SECTION

12 OF 20

UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580 234-8780 | Fax (580) 237 4302

Client: WCH
Submittal: 05-18J Admix Field Data

Sample Information

Contact Name	Charlie Skiba			Sample ID.	SL-331
Project:	S013213A00			Sample Description:	Admix Soil
Project Location	ERDF Cells 9-10			Sampling Date.	6/11/2010
Tested By	J. Schult	Date	6/11/2010	Sampled By.	J. Schult
Reviewed By.	J. Voss	Date	6/14/2010	Date Received.	6/11/2010
Comments				Report No.	05-016-087

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1 Mass of Proctor mold, W_1	3956.10 g
2. Mass of Proctor mold + sand, W_2	5394.20 g
3. Volume of mold, V_1	0.03 ft
4. Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	95.11 lb/ft^3

Calibration Cone

5 Mass of bottle + cone + sand (before use) W_3	6115.40 g
6 Mass of bottle + cone + sand (after use), W_4	4482.70 g
7. Weight of sand to fill the cone. $W_c = W_4 - W_3$	3.60 lb

Results from Field Tests

8. Mass of bottle + cone + sand (before use). W_6	5195.2 g
9. Mass of bottle + cone + sand (after use), W_8	2451.0 g
10 Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma\, d\,(sand)}$	0.0258 ft^3
11 Mass of gallon can, W_5	371.40 g
12. Mass of gallon can + moist soil, W_7	1915.40 g
13. Mass of gallon can + dry soil, W_9	1710.00 g
14. Moist unit weight of soil in field, $= W_7 - W_5 / V_2$	132.12 lb/ft^3
15. Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	15.3%
16 Dry unit weight in the field, $_{d\,(sand)} =$ / (1+(w (%)/100)	114.55 lb/ft^3
17. Comparision moisture content =	14.6%
18. Dry unit weight comparison =	116.8 lb/ft^3

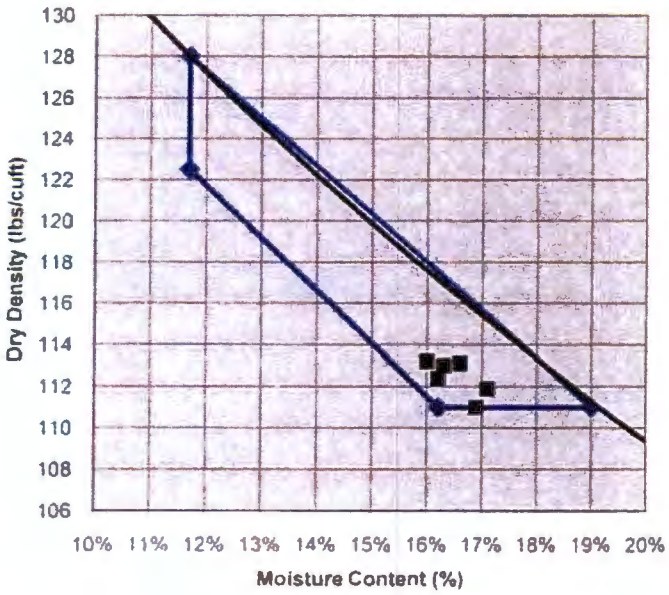
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client	WCH				
Submittal	05-18J Admix Field Data				
Project	S013213A00	Model	3430	Troxler ID	27881
Test Date	6/14/2010	Moisture Std	643	Density Std	2221
Description	Admix Soil	Offsets:	Moisture -	Density -	
Report.	5-16-088	Acceptable Zone			
Comments	Unless otherwise stated - All test at taken at a depth of 6-in				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-348	1	11:33	3	111.9	17.1%	0.507	N/A	91.0%	G3	Pass
SL-349	1	11:37	3	113.1	16.6%	0.490	N/A	91.0%	F3	Pass
SL-350	2	13:26	3	113.0	16.3%	0.491	N/A	90.0%	G3	Pass
SL-351	2	13:53	3	113.2	16.0%	0.489	16.0%	88.0%	F3	Pass
SL-352	3	14:55	3	112.4	16.2%	0.499	N/A	88.0%	G3	Pass
SL-353	3	15:45	3	111.0	16.9%	0.518	N/A	88.0%	F3	Pass
							N/A			
							N/A			
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-348				
SL-349				
SL-350				
SL-351	SC	1849.60	1646.2	371.4
SL-352				
SL-353				



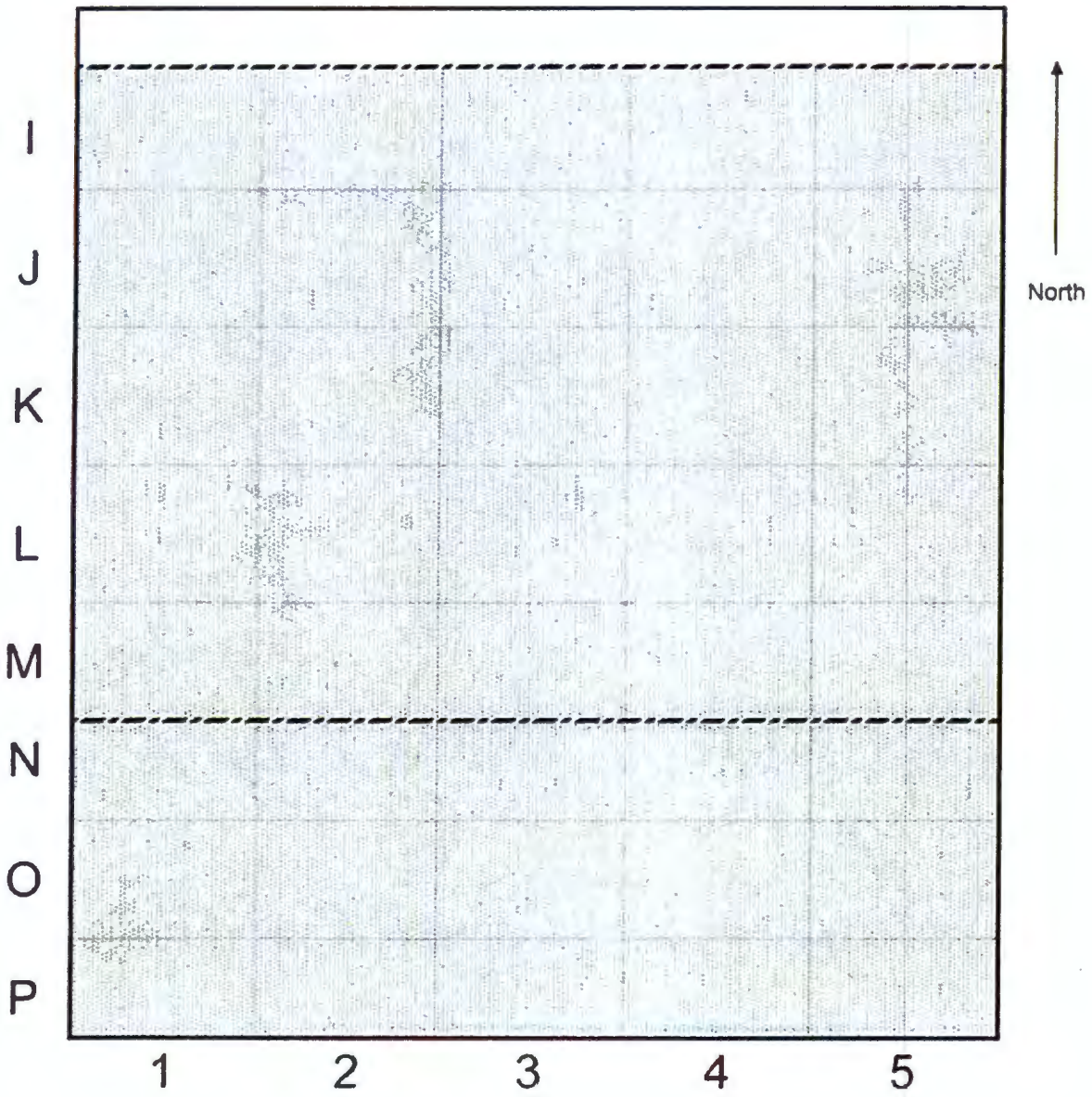
nvirotech Engineering & Consulting, Inc

6/21/10
Date

S/C: S013213A00

CQA Moisture Density Map Cell 9

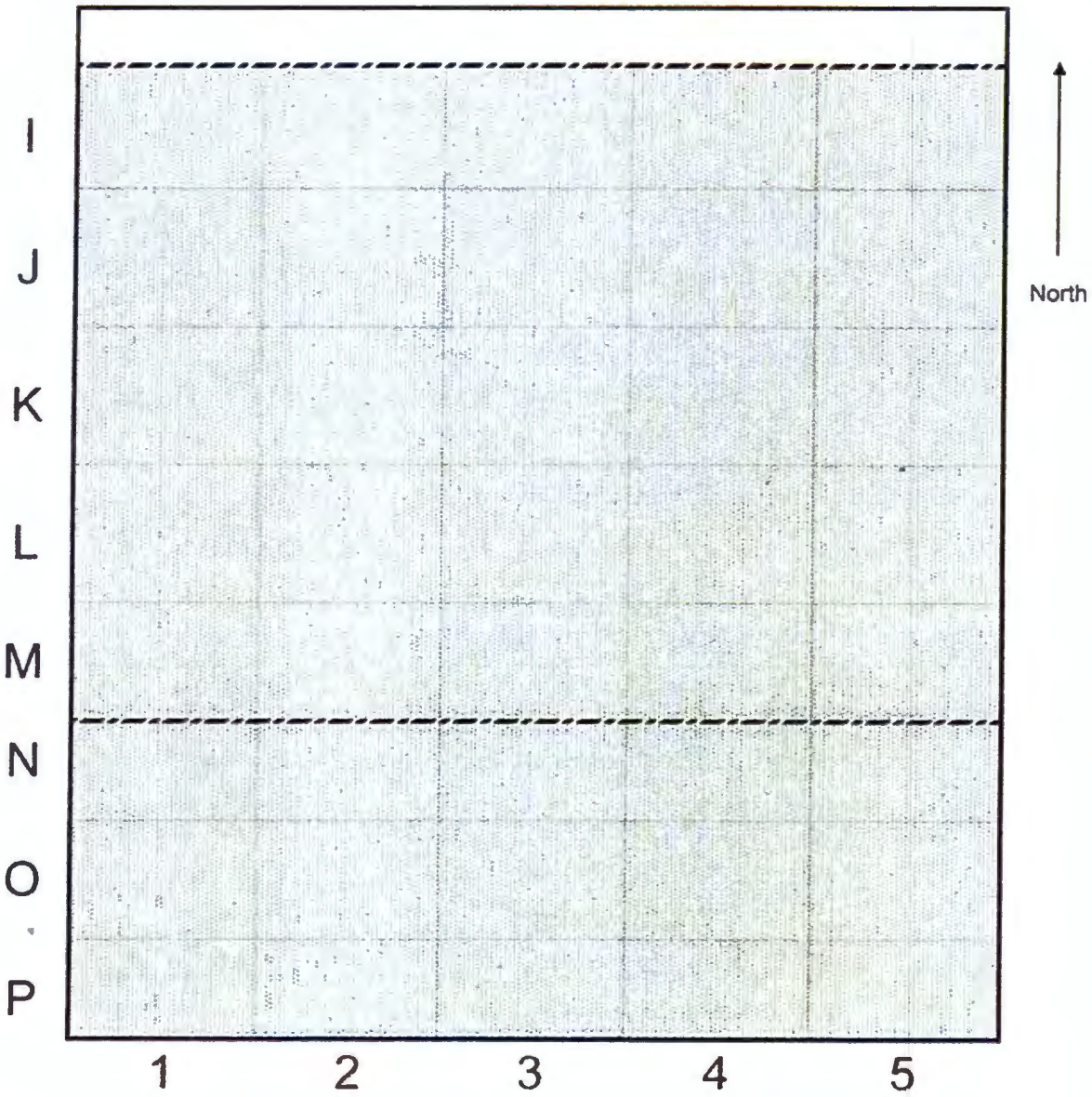
Date	6/14/2010	Lift.	No 1
Report:	5-16-088	Operator	J Schut
Map No.	1 of 12	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

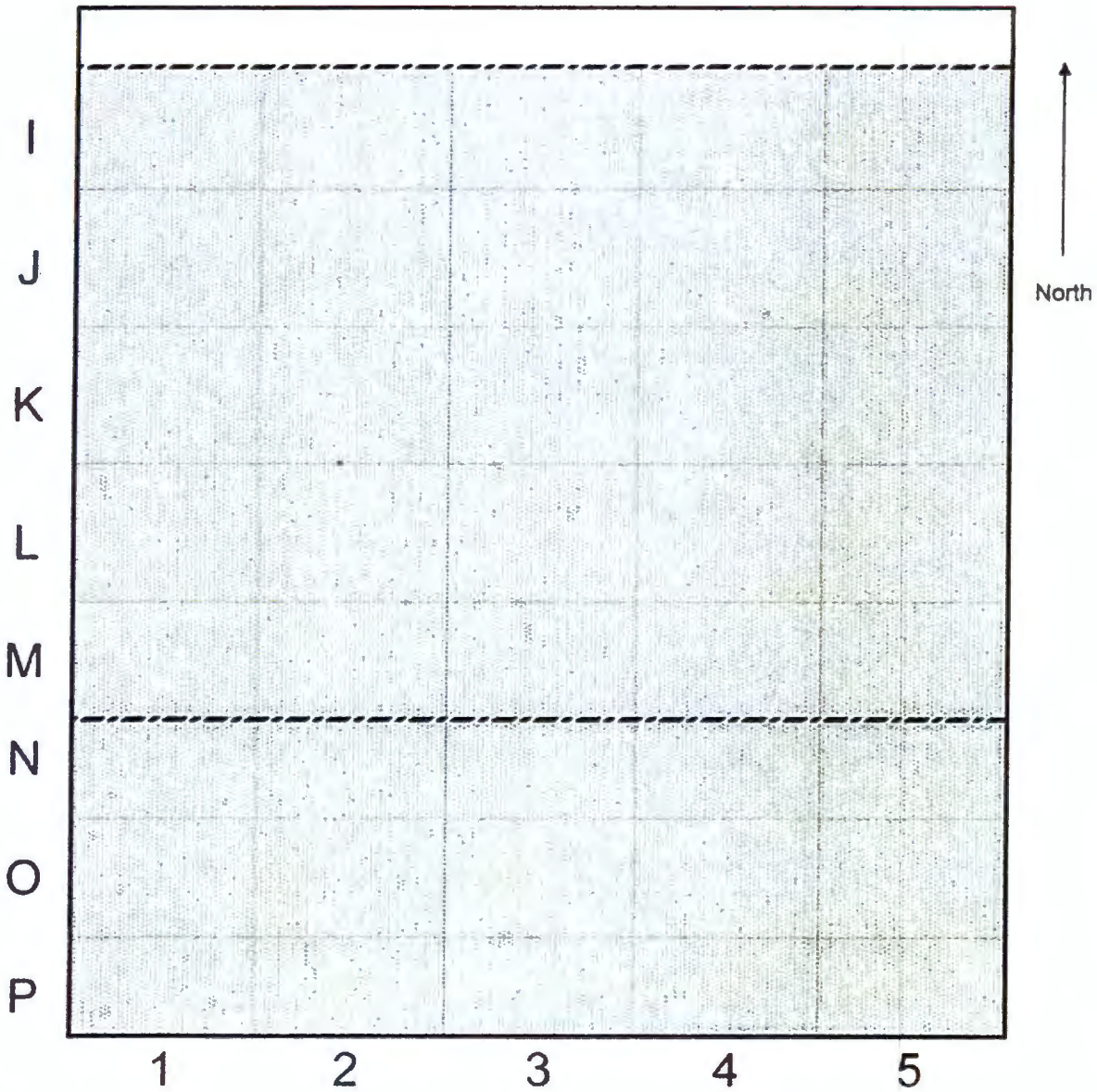
Date	6/14/2010	Lift.	No 2
Report.	5-16-088	Operator:	J Schut
Map No:	2 of 12	Material:	Admix
Grid	95-ft x 90-ft	Notes	



S/C: S013213A00

CQA Moisture Density Map Cell 9

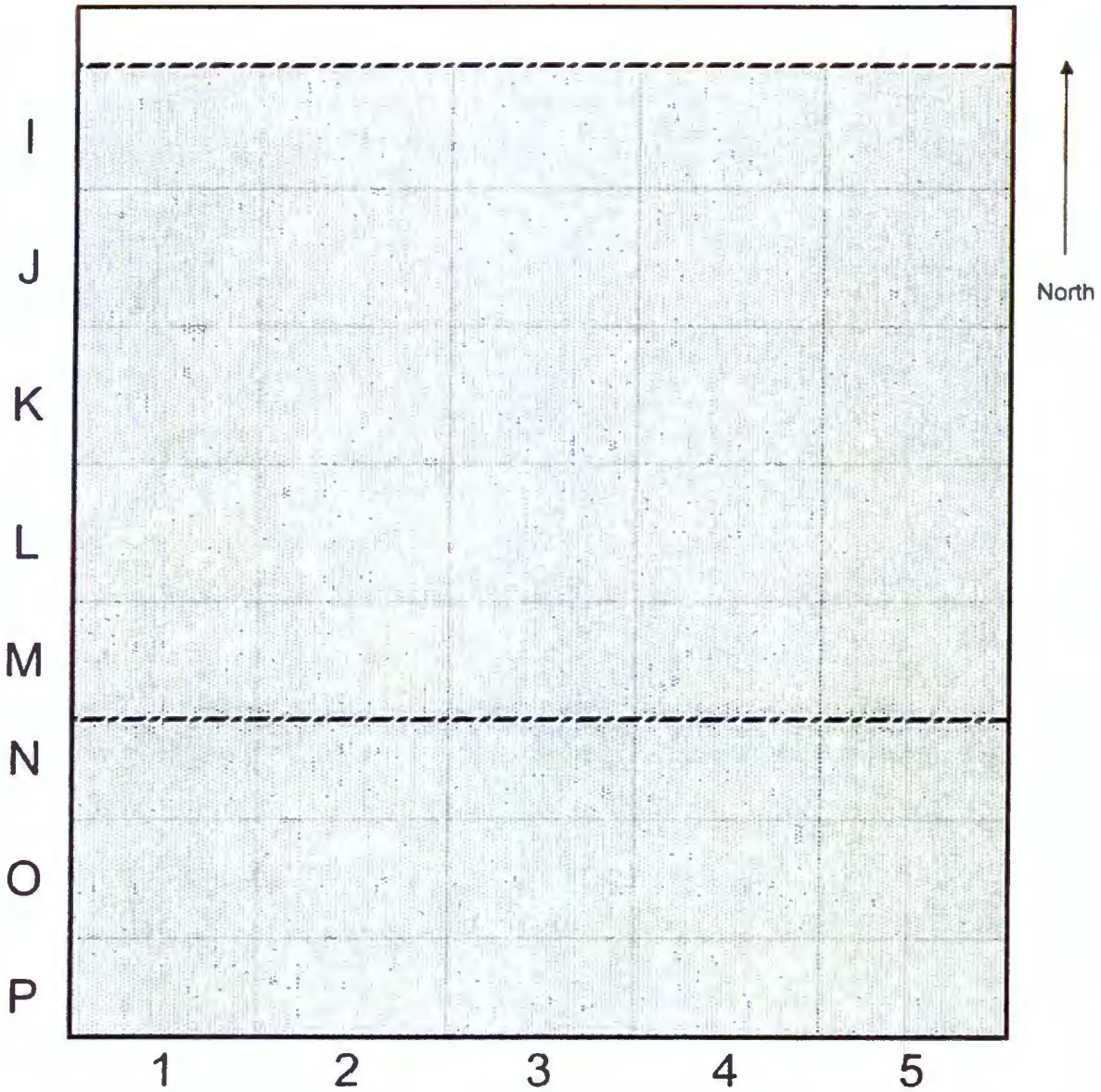
Date	6/14/2010	Lift:	No. 3
Report:	5-16-088	Operator:	J. Schut
Map No.	3 of 12	Material:	Admix
Grid	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

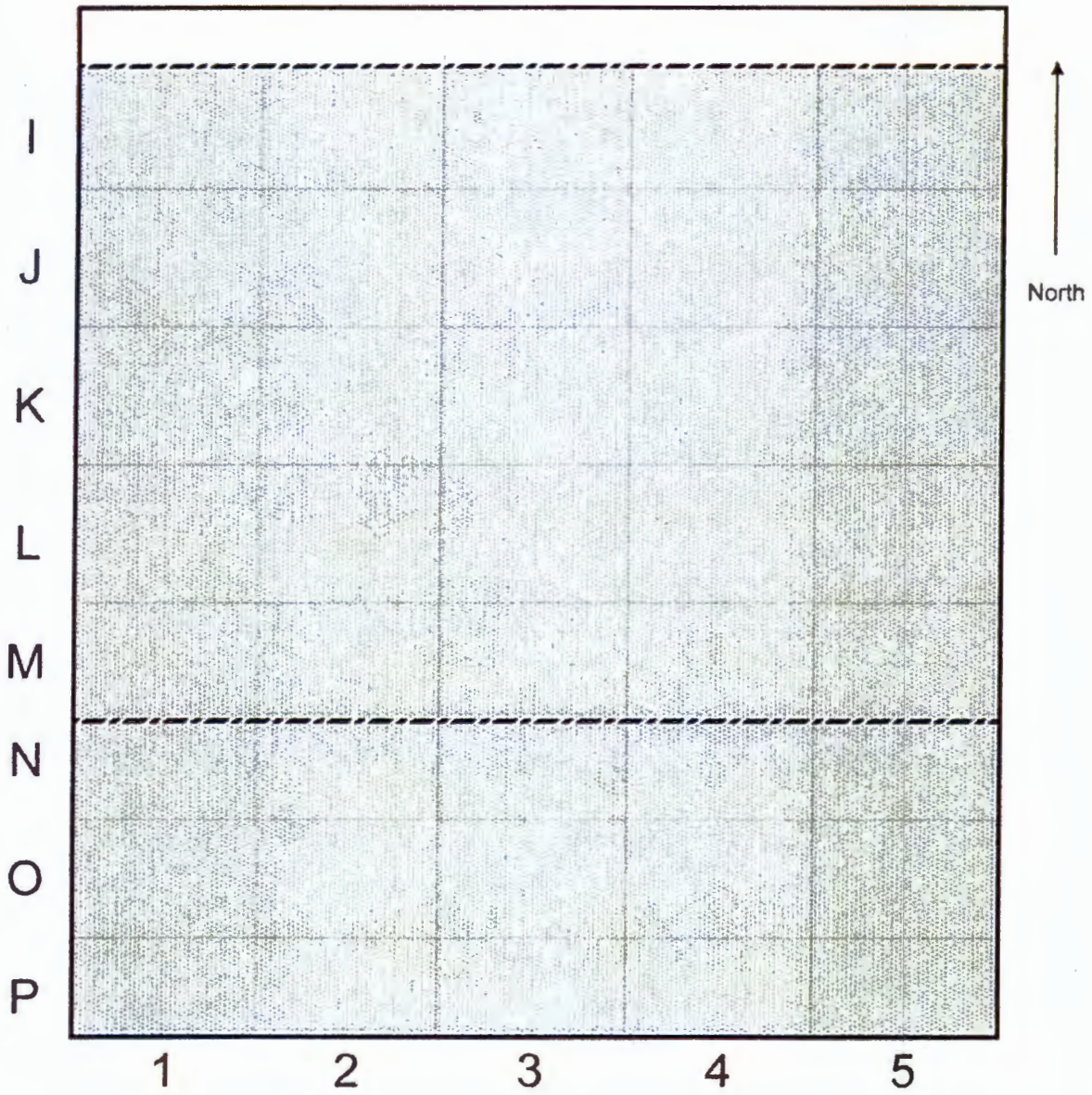
Date	6/14/2010	Lift.	No 4
Report:	5-16-088	Operator	J. Schut
Map No.	4 of 12	Material	Admix
Grid:	95-ft x 90-ft	Notes	



S/C: S013213A00

CQA Moisture Density Map Cell 9

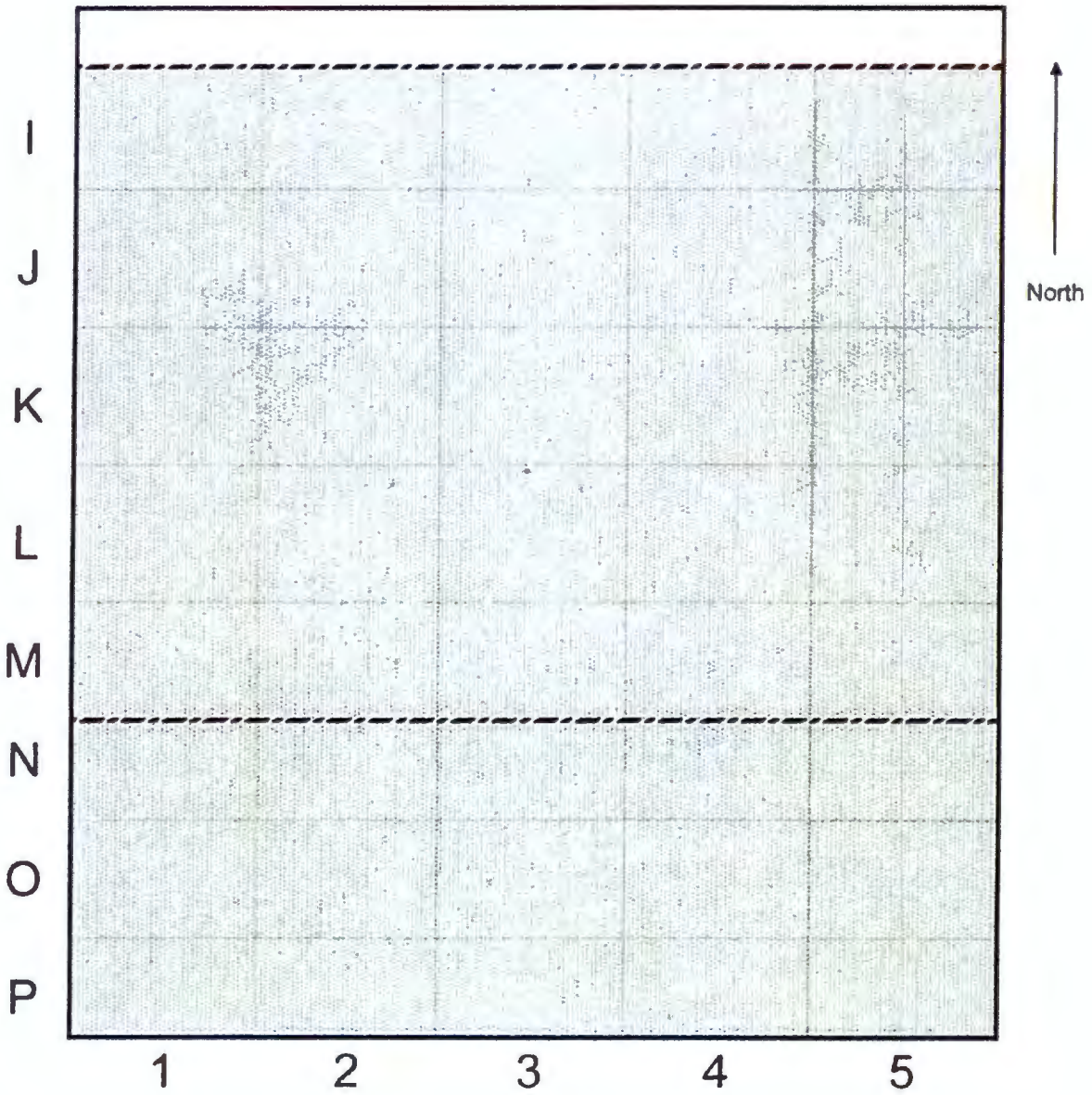
Date:	6/14/2010	Lift	No 5
Report:	5-16-088	Operator:	J. Schut
Map No.	5 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

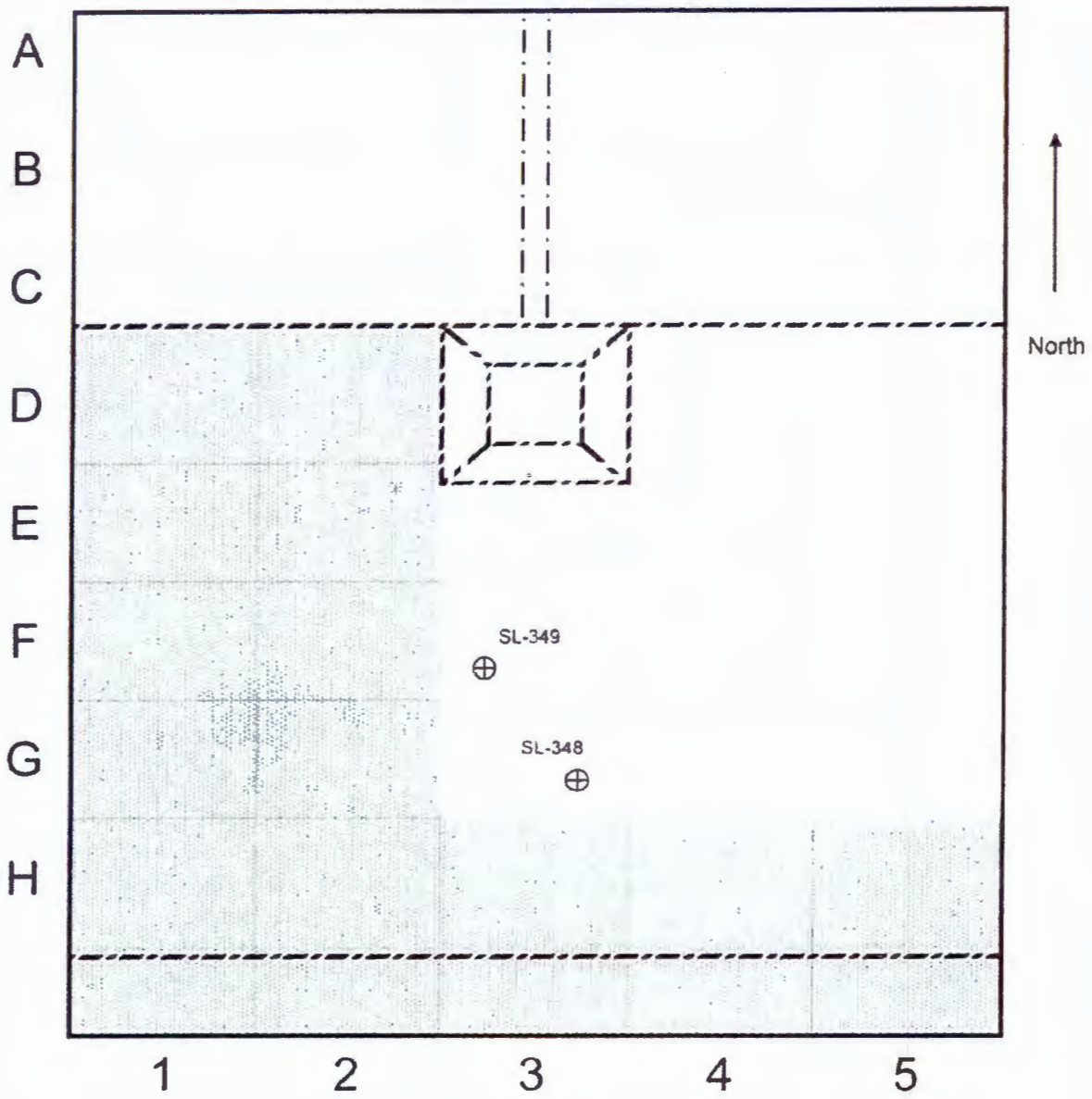
Date:	6/14/2010	Lift	No 6
Report:	5-16-088	Operator:	J Schut
Map No:	6 of 12	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

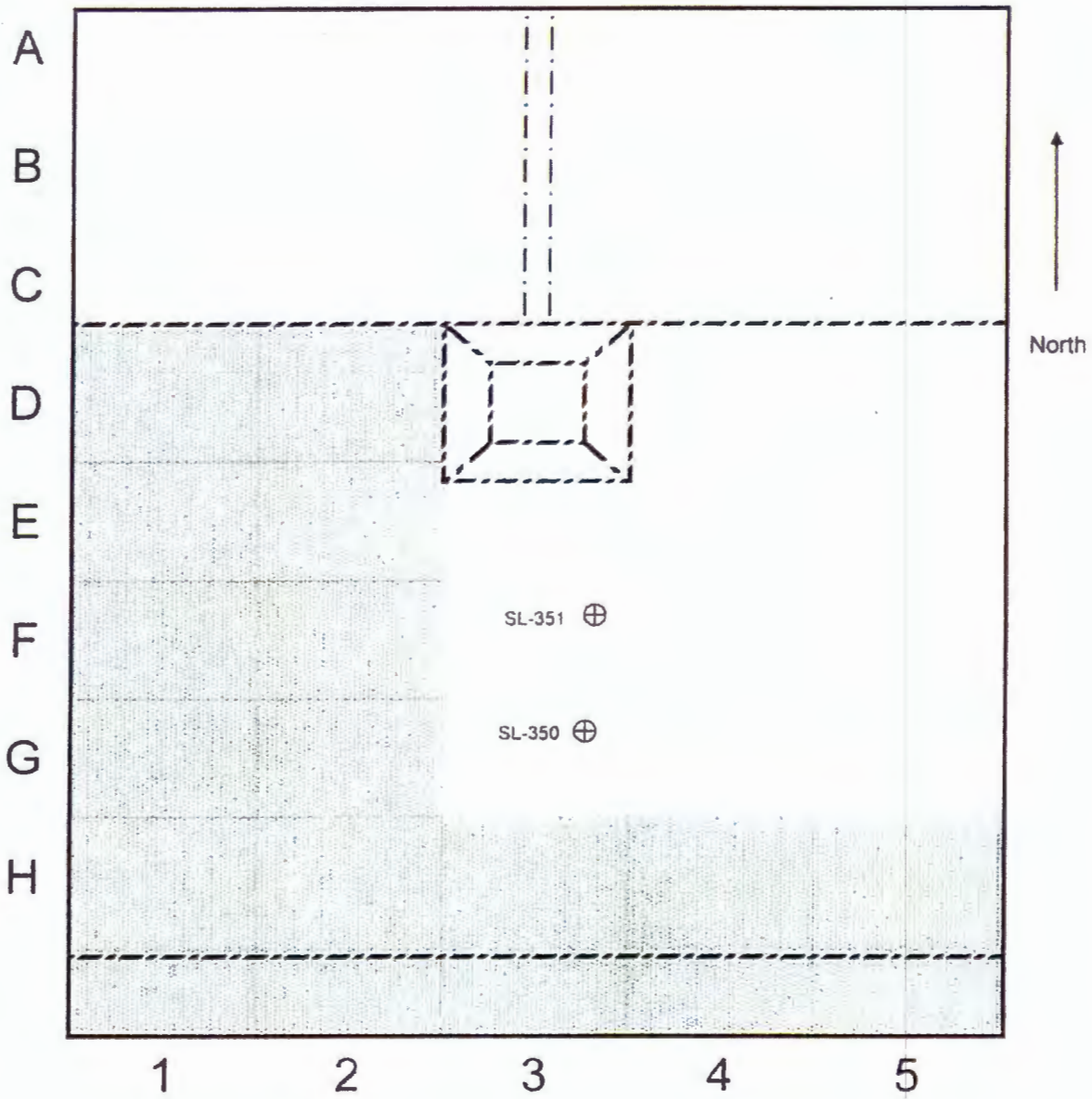
Date	6/14/2010	Lift	No 1
Report	5-16-088	Operator	J Schut
Map No:	7 of 12	Material:	Admix
Grid	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

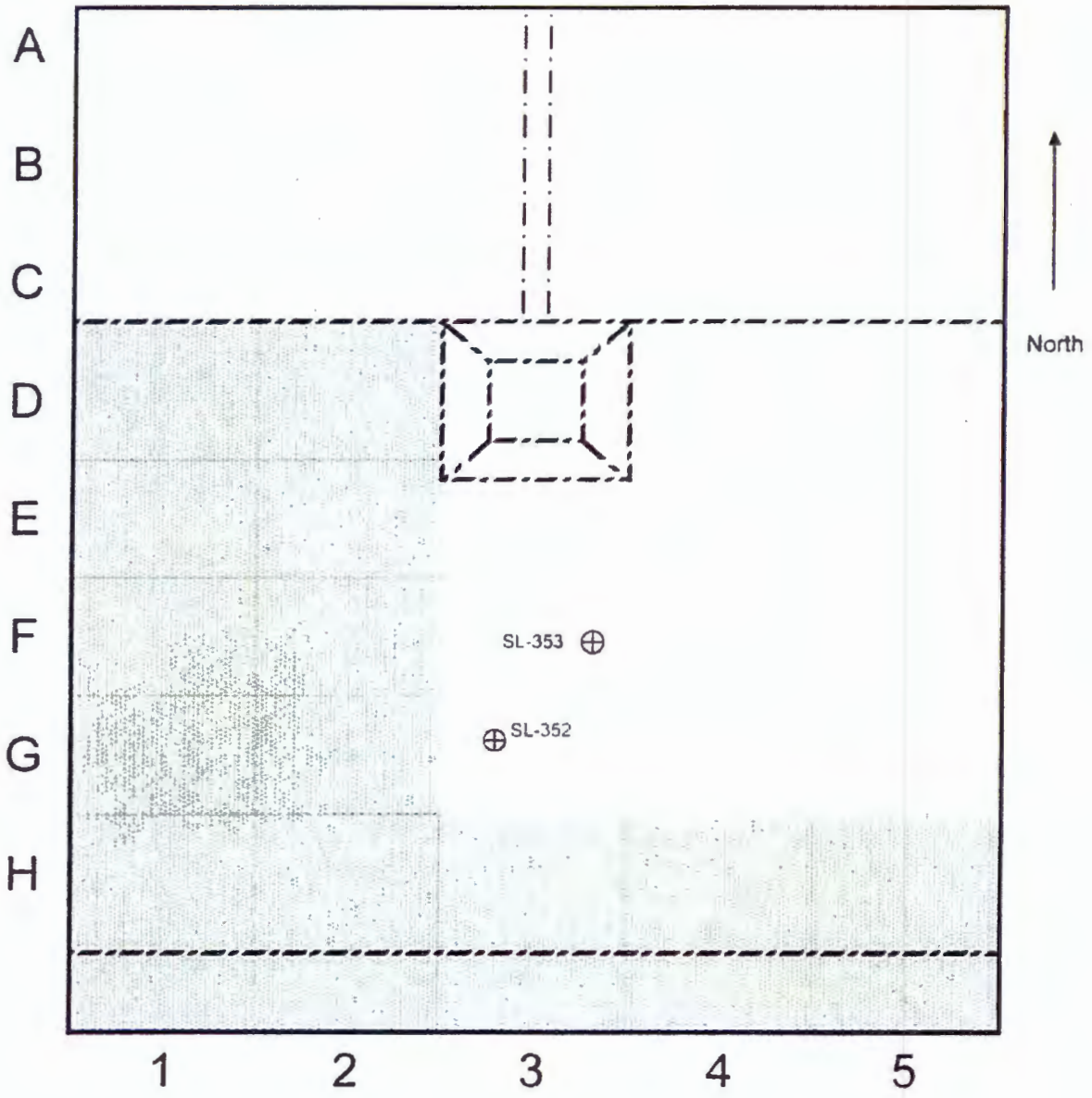
Date	6/14/2010	Lift:	No 2
Report.	5-16-088	Operator:	J. Schut
Map No.	8 of 12	Material:	Admix
Grid	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

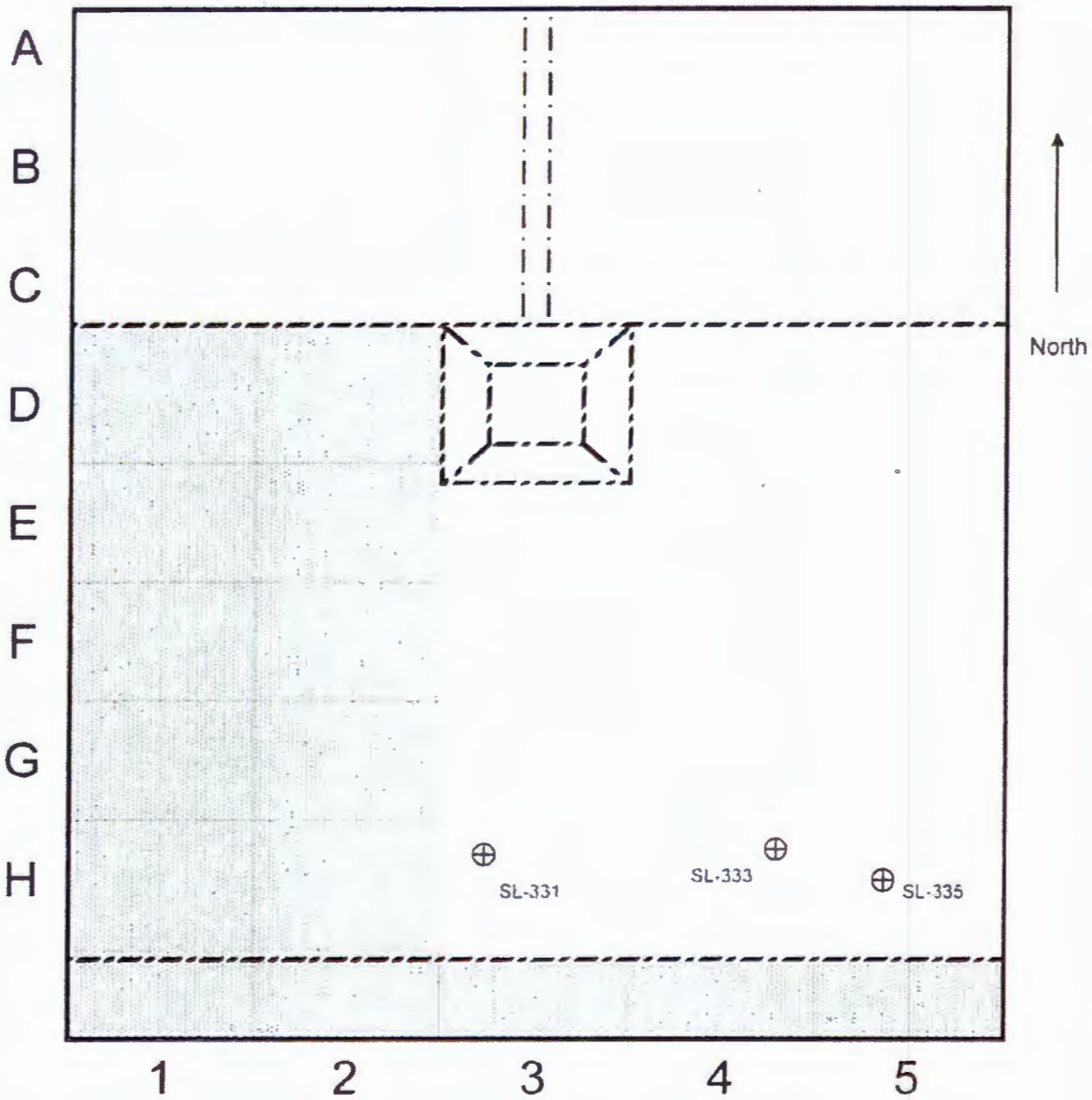
Date	6/14/2010	Lift.	No 3
Report.	5-16-088	Operator	J. Schut
Map No:	9 of 12	Material	Admix
Grid.	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

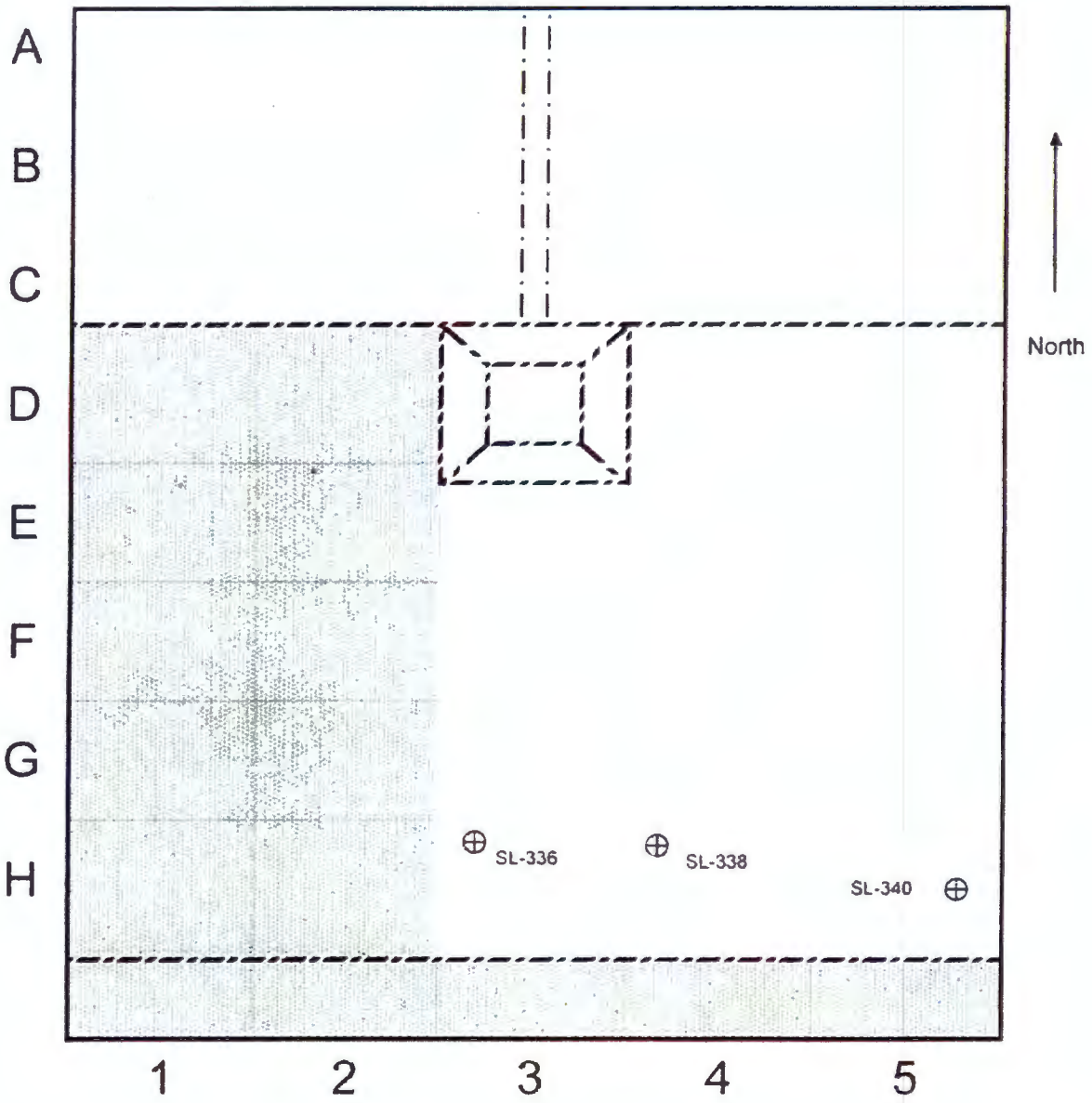
Date	6/14/2010	Lift	No. 4
Report:	5-16-088	Operator	J. Schut
Map No:	10 of 12	Material:	Admix
Grid	95-ft x 90-ft	Notes:	



S/C. S013213A00

CQA Moisture Density Map Cell 9

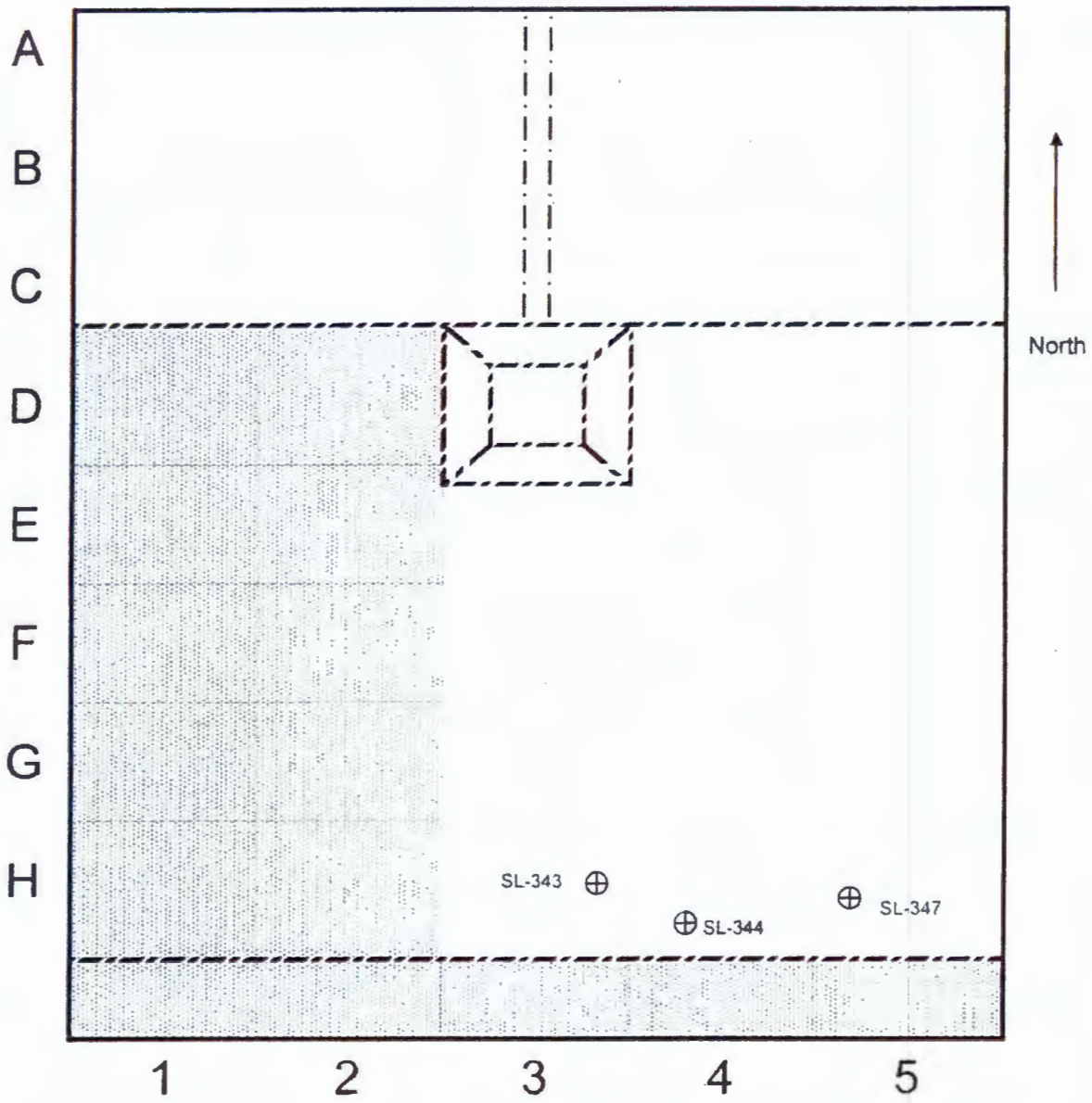
Date	6/14/2010	Lift	No. 5
Report.	5-16-088	Operator:	J. Schut
Map No.	11 of 12	Material.	Admix
Grid	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

Date	6/14/2010	Lift:	No. 6
Report:	5-16-088	Operator:	J Schut
Map No	12 of 12	Material	Admix
Grid:	95-ft x 90-ft	Notes	



UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: WCH
Submittal: 05-18J Admix Field Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	SL-351
Project:	S013213A00			Sample Description:	Admix Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	6/14/2010
Tested By:	J. Schult	Date:	6/14/2010	Sampled By:	J. Schult
Reviewed By:	J. Voss	Date:	6/15/2010	Date Received:	6/14/2010
Comments				Report No.:	05-016-088

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1. Mass of Proctor mold, W_1	3956.10 g
2. Mass of Proctor mold + sand, W_2	5394.20 g
3. Volume of mold, V_1	0.03 ft
4. Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	95.11 lb/ft^3

Calibration Cone

5. Mass of bottle + cone + sand (before use), W_3	6115.40 g
6. Mass of bottle + cone + sand (after use), W_4	4482.70 g
7. Weight of sand to fill the cone, $W_c = W_4 - W_3$	3.60 lb

Results from Field Tests

8. Mass of bottle + cone + sand (before use), W_6	6111.0 g
9. Mass of bottle + cone + sand (after use), W_8	3408.3 g
10. Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma_{d\,(sand)}}$	0.0248 ft^3
11. Mass of gallon can, W_5	371.40 g
12. Mass of gallon can + moist soil, W_7	1849.60 g
13. Mass of gallon can + dry soil, W_9	1646.20 g
14. Moist unit weight of soil in field, $\gamma = W_7 - W_5 / V_2$	131.40 lb/ft^3
15. Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	16.0%
16. Dry unit weight in the field, $\gamma_{d\,(sand)} = \gamma / (1+(w\,(\%)/100)$	113.32 lb/ft^3
17. Comparision moisture content =	16.0%
18. Dry unit weight comparison =	113.2 lb/ft^3

FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

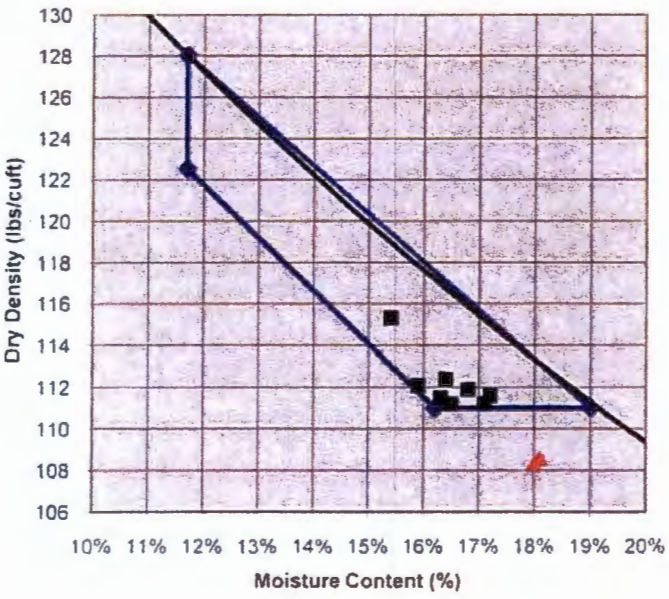
Client:	WCH				
Submittal:	05-18J Admix Field Data				
Project:	S013213A00	Model:	3430	Troxler ID:	27881
Test Date:	6/15/2010	Moisture Std.	642	Density Stc	2226
Description:	Admix Soil	Offsets:	Moisture -	Density -	
Report:	5-16-089	Acceptable Zone			

Comments: Unless otherwise stated - All test at taken at a depth of 6-in.

Soil was placed into grids G4 and G5 at two separate times, south half of the zones first, then the north half

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-354	4	7:57	3	115.3	15.4%	0.461	N/A	90.0%	G3	Pass
SL-355	4	8:19	3	111.6	17.2%	0.511	17.6%	91.0%	F3	Pass
SL-356	1	9:45	3	108.6	18.1%	0.552	N/A	89.0%	G5-S	Fail
SL-357	1	9:50	3	108.3	18.0%	0.556	N/A	87.0%	G4-S	Fail
SL-358	5	10:14	3	111.2	16.5%	0.515	N/A	87.0%	G3	Pass
SL-359	5	10:50	3	112.4	16.4%	0.500	N/A	89.0%	F3	Pass
SL-356A	1	12:19	6	111.5	16.3%	0.511	N/A	86.0%	G5-S	Pass
SL-357A	1	12:23	6	111.2	17.1%	0.515	N/A	90.0%	G4-S	Pass
SL-360	6	13:40	3	111.9	16.8%	0.507	N/A	89.0%	G3	Pass
SL-361	6	14:01	3	112.1	15.9%	0.503	N/A	85.0%	G3	Pass

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-354	Shelby			
SL-355	SC	1896.4	1667.8	371.3
SL-356				
SL-357				
SL-358				
SL-359				
SL-356A				
SL-357A				
SL-360				
SL-361				



Envirotech Engineering & Consulting, Inc

6/18/10
Date

FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

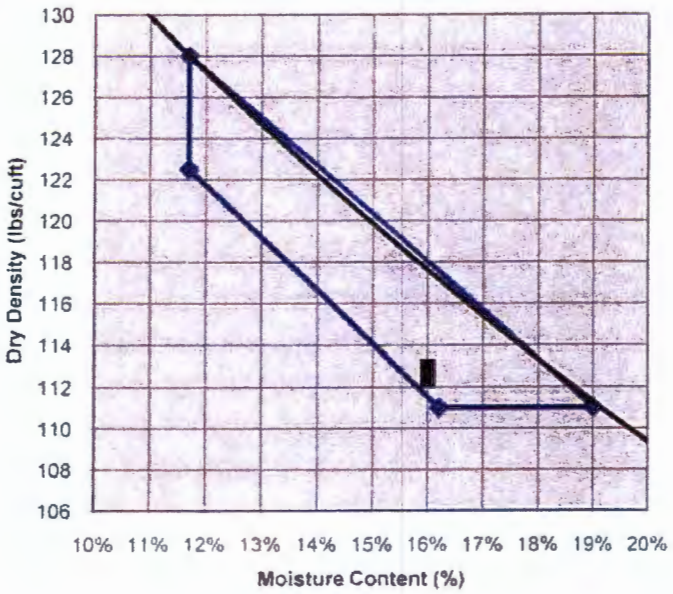
Client: WCH
Submittal: 05-18J Admix Field Data
Project: S013213A00
Test Date: 6/15/2010
Description: Admix Soil
Report: 5-16-089

Model: 3430 Troxler ID: 27881
Moisture Std: 642 Density Std: 2226
Offsets: Moisture - Density -
Acceptable Zone

Comments: Unless otherwise stated - All test at taken at a depth of 6-in.
Soil was placed into grids G4 and G5 at two separate times, south half of the zones first, then the north half

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-362	1	15:10	3	113.0	16.0%	0.492	N/A	88.0%	G4-N	Pass
SL-363	1	15:16	3	112.3	16.0%	0.501	N/A	86.0%	G5-N	Pass
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-362				
SL-363				



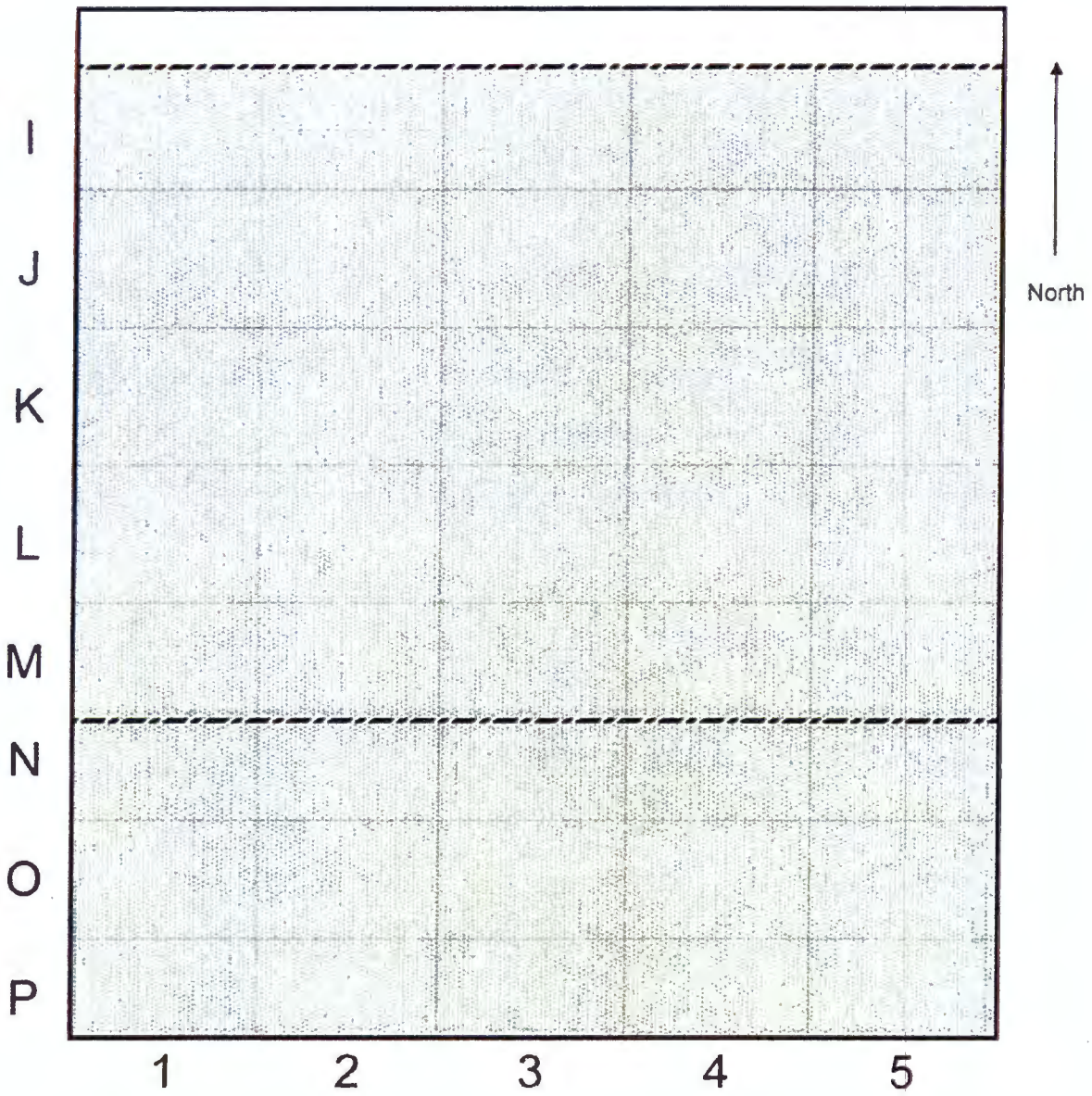
nvirotech Engineering & Consulting, Inc

6/18/10
Date

S/C S013213A00

CQA Moisture Density Map Cell 9

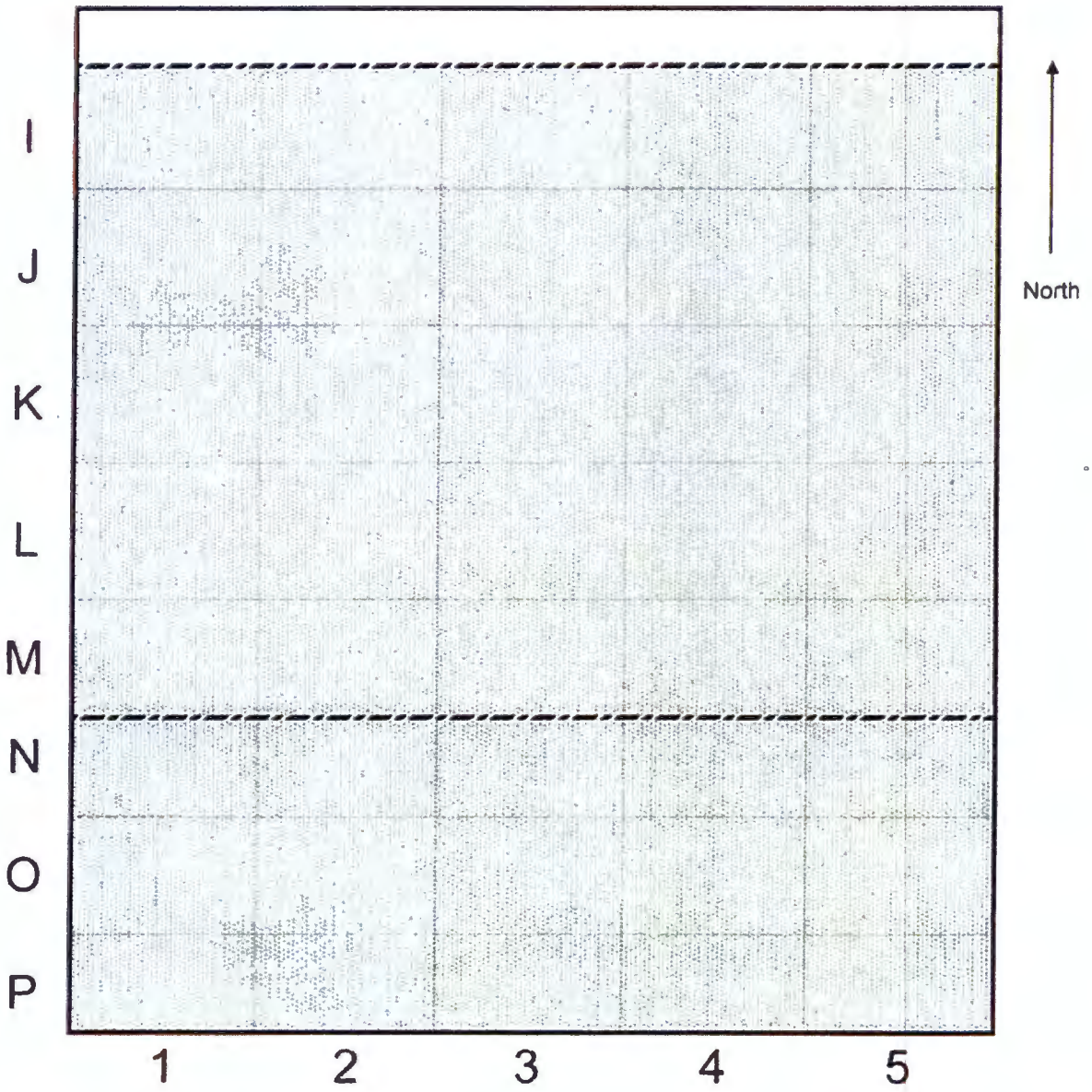
Date	6/15/2010	Lift:	No 1
Report:	5-16-089	Operator:	J Schut
Map No:	1 of 12	Material	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

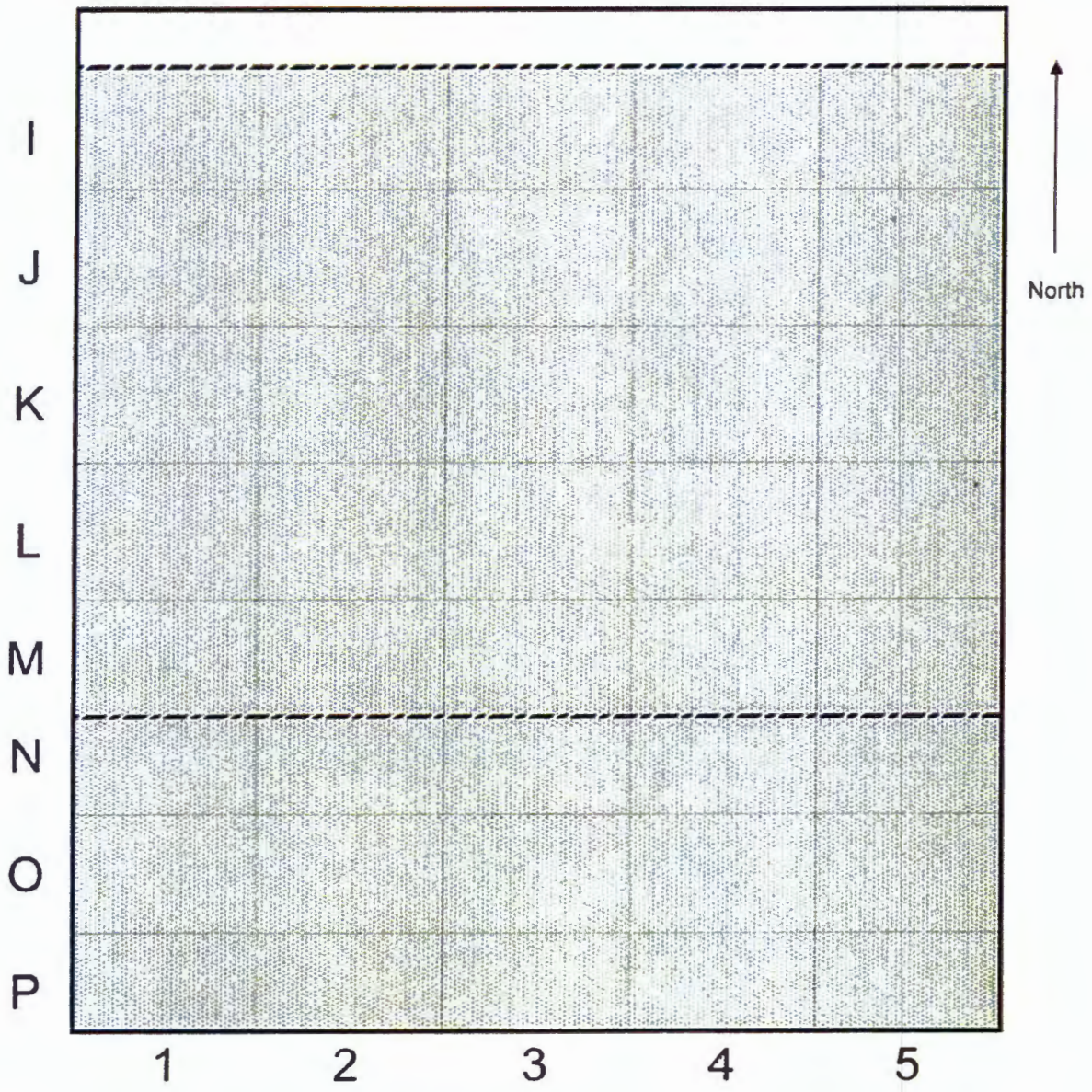
Date:	6/15/2010	Lift	No. 2
Report:	5-16-089	Operator:	J. Schut
Map No	2 of 12	Material	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

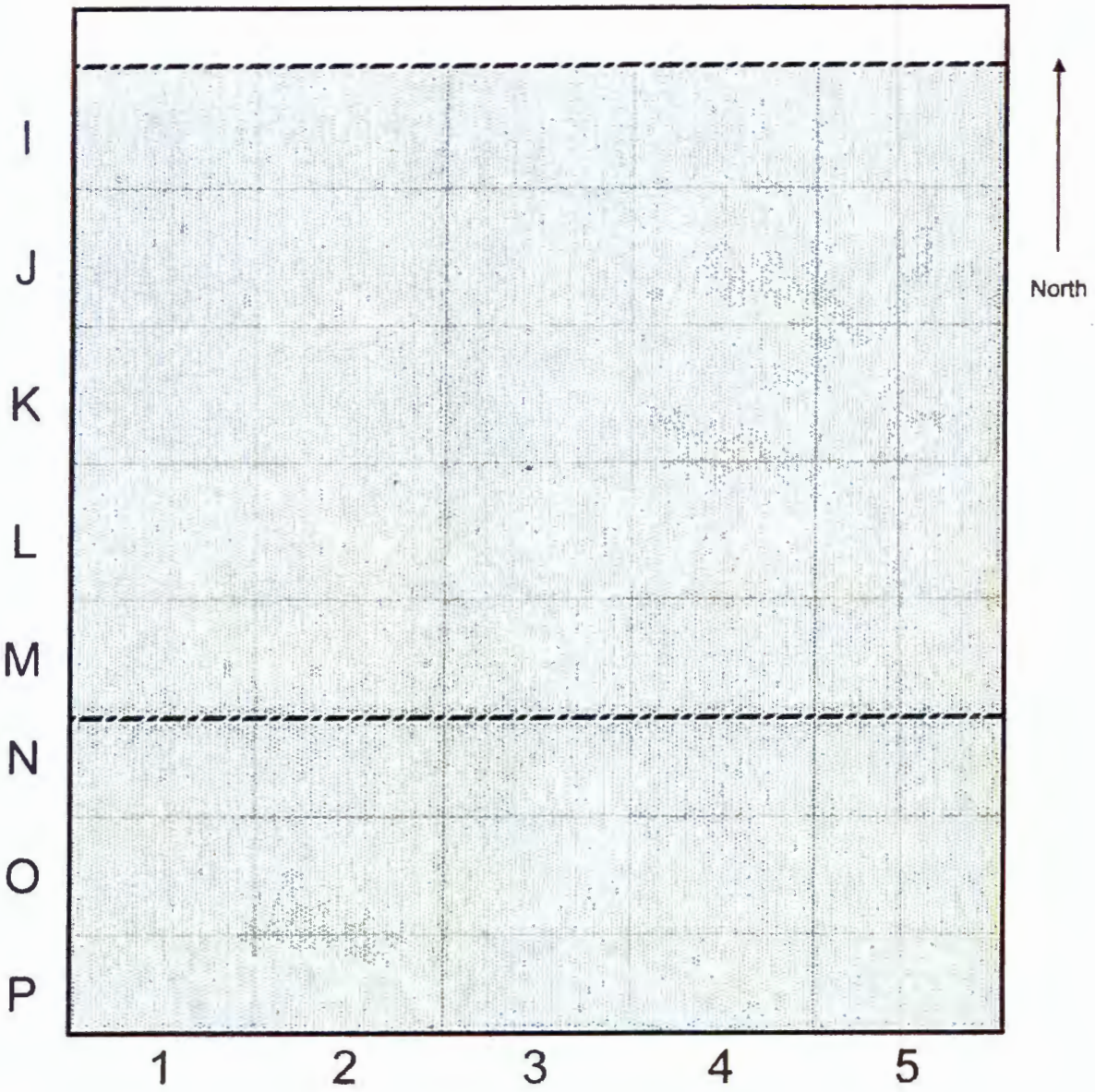
Date:	6/15/2010	Lift:	No. 3
Report:	5-16-089	Operator:	J Schut
Map No:	3 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

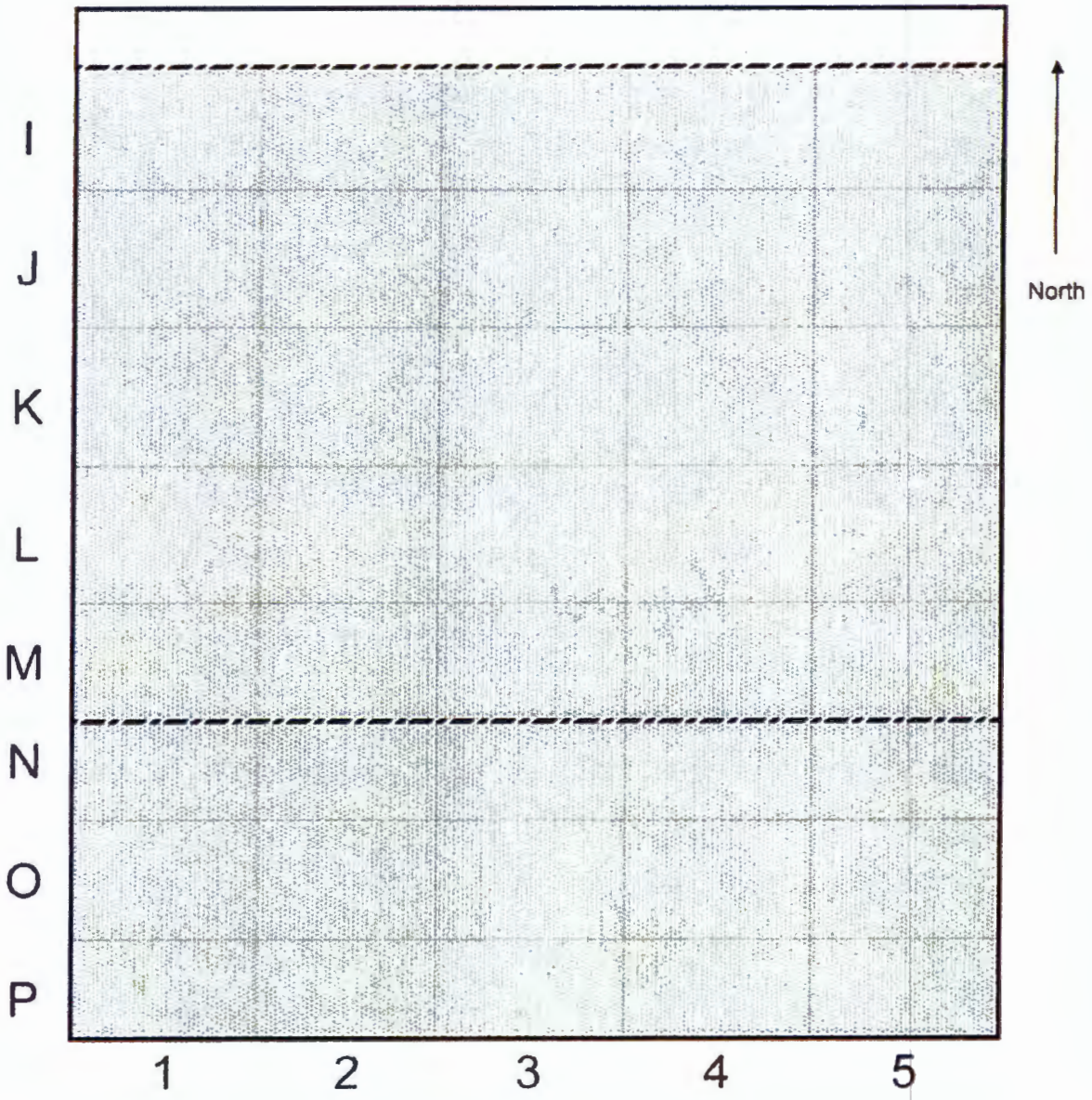
Date	6/15/2010	Lift:	No. 4
Report:	5-16-089	Operator:	J. Schut
Map No.	4 of 12	Material	Admix
Grid:	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

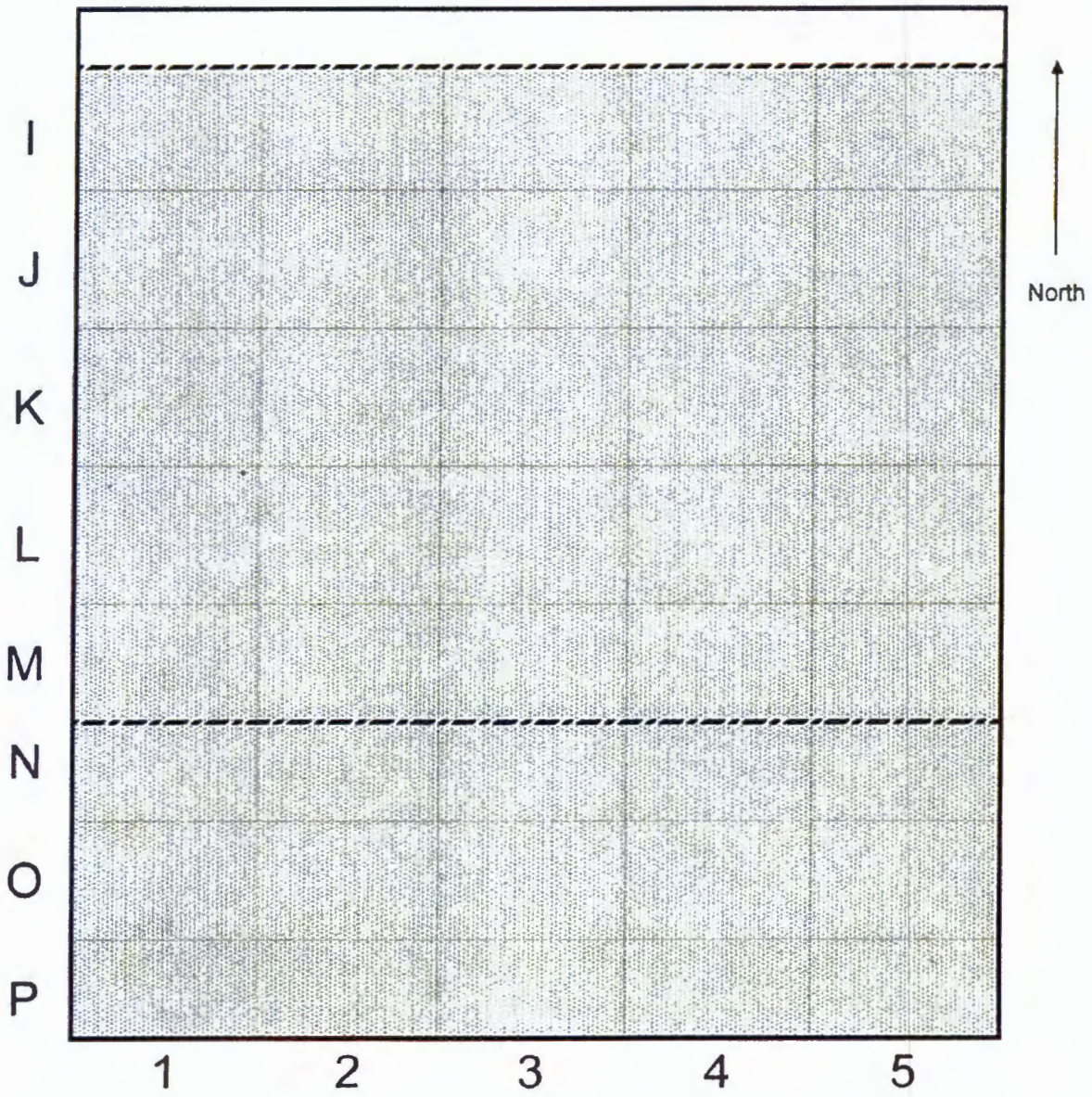
Date:	6/15/2010	Lift:	No 5
Report	5-16-089	Operator:	J. Schut
Map No:	5 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes	



S/C: S013213A00

CQA Moisture Density Map Cell 9

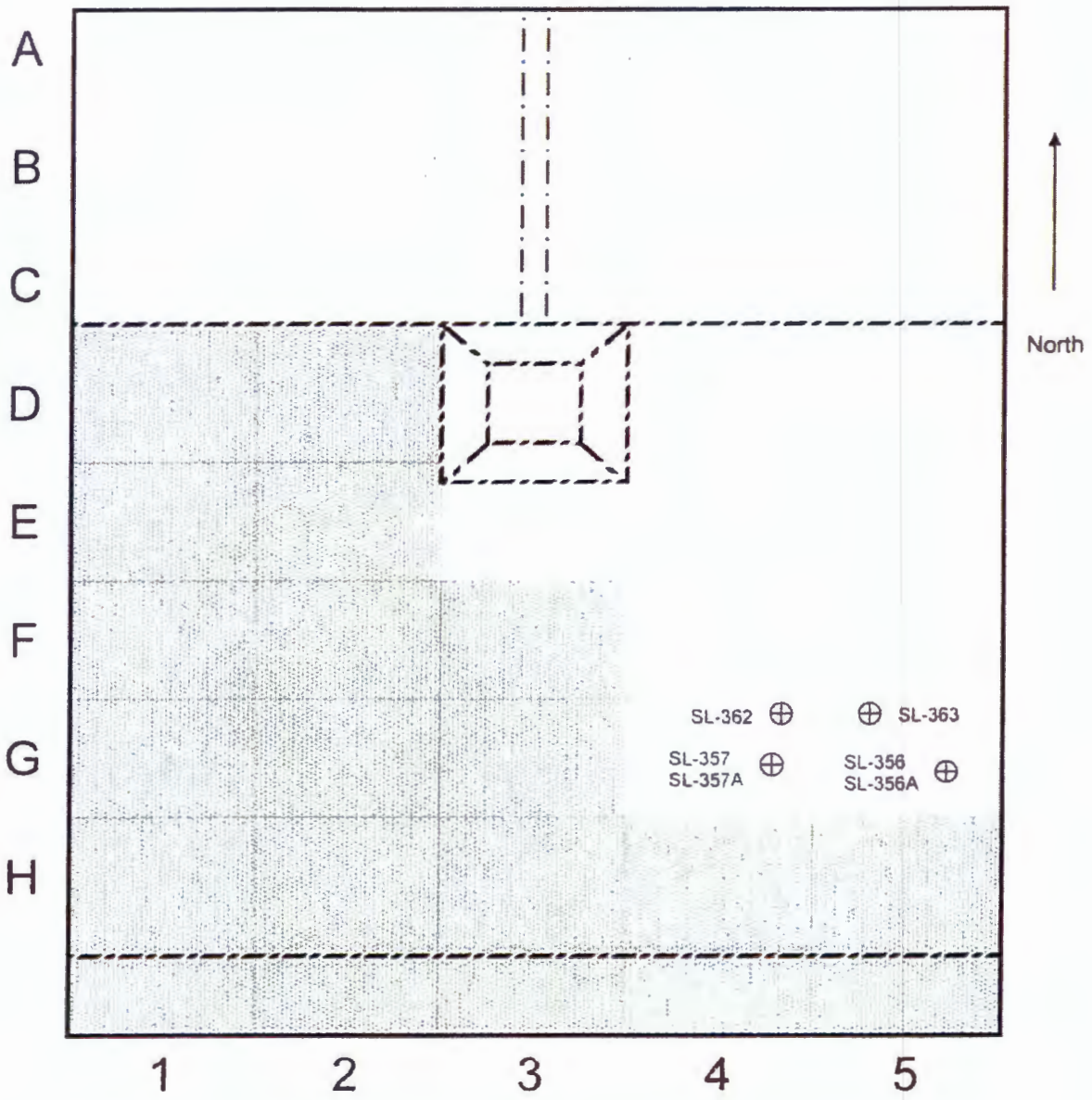
Date	6/15/2010	Lift.	No. 6
Report:	5-16-089	Operator.	J. Schut
Map No:	6 of 12	Material:	Admix
Grid.	95-ft x 90-ft	Notes.	



S/C S013213A00

CQA Moisture Density Map Cell 9

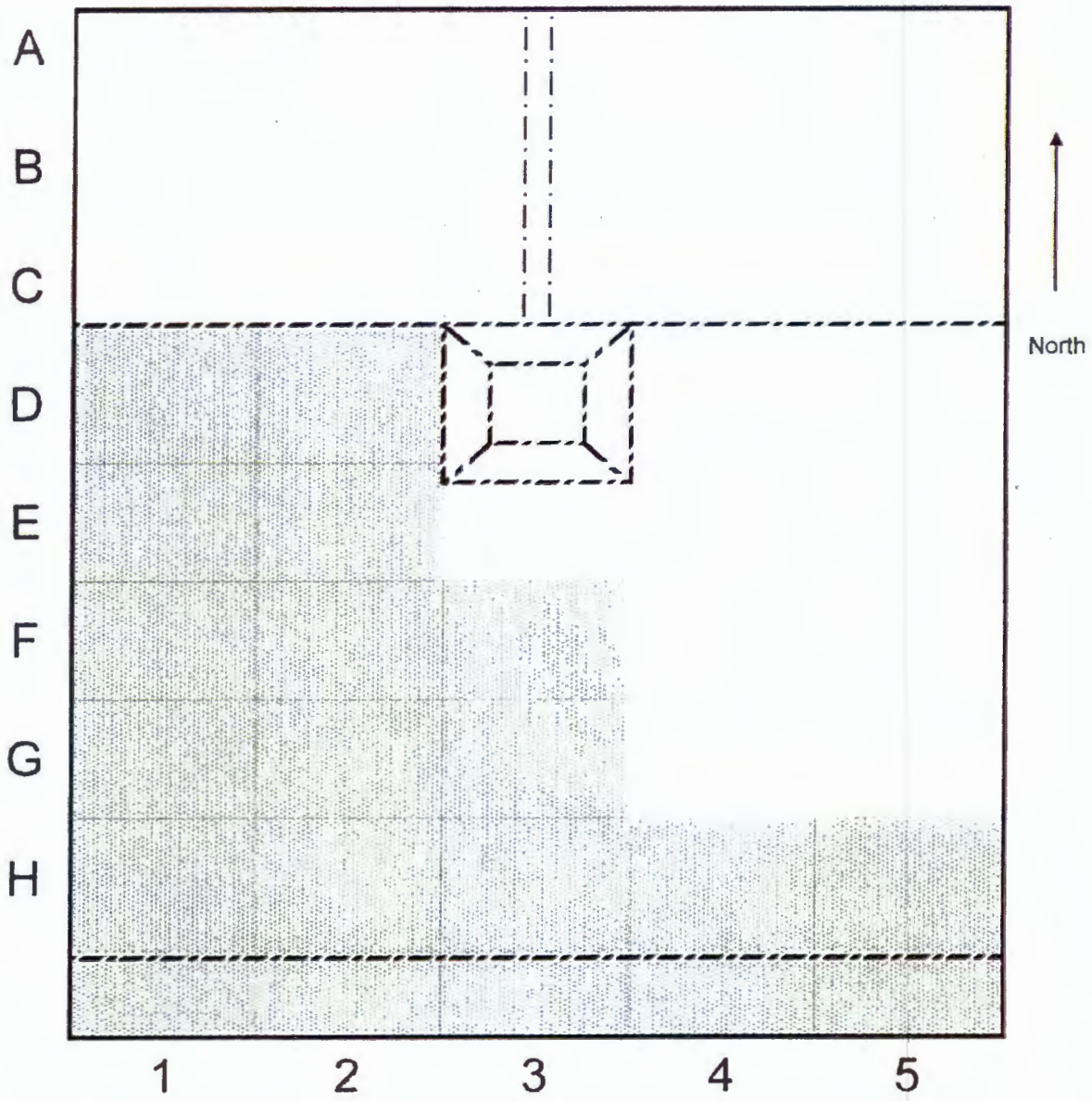
Date	6/15/2010	Lift:	No. 1
Report:	5-16-089	Operator:	J. Schut
Map No.	7 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

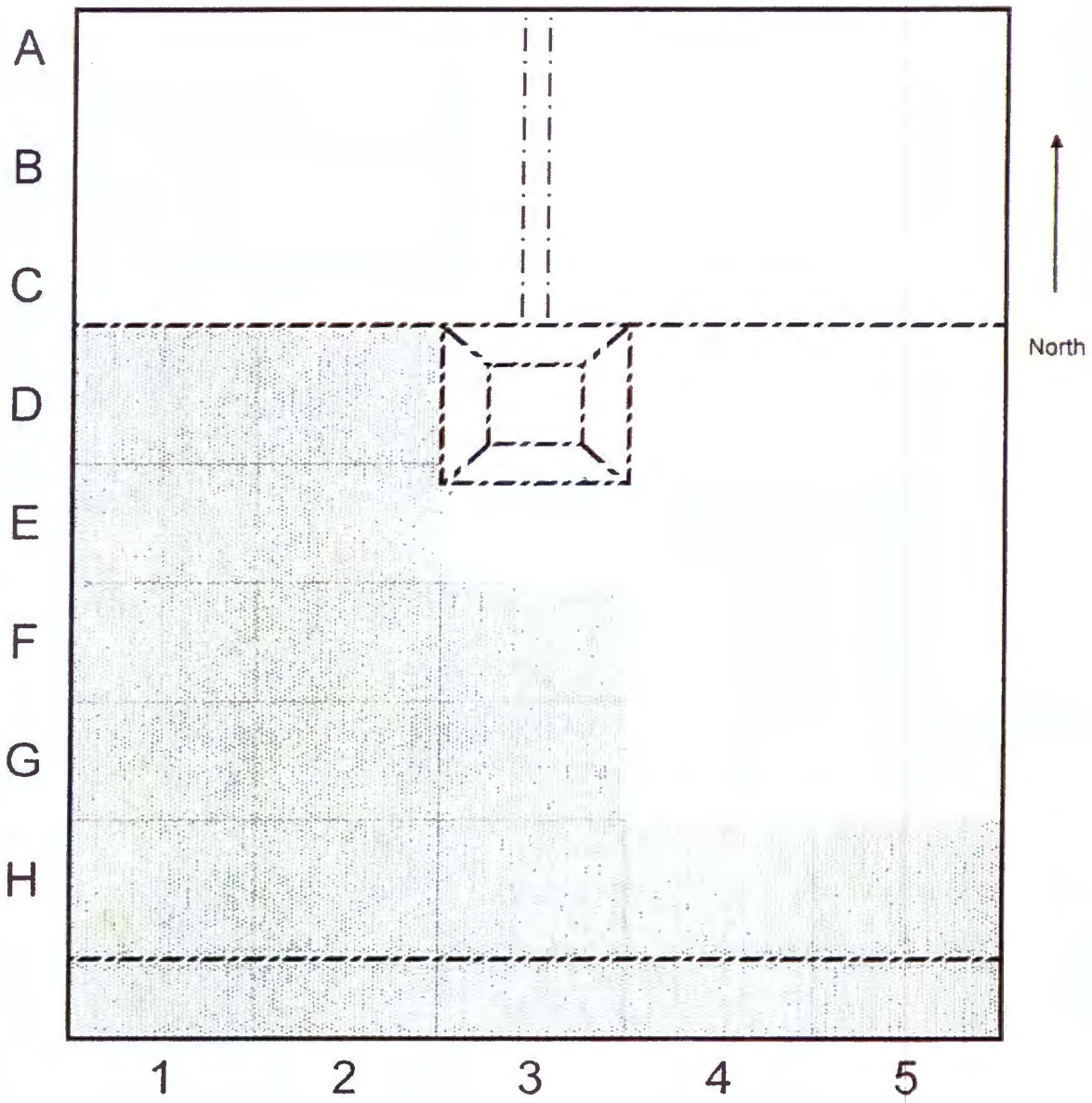
Date:	6/15/2010	Lift:	No. 2
Report:	5-16-089	Operator:	J. Schut
Map No:	8 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

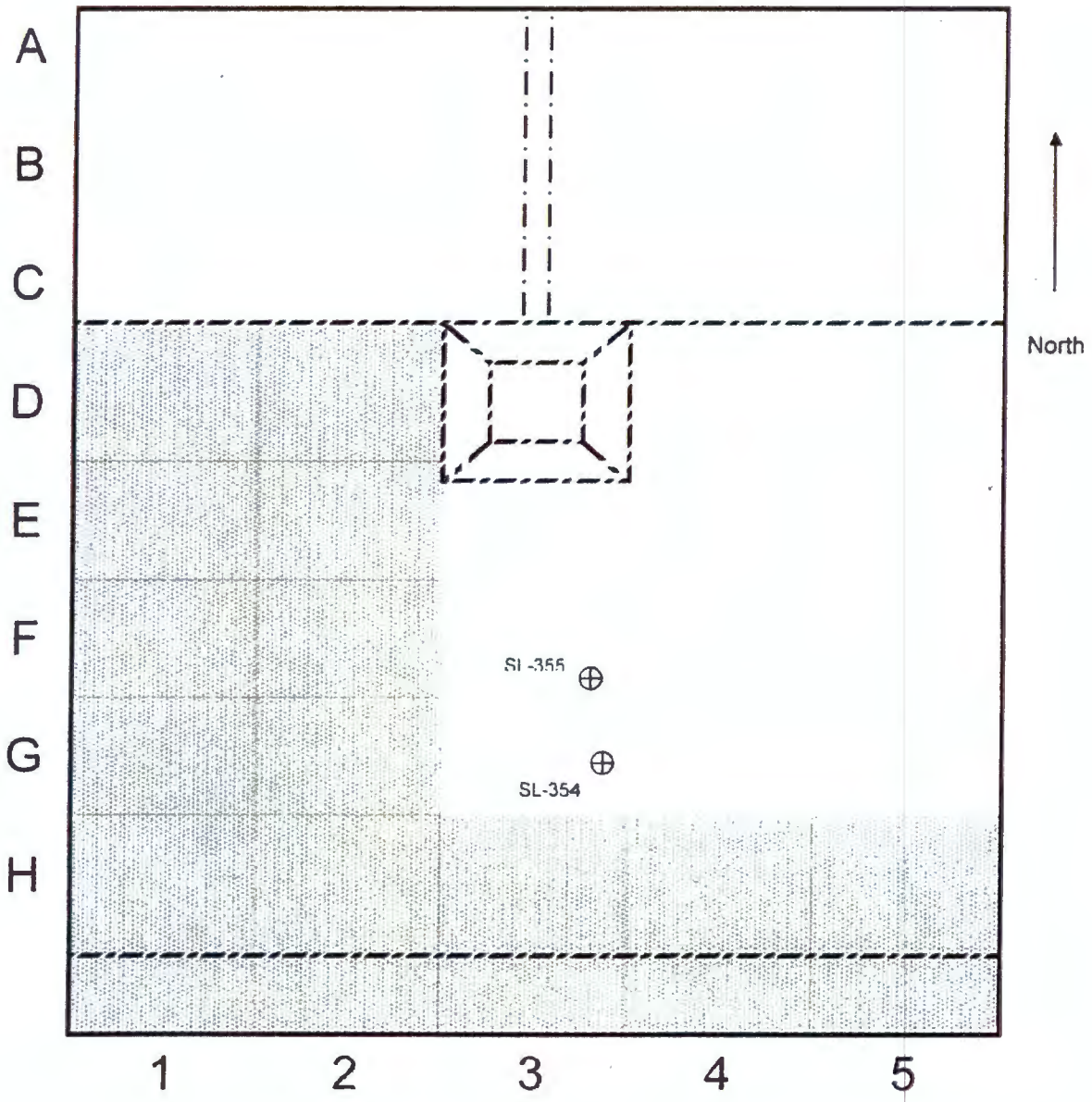
Date:	6/15/2010	Lift:	No. 3
Report:	5-16-089	Operator:	J. Schut
Map No:	9 of 12	Material:	Admix
Grid	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

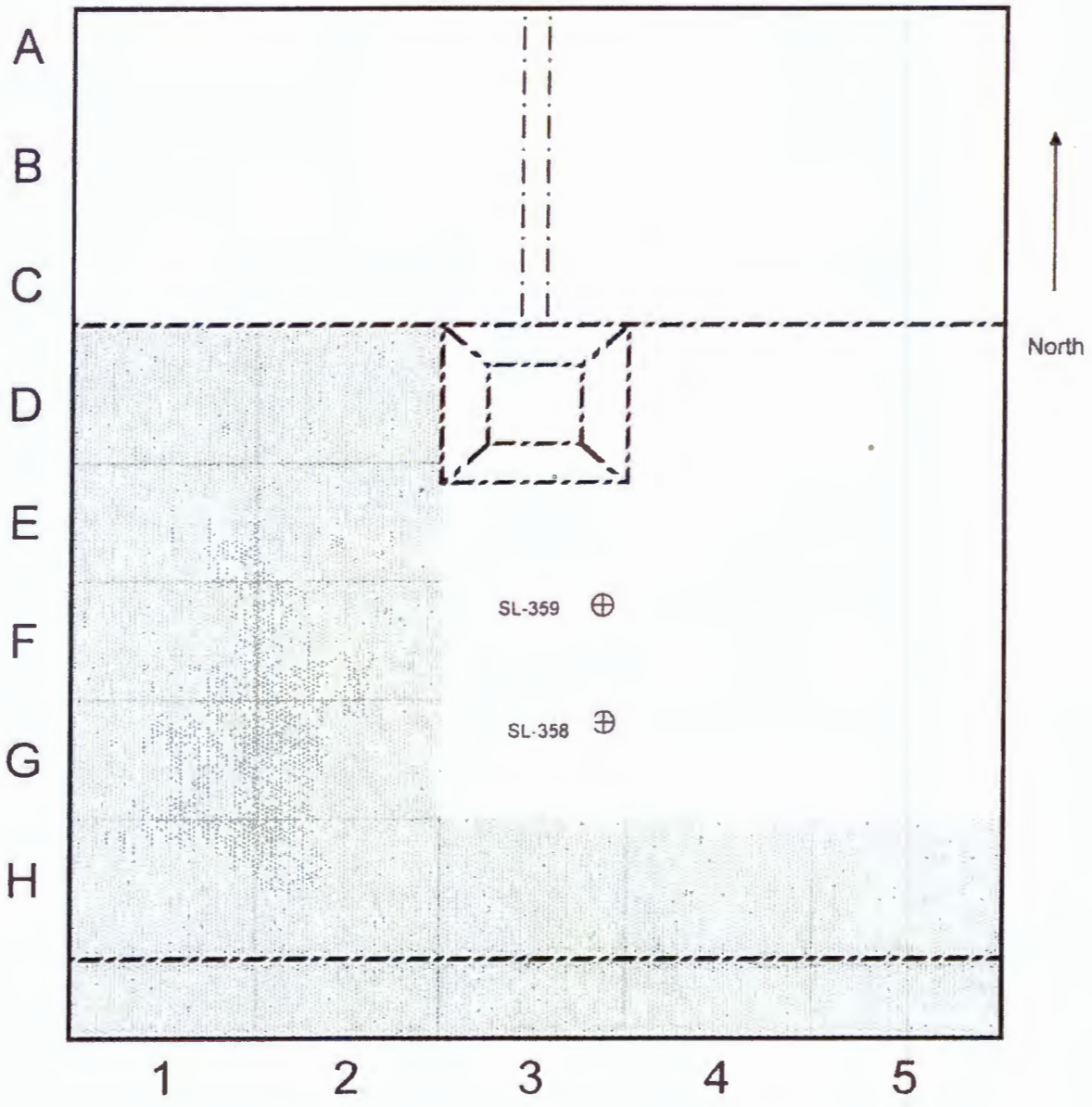
Date:	6/15/2010	Lift:	No. 4
Report:	5-16-089	Operator:	J. Schut
Map No:	10 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C. S013213A00

CQA Moisture Density Map Cell 9

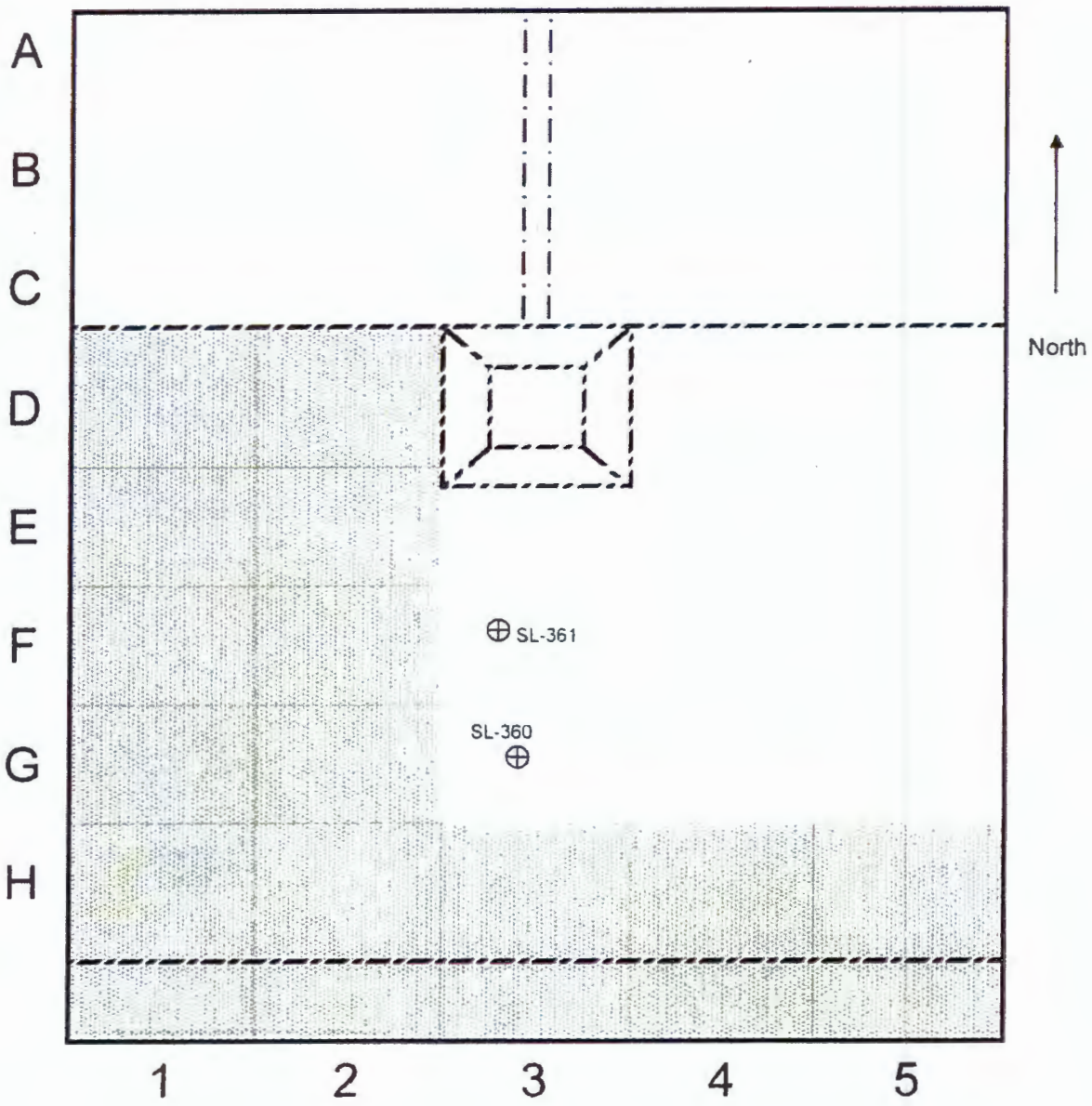
Date	6/15/2010	Lift:	No 5
Report.	5-16-089	Operator:	J. Schut
Map No	11 of 12	Material.	Admix
Grid	95-ft x 90-ft	Notes.	



S/C: S013213A00

CQA Moisture Density Map Cell 9

Date:	6/15/2010	Lift:	No. 6
Report:	5-16-089	Operator:	J. Schut
Map No.	12 of 12	Material:	Admix
Grid	95-ft x 90-ft	Notes:	



UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client:	WCH
Submittal:	05-18J Admix Field Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	SL-355
Project:	S013213A00			Sample Description:	Admix Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	6/15/2010
Tested By:	J. Schult	Date:	6/15/2010	Sampled By:	J. Schult
Reviewed By:	J. Voss	Date:	6/16/2010	Date Received:	6/15/2010
Comments				Report No.:	05-016-089

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1. Mass of Proctor mold, W_1	3955.70 g
2. Mass of Proctor mold + sand, W_2	5387.70 g
3 Volume of mold, V_1	0.03 ft
4. Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	94.71 lb/ft^3

Calibration Cone

5. Mass of bottle + cone + sand (before use), W_3	6114.80 g
6. Mass of bottle + cone + sand (after use), W_4	4630.40 g
7. Weight of sand to fill the cone, $W_c = W_4 - W_3$	3.27 lb

Results from Field Tests

8. Mass of bottle + cone + sand (before use), W_6	6274.5 g
9. Mass of bottle + cone + sand (after use), W_8	3657.9 g
10. Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma\, d\,(sand)}$	0.0264 ft^3
11. Mass of gallon can, W_5	371.30 g
12. Mass of gallon can + moist soil, W_7	1896.40 g
13. Mass of gallon can + dry soil, W_9	1667.80 g
14. Moist unit weight of soil in field, $\gamma = W_7 - W_5 / V_2$	127.58 lb/ft^3
15. Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	17.6%
16. Dry unit weight in the field, $\gamma_{d\,(sand)} = \gamma / (1+(w\,(\%)/100)$	108.46 lb/ft^3
17. Comparision moisture content =	17.2%
18. Dry unit weight comparison =	111.6 lb/ft^3

FIELD DENSITY TEST (ASTM D-6938)

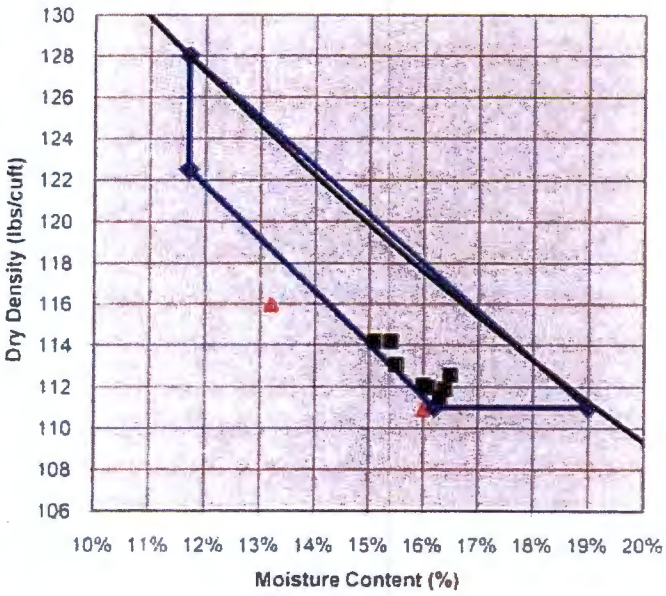
ENVIROTECH

Client: WCH
Submittal: 05-18J Admix Field Data
Project: S013213A00
Test Date: 6/16/2010
Description: Admix Soil
Report: 5-16-090
Comments: Unless otherwise stated - All test at taken at a depth of 6-in.

Model: 3430 Troxler ID: 27881
Moisture Std. 643 Density Stc 2207
Offsets. Moisture - Density -
Acceptable Zone

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-364	2	7:46	3	116.0	13.2%	0.453	N/A	79.0%	G4	Fail
SL-365	2	7:55	3	114.2	15.4%	0.476	N/A	87.0%	G5	Pass
SL-364A	2	8:38	6	113.1	15.5%	0.491	N/A	85.0%	G4	Pass
SL-366	1	9:05	3	111.9	16.4%	0.507	17.7%	87.0%	F4	Pass
SL-367	1	9:45	3	111.5	16.3%	0.512	N/A	86.0%	F5	Pass
SL-368	3	10:52	3	114.2	15.1%	0.476	N/A	86.0%	G4	Pass
SL-369	3	10:56	3	112.1	16.0%	0.504	N/A	86.0%	G5	Pass
SL-370	2	13:09	3	110.9	16.0%	0.520	N/A	83.0%	F4	Fail
SL-371	2	13:14	3	112.6	16.5%	0.497	N/A	90.0%	F5	Pass
SL-370A	2	13:22	6	112.0	16.1%	0.505	N/A	86.0%	F4	Pass

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-364				
SL-365				
SL-364A				
SL-366	SC	1785.80	1573	371.2
SL-367				
SL-368				
SL-369				
SL-370				
SL-371				
SL-370A				



Envirotech Engineering & Consulting, Inc

6/18/10
Date

FIELD DENSITY TEST (ASTM D-6938)

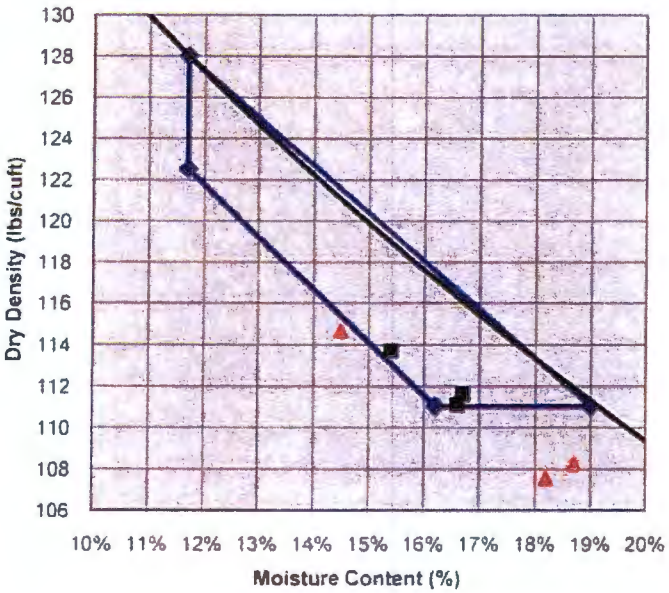
ENVIROTECH

Client: WCH
Submittal: 05-18J Admix Field Data
Project: S013213A00
Test Date: 6/16/2010
Description: Admix Soil
Report: 5-16-090
Comments: Unless otherwise stated - All test at taken at a depth of 6-in.

Model 3430 Troxler ID 27881
Moisture Std: 643 Density Stc 2207
Offsets: Moisture - Density -
Acceptable Zone

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-372	4	14.08	3	113.7	15.4%	0.482	N/A	86.0%	G4	Pass
SL-373	4	14:12	3	107.6	18.2%	0.567	N/A	87.0%	G5	Fail
SL-374	3	15:05	3	111.1	16.6%	0.518	N/A	87.0%	F4	Pass
SL-375	3	15:09	3	114.7	14.5%	0.470	N/A	83.0%	F5	Fail
SL-373A	4	15:25	6	108.3	18.7%	0.556	N/A	91.0%	G5	Fail
SL-375A	3	15:34	6	111.6	16.7%	0.510	N/A	88.0%	F5	Pass
SL-373B	4	16:08	9	111.6	16.7%	0.511	N/A	88.0%	G5	Pass
							N/A			
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-372				
SL-373				
SL-374				
SL-375				
SL-373A				
SL-375A				
SL-373B				



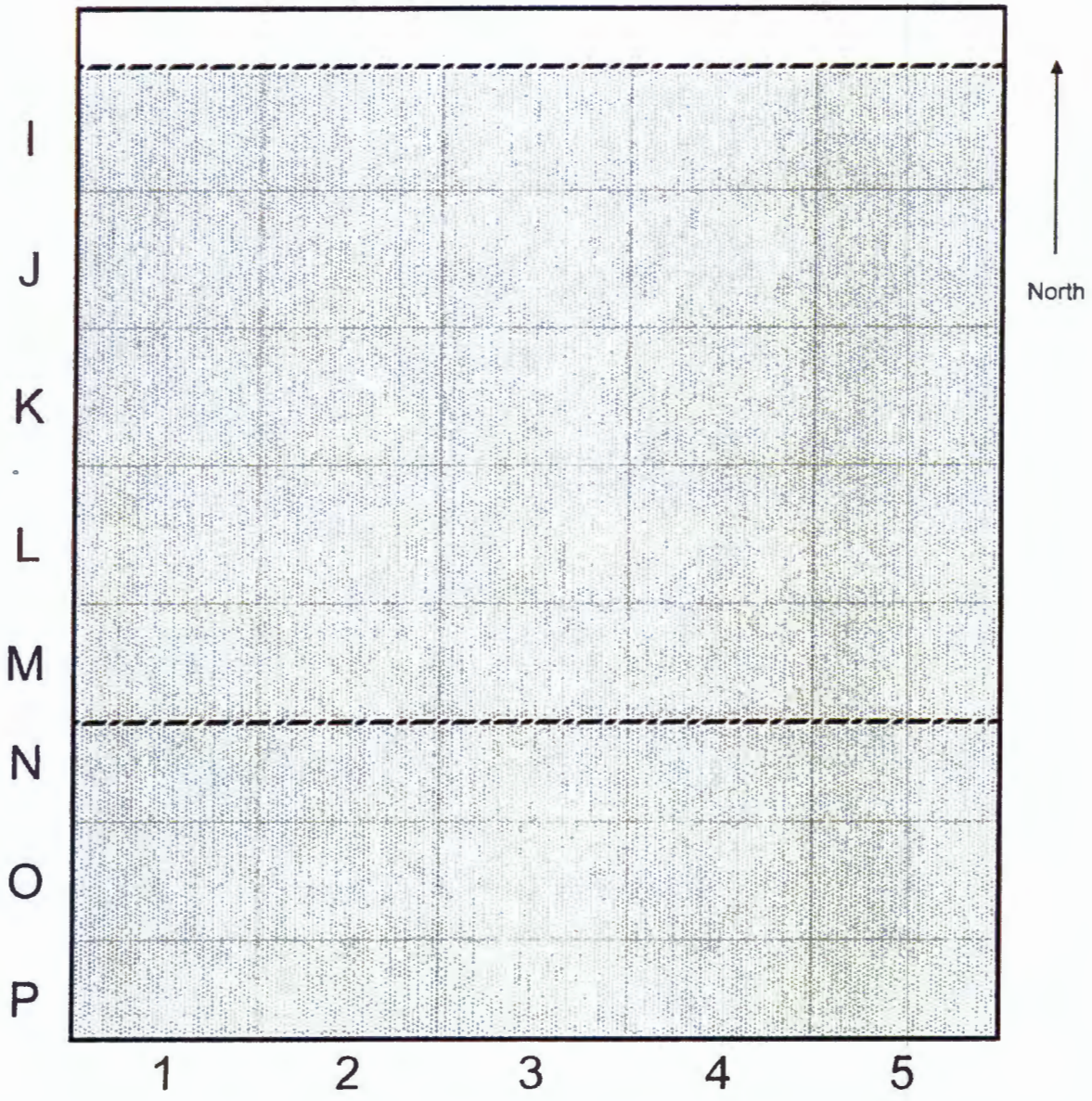
Envirotech Engineering & Consulting, Inc

6/18/10
Date

S/C: S013213A00

CQA Moisture Density Map Cell 9

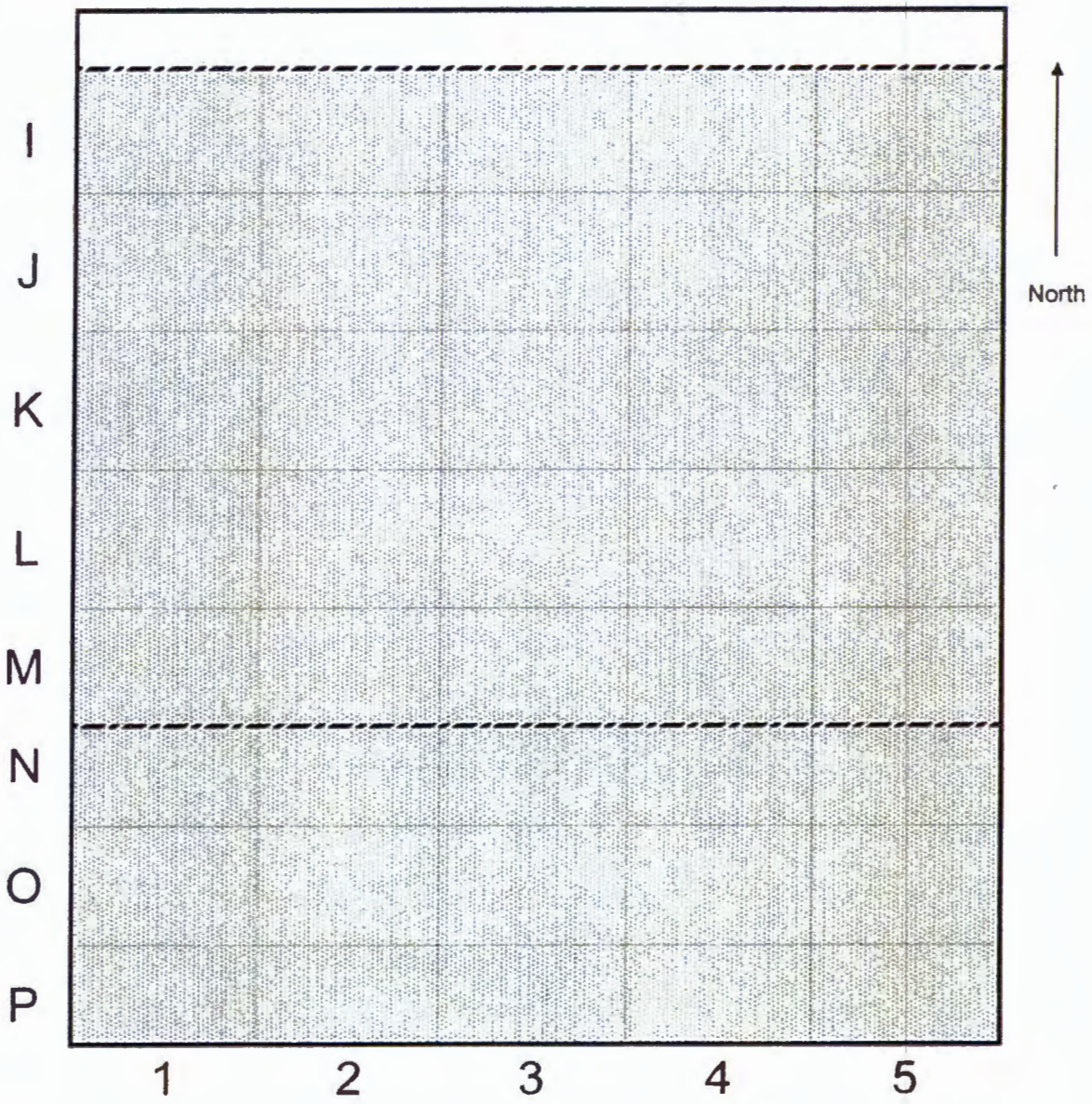
Date:	6/16/2010	Lift:	No 1
Report:	5-16-090	Operator:	J. Schut
Map No:	1 of 12	Material:	Admix
Grid	95-ft x 90-ft	Notes	



S/C: S013213A00

CQA Moisture Density Map Cell 9

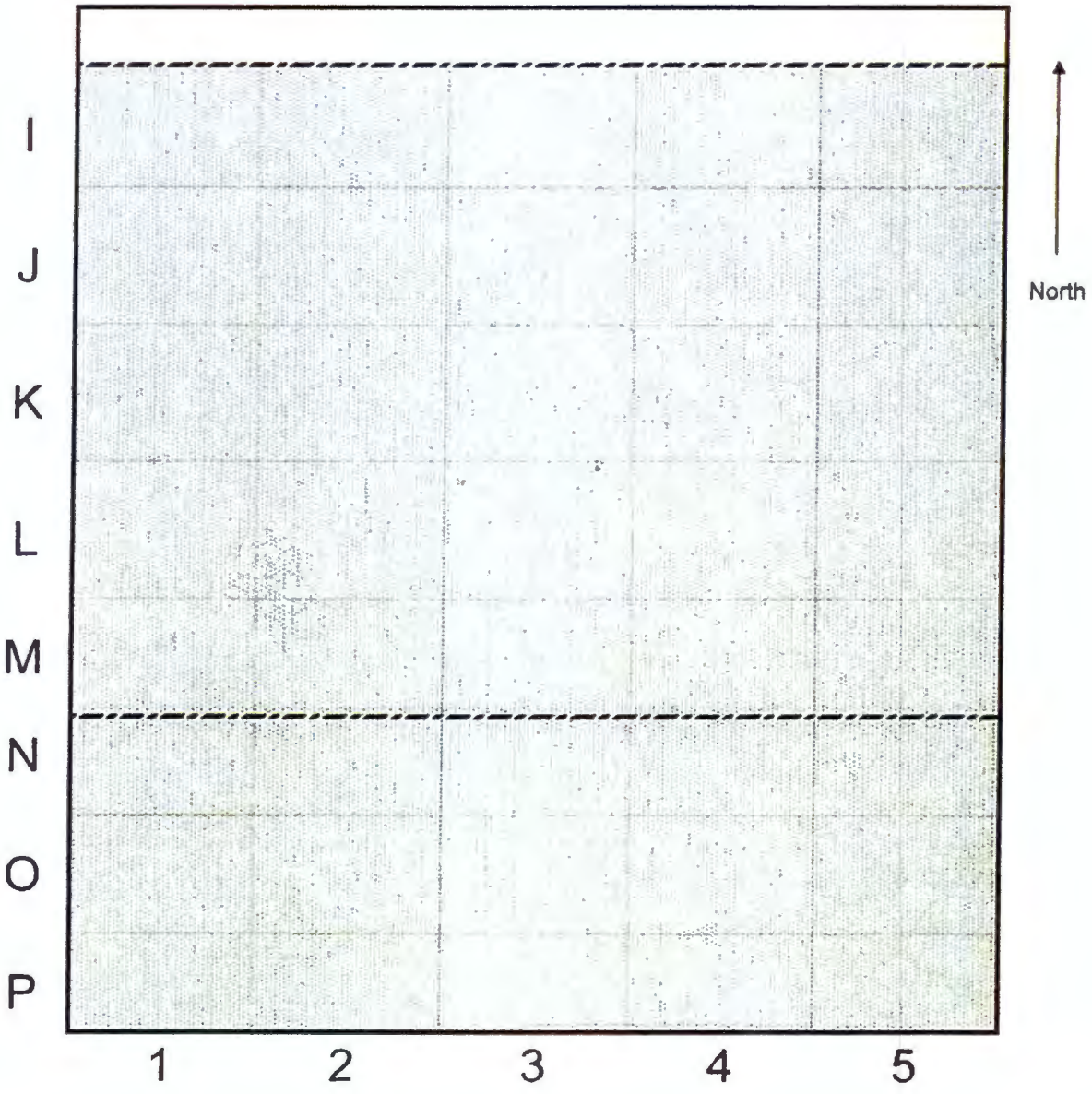
Date:	6/16/2010	Lift:	No 2
Report:	5-16-090	Operator:	J. Schut
Map No:	2 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

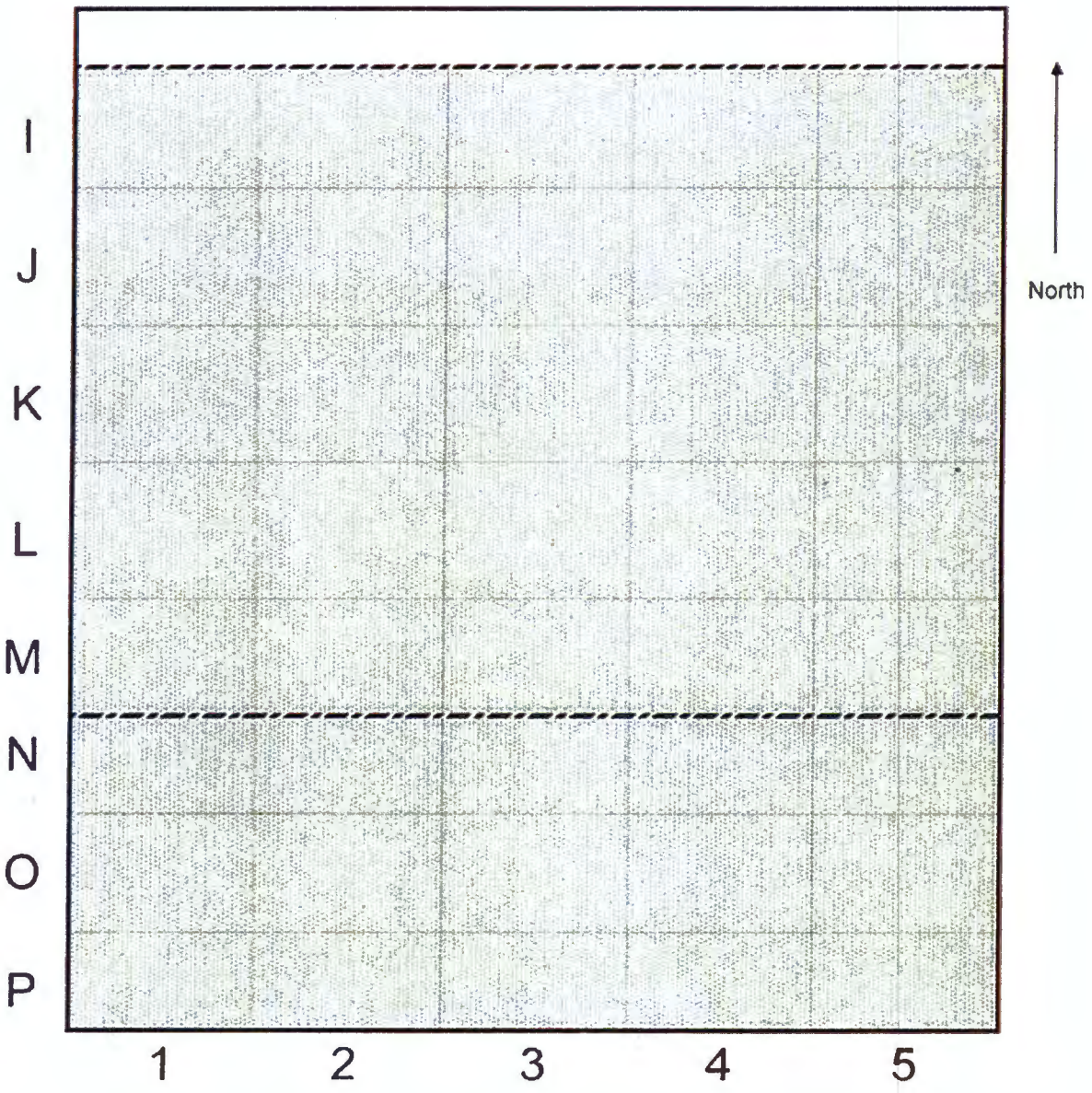
Date	6/16/2010	Lift:	No 3
Report:	5-16-090	Operator.	J Schut
Map No.	3 of 12	Material.	Admix
Grid	95-ft x 90-ft	Notes.	



S/C S013213A00

CQA Moisture Density Map Cell 9

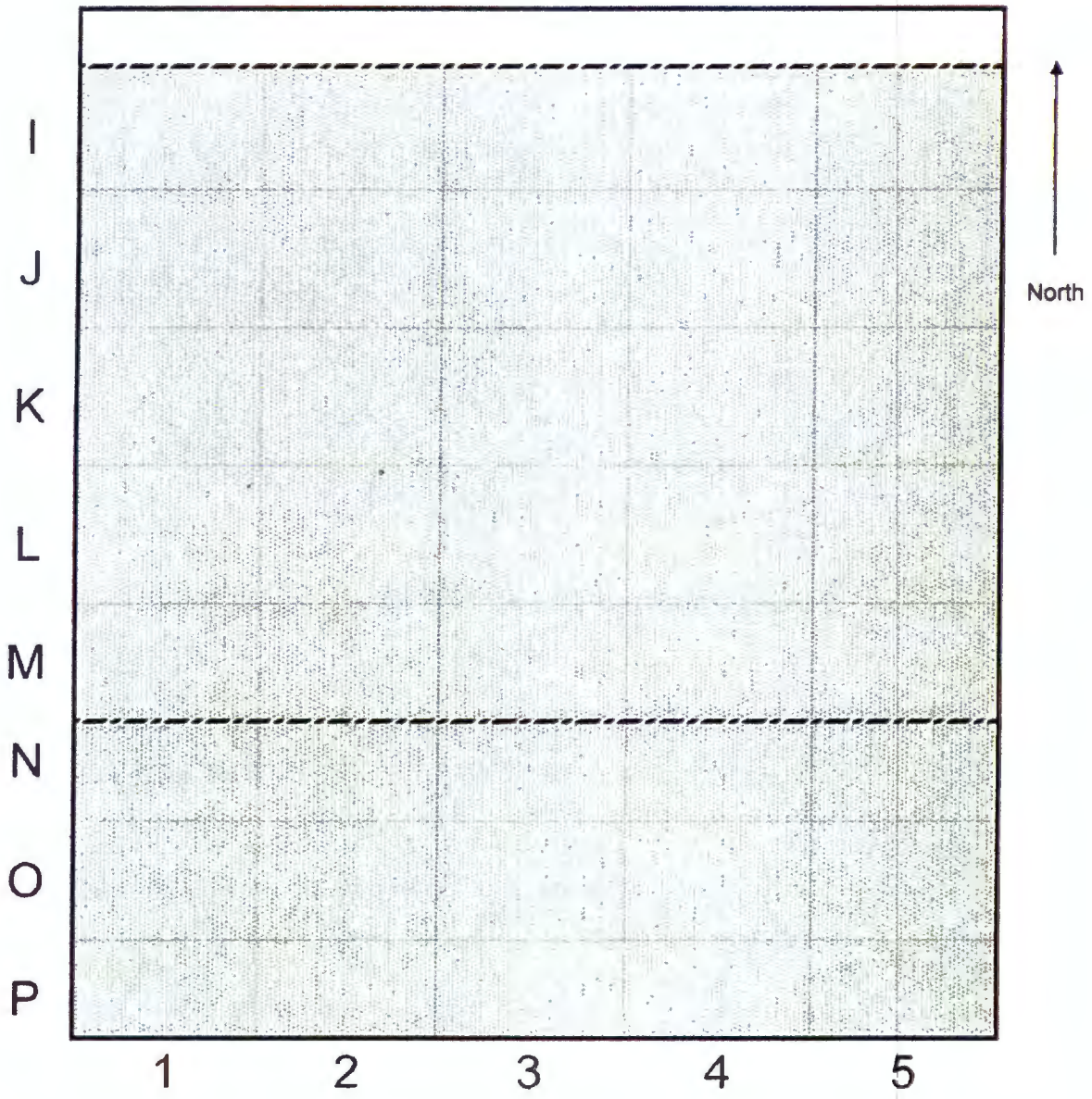
Date	6/16/2010	Lift:	No 4
Report:	5-16-090	Operator:	J. Schut
Map No:	4 of 12	Material:	Admix
Grid	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

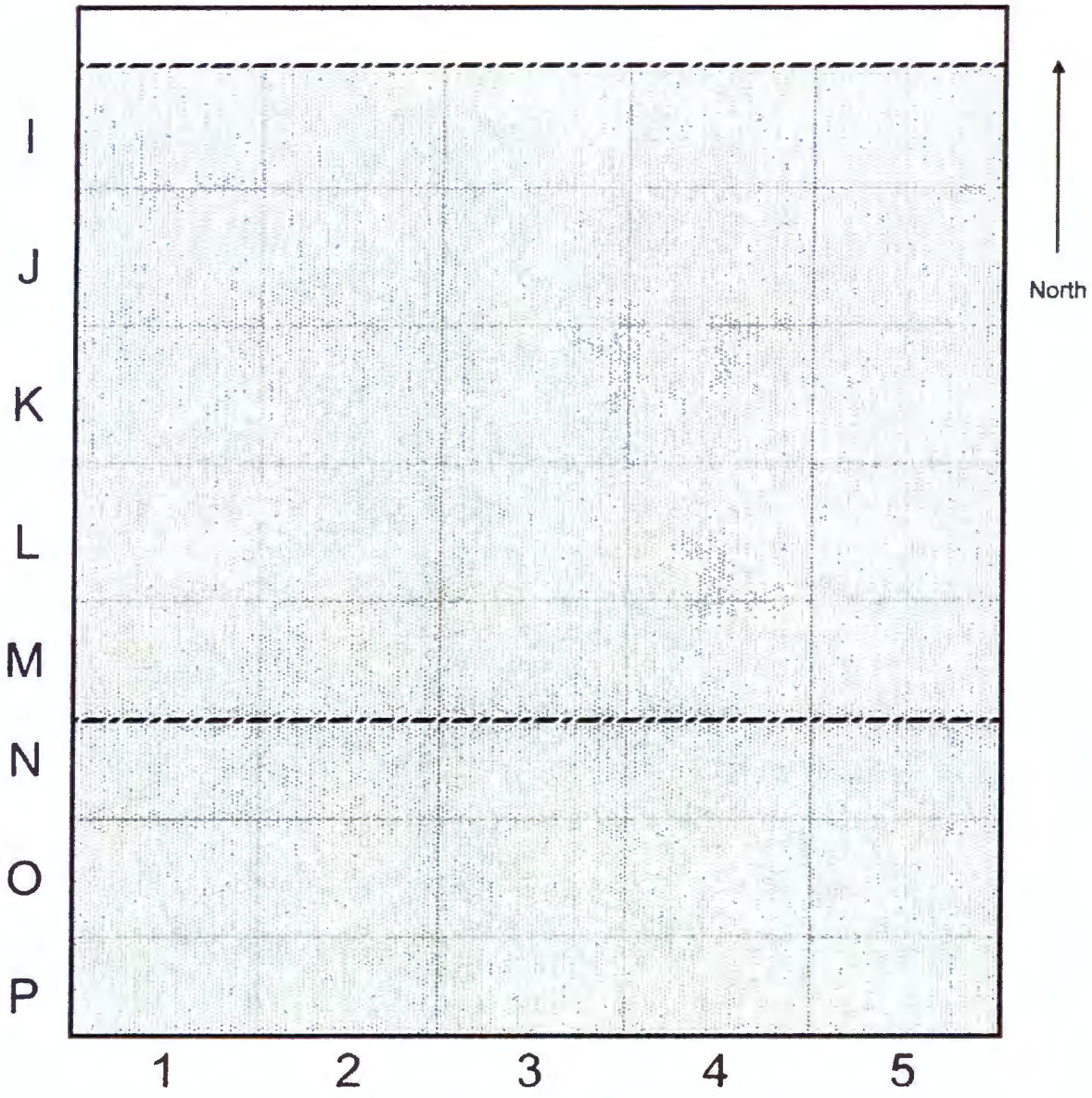
Date	6/16/2010	Lift.	No 5
Report:	5-16-090	Operator.	J Schut
Map No:	5 of 12	Material:	Admix
Grid.	95-ft x 90-ft	Notes.	



S/C S013213A00

CQA Moisture Density Map Cell 9

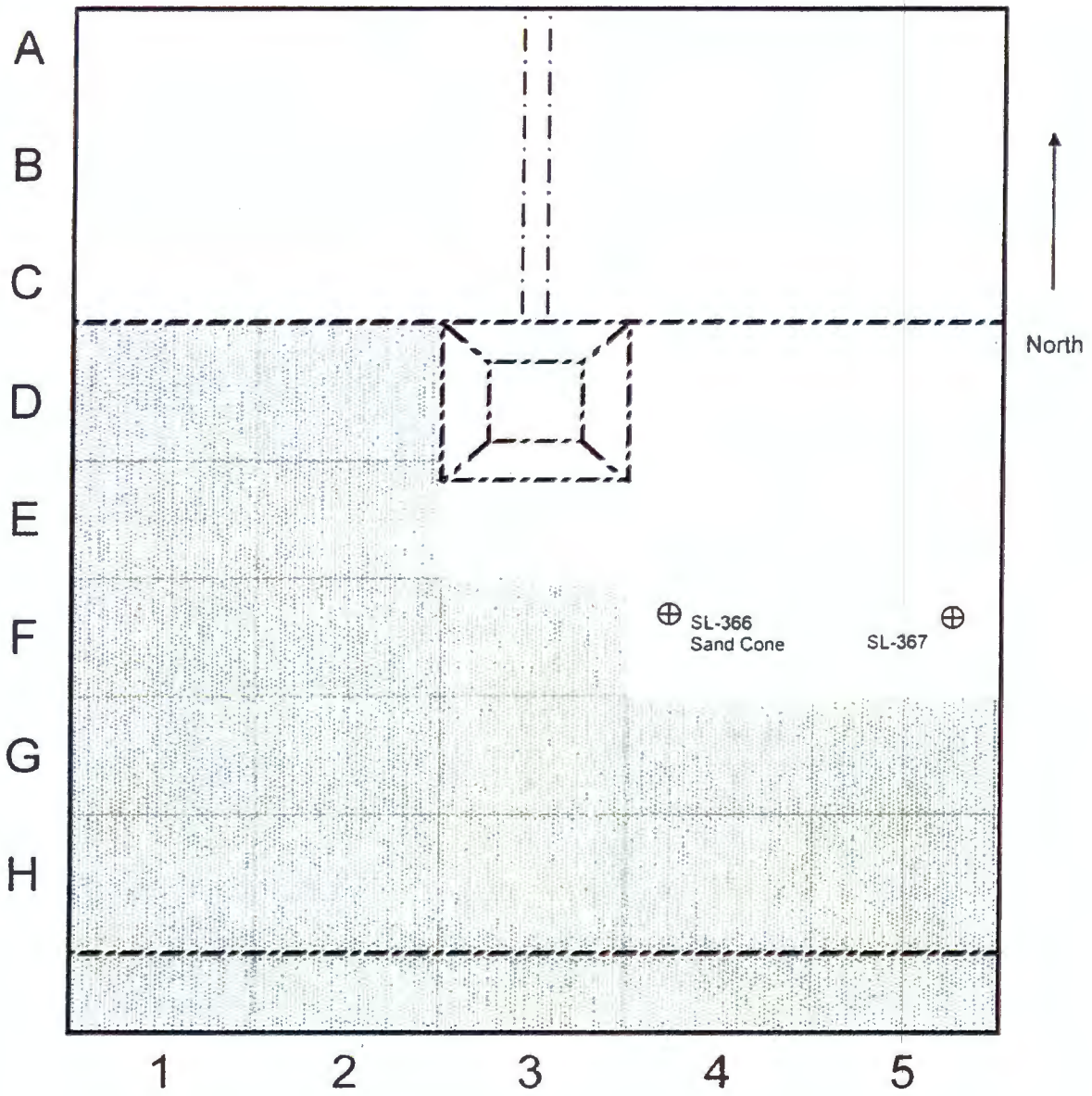
Date:	6/16/2010	Lift:	No 6
Report:	5-16-090	Operator:	J. Schut
Map No.	6 of 12	Material	Admix
Grid	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

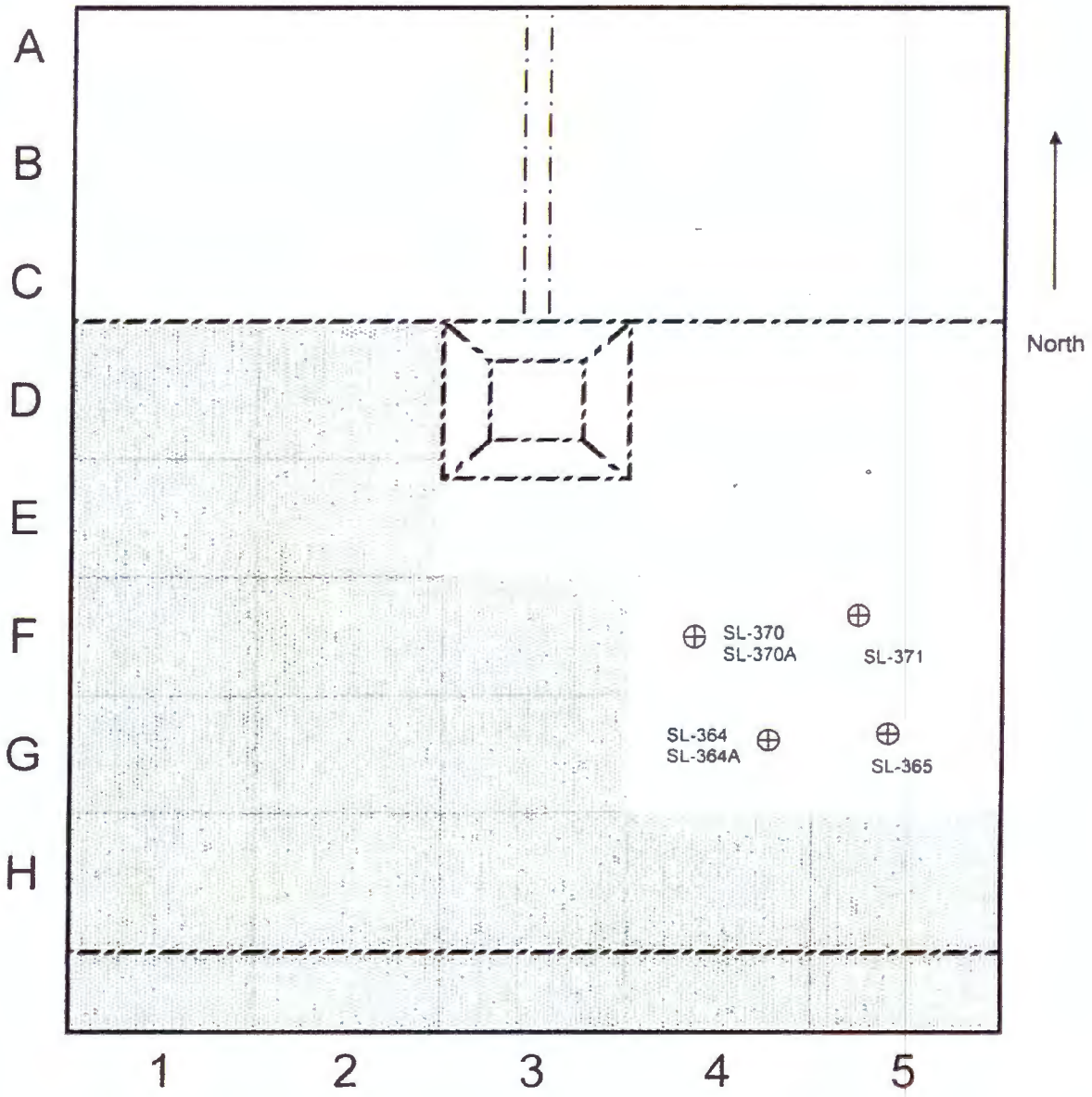
Date:	6/16/2010	Lift:	No. 1
Report:	5-16-090	Operator:	J. Schut
Map No:	7 of 12	Material	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

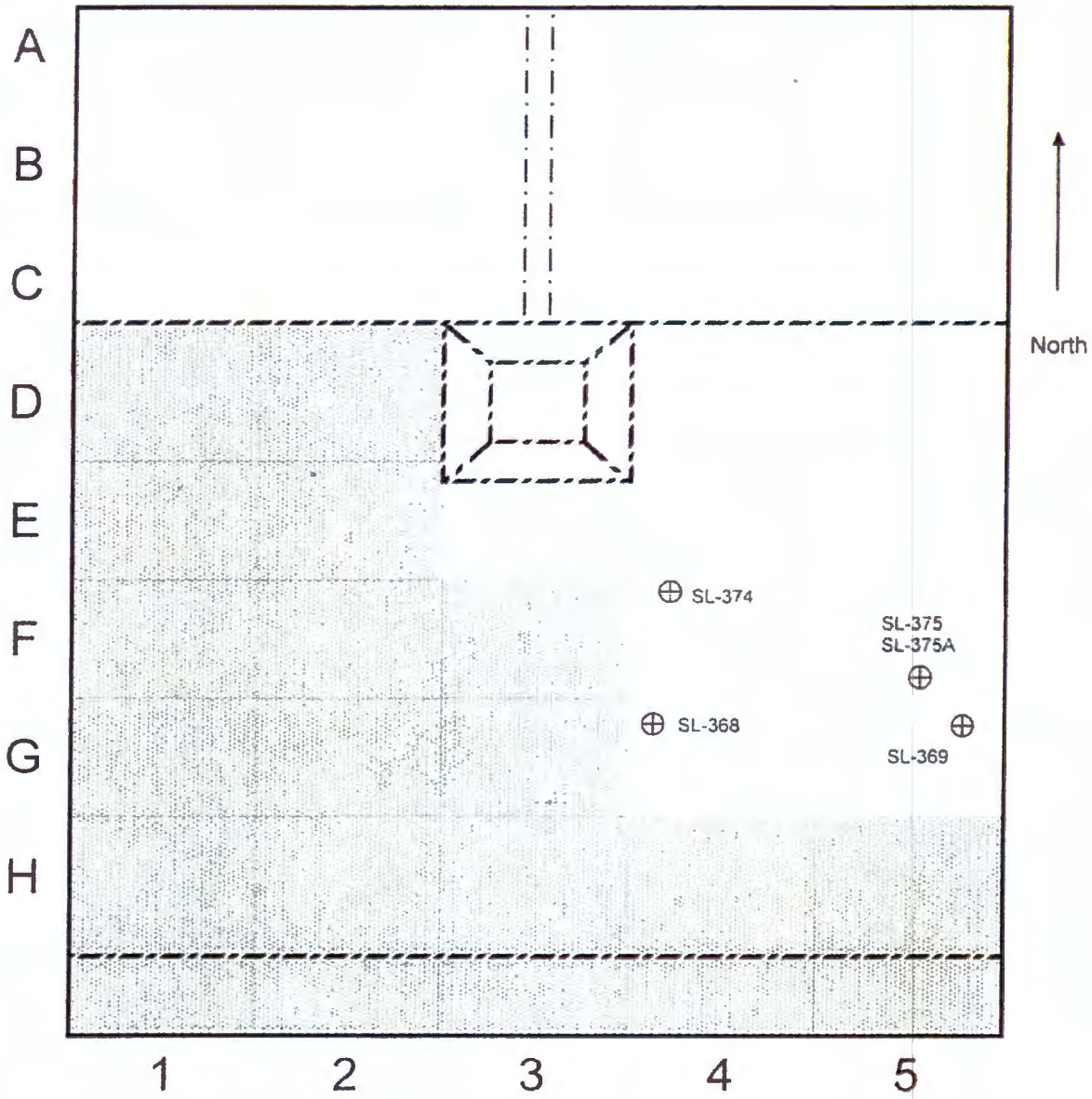
Date	6/16/2010	Lift:	No 2
Report:	5-16-090	Operator:	J. Schut
Map No:	8 of 12	Material:	Admix
Grid	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

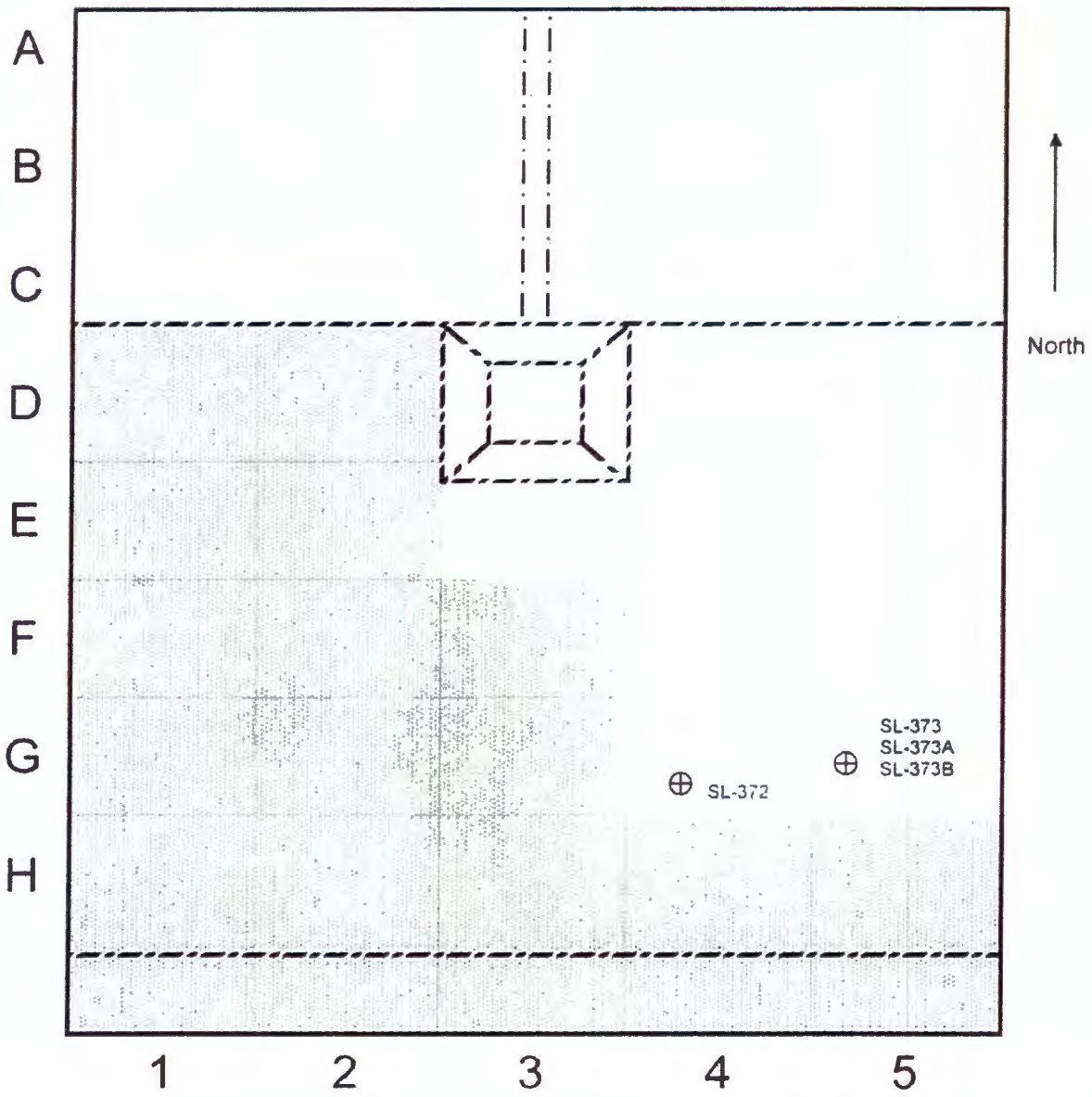
Date	6/16/2010	Lift:	No. 3
Report:	5-16-090	Operator:	J. Schut
Map No:	9 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

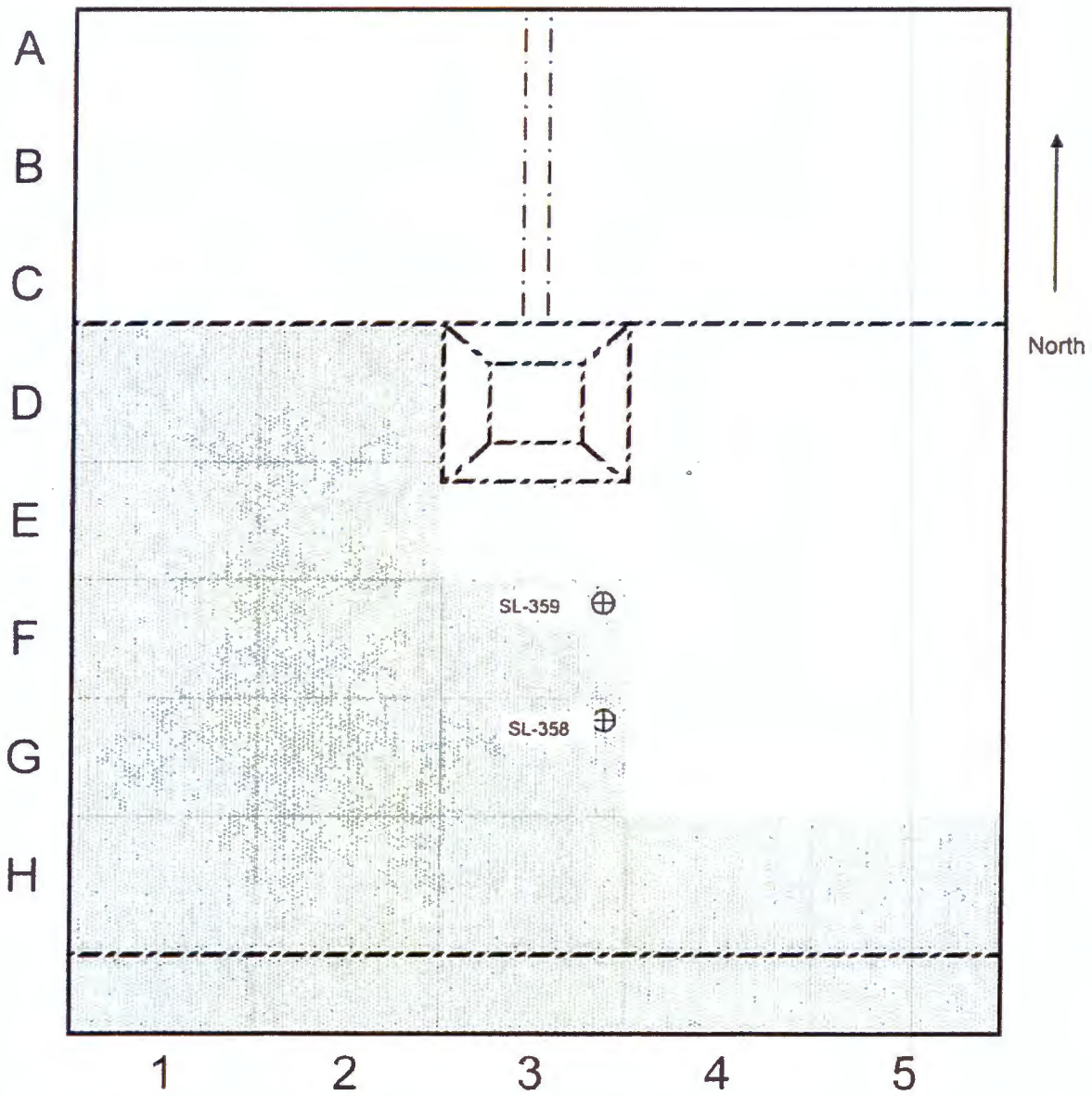
Date:	6/16/2010	Lift	No 4
Report:	5-16-090	Operator:	J. Schut
Map No.	10 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes	



S/C. S013213A00

CQA Moisture Density Map Cell 9

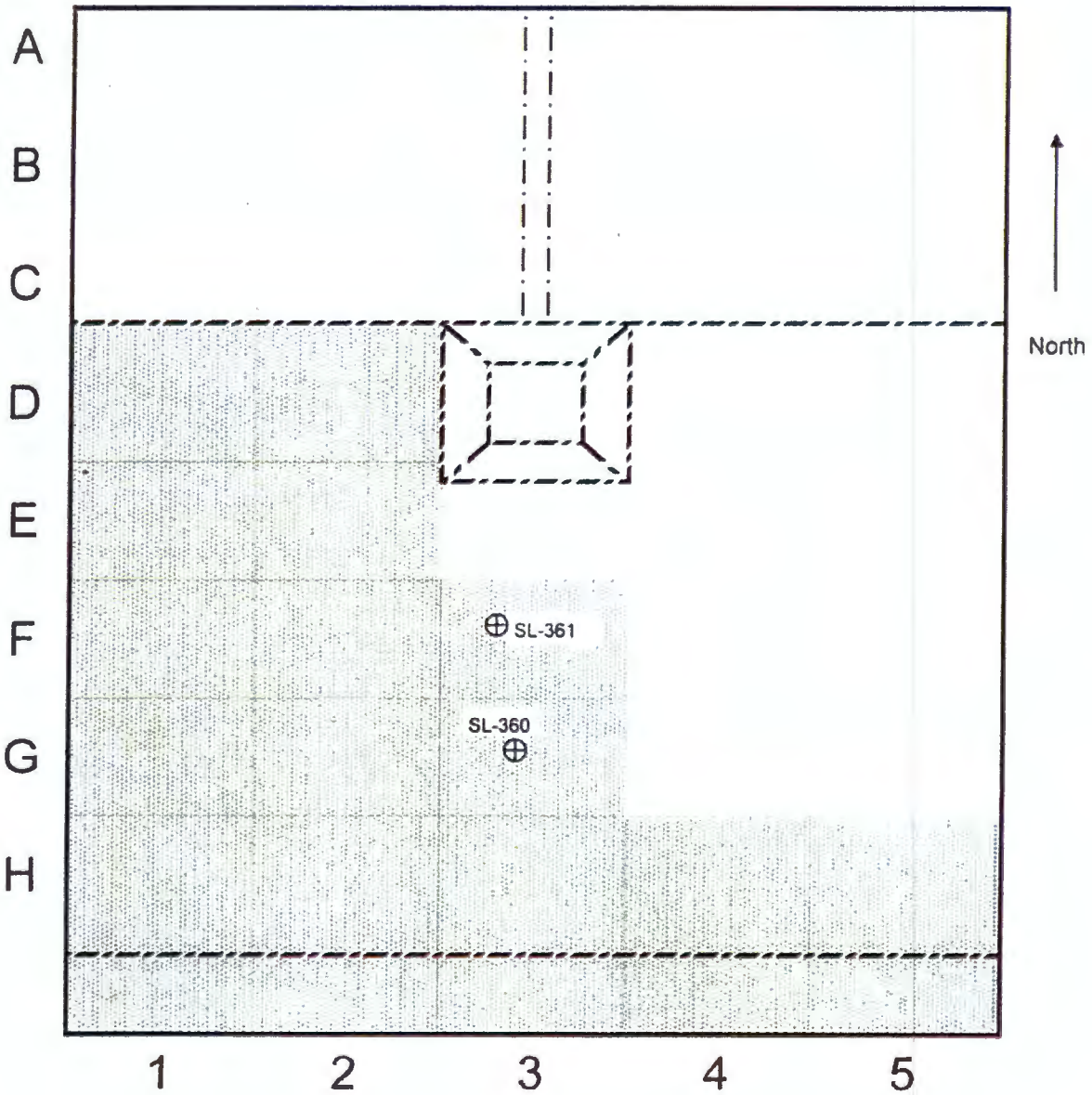
Date	6/16/2010	Lift:	No. 5
Report:	5-16-090	Operator:	J. Schut
Map No:	11 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C. S013213A00

CQA Moisture Density Map Cell 9

Date:	6/16/2010	Lift:	No. 6
Report:	5-16-090	Operator:	J. Schut
Map No:	12 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax 580 237-4302

Client:	WCH
Submittal:	05-18J Admix Field Data

Sample Information

Contact Name	Charlie Skiba			Sample ID:	SL-366
Project	S013213A00			Sample Description:	Admix Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	6/16/2010
Tested By:	J. Schut	Date:	6/16/2010	Sampled By:	J. Schut
Reviewed By	J. Voss	Date:	6/17/2010	Date Received:	6/16/2010
Comments				Report No.:	5-16-090

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1. Mass of Proctor mold, W_1	3956.00 g
2. Mass of Proctor mold + sand, W_2	5394.90 g
3. Volume of mold, V_1	0.03 ft
4. Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	95.17 lb/ft^3

Calibration Cone

5. Mass of bottle + cone + sand (before use), W_3	4610.90 g
6. Mass of bottle + cone + sand (after use), W_4	2987.20 g
7. Weight of sand to fill the cone, $W_c = W_4 - W_3$	3.58 lb

Results from Field Tests

8. Mass of bottle + cone + sand (before use), W_6	5755.4 g
9. Mass of bottle + cone + sand (after use), W_8	3082.6 g
10. Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma_{d\,(sand)}}$	0.0243 ft^3
11. Mass of gallon can, W_5	371.20 g
12. Mass of gallon can + moist soil, W_7	1785.80 g
13. Mass of gallon can + dry soil, W_9	1573.00 g
14. Moist unit weight of soil in field, $\gamma = W_7 - W_5 / V_2$	128.32 lb/ft^3
15. Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	17.7%
16. Dry unit weight in the field, $\gamma_{d\,(sand)} = \gamma / (1+(w\,(\%)/100))$	109.02 lb/ft^3
17. Comparision moisture content =	16.4%
18. Dry unit weight comparison =	111.9 lb/ft^3

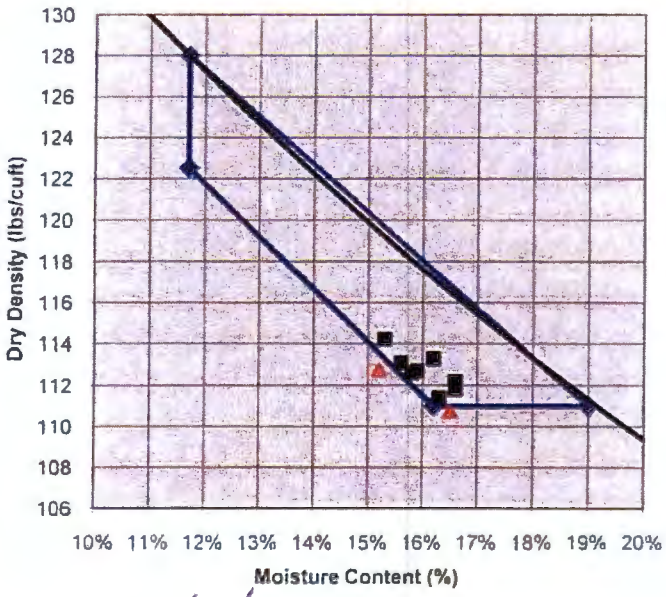
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client	WCH				
Submittal:	05-18J Admix Field Data				
Project:	S013213A00	Model	3430	Troxler ID:	27881
Test Date:	6/17/2010	Moisture Std.	643	Density Stc	2221
Description:	Admix Soil	Offsets:	Moisture -	Density	-
Report:	5-16-091	Acceptable Zone			
Comments:	Unless otherwise stated - All test at taken at a depth of 6-in.				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-376	5	8:05	3	113.3	16.2%	0.488	N/A	90.0%	G4	Pass
SL-377	5	8:18	3	112.2	16.6%	0.503	N/A	89.0%	G5	Pass
SL-378	4	10:43	3	111.4	16.3%	0.514	N/A	86.0%	G4	Pass
SL-379	4	12:26	3	112.6	15.8%	0.498	17.8%	86.0%	F4	Pass
SL-380	6	13:09	3	114.2	15.3%	0.476	N/A	87.0%	F5	Pass
SL-381	6	13:12	3	112.8	15.2%	0.494	N/A	83.0%	G4	Fail
SL-381A	6	13:46	6	112.7	15.9%	0.496	N/A	87.0%	G5	Pass
SL-382	5	14:18	3	111.8	16.6%	0.508	N/A	88.0%	F4	Pass
SL-383	5	15:00	3	113.1	15.6%	0.490	N/A	86.0%	F5	Pass
SL-384	6	16:05	3	110.8	16.5%	0.521	N/A	86.0%	F4	Fail

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-376				
SL-377				
SL-378				
SL-379	SC	1831.80	1610.8	371.2
SL-380				
SL-381				
SL-381A				
SL-382				
SL-383				
SL-384				



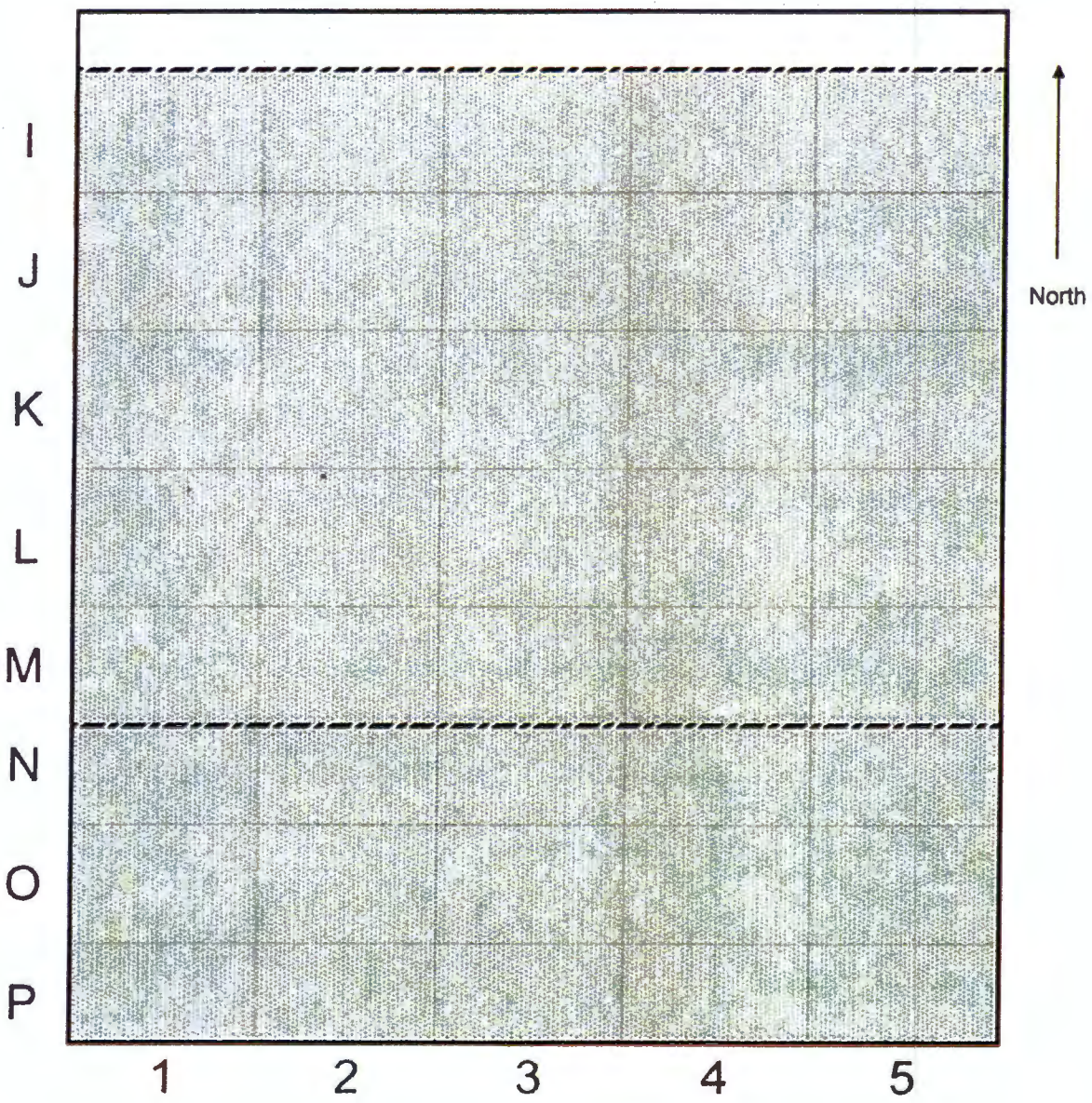
nvirotech Engineering & Consulting, Inc

6/21/10
Date

S/C: S013213A00

CQA Moisture Density Map Cell 9

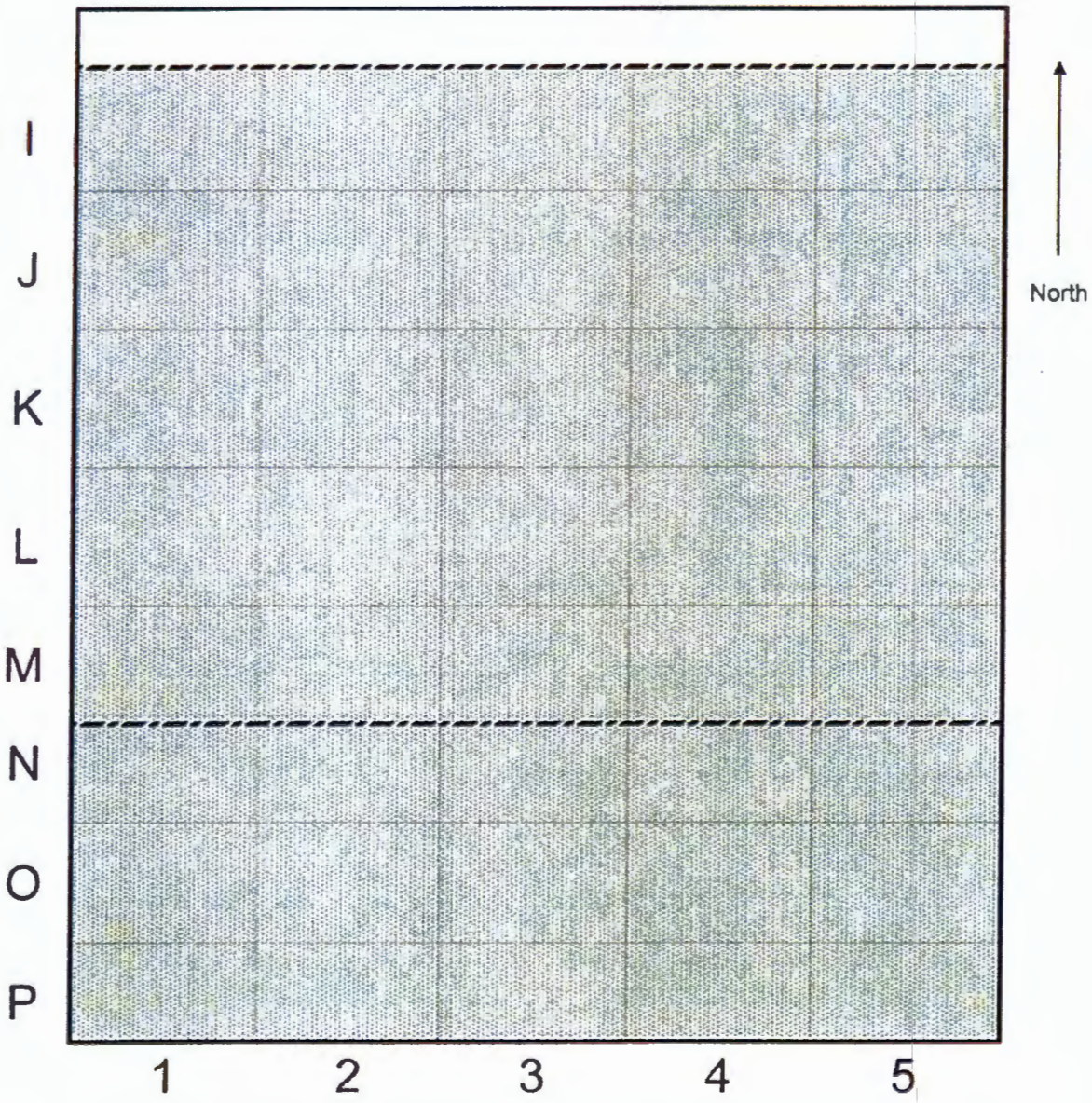
Date	6/17/2010	Lift:	No. 1
Report:	5-16-091	Operator:	J. Schut
Map No:	1 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

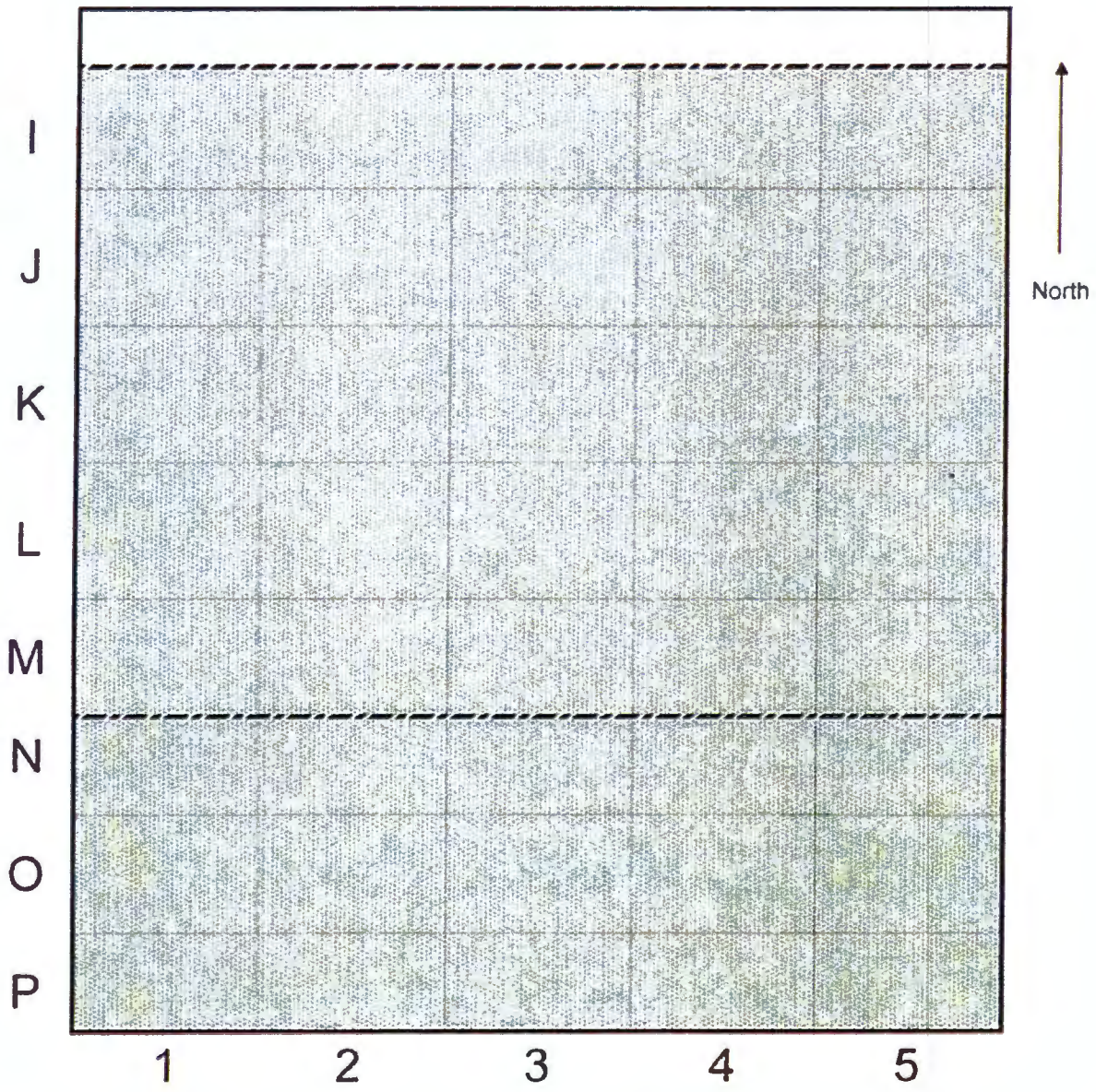
Date:	6/17/2010	Lift:	No. 2
Report:	5-16-091	Operator:	J. Schut
Map No:	2 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

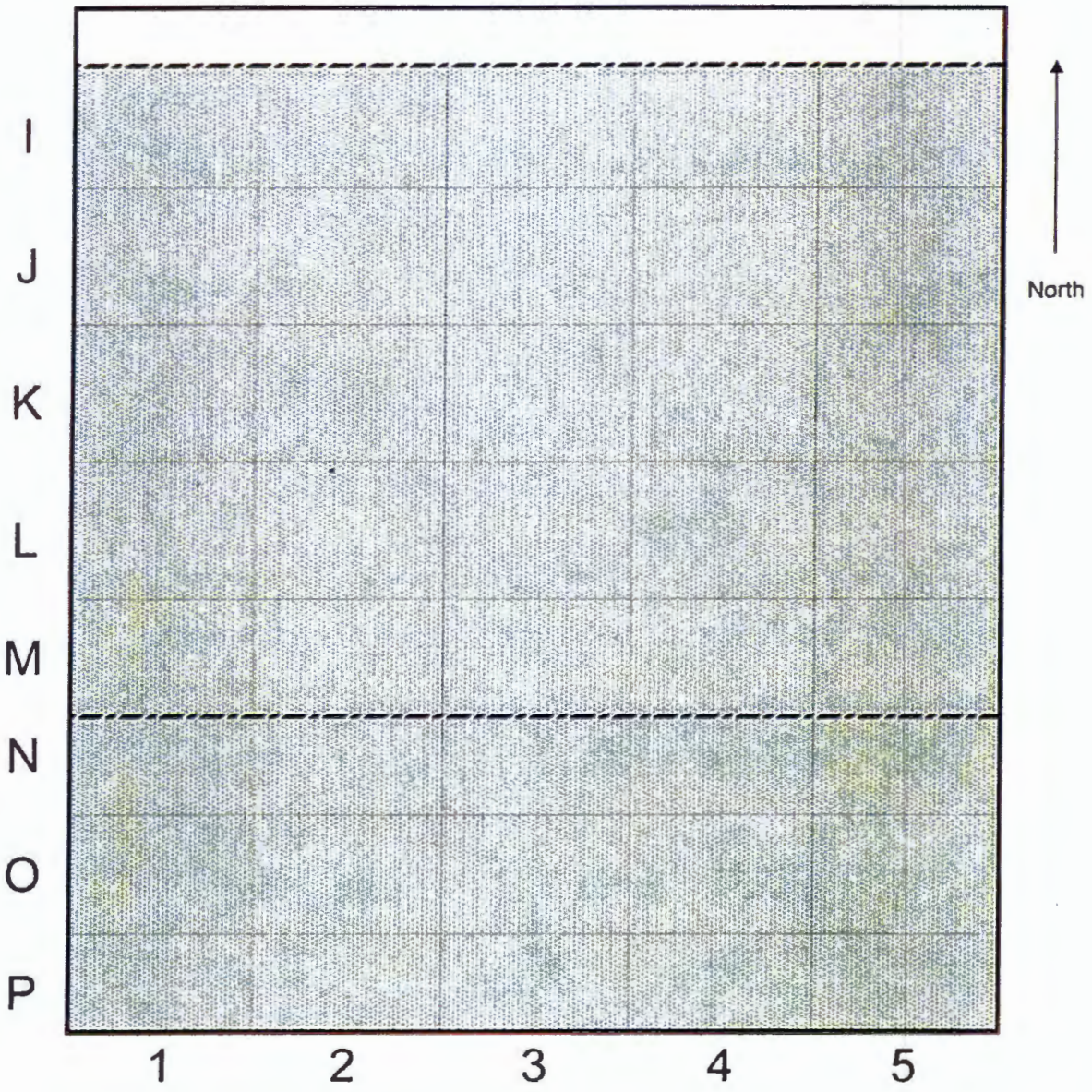
Date:	6/17/2010	Lift:	No. 3
Report:	5-16-091	Operator:	J. Schut
Map No:	3 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

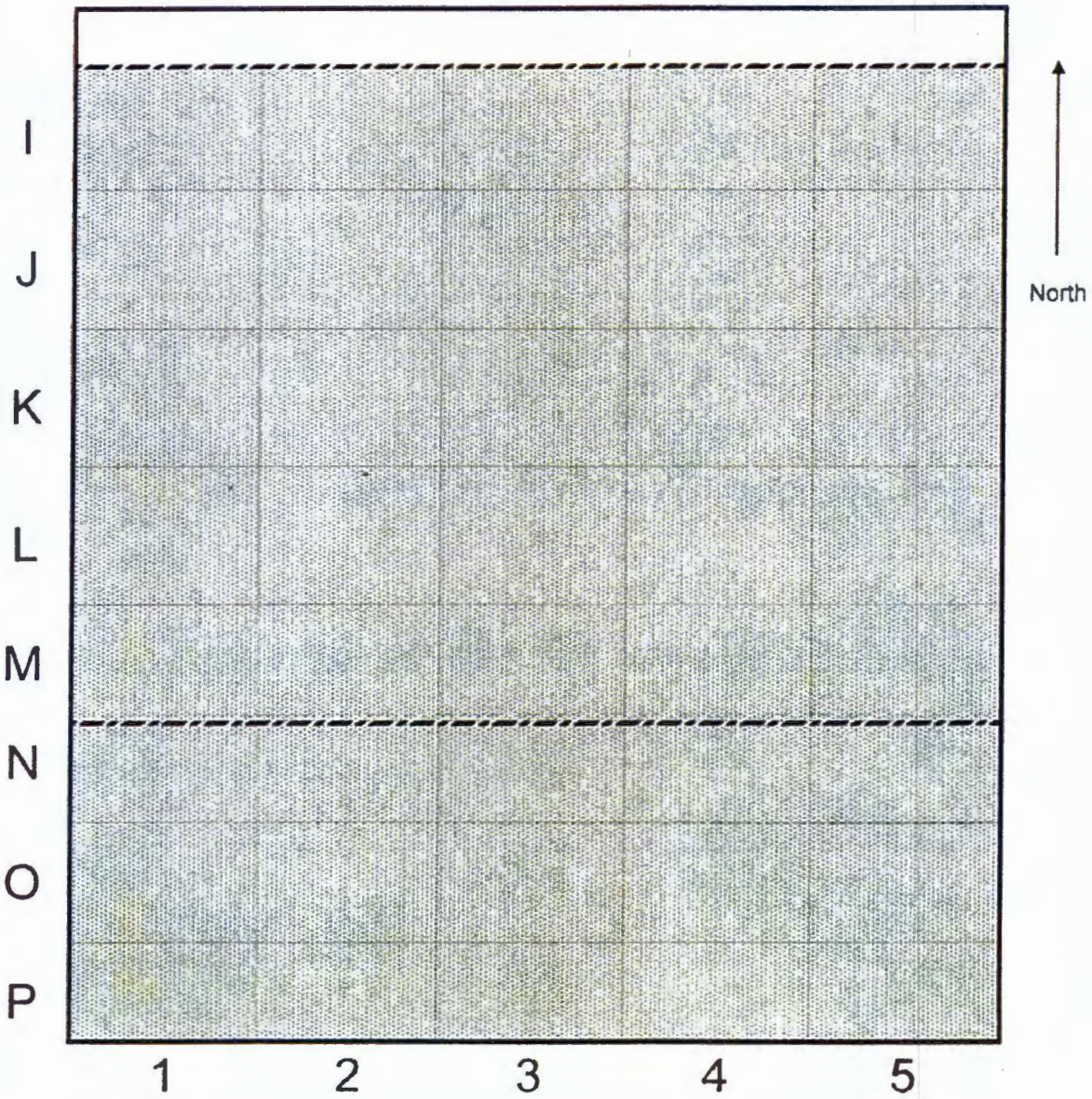
Date:	6/17/2010	Lift:	No 4
Report:	5-16-091	Operator:	J. Schut
Map No:	4 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

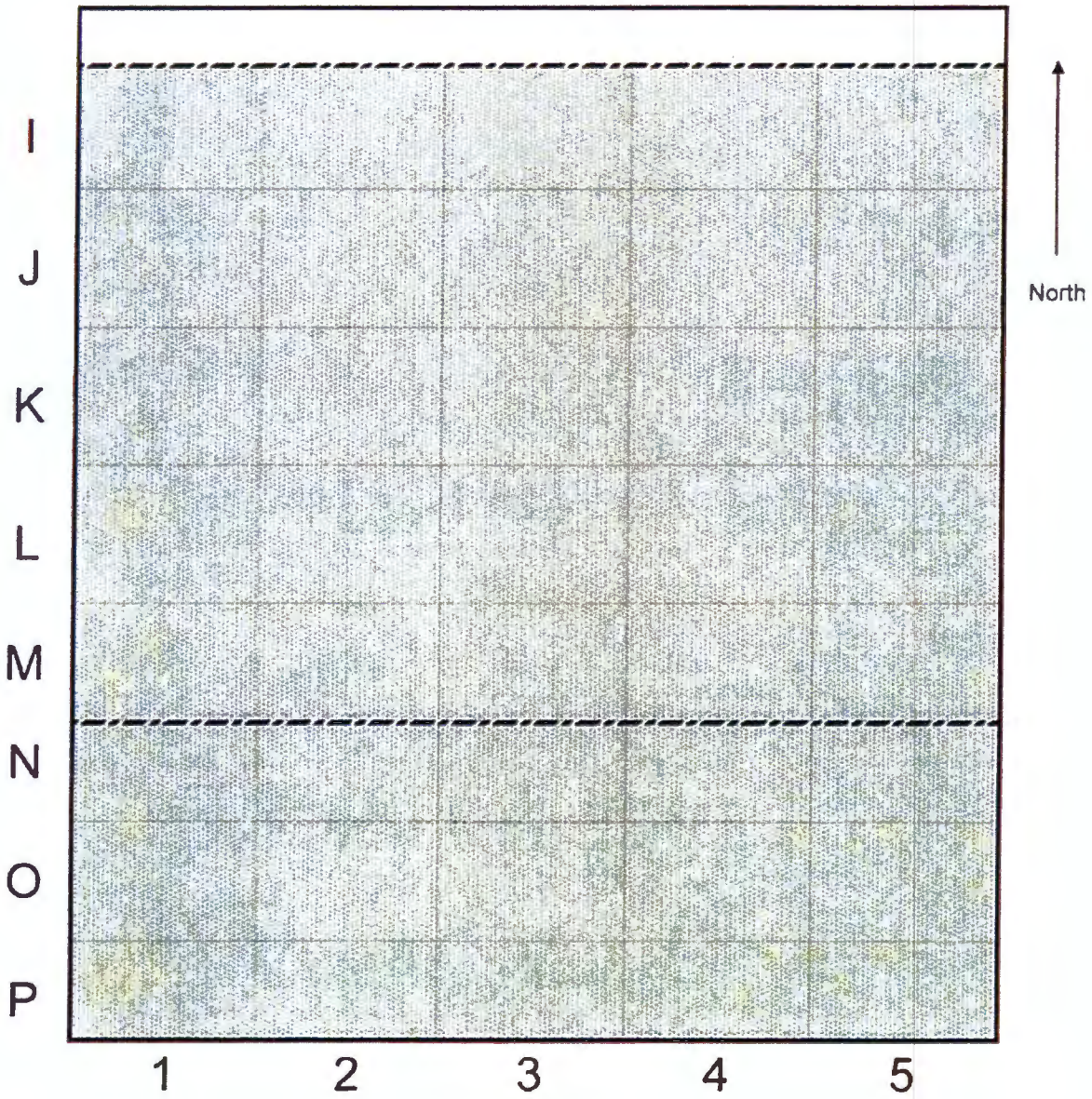
Date:	6/17/2010	Lift.	No. 5
Report:	5-16-091	Operator:	J. Schut
Map No:	5 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes.	



S/C. S013213A00

CQA Moisture Density Map Cell 9

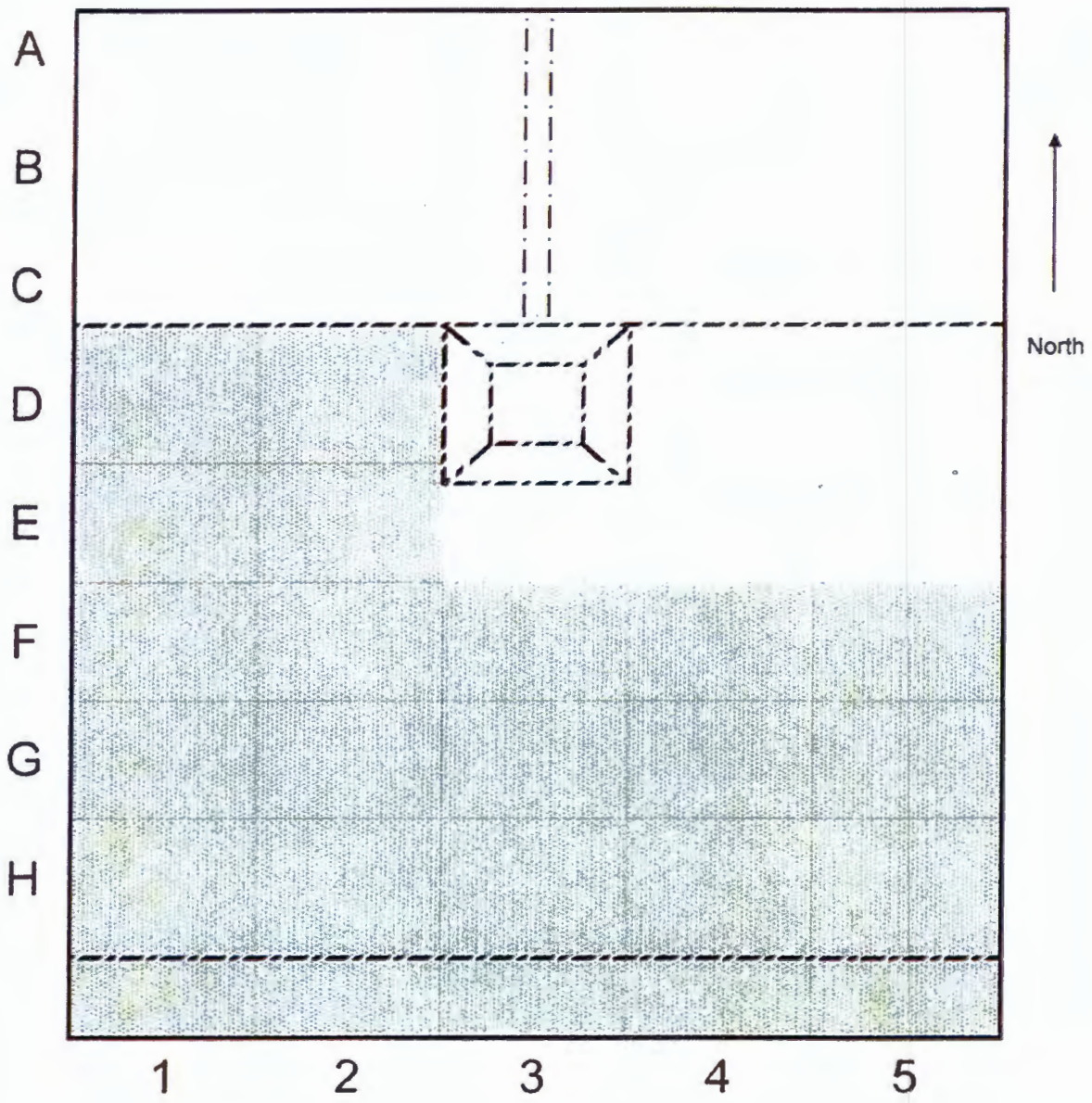
Date:	6/17/2010	Lift:	No. 6
Report.	5-16-091	Operator.	J. Schut
Map No:	6 of 12	Material:	Admix
Grid.	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

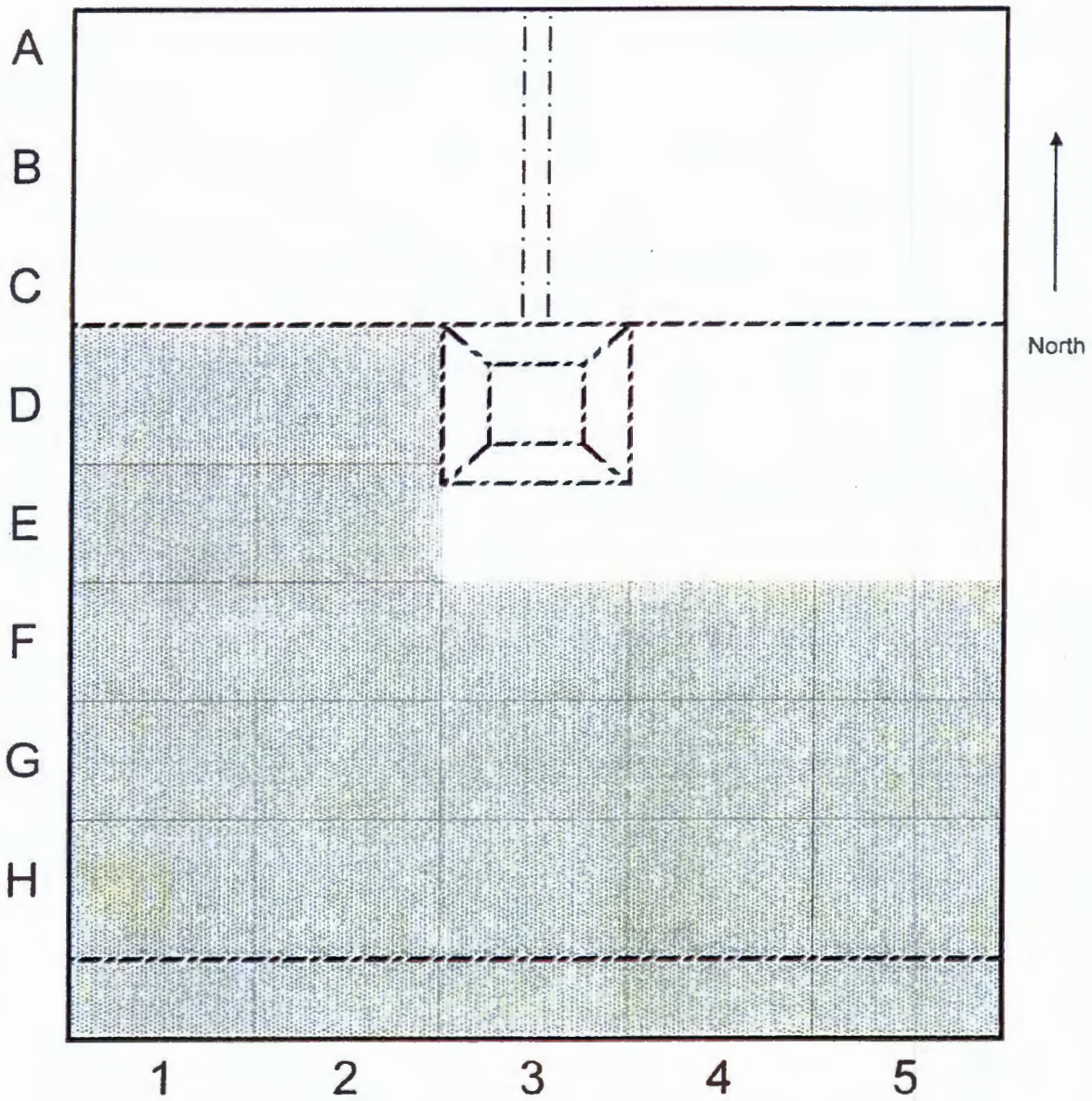
Date	6/17/2010	Lift:	No. 1
Report:	5-16-091	Operator	J. Schut
Map No:	7 of 12	Material	Admix
Grid	95-ft x 90-ft	Notes.	



S/C S013213A00

CQA Moisture Density Map Cell 9

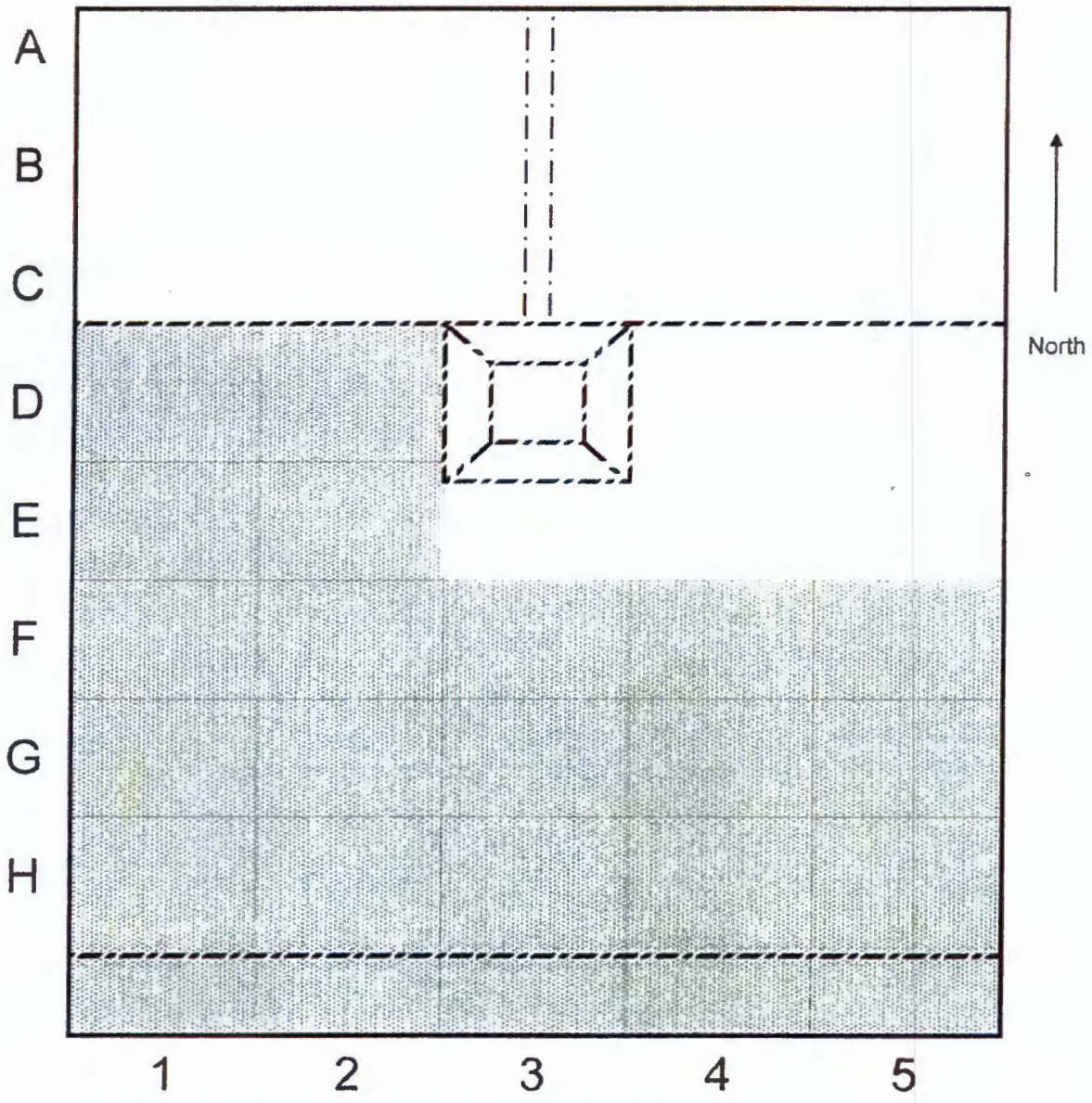
Date:	6/17/2010	Lift:	No. 2
Report:	5-16-091	Operator:	J. Schut
Map No:	8 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

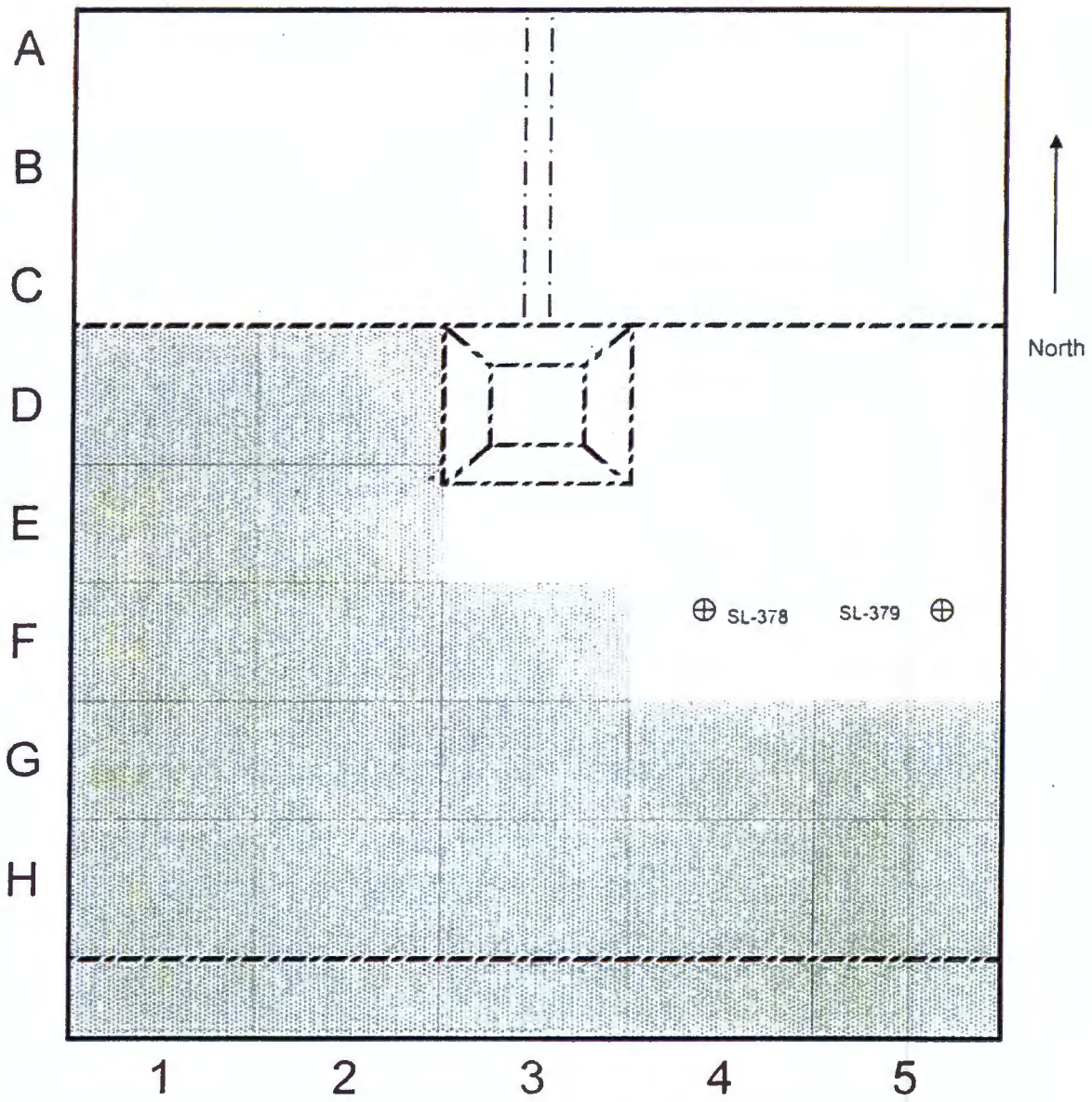
Date:	6/17/2010	Lift:	No. 3
Report:	5-16-091	Operator:	J. Schut
Map No:	9 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C. S013213A00

CQA Moisture Density Map Cell 9

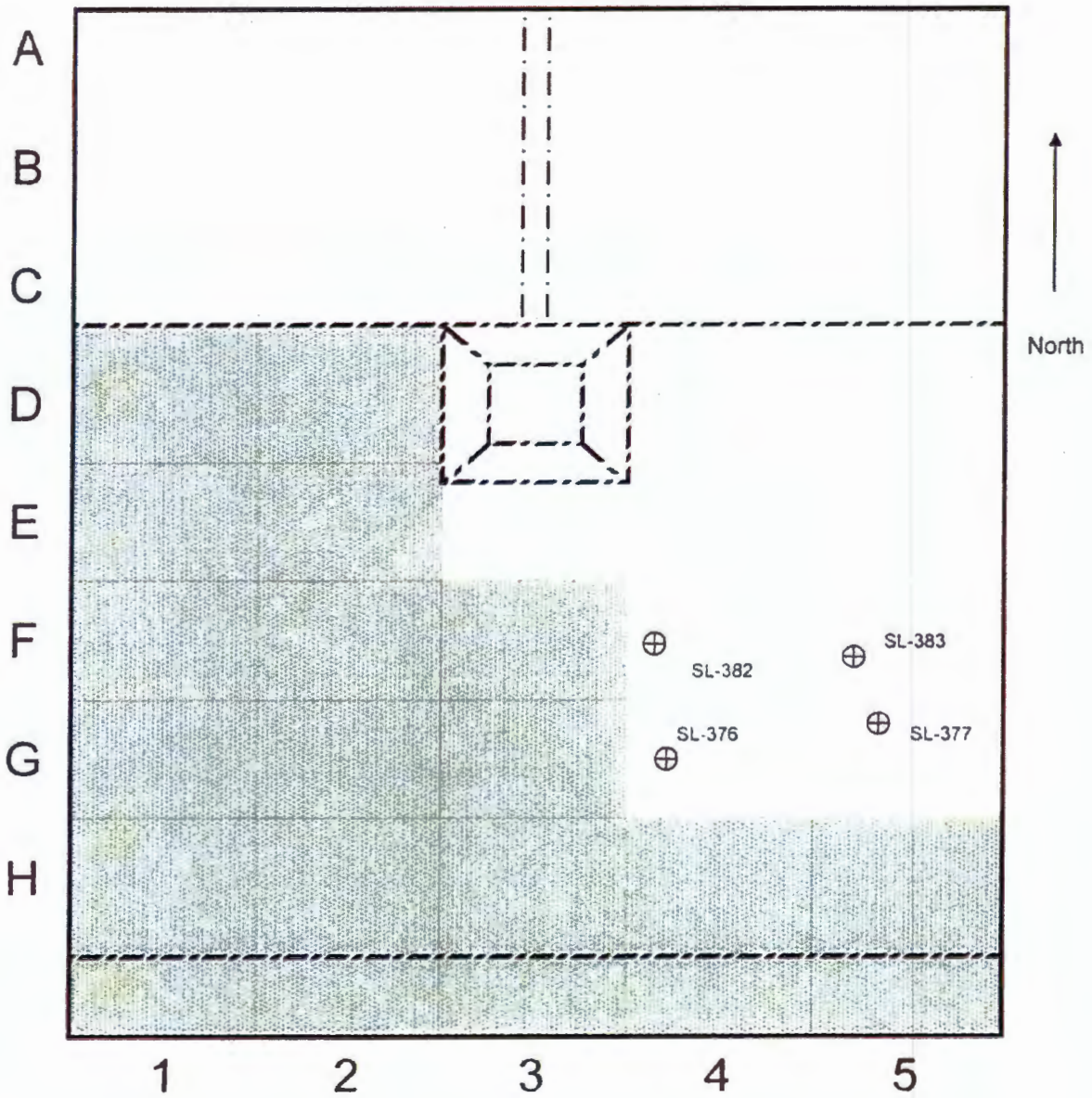
Date:	6/17/2010	Lift.	No 4
Report:	5-16-091	Operator:	J Schut
Map No.	10 of 12	Material:	Admix
Grid.	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

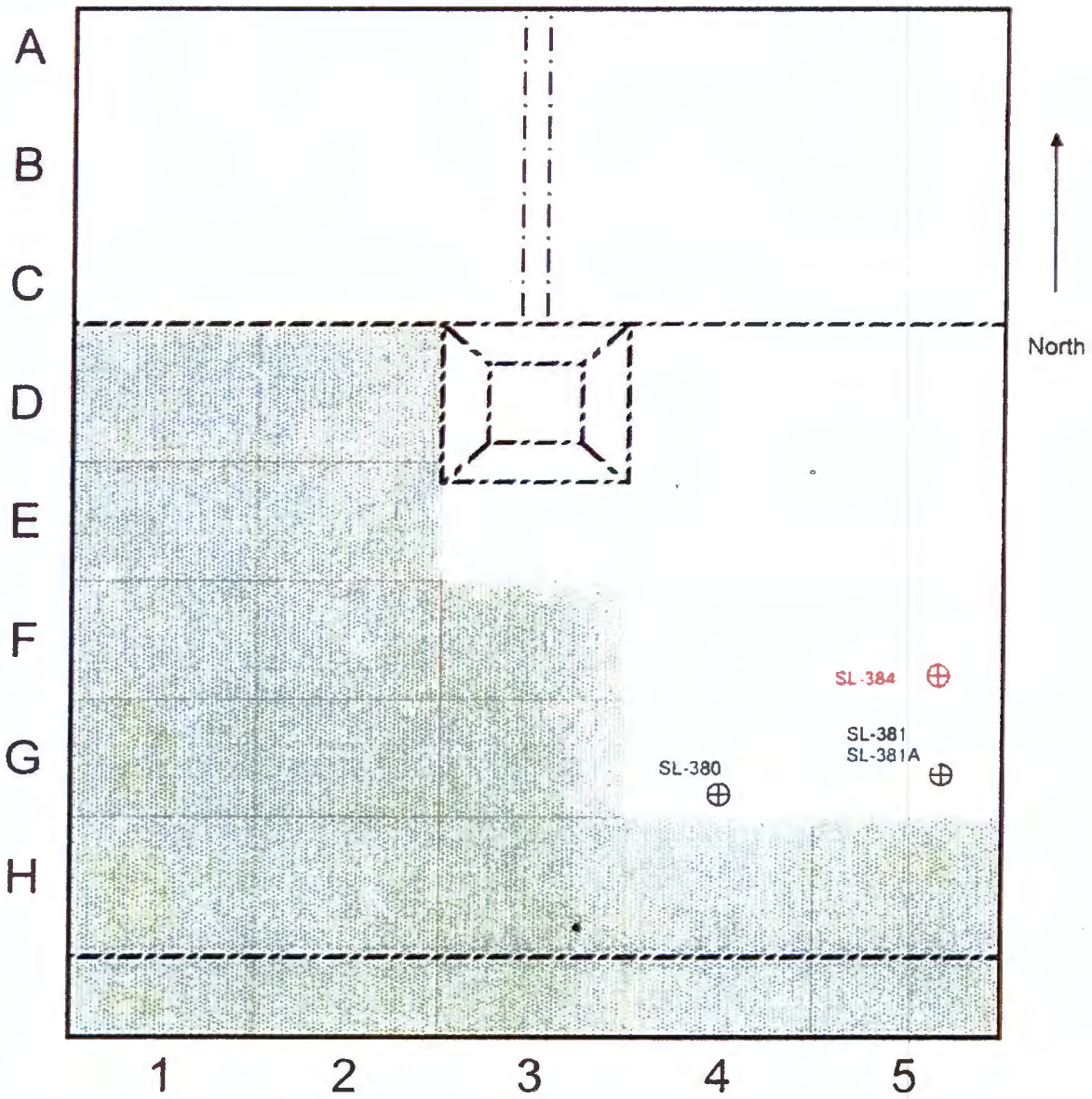
Date:	6/17/2010	Lift:	No 5
Report:	5-16-091	Operator:	J. Schut
Map No.	11 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

Date:	6/17/2010	Lift:	No 6
Report:	5-16-091	Operator:	J Schut
Map No.	12 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580) 234-8780 | Fax (580) 237-4302

Client:	WCH
Submittal:	05-18J Admix Field Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	SL-379
Project:	S013213A00			Sample Description:	Admix Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	6/17/2010
Tested By:	J. Schut	Date:	6/17/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	6/18/2010	Date Received:	6/17/2010
Comments				Report No.:	5-16-091

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1. Mass of Proctor mold, W_1	3956.00 g
2. Mass of Proctor mold + sand, W_2	5394.90 g
3. Volume of mold, V_1	0.03 ft
4 Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	95 17 lb/ft^3

Calibration Cone

5. Mass of bottle + cone + sand (before use), W_3	4610.90 g
6 Mass of bottle + cone + sand (after use), W_4	2987.20 g
7. Weight of sand to fill the cone, $W_c = W_4 - W_3$	3.58 lb

Results from Field Tests

3 8. Mass of bottle + cone + sand (before use), W_6	5969.6 g
9. Mass of bottle + cone + sand (after use), W_8	3280.5 g
10. Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma\, d\,(sand)}$	0.0247 ft^3
11. Mass of gallon can, W_5	371.20 g
12. Mass of gallon can + moist soil, W_7	1831.80 g
13. Mass of gallon can + dry soil, W_9	1610.80 g
14. Moist unit weight of soil in field, $\gamma = W_7 - W_5 / V_2$	130.47 lb/ft^3
15 Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	17.8%
16 Dry unit weight in the field, $\gamma_{d\,(sand)} = \gamma / (1+(w\,(\%)/100)$	110.73 lb/ft^3
17. Comparision moisture content =	15.8%
18. Dry unit weight comparison =	112.6 lb/ft^3

FIELD DENSITY TEST (ASTM D-6938)

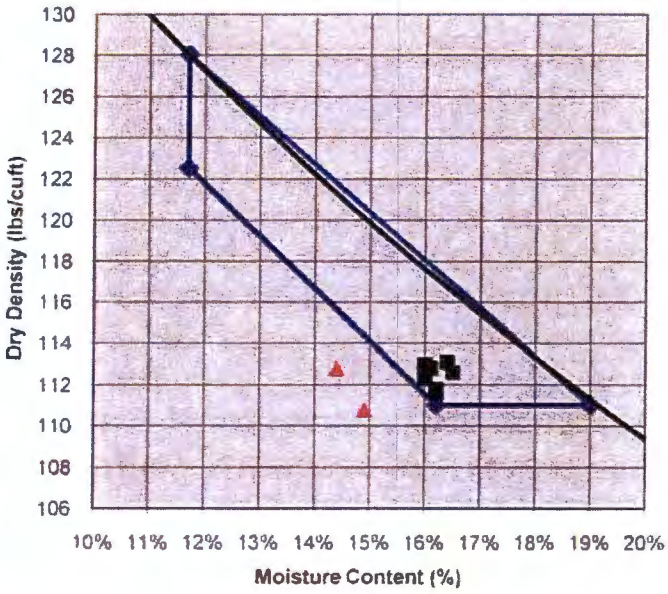
ENVIROTECH

Client: WCH
Submittal: 05-18J Admix Field Data
Project: S013213A00
Test Date: 6/18/2010
Description: Admix Soil
Report: 5-16-092
Comments: Unless otherwise stated - All test at taken at a depth of 6-in.

Model: 3430 Troxler ID: 27881
Moisture Std: 645 Density Stc 2217
Offsets: Moisture - Density -
Acceptable Zone

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-384A	6	6:56	6	112.6	16.5%	0.497	N/A	90.0%	F5	Pass
SL-385	6	7:06	3	112.3	16.0%	0.501	18.5%	86.0%	F4	Pass
SL-386	1	15:11	3	112.8	14.4%	0.495	N/A	79.0%	A1	Fail
SL-387	1	15:17	3	111.6	16.2%	0.510	N/A	86 0%	A2	Pass
SL-388	1	15:24	3	113.0	16.0%	0.491	N/A	88.0%	B2	Pass
SL-389	1	15:27	3	111.8	16.2%	0.508	N/A	86.0%	C2	Pass
SL-390	1	15:31	3	110.8	14.9%	0.521	N/A	77.0%	C1	Fail
SL-391	1	15:35	3	112.8	16.1%	0.494	N/A	88.0%	B1	Pass
SL-392	1	15:50	3	113.1	16.4%	0.491	N/A	90.0%	E3	Pass
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-384A				
SL-385	SC	2216.7	1949.1	505.6
SL-386				
SL-387				
SL-388				
SL-389				
SL-390				
SL-391				
SL-392				



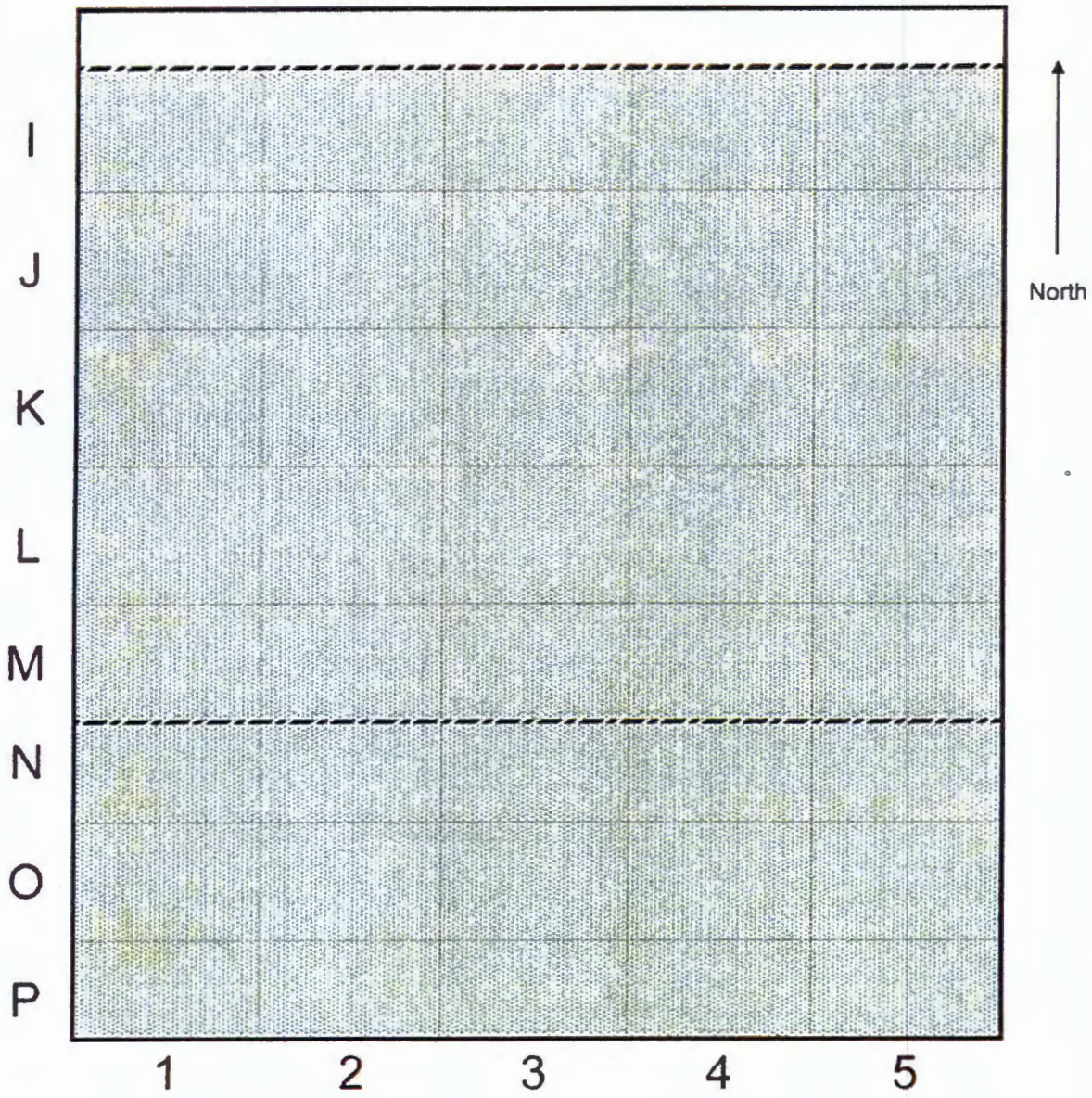
Envirotech Engineering & Consulting, Inc

6/21/10
Date

S/C: S013213A00

CQA Moisture Density Map Cell 9

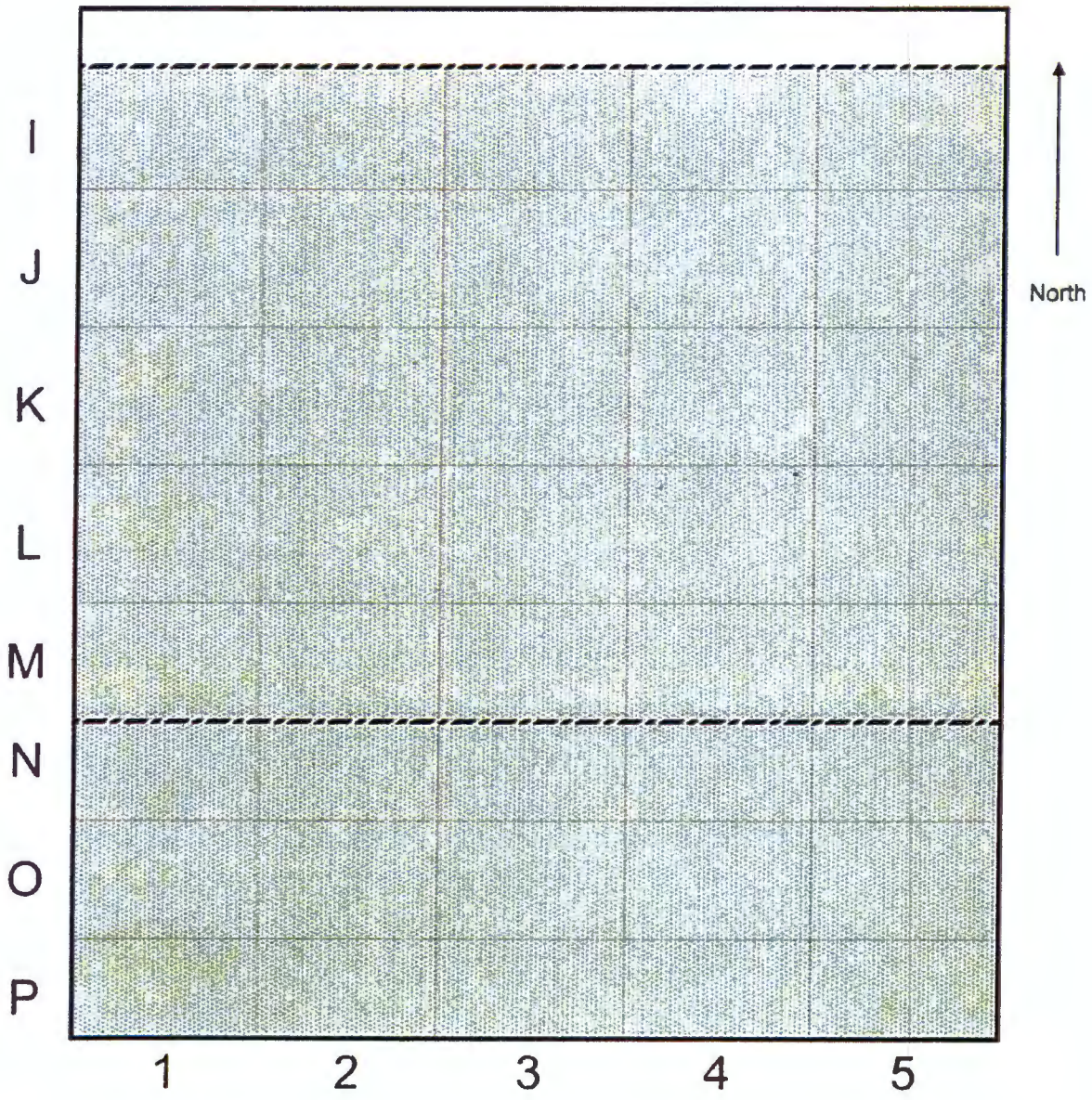
Date:	6/18/2010	Lift:	No 1
Report:	5-16-092	Operator:	J. Schut
Map No:	1 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes	



S/C. S013213A00

CQA Moisture Density Map Cell 9

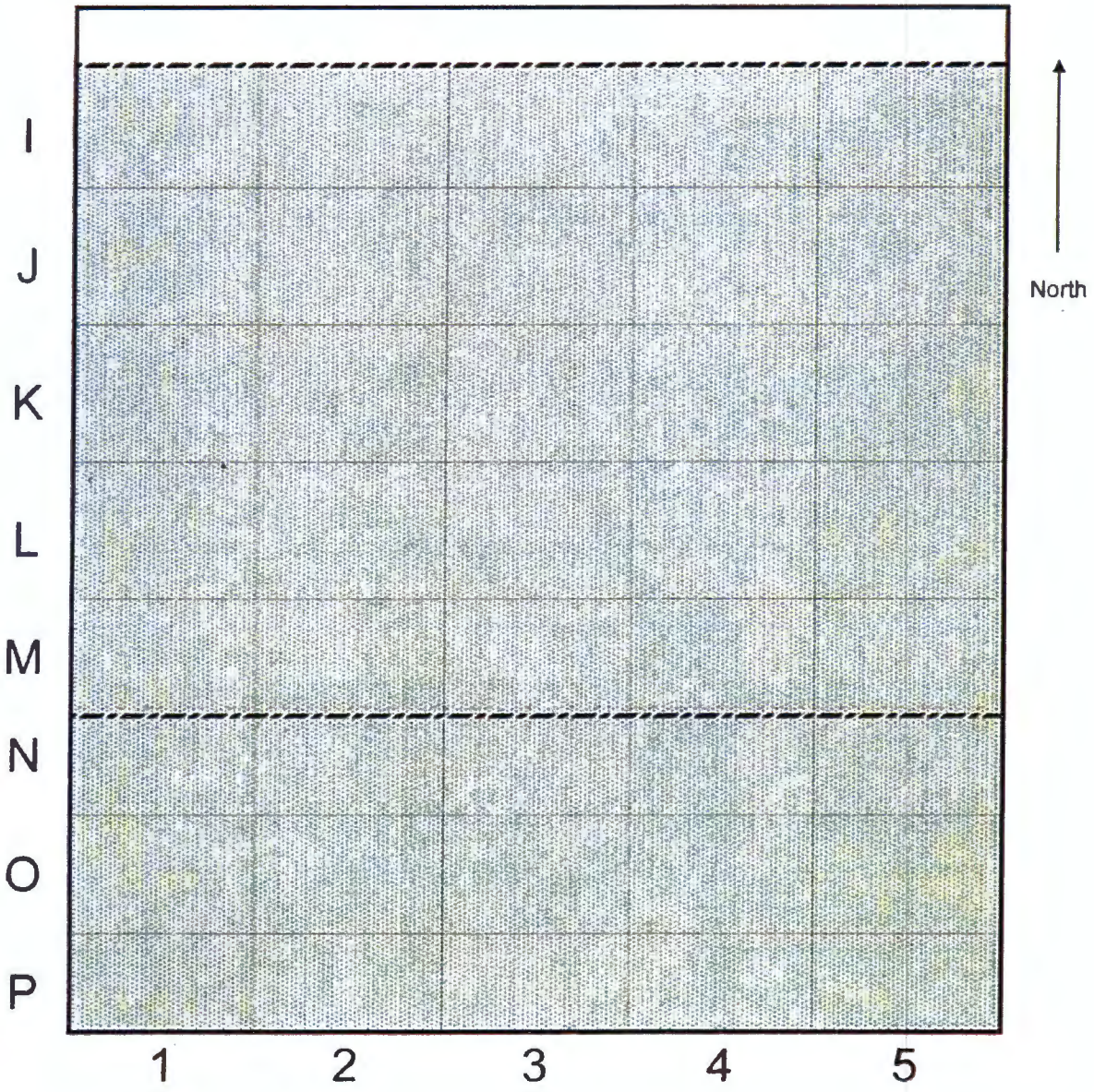
Date:	6/18/2010	Lift:	No. 2
Report:	5-16-092	Operator:	J. Schut
Map No:	2 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

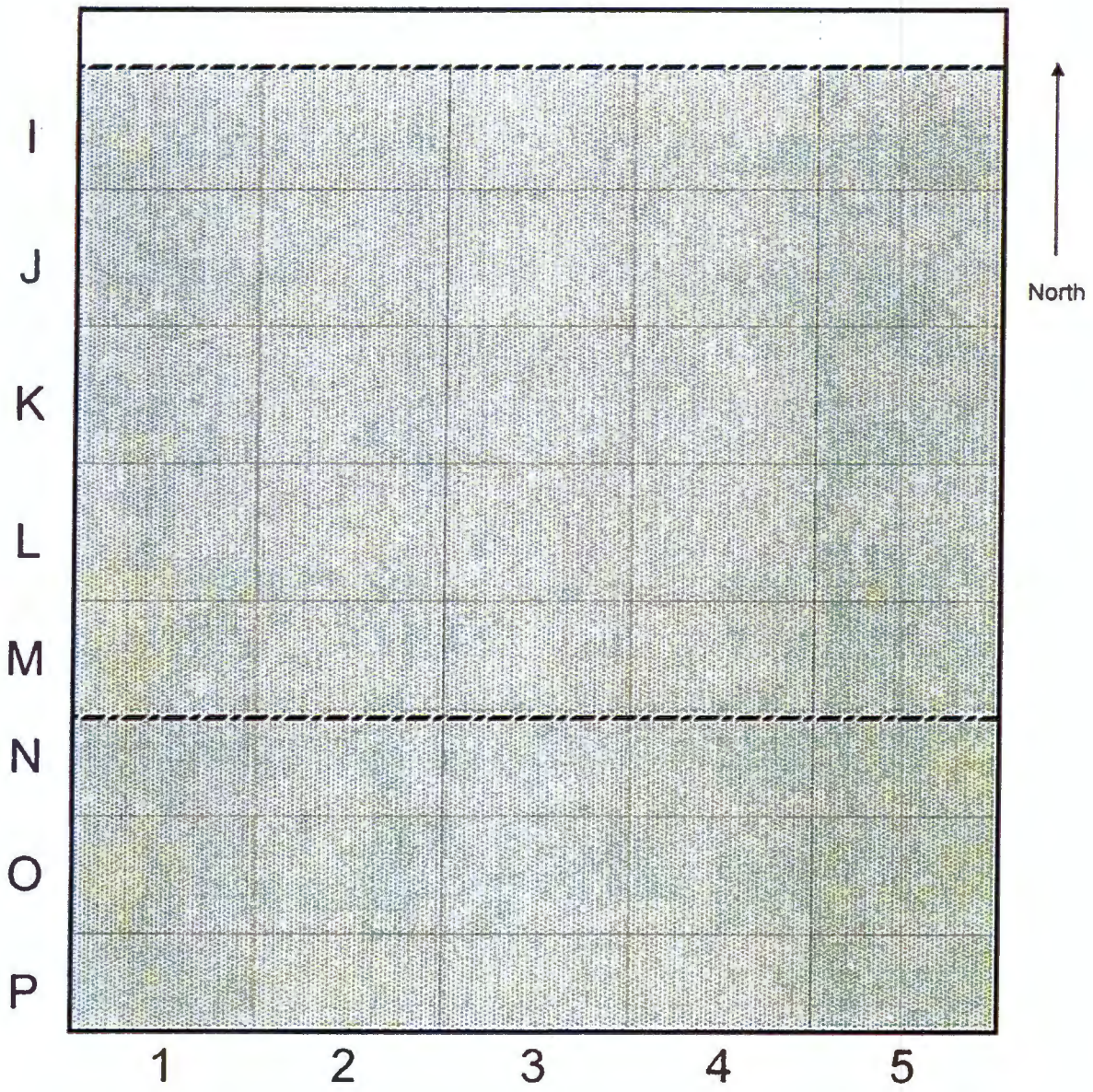
Date:	6/18/2010	Lift:	No. 3
Report:	5-16-092	Operator:	J. Schut
Map No:	3 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C. S013213A00

CQA Moisture Density Map Cell 9

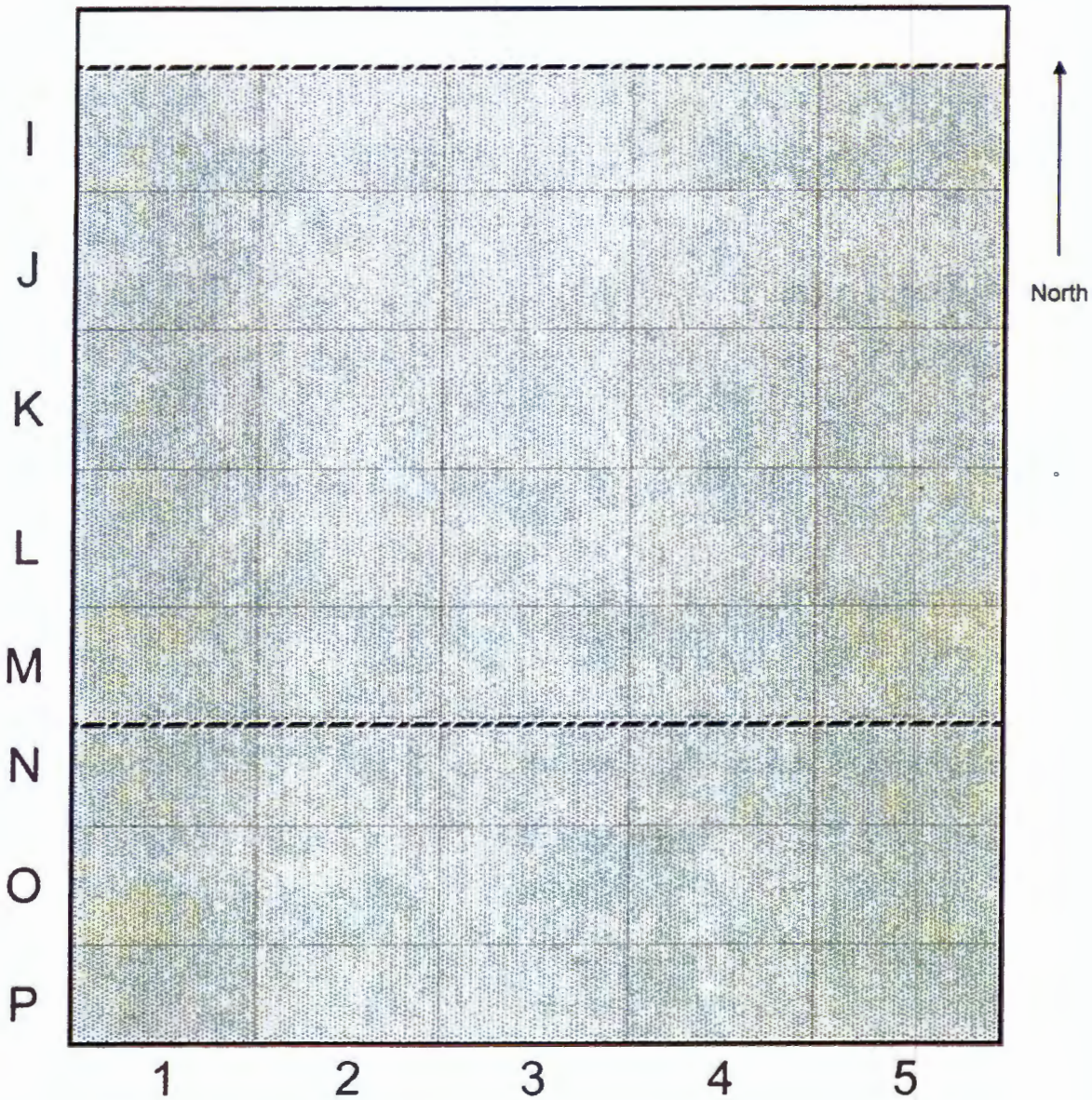
Date.	6/18/2010	Lift:	No. 4
Report:	5-16-092	Operator:	J. Schut
Map No:	4 of 12	Material.	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

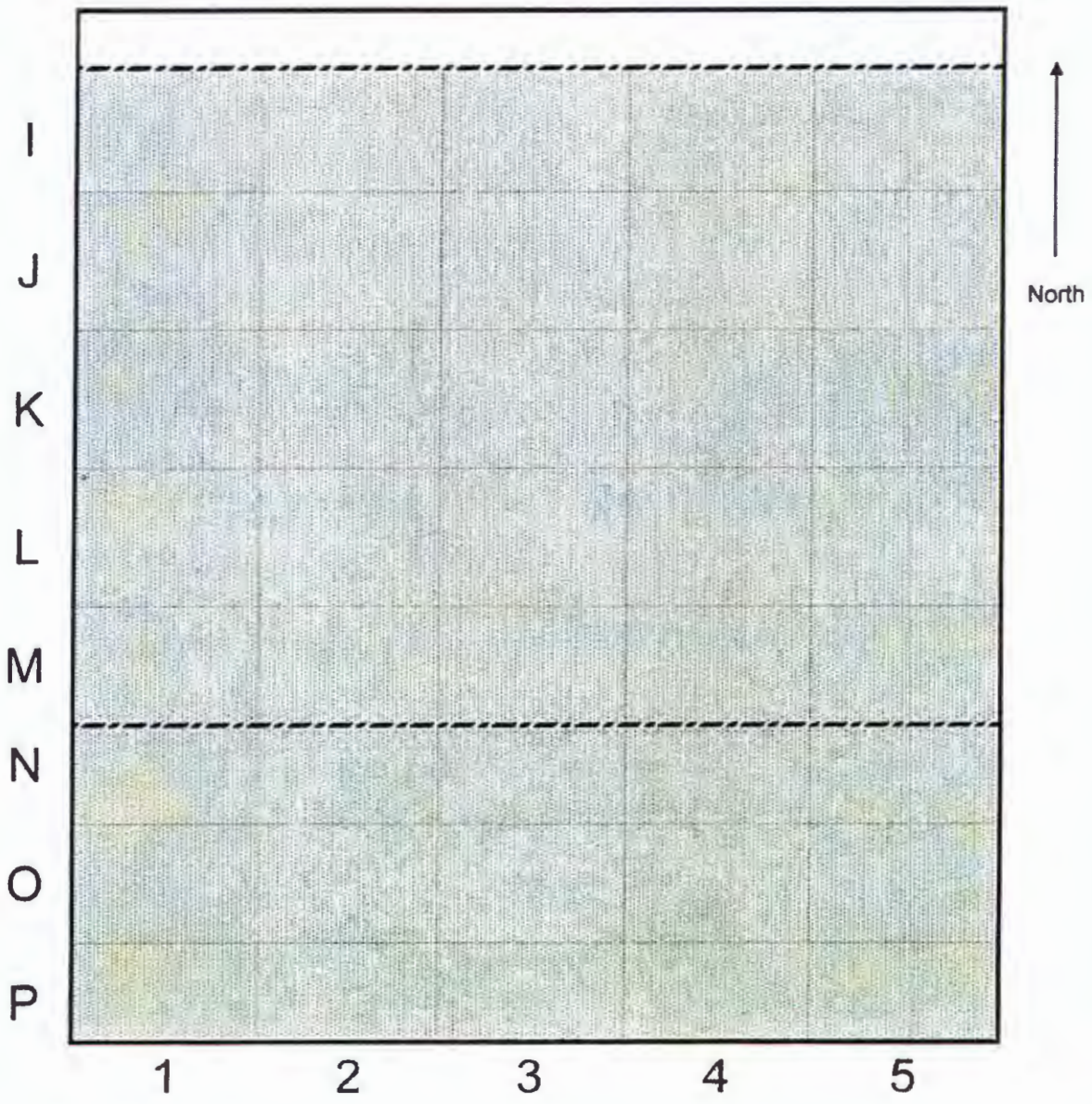
Date:	6/18/2010	Lift:	No. 5
Report:	5-16-092	Operator:	J. Schut
Map No:	5 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes	



S/C. S013213A00

CQA Moisture Density Map Cell 9

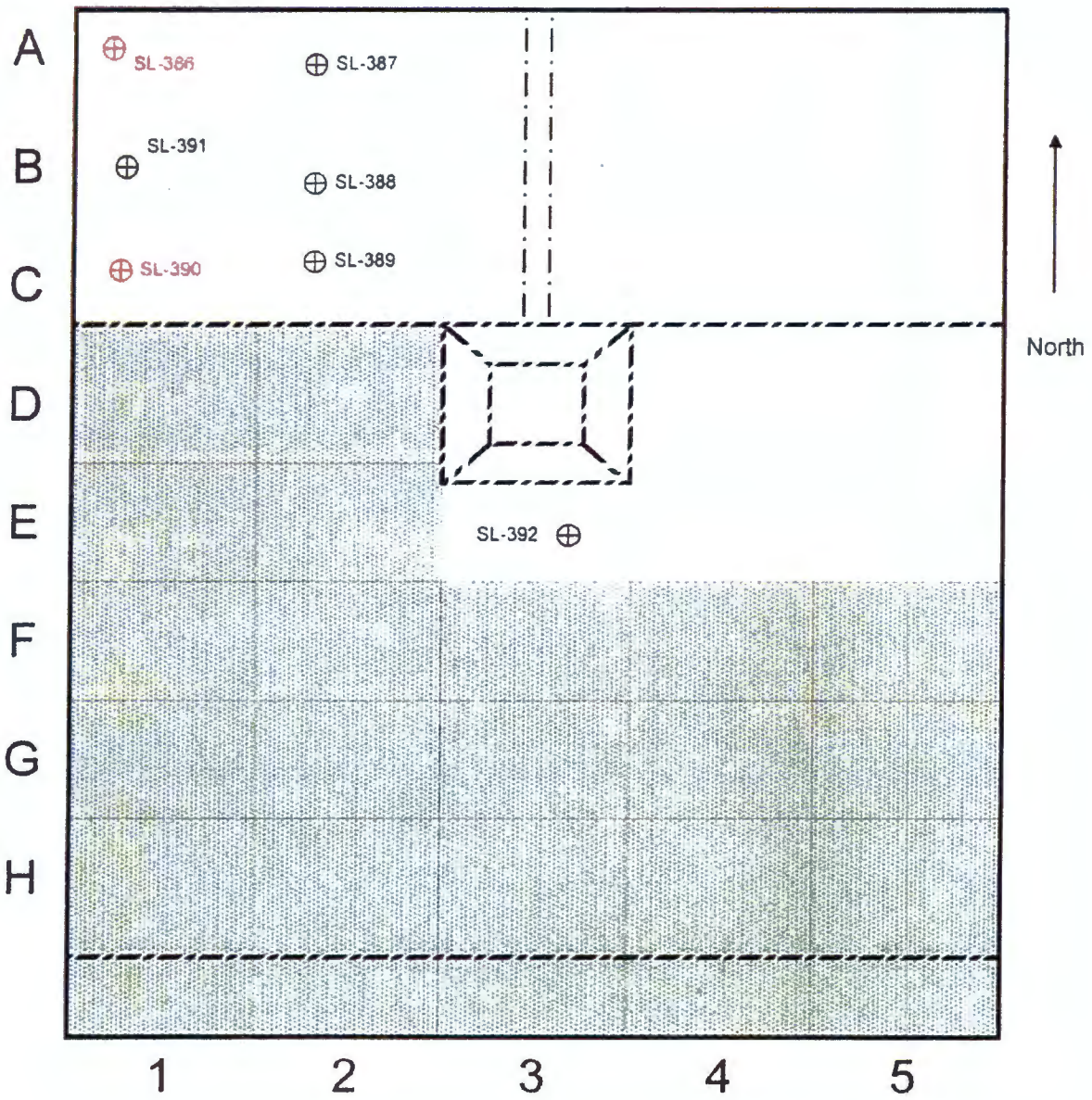
Date:	6/18/2010	Lift:	No 6
Report:	5-16-092	Operator:	J. Schut
Map No:	6 of 12	Material.	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

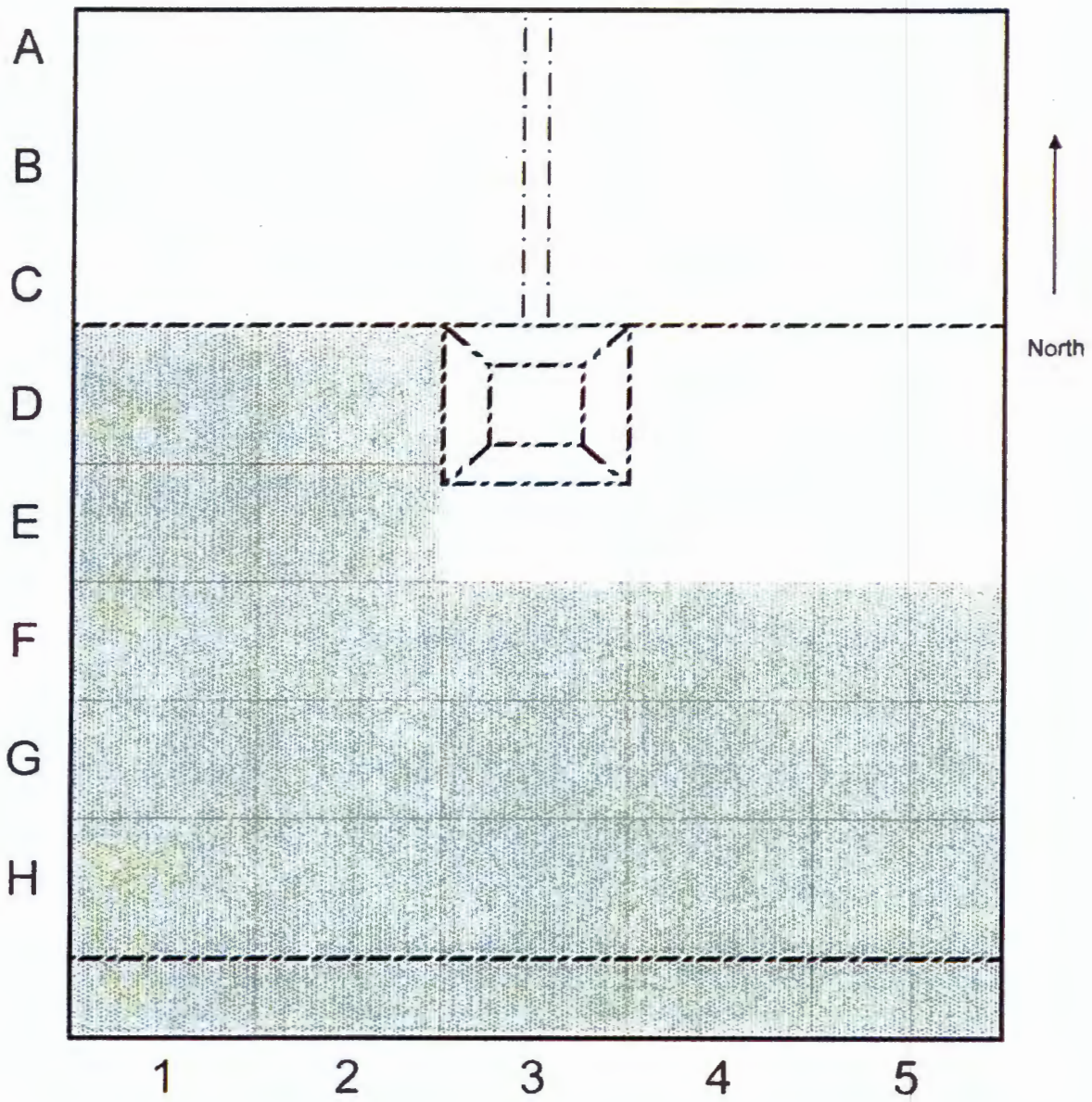
Date:	6/18/2010	Lift:	No. 1
Report:	5-16-092	Operator:	J. Schut
Map No:	7 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes	



S/C. S013213A00

CQA Moisture Density Map Cell 9

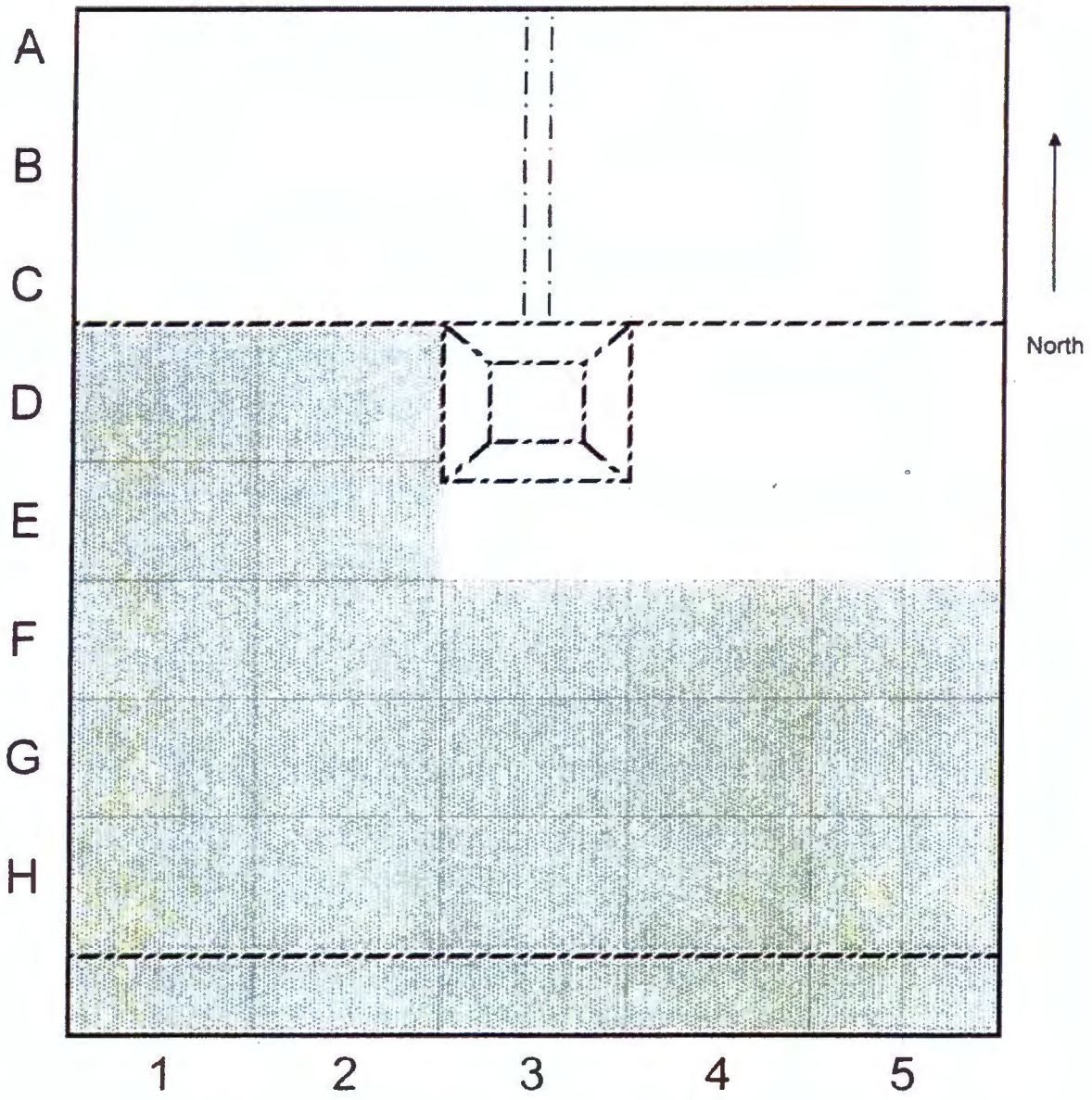
Date	6/18/2010	Lift	No 2
Report:	5-16-092	Operator	J. Schut
Map No:	8 of 12	Material	Admix
Grid:	95-ft x 90-ft	Notes.	



S/C: S013213A00

CQA Moisture Density Map Cell 9

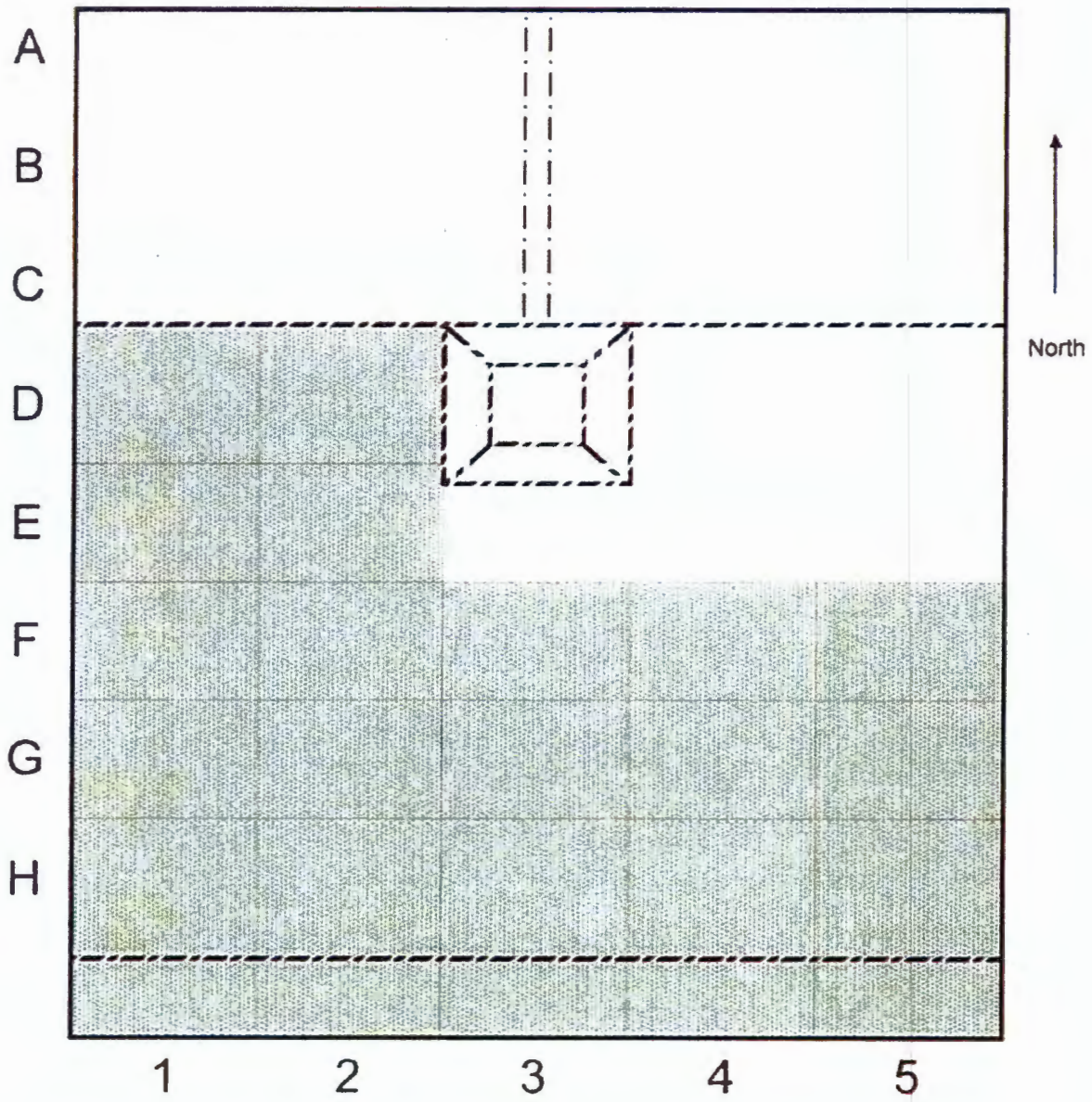
Date	6/18/2010	Lift	No. 3
Report:	5-16-092	Operator	J. Schut
Map No:	9 of 12	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C: S013213A00

CQA Moisture Density Map Cell 9

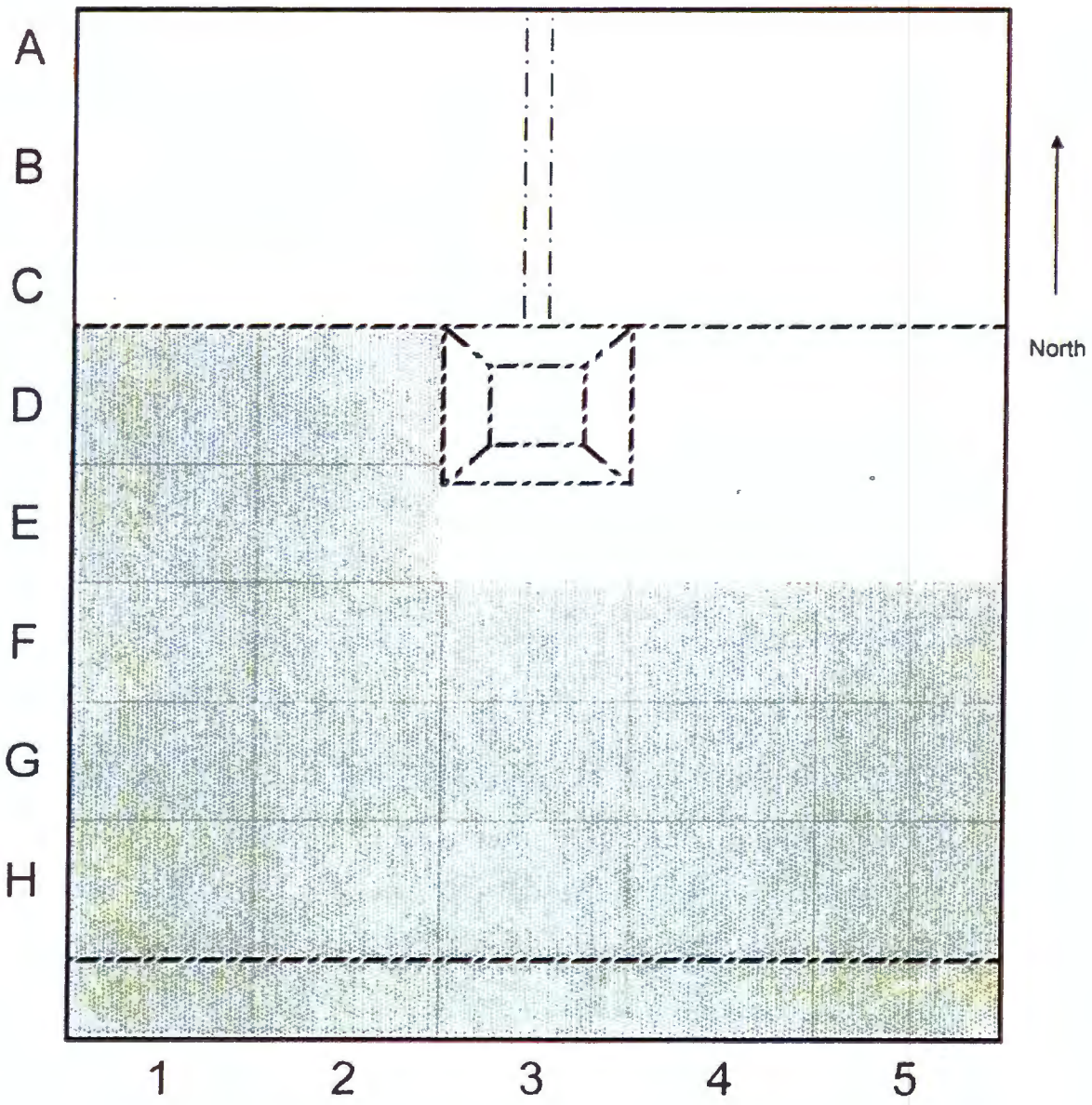
Date	6/18/2010	Lift:	No. 4
Report:	5-16-092	Operator:	J. Schut
Map No:	10 of 12	Material:	Admix
Grid	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

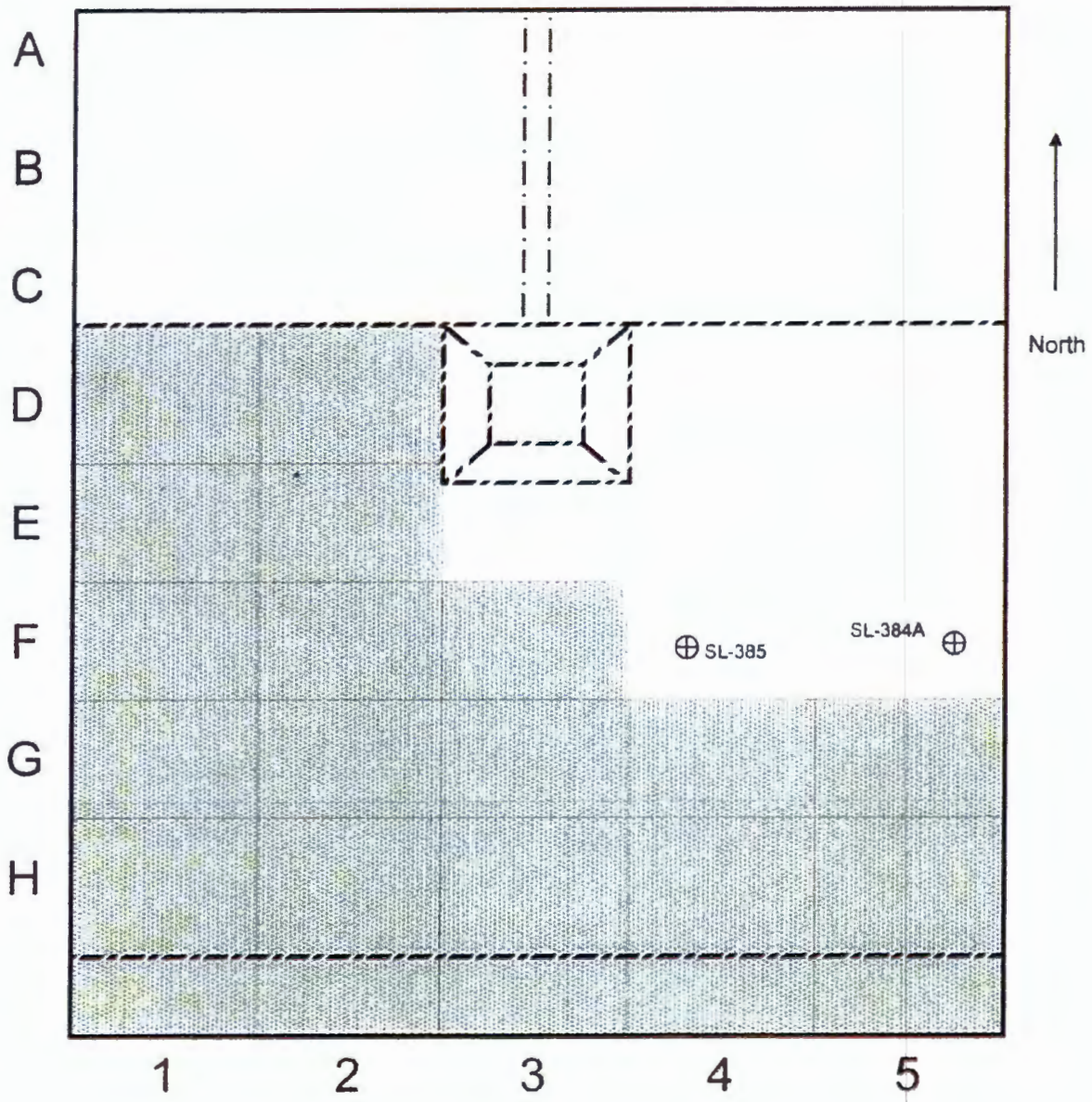
Date	6/18/2010	Lift	No 5
Report:	5-16-092	Operator	J Schut
Map No:	11 of 12	Material	Admix
Grid:	95-ft x 90-ft	Notes	



S/C. S013213A00

CQA Moisture Density Map Cell 9

Date	6/18/2010	Lift:	No. 6
Report:	5-16-092	Operator:	J. Schut
Map No.	12 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



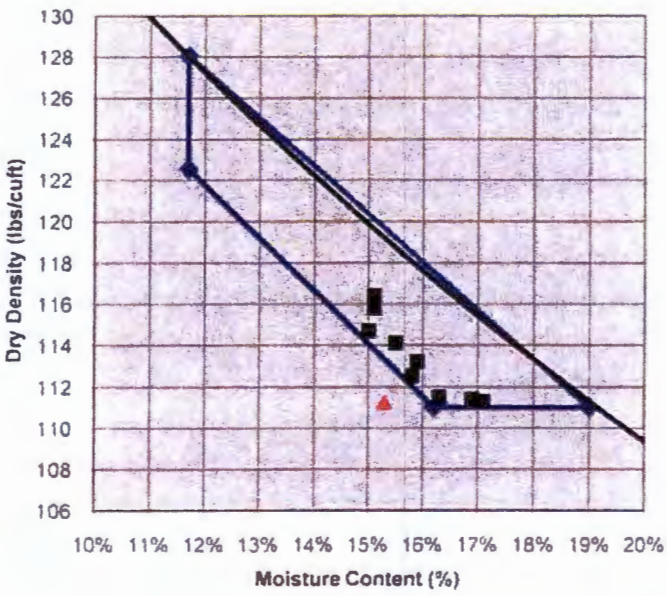
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client	WCH				
Submittal	05-18J Admix Field Data				
Project	S013213A00	Model	3430	Troxler ID	27881
Test Date	6/21/2010	Moisture Std.	638	Density Std	2225
Description	Admix Soil	Offsets	Moisture -	Density -	
Report.	5-16-093	Acceptable Zone			
Comments	Unless otherwise stated - All test at taken at a depth of 6-in				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-386A	1	9:39	6	114.1	15.5%	0.478	N/A	88.0%	A1	Pass
SL-390A	1	9:52	6	111.5	16.3%	0.512	N/A	86.0%	C1	Pass
SL-393	1	10:12	3	116.4	15.1%	0.449	N/A	91.0%	E5	Pass
SL-394	1	10:16	3	115.8	15.1%	0.455	N/A	90.0%	E4	Pass
SL-395	2	12:04	3	113.2	15.9%	0.489	N/A	88.0%	C2	Pass
SL-396	2	12:08	3	112.5	15.8%	0.499	N/A	85.0%	B2	Pass
SL-397	2	12:17	3	111.3	15.3%	0.514	N/A	80.0%	A2	Fail
SL-397A	2	12:46	6	111.3	17.1%	0.515	N/A	90.0%	A2	Pass
SL-398	2	13:44	3	111.4	16.9%	0.514	N/A	89.0%	A1	Pass
SL-399	2	13:47	3	114.7	15.0%	0.470	N/A	86.0%	B1	Pass

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-386A				
SL-390A				
SL-393				
SL-394				
SL-395				
SL-396				
SL-397				
SL-397A				
SL-398				
SL-399				



nvirotech Engineering & Consulting, Inc

6/23/10
Date

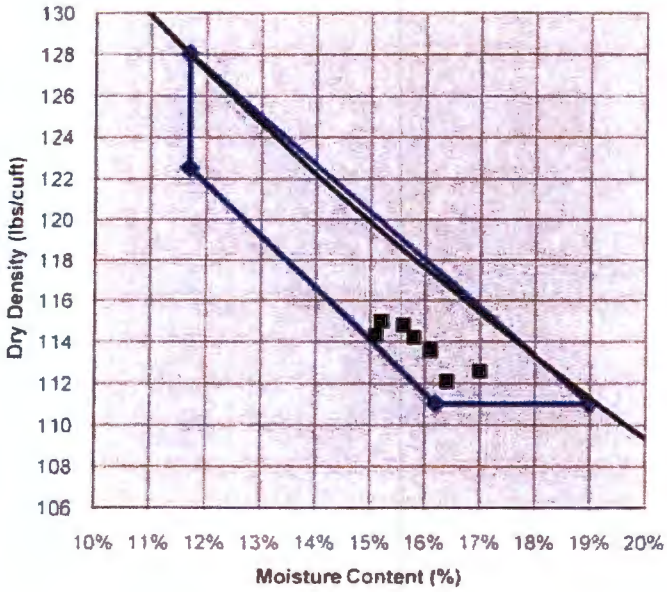
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client:	WCH				
Submittal	05-18J Admix Field Data				
Project	S013213A00	Model	3430	Troxler ID	27881
Test Date	6/21/2010	Moisture Std	638	Density Std	2225
Description	Admix Soil	Offsets:	Moisture -	Density -	
Report	5-16-093	Acceptable Zone			
Comments:	Unless otherwise stated - All test at taken at a depth of 6-in				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-400	2	13:53	3	114.8	15.6%	0.468	N/A	90.0%	C1	Pass
SL-401	2	15:07	3	114.2	15.8%	0.476	N/A	90.0%	E3	Pass
SL-402	2	15:10	3	114.3	15.1%	0.474	N/A	86.0%	E4	Pass
SL-403	2	15:14	3	112.1	16.4%	0.504	16.2%	88.0%	E5	Pass
SL-404	3	16:00	3	113.6	16.1%	0.484	N/A	90.0%	C2	Pass
SL-405	3	16:06	3	115.0	15.2%	0.465	N/A	88.0%	B2	Pass
SL-406	3	16:11	3	112.6	17.0%	0.497	N/A	92.0%	A2	Pass
							N/A			
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-400				
SL-401				
SL-402				
SL-403	SC	2057.70	1823.2	371.4
SL-404				
SL-405				
SL-406				



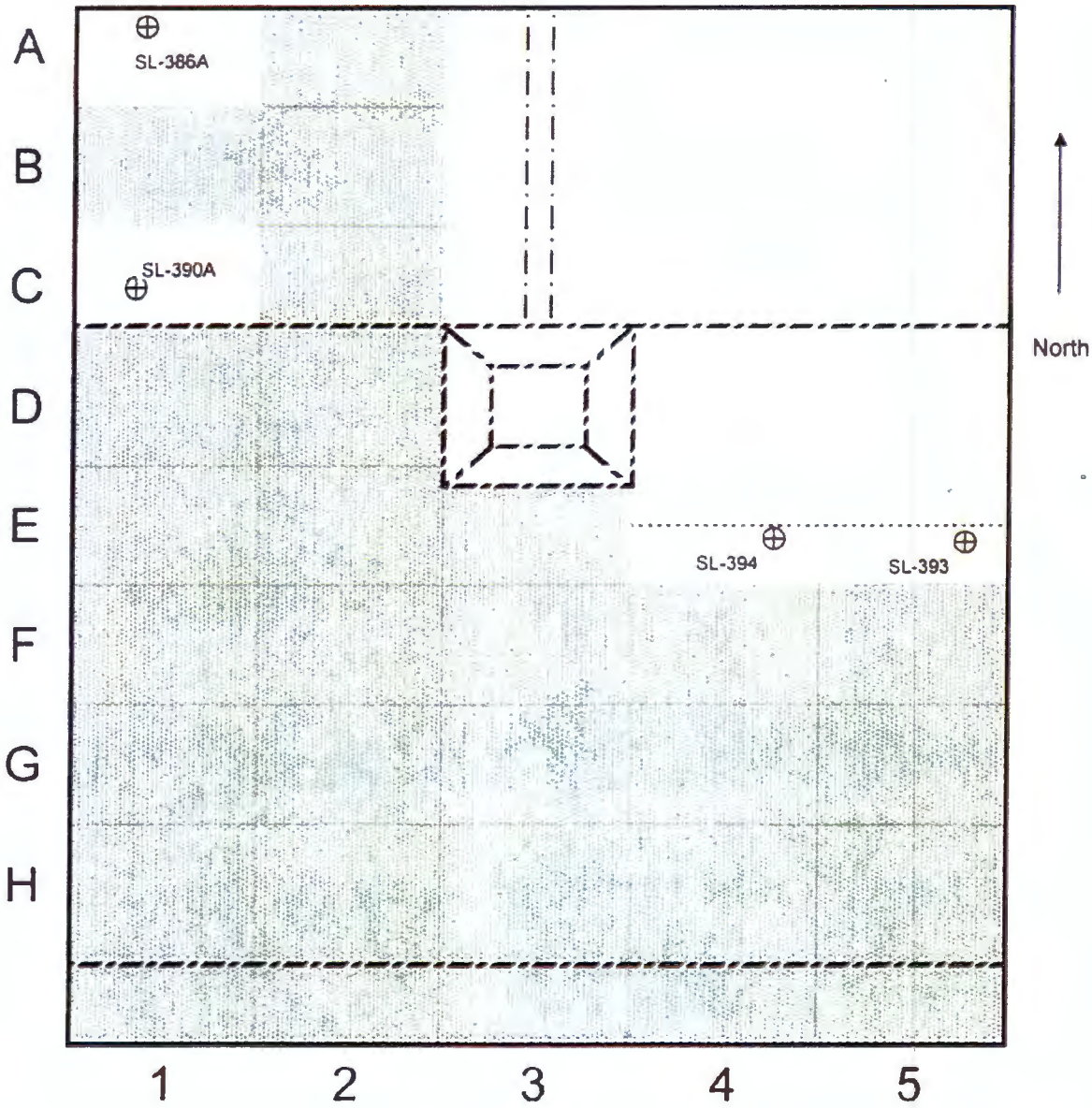
Envirotech Engineering & Consulting, Inc

6/23/10
Date

S/C S013213A00

CQA Moisture Density Map Cell 9

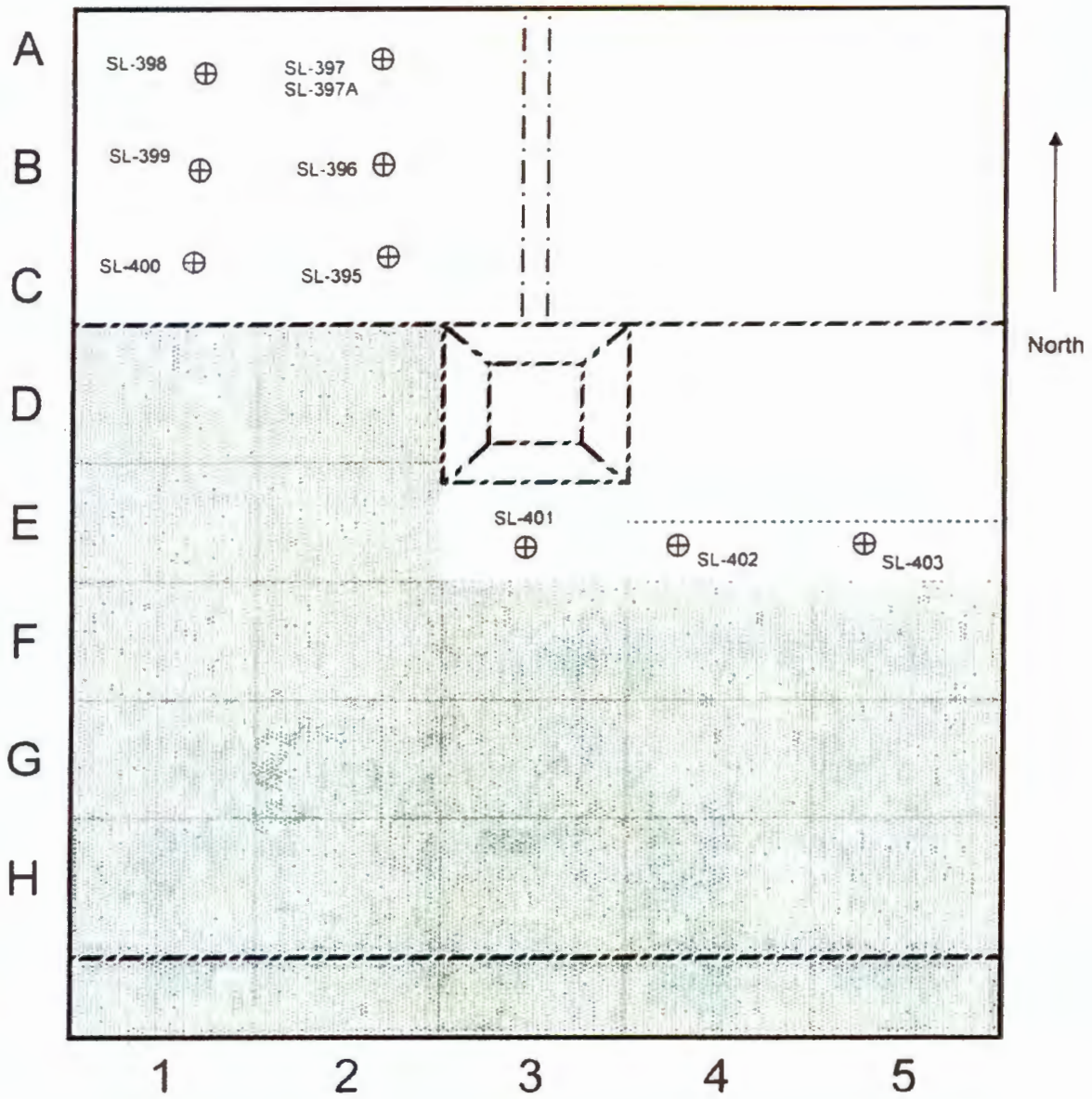
Date	6/21/2010	Lift	No. 1
Report	5-16-093	Operator	J. Schut
Map No	7 of 12	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

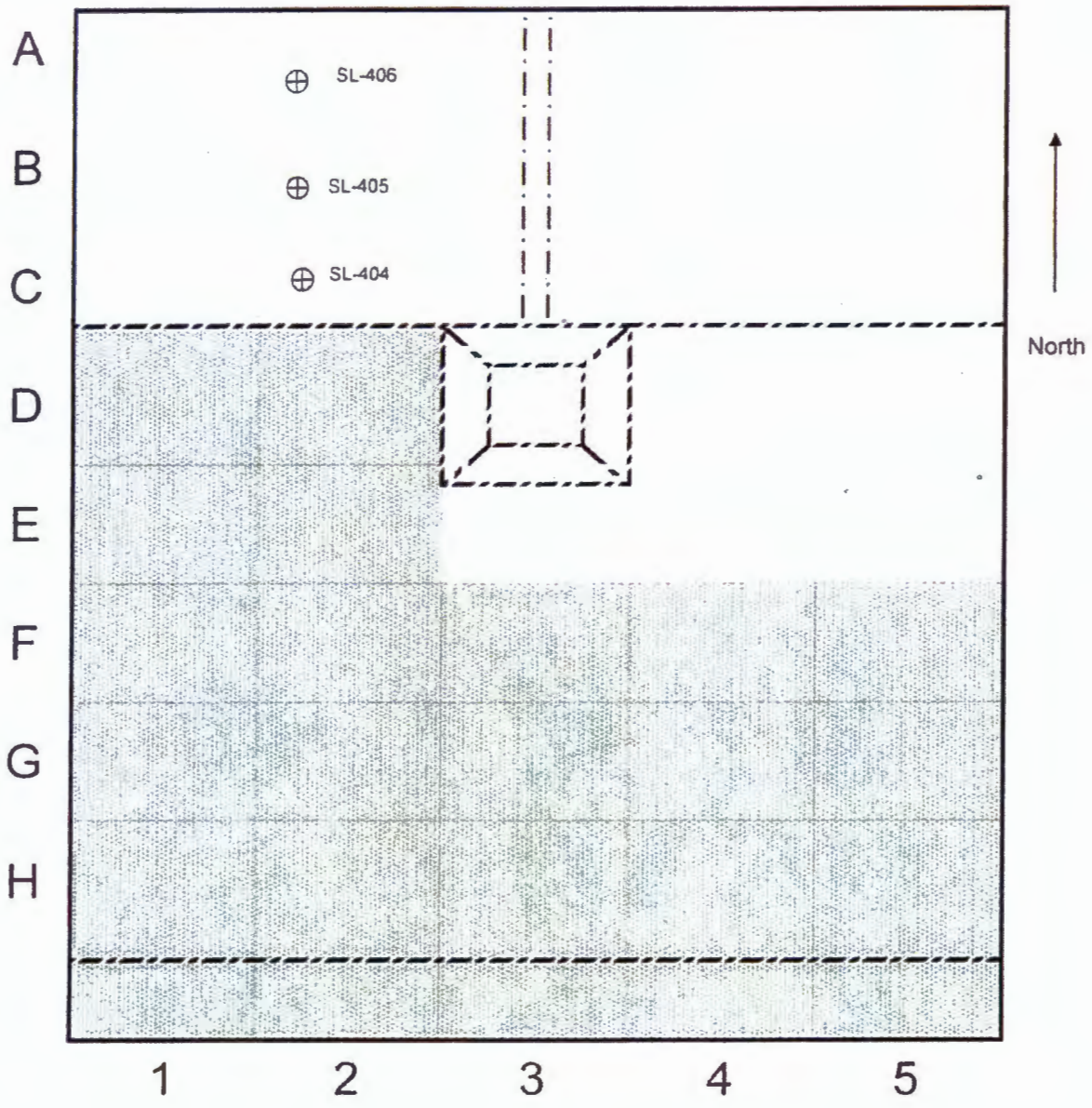
Date:	6/21/2010	Lift:	No 2
Report:	5-16-093	Operator:	J. Schut
Map No:	8 of 12	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

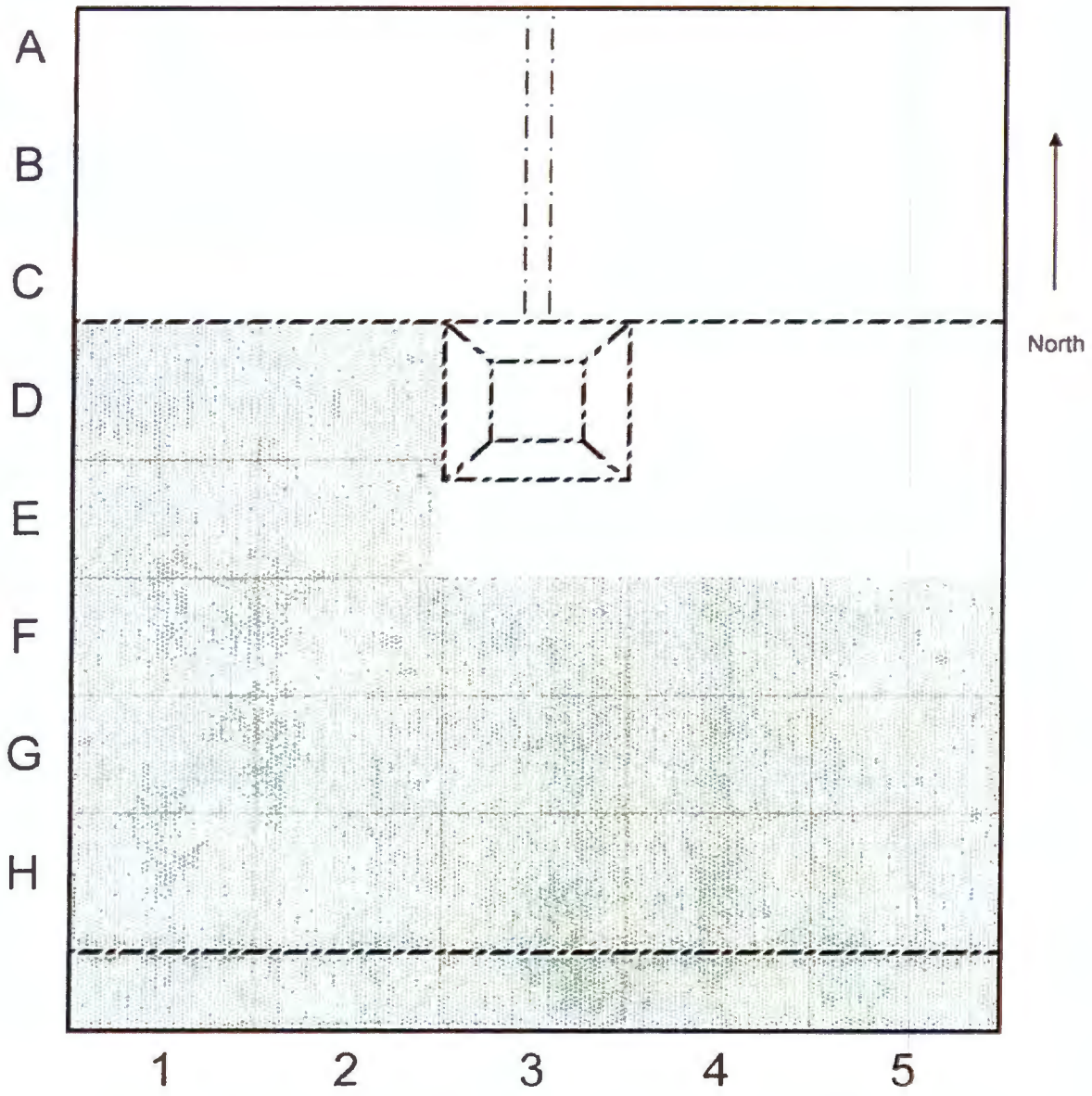
Date	6/21/2010	Lift:	No. 3
Report:	5-16-093	Operator:	J. Schut
Map No:	9 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

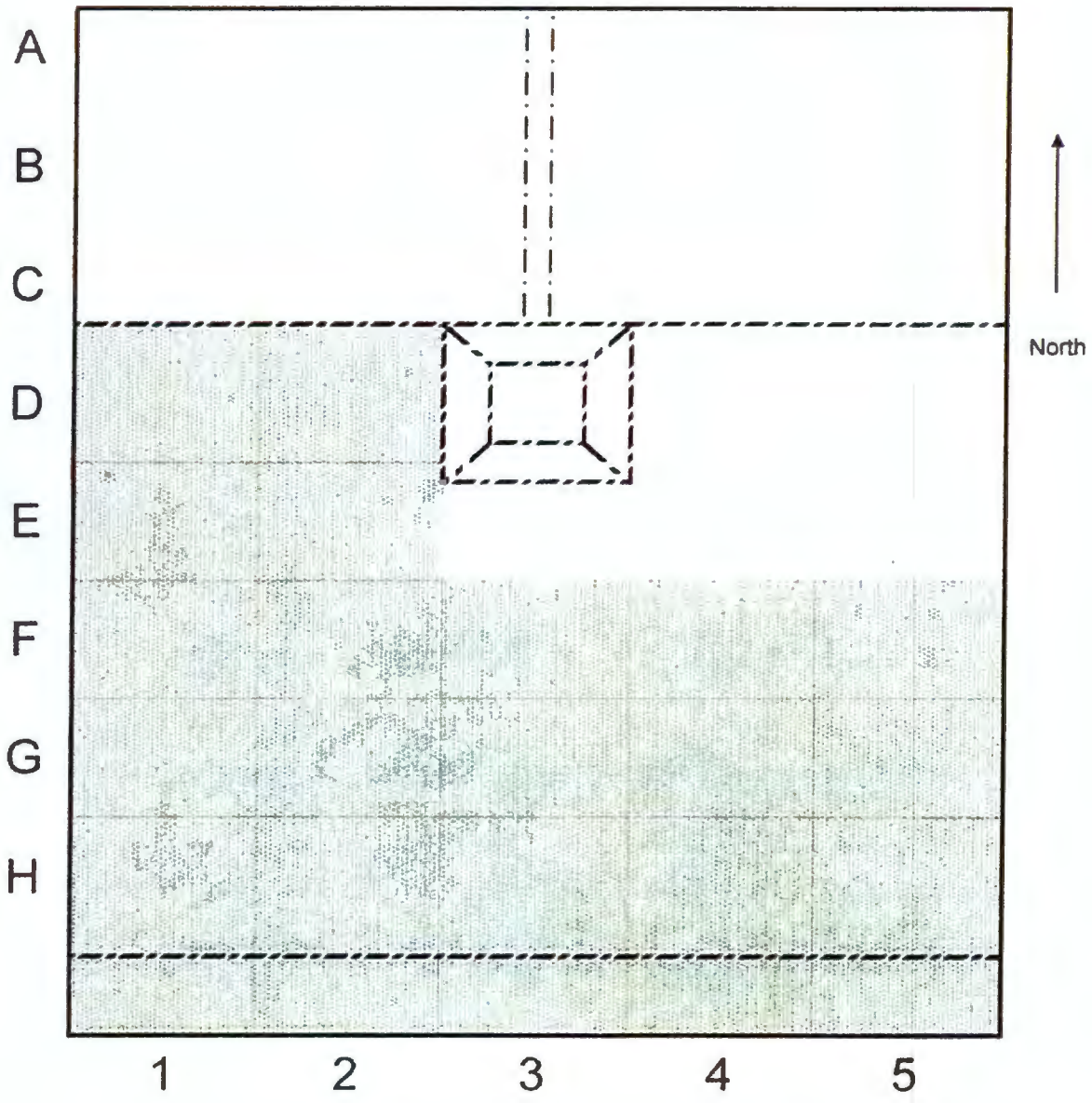
Date	6/21/2010	Lift:	No. 4
Report:	5-16-093	Operator:	J. Schut
Map No:	10 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

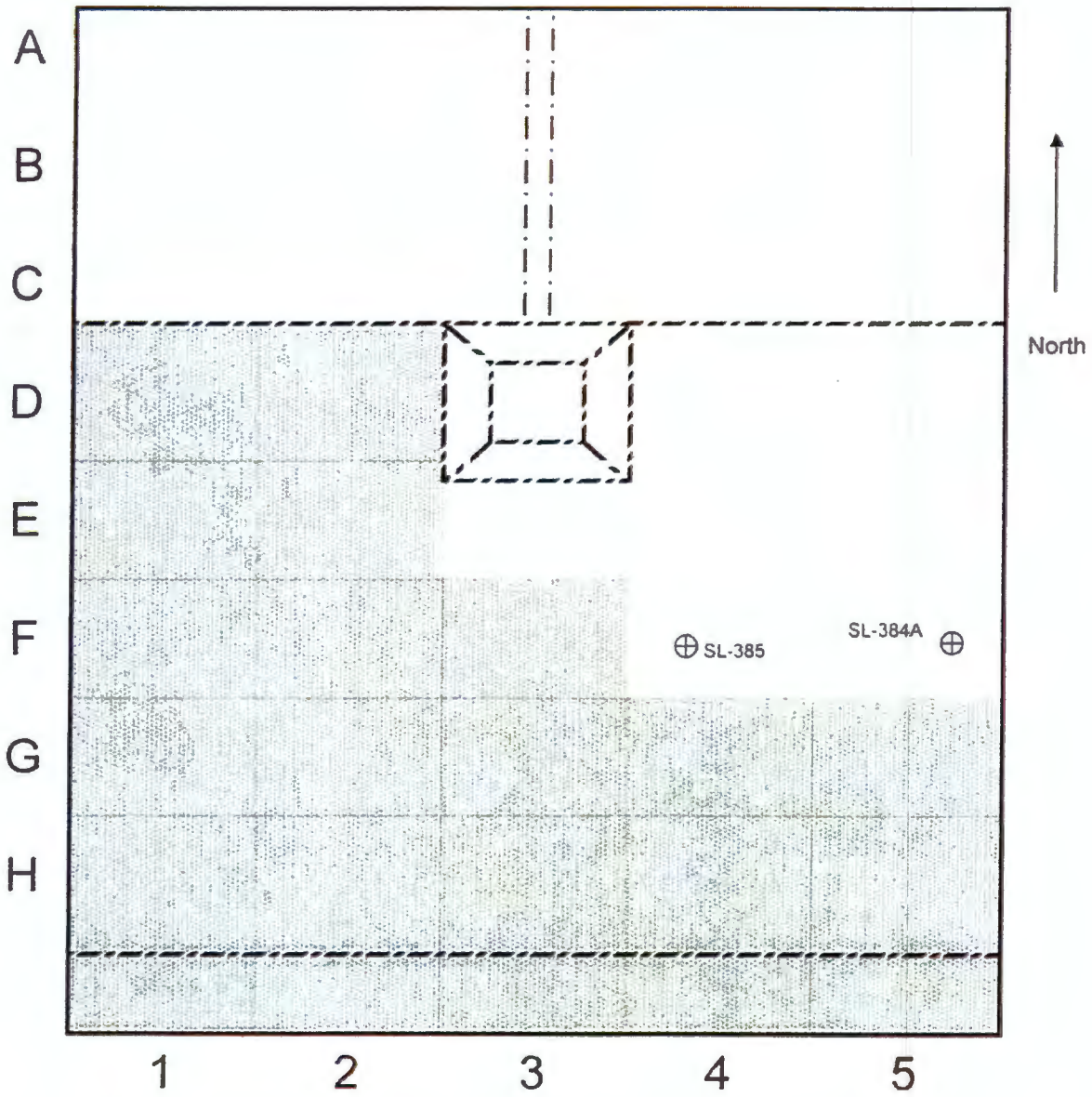
Date	6/21/2010	Lift.	No 5
Report:	5-16-093	Operator	J. Schut
Map No:	11 of 12	Material	Admix
Grid.	95-ft x 90-ft	Notes	



S/C: S013213A00

CQA Moisture Density Map Cell 9

Date:	6/21/2010	Lift:	No. 6
Report:	5-16-093	Operator:	J. Schut
Map No:	12 of 12	Material	Admix
Grid:	95-ft x 90-ft	Notes	



UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, Ok 73701
(580) 234-8780 | Fax (580) 237-4302

Client:	WCH
Submittal:	05-18J Admix Field Data

Sample Information

Contact Name.	Charlie Skiba			Sample ID.	SL-403
Project:	S013213A00			Sample Description:	Admix Soil
Project Location	ERDF Cells 9-10			Sampling Date.	6/21/2010
Tested By	J. Schut	Date:	6/21/2010	Sampled By:	J. Schut
Reviewed By.	J. Voss	Date:	6/22/2010	Date Received.	6/21/2010
Comments				Report No :	5-16-093

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1. Mass of Proctor mold, W_1	3956.00 g
2. Mass of Proctor mold + sand, W_2	5394.90 g
3. Volume of mold, V_1	0.03 ft
4 Dry unit weight, $Y_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	95 17 lb/ft^3

Calibration Cone

5. Mass of bottle + cone + sand (before use), W_3	4610.90 g
6. Mass of bottle + cone + sand (after use), W_4	2987.20 g
7. Weight of sand to fill the cone, $W_c = W_4 - W_3$	3 58 lb

Results from Field Tests

3 8. Mass of bottle + cone + sand (before use), W_6	5572.9 g
9. Mass of bottle + cone + sand (after use), W_8	2727 5 g
10. Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma\, d\,(sand)}$	0 0283 ft^3
11. Mass of gallon can, W_5	371.40 g
12. Mass of gallon can + moist soil, W_7	2057.70 g
13. Mass of gallon can + dry soil, W_9	1823.20 g
14. Moist unit weight of soil in field, $\gamma = W_7 - W_5 / V_2$	131.36 lb/ft^3
15. Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	16 2%
16. Dry unit weight in the field, $\gamma_{d\,(sand)} = \gamma / (1+(w\,(\%)/100)$	113.09 lb/ft^3
17. Comparision moisture content =	16.4%
18. Dry unit weight comparison =	112.1 lb/ft^3

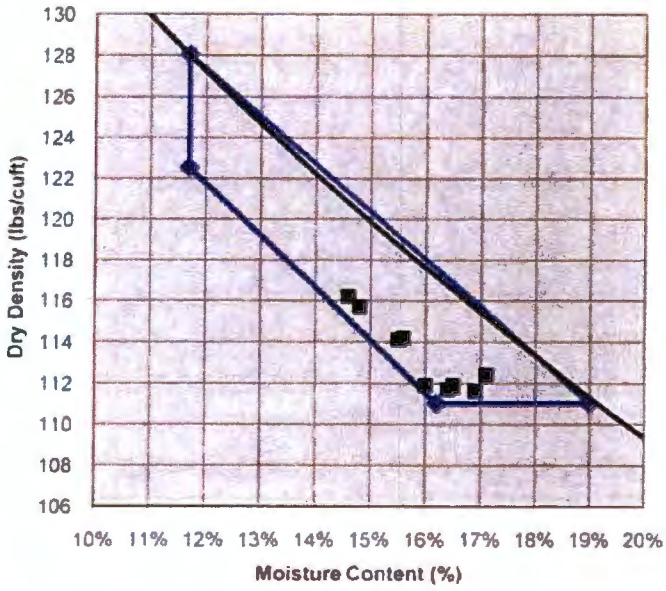
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client	WCH				
Submittal	05-18J Admix Field Data				
Project	S013213A00	Model	3430	Troxler ID	27881
Test Date	6/22/2010	Moisture Std:	640	Density Stc	2229
Description	Admix Soil	Offsets.	Moisture -	Density	-
Report	5-16-094	Acceptable Zone			
Comments:	Unless otherwise stated - All test at taken at a depth of 6-in				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-407	3	7:12	6	116.2	14.6%	0.450	N/A	88.0%	A1	Pass
SL-408	3	7:16	6	111.6	16.9%	0.511	N/A	89.0%	B1	Pass
SL-409	3	7:20	3	114.1	15.5%	0.477	N/A	88.0%	C1	Pass
SL-410	3	8.04	3	111.8	16.5%	0.508	N/A	88.0%	E3	Pass
SL-411	3	8:51	3	114.2	15.6%	0.476	17.3%	88.0%	E4	Pass
SL-412	3	8:54	3	111.7	16.4%	0.509	N/A	87.0%	E5	Pass
SL-413	4	11:00	3	112.4	17.1%	0.500	N/A	92.0%	A2	Pass
SL-414	4	11:08	3	111.9	16.0%	0.506	N/A	85.0%	B2	Pass
SL-415	4	11:16	3	115.7	14.8%	0.457	N/A	87.0%	C2	Pass
SL-416	4	12:45	3	111.9	16.5%	0.506	N/A	88.0%	A1	Pass

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-407				
SL-408	Shelby			
SL-409				
SL-410				
SL-411	SC	1981.6	1743.8	371.1
SL-412				
SL-413				
SL-414				
SL-415				
SL-416				



Envirotech Engineering & Consulting, Inc

6/23/10
Date

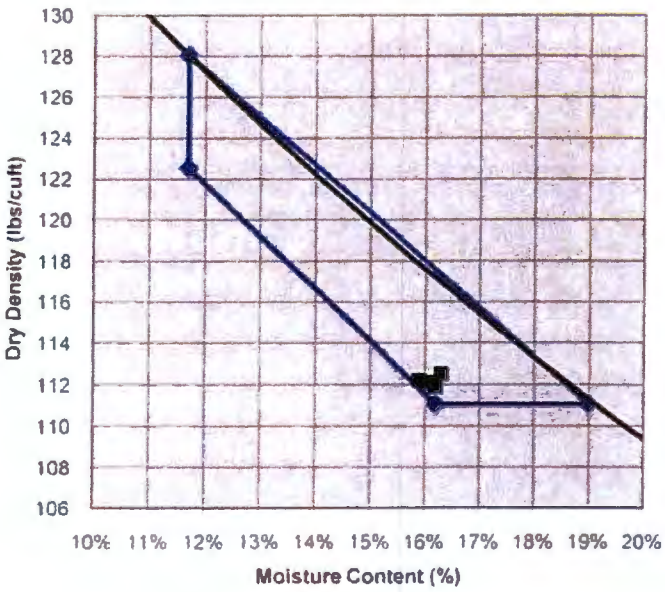
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client	WCH				
Submittal	05-18J Admix Field Data				
Project	S013213A00	Model	3430	Troxler ID	27881
Test Date	6/22/2010	Moisture Std:	640	Density Std	2229
Description	Admix Soil	Offsets:	Moisture -	Density	-
Report	5-16-094	Acceptable Zone			
Comments	Unless otherwise stated - All test at taken at a depth of 6-in.				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-417	4	12:50	3	112.2	15.9%	0.502	N/A	86.0%	B1	Pass
SL-418	4	12:55	3	112.5	16.3%	0.498	N/A	88.0%	C1	Pass
SL-419	5	15:05	3	112.0	16.2%	0.506	N/A	86.0%	A2	Pass
SL-420	5	15:10	3	111.9	16.2%	0.507	N/A	86.0%	B2	Pass
SL-421	5	15:15	3	112.1	16.1%	0.503	N/A	86.0%	C2	Pass
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-417				
SL-418				
SL-419				
SL-420				
SL-421				



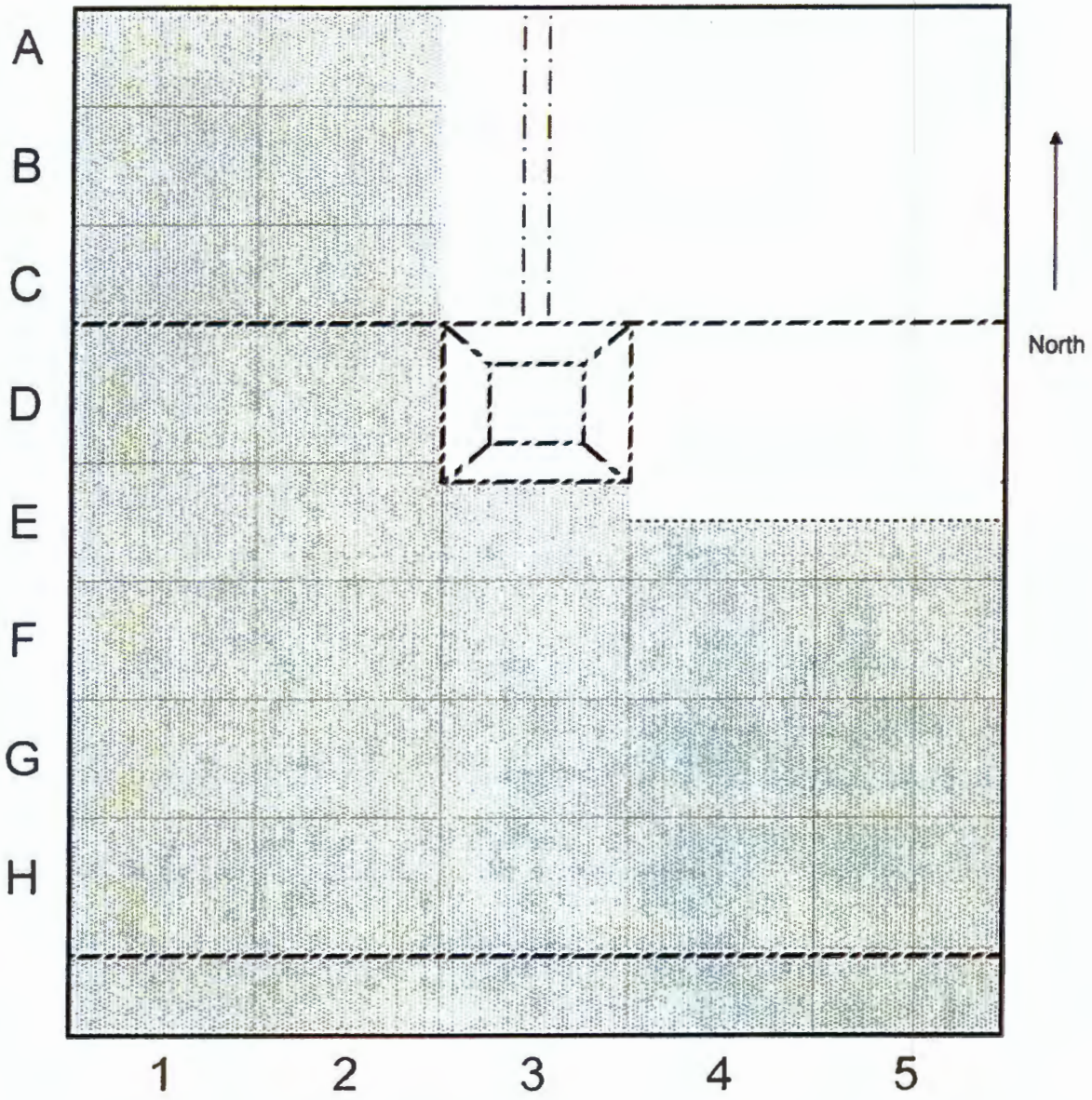
Envirotech Engineering & Consulting Inc

6/23/10
Date

S/C S013213A00

CQA Moisture Density Map Cell 9

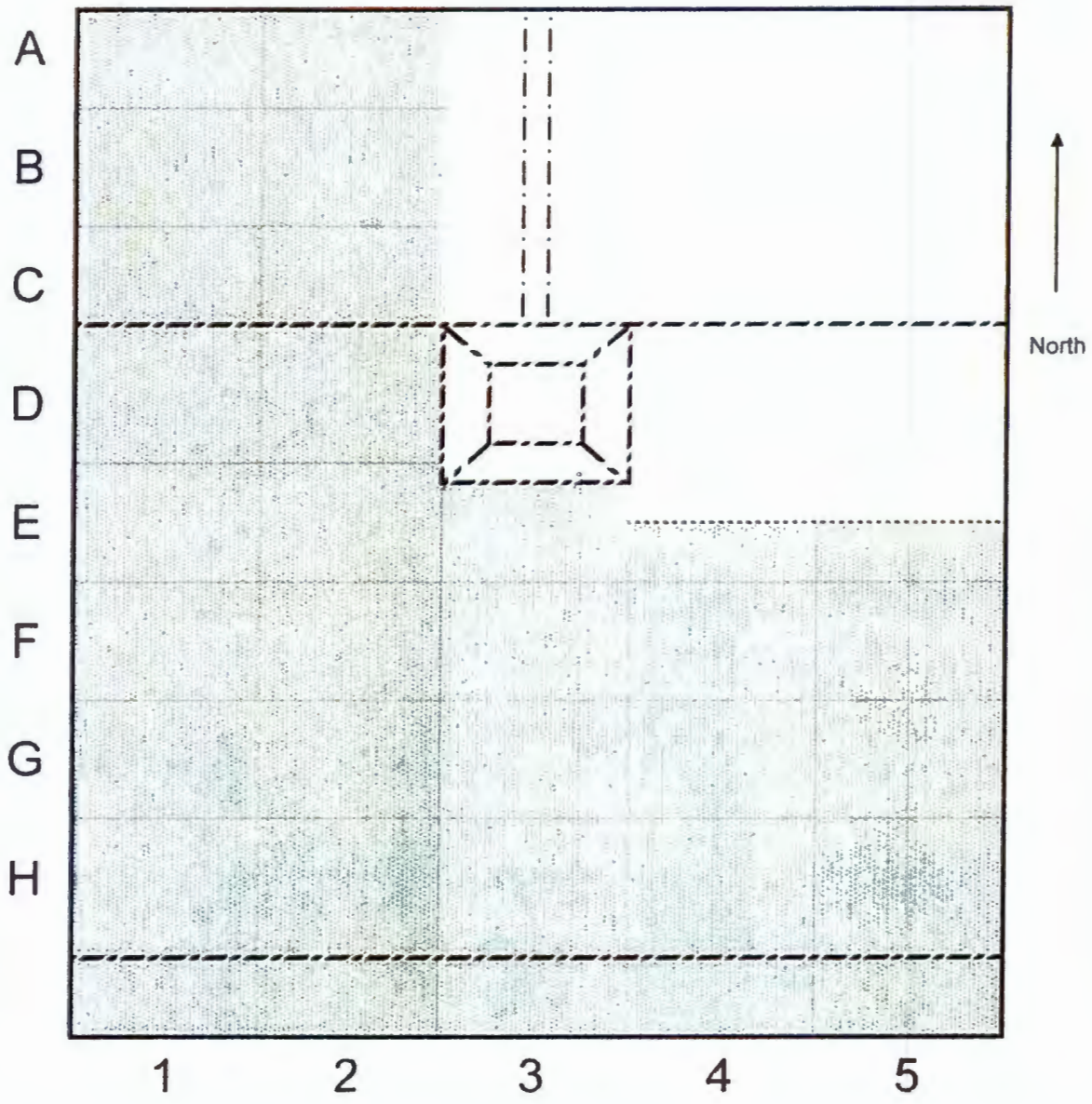
Date:	6/22/2010	Lift:	No. 1
Report:	5-16-094	Operator:	J. Schut
Map No.	7 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

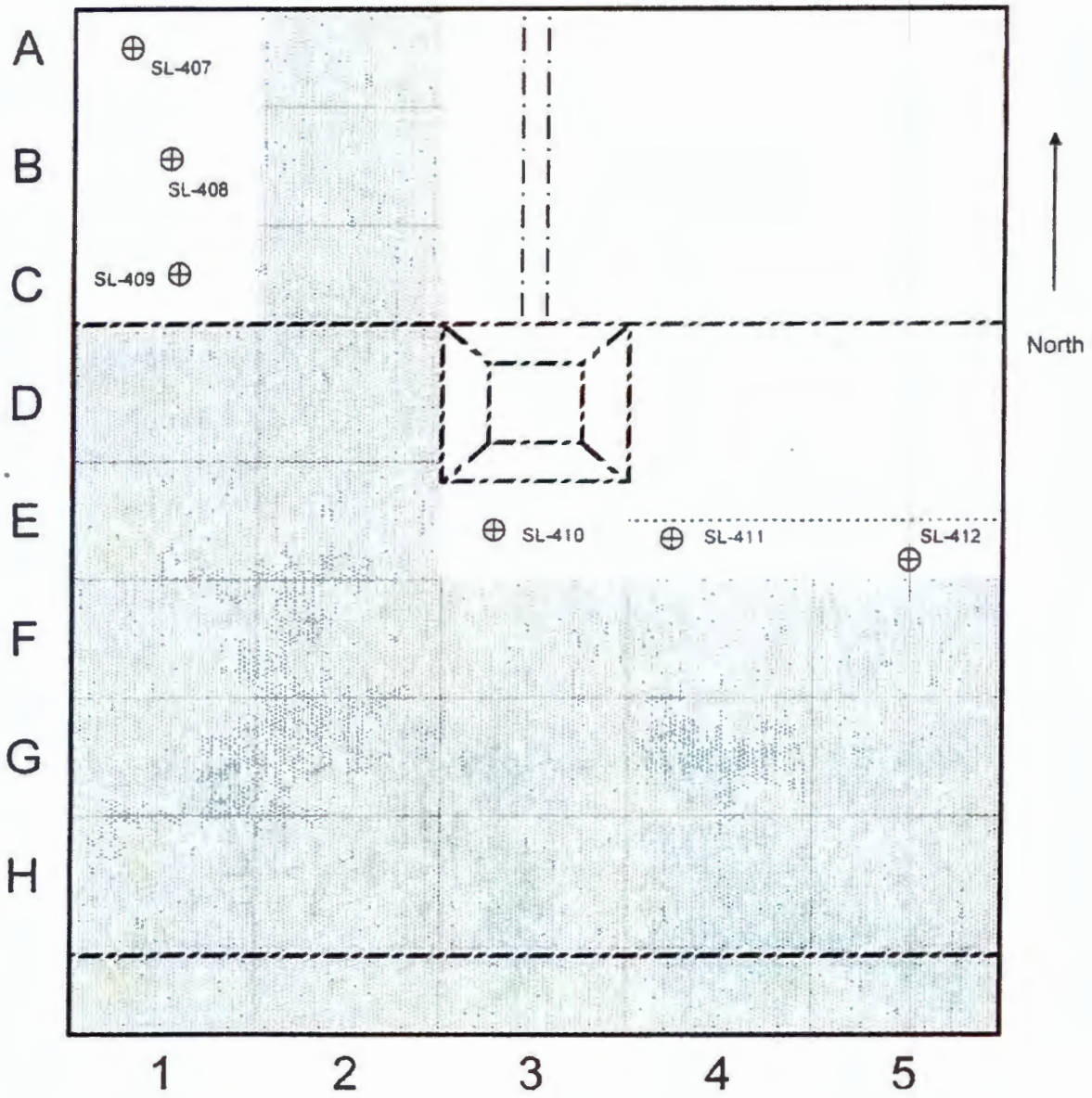
Date.	6/22/2010	Lift	No 2
Report:	5-16-094	Operator.	J Schut
Map No:	8 of 12	Material.	Admix
Grid.	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

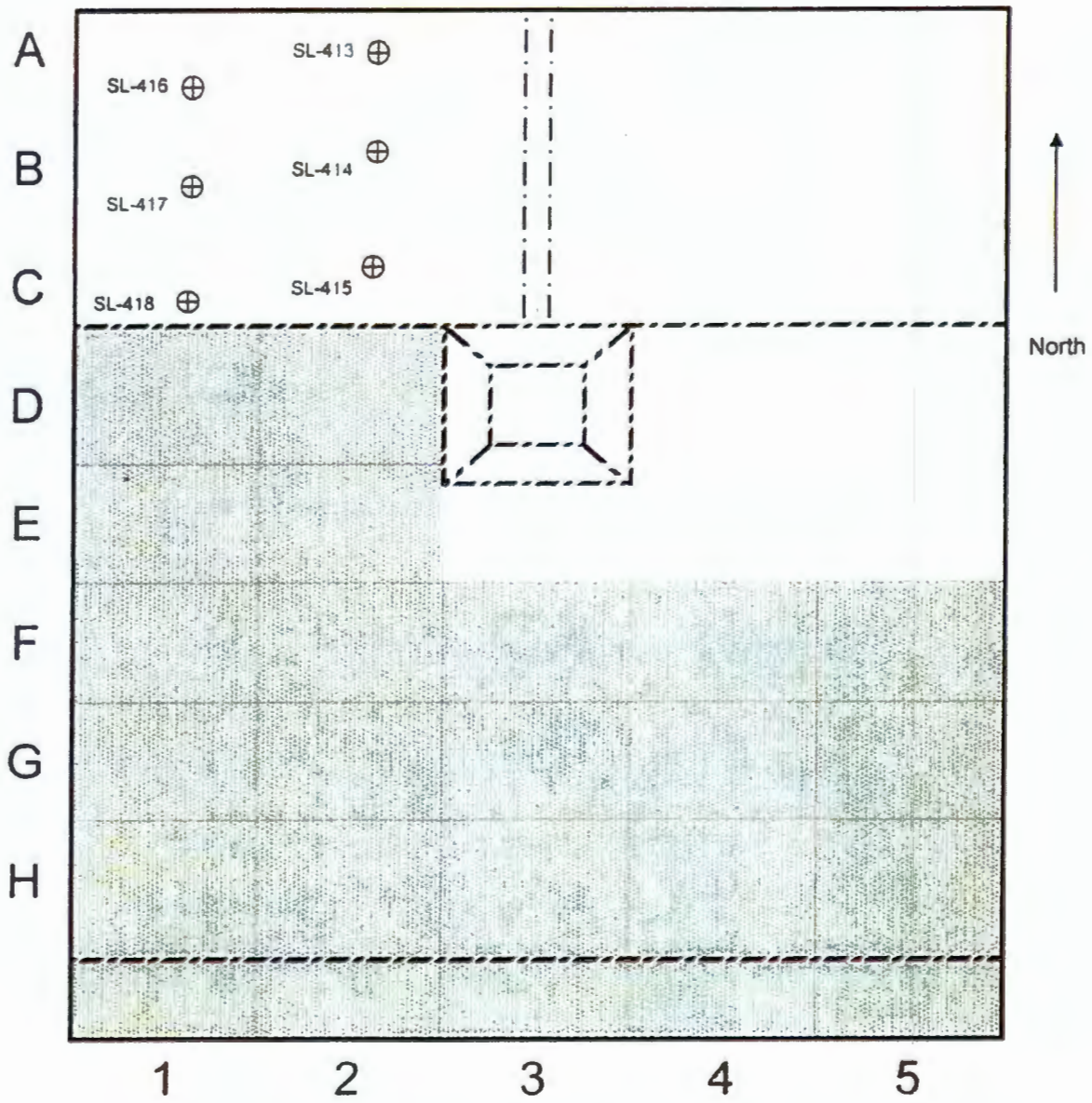
Date	6/22/2010	Lift	No 3
Report:	5-16-094	Operator	J Schut
Map No:	9 of 12	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

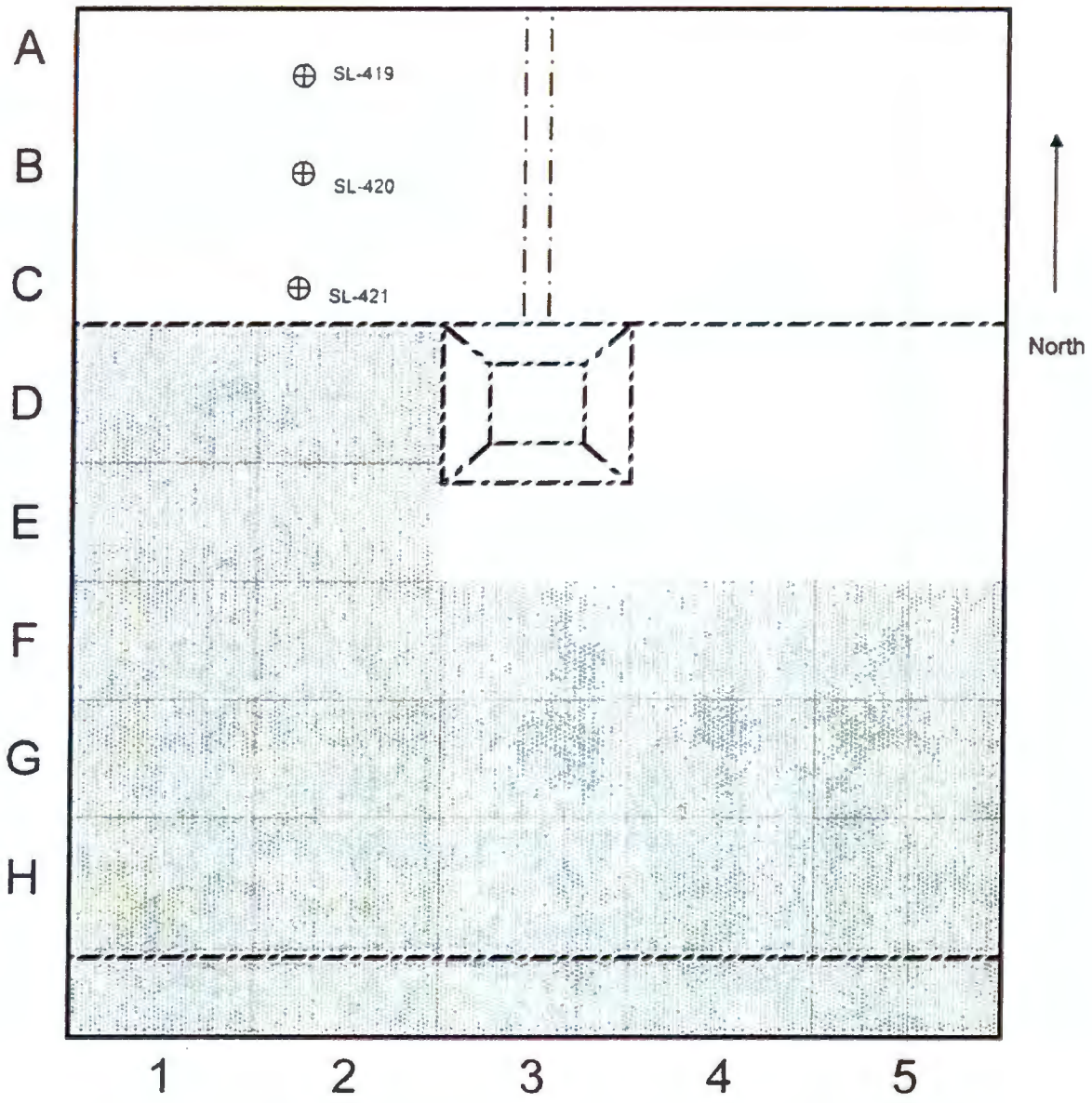
Date.	6/22/2010	Lift.	No 4
Report:	5-16-094	Operator.	J. Schut
Map No.	10 of 12	Material.	Admix
Grid	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

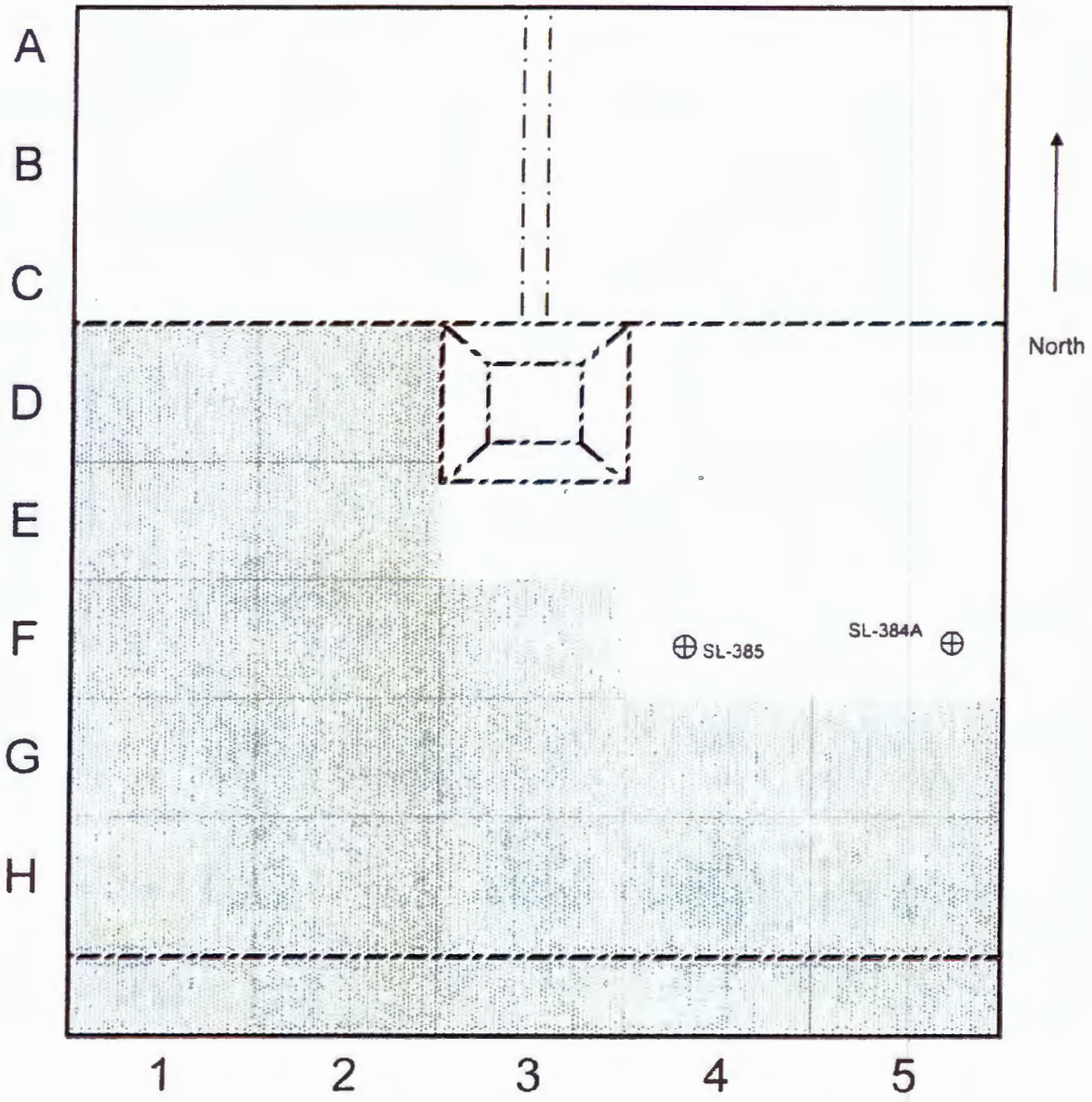
Date:	6/22/2010	Lift:	No 5
Report:	5-16-094	Operator	J. Schut
Map No:	11 of 12	Material	Admix
Grid:	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

Date:	6/22/2010	Lift:	No 6
Report:	5-16-094	Operator:	J. Schut
Map No:	12 of 12	Material	Admix
Grid:	95-ft x 90-ft	Notes	



UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client:	WCH
Submittal:	05-18J Admix Field Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	SL-411
Project:	S013213A00			Sample Description:	Admix Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	6/22/2010
Tested By:	J. Schut	Date:	6/22/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	6/23/2010	Date Received:	6/22/2010
Comments				Report No.:	5-16-094

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1. Mass of Proctor mold, W_1	3956.00 g
2 Mass of Proctor mold + sand, W_2	5394.90 g
3. Volume of mold, V_1	0.03 ft
4 Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	95.17 lb/ft^3

Calibration Cone

5. Mass of bottle + cone + sand (before use), W_3	4610.90 g
6. Mass of bottle + cone + sand (after use), W_4	2987.20 g
7. Weight of sand to fill the cone, $W_c = W_4 - W_3$	3.58 lb

Results from Field Tests

3 8. Mass of bottle + cone + sand (before use), W_6	5985.7 g
9. Mass of bottle + cone + sand (after use), W_8	3198.0 g
10. Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma_{d\,(sand)}}$	0.0270 ft^3
11. Mass of gallon can, W_5	371.10 g
12. Mass of gallon can + moist soil, W_7	1981.60 g
13. Mass of gallon can + dry soil, W_9	1743.80 g
14. Moist unit weight of soil in field, $\gamma = W_7 - W_5 / V_2$	131.67 lb/ft^3
15 Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	17.3%
16. Dry unit weight in the field, $\gamma_{d\,(sand)} = \gamma / (1+(w\,(\%)/100)$	112.23 lb/ft^3
17. Comparision moisture content =	15.6%
18. Dry unit weight comparison =	114.2 lb/ft^3

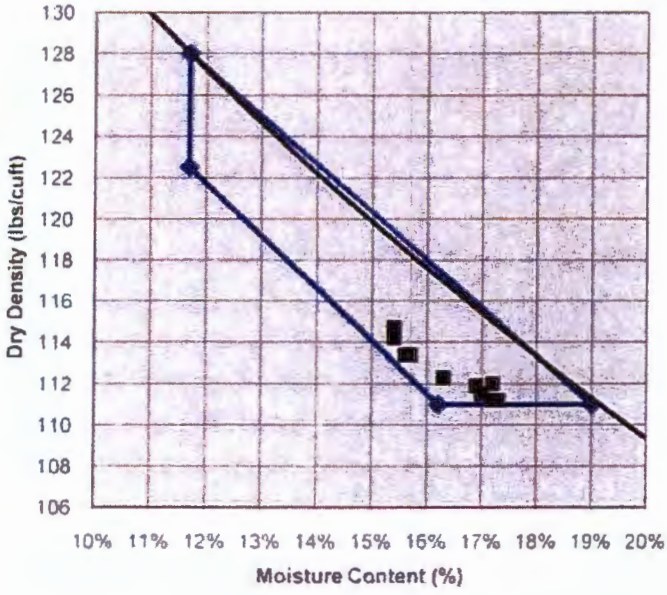
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client	WCH				
Submittal	05-18J Admix Field Data				
Project	S013213A00	Model	3430	Troxler ID	27881
Test Date	6/23/2010	Moisture Std:	637	Density Std	2227
Description	Admix Soil	Offsets:	Moisture -	Density	-
Report.	5-16-095	Acceptable Zone			
Comments.	Unless otherwise stated - All test at taken at a depth of 6-in.				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-422	5	7:18	3	113.4	15.6%	0.486	N/A	87.0%	A1	Pass
SL-423	5	7:27	3	113.4	15.7%	0.486	N/A	87.0%	B1	Pass
SL-424	5	7:31	3	114.2	15.4%	0.476	N/A	87.0%	C1	Pass
SL-425	4	8:15	3	111.9	16.9%	0.506	N/A	90.0%	E3	Pass
SL-426	4	8:19	3	114.7	15.4%	0.469	N/A	89.0%	E4	Pass
SL-427	4	8:24	3	112.3	16.3%	0.500	18.3%	88.0%	E5	Pass
SL-428	5	10:54	3	112.0	17.2%	0.505	N/A	92.0%	E3	Pass
SL-429	5	12:59	3	111.2	17.2%	0.516	N/A	90.0%	E5	Pass
SL-430	5	13:03	3	111.5	17.0%	0.512	N/A	90.0%	E4	Pass
SL-431	6	13:33	3	111.2	17.3%	0.516	N/A	91.0%	A1	Pass

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-422				
SL-423				
SL-424				
SL-425				
SL-426				
SL-427	SC	1931.9	1691	371.2
SL-428				
SL-429				
SL-430				
SL-431				



Jal E Van

ıvirotech Engineering & Consulting. Inc

6/24/10

Date

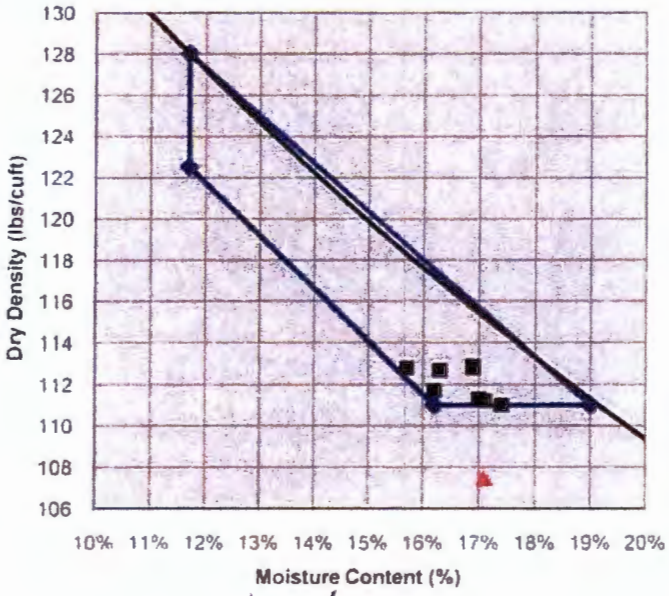
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client	WCH				
Submittal	05-18J Admix Field Data				
Project	S013213A00	Model	3430	Troxler ID.	27881
Test Date	6/23/2010	Moisture Std.	637	Density Stc	2227
Description	Admix Soil	Offsets:	Moisture -	Density -	
Report	5-16-095	Acceptable Zone			
Comments	Unless otherwise stated - All test at taken at a depth of 6-in.				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-432	6	13:35	3	111.2	17.1%	0.515	N/A	90.0%	B1	Pass
SL-433	6	13:40	3	107.5	17.1%	0.569	N/A	81.0%	C1	Fail
SL-434	6	13:50	3	111.0	17.4%	0.518	N/A	91.0%	C2	Pass
SL-435	6	13:55	3	112.8	16.9%	0.494	N/A	92.0%	B2	Pass
SL-436	6	14:02	3	112.8	15.7%	0.494	N/A	86.0%	A2	Pass
SL-433A	6	14:44	6	111.3	17.0%	0.514	N/A	89.0%	C1	Pass
SL-437	6	15:26	3	111.7	16.2%	0.509	N/A	86.0%	E5	Pass
SL-438	6	15:32	3	112.9	16.9%	0.493	N/A	93.0%	E4	Pass
SL-439	6	15:40	3	112.7	16.3%	0.495	N/A	89.0%	E3	Pass
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-432				
SL-433				
SL-434				
SL-435				
SL-436	Shelby			
SL-433A				
SL-437				
SL-438				
SL-439				



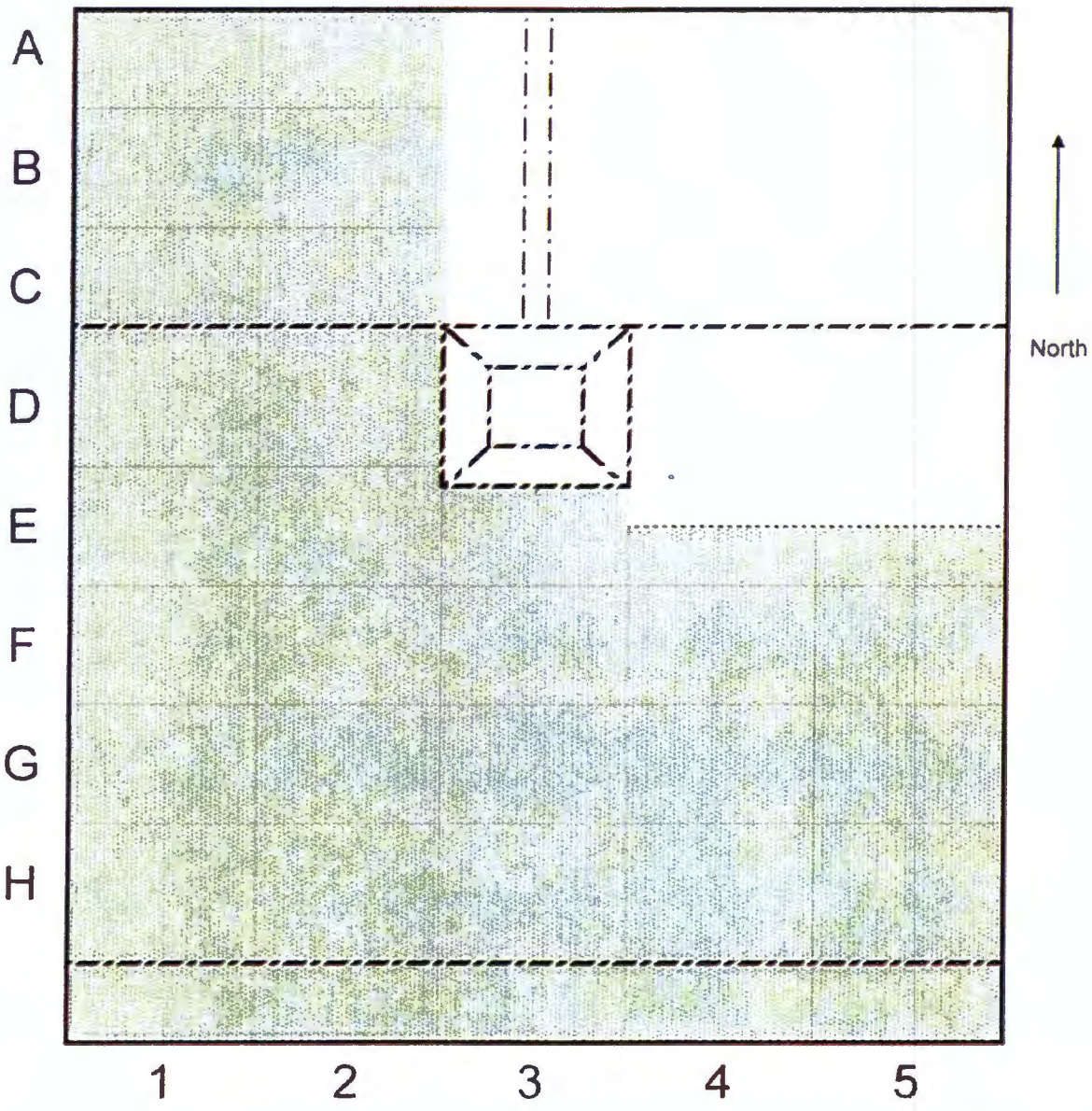
nvirotech Engineering & Consulting. Inc

6/24/10
Date

S/C S013213A00

CQA Moisture Density Map Cell 9

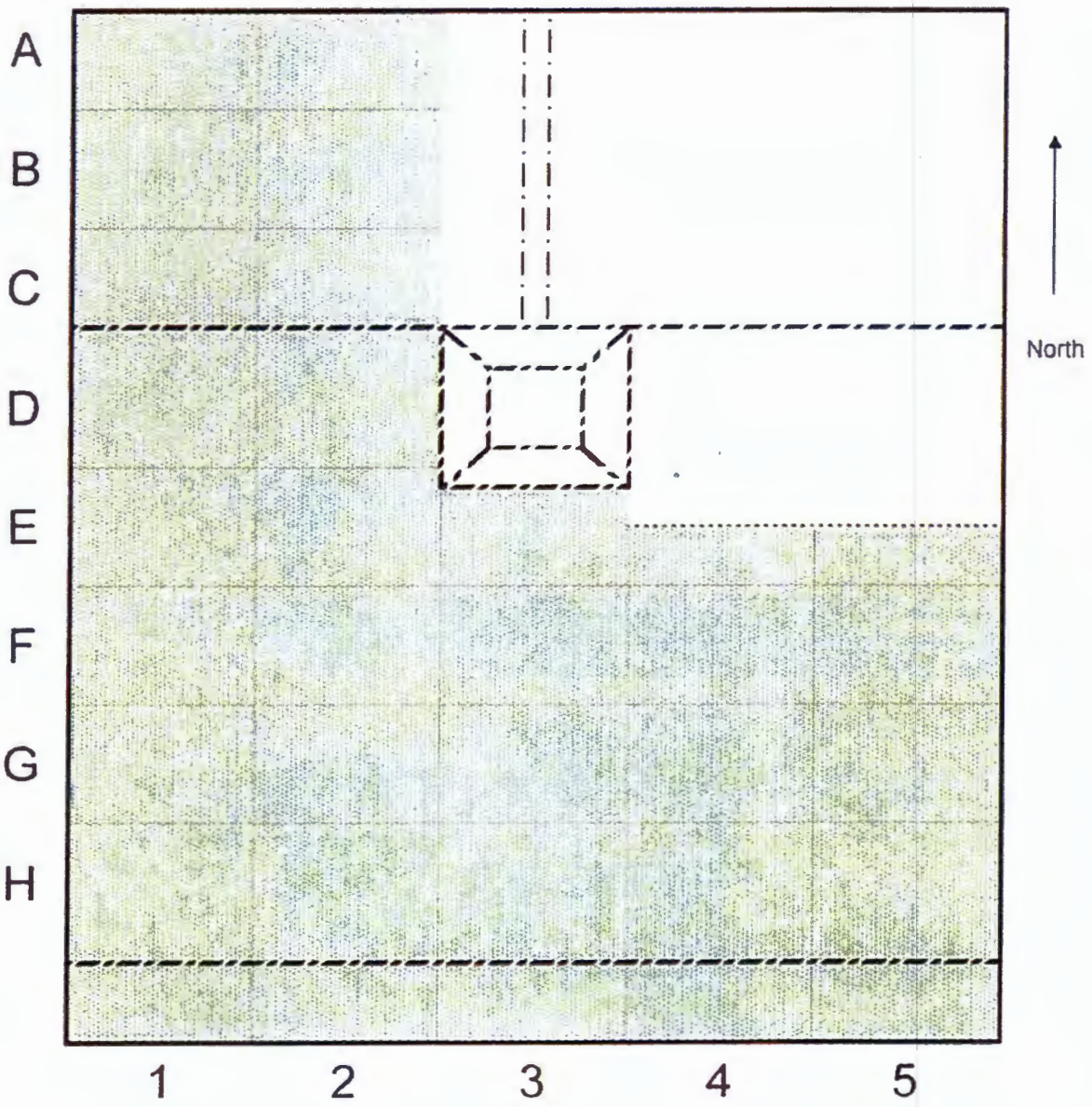
Date	6/23/2010	Lift:	No 1
Report	5-16-095	Operator	J Schut
Map No:	1 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

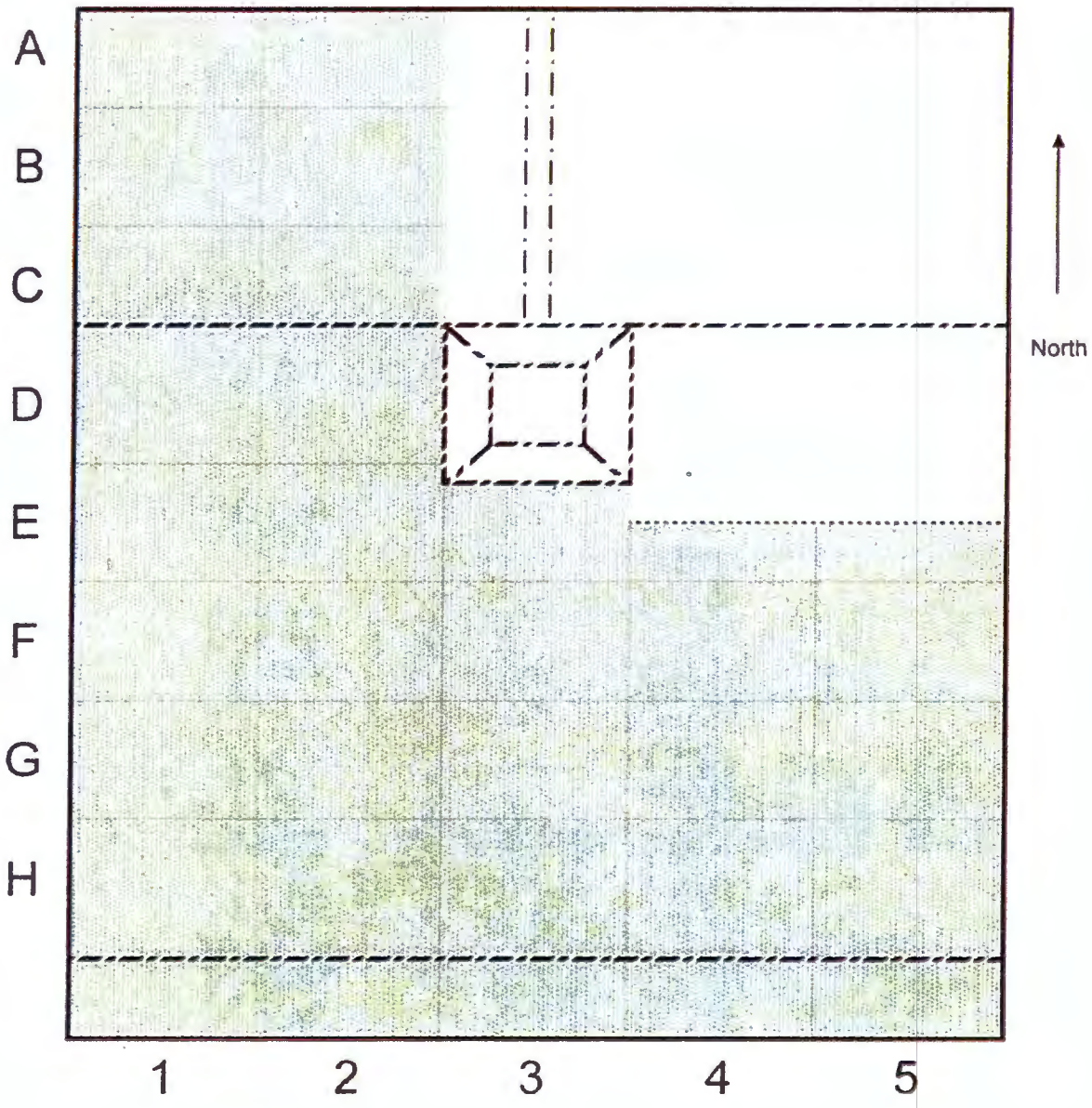
Date	6/23/2010	Lift	No 2
Report	5-16-095	Operator	J Schut
Map No	2 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C: S013213A00

CQA Moisture Density Map Cell 9

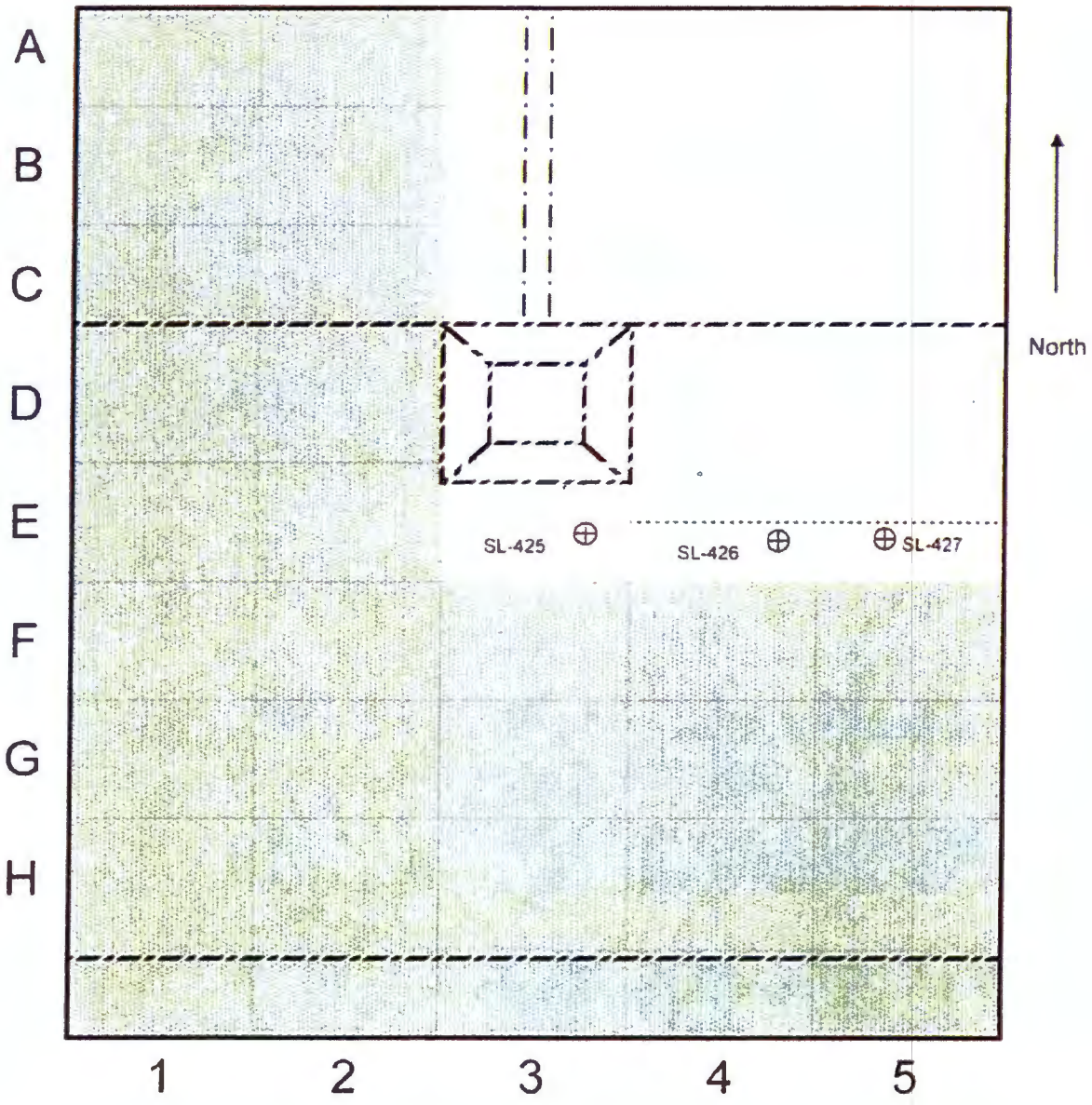
Date	6/23/2010	Lift	No 3
Report	5-16-095	Operator	J. Schut
Map No	3 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

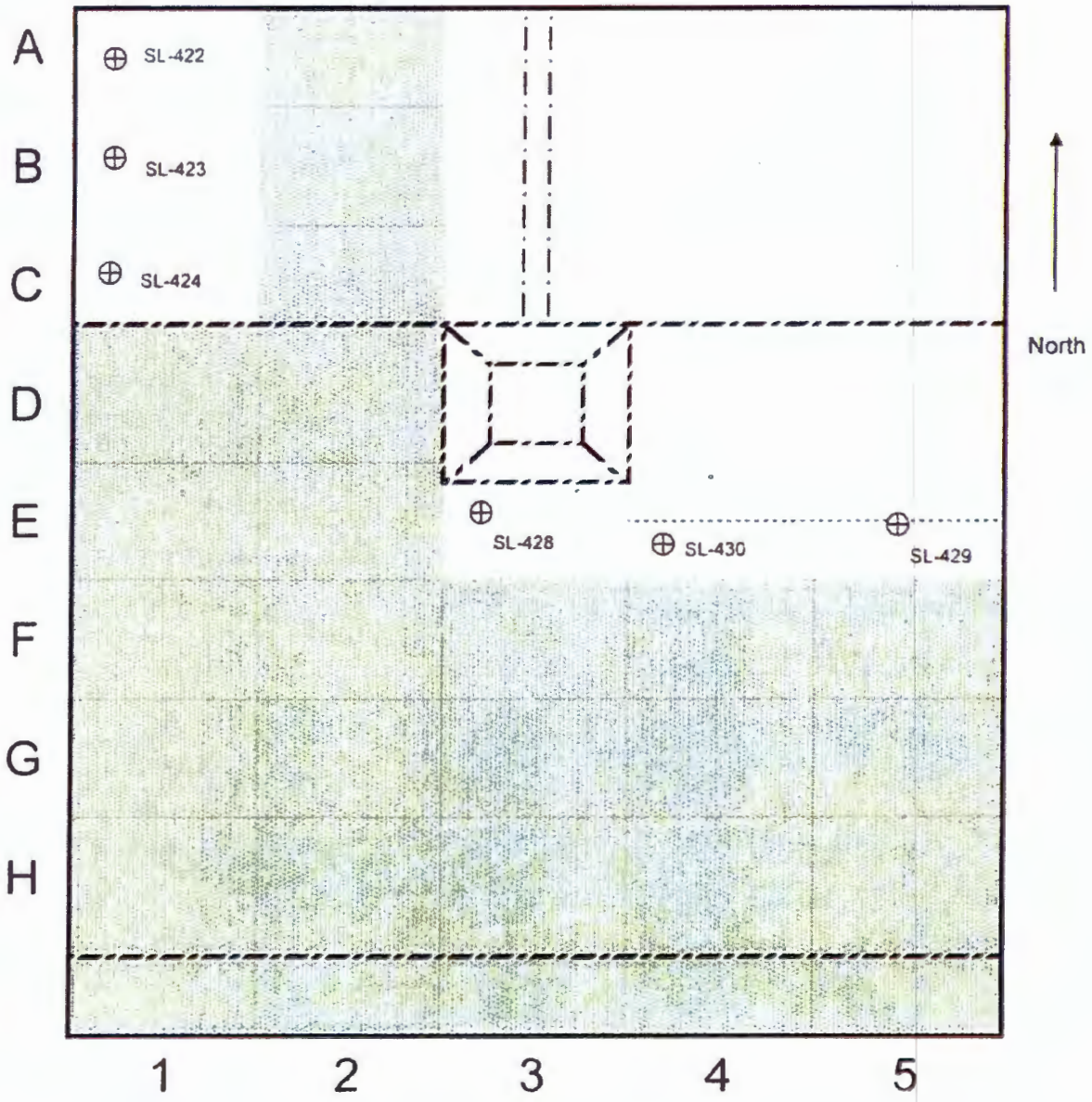
Date	6/23/2010	Lift	No 4
Report:	5-16-095	Operator	J. Schut
Map No.	4 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

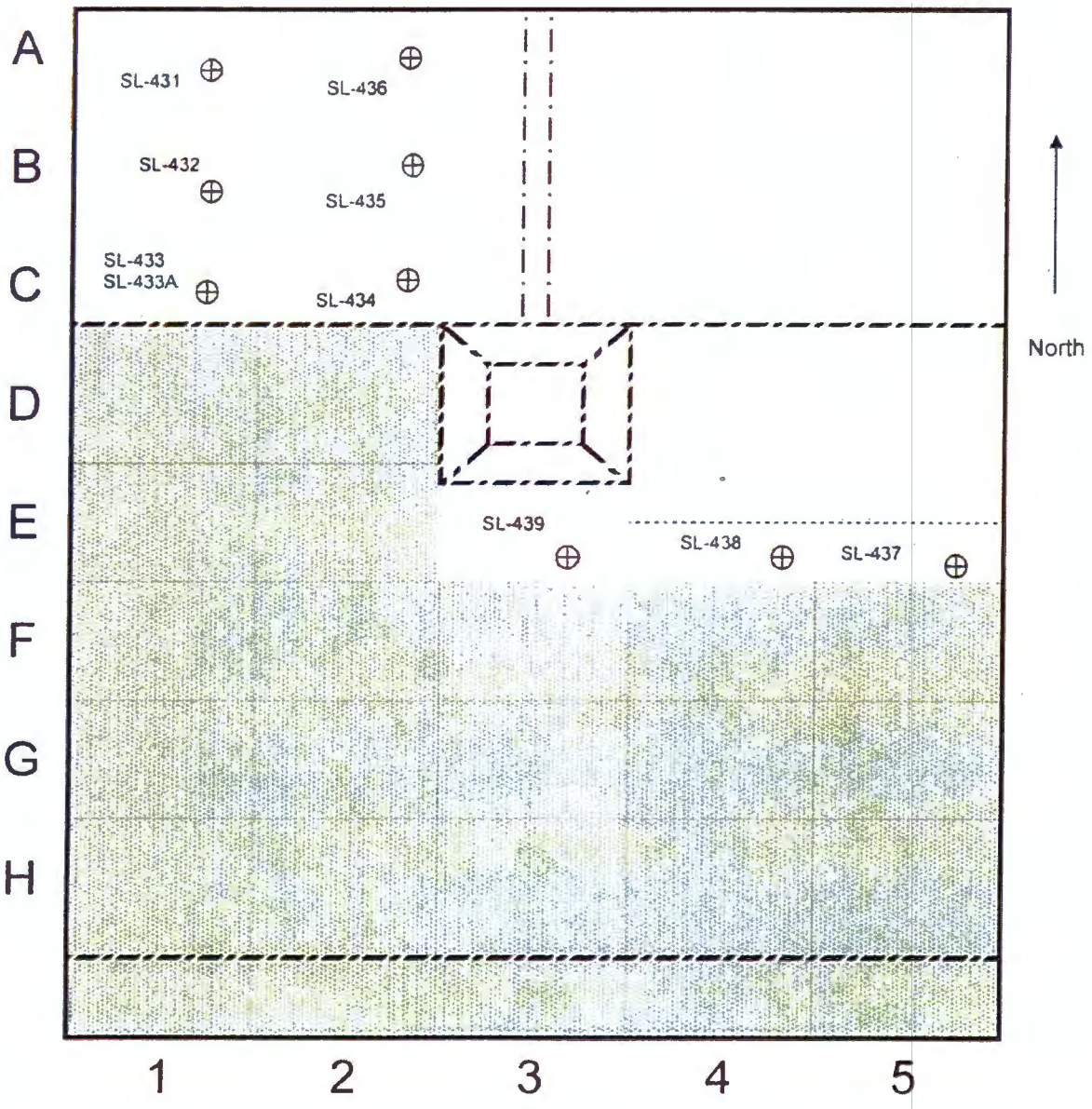
Date	6/23/2010	Lift.	No. 5
Report.	5-16-095	Operator	J. Schut
Map No	5 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C: S013213A00

CQA Moisture Density Map Cell 9

Date	6/23/2010	Lift:	No. 6
Report:	5-16-095	Operator:	J. Schut
Map No:	6 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580 234-8780 | Fax (580) 237-4302

Client: WCH
Submittal: 05-18J Admix Field Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID	SL-427
Project:	S013213A00			Sample Description:	Admix Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	6/23/2010
Tested By:	J. Schut	Date:	6/23/2010	Sampled By:	J. Schut
Reviewed By:	J. Voss	Date:	6/24/2010	Date Received:	6/23/2010
Comments				Report No.:	5-16-095

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1. Mass of Proctor mold, W_1	3956.00 g
2. Mass of Proctor mold + sand, W_2	5394.90 g
3. Volume of mold, V_1	0.03 ft
4. Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	95.17 lb/ft^3

Calibration Cone

5. Mass of bottle + cone + sand (before use), W_3	4610.90 g
6. Mass of bottle + cone + sand (after use), W_4	2987.20 g
7. Weight of sand to fill the cone, $W_c = W_4 - W_3$	3.58 lb

Results from Field Tests

3 8. Mass of bottle + cone + sand (before use), W_6	5911.0 g
9. Mass of bottle + cone + sand (after use), W_8	3111.8 g
10. Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma_{d\,(sand)}}$	0.0272 ft^3
11. Mass of gallon can, W_5	371.20 g
12. Mass of gallon can + moist soil, W_7	1931.90 g
13. Mass of gallon can + dry soil, W_9	1691.00 g
14. Moist unit weight of soil in field, $\gamma = W_7 - W_5 / V_2$	126.35 lb/ft^3
15. Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	18.3%
16. Dry unit weight in the field, $\gamma_{d\,(sand)} = \gamma / (1+(w\,(\%)/100))$	106.85 lb/ft^3
17. Comparision moisture content =	16.3%
18. Dry unit weight comparison =	112.3 lb/ft^3

FIELD DENSITY TEST (ASTM D-6938)

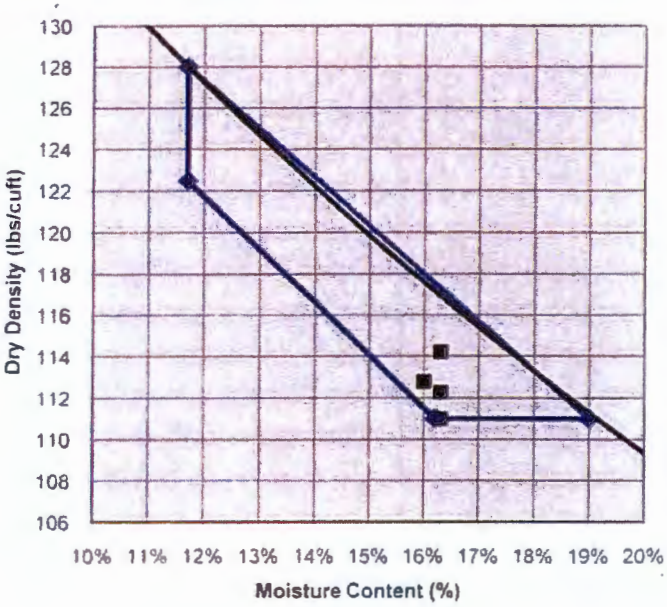
ENVIROTECH

Client: WCH
Submittal: 05-18J Admix Field Data
Project: S013213A00
Test Date: 6/24/2010
Description: Admix Soil
Report: 05-016-096
Comments: Unless otherwise stated - All test at taken at a depth of 6-in.

Model: 3430 Troxler ID: 27881
Moisture Std: 643 Density Std: 2205
Offsets: Moisture - Density -
Acceptable Zone

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-440	1	13:30	3	112.3	16.3%	0.501	16.4%	88.0%	D3	Pass
SL-441	1	15:16	3	114.2	16.3%	0.476	N/A	92.0%	A4	Pass
SL-442	1	15:21	3	112.8	16.0%	0.494	N/A	87.0%	B4	Pass
SL-443	1	15:30	3	111.0	16.3%	0.518	N/A	85.0%	C4	Pass
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-440	SC	2042.1	1806.1	371.4
SL-441				
SL-442				
SL-443				



nvirotech Engineering & Consulting, Inc

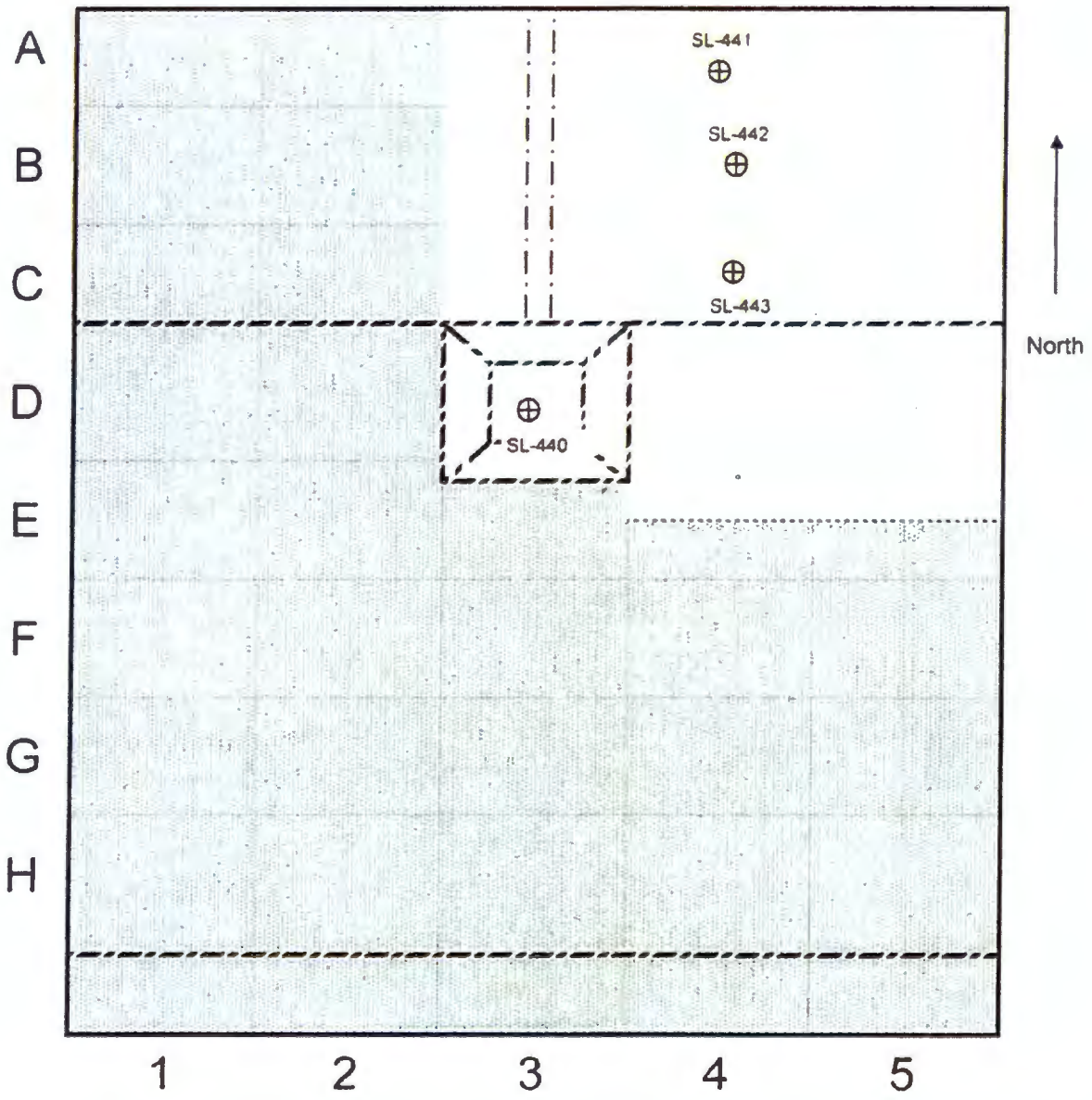
6-28-2010
Date

S/C S013213A00

CQA Moisture Density Map Cell 9

05-016-096

Date	6/24/2010	Lift	No. 1
Report.	05-016-096	Operator	J. Schut
Map No:	1 of 6	Material.	Admix
Grid	95-ft x 90-ft	Notes	

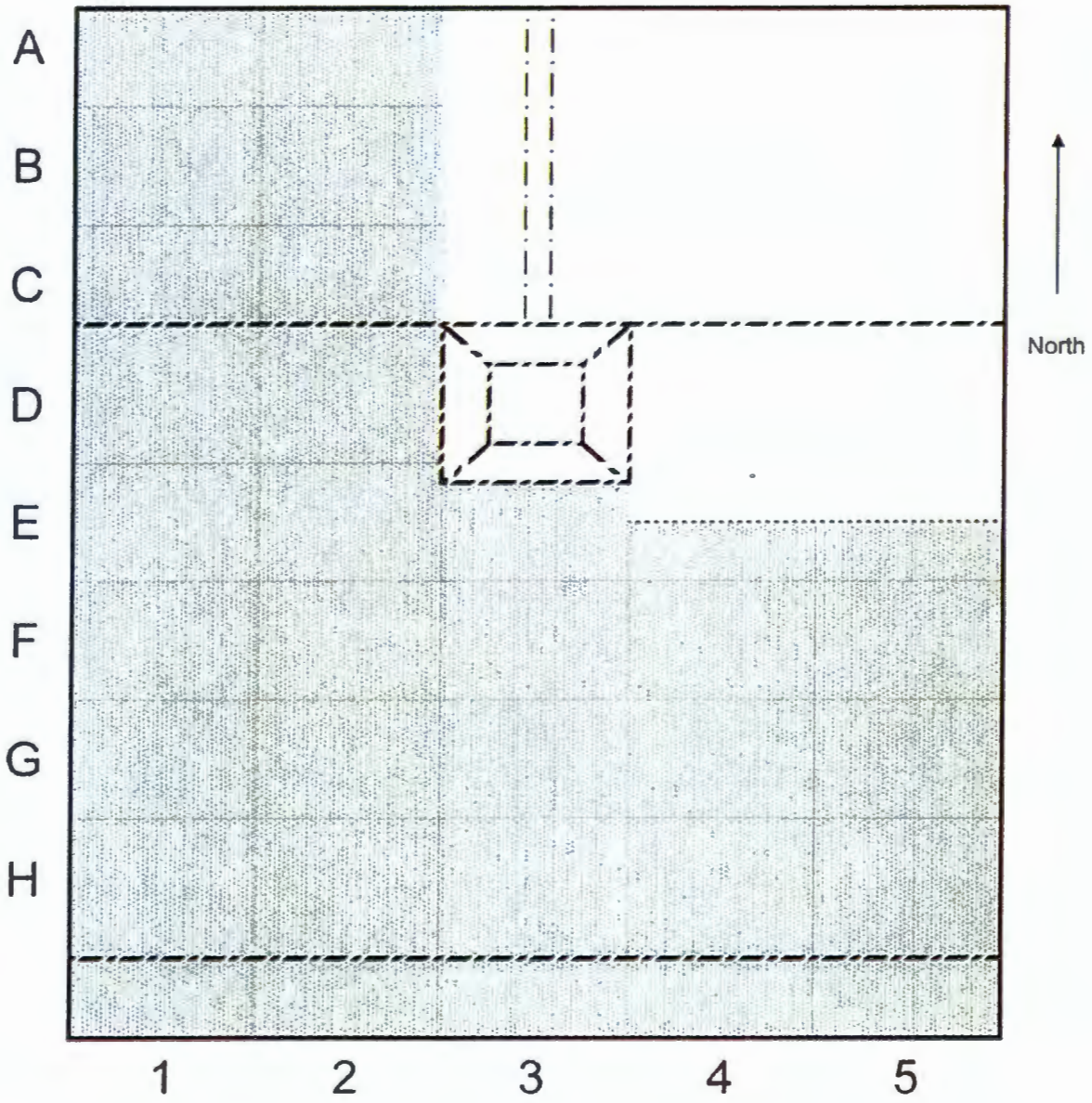


S/C S013213A00

CQA Moisture Density Map Cell 9

05-016-096

Date:	6/24/2010	Lift:	No 2
Report:	05-016-096	Operator:	J. Schut
Map No	2 of 6	Material:	Admix
Grid	95-ft x 90-ft	Notes:	

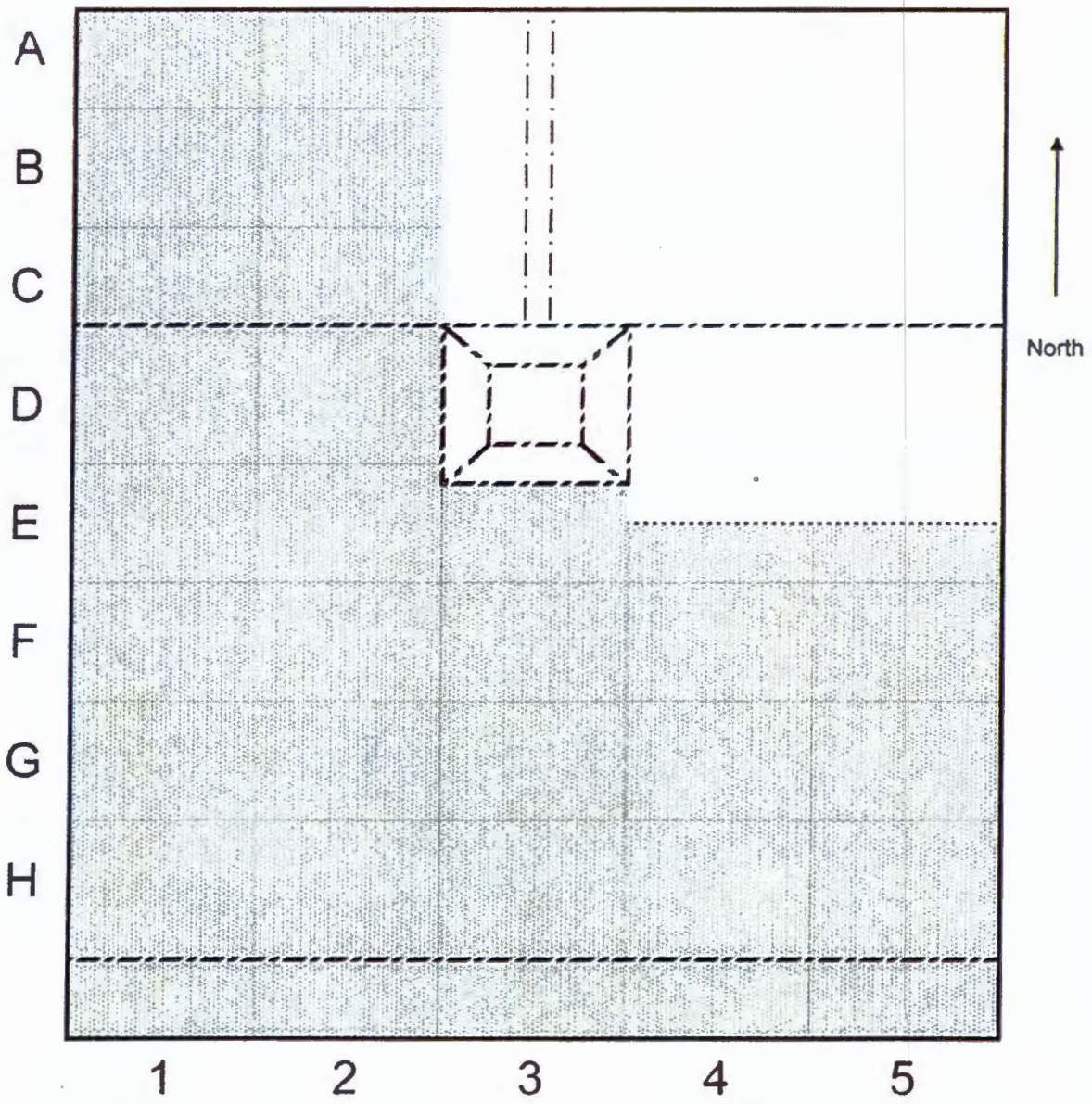


S/C: S013213A00

CQA Moisture Density Map Cell 9

05-016-096

Date:	6/24/2010	Lift:	No. 3
Report:	05-016-096	Operator:	J. Schut
Map No:	3 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	

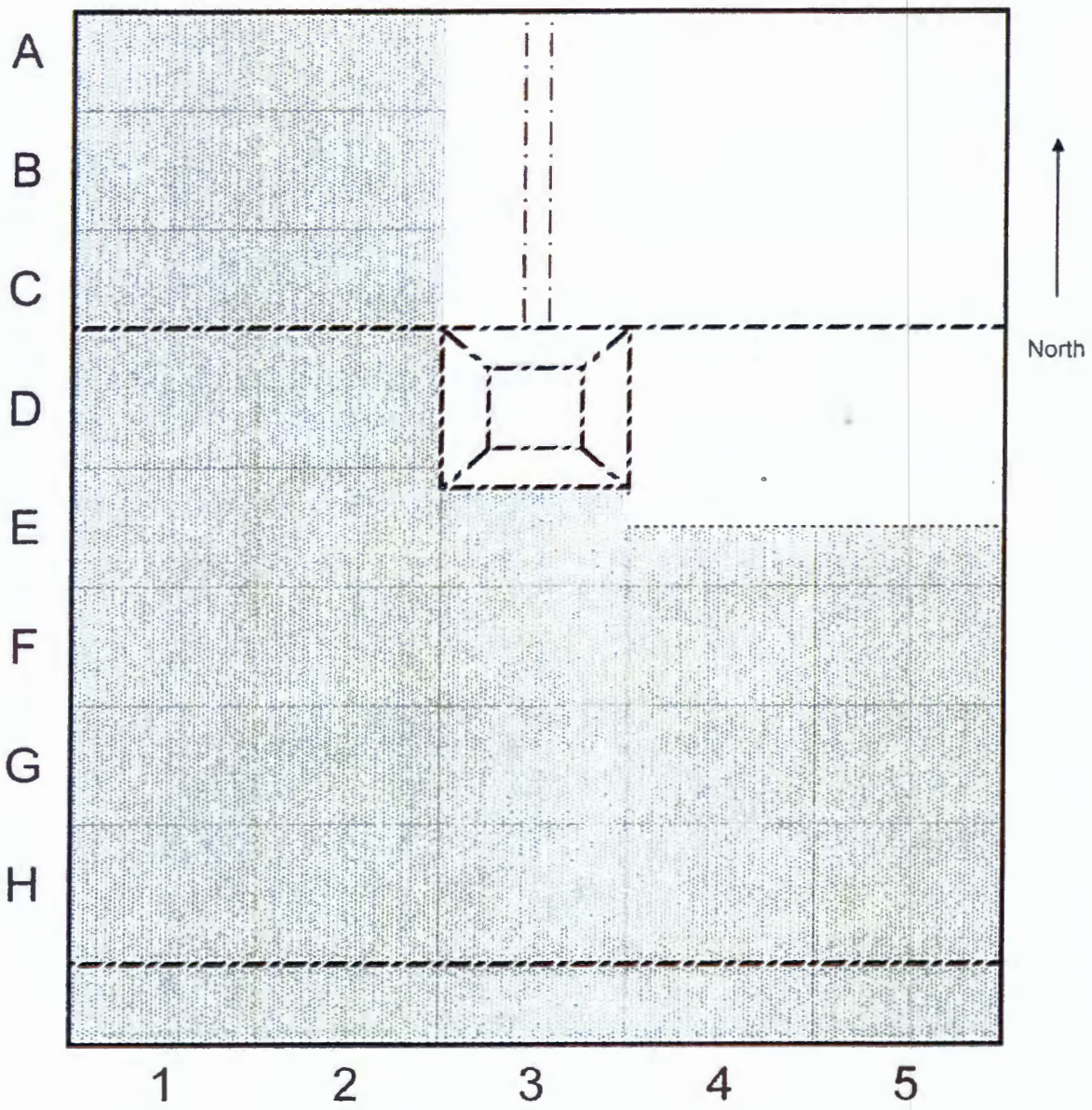


S/C: S013213A00

CQA Moisture Density Map Cell 9

05-016-096

Date:	6/24/2010	Lift:	No. 4
Report:	05-016-096	Operator:	J. Schut
Map No:	4 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	

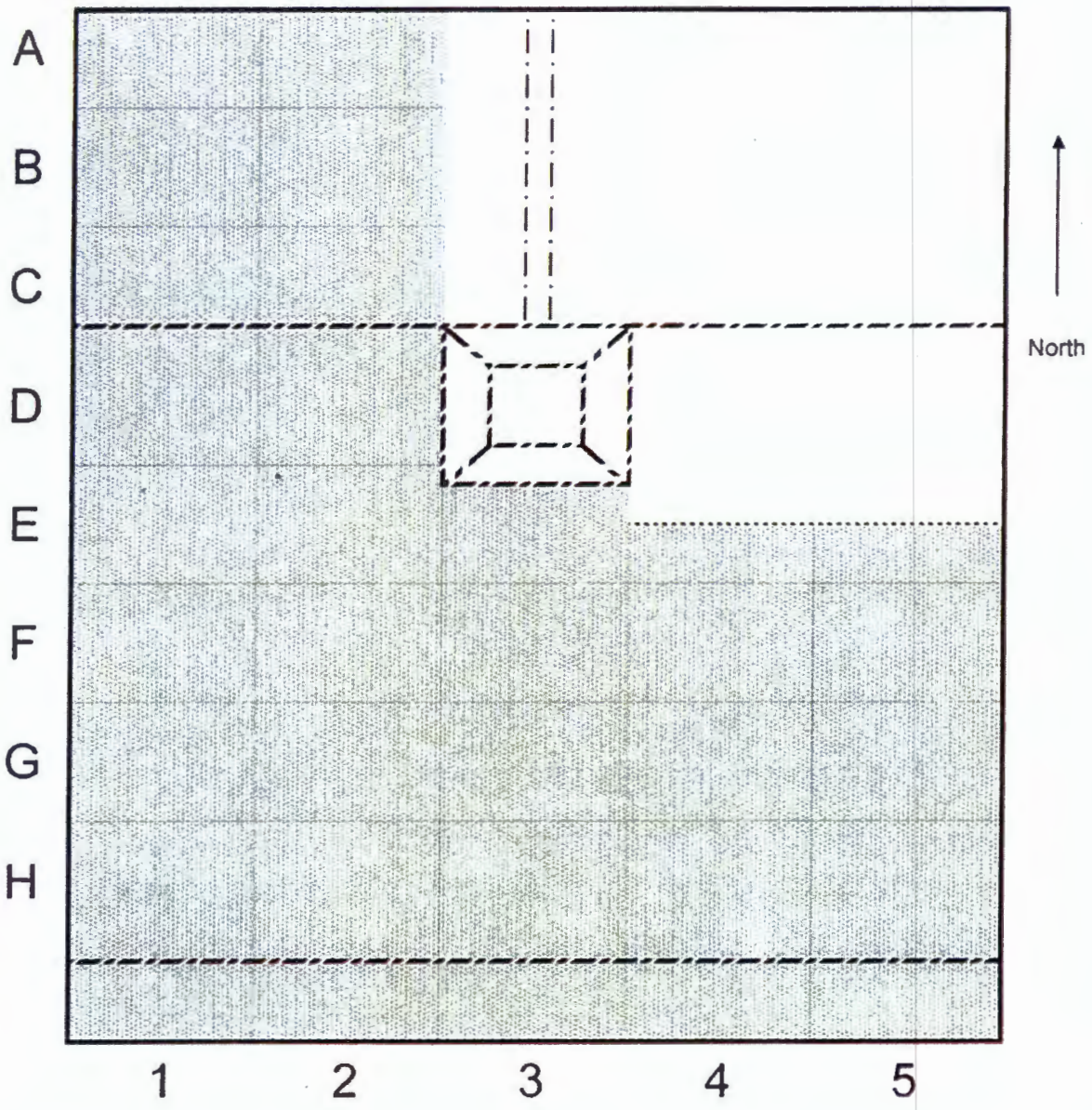


S/C: S013213A00

CQA Moisture Density Map Cell 9

05-016-096

Date:	6/24/2010	Lift:	No. 5
Report:	05-016-096	Operator:	J. Schut
Map No:	5 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes.	

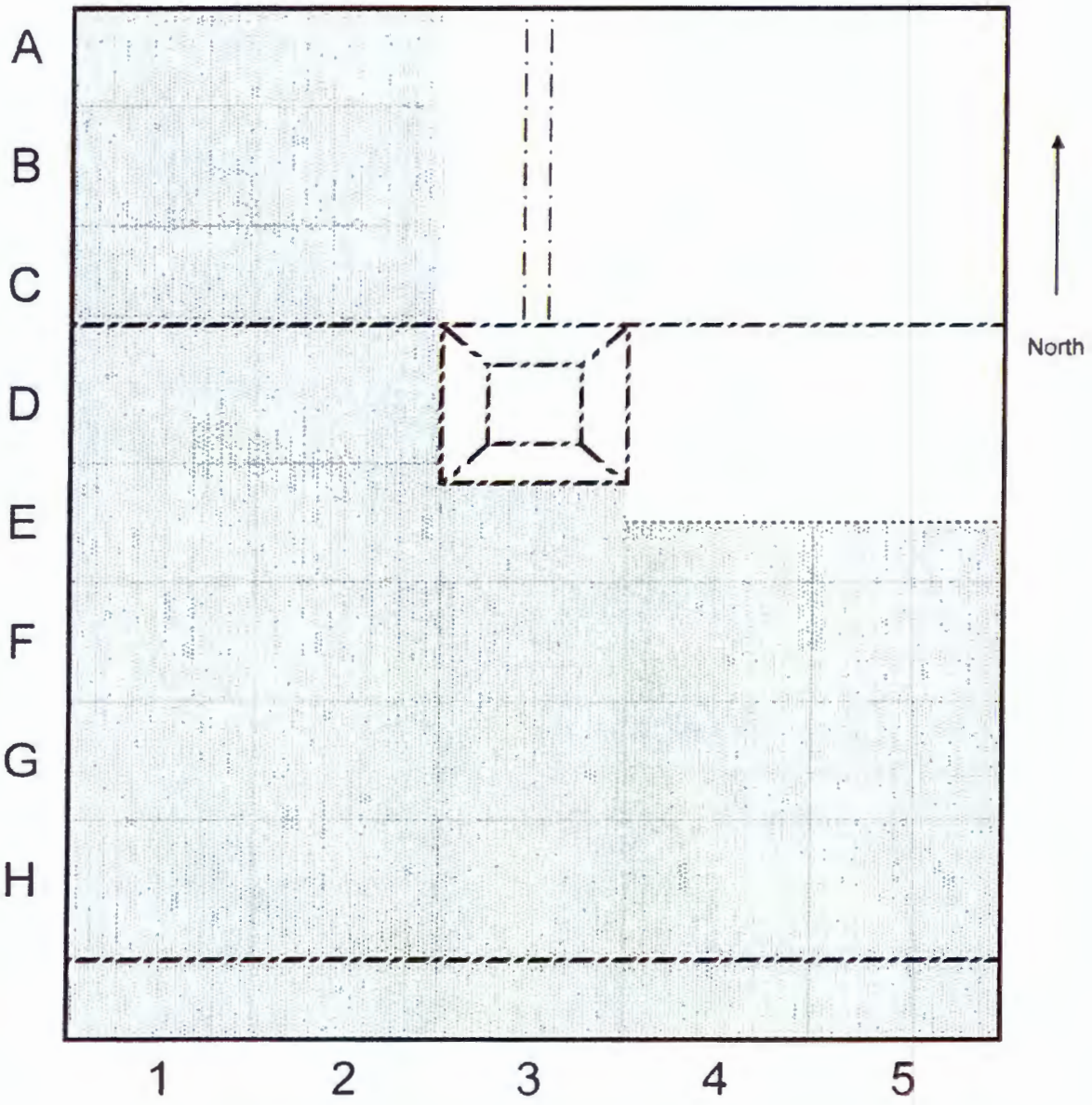


S/C S013213A00

CQA Moisture Density Map Cell 9

05-016-096

Date	6/24/2010	Lift	No. 6
Report:	05-016-096	Operator	J. Schut
Map No.	6 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes:	



UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: WCH
Submittal: 05-18J Admix Field Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	SL-440
Project:	S013213A00			Sample Description:	Admix Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	6/24/2010
Tested By:	J. Schut	Date:	6/24/2010	Sampled By:	J. Schut
Reviewed By:	T. Williams	Date:	6/25/2010	Date Received:	6/24/2010
Comments				Report No.:	05-016-096

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1. Mass of Proctor mold, W_1	3956.00 g
2. Mass of Proctor mold + sand, W_2	5394.90 g
3. Volume of mold, V_1	0.03 ft
4. Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	95.17 lb/ft^3

Calibration Cone

5. Mass of bottle + cone + sand (before use), W_3	4610.90 g
6. Mass of bottle + cone + sand (after use), W_4	2987.20 g
7. Weight of sand to fill the cone, $W_c = W_4 - W_3$	3.58 lb

Results from Field Tests

3 8. Mass of bottle + cone + sand (before use), W_6	6041.3 g
9. Mass of bottle + cone + sand (after use), W_8	3275.5 g
10. Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma_{d\,(sand)}}$	0.0265 ft^3
11. Mass of gallon can, W_5	371.40 g
12. Mass of gallon can + moist soil, W_7	2042.10 g
13. Mass of gallon can + dry soil, W_9	1806.10 g
14. Moist unit weight of soil in field, $\gamma = W_7 - W_5 / V_2$	139.21 lb/ft^3
15. Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	16.4%
16. Dry unit weight in the field, $\gamma_{d\,(sand)} = \gamma / (1+(w\,(\%)/100)$	119.55 lb/ft^3
17. Comparision moisture content =	16.3%
18. Dry unit weight comparison =	112.3 lb/ft^3

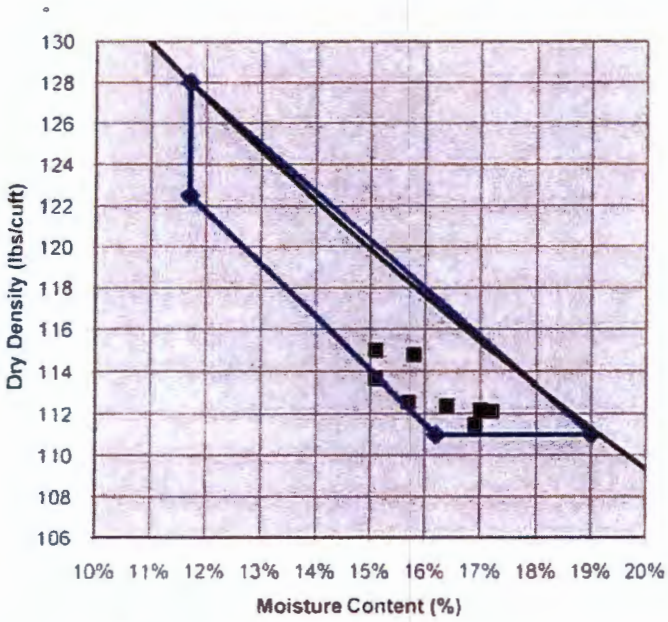
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client	WCH				
Submittal:	05-18J Admix Field Data				
Project:	S013213A00	Model:	3430	Troxler ID:	27881
Test Date:	6/25/2010	Moisture Std:	647	Density Std:	2237
Description:	Admix Soil	Offsets	Moisture -	Density -	
Report:	05-016-097	Acceptable Zone			
Comments:	Unless otherwise stated - All test at taken at a depth of 6-in.				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-444	2	7:30	3	114.8	15.8%	0.468	17.3%	91.0%	D3	Pass
SL-445	1	7:54	3	112.6	15.7%	0.497	N/A	85.0%	A3	Pass
SL-446	1	8:00	3	112.2	17.0%	0.502	N/A	91.0%	B3	Pass
SL-447	1	8:05	3	115.0	15.1%	0.465	N/A	88.0%	C3	Pass
SL-448	2	9:12	3	113.7	15.1%	0.482	N/A	85.0%	A3	Pass
SL-449	2	9:17	3	112.1	17.2%	0.503	N/A	92.0%	B3	Pass
SL-450	2	9:25	3	112.4	16.4%	0.500	N/A	89.0%	C3	Pass
SL-451	3	11.53	3	111.5	16.9%	0.511	N/A	89.0%	D3	Pass
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-444	SC	2036.4	1791	371.1
SL-445				
SL-446				
SL-447				
SL-448				
SL-449				
SL-450				
SL-451				



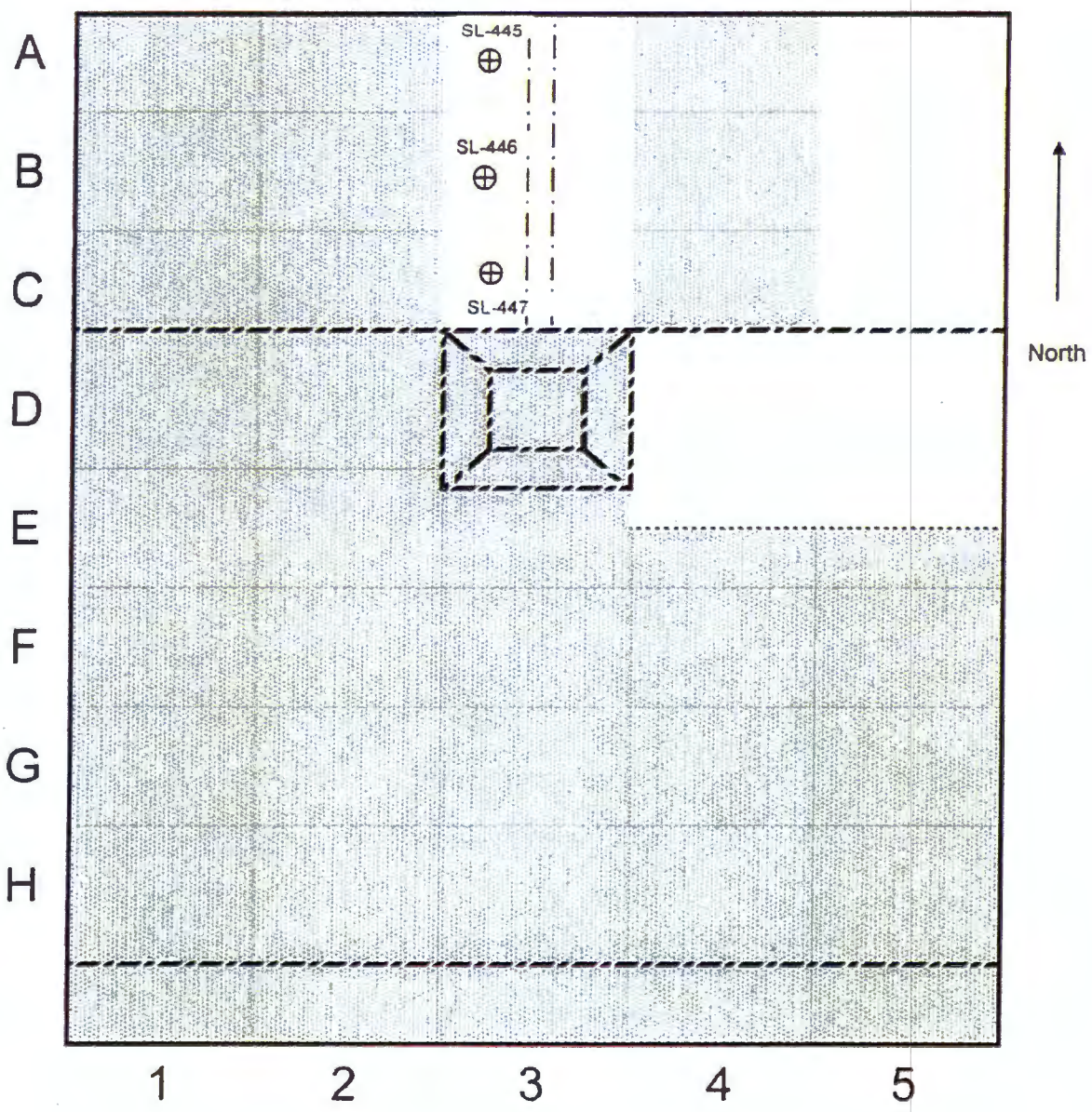
virotech Engineering & Consulting, Inc

6-29-2010
Date

S/C: S013213A00

CQA Moisture Density Map Cell 9

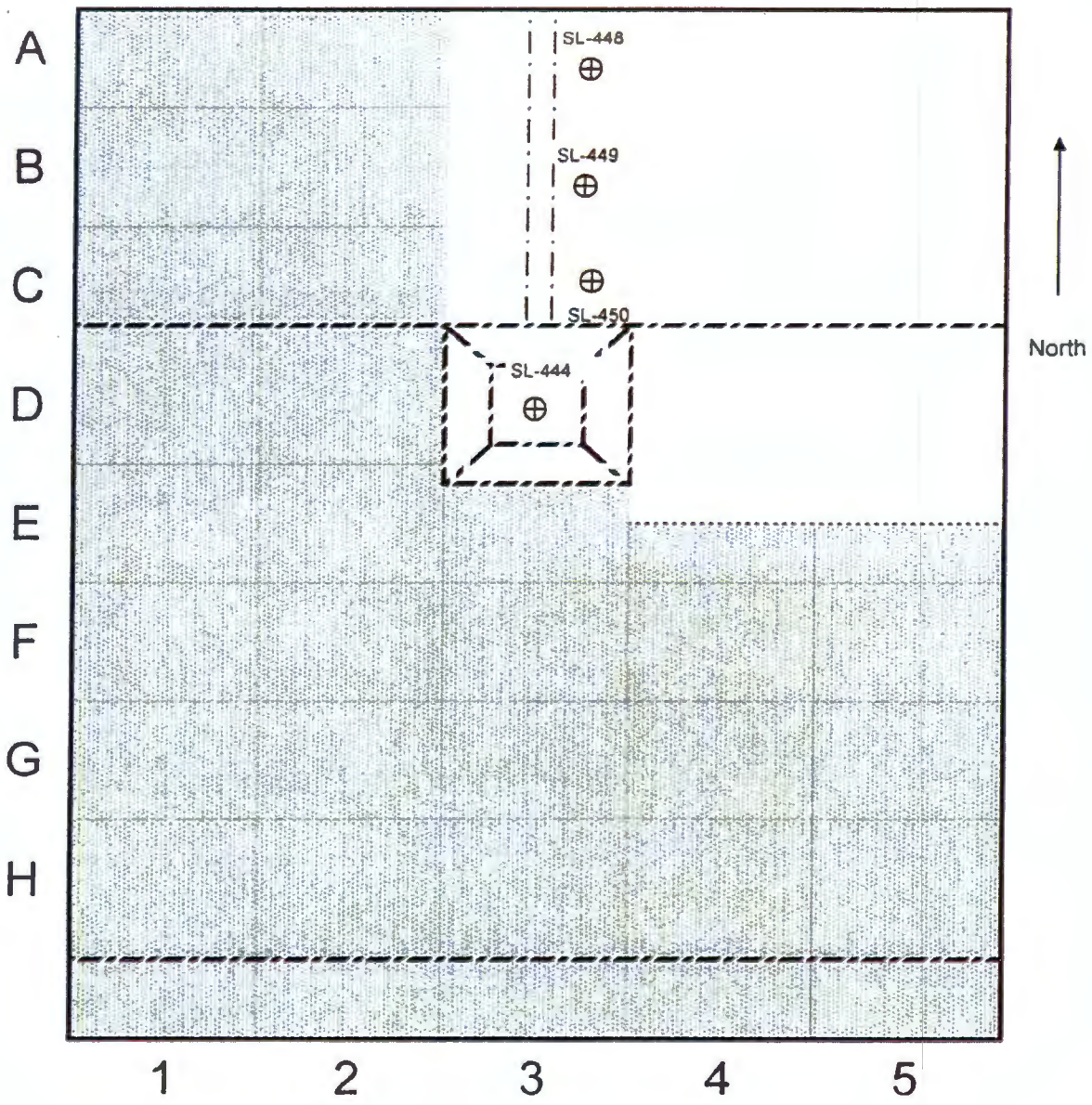
Date:	6/25/2010	Lift:	No. 1
Report:	05-016-097	Operator:	J. Schut
Map No:	1 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

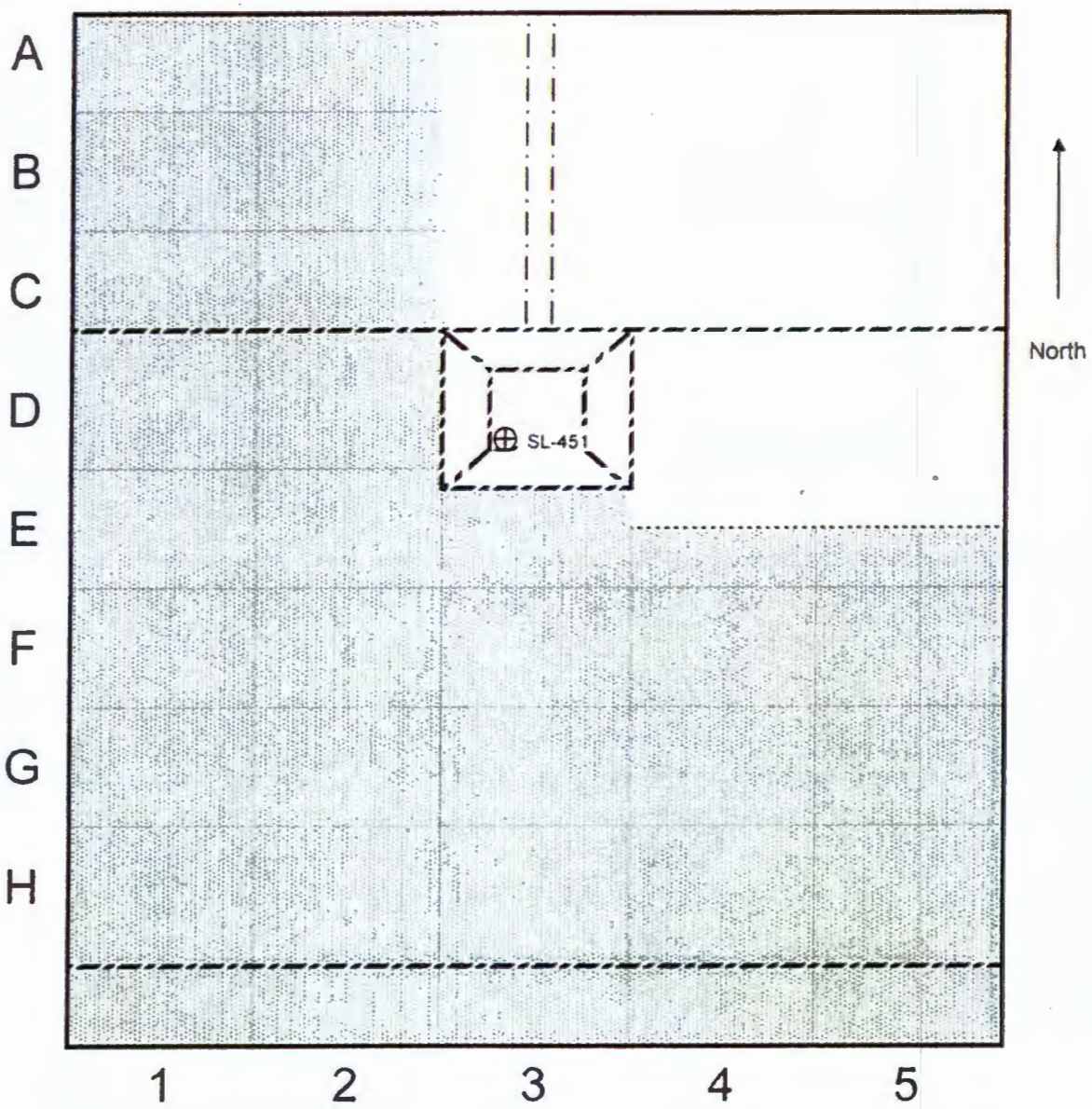
Date:	6/25/2010	Lift:	No. 2
Report:	05-016-097	Operator:	J. Schut
Map No:	2 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

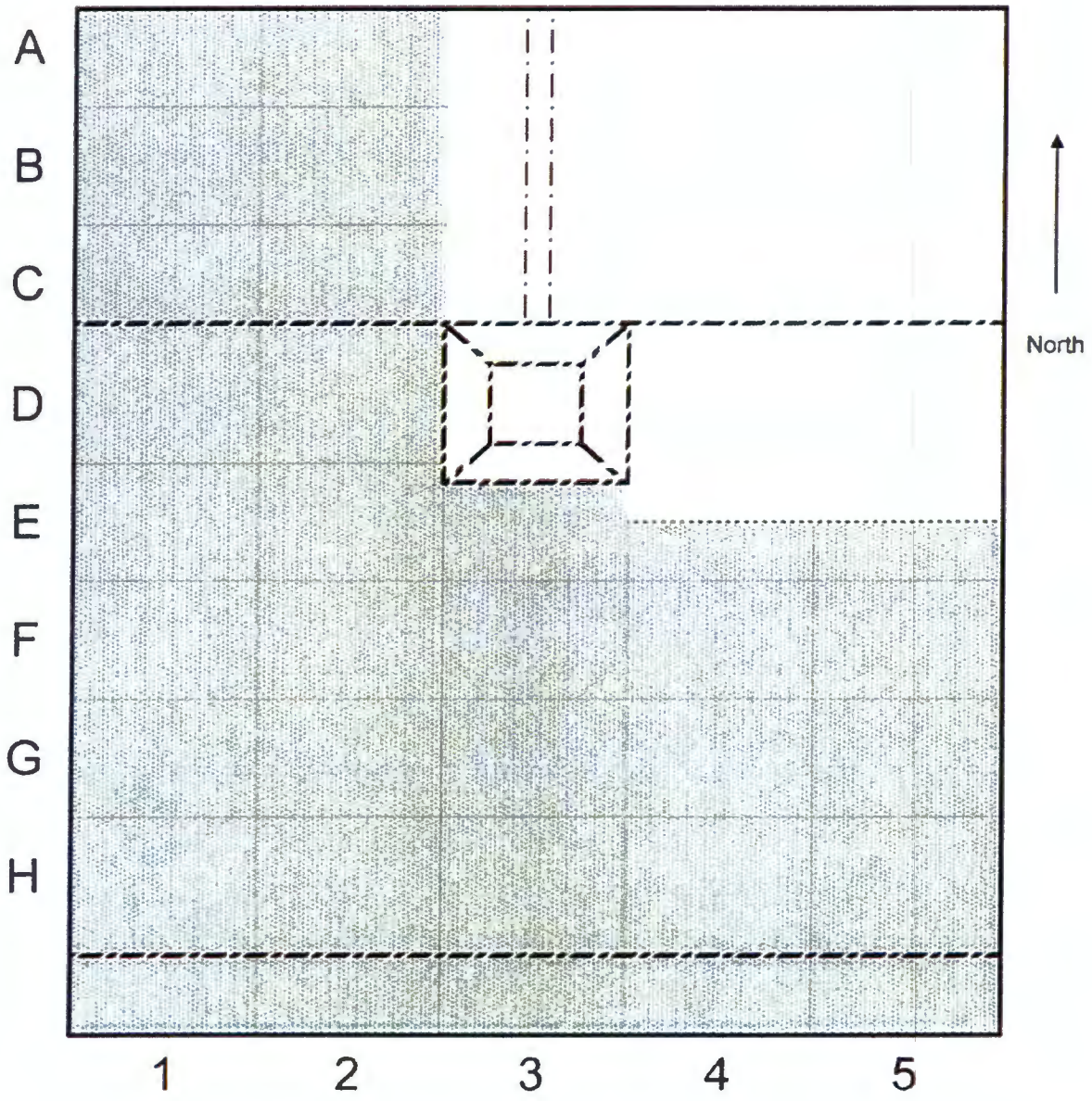
Date:	6/25/2010	Lift:	No. 3
Report:	05-016-097	Operator:	J Schut
Map No:	3 of 6	Material	Admix
Grid:	95-ft x 90-ft	Notes.	



S/C. S013213A00

CQA Moisture Density Map Cell 9

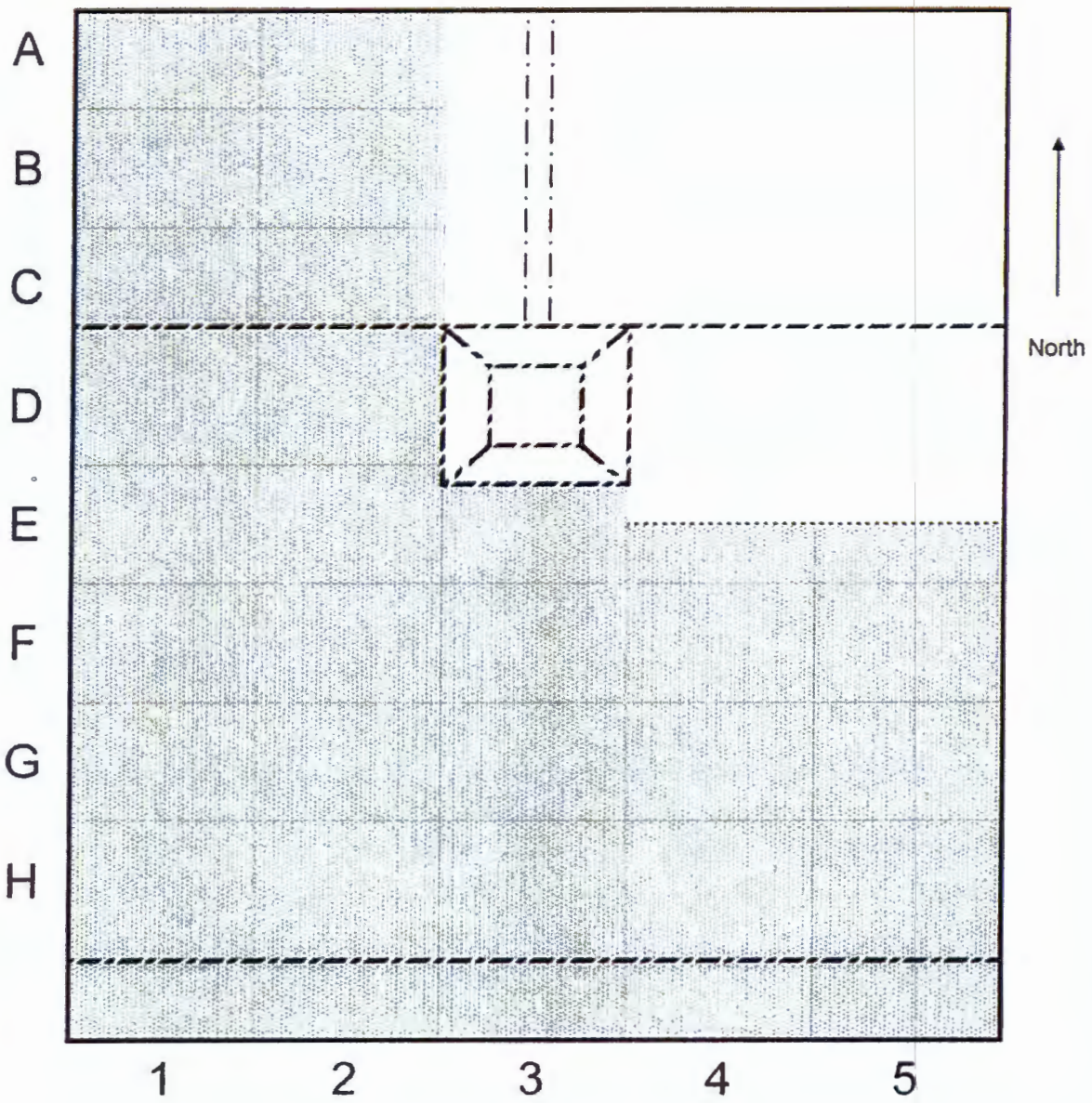
Date:	6/25/2010	Lift:	No. 4
Report:	05-016-097	Operator:	J. Schut
Map No:	4 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C. S013213A00

CQA Moisture Density Map Cell 9

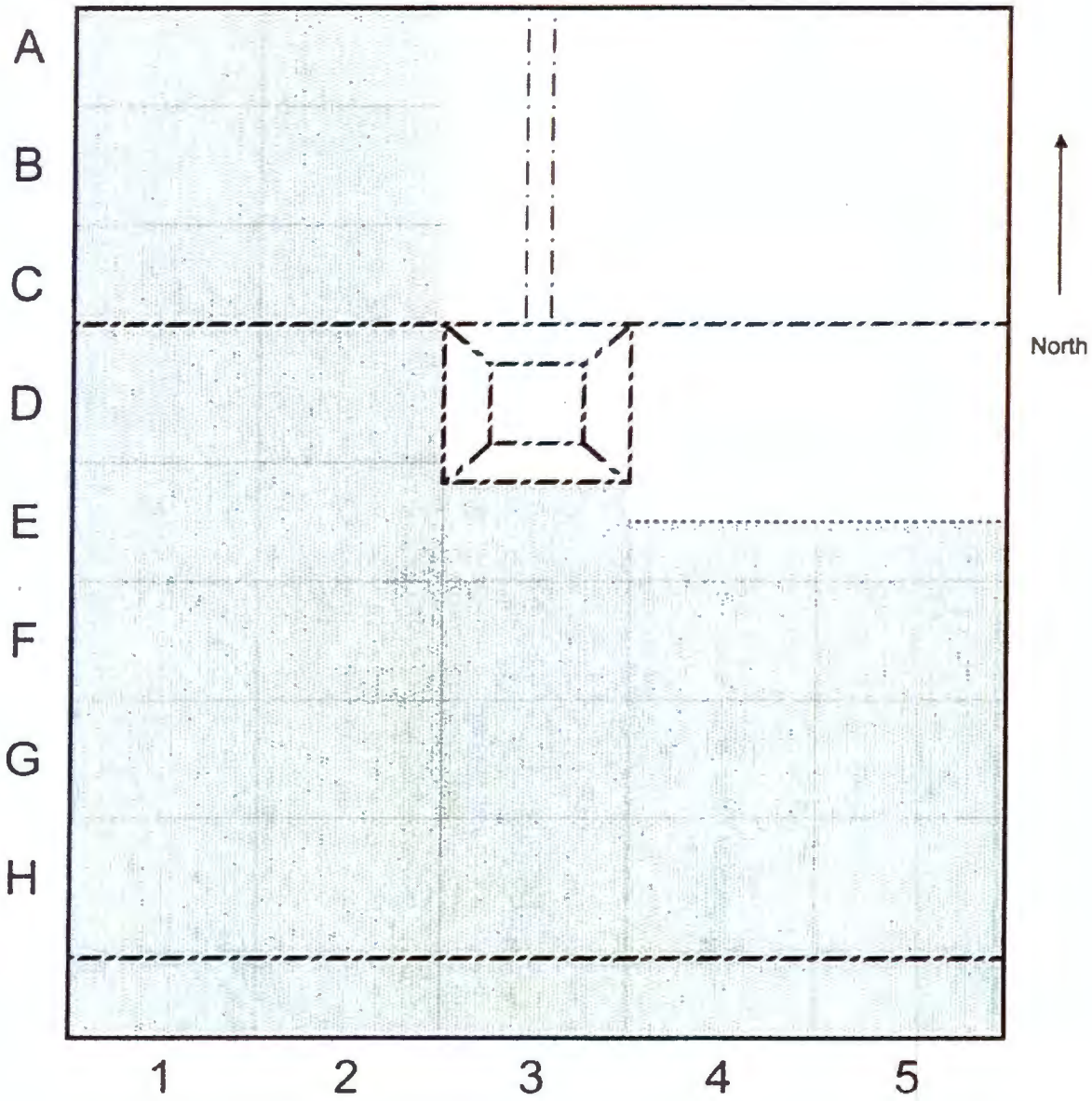
Date:	6/25/2010	Lift:	No. 5
Report:	05-016-097	Operator:	J. Schut
Map No	5 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C S013213A00

CQA Moisture Density Map Cell 9

Date	6/25/2010	Lift:	No 6
Report:	05-016-097	Operator:	J. Schut
Map No:	6 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes:	



UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client:	WCH
Submittal:	05-18J Admix Field Data

Sample Information

Contact Name.	Charlie Skiba			Sample ID:	SL-444
Project:	S013213A00			Sample Description:	Admix Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	6/25/2010
Tested By:	J. Schut	Date:	6/25/2010	Sampled By:	J. Schut
Reviewed By:	T. Williams TW	Date:	6/28/2010	Date Received:	6/25/2010
Comments				Report No.:	05-016-097

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1. Mass of Proctor mold, W_1	3956.00 g
2. Mass of Proctor mold + sand, W_2	5394.90 g
3. Volume of mold, V_1	0.03 ft
4. Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	95 17 lb/ft^3

Calibration Cone

5. Mass of bottle + cone + sand (before use), W_3	4610.90 g
6. Mass of bottle + cone + sand (after use), W_4	2987.20 g
7. Weight of sand to fill the cone, $W_c = W_4 - W_3$	3.58 lb

Results from Field Tests

3 8. Mass of bottle + cone + sand (before use), W_6	6030.8 g
9. Mass of bottle + cone + sand (after use), W_8	3219.5 g
10. Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma\, d\,(sand)}$	0.0275 ft^3
11. Mass of gallon can, W_5	371.10 g
12. Mass of gallon can + moist soil, W_7	2036.40 g
13. Mass of gallon can + dry soil, W_9	1791.00 g
14. Moist unit weight of soil in field, $\gamma = W_7 - W_5 / V_2$	133.45 lb/ft^3
15. Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	17.3%
16. Dry unit weight in the field, $\gamma_{d\,(sand)} = \gamma / (1+(w\,(\%)/100)$	113.78 lb/ft^3
17. Comparision moisture content =	15.8%
18. Dry unit weight comparison =	114.8 lb/ft^3

FIELD DENSITY TEST (ASTM D-6938)

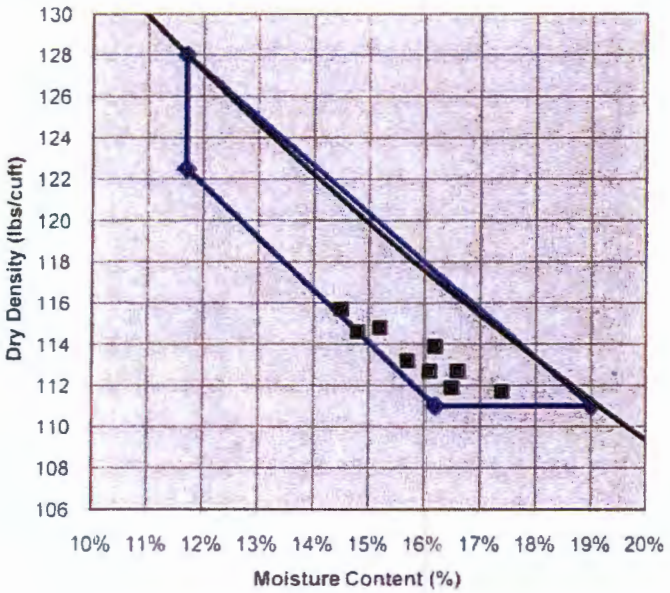
ENVIROTECH

Client: WCH
Submittal: 05-18J Admix Field Data
Project: S013213A00
Test Date: 6/28/2010
Description: Admix Soil
Report: 05-016-098
Comments: Unless otherwise stated - All test at taken at a depth of 6-in.

Model: 3430 Troxler ID: 27881
Moisture Std: 647 Density Std: 2201
Offsets: Moisture - Density -
Acceptable Zone

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-452	1	6:44	3	112.7	16.6%	0.496	N/A	90.0%	C5	Pass
SL-453	1	6:48	3	112.7	16.1%	0.495	N/A	88.0%	B5	Pass
SL-454	1	6:53	3	111.7	17.4%	0.508	N/A	92.0%	A5	Pass
SL-455	4	7:45	3	115.7	14.5%	0.457	N/A	86.0%	D3	Pass
SL-456	1	8:10	3	111.9	16.5%	0.507	16.8%	88.0%	D5	Pass
SL-457	1	8:26	3	114.8	15.2%	0.469	N/A	88.0%	D4	Pass
SL-458	3	9:52	3	113.9	16.2%	0.479	N/A	91.0%	A3	Pass
SL-459	3	9:56	3	114.6	14.8%	0.470	N/A	85.0%	B3	Pass
SL-460	3	10:02	3	113.2	15.7%	0.489	N/A	87.0%	C3	Pass
SL-461	2	12:14	3	112.4	15.9%	0.500	N/A	86.0%	A4	Pass

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-452				
SL-453				
SL-454				
SL-455	Sh. Tube			
SL-456	SC	2033.9	1795.3	371.1
SL-457				
SL-458				
SL-459				
SL-460				
SL-461				



Envirotech Engineering & Consulting, Inc

11/9/10
Date

FIELD DENSITY TEST (ASTM D-6938)

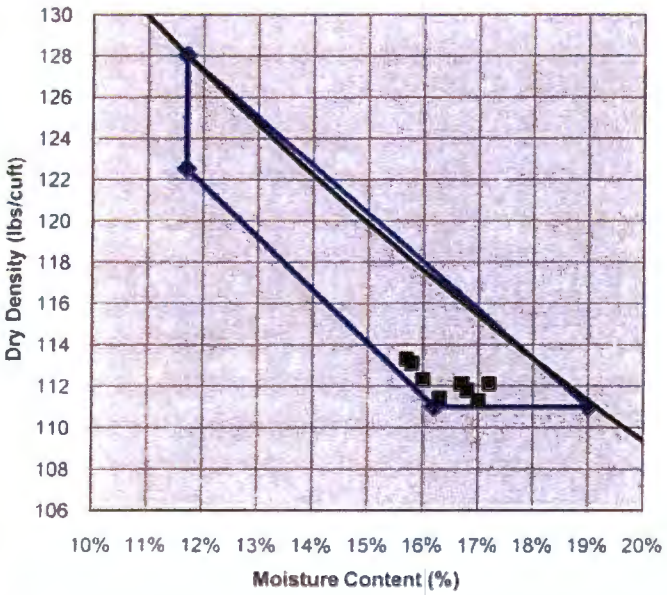
ENVIROTECH

Client: WCH
Submittal: 05-18J Admix Field Data
Project: S013213A00
Test Date: 6/28/2010
Description: Admix Soil
Report: 05-016-098
Comments: Unless otherwise stated - All test at taken at a depth of 6-in.

Model: 3430 Troxler ID: 27881
Moisture Std: 647 Density Stc 2201
Offsets: Moisture - Density -
Acceptable Zone

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-462	2	12:18	3	111.8	16.8%	0.507	N/A	89.0%	B4	Pass
SL-463	2	12:21	3	111.3	17.0%	0.515	N/A	89.0%	C4	Pass
SL-464	2	14:07	3	112.1	16.7%	0.504	N/A	89.0%	A5	Pass
SL-465	2	14:13	3	112.1	17.2%	0.504	N/A	92.0%	B5	Pass
SL-466	2	14:17	3	112.3	16.0%	0.500	N/A	86.0%	C5	Pass
SL-467	2	15:11	3	113.1	15.8%	0.490	N/A	87.0%	D5	Pass
SL-468	2	15:16	3	111.4	16.3%	0.513	N/A	86.0%	D4	Pass
SL-469	5	15:23	3	113.3	15.7%	0.487	N/A	87.0%	D3	Pass
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-462				
SL-463				
SL-464				
SL-465				
SL-466				
SL-467				
SL-468				
SL-469				



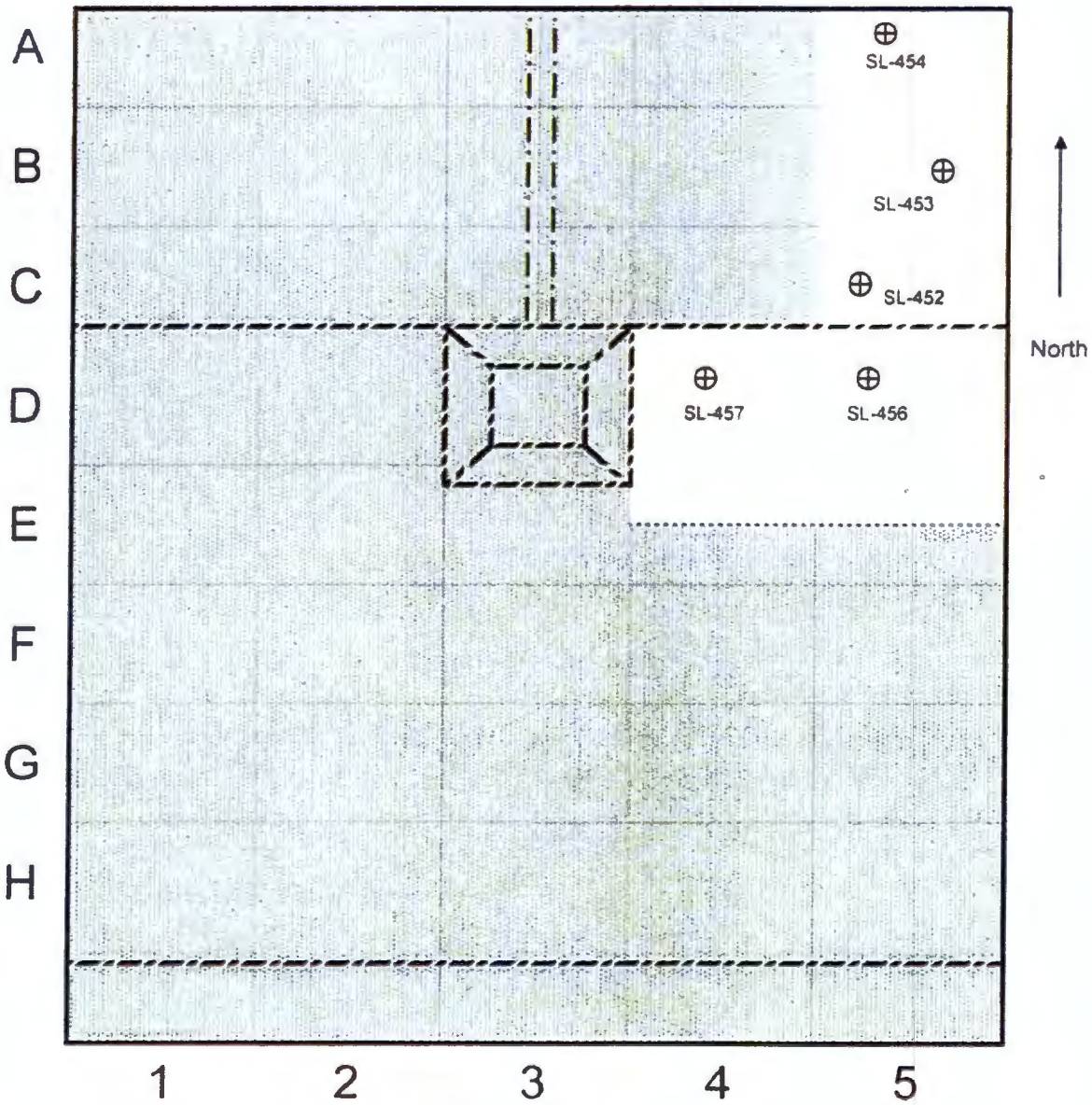
rirotech Engineering & Consulting, Inc

11/9/10
Date

S/C S013213A00

CQA Moisture Density Map Cell 9

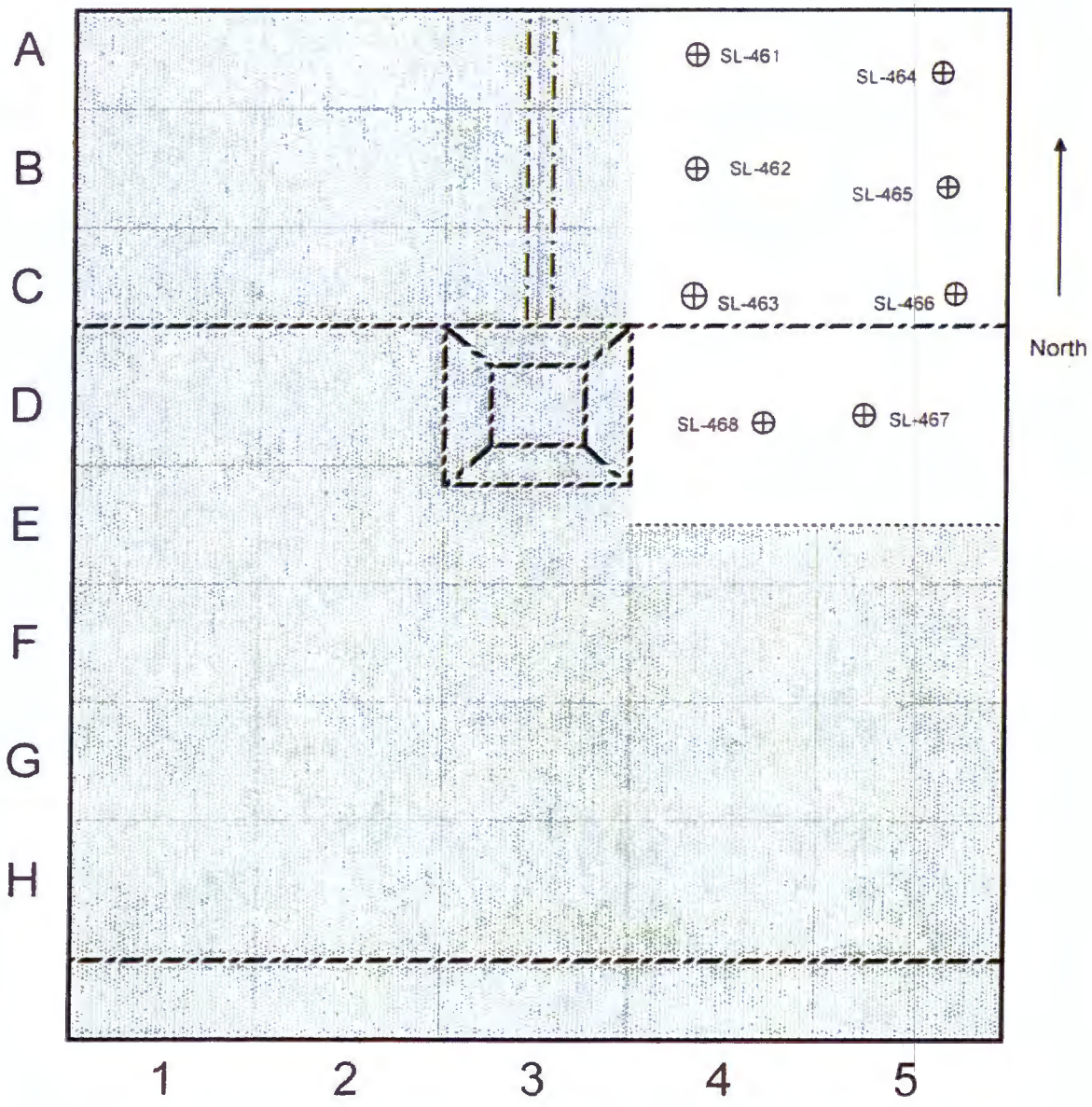
Date	6/28/2010	Lift	No. 1
Report:	05-016-098	Operator	J Schut
Map No.	1 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C: S013213A00

CQA Moisture Density Map Cell 9

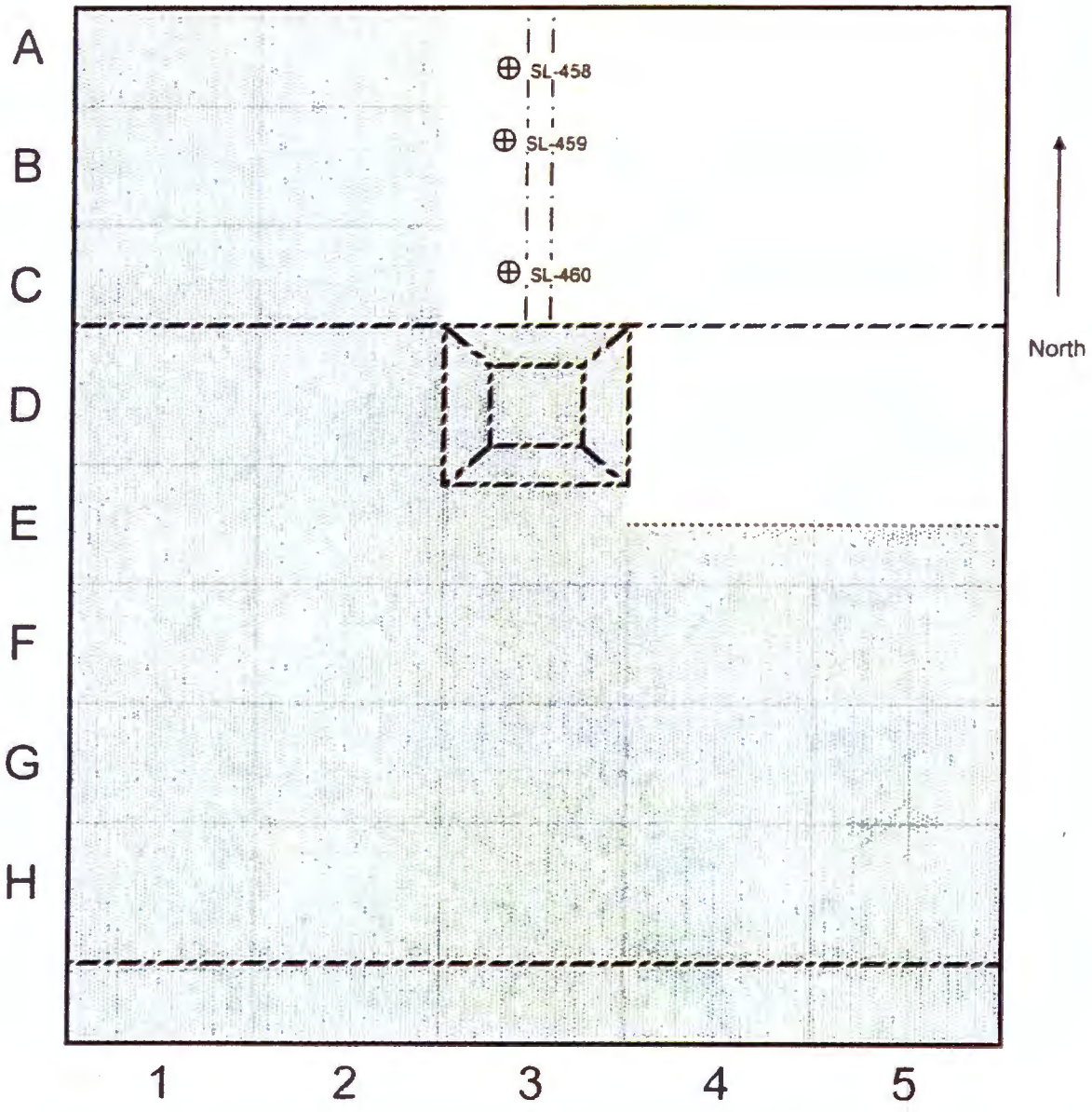
Date	6/28/2010	Lift:	No. 2
Report:	05-016-098	Operator:	J. Schut
Map No.	2 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 9

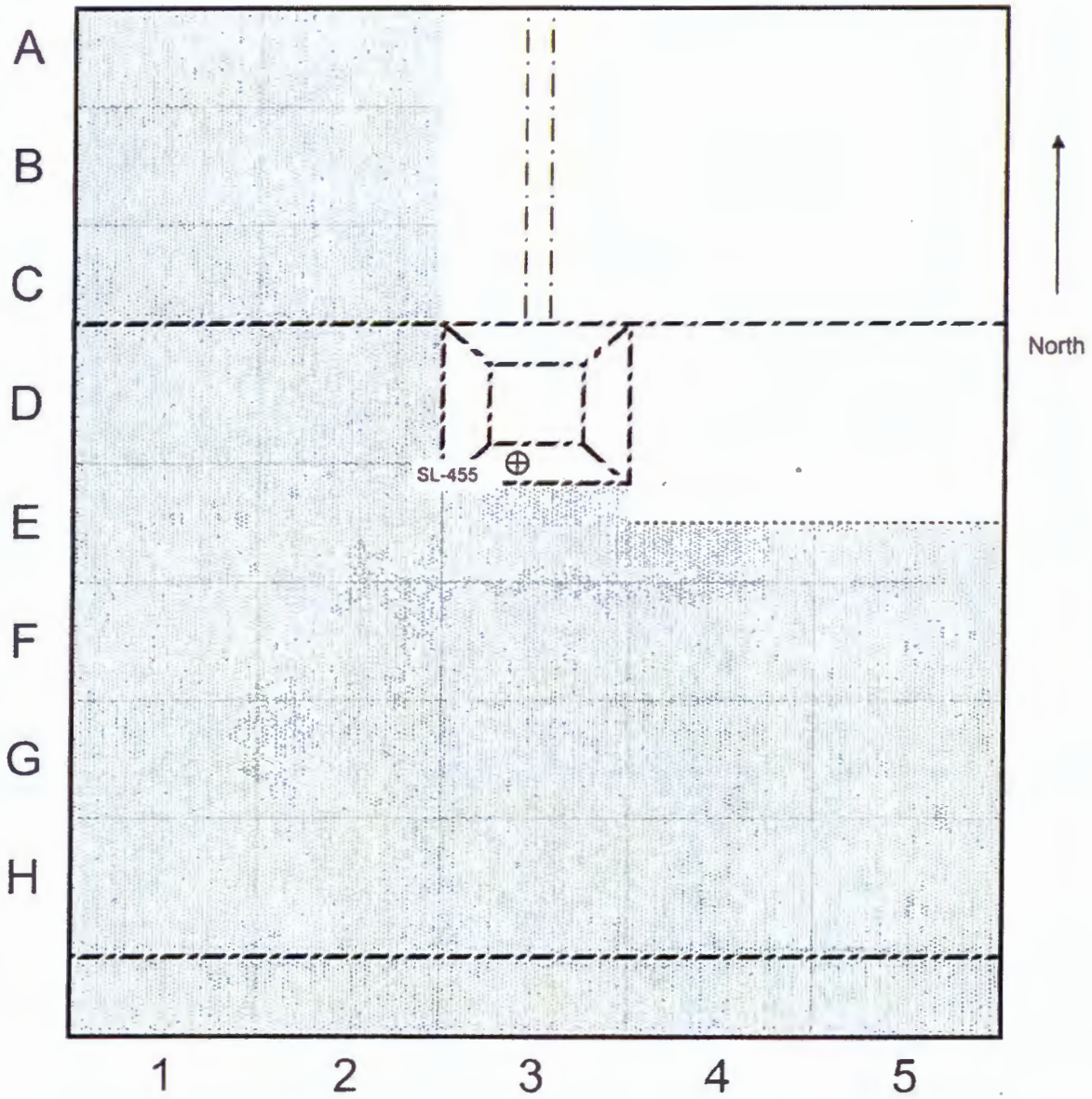
Date	6/28/2010	Lift:	No 3
Report:	05-016-098	Operator:	J. Schut
Map No.	3 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

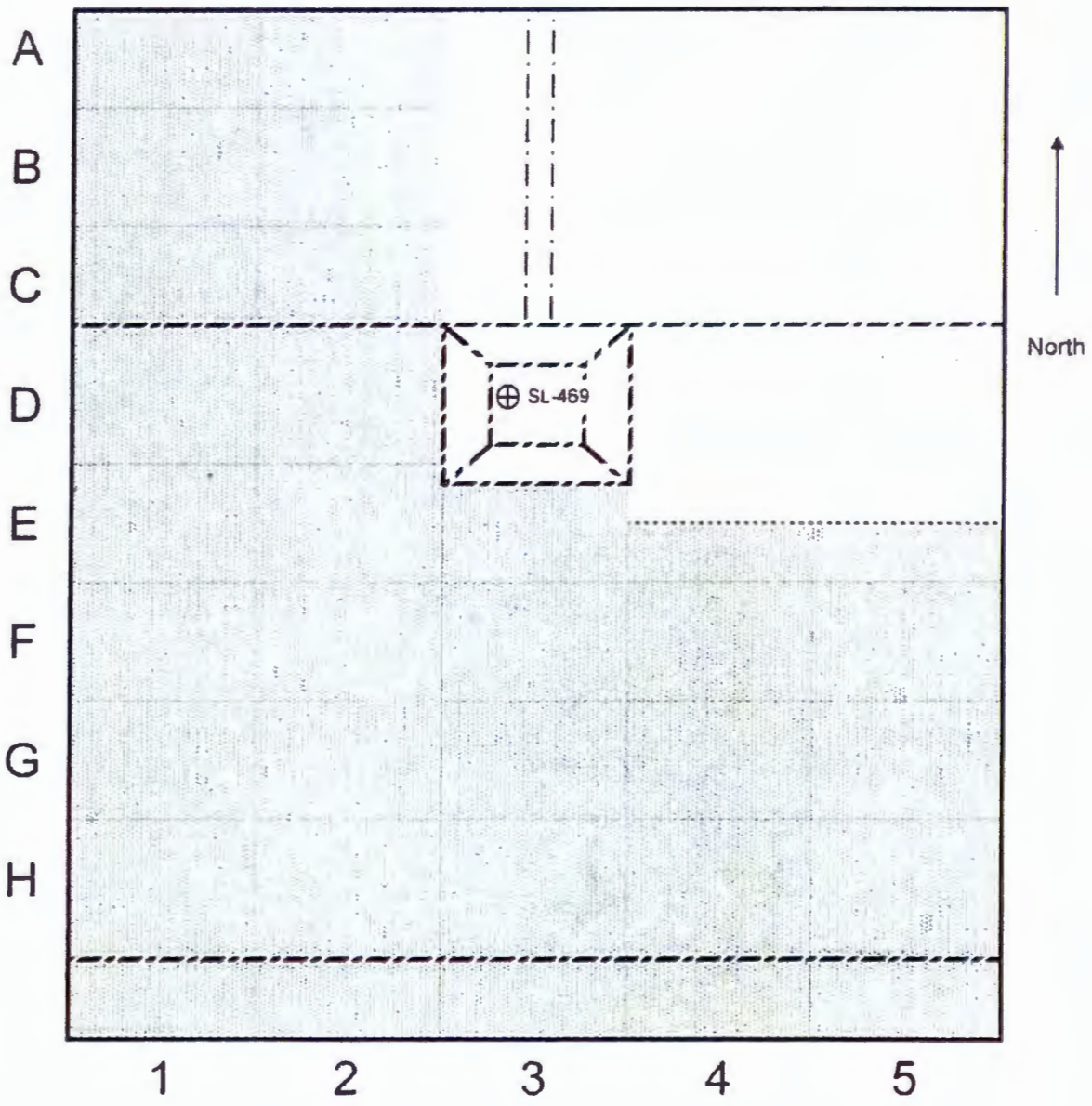
Date:	6/28/2010	Lift:	No 4
Report	05-016-098	Operator:	J. Schut
Map No.	4 of 6	Material:	Admix
Grid	95-ft x 90-ft	Notes	



S/C: S013213A00

CQA Moisture Density Map Cell 9

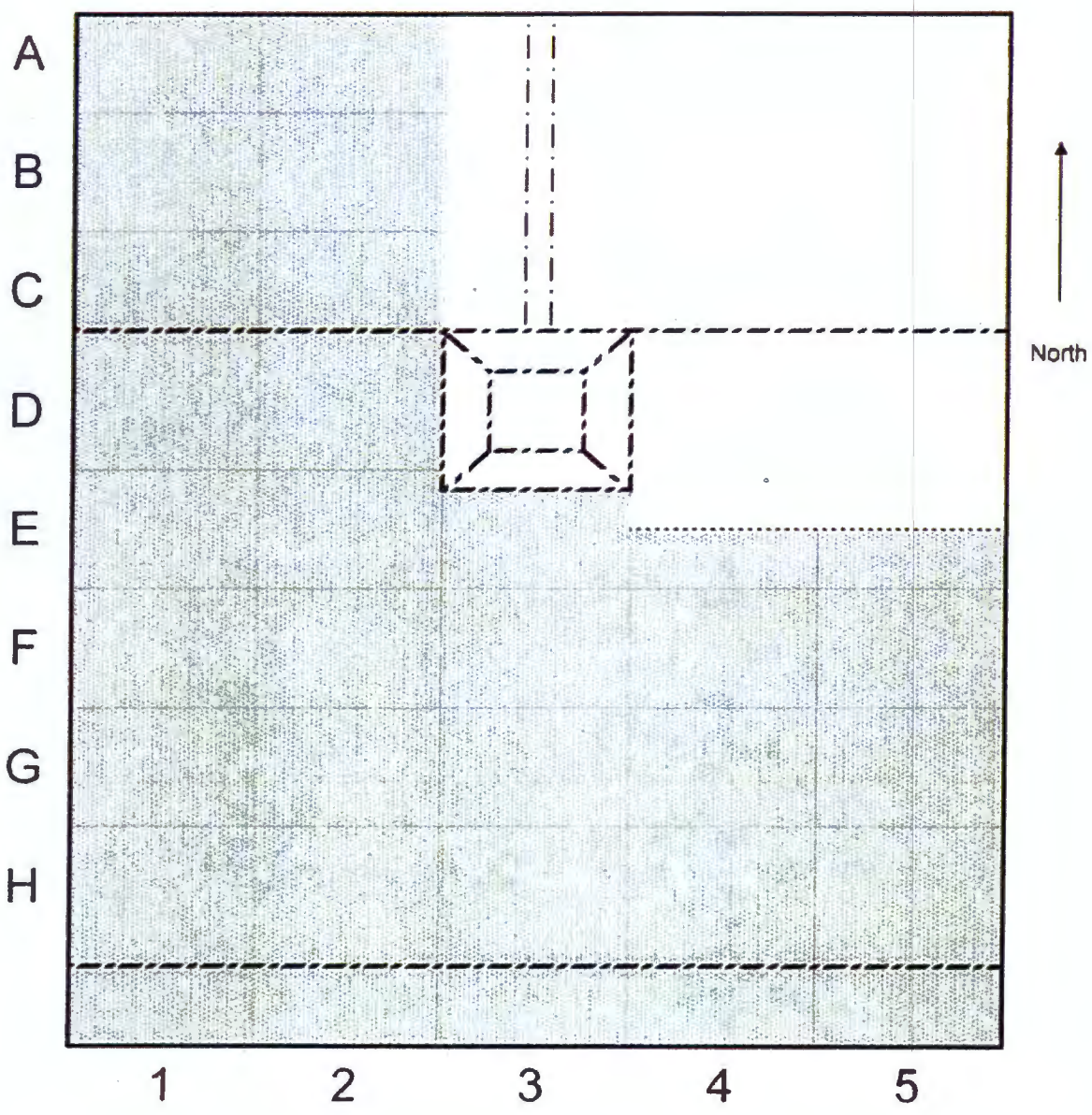
Date	6/28/2010	Lift	No 5
Report:	05-016-098	Operator	J Schut
Map No.	5 of 6	Material:	Admix
Grid	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

Date:	6/28/2010	Lift:	No 6
Report:	05-016-098	Operator:	J Schut
Map No:	6 of 6	Material	Admix
Grid:	95-ft x 90-ft	Notes:	



UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580) 234-8780 | Fax 580) 237-4302

Client:	WCH
Submittal:	05-18J Admix Field Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	SL-456
Project:	S013213A00			Sample Description:	Admix Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	6/28/2010
Tested By:	J. Schut	Date:	6/28/2010	Sampled By:	J. Schut
Reviewed By:	T. Williams	Date:	6/30/2010	Date Received:	6/28/2010
Comments				Report No.:	05-016-098

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1. Mass of Proctor mold, W_1	3956.00 g
2. Mass of Proctor mold + sand, W_2	5394.90 g
3. Volume of mold, V_1	0.03 ft
4. Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	95.17 lb/ft^3

Calibration Cone

5. Mass of bottle + cone + sand (before use), W_3	4610.90 g
6. Mass of bottle + cone + sand (after use), W_4	2987.20 g
7. Weight of sand to fill the cone, $W_c = W_4 - W_3$	3.58 lb

Results from Field Tests

3 8. Mass of bottle + cone + sand (before use), W_6	5853.8 g
9. Mass of bottle + cone + sand (after use), W_8	3021.5 g
10. Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma\, d\,(sand)}$	0.0280 ft^3
11. Mass of gallon can, W_5	371.10 g
12. Mass of gallon can + moist soil, W_7	2033.90 g
13. Mass of gallon can + dry soil, W_9	1795.30 g
14. Moist unit weight of soil in field, = $W_7 - W_5 / V_2$	130.93 lb/ft^3
15. Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	16.8%
16. Dry unit weight in the field, $_{d\,(sand)}$ = / (1+(w (%)/100)	112.14 lb/ft^3
17. Comparision moisture content =	16.5%
18. Dry unit weight comparison =	111.9 lb/ft^3

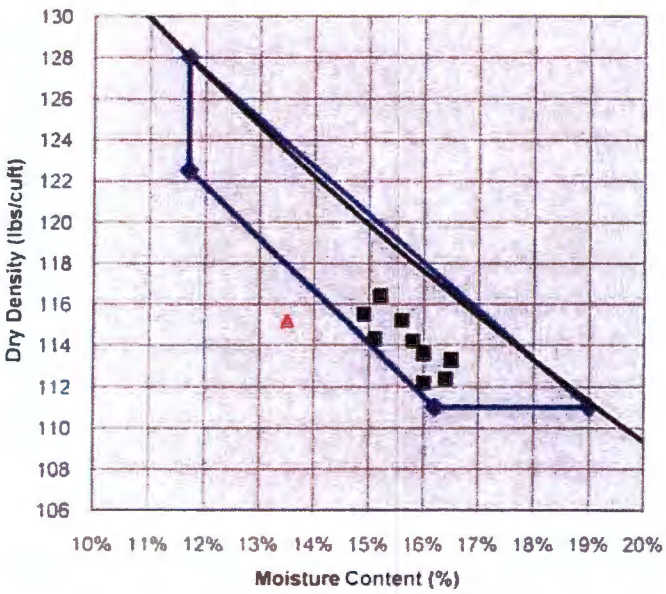
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client	WCH				
Submittal	05-18J Admix Field Data				
Project	S013213A00	Model	3430	Troxler ID	27881
Test Date.	6/29/2010	Moisture Std	644	Density Stc	2233
Description.	Admix Soil	Offsets	Moisture -	Density -	
Report:	05-016-099	Acceptable Zone			
Comments	Unless otherwise stated - All test at taken at a depth of 6-in.				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-473	4	9:51	3	113.6	16.0%	0.483	N/A	89.0%	A3	Pass
SL474	4	9:56	3	114.2	15.8%	0.477	N/A	89.0%	B3	Pass
SL-475	4	10:00	3	115.2	15.6%	0.464	N/A	91.0%	C3	Pass
SL-476	3	13:47	3	114.3	15.1%	0.474	N/A	86.0%	A4	Pass
SL-477	3	13:50	3	115.5	14.9%	0.459	N/A	88.0%	B4	Pass
SL-478	3	13:55	3	113.3	16.5%	0.487	N/A	91.0%	C4	Pass
SL-479	3	13:58	3	115.2	13.5%	0.464	N/A	79.0%	C5	Fail
SL-480	3	14:13	3	112.4	16.4%	0.500	N/A	89.0%	B5	Pass
SL-481	3	14:17	3	112.2	16.0%	0.502	N/A	86.0%	A5	Pass
SL-479A	3	15:48	6	116.4	15.2%	0.448	N/A	92.0%	C5	Pass

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-473				
SL474				
SL-475	Sh Tube			
SL-476				
SL-477				
SL-478				
SL-479				
SL-480				
SL-481				
SL-479A				



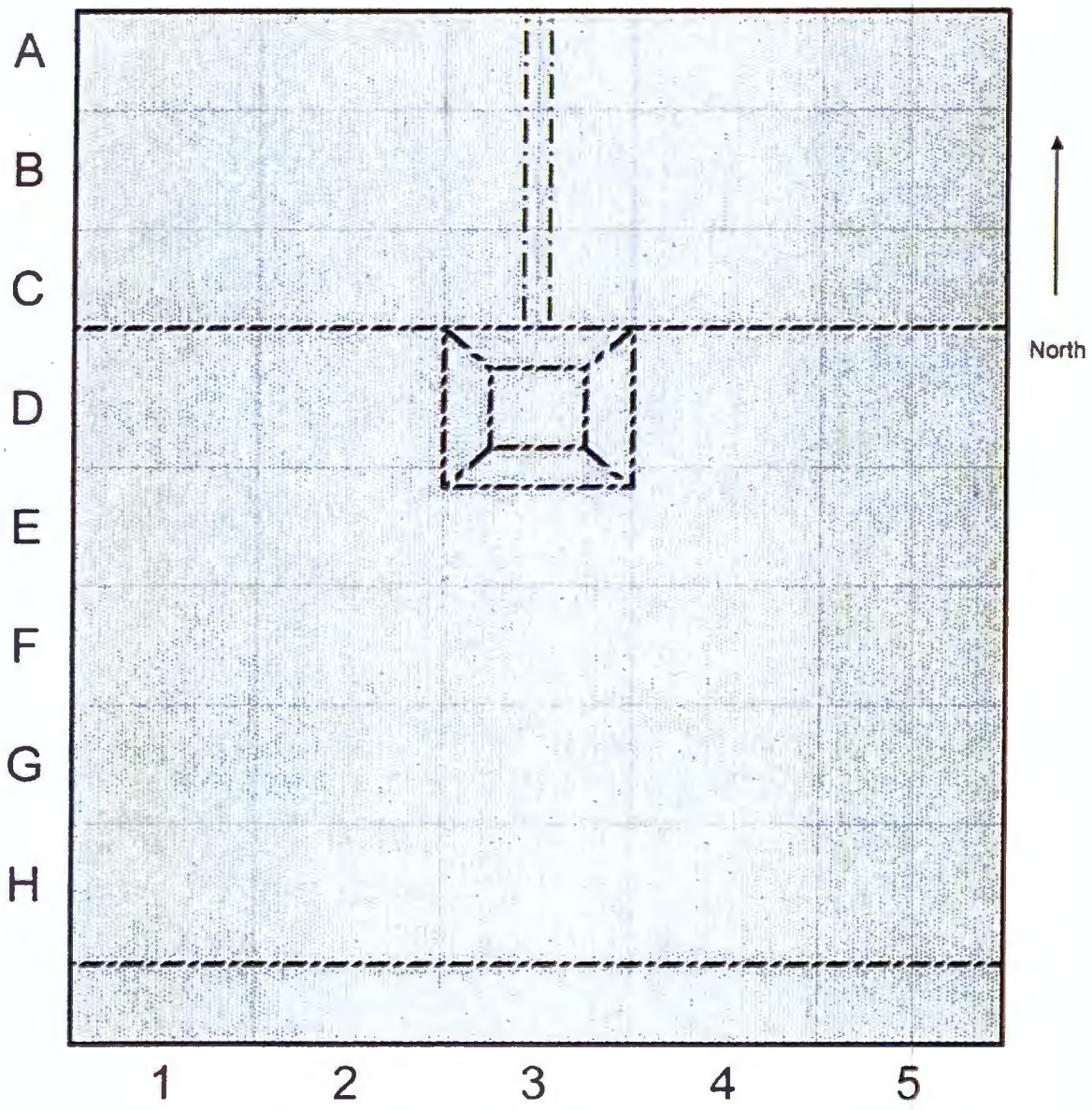
Envirotech Engineering & Consulting, Inc

7/10/10
Date

S/C S013213A00

CQA Moisture Density Map Cell 9

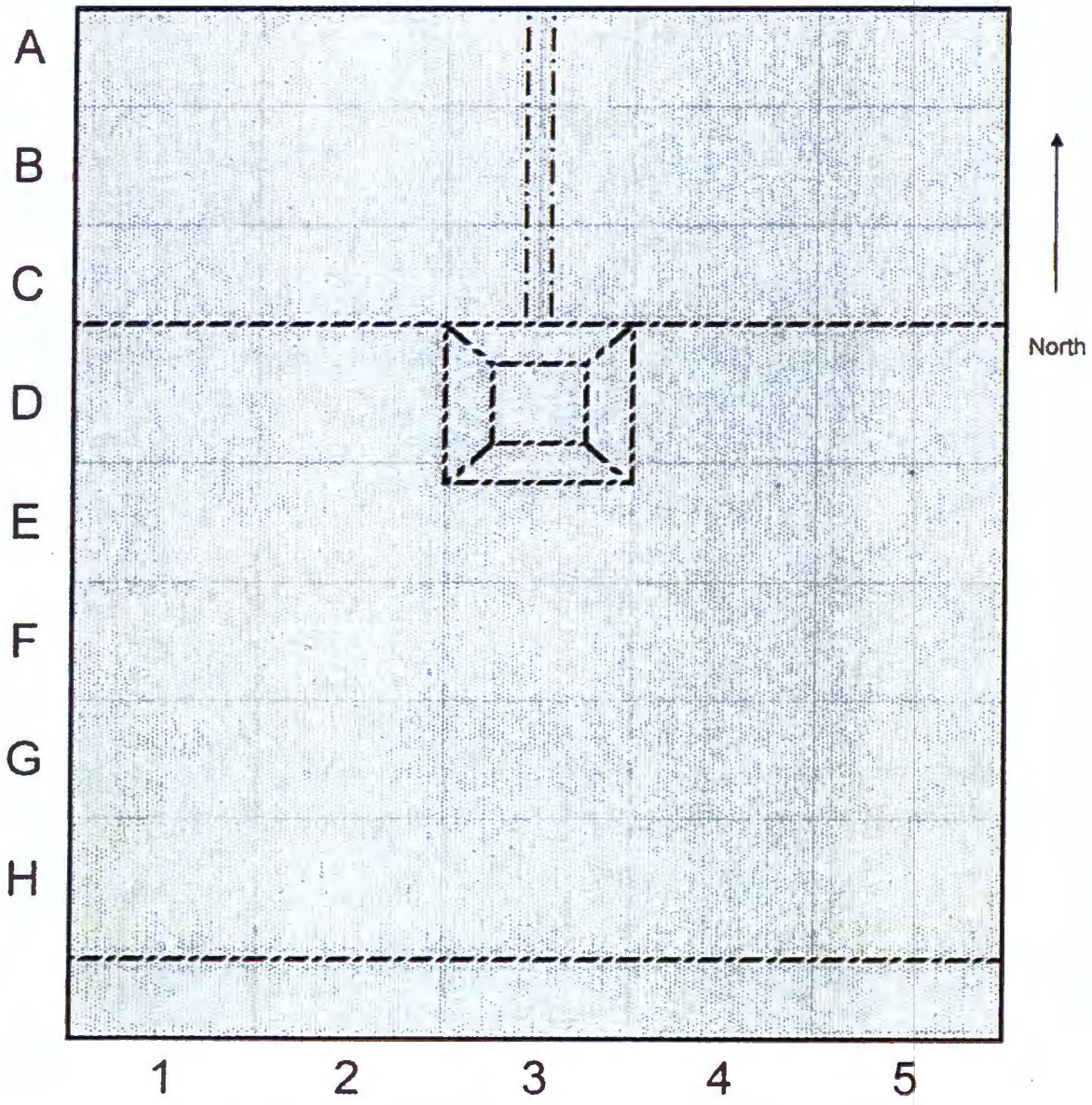
Date	6/29/2010	Lift	No 1
Report:	05-016-099	Operator:	J. Schut
Map No:	1 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C. S013213A00

CQA Moisture Density Map Cell 9

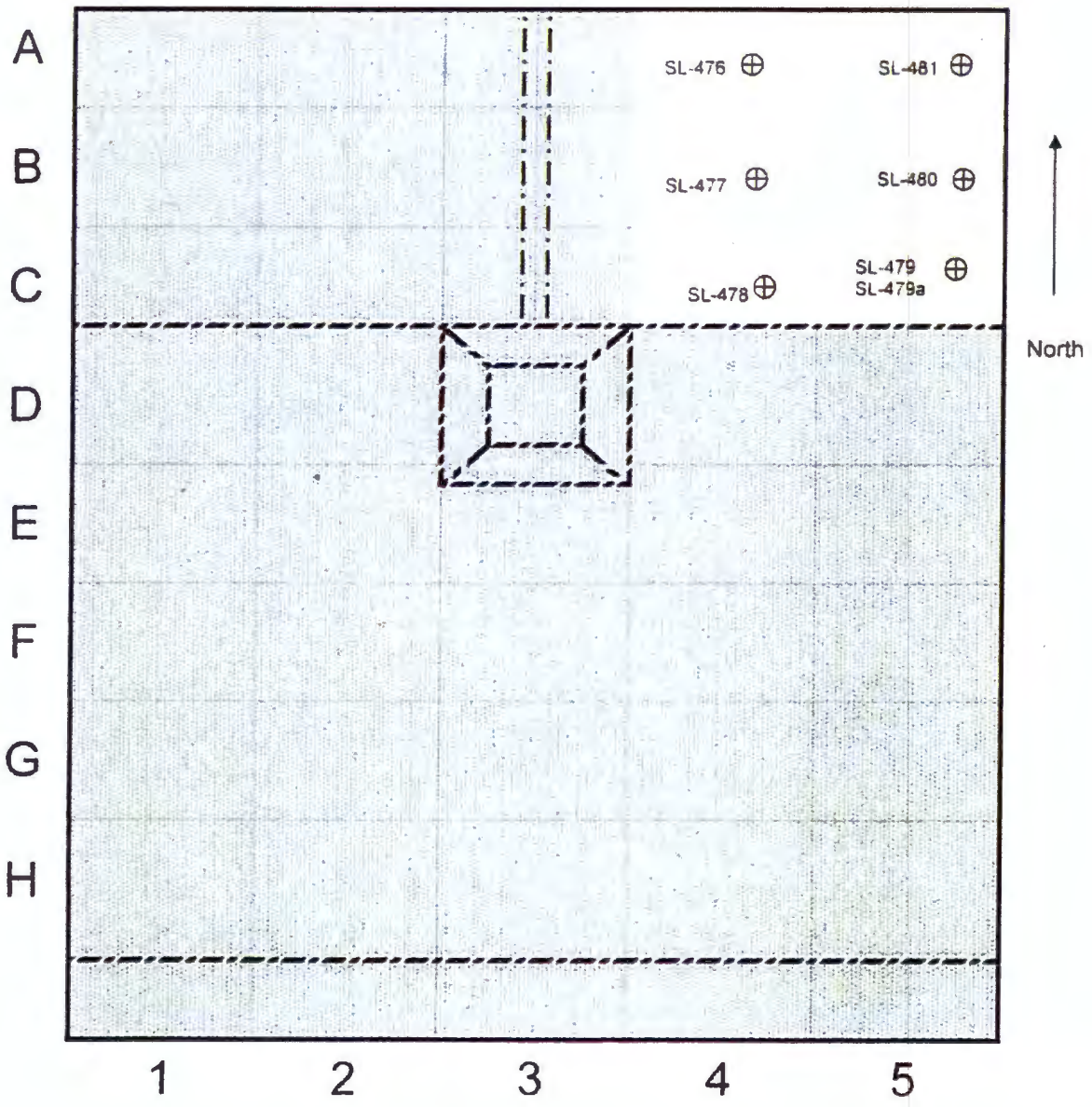
Date	6/29/2010	Lift.	No 2
Report.	05-016-099	Operator:	J. Schut
Map No:	2 of 6	Material:	Admix
Grid.	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

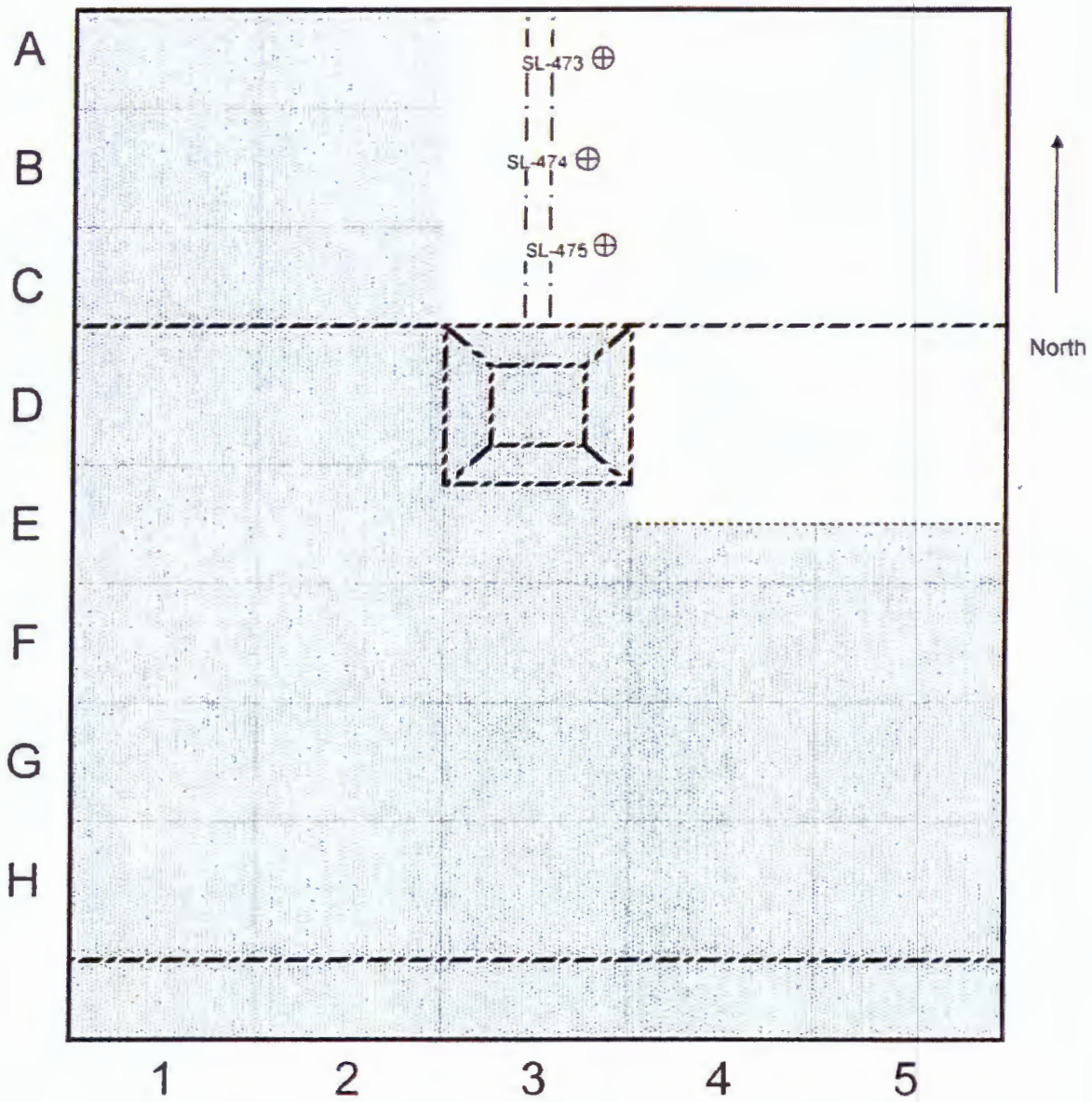
Date	6/29/2010	Lift	No. 3
Report	05-016-099	Operator	J Schut
Map No:	3 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C. S013213A00

CQA Moisture Density Map Cell 9

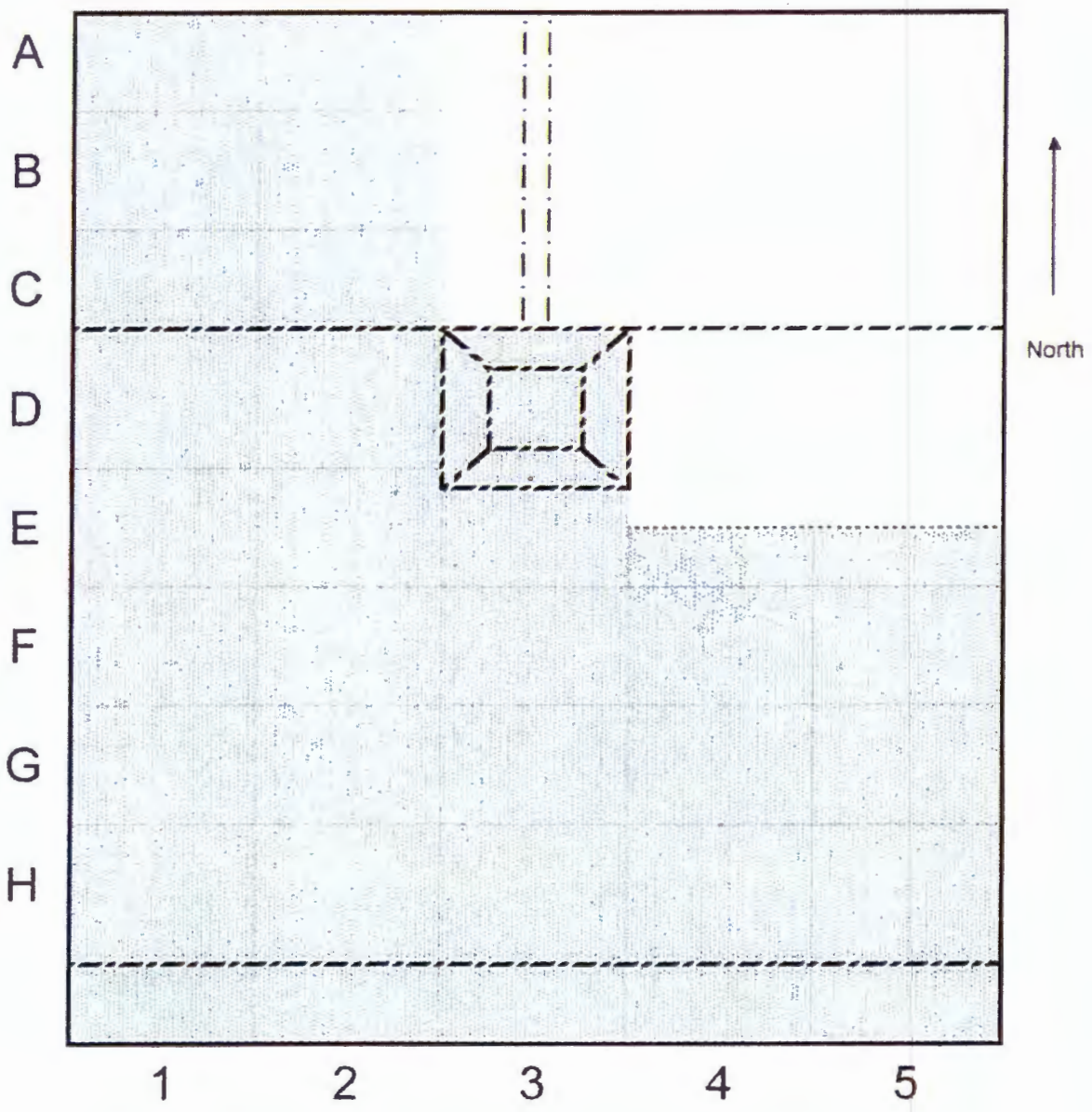
Date	6/29/2010	Lift.	No 4
Report.	05-016-099	Operator.	J. Schut
Map No:	4 of 6	Material.	Admix
Grid:	95-ft x 90-ft	Notes.	



S/C: S013213A00

CQA Moisture Density Map Cell 9

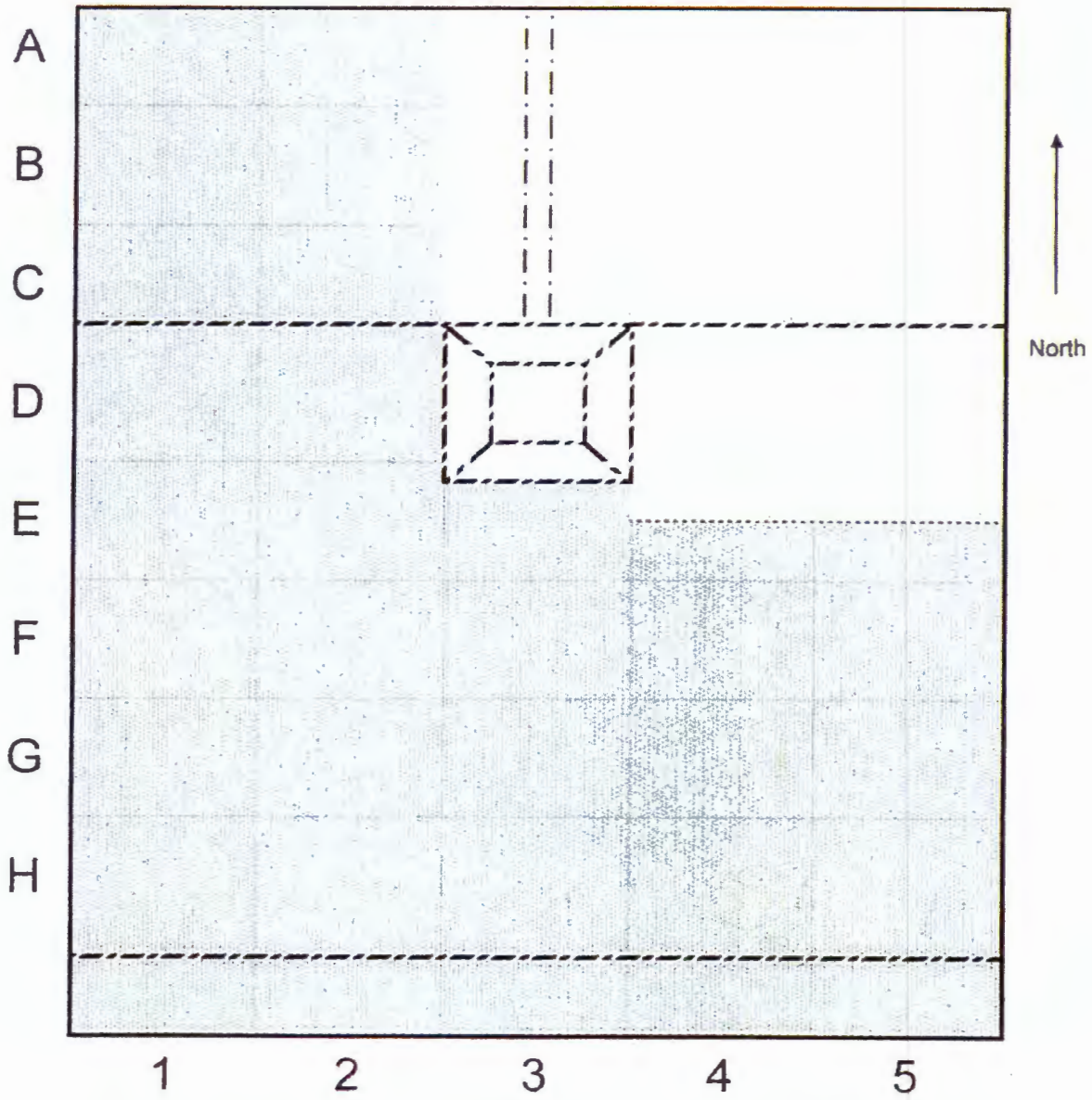
Date	6/29/2010	Lift:	No 5
Report.	05-016-099	Operator.	J. Schut
Map No.	5 of 6	Material.	Admix
Grid.	95-ft x 90-ft	Notes.	



S/C S013213A00

CQA Moisture Density Map Cell 9

Date	6/29/2010	Lift	No 6
Report:	05-016-099	Operator:	J. Schut
Map No:	6 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes	



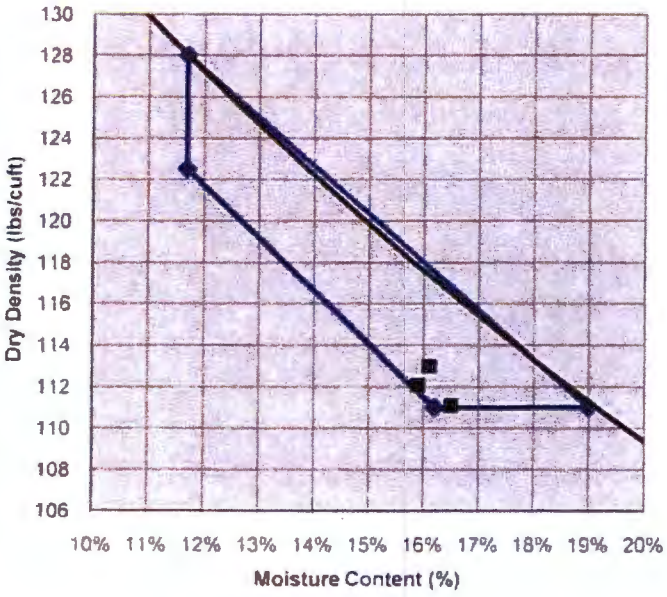
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client	WCH				
Submittal	05-18J Admix Field Data				
Project	S013213A00	Model	3430	Troxler ID	27881
Test Date	6/29/2010	Moisture Std	644	Density Std	2233
Description	Admix Soil	Offsets	Moisture -	Density -	
Report	05-016-099	Acceptable Zone			
Comments	Unless otherwise stated - All test at taken at a depth of 6-in.				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-470	1	7:19	3	112.1	15.9%	0.503	N/A	85.0%	I6	Pass
SL-471	1	7:27	3	111.1	16.5%	0.517	N/A	86.0%	H6	Pass
SL-472	1	7:31	3	113.0	16.1%	0.491	18.0%	89.0%	G6	Pass
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-470				
SL-471				
SL-472	SC	2172.5	1918.3	505.7



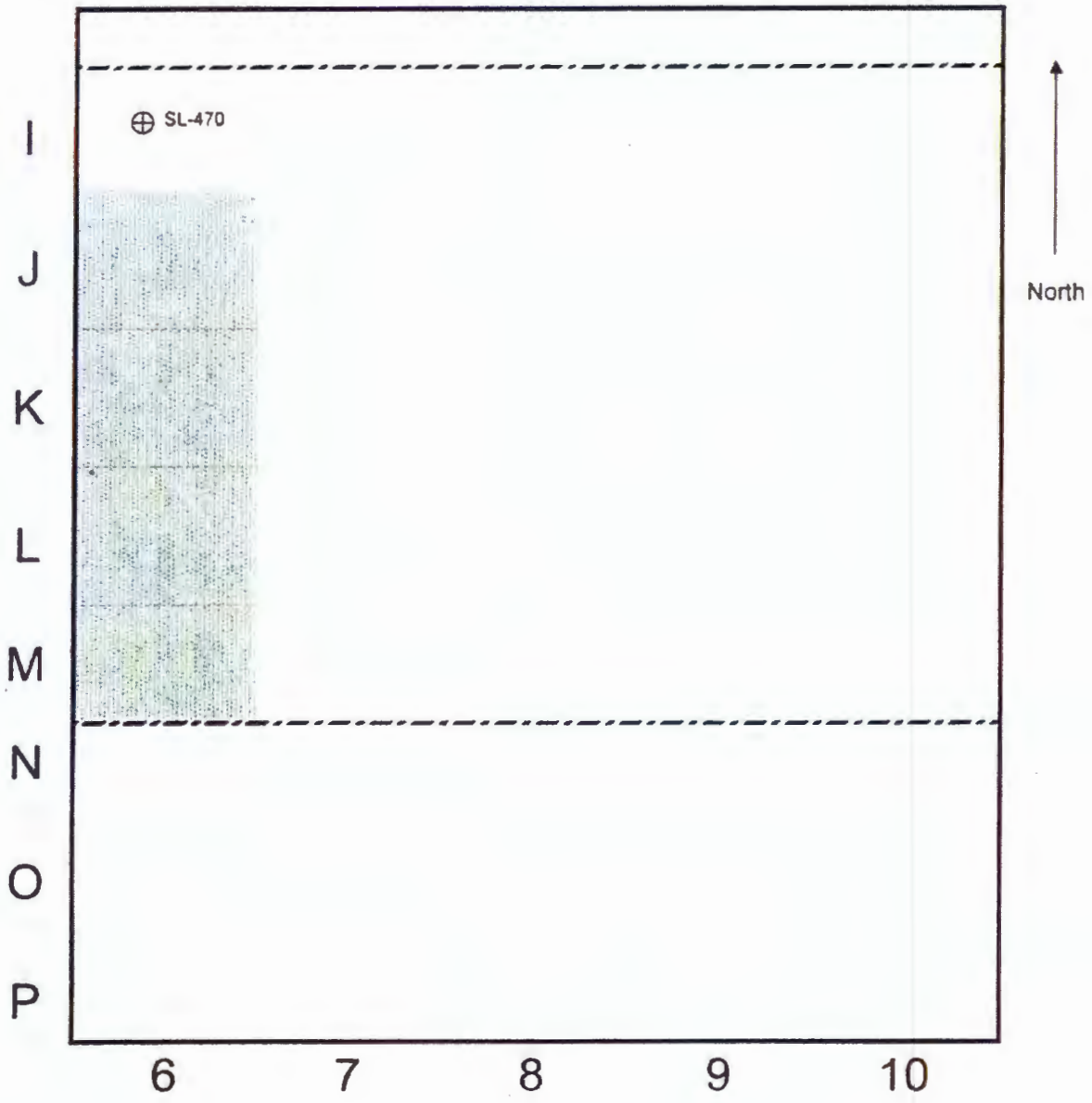
nvirotech Engineering & Consulting, Inc

Date 7/10/10

S/C S013213A00

CQA Moisture Density Map Cell 10

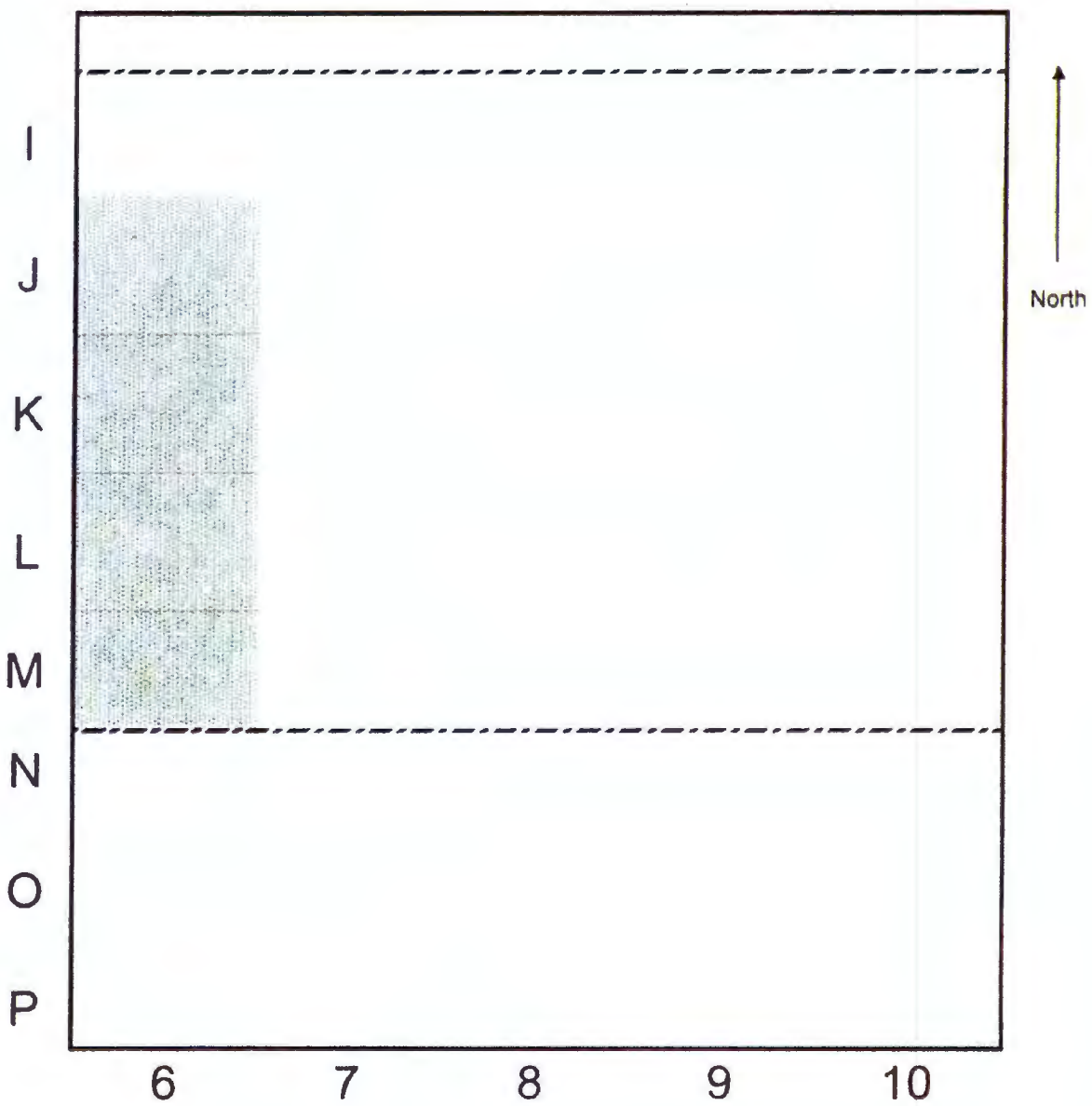
Date	6/29/2010	Lift	No 1
Report	05-016-099	Operator	R.M Lunday
Map No	1 of 3	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 10

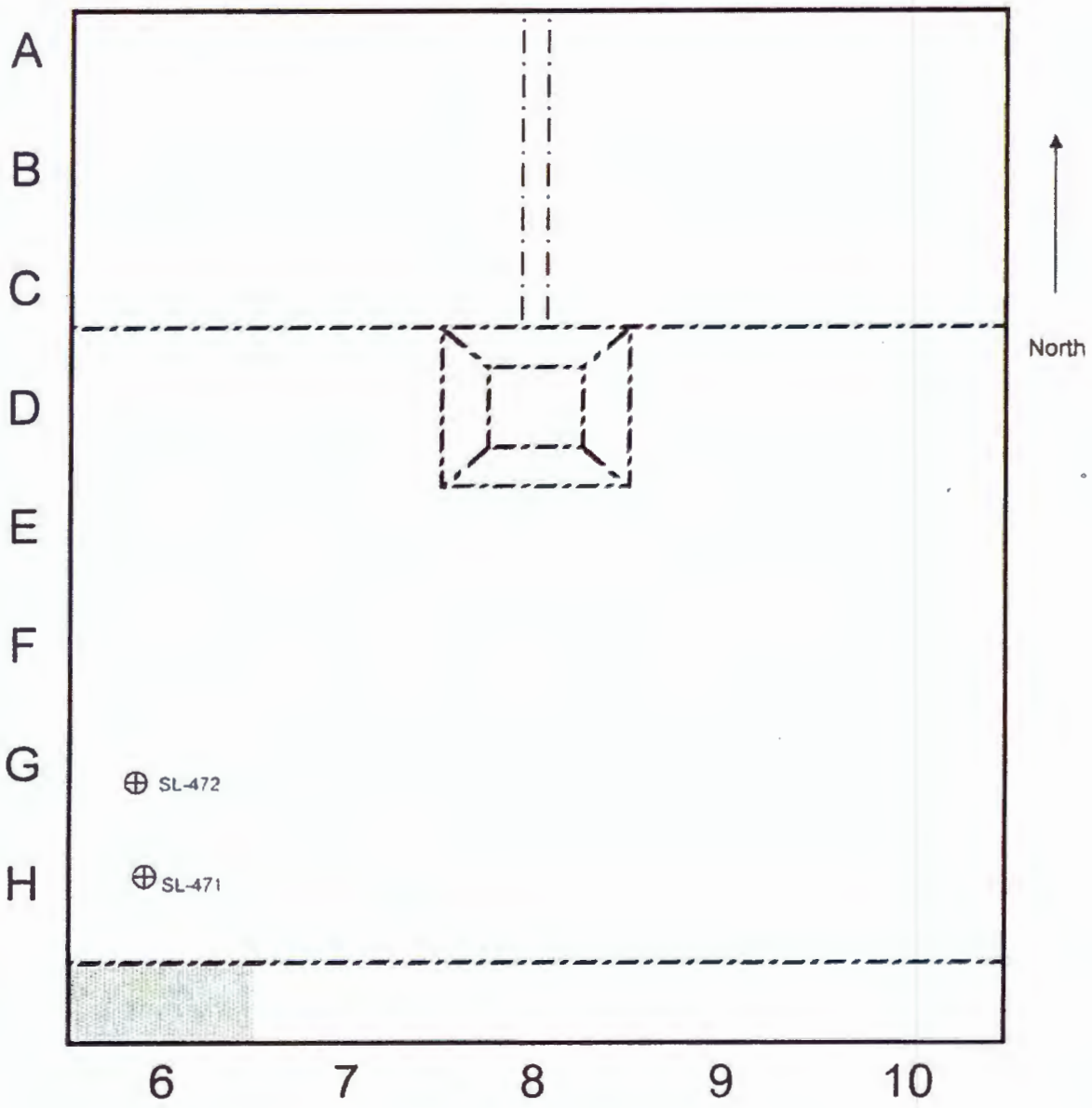
Date	6/29/2010	Lift	No 2
Report:	05-016-099	Operator:	R.M Lunday
Map No.	2 of 3	Material:	Admix
Grid.	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 10

Date	6/29/2010	Lift	No 1
Report:	05-016-099	Operator	R.M. Lunday
Map No	3 of 3	Material	Admix
Grid	95-ft x 90-ft	Notes	



UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: WCH
Submittal: 05-18J Admix Field Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID	SL-472
Project:	S013213A00			Sample Description:	Admix Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	6/29/2010
Tested By:	J. Schut	Date:	6/29/2010	Sampled By:	J. Schut
Reviewed By:	T. Williams	Date:	7/2/2010	Date Received:	6/29/2010
Comments				Report No.:	05-016-099

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1. Mass of Proctor mold, W_1	3956.00 g
2. Mass of Proctor mold + sand, W_2	5394.90 g
3. Volume of mold, V_1	0.03 ft
4. Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	95.17 lb/ft^3

Calibration Cone

5. Mass of bottle + cone + sand (before use), W_3	4610.90 g
6. Mass of bottle + cone + sand (after use), W_4	2987.20 g
7. Weight of sand to fill the cone, $W_c = W_4 - W_3$	3.58 lb

Results from Field Tests

3 8. Mass of bottle + cone + sand (before use), W_6	6030.6 g
9. Mass of bottle + cone + sand (after use), W_8	3252.2 g
10. Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma_{d\,(sand)}}$	0.0267 ft^3
11. Mass of gallon can, W_5	505.70 g
12. Mass of gallon can + moist soil, W_7	2172.50 g
13. Mass of gallon can + dry soil, W_9	1918.30 g
14. Moist unit weight of soil in field, $\gamma = W_7 - W_5 / V_2$	137.37 lb/ft^3
15. Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	18.0%
16. Dry unit weight in the field, $\gamma_{d\,(sand)} = \gamma / (1+(w\,(\%)/100)$	116.42 lb/ft^3
17. Comparision moisture content =	16.1%
18. Dry unit weight comparison =	113.0 lb/ft^3

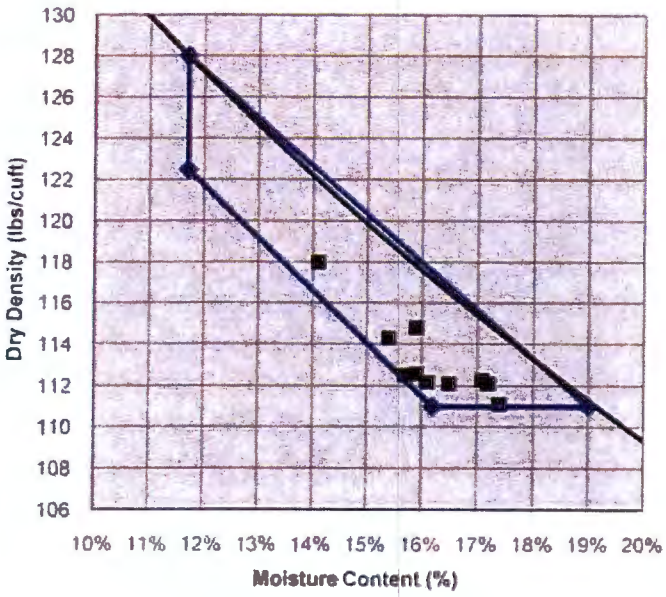
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client	WCH				
Submittal	05-18J Admix Field Data				
Project	S013213A00	Model	3430	Troxler ID	27881
Test Date	6/30/2010	Moisture Std.	641	Density Std	2221
Description	Admix Soil	Offsets:	Moisture -	Density -	
Report	05-016-100	Acceptable Zone			
Comments	Unless otherwise stated - All test at taken at a depth of 6-in.				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-482	3	8:00	3	118.0	14.1%	0.429	N/A	89.0%	D5	Pass
SL-483	3	8:05	3	112.6	15.9%	0.498	17.2%	86.0%	D4	Pass
SL-484	5	9:14	3	112.1	16.5%	0.504	N/A	88.0%	A3	Pass
SL-485	5	9:18	3	112.5	15.7%	0.498	N/A	85.0%	B3	Pass
SL-486	5	9:22	3	111.1	17.4%	0.517	N/A	91.0%	C3	Pass
SL-487	3	11:42	3	112.1	17.2%	0.503	N/A	92.0%	D5	Pass
SL-488	4	13:41	3	112.3	17.1%	0.501	N/A	92.0%	A4	Pass
SL-489	4	13:45	3	112.2	16.1%	0.502	N/A	87.0%	B4	Pass
SL-490	4	13:50	3	114.3	15.4%	0.475	N/A	88.0%	C4	Pass
SL-491	4	13:57	3	114.8	15.9%	0.468	N/A	92.0%	C5	Pass

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-482				
SL-483	SC	2270.9	2011.8	505.6
SL-484				
SL-485				
SL-486				
SL-487	Sh. Tube			
SL-488				
SL-489				
SL-490				
SL-491				



Envirotech Engineering & Consulting Inc

7/10/10
Date

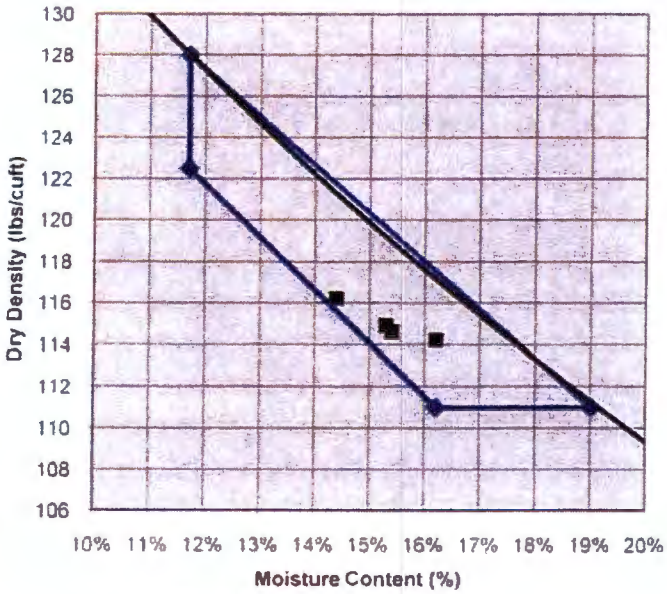
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client	WCH				
Submittal	05-18J Admix Field Data				
Project	S013213A00	Model	3430	Troxler ID.	27881
Test Date	6/30/2010	Moisture Std.	641	Density Stc	2221
Description	Admix Soil	Offsets:	Moisture -	Density	-
Report	05-016-100	Acceptable Zone			
Comments	Unless otherwise stated - All test at taken at a depth of 6-in.				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-492	4	14:01	3	114.9	15.3%	0.466	N/A	89.0%	B5	Pass
SL-493	4	14:06	3	114.2	16.2%	0.477	N/A	92.0%	A5	Pass
SL-494	4	14:53	3	114.6	15.4%	0.471	N/A	88.0%	D5	Pass
SL-495	4	14.58	3	116.2	14.4%	0.451	N/A	86.0%	D4	Pass
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-492				
SL-493				
SL-494				
SL-495				



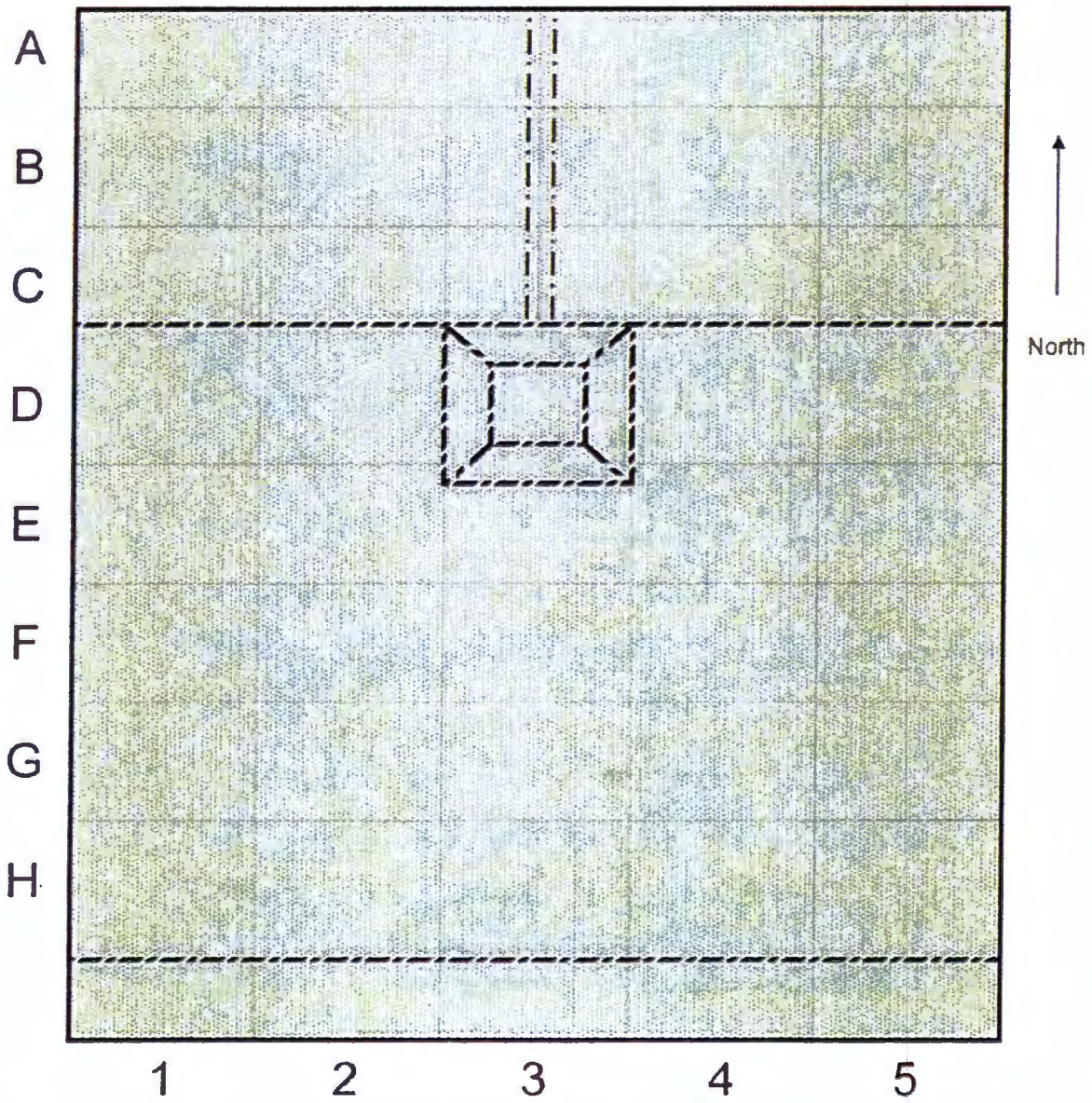
nvirotech Engineering & Consulting Inc

7/10/10
Date

S/C S013213A00

CQA Moisture Density Map Cell 9

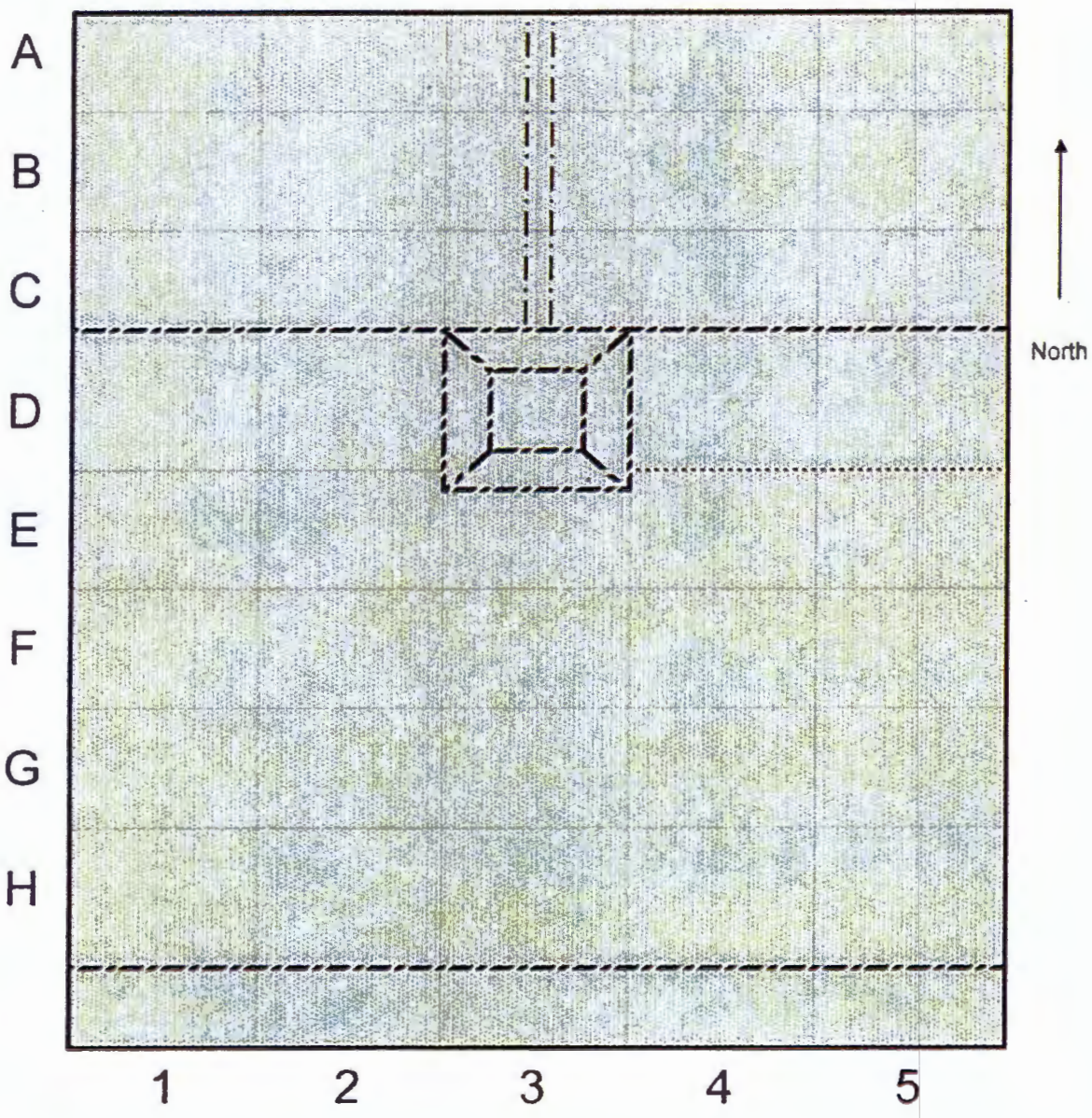
Date	6/30/2010	Lift:	No 1
Report:	05-016-100	Operator:	J. Schut
Map No	1 of 6	Material	Admix
Grid:	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

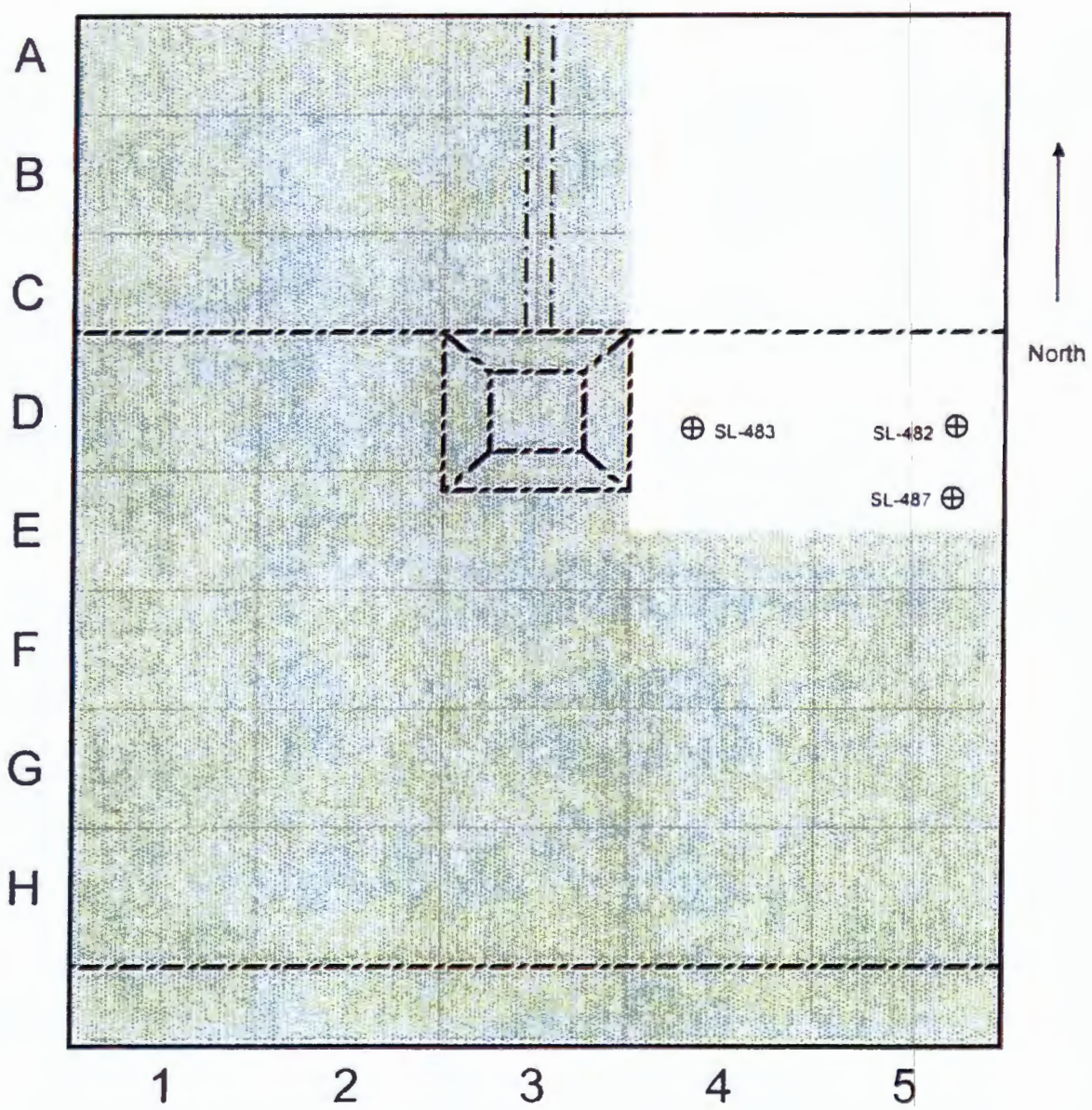
Date	6/30/2010	Lift	No 2
Report	05-016-100	Operator	J. Schut
Map No	2 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

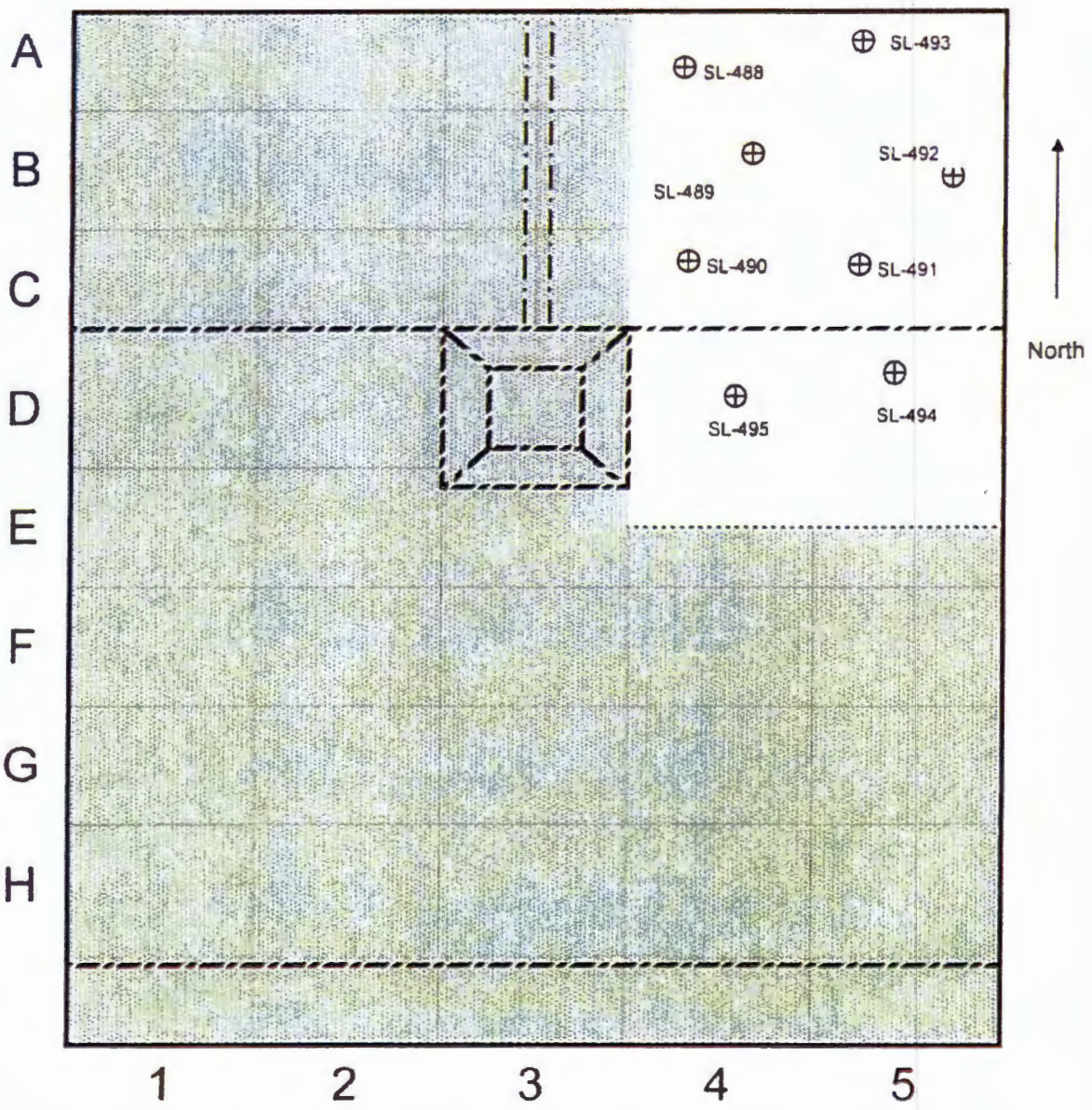
Date	6/30/2010	Lift	No 3
Report	05-016-100	Operator	J. Schut
Map No	3 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

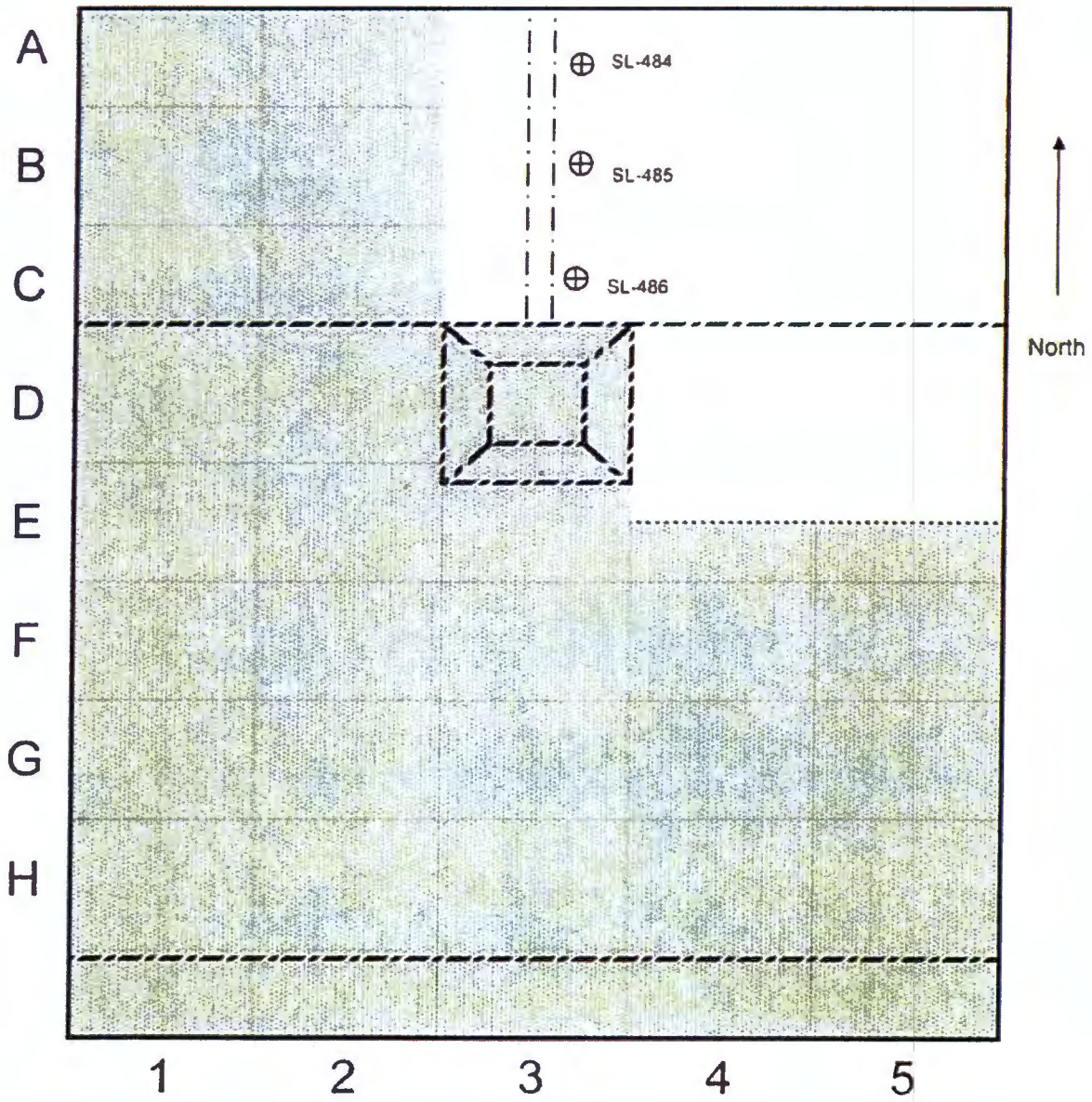
Date:	6/30/2010	Lift:	No 4
Report:	05-016-100	Operator:	J. Schut
Map No:	4 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes	



S/C S013213A00

CQA Moisture Density Map Cell 9

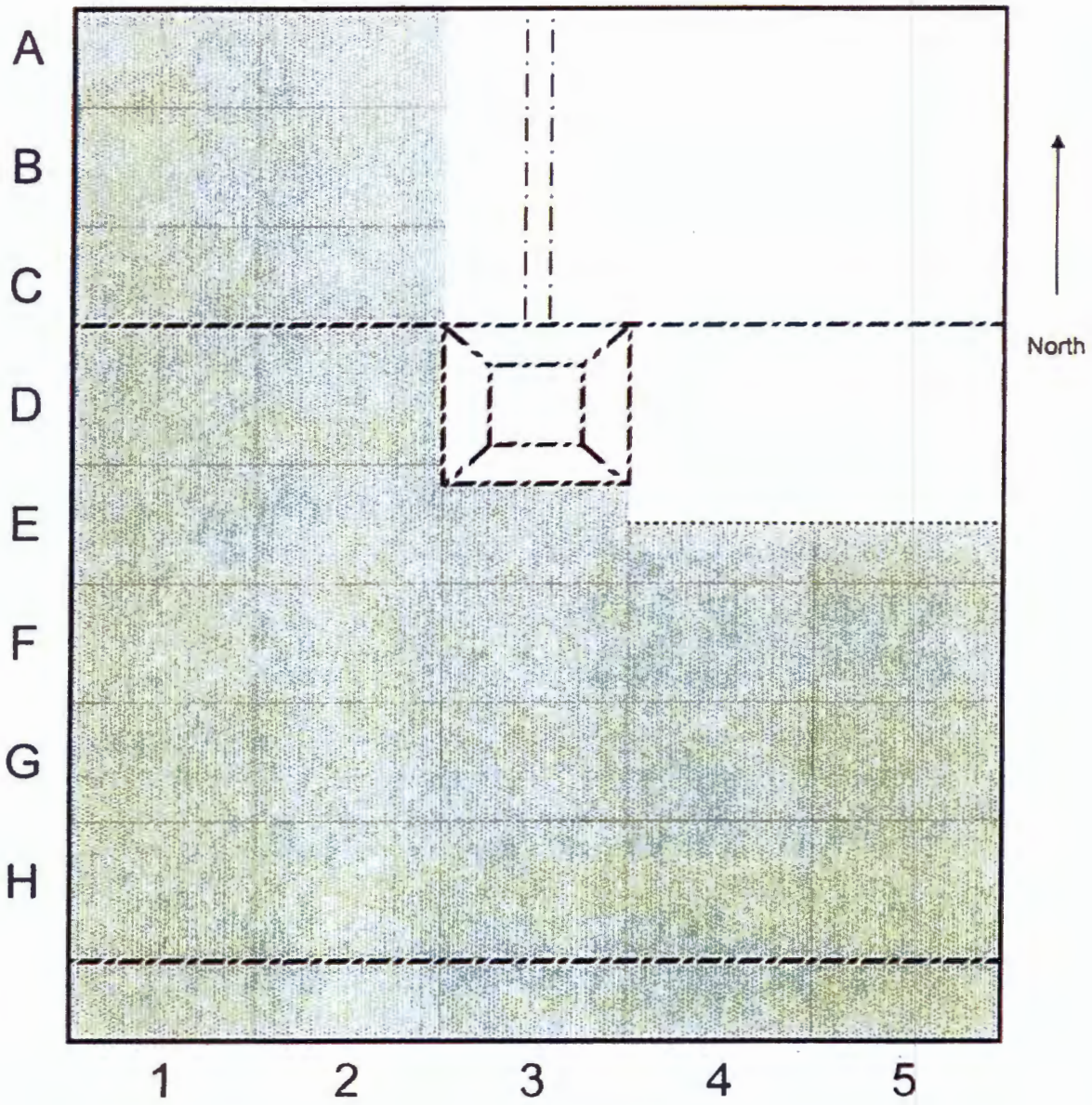
Date	6/30/2010	Lift:	No 5
Report.	05-016-100	Operator.	J. Schut
Map No.	5 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes.	



S/C. S013213A00

CQA Moisture Density Map Cell 9

Date	6/30/2010	Lift.	No 6
Report:	05-016-100	Operator:	J Schut
Map No:	6 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes:	



UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client:	WCH
Submittal:	05-18J Admix Field Data

Sample Information

Contact Name.	Charlie Skiba			Sample ID.	SL-483
Project	S013213A00			Sample Description:	Admix Soil
Project Location.	ERDF Cells 9-10			Sampling Date.	6/30/2010
Tested By.	J. Schut	Date.	6/30/2010	Sampled By:	J. Schut
Reviewed By	T. Williams	Date:	7/2/2010	Date Received	6/30/2010
Comments				Report No .	05-016-100

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1	Mass of Proctor mold, W_1	3956.00 g
2	Mass of Proctor mold + sand, W_2	5394.90 g
3	Volume of mold, V_1	0.03 ft
4	Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	95 17 lb/ft^3

Calibration Cone

5	Mass of bottle + cone + sand (before use). W_3	4610.90 g
6	Mass of bottle + cone + sand (after use), W_4	2987.20 g
7.	Weight of sand to fill the cone, $W_c = W_4 - W_3$	3.58 lb

Results from Field Tests

3	8	Mass of bottle + cone + sand (before use), W_8	6036.7 g
	9.	Mass of bottle + cone + sand (after use), W_8	3142.9 g
	10	Volume of hole, $V_2 = \frac{W_5 - W_8 - W_c}{\gamma_{d\,(sand)}}$	0.0294 ft^3
	11.	Mass of gallon can, W_5	505.60 g
	12	Mass of gallon can + moist soil, W_7	2270.90 g
	13.	Mass of gallon can + dry soil, W_9	2011.80 g
	14	Moist unit weight of soil in field, $= W_7 - W_5 / V_2$	132.27 lb/ft^3
	15	Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	17 2%
	16	Dry unit weight in the field, $\gamma_{d\,(sand)} = \gamma / (1+(w\,(\%)/100)$	112.86 lb/ft^3
	17	Comparision moisture content =	15.9%
	18.	Dry unit weight comparison =	112.6 lb/ft^3

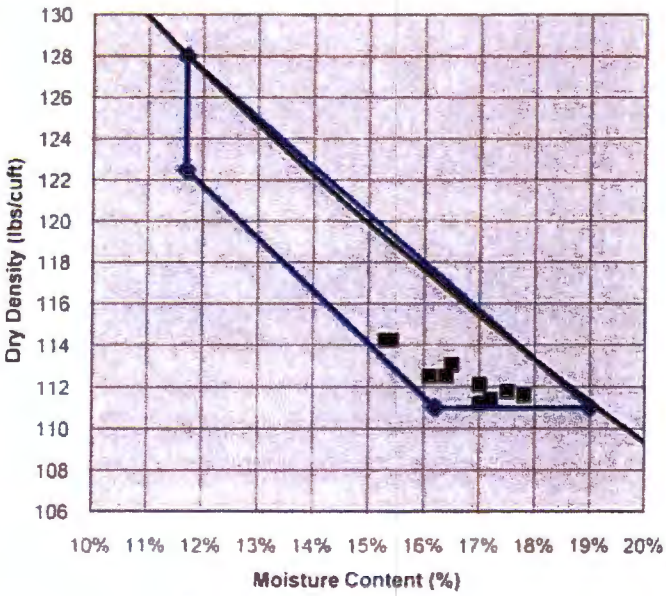
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client	WCH				
Submittal	05-18J Admix Field Data				
Project	S013213A00	Model	3430	Troxler ID	27881
Test Date	7/1/2010	Moisture Std.	646	Density Std	2205
Description	Admix Soil	Offsets	Moisture -	Density -	
Report:	05-016-101	Acceptable Zone			
Comments.	Unless otherwise stated - All test at taken at a depth of 6-in.				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-496	6	8:01	3	114.2	15.4%	0.476	N/A	87.0%	A3	Pass
SL-497	6	8:04	3	111.8	17.5%	0.507	N/A	93.0%	B3	Pass
SL-498	6	8 08	3	113.1	16.5%	0.491	N/A	91.0%	C3	Pass
SL-499	5	9:27	3	112.1	17.0%	0.504	N/A	91.0%	A4	Pass
SL-500	5	9:49	3	111.4	17.2%	0.514	N/A	90 0%	B4	Pass
SL-501	5	9:52	3	112.5	16.4%	0.499	N/A	89 0%	C4	Pass
SL-502	5	12.38	3	114.2	15.3%	0.477	N/A	87.0%	A5	Pass
SL-503	5	12:44	3	111.2	17.0%	0.516	N/A	89.0%	B5	Pass
SL-504	5	12:49	3	111.6	17.8%	0.510	N/A	94 0%	C5	Pass
SL-505	5	13:12	3	112.5	16.1%	0.498	17.6%	87.0%	D5	Pass

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-496				
SL-497				
SL-498				
SL-499	Sh. Tube.			
SL-500				
SL-501				
SL-502				
SL-503				
SL-504				
SL-505	SC	2309.2	2039.6	505.6



nvirotech Engineering & Consulting, Inc

7/10/10
Date

FIELD DENSITY TEST (ASTM D-6938)

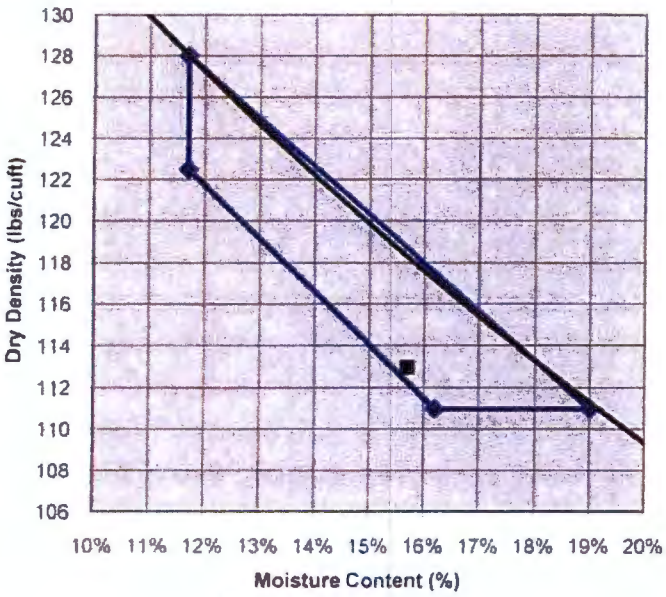
ENVIROTECH

Client: WCH
Submittal: 05-18J Admix Field Data
Project: S013213A00
Test Date: 7/1/2010
Description: Admix Soil
Report: 05-016-101
Comments: Unless otherwise stated - All test at taken at a depth of 6-in.

Model: 3430 Troxler ID: 27881
Moisture Std: 646 Density Stc 2205
Offsets: Moisture - Density -
Acceptable Zone

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-506	5	13:16	3	113.0	15.7%	0.492	N/A	86.0%	D4	Pass
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-506				



Envirotech Engineering & Consulting, Inc

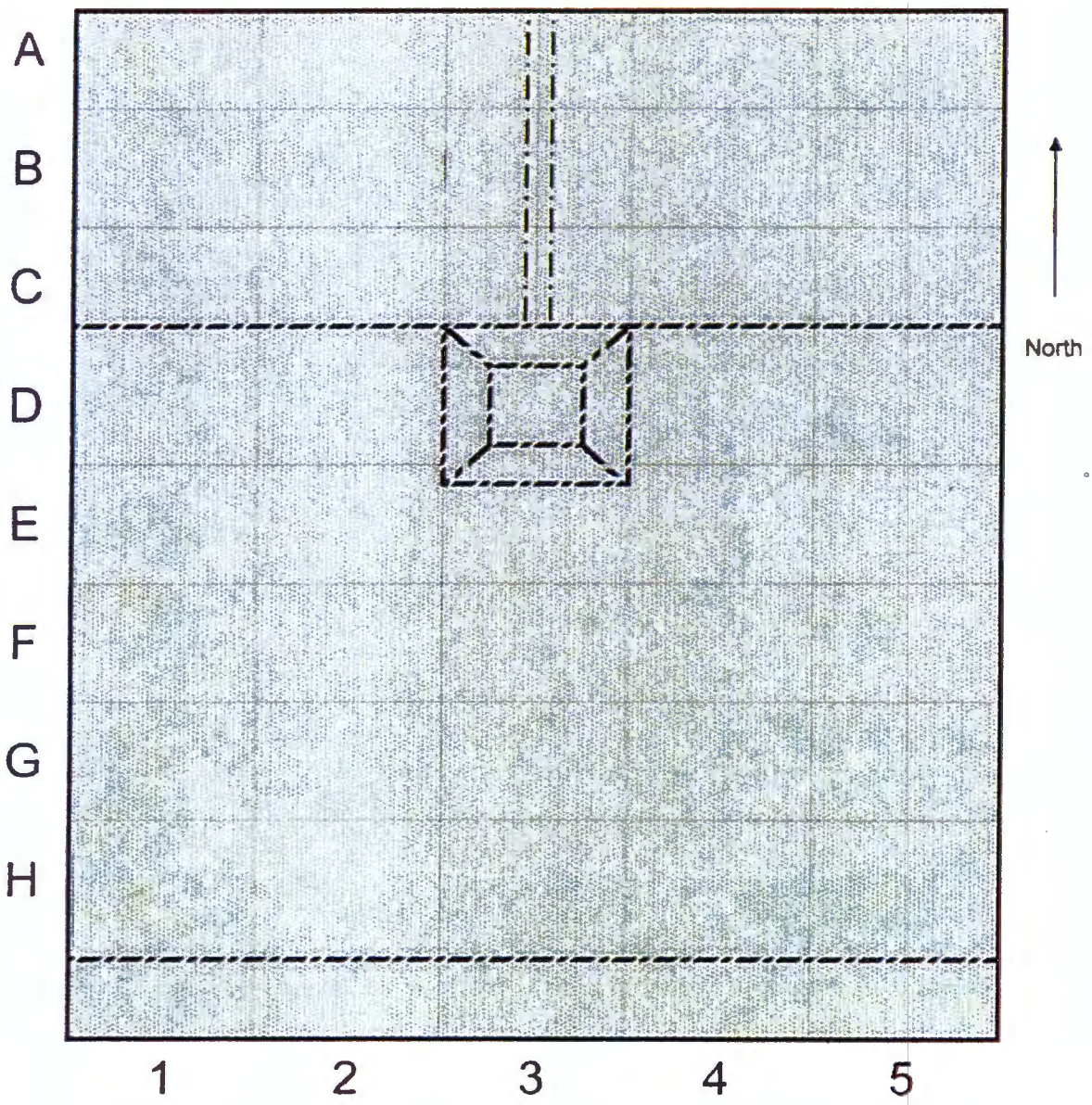
7/10/10
Date

S/C S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date	7/1/2010	Lift:	No 1
Report:	05-016-101	Operator:	J. Schut
Map No:	1 of 6	Material:	Admix
Grid	95-ft x 90-ft	Notes:	

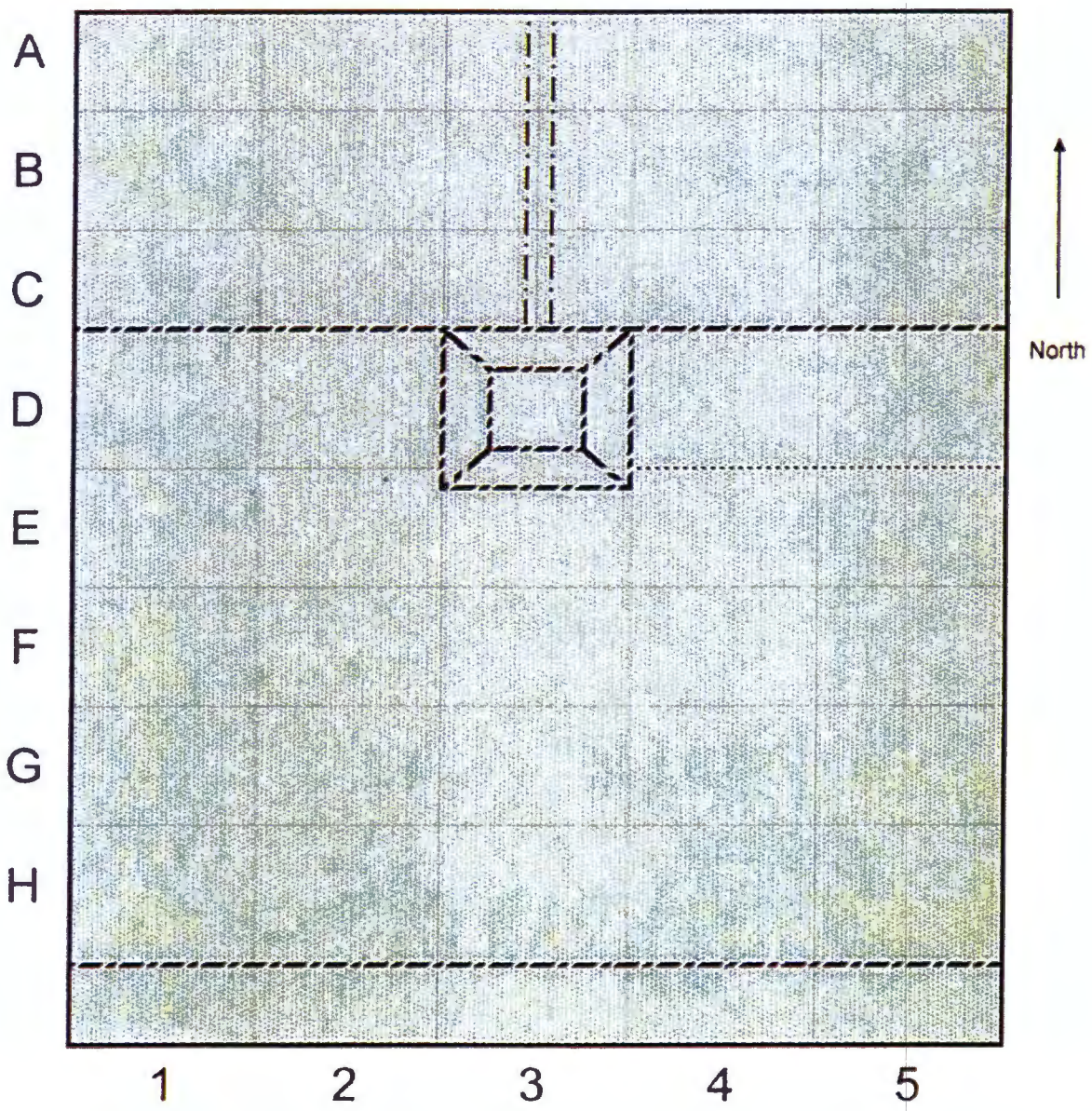


S/C: S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date	7/1/2010	Lift	No 2
Report	05-016-101	Operator:	J Schut
Map No.	2 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes	

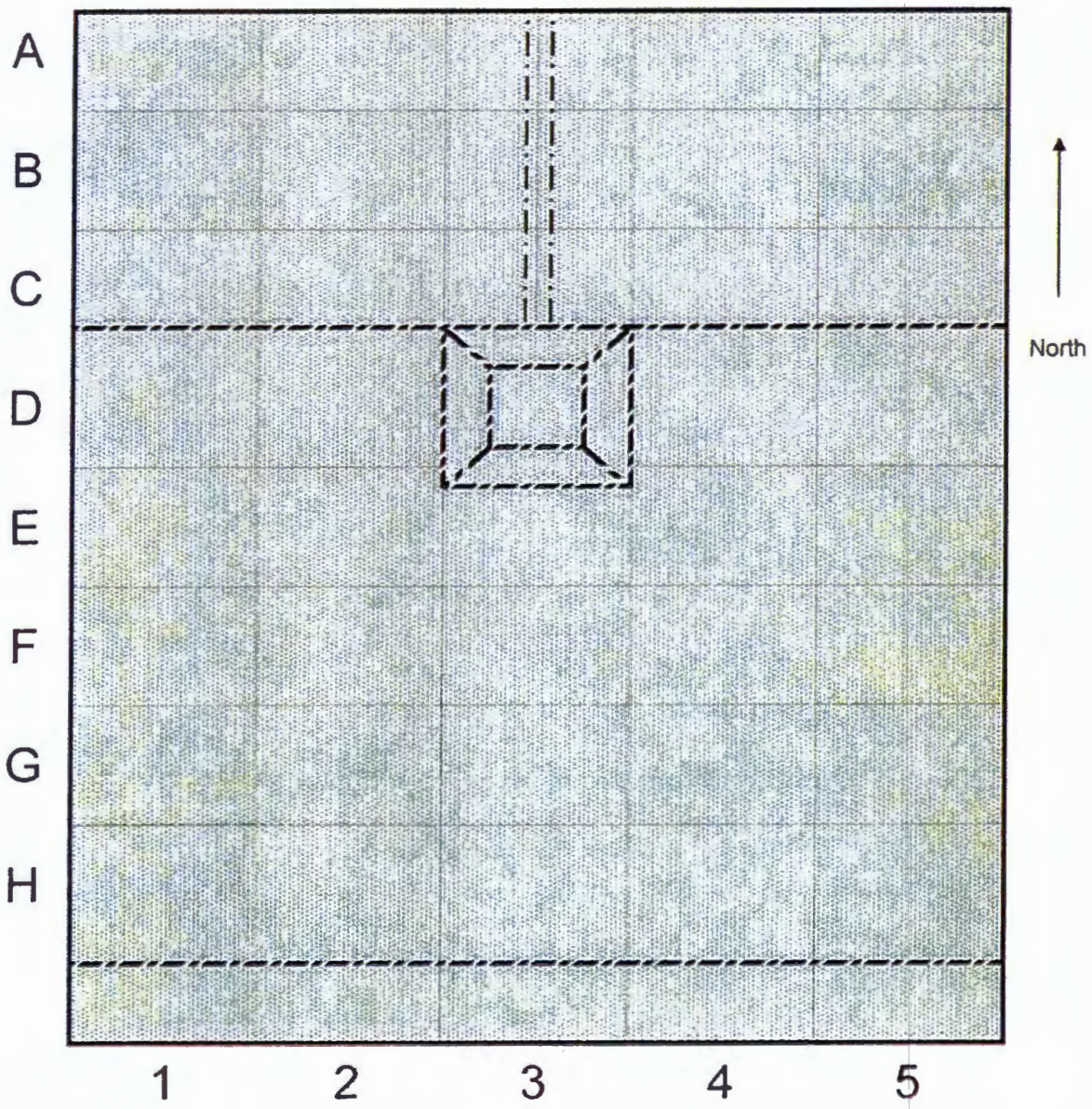


S/C: S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date:	7/1/2010	Lift:	No. 3
Report:	05-016-101	Operator:	J. Schut
Map No:	3 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	

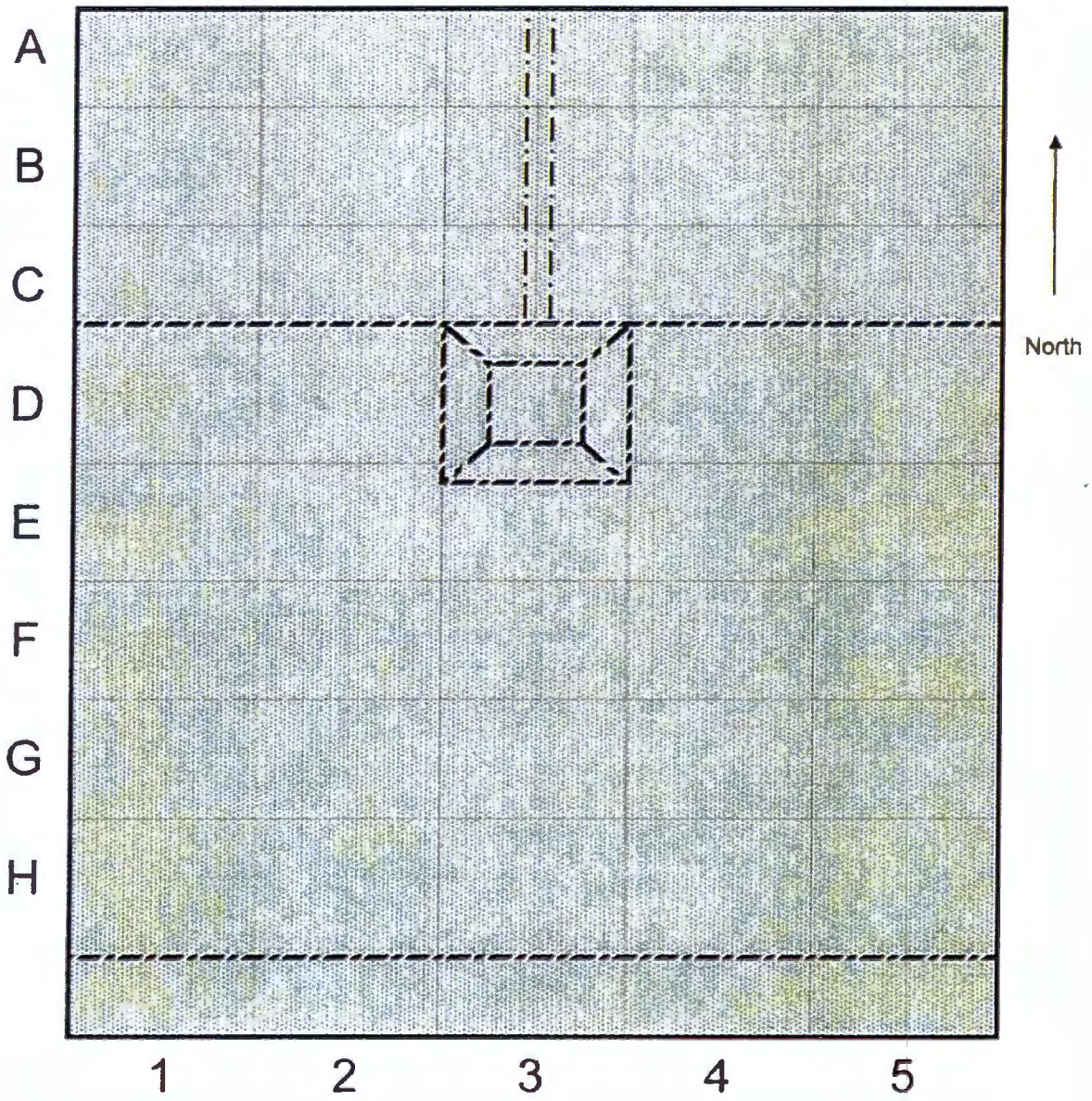


S/C: S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date:	7/1/2010	Lift:	No. 4
Report:	05-016-101	Operator:	J. Schut
Map No:	4 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	

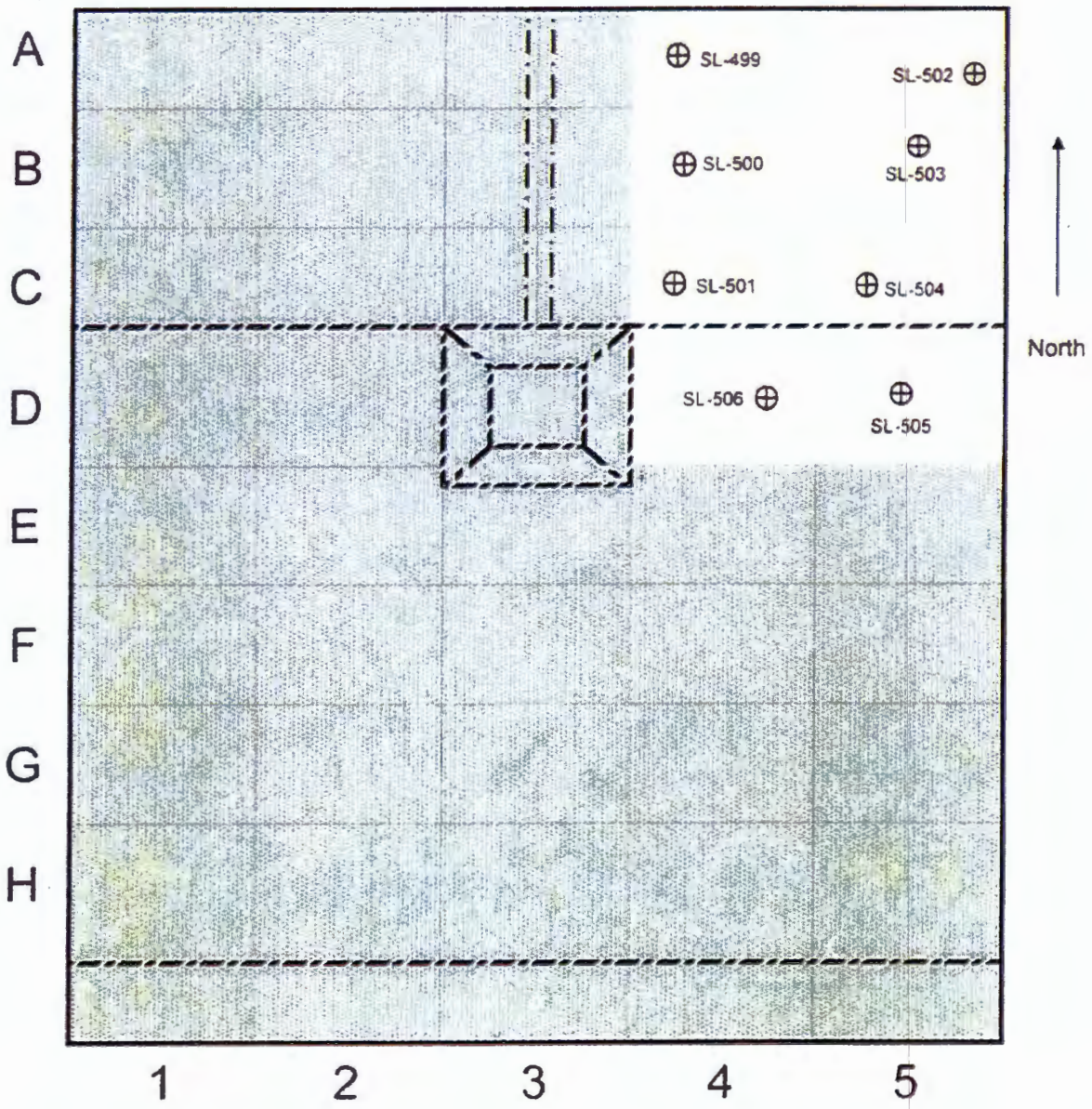


S/C S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date	7/1/2010	Lift	No. 5
Report:	05-016-101	Operator.	J Schut
Map No:	5 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes	

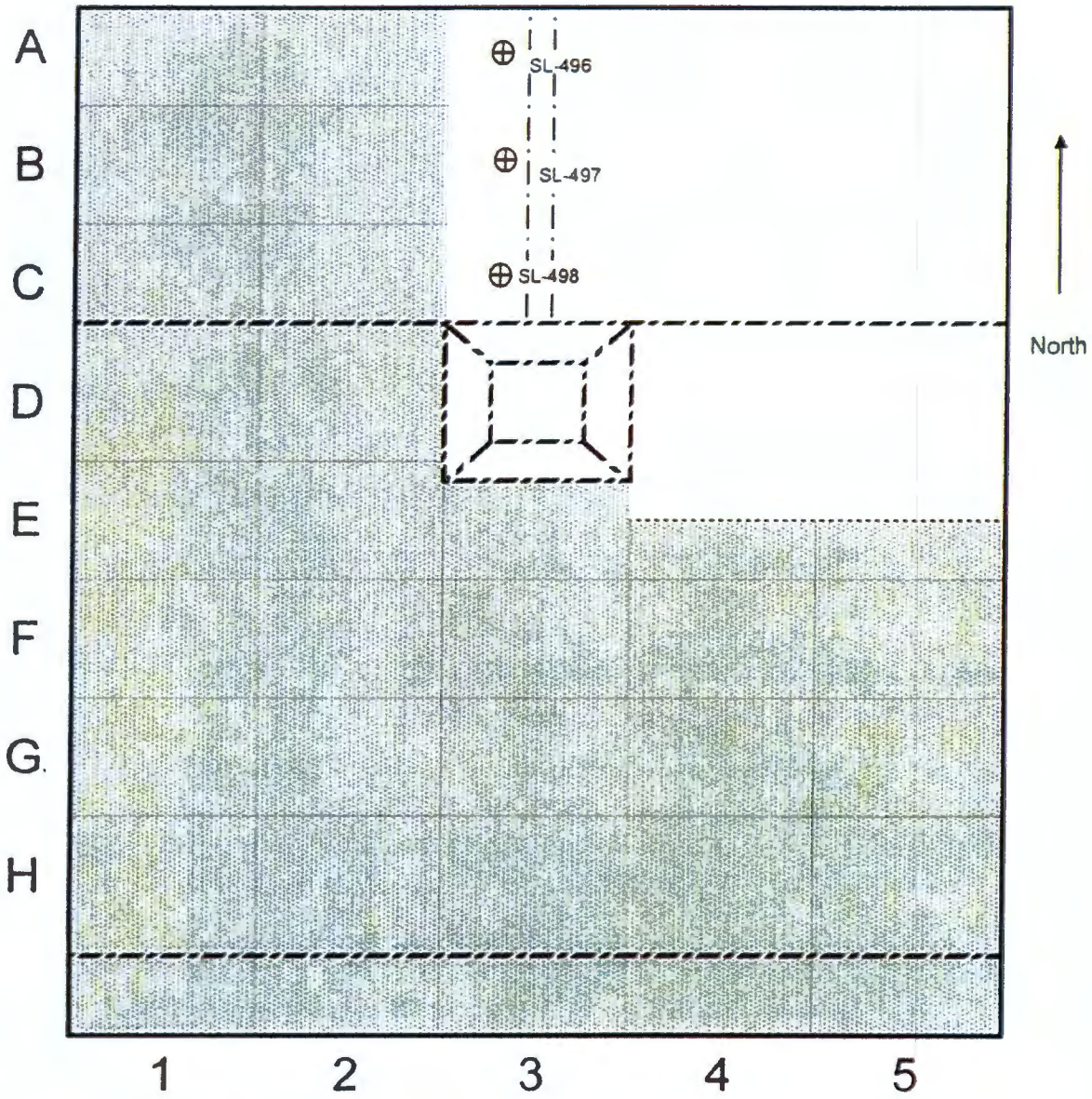


S/C S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date:	7/1/2010	Lift:	No. 6
Report:	05-016-101	Operator:	J. Schut
Map No:	6 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
580) 234-8780 | Fax 580) 237-4302

Client: WCH
Submittal: 05-18J Admix Field Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID	SL-505
Project:	S013213A00			Sample Description:	Admix Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	7/1/2010
Tested By:	J. Schut	Date:	7/1/2010	Sampled By:	J. Schut
Reviewed By:	T. Williams	Date:	7/2/2010	Date Received:	7/1/2010
Comments				Report No.:	05-016-101

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1. Mass of Proctor mold, W_1	3956.00 g
2. Mass of Proctor mold + sand, W_2	5394.90 g
3. Volume of mold, V_1	0.03 ft
4. Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	95.17 lb/ft^3

Calibration Cone

5. Mass of bottle + cone + sand (before use), W_3	4610.90 g
6. Mass of bottle + cone + sand (after use), W_4	2987.20 g
7. Weight of sand to fill the cone, $W_c = W_4 - W_3$	3.58 lb

Results from Field Tests

3 8. Mass of bottle + cone + sand (before use), W_6	6372.1 g
9. Mass of bottle + cone + sand (after use), W_8	3462.7 g
10. Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma_d\,(sand)}$	0.0298 ft^3
11. Mass of gallon can, W_5	505.60 g
12. Mass of gallon can + moist soil, W_7	2309.20 g
13. Mass of gallon can + dry soil, W_9	2039.60 g
14. Moist unit weight of soil in field, $\gamma = W_7 - W_5 / V_2$	133.50 lb/ft^3
15. Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	17.6%
16. Dry unit weight in the field, $\gamma_{d\,(sand)} = \gamma / (1+(w\,(\%)/100)$	113.55 lb/ft^3
17. Comparision moisture content =	16.1%
18. Dry unit weight comparison =	112.5 lb/ft^3

FIELD DENSITY TEST (ASTM D-6938)

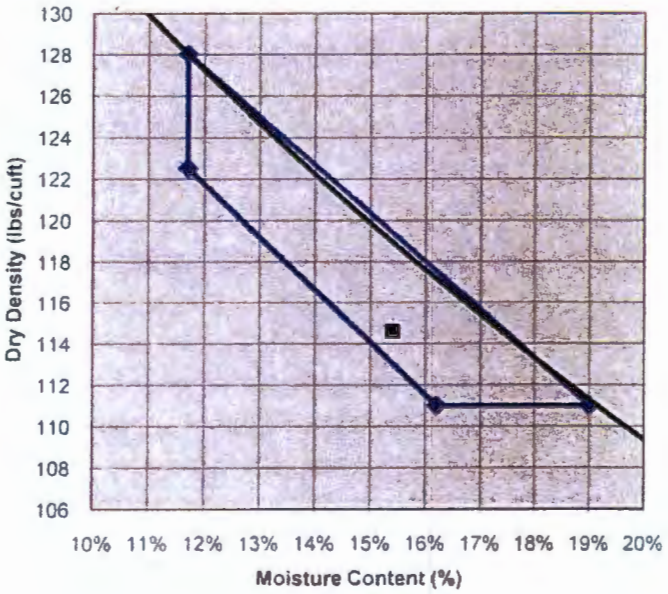
ENVIROTECH

Client: WCH
Submittal: 05-18J Admix Field Data
Project: S013213A00
Test Date: 7/2/2010
Description: Admix Soil
Report: 05-016-102
Comments: Unless otherwise stated - All test at taken at a depth of 6-in.

Model: 3430 Troxler ID: 27881
Moisture Std: 639 Density Stc 2224
Offsets: Moisture - Density -
Acceptable Zone

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-524	6	13:31	3	114.6	15.4%	0.471	N/A	88.0%	D3	Pass
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-524				



Envirotech Engineering & Consulting, Inc

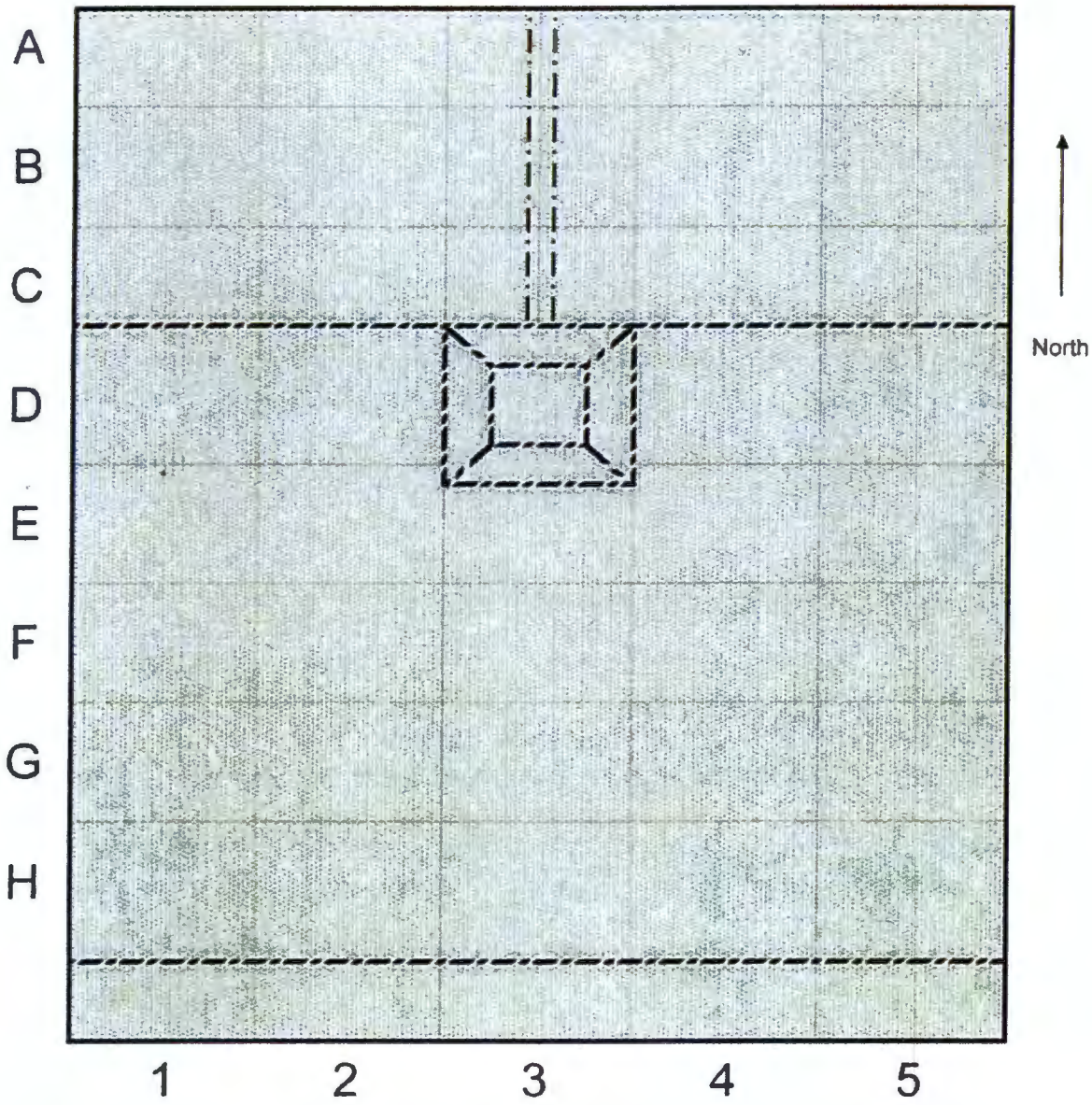
7/14/10
Date

S/C S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date	7/2/2010	Lift	No 1
Report:	05-016-102	Operator	J Schut
Map No.	1 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes	

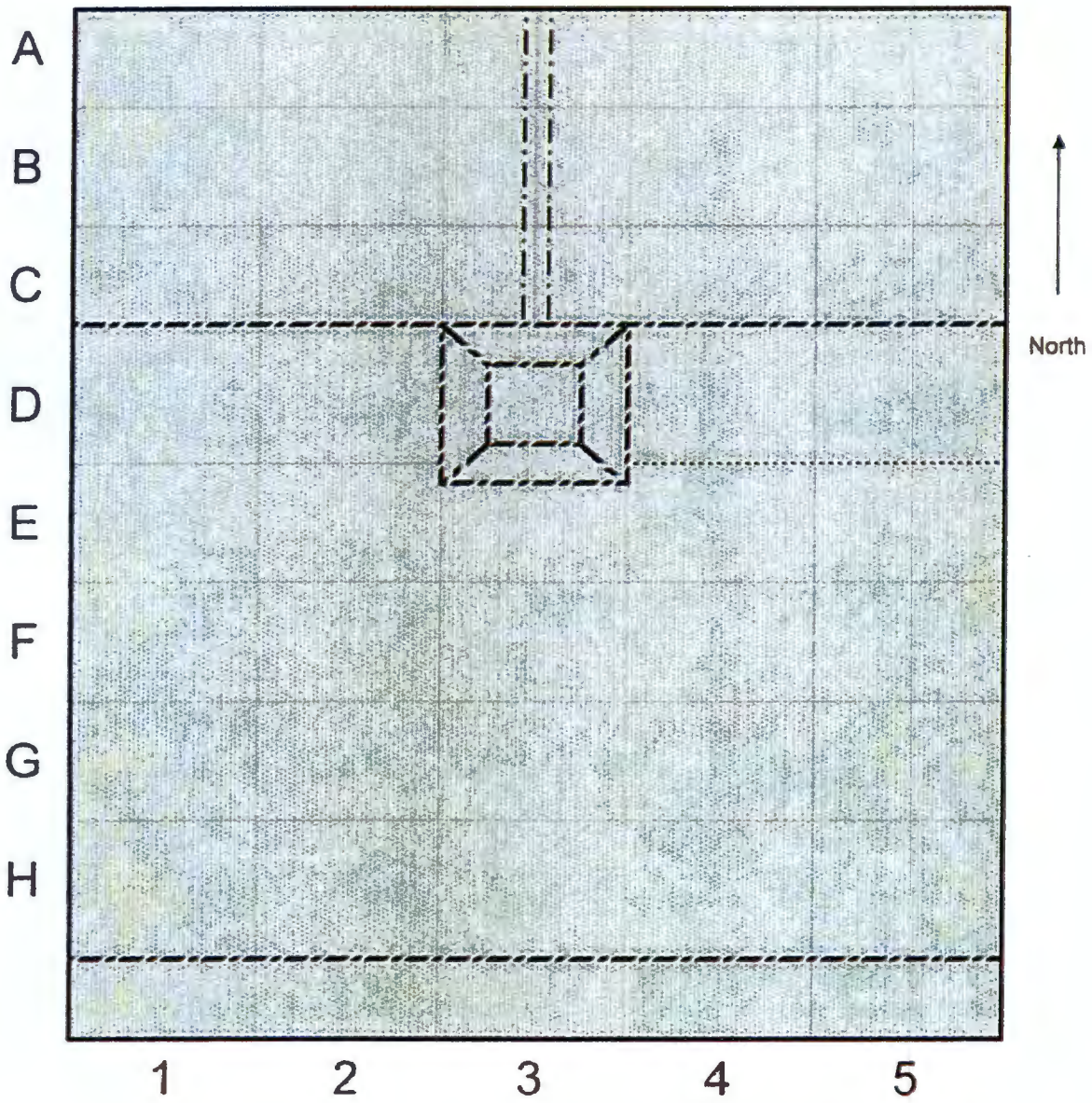


S/C S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date	7/2/2010	Lift	No. 2
Report	05-016-102	Operator	J. Schut
Map No.	2 of 6	Material	Admix
Grid	95-ft x 90-ft	Notes	

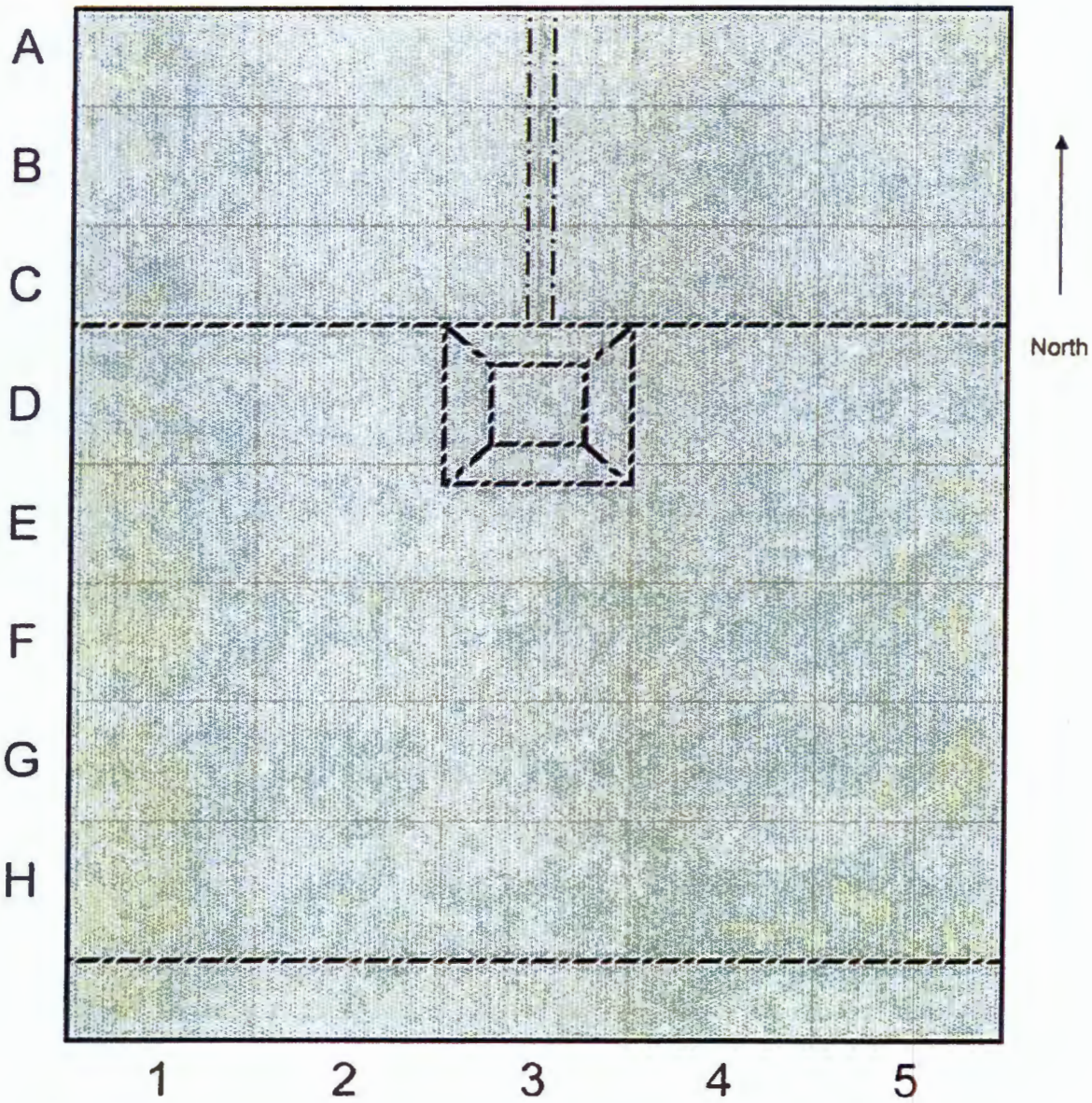


S/C: S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date	7/2/2010	Lift:	No. 3
Report.	05-016-102	Operator.	J. Schut
Map No.	3 of 6	Material:	Admix
Grid.	95-ft x 90-ft	Notes:	

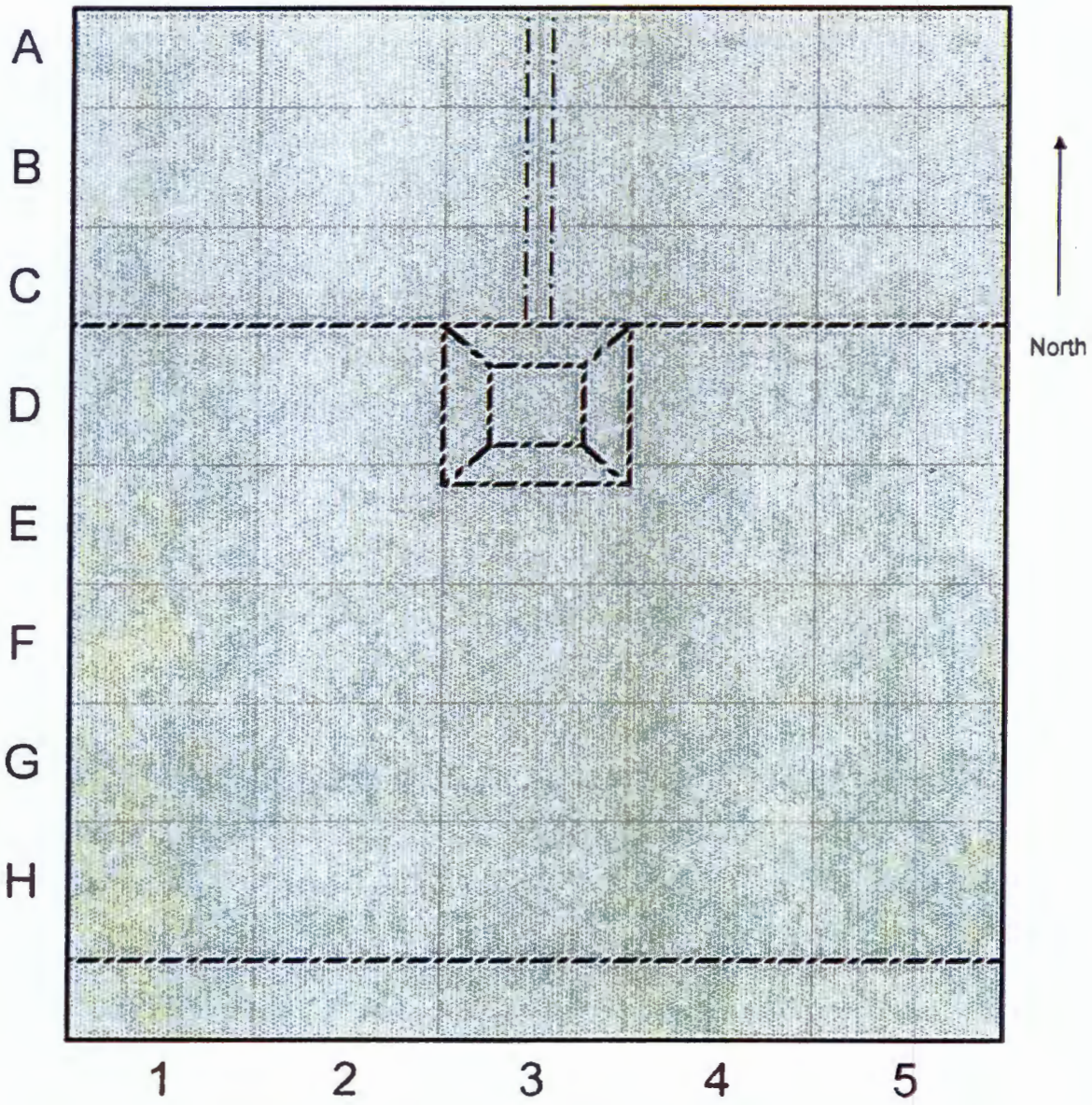


S/C: S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date:	7/2/2010	Lift:	No 4
Report:	05-016-102	Operator:	J. Schut
Map No:	4 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	

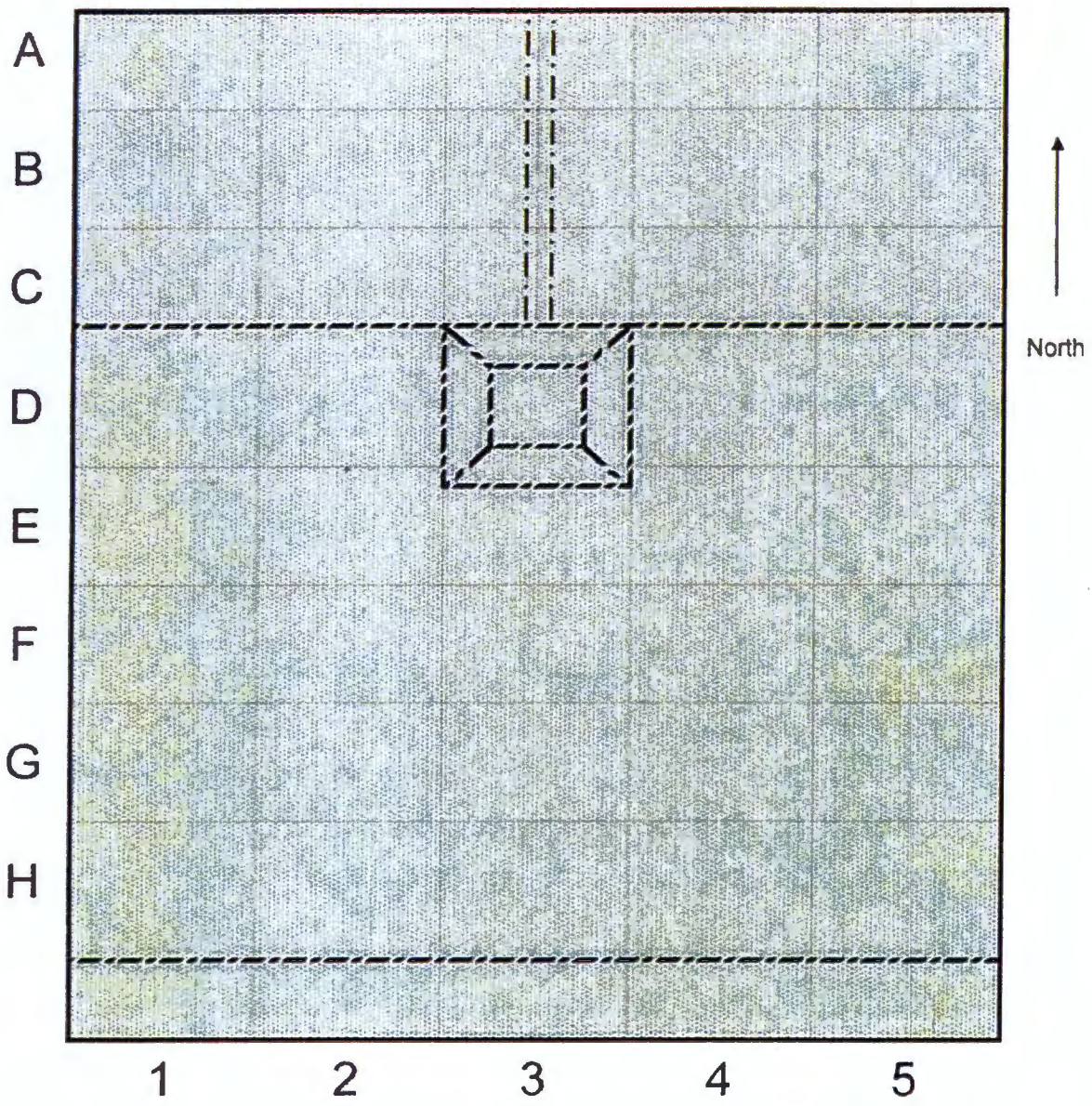


S/C S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date	7/2/2010	Lift:	No 5
Report:	05-016-102	Operator:	J. Schut
Map No:	5 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes	

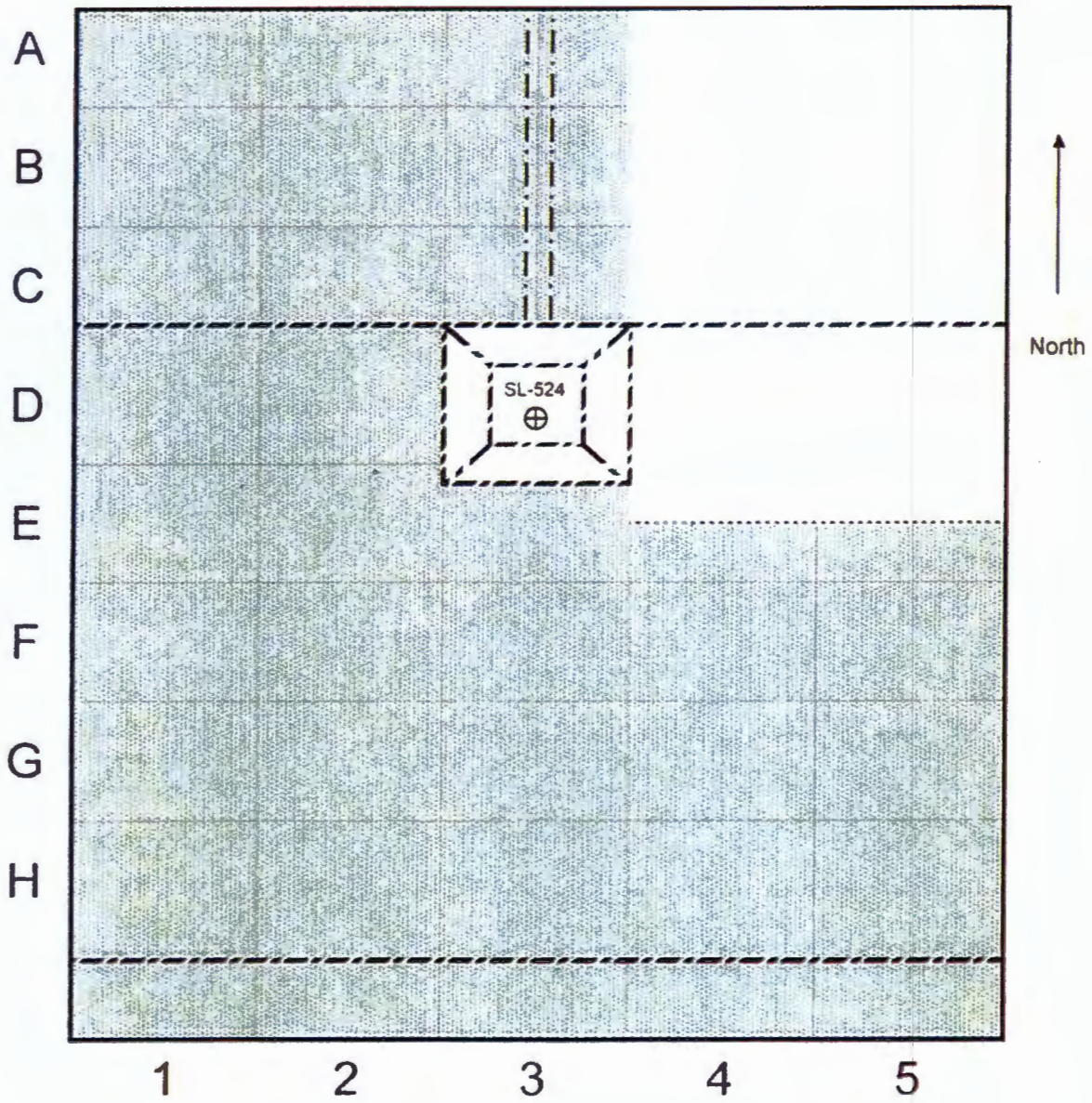


S/C S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date:	7/2/2010	Lift:	No 6
Report:	05-016-102	Operator:	J. Schut
Map No.	6 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



FIELD DENSITY TEST (ASTM D-6938)

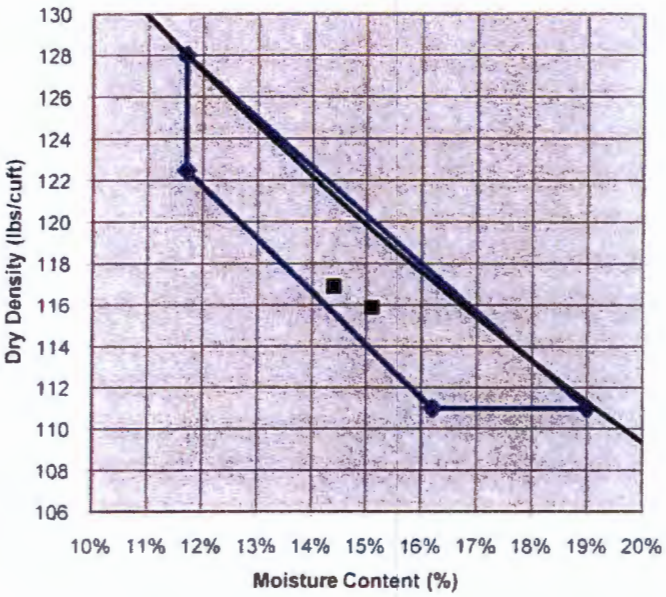
ENVIROTECH

Client: WCH
Submittal: 05-18J Admix Field Data
Project: S013213A00
Test Date: 7/14/2010
Description: Admix Soil
Report: 5-16-109
Comments: Unless otherwise stated - All test at taken at a depth of 6-in.

Model: 3430 Troxler ID: 27881
Moisture Std: 647 Density Stc 2226
Offsets: Moisture - Density -
Acceptable Zone

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-641	6	8:00	3	116.9	14.4%	0.443	N/A	88.0%	D5	Pass
SL-642	6	8:05	3	115.9	15.1%	0.447	N/A	91.0%	D4	Pass
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-641				
SL-642				



Envirotech Engineering & Consulting, Inc

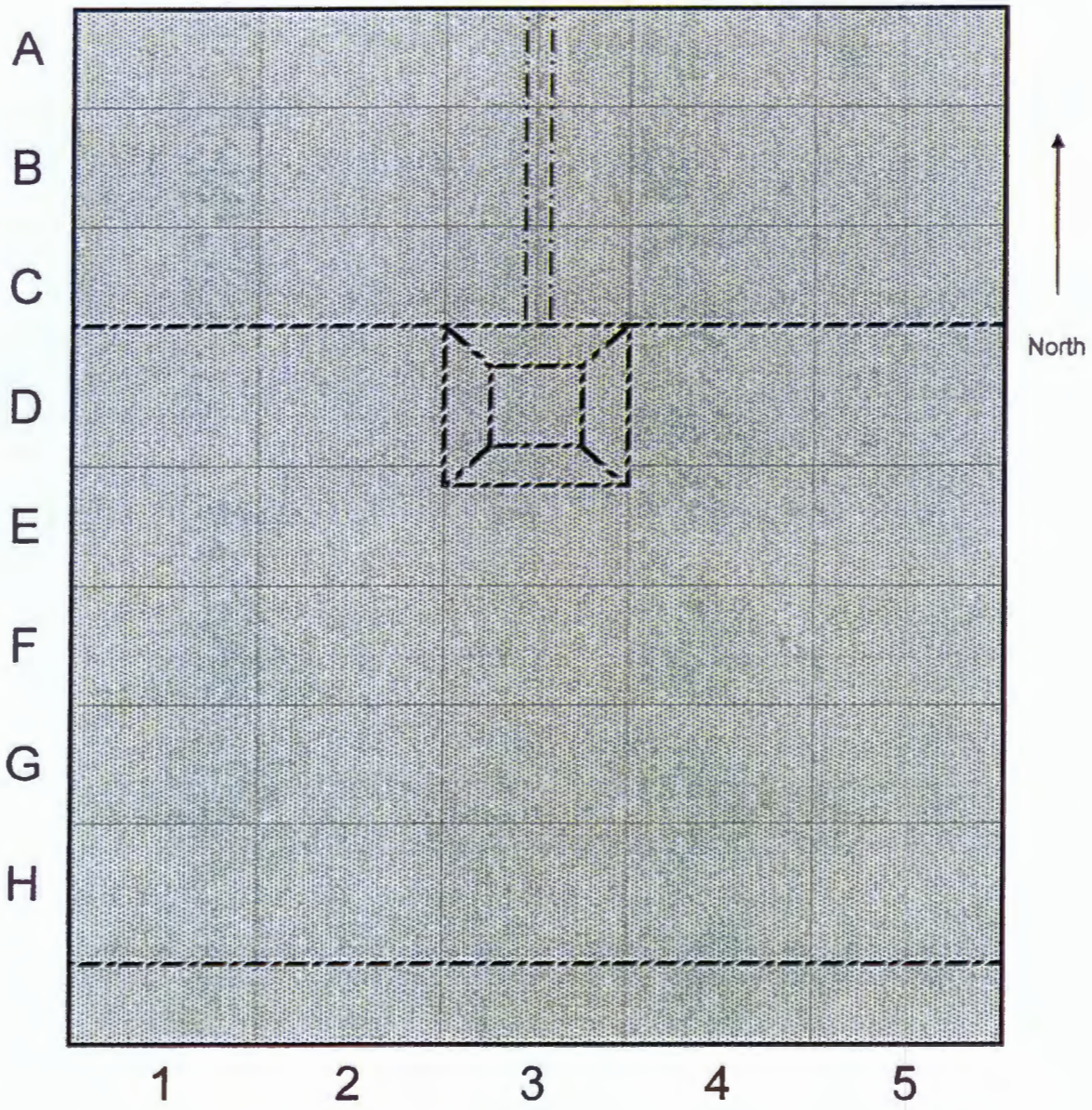
Date 7/16/10

S/C: S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date:	7/14/2010	Lift:	No. 1
Report:	5-16-109	Operator:	L. Hay
Map No:	1 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	

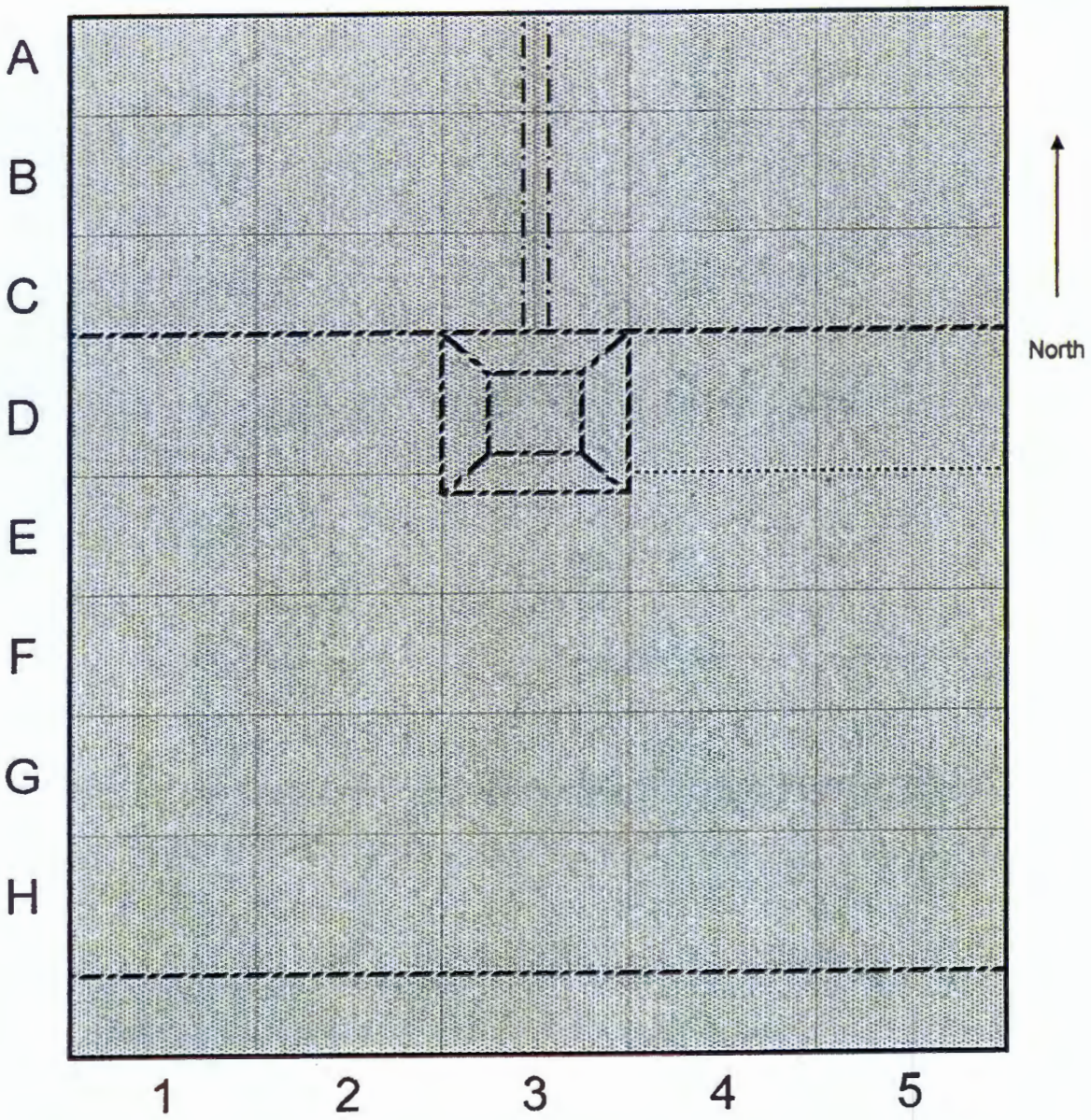


S/C: S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date:	7/14/2010	Lift:	No. 2
Report:	5-16-109	Operator:	L. Hay
Map No:	2 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	

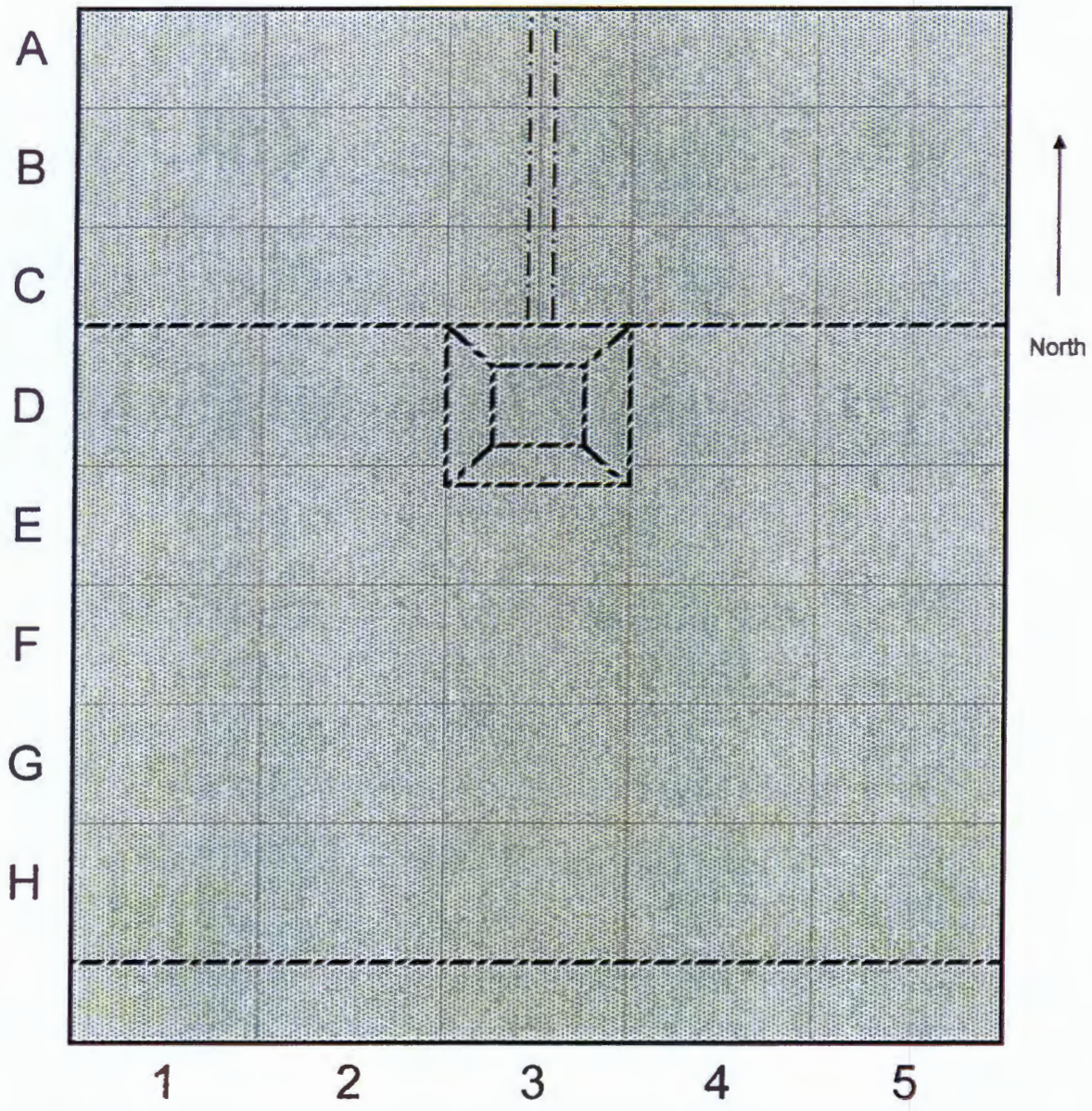


S/C: S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date:	7/14/2010	Lift:	No. 3
Report:	5-16-109	Operator:	L. Hay
Map No:	3 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	

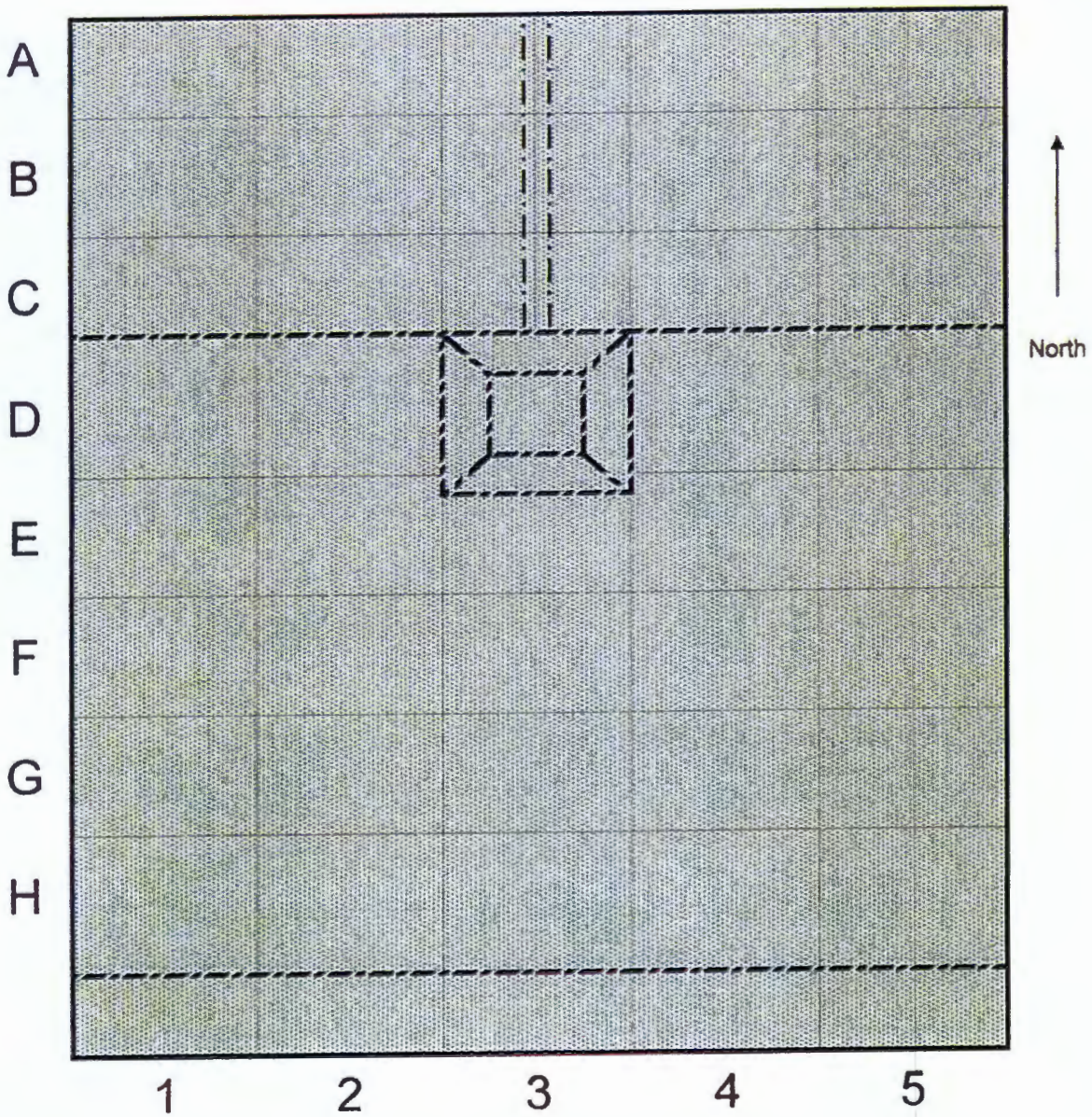


S/C: S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date:	7/14/2010	Lift:	No. 4
Report:	5-16-109	Operator:	L. Hay
Map No:	4 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	

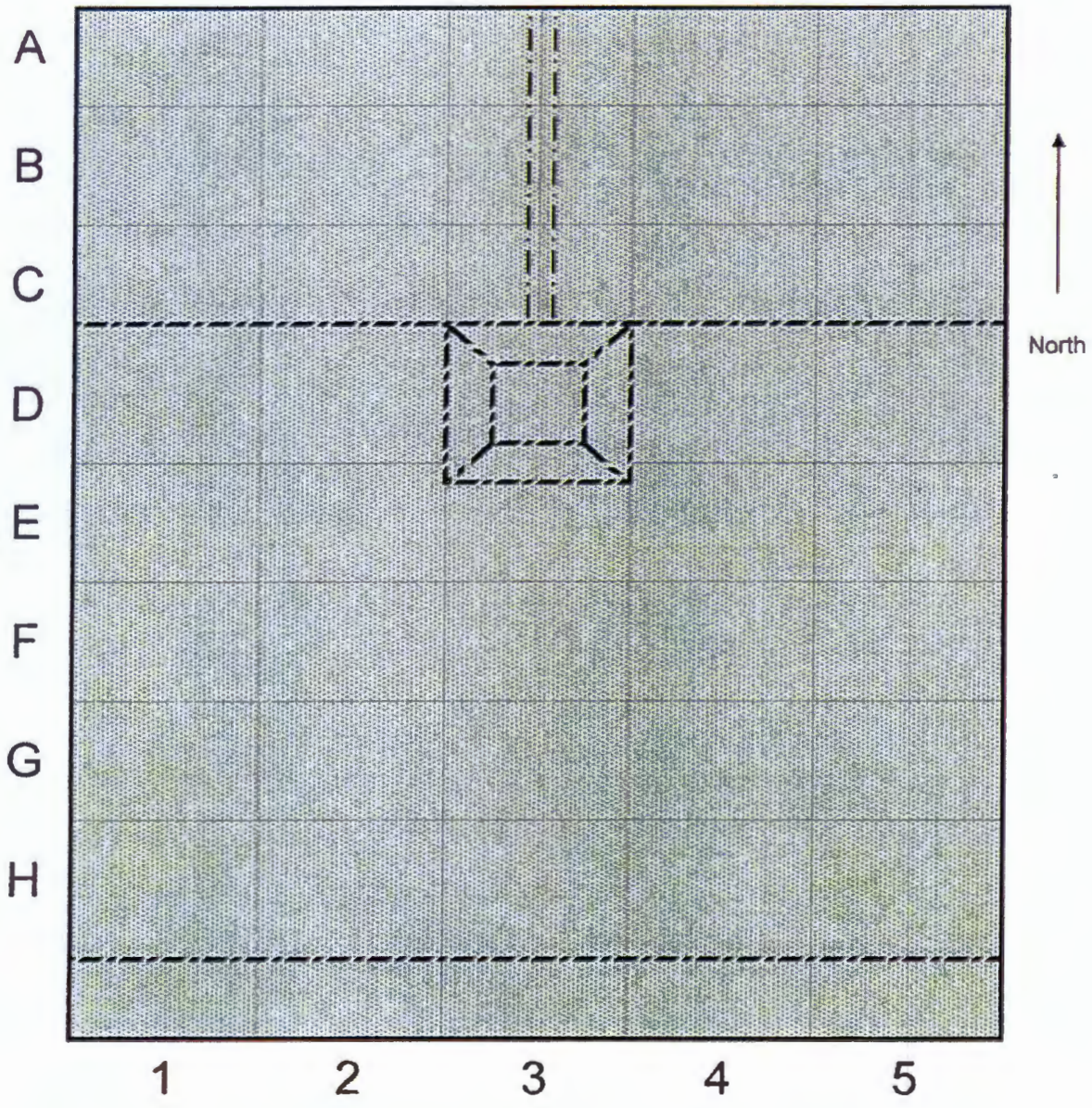


S/C: S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date:	7/14/2010	Lift:	No. 5
Report:	5-16-109	Operator:	L. Hay
Map No:	5 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	

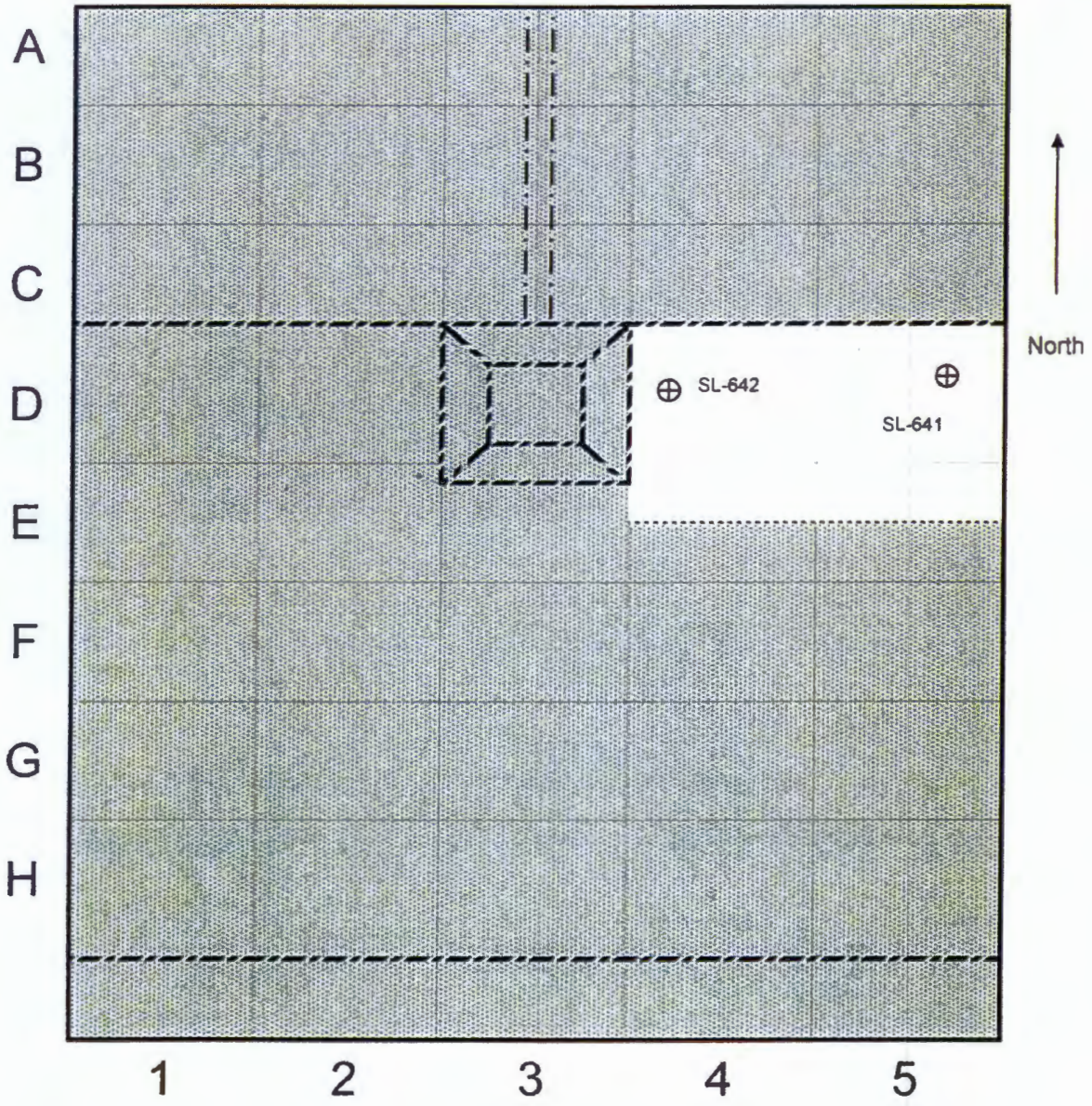


S/C: S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date:	7/14/2010	Lift:	No. 6
Report:	5-16-109	Operator:	L. Hay
Map No:	6 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



FIELD DENSITY TEST (ASTM D-6938)

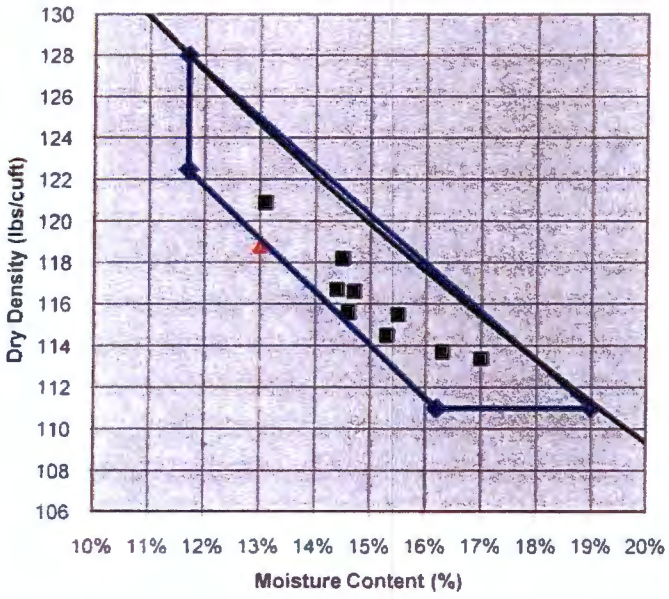
ENVIROTECH

Client: WCH
Submittal: 05-18J Admix Field Data
Project: S013213A00
Test Date: 7/14/2010
Description: Admix Soil
Report: 5-16-109
Comments: Unless otherwise stated - All test at taken at a depth of 6-in.

Model: 3430 Troxler ID: 27881
Moisture Std: 647 Density Stc 2226
Offsets: Moisture - Density -
Acceptable Zone

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-635	5	6:50	3	118.2	14.5%	0.427	16.1%	92.0%	J6	Pass
SL-636	5	6:55	3	113.4	17.0%	0.487	N/A	94.0%	K6	Pass
SL-637	5	7:00	3	113.7	16.3%	0.483	N/A	91.0%	L6	Pass
SL-638	5	7:05	3	115.5	15.5%	0.459	N/A	91.0%	M6	Pass
SL-639	3	7:45	3	116.6	14.7%	0.446	N/A	89.0%	L7	Pass
SL-640	3	7:05	3	114.5	15.3%	0.472	N/A	88.0%	L8	Pass
SL-643	1	8:45	3	120.9	13.1%	0.395	N/A	90.0%	J7	Pass
SL-644	1	8:50	3	116.7	14.4%	0.445	N/A	87.0%	K7	Pass
SL-645	4	9:15	3	115.6	14.6%	0.458	N/A	86.0%	L10	Pass
SL-646	4	9:55	3	118.8	13.0%	0.418	N/A	84.0%	L9	Fail

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-635	SC	1694.4	1510.4	370.8
SL-636				
SL-637				
SL-638				
SL-639				
SL-640				
SL-643				
SL-644				
SL-645				
SL-646				



Envirotech Engineering & Consulting, Inc

7/16/10
Date

FIELD DENSITY TEST (ASTM D-6938)

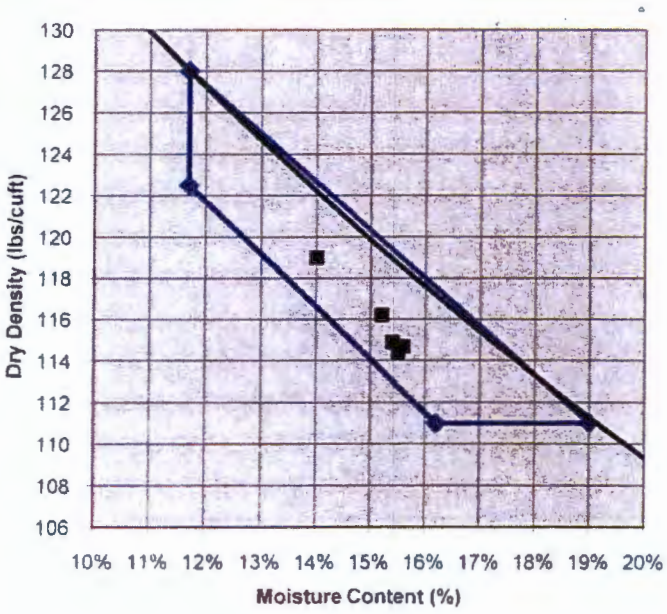
ENVIROTECH

Client: WCH
Submittal: 05-18J Admix Field Data
Project: S013213A00
Test Date: 7/14/2010
Description: Admix Soil
Report: 5-16-109
Comments: Unless otherwise stated - All test at taken at a depth of 6-in.

Model: 3430 Troxler ID: 27881
Moisture Std: 647 Density Std 2226
Offsets: Moisture - Density -
Acceptable Zone

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-646A	4	10:05	5	119.0	14.0%	0.416	N/A	91.0%	L9	Pass
SL-647	4	11:45	3	114.9	15.4%	0.467	N/A	89.0%	L8	Pass
SL-648	4	11:50	3	114.4	15.5%	0.473	N/A	88.0%	L7	Pass
SL-649	2	12:40	3	114.7	15.6%	0.470	N/A	90.0%	J7	Pass
SL-650	2	12:45	3	116.2	15.2%	0.451	N/A	91.0%	K7	Pass
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-646A				
SL-647				
SL-648				
SL-649				
SL-650				



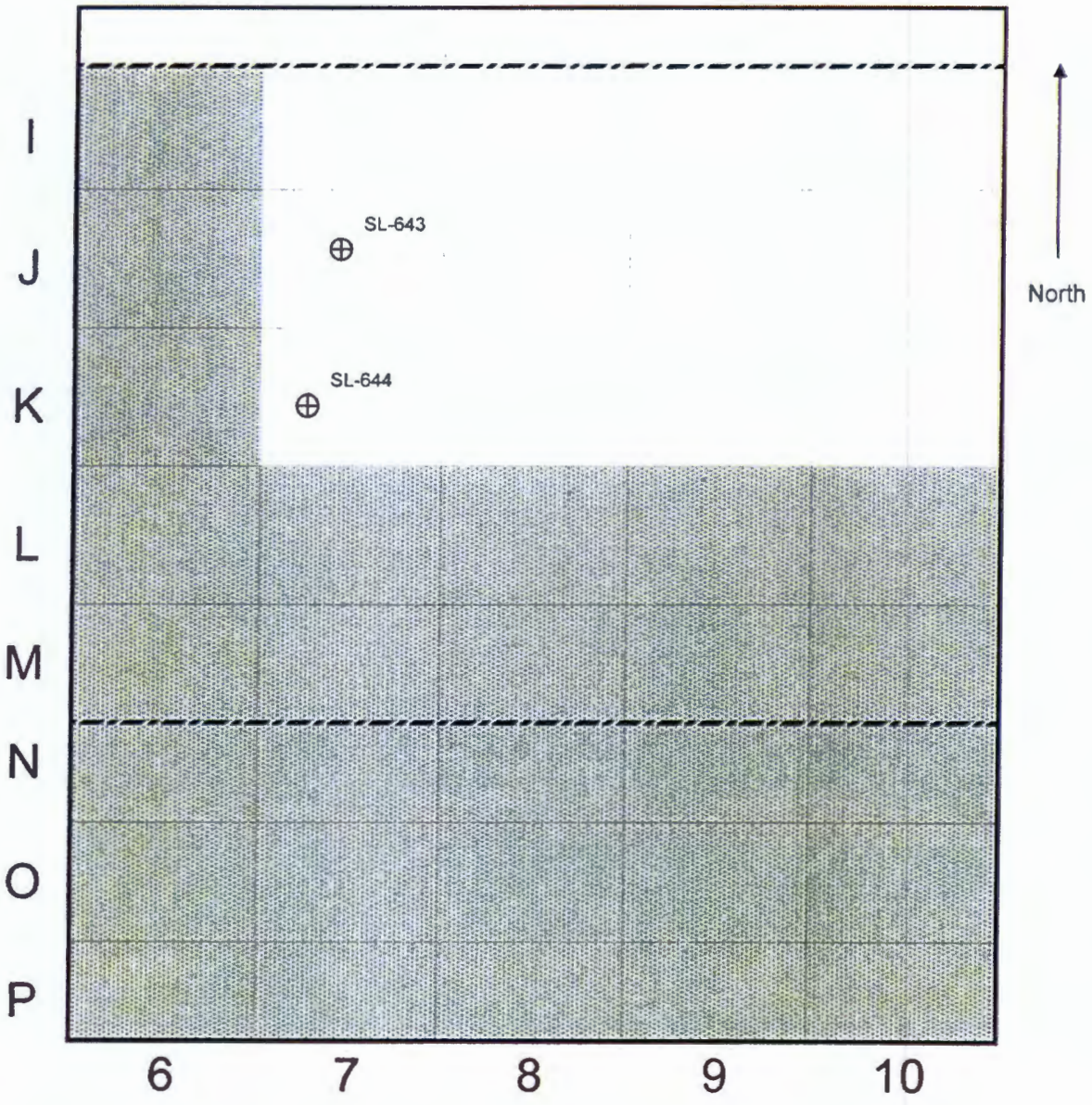
Envirotech Engineering & Consulting, Inc

7-19-2010
Date

S/C: S013213A00

CQA Moisture Density Map Cell 10

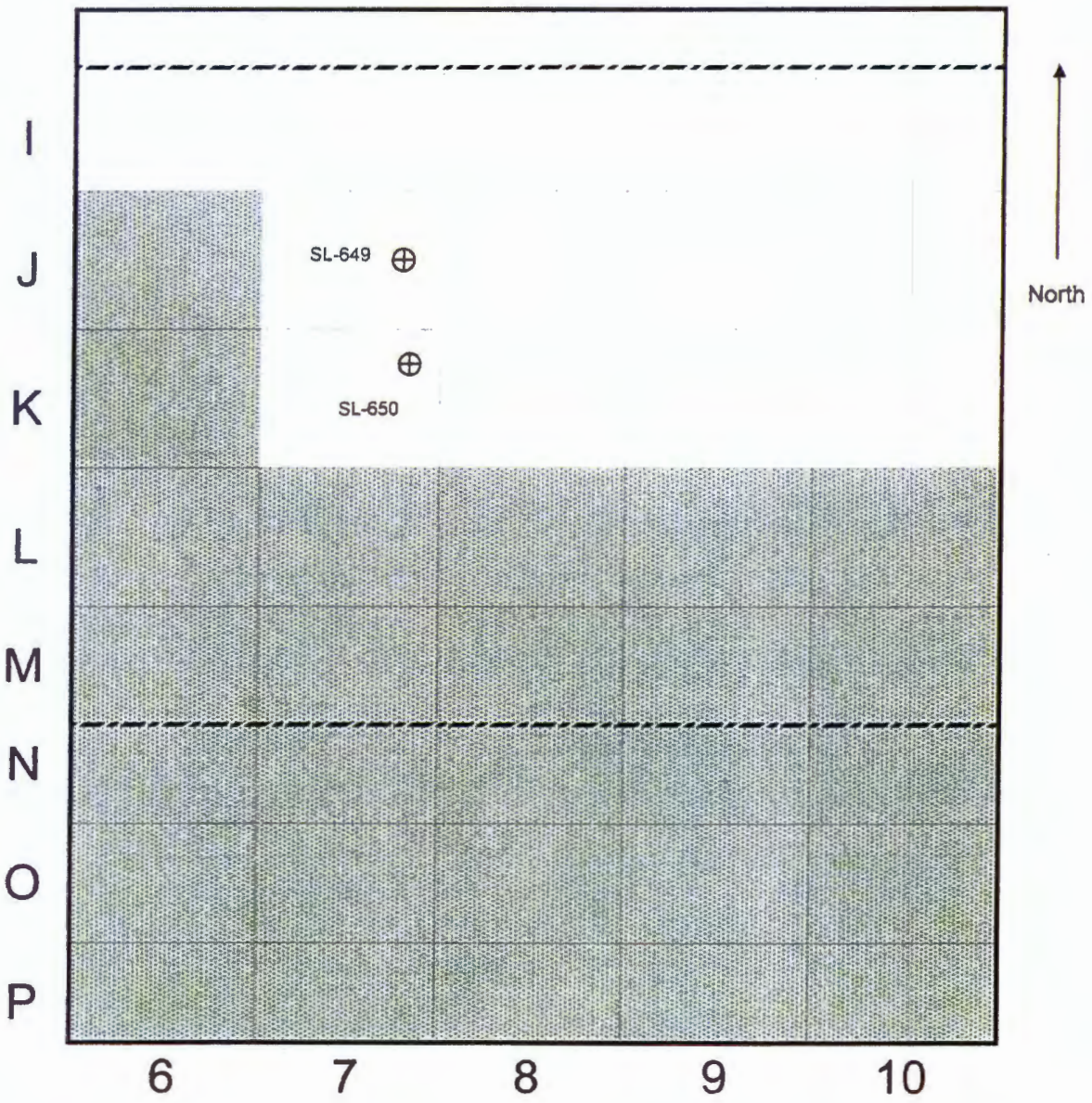
Date:	7/14/2010	Lift:	No. 1
Report:	5-16-109	Operator:	L. Hay
Map No:	1 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 10

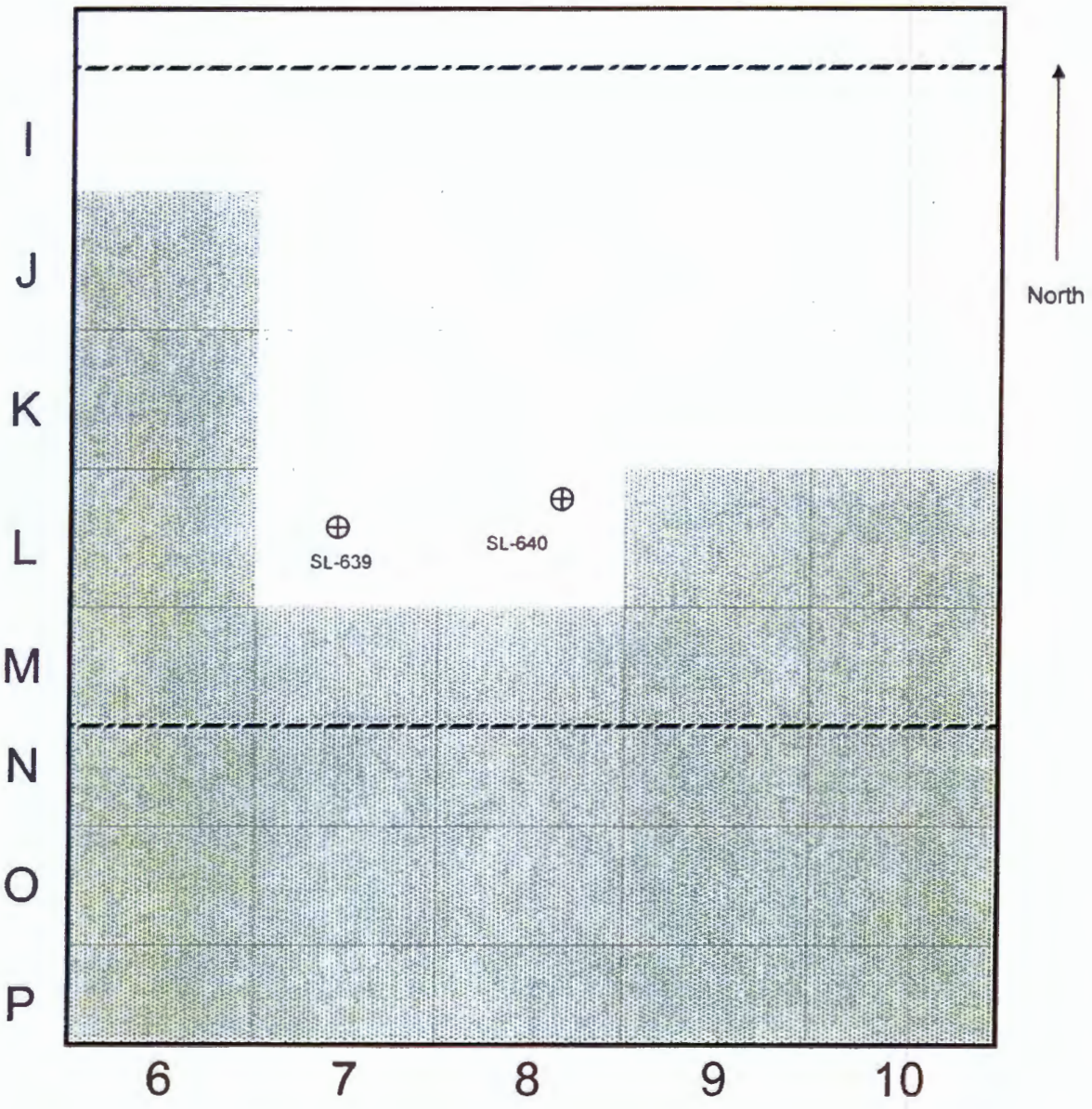
Date:	7/14/2010	Lift:	No. 2
Report:	5-16-109	Operator:	L. Hay
Map No:	2 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 10

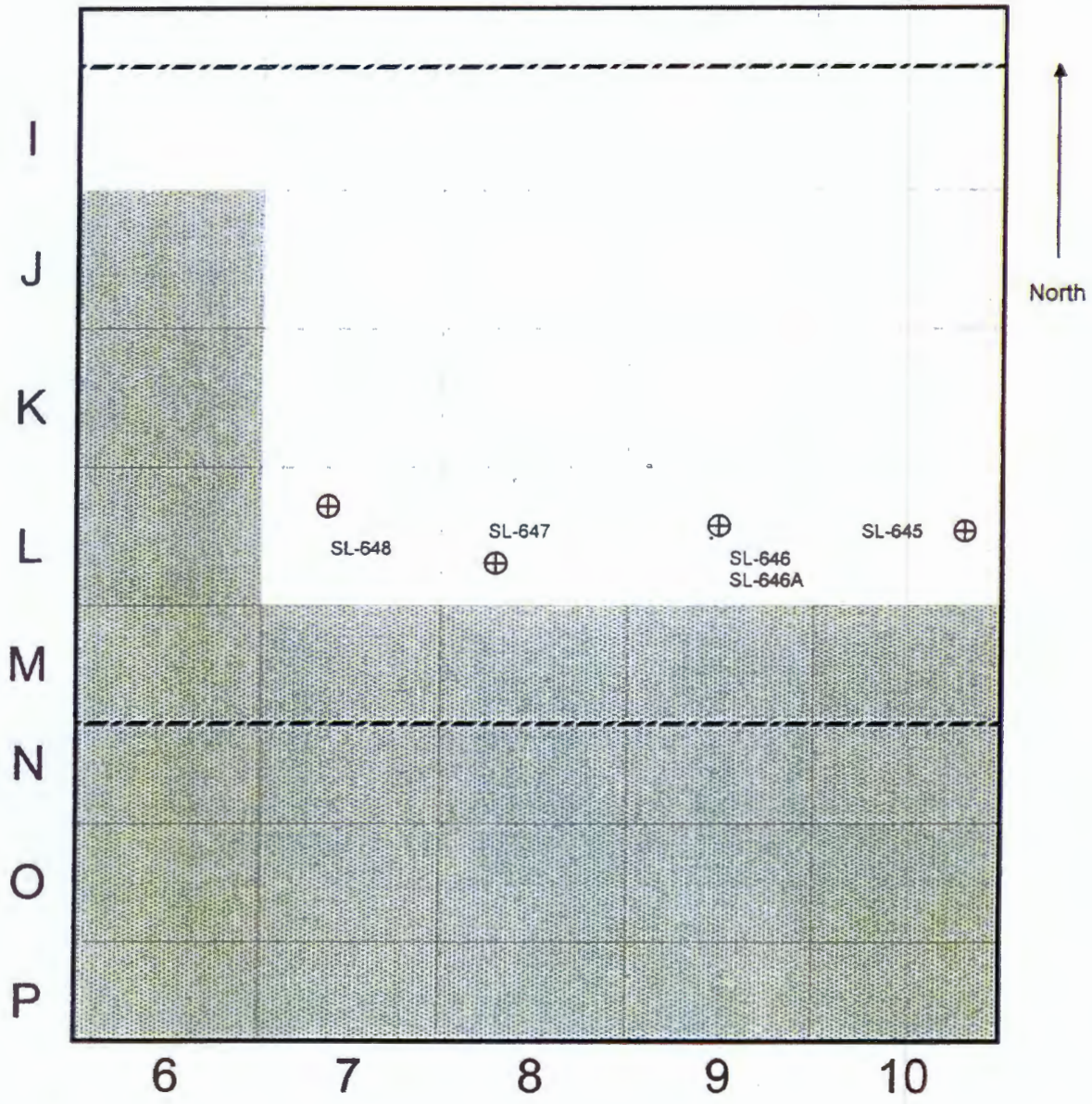
Date:	7/14/2010	Lift:	No. 3
Report:	5-16-109	Operator:	L. Hay
Map No:	2 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	SL-570 was performed for Sand Cone Verification



S/C: S013213A00

CQA Moisture Density Map Cell 10

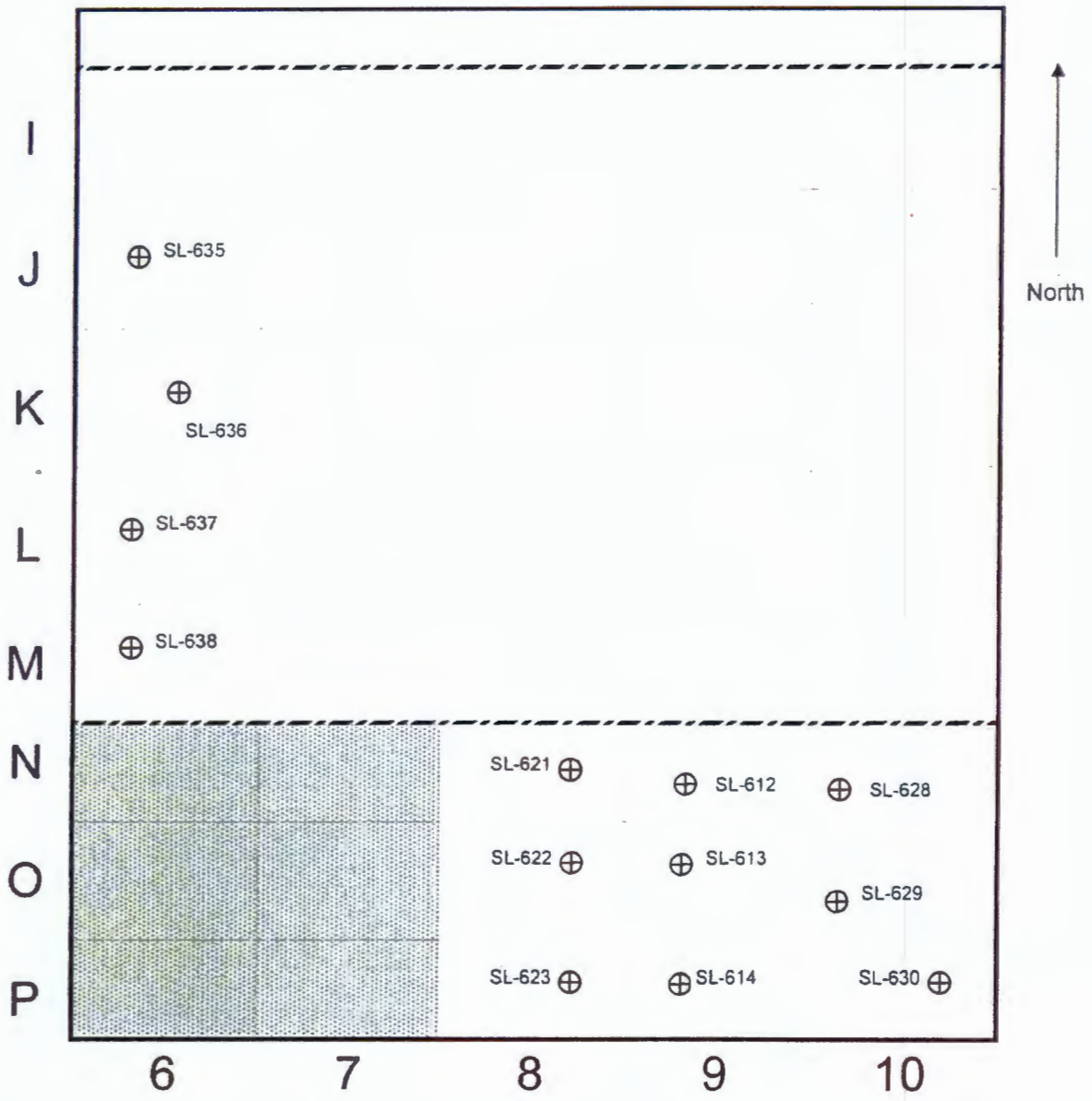
Date:	7/14/2010	Lift:	No. 4
Report:	5-16-109	Operator:	L. Hay
Map No:	4 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 10

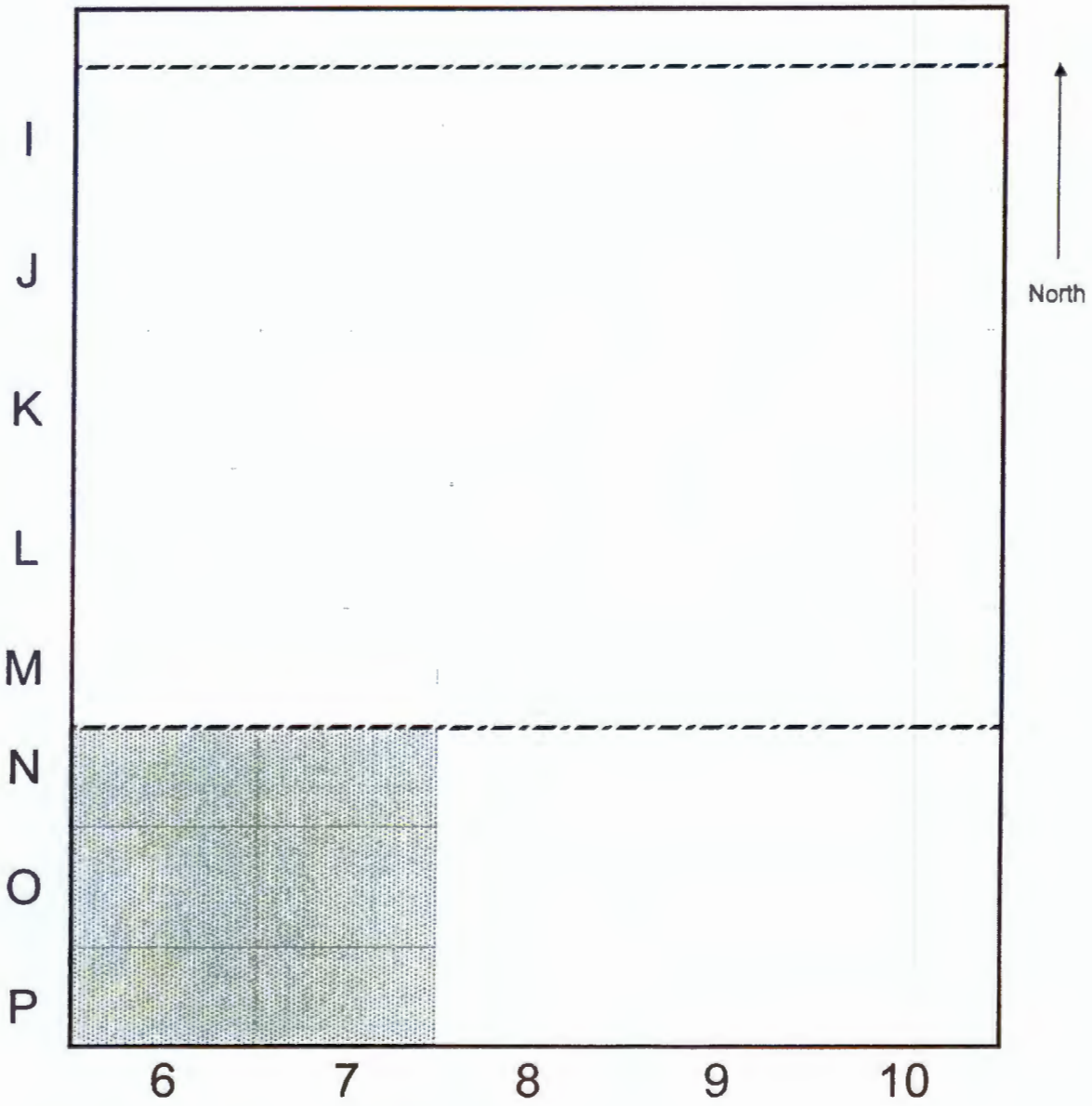
Date:	7/14/2010	Lift:	No. 5
Report:	5-16-109	Operator:	L. Hay
Map No:	5 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



S/C: S013213A00

CQA Moisture Density Map Cell 10

Date:	7/14/2010	Lift:	No. 6
Report:	5-16-109	Operator:	L. Hay
Map No:	6 of 6	Material:	Admix
Grid:	95-ft x 90-ft	Notes:	



UNIT WEIGHT OF COMPACTION
BY SAND CONE (ASTM 1556)

ENVIROTECH

2500 N. 11th Street | Enid, OK 73701
(580) 234-8780 | Fax (580) 237-4302

Client: WCH
Submittal: 05-18J Admix Field Data

Sample Information

Contact Name:	Charlie Skiba			Sample ID:	SL-635
Project:	S013213A00			Sample Description:	Admix Soil
Project Location:	ERDF Cells 9-10			Sampling Date:	7/14/2010
Tested By:	L. Hay		7/14/2010	Sampled By:	L. Hay
Reviewed By:	J. Voss	Date:	7/15/2010	Date Received:	7/14/2010
Comments				Report No.:	5-16-109

FIELD UNIT WEIGHT - SAND CONE METHOD

Calibration of Unit Weight of Ottawa Sand

1. Mass of Proctor mold, W_1	3955.30 g
2. Mass of Proctor mold + sand, W_2	5387.10 g
3. Volume of mold, V_1	0.03 ft
4. Dry unit weight, $\gamma_{d\,(sand)} = \frac{W_2 - W_1}{V_1}$	94.70 lb/ft^3

Calibration Cone

5. Mass of bottle + cone + sand (before use), W_3	4832.80 g
6. Mass of bottle + cone + sand (after use), W_4	3215.40 g
7. Weight of sand to fill the cone, $W_c = W_4 - W_3$	3.57 lb

Results from Field Tests

3 8. Mass of bottle + cone + sand (before use), W_6	6005.6 g
9. Mass of bottle + cone + sand (after use), W_8	3474.9 g
10. Volume of hole, $V_2 = \frac{W_6 - W_8 - W_c}{\gamma\, d\,(sand)}$	0.0213 ft^3
11. Mass of gallon can, W_5	370.80 g
12. Mass of gallon can + moist soil, W_7	1694.40 g
13. Mass of gallon can + dry soil, W_9	1510.40 g
14. Moist unit weight of soil in field, $\gamma = W_7 - W_5 / V_2$	137.24 lb/ft^3
15. Moisture content in the field, $w\,(\%) = \frac{W_7 - W_9}{W_9 - W_5} \times 100$	16.1%
16. Dry unit weight in the field, $_{d\,(sand)} = \gamma / (1+(w\,(\%)/100)$	118.16 lb/ft^3
17. Comparision moisture content =	14.5%
18. Dry unit weight comparison =	118.2 lb/ft^3

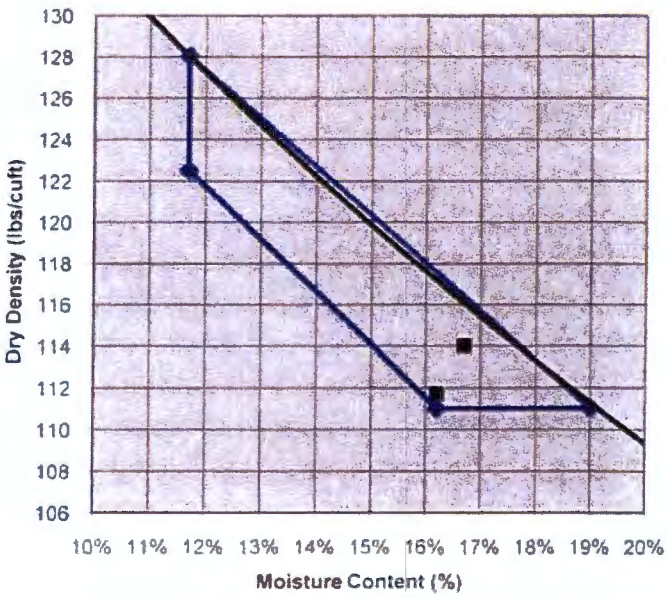
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client	WCH				
Submittal:	05-18J Admix Field Data				
Project:	S013213A00	Model	3430	Troxler ID	27881
Test Date	7/29/2010	Moisture Std:	640	Density Std	2214
Description	Admix Soil	Offsets.	Moisture -	Density -	
Report.	5-16-121	Acceptable Zone			
Comments.	Unless otherwise stated - All test at taken at a depth of 6-in.				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-820	5	7:07	3	114.0	16.7%	0.479	N/A	94.0%	Road	Pass
SL-821	6	8:23	3	111.7	16.2%	0.510	N/A	86.0%	Road	Pass
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-820				
SL-821				



8/5/10

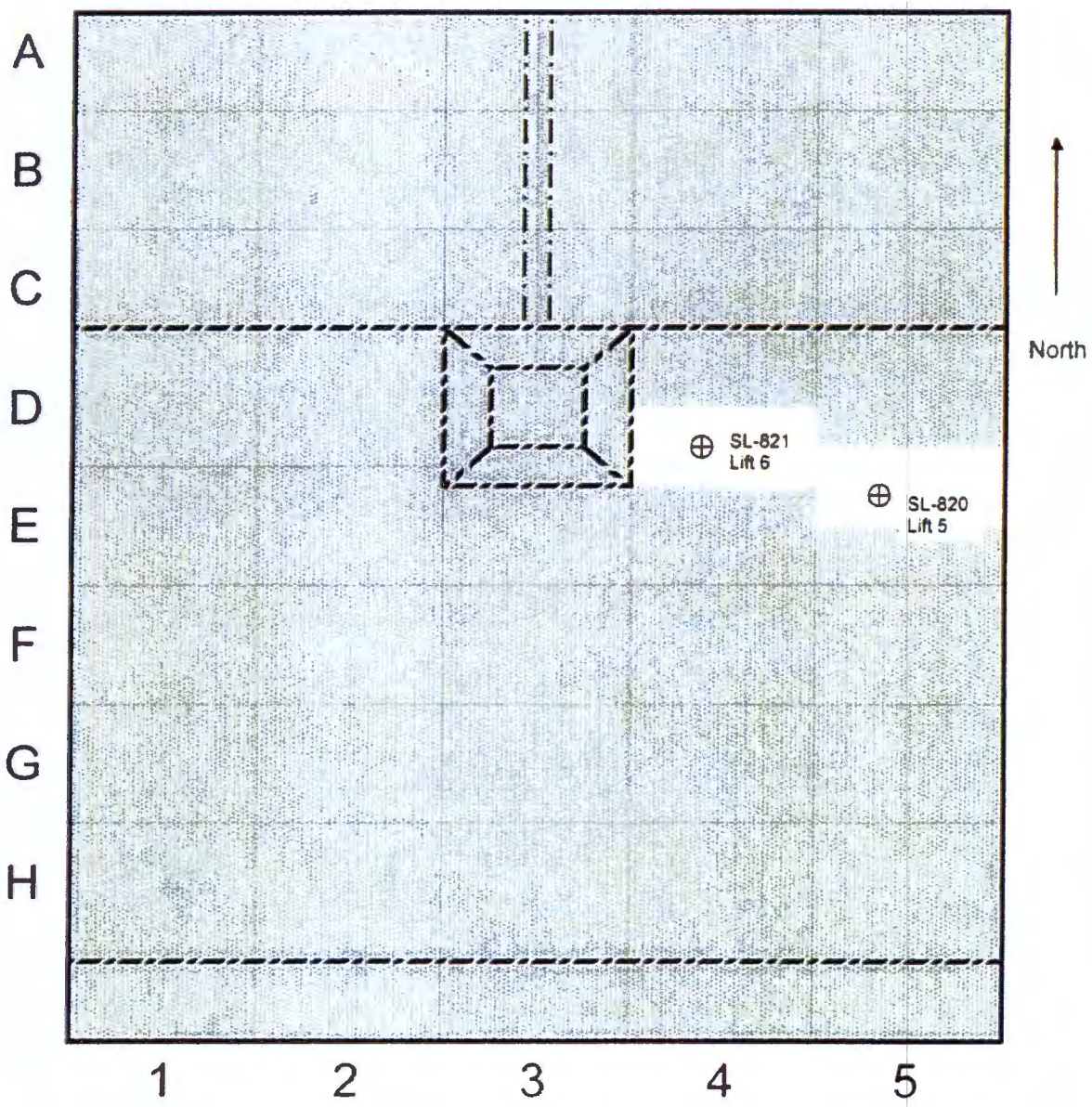
ıvirotech Engineering & Consulting Inc

Date

S/C: S013213A00

CQA Moisture Density Map Cell 9

Date:	7/29/2010	Lift	Haul Road
Report:	5-16-121	Operator:	J. Schut
Map No:	1 of 1	Material	Admix
Grid	95-ft x 90-ft	Notes	



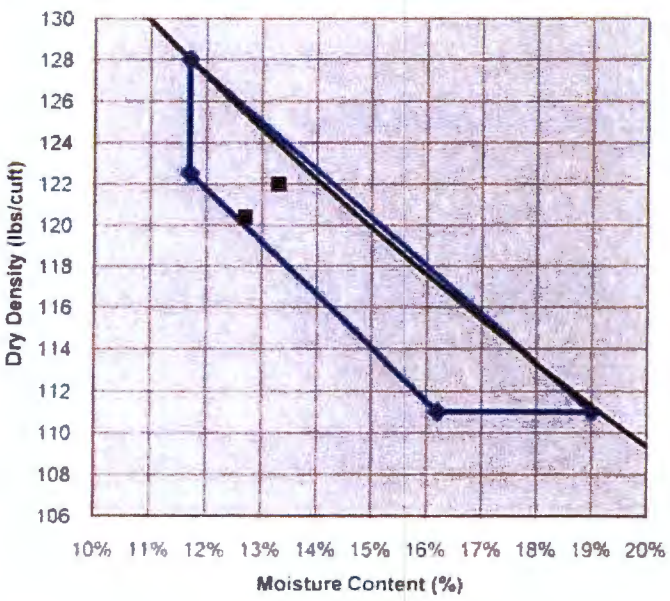
FIELD DENSITY TEST (ASTM D-6938)

ENVIROTECH

Client	WCH				
Submittal	05-18J Admix Field Data				
Project	S013213A00	Model	3430	Troxler ID	27881
Test Date	8/7/2010	Moisture Std	646	Density Std	2192
Description	Admix Soil	Offsets	Moisture -	Density -	
Report	5-16-128	Acceptable Zone			
Comments	Unless otherwise stated - All test at taken at a depth of 6-in				

Test No	Lift	Time	No. of Passes	Dry Density lbs/cuft	Moisture Content (%)	Void Ratio	Moist Verify	% Saturation	Grid Zone	Pass / Fail
SL-944	6	7:35	-	120.4	12.7%	0.400	N/A	86.0%	D3	Pass
SL-945	6	7:46	-	122.0	13.3%	0.381	N/A	94.0%	E3	Pass
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			
							N/A			

Sample ID	Tare No.	Tare + Wet	Tare + Dry	Tare (g)
SL-944				
SL-945				



Envirotech Engineering & Consulting Inc

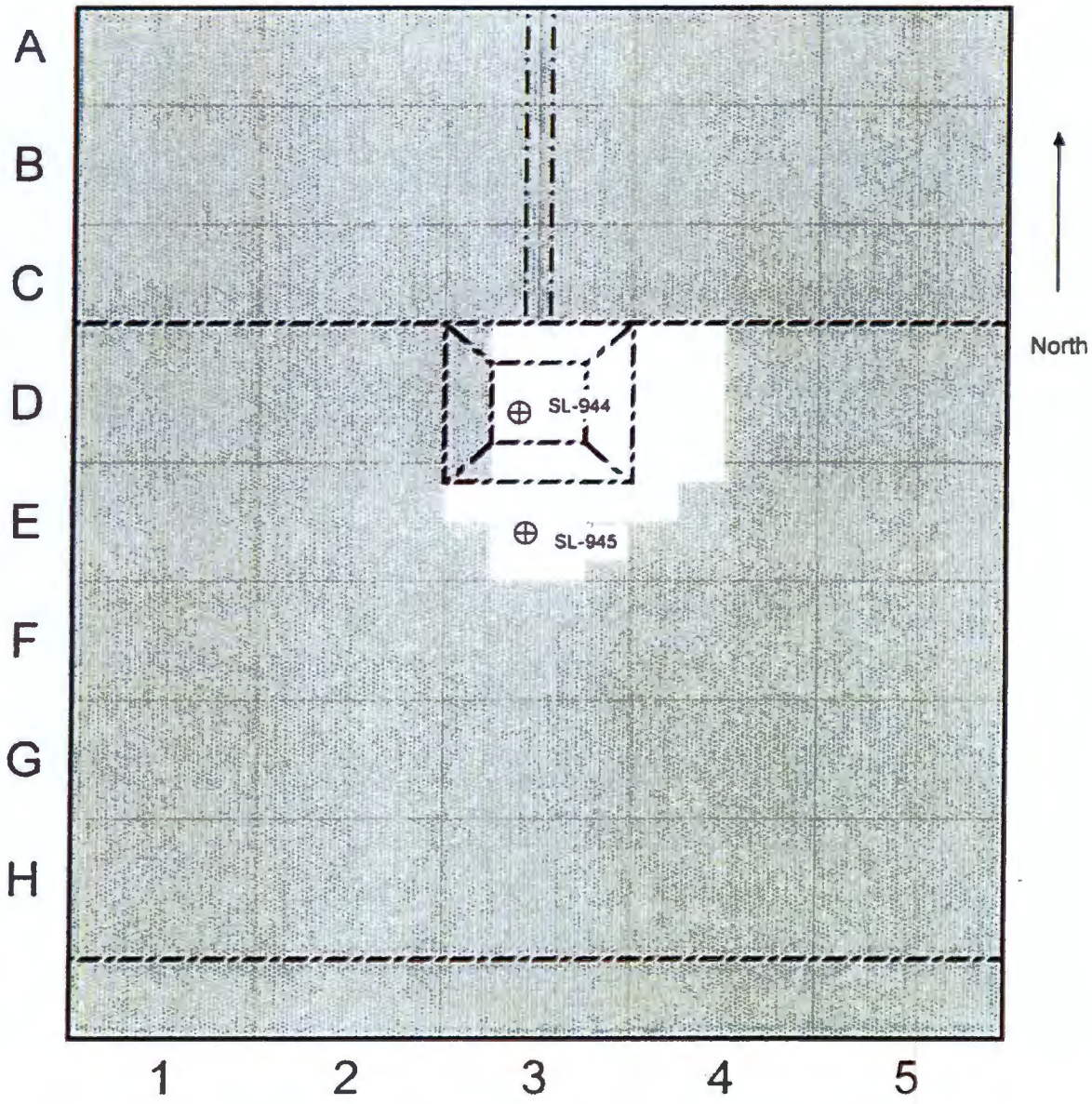
8/9/10
Date

S/C S013213A00

CQA Moisture Density Map Cell 9

05-016-101

Date	8/7/2010	Lift	Sump Repair
Report:	5-16-128	Operator	J. Schut
Map No:	1 of 1	Material.	Admix
Grid.	95-ft x 90-ft	Notes:	



G.7

SHELBY TUBE PERMEABILITY

HYDRAULIC C UCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	7

Date:	4/13/2010
Sample ID:	SL-31
Sample Description:	Brown Sandy Clay

L_i =	7.60	cm	**Hydraulic System Constants**	
L_f =	7.48	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	18.3	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	1.04329		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting			
Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.56	60
10^{-5} - 10^{-6}	10	7.42	60
10^{-6} - 10^{-7}	20	13.13	60
< 10^{-7}	30	18.85	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	JS	5/17/2010	0				20.40	1.70	254.51	34.0		
1	JS	5/17/2010	10	600	60	65	20.20	1.69	251.90	33.7	2.04E-08	2.13E-08
			10				20.20	1.69	251.90	33.7		
2	JS	5/17/2010	20	1200	60	65	20.00	1.68	249.29	33.3	2.05E-08	2.14E-08
			20				20.00	1.68	249.29	33.3		
3	JS	5/17/2010	30	1800	60	65	19.80	1.68	246.68	33.0	2.062E-08	2.15E-08
			30				19.80	1.68	246.68	33.0		
4	JS	5/17/2010	40	2400	60	65	19.70	1.67	245.37	32.8	1.81E-08	1.89E-08
			40				19.70	1.67	245.37	32.8		
5	JS	5/17/2010	50	3000	60	65	19.50	1.66	242.76	32.5	1.872E-08	1.95E-08

Project Manager

5-19-2010
Date

Average K:	1.967E-08	2.0518E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	7

Date:	4/13/2010
Sample ID:	SL-31
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.29		7.29	
Sample Length (cm)	7.60		7.48	
Sample Volume (cm^3)	317.1		312.1	
Tare Number	JS		M	
Tare Weight (gm)	50.04		49.74	
Wet Soil + Tare (gm)	427.4		285.02	
Dry Soil + Tare (gm)	372.99		249.269	
Water Weight (gm)		54.4		35.751
Dry Soil Weight (gm)		322.95		199.529
Moisture Content (%)		16.8%		17.9%
Wet Weight Sample (gm)	659.5		659.5	
Wet Density Sample (pcf)		129.56		131.63
Dry Density Sample (pcf)		110.88		111.63
Saturation %		87.6%		95.0%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	7

Date:	5/20/2010
Sample ID:	SL-60 Lift 4 Zone #0-2
Sample Description:	Brown Sandy Clay

L_i =	7.62	cm	**Hydraulic System Constants**	
L_f =	7.48	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	18.9	C	Area permometer tube, a_p (cm^2)	0.031416
R_i =	1.028861		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting			
Estimated k_i (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.56	60
10^{-5} - 10^{-6}	10	7.41	60
10^{-6} - 10^{-7}	20	13.13	60
< 10^{-7}	30	18.84	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	5/20/2010	0				22.30	1.70	280.37	37.5		
1	KR	5/20/2010	30	1800	60	65	21.90	1.68	275.14	36.8	1.23E-08	1.27E-08
			30				21.90	1.68	275.14	36.8		
2	KR	5/20/2010	40	2400	60	65	21.80	1.68	273.84	36.6	1.1569E-08	1.19E-08
			40				21.80	1.68	273.84	36.6		
3	KR	5/20/2010	50	3000	60	65	21.60	1.67	271.23	36.3	1.3025E-08	1.34E-08
			50				21.60	1.67	271.23	36.3		
4	KR	5/20/2010	60	3600	60	65	21.50	1.67	269.92	36.1	1.2437E-08	1.28E-08
			60				21.50	1.67	269.92	36.1		
5	KR	5/20/2010	70	4200	60	65	21.40	1.66	268.62	35.9	1.2024E-08	1.24E-08

Project Manager

5-21-2010
Date

Average K:	1.2273E-08	1.2627E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	7

Date:	5/20/2010
Sample ID:	SL-60 Lift 4 Zone #0-2
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.32		7.32	
Sample Length (cm)	7.62		7.48	
Sample Volume (cm^3)	320.2		314.3	
Tare Number	GG		CC	
Tare Weight (gm)	49.97		49.83	
Wet Soil + Tare (gm)	412.34		313.38	
Dry Soil + Tare (gm)	366.9		272.97	
Water Weight (gm)		45.4		40.41
Dry Soil Weight (gm)		316.93		223.14
Moisture Content (%)		14.3%		18.1%
Wet Weight Sample (gm)	660.5		663	
Wet Density Sample (pcf)		128.51		131.42
Dry Density Sample (pcf)		112.40		111.27
Saturation %		77.6%		95.1%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	5/21/2010
Sample ID:	SL-100 Lift #6 Zone P-1
Sample Description:	Brown Sandy Clay

L_i =	7.65	cm	**Hydraulic System Constants**	
L_f =	7.51	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	18.9	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	1.028861		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.57	60
10^{-5} - 10^{-6}	10	7.44	60
10^{-6} - 10^{-7}	20	13.17	60
< 10^{-7}	30	18.91	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	5/21/2010	0				22.50	1.70	283.09	37.7		
1	KR	5/21/2010	30	1800	60	65	22.00	1.68	276.56	36.8	1.54E-08	1.59E-08
			30				22.00	1.68	276.56	36.8		
2	KR	5/21/2010	40	2400	60	65	21.80	1.67	273.95	36.5	1.6297E-08	1.68E-08
			40				21.80	1.67	273.95	36.5		
3	KR	5/21/2010	50	3000	60	65	21.70	1.67	272.65	36.3	1.4938E-08	1.54E-08
			50				21.70	1.67	272.65	36.3		
4	KR	5/21/2010	60	3600	60	65	21.50	1.66	270.04	36.0	1.5642E-08	1.61E-08
			60				21.50	1.66	270.04	36.0		
5	KR	5/21/2010	70	4200	60	65	21.40	1.65	268.73	35.8	1.4787E-08	1.52E-08

Project Manager

5-23-2010
Date

Average K:	1.5421E-08	1.5866E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	5/21/2010
Sample ID:	SL-100 Lift #6 Zone P-1
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.29		7.29	
Sample Length (cm)	7.65		7.51	
Sample Volume (cm^3)	319.1		313.3	
Tare Number	FF		JS	
Tare Weight (gm)	49.94		50.02	
Wet Soil + Tare (gm)	435.1		360.28	
Dry Soil + Tare (gm)	387.37		315.73	
Water Weight (gm)		47.7		44.55
Dry Soil Weight (gm)		337.43		265.71
Moisture Content (%)		14.1%		16.8%
Wet Weight Sample (gm)	666.5		670	
Wet Density Sample (pcf)		130.12		133.23
Dry Density Sample (pcf)		114.00		114.10
Saturation %		79.9%		95.0%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	2

Date:	5/21/2010
Sample ID:	SL-102 Lift #6 Zone N-1
Sample Description:	Brown Sandy Clay

L_i =	7.62	cm	**Hydraulic System Constants**	
L_f =	7.48	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	18.9	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	1.028861		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting			
Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.56	60
10^{-5} - 10^{-6}	10	7.42	60
10^{-6} - 10^{-7}	20	13.14	60
< 10^{-7}	30	18.86	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	5/21/2010	0				22.40	1.70	281.73	37.6		
1	KR	5/21/2010	30	1800	60	65	21.90	1.68	275.20	36.8	1.54E-08	1.58E-08
			30				21.90	1.68	275.20	36.8		
2	KR	5/21/2010	40	2400	60	65	21.70	1.67	272.59	36.4	1.6212E-08	1.67E-08
			40				21.70	1.67	272.59	36.4		
3	KR	5/21/2010	50	3000	60	65	21.50	1.66	269.98	36.1	1.6762E-08	1.72E-08
			50				21.50	1.66	269.98	36.1		
4	KR	5/21/2010	60	3600	60	65	21.40	1.66	268.67	35.9	1.5561E-08	1.60E-08
			60				21.40	1.66	268.67	35.9		
5	KR	5/21/2010	70	4200	60	65	21.20	1.65	266.06	35.6	1.609E-08	1.66E-08

Project Manager

5-23-2010
Date

Average K:	1.5997E-08	1.6459E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	2

Date:	5/21/2010
Sample ID:	SL-102 Lift #6 Zone N-1
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.32		7.32	
Sample Length (cm)	7.62		7.48	
Sample Volume (cm^3)	320.2		314.5	
Tare Number	MJ		BB	
Tare Weight (gm)	49.79		50.08	
Wet Soil + Tare (gm)	409.35		367.88	
Dry Soil + Tare (gm)	362.21		319.59	
Water Weight (gm)		47.1		48.29
Dry Soil Weight (gm)		312.42		269.51
Moisture Content (%)		15.1%		17.9%
Wet Weight Sample (gm)	666.3		665	
Wet Density Sample (pcf)		129.66		131.73
Dry Density Sample (pcf)		112.66		111.71
Saturation %		82.2%		95.2%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	7

Date:	5/31/2010
Sample ID:	SL-174 Lift #2 Zone J-3
Sample Description:	Brown Sandy Clay

L_i =	7.62	cm	**Hydraulic System Constants**	
L_f =	7.39	cm	**Mercury U-Tube Manometer**	
Dia =	7.2	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	22.2	C	Area permometer tube, a_p (cm^2)	0.031416
R_i =	0.949048		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting			
Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.52	60
10^{-5} - 10^{-6}	10	7.35	60
10^{-6} - 10^{-7}	20	13.00	60
< 10^{-7}	30	18.65	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	5/31/2010	0				22.30	1.70	280.37	37.9		
1	KR	5/31/2010	30	1800	60	65	21.70	1.68	272.53	36.9	1.89E-08	1.79E-08
			30				21.70	1.68	272.53	36.9		
2	KR	5/31/2010	40	2400	60	65	21.50	1.67	269.92	36.5	1.8963E-08	1.80E-08
			40				21.50	1.67	269.92	36.5		
3	KR	5/31/2010	50	3000	60	65	21.30	1.66	267.31	36.2	1.9063E-08	1.81E-08
			50				21.30	1.66	267.31	36.2		
4	KR	5/31/2010	60	3600	60	65	21.10	1.65	264.70	35.8	1.9164E-08	1.82E-08
			60				21.10	1.65	264.70	35.8		
5	KR	5/31/2010	70	4200	60	65	21.00	1.65	263.40	35.6	1.7843E-08	1.69E-08

Project Manager

6-1-2010
Date

Average K:	1.878E-08	1.7823E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	7

Date:	5/31/2010
Sample ID:	SL-174 Lift #2 Zone J-3
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.21		7.21	
Sample Length (cm)	7.62		7.39	
Sample Volume (cm^3)	311.4		302.1	
Tare Number	Y		WO	
Tare Weight (gm)	49.64		50.12	
Wet Soil + Tare (gm)	394.04		310.93	
Dry Soil + Tare (gm)	343.13		270.33	
Water Weight (gm)		50.9		40.6
Dry Soil Weight (gm)		293.49		220.21
Moisture Content (%)		17.3%		18.4%
Wet Weight Sample (gm)	630		635.5	
Wet Density Sample (pcf)		126.04		131.06
Dry Density Sample (pcf)		107.41		110.66
Saturation %		82.4%		95.3%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	2

Date:	5/31/2010
Sample ID:	SL-176 Lift #4 Zone I-1
Sample Description:	Brown Sandy Clay

L_i =	7.62	cm	**Hydraulic System Constants**	
L_f =	7.50	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	22.2	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.949048		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.57	60
10^{-5} - 10^{-6}	10	7.43	60
10^{-6} - 10^{-7}	20	13.16	60
< 10^{-7}	30	18.89	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	5/31/2010	0				22.60	1.70	284.45	37.9		
1	KR	5/31/2010	30	1800	60	65	22.10	1.68	277.92	37.1	1.53E-08	1.46E-08
			30				22.10	1.68	277.92	37.1		
2	KR	5/31/2010	40	2400	60	65	22.00	1.68	276.62	36.9	1.3849E-08	1.31E-08
			40				22.00	1.68	276.62	36.9		
3	KR	5/31/2010	50	3000	60	65	21.80	1.67	274.01	36.5	1.4849E-08	1.41E-08
			50				21.80	1.67	274.01	36.5		
4	KR	5/31/2010	60	3600	60	65	21.70	1.66	272.70	36.4	1.3957E-08	1.32E-08
			60				21.70	1.66	272.70	36.4		
5	KR	5/31/2010	70	4200	60	65	21.60	1.66	271.40	36.2	1.3326E-08	1.26E-08

Project Manager

6-1-2010
Date

Average K:	1.4266E-08	1.3539E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC.

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	2

Date:	5/31/2010
Sample ID:	SL-176 Lift #4 Zone I-1
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.29		7.29	
Sample Length (cm)	7.62		7.50	
Sample Volume (cm^3)	318.1		313.0	
Tare Number	FF		CC	
Tare Weight (gm)	49.94		49.82	
Wet Soil + Tare (gm)	369.14		359.86	
Dry Soil + Tare (gm)	330.77		318.32	
Water Weight (gm)		38.4		41.54
Dry Soil Weight (gm)		280.83		268.5
Moisture Content (%)		13.7%		15.5%
Wet Weight Sample (gm)	672.5		679.5	
Wet Density Sample (pcf)		131.72		135.27
Dry Density Sample (pcf)		115.88		117.14
Saturation %		81.3%		95.3%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC C DUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	5/31/2010
Sample ID:	SL-177 Lift#3 Zone P-5
Sample Description:	Brown Sandy Clay

L_i =	7.60	cm	**Hydraulic System Constants**	
L_f =	7.41	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	22.2	c	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.949048		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting			
Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.53	60
10^{-5} - 10^{-6}	10	7.36	60
10^{-6} - 10^{-7}	20	13.02	60
< 10^{-7}	30	18.69	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	5/31/2010	0				22.60	1.70	284.45	38.4		
1	KR	5/31/2010	30	1800	60	65	22.10	1.68	277.92	37.5	1.51E-08	1.43E-08
			30				22.10	1.68	277.92	37.5		
2	KR	5/31/2010	40	2400	60	65	21.80	1.67	274.01	37.0	1.8211E-08	1.73E-08
			40				21.80	1.67	274.01	37.0		
3	KR	5/31/2010	50	3000	60	65	21.70	1.66	272.70	36.8	1.6433E-08	1.56E-08
			50				21.70	1.66	272.70	36.8		
4	KR	5/31/2010	60	3600	60	65	21.50	1.65	270.09	36.5	1.6824E-08	1.60E-08
			60				21.50	1.65	270.09	36.5		
5	KR	5/31/2010	70	4200	60	65	21.40	1.65	268.79	36.3	1.5773E-08	1.50E-08

Project Manager

6-1-2010
Date

Average K:	1.646E-08	1.5622E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	5/31/2010
Sample ID:	SL-177 Lift#3 Zone P-5
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.32		7.32	
Sample Length (cm)	7.60		7.41	
Sample Volume (cm^3)	319.2		311.4	
Tare Number	A1		EE	
Tare Weight (gm)	49.92		50.19	
Wet Soil + Tare (gm)	353.93		299.96	
Dry Soil + Tare (gm)	308.89		264.98	
Water Weight (gm)		45.0		34.98
Dry Soil Weight (gm)		258.97		214.79
Moisture Content (%)		17.4%		16.3%
Wet Weight Sample (gm)	666		669.5	
Wet Density Sample (pcf)		129.97		133.96
Dry Density Sample (pcf)		110.72		115.20
Saturation %		90.0%		95.1%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC C DUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	6/5/2010
Sample ID:	SL-209 Lift #5 Zone N-5
Sample Description:	Brown Sandy Clay

L_i =	7.55	cm	**Hydraulic System Constants**	
L_f =	7.43	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	23.3	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.924691		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.54	60
10^{-5} - 10^{-6}	10	7.38	60
10^{-6} - 10^{-7}	20	13.06	60
< 10^{-7}	30	18.75	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	6/5/2010	0				22.40	1.70	281.73	37.9		
1	KR	6/5/2010	30	1800	60	65	22.00	1.68	276.51	37.2	1.22E-08	1.13E-08
			30				22.00	1.68	276.51	37.2		
2	KR	6/5/2010	40	2400	60	65	21.80	1.68	273.90	36.8	1.3771E-08	1.27E-08
			40				21.80	1.68	273.90	36.8		
3	KR	6/5/2010	50	3000	60	65	21.70	1.67	272.59	36.7	1.2886E-08	1.19E-08
			50				21.70	1.67	272.59	36.7		
4	KR	6/5/2010	60	3600	60	65	21.60	1.67	271.28	36.5	1.2304E-08	1.14E-08
			60				21.60	1.67	271.28	36.5		
5	KR	6/5/2010	70	4200	60	65	21.40	1.66	268.67	36.1	1.3252E-08	1.23E-08

Project Manager

6-8-2010
Date

Average K:	1.2878E-08	1.1908E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Field Data Sheet		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	6/5/2010
Sample ID:	SL-209 Lift #5 Zone N-5
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.32		7.32	
Sample Length (cm)	7.55		7.43	
Sample Volume (cm^3)	317.5		312.5	
Tare Number	V		DG	
Tare Weight (gm)	49.8		50	
Wet Soil + Tare (gm)	427.8		460.7	
Dry Soil + Tare (gm)	374.64		397.71	
Water Weight (gm)		53.2		62.99
Dry Soil Weight (gm)		324.84		347.71
Moisture Content (%)		16.4%		18.1%
Wet Weight Sample (gm)	656.4		659.1	
Wet Density Sample (pcf)		128.82		131.41
Dry Density Sample (pcf)		110.70		111.25
Saturation %		84.7%		95.1%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC

Submittal:	05-18j: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	1

Date:	6/17/2010
Sample ID:	SL-297
Sample Description:	Brown Sandy Clay

L_i =	7.58	cm	**Hydraulic System Constants**	
L_f =	7.49	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	23.9	C	Area permometer tube, a_p (cm^2)	0.031416
R_f =	0.91288		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.56	60
10^{-5} - 10^{-6}	10	7.43	60
10^{-6} - 10^{-7}	20	13.15	60
< 10^{-7}	30	18.88	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	ML	6/17/2010	0				23.00	1.70	289.89	38.7		
1	ML	6/17/2010	20	1200	60	65	22.70	1.69	285.98	38.2	1.34E-08	1.22E-08
			20				22.70	1.69	285.98	38.2		
2	ML	6/17/2010	30	1800	60	65	22.50	1.68	283.37	37.8	1.494E-08	1.36E-08
			30				22.50	1.68	283.37	37.8		
3	ML	6/17/2010	40	2400	60	65	22.30	1.67	280.76	37.5	1.577E-08	1.44E-08
			40				22.30	1.67	280.76	37.5		
4	ML	6/17/2010	50	3000	60	65	22.20	1.67	279.45	37.3	1.445E-08	1.32E-08
			50				22.20	1.67	279.45	37.3		
5	ML	6/17/2010	60	3600	60	65	22.10	1.66	278.15	37.1	1.358E-08	1.24E-08

Project Manager

6/18/2010
Date

Average K:	1.443E-08	1.3169E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC

Submittal:	05-18j: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	1

Date:	6/17/2010
Sample ID:	SL-297
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.32		7.32	
Sample Length (cm)	7.58		7.49	
Sample Volume (cm^3)	318.5		314.9	
Tare Number	bb		Z	
Tare Weight (gm)	50.1		49.7	
Wet Soil + Tare (gm)	448.8		230.5	
Dry Soil + Tare (gm)	398.58		204.6	
Water Weight (gm)		50.2		25.9
Dry Soil Weight (gm)		348.48		154.9
Moisture Content (%)		14.4%		16.7%
Wet Weight Sample (gm)	664.2		678.4	
Wet Density Sample (pcf)		129.94		134.20
Dry Density Sample (pcf)		113.57		114.98
Saturation %		80.5%		97.0%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	6/21/2010
Sample ID:	SL-354 Admix
Sample Description:	Brown Sandy Clay

L_i =	7.63	cm	**Hydraulic System Constants**	
L_f =	7.50	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	28.9	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.81618		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.57	60
10^{-5} - 10^{-6}	10	7.43	60
10^{-6} - 10^{-7}	20	13.16	60
< 10^{-7}	30	18.89	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	6/21/2010	0				22.50	1.70	283.09	37.8		
1	KR	6/21/2010	20	1200	60	65	22.30	1.69	280.48	37.4	9.19E-09	7.50E-09
			20				22.30	1.69	280.48	37.4		
2	KR	6/21/2010	30	1800	60	65	22.10	1.68	277.87	37.1	1.231E-08	1.00E-08
			30				22.10	1.68	277.87	37.1		
3	KR	6/21/2010	40	2400	60	65	22.00	1.68	276.56	36.9	1.157E-08	9.44E-09
			40				22.00	1.68	276.56	36.9		
4	KR	6/21/2010	50	3000	60	65	21.90	1.68	275.26	36.7	1.113E-08	9.09E-09
			50				21.90	1.68	275.26	36.7		
5	KR	6/21/2010	60	3600	60	65	21.80	1.67	273.95	36.5	1.085E-08	8.86E-09

Project Manager

6/22/2010
Date

Average K:	1.101E-08	8.9863E-09
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	6/21/2010
Sample ID:	SL-354 Admix
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.29		7.29	
Sample Length (cm)	7.63		7.50	
Sample Volume (cm^3)	318.5		313.0	
Tare Number	VV		EZ	
Tare Weight (gm)	50.1		50.3	
Wet Soil + Tare (gm)	274		488.4	
Dry Soil + Tare (gm)	242.91		427.23	
Water Weight (gm)		31.1		61.17
Dry Soil Weight (gm)		192.81		376.93
Moisture Content (%)		16.1%		16.2%
Wet Weight Sample (gm)	670.8		673.8	
Wet Density Sample (pcf)		131.22		134.12
Dry Density Sample (pcf)		113.00		115.39
Saturation %		88.7%		95.2%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC C[illegible]DUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	6

Date:	6/27/2010
Sample ID:	SL-408 Lift #3 Zone B-1
Sample Description:	Brown Sandy Clay

L_i =	7.56	cm	**Hydraulic System Constants**	
L_f =	7.39	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	24.4	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.90131		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.53	60
10^{-5} - 10^{-6}	10	7.35	60
10^{-6} - 10^{-7}	20	13.00	60
< 10^{-7}	30	18.65	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	6/27/2010	0				22.60	1.70	284.45	38.5		
1	KR	6/27/2010	30	1800	60	65	22.20	1.68	279.23	37.8	1.20E-08	1.08E-08
			30				22.20	1.68	279.23	37.8		
2	KR	6/27/2010	40	2400	60	65	22.00	1.68	276.62	37.4	1.356E-08	1.22E-08
			40				22.00	1.68	276.62	37.4		
3	KR	6/27/2010	50	3000	60	65	21.90	1.67	275.31	37.2	1.269E-08	1.14E-08
			50				21.90	1.67	275.31	37.2		
4	KR	6/27/2010	60	3600	60	65	21.80	1.67	274.01	37.1	1.212E-08	1.09E-08
			60				21.80	1.67	274.01	37.1		
5	KR	6/27/2010	70	4200	60	65	21.60	1.66	271.40	36.7	1.305E-08	1.18E-08

Project Manager

6/28/2010
Date

Average K:	1.268E-08	1.1431E-08
Specification:	< 1.00E-07	

HYDRAULIC C..DUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	6

Date:	6/27/2010
Sample ID:	SL-408 Lift #3 Zone B-1
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.32		7.32	
Sample Length (cm)	7.56		7.39	
Sample Volume (cm^3)	317.8		310.8	
Tare Number	Y		RON	
Tare Weight (gm)	49.6		49.9	
Wet Soil + Tare (gm)	344.3		436.4	
Dry Soil + Tare (gm)	300.81		374.06	
Water Weight (gm)		43.5		62.34
Dry Soil Weight (gm)		251.21		324.16
Moisture Content (%)		17.3%		19.2%
Wet Weight Sample (gm)	646		648.3	
Wet Density Sample (pcf)		126.62		129.97
Dry Density Sample (pcf)		107.93		109.00
Saturation %		83.3%		95.2%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	8

Date:	6/27/2010
Sample ID:	SL-436 Admix
Sample Description:	Brown Sandy Clay

L_i =	7.63	cm	**Hydraulic System Constants**	
L_f =	7.47	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	27.8	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.83631		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.55	60
10^{-5} - 10^{-6}	10	7.41	60
10^{-6} - 10^{-7}	20	13.12	60
< 10^{-7}	30	18.83	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	6/27/2010	0				22.40	1.70	281.73	37.7		
1	KR	6/27/2010	30	1800	60	65	21.80	1.68	273.90	36.7	1.85E-08	1.55E-08
			30				21.80	1.68	273.90	36.7		
2	KR	6/27/2010	40	2400	60	65	21.60	1.67	271.28	36.3	1.859E-08	1.55E-08
			40				21.60	1.67	271.28	36.3		
3	KR	6/27/2010	50	3000	60	65	21.50	1.66	269.98	36.1	1.677E-08	1.40E-08
			50				21.50	1.66	269.98	36.1		
4	KR	6/27/2010	60	3600	60	65	21.30	1.65	267.37	35.8	1.717E-08	1.44E-08
			60				21.30	1.65	267.37	35.8		
5	KR	6/27/2010	70	4200	60	65	21.20	1.65	266.06	35.6	1.61E-08	1.35E-08

Project Manager

6/28/2010
Date

Average K:	1.743E-08	1.4574E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	8

Date:	6/27/2010
Sample ID:	SL-436 Admix
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.31		7.31	
Sample Length (cm)	7.63		7.47	
Sample Volume (cm^3)	319.8		313.3	
Tare Number	BB		Y	
Tare Weight (gm)	50.1		49.6	
Wet Soil + Tare (gm)	301.2		374.9	
Dry Soil + Tare (gm)	265.47		326.06	
Water Weight (gm)		35.7		48.84
Dry Soil Weight (gm)		215.37		276.46
Moisture Content (%)		16.6%		17.7%
Wet Weight Sample (gm)	661.4		664	
Wet Density Sample (pcf)		128.83		132.05
Dry Density Sample (pcf)		110.50		112.22
Saturation %		85.4%		95.1%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	8

Date:	7/1/2010
Sample ID:	SL-455 Lift #4 Zone D-3
Sample Description:	Brown Sandy Clay

L_t =	7.66	cm	**Hydraulic System Constants**	
L_f =	7.54	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	22.2	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.94905		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.58	60
10^{-5} - 10^{-6}	10	7.46	60
10^{-6} - 10^{-7}	20	13.23	60
< 10^{-7}	30	18.99	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	7/1/2010	0				22.60	1.70	284.45	37.7		
1	KR	7/1/2010	30	1800	60	65	22.10	1.68	277.92	36.8	1.54E-08	1.46E-08
			30				22.10	1.68	277.92	36.8		
2	KR	7/1/2010	40	2400	60	65	22.00	1.68	276.62	36.7	1.39E-08	1.32E-08
			40				22.00	1.68	276.62	36.7		
3	KR	7/1/2010	50	3000	60	65	21.80	1.67	274.01	36.3	1.49E-08	1.41E-08
			50				21.80	1.67	274.01	36.3		
4	KR	7/1/2010	60	3600	60	65	21.70	1.66	272.70	36.2	1.401E-08	1.33E-08
			60				21.70	1.66	272.70	36.2		
5	KR	7/1/2010	70	4200	60	65	21.60	1.66	271.40	36.0	1.338E-08	1.27E-08

Project Manager

6/28/2010
Date

Average K:	1.432E-08	1.3589E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	8

Date:	7/1/2010
Sample ID:	SL-455 Lift #4 Zone D-3
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.30		7.30	
Sample Length (cm)	7.66		7.54	
Sample Volume (cm^3)	320.6		315.6	
Tare Number	LOL		A-6	
Tare Weight (gm)	49.5		50.3	
Wet Soil + Tare (gm)	407.3		359.6	
Dry Soil + Tare (gm)	357.78		319.4	
Water Weight (gm)		49.5		40.2
Dry Soil Weight (gm)		308.28		269.1
Moisture Content (%)		16.1%		14.9%
Wet Weight Sample (gm)	676.8		689.9	
Wet Density Sample (pcf)		131.51		136.20
Dry Density Sample (pcf)		113.31.		118.50
Saturation %		89.1%		95.6%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC C)UCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	7/2/2010
Sample ID:	SL-475 Lift #4 Zone C-3
Sample Description:	Brown Sandy Clay

L_i =	7.64	cm	**Hydraulic System Constants**	
L_f =	7.49	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	22.8	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.93674		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.56	60
10^{-5} - 10^{-6}	10	7.43	60
10^{-6} - 10^{-7}	20	13.15	60
< 10^{-7}	30	18.88	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	7/2/2010	0				22.60	1.70	284.45	38.0		
1	KR	7/2/2010	30	1800	60	65	22.20	1.68	279.23	37.3	1.24E-08	1.16E-08
			30				22.20	1.68	279.23	37.3		
2	KR	7/2/2010	40	2400	60	65	22.00	1.68	276.62	36.9	1.397E-08	1.31E-08
			40				22.00	1.68	276.62	36.9		
3	KR	7/2/2010	50	3000	60	65	21.90	1.67	275.31	36.7	1.307E-08	1.22E-08
			50				21.90	1.67	275.31	36.7		
4	KR	7/2/2010	60	3600	60	65	21.80	1.67	274.01	36.6	1.248E-08	1.17E-08
			60				21.80	1.67	274.01	36.6		
5	KR	7/2/2010	70	4200	60	65	21.70	1.66	272.70	36.4	1.207E-08	1.13E-08

Project Manager

6/28/2010
Date

Average K:	1.279E-08	1.1978E-08
Specification:	< 1.00E-07	

HYDRAULIC C...DUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	7/2/2010
Sample ID:	SL-475 Lift #4 Zone C-3
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.26		7.26	
Sample Length (cm)	7.64		7.49	
Sample Volume (cm^3)	316.0		309.8	
Tare Number	Y		EE	
Tare Weight (gm)	49.6		50.1	
Wet Soil + Tare (gm)	379.4		399.5	
Dry Soil + Tare (gm)	333.98		351.8	
Water Weight (gm)		45.4		47.7
Dry Soil Weight (gm)		284.38		301.7
Moisture Content (%)		16.0%		15.8%
Wet Weight Sample (gm)	666.9		670.2	
Wet Density Sample (pcf)		131.46		134.77
Dry Density Sample (pcf)		113.36		116.37
Saturation %		88.7%		95.3%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC C)UCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	8

Date:	7/6/2010
Sample ID:	SL-487 Lift #3 Zone D-5
Sample Description:	Brown Sandy Clay

L_i =	7.62	cm	**Hydraulic System Constants**	
L_f =	7.50	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	21.7	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.96162		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.57	60
10^{-5} - 10^{-6}	10	7.43	60
10^{-6} - 10^{-7}	20	13.17	60
< 10^{-7}	30	18.90	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	7/6/2010	0				22.60	1.70	284.45	37.9		
1	KR	7/6/2010	30	1800	60	65	22.20	1.68	279.23	37.2	1.23E-08	1.18E-08
			30				22.20	1.68	279.23	37.2		
2	KR	7/6/2010	40	2400	60	65	22.10	1.68	277.92	37.0	1.152E-08	1.11E-08
			40				22.10	1.68	277.92	37.0		
3	KR	7/6/2010	50	3000	60	65	22.00	1.68	276.62	36.9	1.109E-08	1.07E-08
			50				22.00	1.68	276.62	36.9		
4	KR	7/6/2010	60	3600	60	65	21.90	1.67	275.31	36.7	1.081E-08	1.04E-08
			60				21.90	1.67	275.31	36.7		
5	KR	7/6/2010	70	4200	60	65	21.80	1.67	274.01	36.5	1.061E-08	1.02E-08

Project Manager

7/7/2010
Date

Average K:	1.126E-08	1.0825E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	8

Date:	7/6/2010
Sample ID:	SL-487 Lift #3 Zone D-5
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.29		7.29	
Sample Length (cm)	7.62		7.50	
Sample Volume (cm^3)	318.0		313.2	
Tare Number	Z		GG	
Tare Weight (gm)	49.7		49.9	
Wet Soil + Tare (gm)	462.8		410	
Dry Soil + Tare (gm)	401.74		357.4	
Water Weight (gm)		61.1		52.6
Dry Soil Weight (gm)		352.04		307.5
Moisture Content (%)		17.3%		17.1%
Wet Weight Sample (gm)	665.8		667.5	
Wet Density Sample (pcf)		130.45		132.79
Dry Density Sample (pcf)		111.17		113.39
Saturation %		90.8%		95.1%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC C[illegible]DUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	7/6/2010
Sample ID:	SL-499 Lift #5 Zone A-4
Sample Description:	Brown Sandy Clay

L_i =	7.64	cm	**Hydraulic System Constants**	
L_f =	7.53	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	21.7	C	Area permometer tube, a_p (cm^2)	0.031416
R_i =	0.96162		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.58	60
10^{-5} - 10^{-6}	10	7.45	60
10^{-6} - 10^{-7}	20	13.20	60
< 10^{-7}	30	18.96	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	7/6/2010	0				22.50	1.70	283.09	37.6		
1	KR	7/6/2010	20	1200	60	65	22.10	1.68	277.87	36.9	1.84E-08	1.77E-08
			20				22.10	1.68	277.87	36.9		
2	KR	7/6/2010	30	1800	60	65	21.80	1.67	273.95	36.4	2.158E-08	2.08E-08
			30				21.80	1.67	273.95	36.4		
3	KR	7/6/2010	40	2400	60	65	21.50	1.66	270.04	35.9	2.331E-08	2.24E-08
			40				21.50	1.66	270.04	35.9		
4	KR	7/6/2010	50	3000	60	65	21.30	1.65	267.42	35.5	2.249E-08	2.16E-08
			50				21.30	1.65	267.42	35.5		
5	KR	7/6/2010	60	3600	60	65	21.10	1.64	264.81	35.2	2.198E-08	2.11E-08

Project Manager

7/7/2010
Date

Average K:	2.155E-08	2.0718E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	7/6/2010
Sample ID:	SL-499 Lift #5 Zone A-4
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.32		7.32	
Sample Length (cm)	7.64		7.53	
Sample Volume (cm^3)	321.9		317.0	
Tare Number	AA		BB	
Tare Weight (gm)	49.9		50.1	
Wet Soil + Tare (gm)	382.8		457.6	
Dry Soil + Tare (gm)	340.61		391.3	
Water Weight (gm)		42.2		66.3
Dry Soil Weight (gm)		290.71		341.2
Moisture Content (%)		14.5%		19.4%
Wet Weight Sample (gm)	664		666.4	
Wet Density Sample (pcf)		128.51		130.95
Dry Density Sample (pcf)		112.22		109.64
Saturation %		78.2%		97.8%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	7/12/2010
Sample ID:	SI-564
Sample Description:	Brown Sandy Clay

L_i =	7.69	cm	**Hydraulic System Constants**	
L_f =	7.41	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	21.7	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.96162		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.53	60
10^{-5} - 10^{-6}	10	7.36	60
10^{-6} - 10^{-7}	20	13.02	60
< 10^{-7}	30	18.69	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	OG	7/12/2010	0				23.90	1.70	302.14	40.8		
1	OG	7/12/2010	20	1200	60	65	23.50	1.68	296.92	40.1	1.70E-08	1.63E-08
			20				23.50	1.68	296.92	40.1		
2	OG	7/12/2010	30	1800	60	65	23.20	1.67	293.01	39.6	1.993E-08	1.92E-08
			30				23.20	1.67	293.01	39.6		
3	OG	7/12/2010	40	2400	60	65	23.00	1.66	290.39	39.2	1.931E-08	1.86E-08
			40				23.00	1.66	290.39	39.2		
4	OG	7/12/2010	50	3000	60	65	22.70	1.65	286.48	38.7	2.075E-08	2.00E-08
			50				22.70	1.65	286.48	38.7		
5	OG	7/12/2010	60	3600	60	65	22.50	1.64	283.87	38.3	2.027E-08	1.95E-08

Project Manager

7/13/2010
Date

Average K:	1.945E-08	1.8699E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	7/12/2010
Sample ID:	SI-564
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.32		7.32	
Sample Length (cm)	7.69		7.41	
Sample Volume (cm^3)	323.4		311.4	
Tare Number	Z		K	
Tare Weight (gm)	49.7		50.1	
Wet Soil + Tare (gm)	237.3		262	
Dry Soil + Tare (gm)	212.8		232.4	
Water Weight (gm)		24.5		29.6
Dry Soil Weight (gm)		163.1		182.3
Moisture Content (%)		15.0%		16.2%
Wet Weight Sample (gm)	656.5		672.3	
Wet Density Sample (pcf)		126.48		134.52
Dry Density Sample (pcf)		109.96		115.73
Saturation %		76.2%		96.2%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC C DUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	7/12/2010
Sample ID:	SL-588
Sample Description:	Brown Sandy Clay

L_i =	7.65	cm	**Hydraulic System Constants**	
L_f =	7.54	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	23.9	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.91288		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.58	60
10^{-5} - 10^{-6}	10	7.47	60
10^{-6} - 10^{-7}	20	13.23	60
< 10^{-7}	30	19.00	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	OG	7/16/2010	0				22.60	1.70	284.45	37.7		
1	OG	7/16/2010	10	600	60	65	22.00	1.68	276.62	36.7	5.57E-08	5.09E-08
			10				22.00	1.68	276.62	36.7		
2	OG	7/16/2010	20	1200	60	65	21.20	1.64	266.18	35.3	6.639E-08	6.06E-08
			20				21.20	1.64	266.18	35.3		
3	OG	7/16/2010	30	1800	60	65	20.70	1.62	259.65	34.4	6.088E-08	5.56E-08
			30				20.70	1.62	259.65	34.4		
4	OG	7/16/2010	40	2400	60	65	20.20	1.60	253.12	33.6	5.847E-08	5.34E-08
			40				20.20	1.60	253.12	33.6		
5	OG	7/16/2010	50	3000	60	65	19.80	1.59	247.90	32.9	5.518E-08	5.04E-08

Project Manager

7/17/2010
Date

Average K:	5.933E-08	5.4161E-08
Specification:	< 1.00E-07	

HYDRAULIC C)UCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	7/12/2010
Sample ID:	SL-588
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.29		7.29	
Sample Length (cm)	7.65		7.54	
Sample Volume (cm^3)	319.4		314.9	
Tare Number	A-10		GG	
Tare Weight (gm)	49.9		49.9	
Wet Soil + Tare (gm)	309.4		338.2	
Dry Soil + Tare (gm)	275.1		294.3	
Water Weight (gm)		34.3		43.9
Dry Soil Weight (gm)		225.2		244.4
Moisture Content (%)		15.2%		18.0%
Wet Weight Sample (gm)	655.8		664.9	
Wet Density Sample (pcf)		127.93		131.56
Dry Density Sample (pcf)		111.02		111.53
Saturation %		79.5%		95.0%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	7/12/2010
Sample ID:	SL-594
Sample Description:	Brown Sandy Clay

L_i =	7.64	cm	**Hydraulic System Constants**	
L_f =	7.49	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	23.3	C	Area permometer tube, a_p (cm^2)	0.031416
R_i =	0.92469		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.56	60
10^{-5} - 10^{-6}	10	7.42	60
10^{-6} - 10^{-7}	20	13.15	60
< 10^{-7}	30	18.87	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	OG	7/16/2010	0				22.80	1.70	287.17	38.3		
1	OG	7/16/2010	30	1800	60	65	22.20	1.68	279.34	37.3	1.83E-08	1.69E-08
			30				22.20	1.68	279.34	37.3		
2	OG	7/16/2010	40	2400	60	65	22.00	1.67	276.73	36.9	1.836E-08	1.70E-08
			40				22.00	1.67	276.73	36.9		
3	OG	7/16/2010	50	3000	60	65	21.80	1.66	274.12	36.6	1.846E-08	1.71E-08
			50				21.80	1.66	274.12	36.6		
4	OG	7/16/2010	60	3600	60	65	21.70	1.65	272.81	36.4	1.696E-08	1.57E-08
			60				21.70	1.65	272.81	36.4		
5	OG	7/16/2010	70	4200	60	65	21.50	1.65	270.20	36.1	1.727E-08	1.60E-08

Project Manager

7/17/2010
Date

Average K:	1.786E-08	1.6519E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	7/12/2010
Sample ID:	SL-594
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.29		7.29	
Sample Length (cm)	7.64		7.49	
Sample Volume (cm^3)	318.8		312.6	
Tare Number	G		N	
Tare Weight (gm)	49.9		49.7	
Wet Soil + Tare (gm)	305.9		357.1	
Dry Soil + Tare (gm)	275.4		314.9	
Water Weight (gm)		30.5		42.2
Dry Soil Weight (gm)		225.5		265.2
Moisture Content (%)		13.5%		15.9%
Wet Weight Sample (gm)	672.2		676	
Wet Density Sample (pcf)		131.37		134.71
Dry Density Sample (pcf)		115.72		116.21
Saturation %		80.1%		95.5%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC C)UCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	1

Date:	7/16/2010
Sample ID:	SL-611
Sample Description:	Brown Sandy Clay

L_i =	7.65	cm	**Hydraulic System Constants**	
L_f =	7.51	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	23.3	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.92469		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting			
Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.57	60
10^{-5} - 10^{-6}	10	7.44	60
10^{-6} - 10^{-7}	20	13.18	60
< 10^{-7}	30	18.92	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	OG	7/16/2010	0				22.60	1.70	284.45	37.9		
1	OG	7/16/2010	30	1800	60	65	22.00	1.68	276.62	36.8	1.85E-08	1.71E-08
			30				22.00	1.68	276.62	36.8		
2	OG	7/16/2010	40	2400	60	65	21.80	1.67	274.01	36.5	1.863E-08	1.72E-08
			40				21.80	1.67	274.01	36.5		
3	OG	7/16/2010	50	3000	60	65	21.60	1.66	271.40	36.1	1.873E-08	1.73E-08
			50				21.60	1.66	271.40	36.1		
4	OG	7/16/2010	60	3600	60	65	21.40	1.65	268.79	35.8	1.883E-08	1.74E-08
			60				21.40	1.65	268.79	35.8		
5	OG	7/16/2010	70	4200	60	65	21.30	1.65	267.48	35.6	1.753E-08	1.62E-08

Project Manager

7/17/2010
Date

Average K:	1.845E-08	1.7062E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	1

Date:	7/16/2010
Sample ID:	SL-611
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.28		7.28	
Sample Length (cm)	7.65		7.51	
Sample Volume (cm^3)	318.5		312.7	
Tare Number	MJ		KR	
Tare Weight (gm)	49.8		49.8	
Wet Soil + Tare (gm)	367.8		394.3	
Dry Soil + Tare (gm)	323.64		343.24	
Water Weight (gm)		44.2		51.06
Dry Soil Weight (gm)		273.84		293.44
Moisture Content (%)		16.1%		17.4%
Wet Weight Sample (gm)	659.8		664.5	
Wet Density Sample (pcf)		129.07		132.38
Dry Density Sample (pcf)		111.15		112.76
Saturation %		84.4%		95.1%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	1

Date:	7/23/2010
Sample ID:	SL-658
Sample Description:	Brown Sandy Clay

L_i =	7.59	cm	**Hydraulic System Constants**	
L_f =	7.54	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	26.1	C	Area permometer tube, a_p (cm^2)	0.031416
R_i =	0.8679		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_i (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.58	60
10^{-5} - 10^{-6}	10	7.47	60
10^{-6} - 10^{-7}	20	13.23	60
< 10^{-7}	30	19.00	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	ML	7/23/2010	0				22.70	1.70	285.81	37.9		
1	ML	7/23/2010	20	1200	60	65	21.80	1.66	274.06	36.3	4.19E-08	3.64E-08
			20				21.80	1.66	274.06	36.3		
2	ML	7/23/2010	30	1800	60	65	21.30	1.64	267.54	35.5	4.404E-08	3.82E-08
			30				21.30	1.64	267.54	35.5		
3	ML	7/23/2010	40	2400	60	65	20.90	1.63	262.32	34.8	4.292E-08	3.73E-08
			40				20.90	1.63	262.32	34.8		
4	ML	7/23/2010	50	3000	60	65	20.50	1.61	257.09	34.1	4.242E-08	3.68E-08
			50				20.50	1.61	257.09	34.1		
5	ML	7/23/2010	60	3600	60	65	20.10	1.59	251.87	33.4	4.224E-08	3.67E-08

Project Manager

7/26/2010
Date

Average K:	4.271E-08	3.7069E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	1

Date:	7/23/2010
Sample ID:	SL-658
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.29		7.29	
Sample Length (cm)	7.59		7.54	
Sample Volume (cm^3)	316.9		314.9	
Tare Number	Y		Y	
Tare Weight (gm)	49.7		49.6	
Wet Soil + Tare (gm)	367.6		296.9	
Dry Soil + Tare (gm)	326.7		259.6	
Water Weight (gm)		40.9		37.3
Dry Soil Weight (gm)		277		210
Moisture Content (%)		14.8%		17.8%
Wet Weight Sample (gm)	662.8		670.9	
Wet Density Sample (pcf)		130.29		132.75
Dry Density Sample (pcf)		113.53		112.72
Saturation %		82.4%		97.0%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC C)UCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	7/26/2010
Sample ID:	SL-681
Sample Description:	Brown Sandy Clay

L_i =	7.66	cm	**Hydraulic System Constants**	
L_f =	7.53	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	25.0	C	Area permometer tube, a_p (cm^2)	0.031416
R_i =	0.88996		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting			
Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.58	60
10^{-5} - 10^{-6}	10	7.46	60
10^{-6} - 10^{-7}	20	13.21	60
< 10^{-7}	30	18.97	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	ML	7/26/2010	0				22.60	1.70	284.45	37.8		
1	ML	7/26/2010	20	1200	60	65	22.10	1.68	277.92	36.9	2.31E-08	2.06E-08
			20				22.10	1.68	277.92	36.9		
2	ML	7/26/2010	30	1800	60	65	21.70	1.66	272.70	36.2	2.804E-08	2.50E-08
			30				21.70	1.66	272.70	36.2		
3	ML	7/26/2010	40	2400	60	65	21.40	1.65	268.79	35.7	2.826E-08	2.51E-08
			40				21.40	1.65	268.79	35.7		
4	ML	7/26/2010	50	3000	60	65	21.10	1.64	264.87	35.2	2.848E-08	2.53E-08
			50				21.10	1.64	264.87	35.2		
5	ML	7/26/2010	60	3600	60	65	20.80	1.63	260.95	34.6	2.871E-08	2.56E-08

Project Manager

7/27/2010
Date

Average K:	2.732E-08	2.4318E-08
Specification:	< 1.00E-07	

HYDRAULIC C_..DUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	7/26/2010
Sample ID:	SL-681
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.29		7.29	
Sample Length (cm)	7.66		7.53	
Sample Volume (cm^3)	319.8		314.4	
Tare Number	AL		GG	
Tare Weight (gm)	50.1		50	
Wet Soil + Tare (gm)	360.7		258.1	
Dry Soil + Tare (gm)	324.1		229.1	
Water Weight (gm)		36.6		29
Dry Soil Weight (gm)		274		179.1
Moisture Content (%)		13.4%		16.2%
Wet Weight Sample (gm)	676.3		677.3	
Wet Density Sample (pcf)		131.76		134.22
Dry Density Sample (pcf)		116.23		115.52
Saturation %		80.2%		95.4%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	3

Date:	7/26/2010
Sample ID:	SL-691
Sample Description:	Brown Sandy Clay

L_i =	7.65	cm	**Hydraulic System Constants**	
L_f =	7.51	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	25.0	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.88996		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting			
Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.57	60
10^{-5} - 10^{-6}	10	7.44	60
10^{-6} - 10^{-7}	20	13.17	60
< 10^{-7}	30	18.91	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	OG	7/26/2010	0				23.50	1.70	296.70	39.5		
1	OG	7/26/2010	20	1200	60	65	22.20	1.65	279.73	37.3	5.82E-08	5.18E-08
			20				22.20	1.65	279.73	37.3		
2	OG	7/26/2010	30	1800	60	65	21.70	1.63	273.20	36.4	5.438E-08	4.84E-08
			30				21.70	1.63	273.20	36.4		
3	OG	7/26/2010	40	2400	60	65	21.20	1.61	266.68	35.5	5.28E-08	4.70E-08
			40				21.20	1.61	266.68	35.5		
4	OG	7/26/2010	50	3000	60	65	20.80	1.59	261.46	34.8	5.011E-08	4.46E-08
			50				20.80	1.59	261.46	34.8		
5	OG	7/26/2010	60	3600	60	65	20.40	1.57	256.23	34.1	4.847E-08	4.31E-08

Project Manager

7/27/2010
Date

Average K:	5.279E-08	4.6977E-08
Specification:	< 1.00E-07	

HYDRAULIC C...DUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	3

Date:	7/26/2010
Sample ID:	SL-691
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.32		7.32	
Sample Length (cm)	7.65		7.51	
Sample Volume (cm^3)	321.4		315.5	
Tare Number	AL		GG	
Tare Weight (gm)	50.1		50	
Wet Soil + Tare (gm)	360.7		258.1	
Dry Soil + Tare (gm)	324.1		225.3	
Water Weight (gm)		36.6		32.8
Dry Soil Weight (gm)		274		175.3
Moisture Content (%)		13.4%		18.7%
Wet Weight Sample (gm)	666.4		669.4	
Wet Density Sample (pcf)		129.16		132.18
Dry Density Sample (pcf)		113.94		111.35
Saturation %		75.3%		98.5%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	1

Date:	7/26/2010
Sample ID:	SL-713
Sample Description:	Brown Sandy Clay

L_i =	7.65	cm	**Hydraulic System Constants**	
L_f =	7.40	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	26.1	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.8679		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.53	60
10^{-5} - 10^{-6}	10	7.36	60
10^{-6} - 10^{-7}	20	13.02	60
< 10^{-7}	30	18.68	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	OG	7/26/2010	0				23.00	1.70	289.89	39.2		
1	OG	7/26/2010	20	1200	60	65	22.60	1.68	284.67	38.4	1.77E-08	1.54E-08
			20				22.60	1.68	284.67	38.4		
2	OG	7/26/2010	30	1800	60	65	22.40	1.68	282.06	38.1	1.78E-08	1.55E-08
			30				22.40	1.68	282.06	38.1		
3	OG	7/26/2010	40	2400	60	65	22.20	1.67	279.45	37.7	1.789E-08	1.55E-08
			40				22.20	1.67	279.45	37.7		
4	OG	7/26/2010	50	3000	60	65	22.00	1.66	276.84	37.4	1.798E-08	1.56E-08
			50				22.00	1.66	276.84	37.4		
5	OG	7/26/2010	60	3600	60	65	21.80	1.65	274.23	37.0	1.808E-08	1.57E-08

Project Manager

7/27/2010
Date

Average K:	1.789E-08	1.5531E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	1

Date:	7/26/2010
Sample ID:	SL-713
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.31		7.31	
Sample Length (cm)	7.65		7.40	
Sample Volume (cm^3)	320.8		310.5	
Tare Number	AL		A-6	
Tare Weight (gm)	50.1		50.3	
Wet Soil + Tare (gm)	360.7		328.5	
Dry Soil + Tare (gm)	324.1		290.6	
Water Weight (gm)		36.6		37.9
Dry Soil Weight (gm)		274		240.3
Moisture Content (%)		13.4%		15.8%
Wet Weight Sample (gm)	667.5		672	
Wet Density Sample (pcf)		129.61		134.84
Dry Density Sample (pcf)		114.34		116.47
Saturation %		76.2%		95.4%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	3

Date:	7/30/2010
Sample ID:	SL-781
Sample Description:	Brown Sandy Clay

L_i =	7.68	cm	**Hydraulic System Constants**	
L_f =	7.81	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	25.0	C	Area permometer tube, a_p (cm^2)	0.031416
R_i =	0.88996		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting			
Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.69	60
10^{-5} - 10^{-6}	10	7.67	60
10^{-6} - 10^{-7}	20	13.64	60
< 10^{-7}	30	19.61	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	OG	7/30/2010	0				23.10	1.70	291.25	37.3		
1	OG	7/30/2010	20	1200	60	65	22.70	1.68	286.03	36.6	1.84E-08	1.64E-08
			20				22.70	1.68	286.03	36.6		
2	OG	7/30/2010	30	1800	60	65	22.40	1.67	282.12	36.1	2.167E-08	1.93E-08
			30				22.40	1.67	282.12	36.1		
3	OG	7/30/2010	40	2400	60	65	22.20	1.66	279.51	35.8	2.1E-08	1.87E-08
			40				22.20	1.66	279.51	35.8		
4	OG	7/30/2010	50	3000	60	65	22.00	1.65	276.90	35.4	2.064E-08	1.84E-08
			50				22.00	1.65	276.90	35.4		
5	OG	7/30/2010	60	3600	60	65	21.90	1.65	275.59	35.3	1.881E-08	1.67E-08

Project Manager

8/2/2010
Date

Average K:	2.011E-08	1.7897E-08
Specification:	< 1.00E-07	

HYDRAULIC C)UCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC.

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	3

Date:	7/30/2010
Sample ID:	SL-781
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.34		7.34	
Sample Length (cm)	7.68		7.81	
Sample Volume (cm^3)	324.9		330.7	
Tare Number	WO		N	
Tare Weight (gm)	50.1		49.8	
Wet Soil + Tare (gm)	260.13		318.9	
Dry Soil + Tare (gm)	231.43		277.9	
Water Weight (gm)		28.7		41
Dry Soil Weight (gm)		181.33		228.1
Moisture Content (%)		15.8%		18.0%
Wet Weight Sample (gm)	688.7		700.8	
Wet Density Sample (pcf)		132.08		132.04
Dry Density Sample (pcf)		114.03		111.92
Saturation %		89.5%		96.0%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC C UCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	7/30/2010
Sample ID:	SL-786
Sample Description:	Brown Sandy Clay

L_i =	7.83	cm	**Hydraulic System Constants**	
L_f =	7.77	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	25.0	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.88996		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting			
Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.67	60
10^{-5} - 10^{-6}	10	7.64	60
10^{-6} - 10^{-7}	20	13.58	60
< 10^{-7}	30	19.52	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	OG	7/30/2010	0				22.10	1.70	277.64	35.7		
1	OG	7/30/2010	30	1800	60	65	21.30	1.67	267.20	34.4	2.61E-08	2.32E-08
			30				21.30	1.67	267.20	34.4		
2	OG	7/30/2010	40	2400	60	65	21.00	1.65	263.29	33.9	2.715E-08	2.42E-08
			40				21.00	1.65	263.29	33.9		
3	OG	7/30/2010	50	3000	60	65	20.80	1.65	260.68	33.5	2.581E-08	2.30E-08
			50				20.80	1.65	260.68	33.5		
4	OG	7/30/2010	60	3600	60	65	20.60	1.64	258.07	33.2	2.495E-08	2.22E-08
			60				20.60	1.64	258.07	33.2		
5	OG	7/30/2010	70	4200	60	65	20.50	1.63	256.76	33.0	2.287E-08	2.04E-08

Project Manager

8/2/2010
Date

Average K:	2.538E-08	2.2587E-08
Specification:	< 1.00E-07	

HYDRAULIC C)UCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	7/30/2010
Sample ID:	SL-786
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.32		7.32	
Sample Length (cm)	7.83		7.77	
Sample Volume (cm^3)	329.1		326.7	
Tare Number	Z		E2	
Tare Weight (gm)	49.6		50.2	
Wet Soil + Tare (gm)	343.1		329	
Dry Soil + Tare (gm)	292.63		277.5	
Water Weight (gm)		50.5		51.5
Dry Soil Weight (gm)		243.03		227.3
Moisture Content (%)		20.8%		22.7%
Wet Weight Sample (gm)	657.2		660.1	
Wet Density Sample (pcf)		124.41		125.86
Dry Density Sample (pcf)		103.02		102.61
Saturation %		88.2%		95.3%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC C DUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	8/3/2010
Sample ID:	SL-808
Sample Description:	Brown Sandy Clay

L_i =	7.65	cm	**Hydraulic System Constants**	
L_f =	7.56	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	25.0	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.88996		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting			
Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.59	60
10^{-5} - 10^{-6}	10	7.48	60
10^{-6} - 10^{-7}	20	13.26	60
< 10^{-7}	30	19.04	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	OG	8/3/2010	0				21.70	1.70	272.20	36.0		
1	OG	8/3/2010	20	1200	60	65	20.70	1.66	259.15	34.3	4.89E-08	4.35E-08
			20				20.70	1.66	259.15	34.3		
2	OG	8/3/2010	30	1800	60	65	19.90	1.63	248.71	32.9	5.997E-08	5.34E-08
			30				19.90	1.63	248.71	32.9		
3	OG	8/3/2010	40	2400	60	65	19.30	1.60	240.87	31.9	6.101E-08	5.43E-08
			40				19.30	1.60	240.87	31.9		
4	OG	8/3/2010	50	3000	60	65	18.60	1.57	231.74	30.6	6.436E-08	5.73E-08
			50				18.60	1.57	231.74	30.6		
5	OG	8/3/2010	60	3600	60	65	18.20	1.56	226.52	30.0	6.129E-08	5.45E-08

Project Manager

8/4/2010
Date

Average K:	5.91E-08	5.2597E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	8/3/2010
Sample ID:	SL-808
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.32		7.32	
Sample Length (cm)	7.65		7.56	
Sample Volume (cm^3)	321.6		317.8	
Tare Number	E2		EE	
Tare Weight (gm)	50.3		50.2	
Wet Soil + Tare (gm)	320.4		293.7	
Dry Soil + Tare (gm)	283.7		255.7	
Water Weight (gm)		36.7		38
Dry Soil Weight (gm)		233.4		205.5
Moisture Content (%)		15.7%		18.5%
Wet Weight Sample (gm)	660.8		669.6	
Wet Density Sample (pcf)		128.02		131.25
Dry Density Sample (pcf)		110.62		110.76
Saturation %		81.2%		95.8%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC C)UCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	8/3/2010
Sample ID:	SL-828
Sample Description:	Brown Sandy Clay

L_i =	7.65	cm	**Hydraulic System Constants**	
L_f =	7.54	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	25.0	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.88996		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.58	60
10^{-5} - 10^{-6}	10	7.47	60
10^{-6} - 10^{-7}	20	13.23	60
< 10^{-7}	30	19.00	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	OG	8/3/2010	0				21.60	1.70	270.84	35.9		
1	OG	8/3/2010	20	1200	60	65	20.60	1.66	257.79	34.2	4.90E-08	4.36E-08
			20				20.60	1.66	257.79	34.2		
2	OG	8/3/2010	30	1800	60	65	19.80	1.63	247.34	32.8	6.014E-08	5.35E-08
			30				19.80	1.63	247.34	32.8		
3	OG	8/3/2010	40	2400	60	65	19.10	1.60	238.21	31.6	6.393E-08	5.69E-08
			40				19.10	1.60	238.21	31.6		
4	OG	8/3/2010	50	3000	60	65	18.80	1.59	234.29	31.1	5.779E-08	5.14E-08
			50				18.80	1.59	234.29	31.1		
5	OG	8/3/2010	60	3600	60	65	18.20	1.56	226.46	30.0	5.955E-08	5.30E-08

Project Manager

8/4/2010
Date

Average K:	5.808E-08	5.1693E-08
Specification:	< 1.00E-07	

HYDRAULIC C)UCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING ,INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	8/3/2010
Sample ID:	SL-828
Sample Description:	Brown Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.32		7.32	
Sample Length (cm)	7.65		7.54	
Sample Volume (cm^3)	321.4		317.1	
Tare Number	K		E2	
Tare Weight (gm)	50.1		50.2	
Wet Soil + Tare (gm)	261.2		355.7	
Dry Soil + Tare (gm)	232.7		305.2	
Water Weight (gm)		28.5		50.5
Dry Soil Weight (gm)		182.6		255
Moisture Content (%)		15.6%		19.8%
Wet Weight Sample (gm)	656.4		664.2	
Wet Density Sample (pcf)		127.22		130.49
Dry Density Sample (pcf)		110.04		108.92
Saturation %		79.4%		97.8%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC C...DUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING, INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	8/6/2010
Sample ID:	SL-890
Sample Description:	Brownish Gray Sandy Clay

L_i =	7.65	cm	**Hydraulic System Constants**	
L_f =	7.50	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	25.0	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.88996		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.57	60
10^{-5} - 10^{-6}	10	7.43	60
10^{-6} - 10^{-7}	20	13.17	60
< 10^{-7}	30	18.90	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	OG	8/3/2010	0				20.90	1.70	261.31	34.8		
1	OG	8/3/2010	30	1800	60	65	19.80	1.65	246.95	32.9	3.72E-08	3.31E-08
			30				19.80	1.65	246.95	32.9		
2	OG	8/3/2010	40	2400	60	65	19.40	1.64	241.73	32.2	3.848E-08	3.42E-08
			40				19.40	1.64	241.73	32.2		
3	OG	8/3/2010	50	3000	60	65	19.00	1.62	236.51	31.5	3.946E-08	3.51E-08
			50				19.00	1.62	236.51	31.5		
4	OG	8/3/2010	60	3600	60	65	18.70	1.61	232.60	31.0	3.841E-08	3.42E-08
			60				18.70	1.61	232.60	31.0		
5	OG	8/3/2010	70	4200	60	65	18.50	1.60	229.99	30.6	3.614E-08	3.22E-08

Project Manager

8/11/2010
Date

Average K:	3.794E-08	3.3762E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	8/6/2010
Sample ID:	SL-890
Sample Description:	Brownish Gray Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.32		7.32	
Sample Length (cm)	7.65		7.50	
Sample Volume (cm^3)	321.6		315.4	
Tare Number	GG		CC	
Tare Weight (gm)	50		49.8	
Wet Soil + Tare (gm)	254.2		293.6	
Dry Soil + Tare (gm)	224.6		253.4	
Water Weight (gm)		29.6		40.2
Dry Soil Weight (gm)		174.6		203.6
Moisture Content (%)		17.0%		19.7%
Wet Weight Sample (gm)	649.6		661.4	
Wet Density Sample (pcf)		125.85		130.65
Dry Density Sample (pcf)		107.60		109.11
Saturation %		80.9%		98.0%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	8/6/2010
Sample ID:	SL-894
Sample Description:	Brownish Gray Sandy Clay

L_i =	7.65	cm	**Hydraulic System Constants**	
L_f =	7.64	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	25.0	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.88996		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting			
Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.62	60
10^{-5} - 10^{-6}	10	7.54	60
10^{-6} - 10^{-7}	20	13.38	60
< 10^{-7}	30	19.22	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	OG	8/6/2010	0				24.70	1.70	313.03	41.0		
1	OG	8/6/2010	20	1200	60	65	23.70	1.66	299.98	39.3	4.28E-08	3.81E-08
			20				23.70	1.66	299.98	39.3		
2	OG	8/6/2010	30	1800	60	65	22.90	1.63	289.54	37.9	5.234E-08	4.66E-08
			30				22.90	1.63	289.54	37.9		
3	OG	8/6/2010	40	2400	60	65	22.30	1.60	281.70	36.9	5.312E-08	4.73E-08
			40				22.30	1.60	281.70	36.9		
4	OG	8/6/2010	50	3000	60	65	21.80	1.58	275.18	36.0	5.2E-08	4.63E-08
			50				21.80	1.58	275.18	36.0		
5	OG	8/6/2010	60	3600	60	65	21.40	1.56	269.96	35.3	4.982E-08	4.43E-08

Project Manager

8/11/2010
Date

Average K:	5.001E-08	4.451E-08
Specification:	< 1.00E-07	

HYDRAULIC C DUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	8/6/2010
Sample ID:	SL-894
Sample Description:	Brownish Gray Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.32		7.32	
Sample Length (cm)	7.65		7.64	
Sample Volume (cm^3)	321.6		321.2	
Tare Number	O		Z	
Tare Weight (gm)	49.8		49.7	
Wet Soil + Tare (gm)	297		352.2	
Dry Soil + Tare (gm)	264.2		306.3	
Water Weight (gm)		32.8		45.9
Dry Soil Weight (gm)		214.4		256.6
Moisture Content (%)		15.3%		17.9%
Wet Weight Sample (gm)	674.9		684.7	
Wet Density Sample (pcf)		130.75		132.82
Dry Density Sample (pcf)		113.40		112.67
Saturation %		85.0%		97.5%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	8/10/2010
Sample ID:	SL-957
Sample Description:	Brownish Gray Sandy Clay

L_i =	7.66	cm	**Hydraulic System Constants**	
L_f =	7.76	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	27.8	C	Area permometer tube, a_p (cm^2)	0.031416
R_t =	0.83631		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.67	60
10^{-5} - 10^{-6}	10	7.63	60
10^{-6} - 10^{-7}	20	13.57	60
< 10^{-7}	30	19.50	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	BM	8/12/2010	0				22.80	1.70	287.17	37.0		
1	BM	8/12/2010	30	1800	60	65	22.10	1.67	278.03	35.8	2.20E-08	1.84E-08
			30				22.10	1.67	278.03	35.8		
2	BM	8/12/2010	40	2400	60	65	21.70	1.65	272.81	35.1	2.619E-08	2.19E-08
			40				21.70	1.65	272.81	35.1		
3	BM	8/12/2010	50	3000	60	65	21.50	1.65	270.20	34.8	2.489E-08	2.08E-08
			50				21.50	1.65	270.20	34.8		
4	BM	8/12/2010	60	3600	60	65	21.30	1.64	267.59	34.5	2.406E-08	2.01E-08
			60				21.30	1.64	267.59	34.5		
5	BM	8/12/2010	70	4200	60	65	21.10	1.63	264.98	34.1	2.35E-08	1.97E-08

Project Manager

8/13/2010
Date

Average K:	2.413E-08	2.0179E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC.

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	8/10/2010
Sample ID:	SL-957
Sample Description:	Brownish Gray Sandy Clay

Item	Initial		Final	
Sample Diameter (cm)	7.32		7.32	
Sample Length (cm)	7.66		7.76	
Sample Volume (cm^3)	321.9		326.4	
Tare Number	D		Ron	
Tare Weight (gm)	50.5		50	
Wet Soil + Tare (gm)	341.4		289.2	
Dry Soil + Tare (gm)	301.6		246.4	
Water Weight (gm)		39.8		42.8
Dry Soil Weight (gm)		251.1		196.4
Moisture Content (%)		15.9%		21.8%
Wet Weight Sample (gm)	657.8		663.9	
Wet Density Sample (pcf)		127.32		126.74
Dry Density Sample (pcf)		109.90		104.06
Saturation %		80.3%		95.0%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC C)UCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	8/16/2010
Sample ID:	SL-985
Sample Description:	Admix

L_i =	7.79	cm	**Hydraulic System Constants**	
L_f =	7.46	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	25.0	C	Area permometer tube, a_p (cm^2)	0.031416
R_i =	0.88996		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting			
Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.55	60
10^{-5} - 10^{-6}	10	7.40	60
10^{-6} - 10^{-7}	20	13.10	60
< 10^{-7}	30	18.79	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Pret/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	8/16/2010	0				22.90	1.70	288.53	38.7		
1	KR	8/16/2010	30	1800	60	65	22.50	1.68	283.31	38.0	1.20E-08	1.07E-08
			30				22.50	1.68	283.31	38.0		
2	KR	8/16/2010	40	2400	60	65	22.40	1.68	282.01	37.8	1.128E-08	1.00E-08
			40				22.40	1.68	282.01	37.8		
3	KR	8/16/2010	50	3000	60	65	22.30	1.68	280.70	37.6	1.086E-08	9.66E-09
			50				22.30	1.68	280.70	37.6		
4	KR	8/16/2010	60	3600	60	65	22.20	1.67	279.40	37.5	1.058E-08	9.42E-09
			60				22.20	1.67	279.40	37.5		
5	KR	8/16/2010	70	4200	60	65	22.10	1.67	278.09	37.3	1.039E-08	9.25E-09

Project Manager

8/17/2010
Date

Average K:	1.102E-08	9.8116E-09
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	4

Date:	8/16/2010
Sample ID:	SL-985
Sample Description:	Admix

Item	Initial		Final	
Sample Diameter (cm)	7.29		7.29	
Sample Length (cm)	7.79		7.46	
Sample Volume (cm^3)	325.1		311.2	
Tare Number	A-6		O	
Tare Weight (gm)	50.3		49.7	
Wet Soil + Tare (gm)	339.3		439.4	
Dry Soil + Tare (gm)	301.6		384.16	
Water Weight (gm)		37.7		55.24
Dry Soil Weight (gm)		251.3		334.46
Moisture Content (%)		15.0%		16.5%
Wet Weight Sample (gm)	663.6		668	
Wet Density Sample (pcf)		127.16		133.73
Dry Density Sample (pcf)		110.57		114.78
Saturation %		77.3%		95.3%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC C)UCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	7

Date:	8/16/2010
Sample ID:	SL-998
Sample Description:	Admix

L_i =	7.84	cm	**Hydraulic System Constants**	
L_f =	7.44	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	25.0	C	Area permometer tube, a_p (cm^2)	0.031416
R_i =	0.88996		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting

Estimated k_i (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.54	60
10^{-5} - 10^{-6}	10	7.39	60
10^{-6} - 10^{-7}	20	13.08	60
< 10^{-7}	30	18.76	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	KR	8/16/2010	0				21.80	1.70	273.56	36.8		
1	KR	8/16/2010	30	1800	60	65	20.90	1.66	261.81	35.2	2.88E-08	2.57E-08
			30				20.90	1.66	261.81	35.2		
2	KR	8/16/2010	40	2400	60	65	20.50	1.65	256.59	34.5	3.158E-08	2.81E-08
			40				20.50	1.65	256.59	34.5		
3	KR	8/16/2010	50	3000	60	65	20.30	1.64	253.98	34.1	2.931E-08	2.61E-08
			50				20.30	1.64	253.98	34.1		
4	KR	8/16/2010	60	3600	60	65	20.10	1.63	251.37	33.8	2.784E-08	2.48E-08
			60				20.10	1.63	251.37	33.8		
5	KR	8/16/2010	70	4200	60	65	19.90	1.62	248.76	33.4	2.682E-08	2.39E-08

Project Manager

8/17/2010
Date

Average K:	2.888E-08	2.5701E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	7

Date:	8/16/2010
Sample ID:	SL-998
Sample Description:	Admix

Item	Initial		Final	
Sample Diameter (cm)	7.29		7.29	
Sample Length (cm)	7.84		7.44	
Sample Volume (cm^3)	327.1		310.7	
Tare Number	J.S.		JV	
Tare Weight (gm)	50		49.6	
Wet Soil + Tare (gm)	300.1		380.3	
Dry Soil + Tare (gm)	268.66		329.03	
Water Weight (gm)		31.4		51.27
Dry Soil Weight (gm)		218.66		279.43
Moisture Content (%)		14.4%		18.3%
Wet Weight Sample (gm)	652.3		656.9	
Wet Density Sample (pcf)		124.25		131.73
Dry Density Sample (pcf)		108.63		111.31
Saturation %		70.5%		96.5%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	5

Date:	10/4/2010
Sample ID:	SL-1012
Sample Description:	Admix

L_i =	7.68	cm	**Hydraulic System Constants**	
L_f =	7.51	cm	**Mercury U-Tube Manometer**	
Dia =	7.3	cm	Area annulus, a_a (cm^2)	0.76712
Temp =	20.6	C	Area permometer tube, a_p (cm^2)	0.031416
R_i =	0.98759		Delta Hg at equilibrium (cm)	1.70

B Coefficient	0.95	**Specific Gravity of Water, Gw**	1
Effective Stress	5		

Mercury Head Setting			
Estimated k_t (cm/sec)	Max Gradient i_o=h/L	Permometer Setting (cm)	Min. Cell Pressure (psi)
10^{-4} - 10^{-5}	5	4.57	60
10^{-5} - 10^{-6}	10	7.44	60
10^{-6} - 10^{-7}	20	13.18	60
< 10^{-7}	30	18.91	60

Test No.	Readings by:	Date:	Time mins	Cumulative t secs	Pressure Cell psi	Pressure Back psi	Mercury Head Tail cm Hg	Mercury Head Head cm Hg	Total Head Loss cm H_2O	Hyd Gradient Prel/final	Hydraulic Conductivity K cm/sec	Hydraulic Conductivity K_{20} cm/sec
	BM	10/4/2010	0				22.20	1.70	279.01	37.2		
1	BM	10/4/2010	20	1200	60	65	21.80	1.68	273.78	36.5	1.88E-08	1.85E-08
			20				21.80	1.68	273.78	36.5		
2	BM	10/4/2010	30	1800	60	65	21.60	1.68	271.17	36.1	1.886E-08	1.86E-08
			30				21.60	1.68	271.17	36.1		
3	BM	10/4/2010	40	2400	60	65	21.30	1.66	267.26	35.6	2.138E-08	2.11E-08
			40				21.30	1.66	267.26	35.6		
4	BM	10/4/2010	50	3000	60	65	21.10	1.65	264.65	35.2	2.102E-08	2.08E-08
			50				21.10	1.65	264.65	35.2		
5	BM	10/4/2010	60	3600	60	65	21.00	1.65	263.34	35.1	1.916E-08	1.89E-08

Project Manager

10/5/2010
Date

Average K:	1.984E-08	1.9589E-08
Specification:	< 1.00E-07	

HYDRAULIC CONDUCTIVITY TEST
ASTM 5084, METHOD F
Constant volume, Falling Head Hydraulic System

ENVIROTECH
ENGINEERING & CONSULTING INC

Submittal:	05-18J: Admix Laboratory Data Sheets		
Project Name:	Hanford-ERDF Cells 9 & 10		
Poject Number:	S013213A00	**Permeameter:**	5

Date:	10/4/2010
Sample ID:	SL-1012
Sample Description:	Admix

Item	Initial		Final	
Sample Diameter (cm)	7.29		7.29	
Sample Length (cm)	7.68		7.51	
Sample Volume (cm^3)	320.5		313.4	
Tare Number	G		EE	
Tare Weight (gm)	50		50.2	
Wet Soil + Tare (gm)	418.9		401.4	
Dry Soil + Tare (gm)	366.18		350.33	
Water Weight (gm)		52.7		51.07
Dry Soil Weight (gm)		316.18		300.13
Moisture Content (%)		16.7%		17.0%
Wet Weight Sample (gm)	664.9		668.5	
Wet Density Sample (pcf)		129.24		132.90
Dry Density Sample (pcf)		110.77		113.57
Saturation %		86.4%		95.0%

Specific Gravity	2.7		Tested		Assumed	x
Sample Results:	**Meets Specifications**					