MOUNTAIN-PLAINS CONSORTIUM

MPC 21-434 | A. Jones, N. Wehbe, S. Klay and S. Maassen

Mitigation of Corrosion in Continuously Reinforced Concrete Pavement

Appendices

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Mitigation of Corrosion in Continuously Reinforced Concrete Pavement
Volume 2 – Appendices

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May 2021

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Table A.1: Site selection matrix for statewide evaluation

Project Rank (1)	Project Rating (5) ,(6)	Segment Rank (2)	Segment Rating (5), (6)	Interstate	Beginning MRM	Ending MRM	Length (miles)	Lane	Project Number(3)	Region/ Reporting Unit (1),(4)	Surface Condition Index (4)	Year Built (4)	Precipitation Region(5)	Average 3-year Maintenance Cost (per mile)(4)	Estimated Deicer Applied per mile (lbs) (3),(5)	Indices(5)					
																Condition Value	Age Value	Precipitation Value	Maintenance Activities Value	Deicer Application Value	
1	1.429	12	1.422	I-29	65.00	72.00	7.00	NB	IM 29-2(9)61	271	4.02	2001	Wet	1807	459,127	0.804	0.500	0.5	0.334	0.059	(a), (b)
		13	1.440	I-29	61.00	64.57	3.57	NB	IM 29-2(9)61	271	4.11	2001	Wet	1807	459,127	0.822	0.500	0.5	0.334	0.059	(a)
		16	1.458	I-29	64.57	65.00	0.43	NB	IM 29-2(9)61	271	4.20	2001	Wet	1807	459,127	0.840	0.500	0.5	0.334	0.059	(a)
2	1.442	1	1.118	I-229	5.70	8.28	2.58	NB	IM 229-2(50)2	271	4.17	2001	Wet	2712	459,127	0.834	0.500	0.5	0.000	0.059	(a)
		3	1.418	I-229	2.08	2.89	0.81	NB	IM 229-2(50)2	271	4.20	2001	Wet	1914	459,127	0.840	0.500	0.5	0.294	0.059	(a)
		3	1.418	I-229	2.89	3.12	0.23	NB	IM 229-2(50)2	271	4.20	2001	Wet	1914	459,127	0.840	0.500	0.5	0.294	0.059	(a)
		3	1.418	I-229	3.93	4.16	0.23	NB	IM 229-2(50)2	271	4.20	2001	Wet	1914	459,127	0.840	0.500	0.5	0.294	0.059	(a)
		3	1.418	I-229	4.95	5.00	0.05	NB	IM 229-2(50)2	271	4.20	2001	Wet	1914	459,127	0.840	0.500	0.5	0.294	0.059	(a)
		7	1.418	I-229	2.07	2.08	0.01	NB	IM 229-2(50)2	271	4.20	2001	Wet	1913	459,127	0.840	0.500	0.5	0.295	0.059	(a)
		7	1.418	I-229	3.12	3.93	0.81	NB	IM 229-2(50)2	271	4.20	2001	Wet	1913	459,127	0.840	0.500	0.5	0.295	0.059	(a)
		7	1.418	I-229	4.16	4.95	0.79	NB	IM 229-2(50)2	271	4.20	2001	Wet	1913	459,127	0.840	0.500	0.5	0.295	0.059	(a)
		7	1.419	I-229	5.00	5.32	0.32	NB	IM 229-2(50)2	271	4.20	2001	Wet	1912	459,127	0.840	0.500	0.5	0.295	0.059	(a)
		19	1.578	I-229	2.94	3.12	0.18	SB	IM 229-2(50)2	271	4.05	2001	Wet	1399	459,127	0.810	0.500	0.5	0.484	0.059	(a)
		20	1.594	I-229	3.12	3.97	0.85	SB	IM 229-2(50)2	271	4.13	2001	Wet	1398	459,127	0.826	0.500	0.5	0.485	0.059	(a)
		20	1.595	I-229	5.70	8.28	2.58	SB	IM 229-2(50)2	271	4.24	2001	Wet	1455	459,127	0.848	0.500	0.5	0.463	0.059	(a)
		23	1.603	I-229	3.97	4.16	0.19	SB	IM 229-2(50)2	271	4.17	2001	Wet	1397	459,127	0.834	0.500	0.5	0.485	0.059	(a)
		24	1.608	I-229	4.16	5.32	1.16	SB	IM 229-2(50)2	271	4.20	2001	Wet	1398	459,127	0.840	0.500	0.5	0.485	0.059	(a)
		24	1.609	I-229	2.08	2.94	0.86	SB	IM 229-2(50)2	271	4.20	2001	Wet	1397	459,127	0.840	0.500	0.5	0.485	0.059	(a)
		26	1.609	I-229	2.07	2.08	0.01	SB	IM 229-2(50)2	271	4.20	2001	Wet	1395	459,127	0.840	0.500	0.5	0.486	0.059	(a)

																Indices[5]				
Project Rank (1)	**Project Rating** (5) ,(6)	**Segment Rank** (2)	**Segment Rating** (5), (6)	**Interstate**	**Beginning MRM**	**Ending MRM**	**Length (miles)**	**Lane**	**Project Number**[3]	**Region/ Reporting Unit** (1),(4)	**Surface Condition Index** (4)	**Year Built** (4)	**Precipitation Region**[5]	**Average 3-year Maintenance Cost (per mile)**[4]	**Estimated Deicer Applied per mile (lbs)** (3),(5)	**Condition Value**	**Age Value**	**Precipitation Value**	**Maintenance Activities Value**	**Deicer Application Value**	
3	1.461	2	1.344	I-29	83.00	83.70	0.70	NB	IM 29-3(68)80	271	4.12	2003	Wet	2047	487,828	0.824	0.667	0.5	0.245	0.000	(a)
		11	1.361	I-29	80.29	83.00	2.71	NB	IM 29-3(68)80	271	4.20	2003	Wet	2046	487,828	0.840	0.667	0.5	0.246	0.000	(a)
		28	1.573	I-29	83.00	83.38	0.38	SB	IM 29-3(68)80	271	4.20	2003	Wet	1470	487,828	0.840	0.667	0.5	0.458	0.000	(a)
		29	1.577	I-29	80.29	83.00	2.71	SB	IM 29-3(68)80	271	4.22	2003	Wet	1470	487,828	0.844	0.667	0.5	0.458	0.000	(a)
4	1.492	14	1.385	I-29	79.98	80.29	0.31	NB	IM 29-3(38)79 & P 1298(2)	271	4.20	2004	Wet	2047	487,828	0.840	0.750	0.5	0.245	0.000	(a)
		15	1.386	I-29	79.26	79.98	0.72	NB	IM 29-3(38)79 & P 1298(2)	271	4.20	2004	Wet	2046	487,828	0.840	0.750	0.5	0.246	0.000	(a)
		31	1.598	I-29	79.26	79.98	0.72	SB	IM 29-3(38)79 & P 1298(2)	271	4.20	2004	Wet	1470	487,828	0.840	0.750	0.5	0.458	0.000	(a)
		31	1.598	I-29	79.98	80.29	0.31	SB	IM 29-3(38)79 & P 1298(2)	271	4.20	2004	Wet	1470	487,828	0.840	0.750	0.5	0.458	0.000	(a)
5	1.551	26	1.551	I-29	85.35	97.00	11.65	NB	IM 29-3(82)84	271	3.68	1999	Wet	975	487,828	0.736	0.333	0.5	0.640	0.000	(a), (b)
6	1.597	17	1.498	I-29	83.38	84.21	0.83	SB	IM 29-3(83)84	271	4.20	2000	Wet	1469	487,828	0.840	0.417	0.5	0.458	0.000	(a)
		33	1.604	I-29	85.00	97.00	12.00	SB	IM 29-3(83)84	271	4.02	2000	Wet	1085	487,828	0.804	0.417	0.5	0.600	0.000	(a)
7	1.602	22	1.602	I-29	61.00	72.00	11.00	SB	IM 29-2(10)62	271	4.18	2000	Wet	1336	459,127	0.836	0.417	0.5	0.507	0.059	(a)
8	1.641	18	1.558	I-29	72.00	73.78	1.78	NB	IM 29-2(52)72	271	4.20	2005	Wet	1807	459,127	0.840	0.833	0.5	0.334	0.059	(a)
		36	1.731	I-29	72.00	73.66	1.66	SB	IM 29-2(52)72	271	4.20	2005	Wet	1336	459,127	0.840	0.833	0.5	0.507	0.059	(a)
9	1.649	30	1.649	I-90	401.61	412.00	10.39	WB	IM 90-9(63)401	271	4.01	1997	Wet	913	459,127	0.802	0.167	0.5	0.663	0.059	(a), (b)
10	1.707	34	1.707	I-90	401.61	412.00	10.39	EB	IMID 90-9(70)401	271	3.89	1998	Wet	758	459,127	0.778	0.250	0.5	0.721	0.059	(a)
11	1.719	35	1.719	I-29	97.00	110.10	13.10	NB	IM 29-3(92)97	272	3.66	1998	Wet	975	392,085	0.732	0.250	0.5	0.640	0.196	(a)
12	1.753	37	1.753	I-29	97.00	110.11	13.11	SB	IM29-3(89)97	272	4.16	1997	Wet	1085	392,085	0.832	0.167	0.5	0.600	0.196	(a)
13	2.262	38	2.262	I-29	110.10	110.10	0.00	NB	IM 29-4(58)	272	5.00	2009	Wet	974	392,085	1.000	1.167	0.5	0.641	0.196	(c)

Project Rank [1]	Project Rating [5],[6]	Segment Rank [2]	Segment Rating [5], [6]	Interstate	Beginning MRM	Ending MRM	Length (miles)	Lane	Project Number[3]	Region/ Reporting Unit[1],[4]	Surface Condition Index[4]	Year Built[4]	Precipitation Region[5]	Average 3-year Maintenance Cost (per mile)[4]	Estimated Deicer Applied per mile (lbs)[3],[5]	Condition Value	Age Value	Precipitation Value	Maintenance Activities Value	Deicer Application Value
14	**2.526**	**40**	**2.526**	**I-90**	**213.10**	**226.68**	**13.58**	**EB**	**IM 90-5(66)187**	**391**	**4.01**	**2000**	**Dry**	**688**	**144,958**	**0.802**	**0.417**	**1**	**0.746**	**0.703**
		41	**2.533**	**I-90**	**226.68**	**227.00**	**0.32**	**EB**	**IM 90-5(66)187**	**391**	**4.04**	**2000**	**Dry**	**685**	**144,958**	**0.808**	**0.417**	**1**	**0.747**	**0.703**
15	2.539	39	2.515	I-90	18.48	19.42	0.94	EB	IM 90-1(45)18	451	4.06	2001	Dry	657	173,100	0.812	0.500	1	0.758	0.645
		43	2.541	I-90	19.42	28.34	8.92	EB	IM 90-1(45)18	451	4.19	2001	Dry	656	173,100	0.838	0.500	1	0.758	0.645
16	2.567	44	2.567	I-90	10.08	18.48	8.40	EB		451	3.82	2005	Dry	656	173,100	0.764	0.833	1	0.758	0.645
17	**2.579**	**45**	**2.579**	**I-29**	**27.00**	**37.32**	**10.32**	**SB**	**IM 29-1(44)27**	**291**	**4.33**	**2001**	**Wet**	**764**	**112,280**	**0.866**	**0.500**	**0.5**	**0.718**	**0.770**
118	2.638	442	2.535	I-90	210.14	213.10	2.96	EB	IM 90-5(52)210	391	4.18	1999	Dry	688	144,958	0.836	0.333	1	0.746	0.703
		52	2.739	I-90	210.14	213.15	3.01	WB	IM 90-5(52)210	391	4.42	1999	Dry	265	144,958	0.884	0.333	1	0.902	0.703
19	2.643	46	2.636	I-90	264.68	265.00	0.32	EB	IM 90-5(80)262	253	4.20	1995	Wet	523	41,895	0.840	0.000	0.5	0.807	0.914
		46	2.637	I-90	263.34	264.68	1.34	EB	IM 90-5(80)262	253	4.20	1995	Wet	522	41,895	0.840	0.000	0.5	0.808	0.914
		48	2.651	I-90	263.39	265.00	1.61	WB	IM 90-5(80)262	253	4.29	1995	Wet	533	41,895	0.858	0.000	0.5	0.803	0.914
20	2.681	49	2.681	I-90	10.08	18.58	8.50	WB		451	3.46	2005	Dry	152	173,100	0.692	0.833	1	0.944	0.645
21	2.693	50	2.684	I-90	18.58	19.42	0.84	WB	IM 90-1(25)19	451	4.10	2000	Dry	152	173,100	0.820	0.417	1	0.944	0.645
		51	2.694	I-90	19.42	28.34	8.92	WB	IM 90-1(25)19	451	4.15	2000	Dry	152	173,100	0.830	0.417	1	0.944	0.645
22	2.742	53	2.742	I-90	213.15	227.00	13.85	WB	IM 90-5(53)213	391	4.18	2001	Dry	264	144,958	0.836	0.500	1	0.903	0.703
23	2.747	54	2.747	I-90	251.60	259.90	8.30	EB	IM-IDR 90-5(73)251	253	4.08	1996	Dry	429	41,895	0.816	0.083	1	0.842	0.914
24	2.814	55	2.814	I-29	27.00	37.32	10.32	NB	IM 29-1(63)	291	4.49	2002	Wet	282	112,280	0.898	0.583	0.5	0.896	0.770
25	2.824	56	2.824	I-29	37.32	46.31	8.99	SB	IM 29-1(84)	291	4.93	2006	Wet	764	112,280	0.986	0.917	0.5	0.718	0.770
26	2.826	57	2.822	I-90	251.60	259.52	7.92	WB	IM 90-5(86)251	253	4.07	1997	Dry	289	41,895	0.814	0.167	1	0.893	0.914
		73	2.954	I-90	259.60	259.88	0.28	WB	IM 90-5(86)251	253	4.20	1997	Dry	0	41,895	0.840	0.167	1	1.000	0.914
27	**2.853**	**58**	**2.853**	**I-29**	**4.64**	**17.00**	**12.36**	**NB**	**IM 29-1(72)4**	**291**	**4.25**	**2006**	**Wet**	**316**	**112,280**	**0.850**	**0.917**	**0.5**	**0.883**	**0.770**

Project Rank [1]	Project Rating [5],[6]	Segment Rank [2]	Segment Rating [5], [6]	Interstate	Beginning MRM	Ending MRM	Length (miles)	Lane	Project Number[3]	Region/ Reporting Unit[1],[4]	Surface Condition Index[4]	Year Built[4]	Precipitation Region[5]	Average 3-year Maintenance Cost (per mile)[4]	Estimated Deicer Applied per mile (lbs)[3],[5]	Condition Value	Age Value	Precipitation Value	Maintenance Activities Value	Deicer Application Value
28	**2.866**	**59**	**2.864**	**I-90**	**335.00**	**344.34**	**9.34**	**EB**	**IM-BRF 90-8(40)334**	**252**	**3.99**	**2003**	**Wet**	**85**	**86,853**	**0.798**	**0.667**	**0.5**	**0.969**	**0.822**
		69	**2.906**	**I-90**	**334.54**	**335.00**	**0.46**	**EB**	**IM-BRF 90-8(40)334**	**252**	**4.20**	**2003**	**Wet**	**84**	**86,853**	**0.840**	**0.667**	**0.5**	**0.969**	**0.822**
29	2.877	60	2.877	I-90	353.07	362.00	8.93	EB	IM 90-8(79)353	252	4.18	2002	Wet	85	86,853	0.836	0.583	0.5	0.969	0.822
30	2.882	63	2.882	I-90	353.07	362.00	8.93	WB	IM 90-8-(33)353	252	4.30	2001	Wet	68	86,853	0.860	0.500	0.5	0.975	0.822
31	2.883	61	2.881	I-90	338.42	343.73	5.31	WB	IM 90-8(83)334	252	4.17	2002	Wet	68	86,853	0.834	0.583	0.5	0.975	0.822
		61	2.881	I-90	343.73	344.34	0.61	WB	IM 90-8(83)334	252	4.17	2002	Wet	68	86,853	0.834	0.583	0.5	0.975	0.822
		64	2.887	I-90	335.00	338.00	3.00	WB	IM 90-8(83)334	252	4.20	2002	Wet	68	86,853	0.840	0.583	0.5	0.975	0.822
		64	2.887	I-90	334.54	335.00	0.46	WB	IM 90-8(83)334	252	4.20	2002	Wet	67	86,853	0.840	0.583	0.5	0.975	0.822
		64	2.887	I-90	338.00	338.42	0.42	WB	IM 90-8(83)334	252	4.20	2002	Wet	67	86,853	0.840	0.583	0.5	0.975	0.822
32	2.915	71	2.915	I-90	344.34	353.07	8.73	WB	IM-BRF 90-8(41)344	252	4.09	2004	Wet	67	86,853	0.818	0.750	0.5	0.975	0.822
33 (tie)	**2.916**	**67**	**2.907**	**I-90**	**247.00**	**251.60**	**4.60**	**EB**	**IM 90-5(61)236**	**391**	**4.56**	**2007**	**Dry**	**429**	**144,958**	**0.912**	**1.000**	**1**	**0.842**	**0.703**
		68	**2.912**	**I-90**	**246.00**	**247.00**	**1.00**	**EB**	**IM 90-5(61)236**	**391**	**4.59**	**2007**	**Dry**	**430**	**144,958**	**0.918**	**1.000**	**1**	**0.841**	**0.703**
		70	**2.921**	**I-90**	**236.00**	**246.00**	**10.00**	**EB**	**IM 90-5(61)236**	**391**	**4.63**	**2007**	**Dry**	**429**	**144,958**	**0.926**	**1.000**	**1**	**0.842**	**0.703**
33 (tie)	**2.916**	**71**	**2.916**	**I-90**	**344.34**	**353.07**	**8.73**	**EB**	**IM 90-8(43)344**	**252**	**4.00**	**2005**	**Wet**	**85**	**86,853**	**0.800**	**0.833**	**0.5**	**0.969**	**0.822**
35	**2.967**	**74**	**2.967**	**I-29**	**165.00**	**179.00**	**14.00**	**SB**	**IMBR29-6(23)164**	**171**	**4.02**	**2004**	**Dry**	**449**	**22,729**	**0.804**	**0.750**	**1**	**0.834**	**0.953**
36	3.008	75	3.008	I-29	151.22	165.00	13.78	SB	IM29-6(21)	171	4.35	2003	Dry	449	22,729	0.870	0.667	1	0.834	0.953
37	3.114	77	3.114	I-29	139.30	151.22	11.92	SB	IM29-5(22)141	171	4.38	2007	Dry	449	22,729	0.876	1.000	1	0.834	0.953
38	3.120	76	3.079	I-90	52.44	56.00	3.56	EB	IMBF 90-1(10)6	452	4.47	2005	Dry	122	83,170	0.894	0.833	1	0.955	0.830
		79	3.161	I-90	52.44	56.00	3.56	WB	IMBF 90-1(10)6	452	4.80	2005	Dry	78	83,170	0.960	0.833	1	0.971	0.830
39	3.136	78	3.136	I-29	151.31	165.00	13.69	NB	IMBF29-6(15)151	171	4.21	2005	Dry	162	22,729	0.842	0.833	1	0.940	0.953
40	**3.173**	**80**	**3.173**	**I-29**	**165.00**	**179.00**	**14.00**	**NB**	**IM29-6(26)164**	**171**	**4.27**	**2006**	**Dry**	**162**	**22,729**	**0.854**	**0.917**	**1**	**0.940**	**0.953**

Notes:

Recommended projects in bold print.

(1) Projects are ranked from 1 to 40, with 1 being the lowest quality and 40 being the highest quality

(2) Pavement Segments are ranked from 1 to 80, with 1 being the lowest quality and 80 being the highest quality

(3) Information provided by SDDOT

(4) Information provided by SDDOT Highway Needs and Project Analysis Report

(5) See attached discussion

(6)

Category	**Weighting Factor**
Condition	1.00
Age	0.30
Precipitation	0.15
Maintenance	1.00
Deicer Application	1.00

(a) Project within 20 miles of Sioux Falls

(b) Tested previously, exclude

(c) Maintenance site, exclude

APPENDIX B. EQUIPOTENTIAL CONTOUR MAPS FOR INITIAL AND STATEWIDE ASSESSMENTS

Crack and Equipotential Maps

MRM 87 Fall 2010

MRM 87 Spring 2011

MRM 68 Fall 2010

MRM 68 Spring 2011

MRM 411 Fall 2010

MRM 411 Spring 2011

MRM 33

MRM 44

MRM 25

MRM 54

MRM 222

MRM 246

MRM 168NB

MRM 168SB

Minimum Reading (mV)	Maximum Reading (mV)	Color
−750.00	−720.00	
−720.00	−690.00	
−690.00	−660.00	
−660.00	−630.00	
−630.00	−600.00	
−600.00	−570.00	
−570.00	−540.00	
−540.00	−510.00	
−510.00	−480.00	
−480.00	−450.00	
−450.00	−420.00	
−420.00	−390.00	
−390.00	−360.00	
−360.00	−330.00	
−330.00	−300.00	
−300.00	−270.00	
−270.00	−240.00	
−240.00	−210.00	
−210.00	−180.00	
−180.00	−150.00	

Figure B.1: Equipotential contour map legend

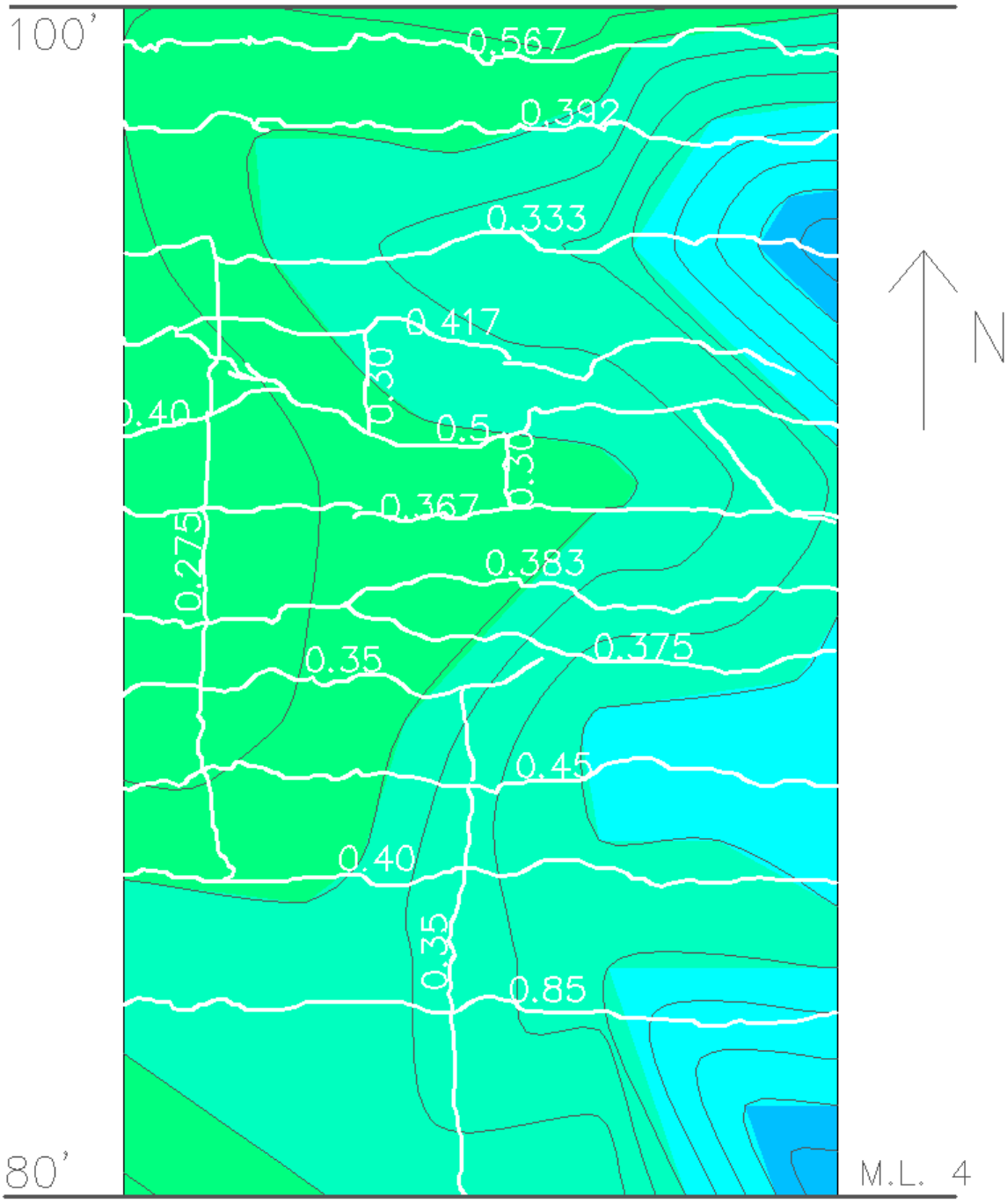

Figure B.2: MRM 87 fall 2010 from 80 to 100 feet

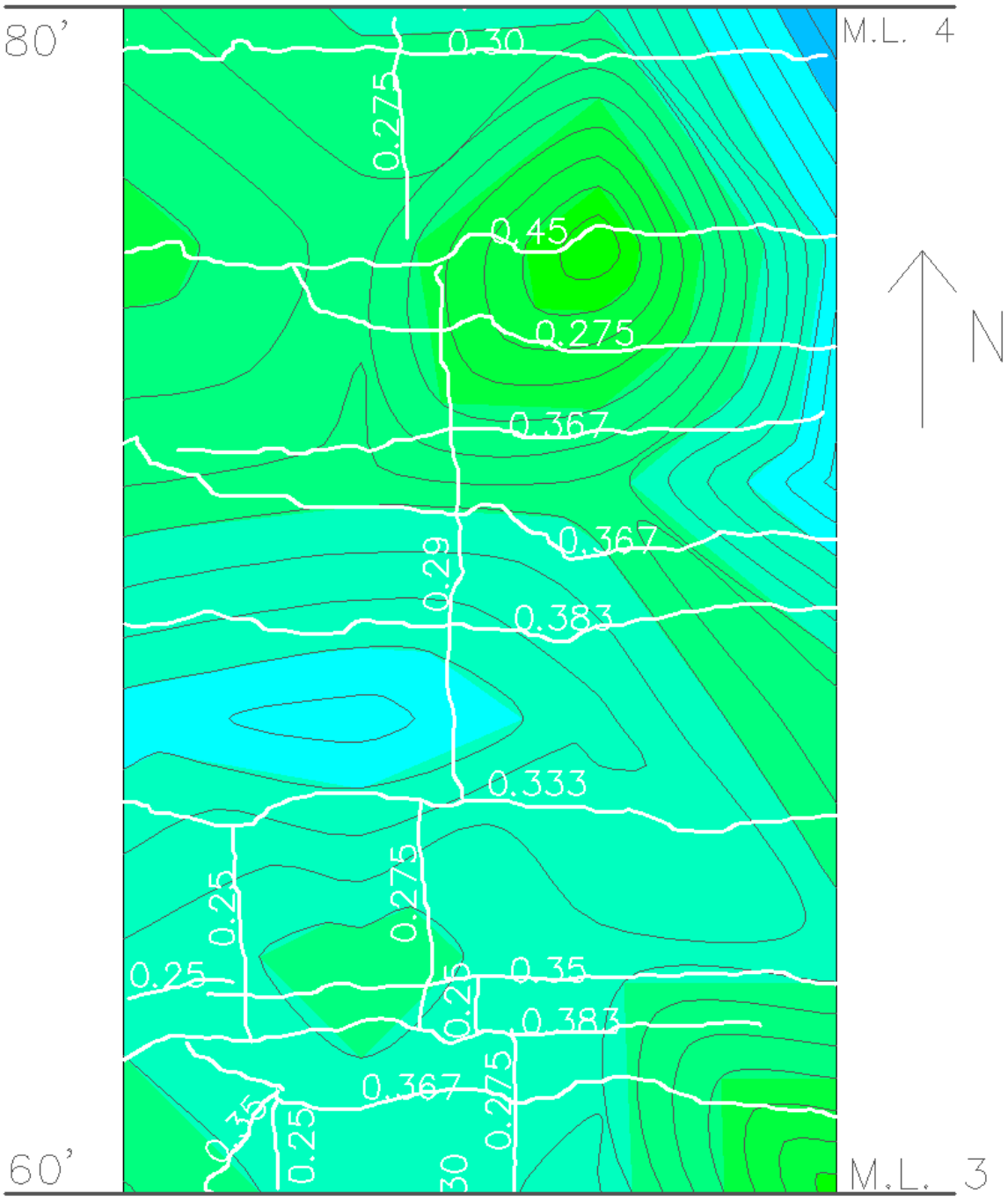

Figure B.3: MRM 87 fall 2010 from 60 to 80 feet

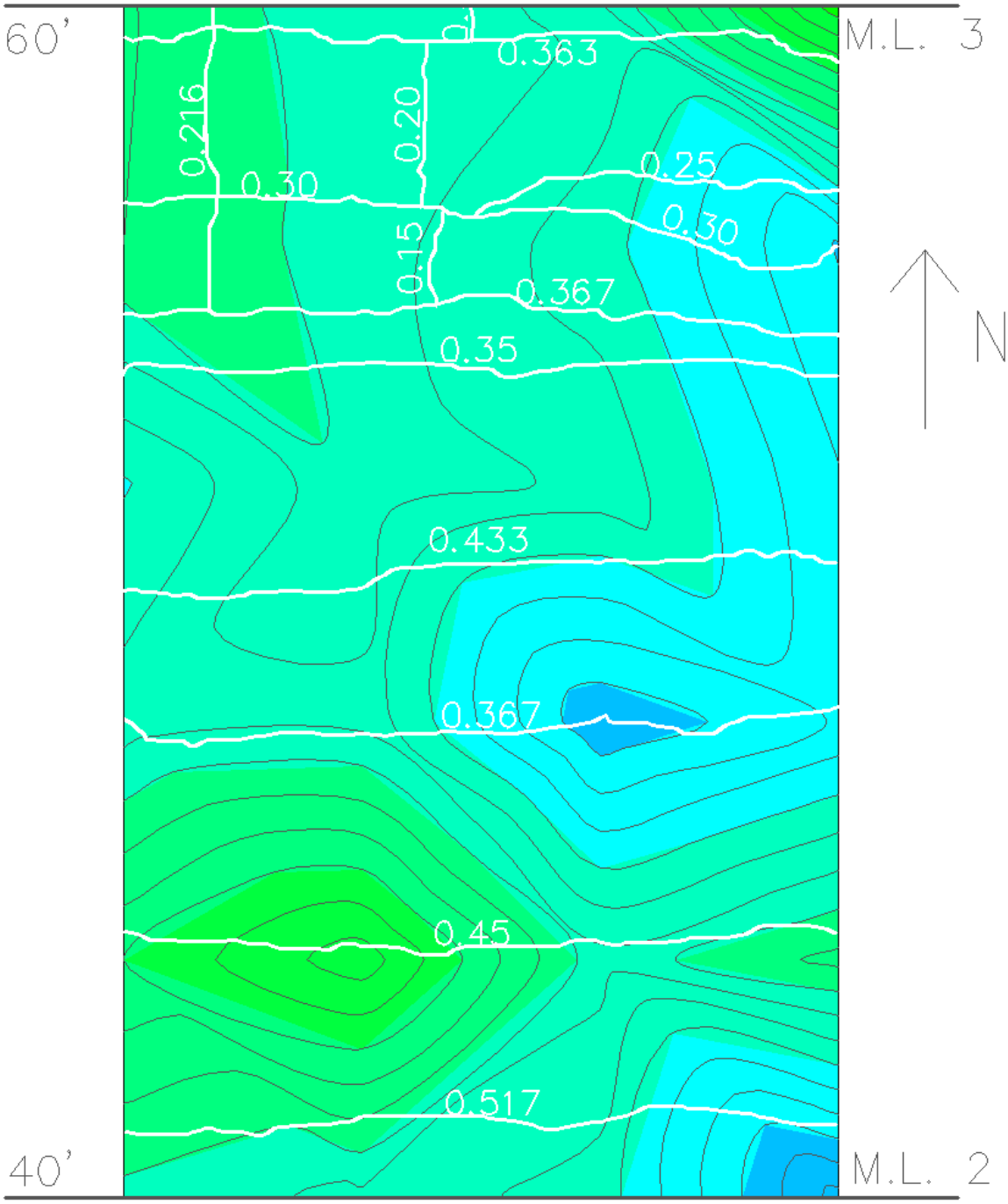

Figure B.4: MRM 87 fall 2010 from 40 to 60 feet

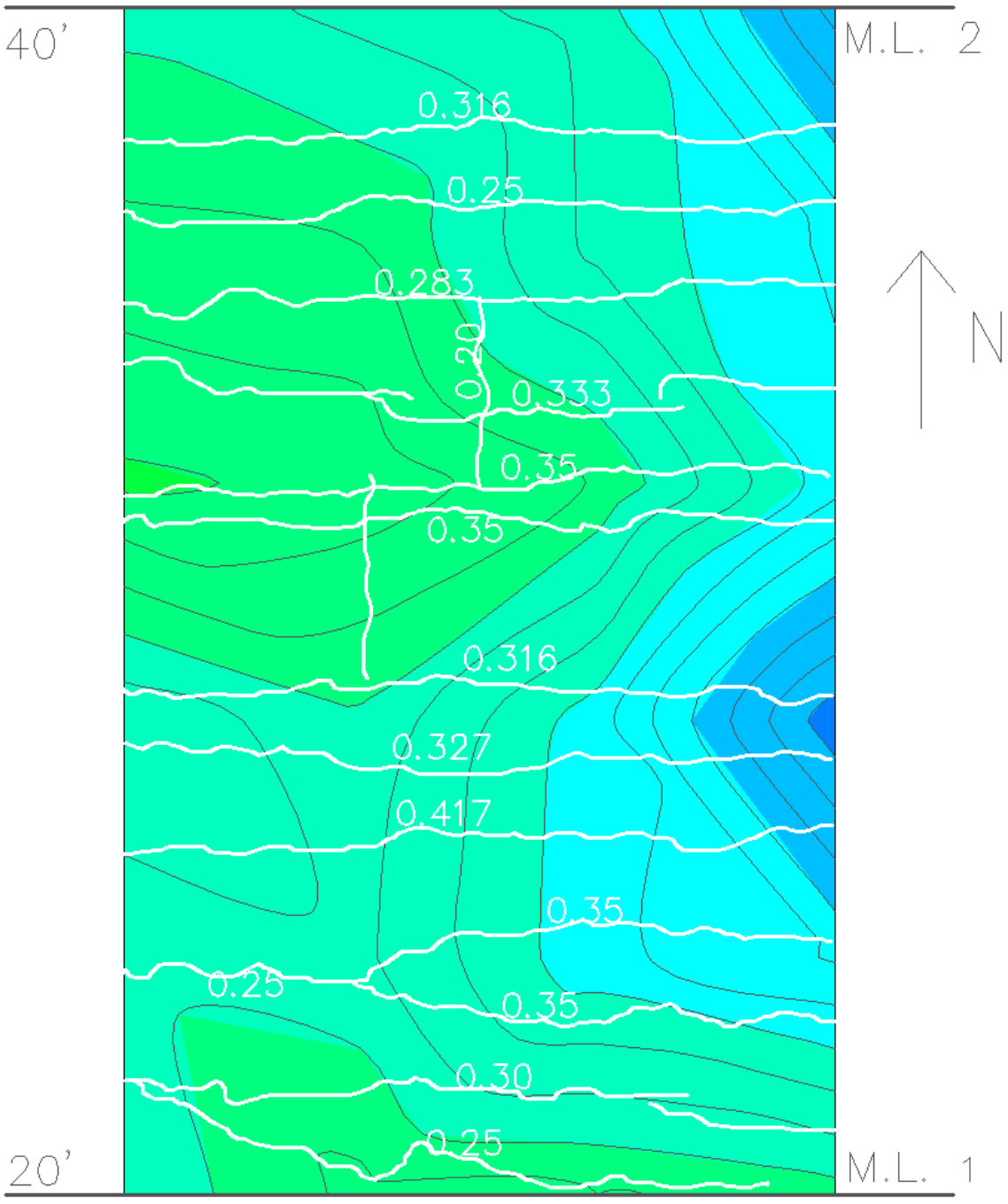

Figure B.5: MRM 87 fall 2010 from 20 to 40 feet

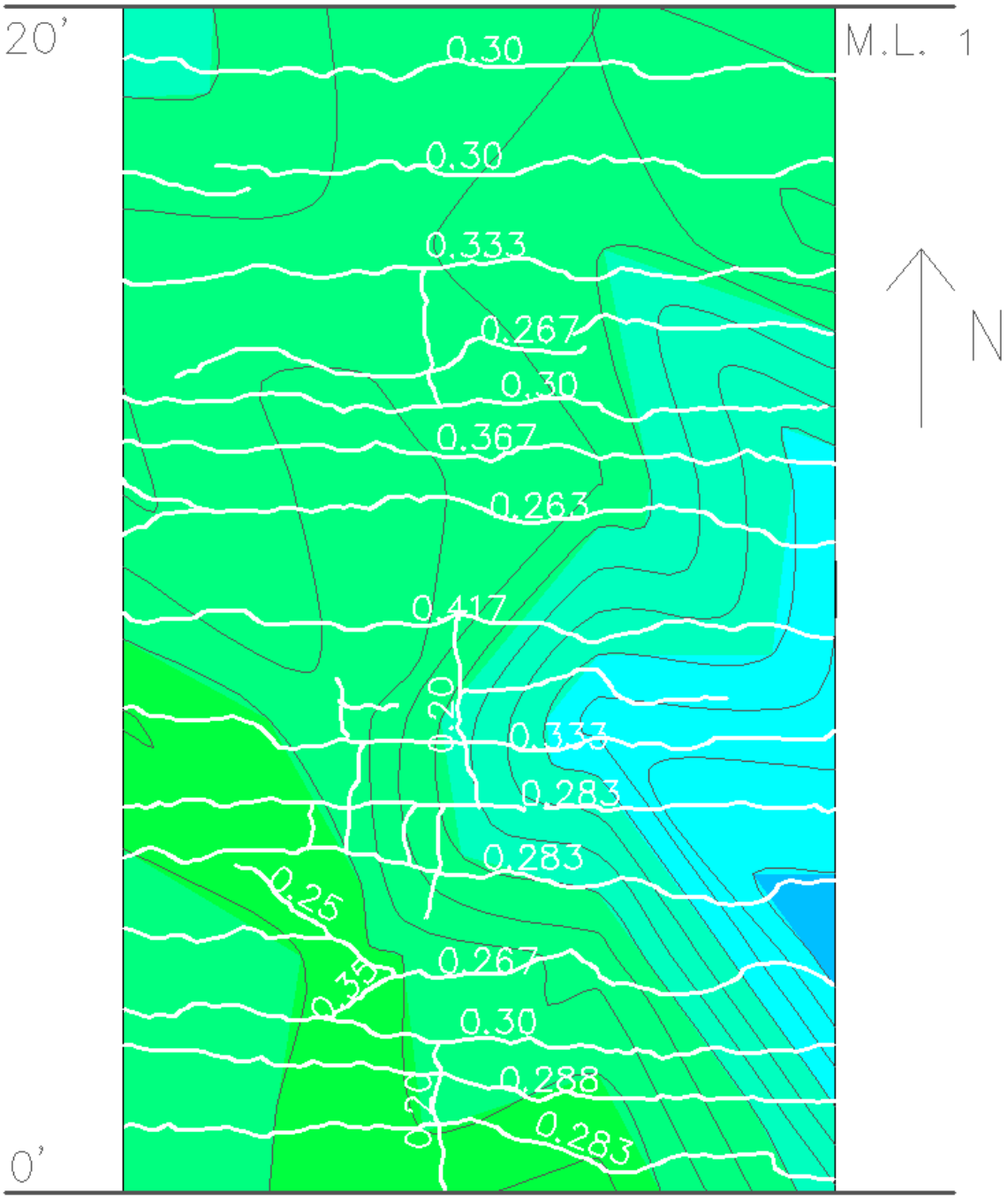

Figure B.6: MRM 87 fall 2010 from 0 to 20 feet

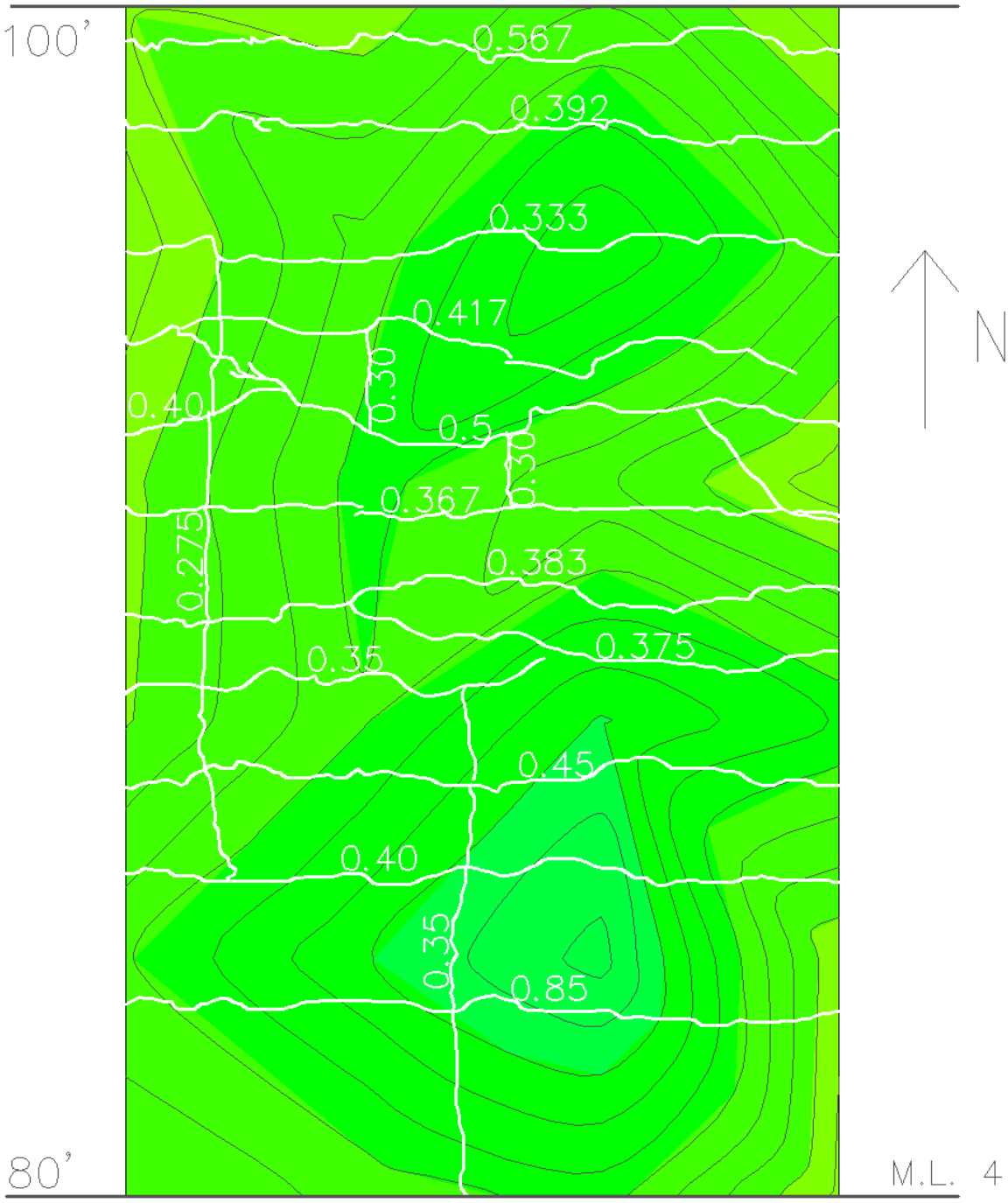

Figure B.7: MRM 87 spring 2011 from 80 to 100 feet

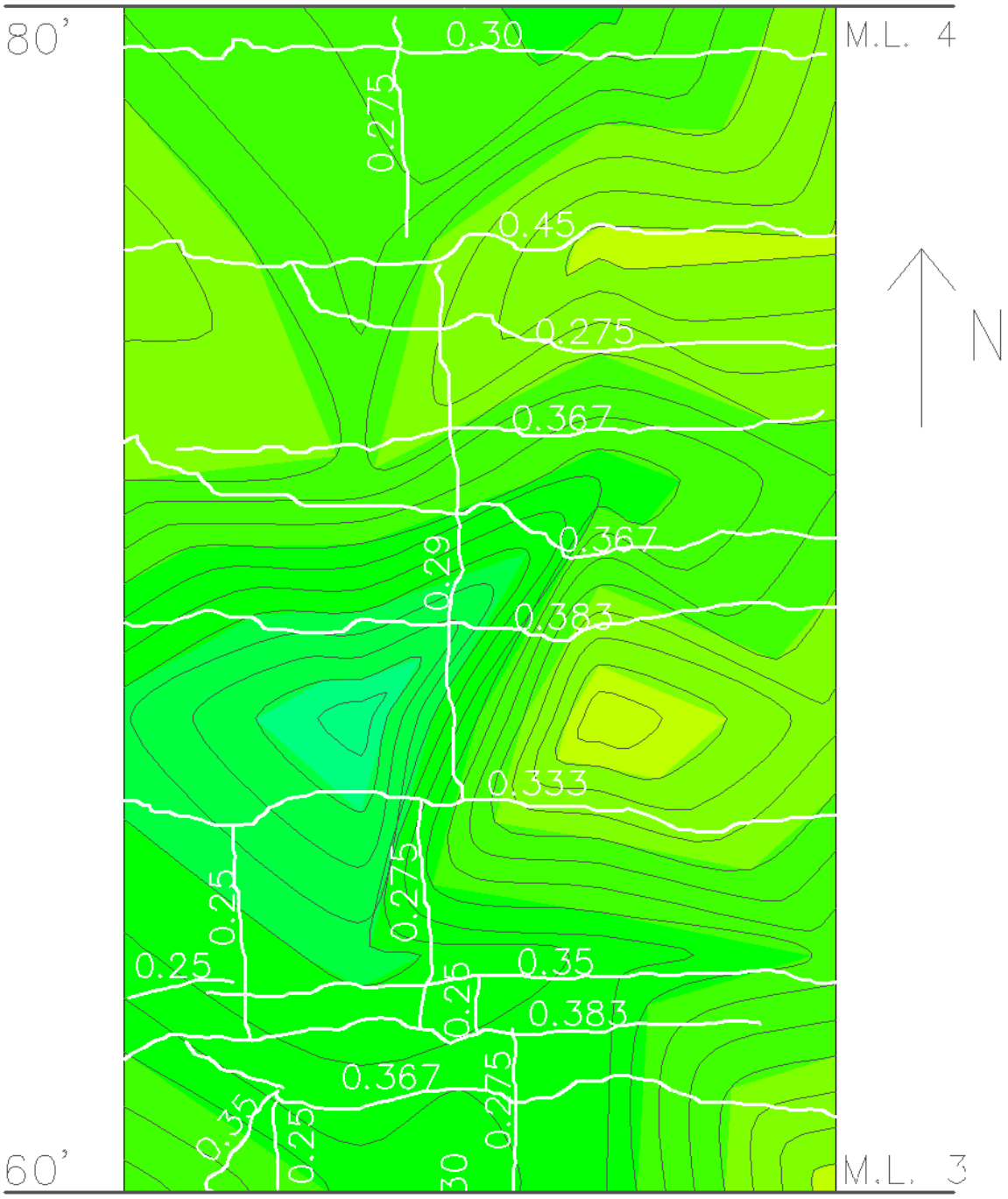

Figure B.8: MRM 87 spring 2011 from 60 to 80 feet

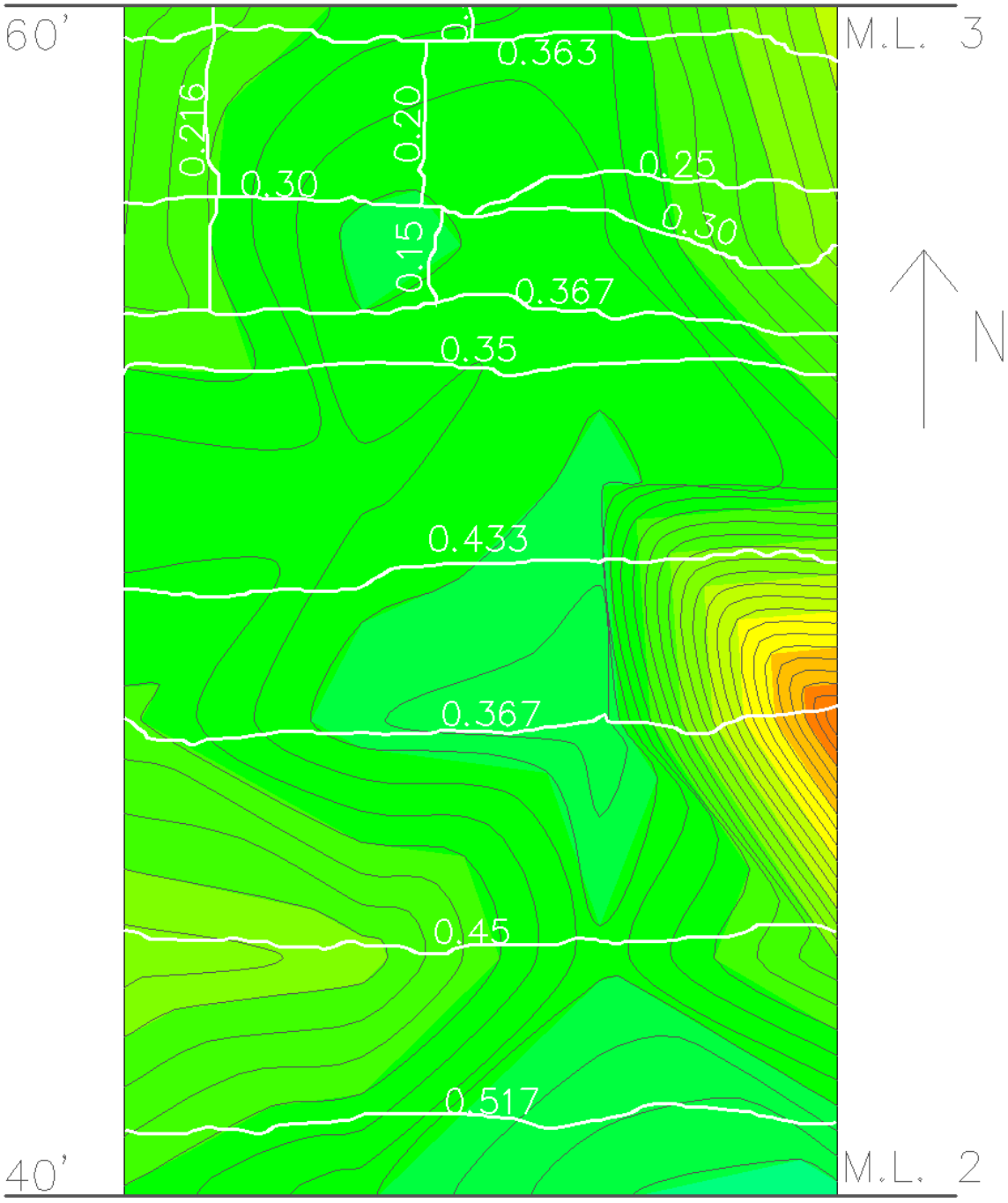

Figure B.9: MRM 87 spring 2011 from 40 to 60 feet

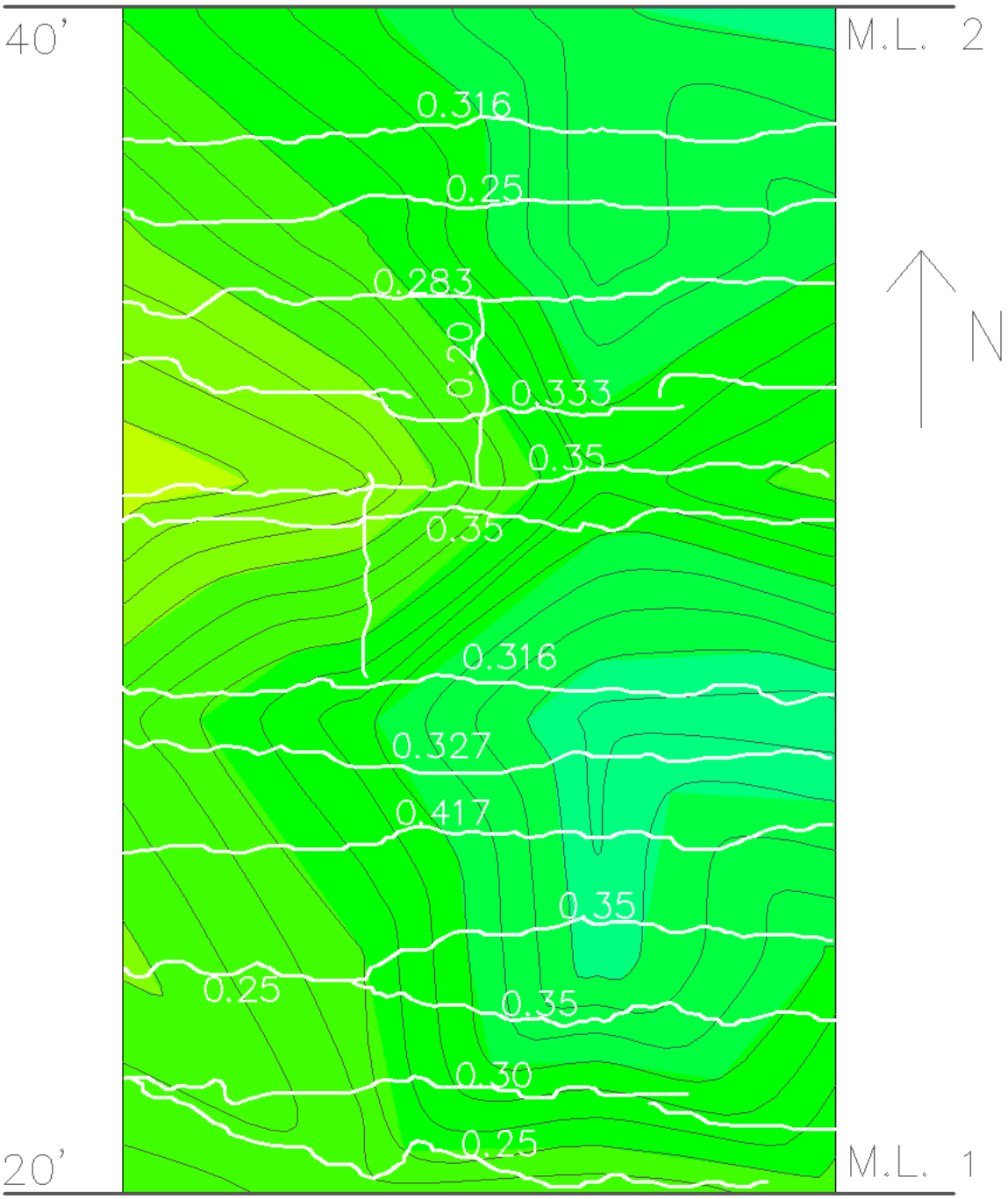

Figure B.10: MRM 87 spring 2011 from 20 to 40 feet

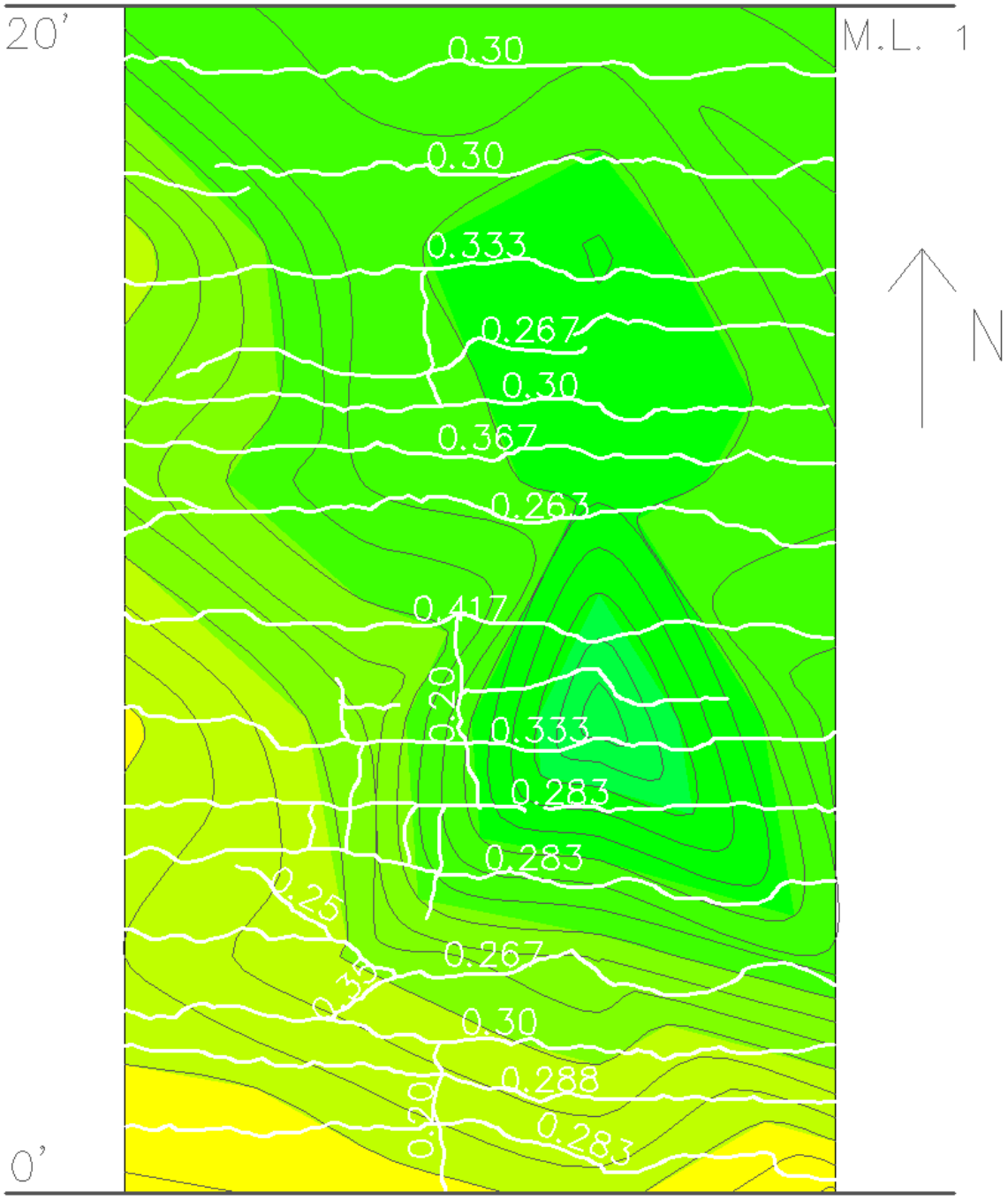

Figure B.11: MRM 87 spring 2011 from 0 to 20 feet

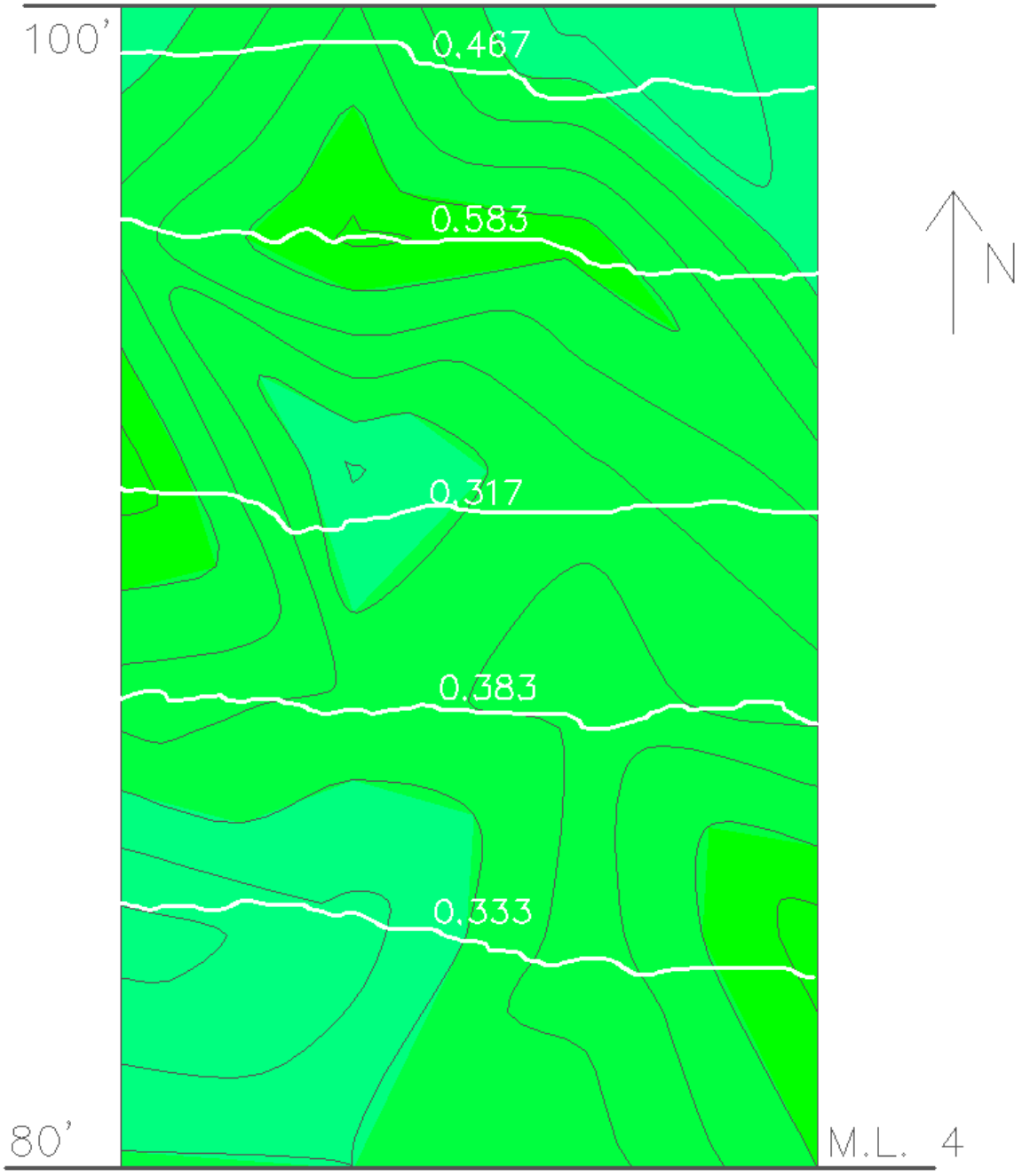

Figure B.12: MRM 68 fall 2010 from 80 to 100 feet

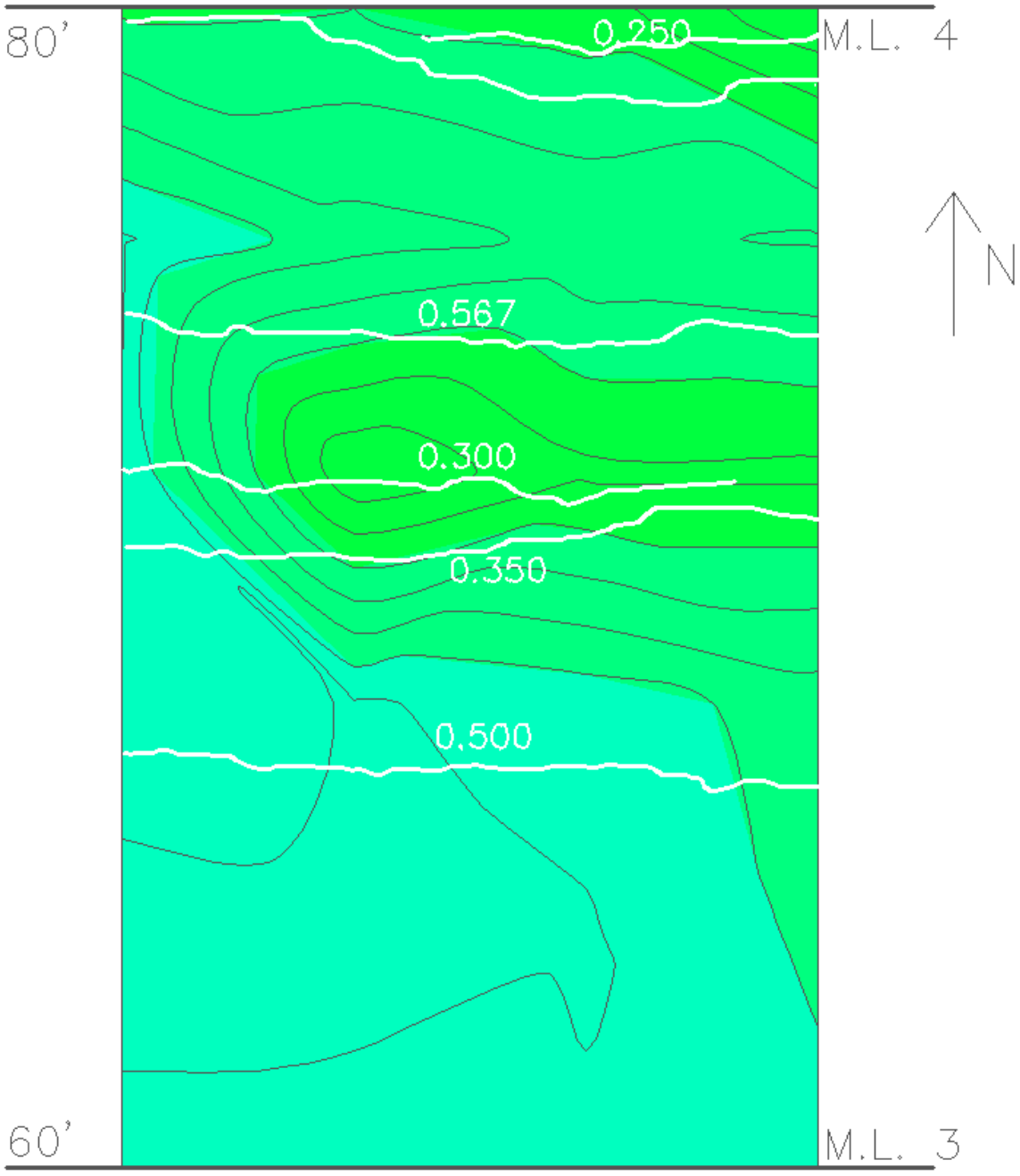

Figure B.13: MRM 68 fall 2010 from 60 to 80 feet

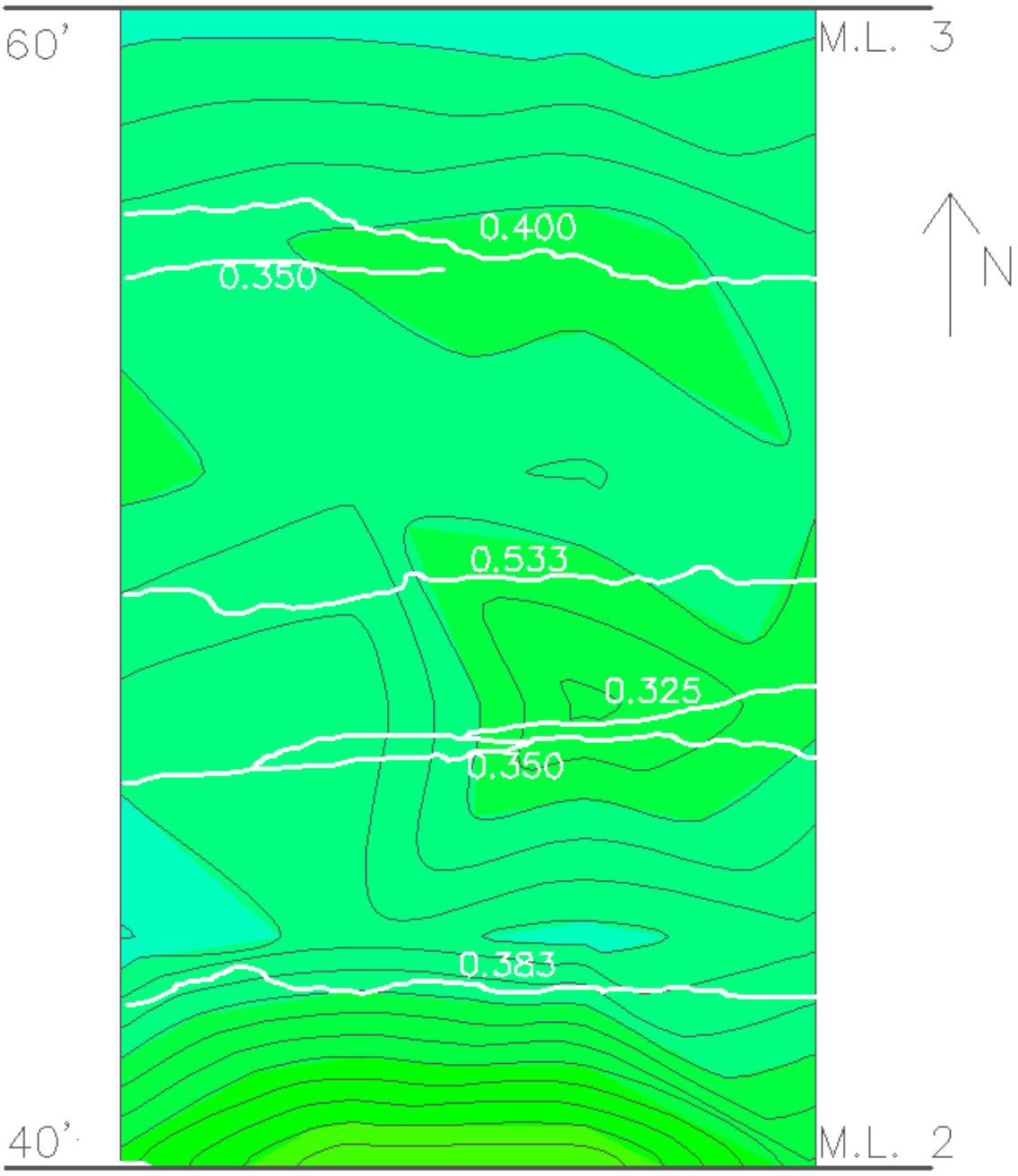

Figure B.14: MRM 68 fall 2010 from 40 to 60 feet

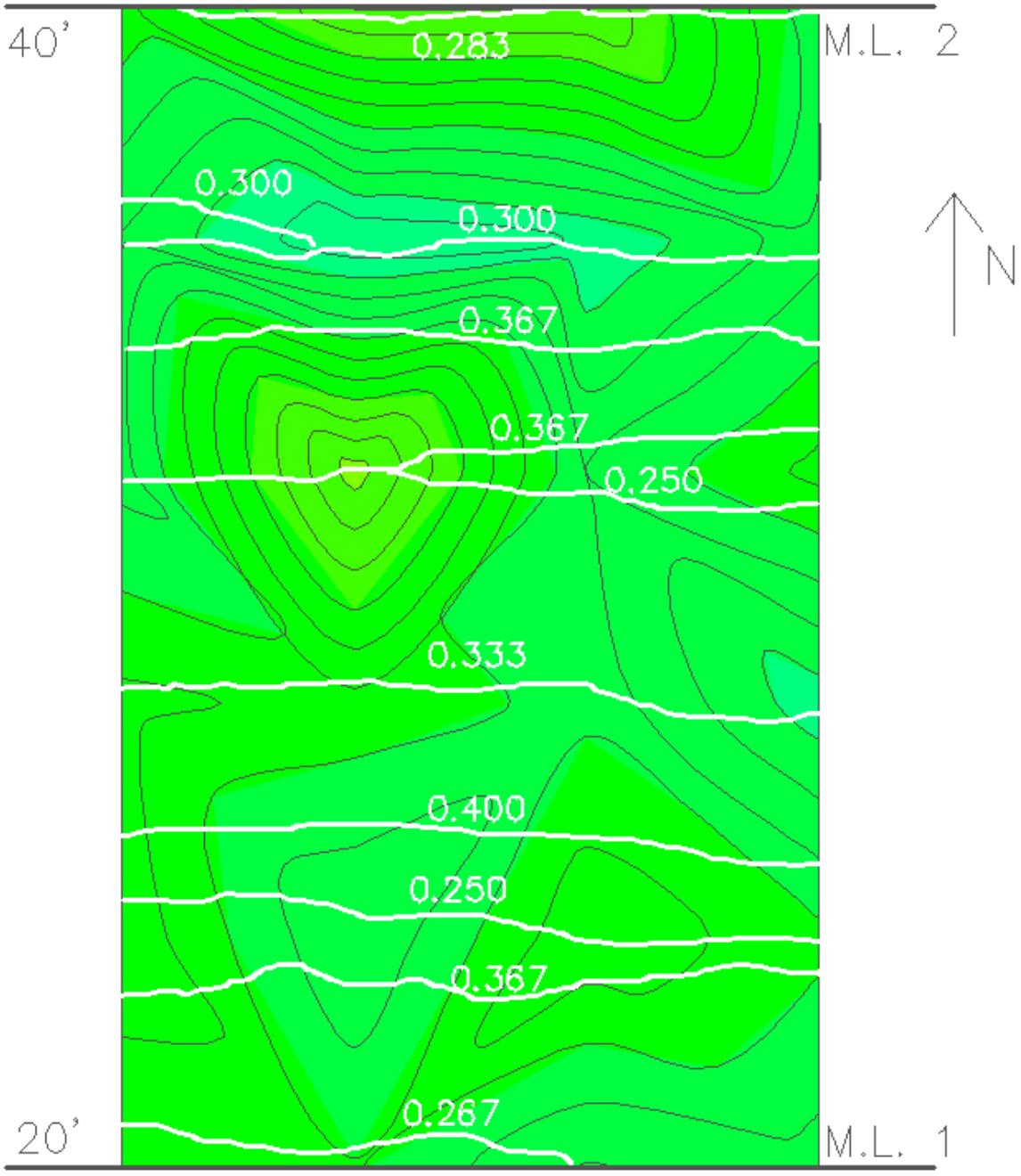

Figure B.15: MRM 68 fall 2010 from 20 to 40 feet

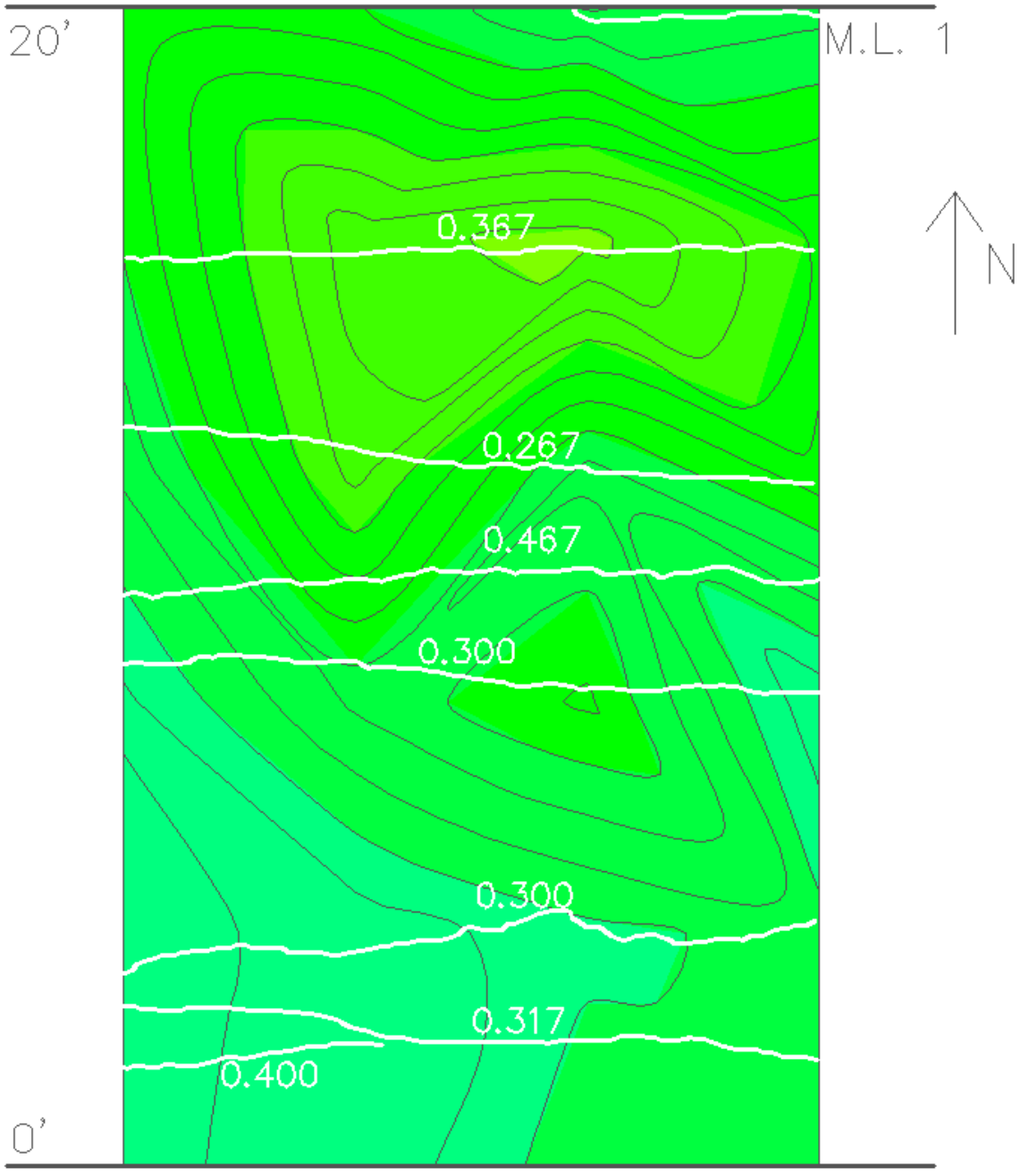

Figure B.16: MRM 68 fall 2010 from 0 to 20 feet

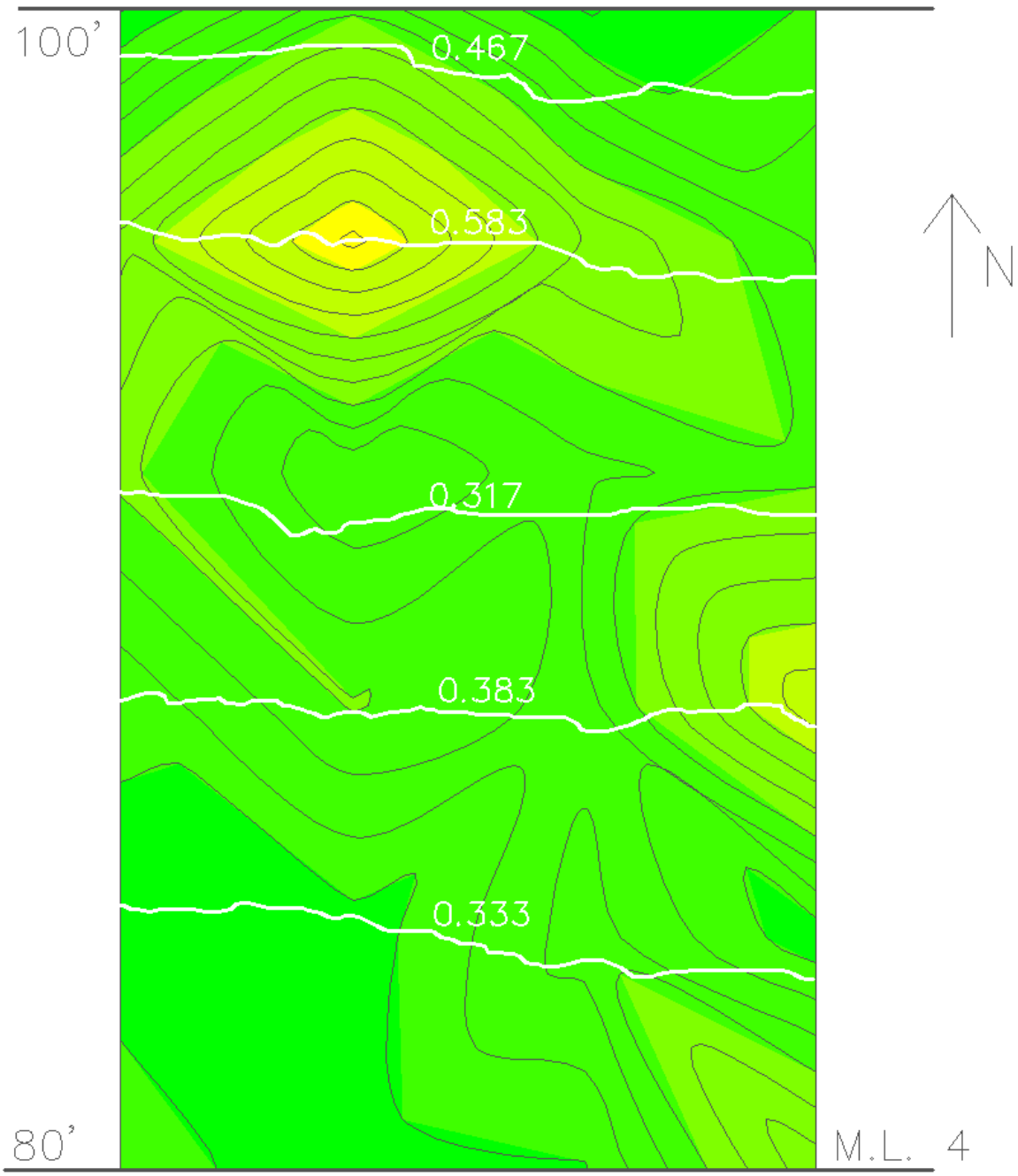

Figure B.17: MRM 68 spring 2011 from 80 to 100 feet

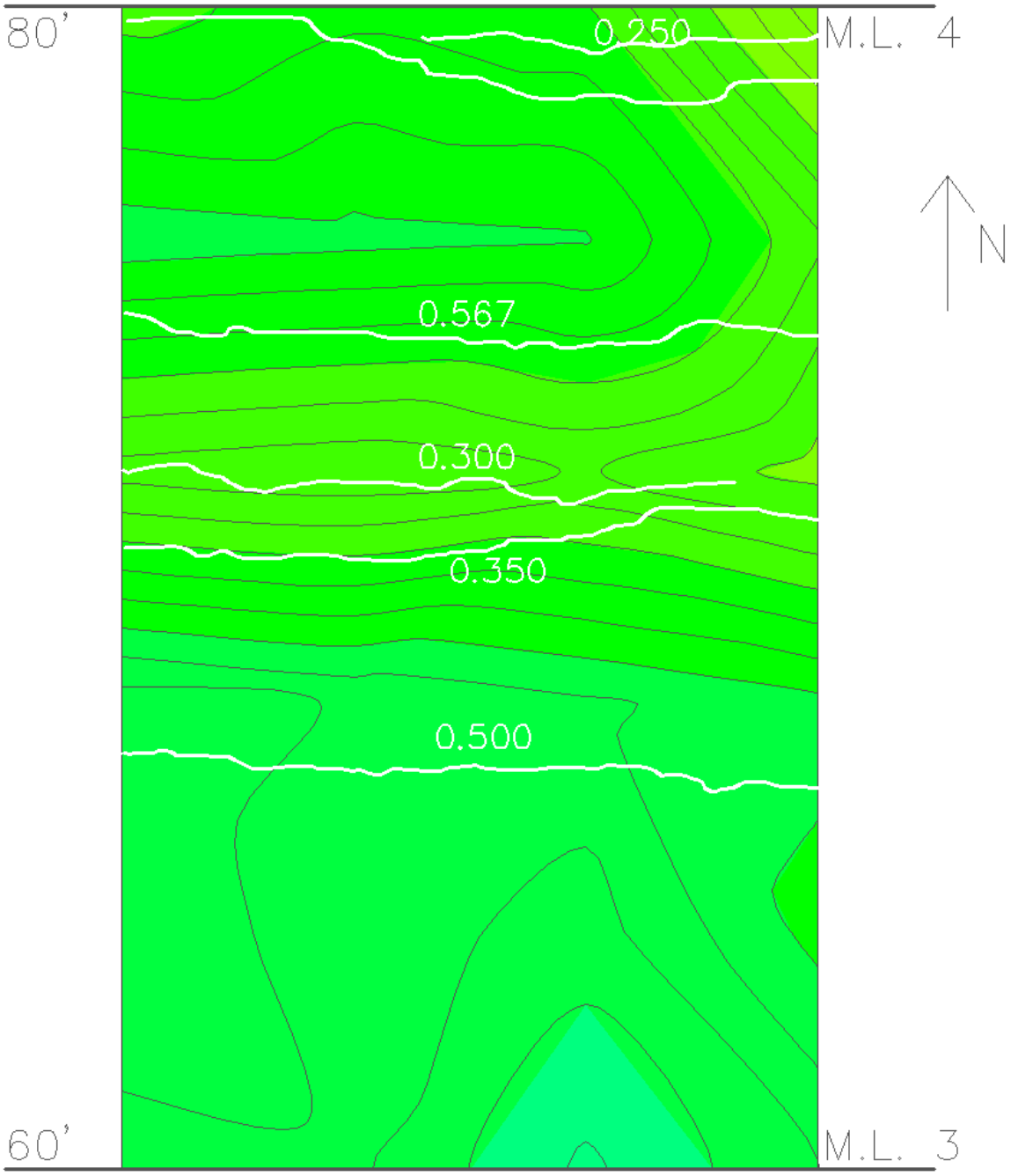

Figure B.18: MRM 68 spring 2011 from 60 to 80 feet

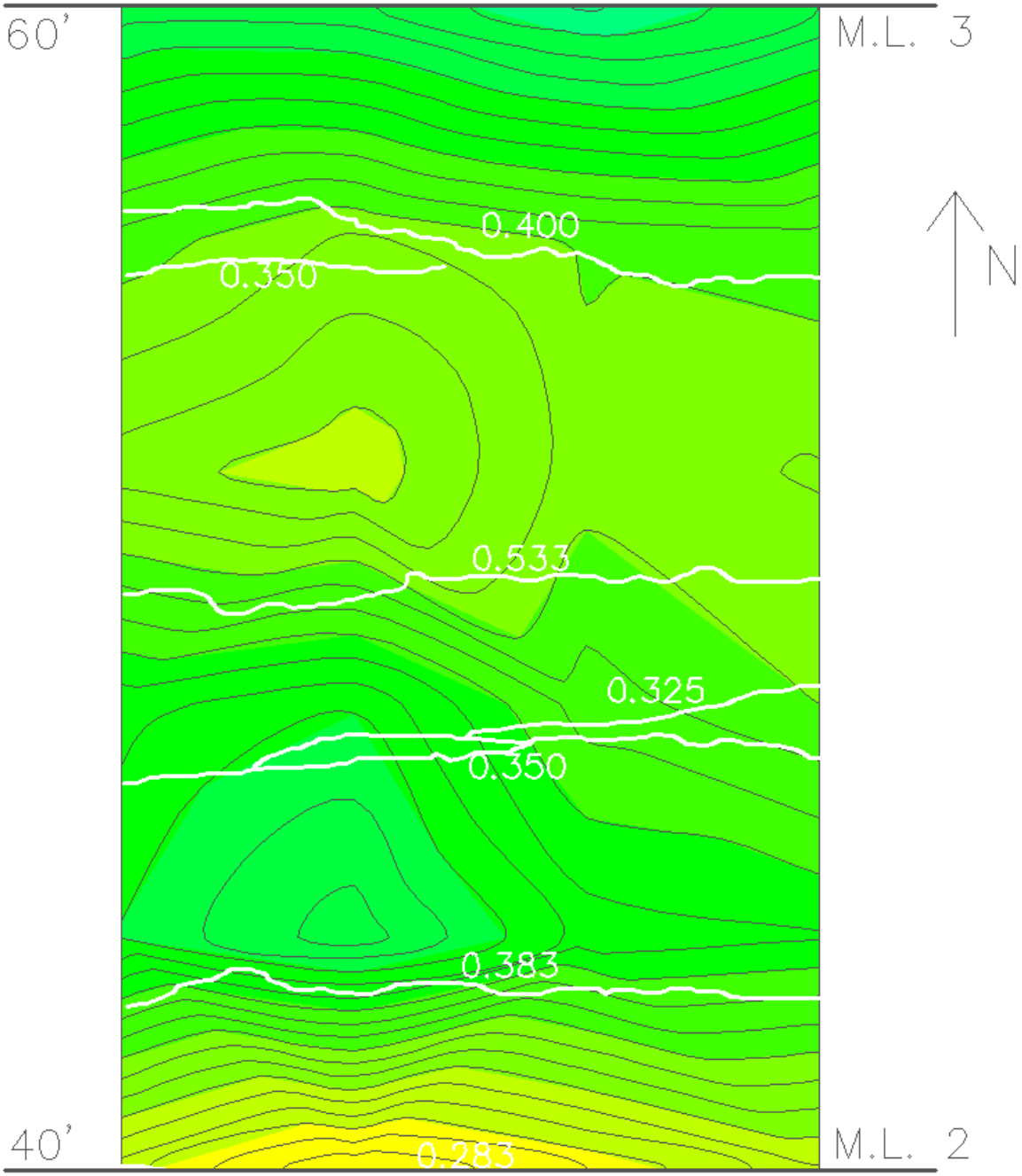

Figure B.19: MRM 68 spring 2011 from 40 to 60 feet

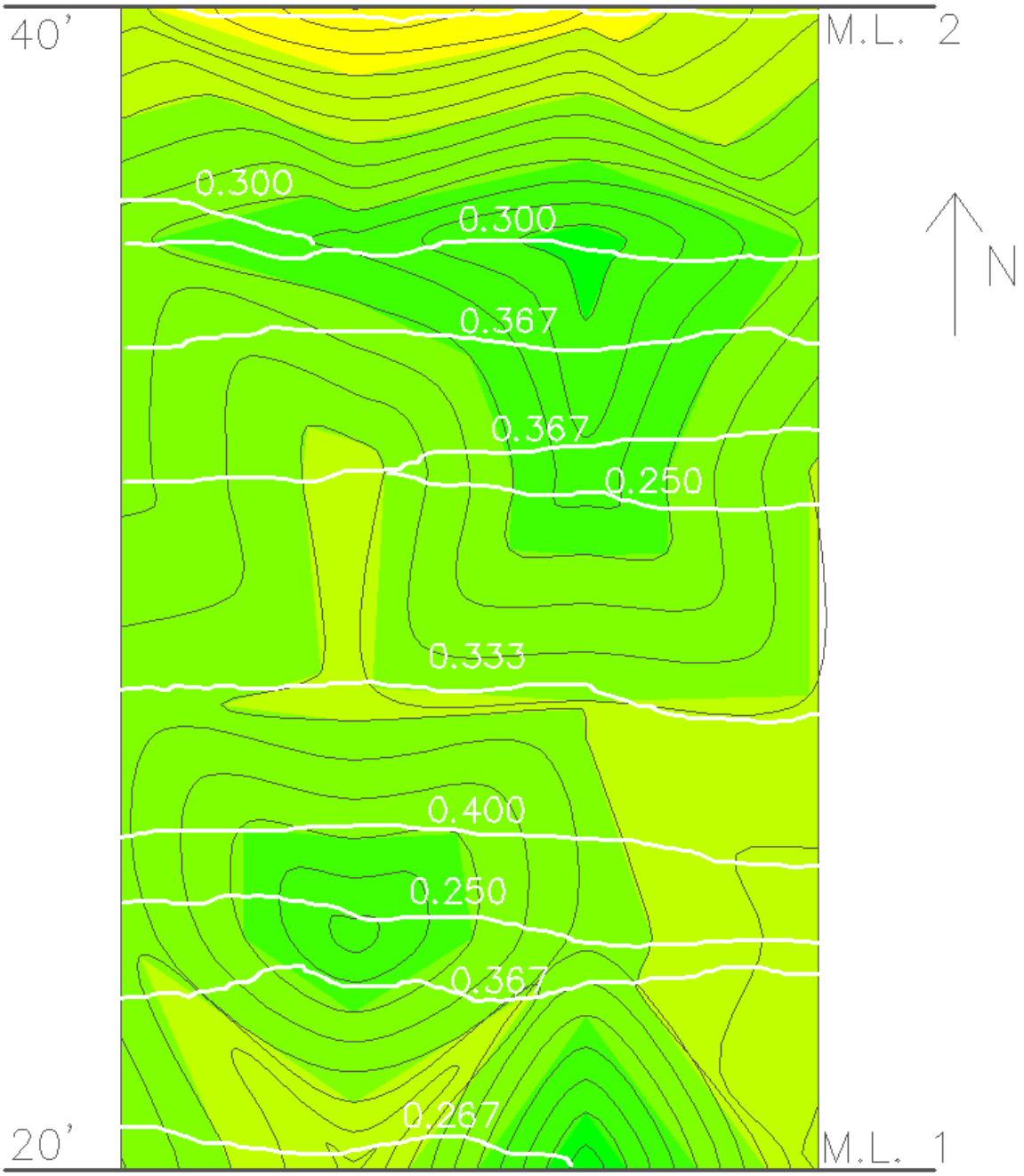

Figure B.20: MRM 68 spring 2011 from 20 to 40 feet

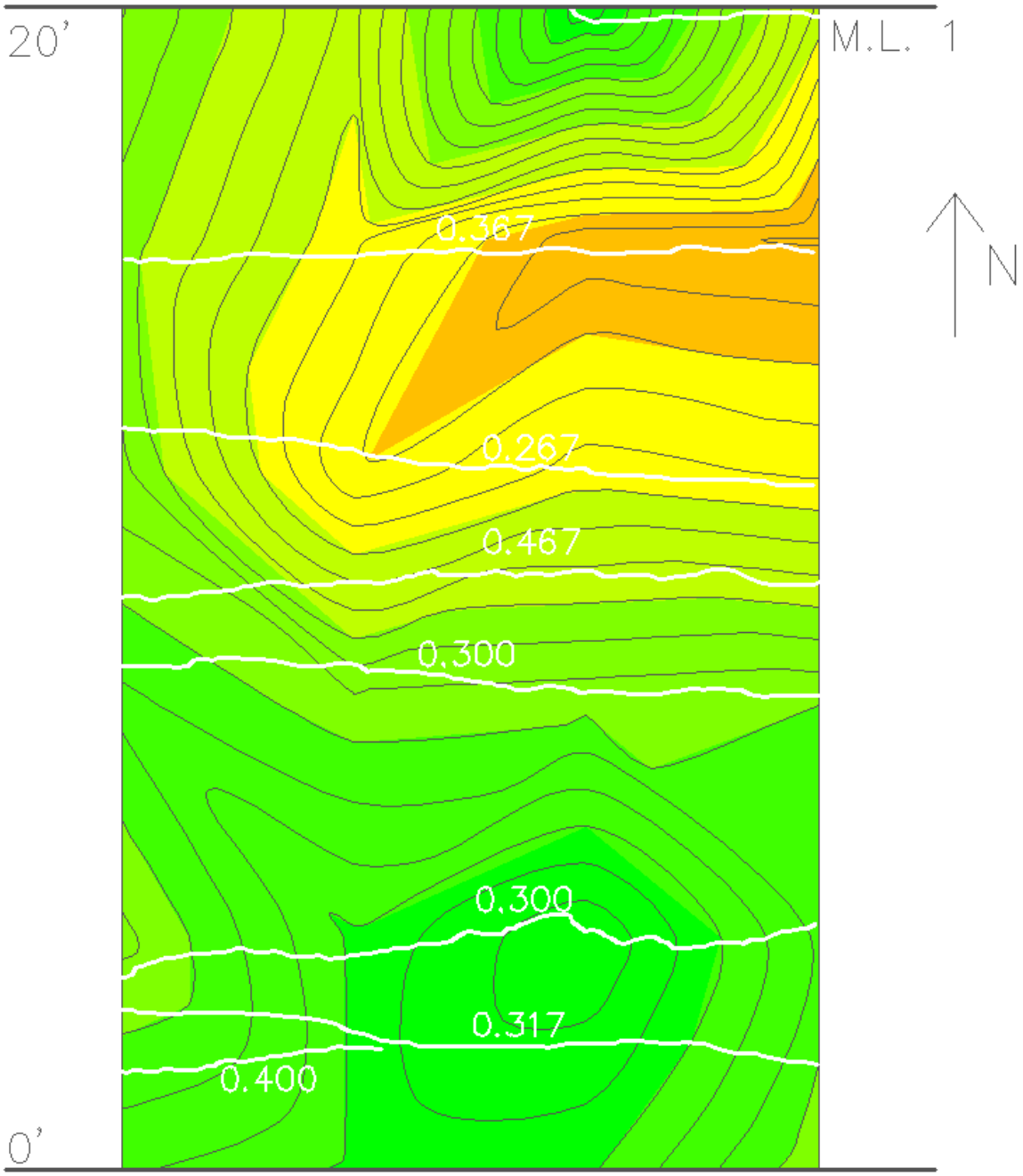

Figure B.21: MRM 68 spring 2011 from 0 to 20 feet

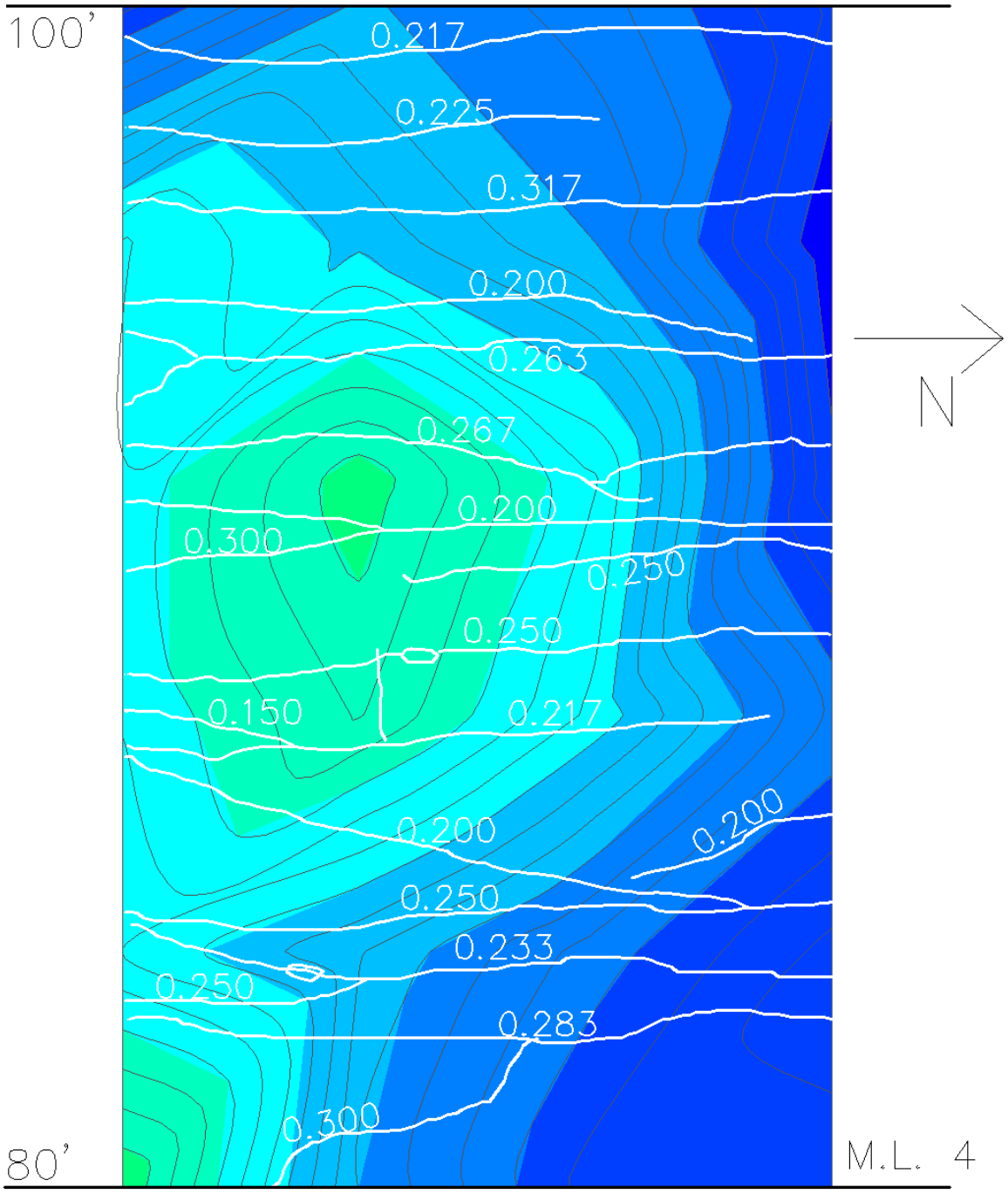

Figure B.22: MRM 411 fall 2010 from 80 to 100 feet

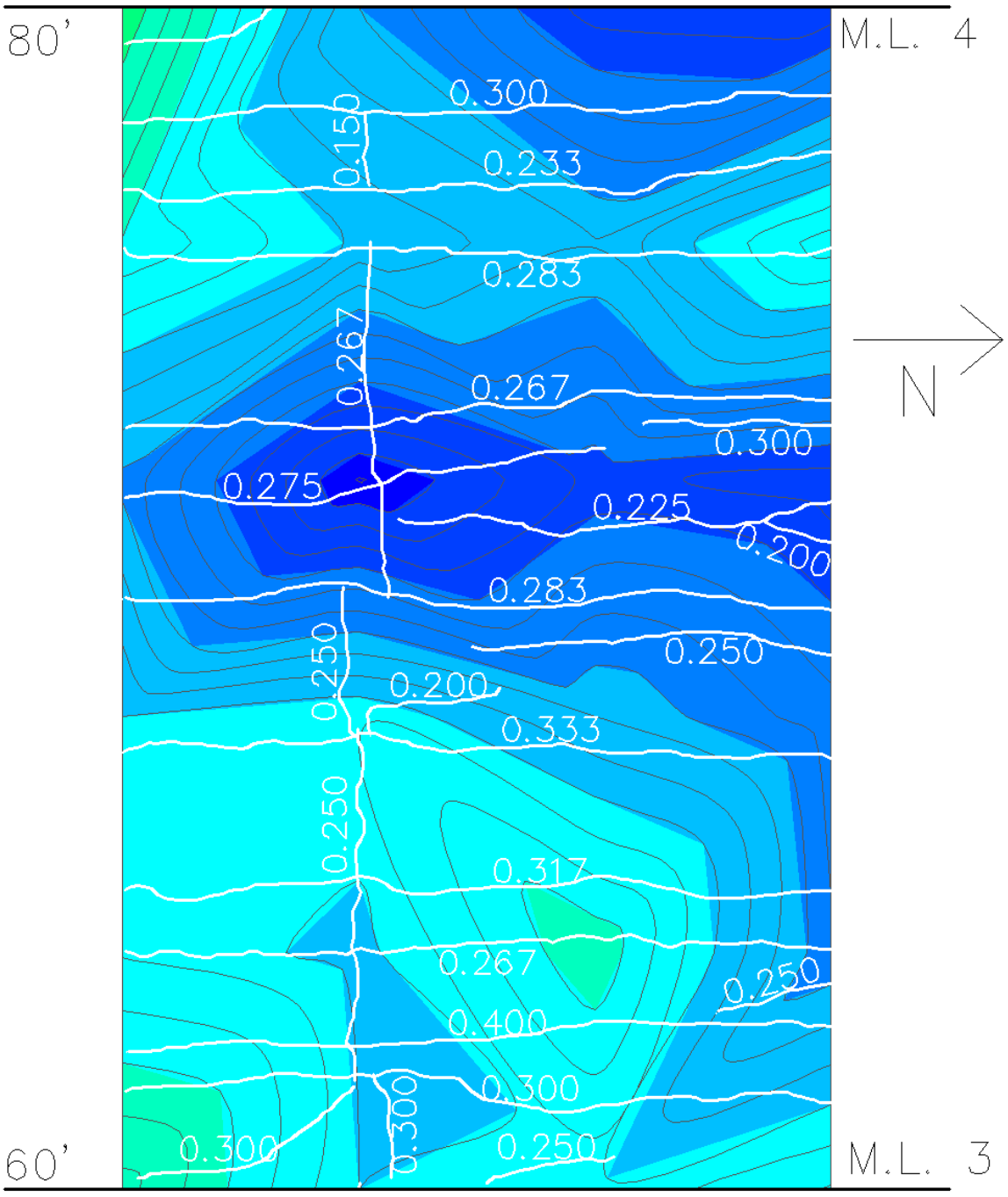

Figure B.23: MRM 411 fall 2010 from 60 to 80 feet

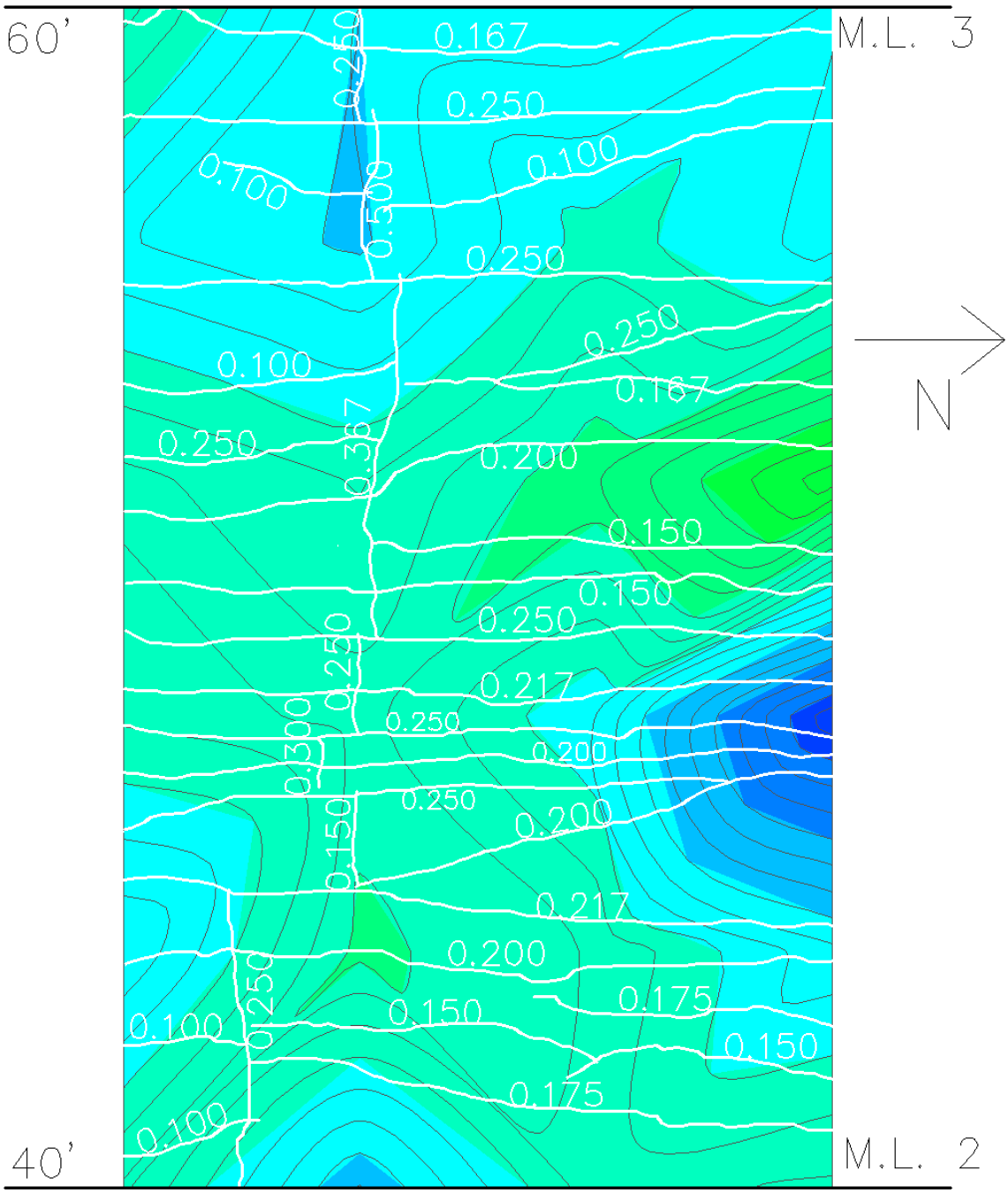

Figure B.24: MRM 411 fall 2010 from 40 to 60 feet

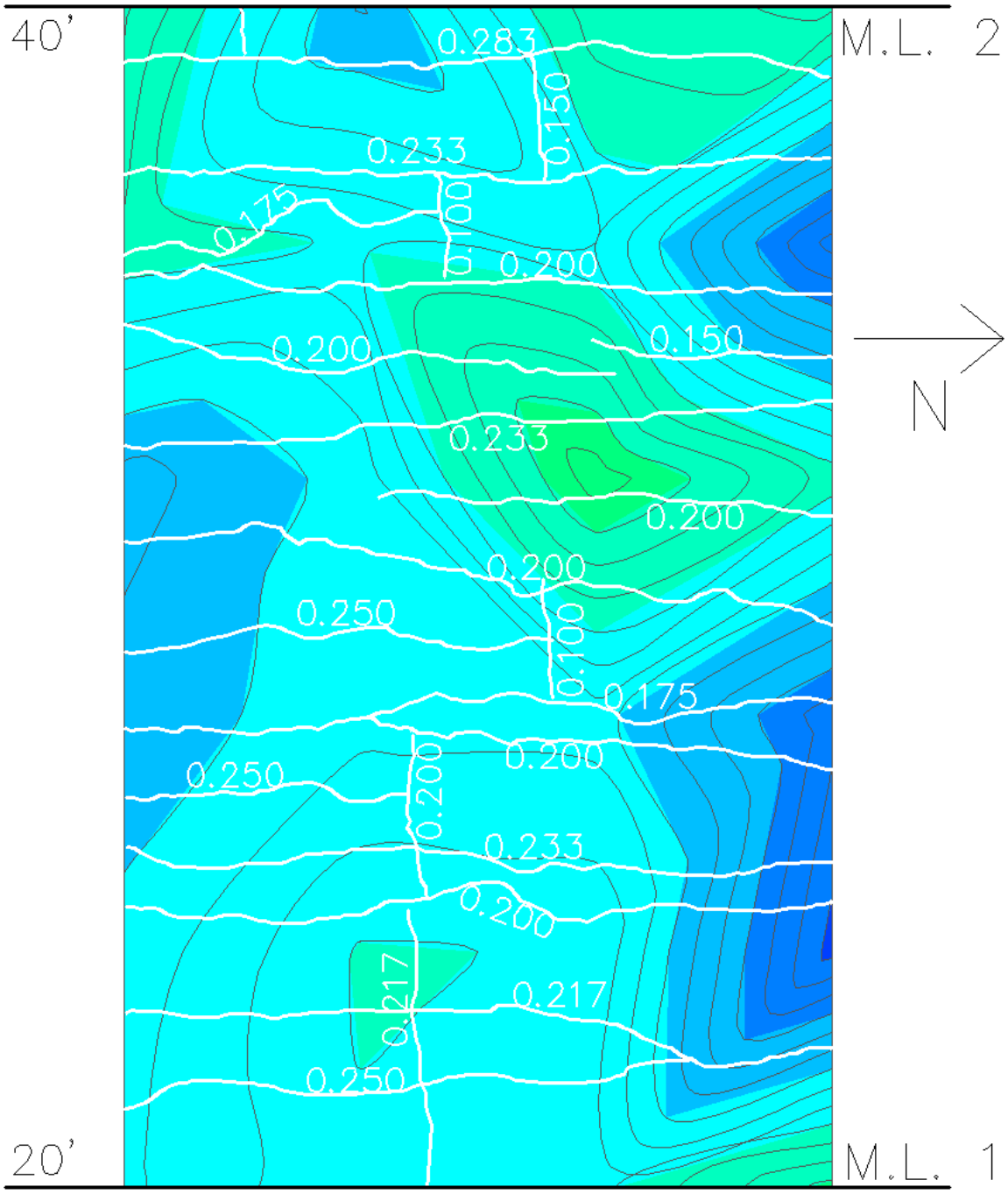

Figure B.25: MRM 411 fall 2010 from 20 to 40 feet

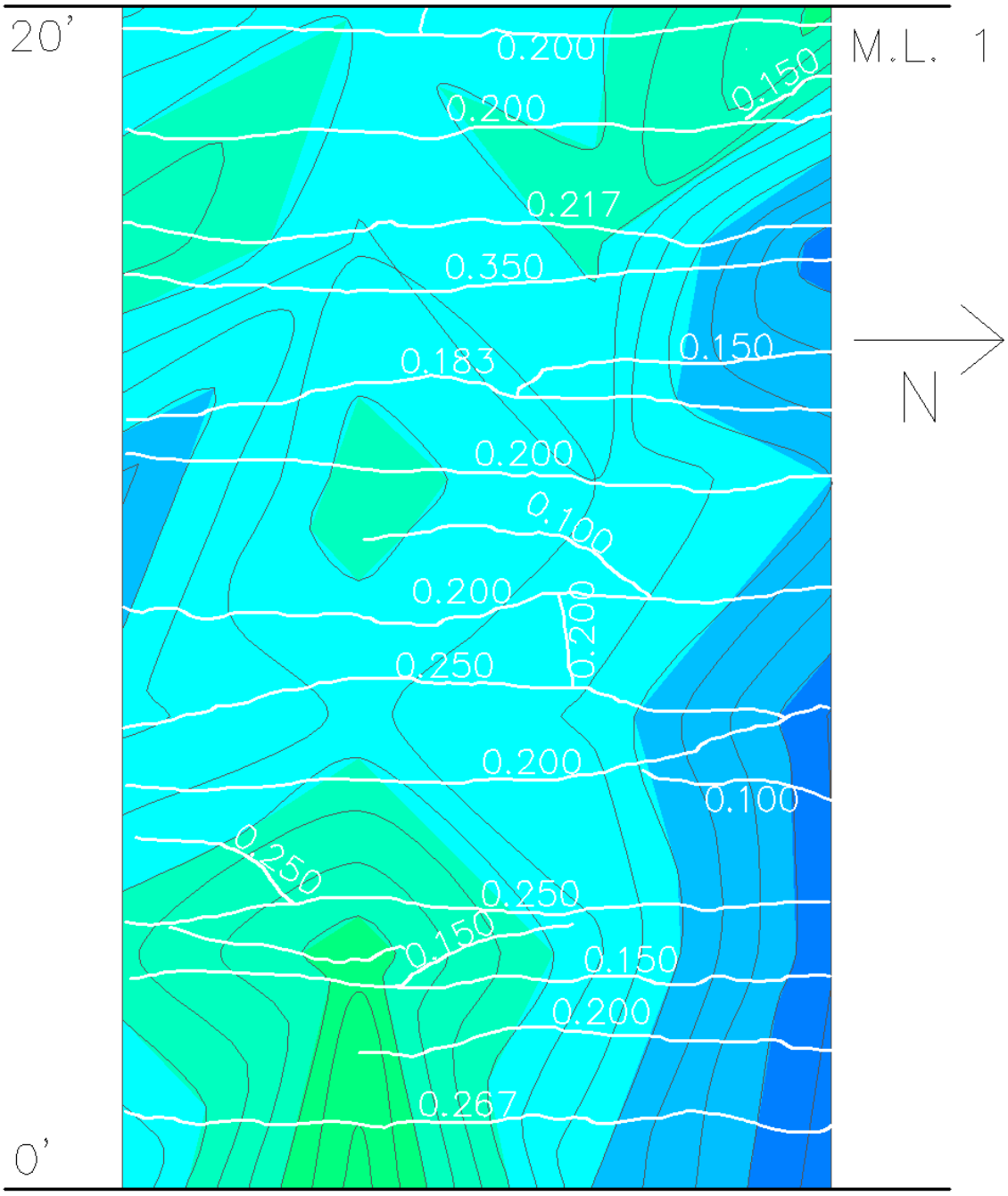

Figure B.26: MRM 411 fall 2010 from 0 to 20 feet

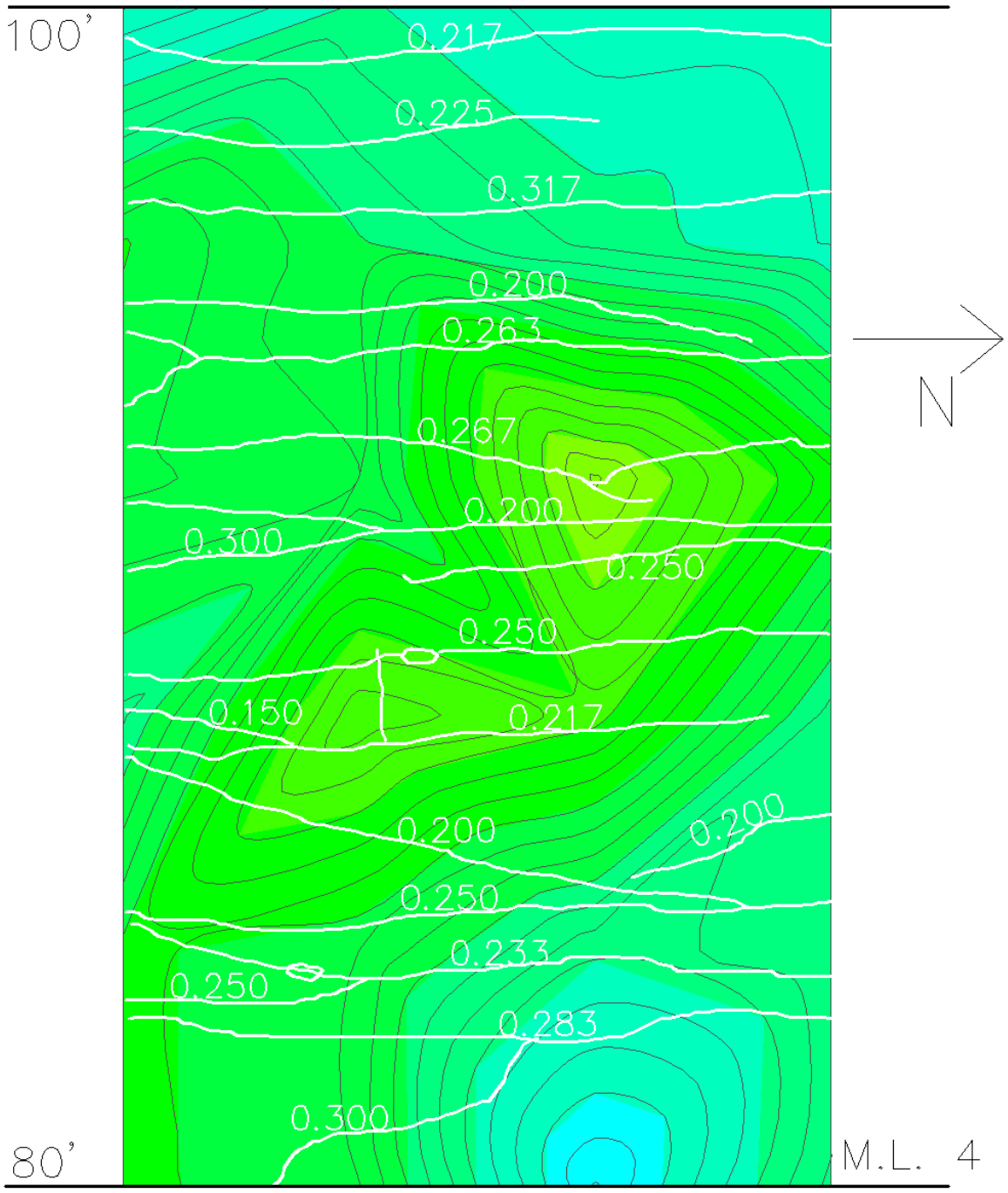

Figure B.27: MRM 411 spring 2011 from 80 to 100 feet

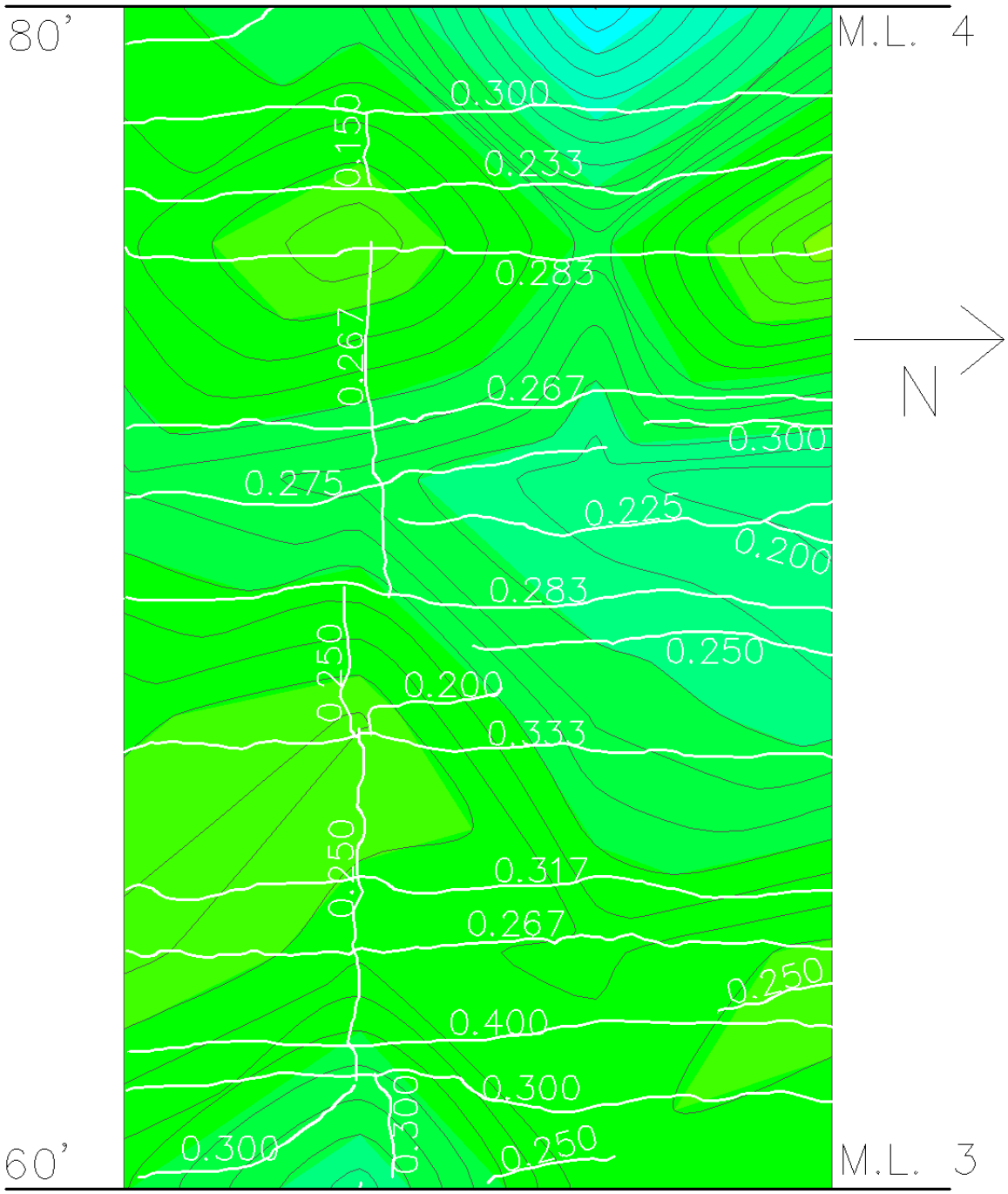

Figure B.28: MRM 411 spring 2011 from 60 to 80 feet

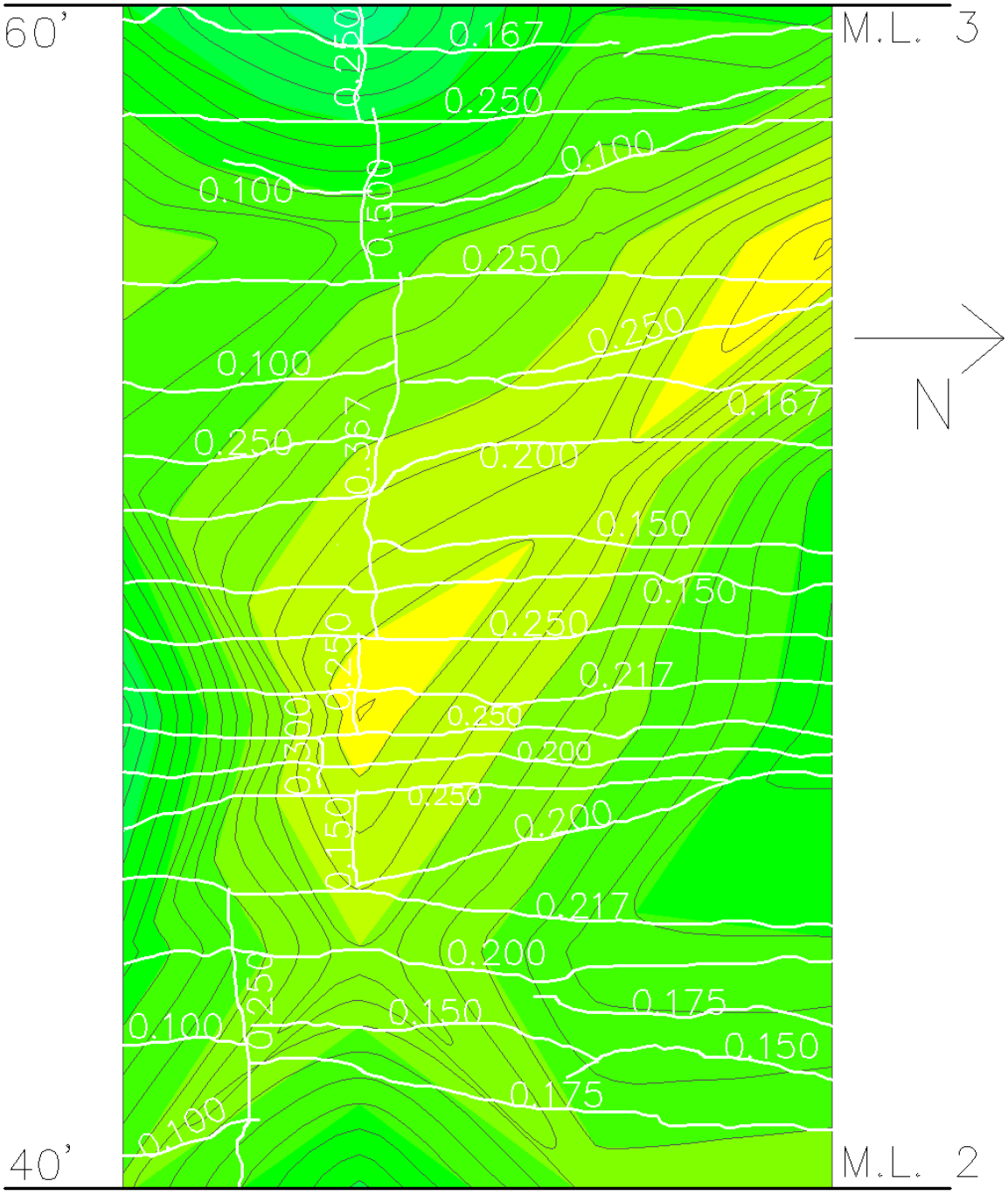

Figure B.29: MRM 411 spring 2011 from 40 to 60 feet

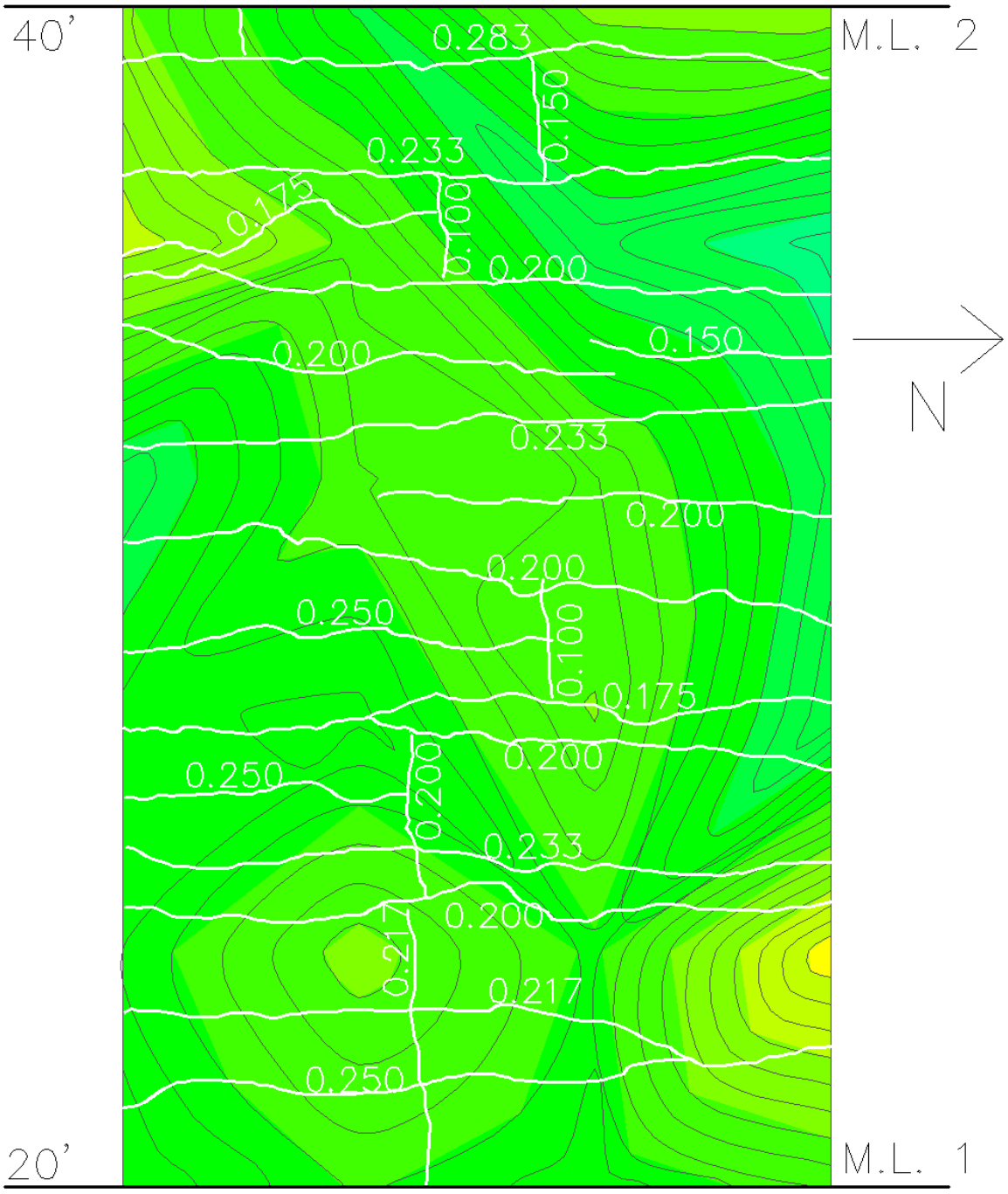

Figure B.30: MRM 411 spring 2011 from 20 to 40 feet

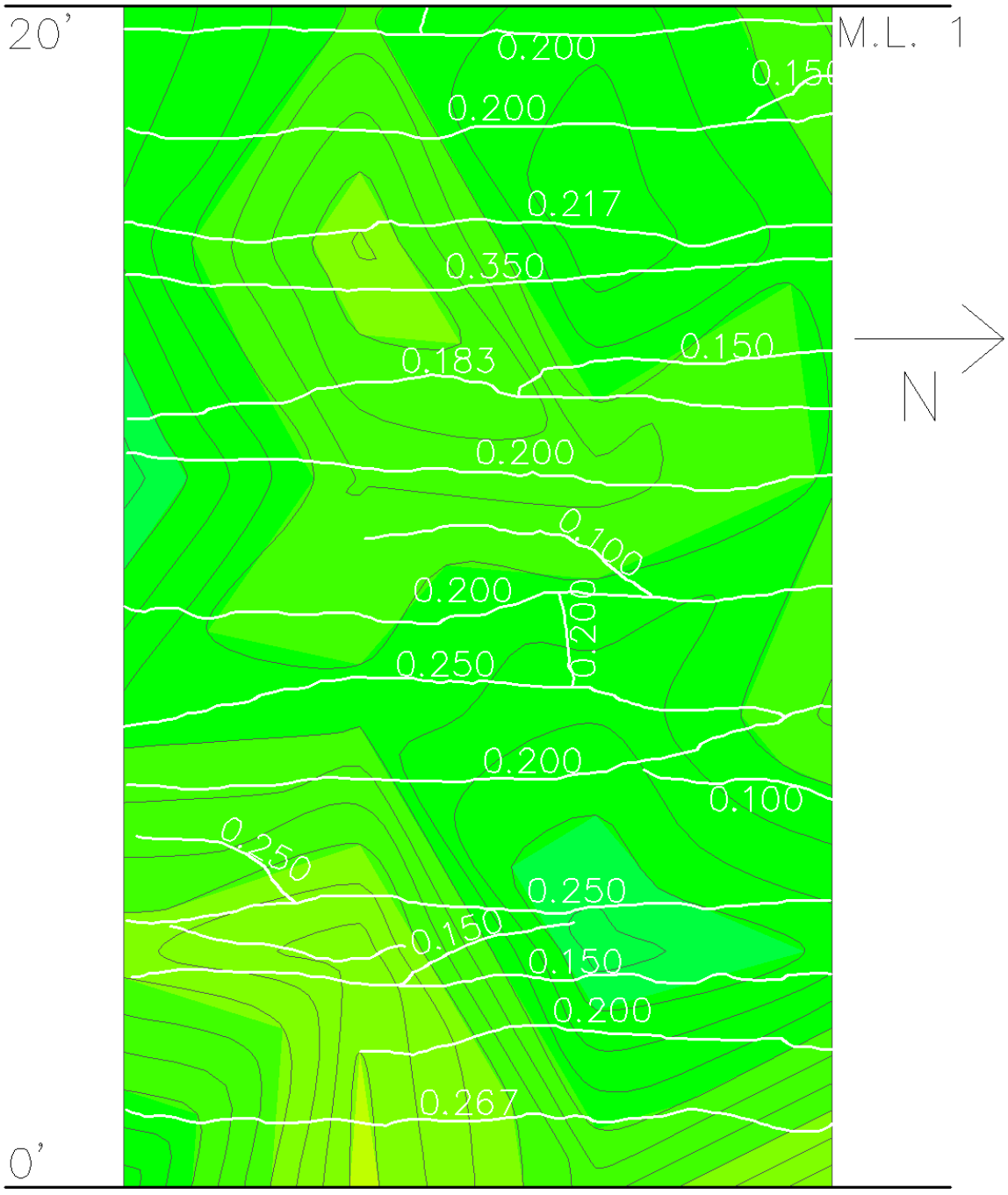

Figure B.31: MRM 411 spring 2011 from 0 to 20 feet

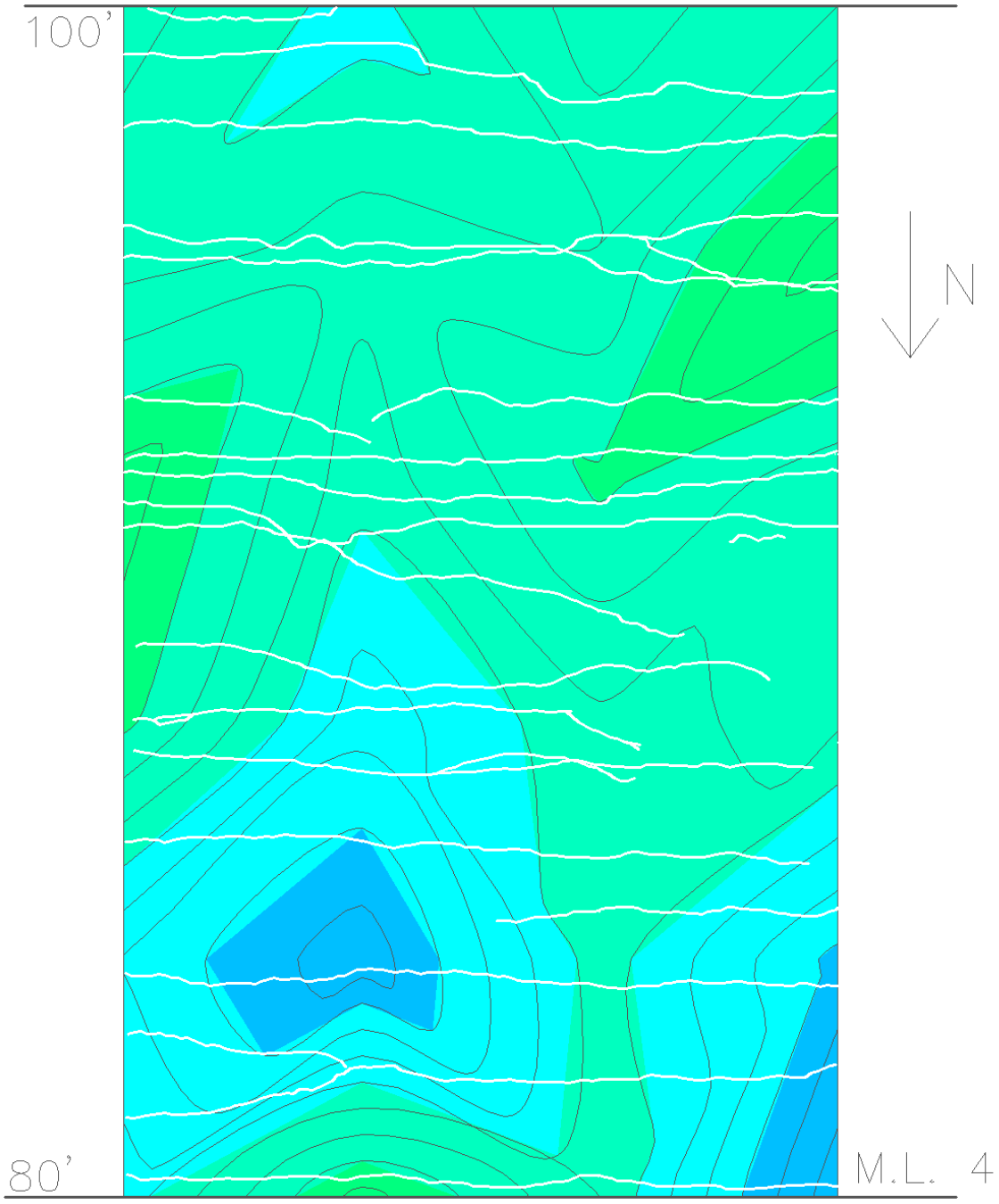

Figure B.32: MRM 33 from 80 to 100 feet

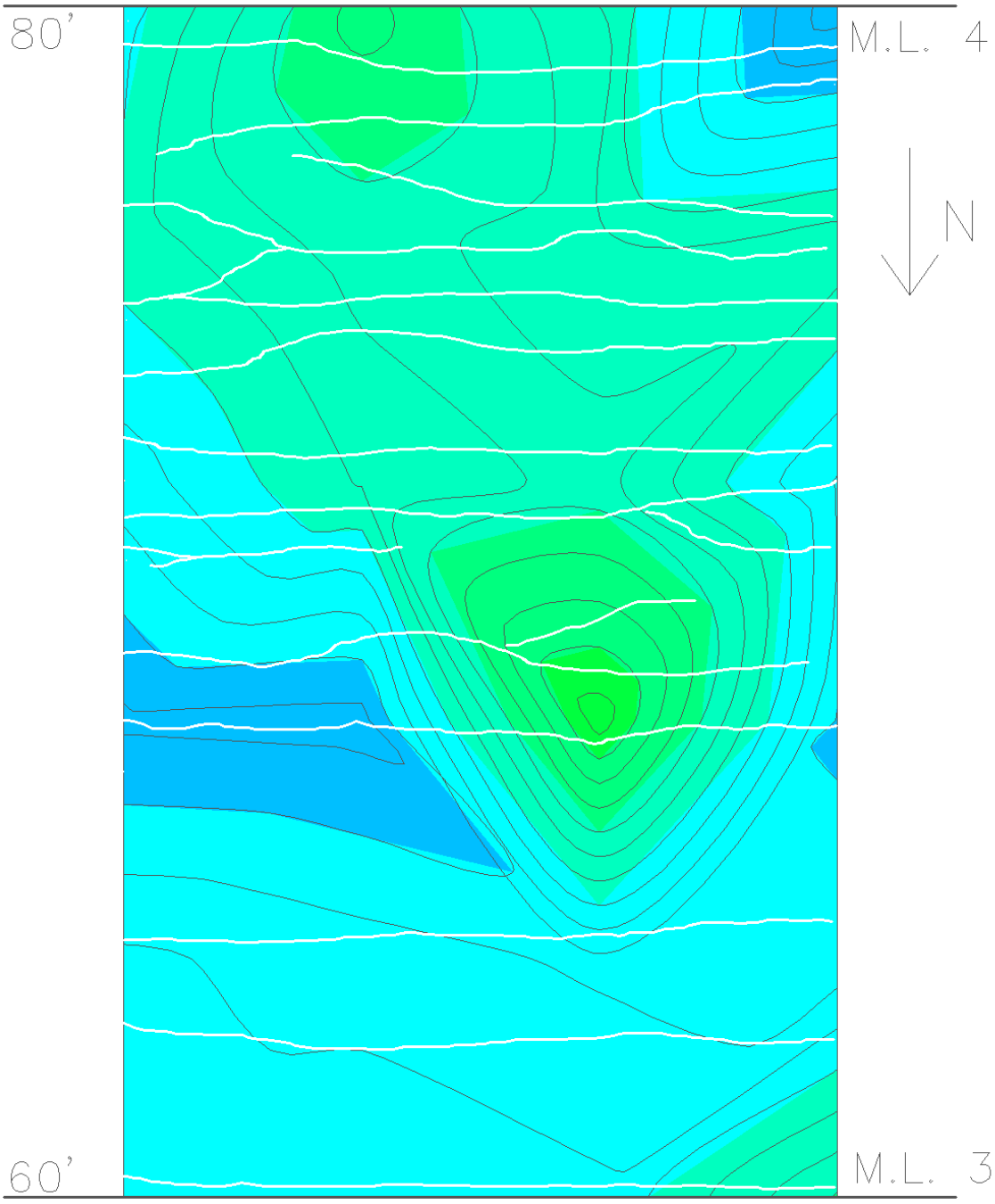

Figure B.33: MRM 33 from 60 to 80 feet

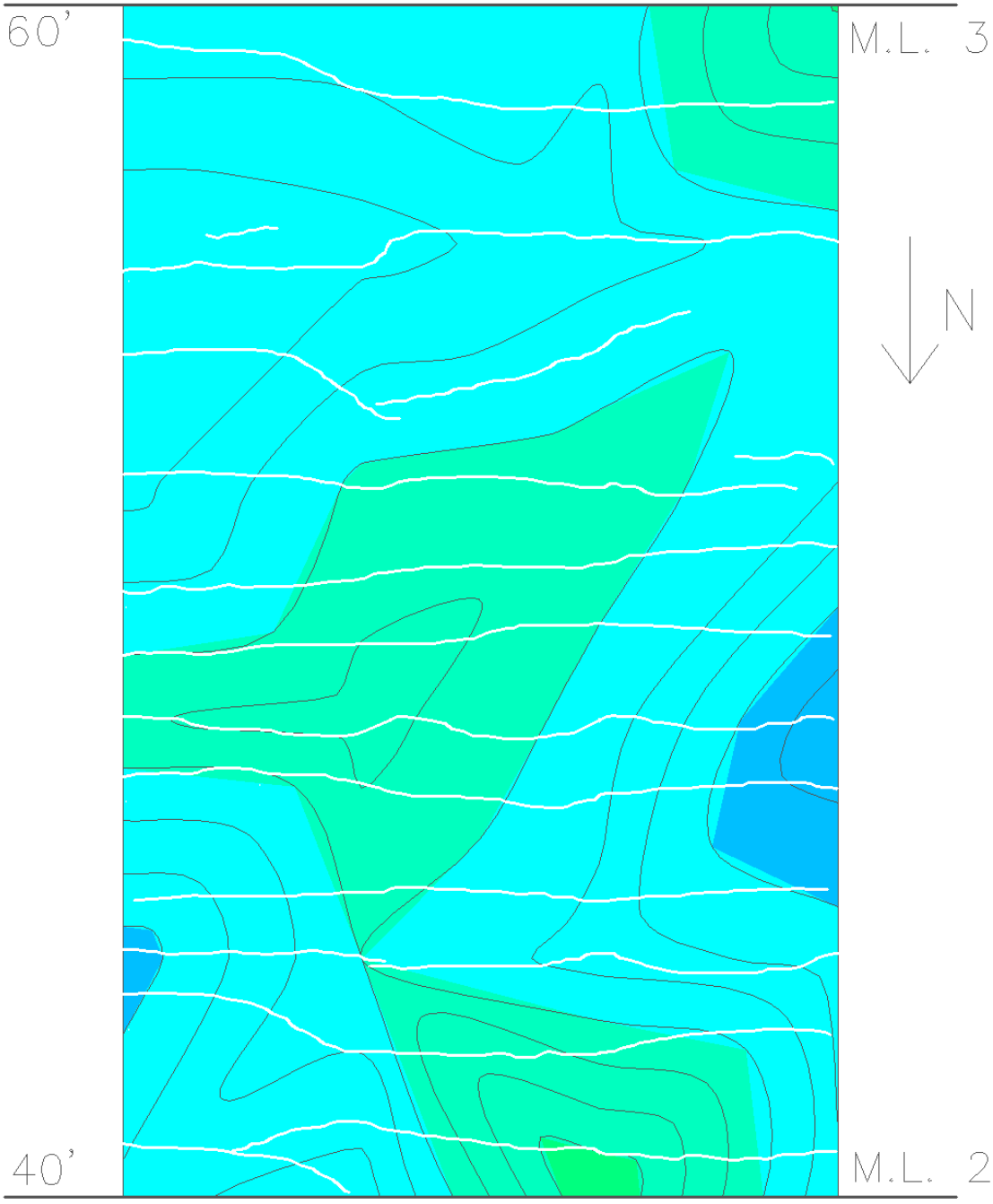

Figure B.34: MRM 33 from 40 to 60 feet

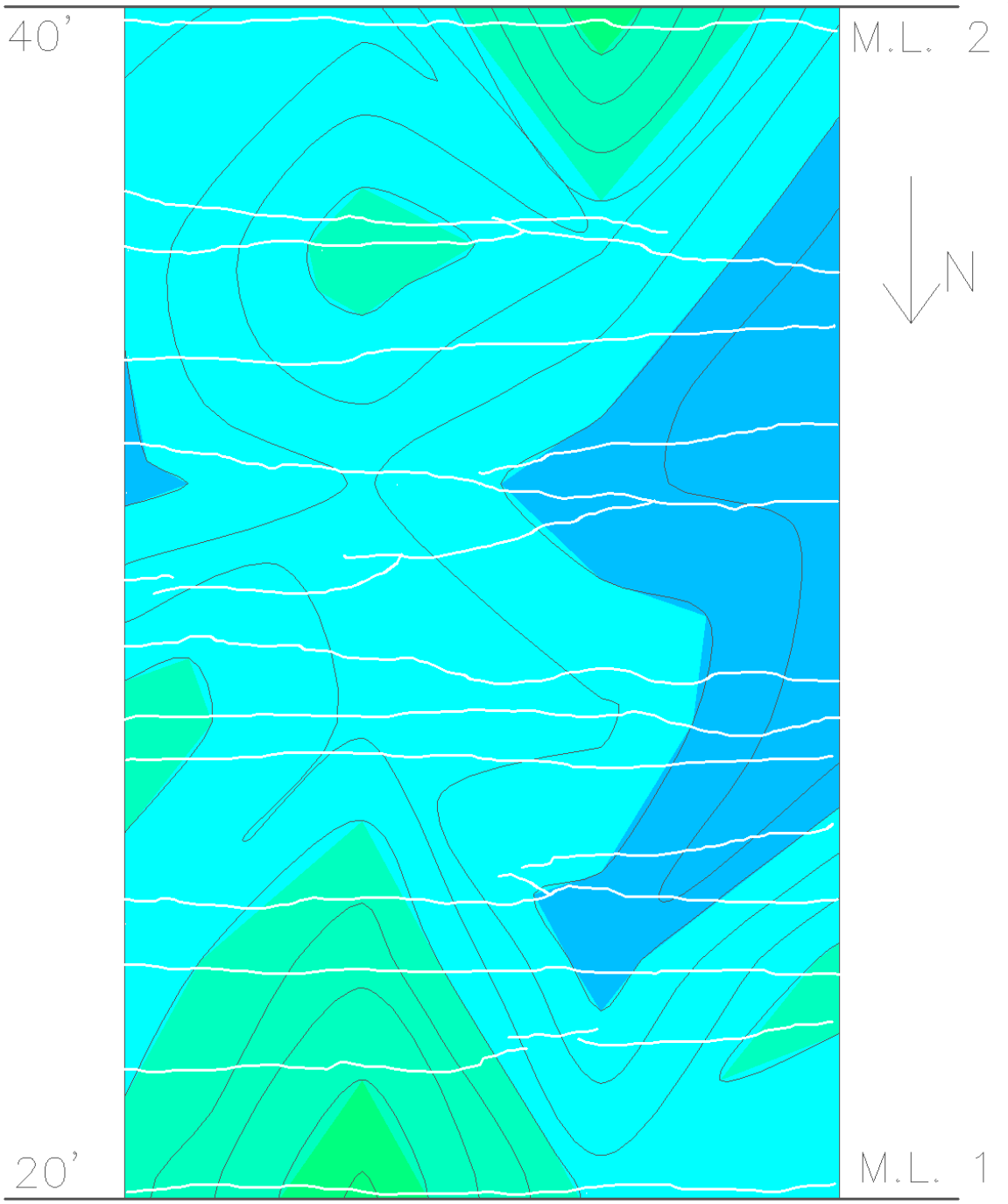

Figure B.35: MRM 33 from 20 to 40 feet

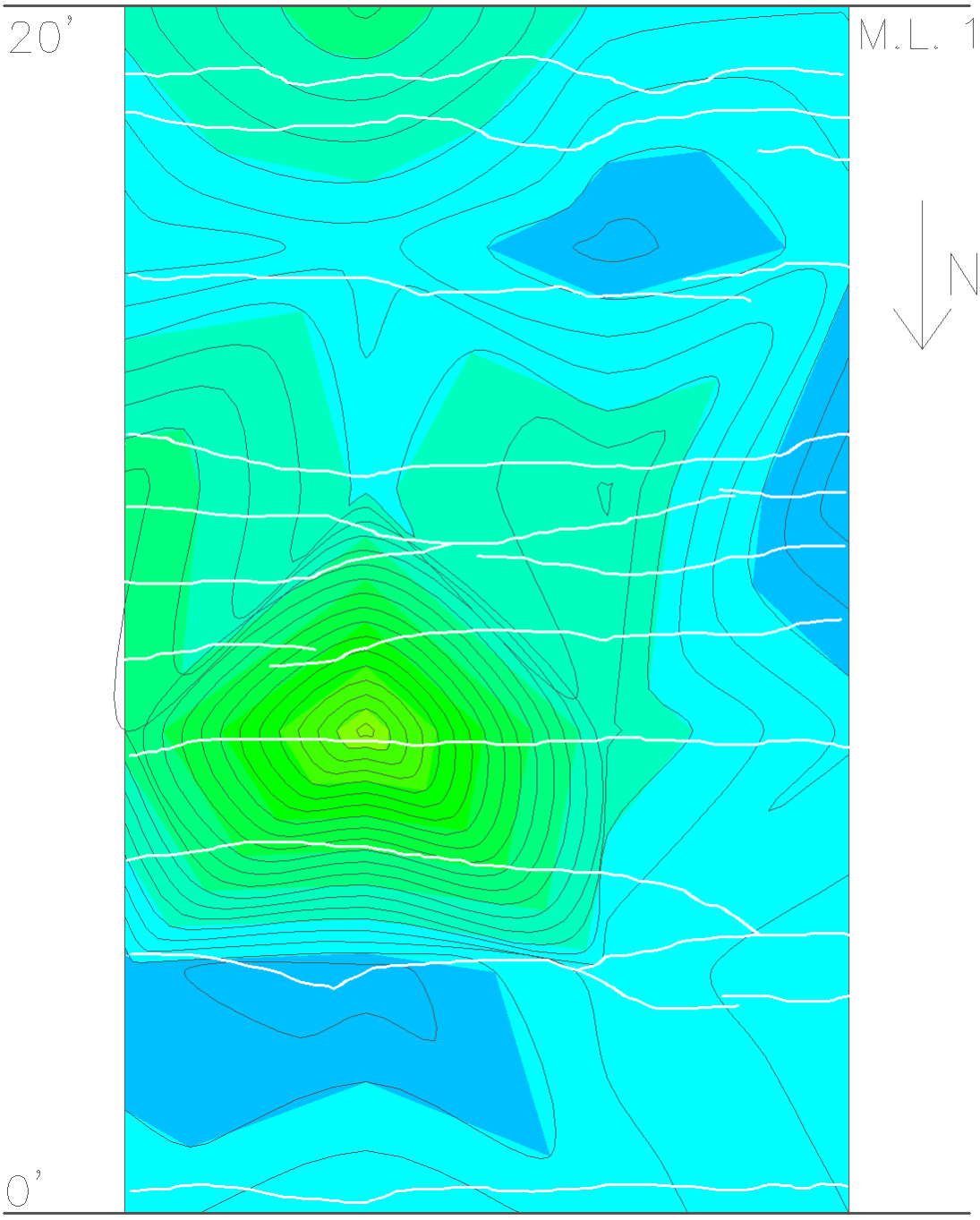

Figure B.36: MRM 33 from 0 to 20 feet

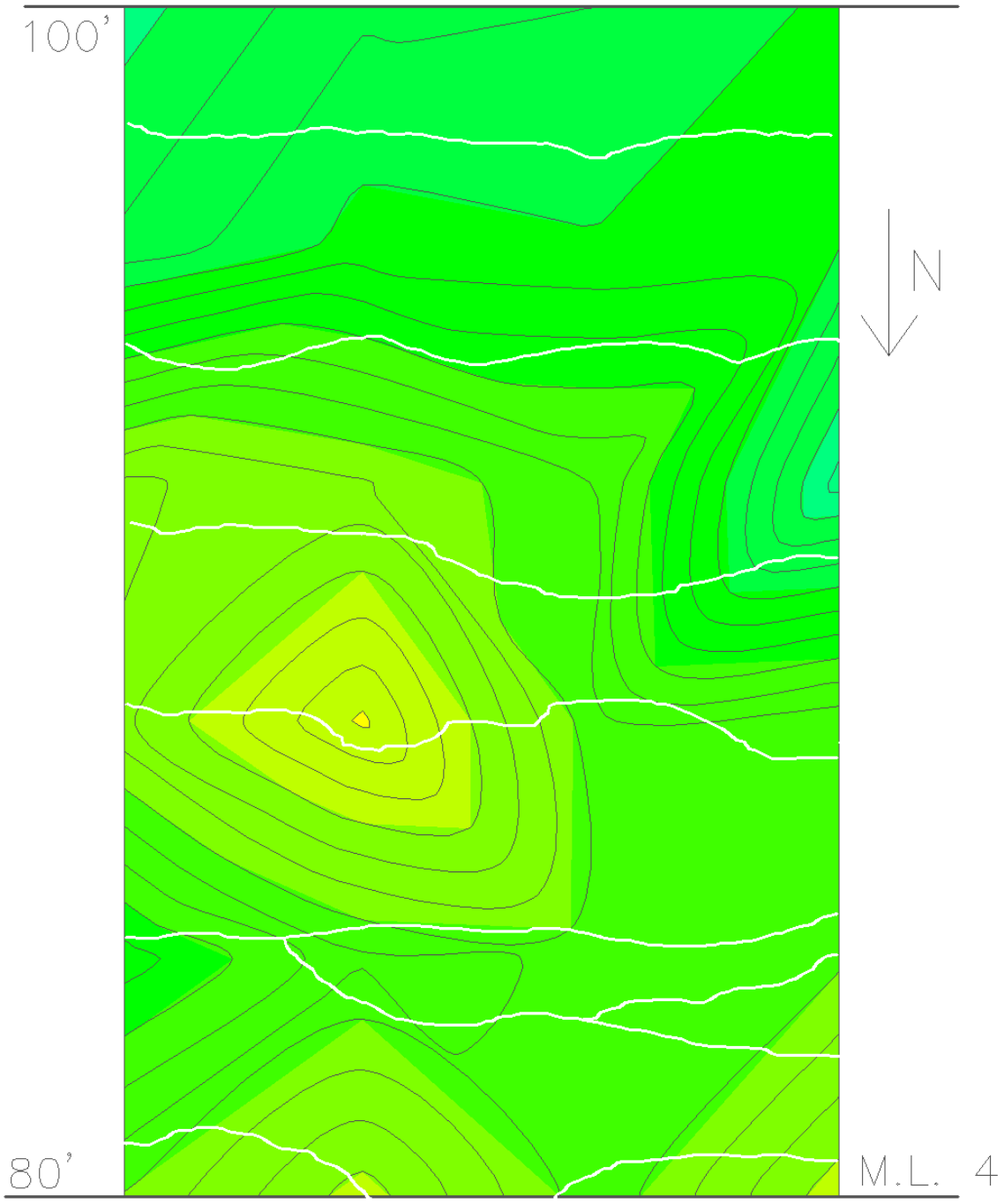

Figure B.37: MRM 44 from 80 to 100 feet

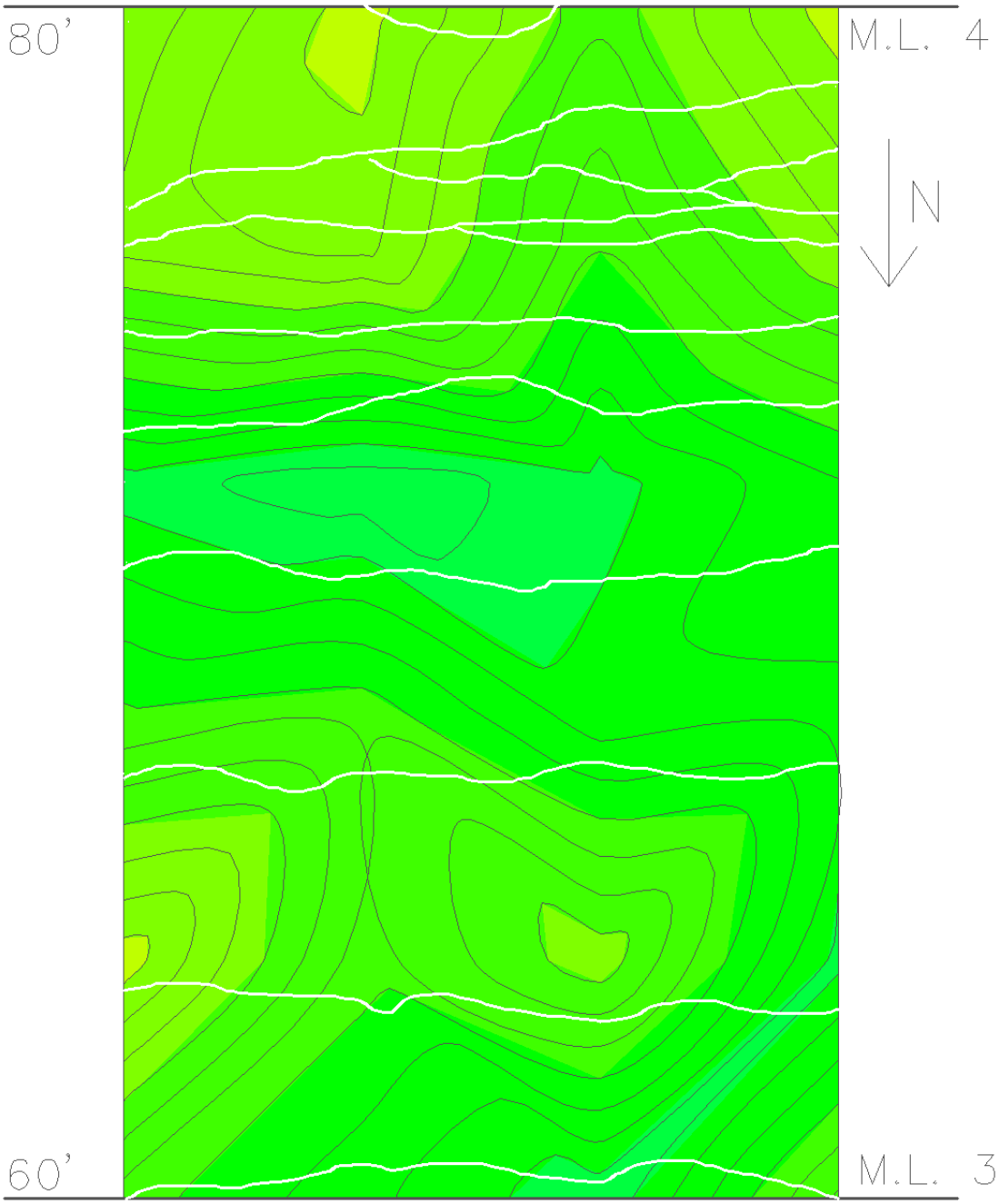

Figure B.38: MRM 44 from 60 to 80 feet

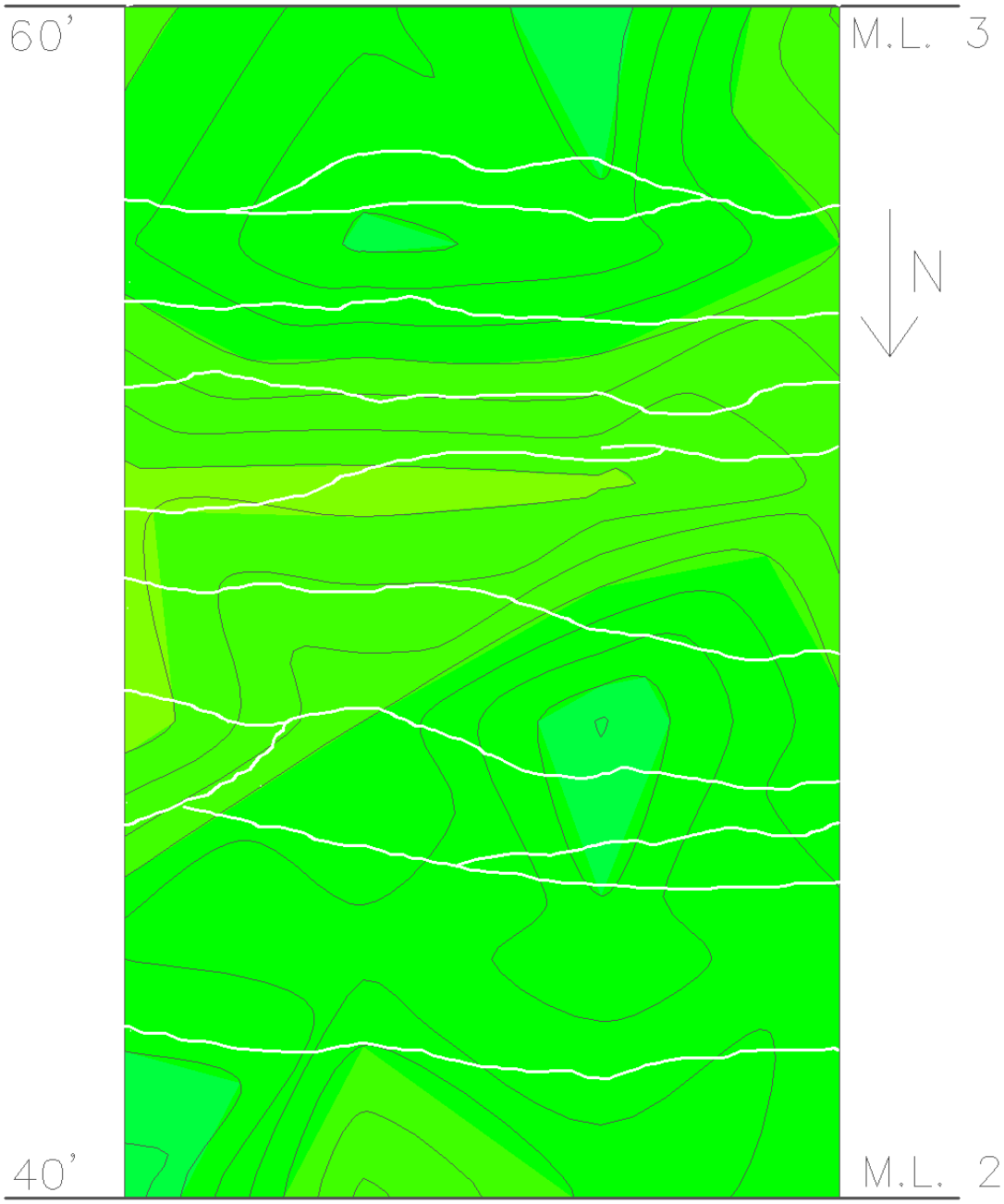

Figure B.39: MRM 44 from 40 to 60 feet

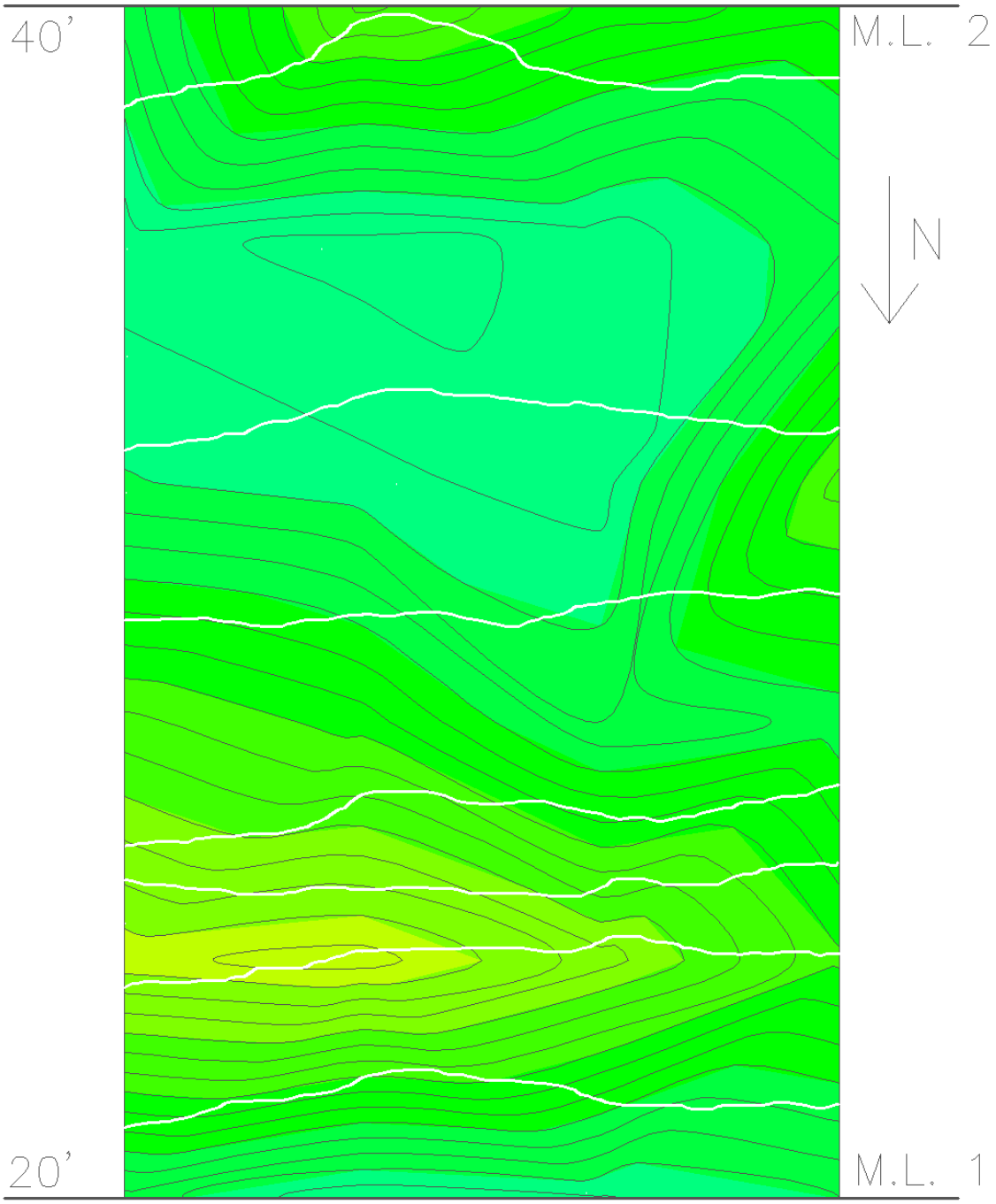

Figure B.40: MRM 44 from 20 to 40 feet

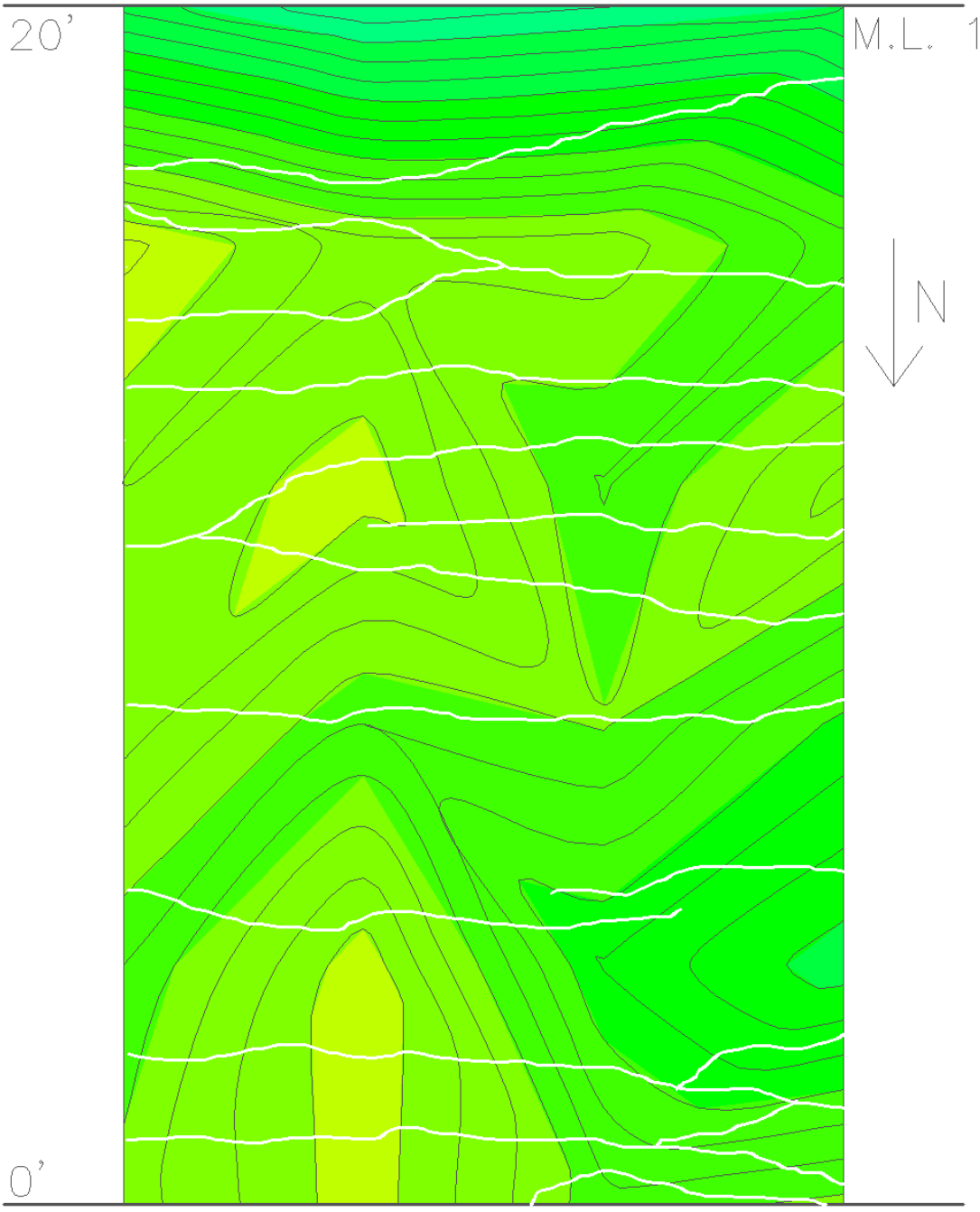

Figure B.41: MRM 44 from 0 to 20 feet

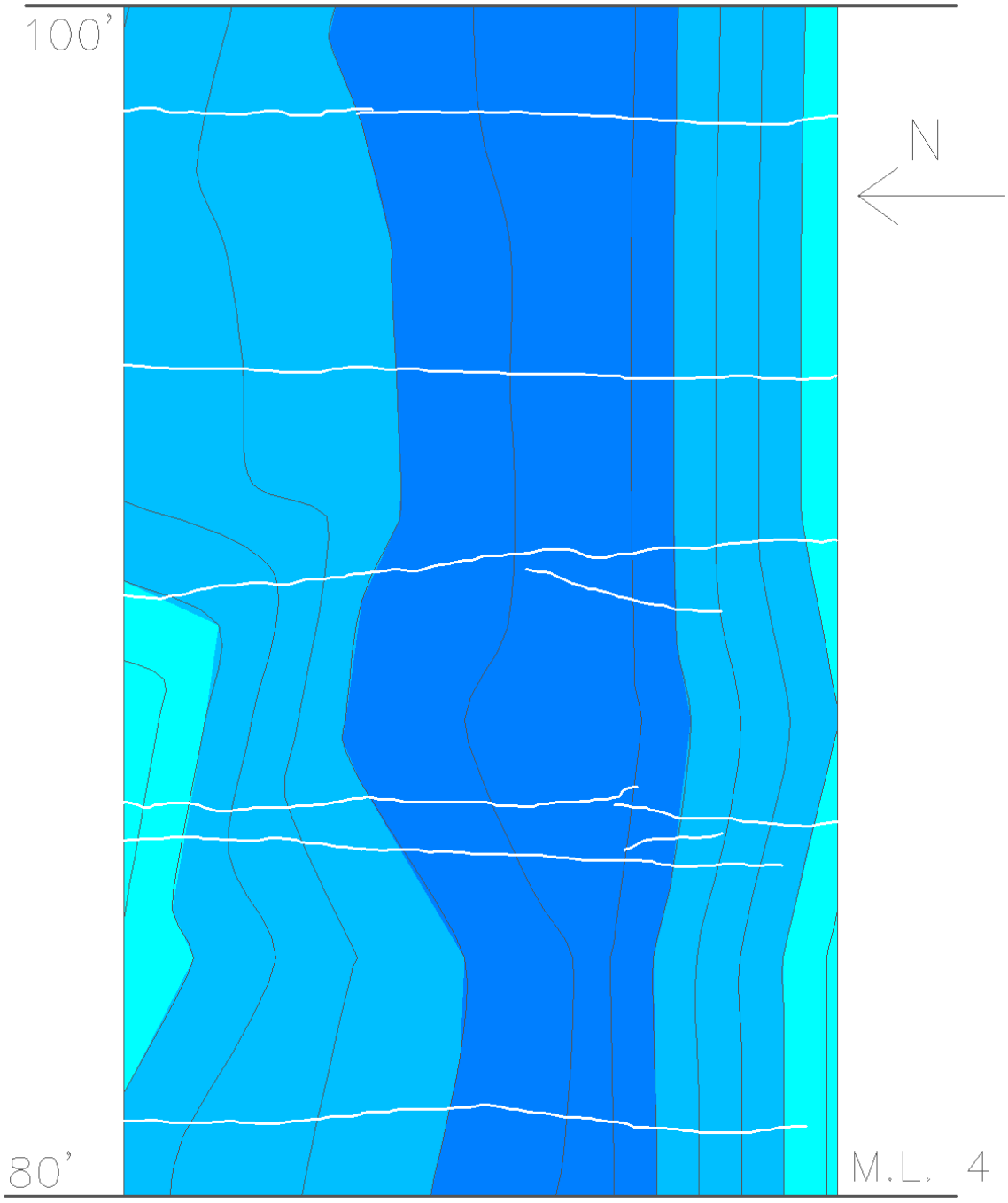

Figure B.42: MRM 25 from 80 to 100 feet

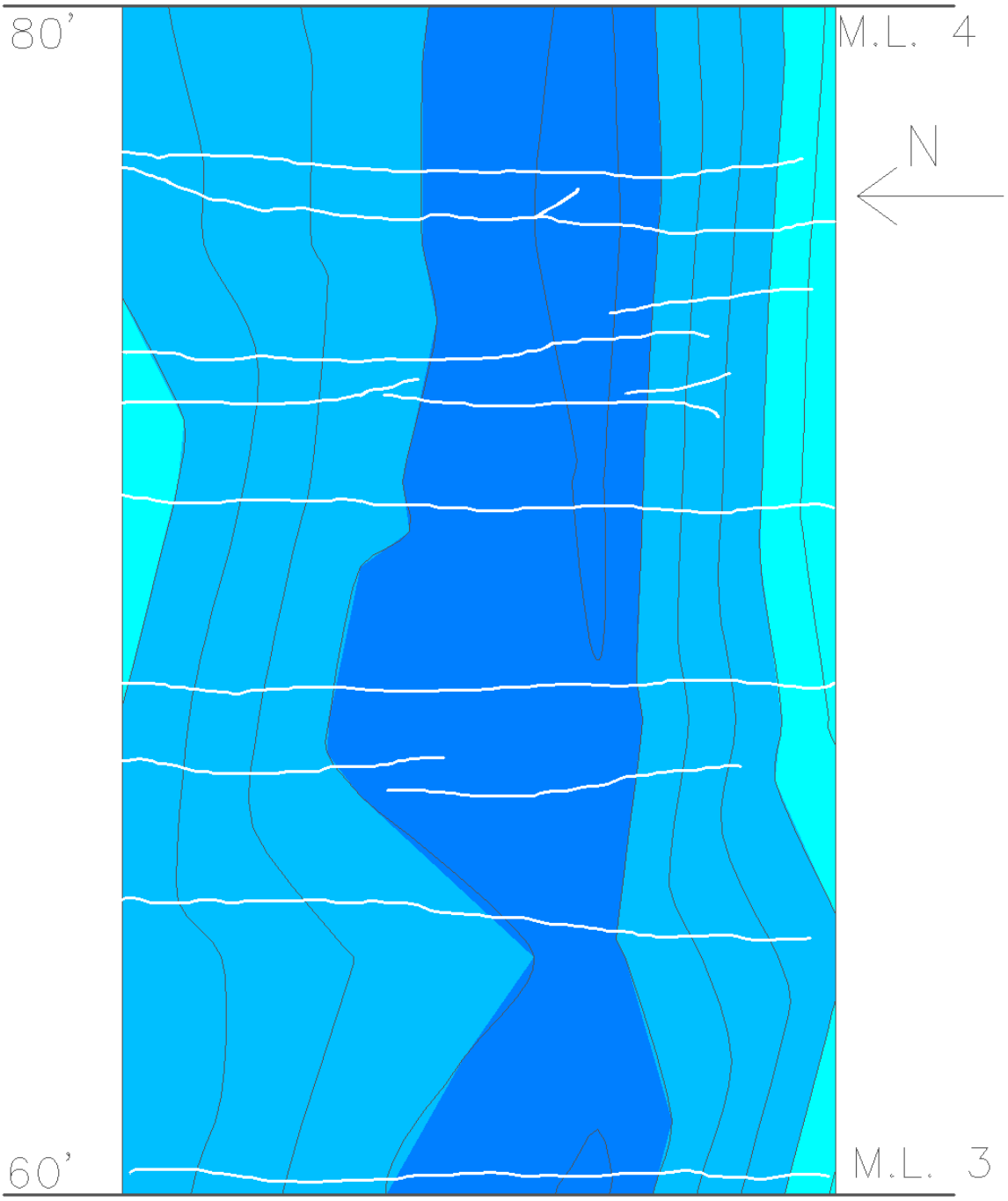

Figure B.43: MRM 25 from 60 to 80 feet

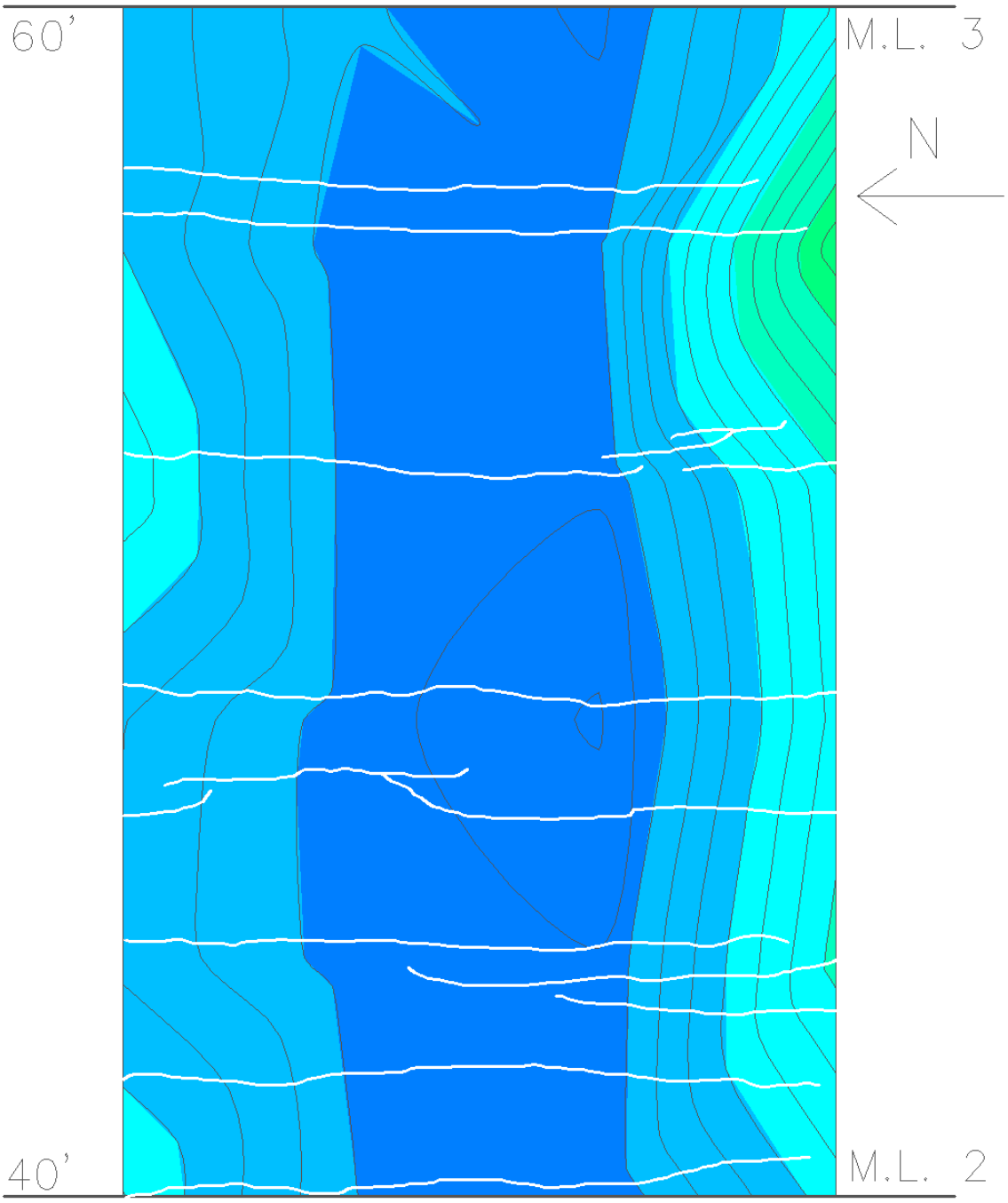

Figure B.44: MRM 25 from 40 to 60 feet

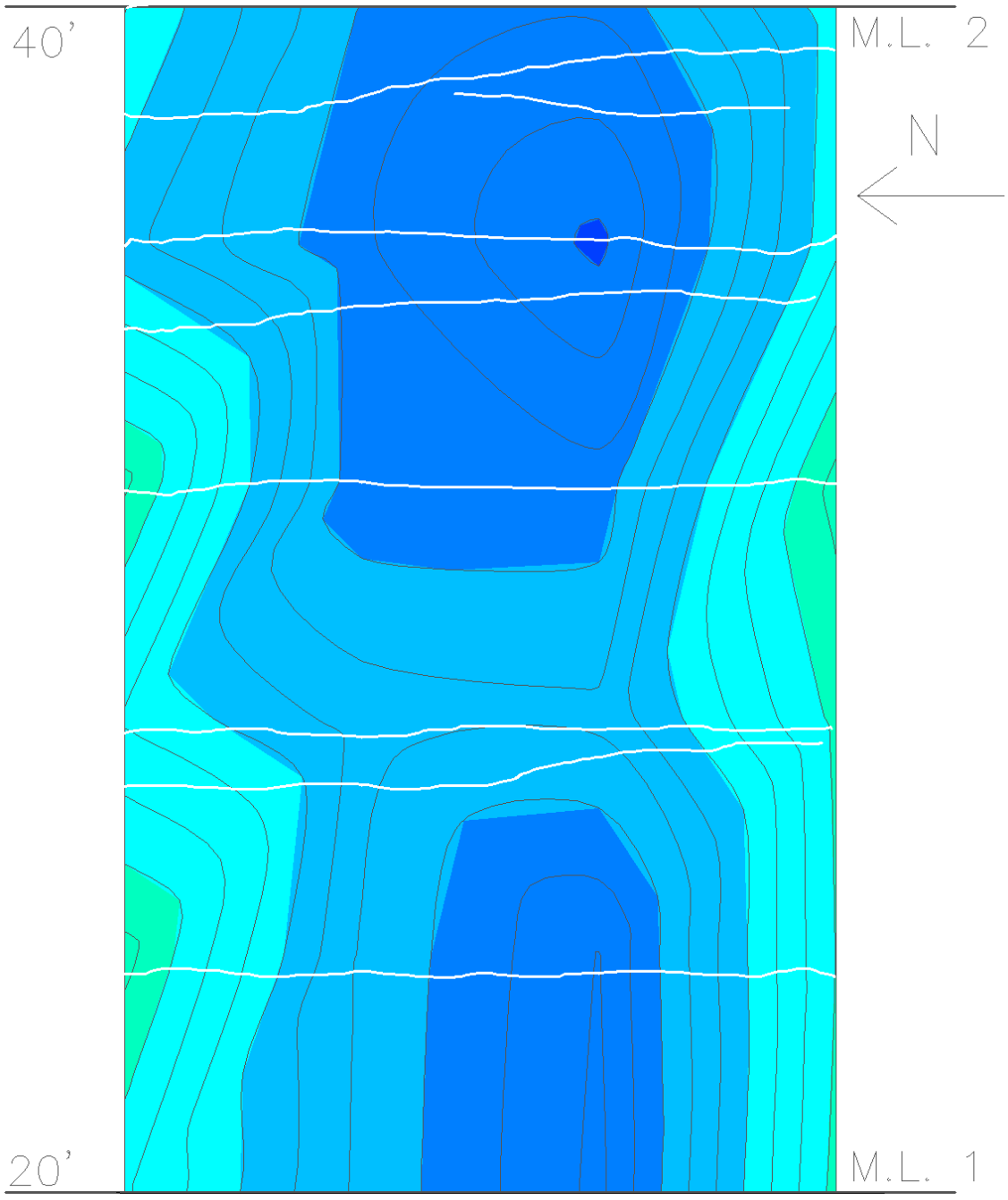

Figure B.45: MRM 25 from 20 to 40 feet

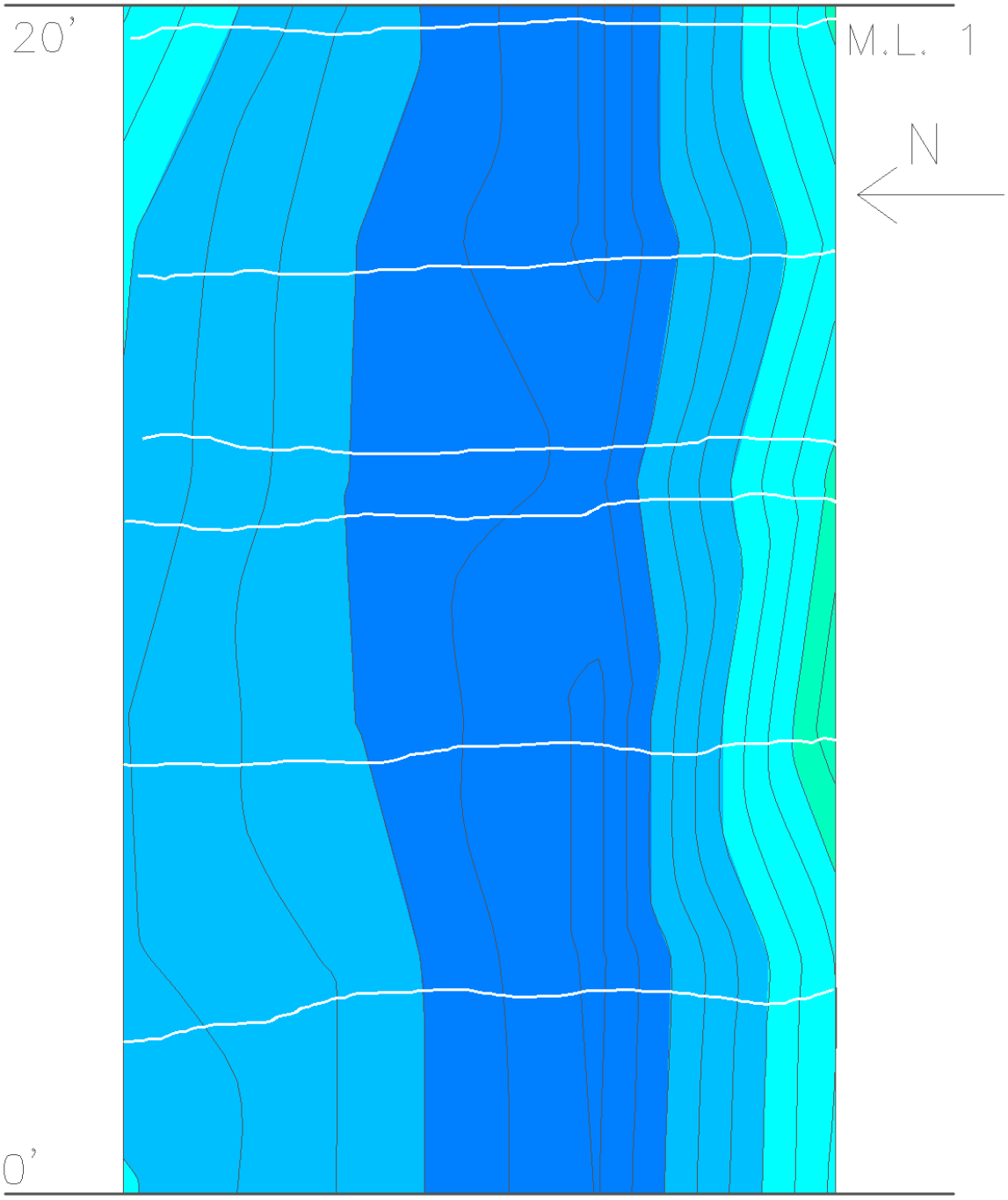

Figure B.46: MRM 25 from 0 to 20 feet

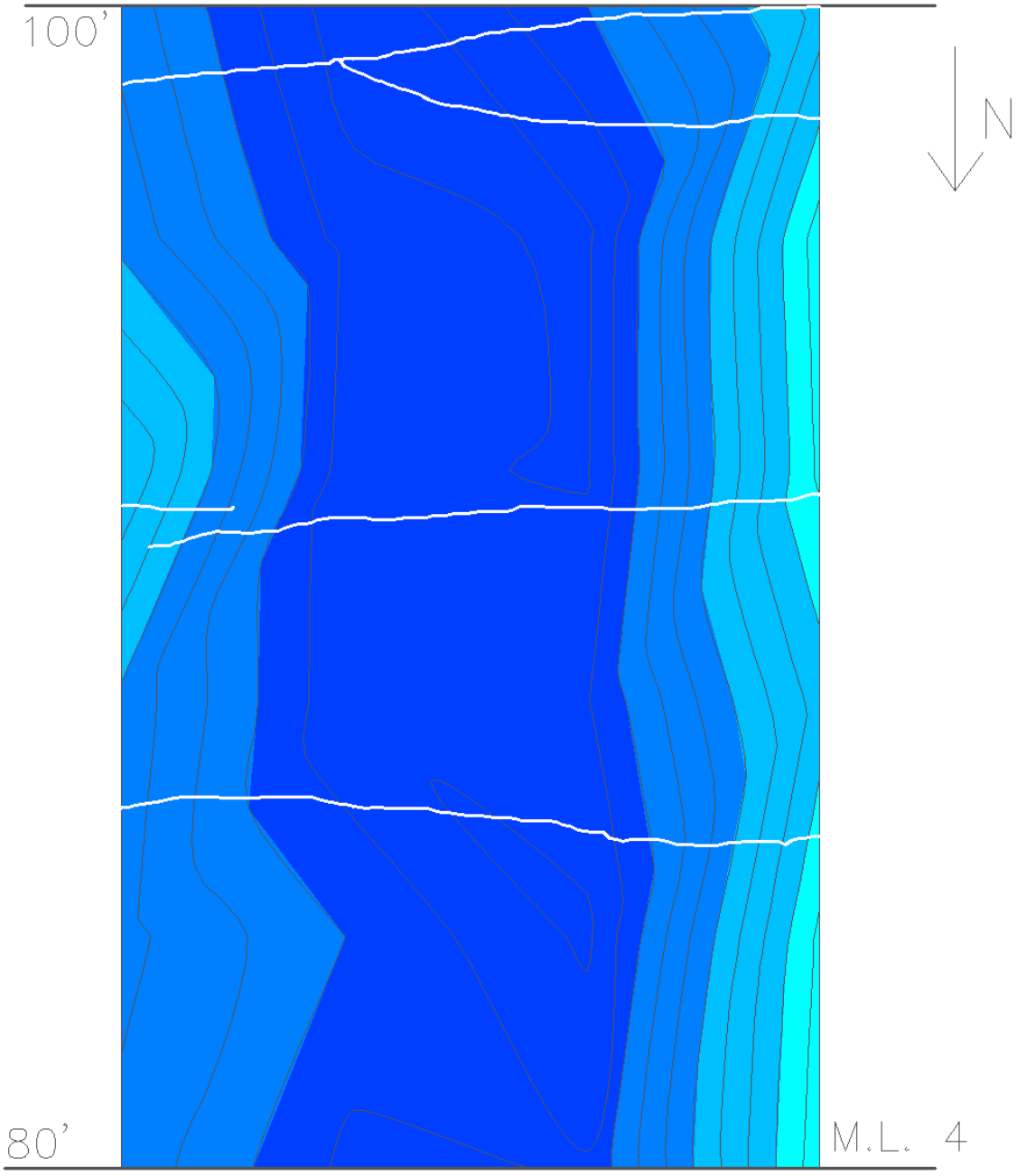

Figure B.47: MRM 54 from 80 to 100 feet

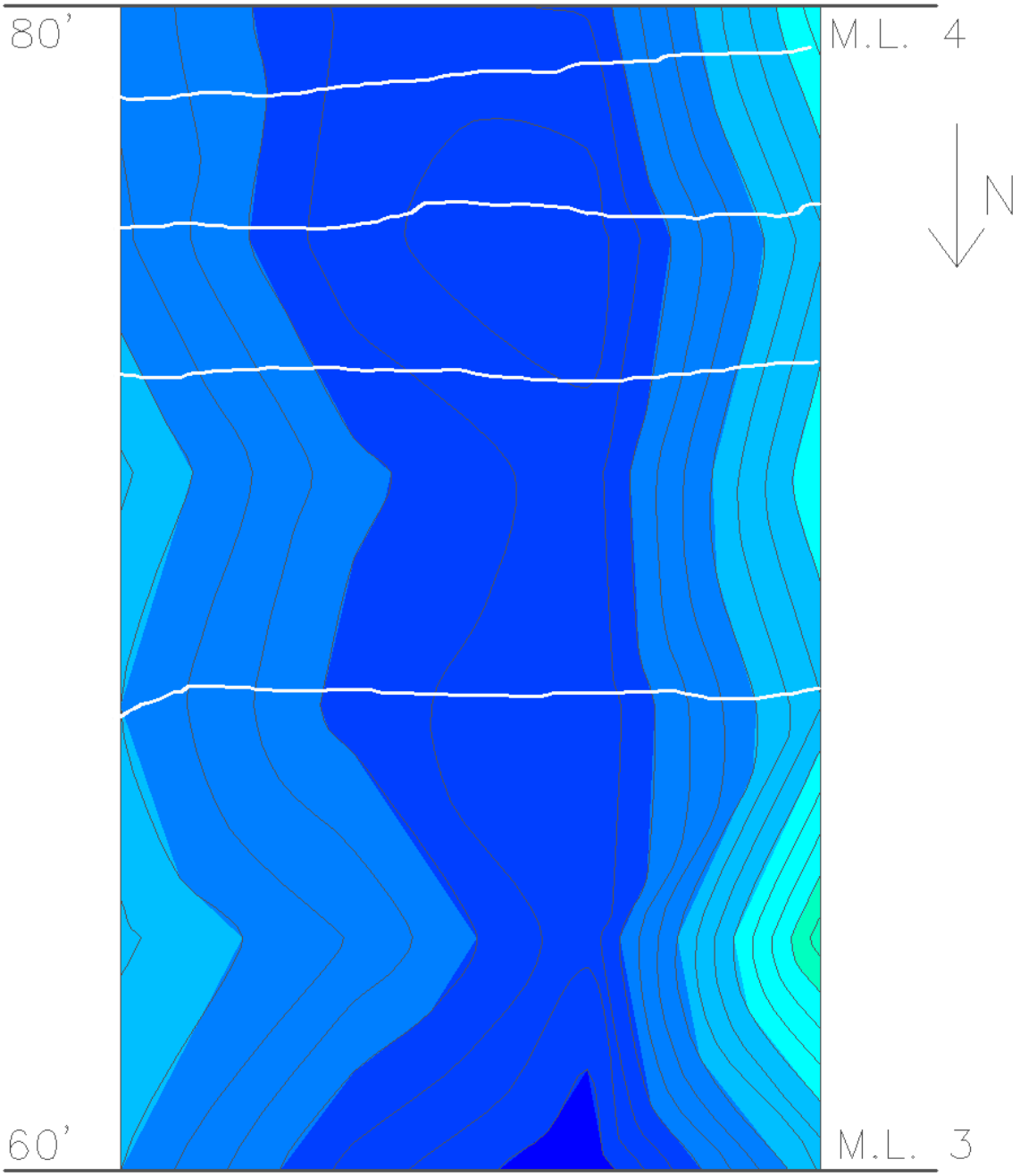

Figure B.48: MRM 54 from 60 to 80 feet

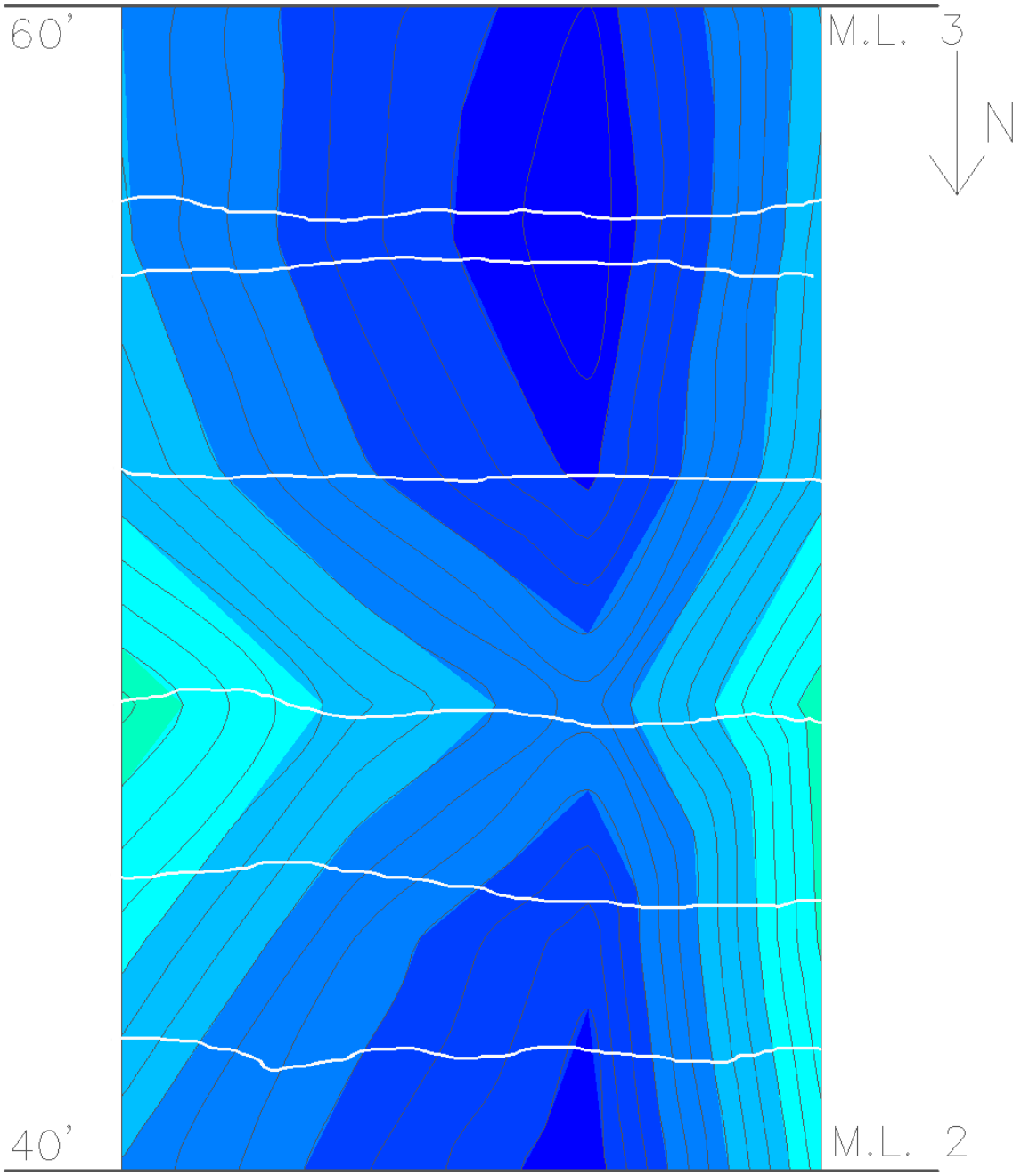

Figure B.49: MRM 54 from 40 for 60 feet

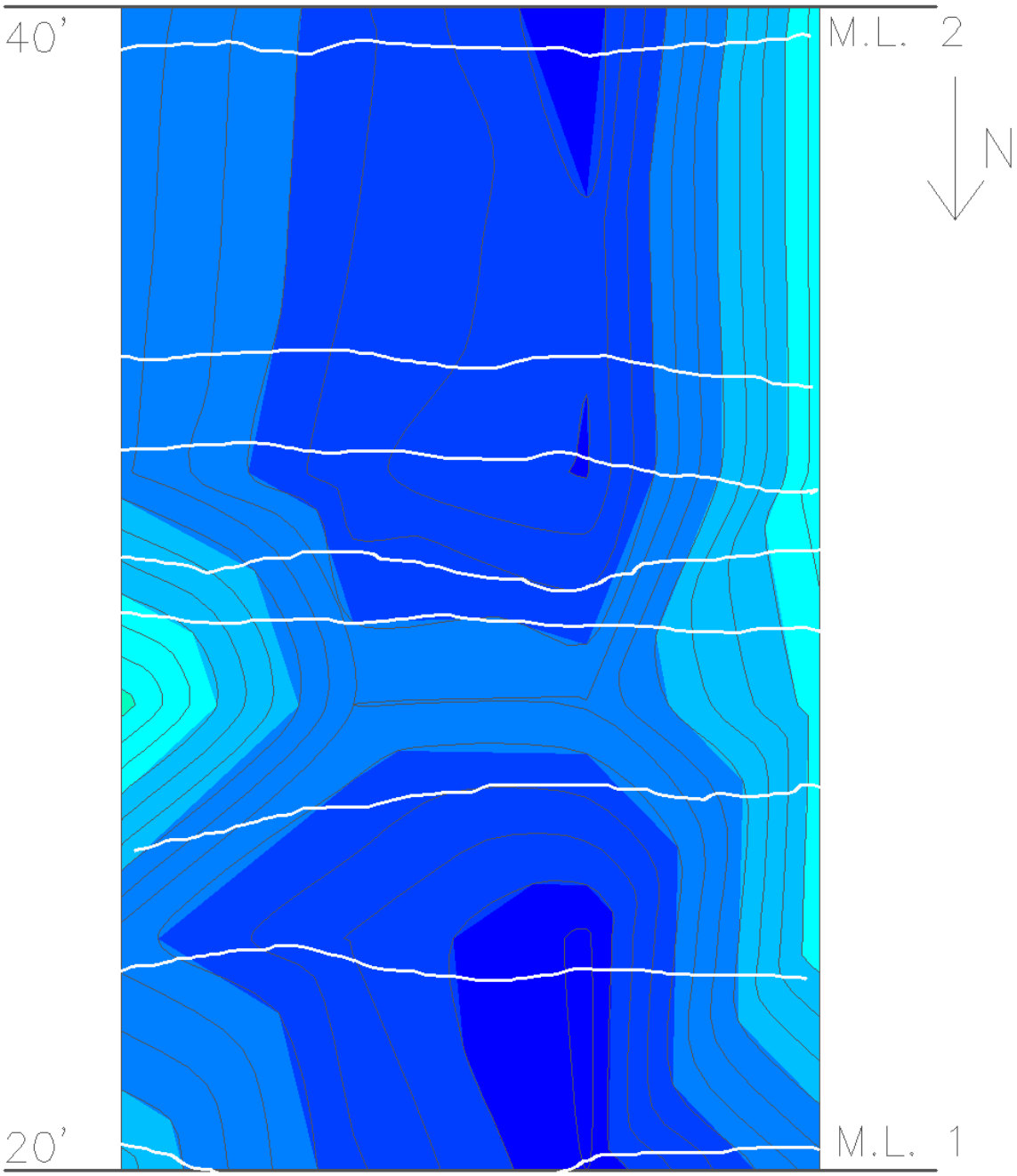

Figure B.50: MRM 54 from 20 to 40 feet

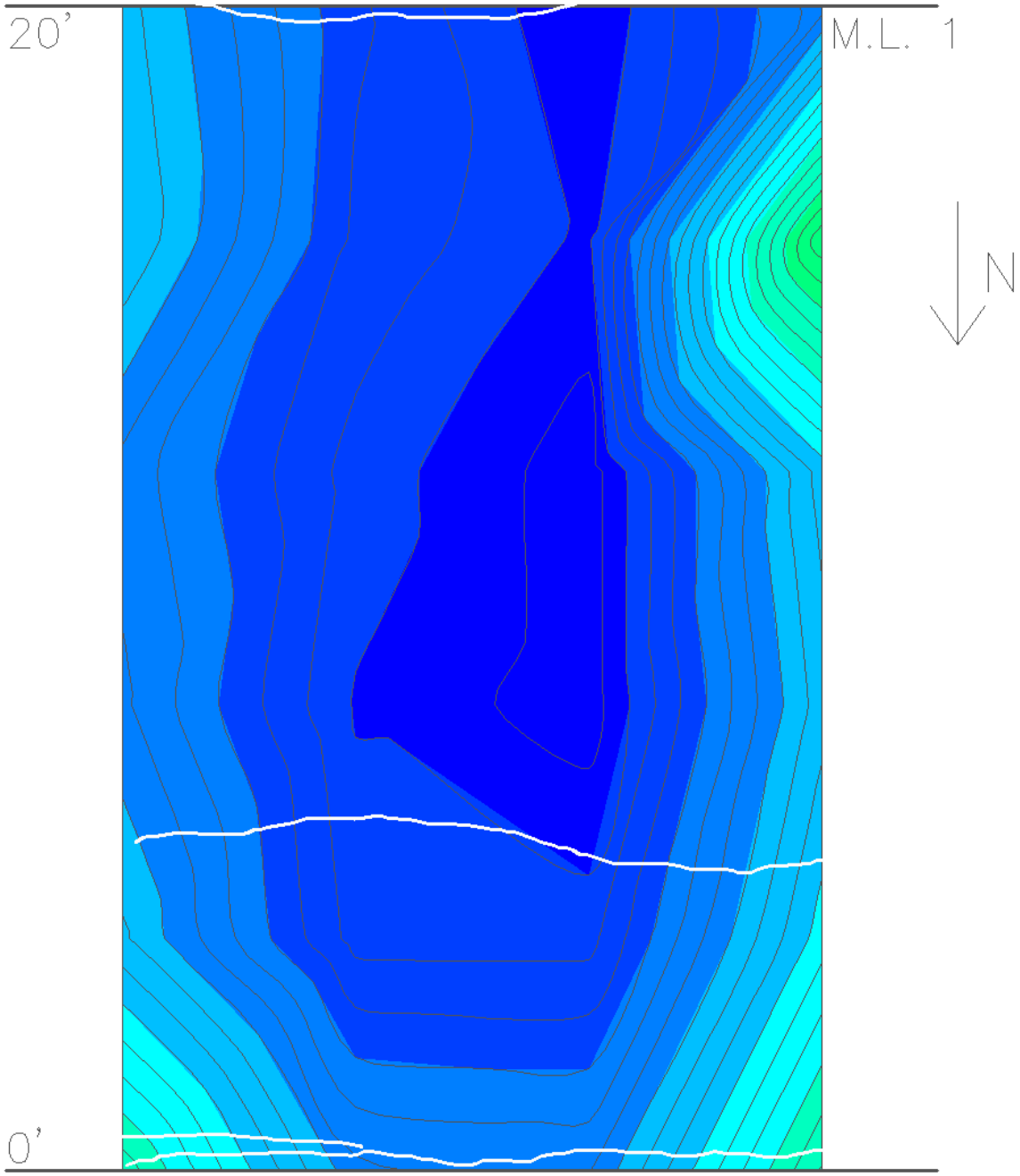

Figure B.51: MRM 54 from 0 to 20 feet

Figure B.52: MRM 222 from 80 to 100 feet

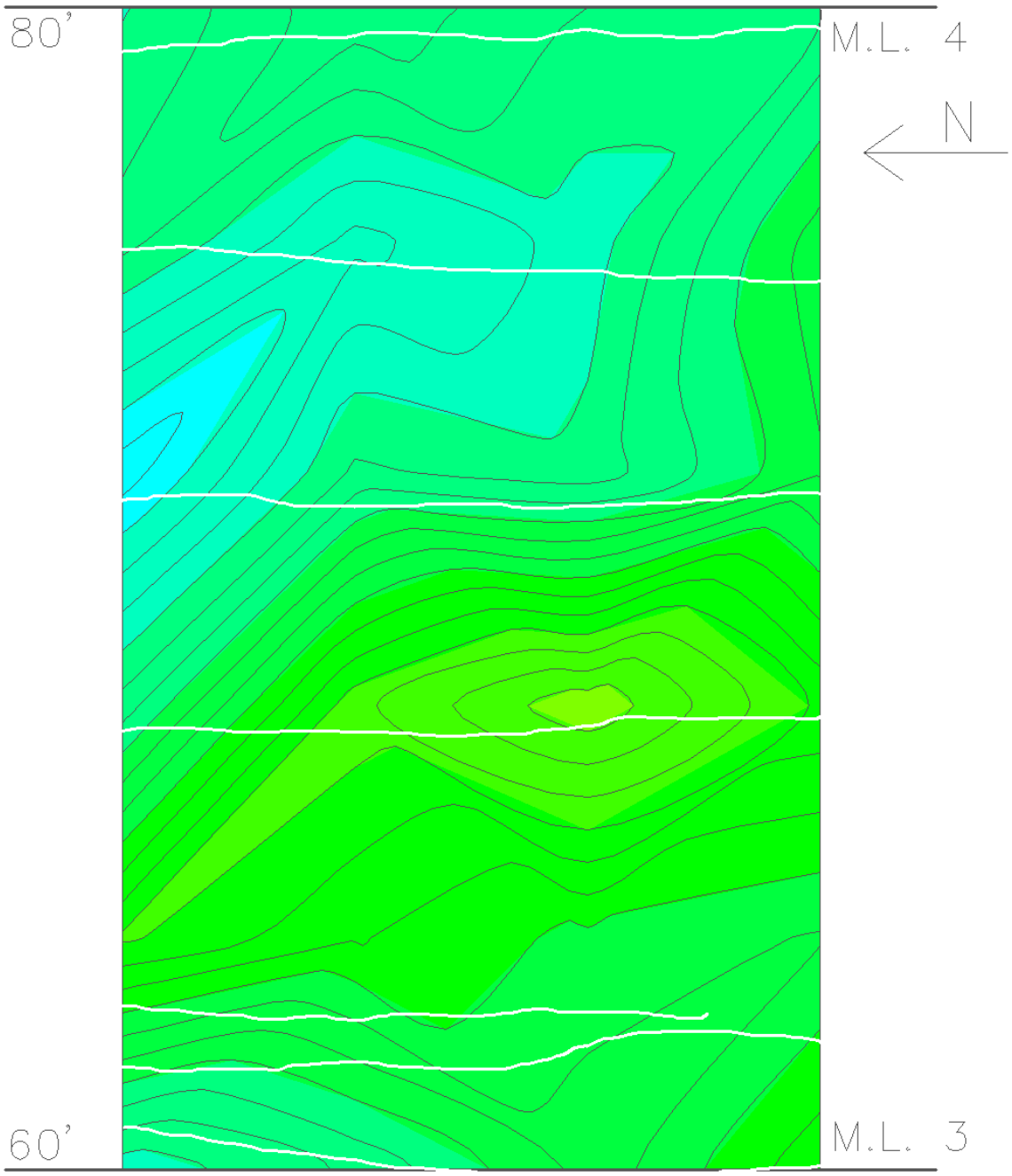

Figure B.53: MRM 222 from 60 to 80 feet

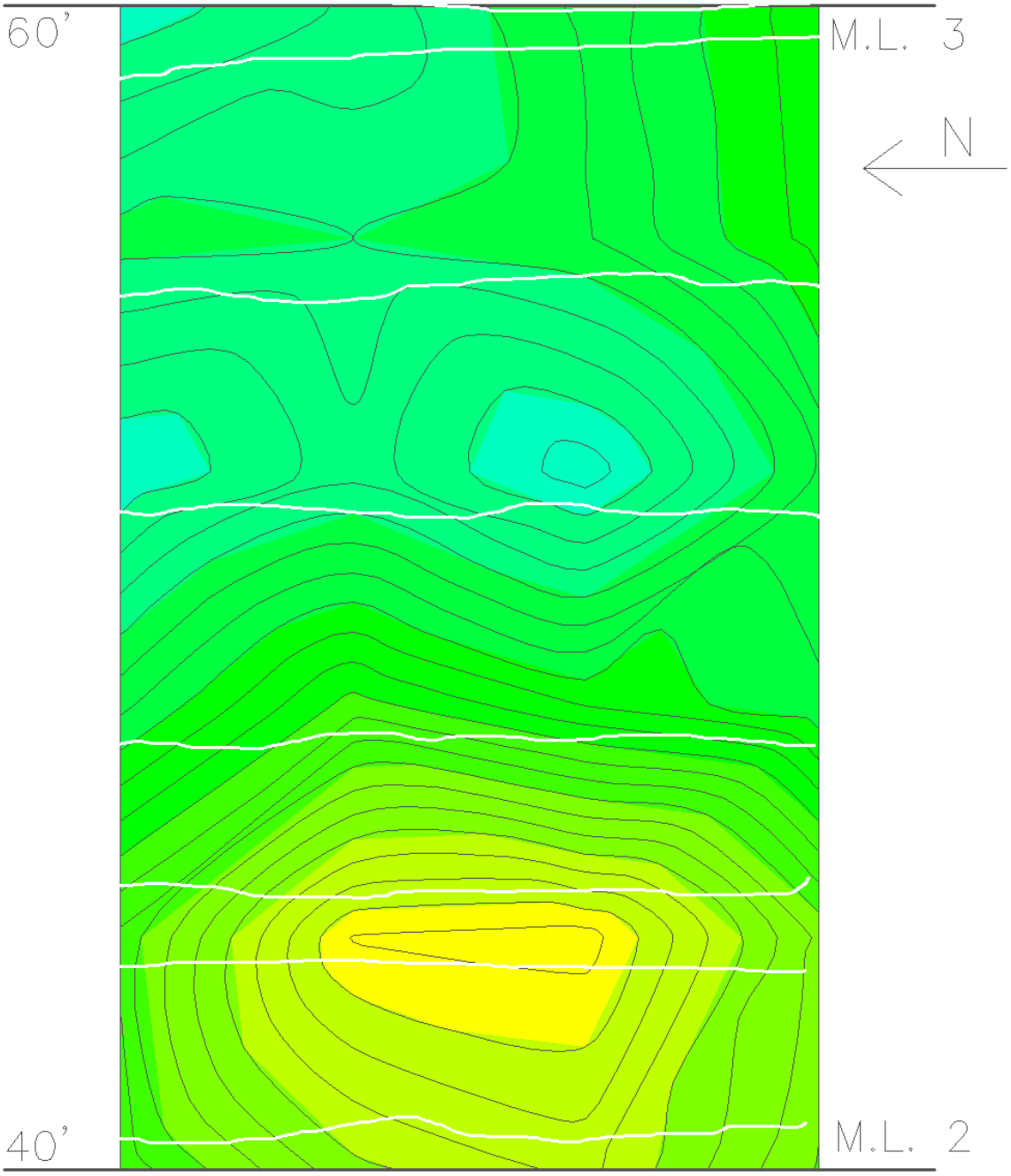

Figure B.54: MRM 222 from 40 to 60 feet

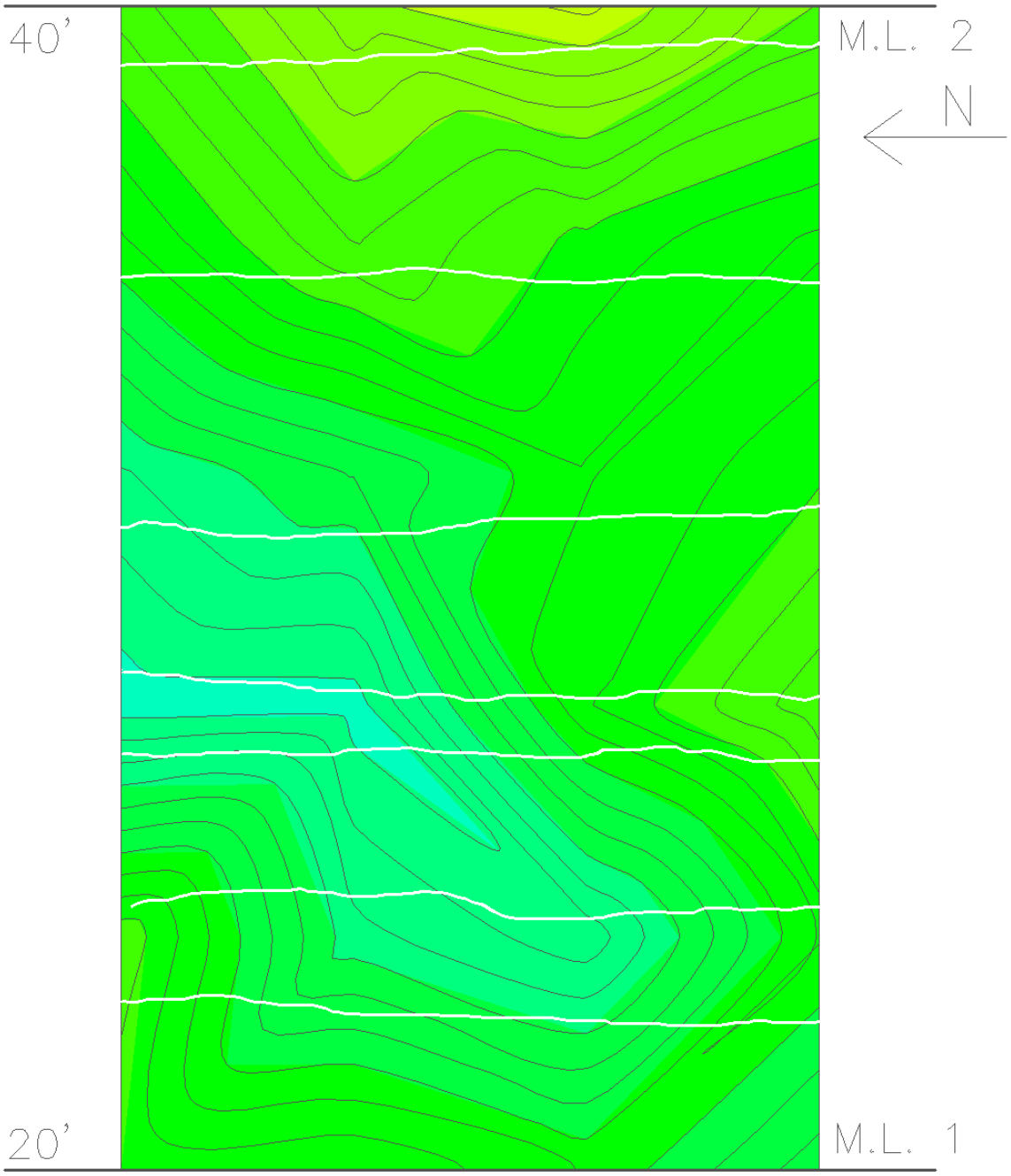

Figure B.55: MRM 222 from 20 to 40 feet

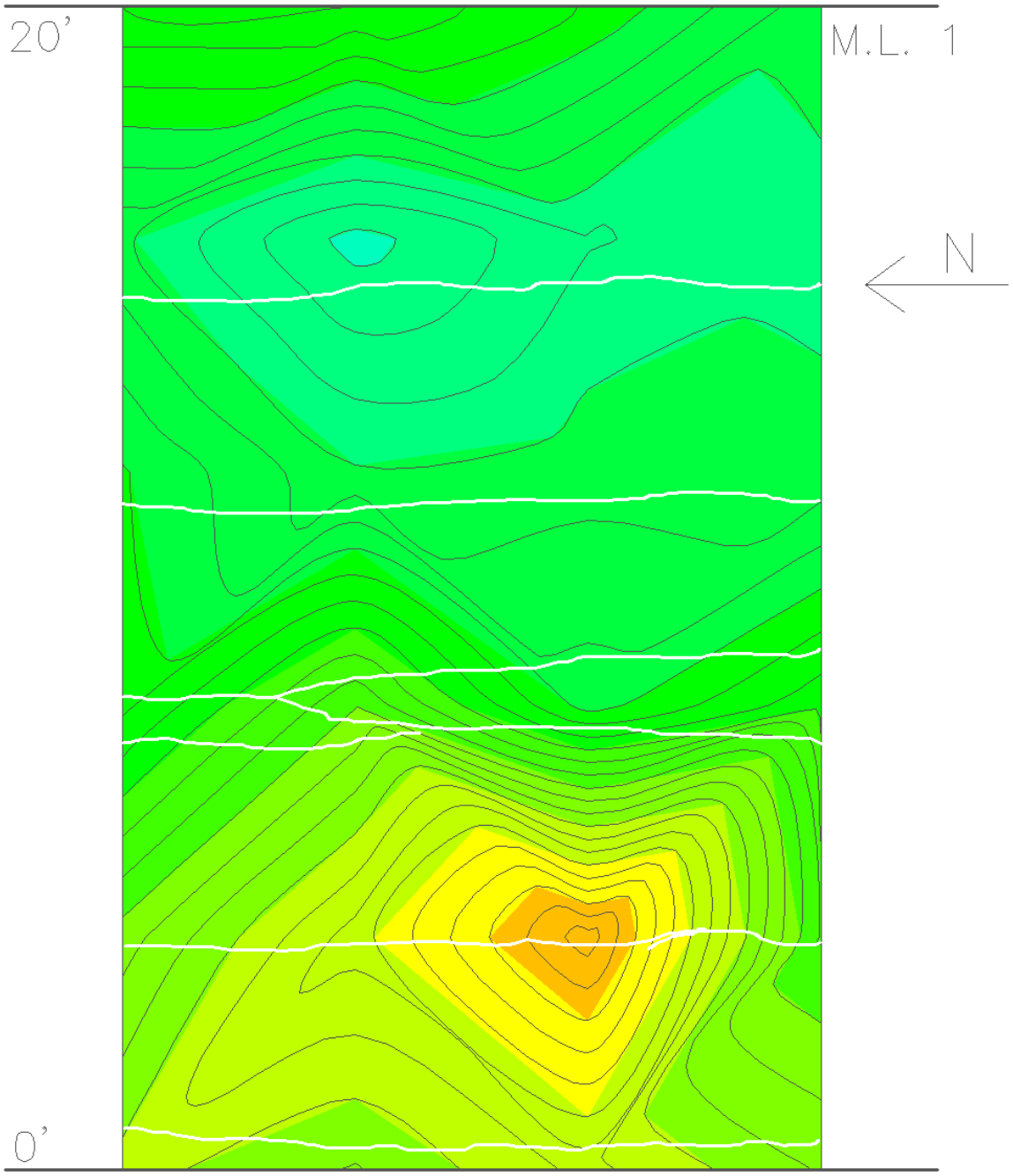

Figure B.56: MRM 222 from 0 to 20 feet

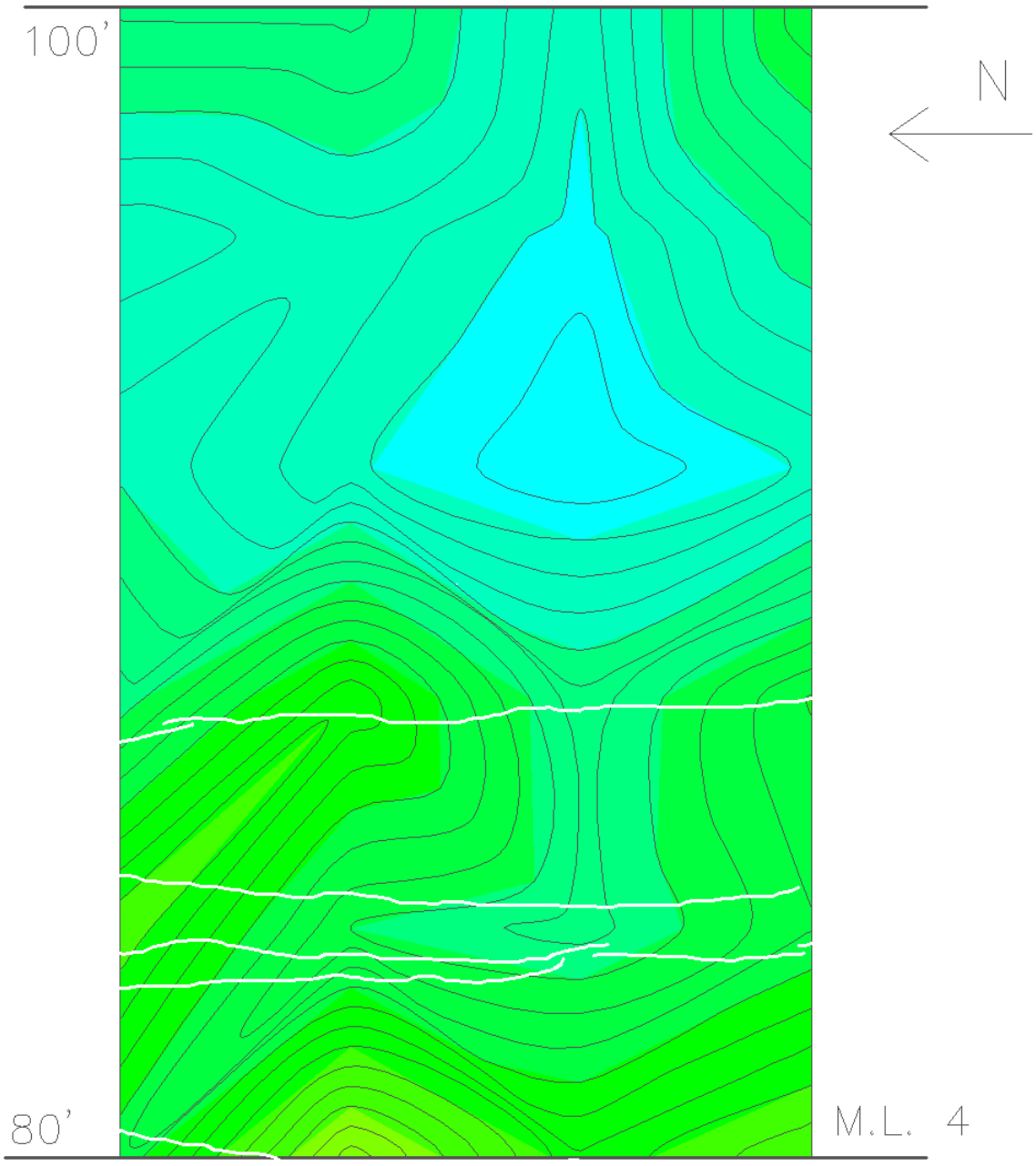

Figure B.57: MRM 246 from 80 to 100 feet

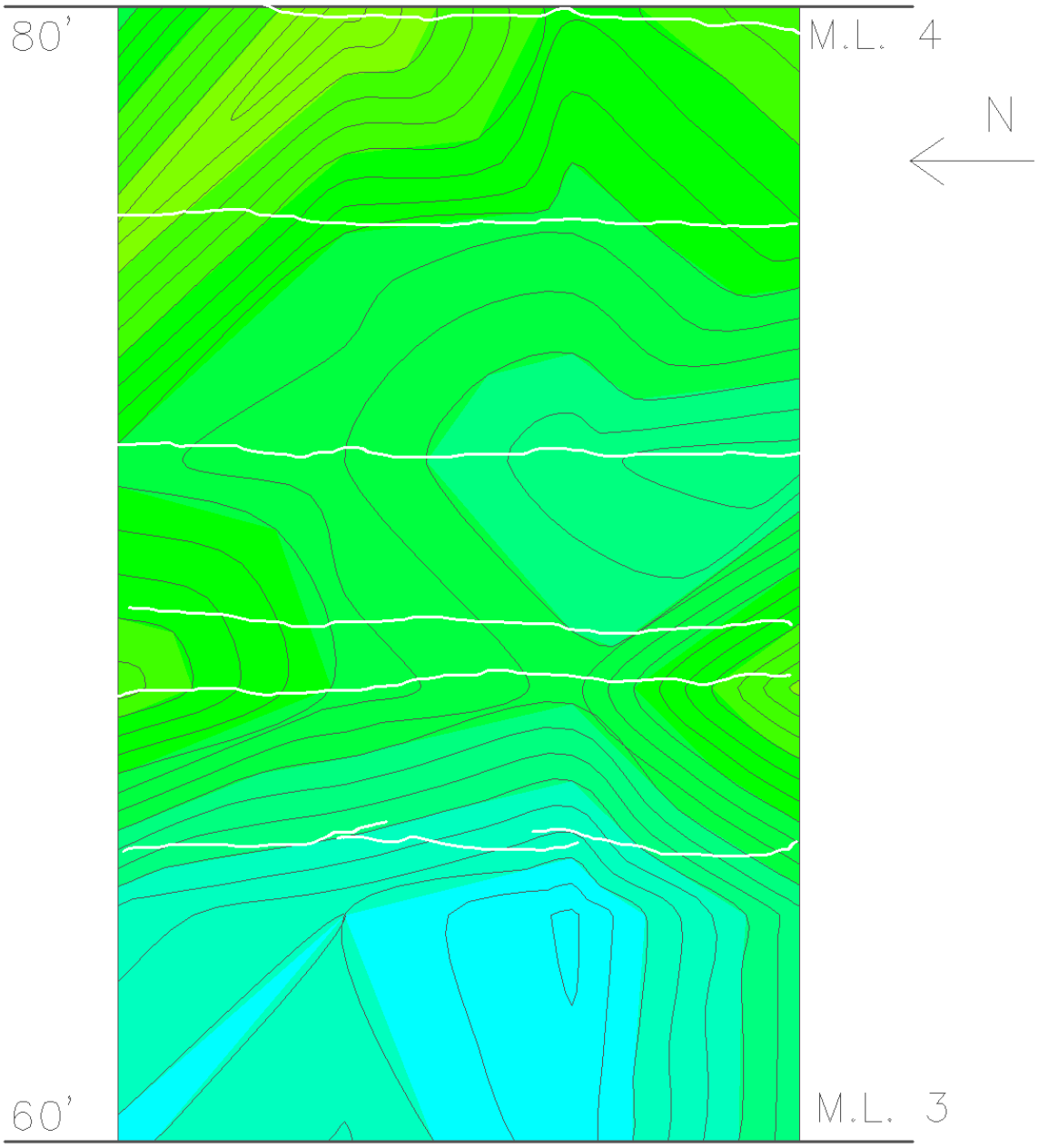

Figure B.58: MRM 246 from 60 to 80 feet

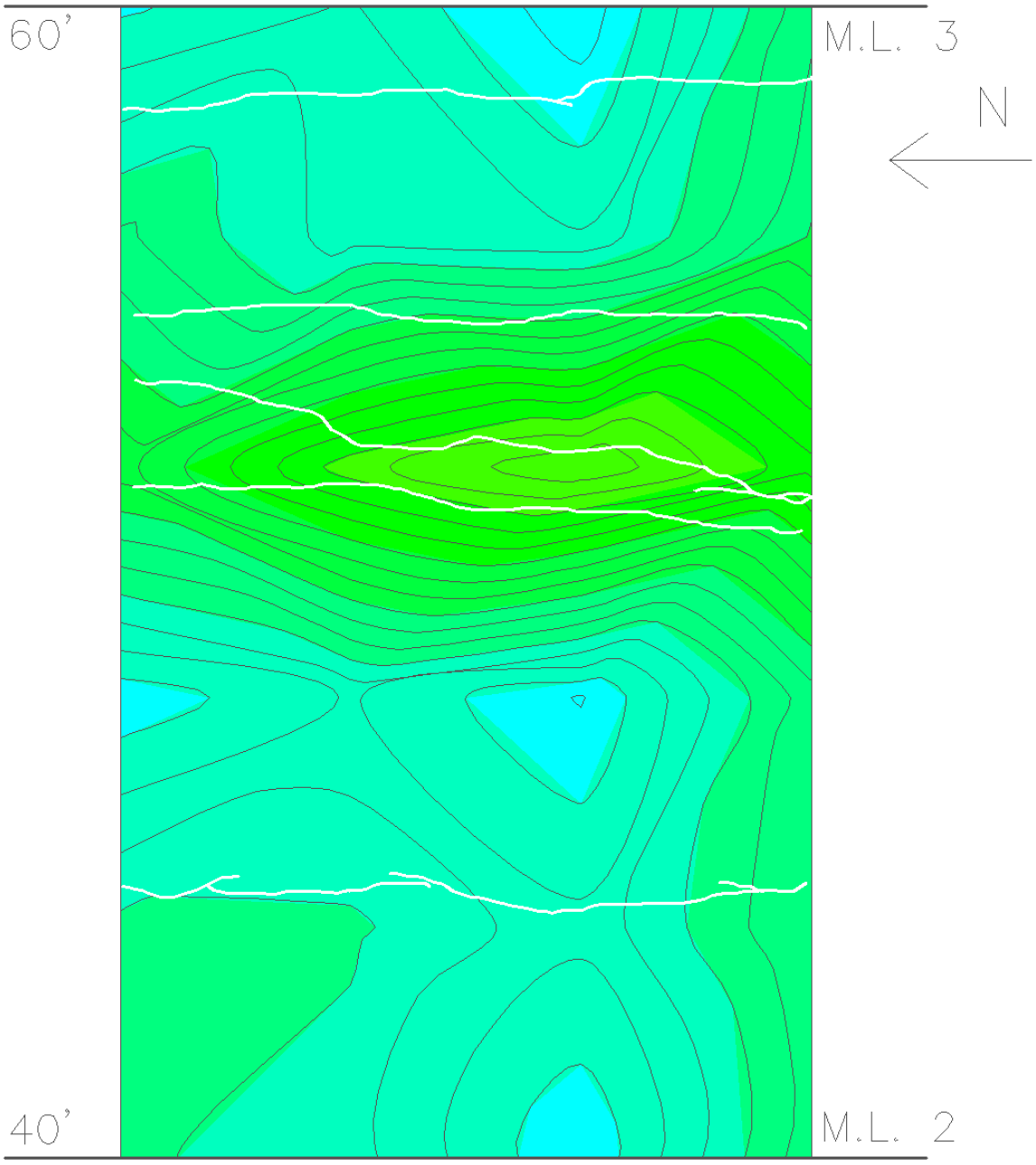

Figure B.59: MRM 246 from 40 to 60 feet

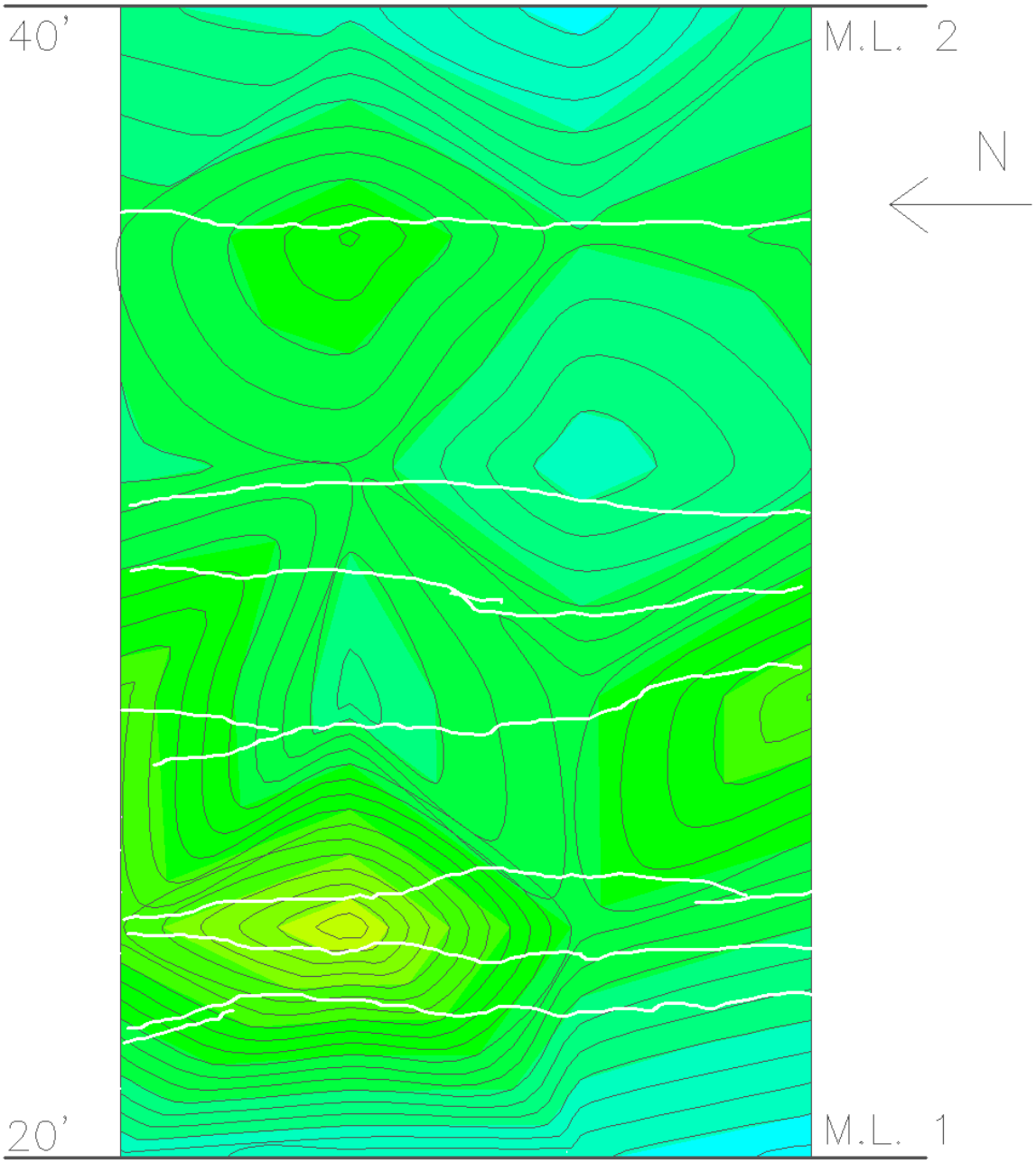

Figure B.60: MRM 246 from 20 to 40 feet

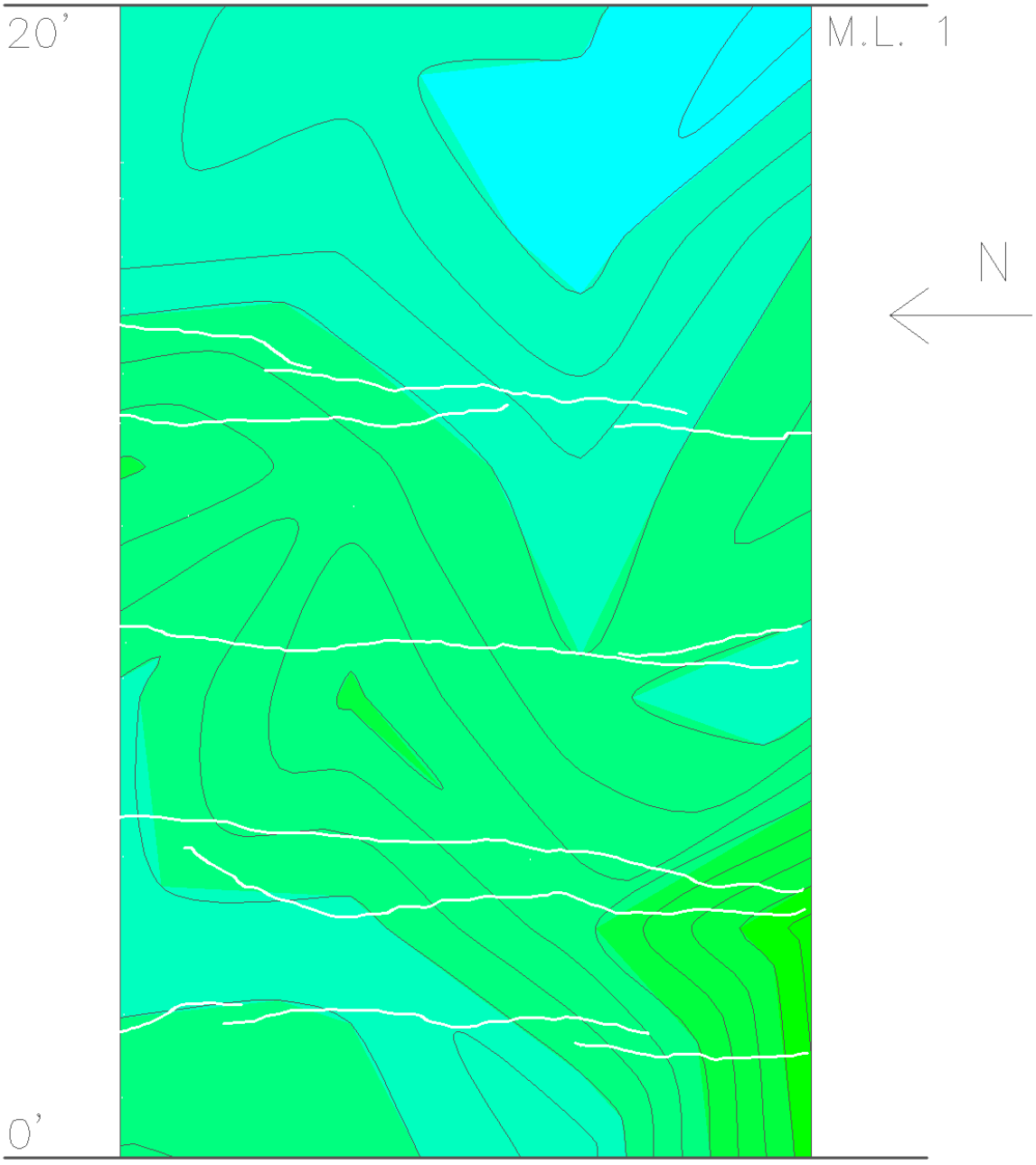

Figure B.61: MRM 246 from 0 to 20 feet

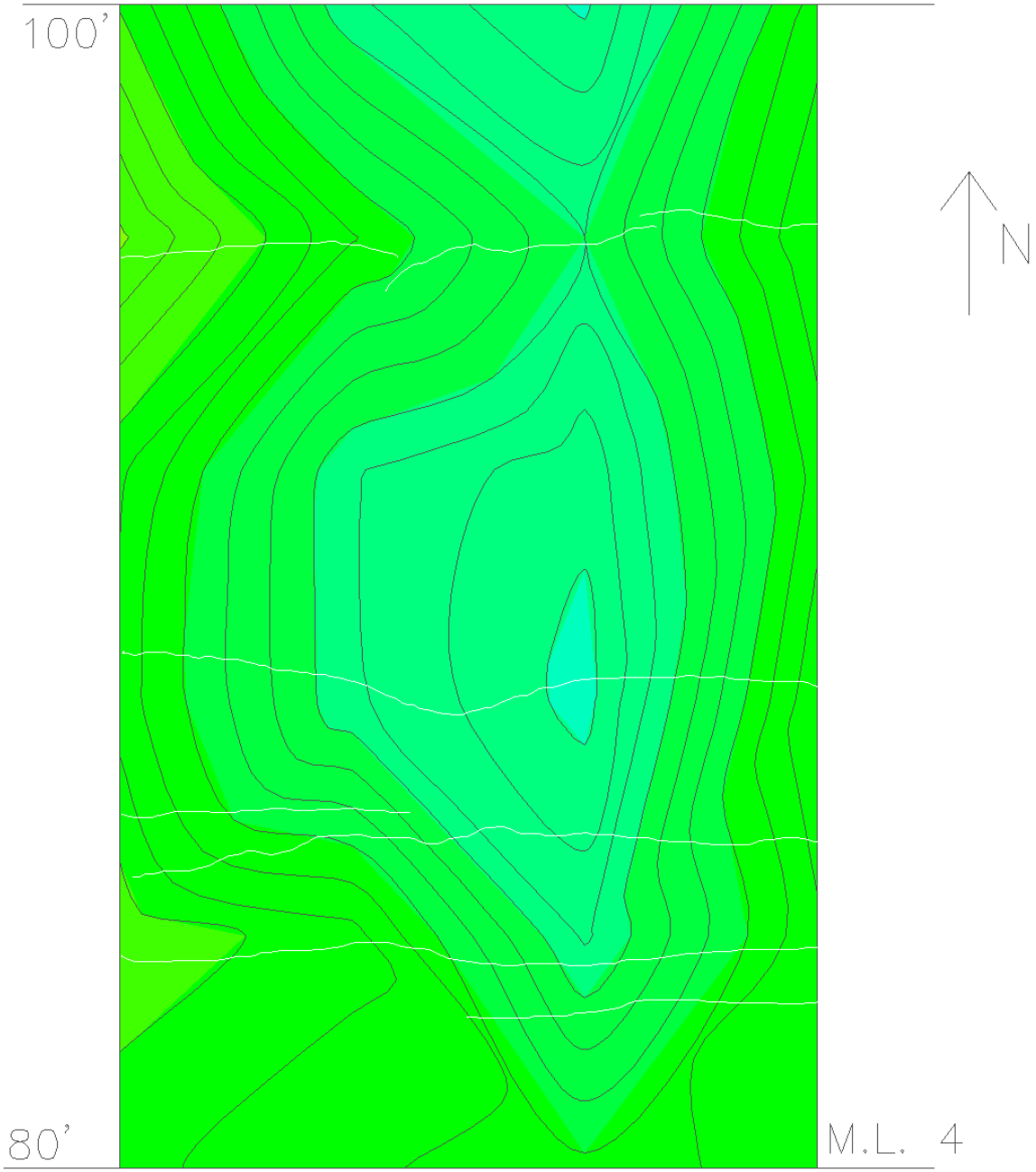

Figure B.62: MRM 168 NB from 80 to 100 feet

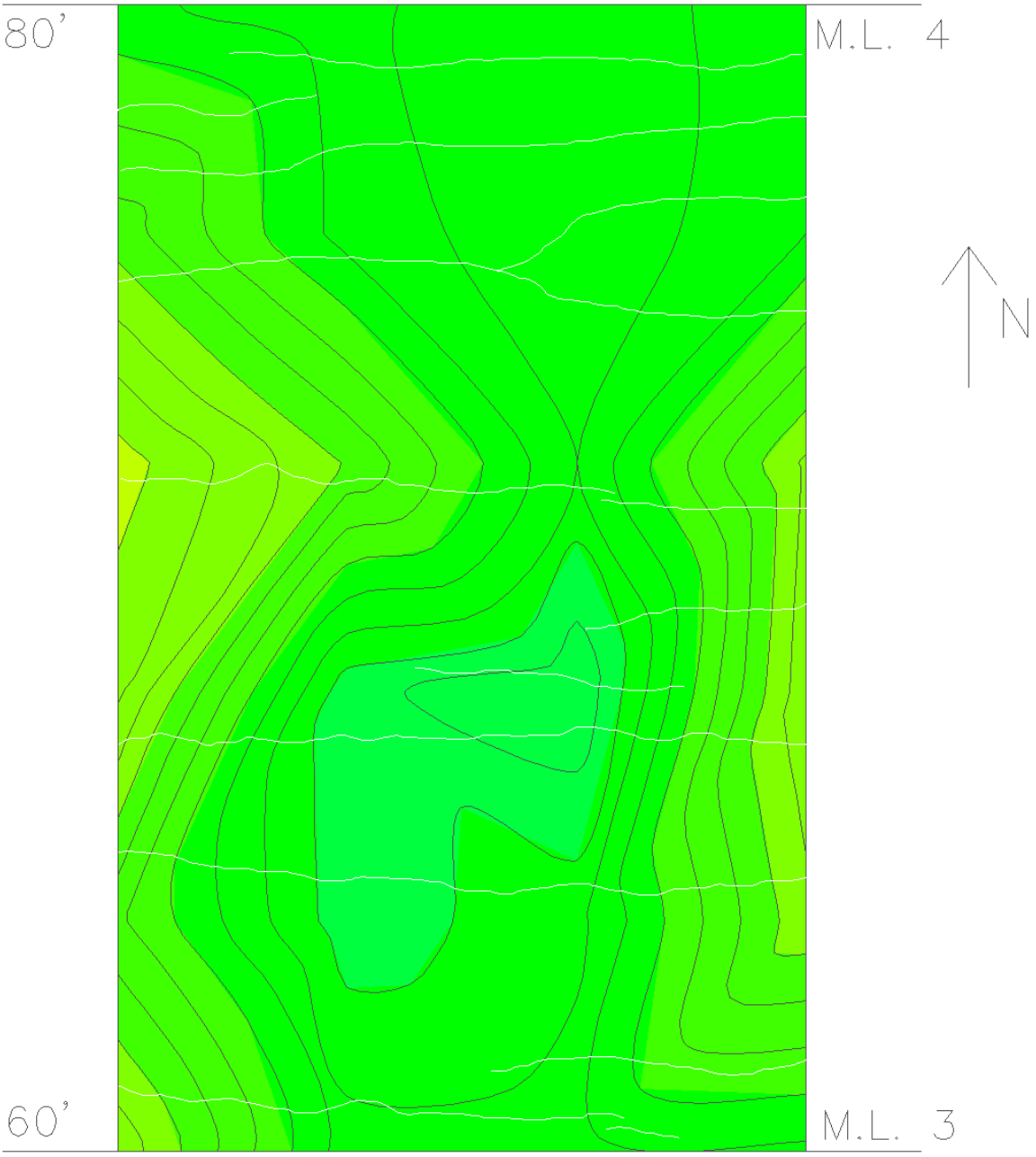

Figure B.63: MRM 168 NB from 60 to 80 feet

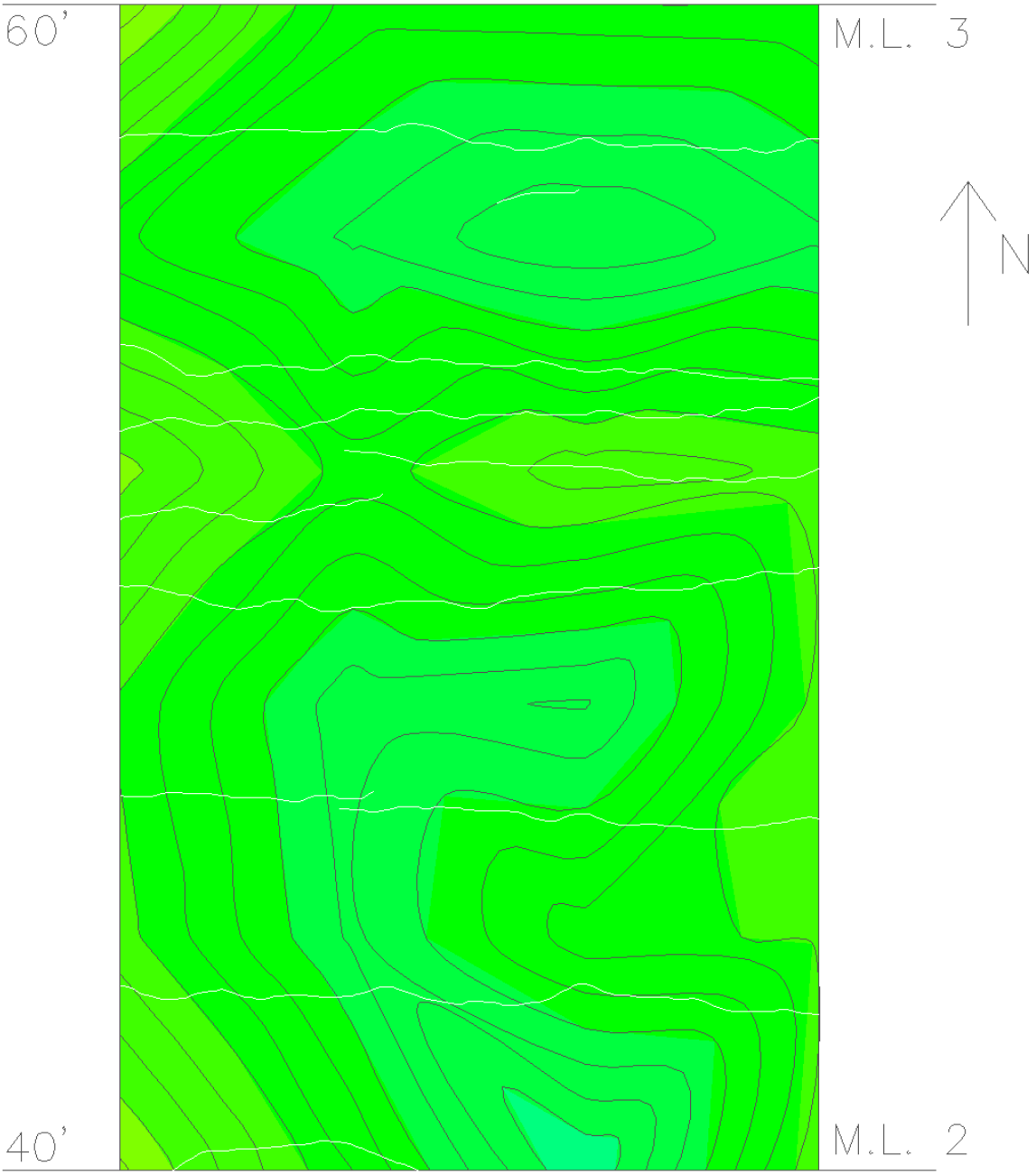

Figure B.64: MRM 168 NB from 40 to 60 feet

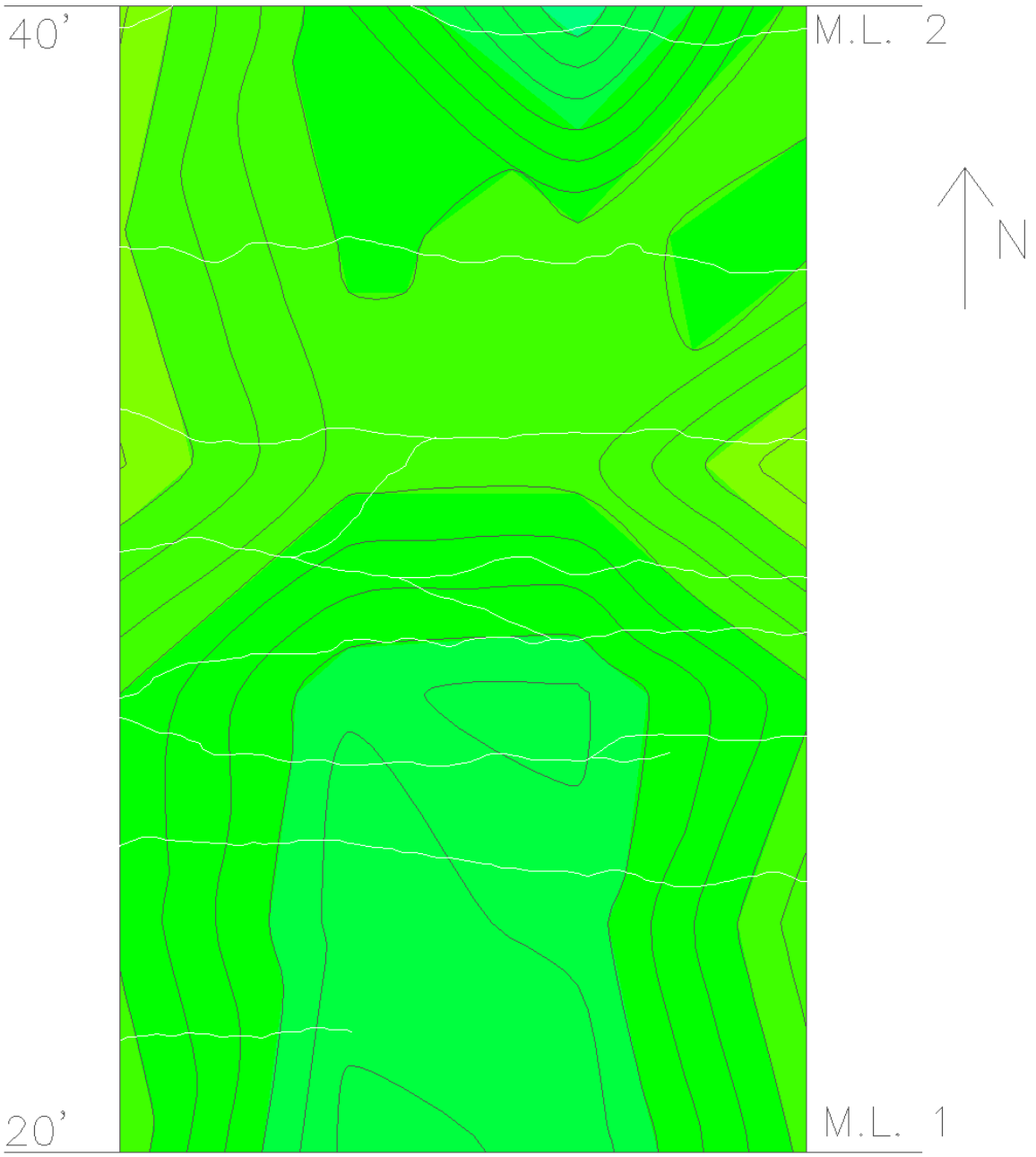

Figure B.65: MRM 168 NB from 20 to 40 feet

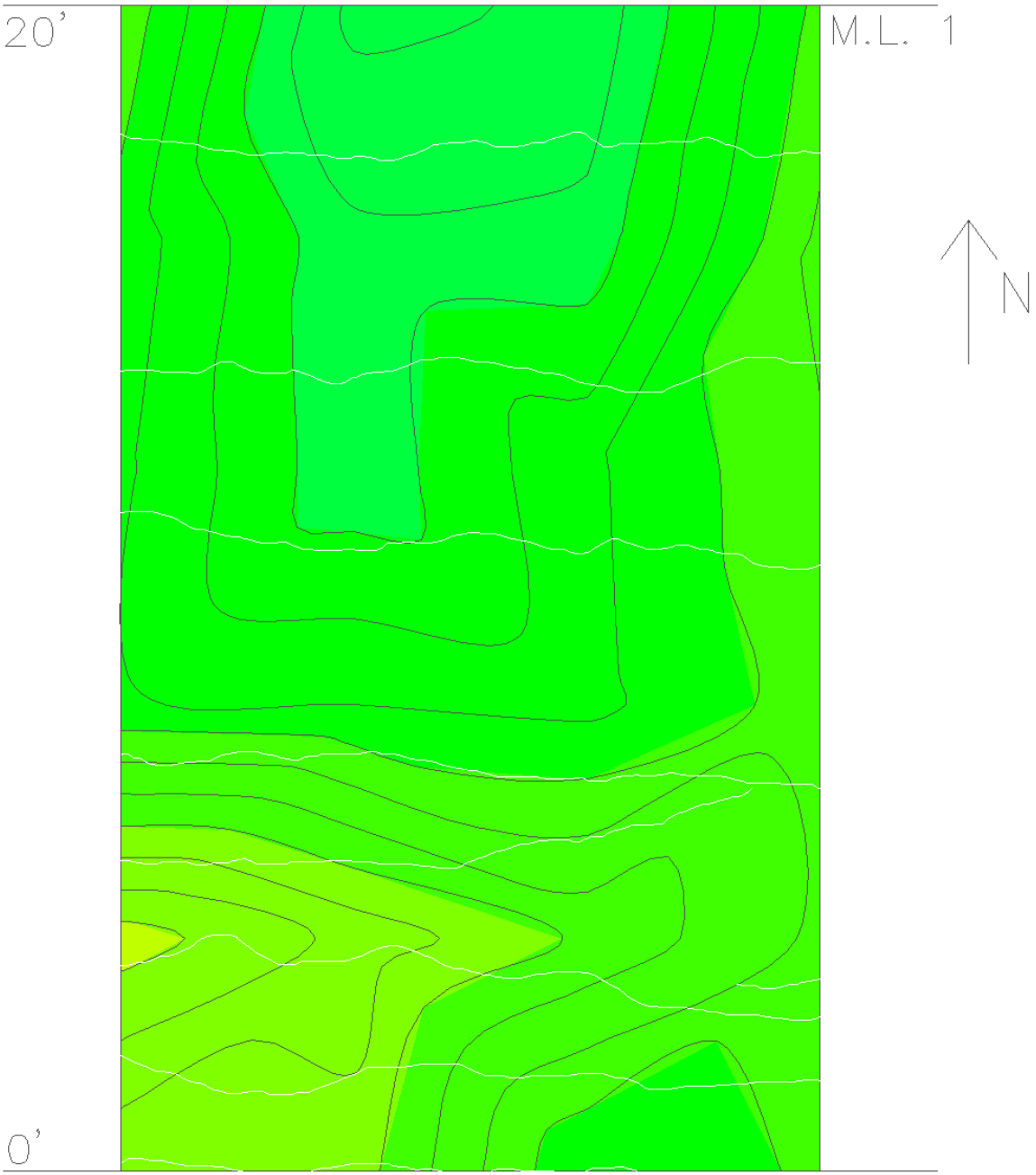

Figure B.66: MRM 168 NB from 0 to 20 feet

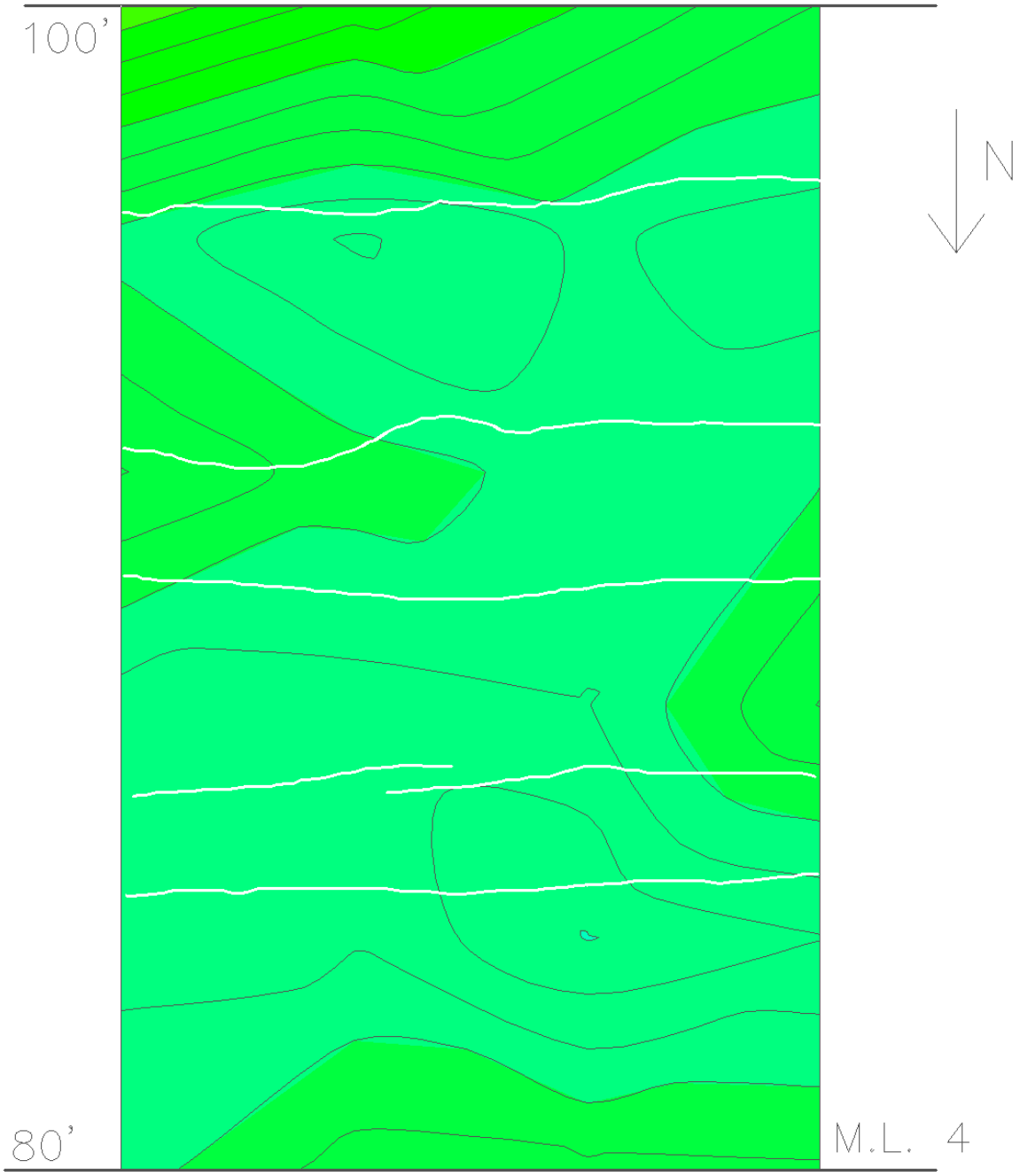

Figure B.67: MRM 168 SB from 80 to 100 feet

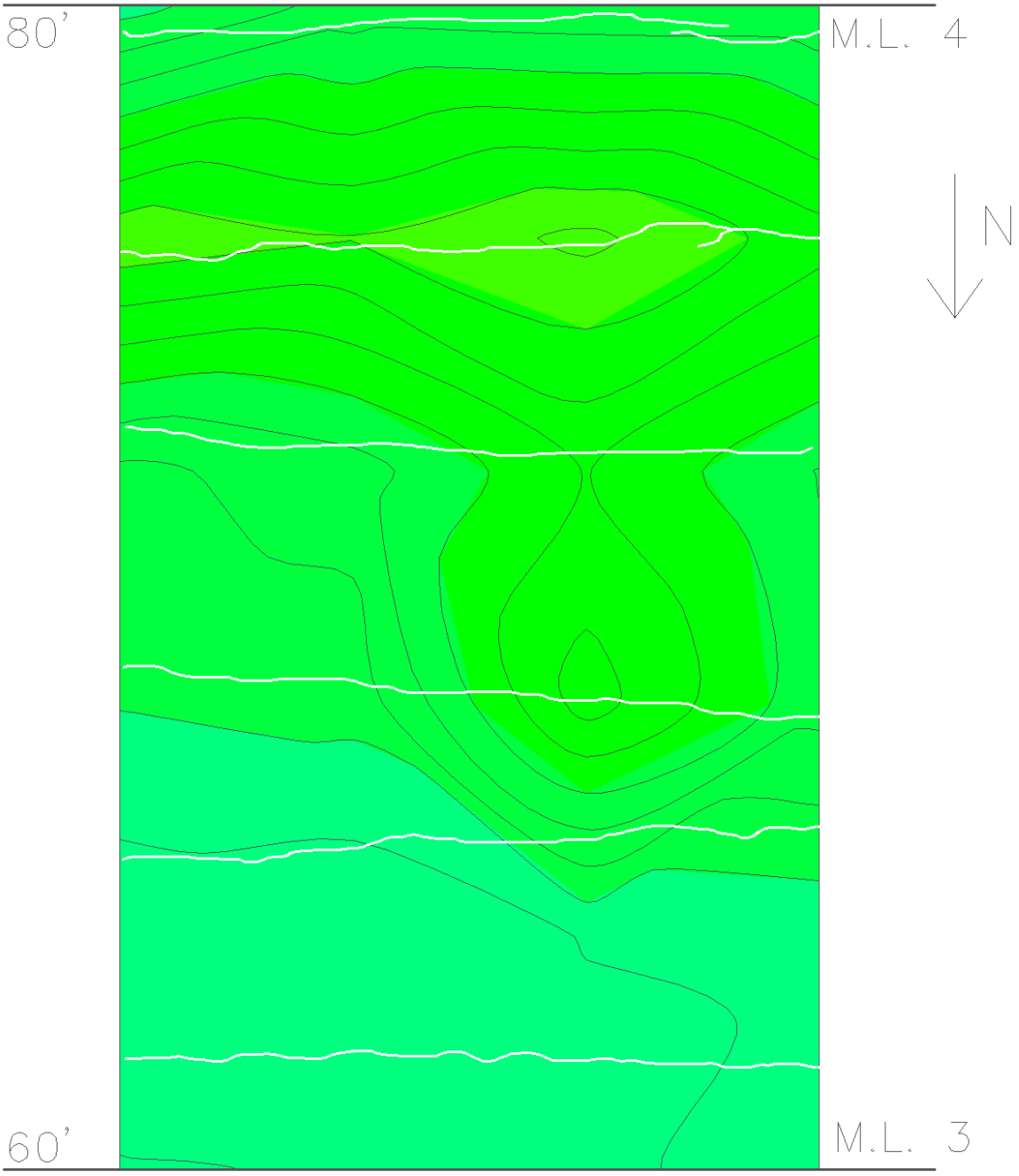

Figure B.68: MRM 168 SB from 60 to 80 feet

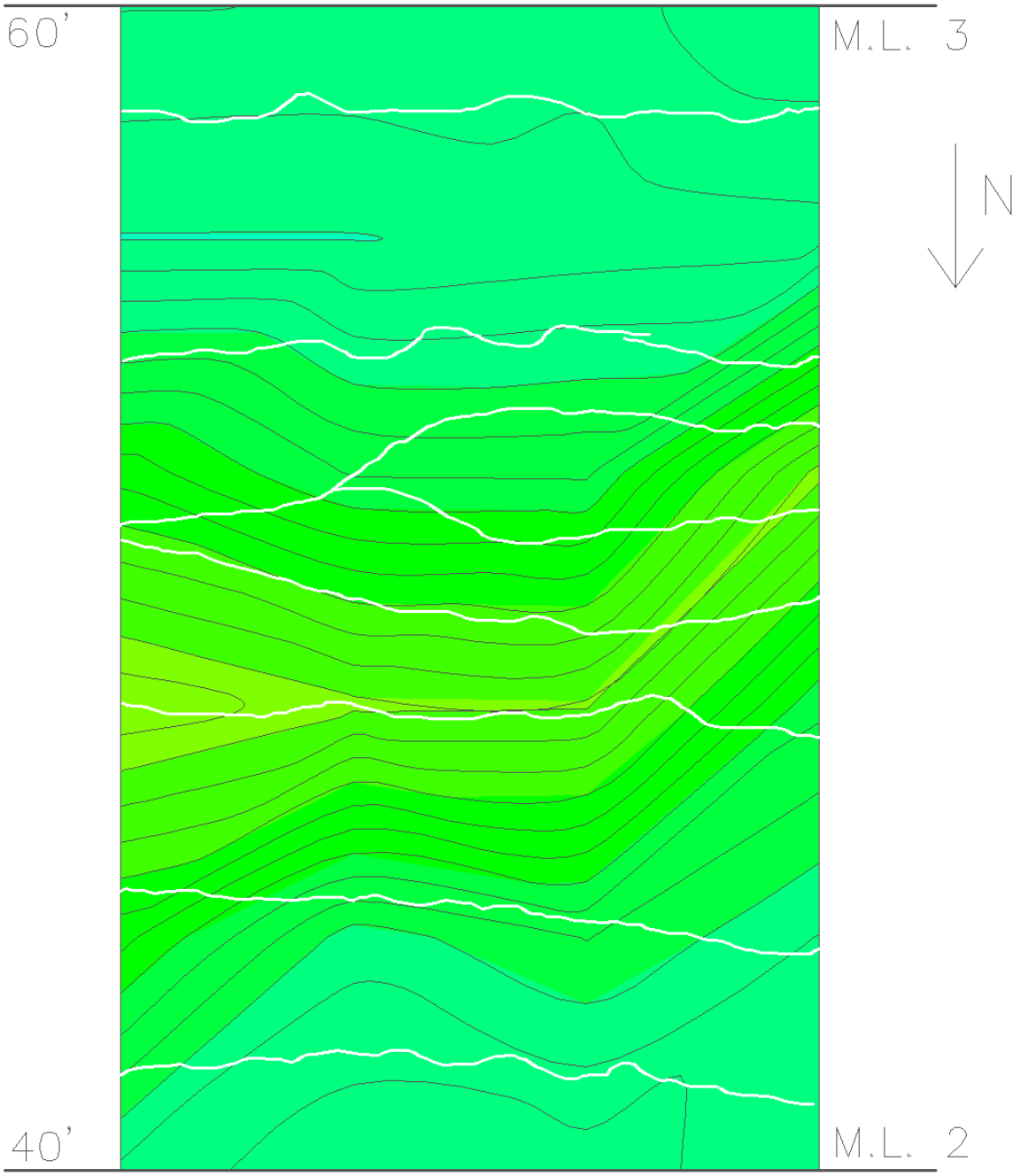

Figure B.69: MRM 168 SB from 40 to 60 feet

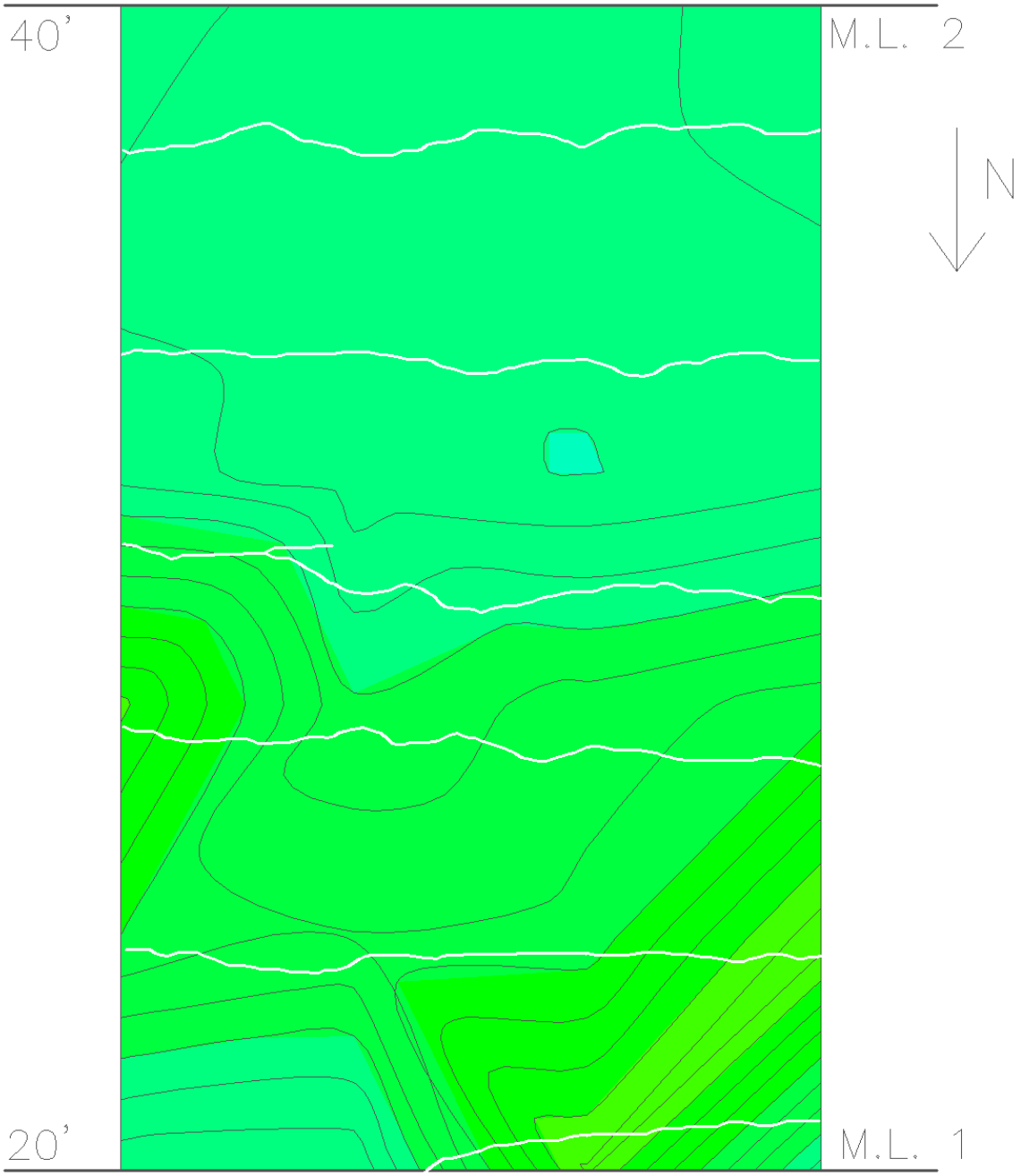

Figure B.70: MRM 168 SB from 20 to 40 feet

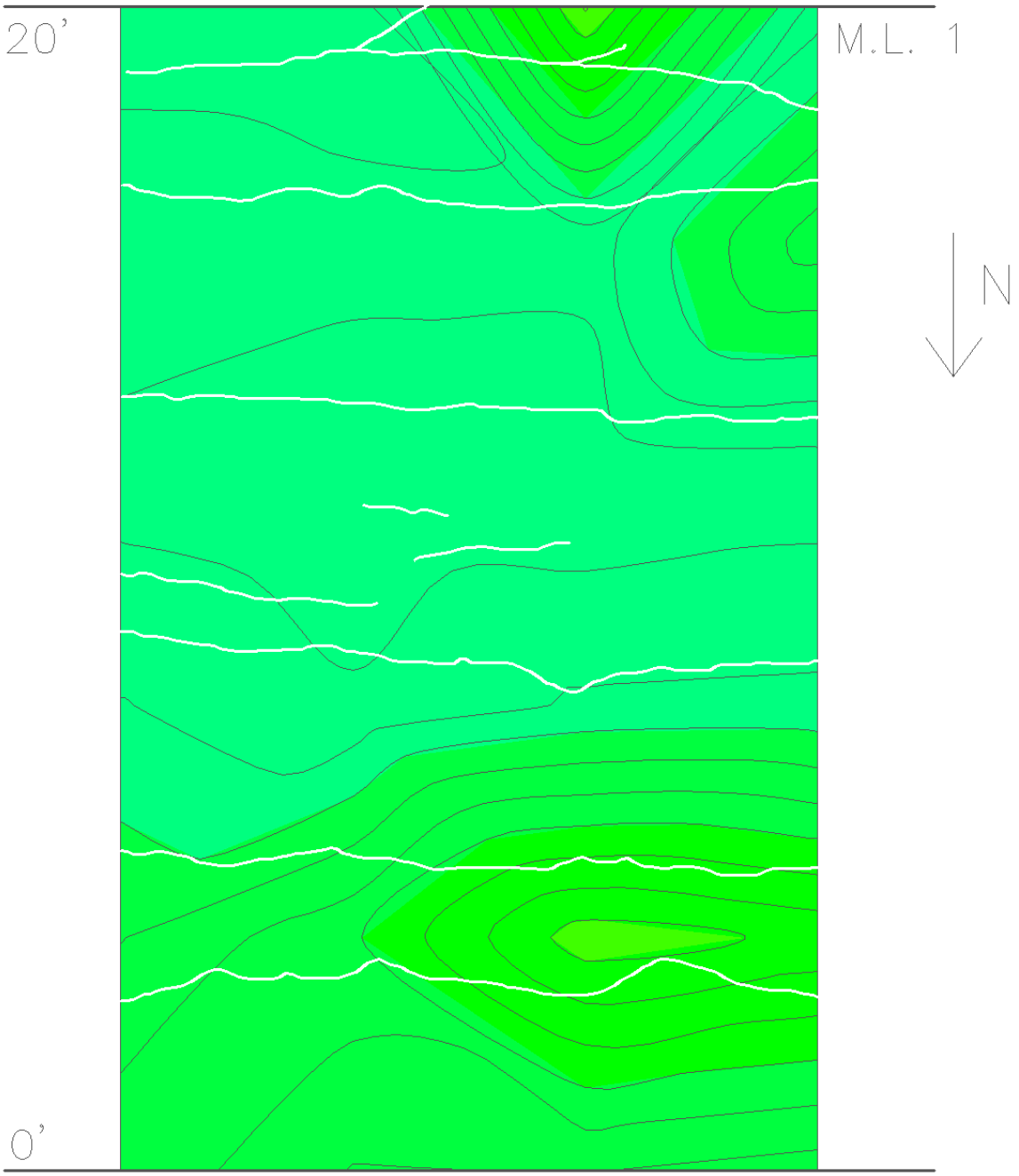

Figure B.71: MRM 168 SB from 0 to 20 feet

APPENDIX C. CHLORIDE PROFILES FOR INITIAL AND STATEWIDE ASSESSMENTS

Vertical chloride profiles

- MRM 87
- MRM 68
- MRM 411
- MRM 33
- MRM 44
- MRM 25
- MRM 54
- MRM 222
- MRM 246
- MRM 168NB
- MRM 168SB

Horizontal chloride profiles

- MRM 87
- MRM 68
- MRM 411

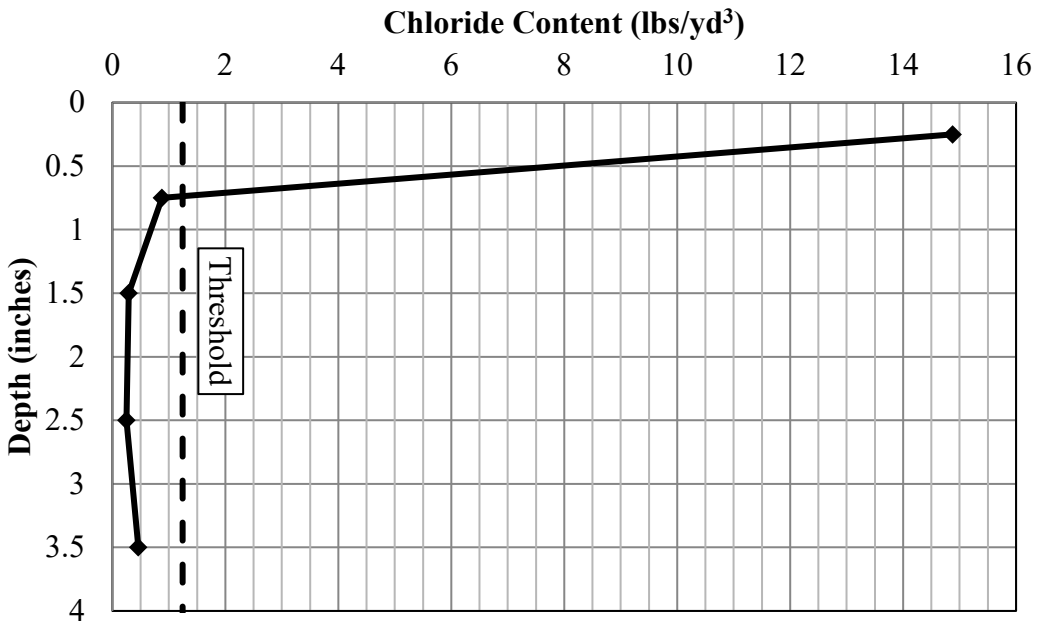

Figure C.1: Vertical chloride profile of dust sample 1 at MRM 87

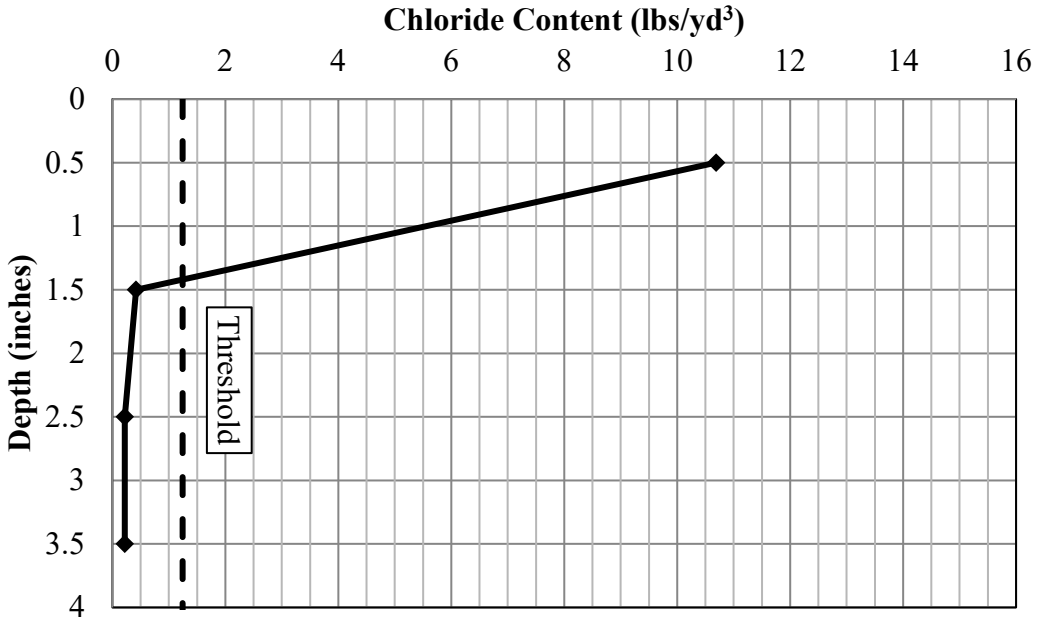

Figure C.2: Vertical chloride profile of dust sample 2 at MRM 87

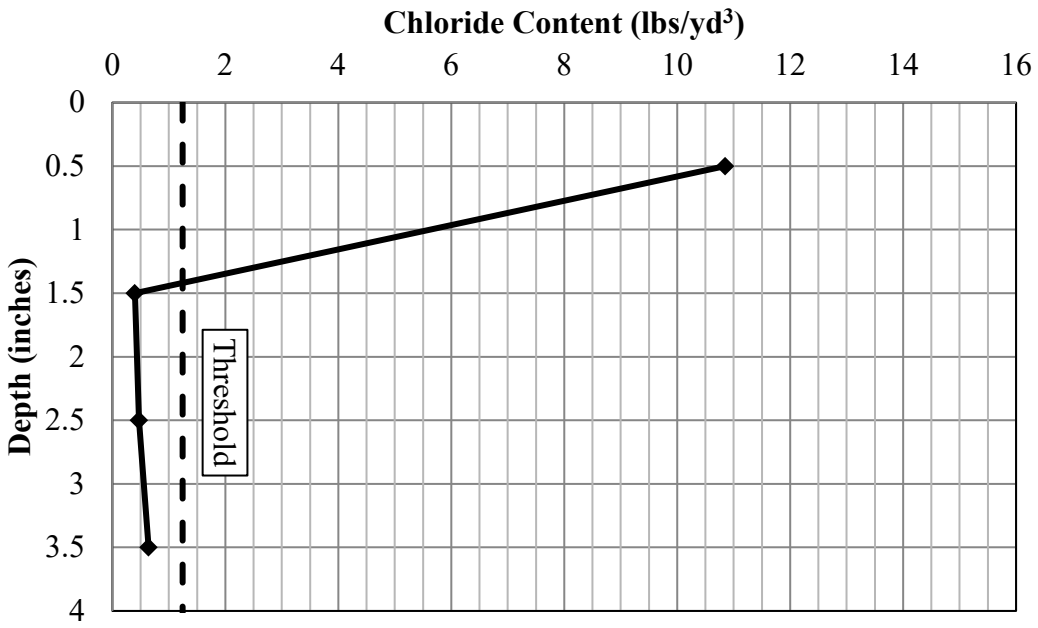

Figure C.3: Vertical chloride profile of dust sample 3 at MRM 87

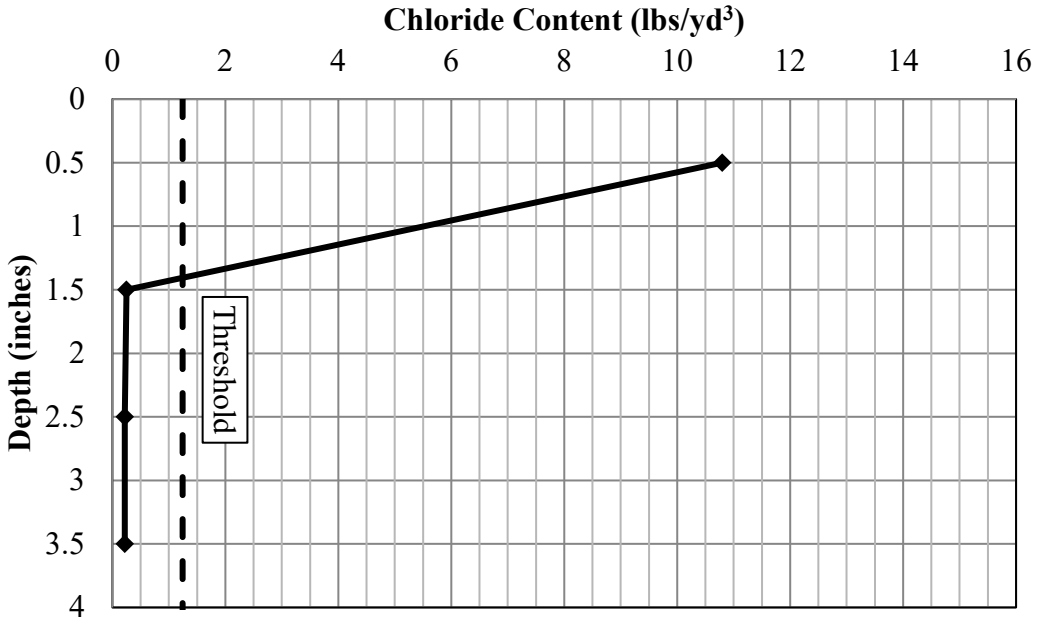

Figure C.4: Vertical chloride profile of dust sample 4 at MRM 87

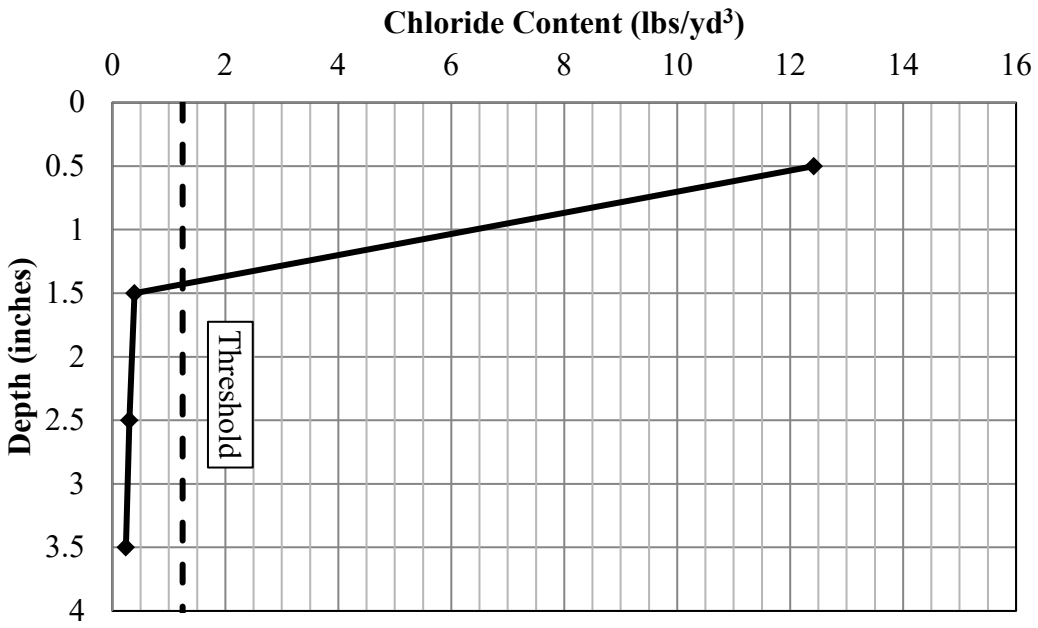

Figure C.5: Vertical chloride profile of dust sample 1 at MRM 68

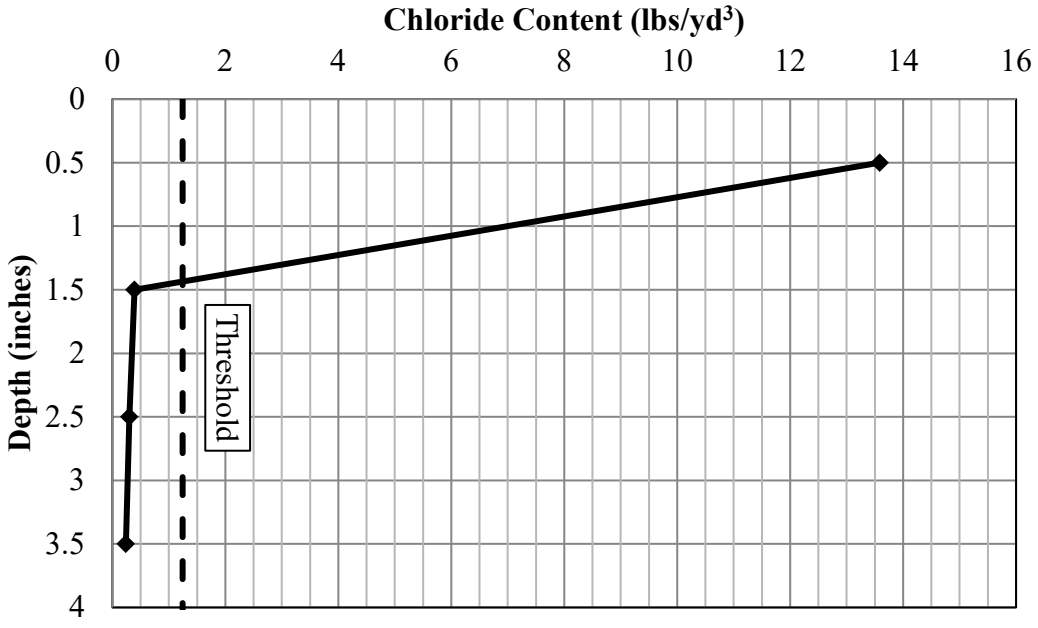

Figure C.6: Vertical chloride profile of dust sample 2 at MRM 68

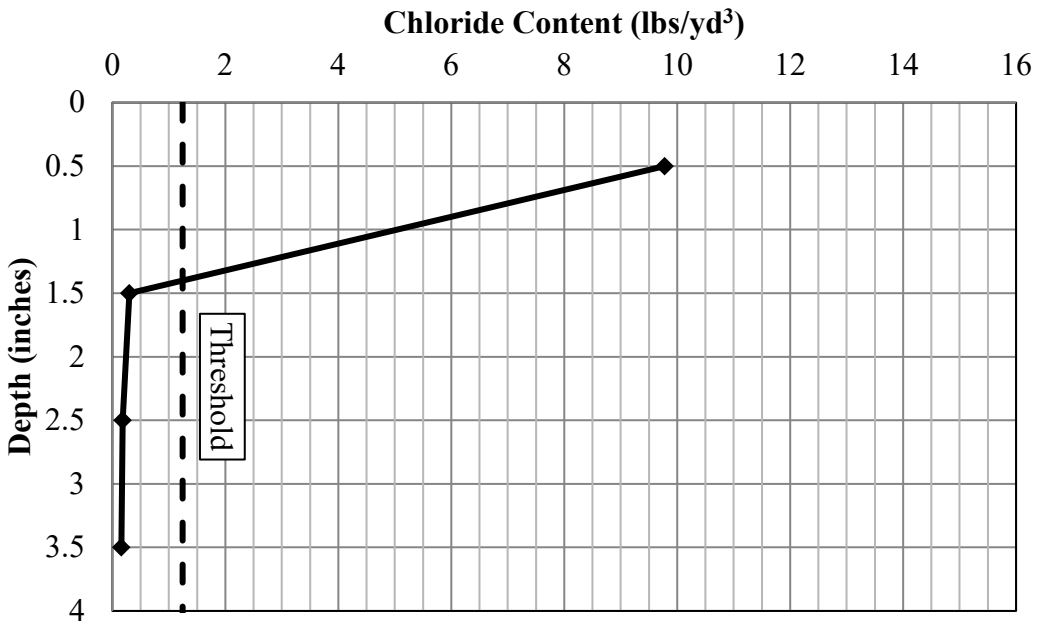

Figure C.7: Vertical chloride profile of dust sample 3 at MRM 68

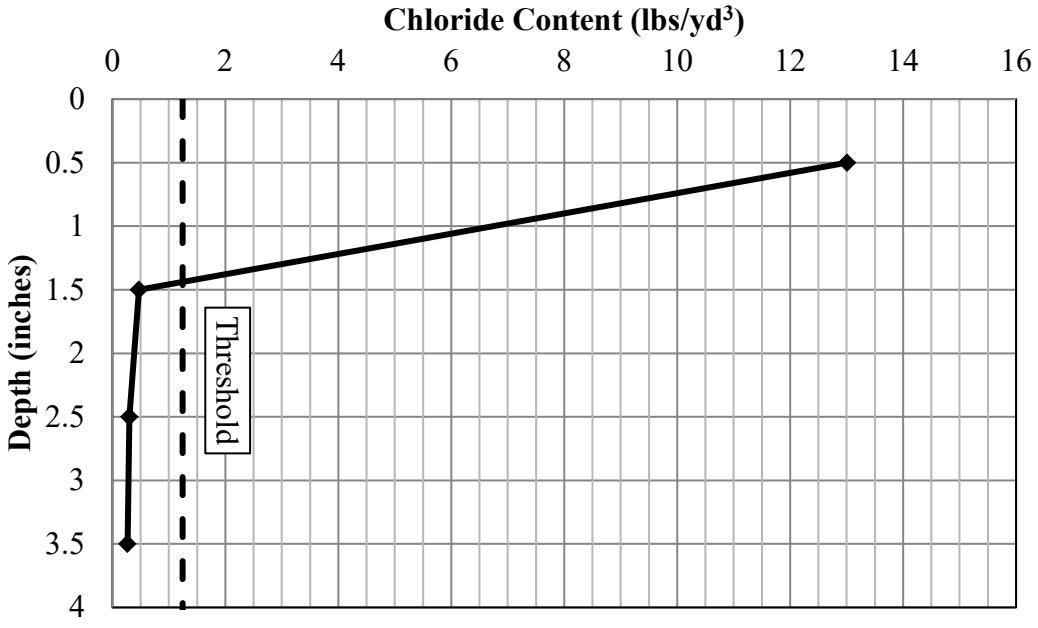

Figure C.8: Vertical chloride profile of dust sample 4 at MRM 68

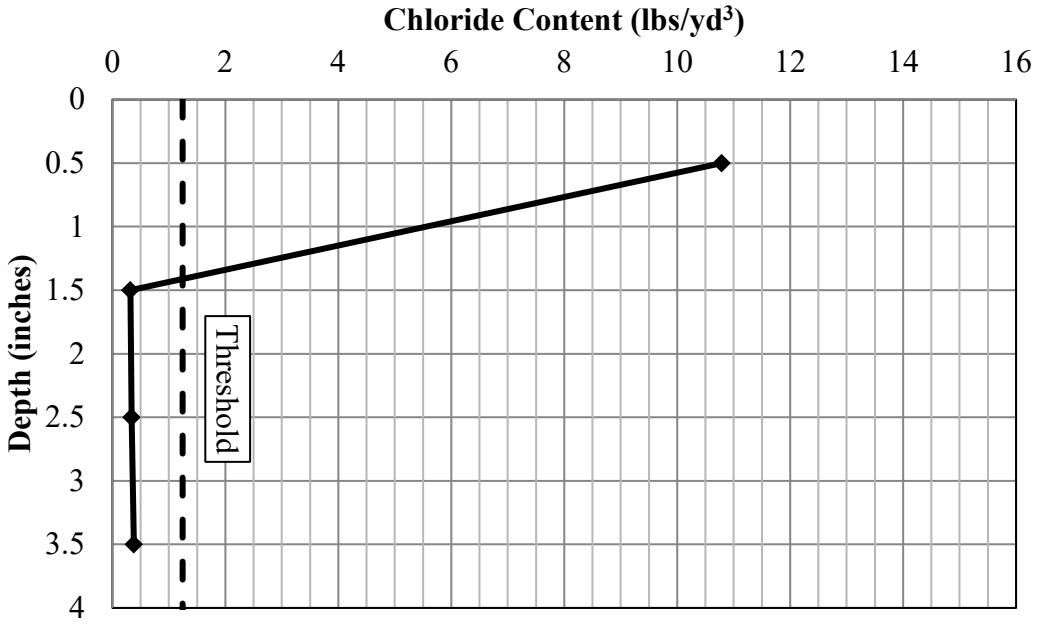

Figure C.9: Vertical chloride profile of dust sample 1 at MRM 411

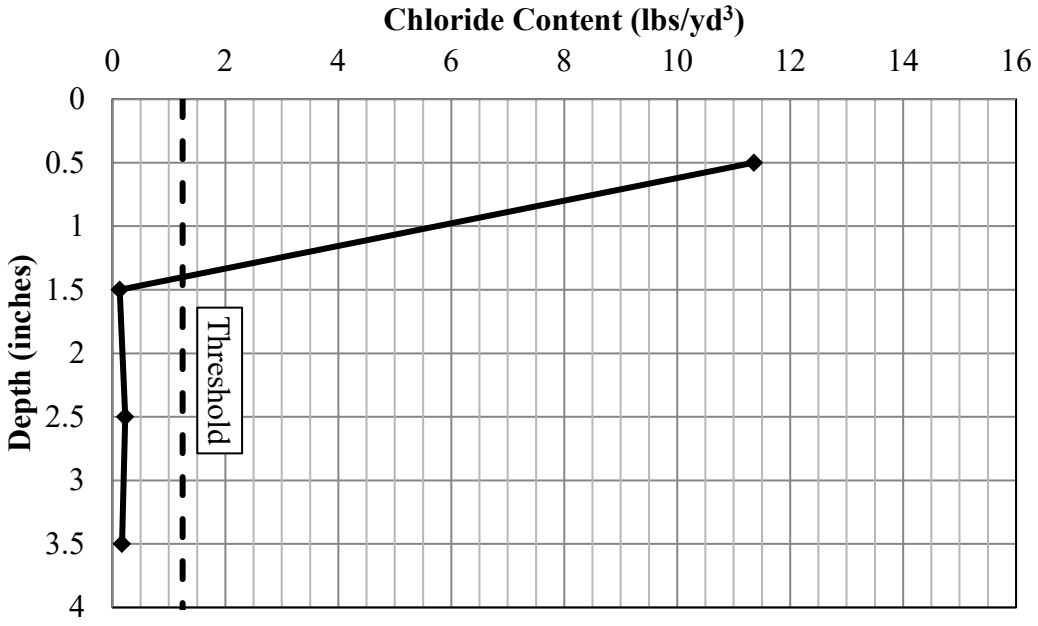

Figure C.10: Vertical chloride profile of dust sample 2 at MRM 411

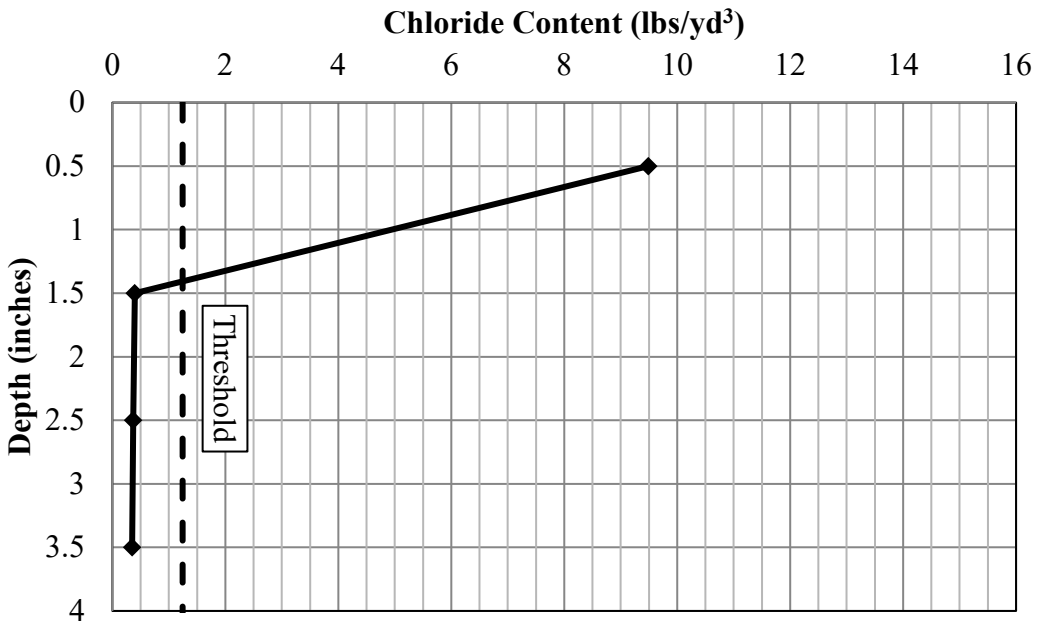

Figure C.11: Vertical chloride profile of dust sample 3 at MRM 411

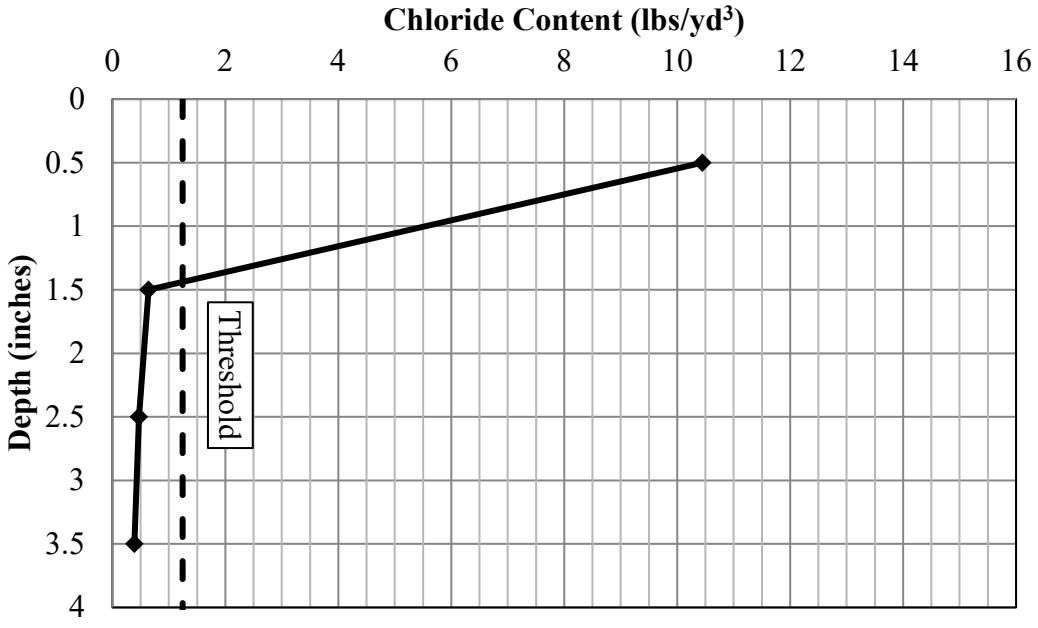

Figure C.12: Vertical chloride profile of dust sample 4 at MRM 411

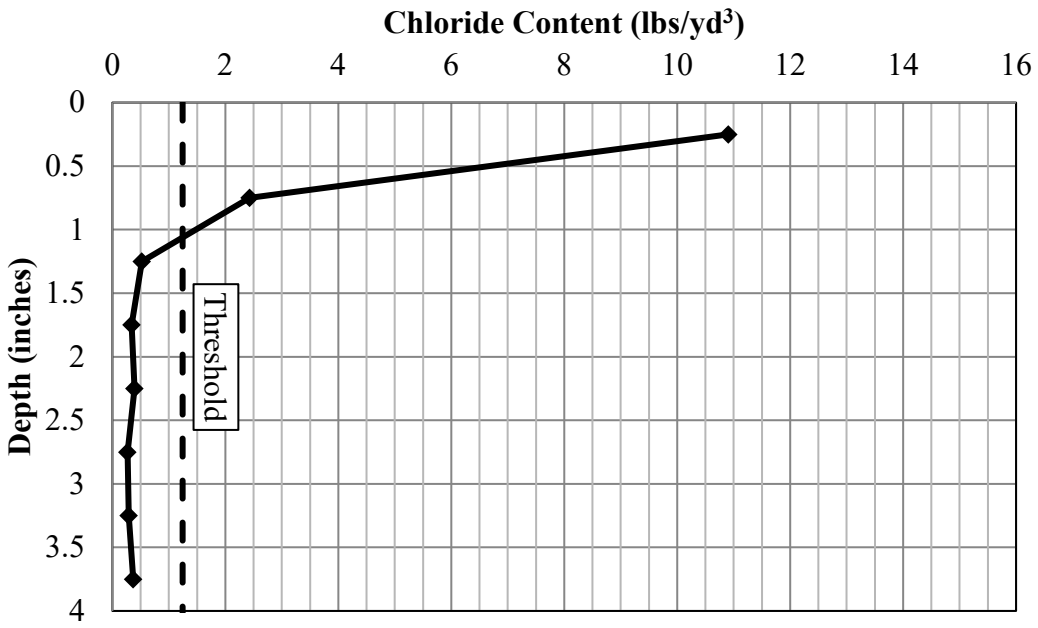

Figure C.13: Vertical chloride profile of dust sample 1 at MRM 33

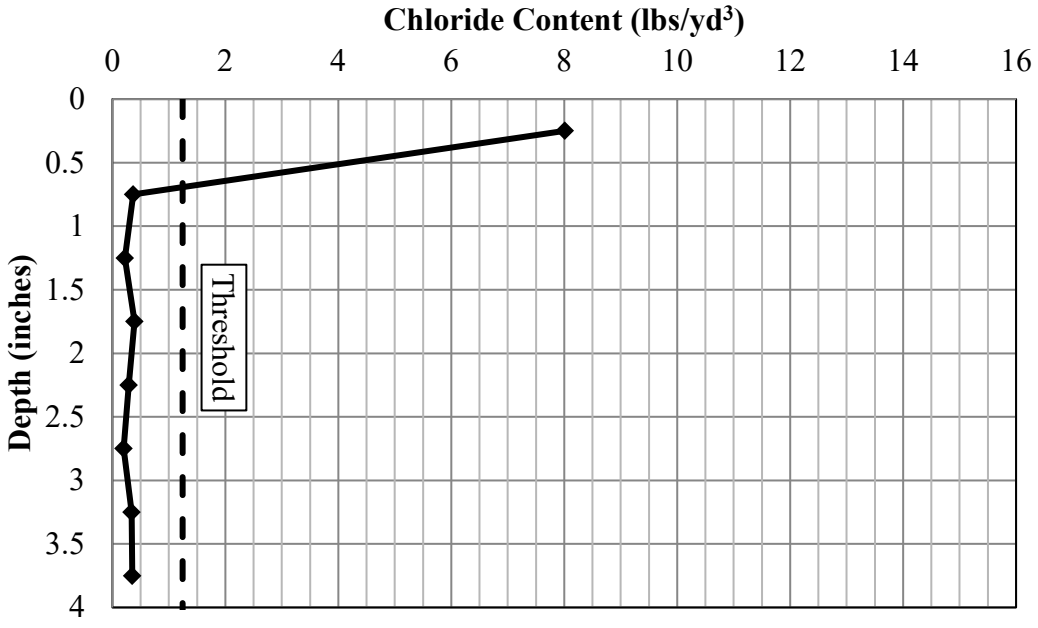

Figure C.14: Vertical chloride profile of dust sample 2 at MRM 33

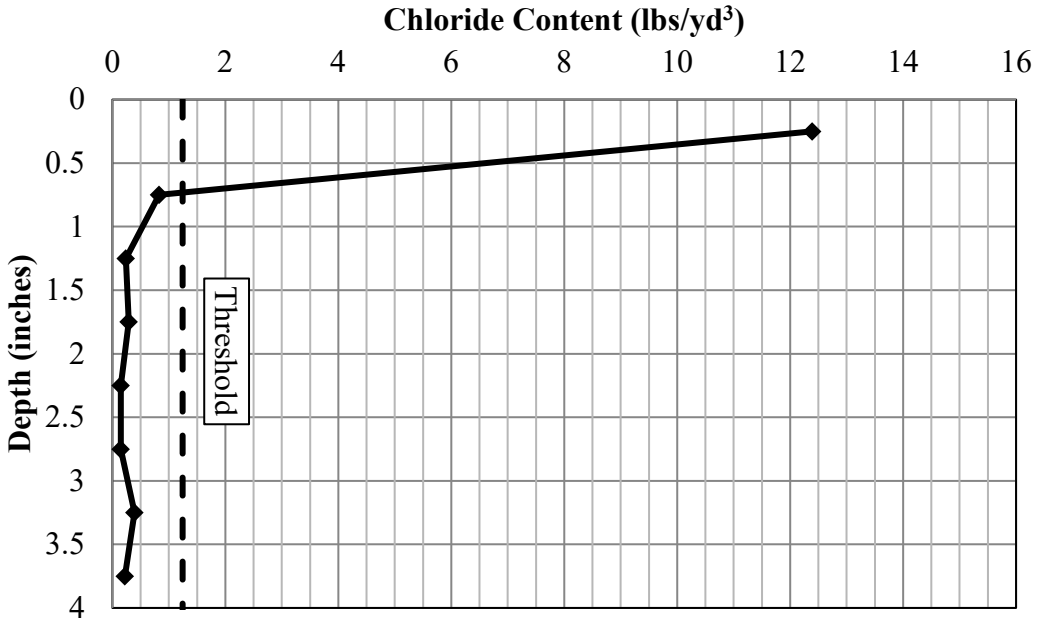

Figure C.15: Vertical chloride profile of dust sample 1 at MRM 44

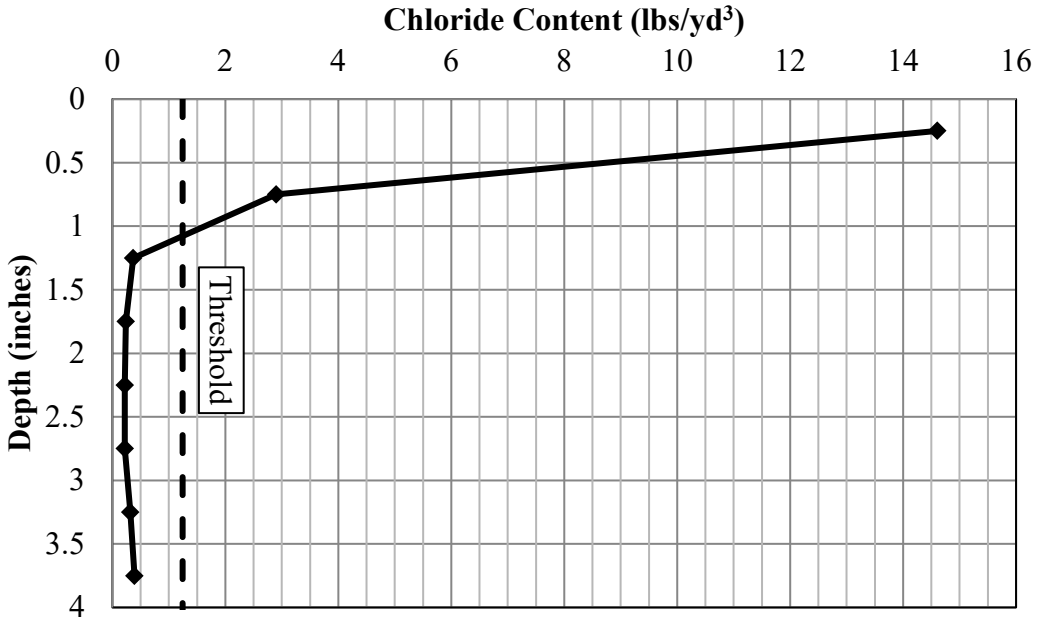

Figure C.16: Vertical chloride profile of dust sample 2 at MRM 44

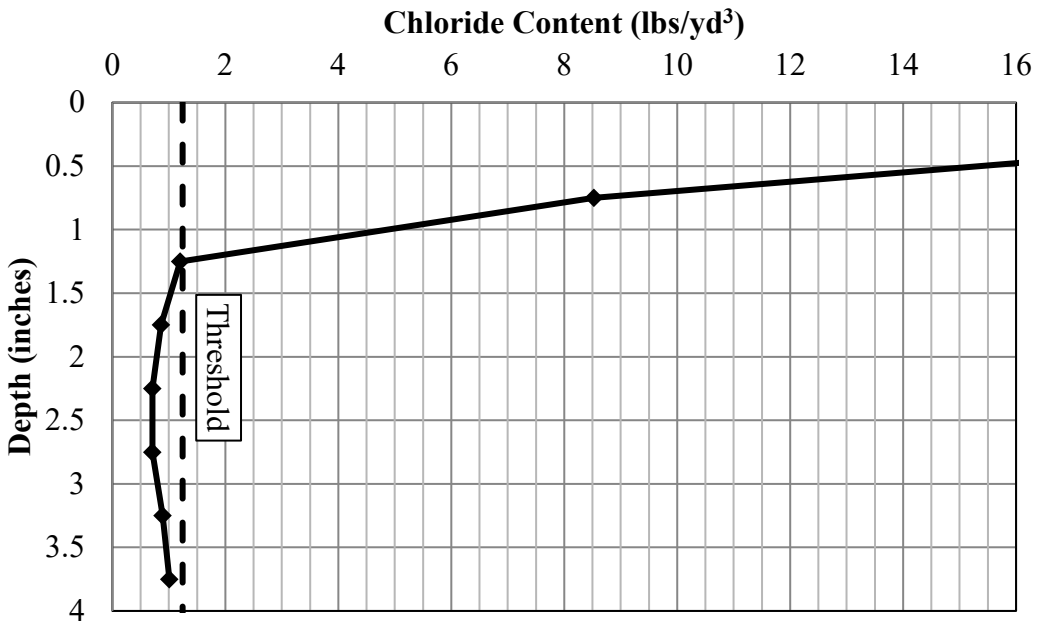

Figure C.17: Vertical chloride profile of dust sample 1 at MRM 25

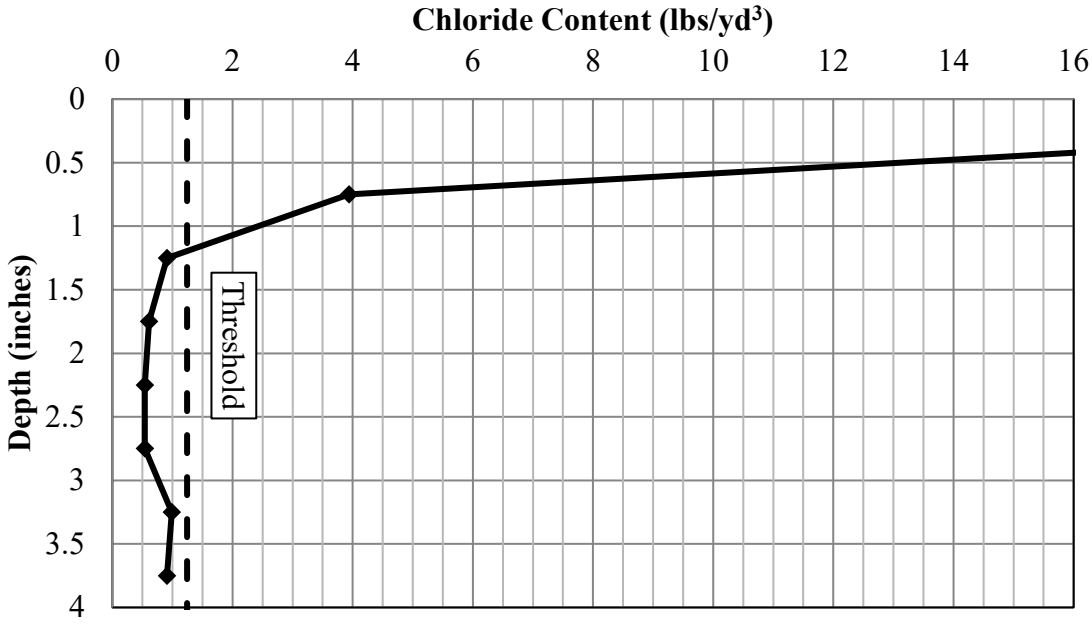

Figure C.18: Vertical chloride profile of dust sample 2 at MRM 25

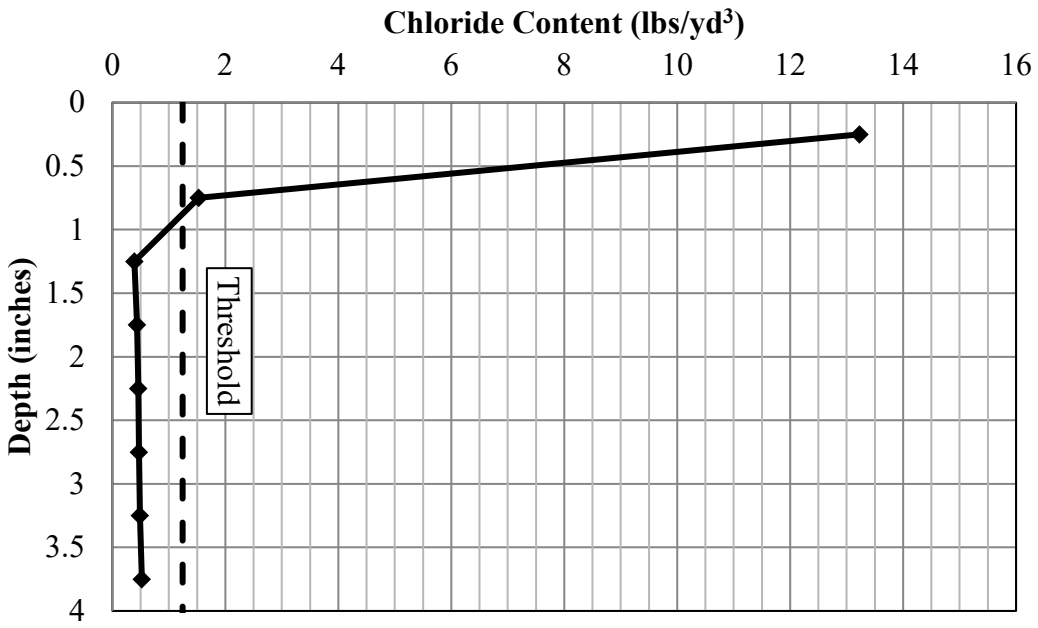

Figure C.19: Vertical chloride profile of dust sample 1 at MRM 54

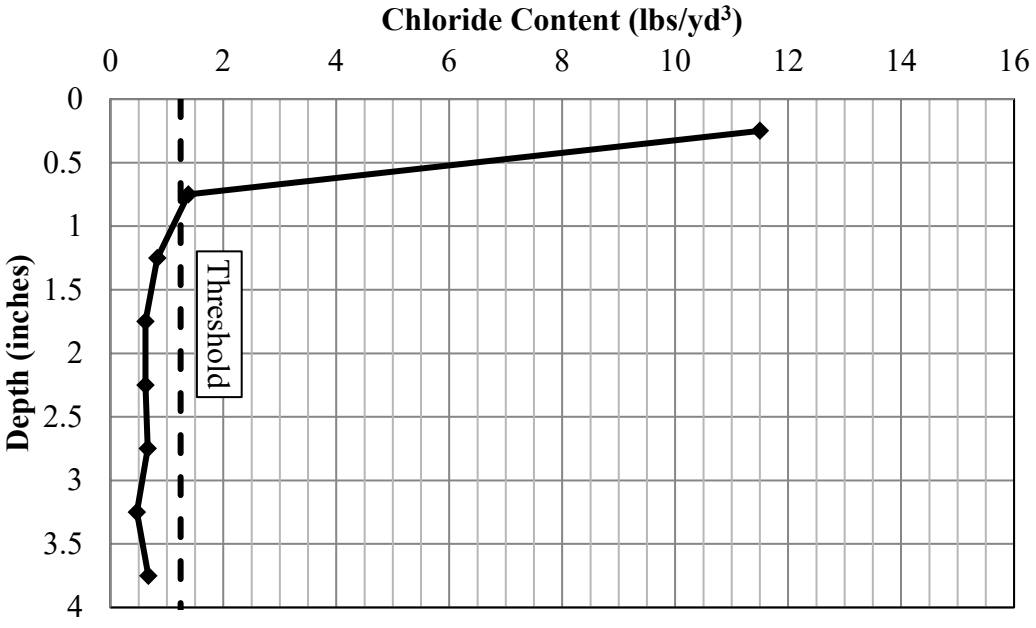

Figure C.20: Vertical chloride profile of dust sample 2 at MRM 54

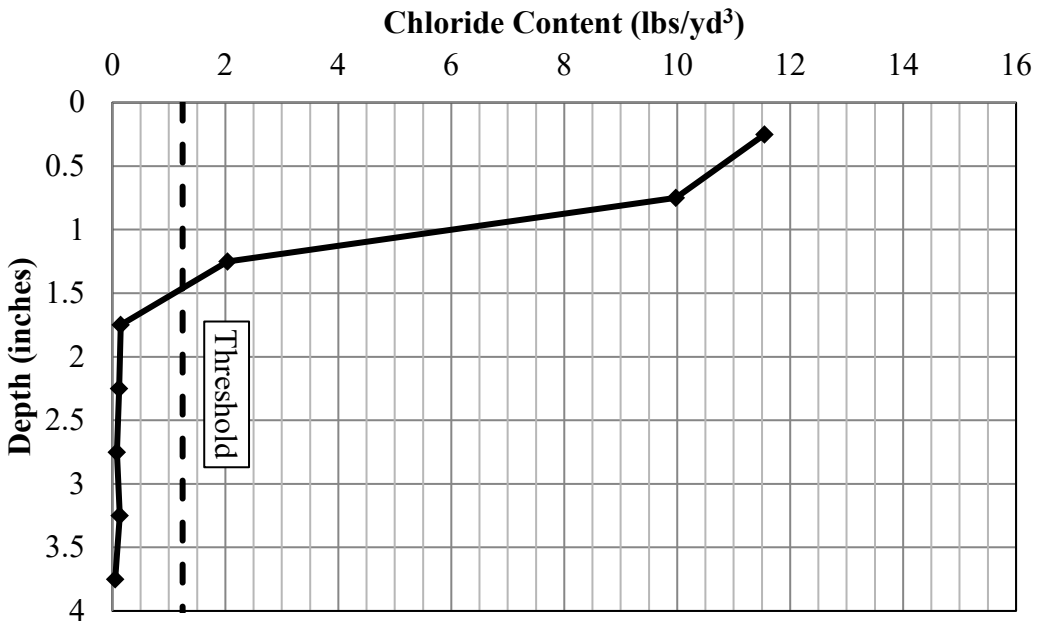

Figure C.21: Vertical chloride profile of dust sample 1 at MRM 222

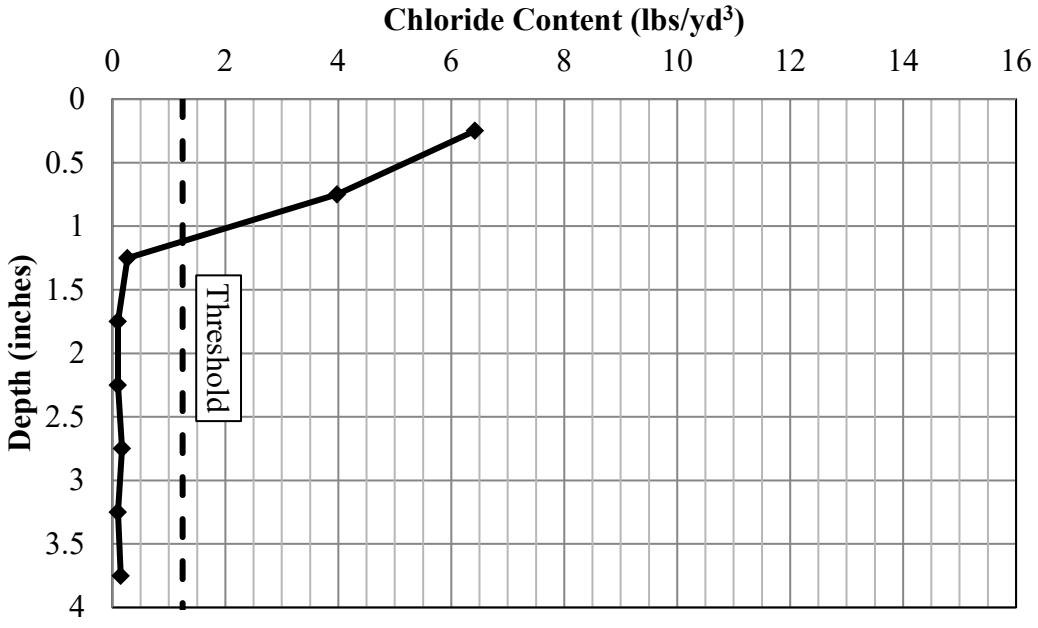

Figure C.22: Vertical chloride profile of dust sample 2 at MRM 222

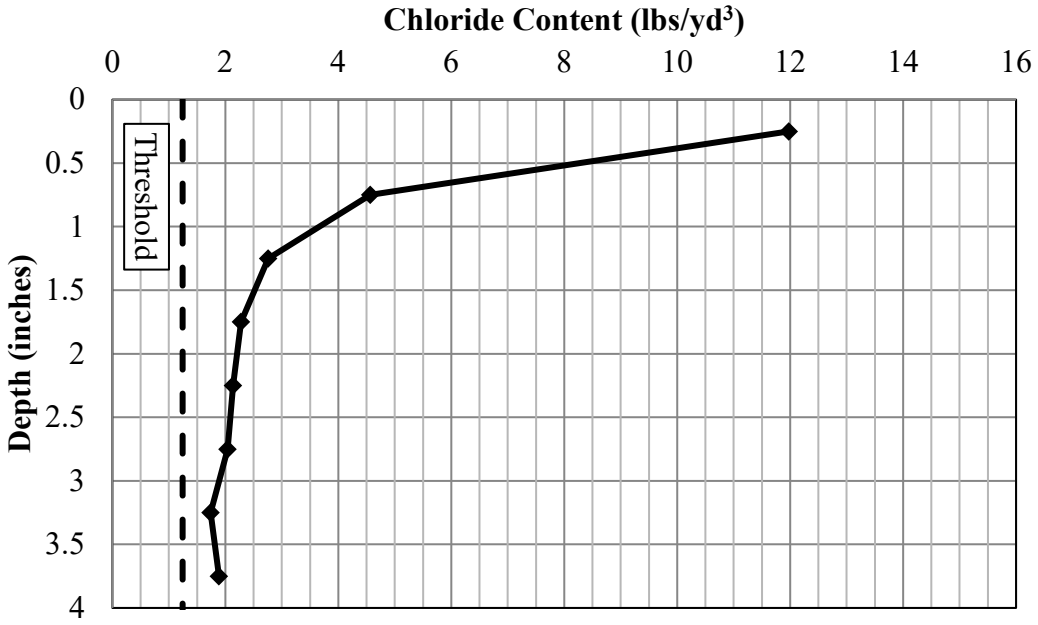

Figure C.23: Vertical chloride profile of dust sample 1 at MRM 246

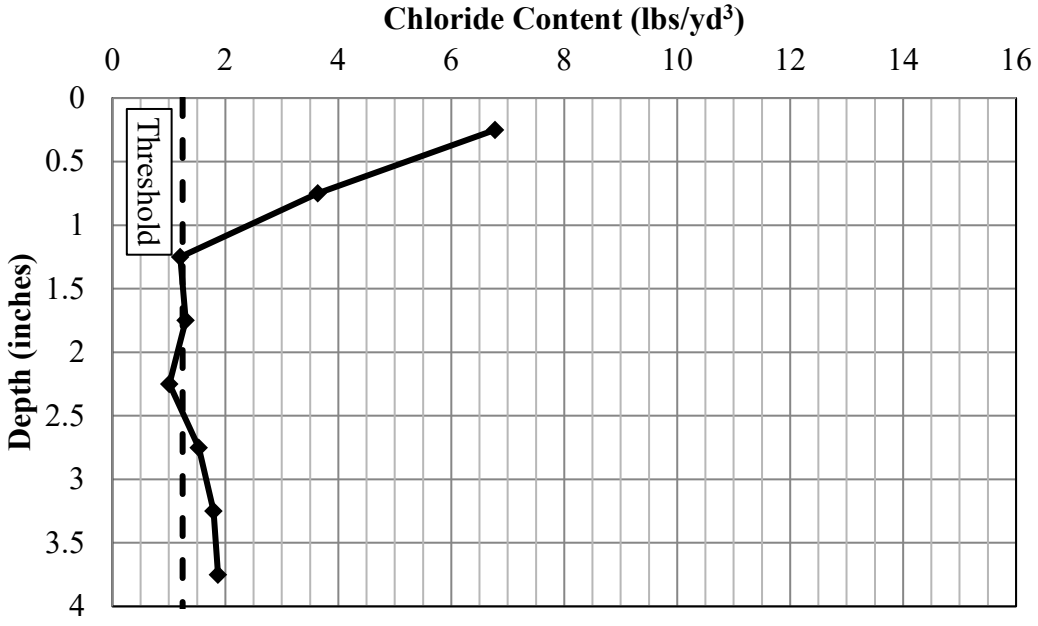

Figure C.24: Vertical chloride profile of dust sample 2 at MRM 246

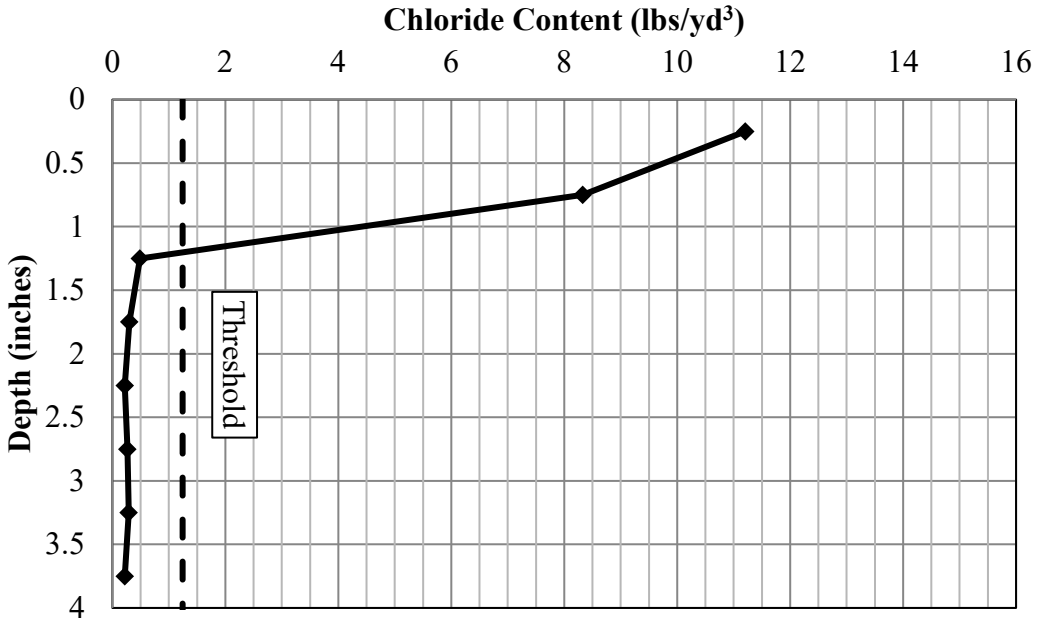

Figure C.25: Vertical chloride profile of dust sample 1 at MRM 168 NB

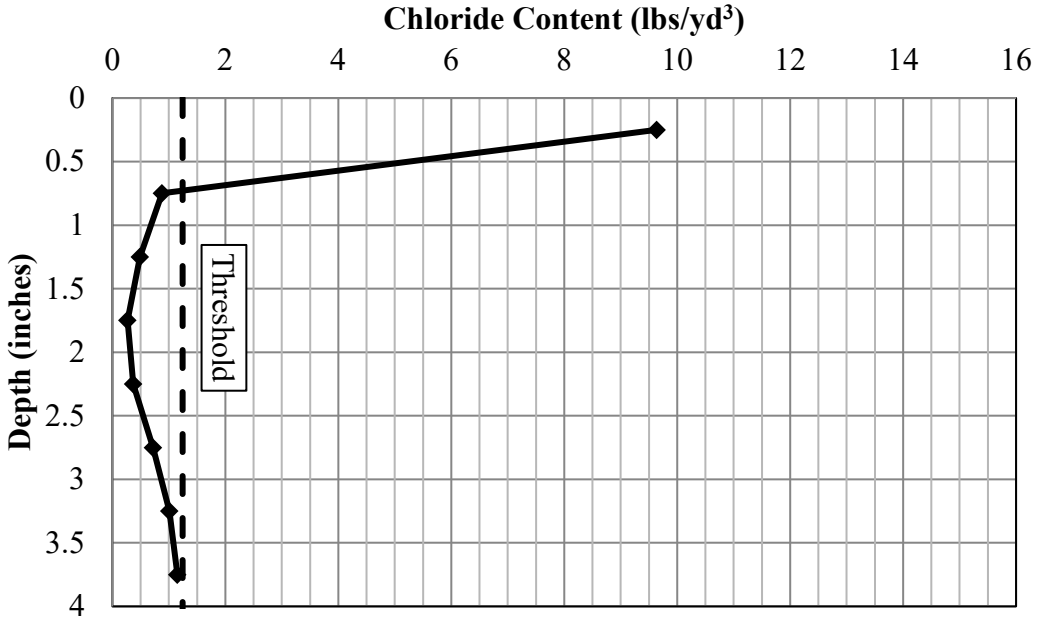

Figure C.26: Vertical chloride profile of dust sample 2 at MRM 168 NB

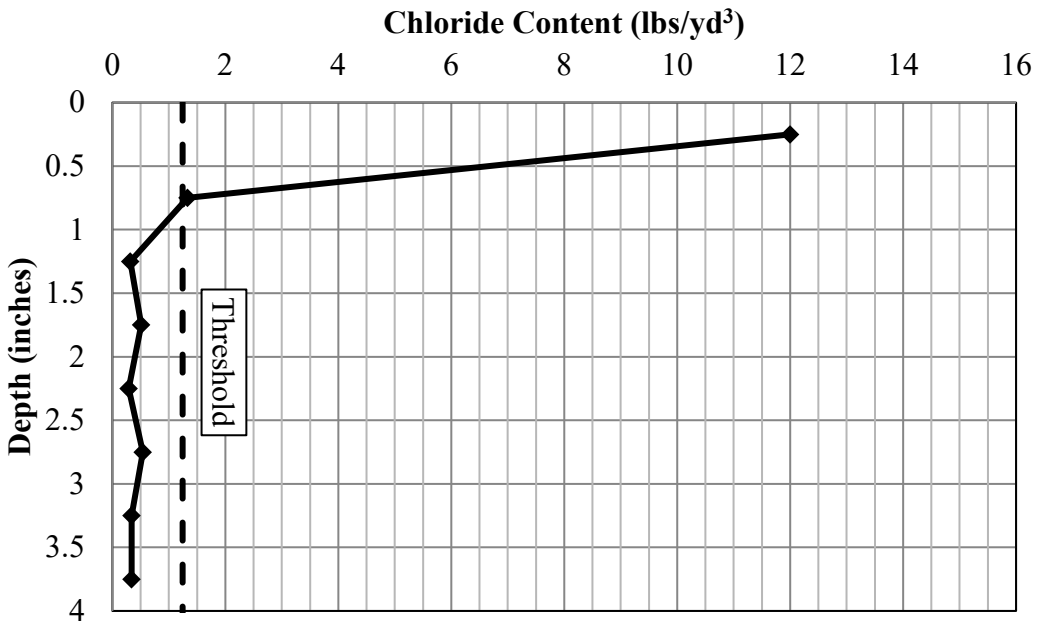

Figure C.27: Vertical chloride profile of dust sample 1 at MRM 168SB

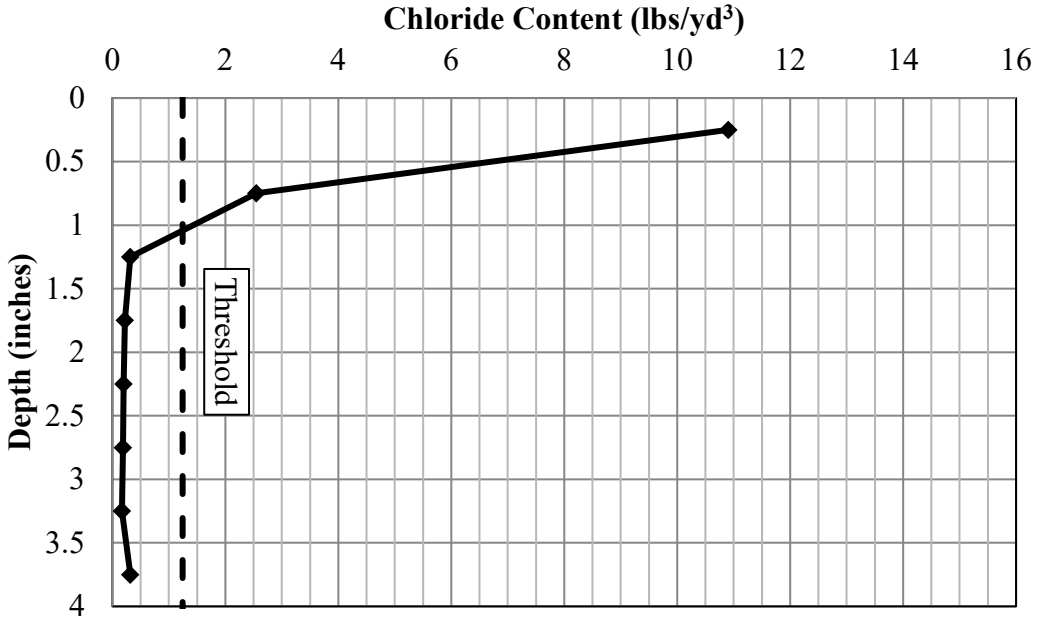

Figure C.28: Vertical chloride profile of dust sample 2 at MRM 168SB

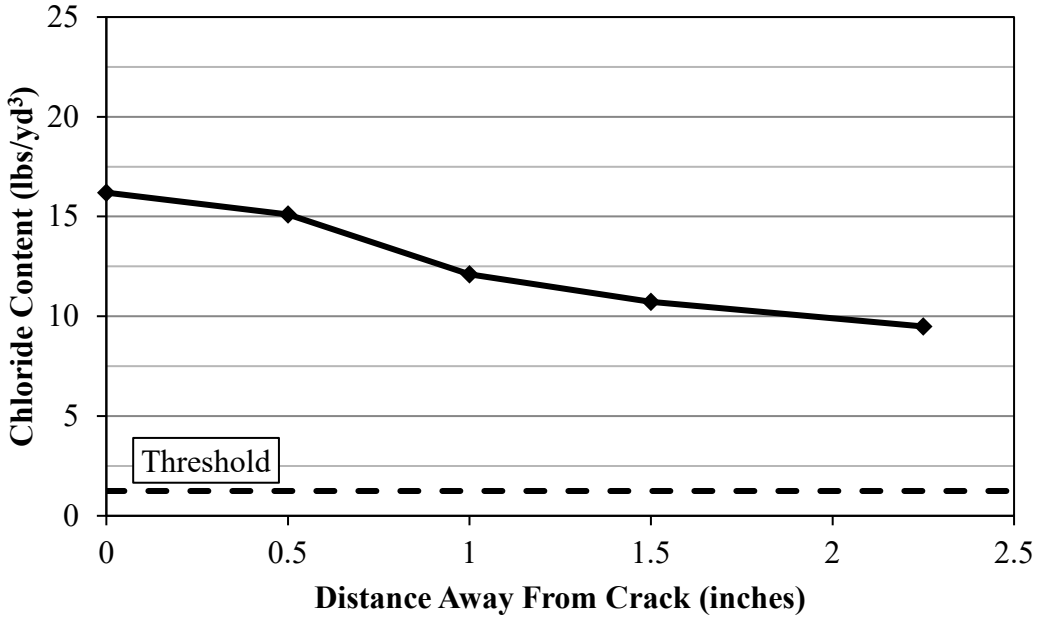

Figure C.29: Horizontal chloride profile of core MRM 87-3 at depth 0.5 inches

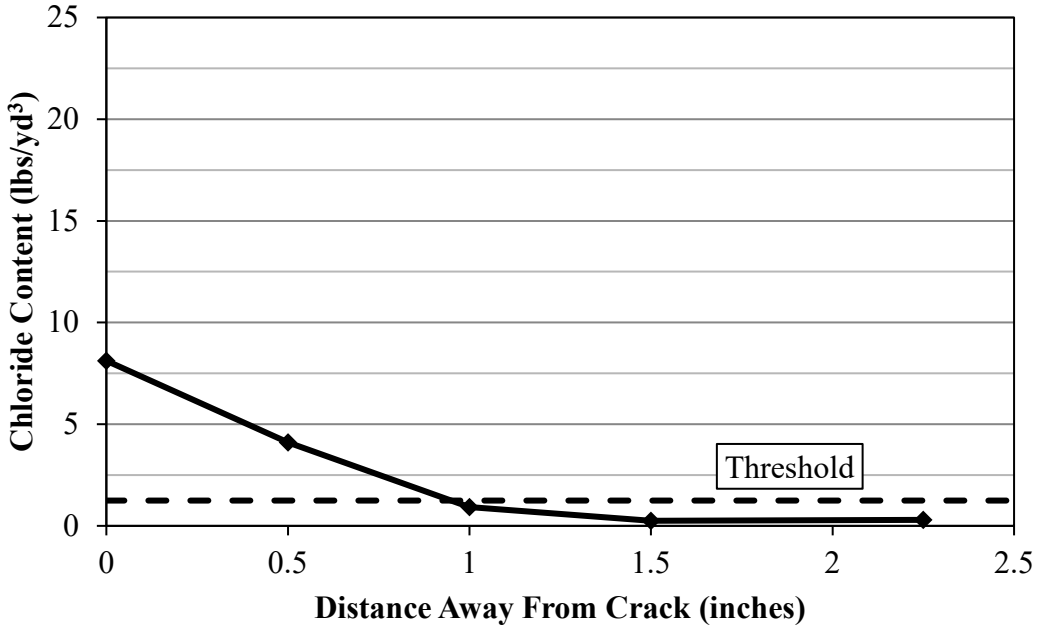

Figure C.30: Horizontal chloride profile of core MRM 87-3 at depth 1.5 inches

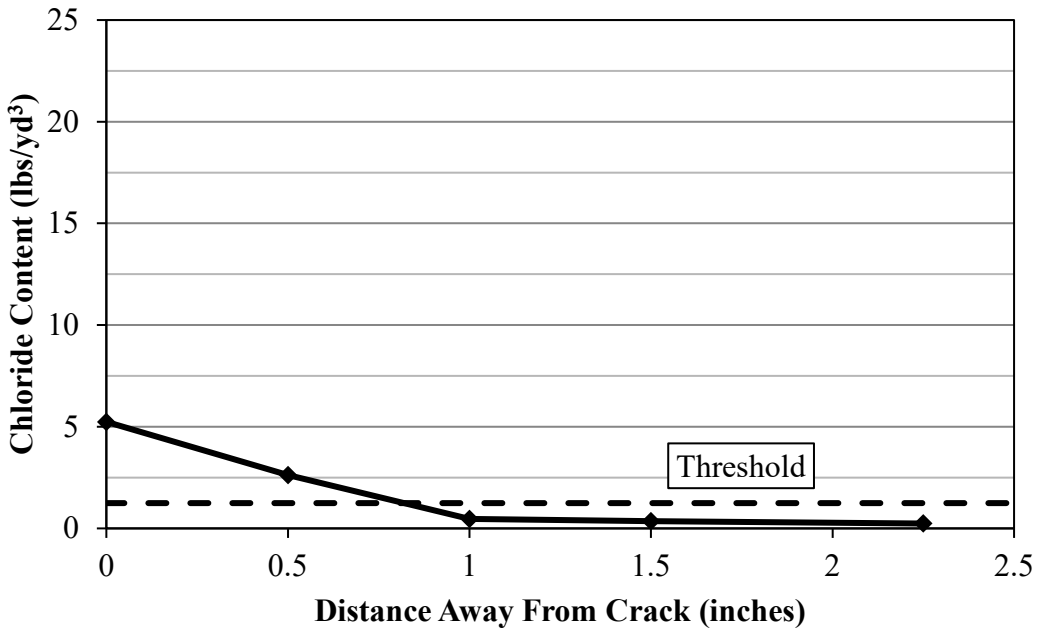

Figure C.31: Horizontal chloride profile of core MRM 87-3 at depth 2.5 inches

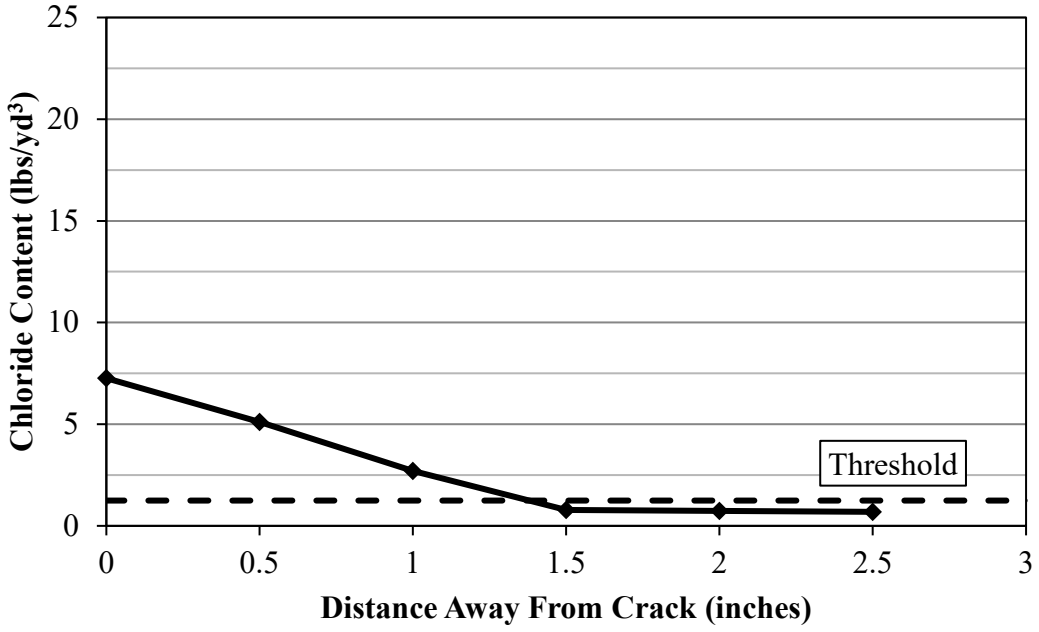

Figure C.32: Horizontal chloride profile of core MRM 87-3 at depth 3.5 inches

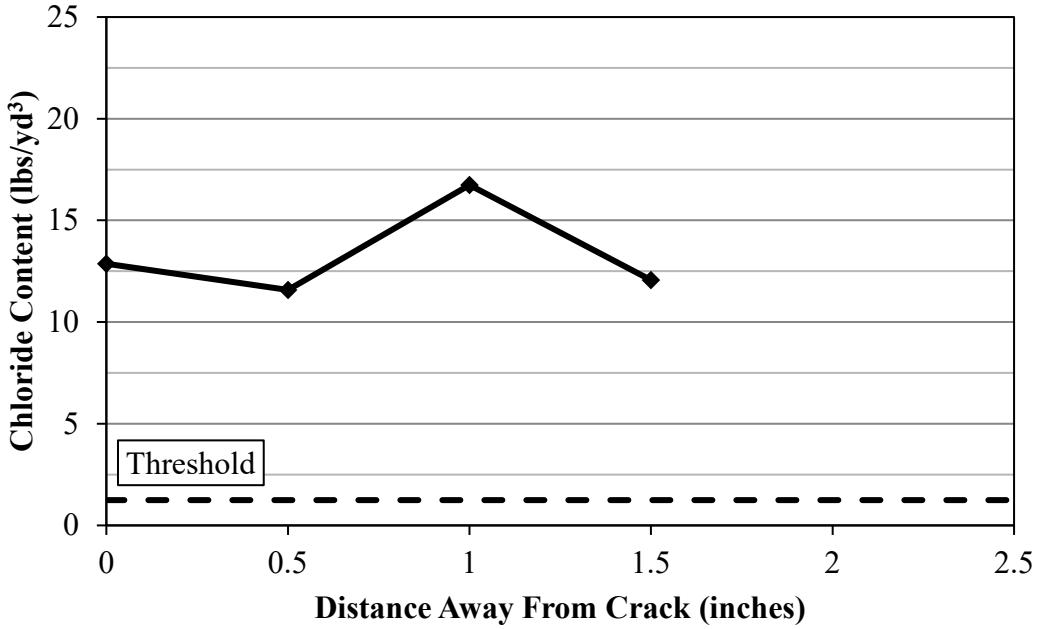

Figure C.33: Horizontal chloride profile of core MRM 68-3 at depth 0.5 inches

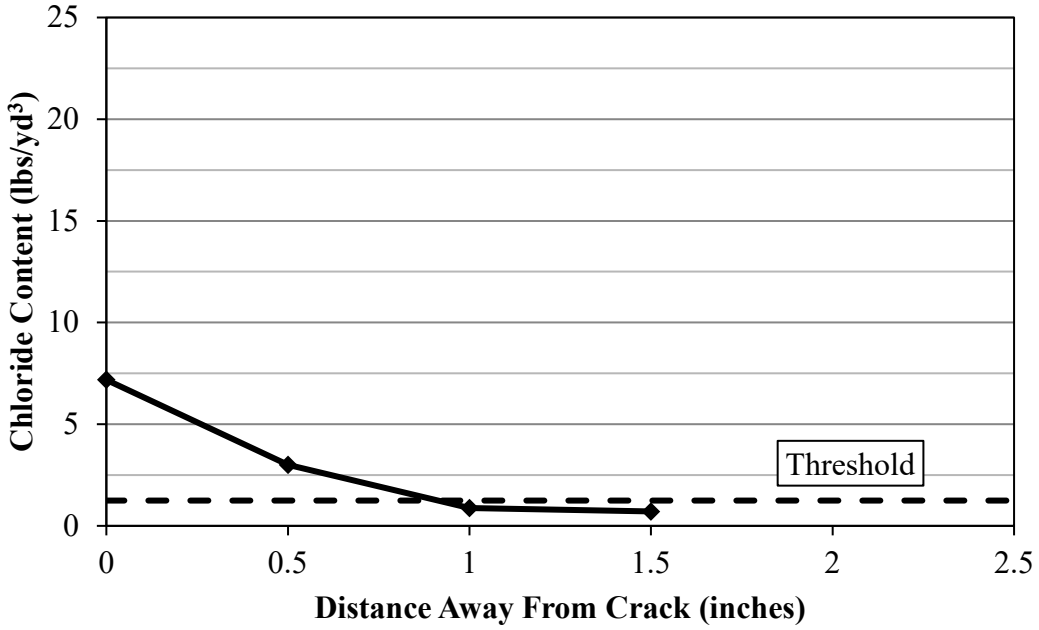

Figure C.34: Horizontal chloride profile of core MRM 68-3 at depth 1.5 inches

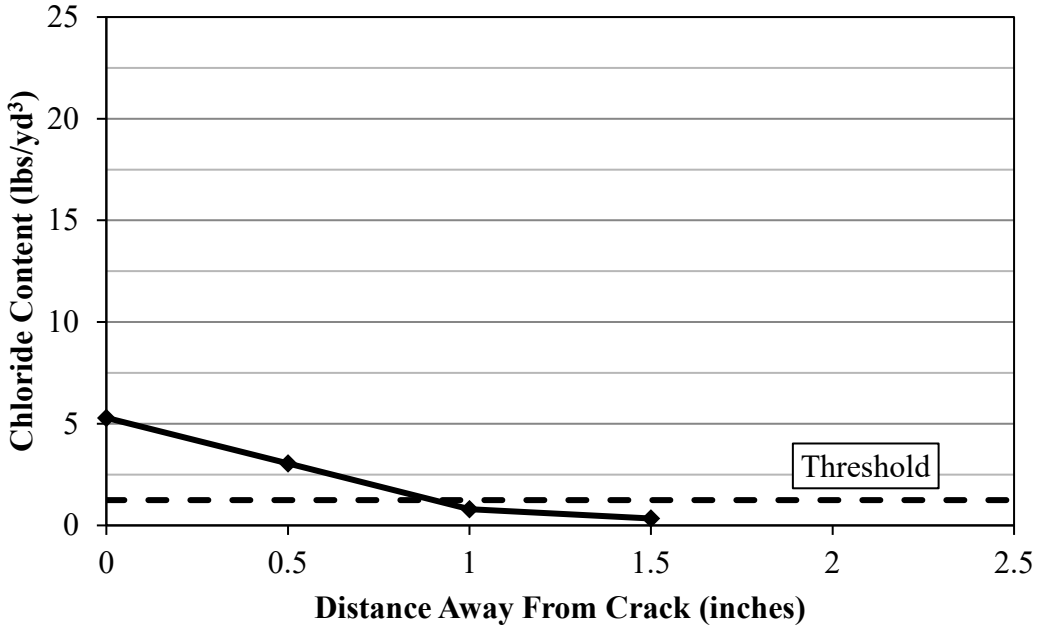

Figure C.35: Horizontal chloride profile of core MRM 68-3 at depth 2.5 inches

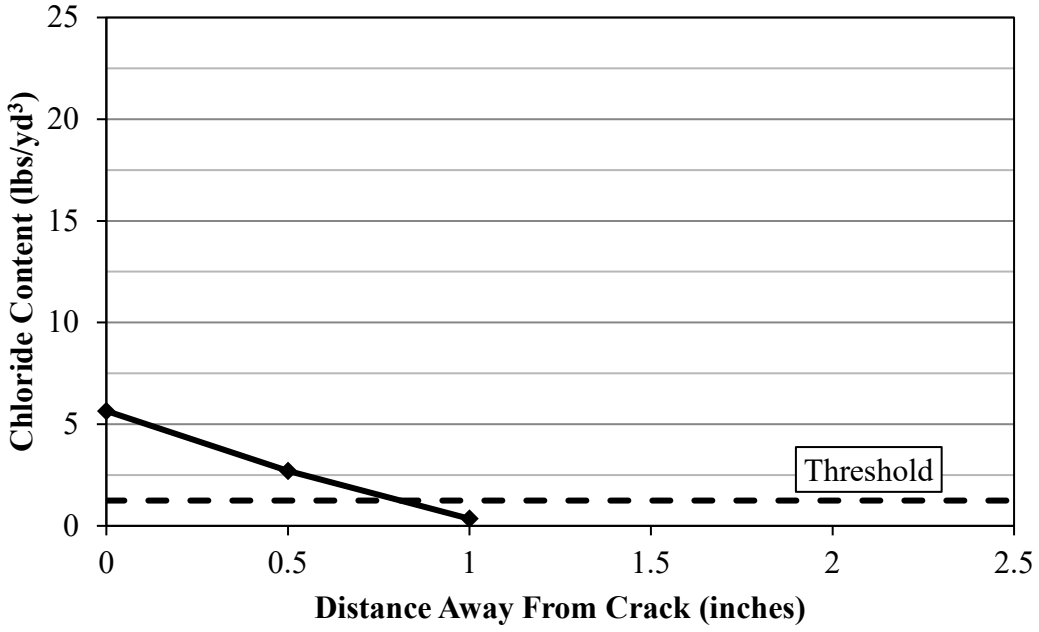

Figure C.36: Horizontal chloride profile of core MRM 68-3 at depth 3.5 inches

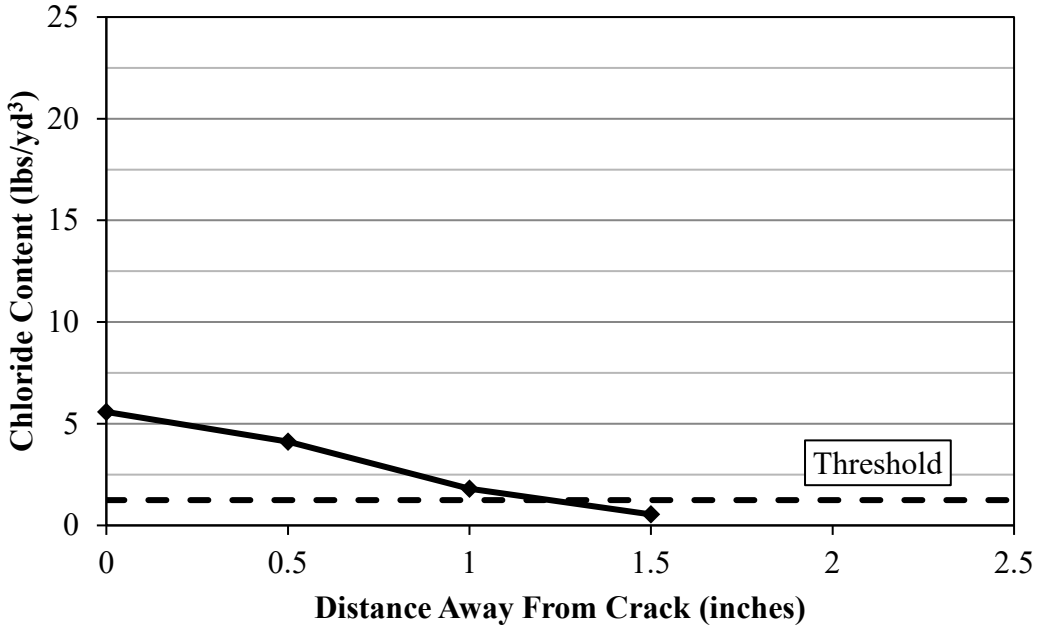

Figure C.37: Horizontal chloride profile of core MRM 68-3 at depth 4.5 inches

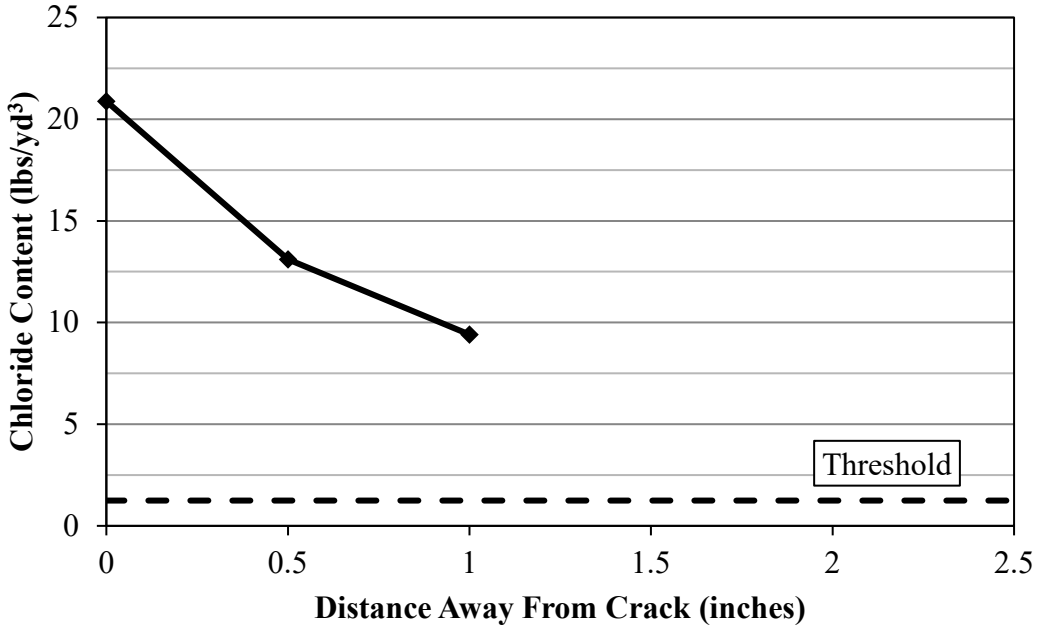

Figure C.38: Horizontal chloride profile of core MRM 411-1 at depth 0.5 inches

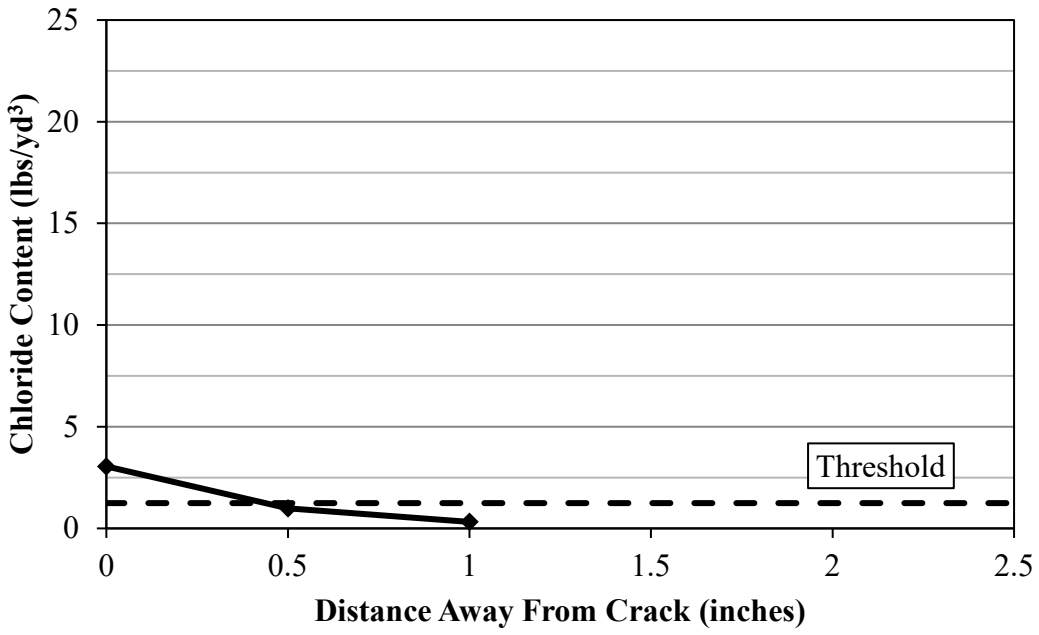

Figure C.39: Horizontal chloride profile of core MRM 411-1 at depth 1.5 inches

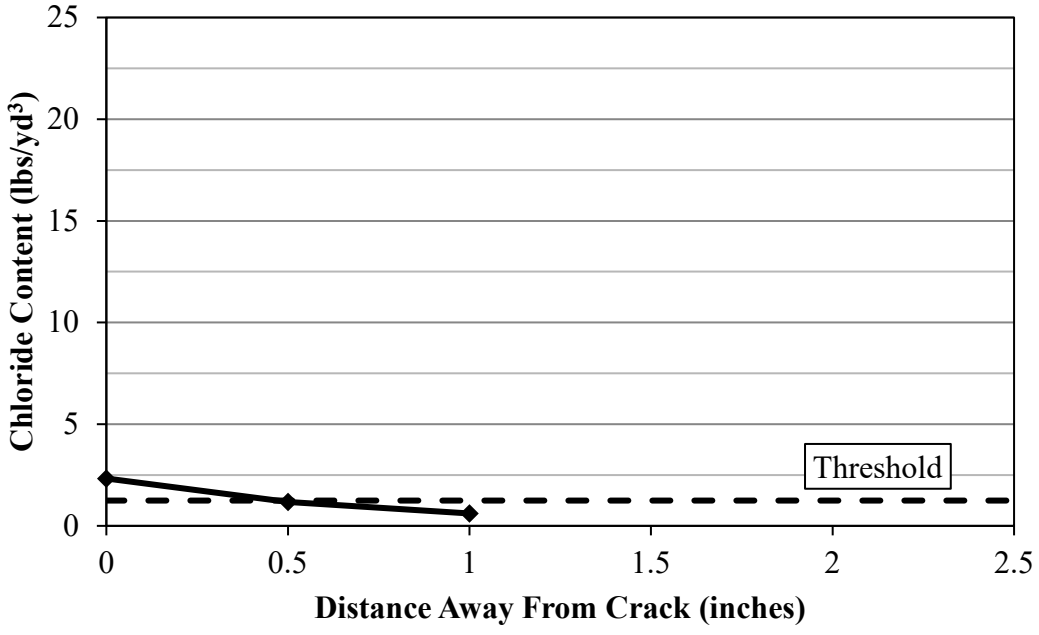

Figure C.40: Horizontal chloride profile of core MRM 411-1 at depth 2.5 inches

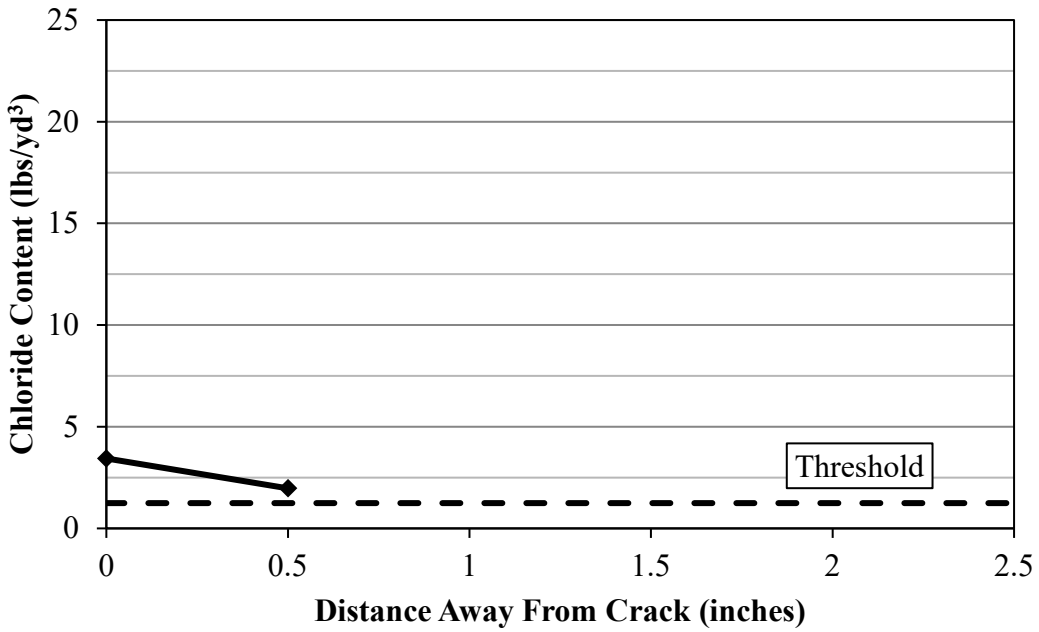

Figure C.41: Horizontal chloride profile of core MRM 411-1 at depth 3.5 inches

APPENDIX D. PAVEMENT DISTRESS DEFINITIONS

The definitions presented in this appendix were obtained from the Distress Identification Manual for the Long-Term Pavement Performance Program.

Longitudinal Cracking: Cracks that are predominately parallel to the pavement centerline.

Transverse Cracking: Cracks that are predominantly perpendicular to the pavement centerline.

Polished Aggregate: Surface mortar and texturing worn away to expose coarse aggregate.

Popouts: Small pieces of pavement broken loose from the surface, normally ranging in diameter from 25 mm to 100 mm and depth from 13 mm to 50 mm.

Patch/Patch Deterioration: A portion, greater than 0.1 m^2, or all of the original concrete slab that has been removed and replaced, or additional material applied to the pavement after original construction.

Punchouts: The area enclosed by two closely spaced (usually < 0.6 m) transverse cracks, a short longitudinal crack, and the edge of the pavement or a longitudinal joint. Also includes "Y" cracks that exhibit spalling, breakup, or faulting.

Spalling of Longitudinal Joints: Cracking, breaking, chipping, or fraying of slab edges within 0.3 m from the face of the longitudinal joint.

APPENDIX E. EQUIPOTENTIAL CONTOUR MAPS FOR MITIGATION PRODUCT ASSESSMENT

The grid shown on the equipotential contour maps (Figure E-2 through Figure E-65) is 4 feet by 4 feet. However, the half-cell potential measurements were obtained on a 2 feet by 2 feet grid.

Figure E-2 through Figure E-36 show contour maps of the half-cell potential measurements at the date indicated.

Figure E-38 through Figure E-65 show contour maps of the differences between half-cell measurements at the dates indicated.

Section A – MCI-2018

Section B – Protectosil CIT and Ferrogard 903

Section C – Protectosil CIT

Section D – Ferrogard 903

Section E – Duralprep 3020

Section F – Chemtrete 40

Section G – Control

Minimum Reading (mV)	Maximum Reading (mV)	Color
−750.00	−720.00	
−720.00	−690.00	
−690.00	−660.00	
−660.00	−630.00	
−630.00	−600.00	
−600.00	−570.00	
−570.00	−540.00	
−540.00	−510.00	
−510.00	−480.00	
−480.00	−450.00	
−450.00	−420.00	
−420.00	−390.00	
−390.00	−360.00	
−360.00	−330.00	
−330.00	−300.00	
−300.00	−270.00	
−270.00	−240.00	
−240.00	−210.00	
−210.00	−180.00	
−180.00	−150.00	

Figure E.1: Legend for half-cell potential contour maps

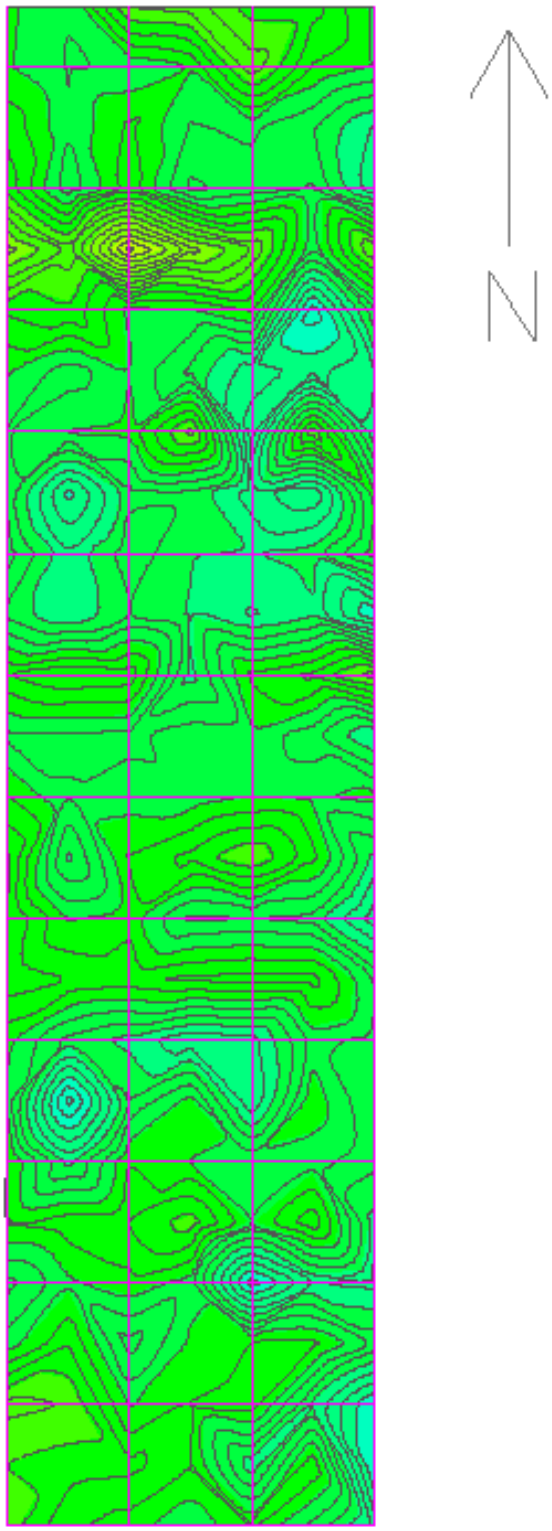

Figure E.2: Section A – 8/25/2011

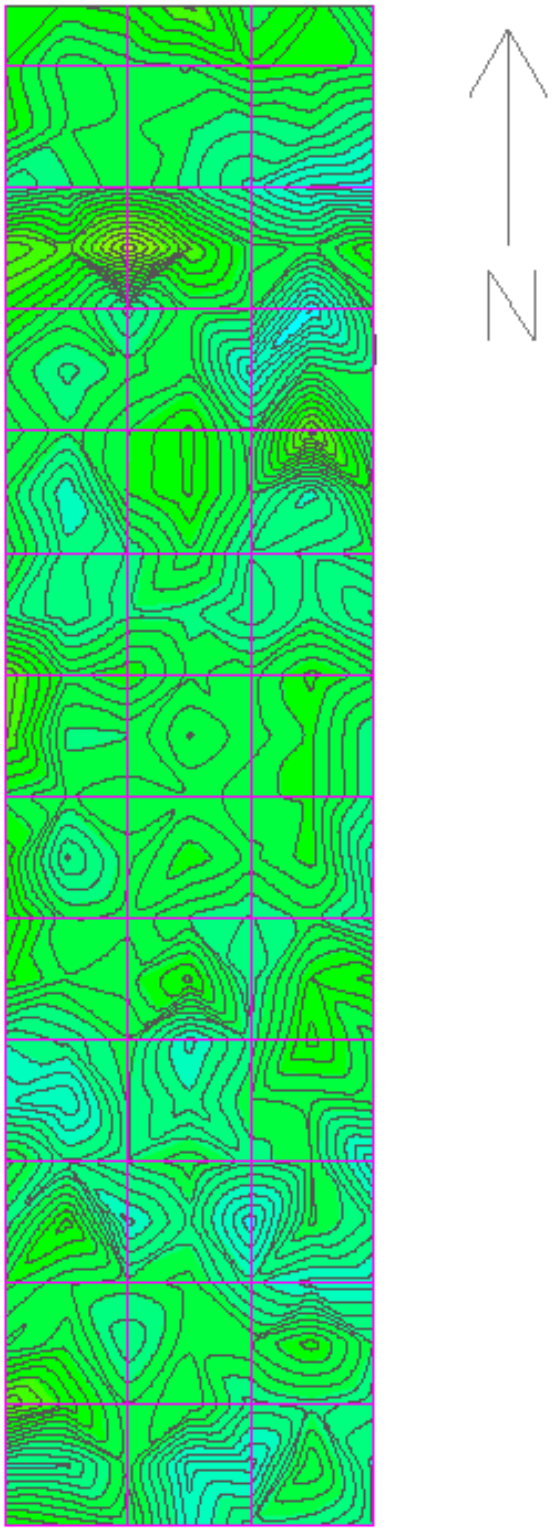

Figure E.3: Section A – 10/6/2011

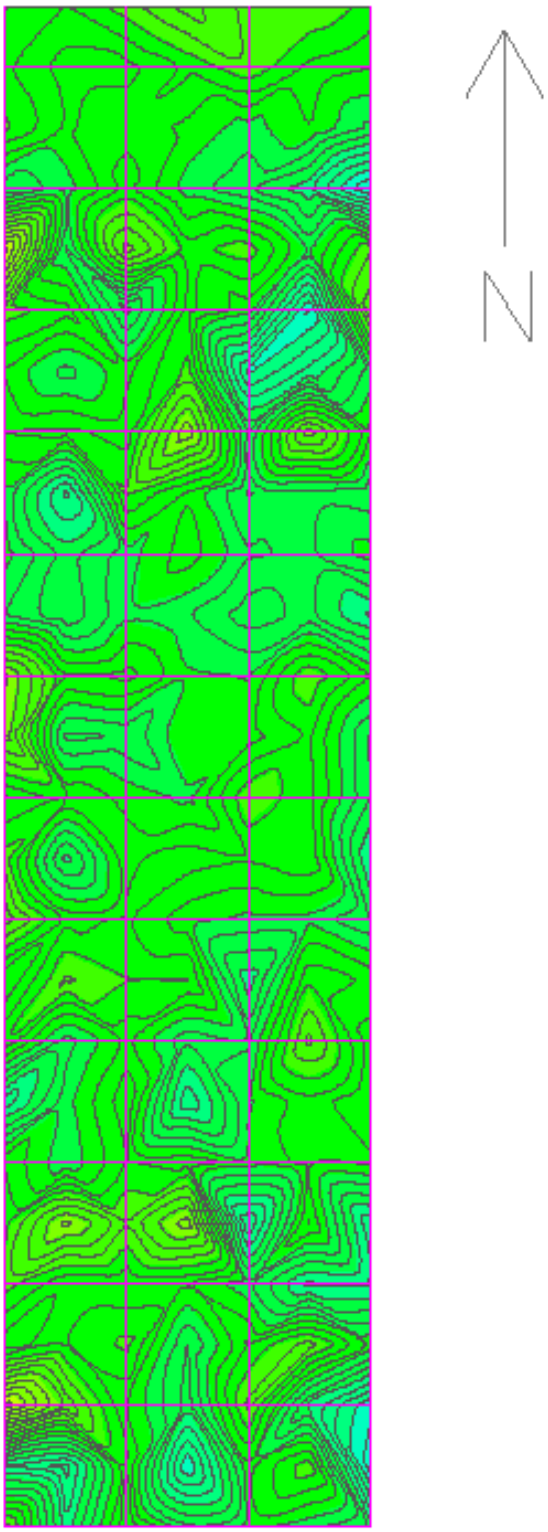

Figure E.4: Section A – 10/27/2012

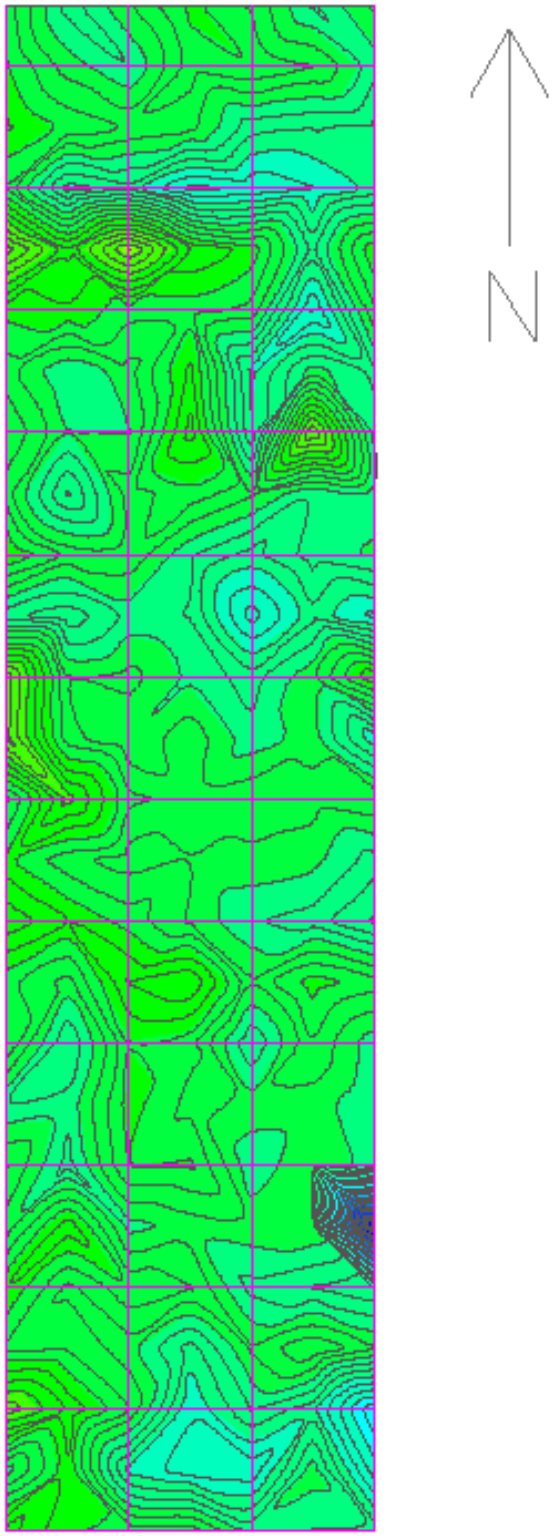

Figure E.5: Section A – 4/10/2012

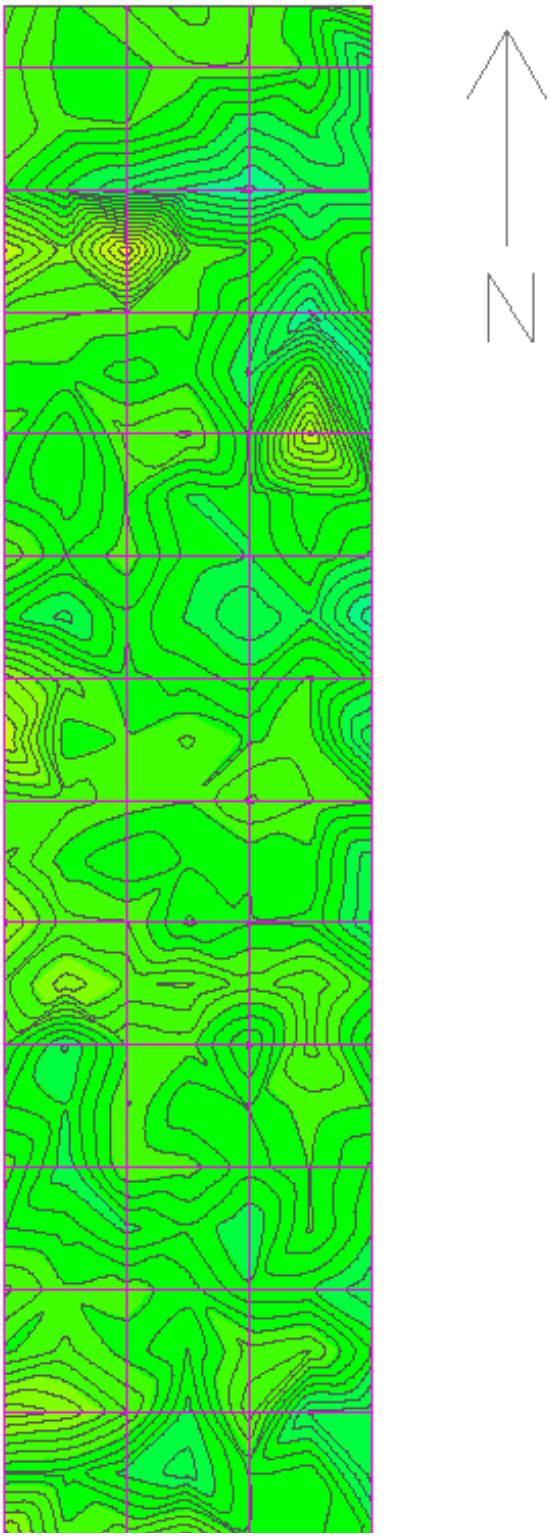

Figure E.6: Section A – 5/9/2012

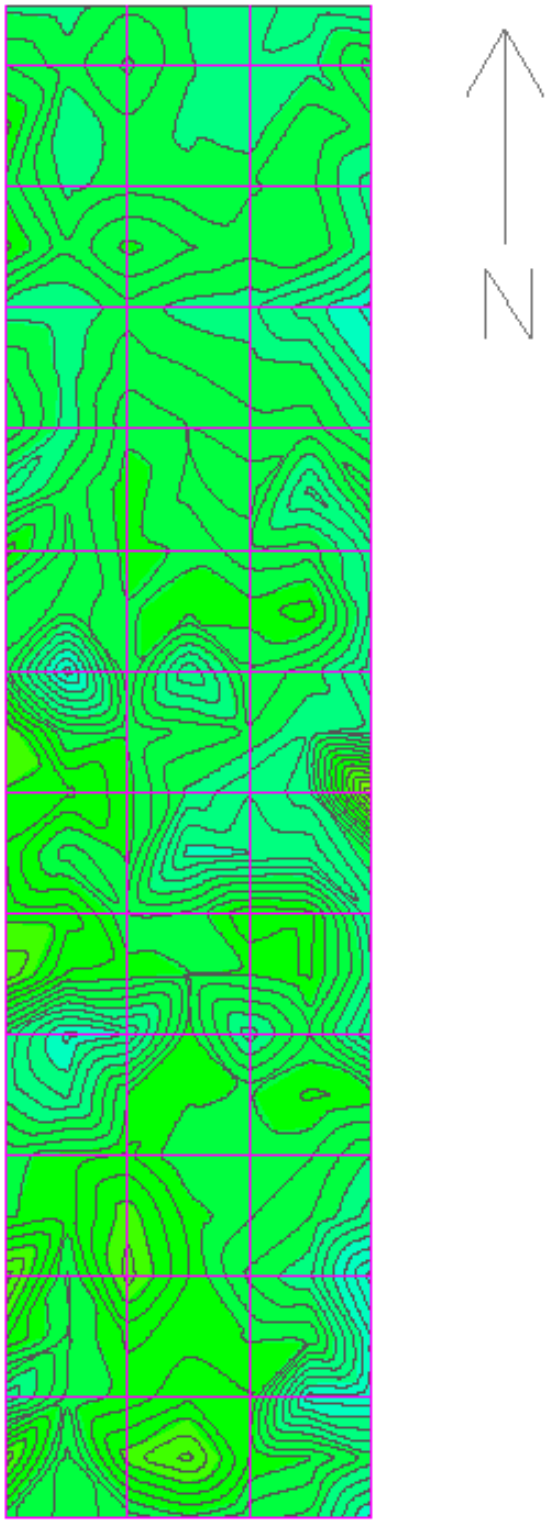

Figure E.7: Section B – 8/25/2011

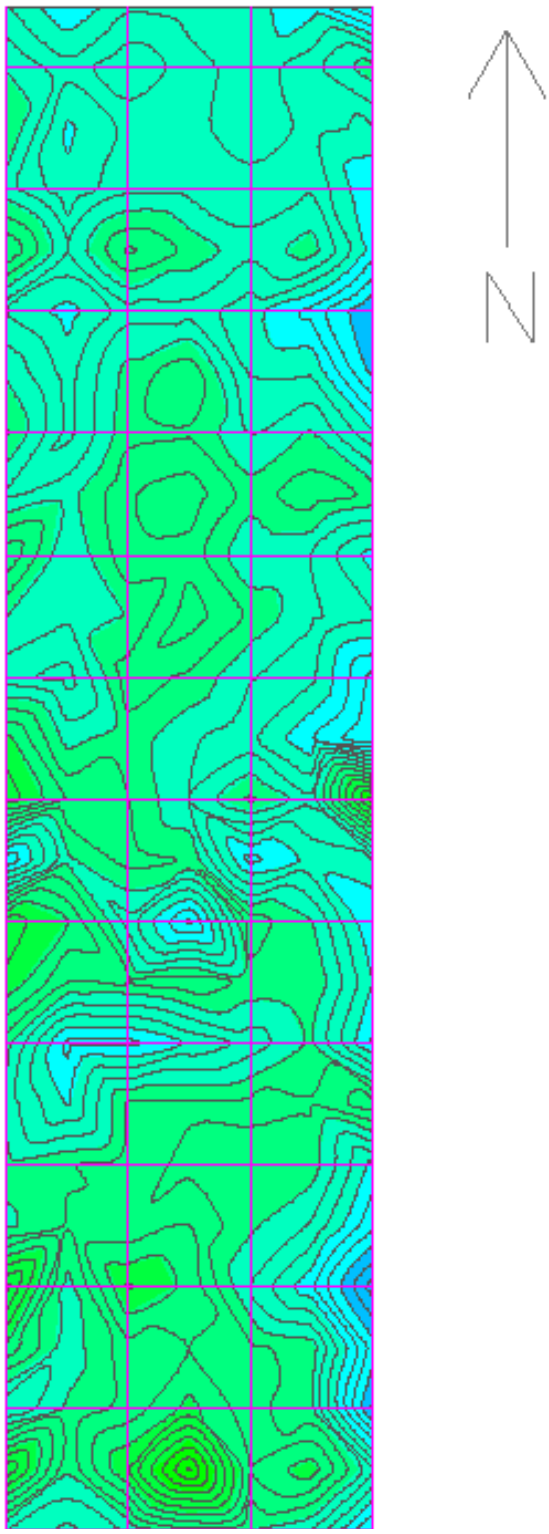

Figure E.8: Section B – 10/6/2011

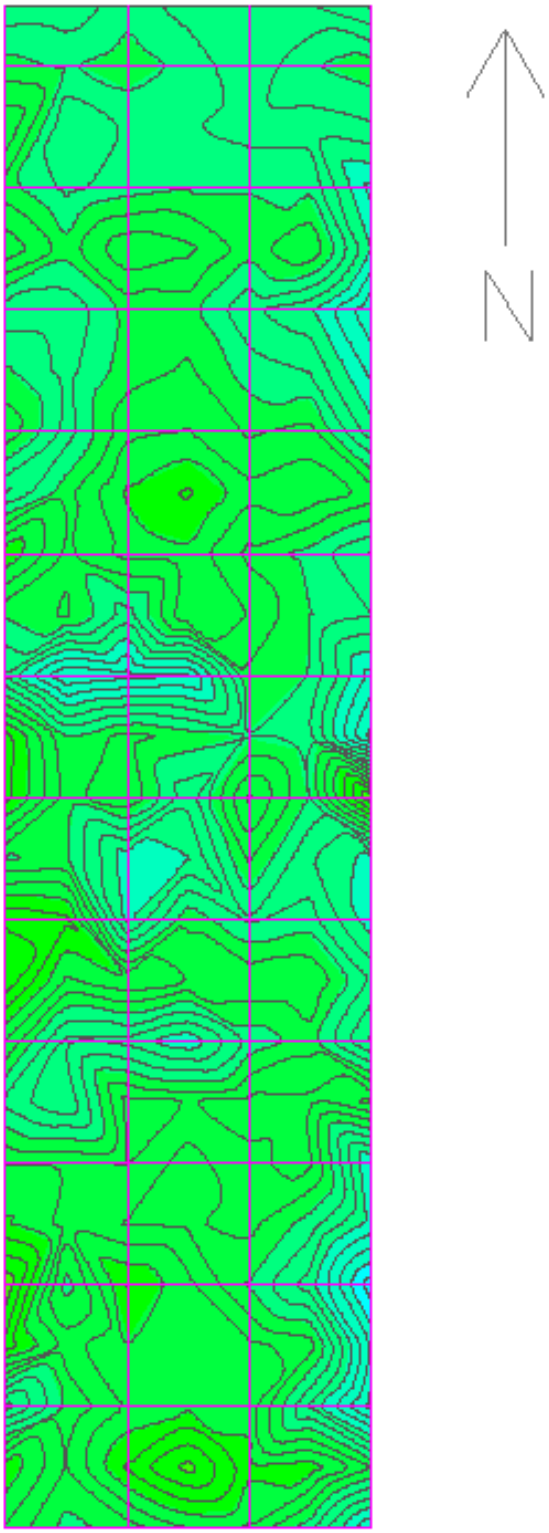

Figure E.9: Section B – 10/27/2012

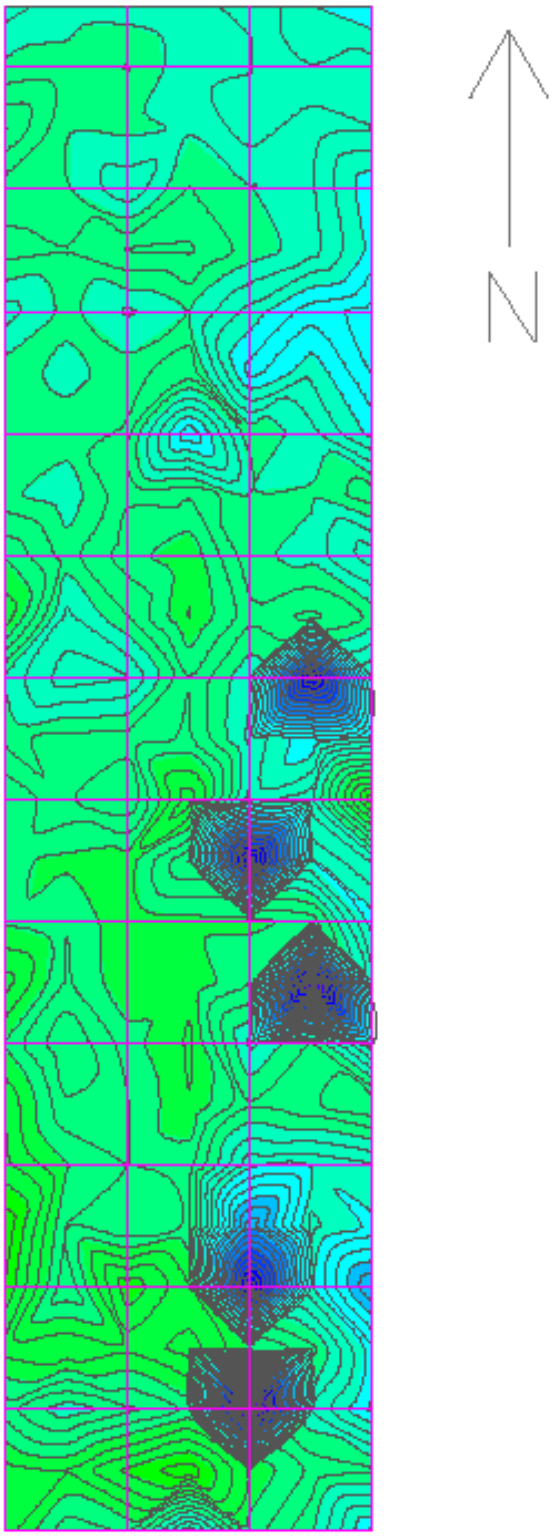

Figure E.10: Section B – 4/10/2012

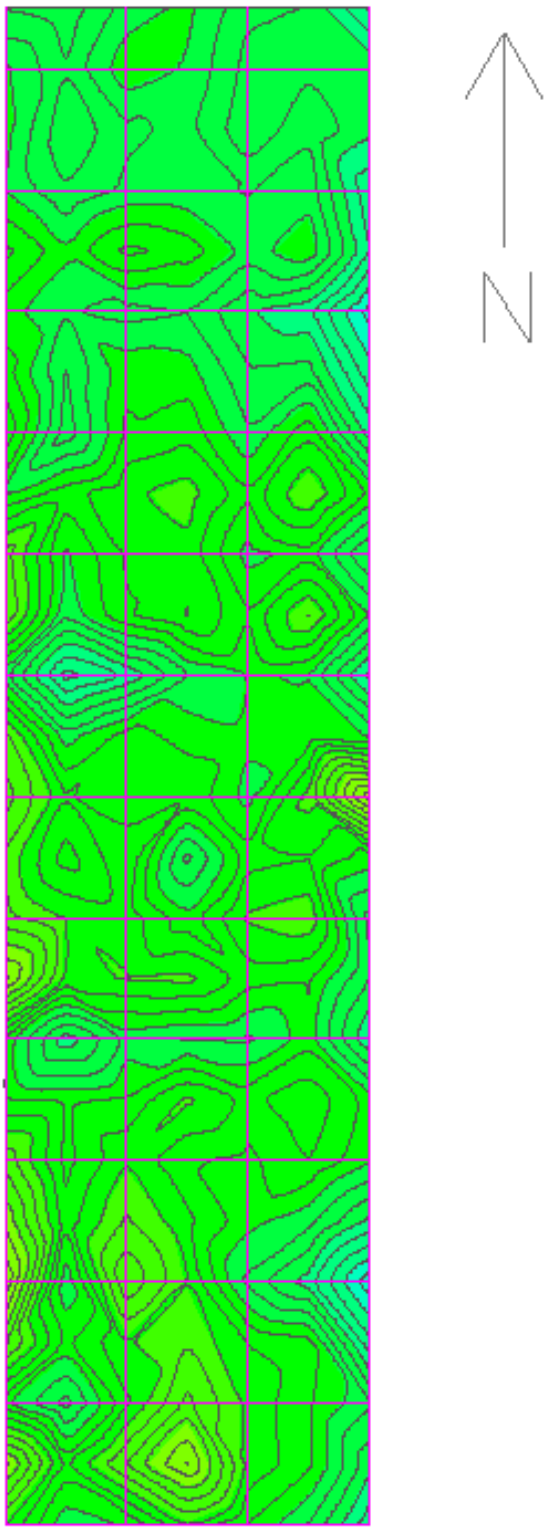

Figure E.11: Section B – 5/9/2012

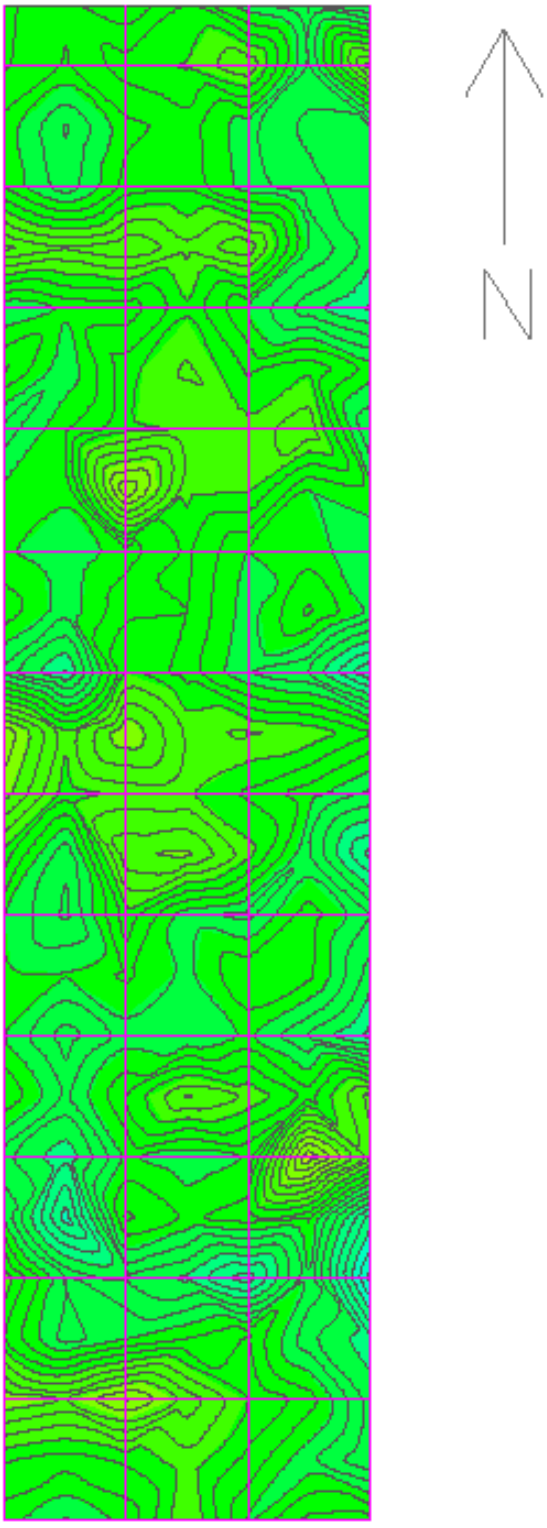

Figure E.12: Section C – 8/25/2011

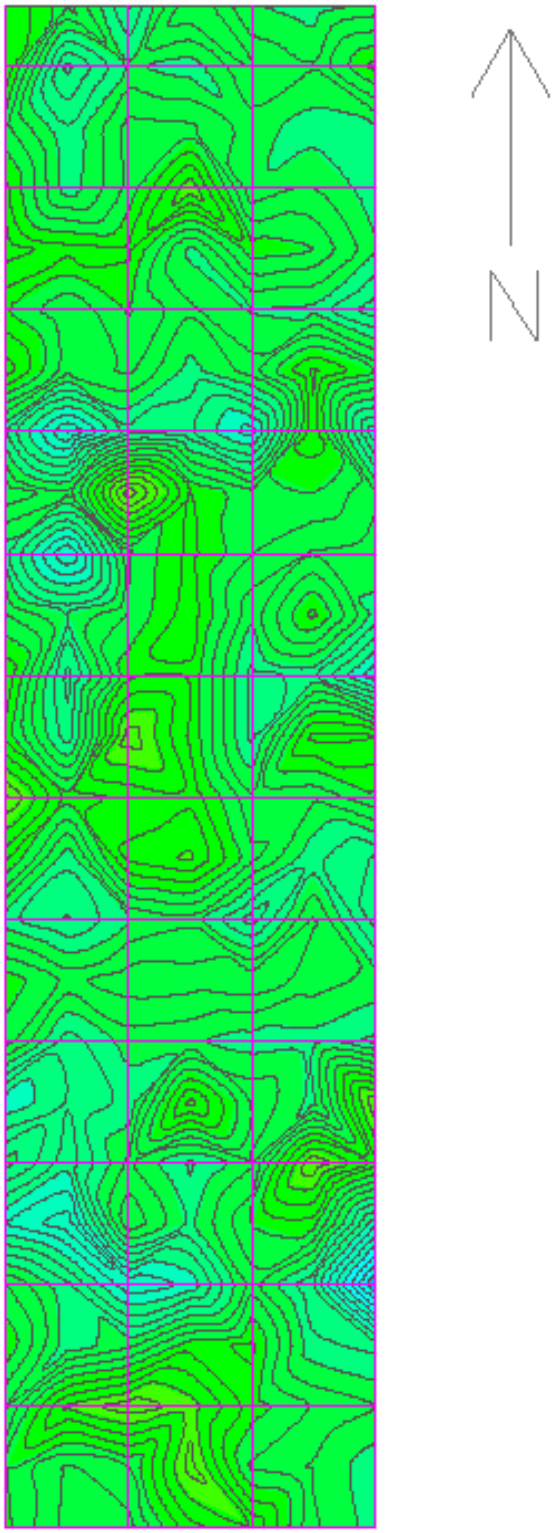

Figure E.13: Section C – 10/6/2011

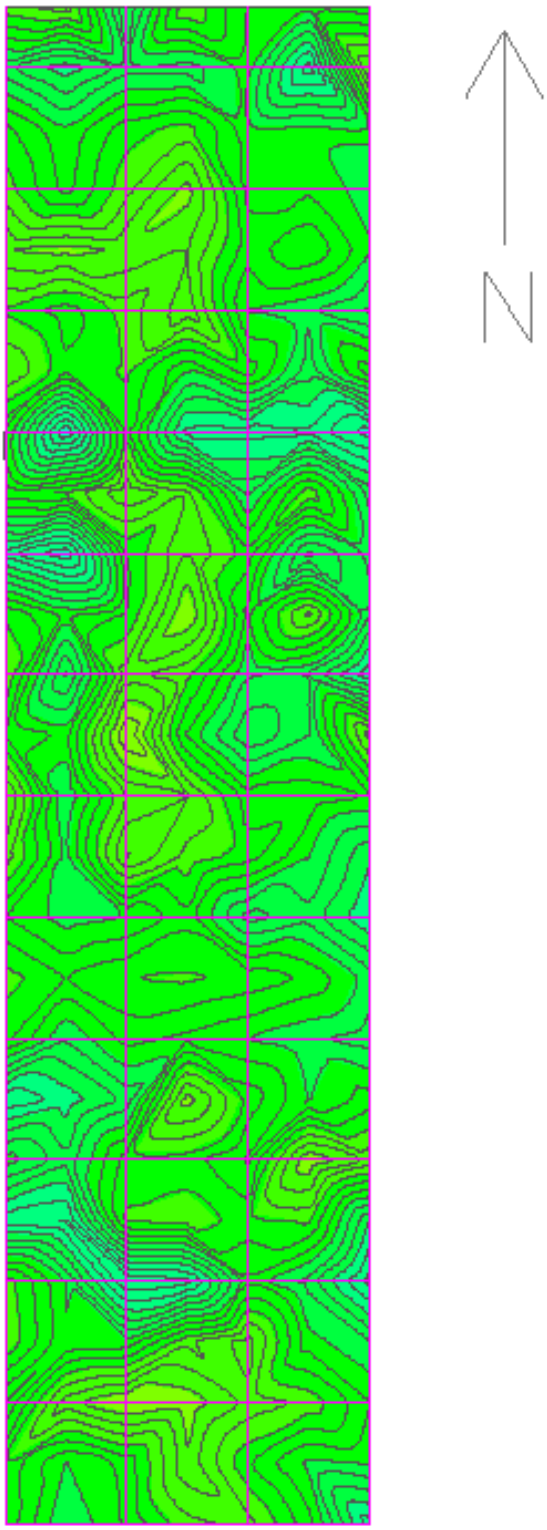

Figure E.14: Section C – 10/27/2012

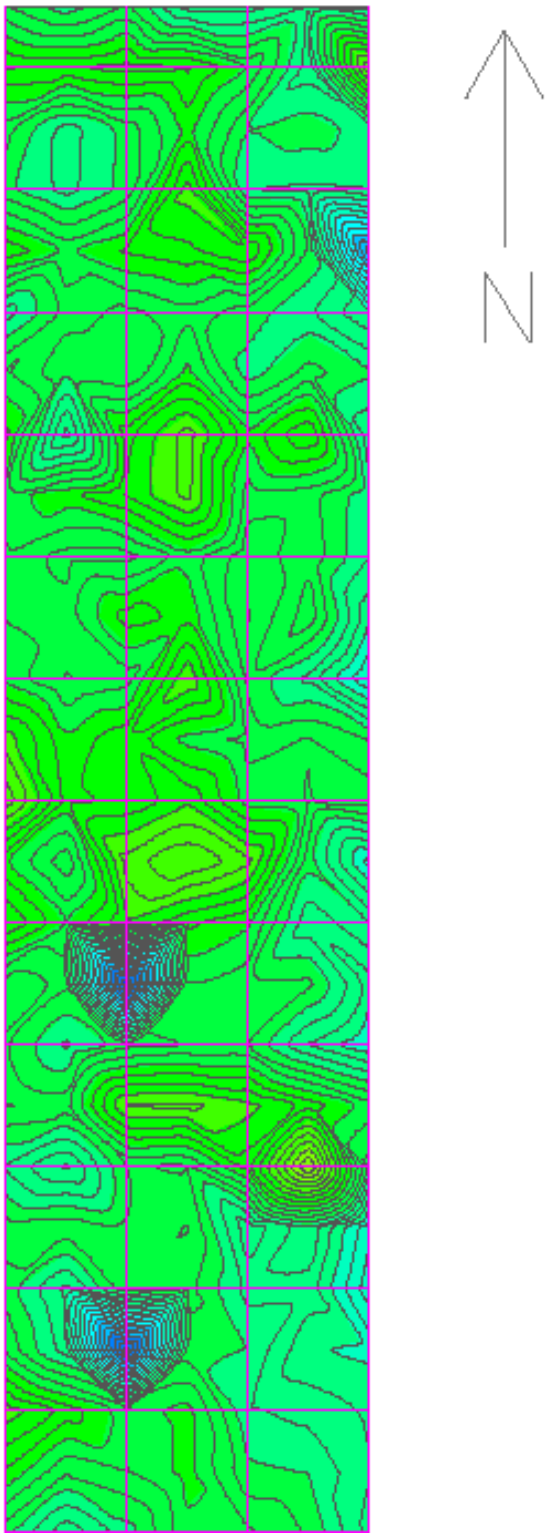

Figure E.15: Section C – 4/10/2012

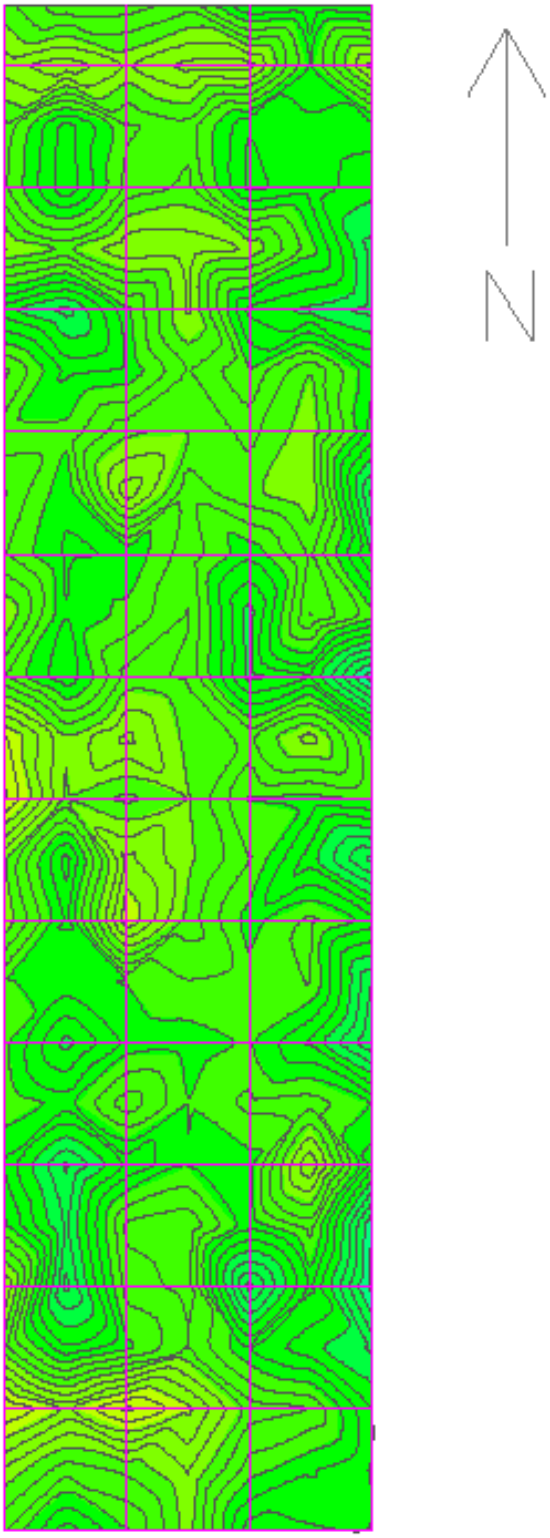

Figure E.16: Section C – 5/9/2012

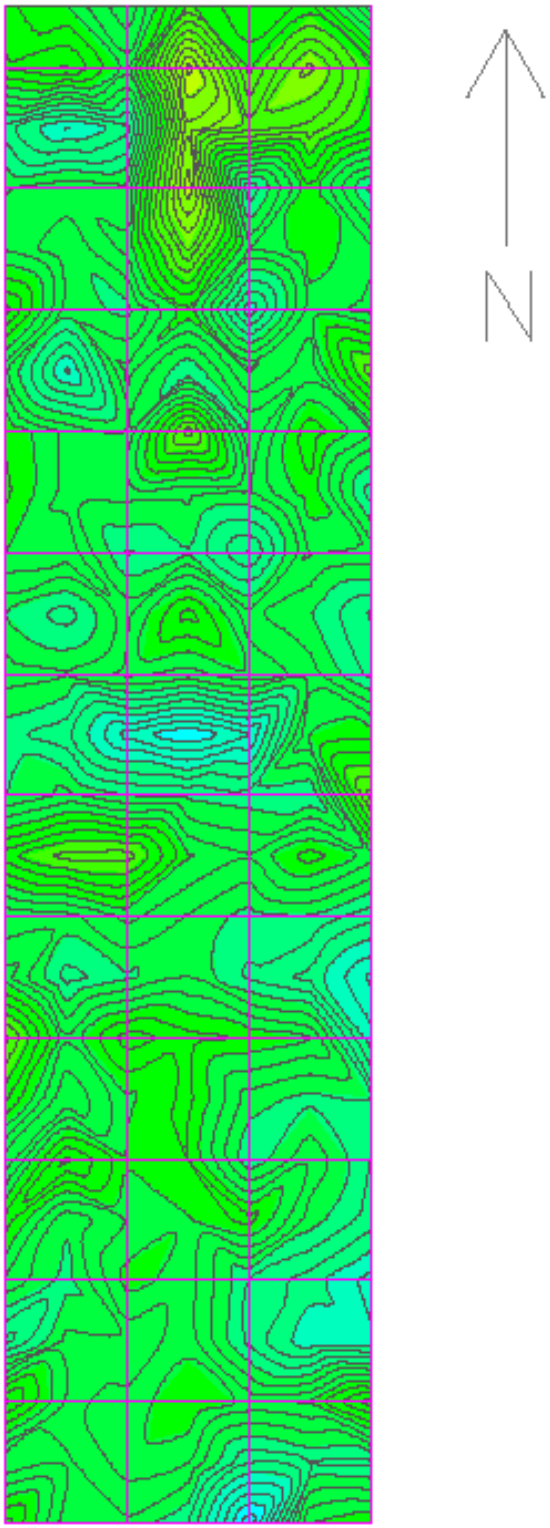

Figure E.17: Section D – 8/25/2011

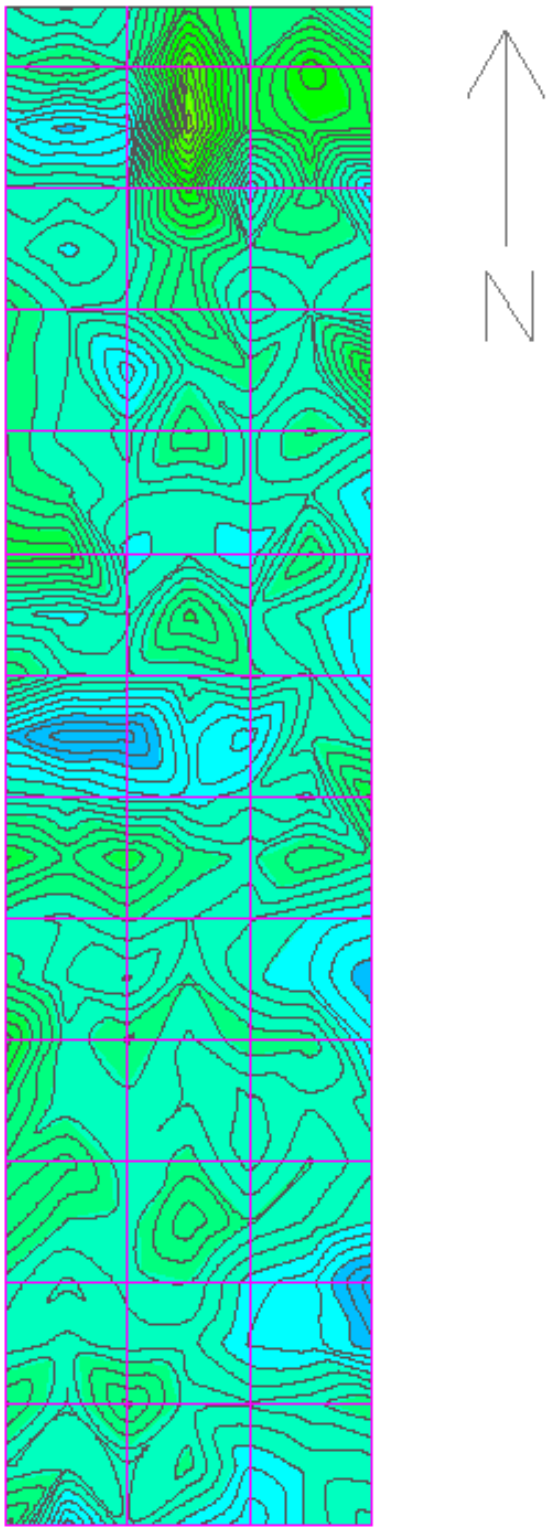

Figure E.18: Section D – 10/6/2011

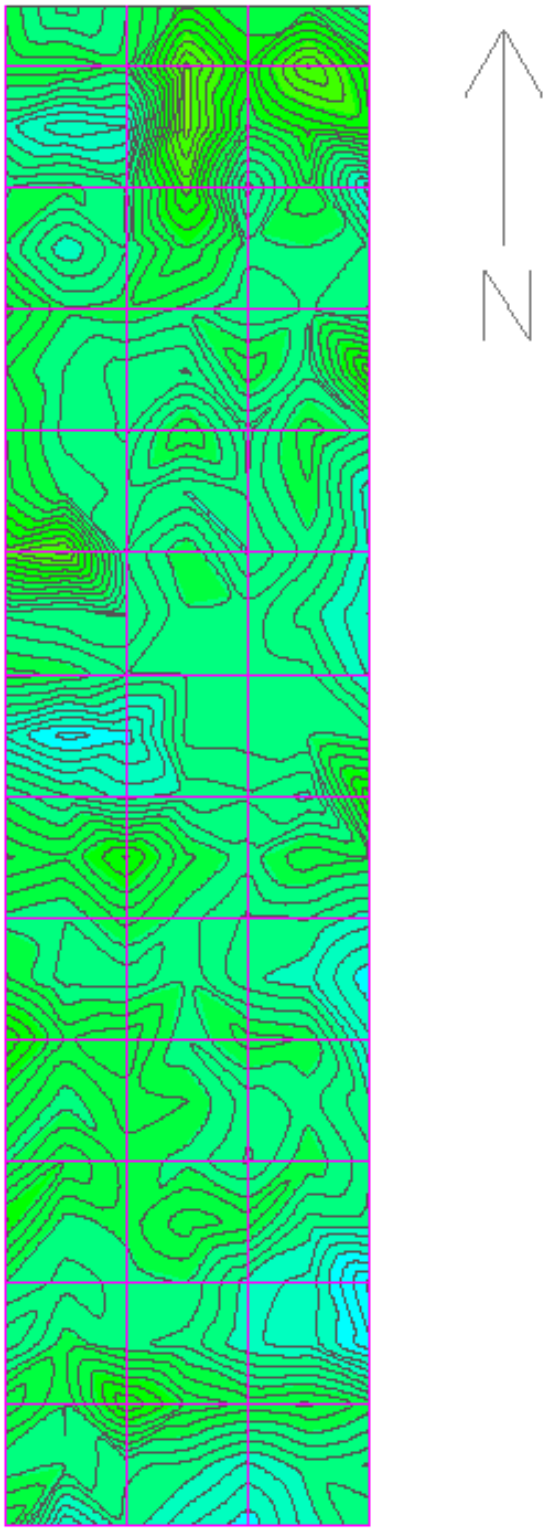

Figure E.19: Section D – 10/27/2012

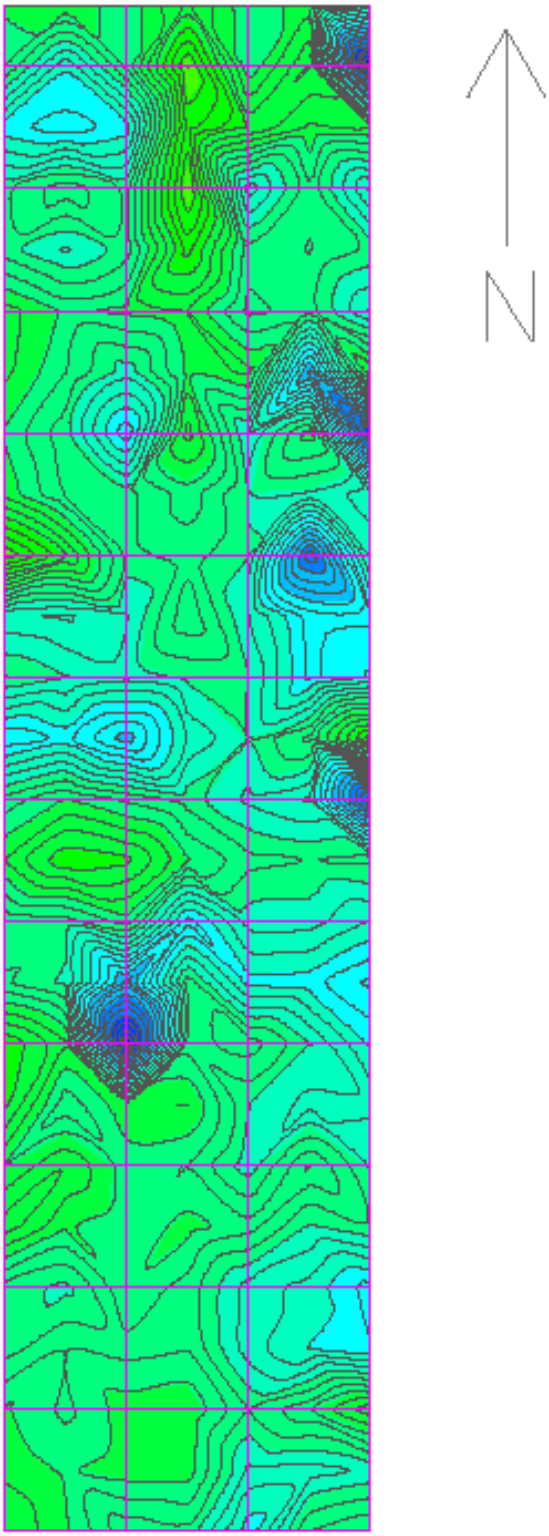

Figure E.20: Section D – 4/10/2012

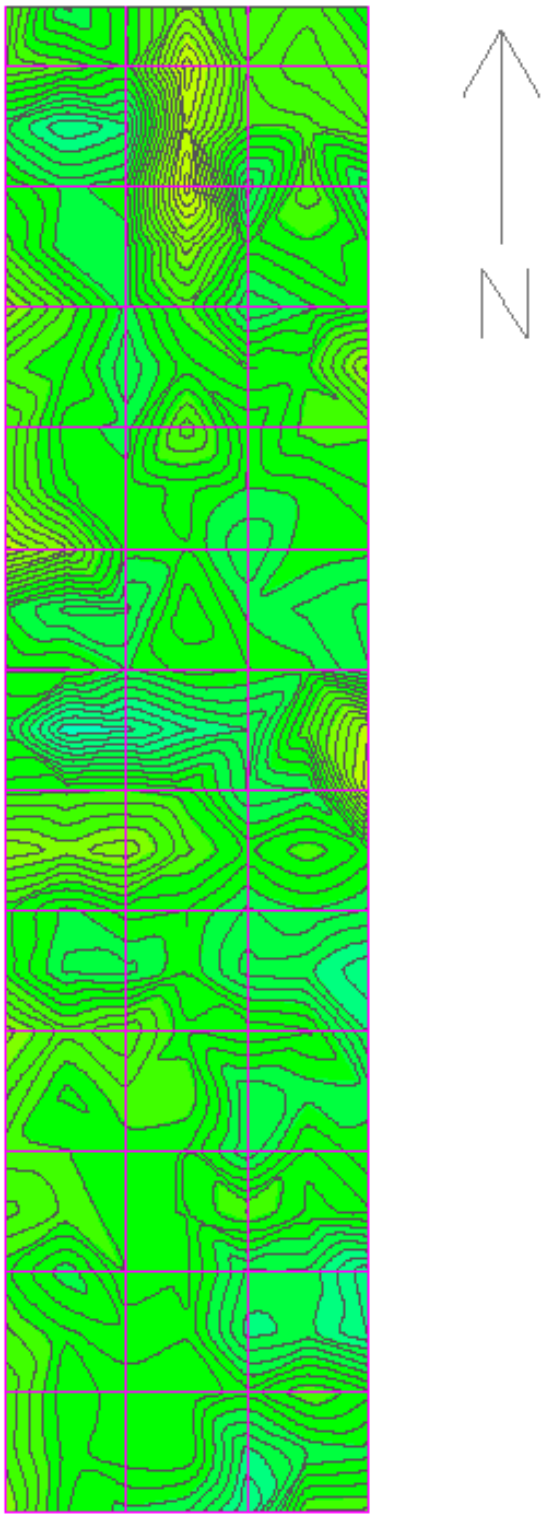

Figure E.21: Section D – 5/9/2012

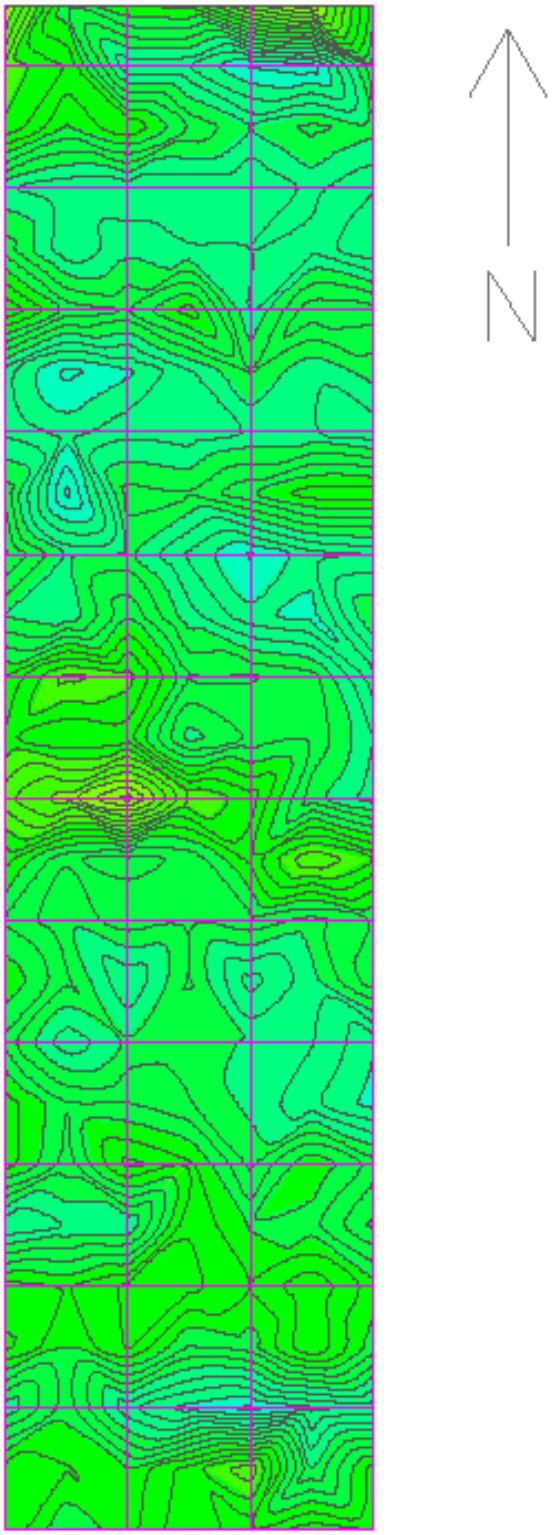

Figure E.22: Section E – 8/25/2011

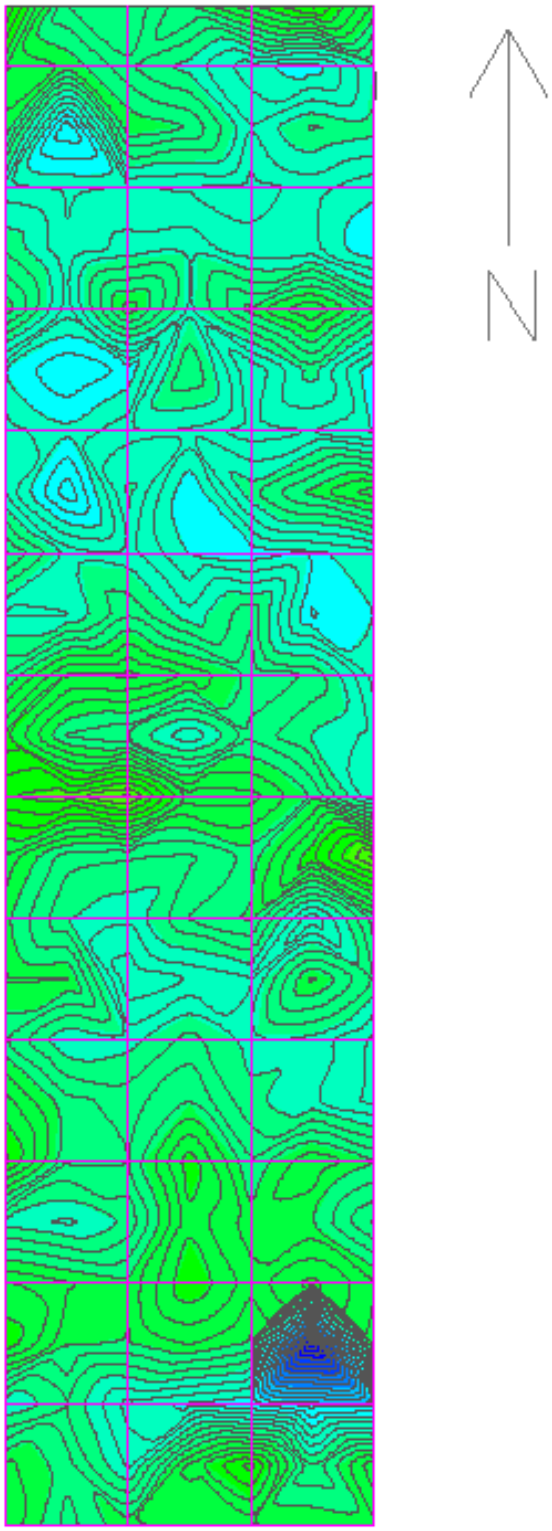

Figure E.23: Section E – 10/6/2011

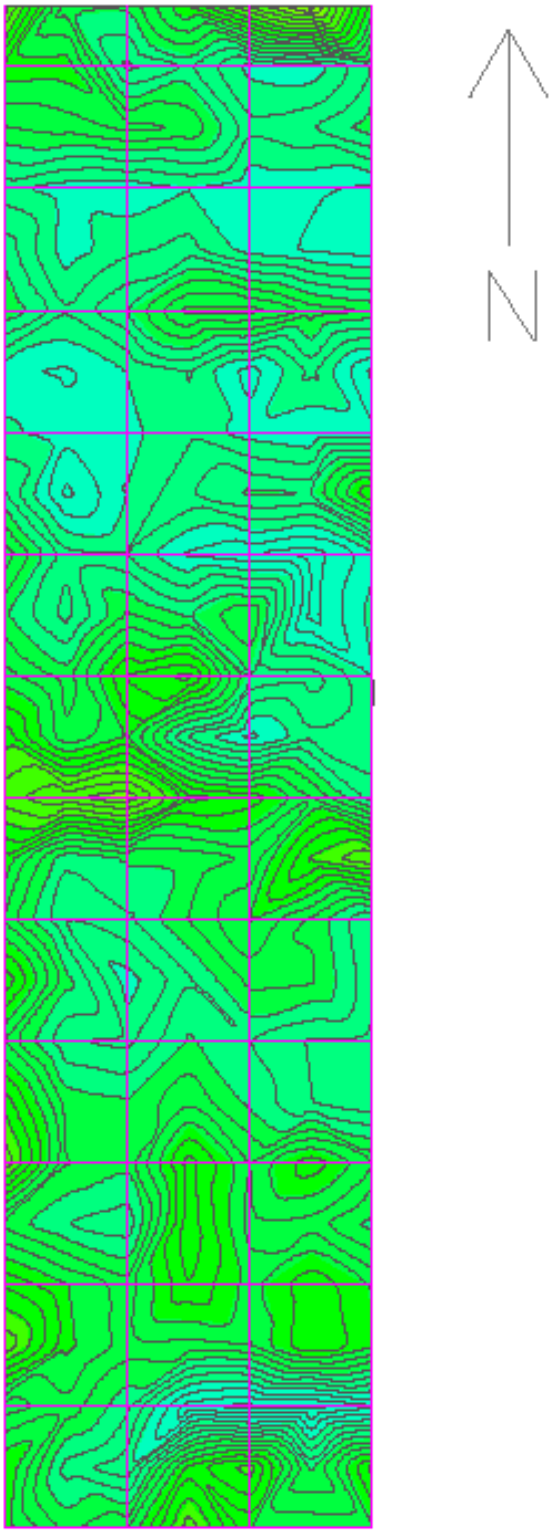

Figure E.24: Section E – 10/27/2011

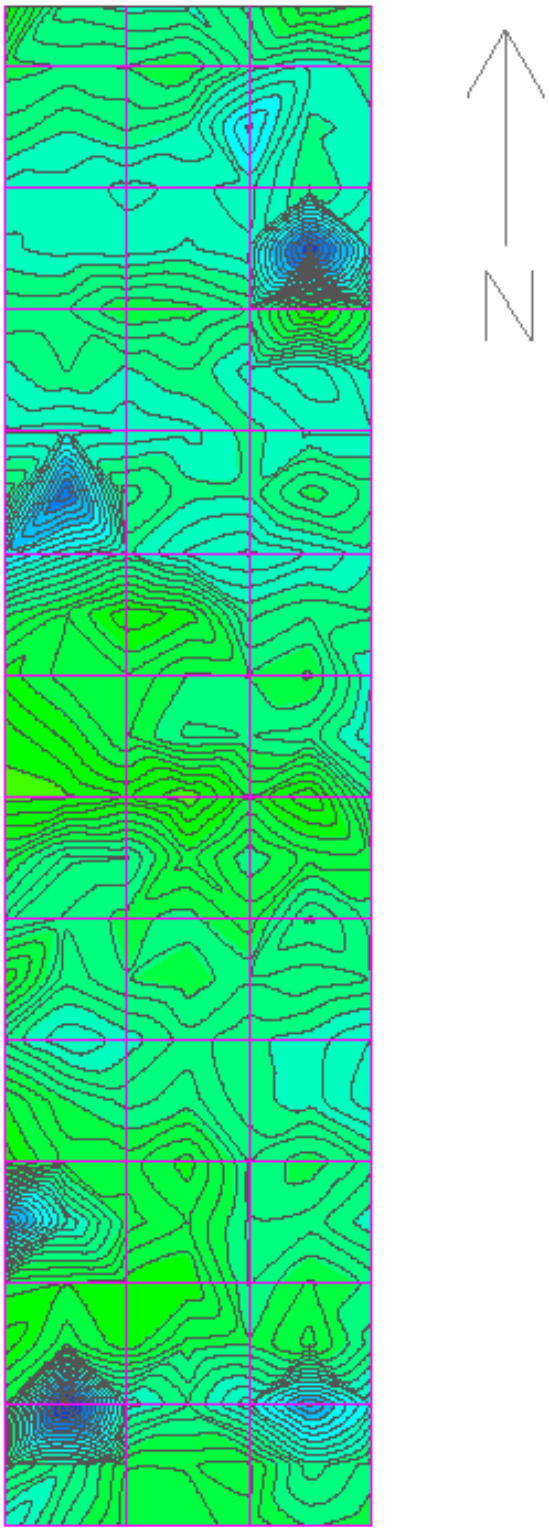

Figure E.25: Section E – 4/10/2012

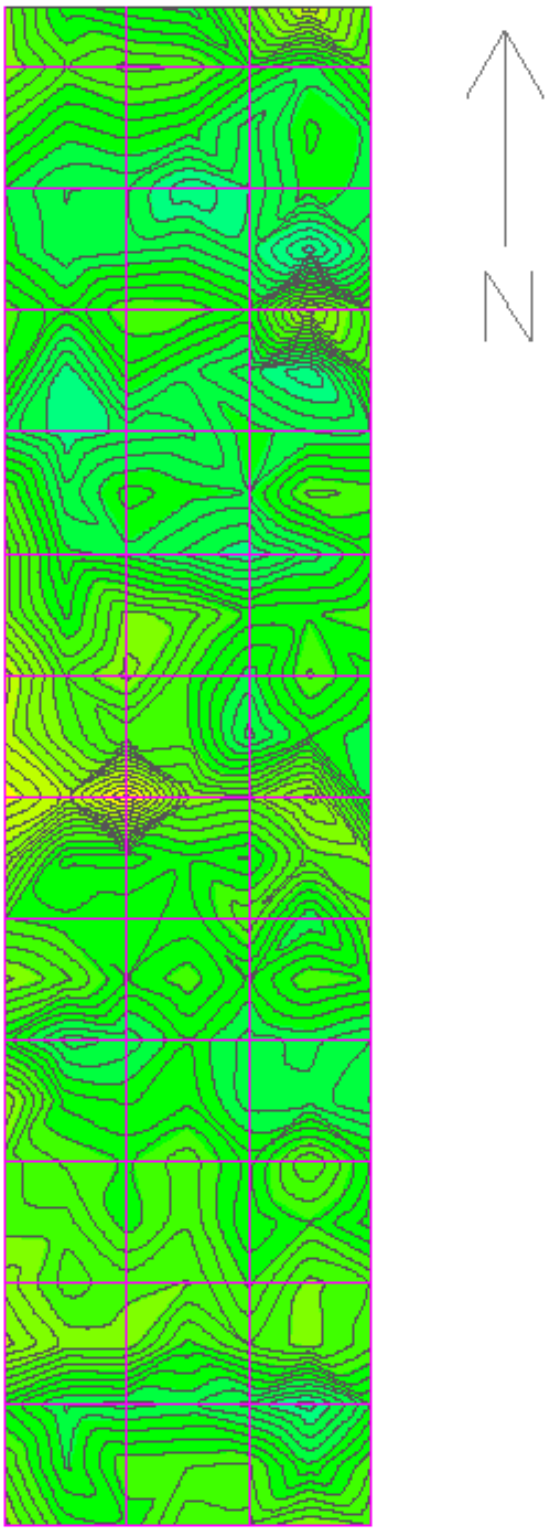

Figure E.26: Section E – 5/9/2012

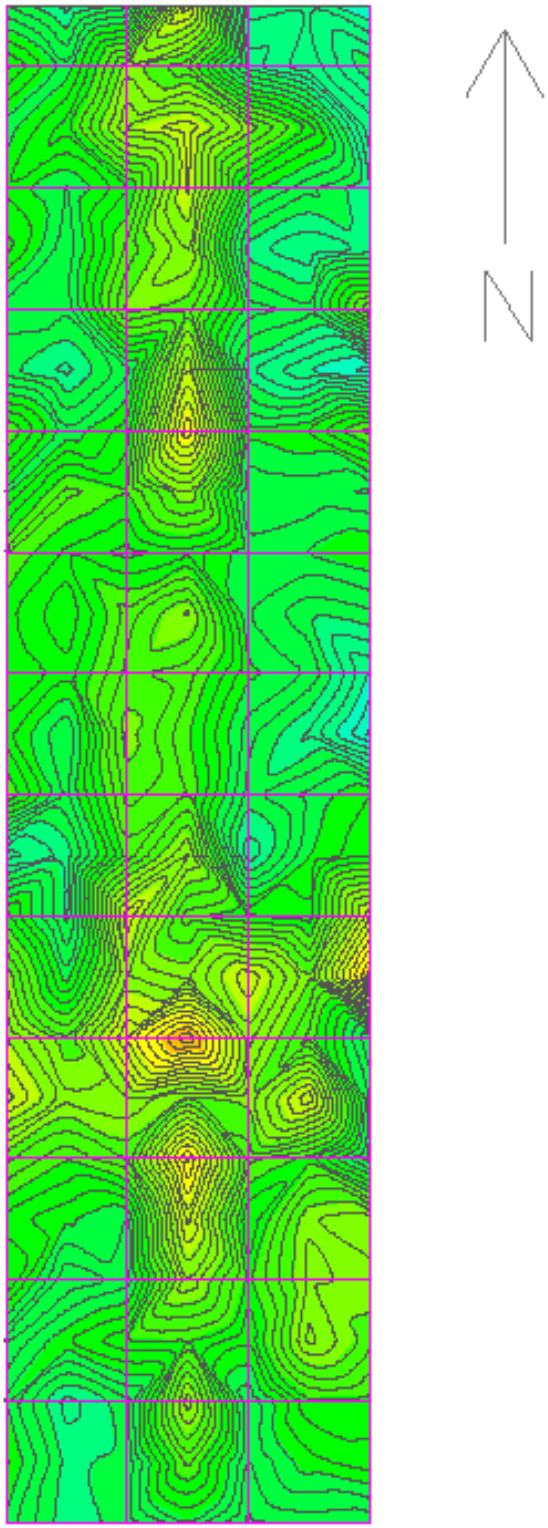

Figure E.27: Section F – 8/25/2011

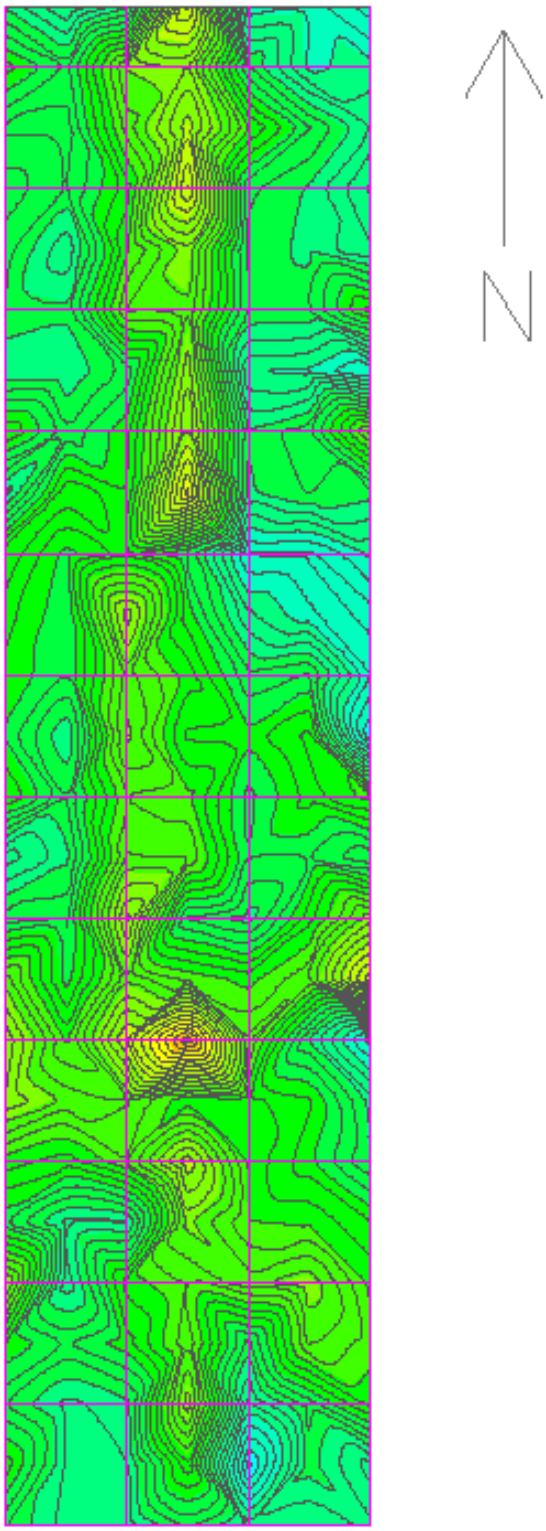

Figure E.28: Section F – 10/6/2011

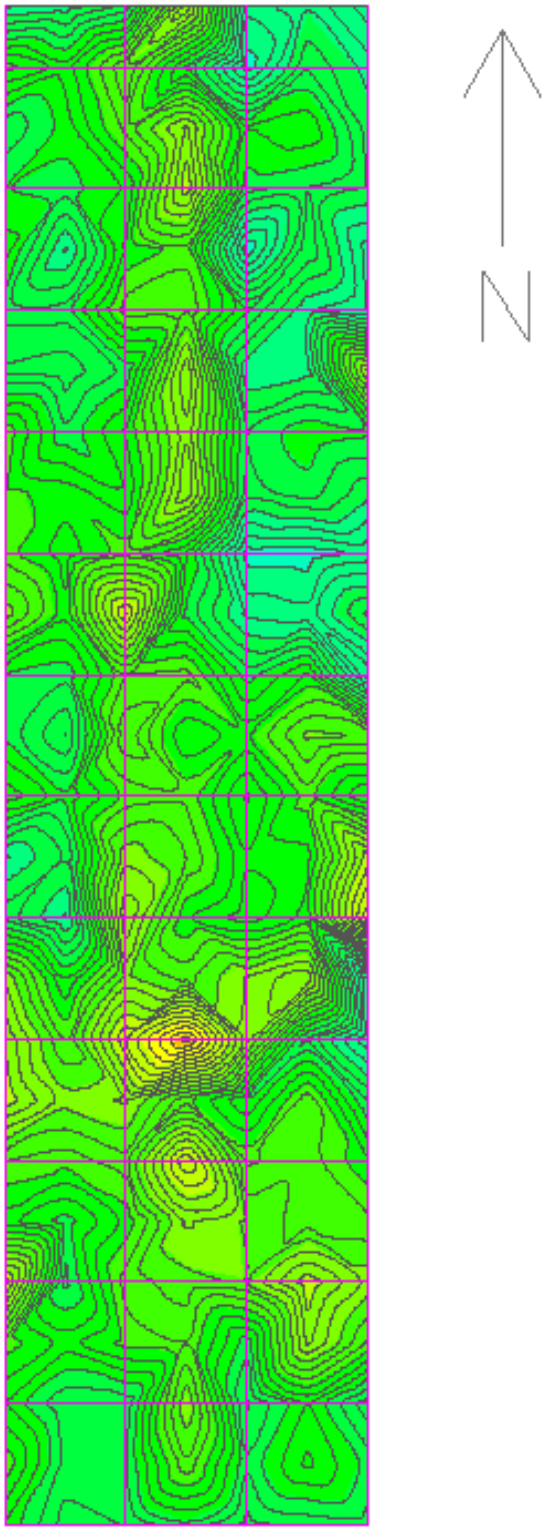

Figure E.29: Section F – 10/27/2011

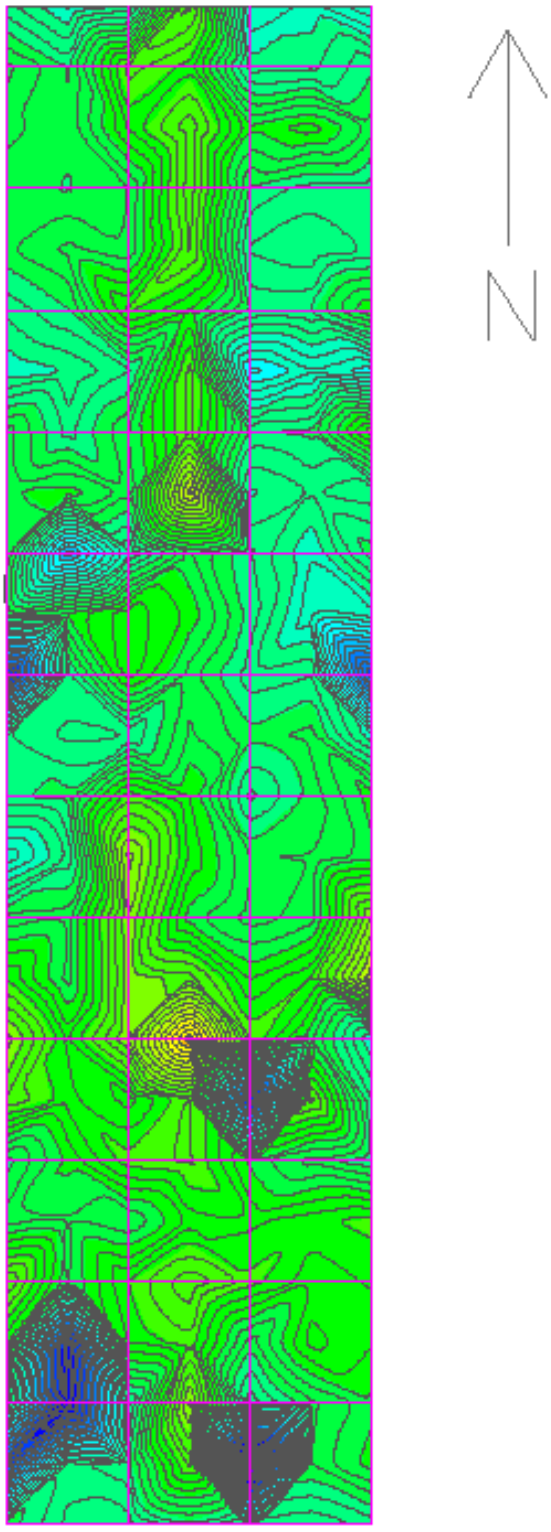

Figure E.30: Section F – 4/10/2012

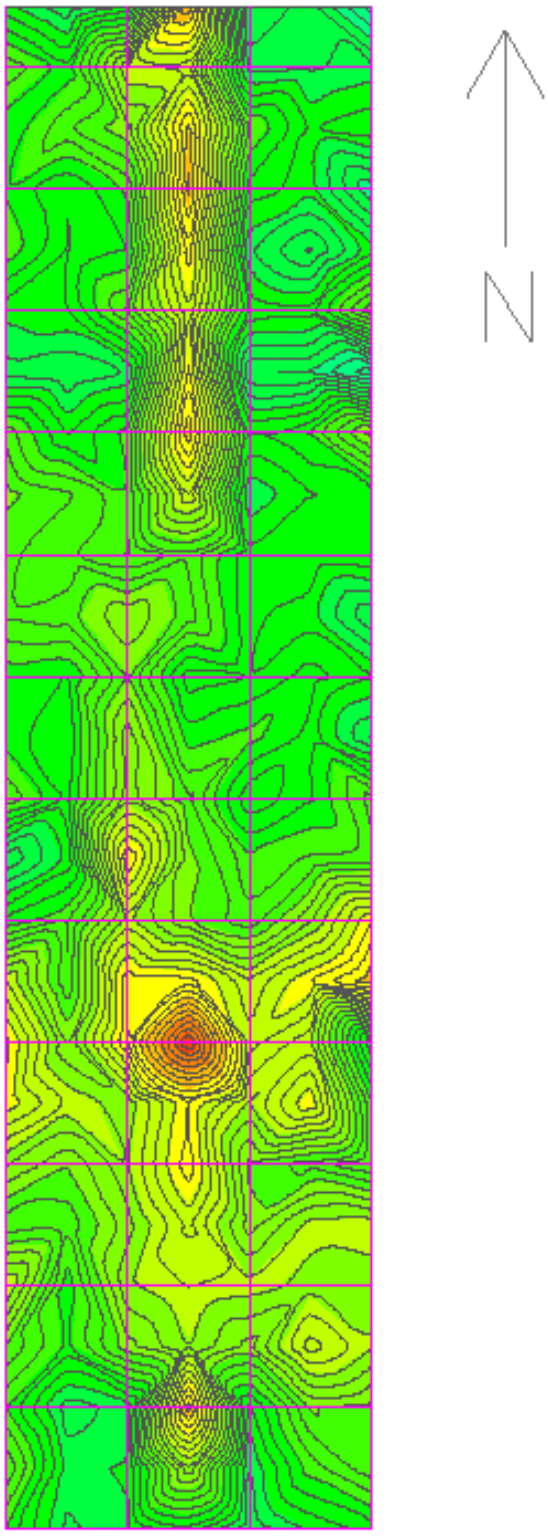

Figure E.31: Section F – 5/9/2012

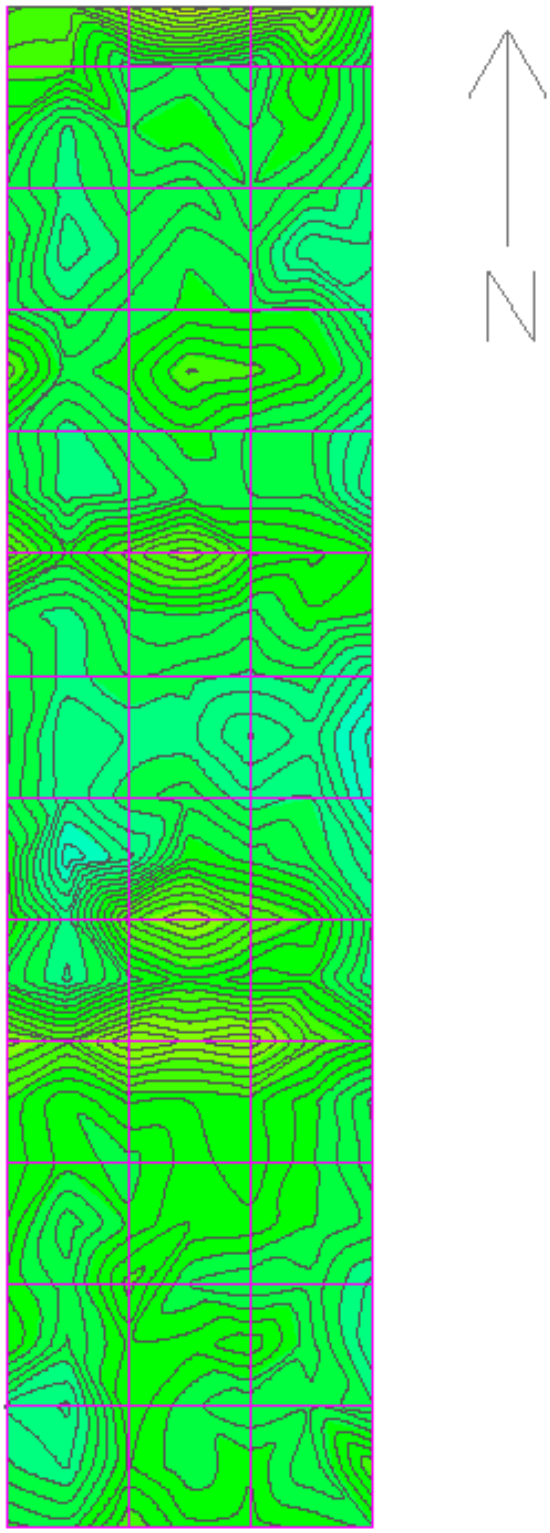

Figure E.32: Section G – 8/25/2011

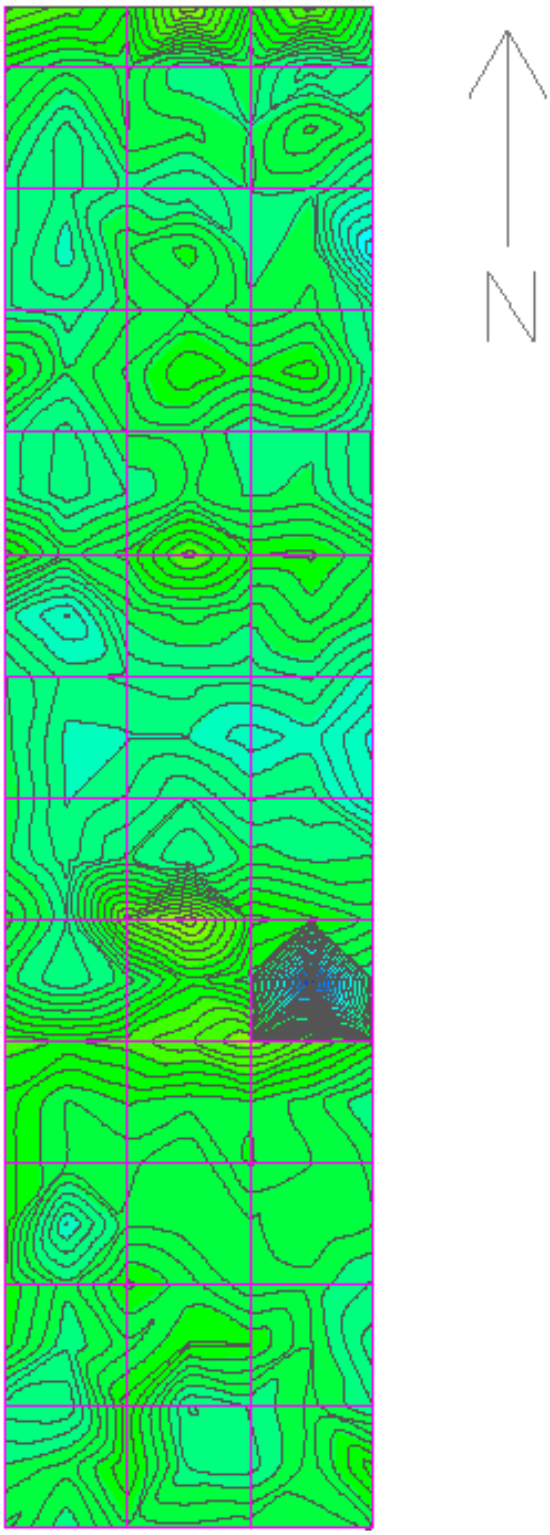

Figure E.33: Section G – 10/6/2011

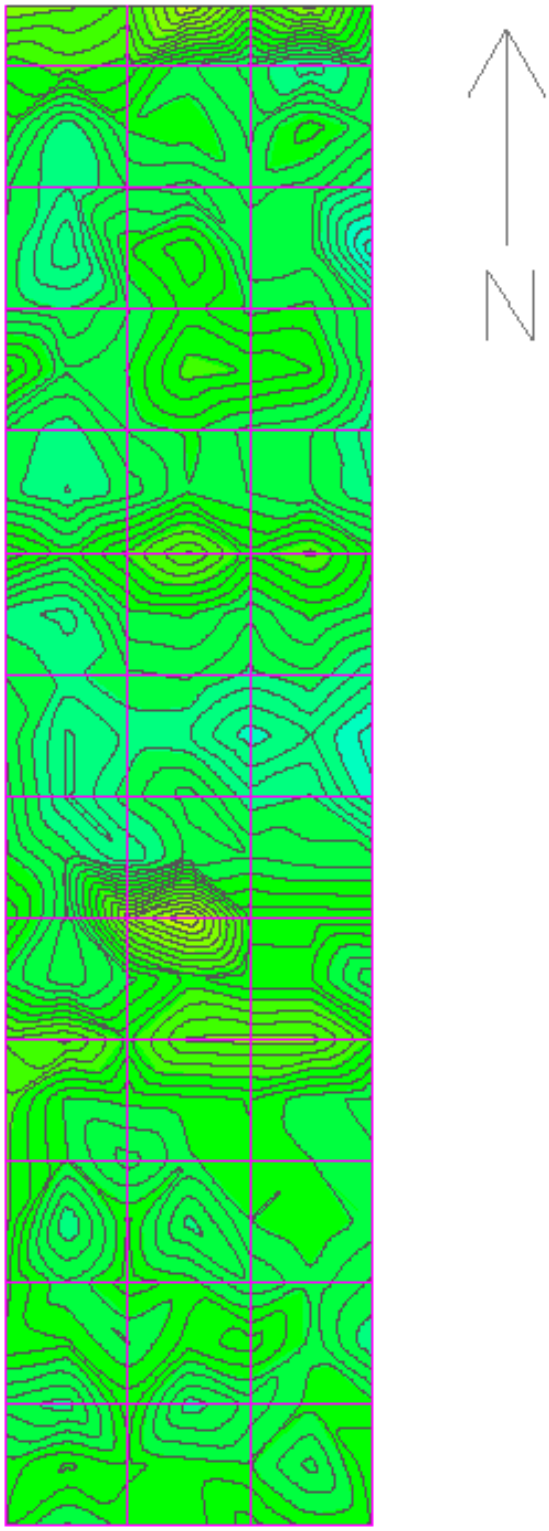

Figure E.34: Section G – 10/27/2011

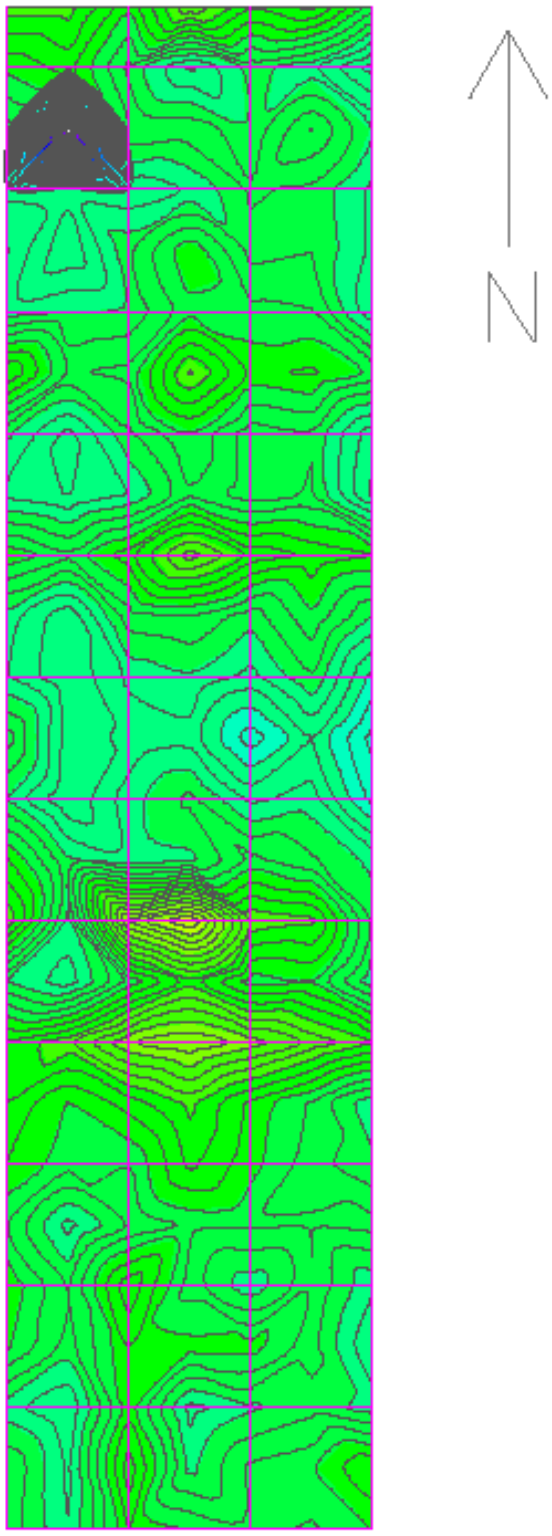

Figure E.35: Section G – 4/10/2012

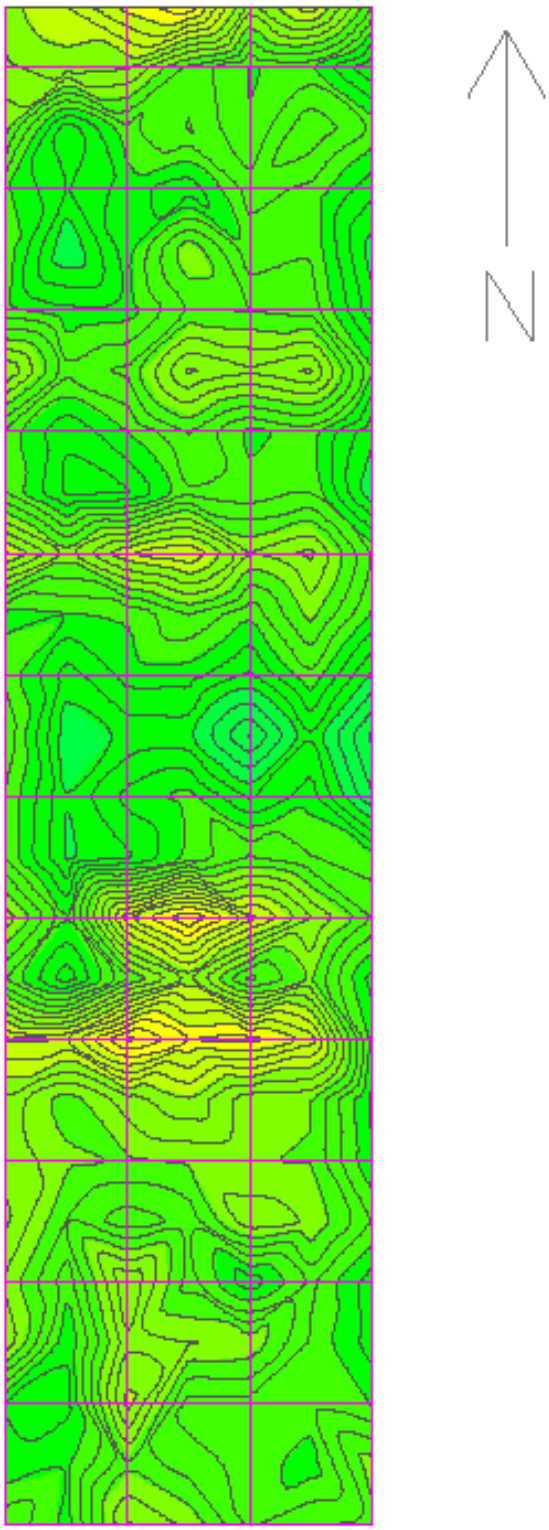

Figure E.36: Section G – 5/9/2012

Minimum Elevation	Maximum Elevation	Color
−150.00	−120.00	
−120.00	−90.00	
−90.00	−60.00	
−60.00	−30.00	
−30.00	0.00	
0.00	30.00	
30.00	60.00	
60.00	90.00	
90.00	120.00	
120.00	150.00	
150.00	180.00	
180.00	210.00	
210.00	240.00	
240.00	270.00	

Figure E.37: Legend for the difference in half-cell potential contour maps

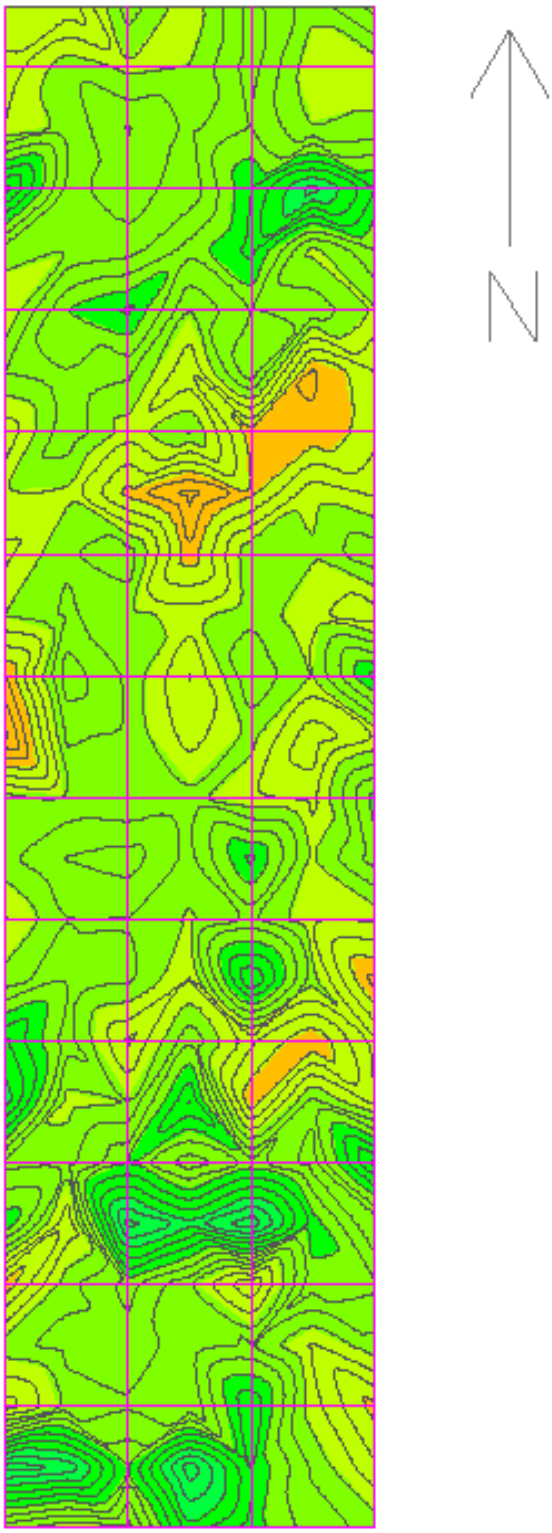

Figure E.38: Section A – Difference between 8/25/2011 and 10/6/2011

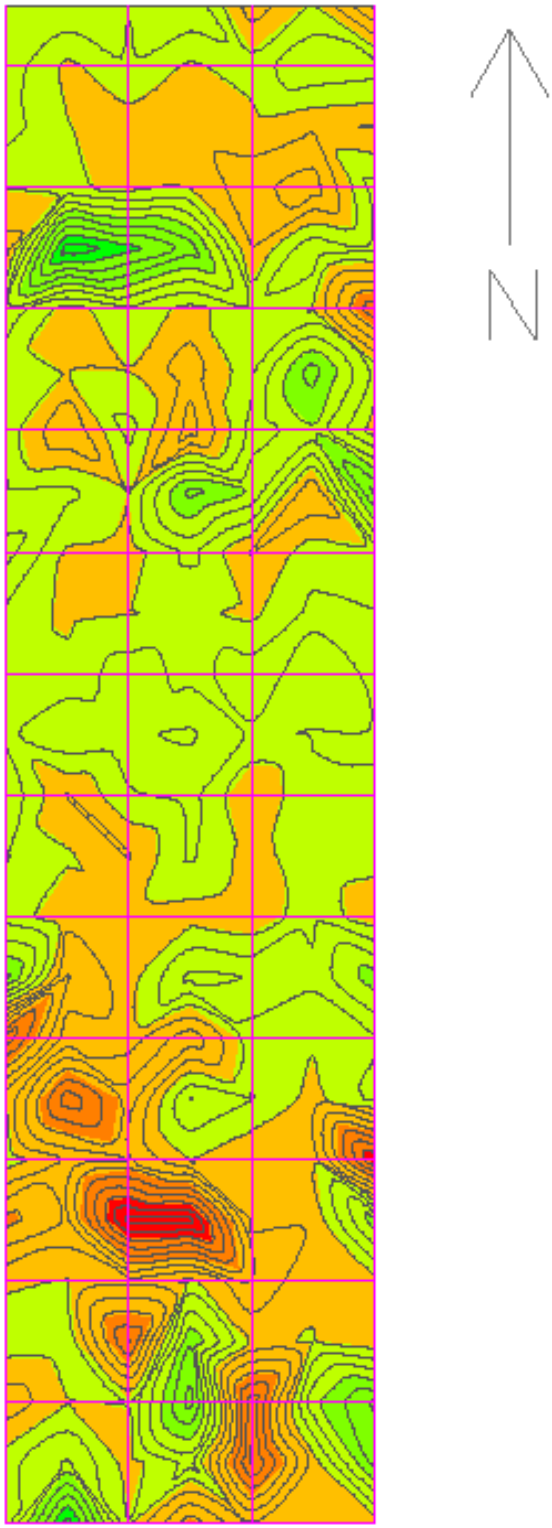

Figure E.39: Section A – Difference between 10/6/2011 and 10/27/2011

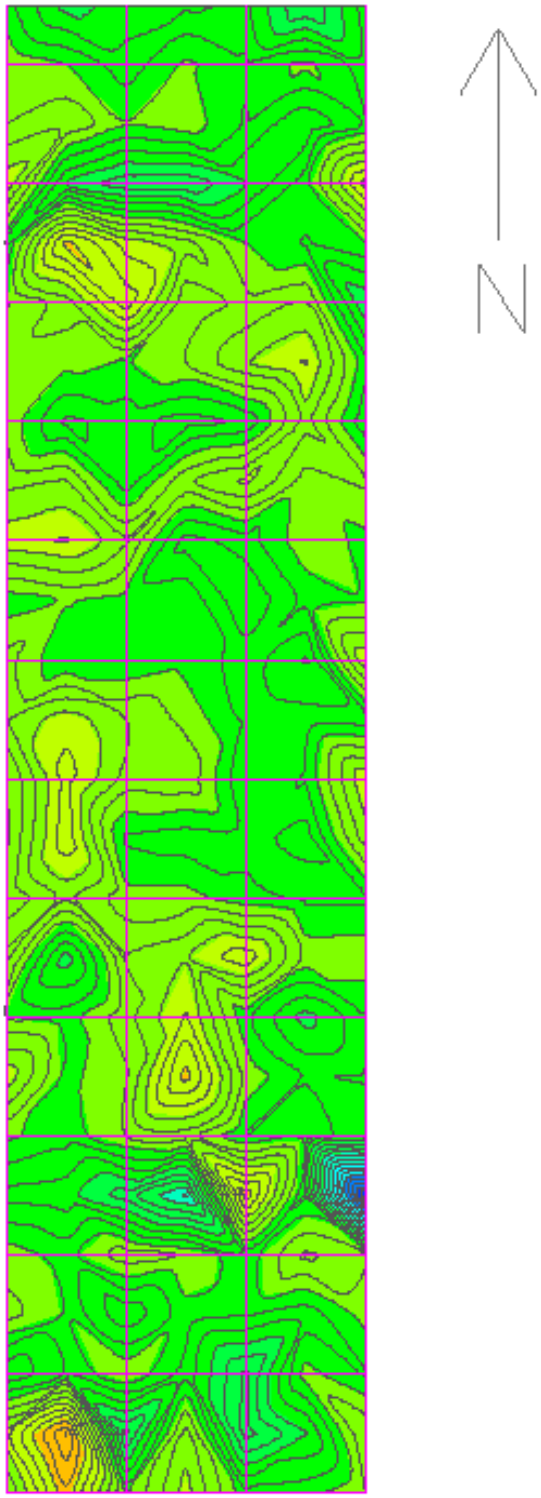

Figure E.40: Section A – Difference between 10/27/2011 and 4/10/2012

Figure E.41: Section A – Difference between 4/10/2012 and 5/9/2012

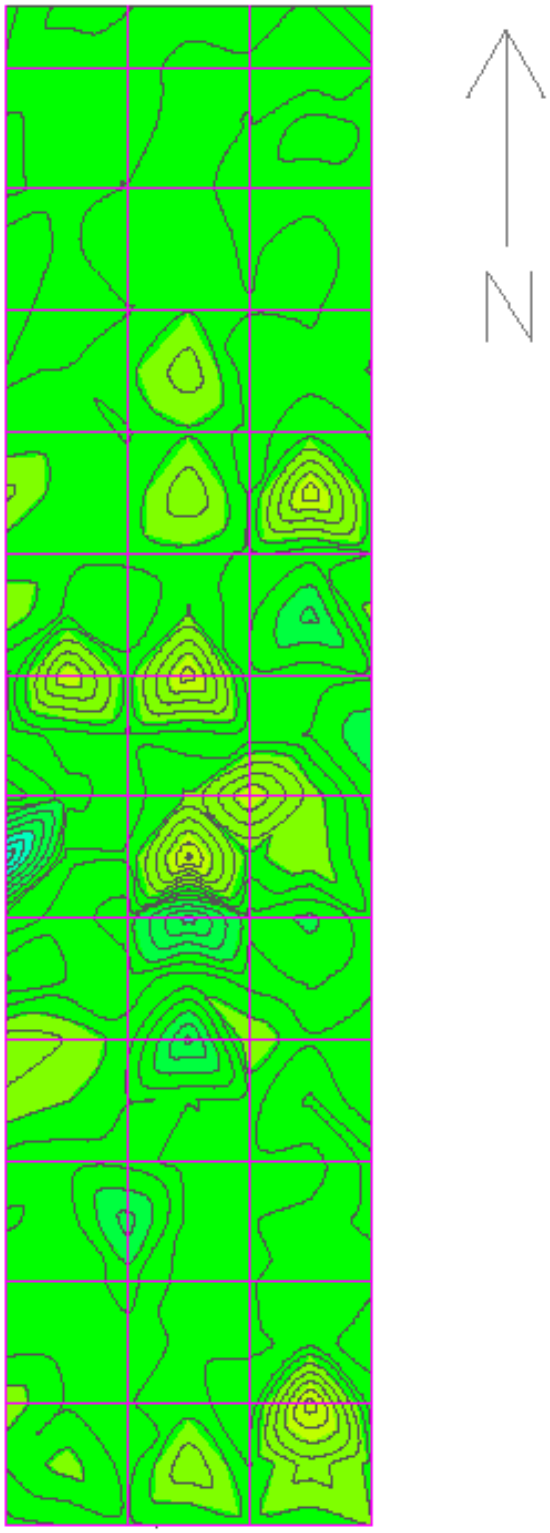

Figure E.42: Section B – Difference between 8/25/2011 and 10/6/2011

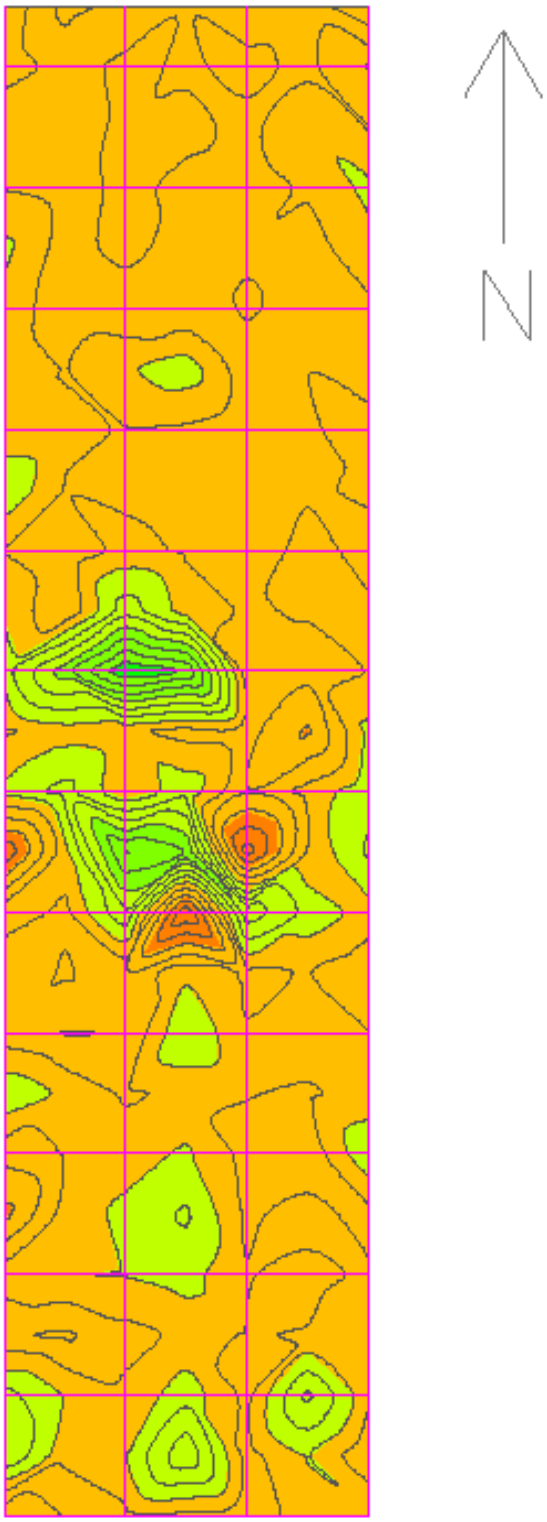

Figure E.43: Section B – Difference between 10/6/2011 and 10/27/2011

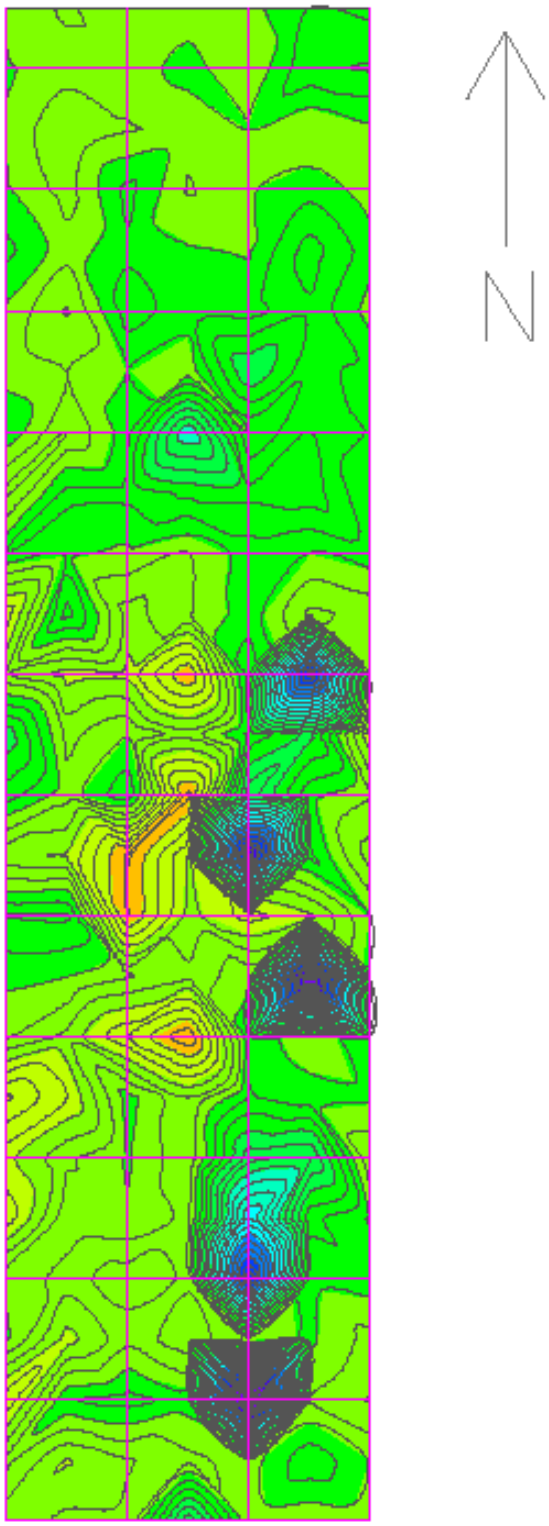

Figure E.44: Section B – Difference between 10/27/2011 and 4/10/2012

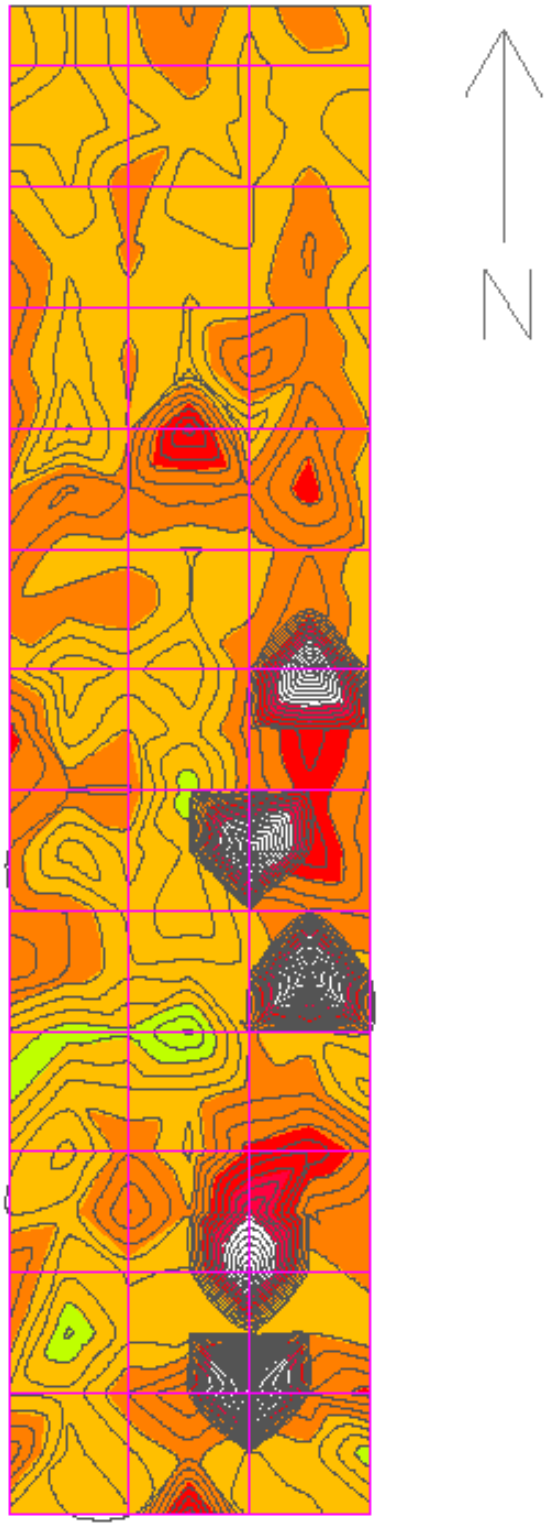

Figure E.45: Section B – Difference between 4/10/2012 and 5/9/2012

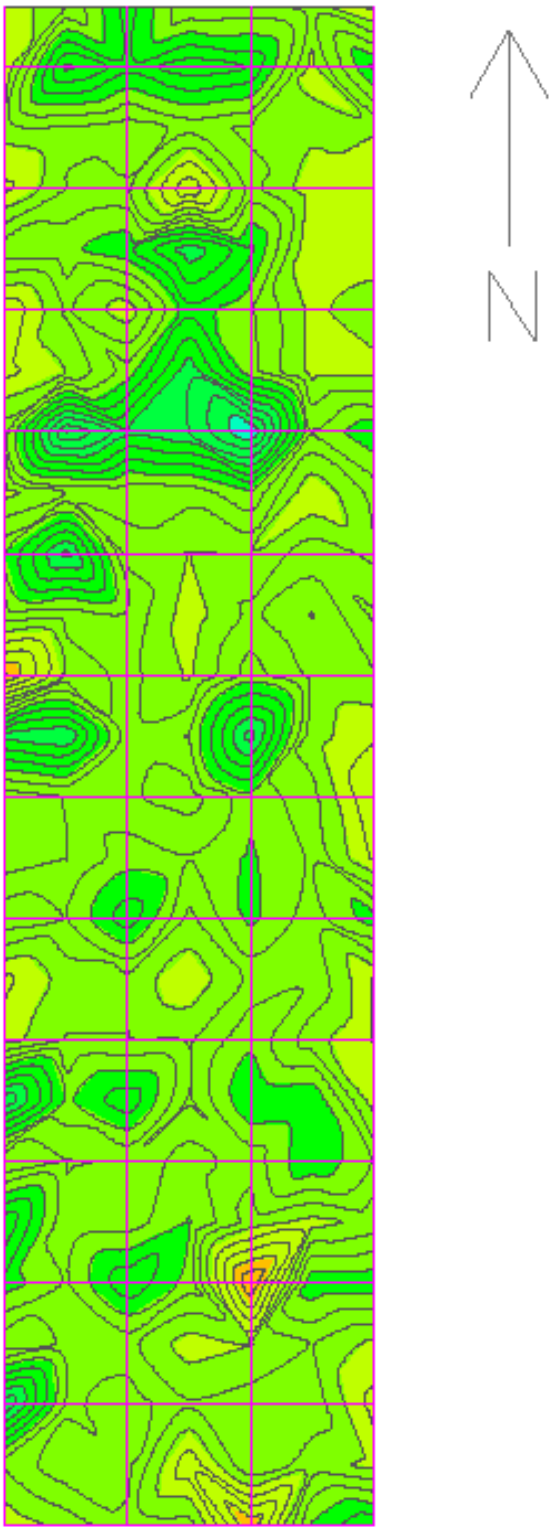

Figure E.46: Section C – Difference between 8/25/2011 and 10/6/2011

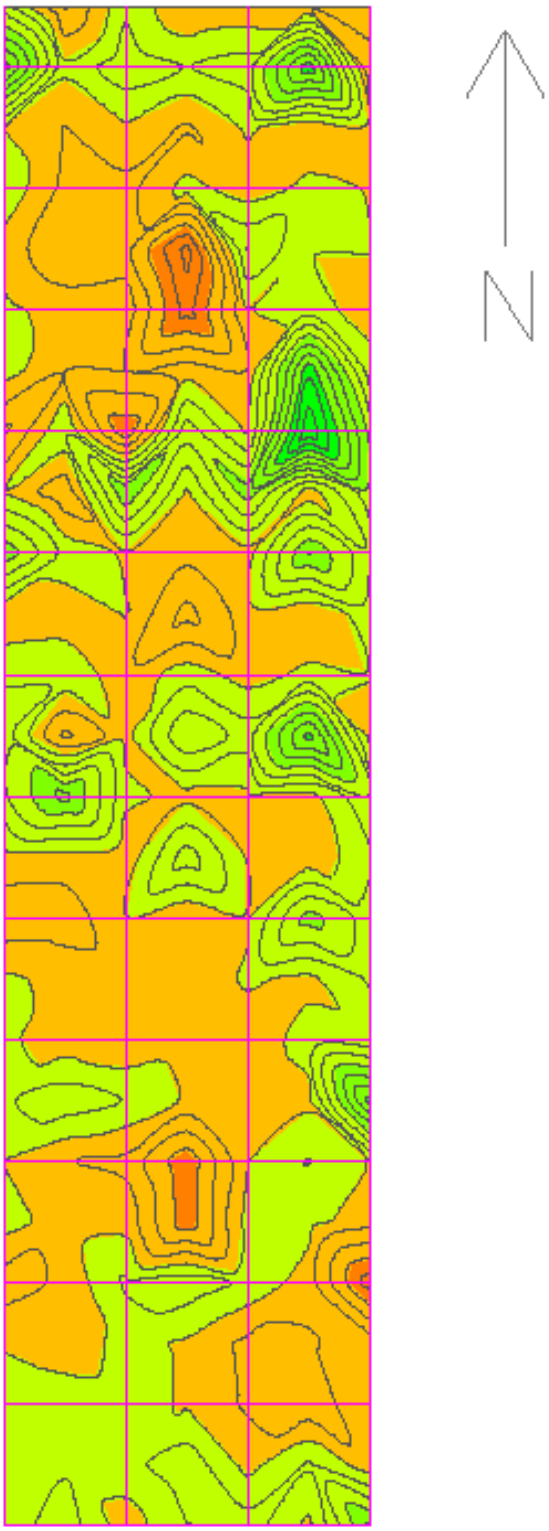

Figure E.47: Section C – Difference between 10/6/2011 and 10/27/2011

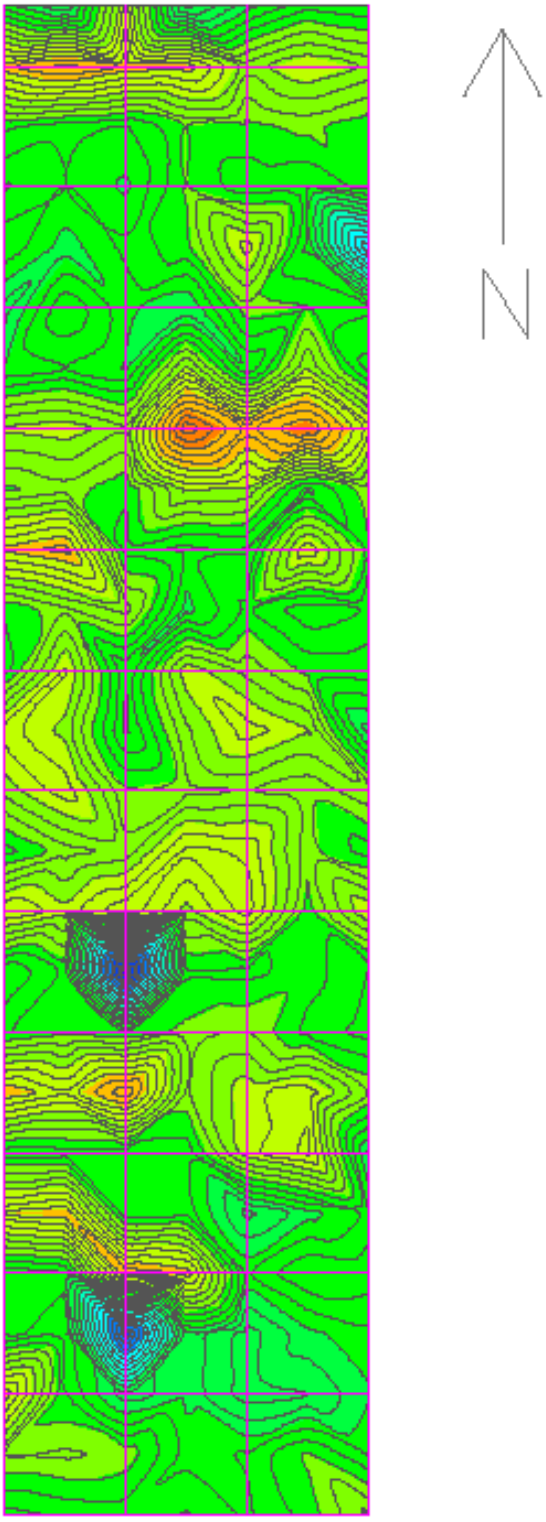

Figure E.48: Section C – Difference between 10/27/2011 and 4/10/2012

Figure E.49: Section C – Difference between 4/10/2012 and 5/9/2012

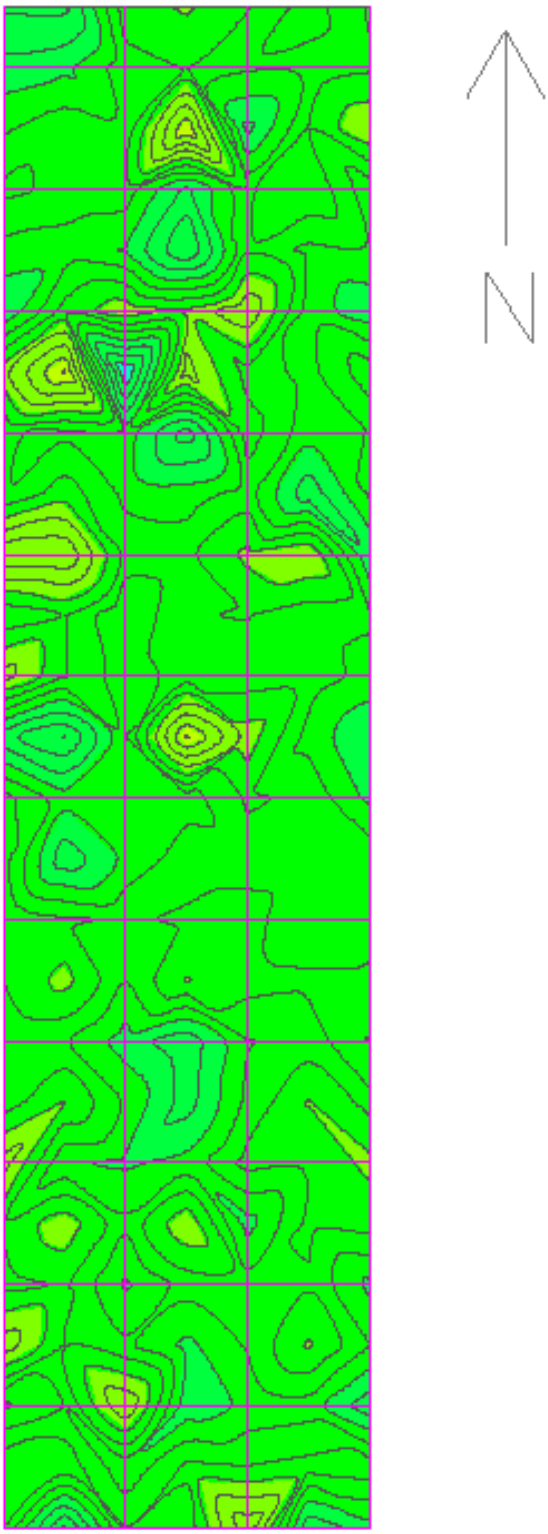

Figure E.50: Section D – Difference between 8/25/2011 and 10/6/2011

Figure E.51: Section D – Difference between 10/6/2011 and 10/27/2011

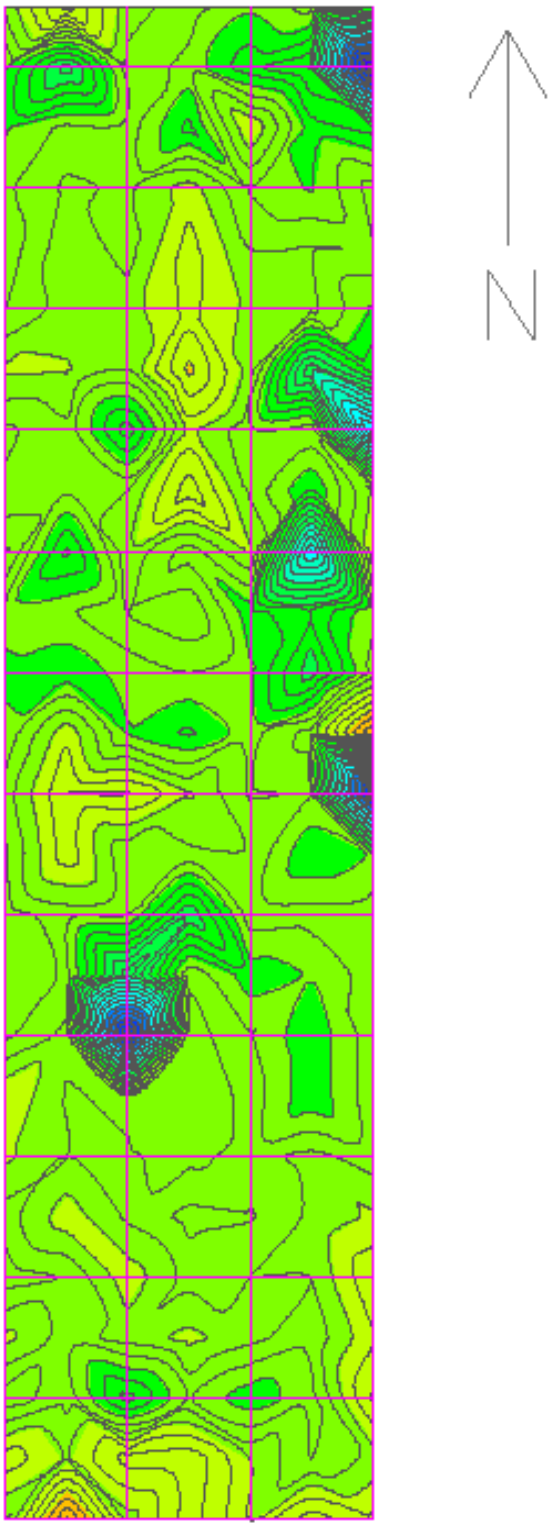

Figure E.52: Section D – Difference between 10/27/2011 and 4/10/2012

Figure E.53: Section D – Difference between 4/10/2012 and 5/9/2012

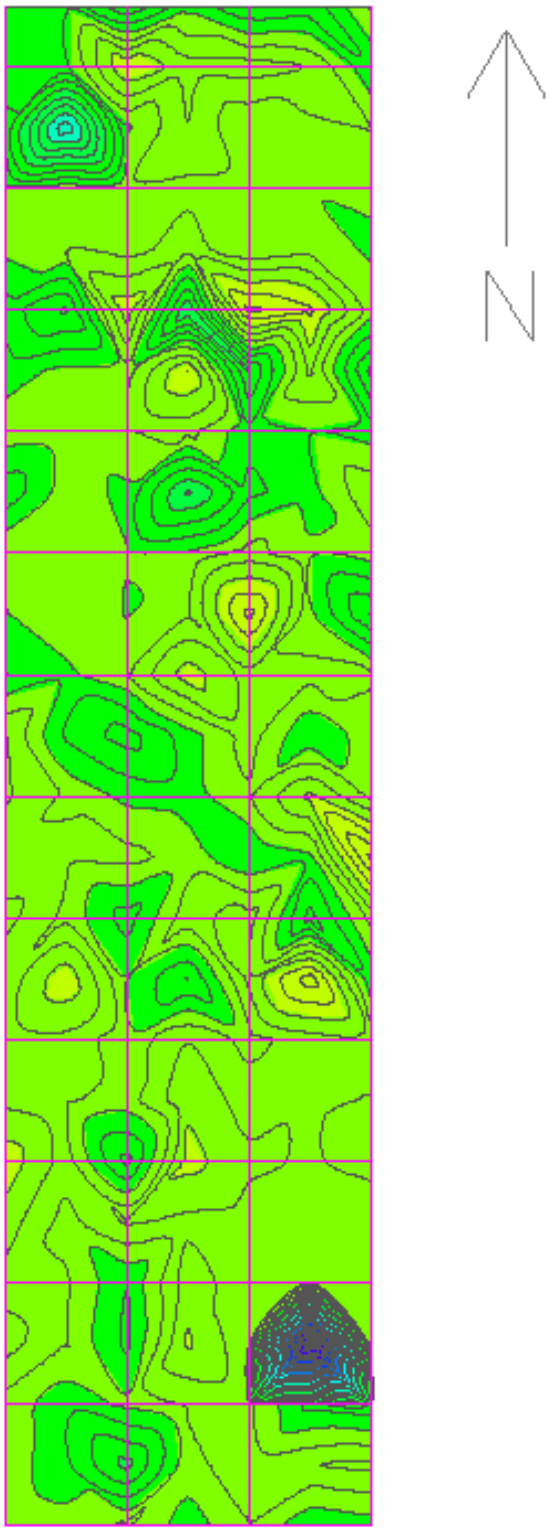

Figure E.54: Section E – Difference between 8/25/2011 and 10/6/2011

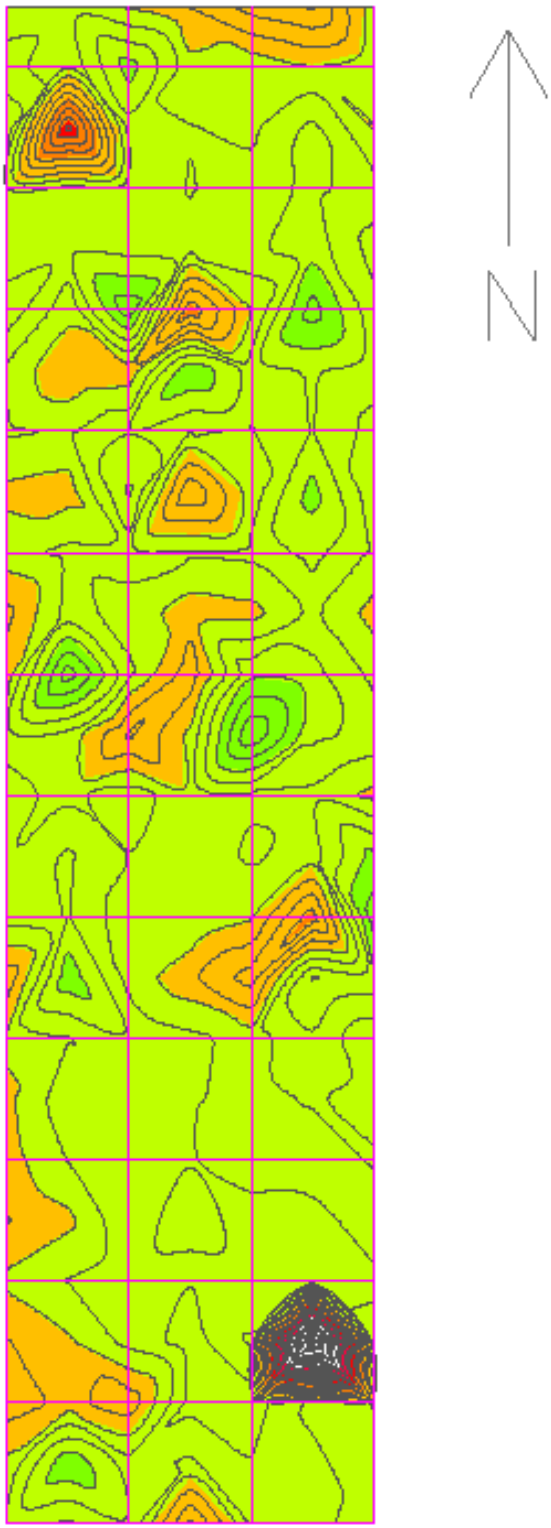

Figure E.55: Section E – Difference between 10/6/2011 and 10/27/2011

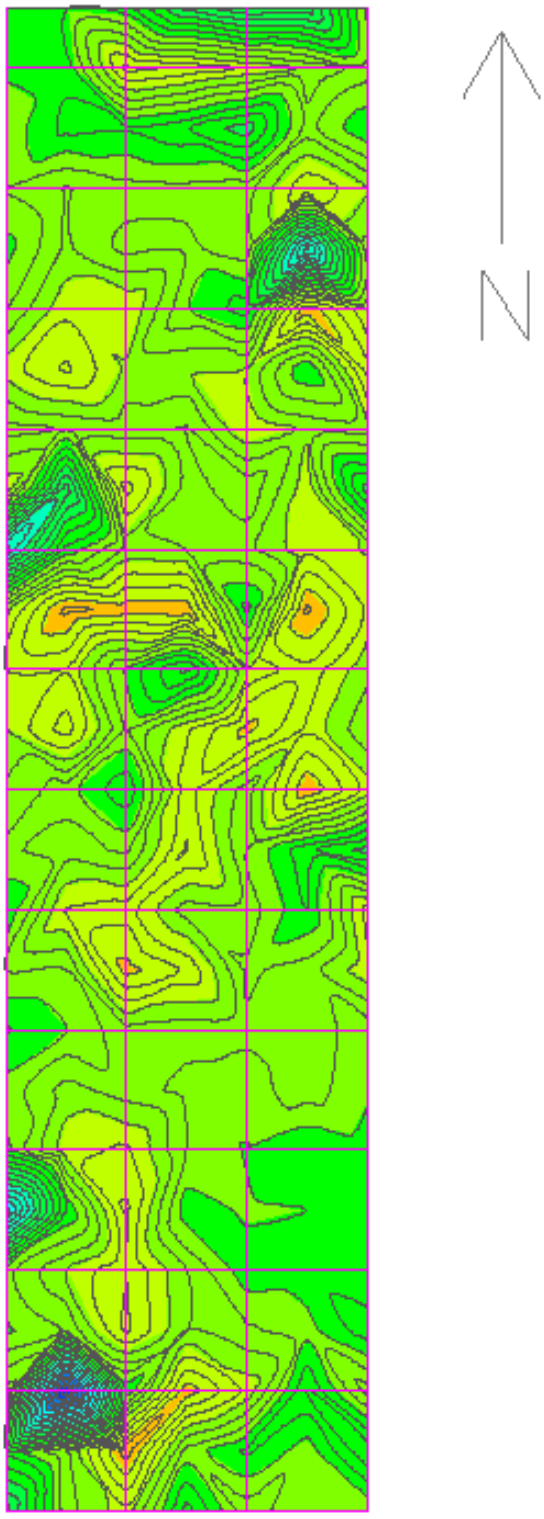

Figure E.56: Section E – Difference between 10/27/2011 and 4/10/2012

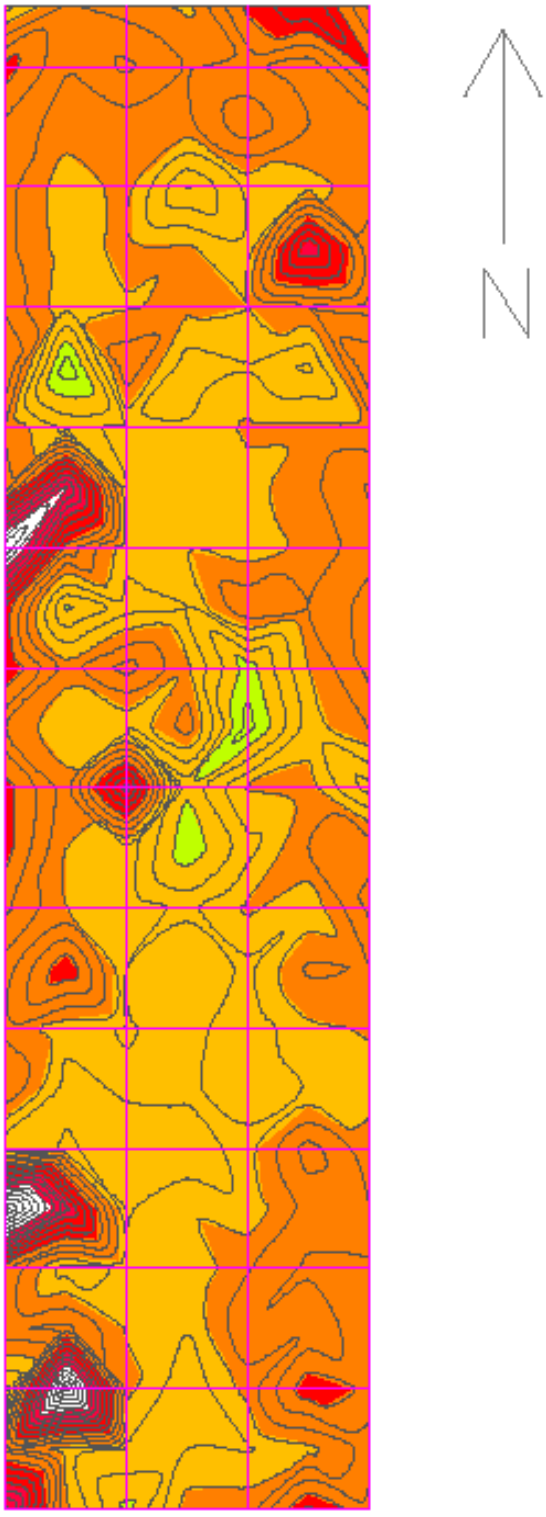

Figure E.57: Section E – Difference between 4/10/2012 and 5/9/2012

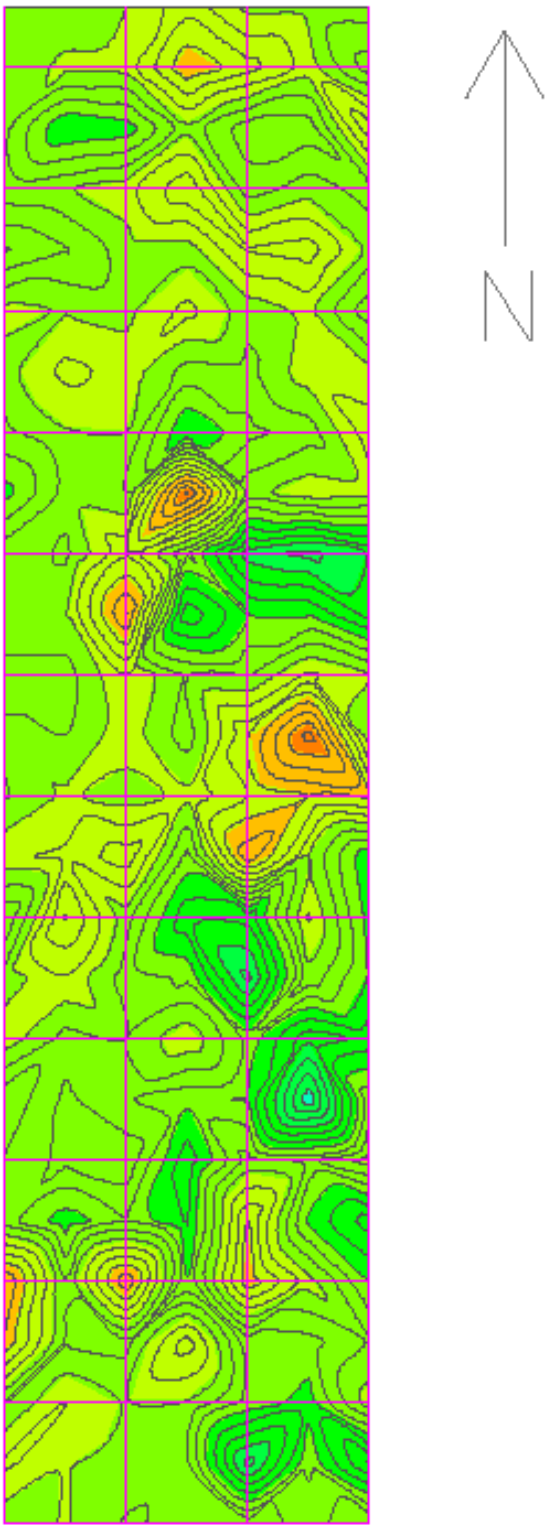

Figure E.58: Section F – Difference between 8/25/2011 and 10/6/2011

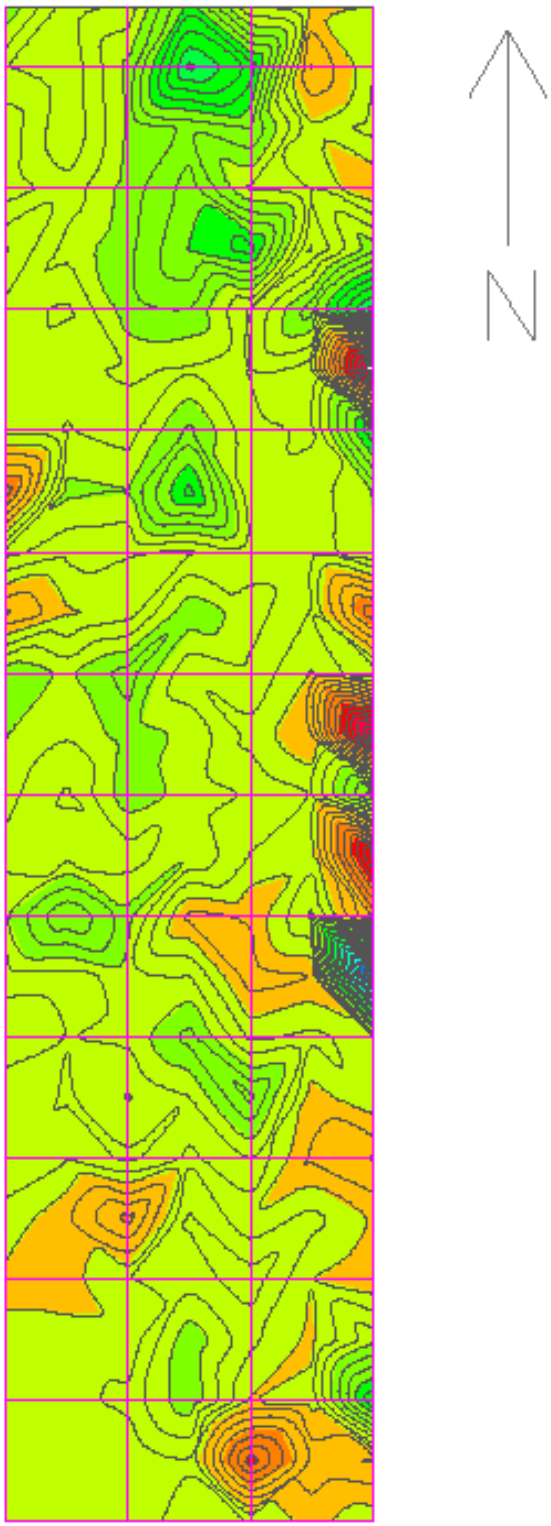

Figure E.59: Section F – Difference between 10/6/2011 and 10/27/2011

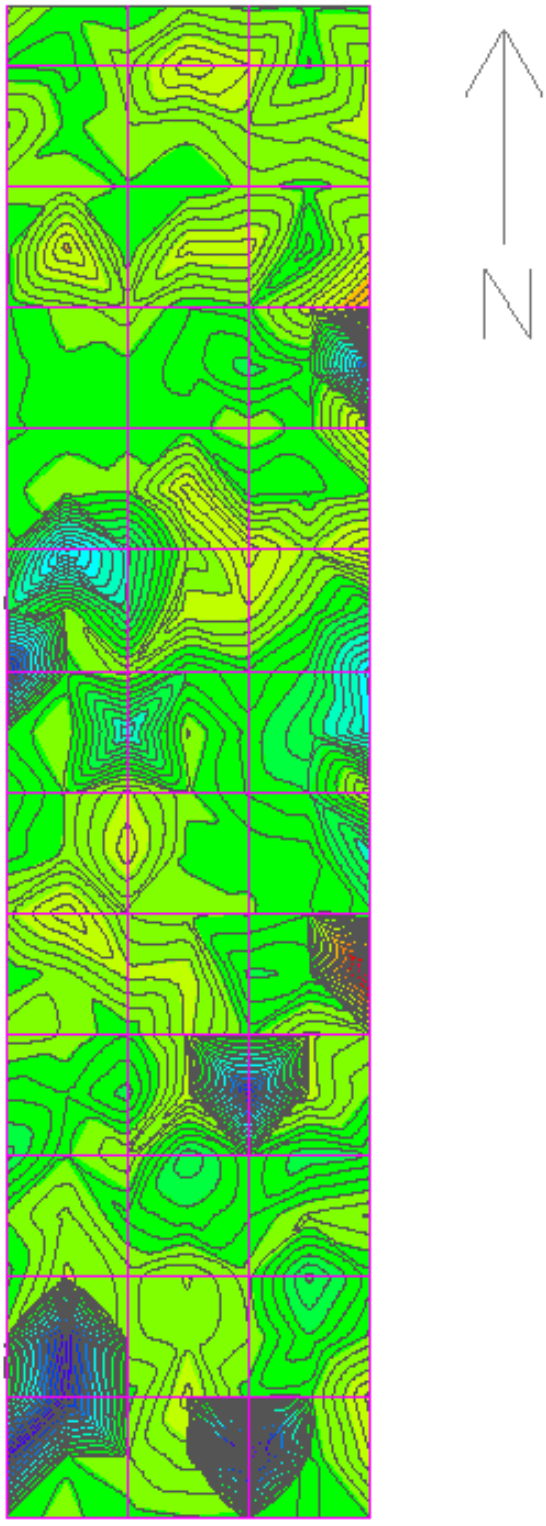

Figure E.60: Section F – Difference between 10/27/2011 and 4/10/2012

Figure E.61: Section F – Difference between 4/10/2012 and 5/9/2012

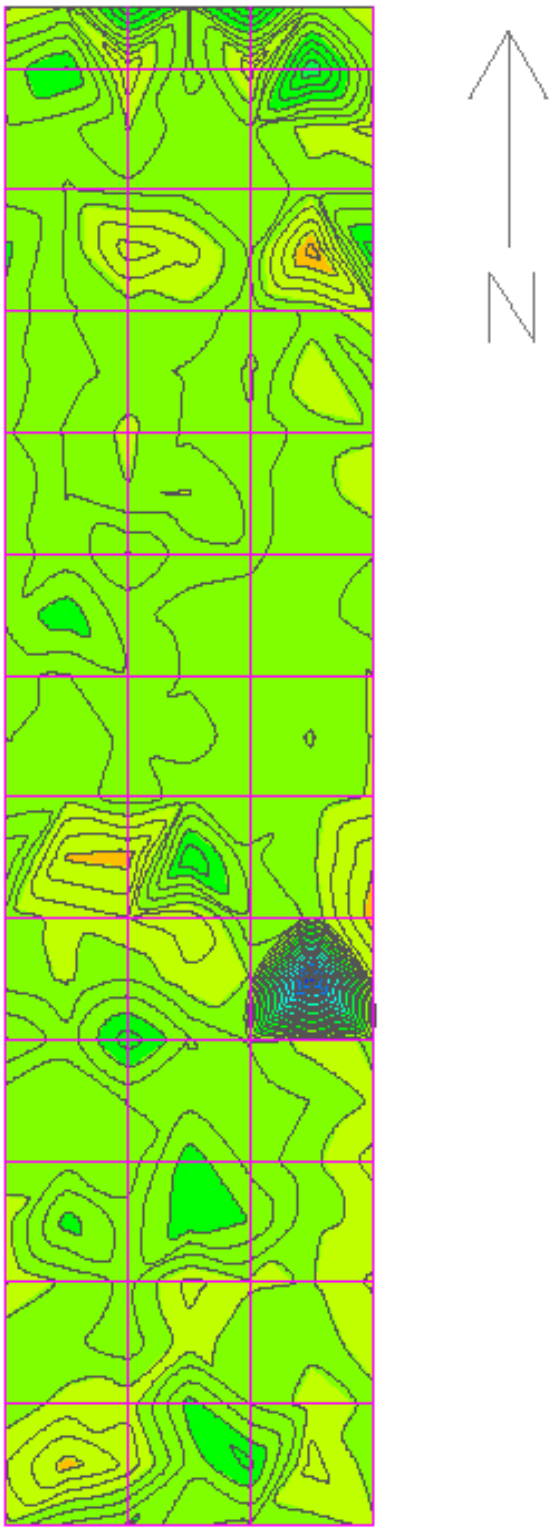

Figure E.62: Section G – Difference between 8/25/2011 and 10/6/2011

Figure E.63: Section G – Difference between 10/6/2011 and 10/27/2011

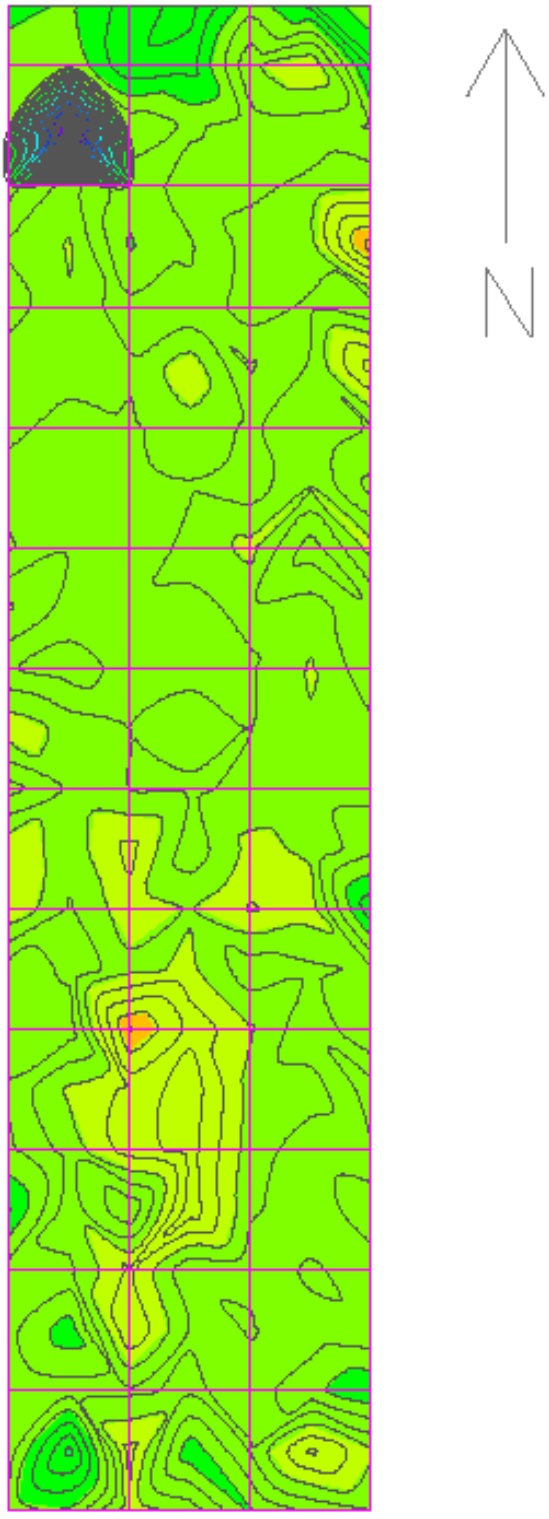

Figure E.64: Section G – Difference between 10/27/2011 and 4/10/2012

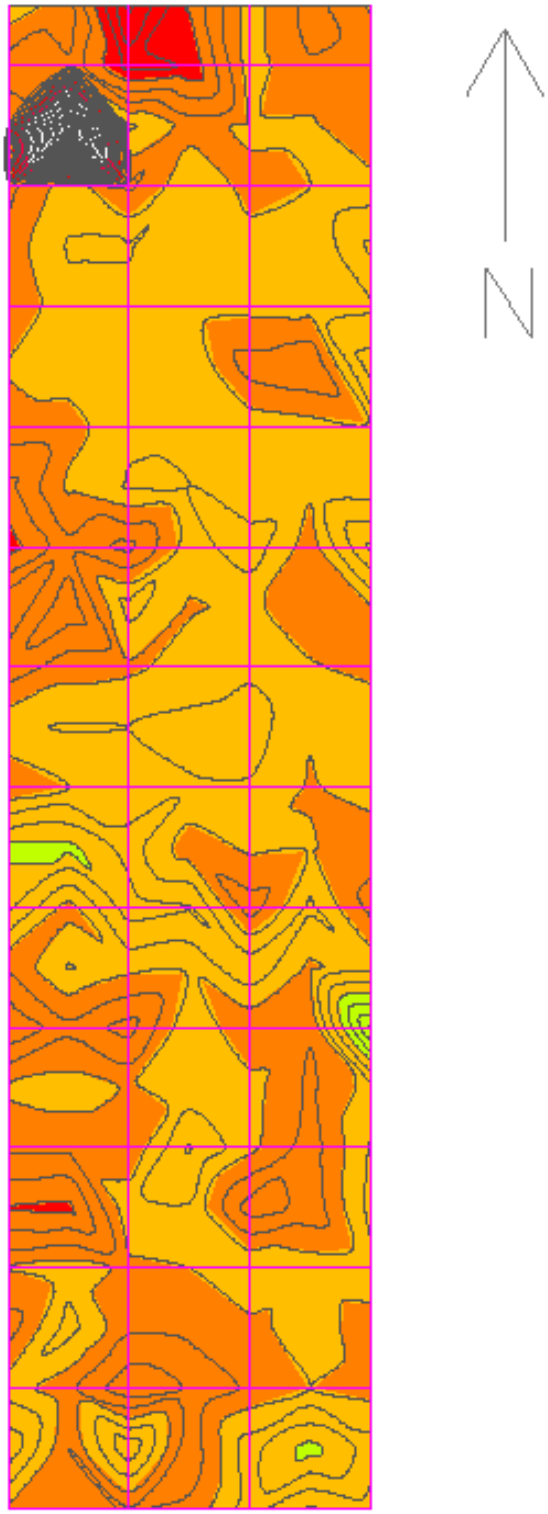

Figure E.65: Section G – Difference between 4/10/2012 and 5/9/2012

APPENDIX F. PLOTS OF HALF-CELL POTENTIAL MEASUREMENTS FOR FIELD TESTING OF MITIGATION PRODUCTS

Figure F-1 through Figure F-35 show plots of the half-cell potential measurements at the date indicated.

Figure F-36 through Figure F-70 show plots of the differences between half-cell measurements at the dates indicated.

Section A – MCI-2018

Section B – Protectosil CIT and Ferrogard 903

Section C – Protectosil CIT

Section D – Ferrogard 903

Section E – Duralprep 3020

Section F – Chemtrete 40

Section G – Control

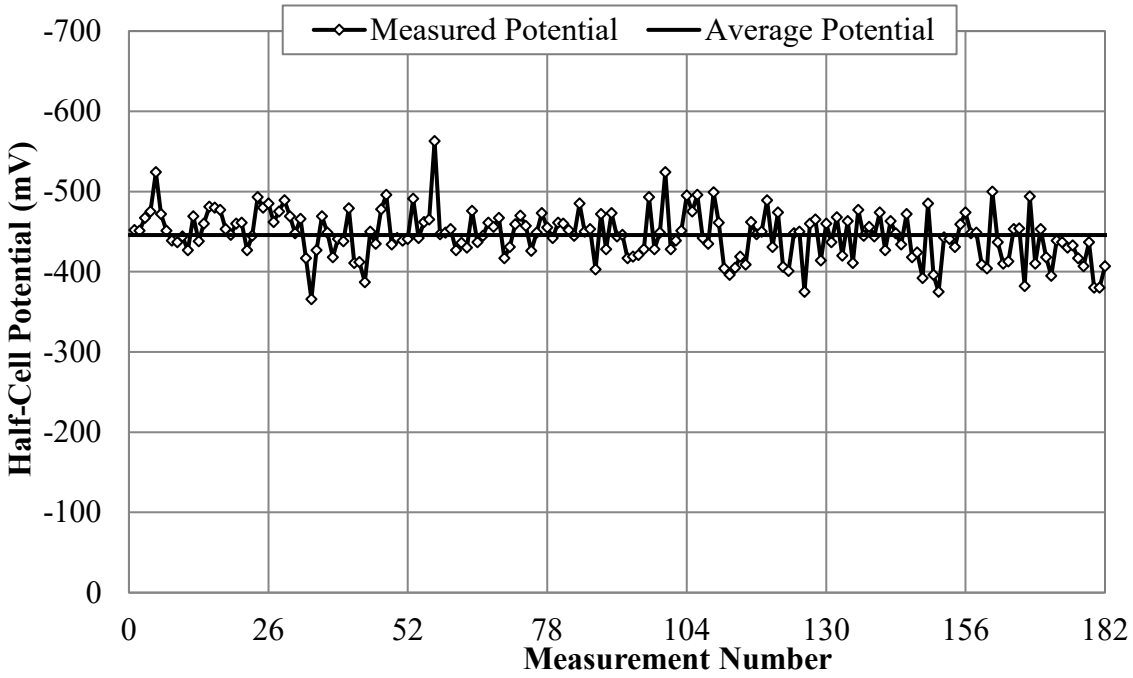

Figure F.1: Section A – Half-cell potential on 8/25/11

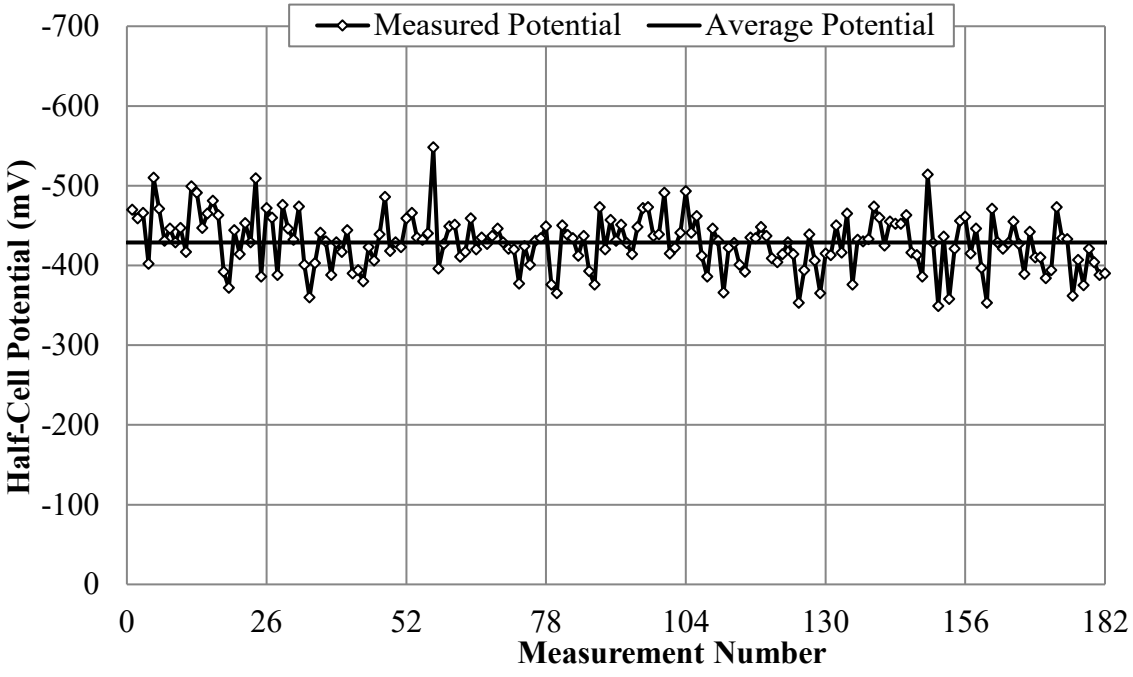

Figure F.2: Section A – Half-cell potential on 10/6/11

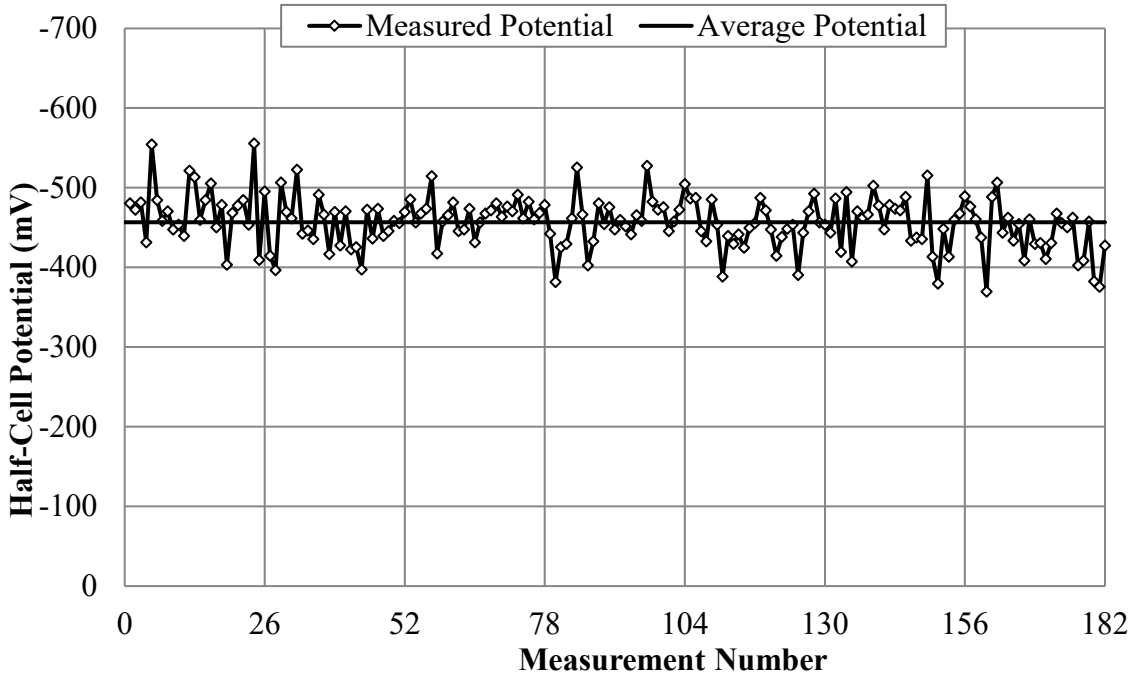

Figure F.3: Section A – Half-cell potential on 10/27/11

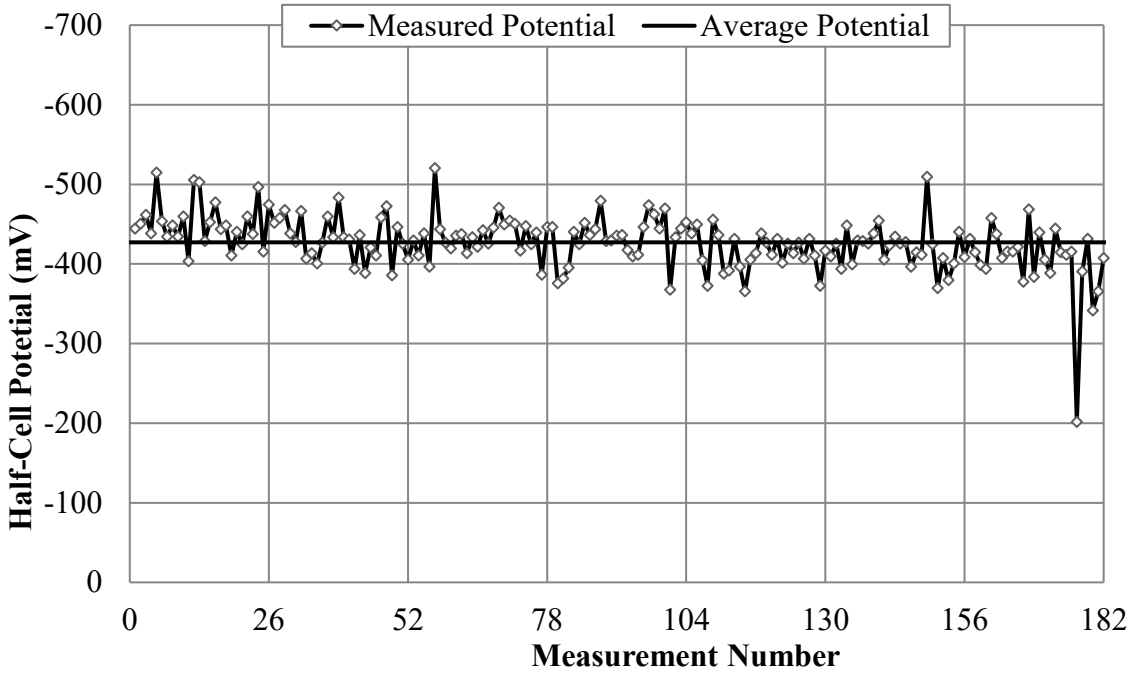

Figure F.4: Section A – Half-cell potential on 4/10/12

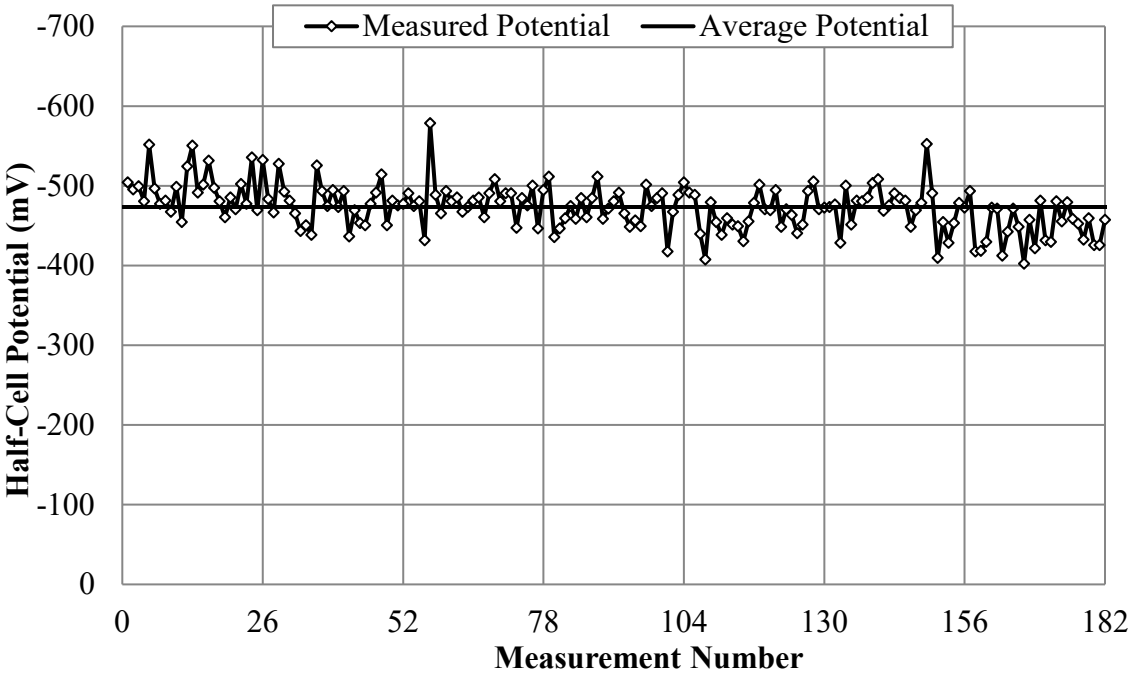

Figure F.5: Section A – Half-cell potential on 5/9/12

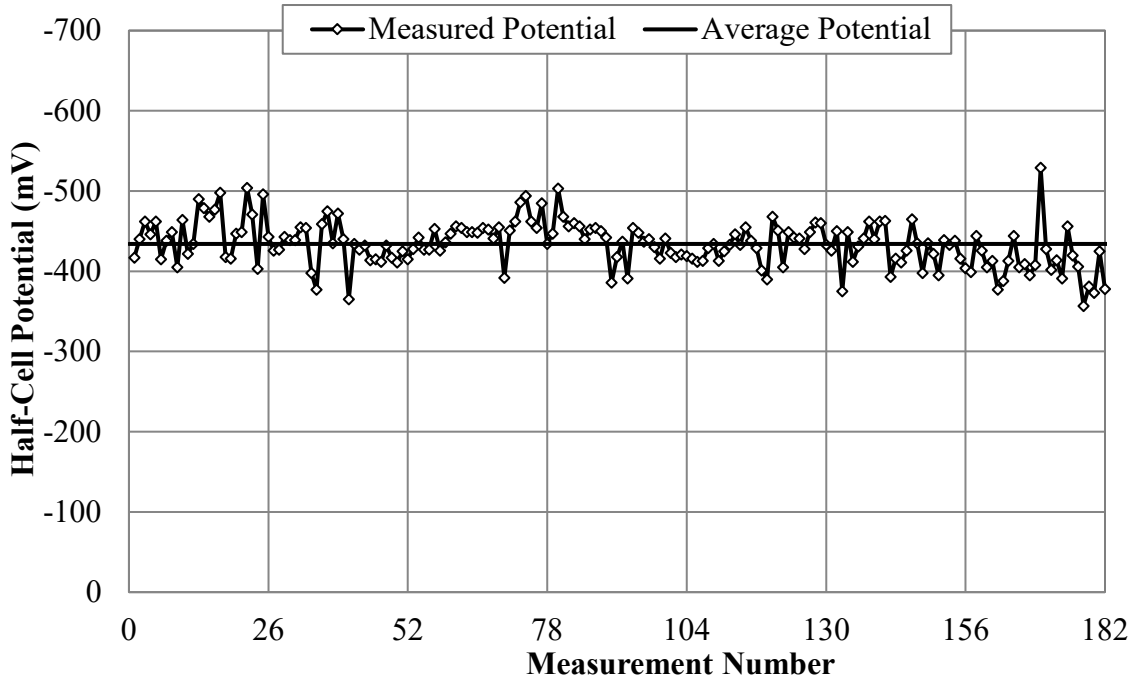

Figure F.6: Section B – Half-cell potential on 8/25/11

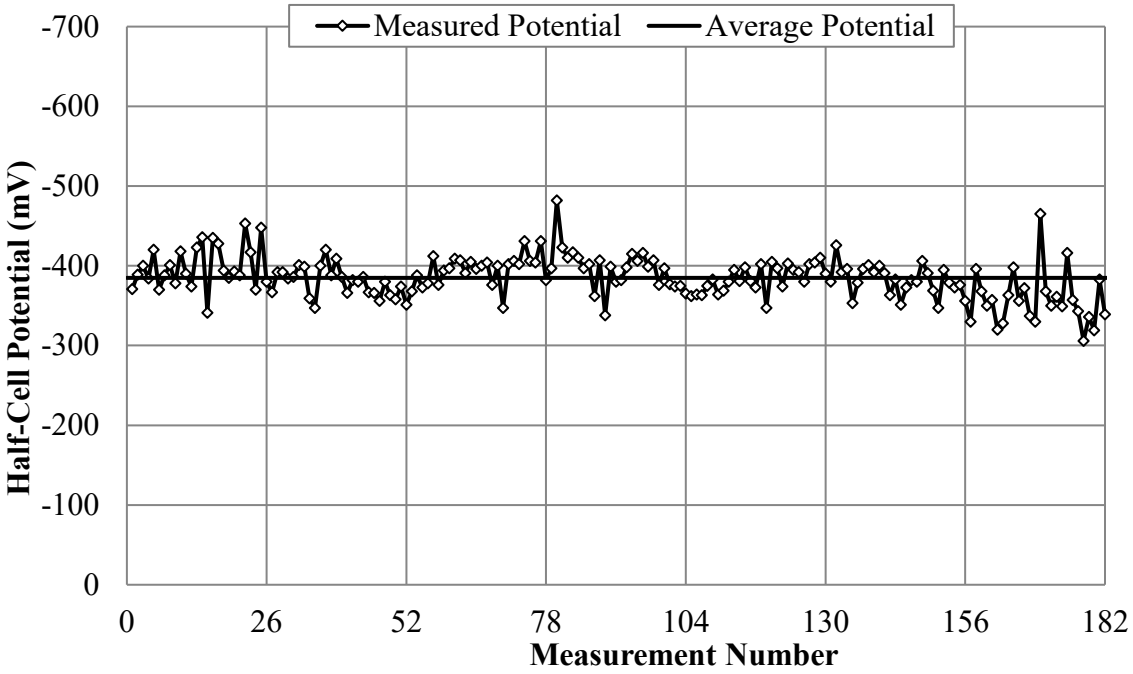

Figure F.7: Section B – Half-cell potential on 10/6/11

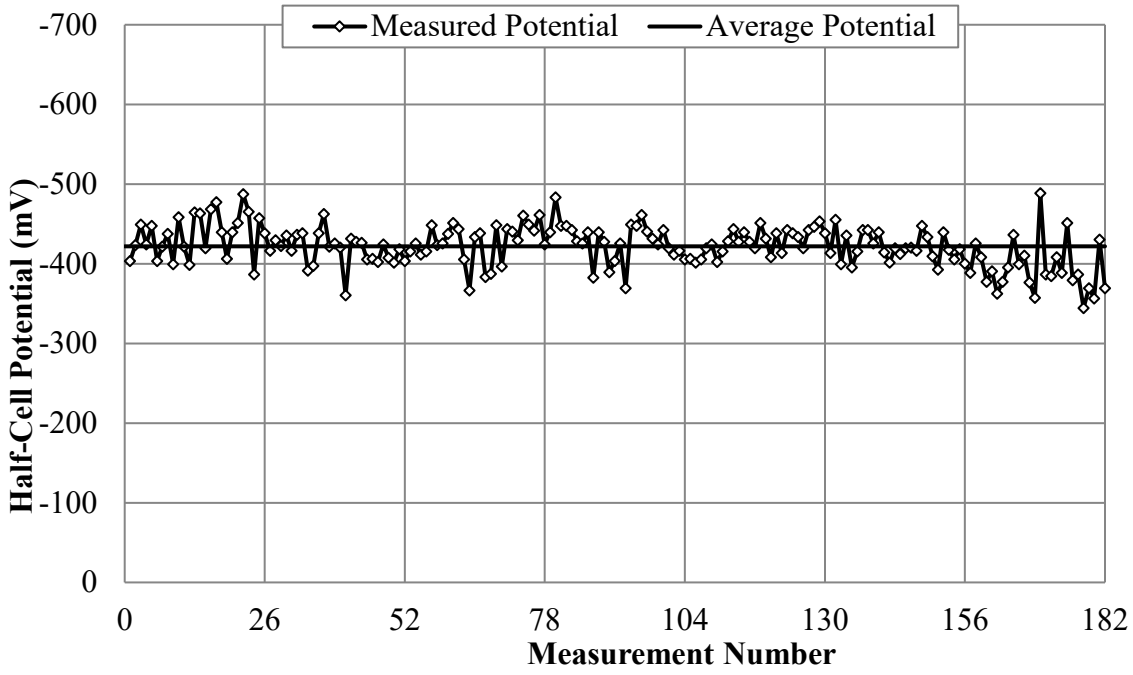

Figure F.8: Section B – Half-cell potential in 10/27/11

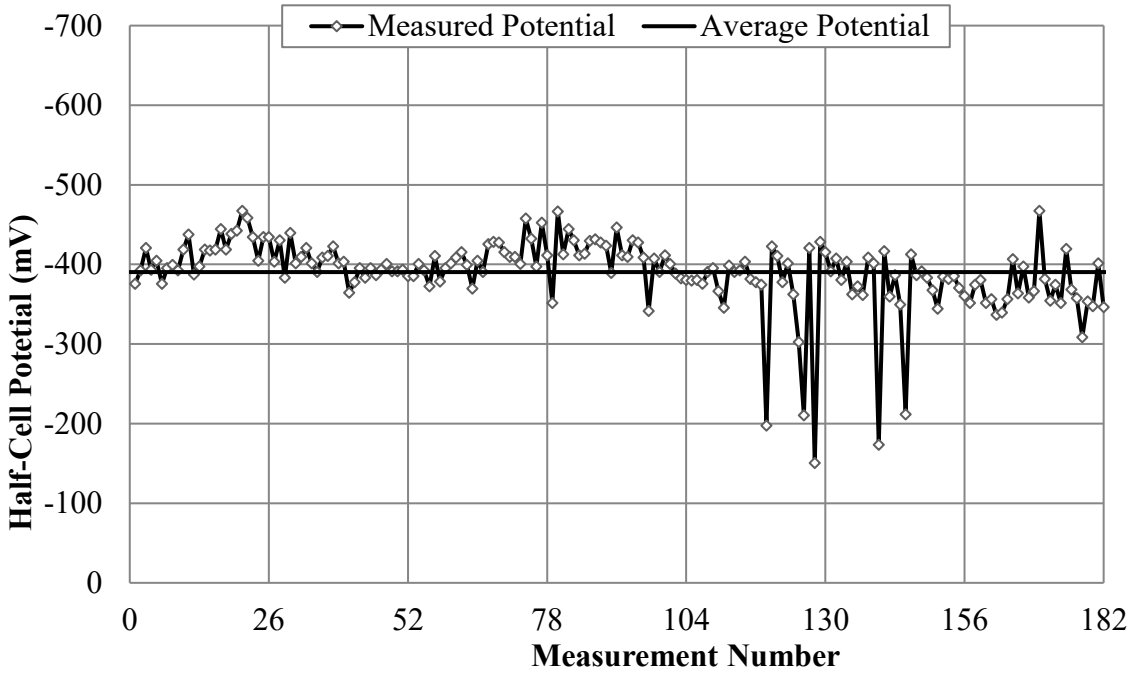

Figure F.9: Section B – Half-cell potential on 4/10/12

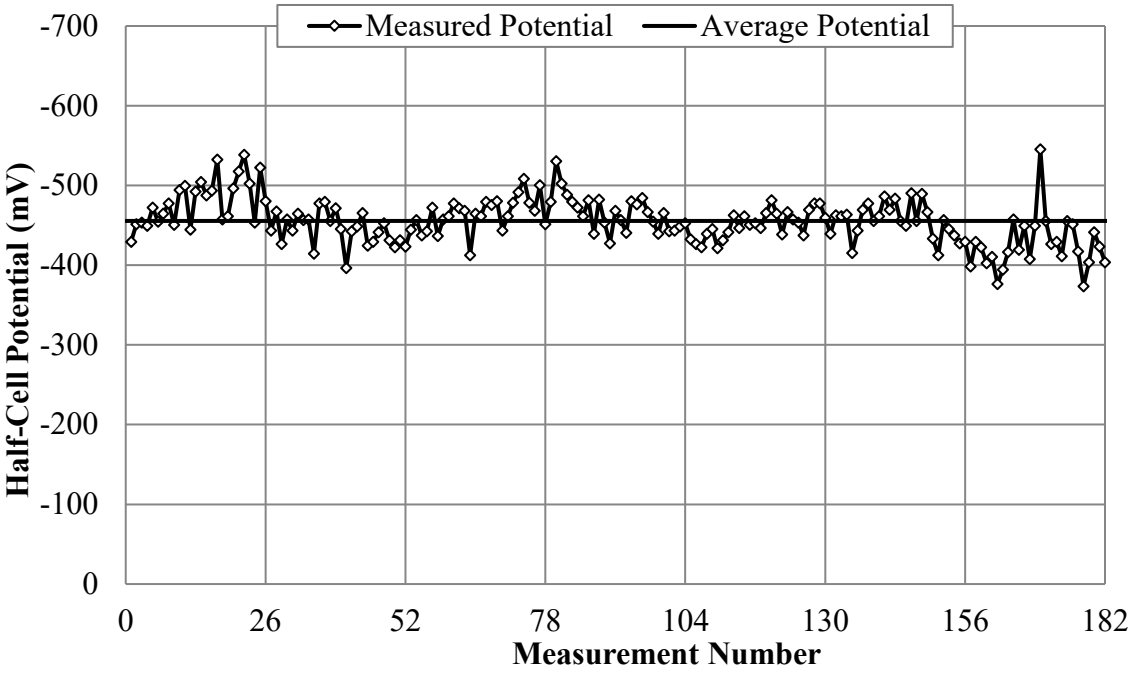

Figure F.10: Section B – Half-cell potential on 5/9/12

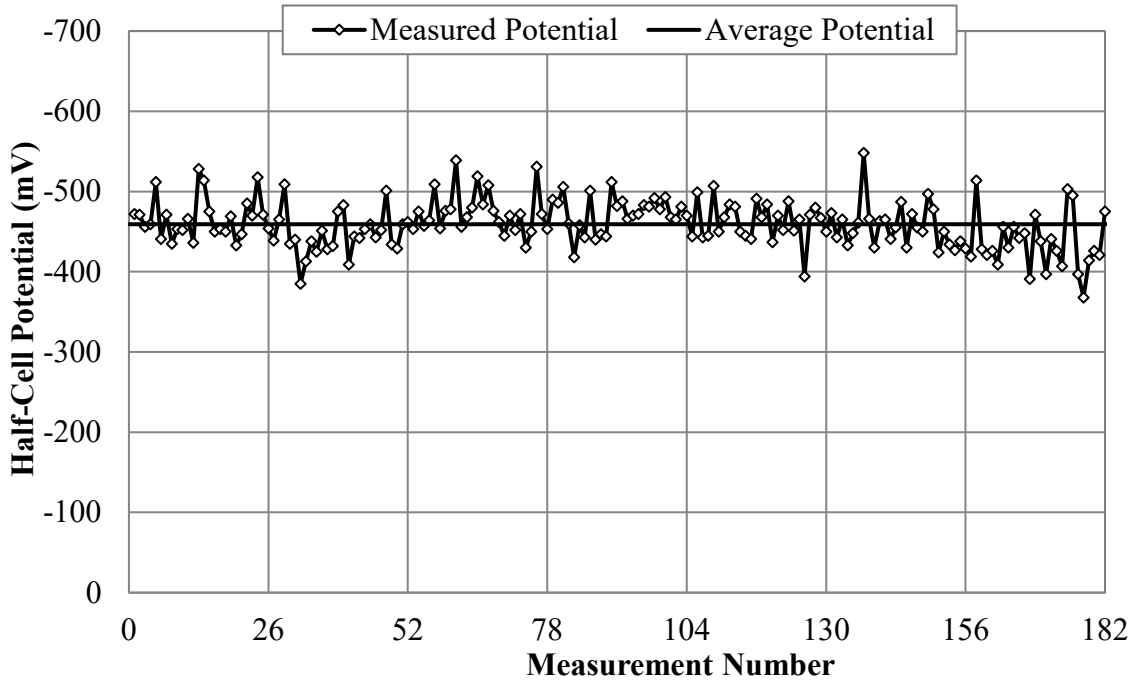

Figure F.11: Section C – Half-cell potential on 8/25/11

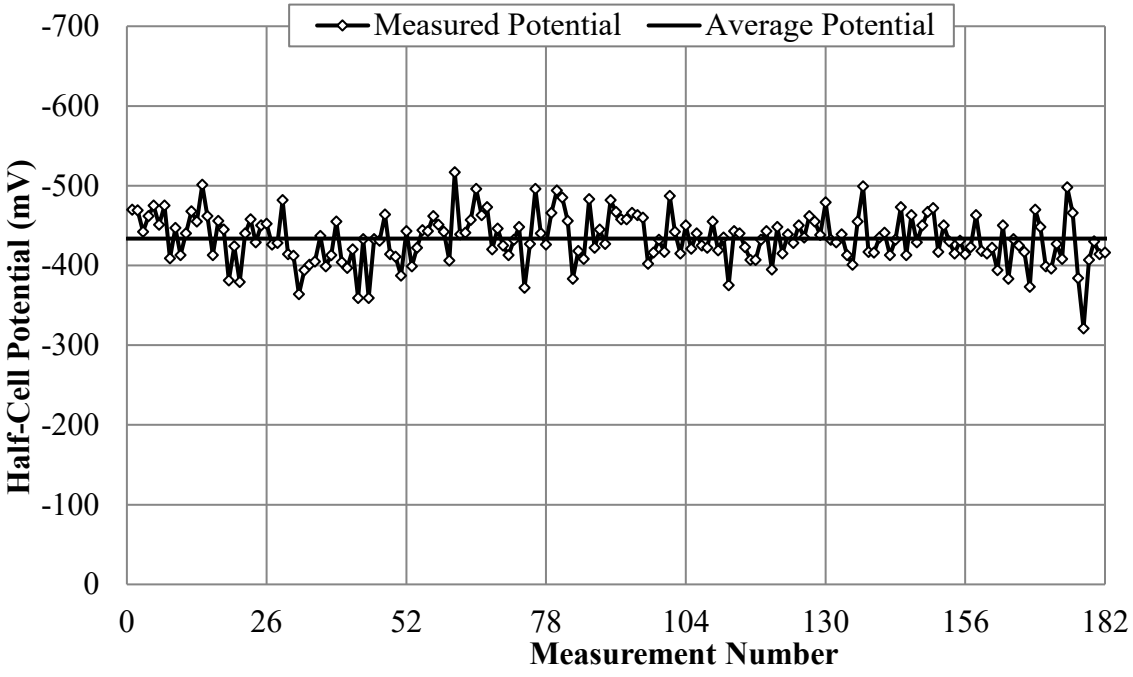

Figure F.12: Section C – Half-cell potential on 10/6/11

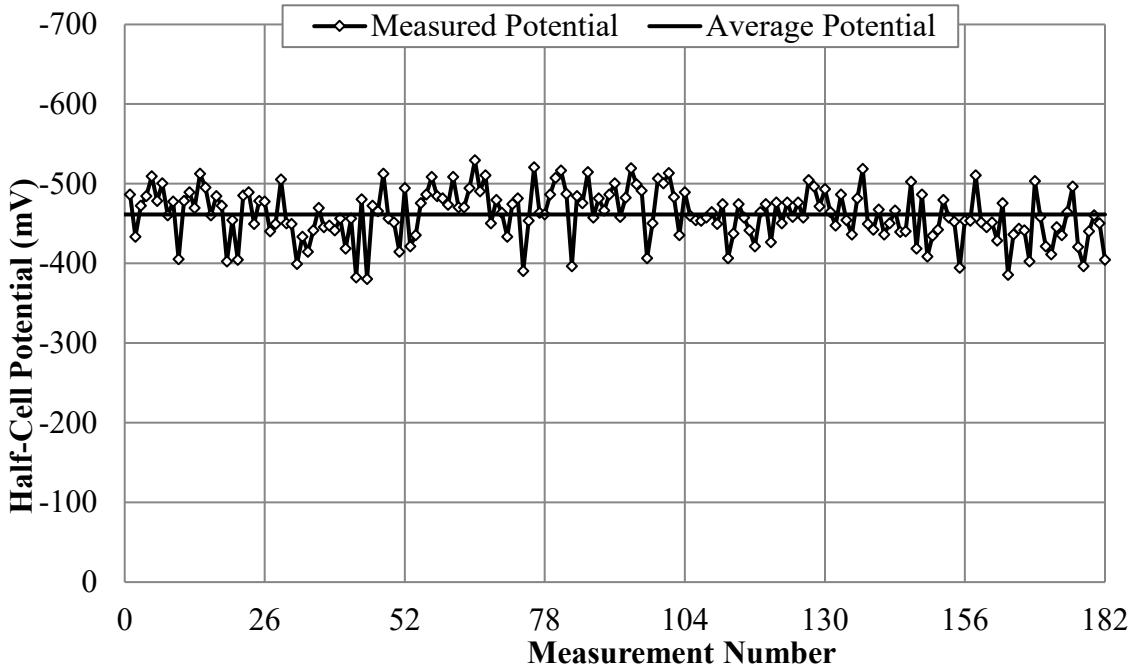

Figure F.13: Section C – Half-cell potential in 10/27/11

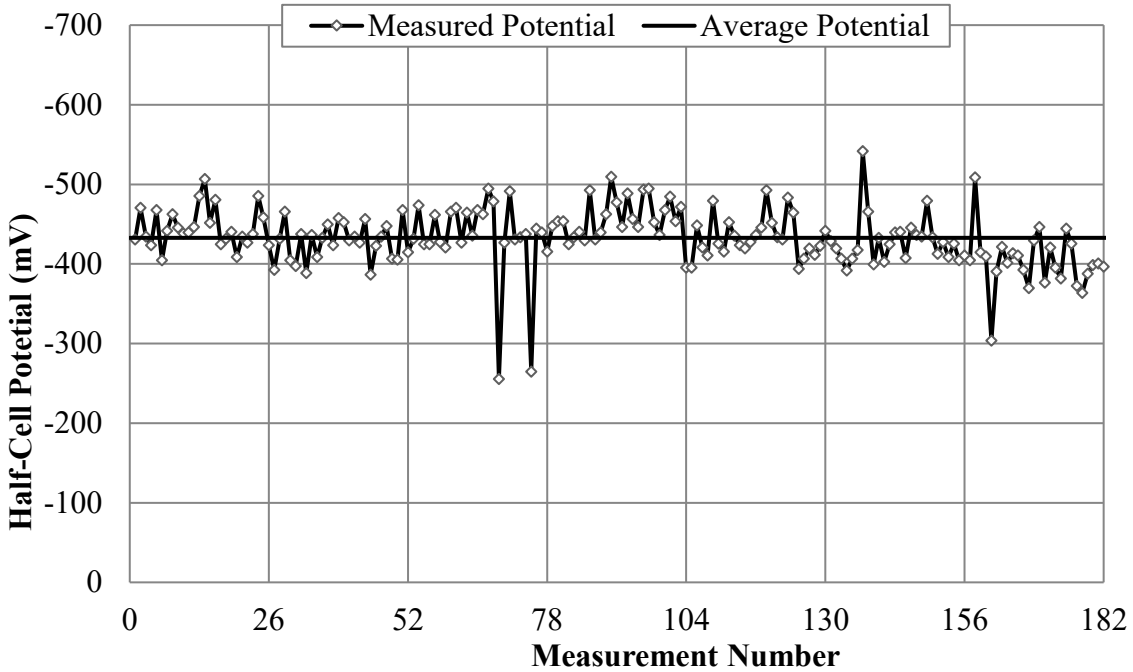

Figure F.14: Section C – Half-cell potential on 4/10/12

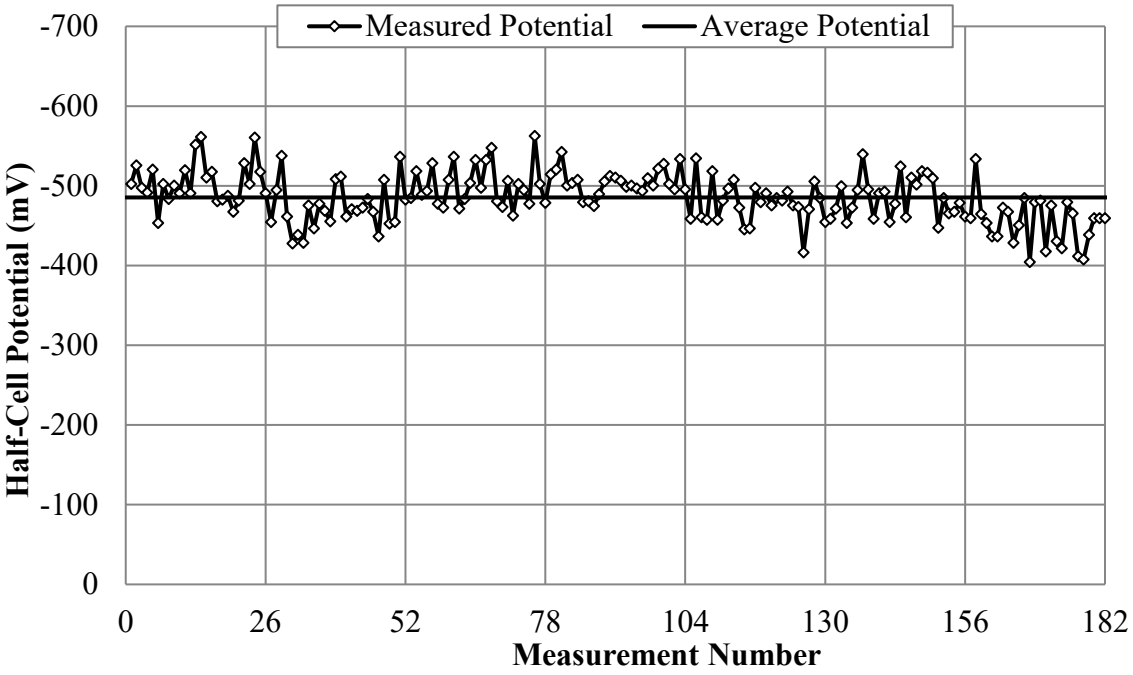

Figure F.15: Section C – Half-cell potential on 5/9/12

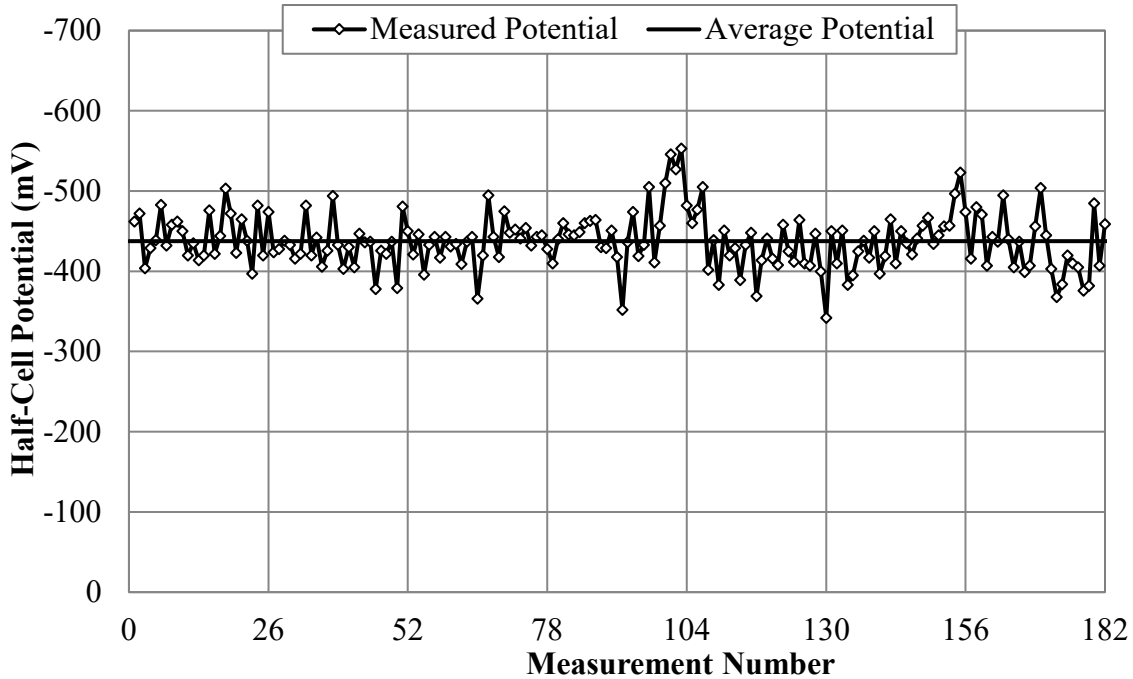

Figure F.16: Section D – Half-cell potential on 8/25/11

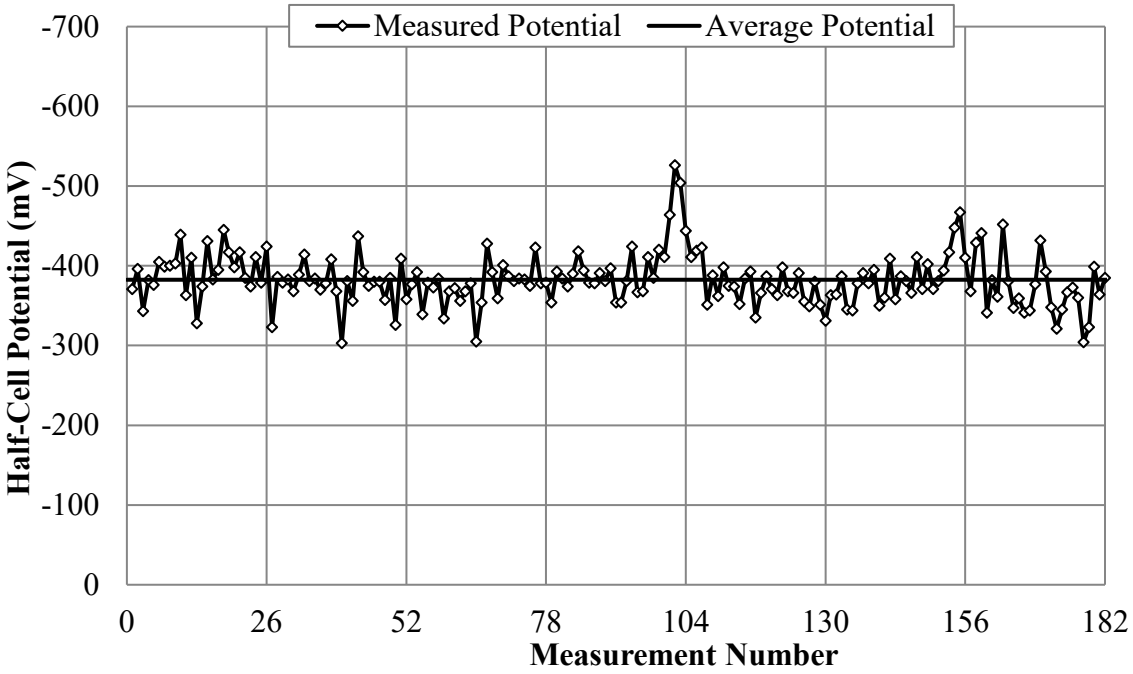

Figure F.17: Section D – Half-cell potential on 10/6/11

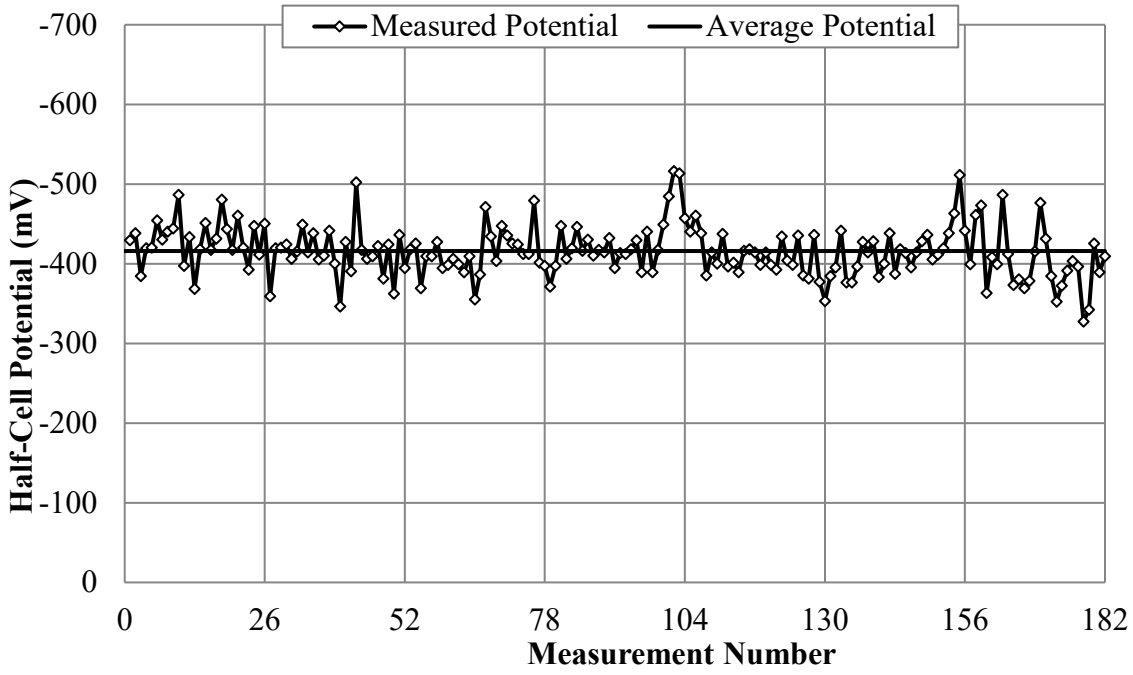

Figure F.18: Section D – Half-cell potential in 10/27/11

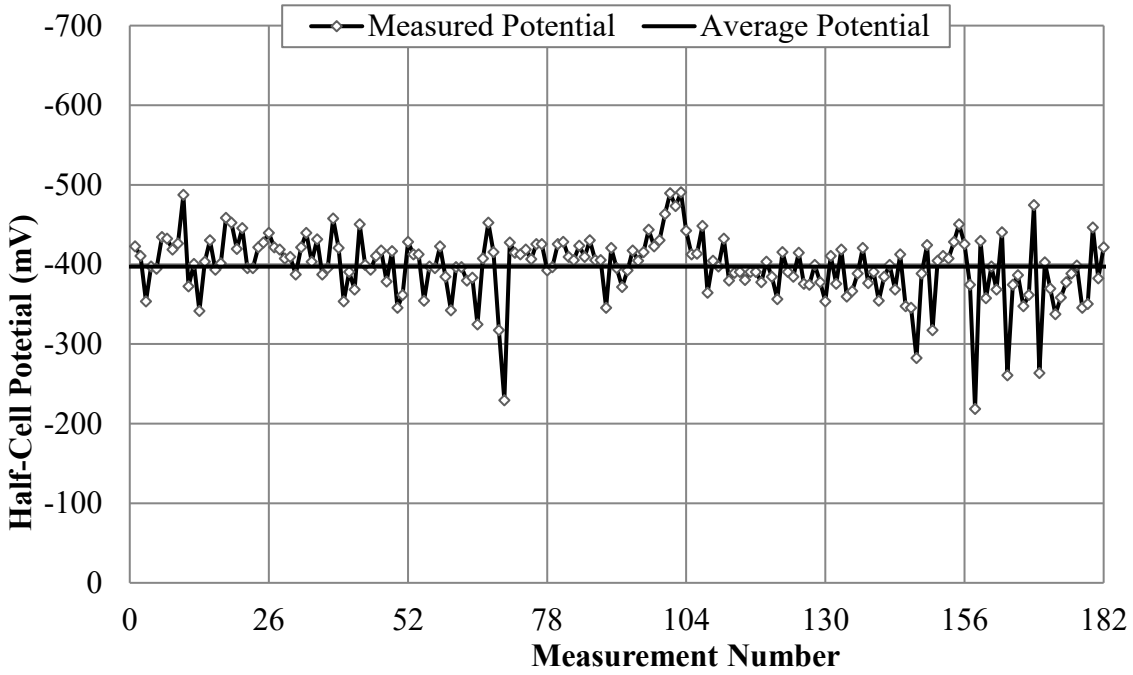

Figure F.19: Section D – Half-cell potential on 4/10/12

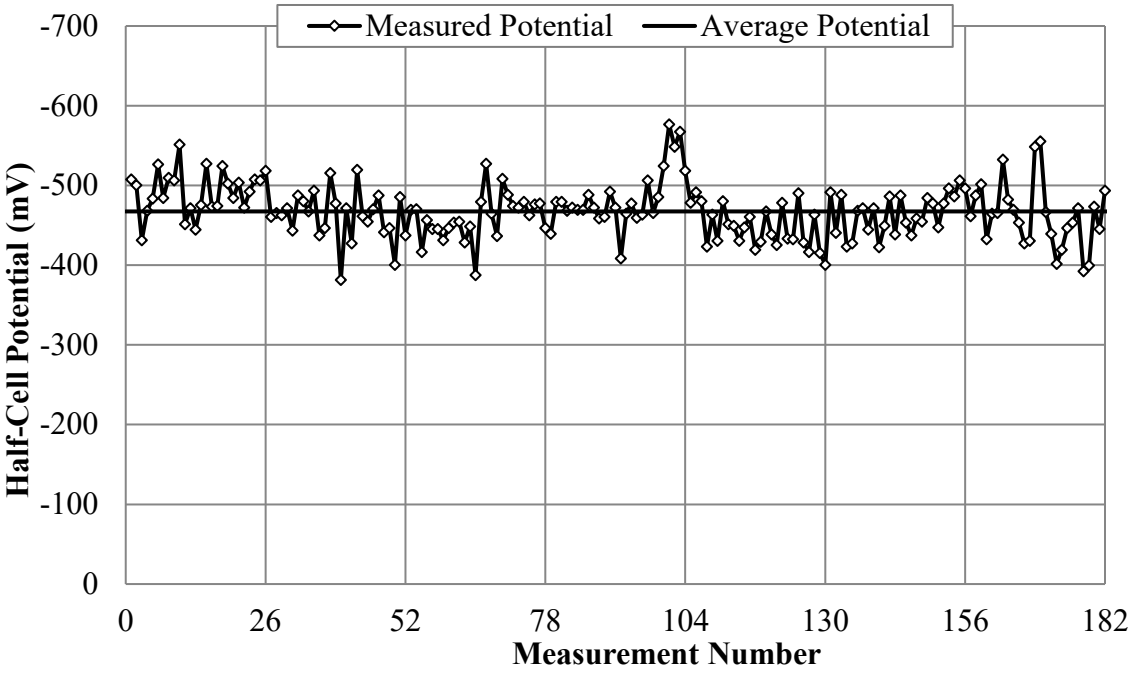

Figure F.20: Section D – Half-cell potential on 5/9/12

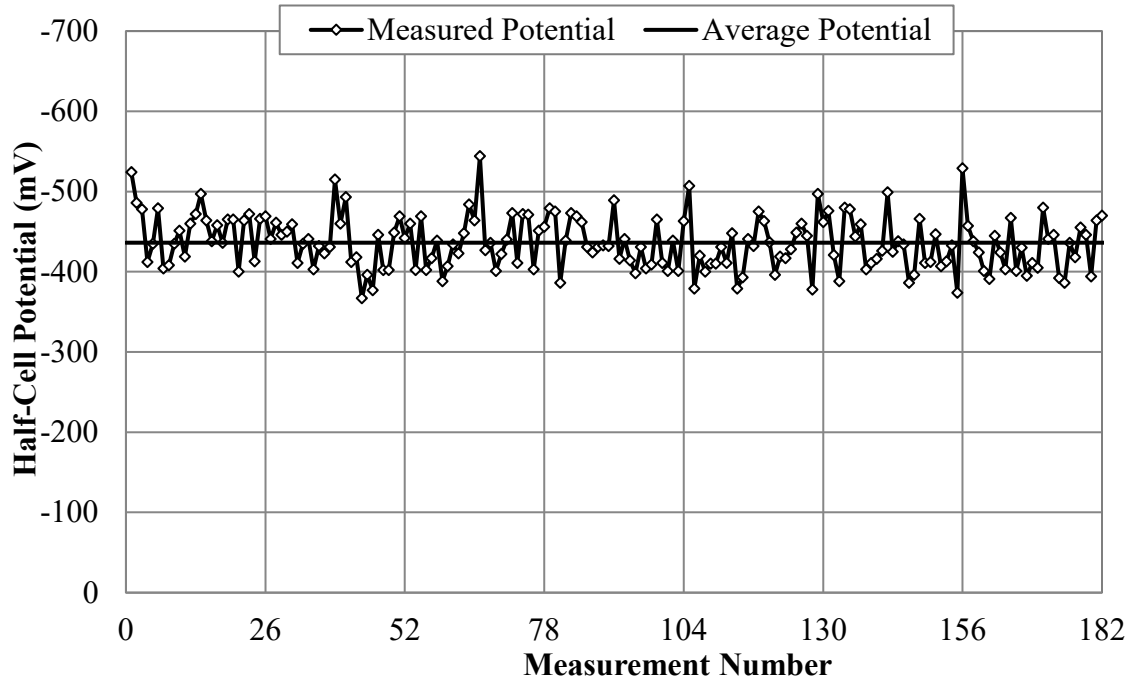

Figure F.21: Section E – Half-cell potential on 8/25/11

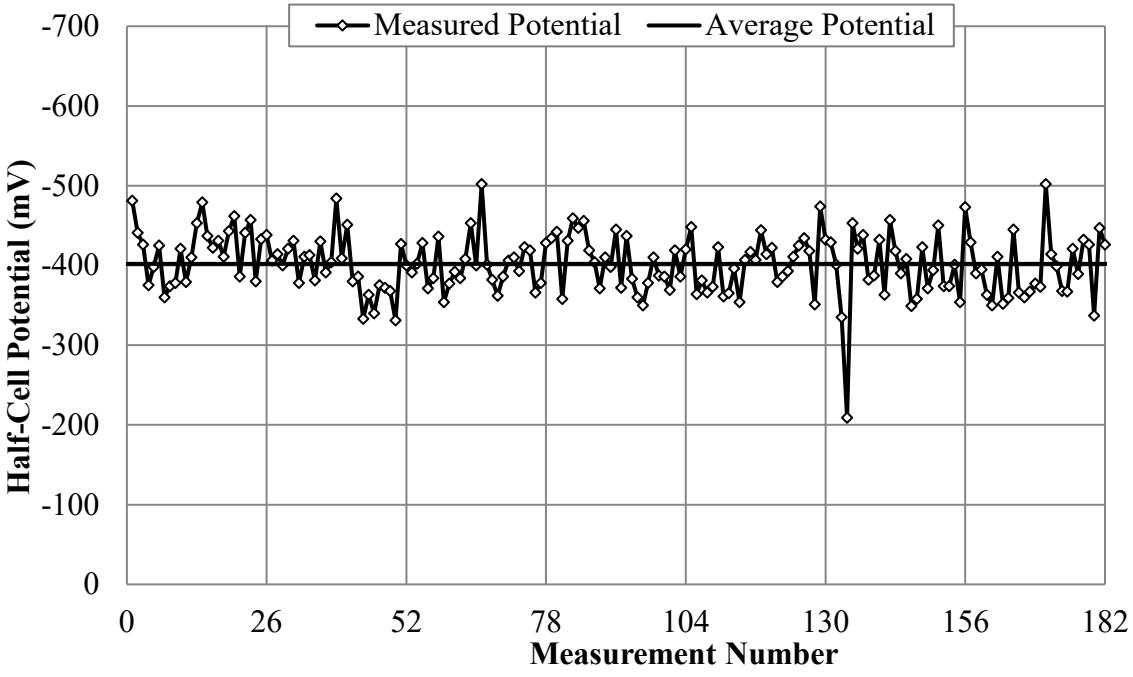

Figure F.22: Section E – Half-cell potential on 10/6/11

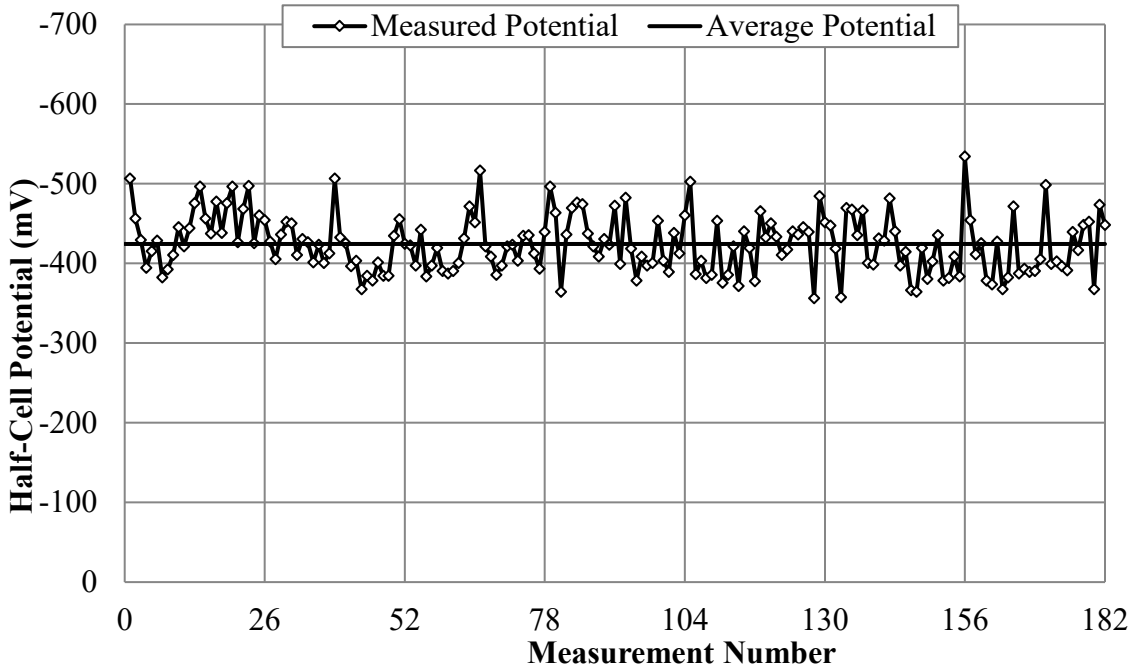

Figure F.23: Section E – Half-cell potential on 10/27/11

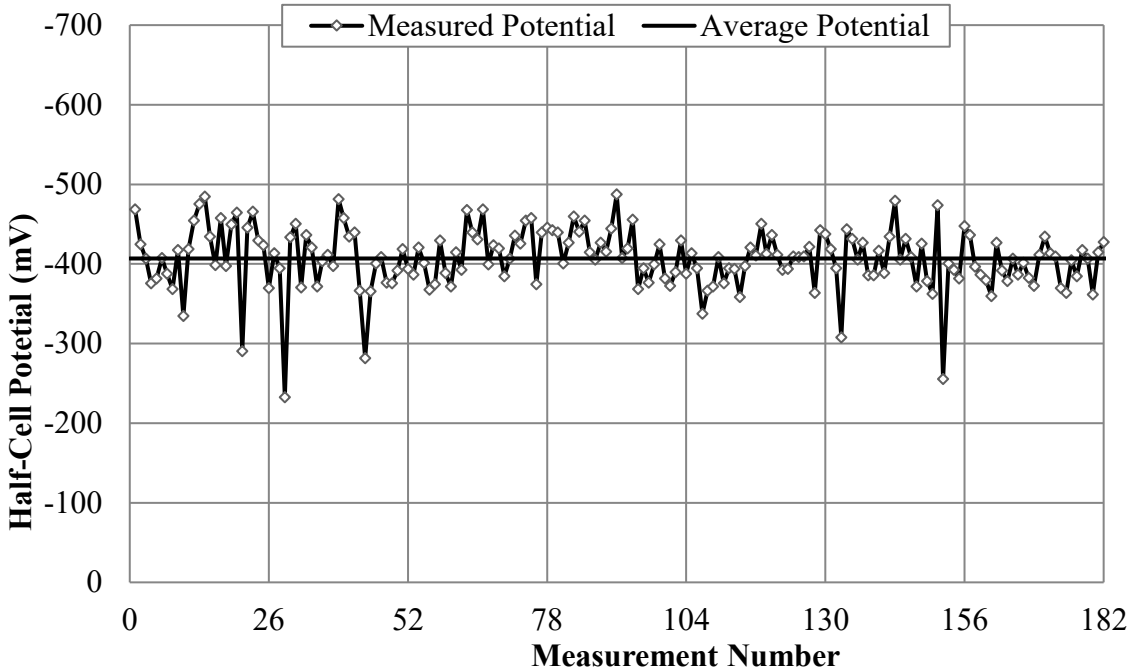

Figure F.24: Section E – Half-cell potential on 4/10/12

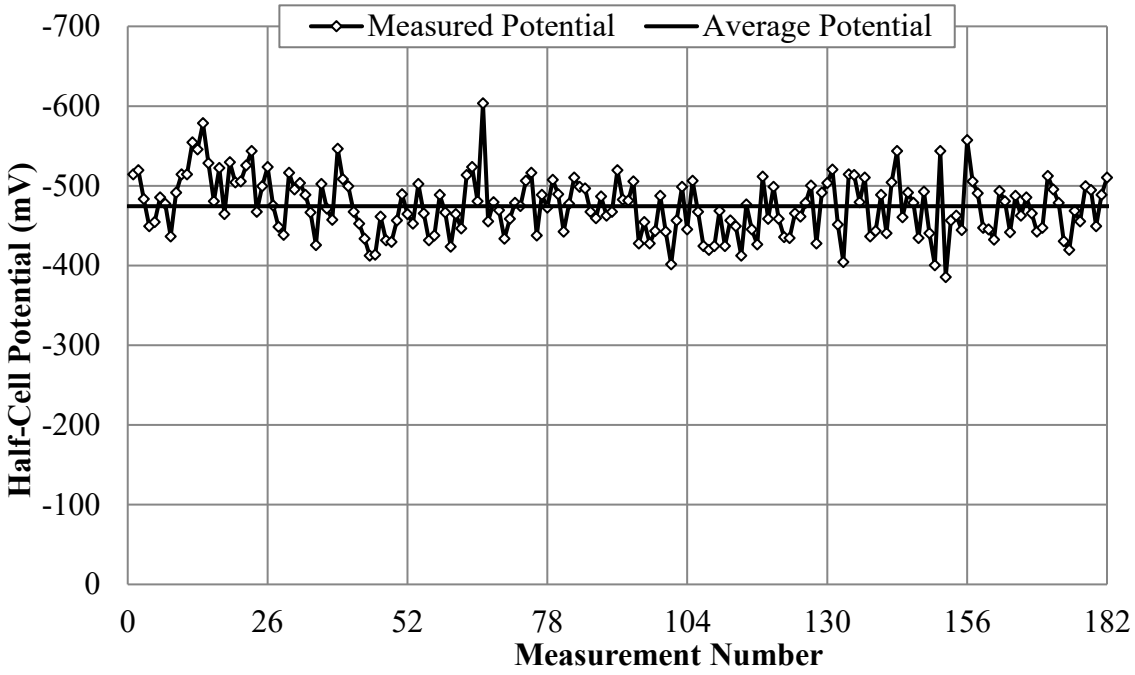

Figure F.25: Section E – Half-cell potential on 5/9/12

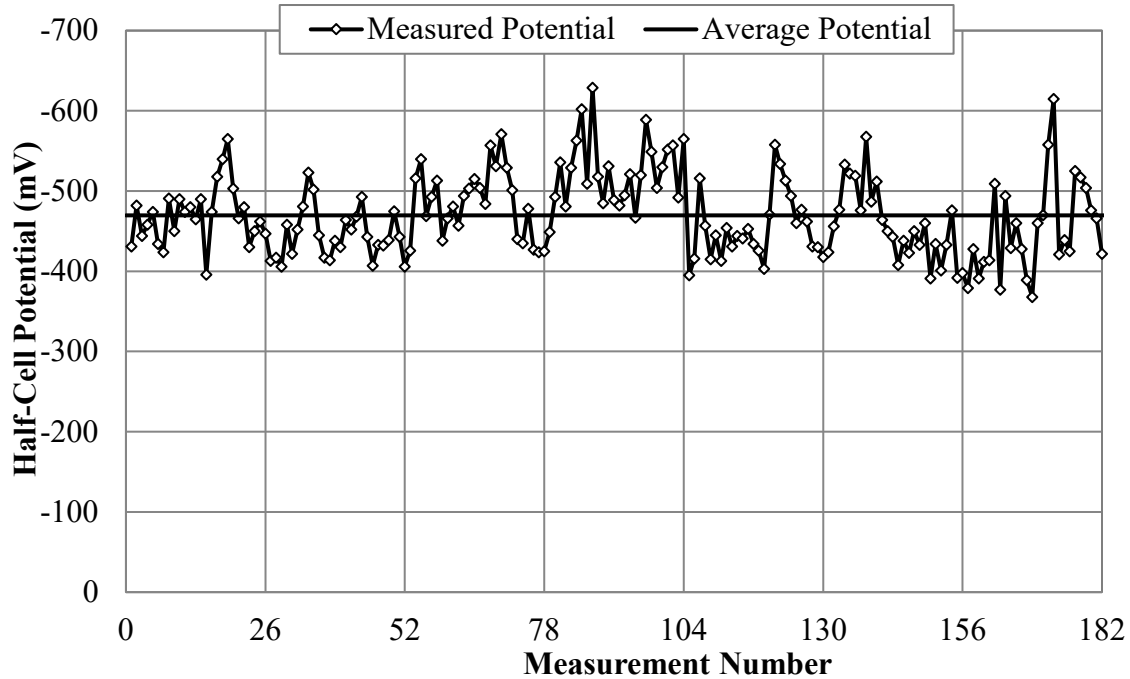

Figure F.26: Section F – Half-cell potential on 8/25/11

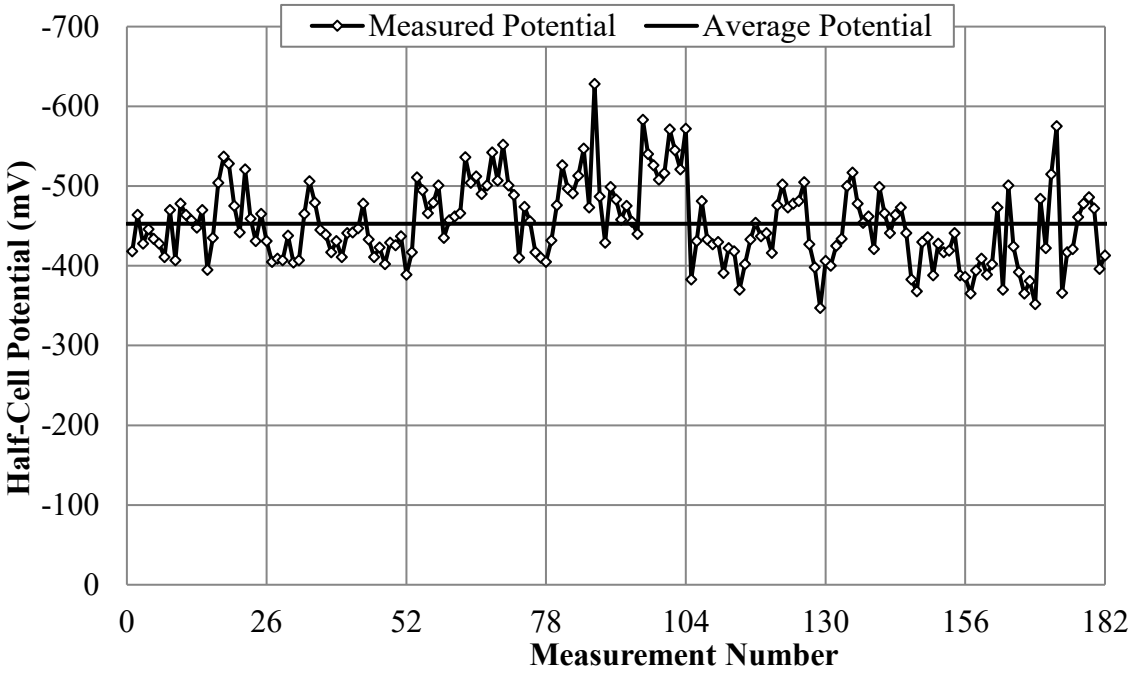

Figure F.27: Section F – Half-cell potential on 10/6/11

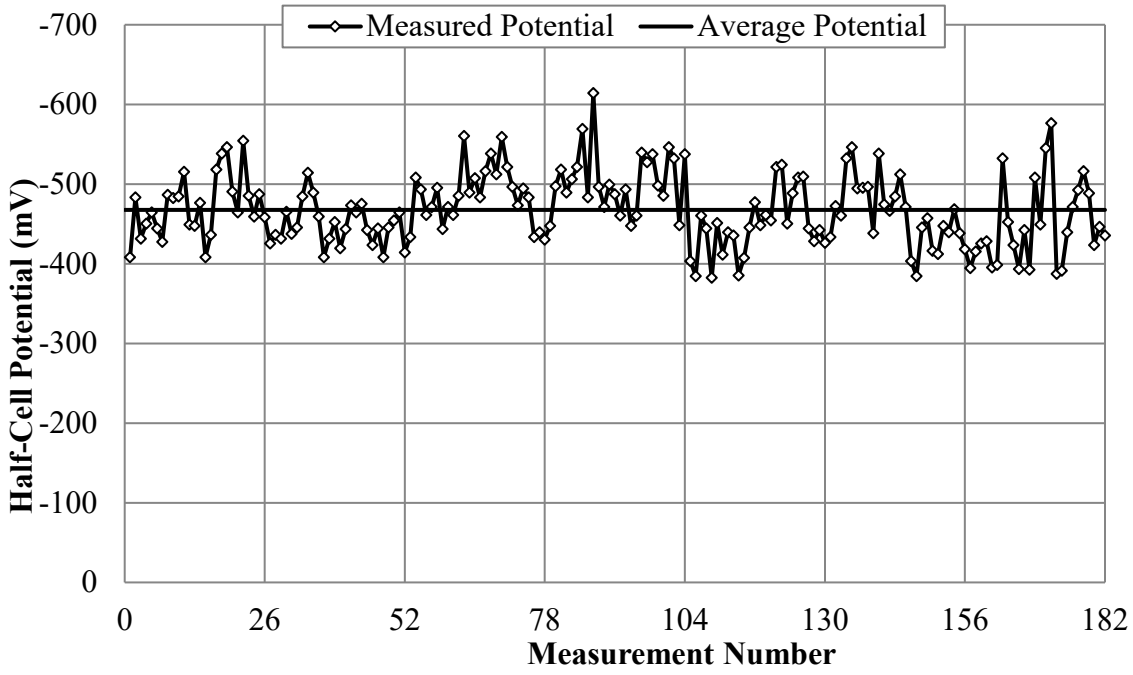

Figure F.28: Section F – Half-cell potential on 10/27/11

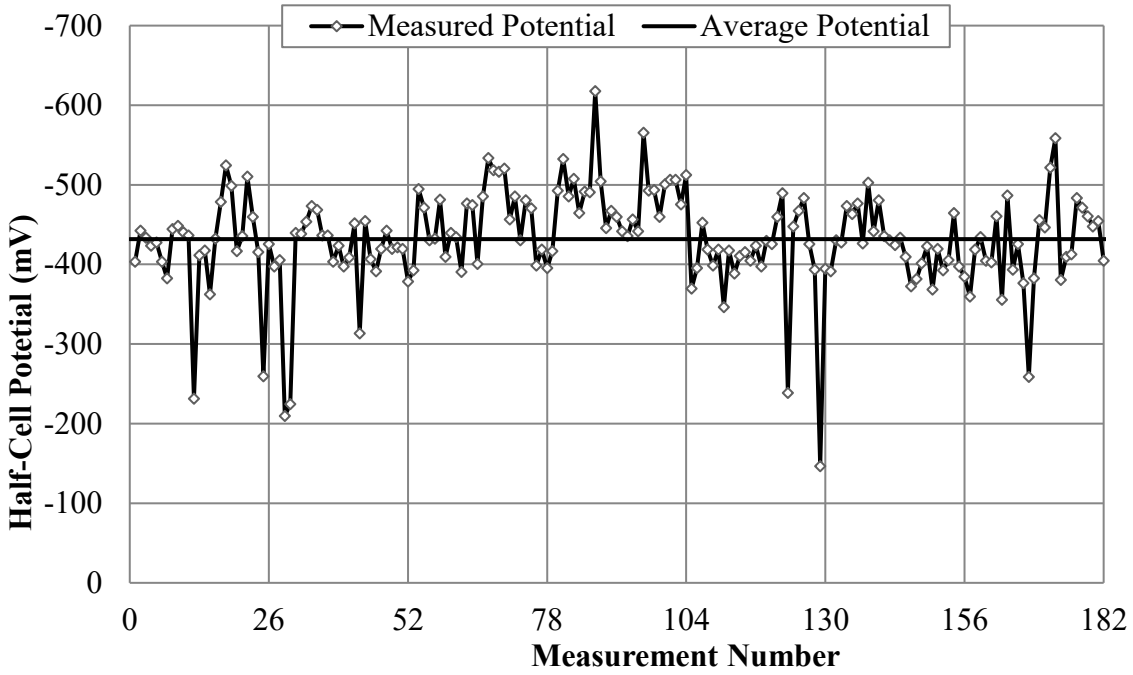

Figure F.29: Section F – Half-cell potential on 4/10/12

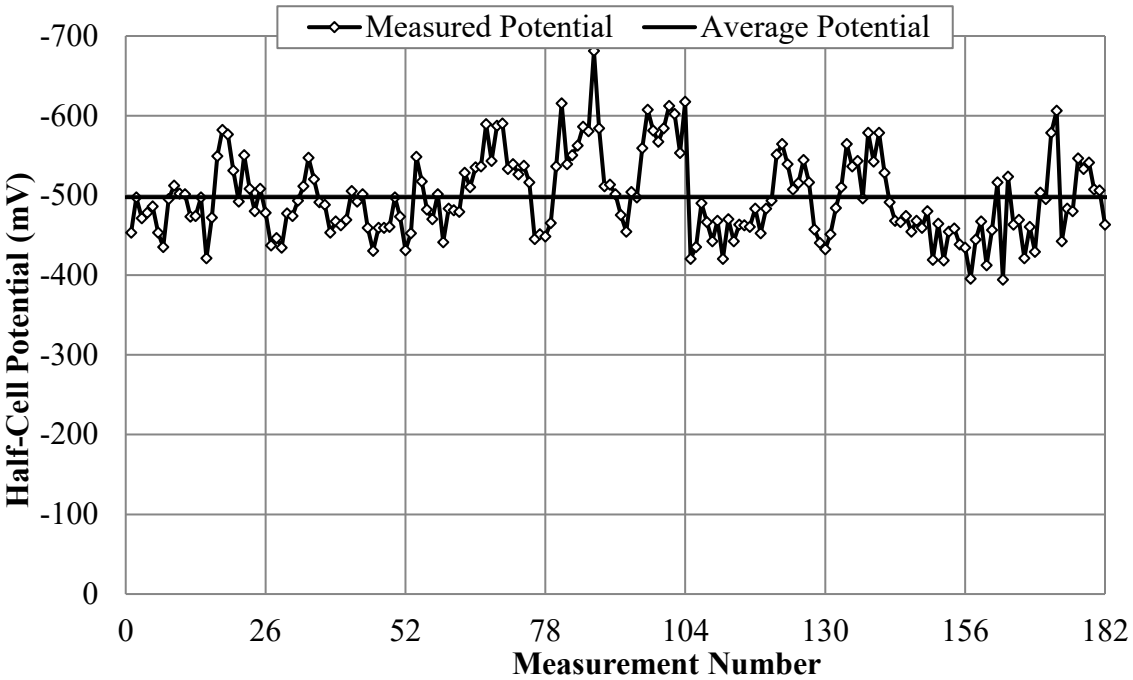

Figure F.30: Section F – Half-cell potential on 5/9/12

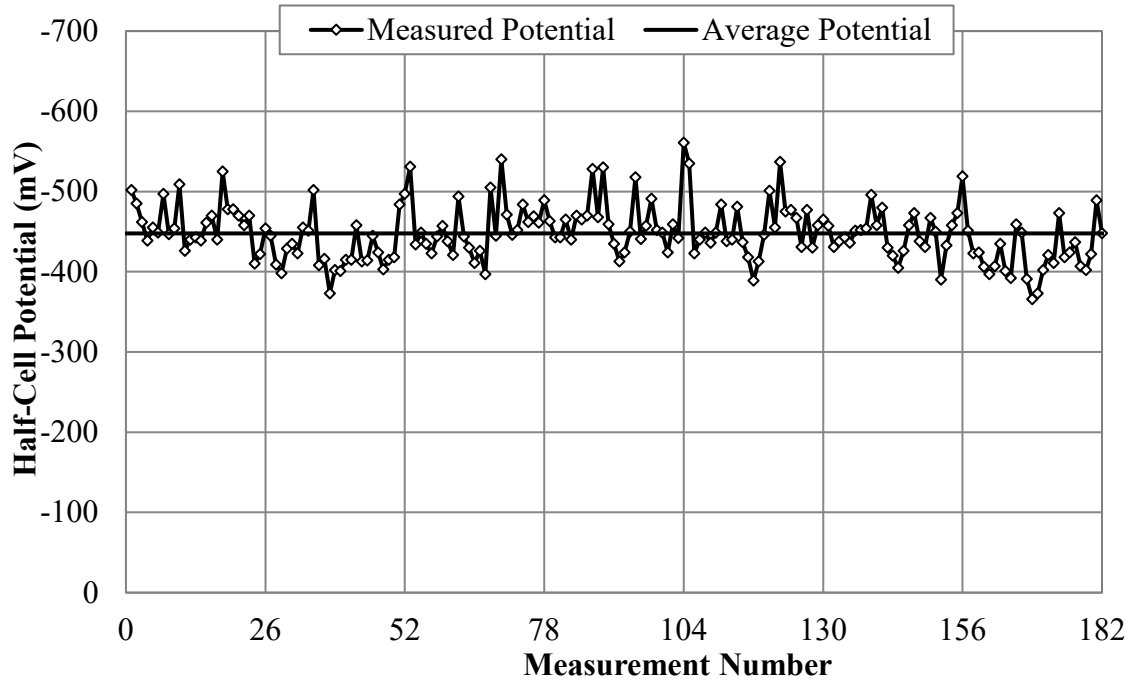

Figure F.31: Section G – Half-cell potential on 8/25/11

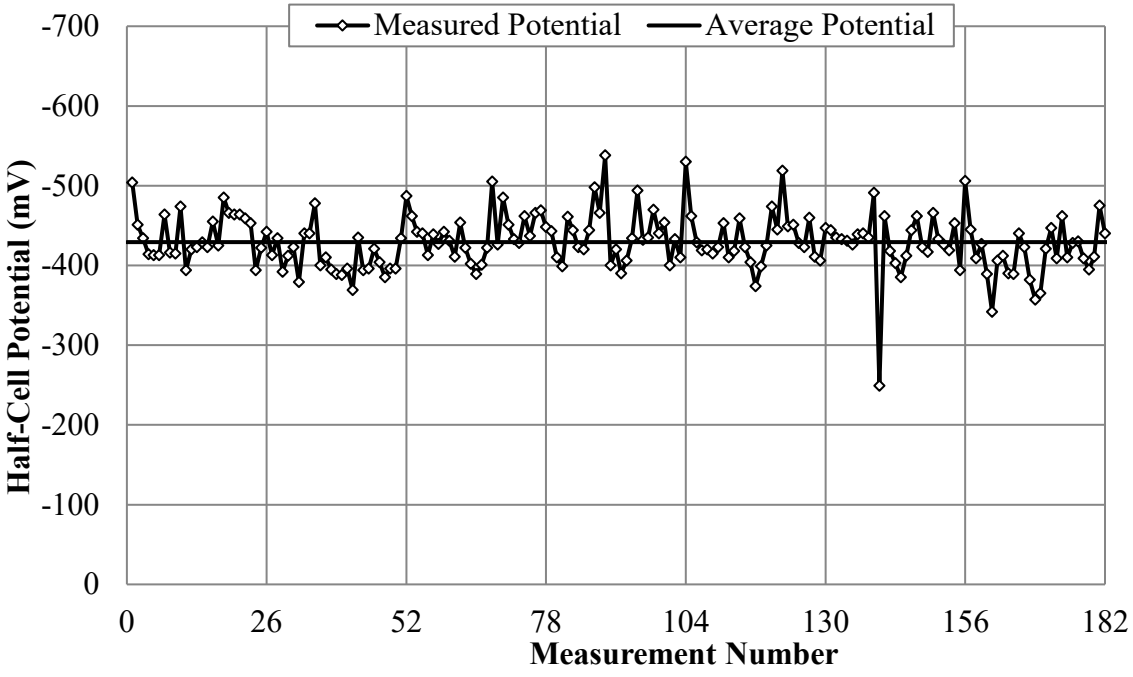

Figure F.32: Section G – Half-cell potential on 10/6/11

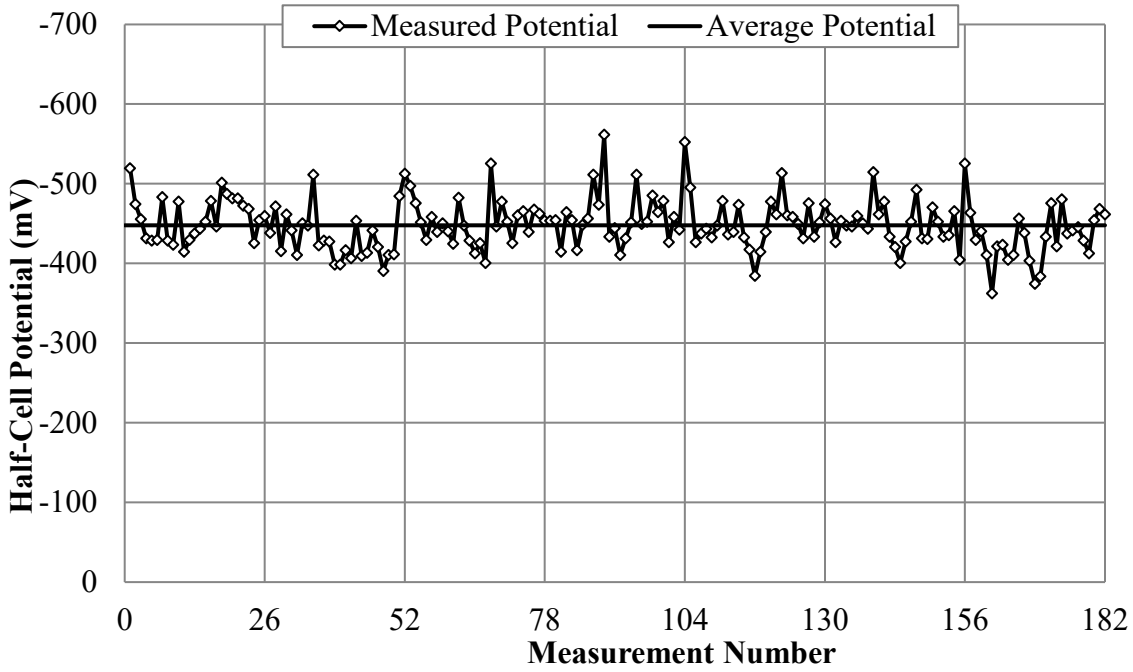

Figure F.33: Section G – Half-cell potential on 10/27/11

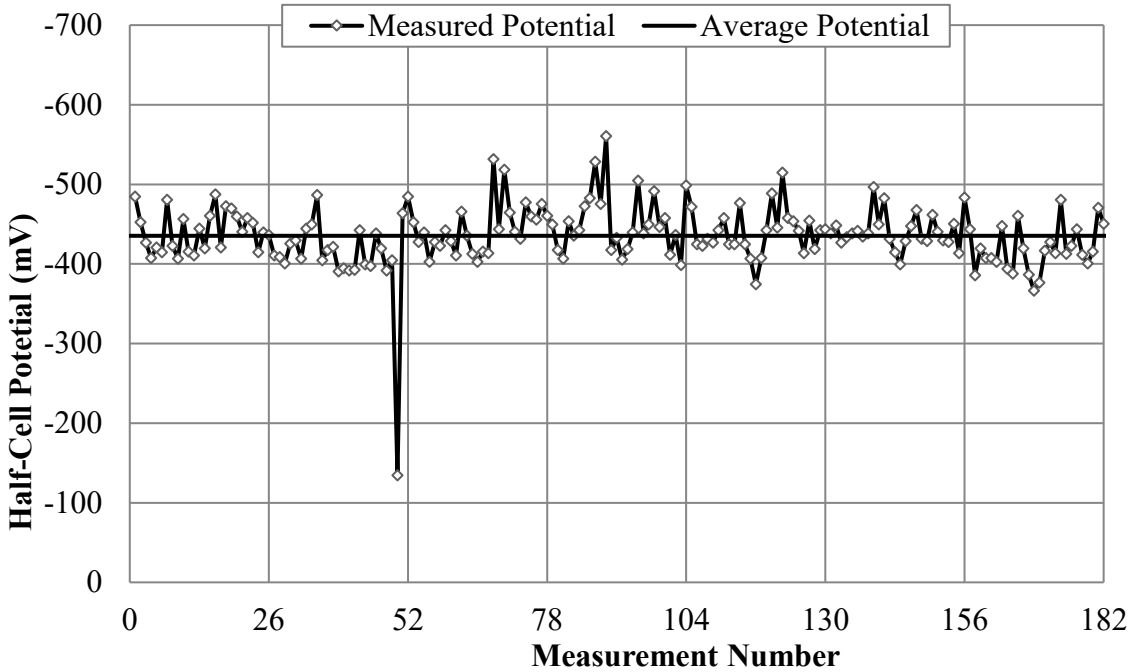

Figure F.34: Section G – Half-cell potential on 4/10/12

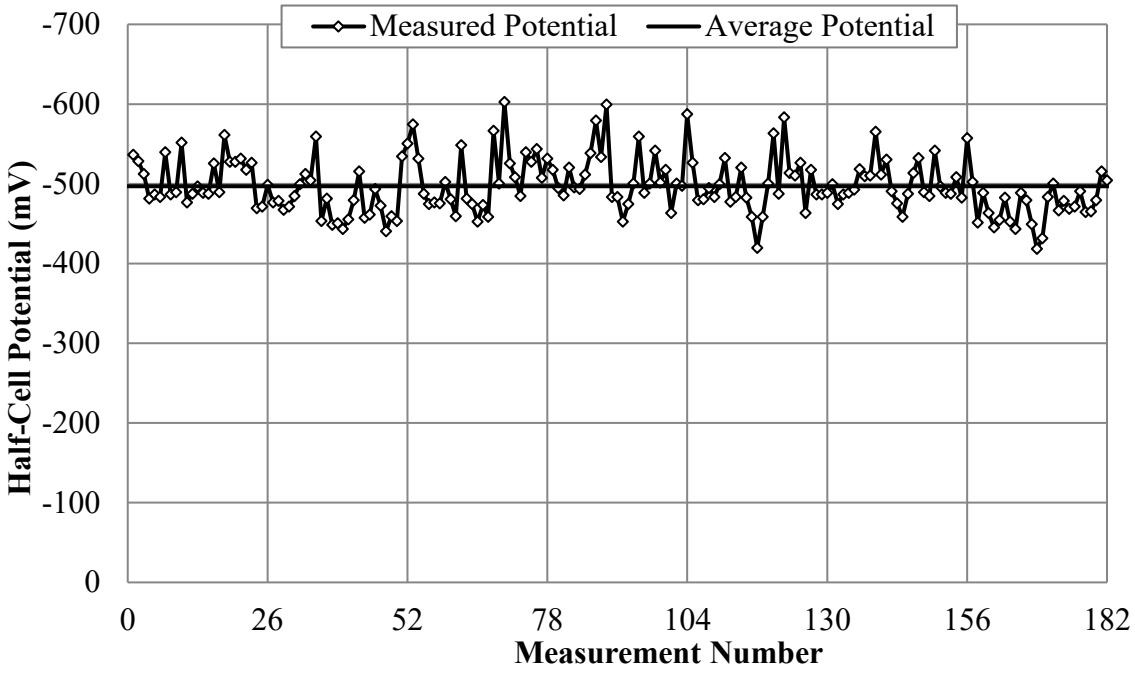

Figure F.35: Section G – Half-cell potential on 5/9/12

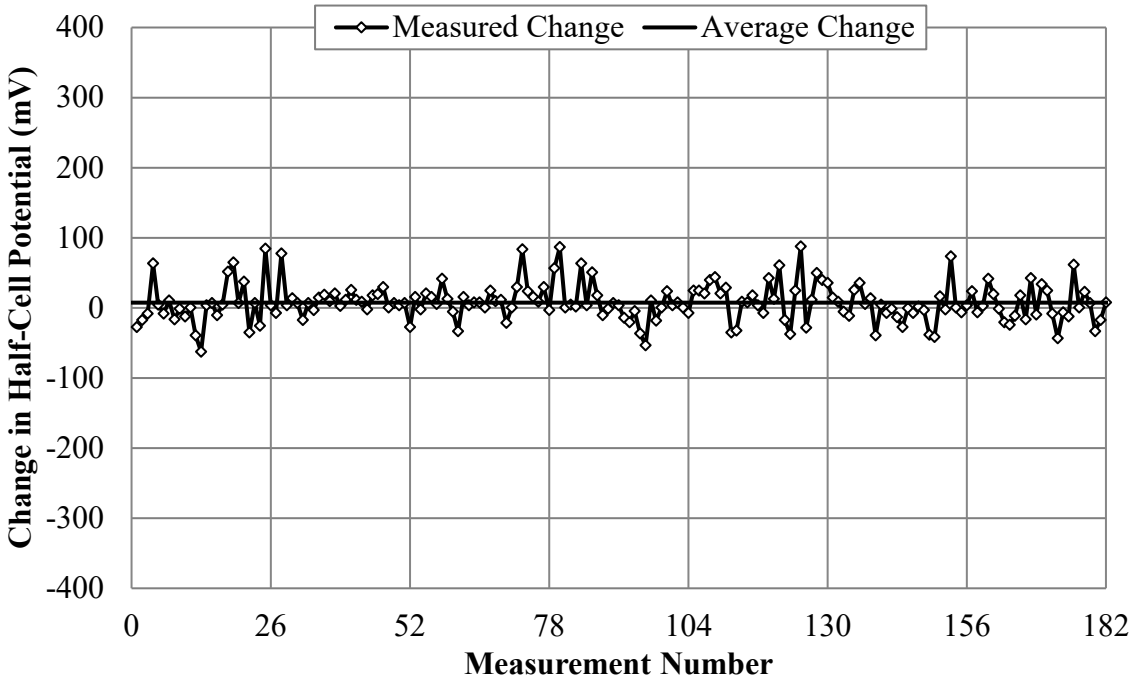

Figure F.36: Section A – Change in Half-cell potential from 8/25/11 to 10/6/11

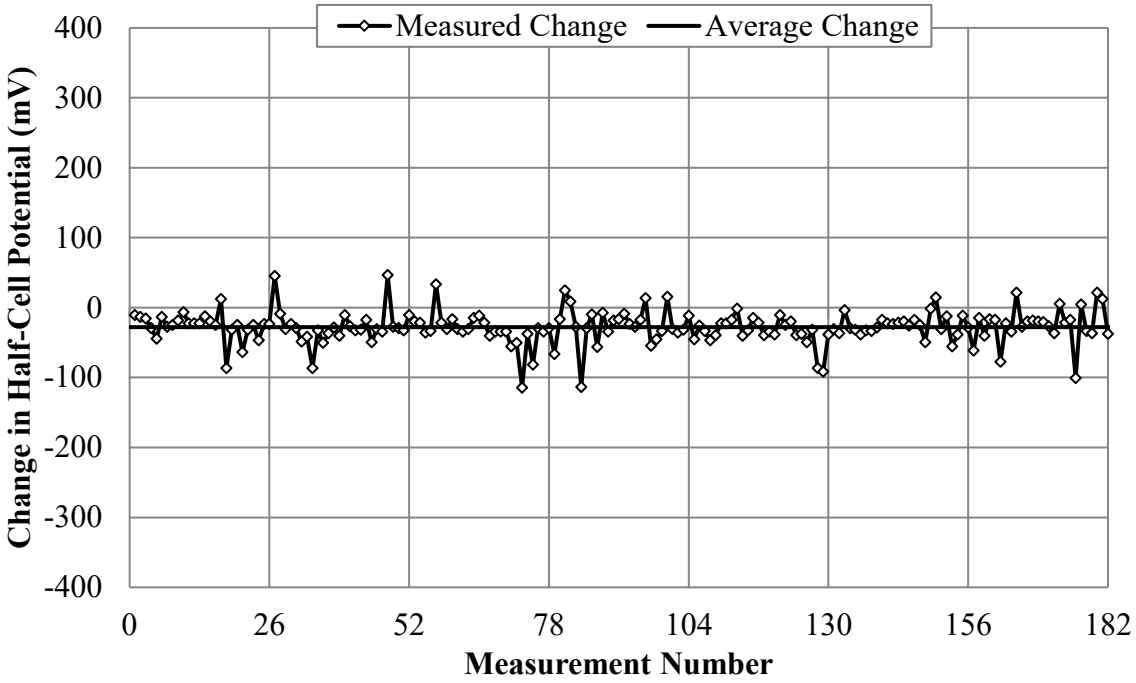

Figure F.37: Section A – Change in Half-cell potential from 10/6/11 to 10/27/11

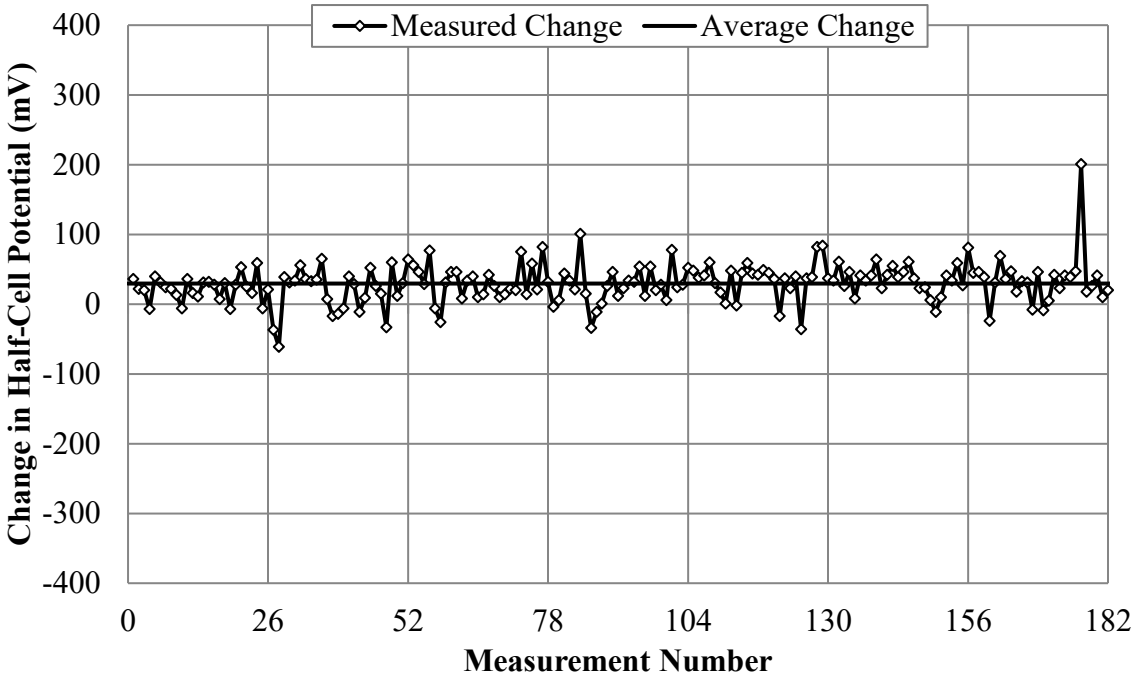

Figure F.38: Section A – Change in Half-cell potential from 10/27/11 to 4/10/12

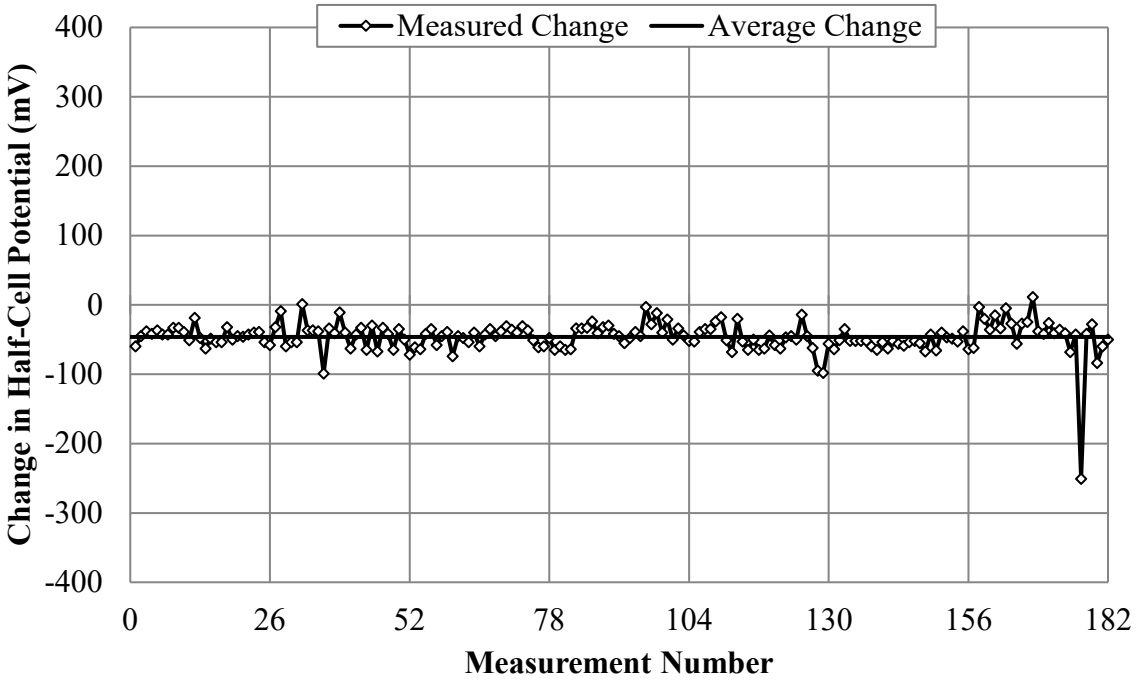

Figure F.39: Section A – Change in Half-cell potential from 4/10/12 to 5/9/12

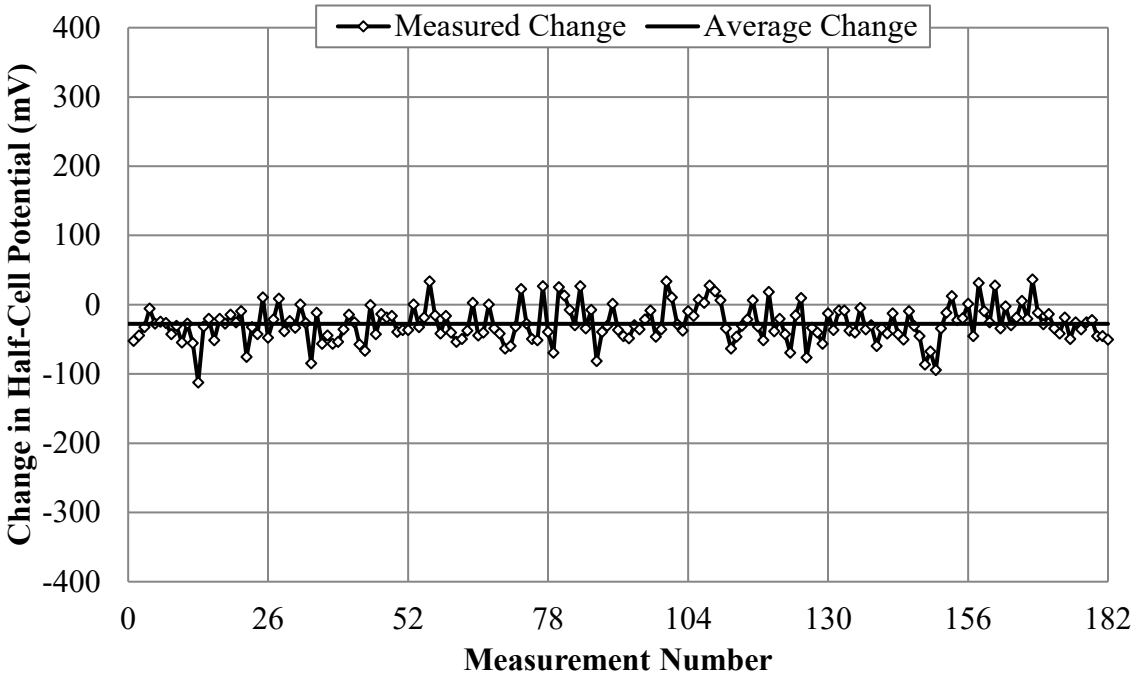

Figure F.40: Section A – Change in Half-cell potential from 8/25/11 to 5/9/12

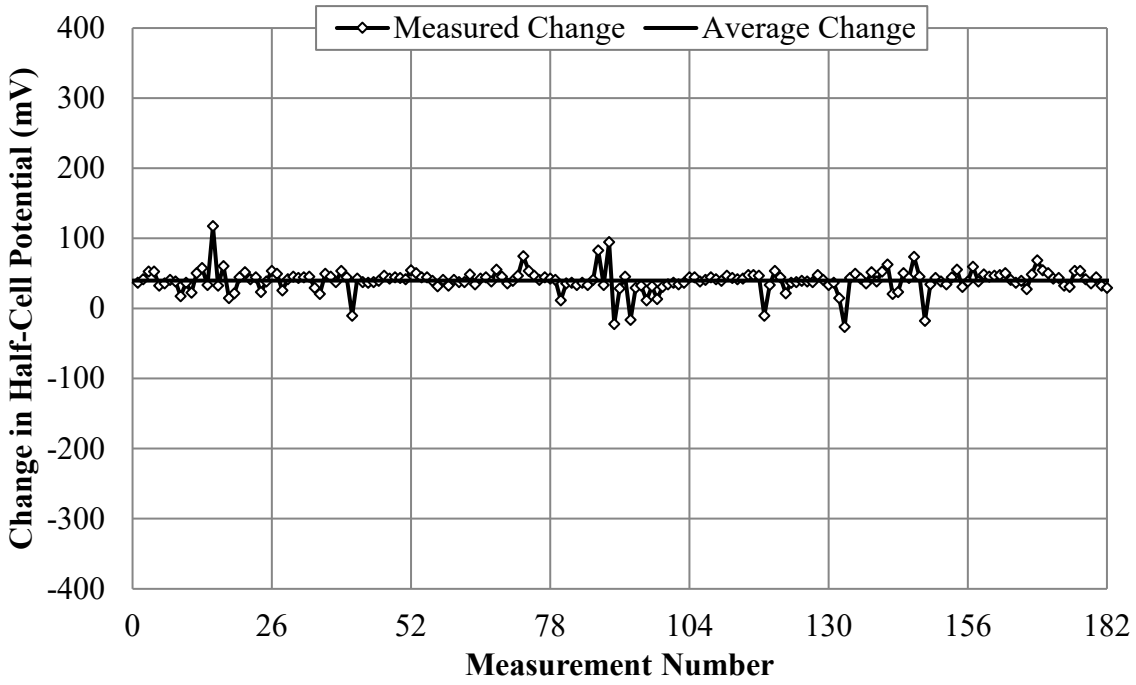

Figure F.41: Section B – Change in Half-cell potential from 8/25/11 to 10/6/11

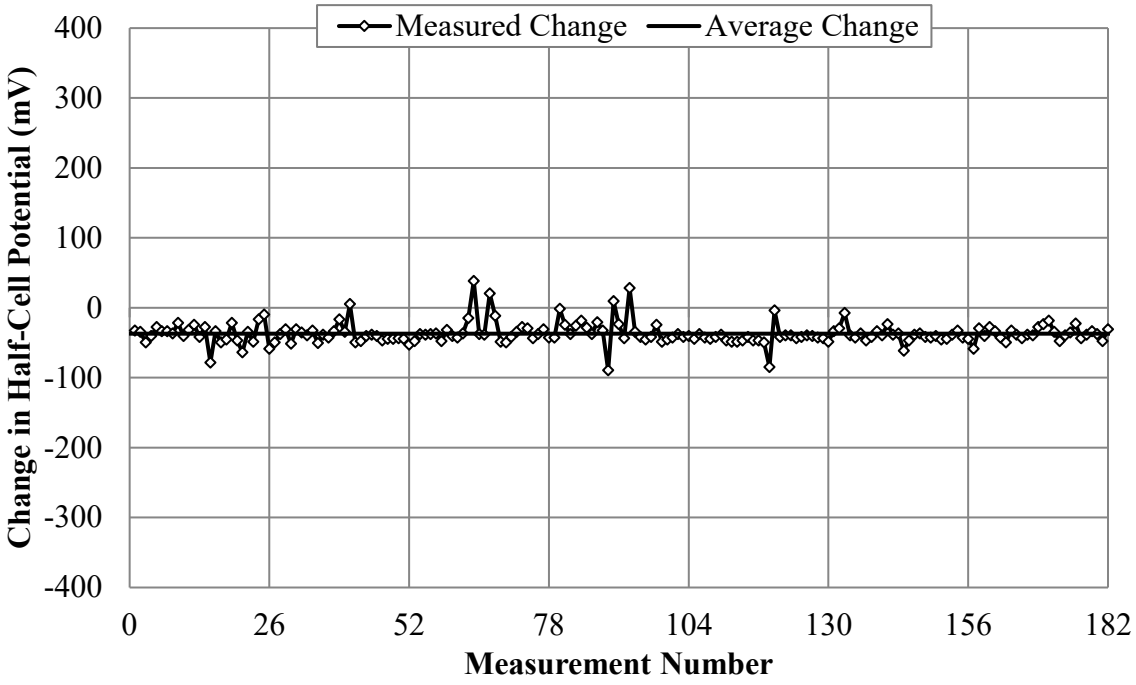

Figure F.42: Section B – Change in Half-cell potential from 10/6/11 to 10/27/11

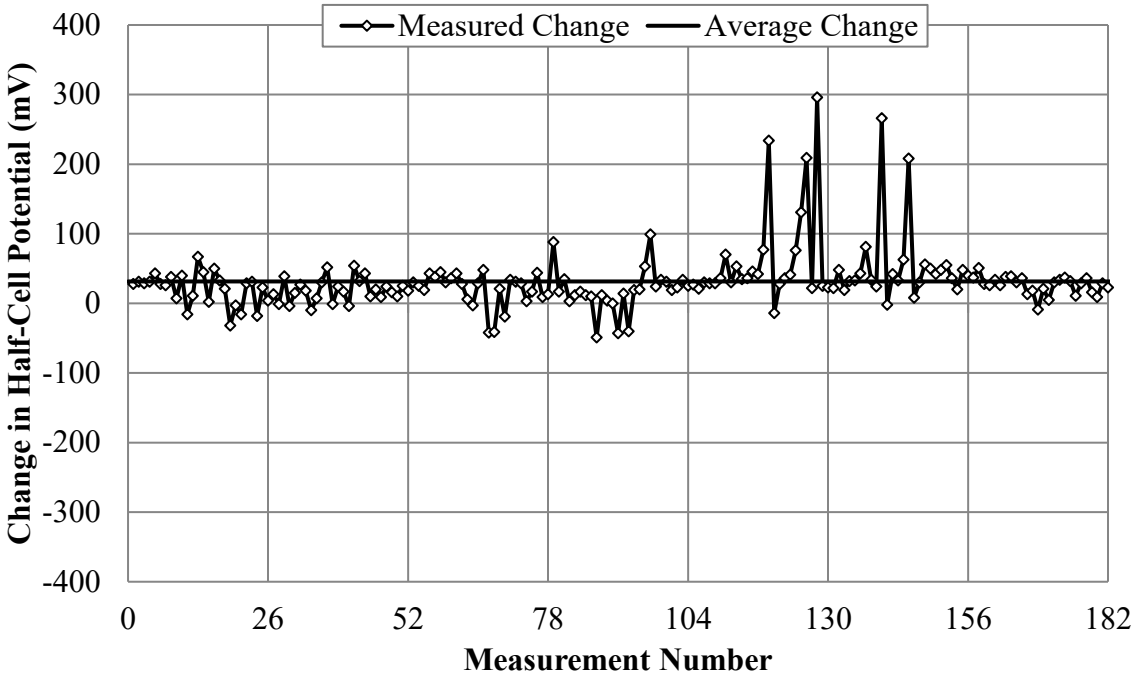

Figure F.43: Section B – Change in Half-cell potential from 10/27/11 to 4/10/12

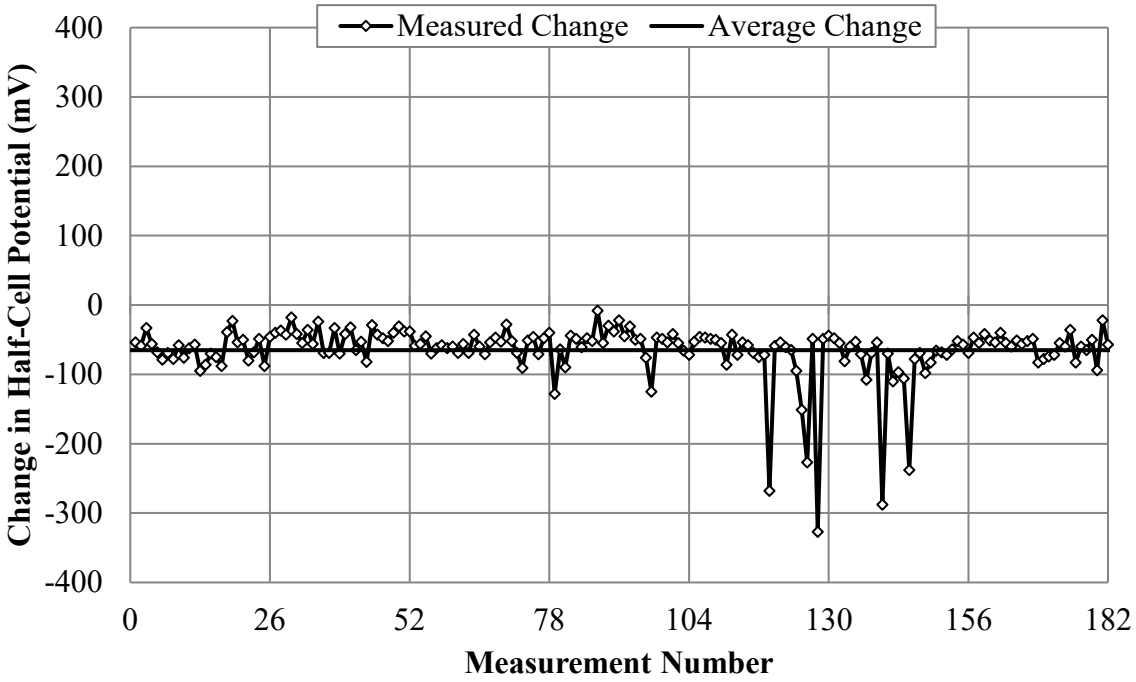

Figure F.44: Section B – Change in Half-cell potential from 4/10/12 to 5/9/12

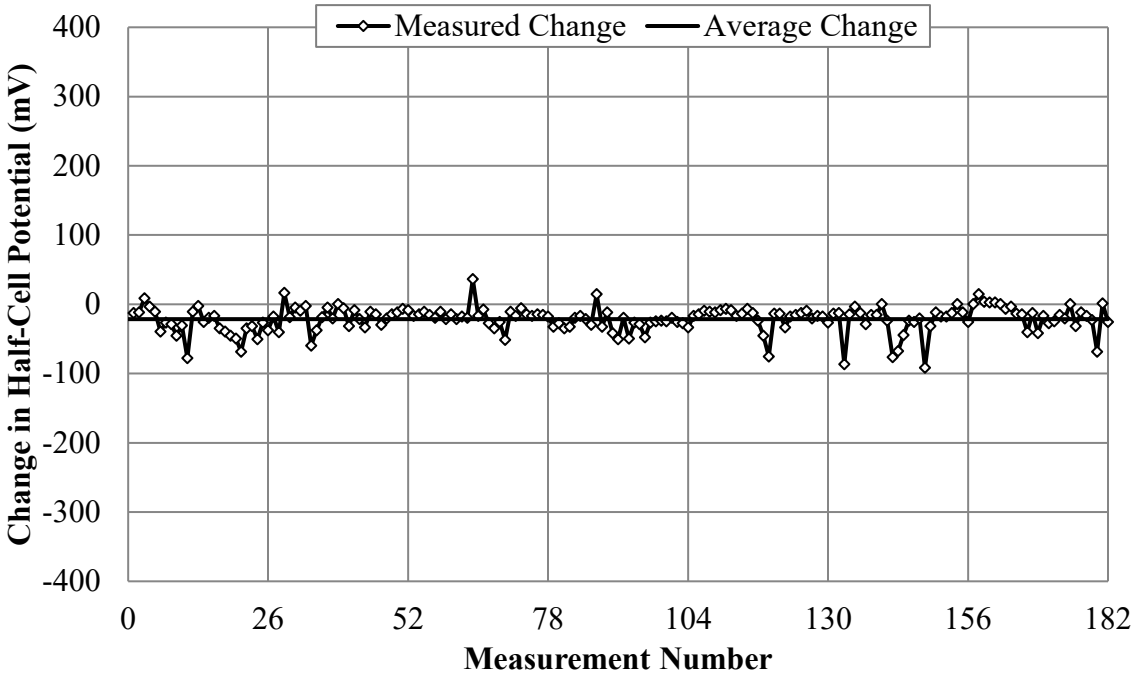

Figure F.45: Section B – Change in Half-cell potential from 8/25/11 to 5/9/12

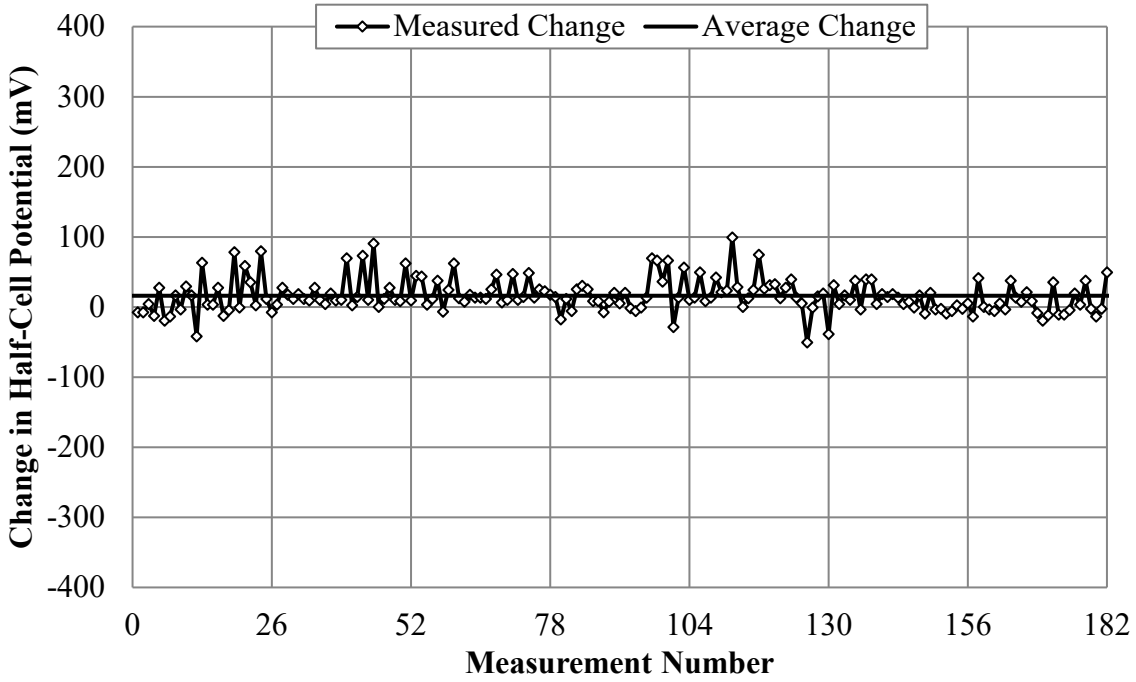

Figure F.46: Section C – Change in Half-cell potential from 8/25/11 to 10/6/11

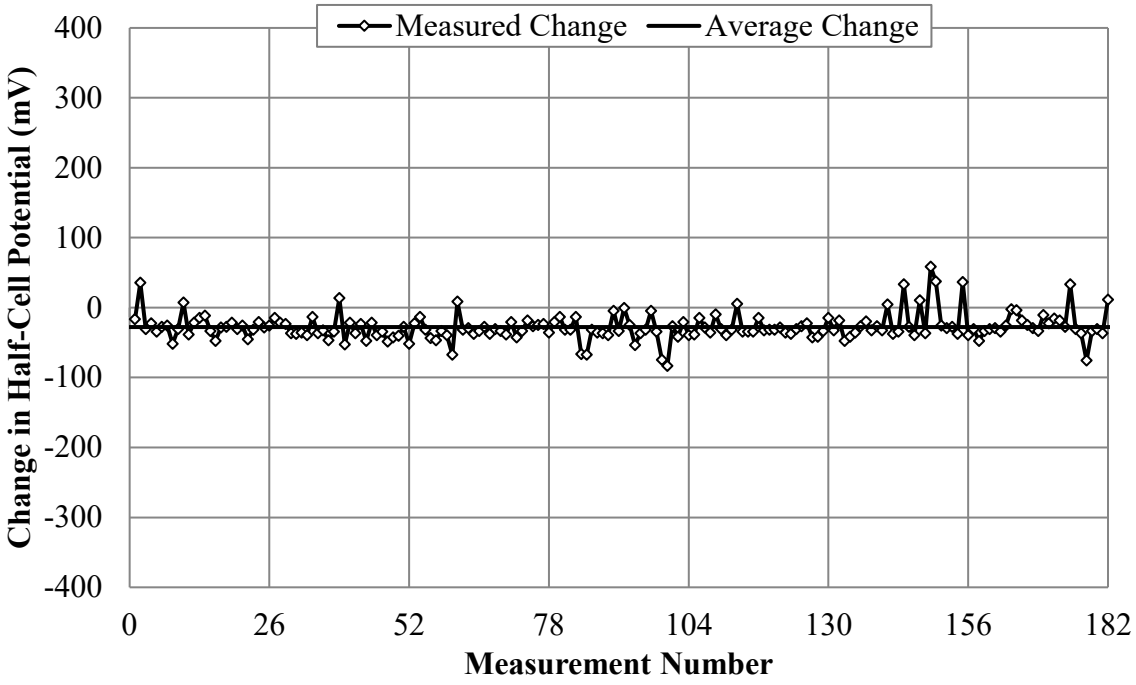

Figure F.47: Section C – Change in Half-cell potential from 10/6/11 to 10/27/11

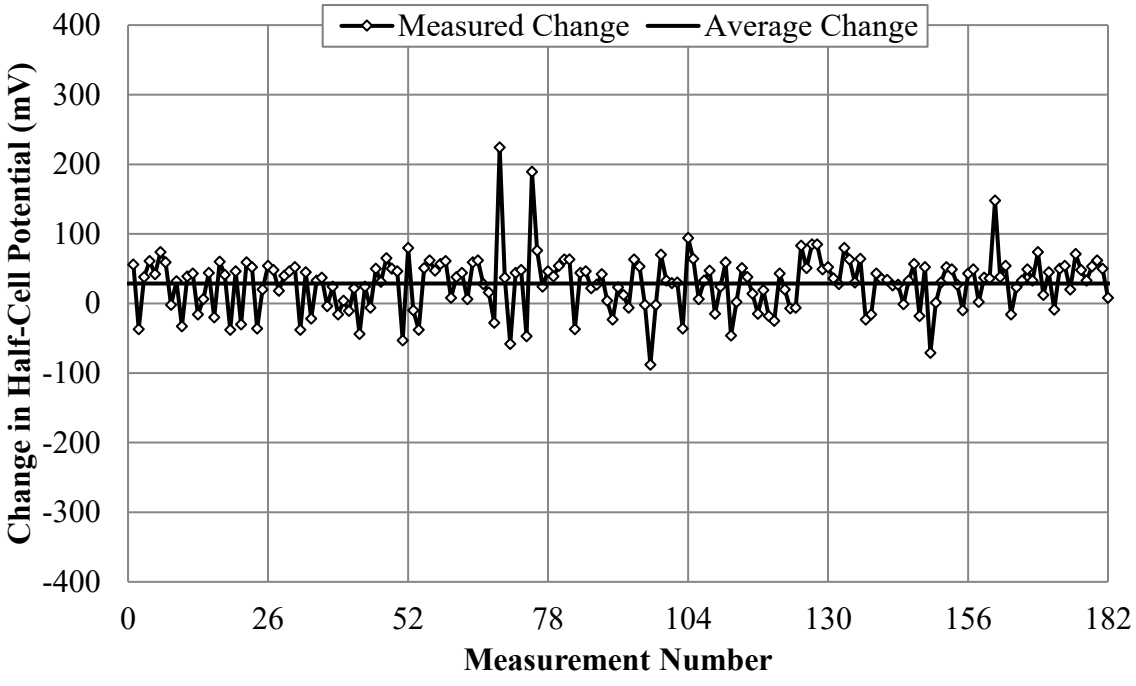

Figure F.48: Section C – Change in Half-cell potential from 10/27/11 to 4/10/12

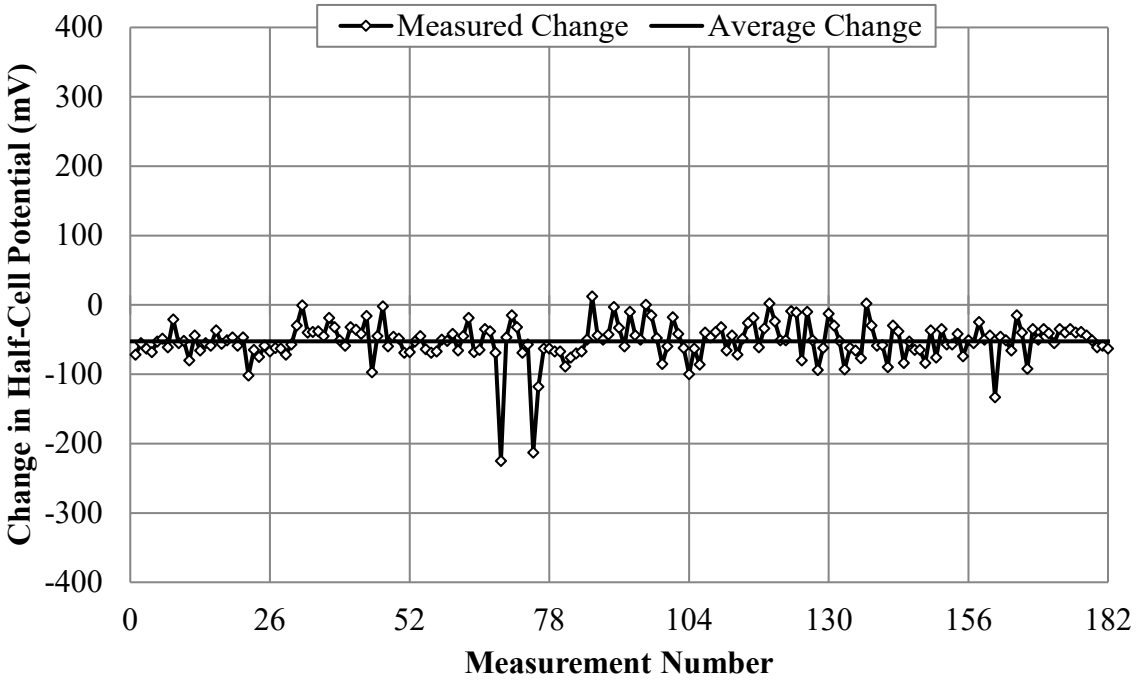

Figure F.49: Section C – Change in Half-cell potential from 4/10/12 to 5/9/12

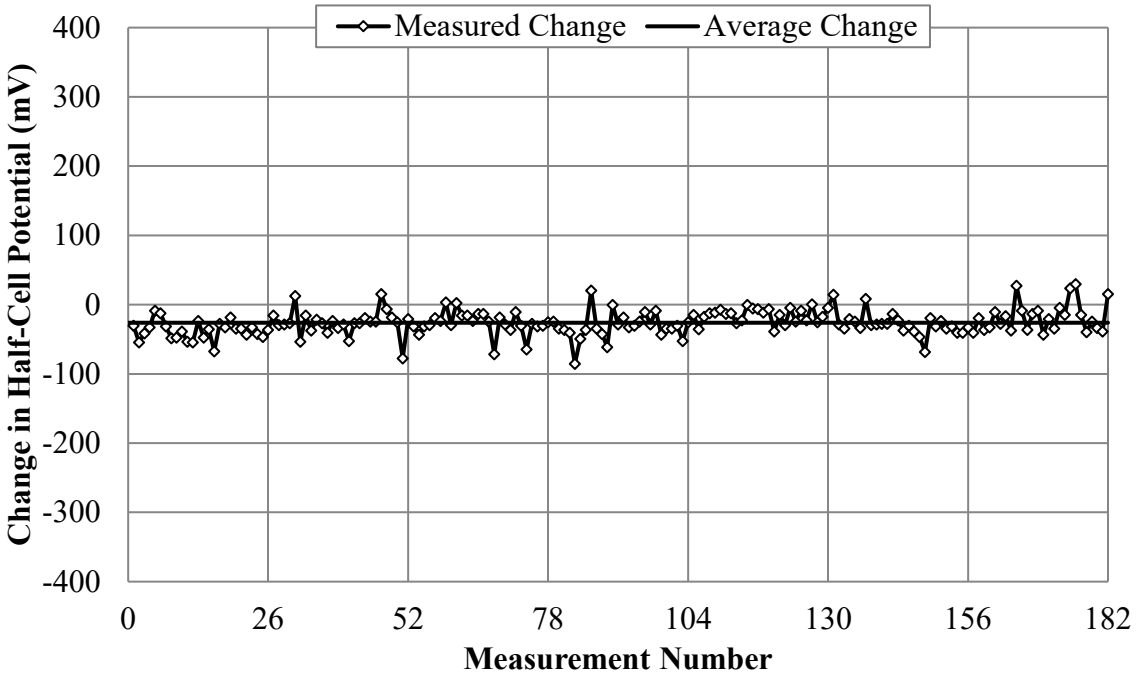

Figure F.50: Section C – Change in Half-cell potential from 8/25/11 to 5/9/12

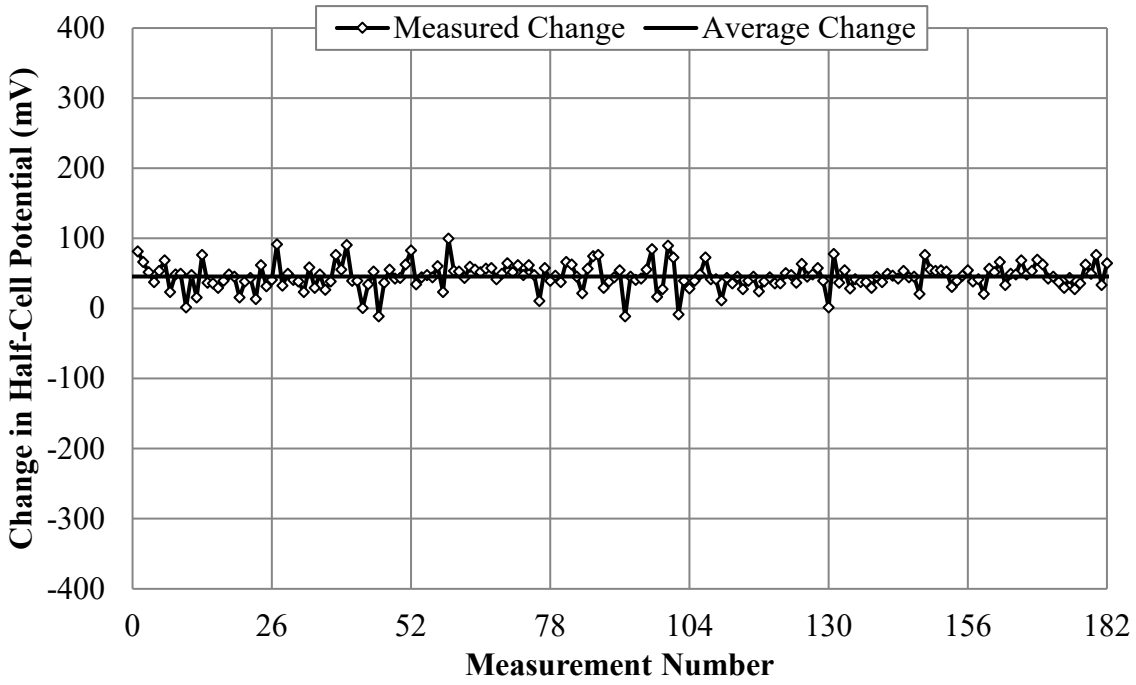

Figure F.51: Section D – Change in Half-cell potential from 8/25/11 to 10/6/11

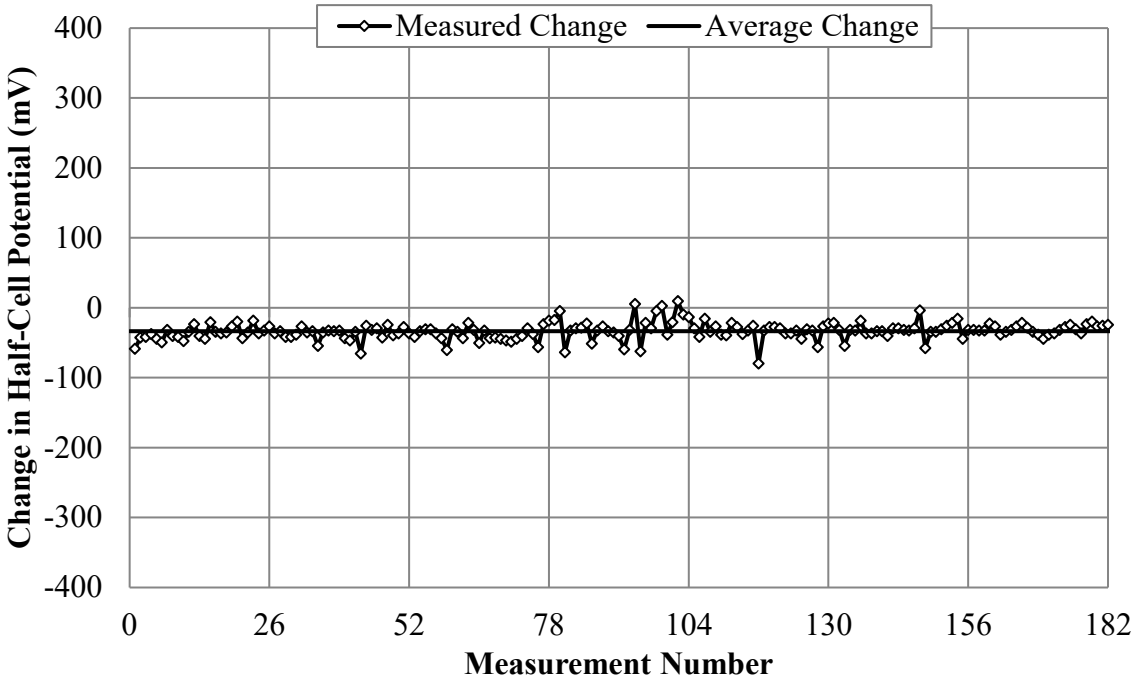

Figure F.52: Section D – Change in Half-cell potential from 10/6/11 to 10/27/11

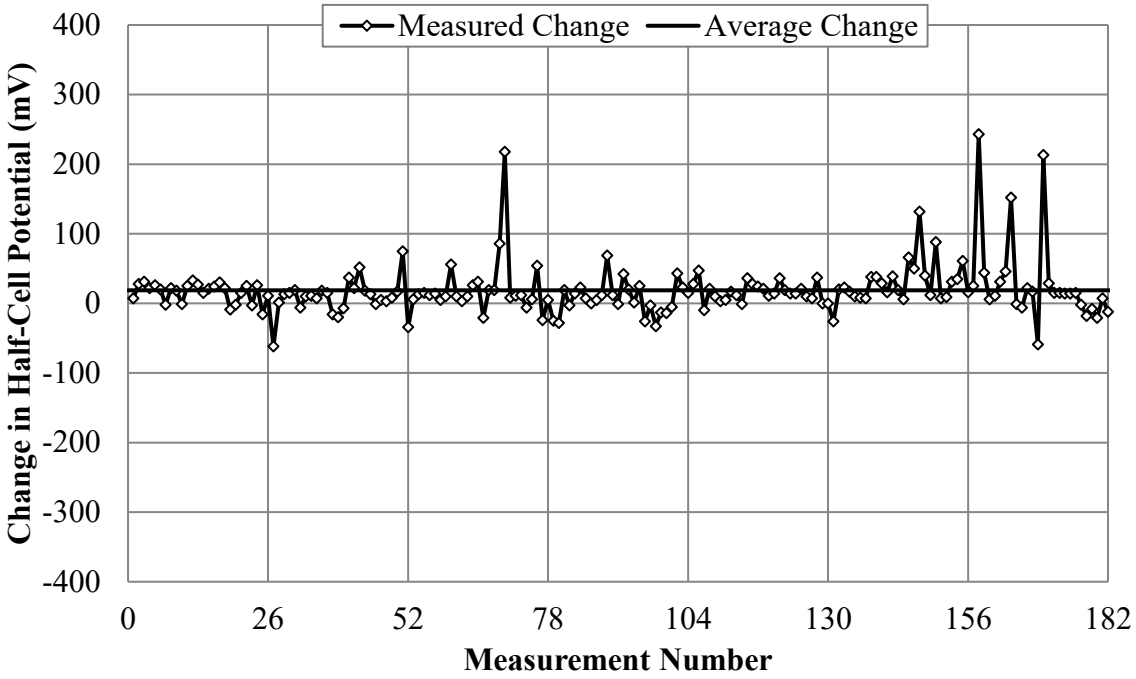

Figure F.53: Section D – Change in Half-cell potential from 10/27/11 to 4/10/12

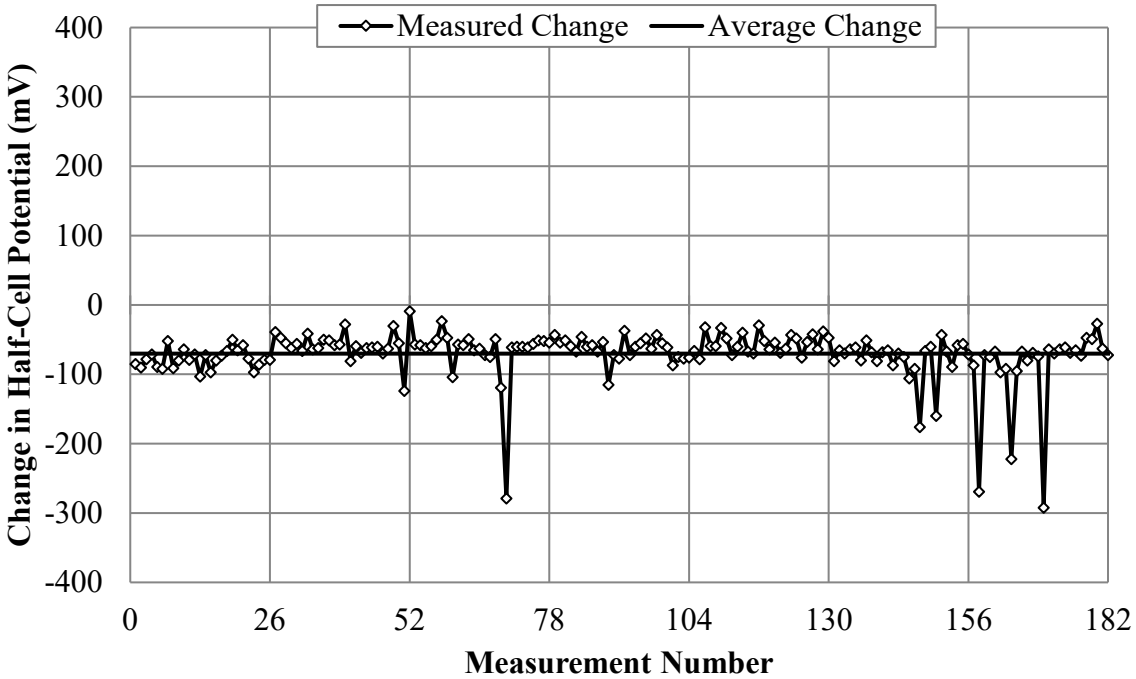

Figure F.54: Section D – Change in Half-cell potential from 4/10/12 to 5/9/12

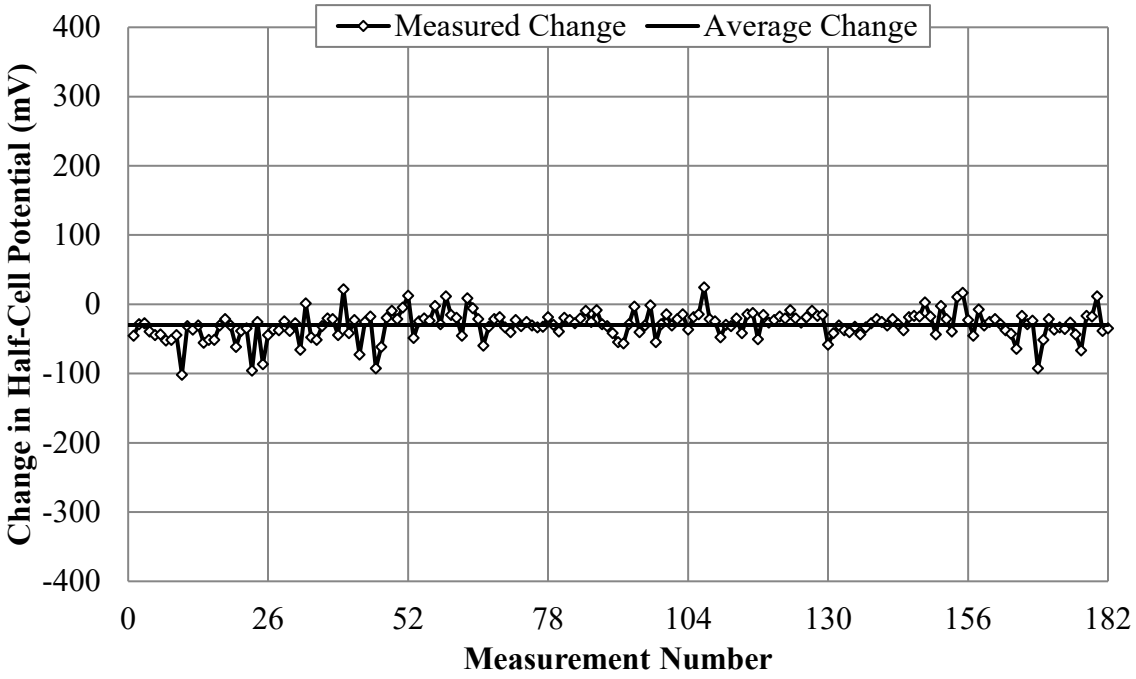

Figure F.55: Section D – Change in Half-cell potential from 8/25/11 to 5/9/12

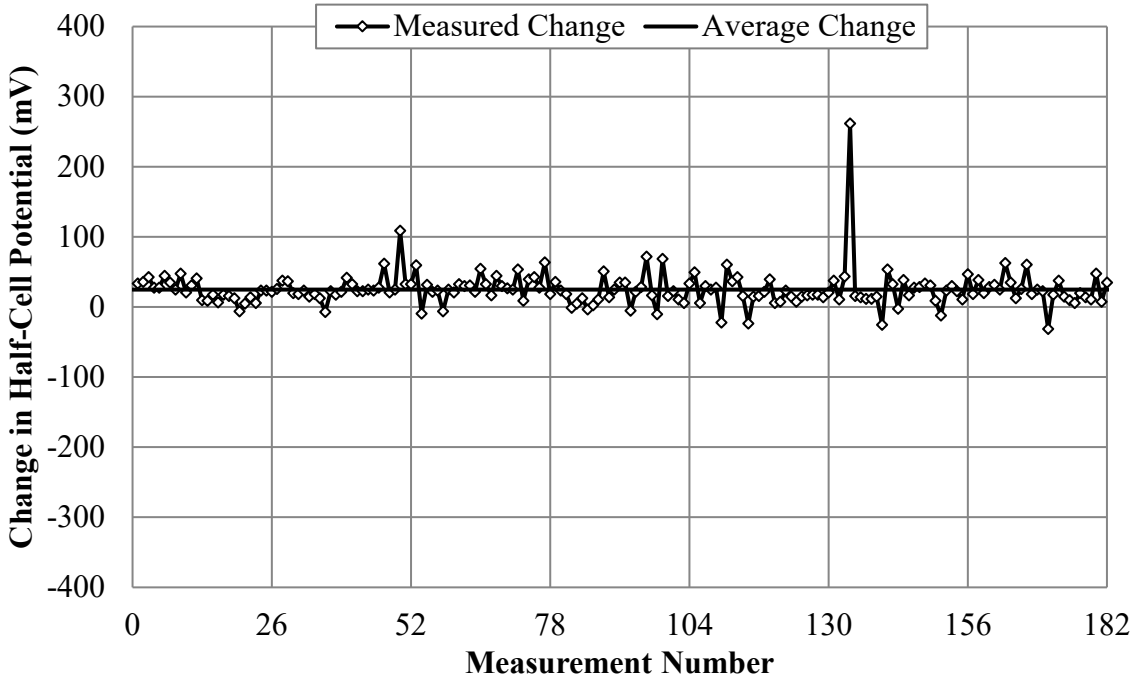

Figure F.56: Section E – Change in Half-cell potential from 8/25/11 to 10/6/11

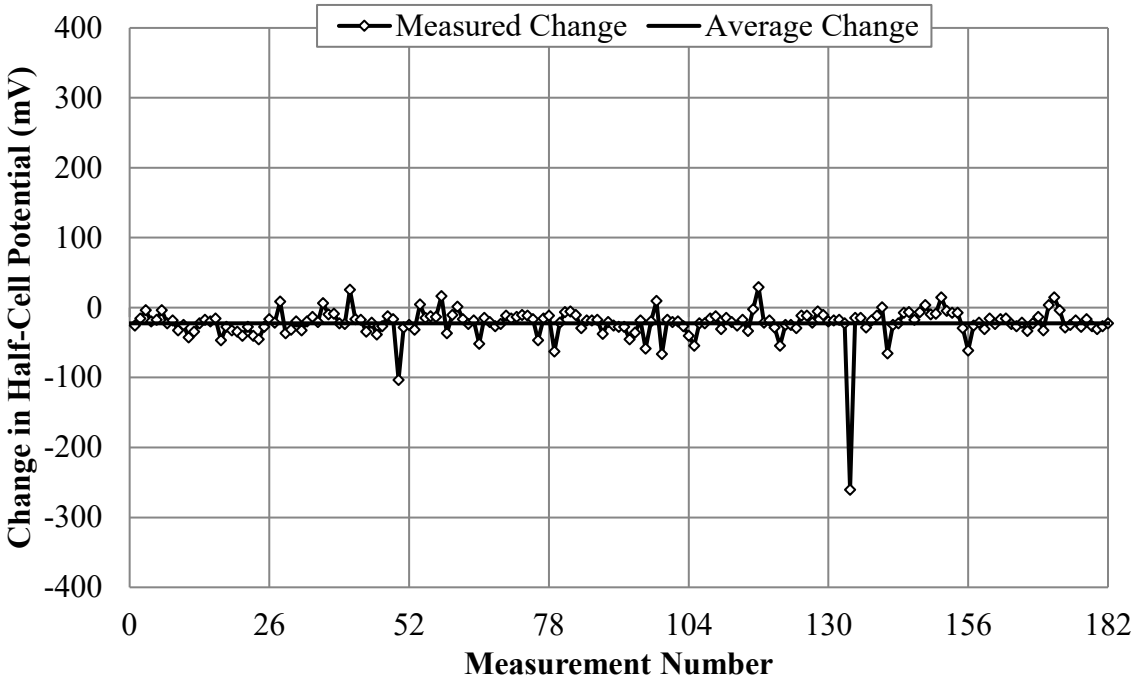

Figure F.57: Section E – Change in Half-cell potential from 10/6/11 to 10/27/11

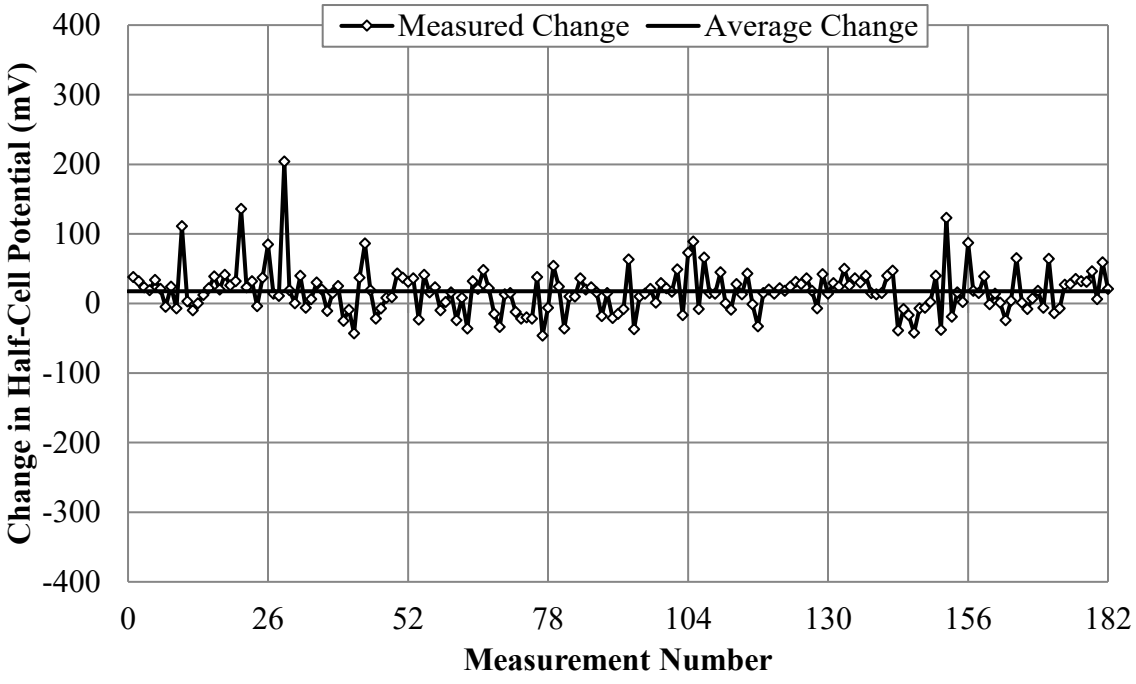

Figure F.58: Section E – Change in Half-cell potential from 10/27/11 to 4/10/12

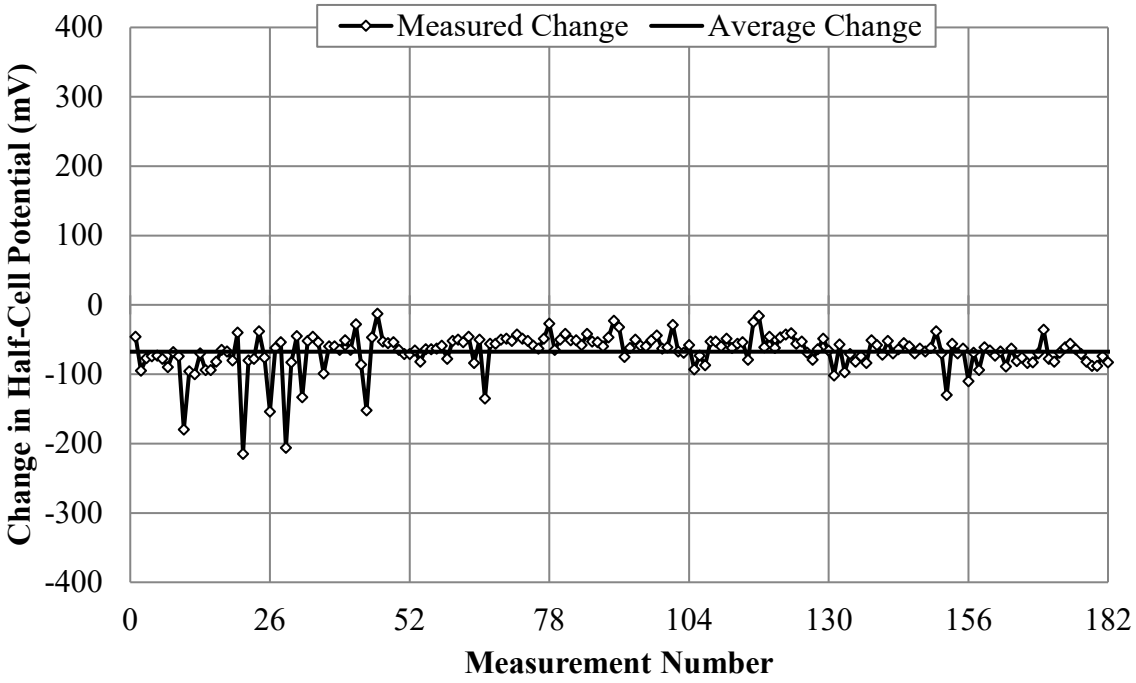

Figure F.59: Section E – Change in Half-cell potential from 4/10/12 to 5/9/12

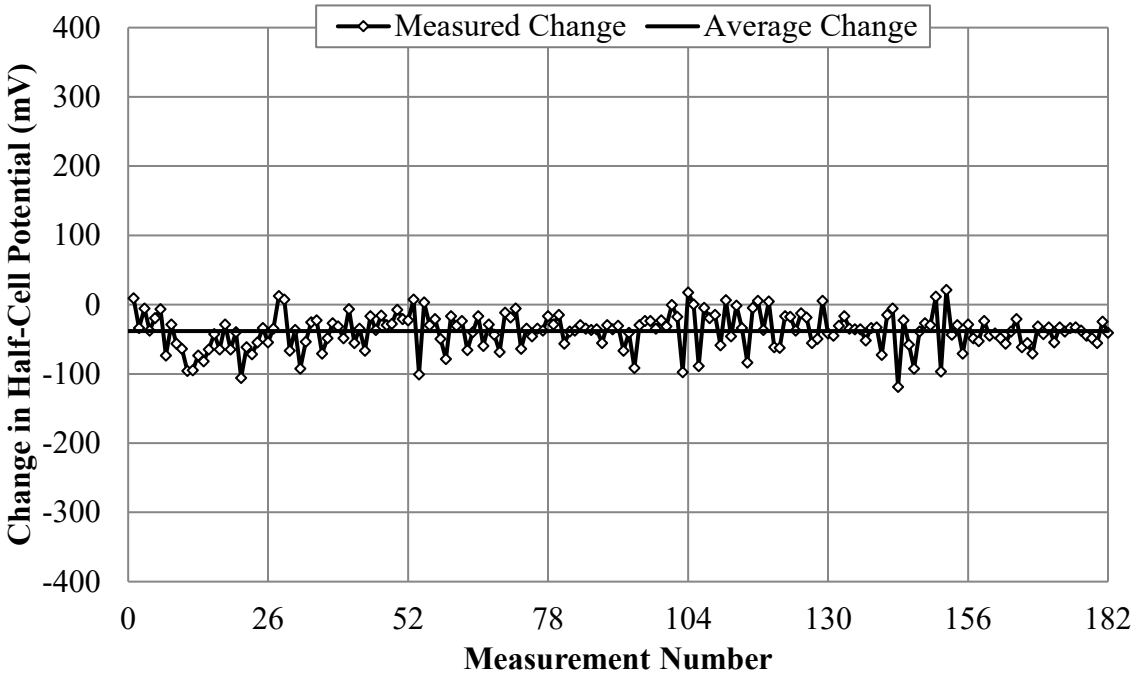

Figure F.60: Section E – Change in Half-cell potential from 8/25/11 to 5/9/12

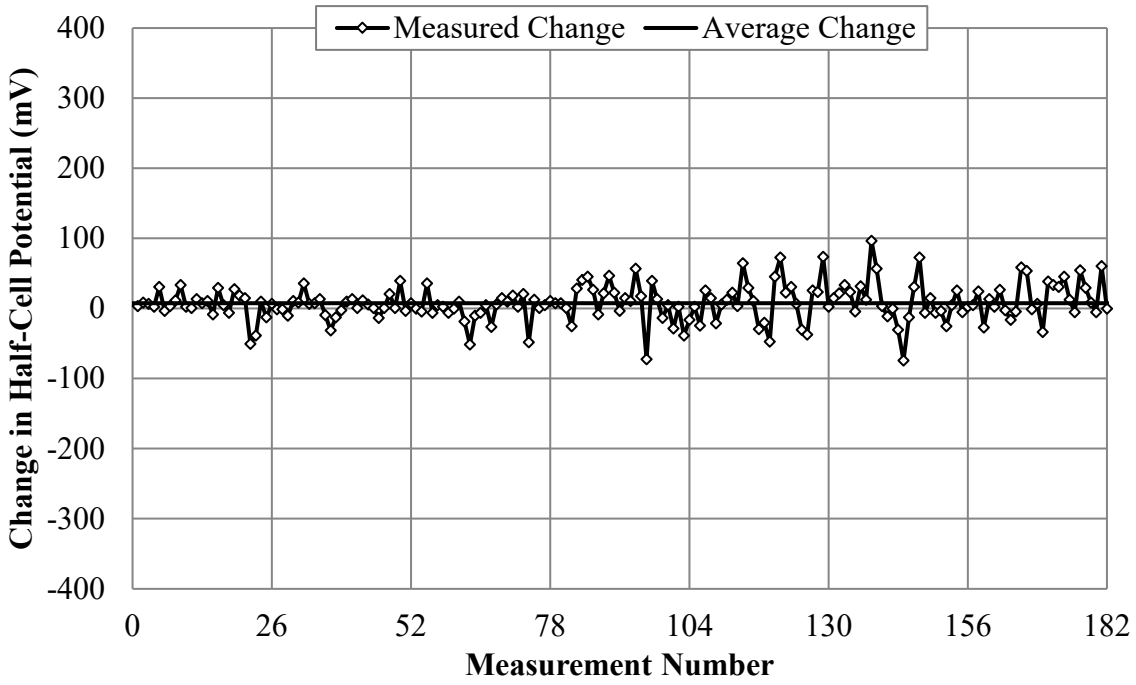

Figure F.61: Section F – Change in Half-cell potential from 8/25/11 to 10/6/11

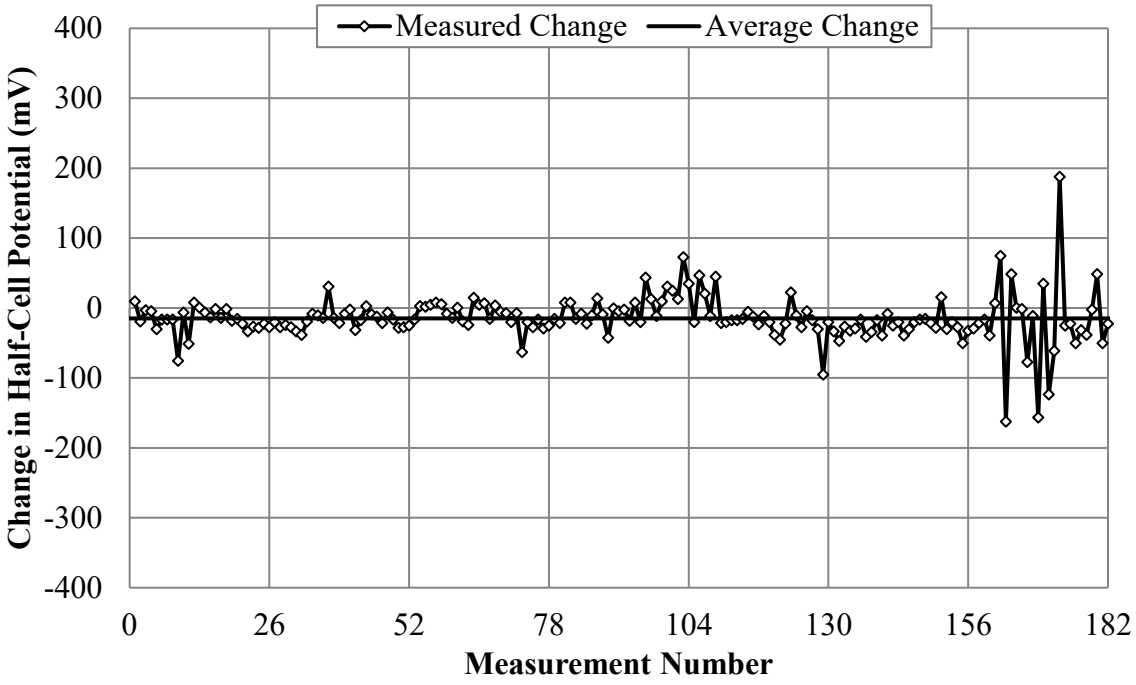

Figure F.62: Section F – Change in Half-cell potential from 10/6/11 to 10/27/11

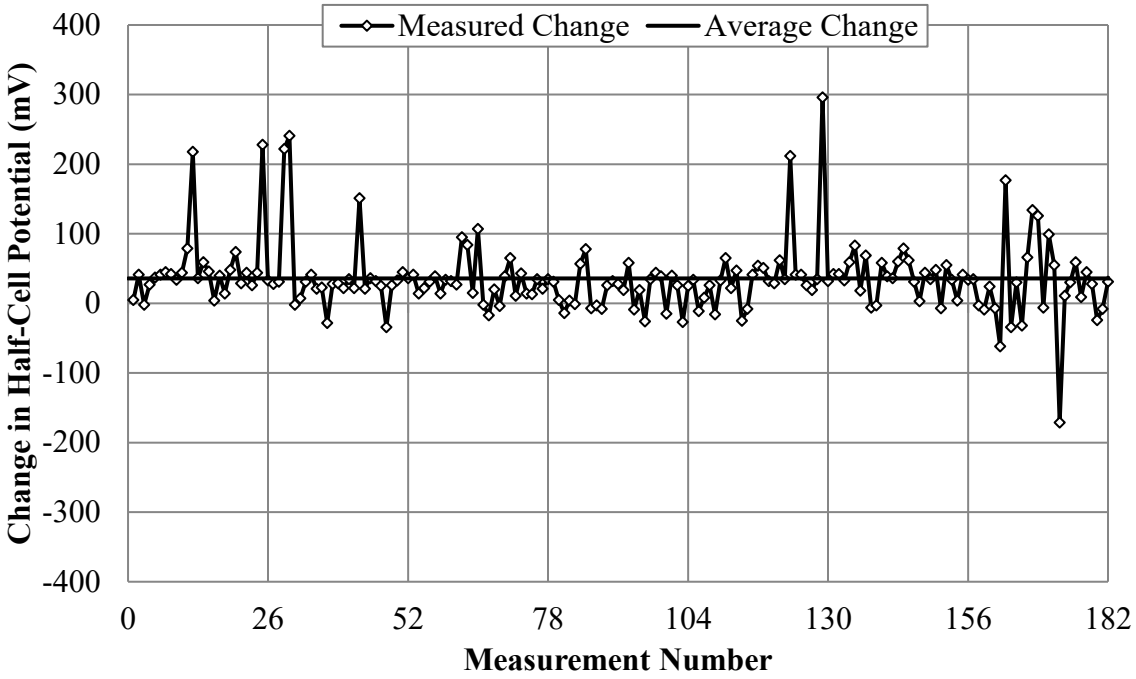

Figure F.63: Section F – Change in Half-cell potential from 10/27/11 to 4/10/12

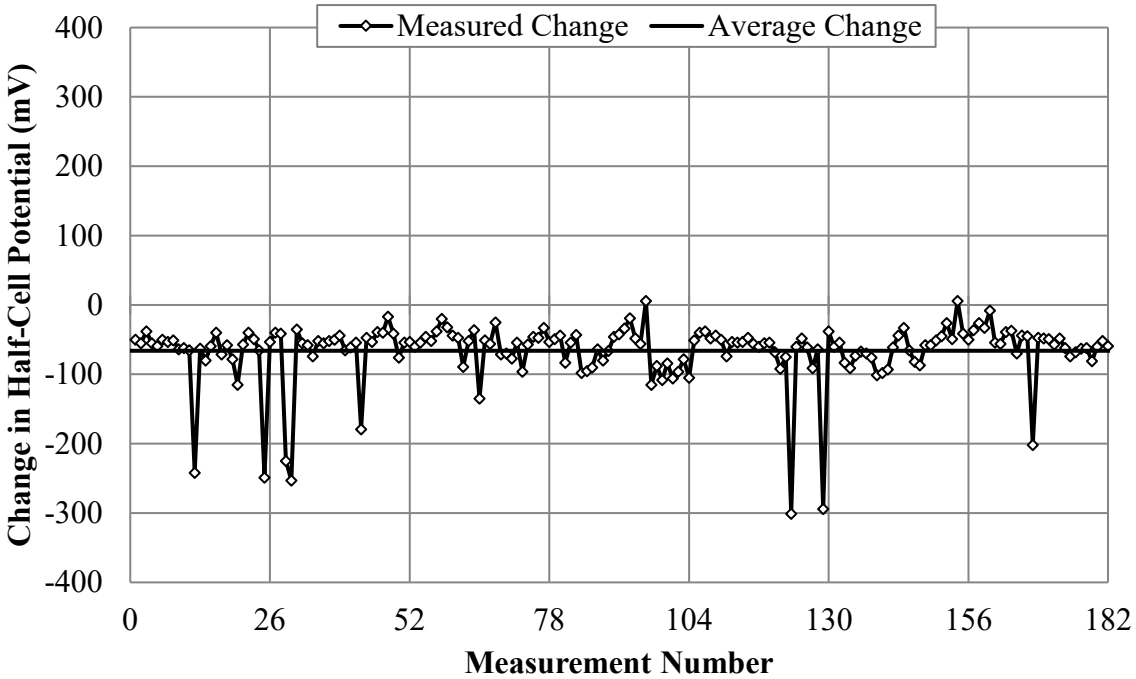

Figure F.64: Section F – Change in Half-cell potential from 4/10/12 to 5/9/12

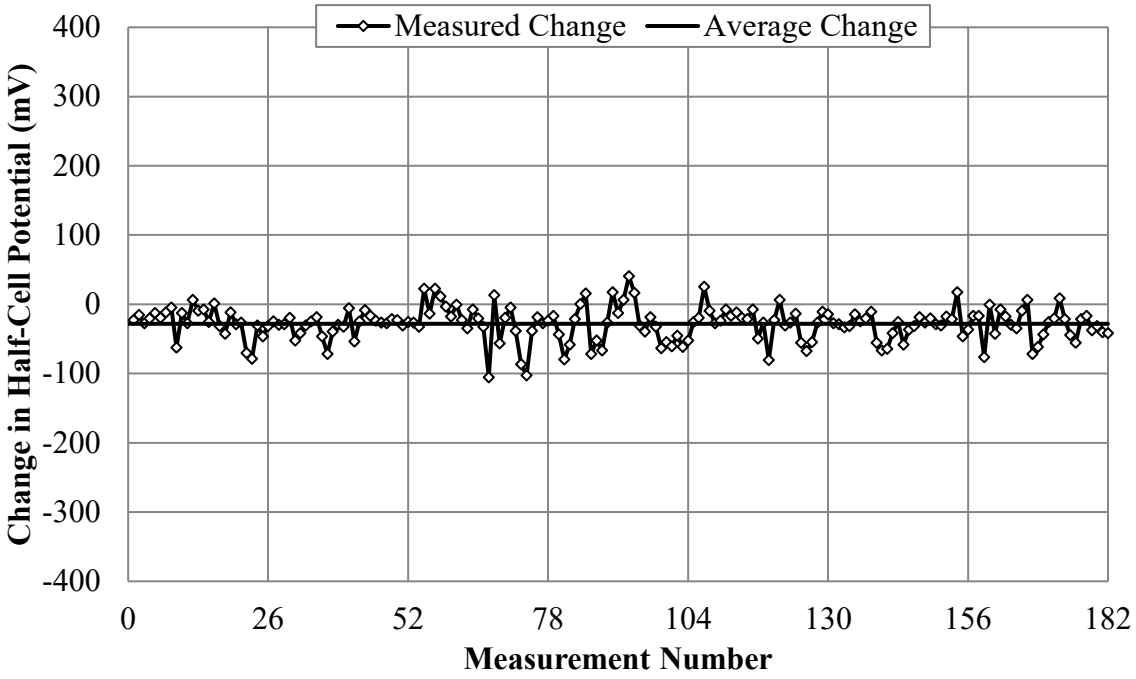

Figure F.65: Section F – Change in Half-cell potential from 8/25/11 to 5/9/12

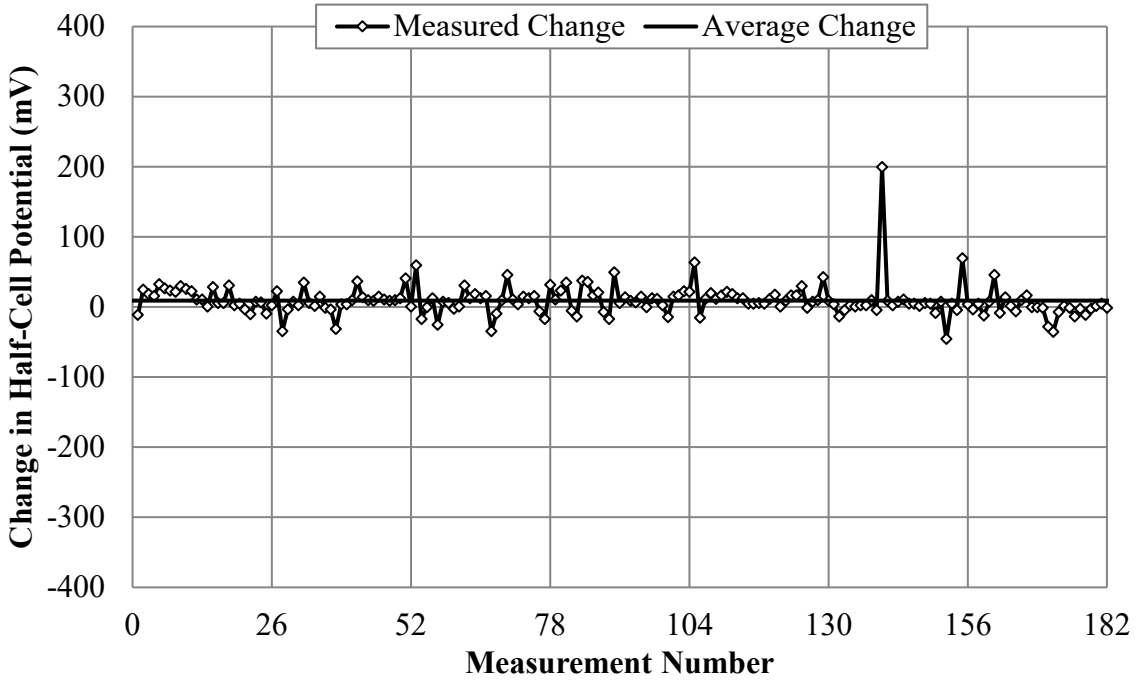

Figure F.66: Section G – Change in Half-cell potential from 8/25/11 to 10/6/11

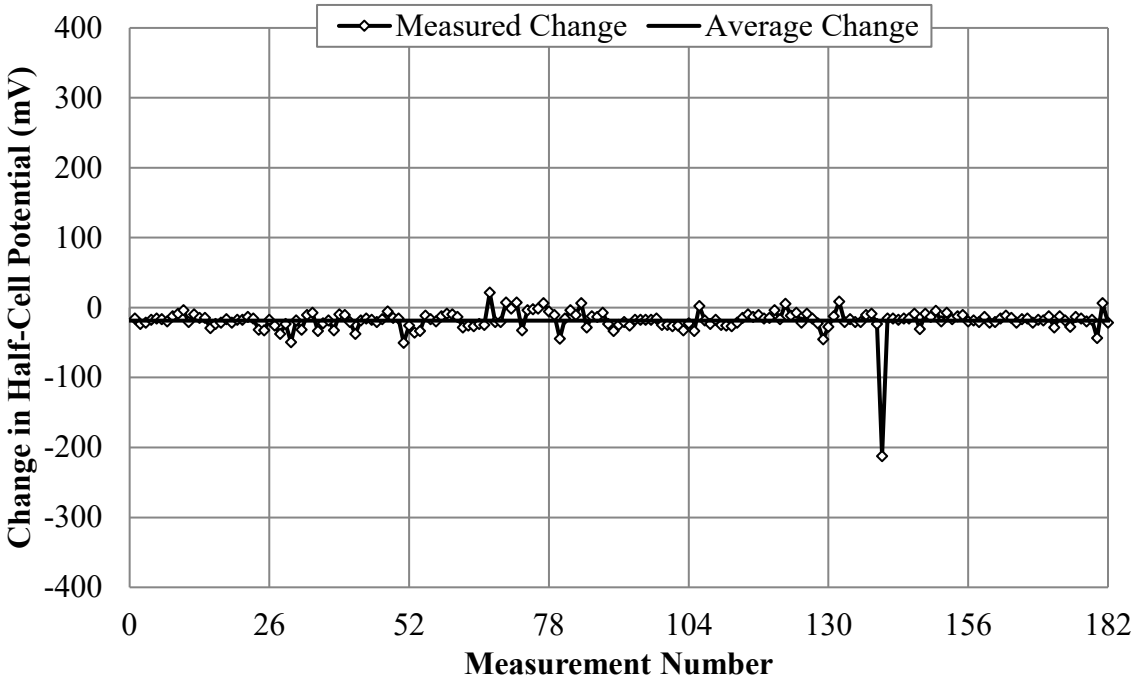

Figure F.67: Section G – Change in Half-cell potential from 10/6/11 to 10/27/11

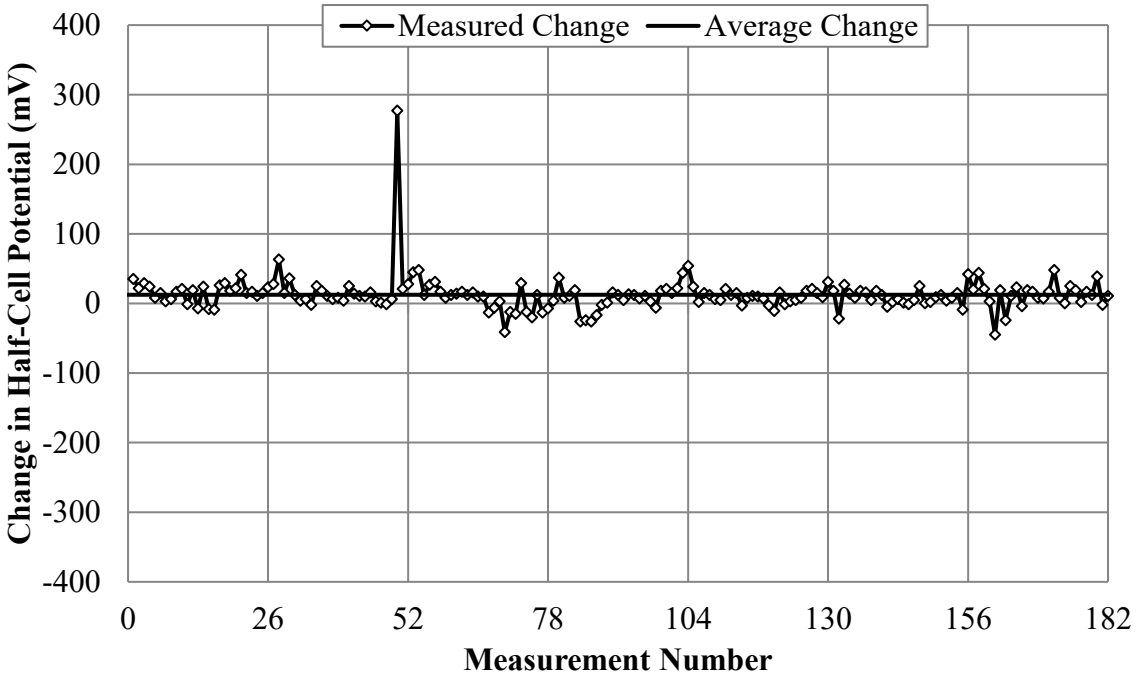

Figure F.68: Section G – Change in Half-cell potential from 10/27/11 to 4/10/12

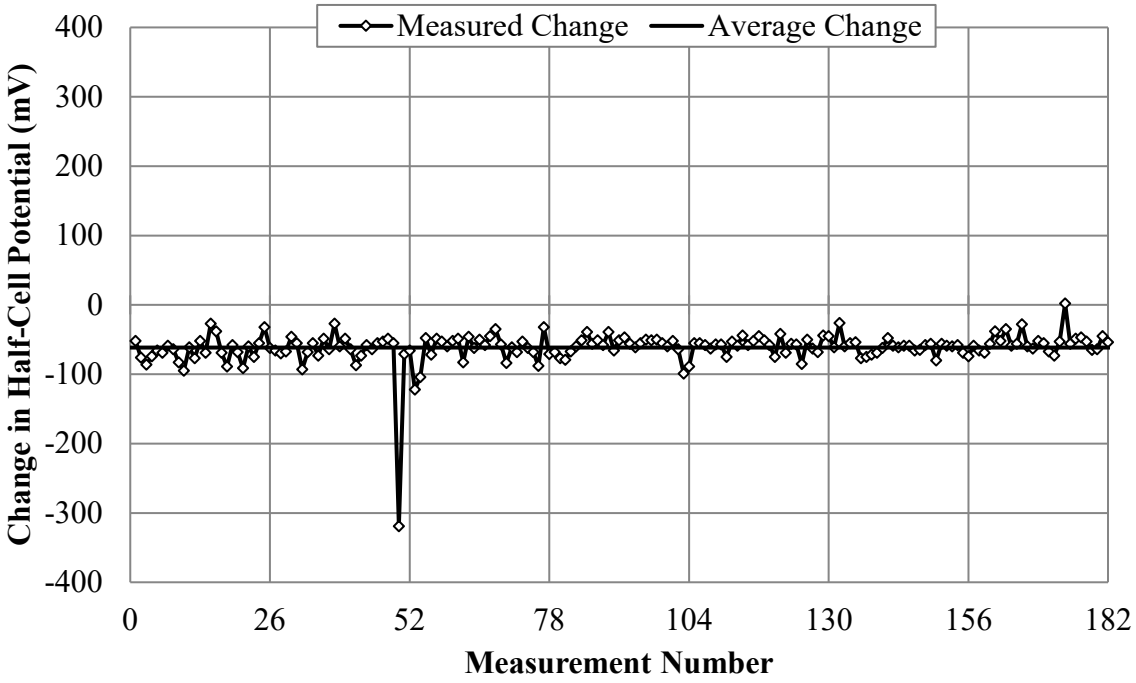

Figure F.69: Section G – Change in Half-cell potential from 4/10/12 to 5/9/12

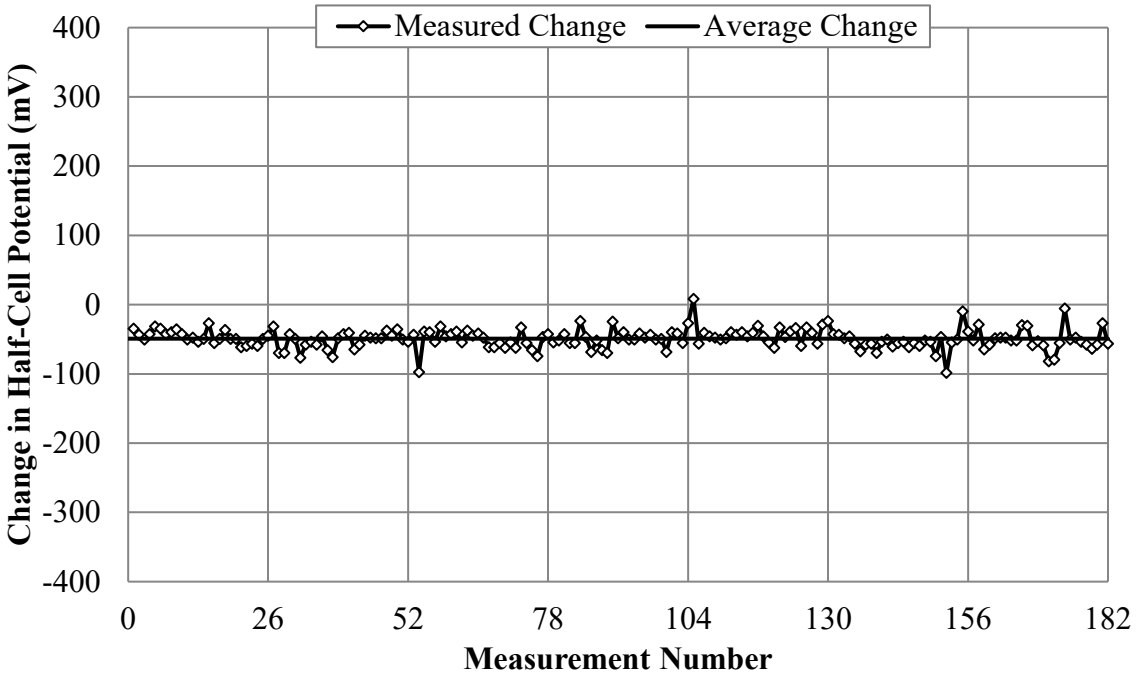

Figure F.70: Section G – Change in Half-cell potential from 8/25/11 to 5/9/12