\Delta\sigma_{VO} = 0.48 \times 12 \times 130 \quad (\text{half embankment only})$$

$$= 748.8 \quad \text{psf}$$

$$S_c = 0.15 \times 22.5 \times \log \left(\frac{3,257.0 + 748.8}{3,257.0} \right)$$

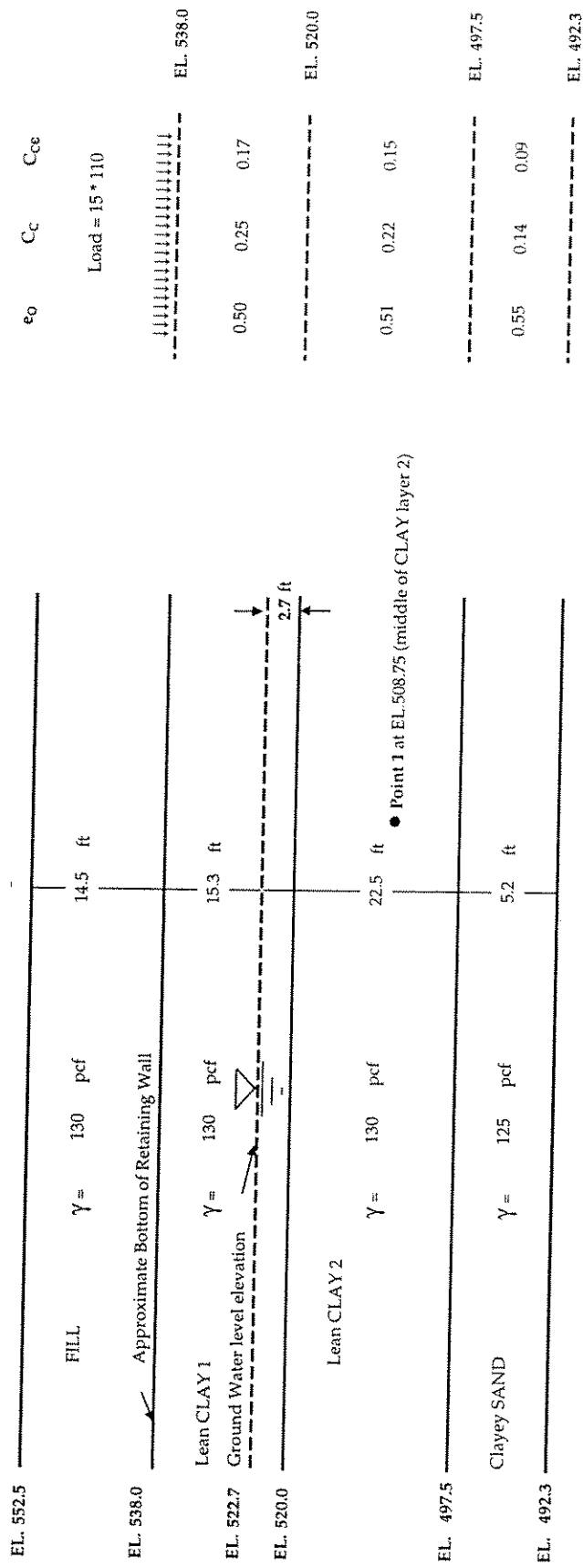
$$= 0.29 \quad \text{ft}$$

$$= 3.5 \quad \text{inches}$$

Trinity River Realignment Project Ft. Worth, Texas

Settlement Calculation

2. → 1st Retaining Wall



Note:

1. Fill thickness = 14.5 ft thick.
2. Settlement will be calculate using average value.

Equations:

For Normally Consolidated clay;

$$S_c = C_{c\varepsilon} * H_o * \log \frac{\sigma'_{vo} + \Delta\sigma_v}{\sigma'_{vo}}$$

S_c = settlement

$C_{c\varepsilon}$ = compression ratio

H_o = thickness of soil layer

σ'_{vo} = vertical effective overburden stress

$\Delta\sigma'_{vo}$ = additional stress due to loading above ground surface/ foundation soil layer

Settlement at Point 1 EL. 508.75 (middle of clay layer 2)

H_o = 22.5 ft

σ'_{vo} = $(15.3 - 2.7) \times 130 + 2.7 \times (130 - 62.4) + (22.5 / 2) \times (130 - 62.4)$
= 2,581.0 psf

$\Delta\sigma'_{vo}$ = 14.5×130
= 1,885.0 psf

Client: Tarrant Regional Water District
Project: Trinity River Realignment Project
Job Number: 2521-42775-Geotech.PHS1

Computed by: EDM
Date: 10/5/2004
Checked by:
Date:

$$S_c = 0.15 \times 22.5 \times \log \left(\frac{2,581.0 + 1,885.0}{2,581.0} \right)$$

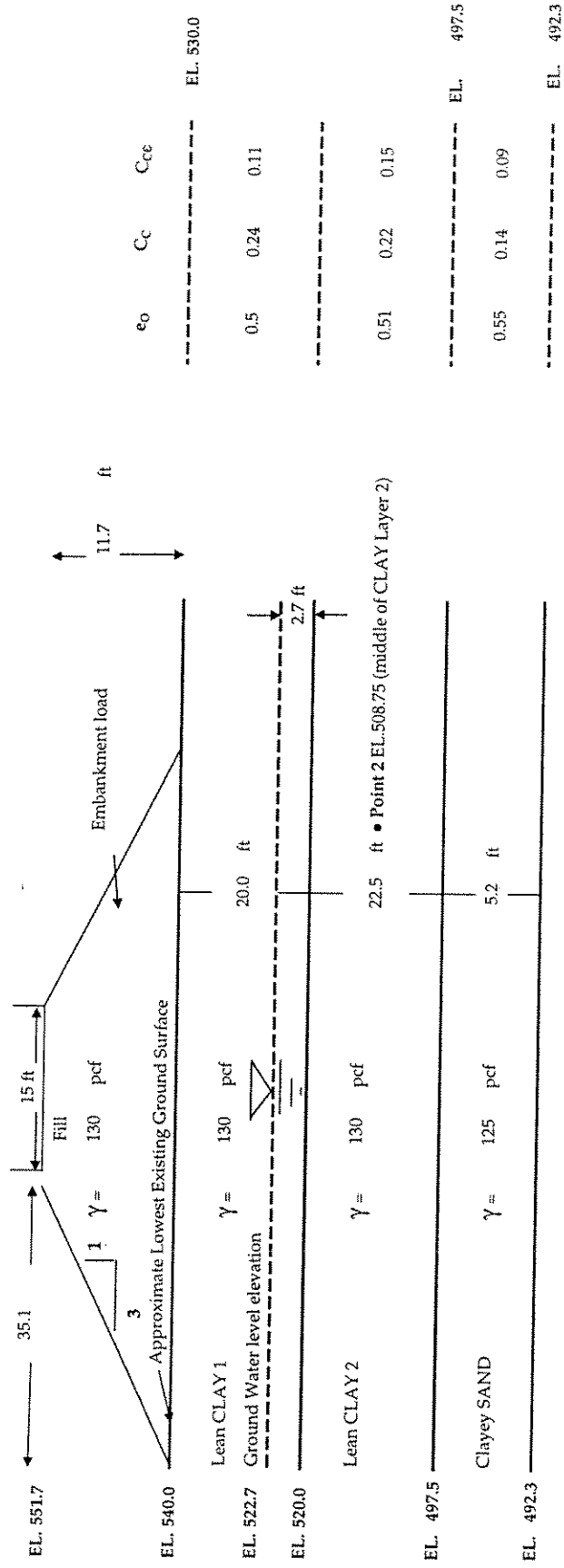
$$= 0.78 \text{ ft}$$

$$= 9.3 \text{ inches}$$

Trinity River Realignment Project Ft. Worth, Texas

Settlement Calculation

3. → Right Side of the Channel & Levee Cross Section



NOT TO SCALE

Note:

1. Fill thickness range from 3 to 11.7 ft thick, for this calculation as conservative approach CDM will use 11.7 ft thick FILL as a load.
2. Settlement will be calculate using average parameter.

Equations:

For Normally Consolidated clay:

$$S_c = C_{c_e} * H_o * \log \frac{\sigma'_{vo} + \Delta\sigma_v}{\sigma'_{vo}}$$

S_c = settlement

C_{c_e} = compression ratio

H_o = thickness of soil layer

σ'_{vo} = vertical effective overburden stress

$\Delta\sigma_{vo}$ = additional stress due to loading above ground surface/ foundation soil layer

Settlement at Point 1 EL. 508.75 (middle of clay layer 2)

H_o = 22.5 ft

$$\sigma'_{vo} = (20 - 2.7) \times 130 + 2.7 \times (130 - 62.4) + (22.5 / 2) \times (130 - 62.4)$$

$$= 3,894.0 \text{ psf}$$

Additional Loading

a = 35.1 ft

b = 7.5 ft

z = 31.25 ft

Client: Tarrant Regional Water District
 Project: Trinity River Realignment Project
 Job Number: 2521-42775-Geotech.PHS1

Computed by: EDM
 Date: 10/5/2004
 Checked by:
 Date:

$$\frac{a}{z} = 1.1 \qquad \frac{b}{z} = 0.2$$

Determine influences values using Figure 8.23.

$$I = 0.325 \text{ for half embankment}$$

(Source: An Introduction to Geotechnical Engineering, Robert D. Holtz & William Kovacs, Prentice Hall, page 355, Figure 8.23 Influences Values for Vertical Stress Under a Very Long Embankment; Length = ∞ (from US. Navy, 1971, after Osterberg, 1957))

$$\Delta\sigma_{vo} = 0.325 \times 2 \times 11.7 \times 130 \quad (\text{full embankment})$$

$$= 988.7 \text{ psf}$$

$$S_c = 0.15 \times 22.5 \times \log \left(\frac{3,894.0 + 988.7}{3,894.0} \right)$$

$$= 0.32 \text{ ft}$$

$$= 3.8 \text{ inches}$$

Client: Tarrant Regional Water District
 Project: Trinity River Realignment Project
 Job Number: 2521-42775-Geotech.PHS1

Computed by: EDM
 Date: 10/5/2004
 Checked by:
 Date:

Trinity River Realignment Project Ft. Worth, Texas

Settlement Calculation

Summary of Settlements

Location	Settlement	
	(ft)	(in)
<i>Middle of Clay Layer 1 at EL 508.75</i>		
* Left side of the channel, Levee, and Retaining Wall	0.29	3.5
* Retaining Wall	0.78	9.3
* Right side of the channel, Levee, and Retaining Wall	0.32	3.8

Trinity River Realignment Project
 Ft. Worth, Texas

Table 8:
 Summary of Coefficient of Consolidation Calculation Based on Moisture Content and Atterberg Limits Test Results

Boring No.	Sample No.	Ground Surface Elevation (ft)	Sample Depth (ft)	Sample Elevation (ft)	Moisture Content (%)	Dry Unit Weight (pcf)	Atterberg Limits			Void Ratio, e_0	Coefficient of Consolidation, C_c	Compression Ratio, C_{cc}	USCS	Visual Description	Summary Value				
							LL	PI	PL						Void Ratio, e_0	Compression Ratio, C_{cc}			
C-9	ST-1	537.5	2.0	535.69	18.1	109.9	47	30	17	0.49	0.33	0.22	CL	Dark gray CLAY	average	0.47	0.31	0.21	EL. 535 to EL. 530
C-7	ST-1	534.1	3.0	531.13	17.7	108.1	42	21	21	0.48	0.29	0.19	CL	Brown silty CLAY	max	0.49	0.33	0.22	
C-8	ST-1	535.5	3.0	530.65	16.6	112.6	44	26	18	0.45	0.31	0.21	CL	Brown sandy CLAY					
C-1	ST-1	531.7	2.0	529.65	13.9	108.7	33	17	16	0.38	0.21	0.15	CL	Dark brown sandy clay					
C-9	B-1	537.5	9.5	527.99	18.9	107.6	50	33	17	0.51	0.30	0.20	CL-CH	Light brown CLAY with sand					
C-10	ST-1	531.3	4.0	527.33	16.2	107.7	29	12	17	0.44	0.17	0.12	SC	Brown clayey SAND					
F-3	ST-1	531.2	4.0	527.16	13.0	123.1	42	26	16	0.35	0.29	0.21	CL	Brown sandy CLAY with calcareous nodules					
C-3	ST-1	530.6	4.0	526.64	19.5	106.7	48	29	19	0.53	0.34	0.22	CL	Dark brown CLAY					
B-4	ST-2	537.2	11.0	526.24	19.6	106.9	46	29	17	0.53	0.32	0.21	CL	Brown silty clay					
C-1	A	531.7	5.8	525.90	17.6	---	51	33	18	0.48	0.37	0.25	CH	Brown and gray clay					
F-1	ST-1	526.8	1.0	525.82	13.5	115.7	36	19	17	0.36	0.23	0.17	CL	Brown sandy CLAY with gravel					
B-4	ST-2	535.7	10.0	525.73	18.6	109.1	42	23	19	0.50	0.29	0.19	CL	Brown silty clay					
F-2	ST-1	525.5	2.0	523.51	14.0	-	35	17	18	0.38	0.23	0.16	SC	Brown clayey SAND					
C-8	ST-2	535.5	12.0	523.45	18.8	107.9	39	22	17	0.51	0.26	0.17	CL	Reddish brown sandy CLAY					
C-8	ST-2	535.5	12.0	523.45	18.8	107.9	39	22	17	0.51	0.26	0.17	CL	Reddish brown sandy CLAY					
C-7	ST-2	534.1	11.0	523.13	19.0	109.7	48	30	18	0.51	0.34	0.23	CL	Brown sandy CLAY					
C-9	ST-2	537.5	16.0	521.49	18.8	110.8	38	20	18	0.51	0.25	0.17	CL	Light brown silty CLAY					
C-10	ST-2	531.3	11.0	520.35	25.5	99.6	21	5	16	0.63	0.10	0.06	SC-SM	Brown silty SAND with clay					
F-3	ST-2	531.2	11.0	520.16	25.6	91.1	35	16	19	0.69	0.23	0.13	CL	Brown sandy CLAY	average	0.49	0.23	0.13	EL. 529 to EL. 510
B-5	ST-3	536.8	17.0	519.82	21.3	105.7	36	20	16	0.58	0.23	0.15	CL	Brown sandy clay	max	0.73	0.31	0.20	
C-4	B-1	531.8	12.0	519.81	13.6	118.3	27	10	17	0.37	0.14	0.10	CL	Reddish brown sandy CLAY					
C-6	ST-1	525.7	6.0	519.72	27.2	96.6	41	24	17	0.73	0.28	0.16	CL	Light gray and brown silty CLAY					
C-3	ST-2	530.6	11.0	519.64	16.4	111.6	28	13	15	0.44	0.16	0.11	CL	Light brown sandy CLAY					
F-1	ST-2	526.8	8.0	518.82	16.3	112.5	42	26	16	0.46	0.29	0.20	CL	Brown sandy CLAY					
F-2	ST-2	525.5	9.0	516.51	19.5	102.7	35	20	15	0.53	0.23	0.15	CL	Light brown silty CLAY with sand					
C-8	ST-3	535.5	19.0	516.45	21.5	107.3	41	24	17	0.58	0.28	0.18	CL	Brown silty CLAY					
C-7	ST-3	534.1	18.0	516.13	21.5	105.9	40	24	16	0.58	0.27	0.17	CL	Light brown silty CLAY					
C-1	ST-3	531.7	16.0	515.65	17.0	109.2	41	24	17	0.46	0.28	0.19	CL	Light brown silty clay					
C-2	B-1	519.6	4.5	515.05	18.3	104.5	37	23	14	0.49	0.21	0.14	CL	Brown sandy clay					
D-2	B	527.5	12.8	514.71	5.0	-	25	13	12	0.14	0.13	0.11	CC	Light brown sandy gravel with clay					
D-2	B	527.5	12.8	514.71	5.0	-	25	13	12	0.14	0.13	0.11	CC	Light brown sandy GRAVEL with clay					
C-9	ST-3	537.5	23.0	514.49	20.3	107.0	38	21	17	0.55	0.25	0.16	CL	Brown silty CLAY with calcareous nodules					
C-9	ST-3	537.5	23.0	514.49	20.3	107.0	38	21	17	0.55	0.25	0.16	CL	Brown silty CLAY with calcareous nodules					
C-6	ST-2	525.7	13.0	512.72	22.8	98.7	44	28	16	0.62	0.31	0.19	CL	Gray and brown silty CLAY					
B-4	ST-4	535.7	24.0	511.73	22.1	104.7	36	21	15	0.60	0.23	0.15	CL	Brown silty clay					

Boring No.	Sample No.	Ground Surface Elevation (ft) ¹	Sample Depth (ft)	Sample Elevation (ft)	Moisture Content (%)	Dry Unit Weight (pcf)	Atterberg Limits			Void Ratio, e ₀	Coefficient of Consolidation, C _c	Compression Ratio, C _{cc}	USCS	Visual Description	Void Ratio, e ₀	Coefficient of Consolidation, C _c	Compression Ratio, C _{cc}
							LL	PI	PL								
C-1	ST-4	531.7	21.0	510.65	16.2	108.6	94	19	15	0.84	0.22	0.15	CL	Light brown silty clay	#REF!	#REF!	#REF!
C-10	ST-3	531.3	21.0	510.33	24.5	103.3	39	22	17	0.66	0.26	0.16	CL	Brown silty CLAY	#REF!	0.21	#REF!
F-2	ST-3	525.5	16.0	509.51	20.0	108.6	32	16	16	0.54	0.20	0.13	CL	Brown and gray silty CLAY with sand	#REF!	0.20	#REF!
C-8	ST-4	535.5	26.0	504.65	21.6	103.8	36	21	15	0.58	0.23	0.15	CL	Brown silty CLAY	#REF!	0.20	#REF!
C-7	ST-4	534.1	25.0	509.13	19.4	109.6	39	24	15	0.52	0.26	0.17	CL	Light brown CLAY	#REF!	0.20	#REF!
C-6	B-1	525.7	18.0	502.72	#REF!	115.2	34	21	13	#REF!	0.19	#REF!	CL	Grayish-brown sandy CLAY	#REF!	0.20	#REF!
C-9	ST-4	537.5	31.0	506.49	20.7	104.1	23	7	16	0.56	0.12	0.08	SC	Light brown clayey SAND	#REF!	0.20	#REF!
B-5	ST-5	536.8	31.0	505.82	24.6	101.4	34	18	16	0.66	0.22	0.13	CL	Brown silty clay	#REF!	0.20	#REF!
C-1	ST-5	531.7	26.0	505.65	17.6	109.9	32	19	13	0.48	0.20	0.13	CL	Light brown silty clay	#REF!	0.20	#REF!
B-6	ST-5	537.2	33.0	504.24	23.3	104.2	34	20	14	0.63	0.22	0.13	CL	Light brown sandy clay	#REF!	0.20	#REF!
C-10	ST-4	531.3	28.0	503.33	24.5	102.9	27	10	17	0.66	0.15	0.09	CL	Light brown sandy CLAY	#REF!	0.20	#REF!
C-8	ST-5	535.5	33.0	502.45	24.0	100.1	36	19	17	0.65	0.23	0.14	CL	Gray and brown silty CLAY	#REF!	0.20	#REF!
C-7	ST-5	534.1	32.0	502.13	18.9	102.4	29	14	15	0.51	0.11	0.11	SC	Gray and tan clayey CLAY	#REF!	0.20	#REF!
C-6	ST-4	525.7	25.0	500.72	20.3	107.0	43	24	19	0.55	0.20	0.19	CL	Light brown sandy CLAY	#REF!	0.20	#REF!
C-1	ST-6	531.7	31.0	503.65	19.3	108.2	31	17	14	0.52	0.19	0.12	CL	Light brown CLAY	#REF!	0.20	#REF!
F-1	ST-5	526.8	31.0	495.82	20.3	103.2	27	12	15	0.55	0.15	0.10	CL	Light brown sandy CLAY	#REF!	0.20	#REF!
F-2	ST-5	525.5	31.0	494.51	24.2	103.2	35	20	15	0.65	0.23	0.14	CL	Gray silty CLAY	#REF!	0.20	#REF!
C-4	ST-5	525.7	32.0	493.72	19.8	108.0	25	10	15	0.53	0.14	0.09	CL	Gray and brown sandy CLAY	#REF!	0.20	#REF!
C-1	B	531.7	38.8	492.9	20.8	108.0	19	4	15	0.56	0.08	0.05	SM-SC	Tan silty sand with clay	#REF!	0.20	#REF!
C-1	D	531.7	56.3	475.4	16.8	108.0	20	4	16	0.45	0.09	0.06	SC	Tan clayey sand with gravel	#REF!	0.20	#REF!

Notes: 1 Elevations based on the North American Vertical Datum (NAVD) of 1988 and are reported in feet.

2 Equations: Source: An Introduction to Geotechnical Engineering, Robert D. Holtz & William Kovacs, Prentice Hall, page 315, 317, 320, and 341.

$$C_c = 0.009(LL - 10) \quad \text{for undisturbed clay with low to medium sensitivity}$$

$$C_c = 0.007(LL - 7) \quad \text{for remolded clay}$$

$$e_0 = W_L / CS$$

$$C_c = C_c / (1 + e_0)$$

where: C_c = Coefficient of consolidation
 LL = Liquid Limit (from Atterberg test results)
 e₀ = Void ratio
 W_L = Water content / moisture
 CS = Specific Gravity (from lab test range from 2.6 to 2.7)

Abbreviations: #REF! = Not Available / Not Encountered

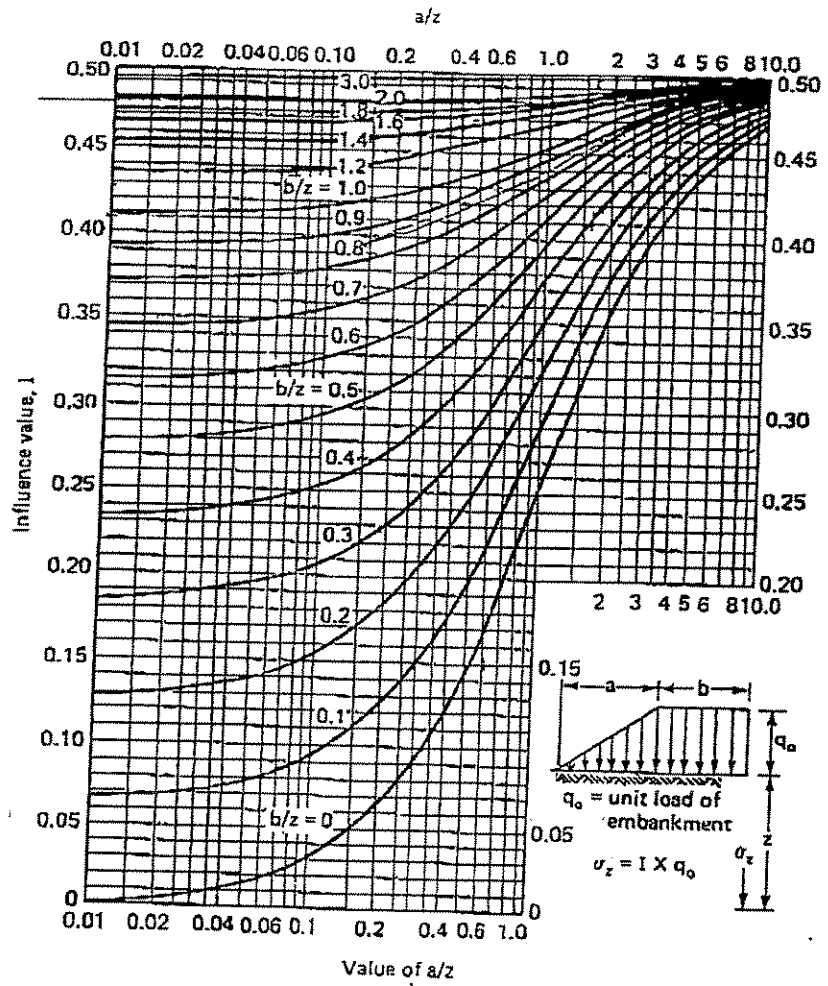


Fig. 8.23 Influence values for vortical stress under a very long embankment; length = ∞ (from U.S. Navy, 1971, after Osterberg, 1957).