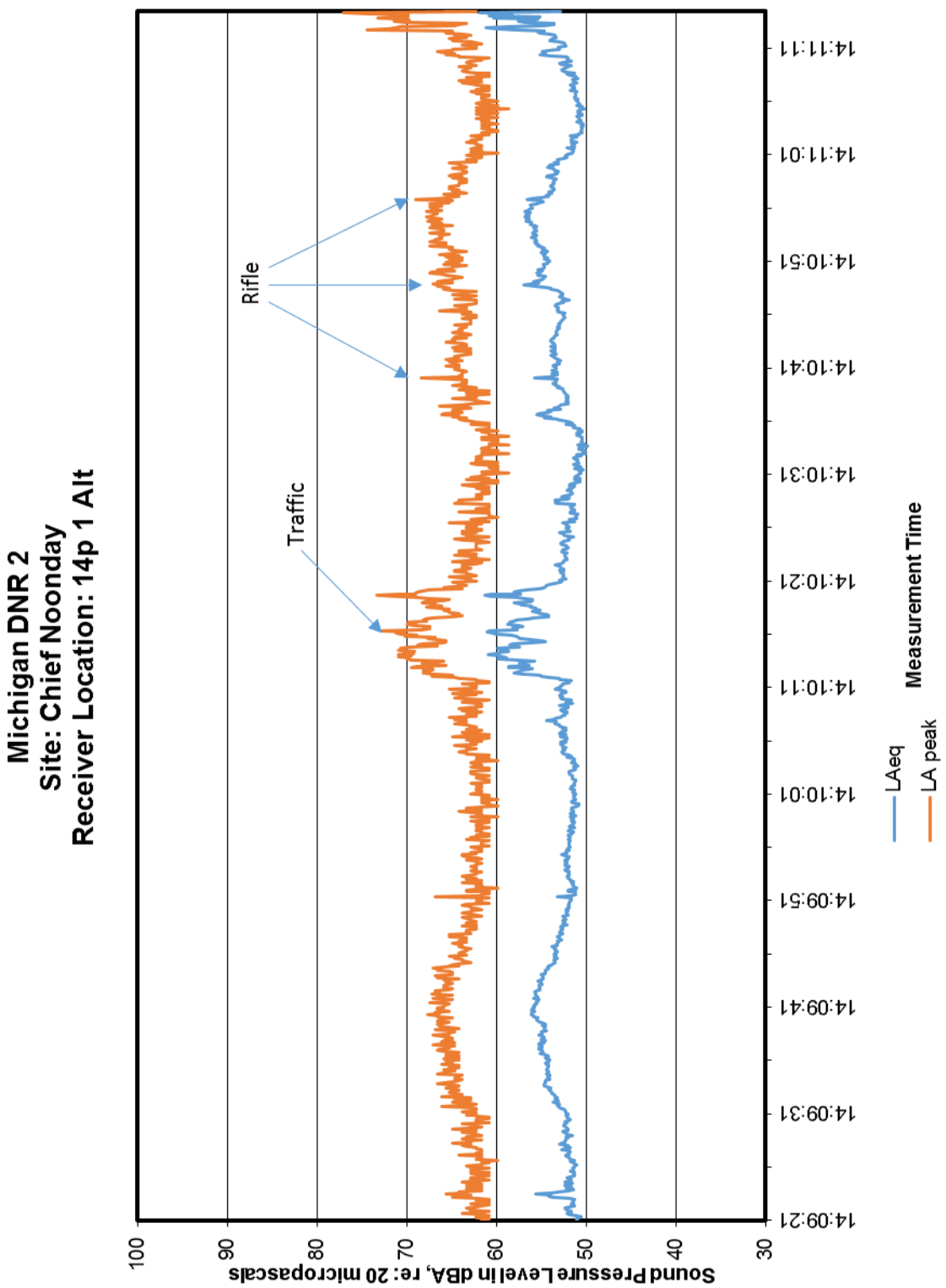
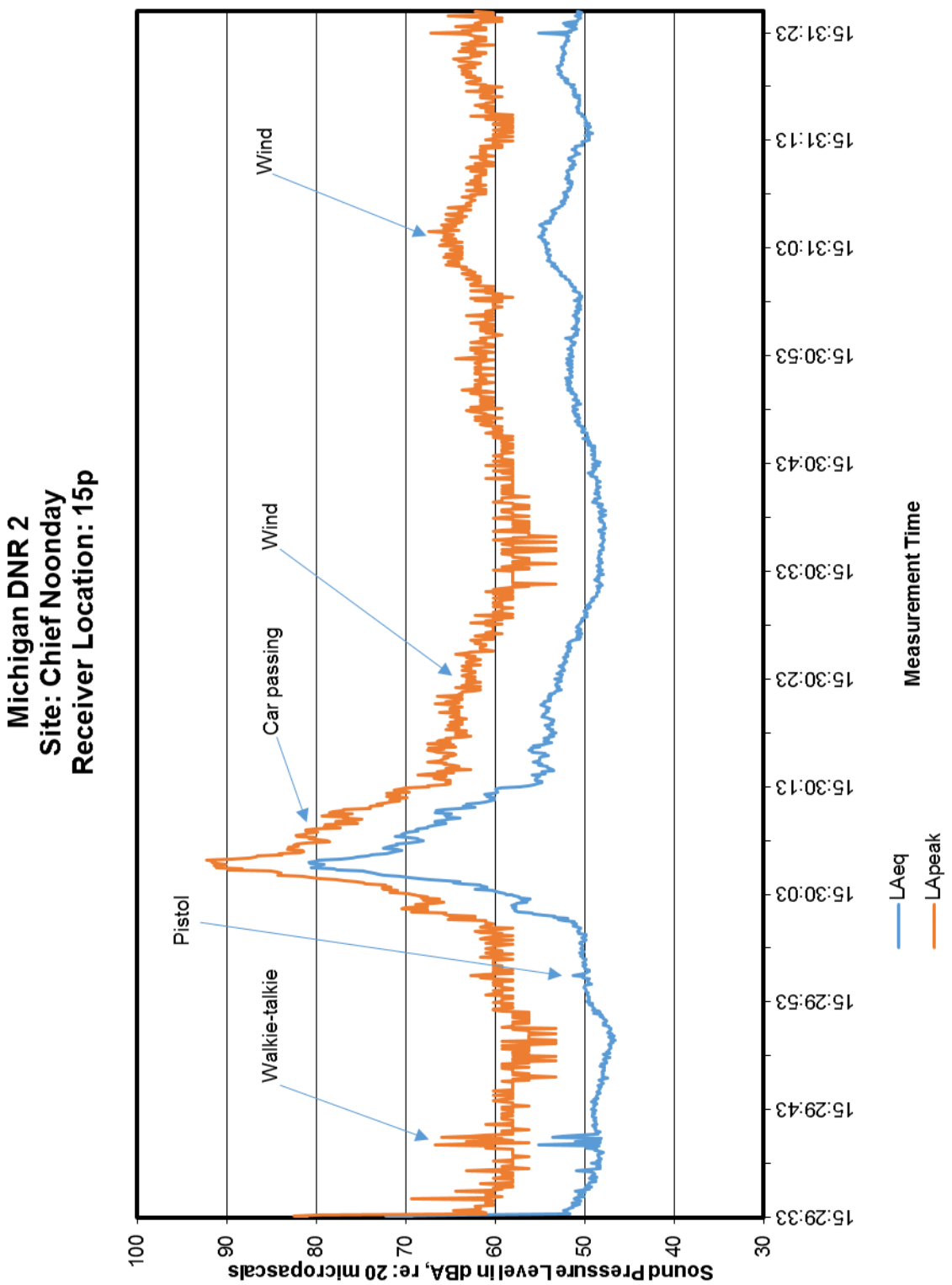
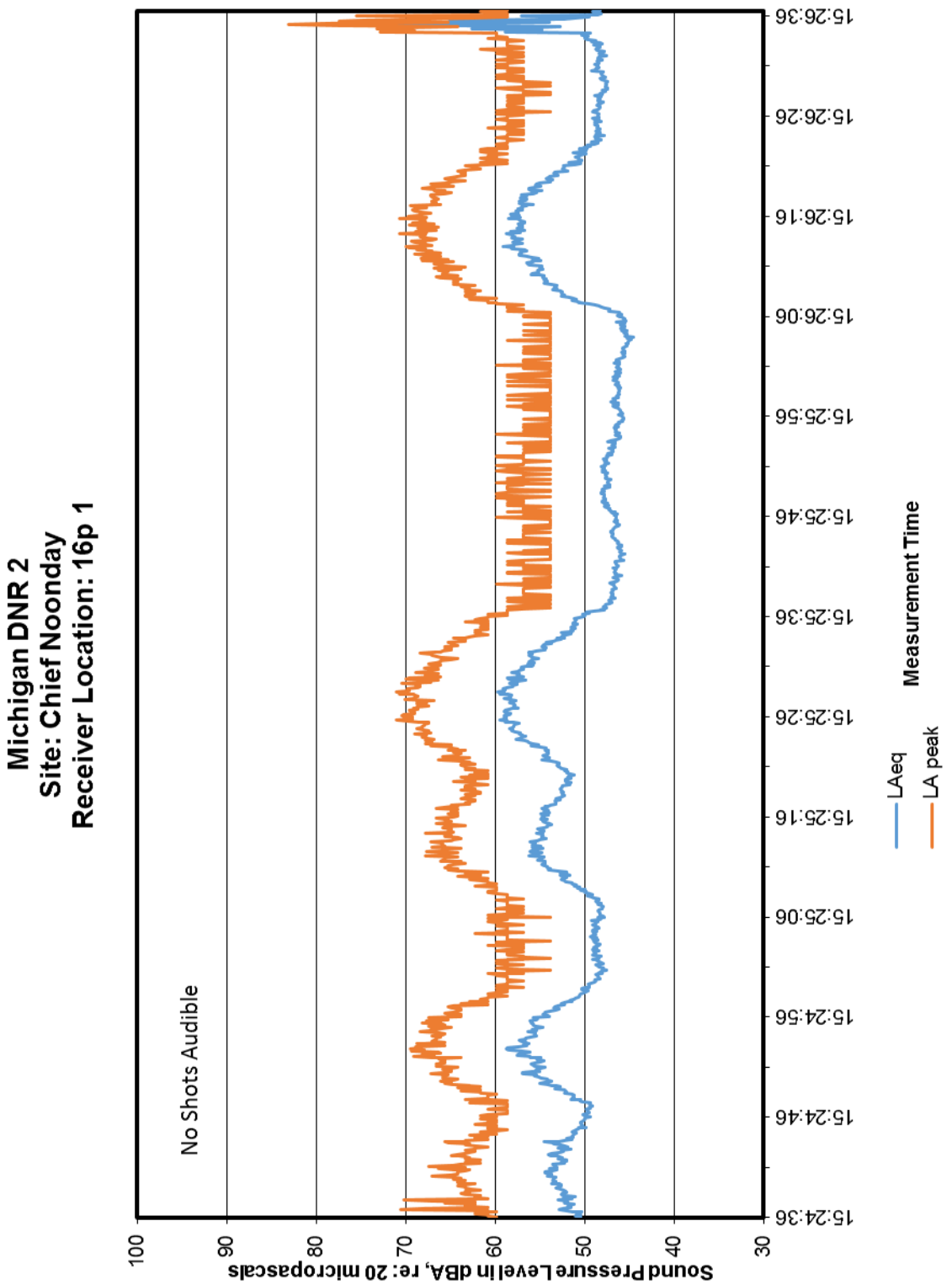
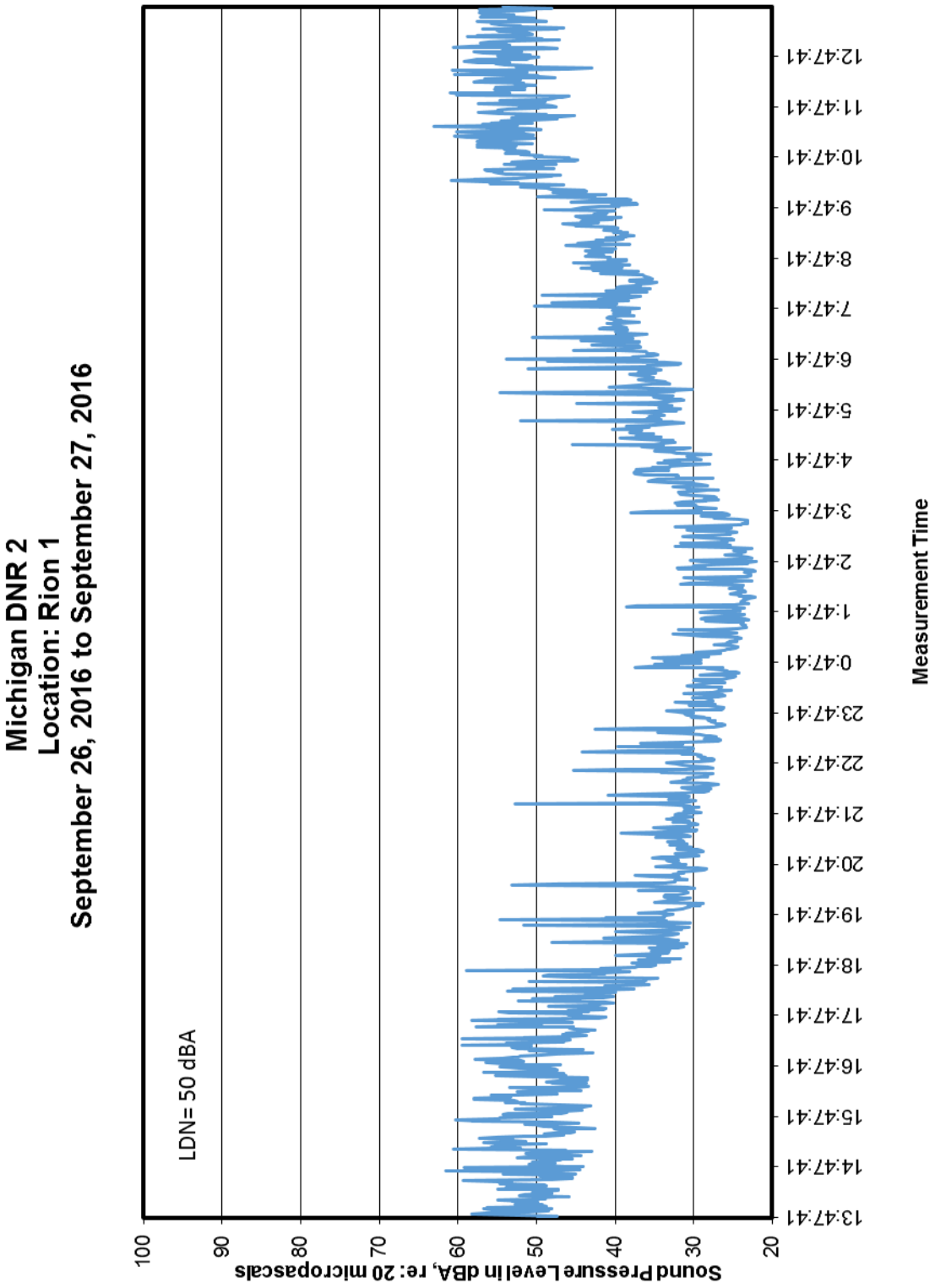
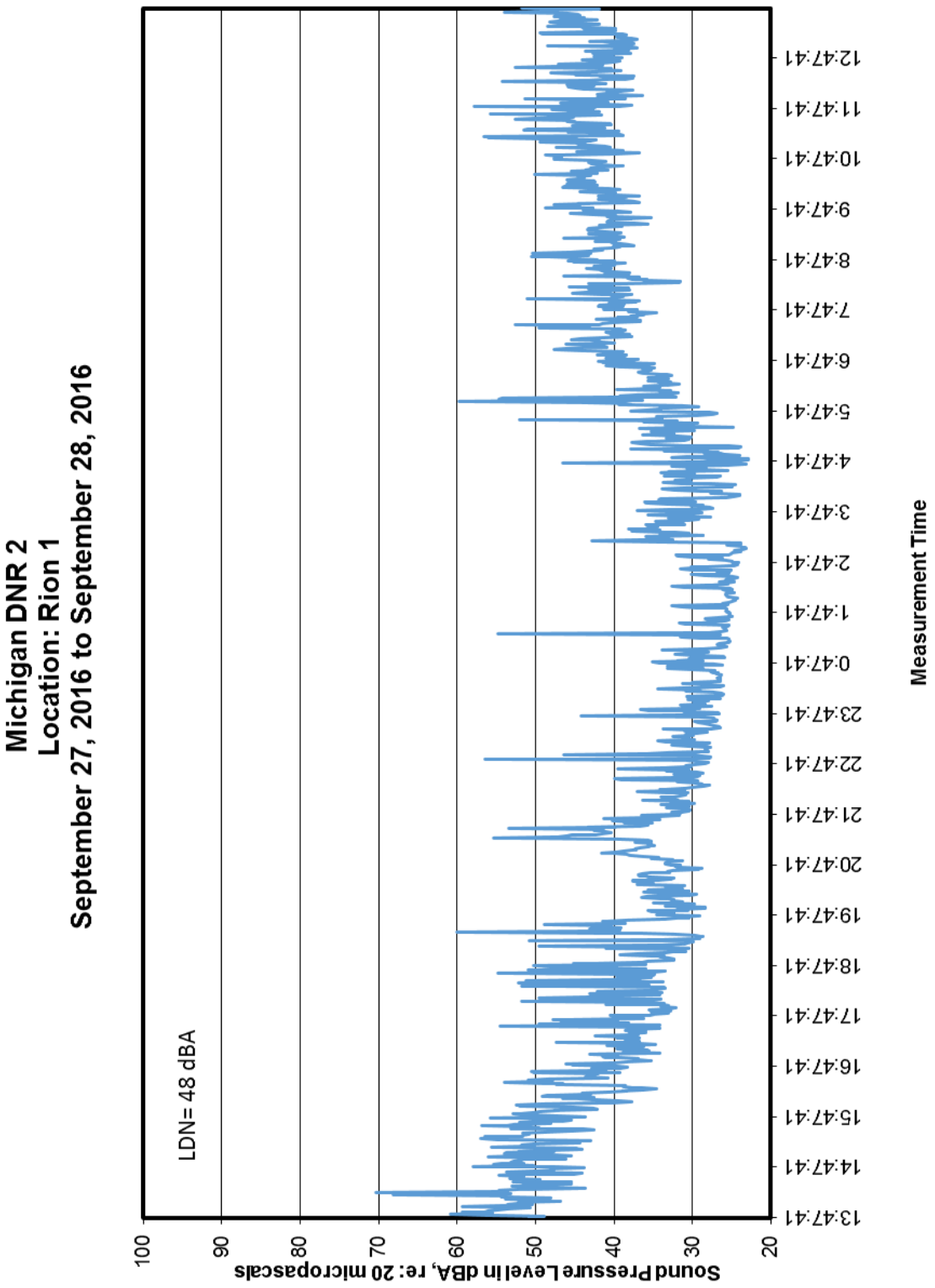

Michigan DNR 2
Site: Chief Noonday
Receiver Location: 14p 1 Alt
Rifle
Traffic
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
14:09:21
14:09:31
14:09:41
14:09:51
14:10:01
14:10:11
14:10:21
14:10:31
14:10:41
14:10:51
14:11:01
14:11:11
Measurement Time
LAeq
LA peak

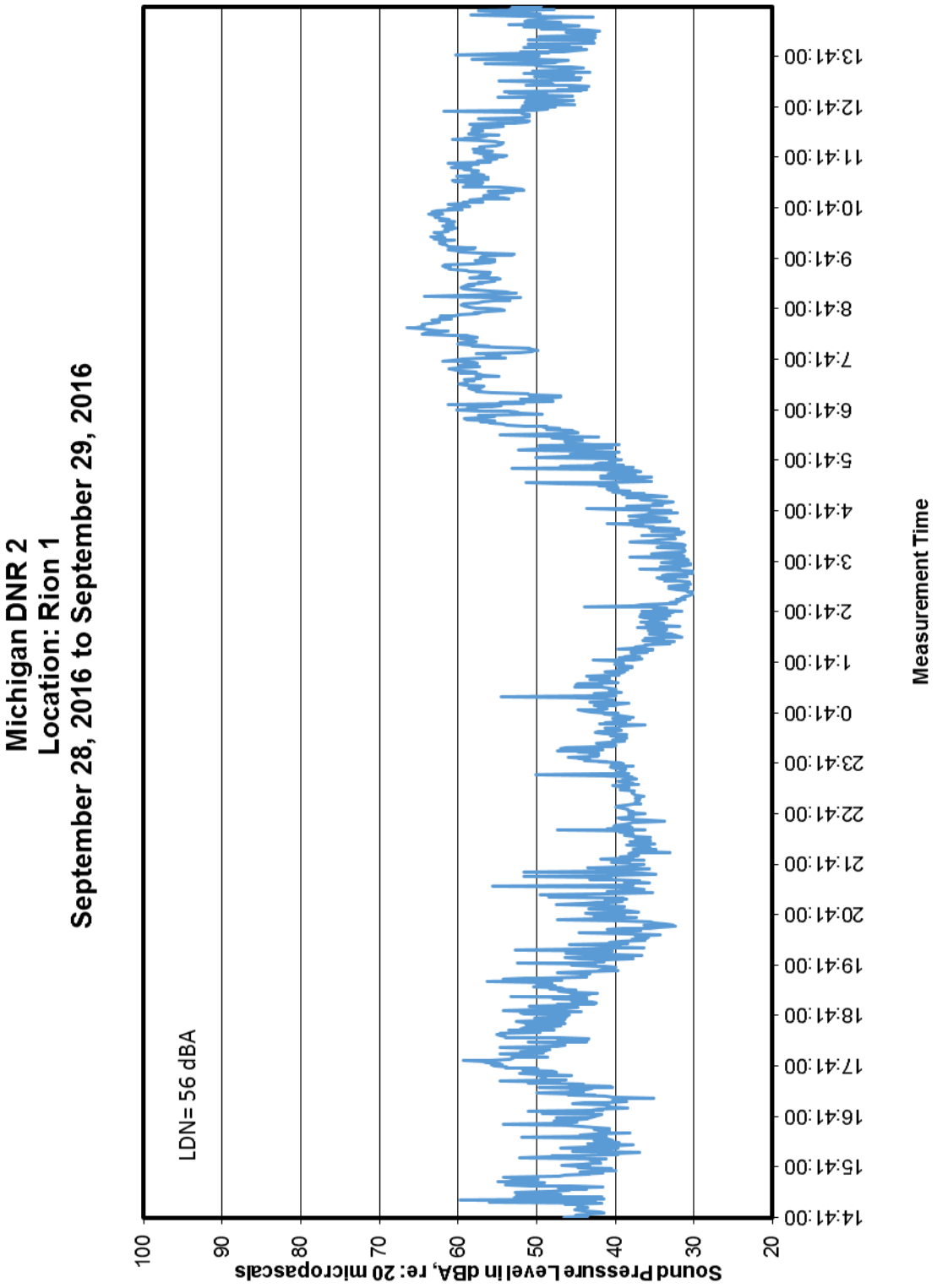

Michigan DNR 2
Site: Chief Noonday
Receiver Location: 15p
Wind
Wind
Car passing
Pistol
Walkie-talkie
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
15:29:33
15:29:43
15:29:53
15:30:03
15:30:13
15:30:23
15:30:33
15:30:43
15:30:53
15:31:03
15:31:13
15:31:23
Measurement Time
LAeq
LApeak

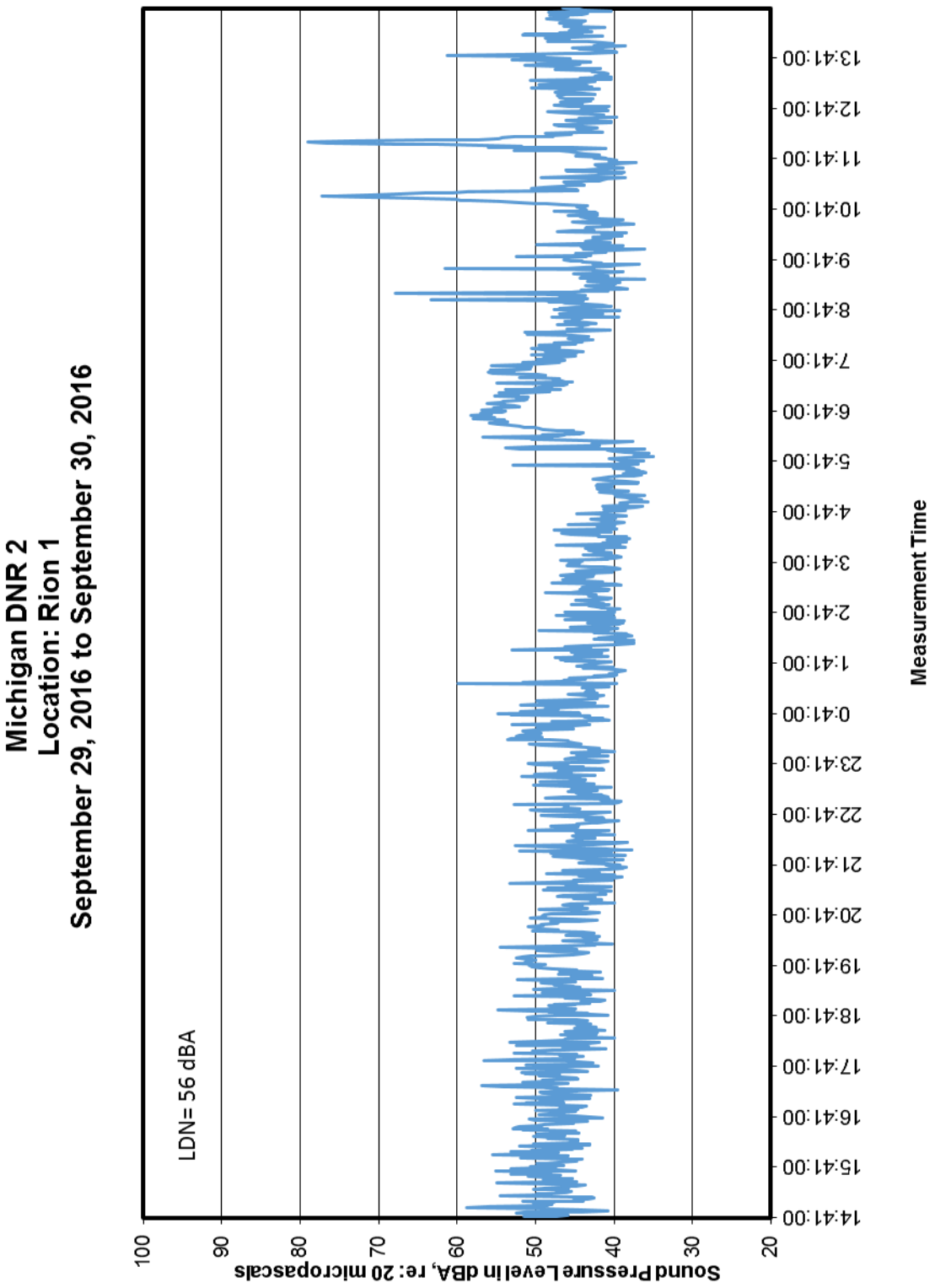

Michigan DNR 2
Site: Chief Noonday
Receiver Location: 16p 1
No Shots Audible
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
15:24:36
15:24:46
15:24:56
15:25:06
15:25:16
15:25:26
15:25:36
15:25:46
15:25:56
15:26:06
15:26:16
15:26:26
15:26:36
Measurement Time
LAeq
LA peak

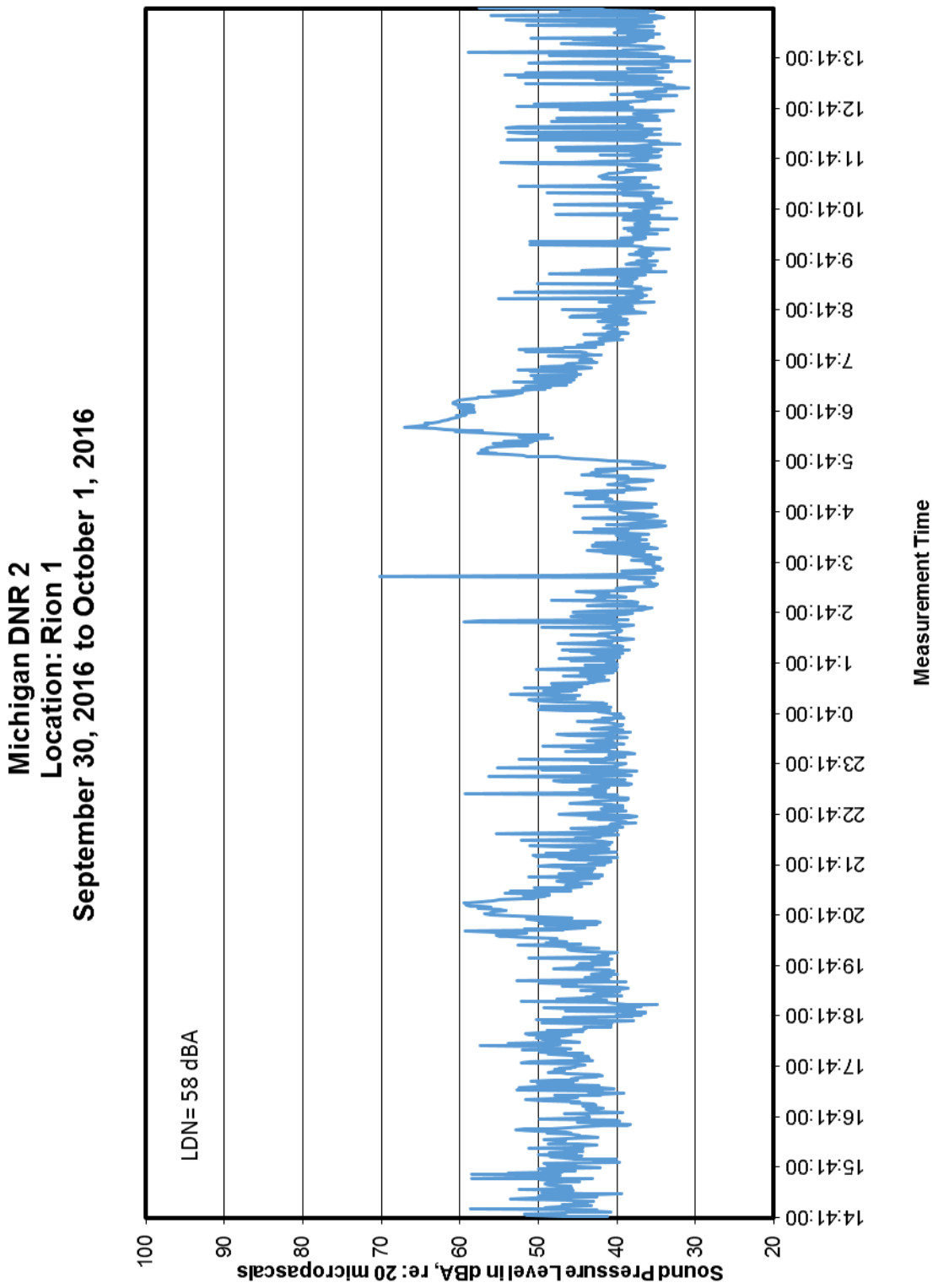
APPENDIX T: GRAPHS OF AVERAGE EXISTING AMBIENT PEAK SOUND LEVELS MEASURED NEAR EACH OF THE 2 PROPOSED RANGE SITES

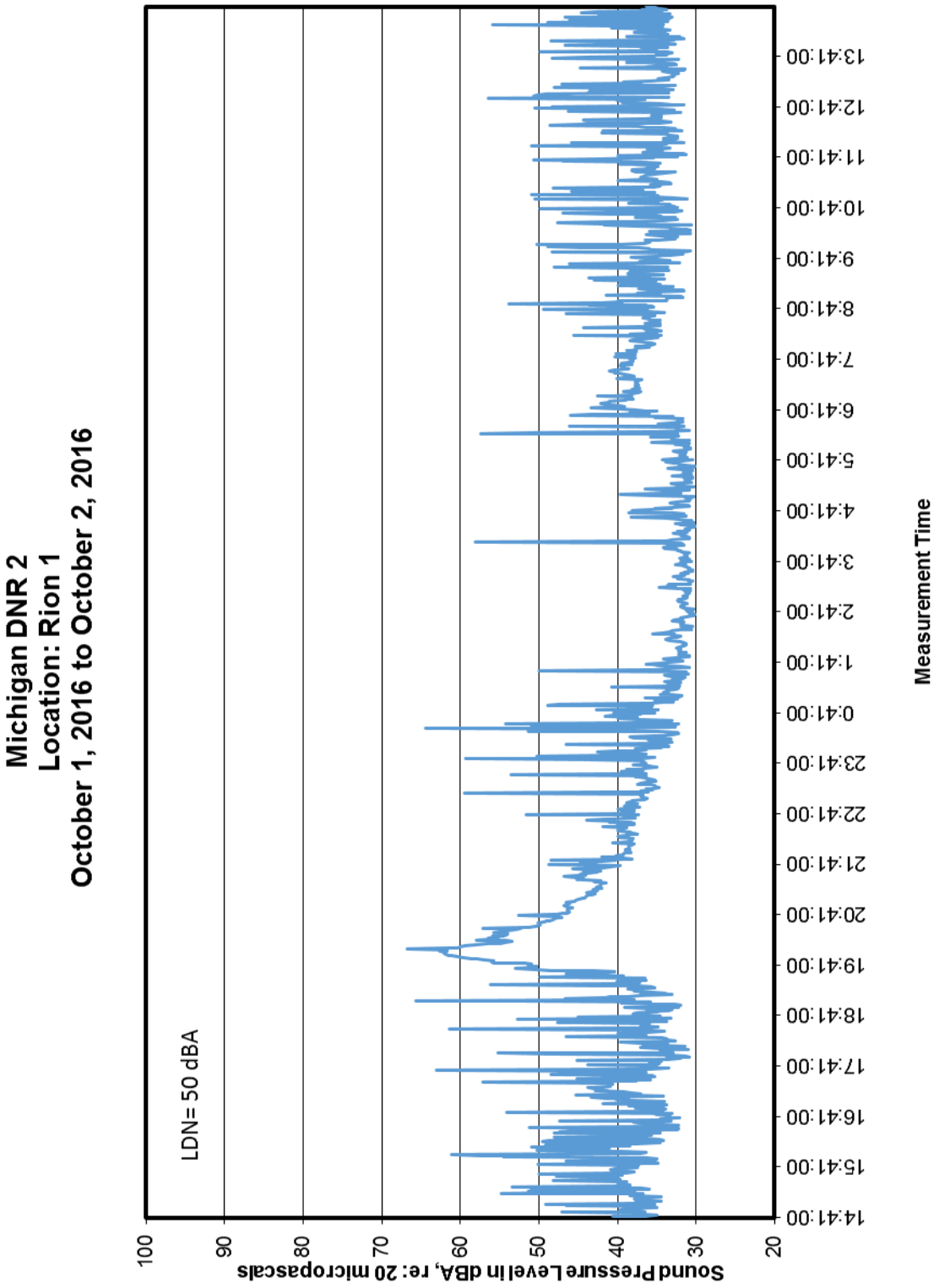

Michigan DNR 2
Location: Rion 1
September 26, 2016 to September 27, 2016
LDN= 50 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
Measurement Time
13:47:41
14:47:41
15:47:41
16:47:41
17:47:41
18:47:41
19:47:41
20:47:41
21:47:41
22:47:41
23:47:41
0:47:41
1:47:41
2:47:41
3:47:41
4:47:41
5:47:41
6:47:41
7:47:41
8:47:41
9:47:41
10:47:41
11:47:41
12:47:41

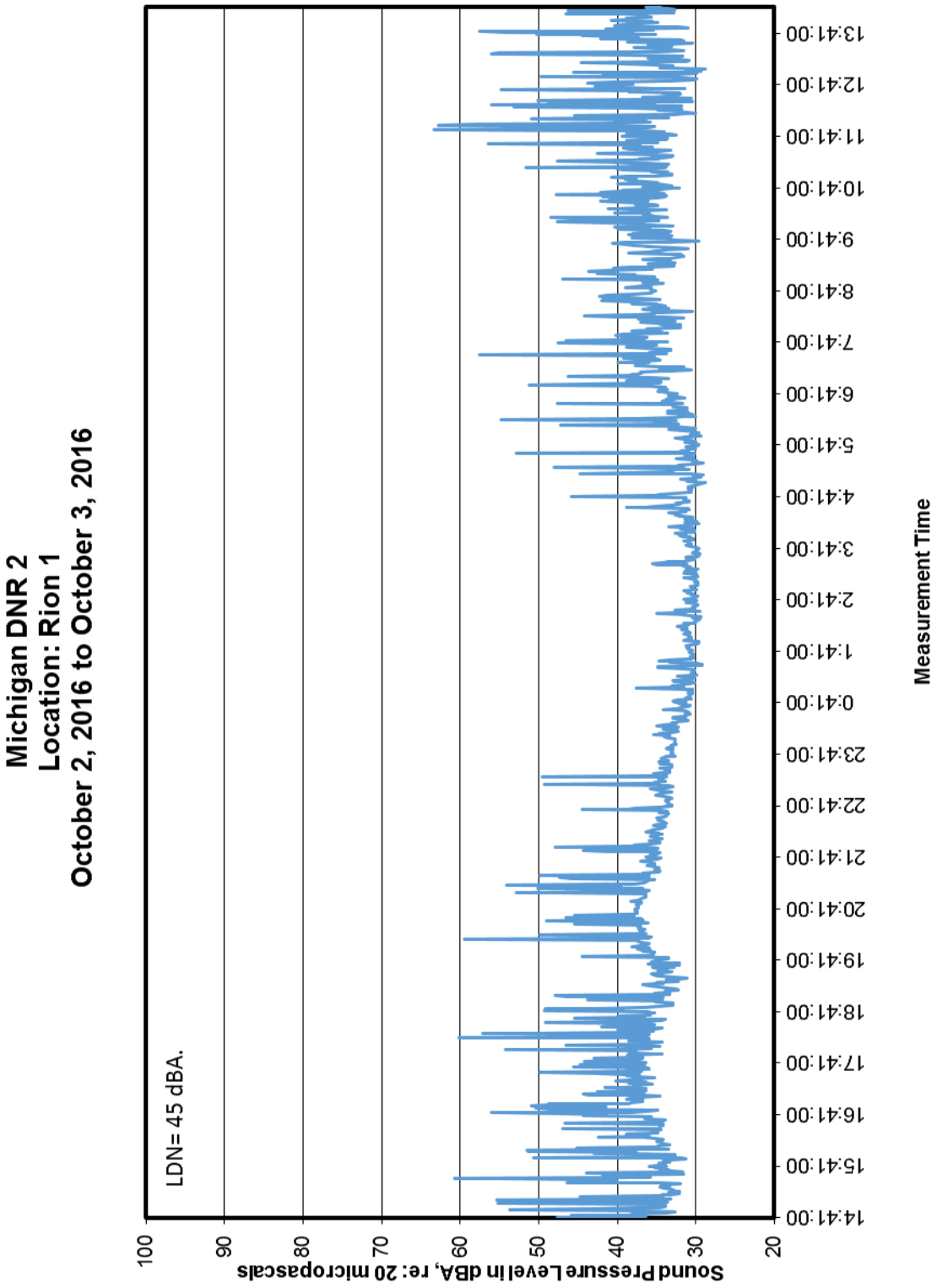

Michigan DNR 2
Location: Rion 1
September 27, 2016 to September 28, 2016
LDN= 48 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
Measurement Time
13:47:41
14:47:41
15:47:41
16:47:41
17:47:41
18:47:41
19:47:41
20:47:41
21:47:41
22:47:41
23:47:41
0:47:41
1:47:41
2:47:41
3:47:41
4:47:41
5:47:41
6:47:41
7:47:41
8:47:41
9:47:41
10:47:41
11:47:41
12:47:41

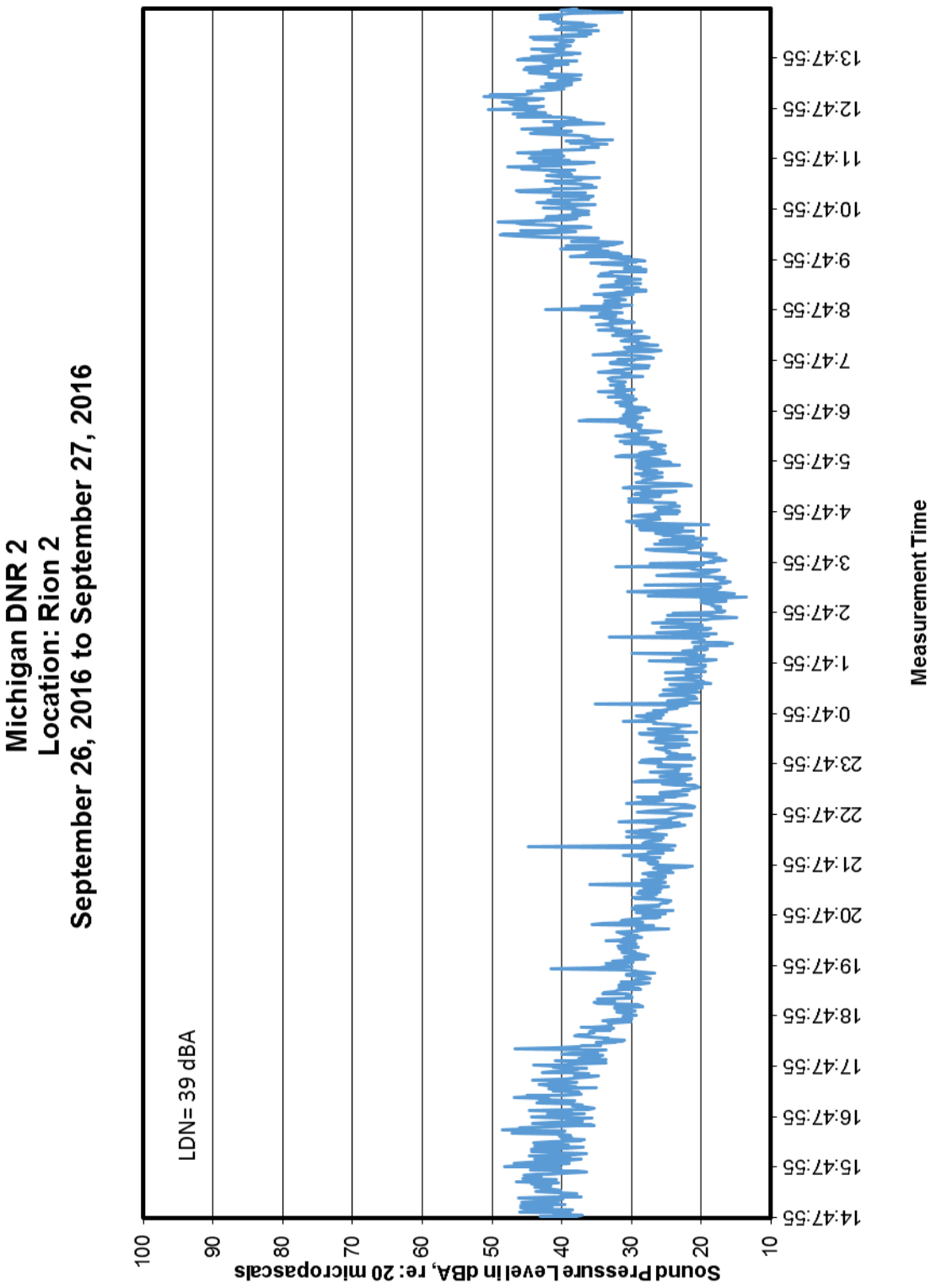

Michigan DNR 2
Location: Rion 1
September 28, 2016 to September 29, 2016
LDN= 56 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
Measurement Time
14:41:00
15:41:00
16:41:00
17:41:00
18:41:00
19:41:00
20:41:00
21:41:00
22:41:00
23:41:00
0:41:00
1:41:00
2:41:00
3:41:00
4:41:00
5:41:00
6:41:00
7:41:00
8:41:00
9:41:00
10:41:00
11:41:00
12:41:00
13:41:00

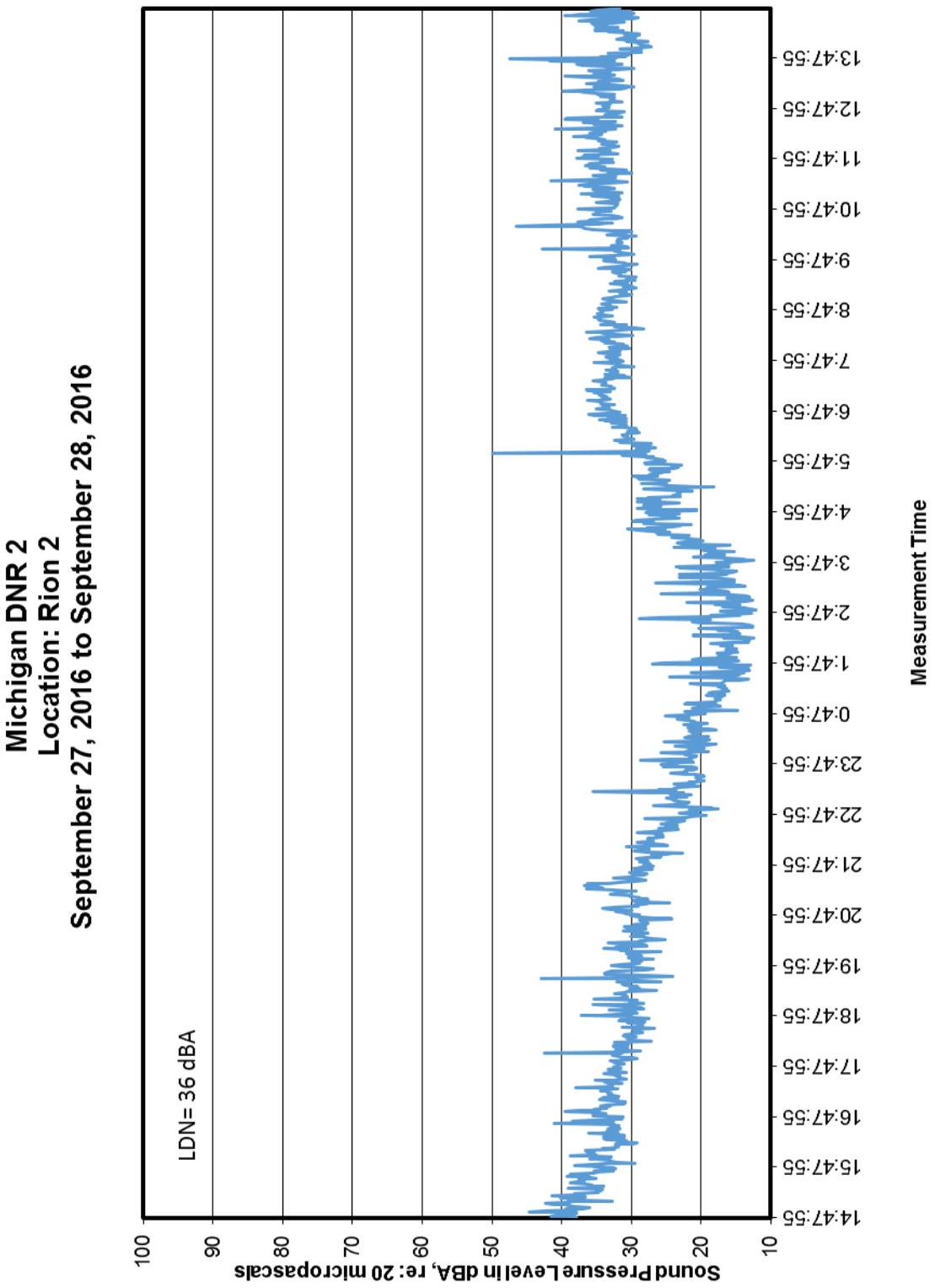

Michigan DNR 2
Location: Rion 1
September 29, 2016 to September 30, 2016
LDN= 56 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
Measurement Time
14:41:00
15:41:00
16:41:00
17:41:00
18:41:00
19:41:00
20:41:00
21:41:00
22:41:00
23:41:00
0:41:00
1:41:00
2:41:00
3:41:00
4:41:00
5:41:00
6:41:00
7:41:00
8:41:00
9:41:00
10:41:00
11:41:00
12:41:00
13:41:00

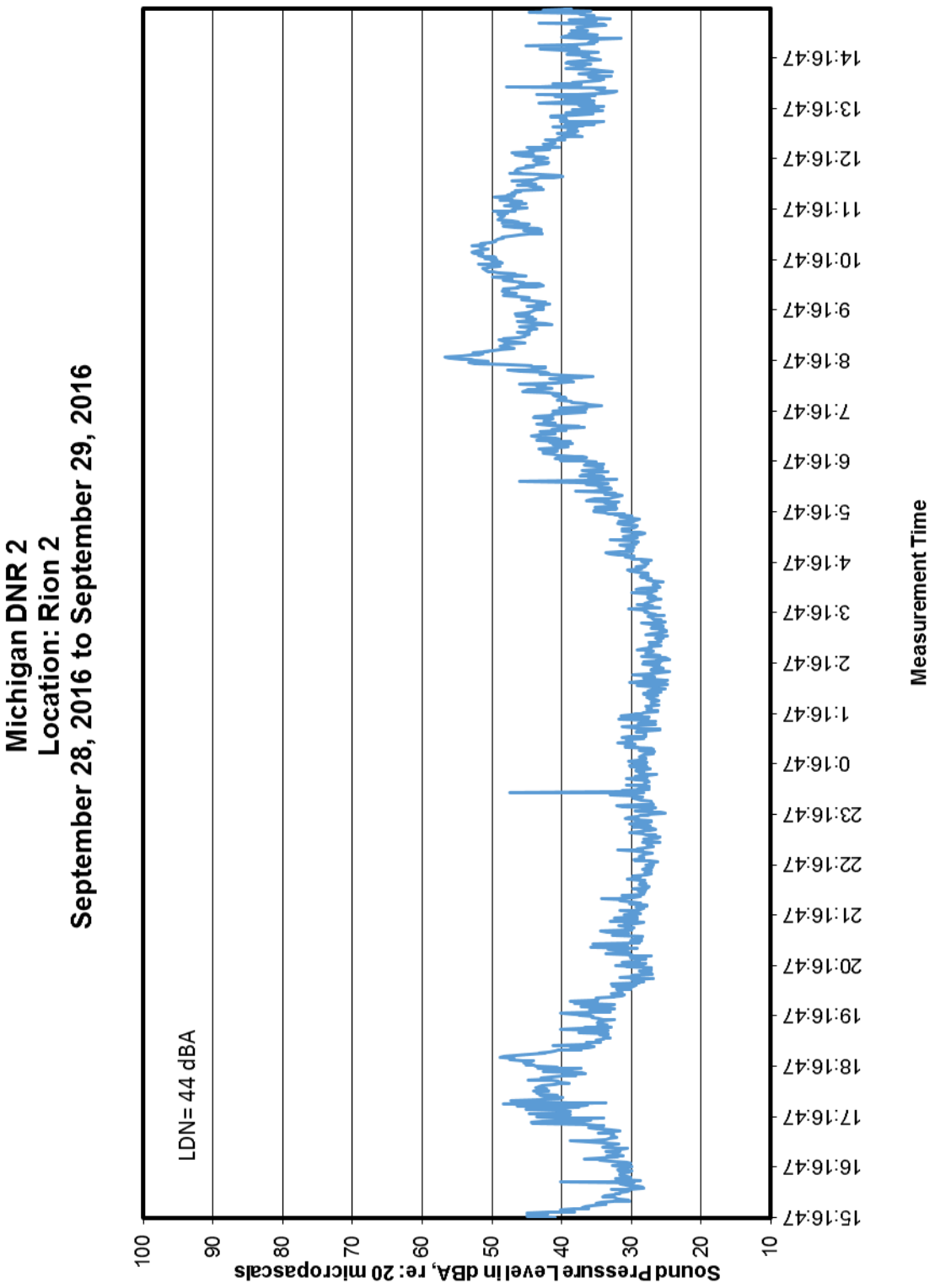

Michigan DNR 2
Location: Rion 1
September 30, 2016 to October 1, 2016
LDN= 58 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
Measurement Time
14:41:00
15:41:00
16:41:00
17:41:00
18:41:00
19:41:00
20:41:00
21:41:00
22:41:00
23:41:00
0:41:00
1:41:00
2:41:00
3:41:00
4:41:00
5:41:00
6:41:00
7:41:00
8:41:00
9:41:00
10:41:00
11:41:00
12:41:00
13:41:00

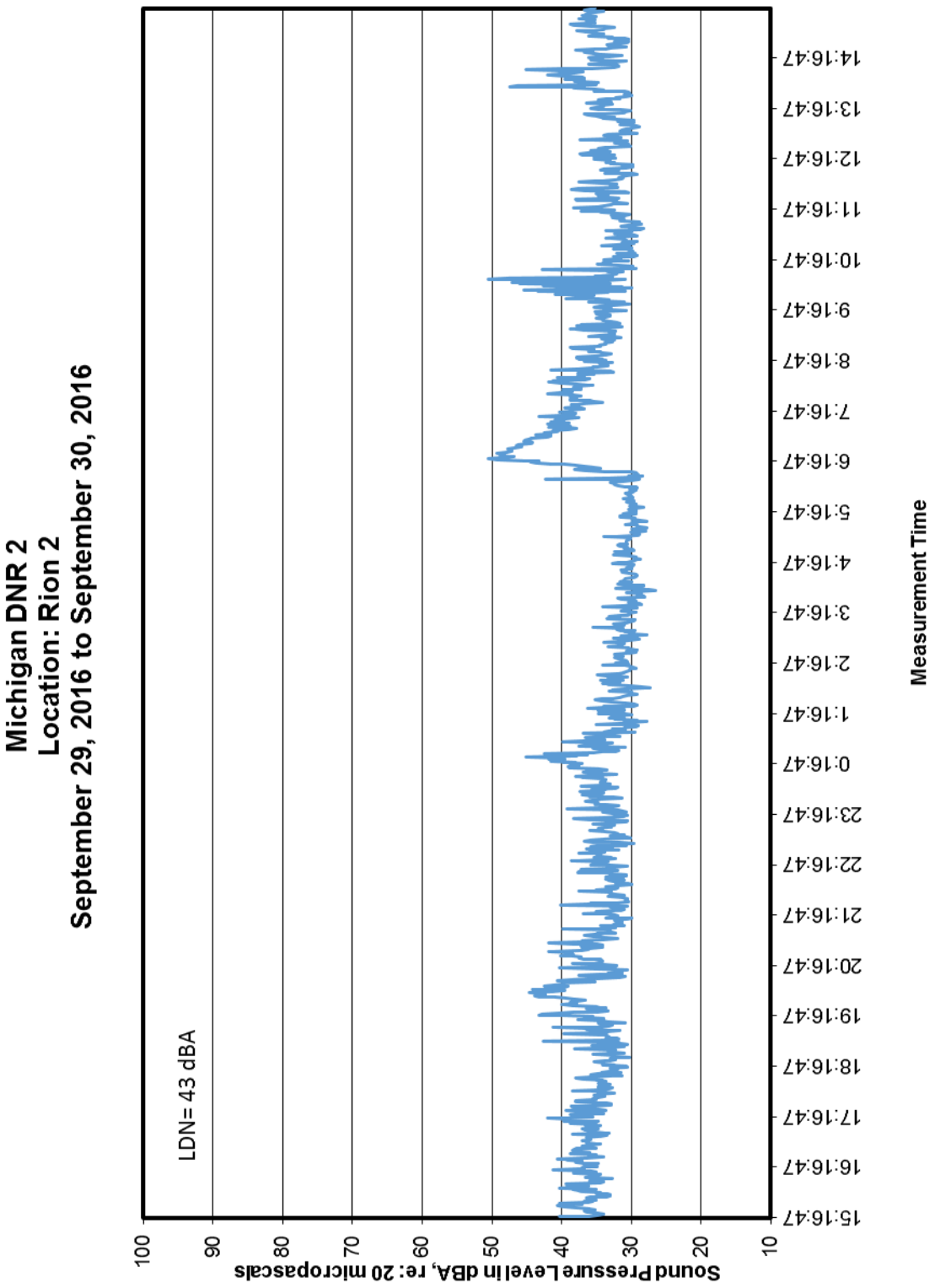

Michigan DNR 2
Location: Rion 1
October 1, 2016 to October 2, 2016
LDN= 50 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
Measurement Time
14:41:00
15:41:00
16:41:00
17:41:00
18:41:00
19:41:00
20:41:00
21:41:00
22:41:00
23:41:00
0:41:00
1:41:00
2:41:00
3:41:00
4:41:00
5:41:00
6:41:00
7:41:00
8:41:00
9:41:00
10:41:00
11:41:00
12:41:00
13:41:00

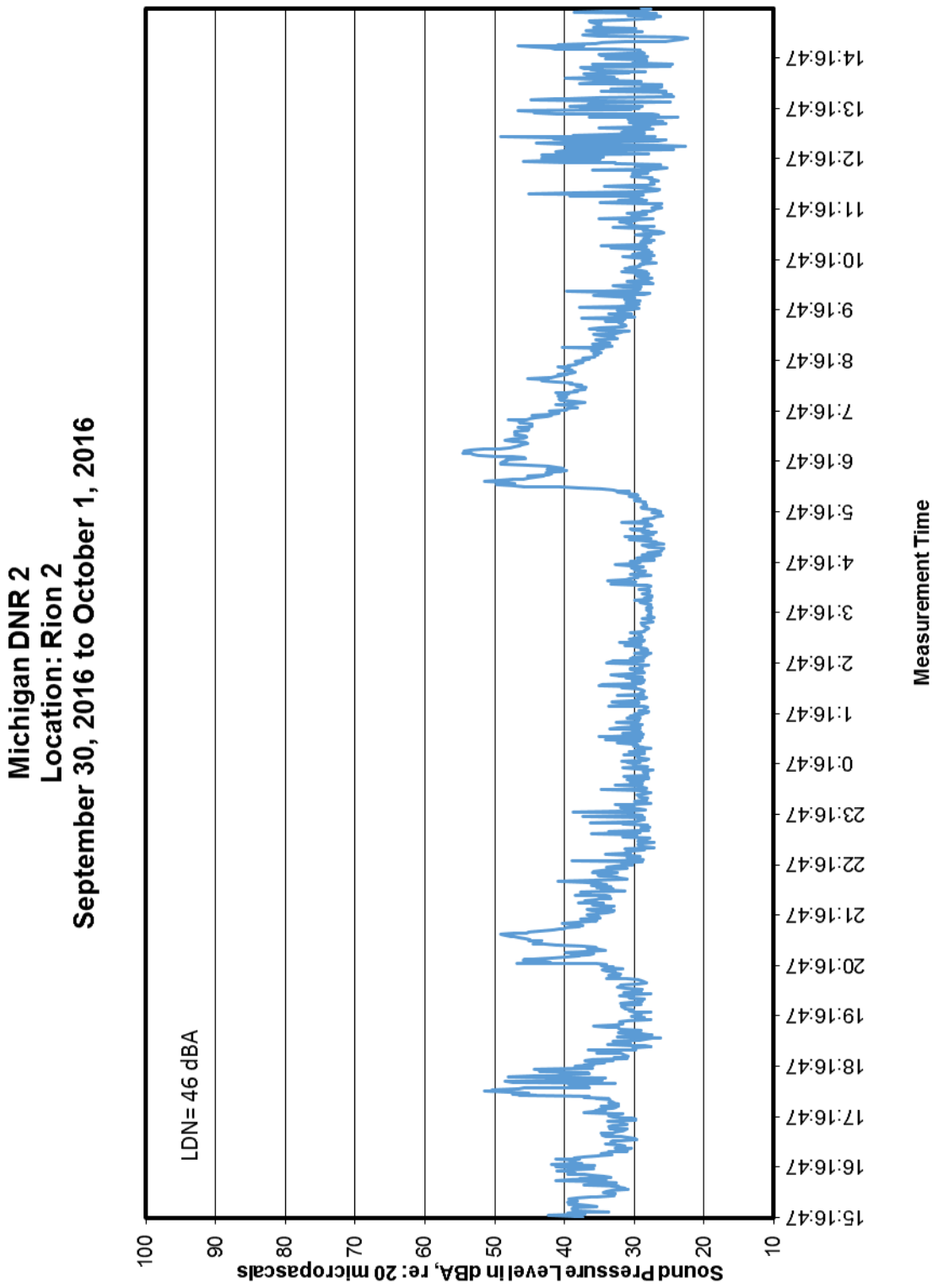

Michigan DNR 2
Location: Rion 1
October 2, 2016 to October 3, 2016
LDN= 45 dBA.
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
Measurement Time
14:41:00
15:41:00
16:41:00
17:41:00
18:41:00
19:41:00
20:41:00
21:41:00
22:41:00
23:41:00
0:41:00
1:41:00
2:41:00
3:41:00
4:41:00
5:41:00
6:41:00
7:41:00
8:41:00
9:41:00
10:41:00
11:41:00
12:41:00
13:41:00

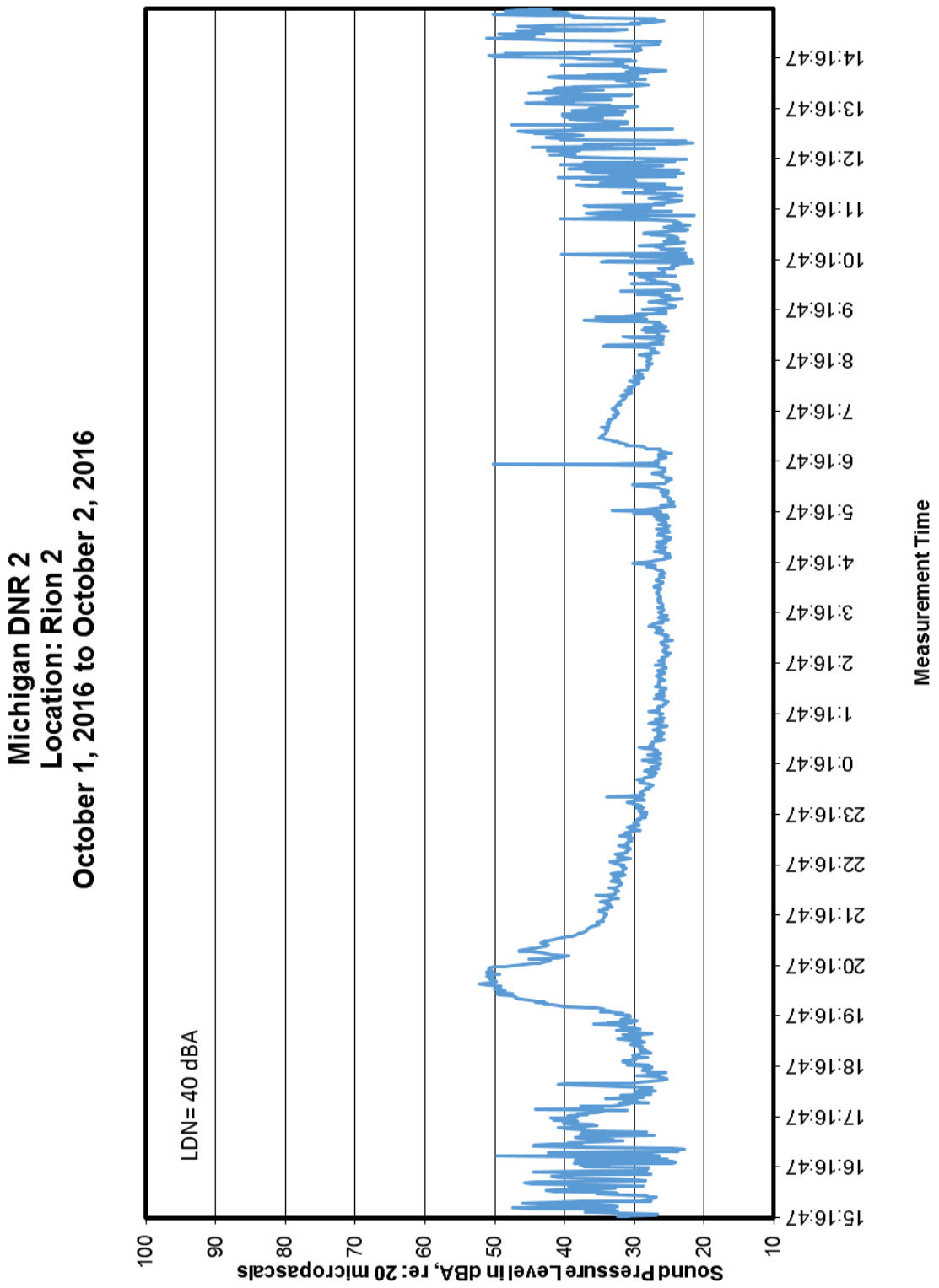

Michigan DNR 2
Location: Rion 2
September 26, 2016 to September 27, 2016
LDN= 39 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
10
Measurement Time
14:47:55
15:47:55
16:47:55
17:47:55
18:47:55
19:47:55
20:47:55
21:47:55
22:47:55
23:47:55
0:47:55
1:47:55
2:47:55
3:47:55
4:47:55
5:47:55
6:47:55
7:47:55
8:47:55
9:47:55
10:47:55
11:47:55
12:47:55
13:47:55

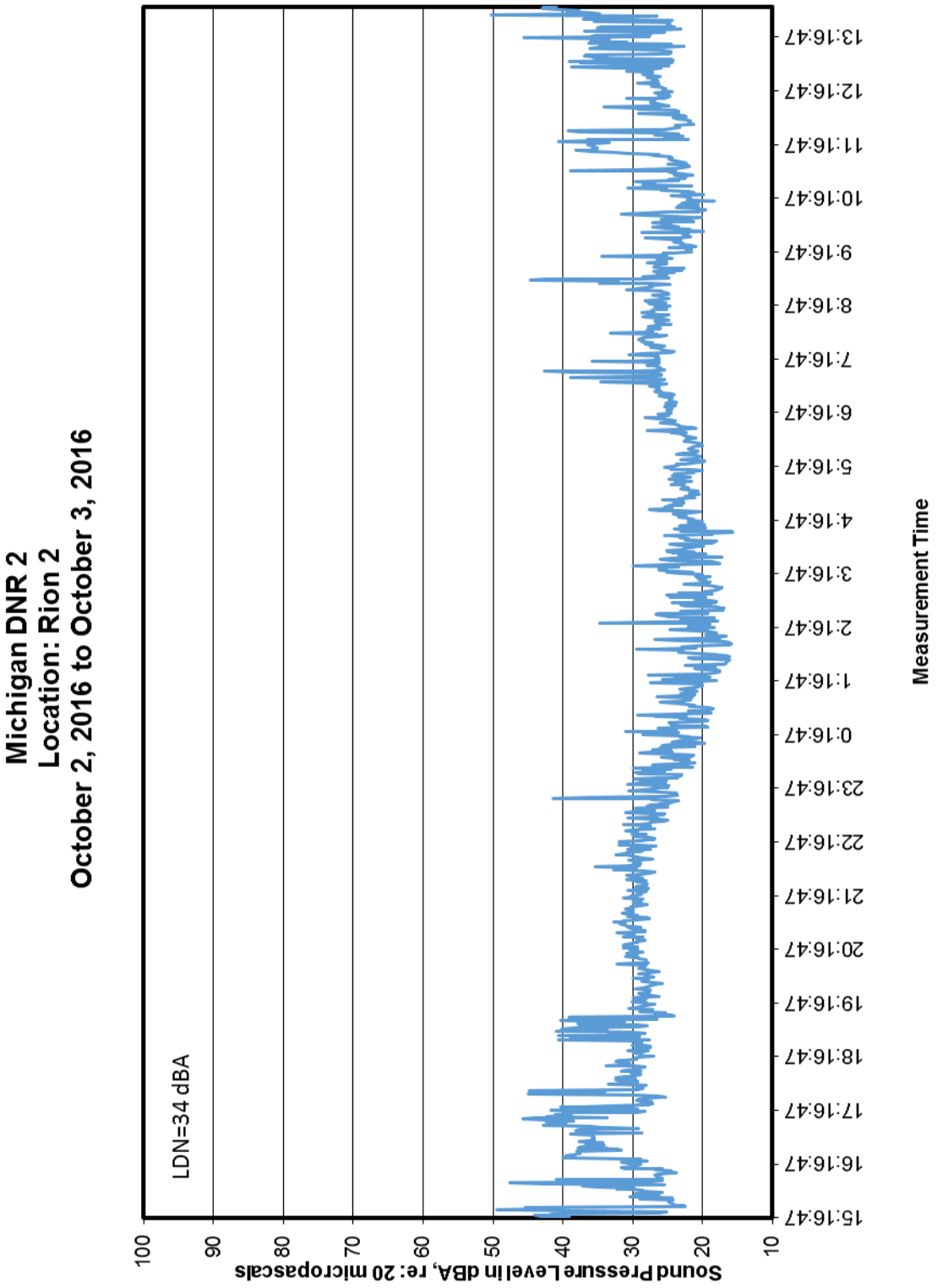

Michigan DNR 2
Location: Rion 2
September 27, 2016 to September 28, 2016
LDN= 36 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
10
Measurement Time
14:47:55
15:47:55
16:47:55
17:47:55
18:47:55
19:47:55
20:47:55
21:47:55
22:47:55
23:47:55
0:47:55
1:47:55
2:47:55
3:47:55
4:47:55
5:47:55
6:47:55
7:47:55
8:47:55
9:47:55
10:47:55
11:47:55
12:47:55
13:47:55

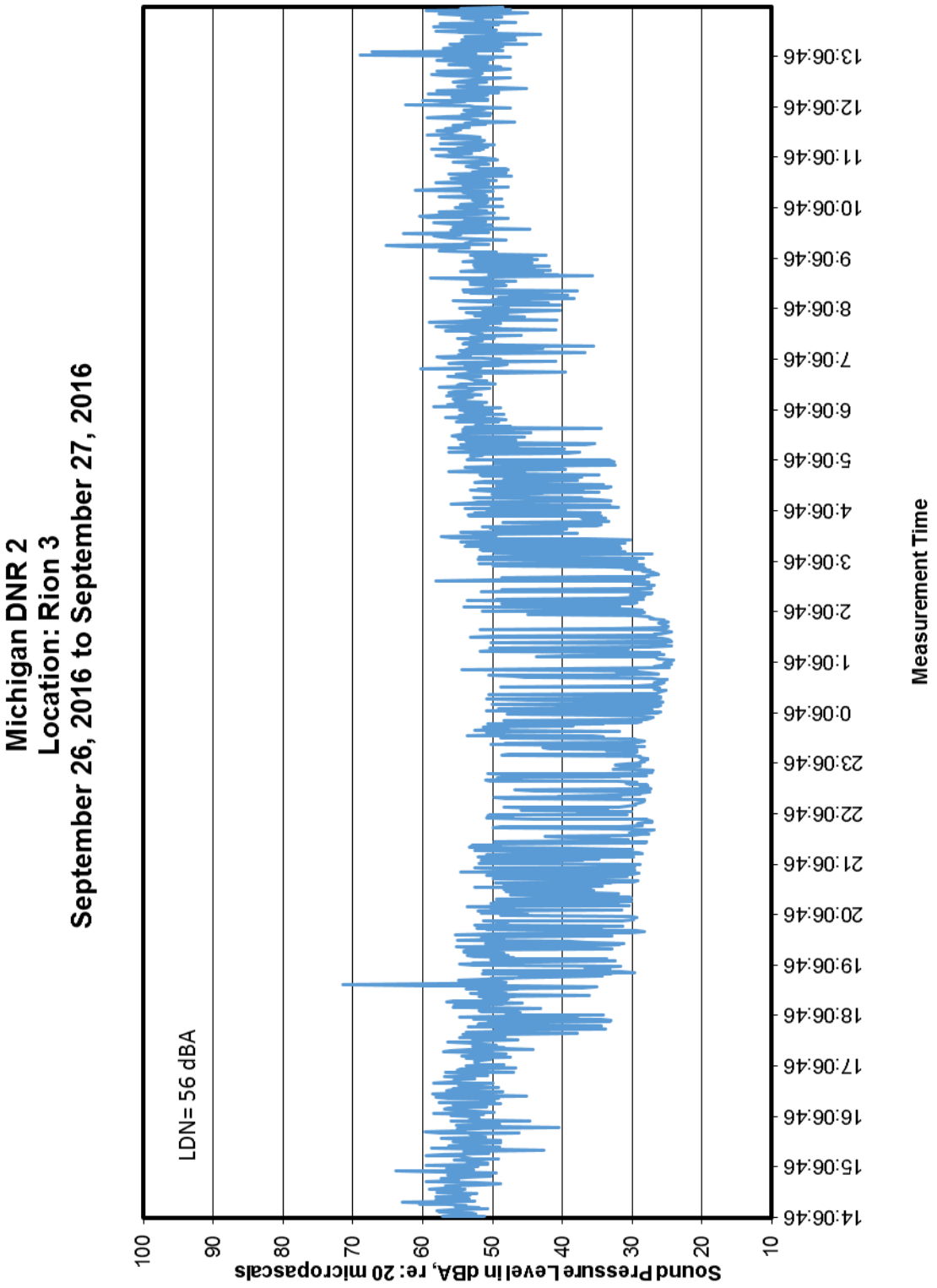

Michigan DNR 2
Location: Rion 2
September 28, 2016 to September 29, 2016
LDN= 44 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
10
Measurement Time
15:16:47
16:16:47
17:16:47
18:16:47
19:16:47
20:16:47
21:16:47
22:16:47
23:16:47
0:16:47
1:16:47
2:16:47
3:16:47
4:16:47
5:16:47
6:16:47
7:16:47
8:16:47
9:16:47
10:16:47
11:16:47
12:16:47
13:16:47
14:16:47

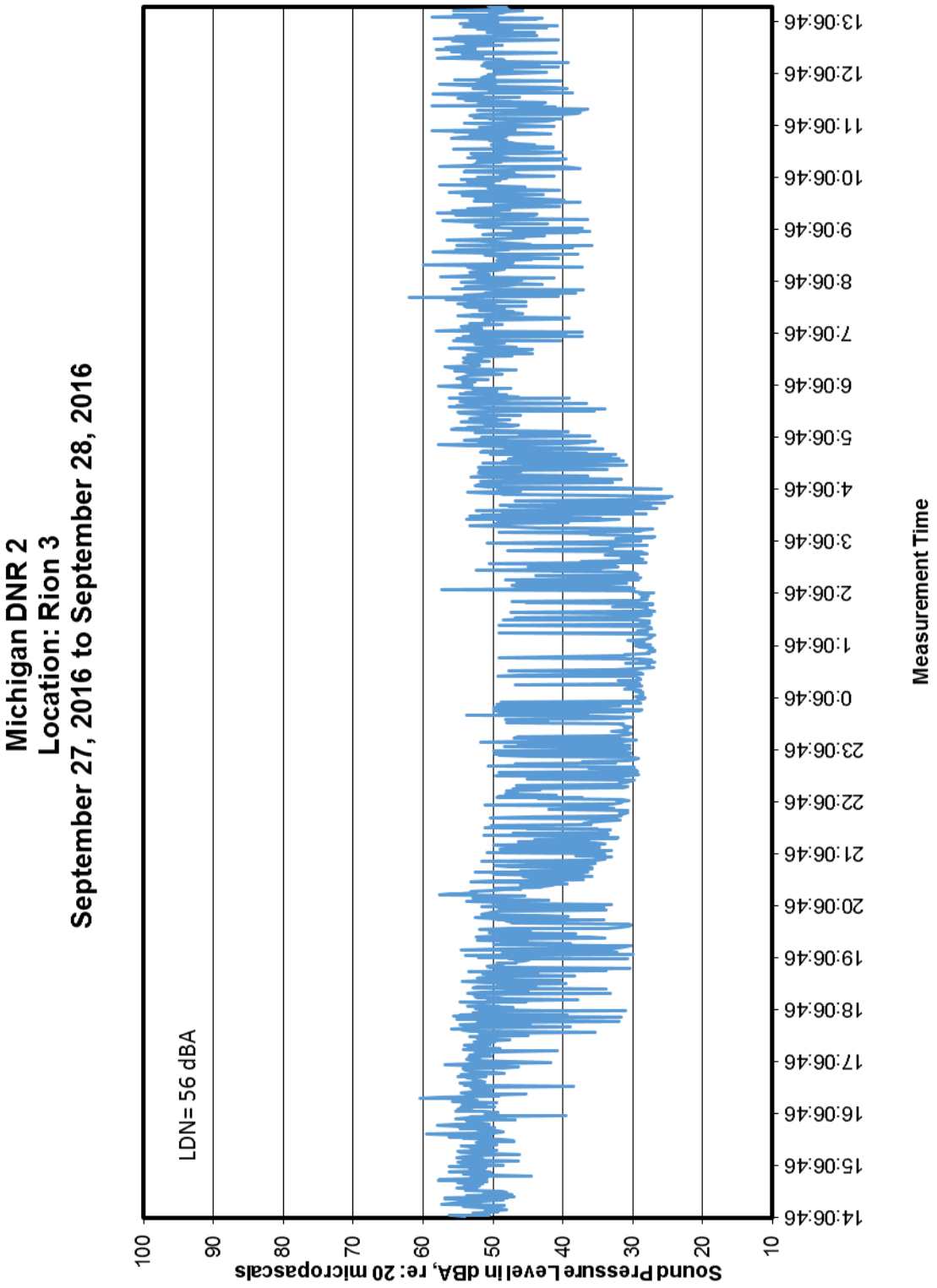

Michigan DNR 2
Location: Rion 2
September 29, 2016 to September 30, 2016
LDN= 43 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
10
Measurement Time
15:16:47
16:16:47
17:16:47
18:16:47
19:16:47
20:16:47
21:16:47
22:16:47
23:16:47
0:16:47
1:16:47
2:16:47
3:16:47
4:16:47
5:16:47
6:16:47
7:16:47
8:16:47
9:16:47
10:16:47
11:16:47
12:16:47
13:16:47
14:16:47

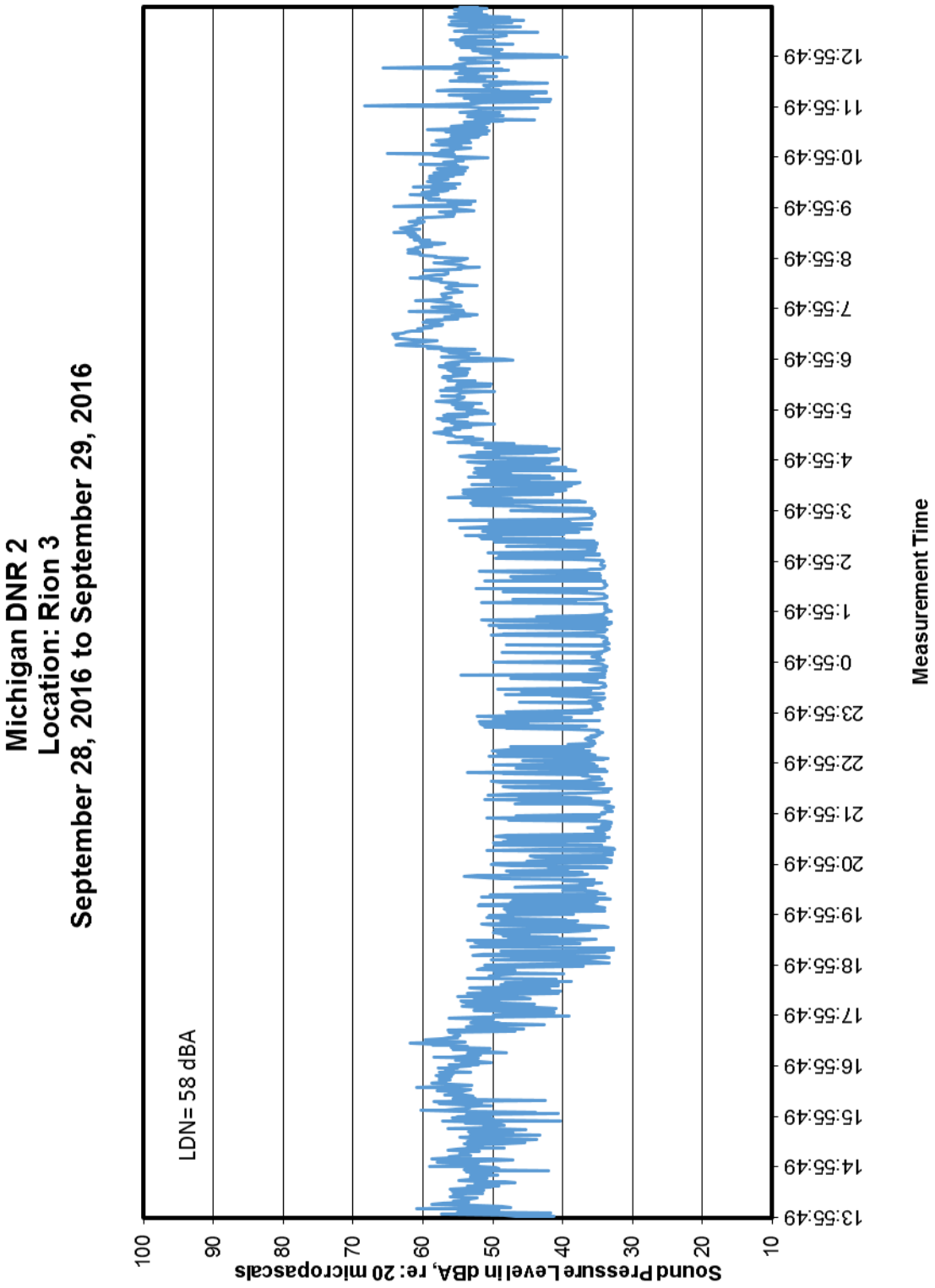

Michigan DNR 2
Location: Rion 2
September 30, 2016 to October 1, 2016
LDN= 46 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
10
Measurement Time
15:16:47
16:16:47
17:16:47
18:16:47
19:16:47
20:16:47
21:16:47
22:16:47
23:16:47
0:16:47
1:16:47
2:16:47
3:16:47
4:16:47
5:16:47
6:16:47
7:16:47
8:16:47
9:16:47
10:16:47
11:16:47
12:16:47
13:16:47
14:16:47

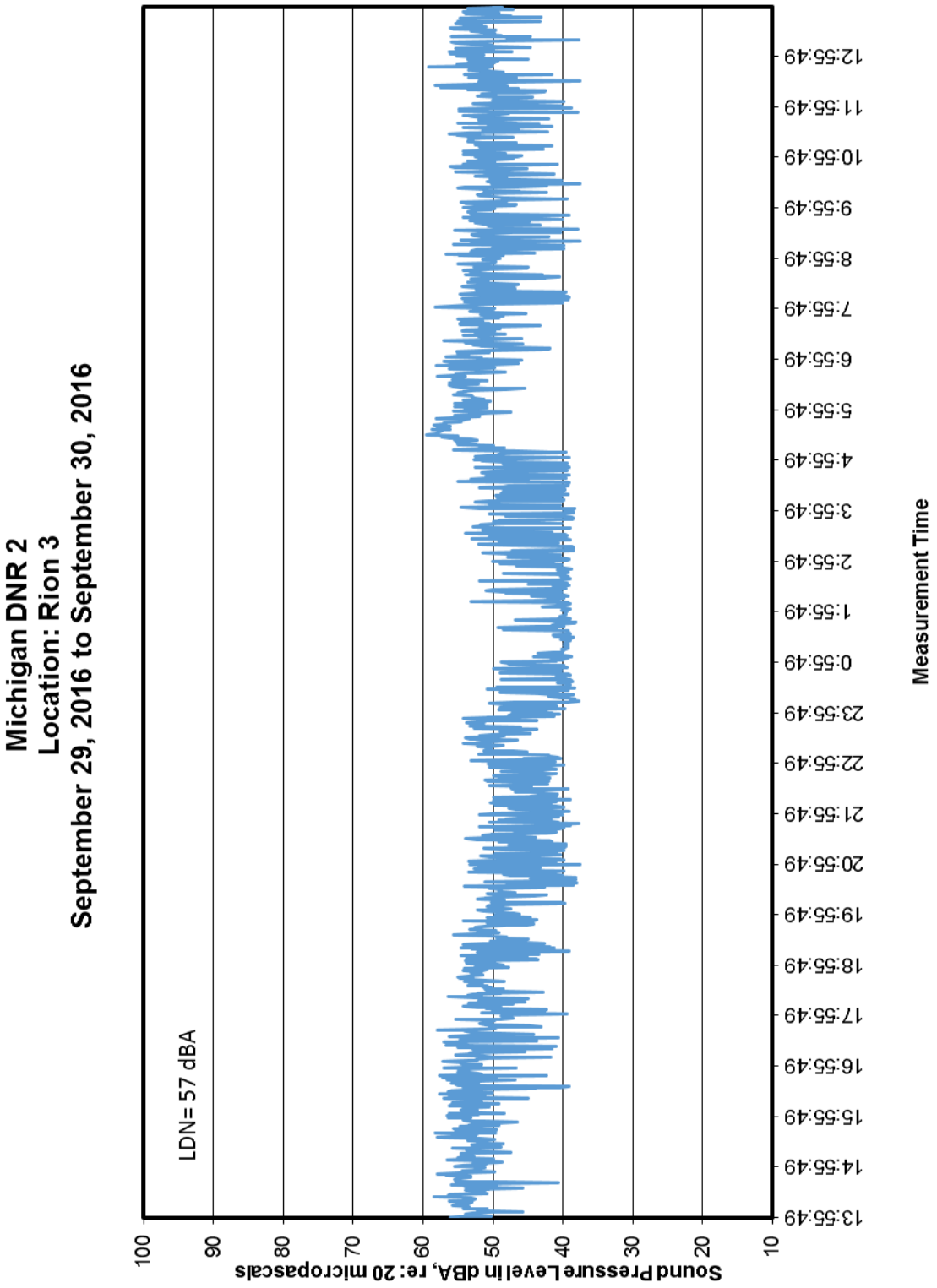

Michigan DNR 2
Location: Rion 2
October 1, 2016 to October 2, 2016
LDN= 40 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
10
Measurement Time
15:16:47
16:16:47
17:16:47
18:16:47
19:16:47
20:16:47
21:16:47
22:16:47
23:16:47
0:16:47
1:16:47
2:16:47
3:16:47
4:16:47
5:16:47
6:16:47
7:16:47
8:16:47
9:16:47
10:16:47
11:16:47
12:16:47
13:16:47
14:16:47

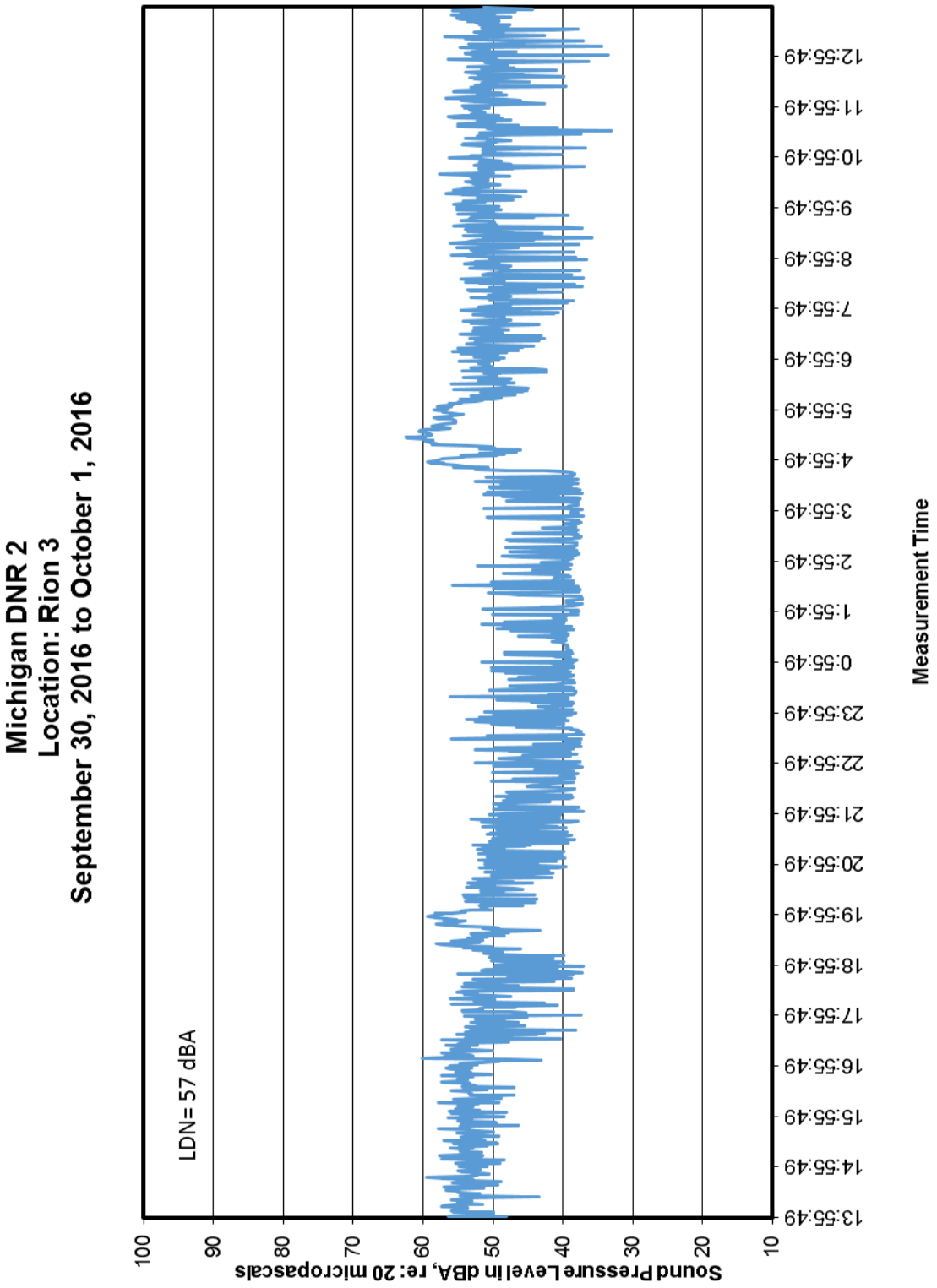

Michigan DNR 2
Location: Rion 2
October 2, 2016 to October 3, 2016
LDN=34 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
10
Measurement Time
15:16:47
16:16:47
17:16:47
18:16:47
19:16:47
20:16:47
21:16:47
22:16:47
23:16:47
0:16:47
1:16:47
2:16:47
3:16:47
4:16:47
5:16:47
6:16:47
7:16:47
8:16:47
9:16:47
10:16:47
11:16:47
12:16:47
13:16:47

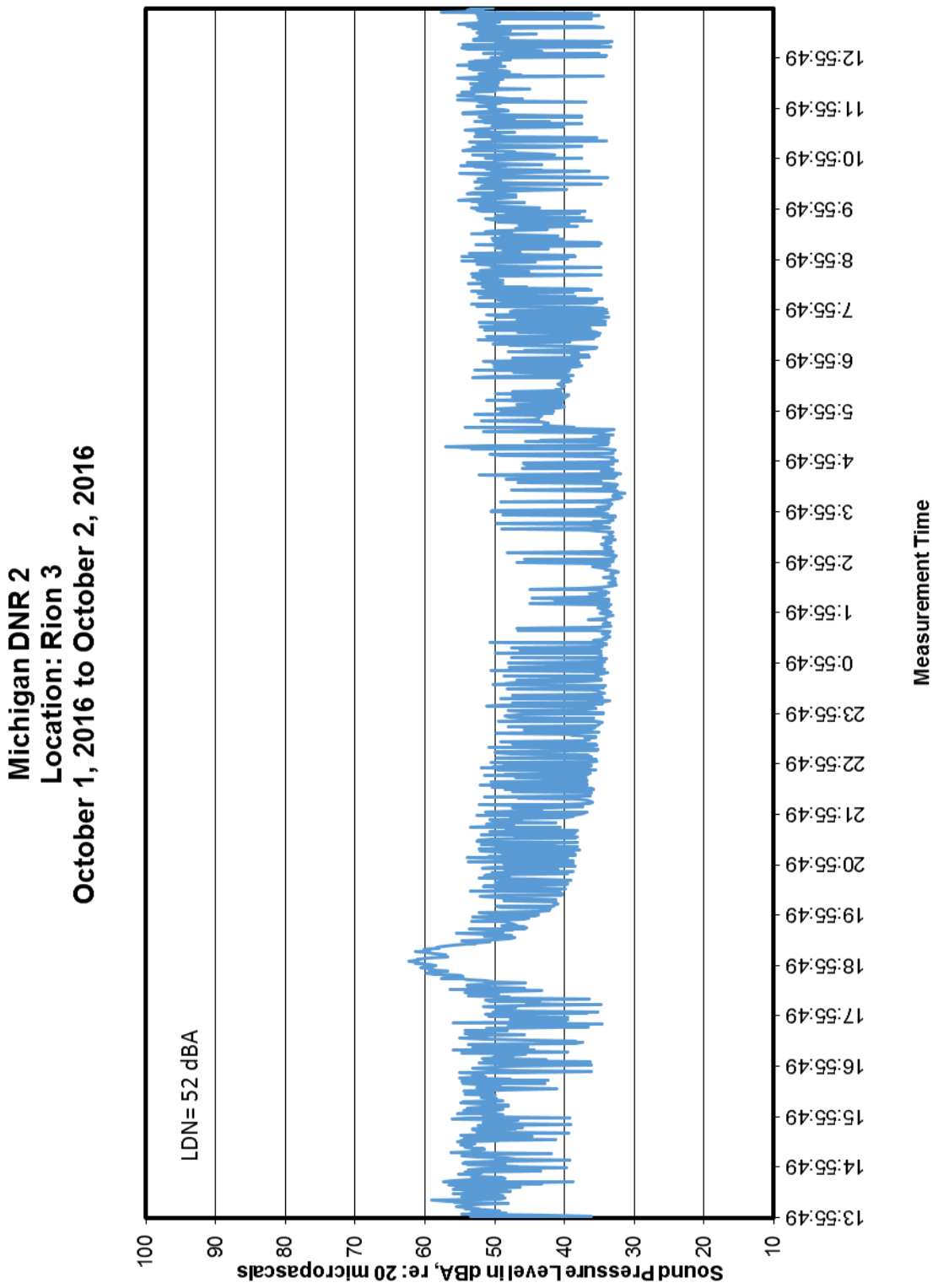

Michigan DNR 2
Location: Rion 3
September 26, 2016 to September 27, 2016
LDN= 56 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
10
Measurement Time
14:06:46
15:06:46
16:06:46
17:06:46
18:06:46
19:06:46
20:06:46
21:06:46
22:06:46
23:06:46
0:06:46
1:06:46
2:06:46
3:06:46
4:06:46
5:06:46
6:06:46
7:06:46
8:06:46
9:06:46
10:06:46
11:06:46
12:06:46
13:06:46

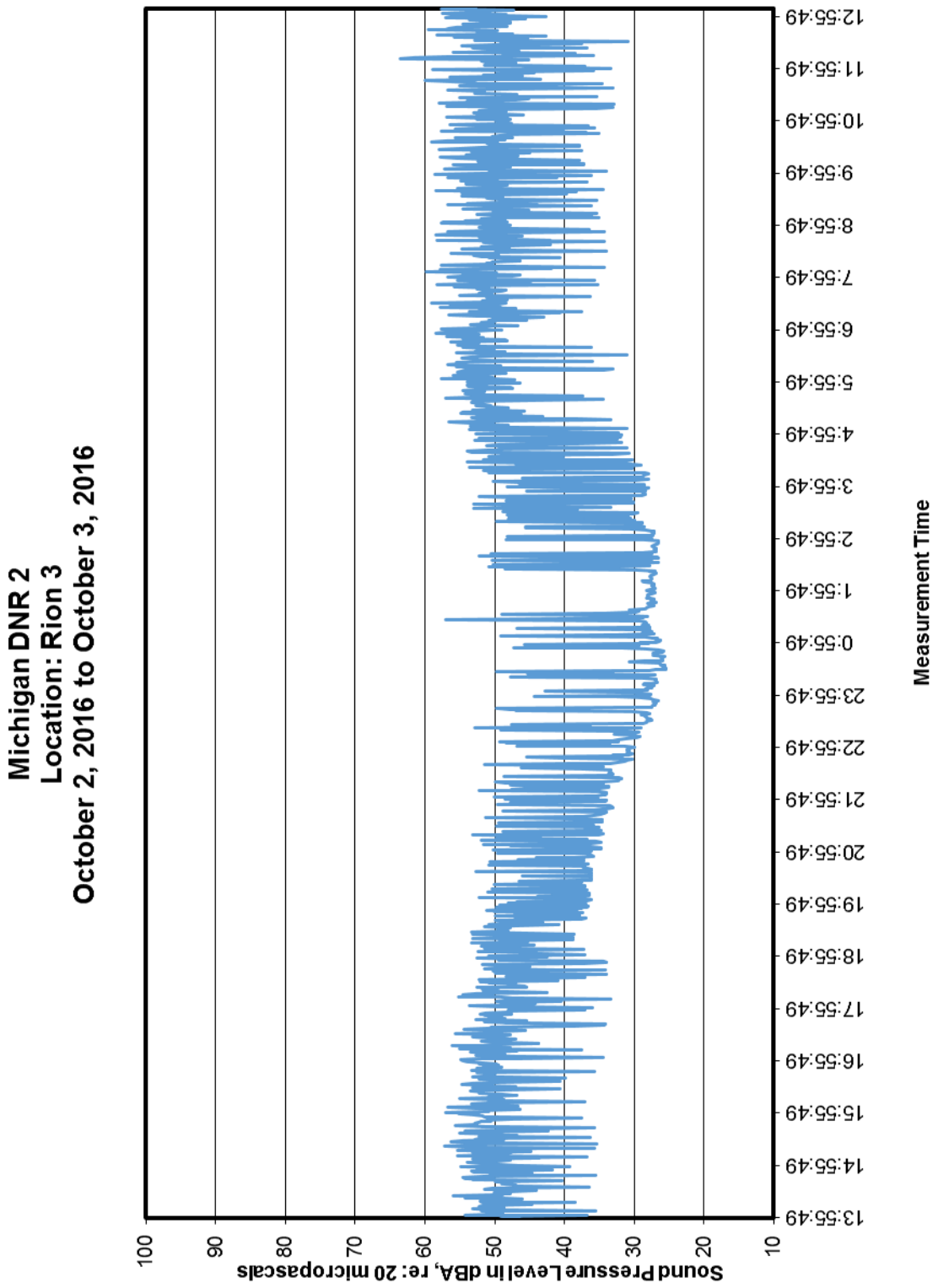

Michigan DNR 2
Location: Rion 3
September 27, 2016 to September 28, 2016
LDN= 56 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
10
Measurement Time
14:06:46
15:06:46
16:06:46
17:06:46
18:06:46
19:06:46
20:06:46
21:06:46
22:06:46
23:06:46
0:06:46
1:06:46
2:06:46
3:06:46
4:06:46
5:06:46
6:06:46
7:06:46
8:06:46
9:06:46
10:06:46
11:06:46
12:06:46
13:06:46

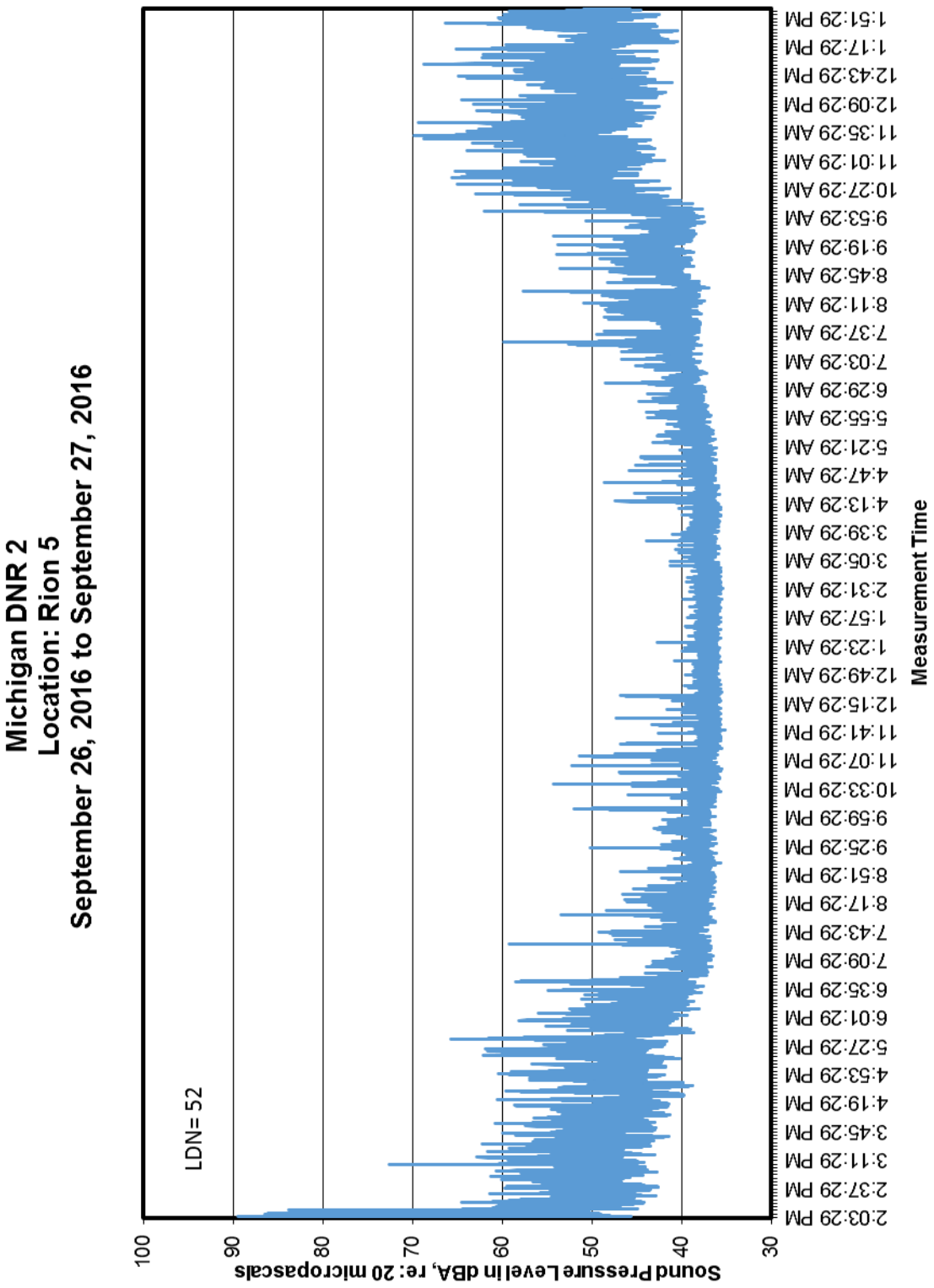

Michigan DNR 2
Location: Rion 3
September 28, 2016 to September 29, 2016
LDN= 58 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
10
Measurement Time
13:55:49
14:55:49
15:55:49
16:55:49
17:55:49
18:55:49
19:55:49
20:55:49
21:55:49
22:55:49
23:55:49
0:55:49
1:55:49
2:55:49
3:55:49
4:55:49
5:55:49
6:55:49
7:55:49
8:55:49
9:55:49
10:55:49
11:55:49
12:55:49

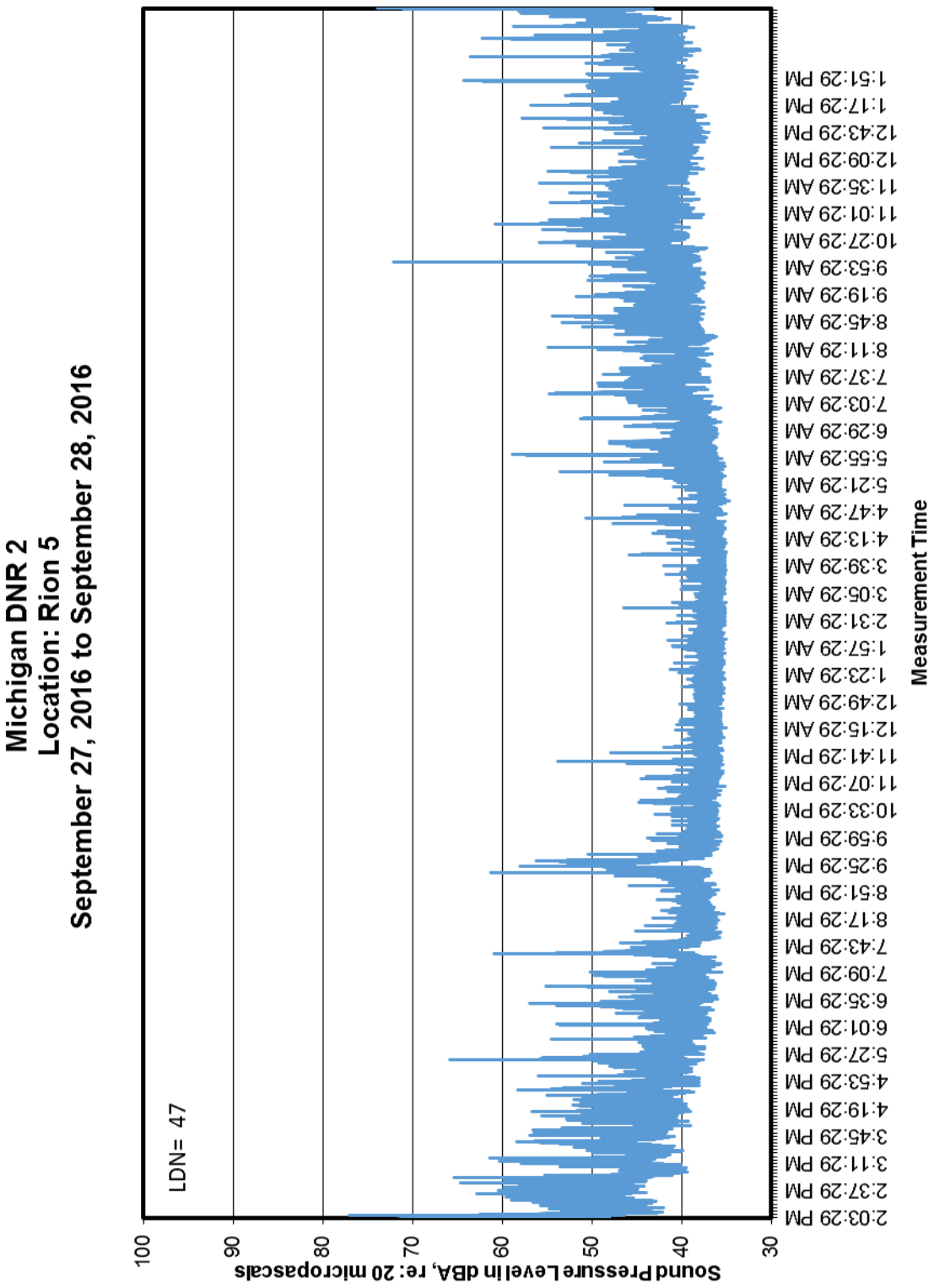

Michigan DNR 2
Location: Rion 3
September 29, 2016 to September 30, 2016
LDN= 57 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
10
Measurement Time
13:55:49
14:55:49
15:55:49
16:55:49
17:55:49
18:55:49
19:55:49
20:55:49
21:55:49
22:55:49
23:55:49
0:55:49
1:55:49
2:55:49
3:55:49
4:55:49
5:55:49
6:55:49
7:55:49
8:55:49
9:55:49
10:55:49
11:55:49
12:55:49

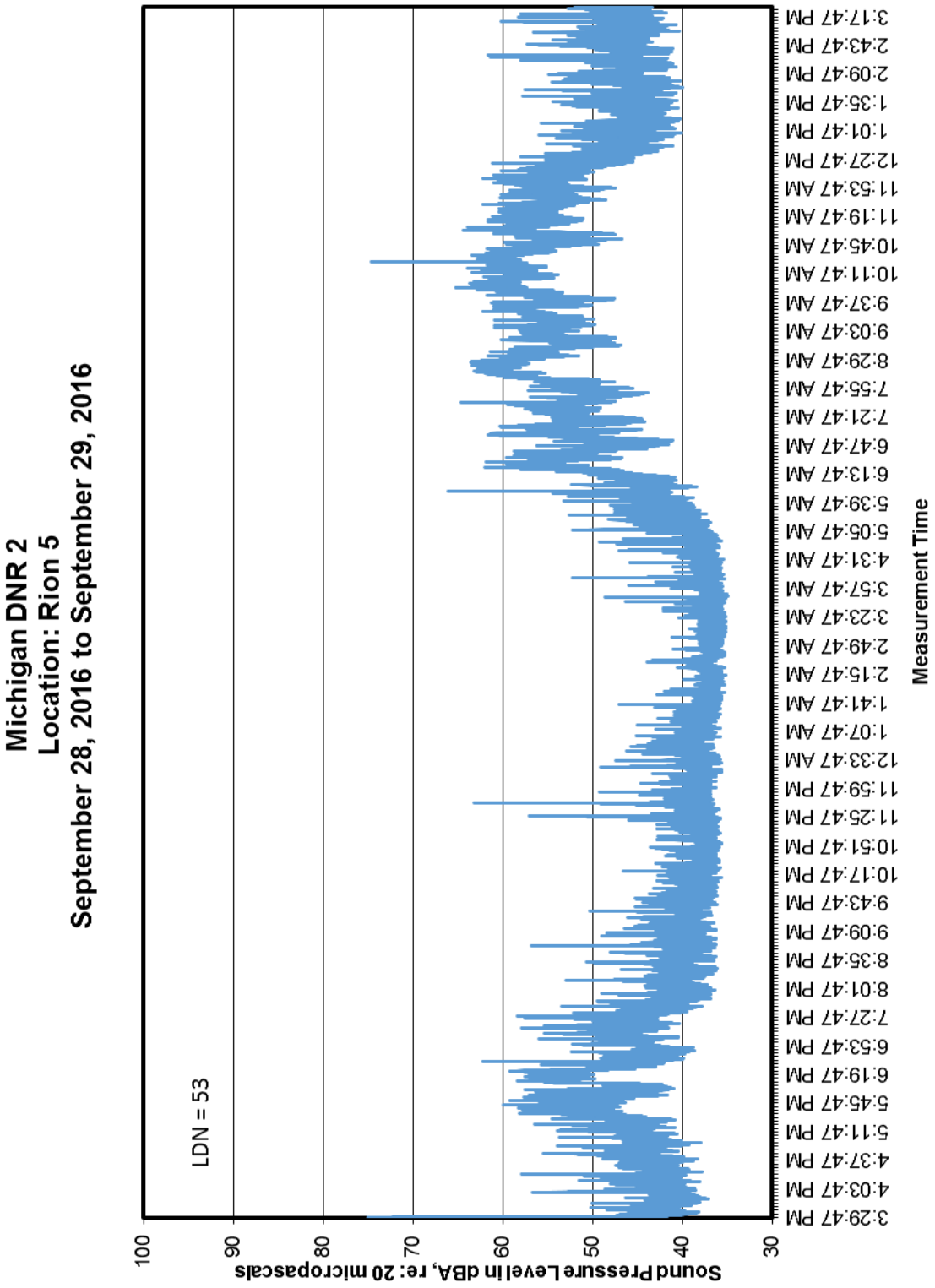

Michigan DNR 2
Location: Rion 3
September 30, 2016 to October 1, 2016
LDN= 57 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
10
Measurement Time
13:55:49
14:55:49
15:55:49
16:55:49
17:55:49
18:55:49
19:55:49
20:55:49
21:55:49
22:55:49
23:55:49
0:55:49
1:55:49
2:55:49
3:55:49
4:55:49
5:55:49
6:55:49
7:55:49
8:55:49
9:55:49
10:55:49
11:55:49
12:55:49

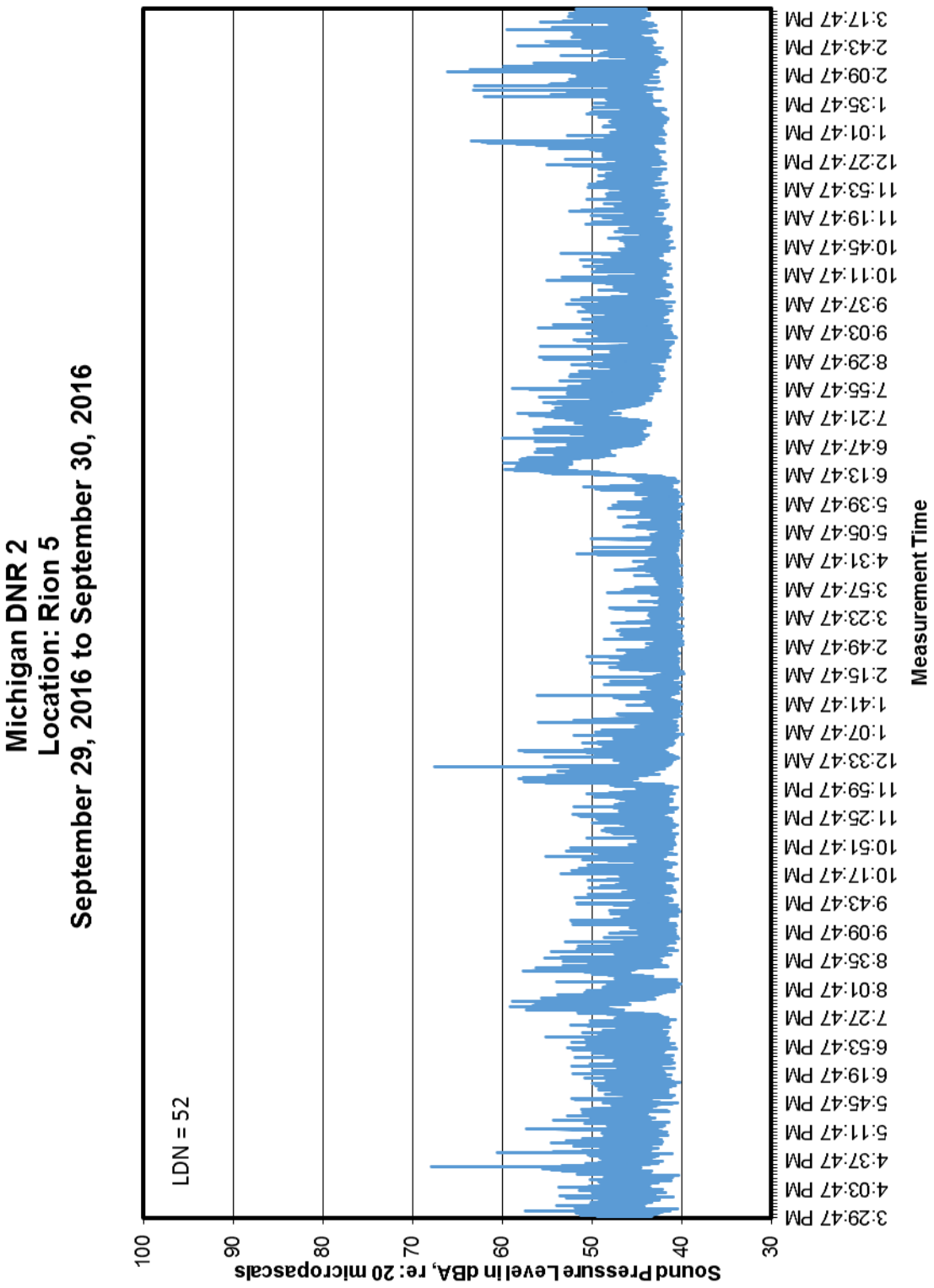

Michigan DNR 2
Location: Rion 3
October 1, 2016 to October 2, 2016
LDN= 52 dBA
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
10
Measurement Time
13:55:49
14:55:49
15:55:49
16:55:49
17:55:49
18:55:49
19:55:49
20:55:49
21:55:49
22:55:49
23:55:49
0:55:49
1:55:49
2:55:49
3:55:49
4:55:49
5:55:49
6:55:49
7:55:49
8:55:49
9:55:49
10:55:49
11:55:49
12:55:49

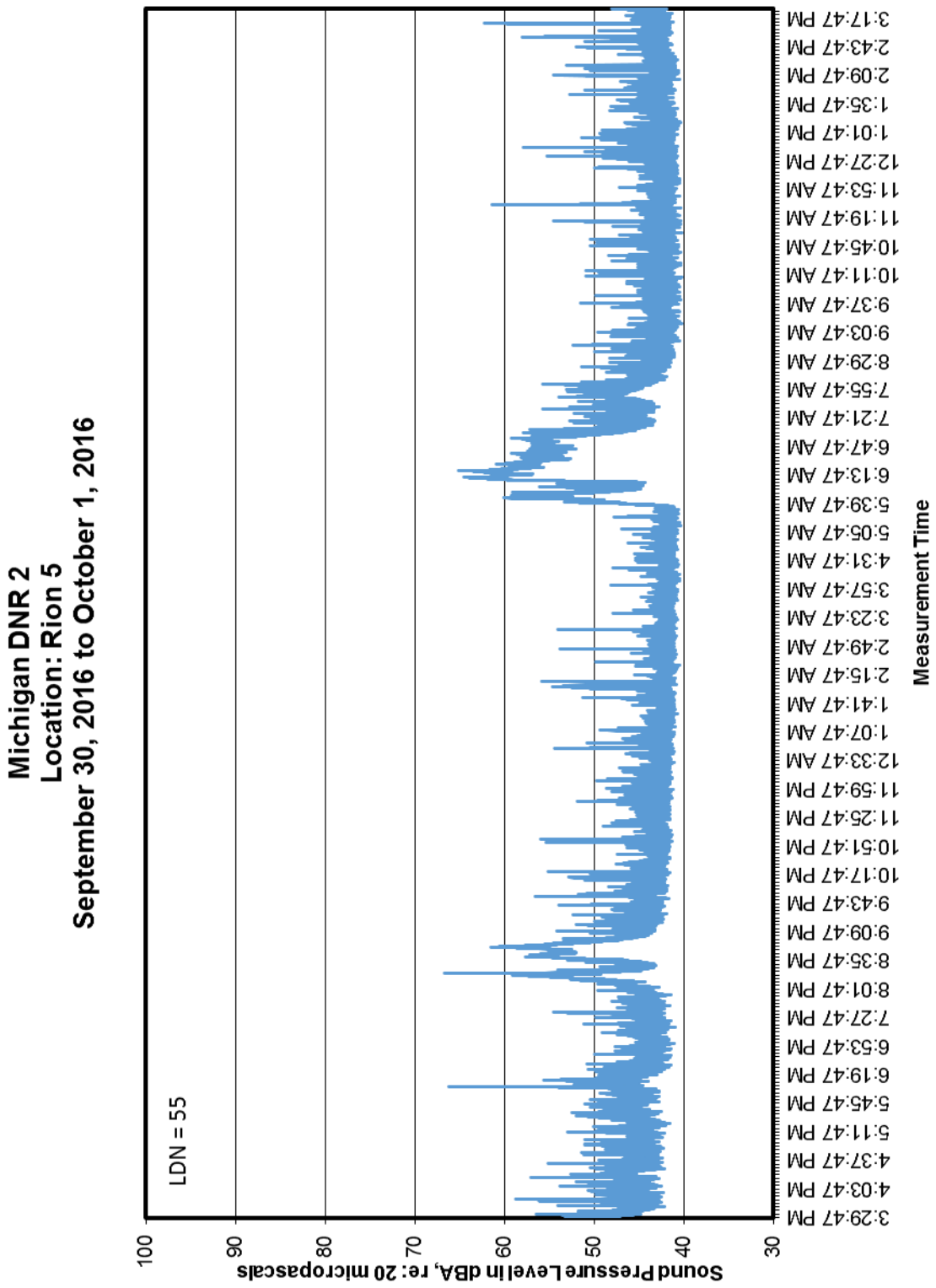

Michigan DNR 2
Location: Rion 3
October 2, 2016 to October 3, 2016
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
20
10
Measurement Time
13:55:49
14:55:49
15:55:49
16:55:49
17:55:49
18:55:49
19:55:49
20:55:49
21:55:49
22:55:49
23:55:49
0:55:49
1:55:49
2:55:49
3:55:49
4:55:49
5:55:49
6:55:49
7:55:49
8:55:49
9:55:49
10:55:49
11:55:49
12:55:49

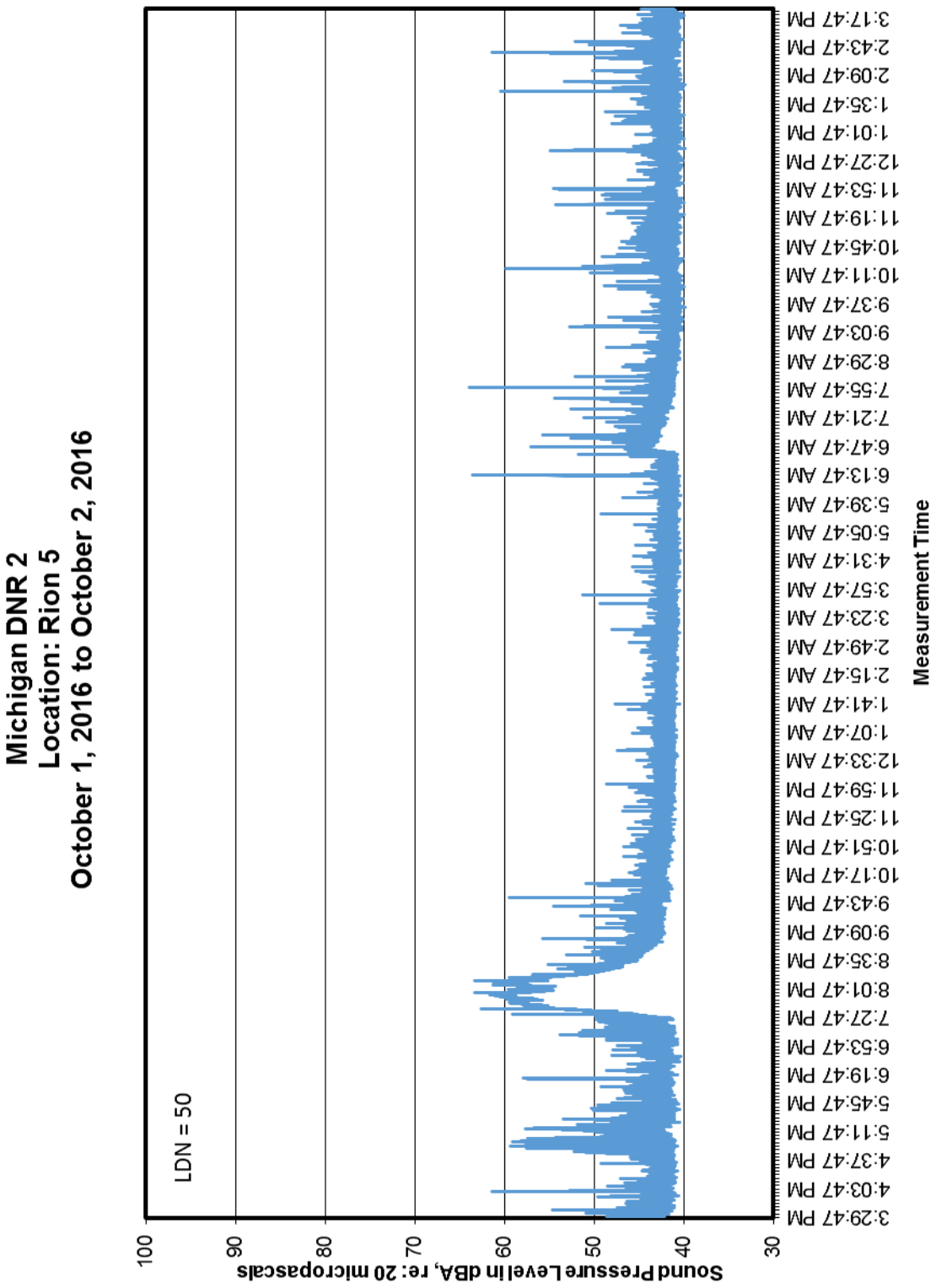

Michigan DNR 2
Location: Rion 5
September 26, 2016 to September 27, 2016
LDN= 52
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
Measurement Time
2:03:29 PM
2:37:29 PM
3:11:29 PM
3:45:29 PM
4:19:29 PM
4:53:29 PM
5:27:29 PM
6:01:29 PM
6:35:29 PM
7:09:29 PM
7:43:29 PM
8:17:29 PM
8:51:29 PM
9:25:29 PM
9:59:29 PM
10:33:29 PM
11:07:29 PM
11:41:29 PM
12:15:29 AM
12:49:29 AM
1:23:29 AM
1:57:29 AM
2:31:29 AM
3:05:29 AM
3:39:29 AM
4:13:29 AM
4:47:29 AM
5:21:29 AM
5:55:29 AM
6:29:29 AM
7:03:29 AM
7:37:29 AM
8:11:29 AM
8:45:29 AM
9:19:29 AM
9:53:29 AM
10:27:29 AM
11:01:29 AM
11:35:29 AM
12:09:29 PM
12:43:29 PM
1:17:29 PM
1:51:29 PM


Michigan DNR 2
Location: Rion 5
September 27, 2016 to September 28, 2016
LDN= 47
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
Measurement Time
2:03:29 PM
2:37:29 PM
3:11:29 PM
3:45:29 PM
4:19:29 PM
4:53:29 PM
5:27:29 PM
6:01:29 PM
6:35:29 PM
7:09:29 PM
7:43:29 PM
8:17:29 PM
8:51:29 PM
9:25:29 PM
9:59:29 PM
10:33:29 PM
11:07:29 PM
11:41:29 PM
12:15:29 AM
12:49:29 AM
1:23:29 AM
1:57:29 AM
2:31:29 AM
3:05:29 AM
3:39:29 AM
4:13:29 AM
4:47:29 AM
5:21:29 AM
5:55:29 AM
6:29:29 AM
7:03:29 AM
7:37:29 AM
8:11:29 AM
8:45:29 AM
9:19:29 AM
9:53:29 AM
10:27:29 AM
11:01:29 AM
11:35:29 AM
12:09:29 PM
12:43:29 PM
1:17:29 PM
1:51:29 PM


Michigan DNR 2
Location: Rion 5
September 28, 2016 to September 29, 2016
LDN = 53
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
Measurement Time
3:29:47 PM
4:03:47 PM
4:37:47 PM
5:11:47 PM
5:45:47 PM
6:19:47 PM
6:53:47 PM
7:27:47 PM
8:01:47 PM
8:35:47 PM
9:09:47 PM
9:43:47 PM
10:17:47 PM
10:51:47 PM
11:25:47 PM
11:59:47 PM
12:33:47 AM
1:07:47 AM
1:41:47 AM
2:15:47 AM
2:49:47 AM
3:23:47 AM
3:57:47 AM
4:31:47 AM
5:05:47 AM
5:39:47 AM
6:13:47 AM
6:47:47 AM
7:21:47 AM
7:55:47 AM
8:29:47 AM
9:03:47 AM
9:37:47 AM
10:11:47 AM
10:45:47 AM
11:19:47 AM
11:53:47 AM
12:27:47 PM
1:01:47 PM
1:35:47 PM
2:09:47 PM
2:43:47 PM
3:17:47 PM


Michigan DNR 2
Location: Rion 5
September 29, 2016 to September 30, 2016
LDN = 52
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
Measurement Time
3:29:47 PM
4:03:47 PM
4:37:47 PM
5:11:47 PM
5:45:47 PM
6:19:47 PM
6:53:47 PM
7:27:47 PM
8:01:47 PM
8:35:47 PM
9:09:47 PM
9:43:47 PM
10:17:47 PM
10:51:47 PM
11:25:47 PM
11:59:47 PM
12:33:47 AM
1:07:47 AM
1:41:47 AM
2:15:47 AM
2:49:47 AM
3:23:47 AM
3:57:47 AM
4:31:47 AM
5:05:47 AM
5:39:47 AM
6:13:47 AM
6:47:47 AM
7:21:47 AM
7:55:47 AM
8:29:47 AM
9:03:47 AM
9:37:47 AM
10:11:47 AM
10:45:47 AM
11:19:47 AM
11:53:47 AM
12:27:47 PM
1:01:47 PM
1:35:47 PM
2:09:47 PM
2:43:47 PM
3:17:47 PM


Michigan DNR 2
Location: Rion 5
September 30, 2016 to October 1, 2016
LDN = 55
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
Measurement Time
3:29:47 PM
4:03:47 PM
4:37:47 PM
5:11:47 PM
5:45:47 PM
6:19:47 PM
6:53:47 PM
7:27:47 PM
8:01:47 PM
8:35:47 PM
9:09:47 PM
9:43:47 PM
10:17:47 PM
10:51:47 PM
11:25:47 PM
11:59:47 PM
12:33:47 AM
1:07:47 AM
1:41:47 AM
2:15:47 AM
2:49:47 AM
3:23:47 AM
3:57:47 AM
4:31:47 AM
5:05:47 AM
5:39:47 AM
6:13:47 AM
6:47:47 AM
7:21:47 AM
7:55:47 AM
8:29:47 AM
9:03:47 AM
9:37:47 AM
10:11:47 AM
10:45:47 AM
11:19:47 AM
11:53:47 AM
12:27:47 PM
1:01:47 PM
1:35:47 PM
2:09:47 PM
2:43:47 PM
3:17:47 PM


Michigan DNR 2
Location: Rion 5
October 1, 2016 to October 2, 2016
LDN = 50
Sound Pressure Level in dBA, re: 20 micropascals
100
90
80
70
60
50
40
30
Measurement Time
3:29:47 PM
4:03:47 PM
4:37:47 PM
5:11:47 PM
5:45:47 PM
6:19:47 PM
6:53:47 PM
7:27:47 PM
8:01:47 PM
8:35:47 PM
9:09:47 PM
9:43:47 PM
10:17:47 PM
10:51:47 PM
11:25:47 PM
11:59:47 PM
12:33:47 AM
1:07:47 AM
1:41:47 AM
2:15:47 AM
2:49:47 AM
3:23:47 AM
3:57:47 AM
4:31:47 AM
5:05:47 AM
5:39:47 AM
6:13:47 AM
6:47:47 AM
7:21:47 AM
7:55:47 AM
8:29:47 AM
9:03:47 AM
9:37:47 AM
10:11:47 AM
10:45:47 AM
11:19:47 AM
11:53:47 AM
12:27:47 PM
1:01:47 PM
1:35:47 PM
2:09:47 PM
2:43:47 PM
3:17:47 PM

Appendix U:

Staffing and Qualifications

FIRM QUALIFICATIONS

Siebein Associates, Inc. established in 1981 in Gainesville, Florida is a leading acoustical consulting firm that specializes in sound assessment and analysis for shooting ranges and noise mitigation design for facilities using a variety of small arms, heavy weapons, field measurement; research; development of computer programs; and design of state, federal, public, and military and police training facilities. This has included work for firing ranges around the world for the US military, federal agencies such as the FBI, Capitol Police and FLETC as well as police training and privately owned ranges. We have also conducted research on firearms noise measurement and mitigation for the National Rifle Association and the National Science Foundation.

The firm has worked on over 1900 projects worldwide and is very experienced with work on police and recreational shooting facilities in the vicinity of residential neighborhoods. We have also worked with a number of municipalities to develop noise ordinances, participated in public hearings for noise impact related work, and worked on ANSI and ASTM committees to draft acoustical standards. Measurement, modeling and prediction of noise levels from impulsive sounds like gun fire in complex environments using field measures, computer models, and auralizations is a particular strength of the firm.

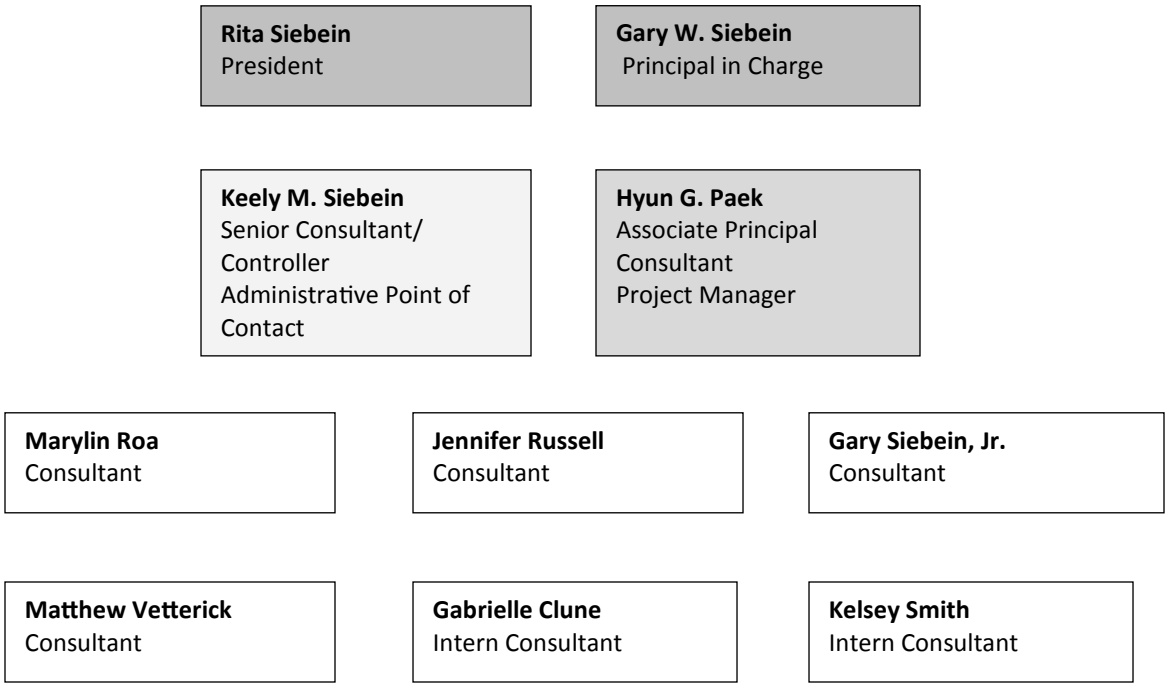


Figure 1. Organizational Chart

Table 1. Staff Roles and Responsibilities

Name	Role	Responsibility
Gary W. Siebein, FASA, FAIA	Principal-in-Charge	Experimental Design Field Measurements Quality Control Review of Work
Hyun Paek, ASA, INCE	Project Manager	Experimental Design Field Measurements Manage Data Analysis and Report Production
Keely Siebein, ASA, INCE	Administrative Point of Contact	Qualification and Proposal Preparation, Data Review
Gary Siebein, Jr., CTS	Environmental Noise Measurement, Consultant	Project Data Analysis and Field Measurements
Jennifer Russell, Assoc. AIA, ASA	Environmental Noise Measurement, Consultant	Project Data Analysis and Field Measurements
Marylin Roa, Assoc. AIA, ASA	Consultant	Project Data Analysis and Technical Assistance with Report Preparation
Matthew Vetterick, Assoc. AIA, ASA	Consultant	Technical Assistance with Report Preparation
Gabrielle Clune	Intern Consultant	Technical Assistance with Report Preparation
Kelsey Smith	Intern Consultant	Technical Assistance with Report Preparation

SELECTED PROJECT EXPERIENCE

ASYMMETRIC WARFARE GROUP INDOOR FIRING RANGE

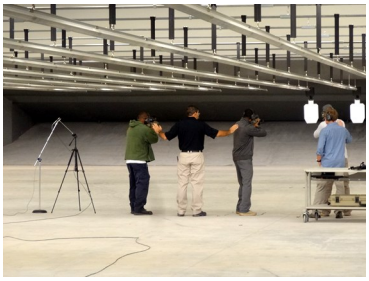
Fort AP Hill, Virginia

Siebein Associates, Inc. consultants constructed a state-of-the-art acoustical measurement instrumentation system in house to conduct short term acoustical measurements of overall-A-weighted and Z-weighted sound levels produced by firearms operations at the AWG 50M Indoor Range at Fort AP Hill. The measurements were taken as part of a study to validate the effectiveness of custom sound absorbent materials in firing ranges.

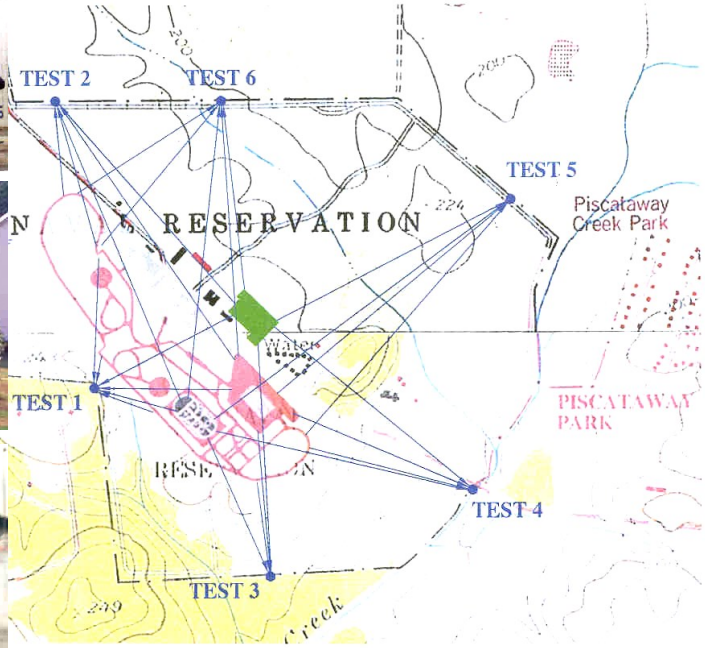
Prior to the installation of the acoustics panels, Siebein Associates consultants took acoustical measurements at four different locations inside the AWG Firing Range from three shooters firing three rounds in succession from M9 Beretta 9mm handguns, M4 Colt 5.56 rifles, and MK11 Mod 0, 7.62 caliber rifles. Three microphones with preamplifiers were placed two lanes over from the shooters at 15, 25, and 50 meters from the targets to record the sound levels. Additionally, a high pressure microphone was placed three meters from the shooters along with another high pressure microphone with preamplifier that was connected to a CESVA sound level meter.

The high pressure microphone that was not recording to the CESVA was connected to an 8 Channel Data Acquisition System along with the three microphones. The data acquisition system digitized the data and transferred it to a laptop computer that acquired the four channels of data using Multi-Track Recording software.

To complete the study, the consultants traveled back to Fort AP Hill after the acoustical treatments had been applied inside the AWG Range and conducted identical tests that proved the addition of the sound absorbent material was successful in significantly reducing the sound levels.



SELECTED PROJECT EXPERIENCE

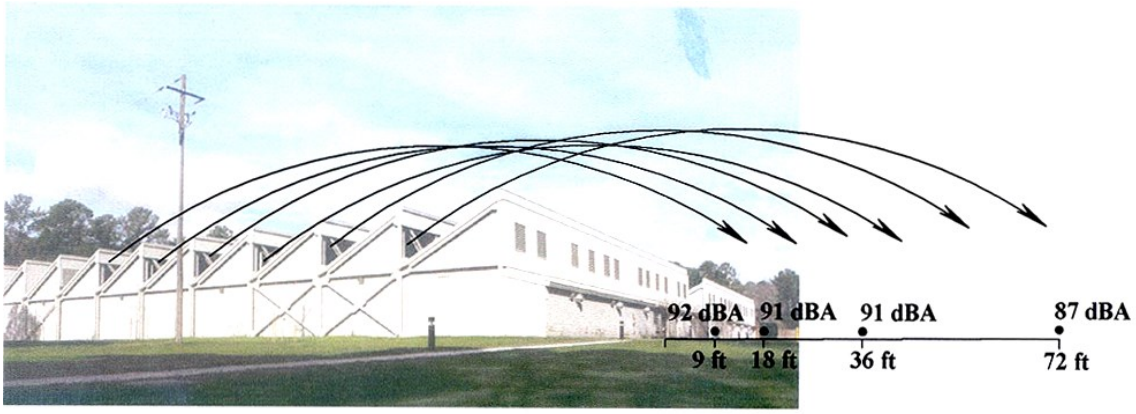


FEDERAL LAW ENFORCEMENT TRAINING CENTER (FLETC)

Cheltenham, Maryland

Siebein Associates conducted a sound assessment and noise analysis for new enclosed firing ranges and driving training facilities on nearby communities. Noise measurement levels were taken at over 40 locations in the community and the existing sonic environment was characterized using a combination of quantitative metrics such as Ldn's and soundscape terms. Field measurements were conducted of long term sound levels and individual event levels for firearms training at multiple indoor, partially enclosed and outdoor firing ranges at an existing facility. The data was used as source data in computer model studies using the SA Environmental Noise Analysis program of noise impacts from a number of design alternatives. The field measurements were also made at distances away from the sources that would be found at the proposed facility as a method to calibrate the model studies. A variety of mitigation options were explored and recommendations presented.

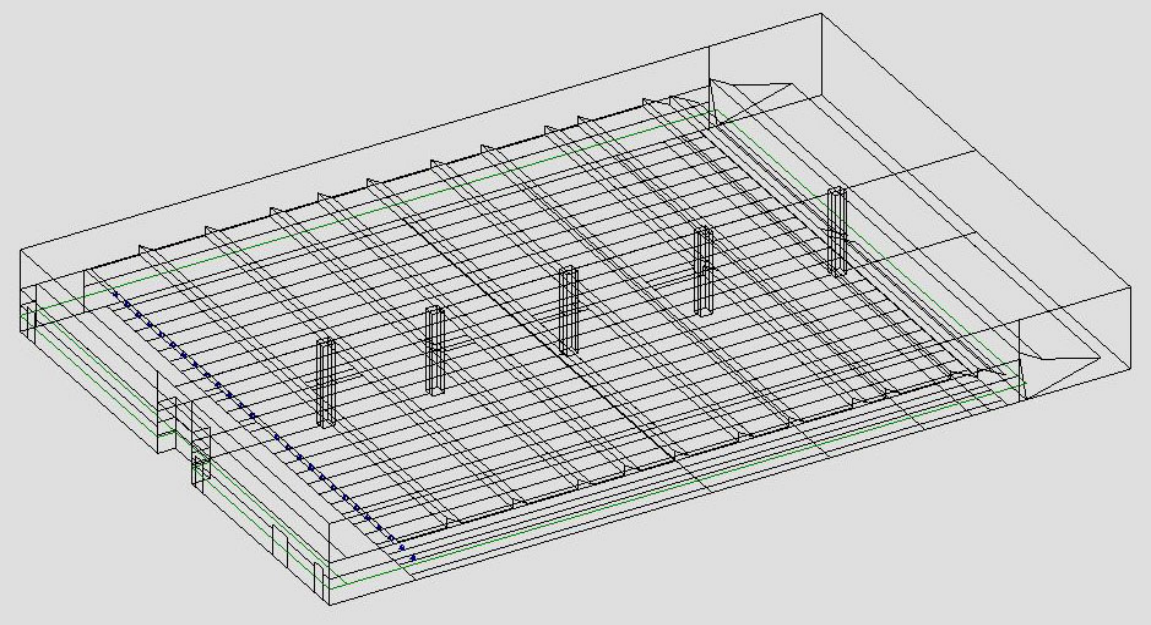
SELECTED PROJECT EXPERIENCE



FEDERAL LAW ENFORCEMENT TRAINING CENTER (FLETC)
Brunswick, Georgia

Siebein Associates conducted a sound assessment and noise analysis new partially enclosed firing ranges on near by communities. Long term sound levels were recorded at critical locations in the community where complaints had been received. Detailed measurements of individual training events were also made both close to the source and in the neighborhoods. These data were used in computer model studies using the SA Environmental Noise Analysis program of design alternatives including range location, orientation, materials and baffling systems. Physical scale models were also built of design options for the partially enclosed ranges to study the directional effects of sound diffracted out through the openings into the community. The effects of moving the sound sources to different firing positions within the range was found to account for much of the variability in acoustical measurements made in the neighborhood in previous studies. Recommendations for to minimize noise propagation into the neighborhood were presented and constructed.

SELECTED PROJECT EXPERIENCE



FEDERAL LAW ENFORCEMENT TRAINING CENTER (FLETC)
Charleston, South Carolina

Siebein Associates provided sound analysis and acoustical design recommendations for indoor firing ranges in Charleston, South Carolina. Mitigation to increase sound absorption and reduce harmful noise propagation was provided. A three-dimensional acoustic computer model was constructed to study sound propagation as shown in the Figure above.

SELECTED PROJECT EXPERIENCE

FBI FIRING RANGE ACOUSTICAL STUDY
Quantico, Virginia

Siebein Associates conducted a comprehensive evaluation of acoustic problems in large indoor/outdoor firing ranges; monitoring of OSHA noise exposure for instructors and students; development of software systems to evaluate hearing conservation issues from high-energy impulse noise from firearms; and integrated acoustical mitigation design for ranges with architectural, air-flow and lead abatement consultants.

SELECTED PROJECT EXPERIENCE

OKINAWA FIRING RANGE NOISE IMPACT STUDY
Okinawa, Japan

Siebein Associates conducted a sound assessment and analysis for expansion of range activities and construction for new ranges. Design criteria for off-site noise propagation were established by the military. The ranges were to be used for Special Forces firearms training activities. A combination of acoustical measurements at similar training facilities, computer model studies of proposed activities, and model calibration studies conducted in the field were used to evaluate proposed designs. Acoustical measurements of typical busy day training activities were recorded at for Army Special Forces operations at an existing facility. The acoustical data from the actual training activities were used in 4 different computer models to estimate sound levels at various locations around the proposed facility as affected by distance, topography and vegetation. Sophisticated military noise prediction programs were also used to independently estimate noise contours based on the projected number of personnel, rounds per day and weapons used in the training exercises. Methods to reduce sound levels were evaluated as well in a series of optimization studies.

SELECTED PROJECT EXPERIENCE

CITY OF VIRGINIA BEACH FIRING RANGE
Virginia Beach, Virginia

Siebein Associates worked with city and police personnel, and residents to conduct a sound assessment and analysis of existing firing range noise on nearby communities. A computer model study was constructed using the SA Environmental Analysis program of design alternatives to provide recommendations for mitigation.

SELECTED PROJECT EXPERIENCE

MAUMEE POLICE AND FIRE TRAINING FACILITY
Maumee, Ohio

Siebein Associates conducted a sound assessment and analysis for the proposed Maumee Fire and Police Training Facility to determine the noise impact of firearms training activities on the surrounding communities. Acoustic measurements were made at the proposed site and in the surrounding community of police officers firing shotguns and pistols at the site of the proposed Firing Range. Noise mitigation strategies were presented.

SELECTED PROJECT EXPERIENCE

BLALOCK LAKES CLAY PIGEON RANGE NOISE STUDY

Blalock, Georgia

Siebein Associates, Inc. conducted a sound assessment and analysis to determine noise mitigation strategies to reduce noise associated with clay pigeon shooting events at an adjoining residential property.

SELECTED PROJECT EXPERIENCE

UNITED STATES CAPITOL POLICE PRACTICAL APPLICATIONS CENTER

Cheltenham, Maryland

Siebein Associates conducted a sound assessment and analysis to establish acoustical design criteria for background noise levels from building and simulation equipment; selection of room finish materials; sound isolation between critical spaces; acoustical measurements and analysis to determine occupational hearing loss issues relative to the range usage by instructors and students during firearms training.

SELECTED PROJECT EXPERIENCE

CASEYVILLE RIFLE AND PISTOL CLUB
Masacoutah, Illinois

Constructed a computer model for proposed shooting range to produce noise contours for the projected number and types of weapons to be used at the new range.

MONTGOMERY COUNTY WEAPONS TRAINING CENTER
Conshohcken, Pennsylvania

Conducted acoustical analysis and design recommendations to reduce noise from gun fire within the firing range and reduce the transfer of gun fire noise to the Fire Academy classrooms and adjoining properties.

ROCKVILLE POLICE ACADEMY FIRING RANGE
Rockville, Maryland

Conducted acoustical analysis and design recommendations for the construction of a new firing range to allow for simultaneous use with adjacent offices and nearby classrooms. Acoustical measurements were taken of firearms training in the existing range to estimate noise impact at nearby receiver properties and to recommend acoustical upgrades to the construction of the building envelope.

AIS QUICK STUDY
Las Vegas, Nevada

Conducted acoustical analysis of sound levels of Quick Range structures in the Control Room and just outside the Range to determine compliance with the performance criteria based on OSHA and NIOSH permissible sound level limits. A computer model was constructed to study alternate range sizes to determine equivalent sound levels with substitute sizes and materials used for the ranges.

RHINO OUTDOOR OPEN GUN RANGE
Williston, Florida

Conducted sound assessment and analysis of shotgun blast noise from the Rhino Outdoors open gun range at the property line of adjacent and nearby residences and businesses to determine the extent to which the noise exceeds the noise level limit described in the Levy County Code of Ordinances.

SELECTED PROJECT EXPERIENCE

MARINE RECRUIT TRAINING FACILITY
Parris Island, South Carolina

Provided acoustical design of a U.S. Marine Corps Large Group Training Facility at Parris Island, South Carolina including room acoustic design, sound isolation for large public restrooms and mechanical equipment and interface with Marine audio-visual systems.

CITY OF PHOENIX POLICE TRAINING FACILITY
Phoenix, Arizona

Conducted acoustical analysis and design recommendations for existing outdoor and indoor firing ranges proposed for a major expansion of this large facility in suburban Phoenix.

DUVAL COUNTY SHERIFF'S OFFICE FIRING RANGE NOISE IMPACT STUDY
Jacksonville, Florida

Conducted acoustical measurements at existing indoor and outdoor firing ranges. Determined existing and future noise impact for expansion of outdoor ranges. Investigated enclosed and partially enclosed options for range development to minimize noise impact on nearby residences.

MANASSAS PARK NEW POLICE STATION INDOOR SHOOTING RANGE
Manassas Park, Virginia

Conducted acoustical analysis and design recommendations to reduce sound from fire arms in the firing range on the ground floor to offices above and to the side of the range. Conducted computer model studies using the SA Environmental Analysis program of design alternatives to proved recommendations for noise mitigation.

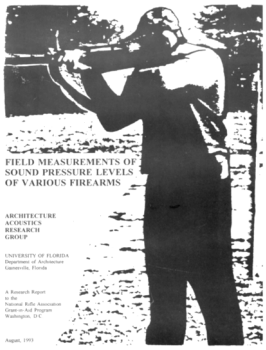
FLORIDA DEPARTMENT OF LAW ENFORCEMENT HEADQUARTERS
Tallahassee, Florida

Conducted acoustical measurements and design for indoor firing ranges located in close proximity to the Director's Office and other noise sensitive locations in this major headquarters facility for a large law enforcement agency.

SELECTED RELEVANT PUBLICATIONS

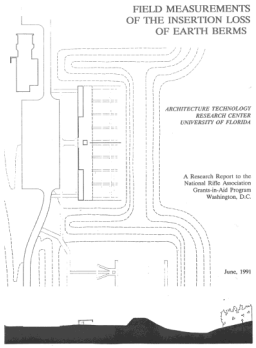
Field Measurements of Sound Pressure levels of Various Firearms

Research to document methods and a digital data acquisition system to record peak pressure levels, sound exposure levels and other metrics of interest produced by a variety of firearms. A catalog of peak pressure levels and octave band sound exposure levels for various firearms was produced to aid the NRA in assessing noise impacts of range facilities.



Field Measurement of the Insertion Loss of Earth Berms

Field measurements of the insertion loss of earth berms surrounding outdoor firing ranges were compared with estimates of insertion loss calculated by a variety of methods in the literature. Advantages and disadvantages of various computational methods and field measurement techniques were evaluated. Presented to the National Rifle Association.

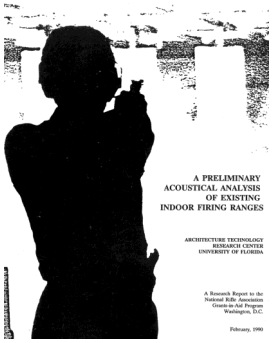


Preliminary Acoustical Analysis of Existing Indoor Firing Ranges

Research presented to the National Rifle Association (NRA) to document methods to accurately measure impulsive sounds produced by firearms; develop acoustical design guidelines for indoor firing ranges including transmission loss of wall, floor and ceiling assemblies and interior finish materials; and present case studies of the acoustical design of ranges.

"Project Design Phase Analysis Techniques to Evaluate the Acoustical Environment of Buildings and Listening to Buildings"

Developed a multi-channel digital data acquisition system to compute acoustical metrics based on impulse response theory to assess interior and exterior situations as part of 10 years of work. The system was used successfully in full size environments as diverse as concert halls, construction sites and firing ranges. It was also used in scale model studies of interior acoustical qualities in concert halls and exterior sound propagation in police training facilities. Impulse responses acquired in the field were also convolved or mixed with recorded sounds to present aural simulations of sounds as they were heard in complex environments. Case studies comparing full size and scale model measurements in actual design situations were presented. Presented to the National Science Foundation.



RESUMES OF SENIOR STAFF

Gary W. Siebein, FASA, FAIA

Senior Principal Consultant

Gary W. Siebein has consulted for military and law enforcement training facilities for over 36 years. He has designed methods to accurately measure, model and predict the effects of impulsive sounds such as gunfire and demolition blasts associated with military and police training activities on adjoining properties as part of environmental assessment and ICUZ processes. He has worked with the military, federal, state and local law enforcement agencies to develop comprehensive cost effective noise management plans for training facilities. This work has included design of baffled ranges, fully enclosed ranges, conducting community workshops and large scale experiments on sites to demonstrate acoustic effects of noise mitigation, computer modeling of noise contours, and auralization of sounds as they are heard at neighboring properties. He consults with communities to develop practical noise ordinances and is currently serving on an ANSI working group to develop a model community noise ordinance. He also serves on ASTM Committee E33 on Environmental Acoustics which develops testing standards for building and environmental acoustics.

As Director of the Architecture Technology Research Center at the University of Florida, Professor Siebein implemented a long-term research agenda to provide a scientific basis for environmental and building acoustic design issues. He has directed multi-year, multi-disciplinary projects in the measurement, modeling and prediction and simulation of building and environmental acoustics under the sponsorship of NSF and other public and private clients. He has developed innovative multi-channel digital acoustical measurement systems for building and environmental acoustics, developed methods to qualitatively assess noise impacts, developed physical scale modeling systems for environmental and building acoustics, developed computer models for a variety of acoustic situations and used these techniques to solve difficult acoustical problems as a Principal Consultant on over 1900 projects.

RELEVANT PROJECT EXPERIENCE (Partial List)

- Aberdeen Firing Range, Aberdeen, MD
- AFETA Firing Range Noise Mitigation, Williamsburg, VA
- AIS Quick Range Study (Picatinny, NJ), Las Vegas, NV
- Albemarle Firing Range, Roanoke, VA
- Albemarle Public Safety Training Facility - Phase 3: Indoor Firearms Range, Roanoke, VA
- Camp LeJeune USMC Firing Range, Camp LeJeune, NC
- Corp for Rifle Practice and Firearms Safety Talladega Range, Talladega, GA
- Dubuque County Sheriff's Range, Dubuque, IA
- Duncan Farms - Troy Acoustics, Tampa, FL
- Everglades Youth Camp Firing Range, Palm Beach, FL
- FBI Proposed 500 Yard Precision Rifle Deck Environmental Acoustic Assessment, Quantico, VA
- Fort AP Hill Indoor Firing Range, Fort AP Hill, VA
- Fort Lewis Special Forces (SOF) Indoor Firing Range, Fort Lewis, WA
- Loudon County Firing Range, Ashburn, VA
- Maxwell Air Force Base New Outdoor Baffled Firing Range, Montgomery, AL
- Michigan Department of Natural Resources:
  - Grand Traverse Shooting Range, Grand Traverse County, MI
  - Allegan & Barry State, Allegan & Barry Game Areas, MI
  - Lapeer Range, Grand Traverse County, MI
  - Marquette Range, Grand Traverse County, MI
- Navy SWG Firing Range, Norfolk, VA
- Omaha Firing Range, Omaha, NE
- Orlando Police Department Gun Range Noise Study, Orlando, FL
- Patrick AFB Firing Range, Patrick AFB, FL
- Pedlar Mountain Firing Range, Core, WV
- Special Weapons Assessment Facility, Crane, IN
- Tampa Police Department Firing Range, Tampa, FL
- Troy Acoustics General Instrumentation, Gainesville, FL
- US Marshal's Firing Range, Tallahassee, FL
- US Secret Service Firing Range (Washington DC), Washington, DC
- Zenith Quest Firing Range, Afton, VA

SIEBEIN ASSOCIATES

AREAS OF EXPERTISE

Soundscape planning and design, Environmental Noise; Architectural Acoustic Design of indoor and outdoor performance spaces; Mechanical System Noise & Vibration Control

EDUCATION

M.A. (Architecture), 1980
University of Florida

Bachelor of Architecture, 1978
Rensselaer Polytechnic Institute

B.S. (Building Science), 1972
Rensselaer Polytechnic Institute

REGISTRATION

Registered Architect:
Florida # 8846
Georgia #RA014816
NCARB # 86214

AFFILIATIONS

Fellow, American Institute of Architects
Fellow, Acoustical Society of America
Member: NCAC, ASTM, ASHRAE, NCARB

PROFESSIONAL EXPERIENCE

40+Years

CONTACT INFORMATION

625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 16
gsiebein@siebeinacoustic.com

Hyun G. Paek, ASA, INCE

Associate Principal Consultant

Hyun has studied and worked in the field of architectural acoustics, architecture, and building construction in various capacities for more than 22 years. He specializes in soundscape planning, architectural acoustical design, and environmental acoustics. Hyun focuses on visionary acoustics, ensuring the final design blends in as a part of the community.

Mr. Paek serves as a mentor to his colleagues, encouraging them to reach beyond the boundaries of the modern acoustical field and to find creative solutions of complex acoustical issues. Hyun has worked on over 800 projects worldwide. From this depth and breadth of knowledge comes an acute understanding of a variety of building types. This extensive experience also allows him to organize and supervise acoustical measurements that are critical to designing the soundscape. He is proficient at analyzing present and future noise impacts of sources. He has extensive experience in noise assessment, 3-D computer modeling and calibrations, planning and analysis of acoustical measurements, and monitoring of sound levels. He is proficient at analyzing present and future noise impacts of sources.

Hyun is deeply experienced in project management; proactively and successfully leading teams through each project phase, organizing, supervising, and analyzing the soundscape design. He enjoys the collaborative process of developing state of the art sonic environments and brings his professional expertise, mechanical capabilities, and aestheticism to every project.

He has written many papers on the subject of architectural acoustics and computer modeling systems and presented them at regional and national acoustics meetings. He also serves as a guest lecturer in graduate architectural acoustics courses at the University of Florida. He is a member of the Acoustical Society of America, the Institute of Noise Control Engineers, and the Florida Chapter Acoustical Society of America.

EXPERIENCE

- Associate Principal Consultant, Siebein Associates, Inc. 2014-present
- Senior Consultant, Siebein Associates, Inc. 2007-2014
- Consultant, Siebein Associates, Inc. 2000-2007
- Project Architect, Jeong Ik Architects and Engineers 1996-1997
- Project Architect, Ilkun C&C Architects 1994-1996

RELEVANT PROJECT EXPERIENCE (partial list)

- Aberdeen Firing Range, Aberdeen, MD
- AIS Quick Range Study (Picatinny, NJ), Las Vegas, NV
- Albemarle Firing Range, Roanoke, VA
- Albemarle Public Safety Training Facility - Phase 3: Indoor Firearms Range, Roanoke, VA
- Camp Lejeune USMC Firing Range, Camp Lejeune, NC
- Corp for Rifle Practice and Firearms Safety Talladega Range, Talladega, GA
- Dubuque County Sheriff's Range, Dubuque, IA
- Duncan Farms - Troy Acoustics, Tampa, FL
- FBI Proposed 500 Yard Precision Rifle Deck Environmental Acoustic Assessment, Quantico, VA
- Fort AP Hill Indoor Firing Range, Fort AP Hill, VA
- Fort Lewis Special Forces (SOF) Indoor Firing Range, Fort Lewis, WA
- Loudon County Firing Range, Ashburn, VA
- Maxwell Air Force Base New Outdoor Baffled Firing Range, Montgomery, AL
- Michigan Department of Natural Resources:
  - Grand Traverse Shooting Range, Grand Traverse County, MI
  - Allegan & Barry State, Allegan & Barry Game Areas, MI
  - Lapeer Range, Grand Traverse County, MI
  - Marquette Range, Grand Traverse County, MI
- Navy SWG Firing Range, Norfolk, VA
- Omaha Firing Range, Omaha, NE
- Patrick AFB Firing Range, Patrick AFB, FL
- Tampa Police Department Firing Range, Tampa, FL
- Troy Acoustics General Instrumentation, Gainesville, FL
- US Secret Service Firing Range, Washington, DC
- Zenith Quest Firing Range, Afton, VA

SIEBEIN ASSOCIATES

AREAS OF EXPERTISE

Architectural Acoustic Design
Mechanical System Noise & Vibration
Environmental Noise

EDUCATION

M.A. (Architecture), 1994
University of Pennsylvania

B.A. (Architectural Studies), 1992
University of Washington

B.S. (Building Construction) 1992
University of Washington

AFFILIATIONS

Member, Acoustical Society of America
Member, Florida Chapter Acoustical Society of America
Member, Institute of Noise Control Engineering
Member, American Society of Heating, Refrigerating & Air-Conditioning Engineers

PUBLICATIONS

Mr. Paek has written papers on the subject of architectural acoustics and computer modeling systems and has presented published papers at regional and national acoustics meetings. He has also served as a guest lecturer in architectural acoustics at the University of Florida.

CONTACT INFORMATION

625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 15
hpaek@siebeinacoustic.com

Keely M. Siebein, ASA, INCE

Senior Consultant

Keely has 15+ years' experience in acoustical research, technical field data collection and analysis, room acoustics, sound isolation and environmental acoustics. She has completed work on more than 200 projects for clients on a wide range of projects. She has completed research on natural, historic, and urban soundscapes, classroom acoustics, performance space acoustics, and performed critical analysis of acoustical standards.

Keely has worked on various building types including amusement park attractions, worship spaces, performance spaces, educational facilities, condominiums, and restaurant and dining facilities performing acoustical measurements, analysis, and design of the spaces. She has also worked on a number of environmental impact projects and traffic noise studies and has proficiency with acoustical modeling software such as CATT-Acoustic, Ecotect, TMN, and CadnaA. Keely's technical expertise is complimented by her sensitivity to design aesthetics and client needs, and she ensures there is open communication and collaboration among all parties involved with every project.

Keely is a member of the Acoustical Society of America and a member of the Florida chapter of the ASA. She received the Robert Bradford Newman award for excellence in architectural acoustical research in 2012. She was an Alternate Voting Representative for the Accredited Standards Committee on Noise – TAG TC 43/SC1 from 2009-2011.

EXPERIENCE

- Senior Consultant, Siebein Associates, Inc. 2016-present
- Consultant, Siebein Associates, Inc. 2009-2016
- Junior Consultant, Siebein Associates, Inc. 2002-2007
- Research Assistant, Siebein Associates, Inc. 1999-2002

RECOGNITION

- Robert Bradford Newman Award for Excellence in Architectural Acoustics 2012

RELEVANT EXPERIENCE (partial list)

- 82nd Airborne Headquarters Building, Fort Bragg, NC
- Albemarle Firing Range, Roanoke, VA
- Camp Lejeune USMC Firing Range, Camp Lejeune, NC
- Corp for Rifle Practice and Firearms Safety Talladega Range, Talladega, GA
- Everglades Youth Camp Firing Range, Palm Beach, FL
- FBI Proposed 500 Yard Precision Rifle Deck Environmental Acoustic Assessment, Quantico, VA
- FDOT_NE Regional Transportation Center Control Room
- Federal Air Marshals Firing Range Facility, Chicago, IL
- JPATS Naval Training Operations Facility, Milton, FL
- Michigan Department of Natural Resources Grand Traverse Shooting Range, Grand Traverse County, MI
- Omaha Firing Range, Omaha, NE
- Orlando Police Department Gun Range Noise Study, Orlando, FL
- Patrick AFB Firing Range, Patrick AFB, FL
- Tampa Police Department Firing Range, Tampa, FL
- Troy Acoustics General Instrumentation, Gainesville, FL
- Zenith Quest Firing Range, Afton, VA

PROFESSIONAL EXPERIENCE

15+ Years

AREAS OF EXPERTISE

Architectural Acoustic Design
Environmental Noise

EDUCATION

Master of Architectural Acoustics (2012)
University of Florida, *cum laude*

Bachelor of Arts in Theater (2007)
University of Florida, *cum laude*

AFFILIATIONS

Member, Acoustical Society of America
Member, Florida Chapter ASA
Member, COST
Member, INCE
ASC Noise – TAG TC 43/SC1: Alternate Voting Representative 2009-2011

PUBLICATIONS

Ms. Siebein has coauthored papers on natural soundscapes and classroom acoustics and has been invited to present them at regional and national ASA meetings.

CONTACT INFORMATION

625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 25
ksiebein@siebeinacoustic.com

Gary Siebein Jr., CTS

Consultant

Gary has over 9 years' experience consulting with Siebein Associates and has worked on more than 200 projects. He is a member of Siebein Associate's A/V Design Team where his expertise in sound system and A/V design allows him to design functional and practical sound, audio and video systems in performing arts centers, religious facilities, educational facilities, theme parks and many other building types.

Gary is also a key member of our environmental noise team, leading many environmental noise impact studies in the field. His technical dexterity and extensive experience allow him to operate specialized equipment and advanced digital software under any conditions to gain insight into custom sound mitigation techniques and design solutions.

He is fluent on many sound level meters including meters by Larson Davis, B+K, Cesva, Rion and Ivie. He is proficient in architectural/acoustic software programs including AutoCAD, TNM, SARNAM, WinMLS, and EASE.

He has worked on various building types including worship spaces, performance halls, firing ranges, educational facilities, amusement park attractions, condominiums, and hospitals, as well as been involved on environmental impact projects and traffic noise studies.

EXPERIENCE

- Siebein Associates, Inc. - Consultant (2016 - present)
- Siebein Associates, Inc. - Technical Acoustic Specialist (2010 - 2016)
- Siebein Associates, Inc. – Junior Consultant (2008 - 2010)

RELEVANT PROJECT EXPERIENCE (partial list)

- Albemarle Firing Range, Roanoke, VA
- Camp Lejeune High School, Camp Lejeune, NC
- Camp Lejeune USMC Firing Range, Camp Lejeune, NC
- Dubuque County Sheriff's Range, Dubuque, IA
- Duncan Farms - Troy Acoustics, Tampa, FL
- Everglades Youth Camp Firing Range, Palm Beach, FL
- Fort AP Hill Indoor Firing Range, Fort AP Hill, VA
- JPATS Naval Training Operations Facility, Milton, FL
- Little Creek Navy Seal Firing Range, Norfolk, VA
- Loudon County Firing Range, Ashburn, VA
- Michigan Department of Natural Resources:
  - Grand Traverse Shooting Range, Grand Traverse County, MI
  - Allegan & Barry State, Allegan & Barry Game Areas, MI
  - Lapeer Range, Grand Traverse County, MI
  - Marquette Range, Grand Traverse County, MI
- Omaha Firing Range, Omaha, NE
- Patrick AFB Firing Range, Patrick AFB, FL
- Rowe Training Facility Phase V Classroom Building (US Army), Fort Bragg, NC
- Troy Acoustics General Instrumentation, Gainesville, FL
- Zenith Quest Firing Range, Afton, VA

PROFESSIONAL EXPERIENCE

9+ Years

AREAS OF EXPERTISE

Acoustical Measurements
Environmental Noise
Sound System Design

CERTIFICATIONS

Certified Technology Specialist (2017)
Audio Visual Technologist - Infocomm (2014)

AFFILIATIONS

Member, Florida Chapter of the Acoustical Society of America

CONTACT INFORMATION

625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 19
gary@siebeinacoustic.com

Marylin Roa, ASA, Assoc. AIA

Consultant

Marylin designs creative solutions to acoustical challenges faced in more than 30 project building types. The acoustical assessment of multiple project types allows her to be involved in the acoustical design of extreme quiet background noise level for recording studios to creating graphic acoustical 3-D modeling of loud noise generating sources to determine their noise impact on buildings and the environment. By being able to determine applicable regulations and ordinances for each project type, Marylin can interpret the acoustical measurements made on site as well as virtually on the computer models and provide recommendations that meet design criteria and provide comfortable acoustic environments.

Marylin's intuitive ability to visually space and sound three-dimensionally helps her have clear conversations with owners, architects, engineers, and contractors. Marylin has been immersed in more than 165 projects during her time with Siebein Associates and is experienced in all phases of project management, from schematic design through construction. She actively participates in project meetings, clearly communicating acoustical design goals and acoustical recommendations to designers, owners, user groups and project stakeholders. Marylin consistently applies her skills and experience to find creative acoustic solutions for her projects and excels in in providing acoustic design and analysis for critical acoustic spaces.

She is proficient in many architectural/acoustic software programs including AutoCAD, Revit, Trane, VA Select, Ibana Calc, Cope Calc, TNM, CadnaA, CATT Acoustic, and Photoshop.

EXPERIENCE

- Consultant, Siebein Associates Inc. (2014 – present)
- Intern Consultant, Siebein Associates Inc. (2014)
- Graduate Teacher Assistant, University of Florida (2013 – 2014)
- Freelance Designer, NV Capital Partners LLC (2012 – 2014)
- Photographer and Web Designer, Frost Art Museum, Florida International University. (2011)
- Digital Lab Supervisor, School of Architecture, Florida International University (2009 – 2011)
- Professional Photography, Darimar Inc. (2006 – 2007)

SPECIAL ACHIEVEMENTS

- Robert Bradford Newman Award for Excellence in Architectural Acoustics (2014)
- Architecture MRP Design Honor Award, University of Florida (2014)
- Architecture Academic Excellence Award, University of Florida (2014)
- Architecture Academic Achievement, University of Florida (2013)

RELEVANT PROJECT EXPERIENCE (Partial List)

- Albemarle Firing Range, Roanoke, VA
- Dubuque County Sheriff's Range, Dubuque, IA
- Everglades Youth Camp Firing Range, Palm Beach, FL
- Fort AP Hill Indoor Firing Range, Fort AP Hill, VA
- Loudon County Firing Range, Ashburn, VA
- Michigan Department of Natural Resources:
  - Grand Traverse Shooting Range, Grand Traverse County, MI
  - Allegan & Barry State, Allegan & Barry Game Areas, MI
  - Lapeer Range, Grand Traverse County, MI
  - Marquette Range, Grand Traverse County, MI
- Omaha Firing Range, Omaha, NE
- Patrick AFB Firing Range, Patrick AFB, FL
- Pedlar Mountain Firing Range, Core, WV
- Tampa Police Department Firing Range, Tampa, FL
- Zenith Quest Firing Range, Afton, VA

PROFESSIONAL EXPERIENCE

3+ Years

AREAS OF EXPERTISE

Architectural Acoustic Design

Mechanical System Design

Environmental Noise

EDUCATION

Master of Architecture (2014) University of Florida.

Bachelor of Architecture (2012) Florida International University

AFFILIATIONS

Member, Acoustical Society of America

Associate Member, American Institute of Architects

CONTACT INFORMATION

625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 14
mroa@siebeinacoustic.com

Jennifer Russell Miller, ASA, Assoc. AIA
Consultant

Jennifer excels in architectural acoustic design and analysis. Having worked on more than 140 projects with Siebein Associates, Jennifer is proficient in full-cycle project management from schematic design through construction and has considerable experience in taking field measurements, analyzing data, and performing acoustical calculations.

Jennifer is fluent in many architectural/acoustic software programs including Adobe Suite Programs, AutoCAD, Rhinoceros, VRay Rendering Software, Brazil Rendering Software, Grasshopper Software, Microsoft Office Programs, Ecotect, and V-A Select and is proficient in taking acoustic measurements using sound level meters by Rion, Cesva, B+K and Larson Davis.

She collaborates very well with architects, design teams and project stakeholders, carefully analyzing design criteria, and consistently creating functional and aesthetically pleasing acoustical systems in a wide variety of building acoustic and environmental noise projects.

EXPERIENCE

- Consultant, Siebein Associates, Inc. (2015-present)
- Intern Consultant, Siebein Associates, Inc. (2014-2015)
- Lunz Prebor Fowler Architects, Intern (May-August 2011, May-August 2012)
- SCMH Architects, Intern (May-August 2010)

SPECIAL ACHIEVEMENTS

- Robert Bradford Newman Award for Excellence in Architectural Acoustics (2015)

Relevant Project Experience (Partial List)

- Aberdeen Firing Range, Aberdeen, MD
- Camp Lejeune High School, Camp Lejeune, NC
- Camp Lejeune USMC Firing Range, Camp Lejeune, NC
- City of Homestead, Homestead, FL
- Dubuque County Sheriff's Range, Dubuque, IA
- Grand Traverse Firing Range, Traverse City, Michigan
- JIATFS Command Center, Key West, FL
- JPATS Naval Training Operations Facility, Milton, FL
- Michigan Department of Natural Resources:
  - Grand Traverse Shooting Range, Grand Traverse County, MI
  - Allegan & Barry State, Allegan & Barry Game Areas, MI
  - Lapeer Range, Grand Traverse County, MI
  - Marquette Range, Grand Traverse County, MI
- Omaha Firing Range, Omaha, NE
- Patrick AFB Firing Range, Patrick AFB, FL
- Pedlar Mountain Firing Range, Core, WV
- Tampa Police Department Firing Range, Tampa, FL
- Zenith Quest Firing Range, Afton, VA

PROFESSIONAL EXPERIENCE

3 Years

AREAS OF EXPERTISE

Acoustical Measurements
Architectural Acoustic Design
HVAC Design

AFFILIATIONS

Associate, American Institute of Architects
Member, Acoustical Society of America

EDUCATION

Master of Architecture (*2015)*
University of Florida

Bachelor of Design in Architecture
cum laude (2013), University of Florida

CONTACT INFORMATION

625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 12
jrussell@siebeinacoustic.com

Matthew Vetterick, Assoc. AIA, ASA
Consultant

During his time with Siebein Associates, Matthew has worked on more than 115 projects and excels in developing acoustical solutions for clients that are both efficient and aesthetically pleasing. He is experienced in all phases of project management, from schematic design through construction and collaborates perceptively with project stakeholders, consistently providing intuitive acoustical design goals and recommendations.

He is adept in many architectural/acoustic software programs including AutoCAD, Revit, Rhinoceros, VRay Rendering Software, Grasshopper Software, Ecotect, V-A Select, TAP (Trane Acoustic Program), Adobe Suite Programs and Microsoft Office. Matthew is also experienced in taking acoustic measurements using sound level meters by Larson Davis and using Win MLS software.

Matthew is highly accomplished in performing mechanical system noise and vibration analysis and room acoustic analysis. He is experienced in taking field measurements, analyzing data, performing acoustical calculations and providing recommendations. Matthew is equally proficient onsite and in the acoustical laboratory.

EXPERIENCE

- Consultant, Siebein Associates, Inc. (2016-present)
- Intern Consultant, Siebein Associates, Inc. (2015-2016)
- Graduate Teaching Assistant, University of Florida School of Architecture (2014-Present)
- Technology Consultant University of Florida Academic Technology (2013-2015)
- Office Assistant, Marvette Productions, Inc. (2008-Present)

SPECIAL ACHIEVEMENTS

- AIA Florida Bronze Medal - one of the profession's most prestigious awards given to students (2016)
- Featured Student Work Chicago Architecture Foundation (2010)
- The Architecture Handbook – Student Design Experience
- Eagle Scout, Boy Scouts of America (2007)

RELEVANT PROJECT EXPERIENCE (partial list)

- Camp Lejeune High School, Camp Lejeune, NC
- Camp Lejeune USMC Firing Range, Camp Lejeune, NC
- Gainesville Police Department, Gainesville, FL
- JPATS Naval Training Operations Facility, Milton, FL
- Michigan Department of Natural Resources, Allegan & Barry State Firing Ranges, Grand Traverse County, MI
- Omaha State Police Firing Range, Omaha, NE
- Patrick AFB Firing Range, Brevard County, FL
- Tampa Police Department Firing Range, Tampa, FL
- Zenith Quest Firing Range, Afton, VA

PROFESSIONAL EXPERIENCE

2 Years

AREAS OF EXPERTISE

Acoustical Measurements
Architectural Acoustic Design
Mechanical System Noise and Vibration

EDUCATION

Master of Architecture (*2016),* University of Florida

Bachelor of Design in Architecture *summa cum laude* (2014), University of Florida

Associate in Arts in Architecture (2012), Valencia College

AFFILIATIONS

Associate, American Institute of Architects
Member, Acoustical Society of America

CONTACT INFORMATION

625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 10
mvetterick@siebeinacoustic.com

Appendix U:

Staffing and Qualifications

FIRM QUALIFICATIONS

Siebein Associates, Inc. established in 1981 in Gainesville, Florida is a leading acoustical consulting firm that specializes in sound assessment and analysis for shooting ranges and noise mitigation design for facilities using a variety of small arms, heavy weapons, field measurement; research; development of computer programs; and design of state, federal, public, and military and police training facilities. This has included work for firing ranges around the world for the US military, federal agencies such as the FBI, Capitol Police and FLETC as well as police training and privately owned ranges. We have also conducted research on firearms noise measurement and mitigation for the National Rifle Association and the National Science Foundation.

The firm has worked on over 1900 projects worldwide and is very experienced with work on police and recreational shooting facilities in the vicinity of residential neighborhoods. We have also worked with a number of municipalities to develop noise ordinances, participated in public hearings for noise impact related work, and worked on ANSI and ASTM committees to draft acoustical standards. Measurement, modeling and prediction of noise levels from impulsive sounds like gun fire in complex environments using field measures, computer models, and auralizations is a particular strength of the firm.

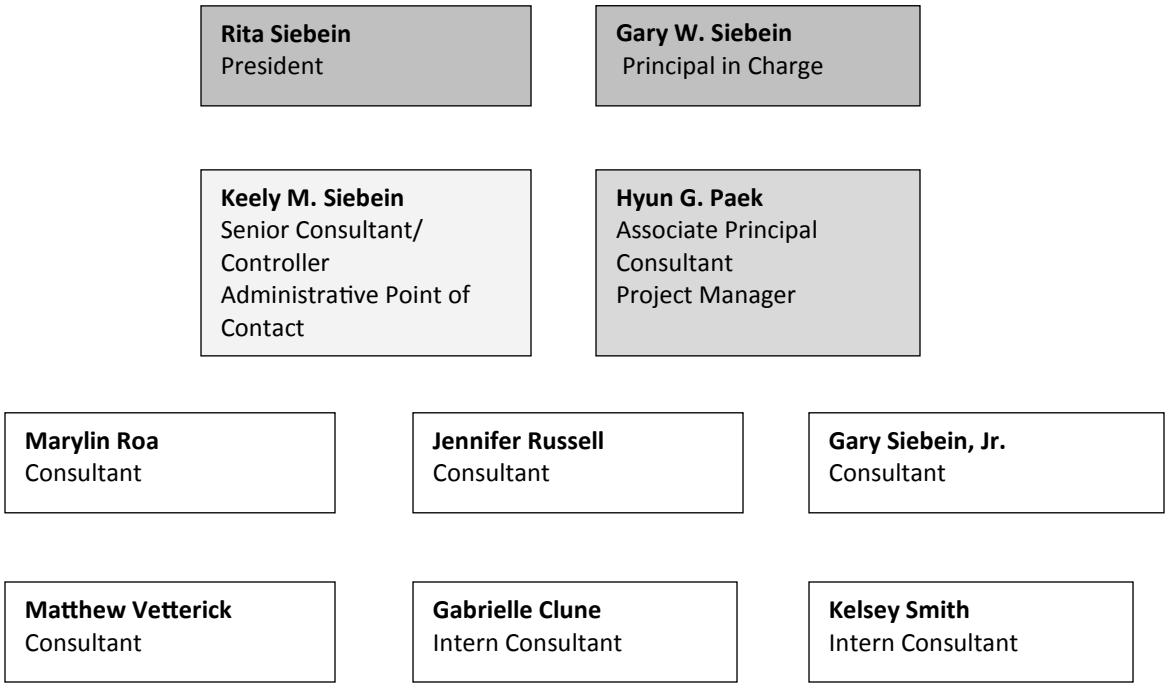


Figure 1. Organizational Chart

Table 1. Staff Roles and Responsibilities

Name	Role	Responsibility
Gary W. Siebein, FASA, FAIA	Principal-in-Charge	Experimental Design Field Measurements Quality Control Review of Work
Hyun Paek, ASA, INCE	Project Manager	Experimental Design Field Measurements Manage Data Analysis and Report Production
Keely Siebein, ASA, INCE	Administrative Point of Contact	Qualification and Proposal Preparation, Data Review
Gary Siebein, Jr., CTS	Environmental Noise Measurement, Consultant	Project Data Analysis and Field Measurements
Jennifer Russell, Assoc. AIA, ASA	Environmental Noise Measurement, Consultant	Project Data Analysis and Field Measurements
Marylin Roa, Assoc. AIA, ASA	Consultant	Project Data Analysis and Technical Assistance with Report Preparation
Matthew Vetterick, Assoc. AIA, ASA	Consultant	Technical Assistance with Report Preparation
Gabrielle Clune	Intern Consultant	Technical Assistance with Report Preparation
Kelsey Smith	Intern Consultant	Technical Assistance with Report Preparation

SELECTED PROJECT EXPERIENCE

ASYMMETRIC WARFARE GROUP INDOOR FIRING RANGE

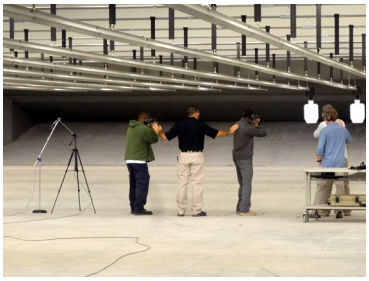
Fort AP Hill, Virginia

Siebein Associates, Inc. consultants constructed a state-of-the-art acoustical measurement instrumentation system in house to conduct short term acoustical measurements of overall-A-weighted and Z-weighted sound levels produced by firearms operations at the AWG 50M Indoor Range at Fort AP Hill. The measurements were taken as part of a study to validate the effectiveness of custom sound absorbent materials in firing ranges.

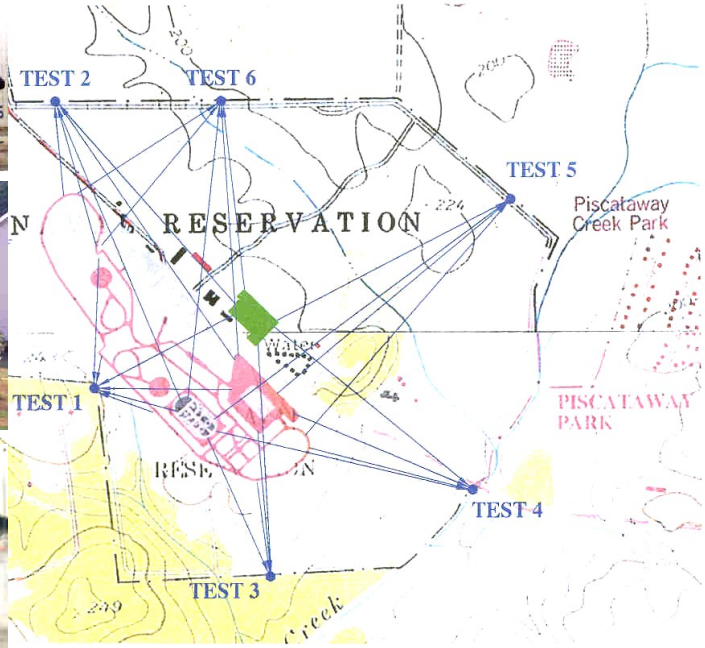
Prior to the installation of the acoustics panels, Siebein Associates consultants took acoustical measurements at four different locations inside the AWG Firing Range from three shooters firing three rounds in succession from M9 Beretta 9mm handguns, M4 Colt 5.56 rifles, and MK11 Mod 0, 7.62 caliber rifles. Three microphones with preamplifiers were placed two lanes over from the shooters at 15, 25, and 50 meters from the targets to record the sound levels. Additionally, a high pressure microphone was placed three meters from the shooters along with another high pressure microphone with preamplifier that was connected to a CESVA sound level meter.

The high pressure microphone that was not recording to the CESVA was connected to an 8 Channel Data Acquisition System along with the three microphones. The data acquisition system digitized the data and transferred it to a laptop computer that acquired the four channels of data using Multi-Track Recording software.

To complete the study, the consultants traveled back to Fort AP Hill after the acoustical treatments had been applied inside the AWG Range and conducted identical tests that proved the addition of the sound absorbent material was successful in significantly reducing the sound levels.



SELECTED PROJECT EXPERIENCE

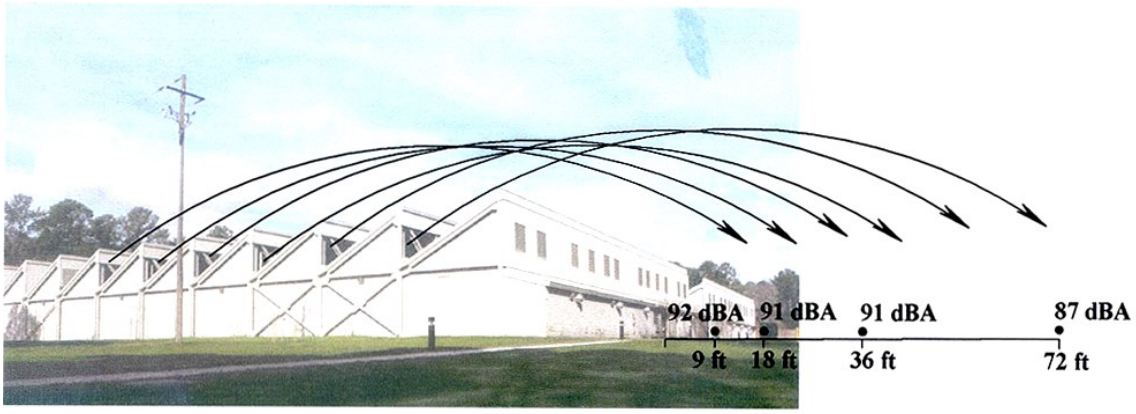


FEDERAL LAW ENFORCEMENT TRAINING CENTER (FLETC)

Cheltenham, Maryland

Siebein Associates conducted a sound assessment and noise analysis for new enclosed firing ranges and driving training facilities on nearby communities. Noise measurement levels were taken at over 40 locations in the community and the existing sonic environment was characterized using a combination of quantitative metrics such as Ldn's and soundscape terms. Field measurements were conducted of long term sound levels and individual event levels for firearms training at multiple indoor, partially enclosed and outdoor firing ranges at an existing facility. The data was used as source data in computer model studies using the SA Environmental Noise Analysis program of noise impacts from a number of design alternatives. The field measurements were also made at distances away from the sources that would be found at the proposed facility as a method to calibrate the model studies. A variety of mitigation options were explored and recommendations presented.

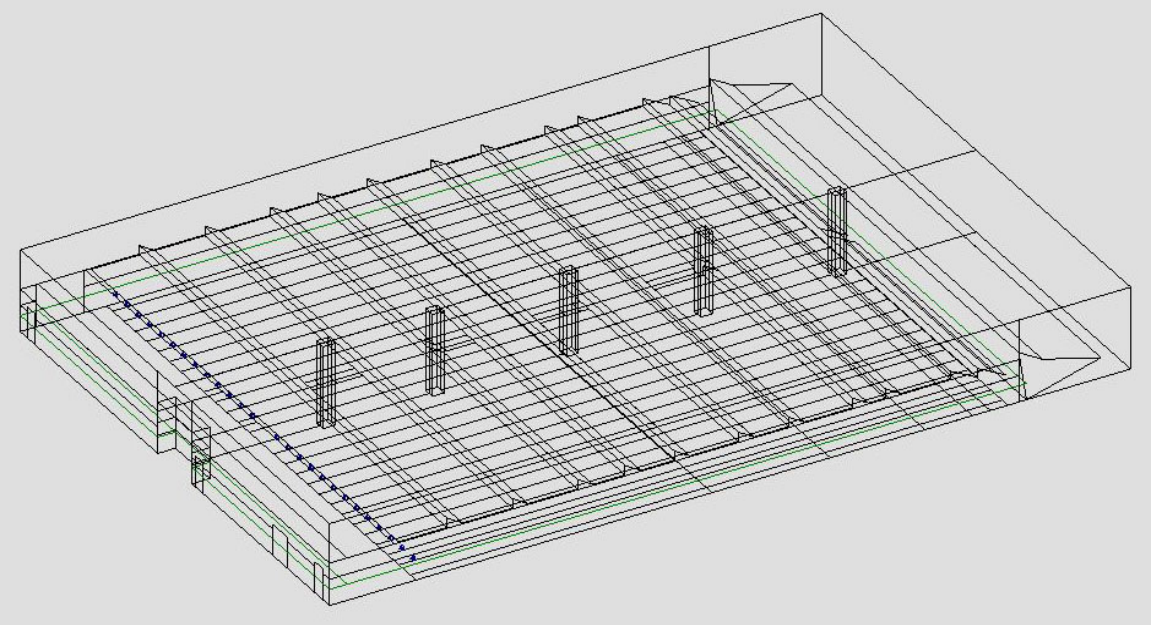
SELECTED PROJECT EXPERIENCE



FEDERAL LAW ENFORCEMENT TRAINING CENTER (FLETC)
Brunswick, Georgia

Siebein Associates conducted a sound assessment and noise analysis new partially enclosed firing ranges on near by communities. Long term sound levels were recorded at critical locations in the community where complaints had been received. Detailed measurements of individual training events were also made both close to the source and in the neighborhoods. These data were used in computer model studies using the SA Environmental Noise Analysis program of design alternatives including range location, orientation, materials and baffling systems. Physical scale models were also built of design options for the partially enclosed ranges to study the directional effects of sound diffracted out through the openings into the community. The effects of moving the sound sources to different firing positions within the range was found to account for much of the variability in acoustical measurements made in the neighborhood in previous studies. Recommendations for to minimize noise propagation into the neighborhood were presented and constructed.

SELECTED PROJECT EXPERIENCE



FEDERAL LAW ENFORCEMENT TRAINING CENTER (FLETC)
Charleston, South Carolina

Siebein Associates provided sound analysis and acoustical design recommendations for indoor firing ranges in Charleston, South Carolina. Mitigation to increase sound absorption and reduce harmful noise propagation was provided. A three-dimensional acoustic computer model was constructed to study sound propagation as shown in the Figure above.

SELECTED PROJECT EXPERIENCE

FBI FIRING RANGE ACOUSTICAL STUDY
Quantico, Virginia

Siebein Associates conducted a comprehensive evaluation of acoustic problems in large indoor/outdoor firing ranges; monitoring of OSHA noise exposure for instructors and students; development of software systems to evaluate hearing conservation issues from high-energy impulse noise from firearms; and integrated acoustical mitigation design for ranges with architectural, air-flow and lead abatement consultants.

SELECTED PROJECT EXPERIENCE

OKINAWA FIRING RANGE NOISE IMPACT STUDY
Okinawa, Japan

Siebein Associates conducted a sound assessment and analysis for expansion of range activities and construction for new ranges. Design criteria for off-site noise propagation were established by the military. The ranges were to be used for Special Forces firearms training activities. A combination of acoustical measurements at similar training facilities, computer model studies of proposed activities, and model calibration studies conducted in the field were used to evaluate proposed designs. Acoustical measurements of typical busy day training activities were recorded at for Army Special Forces operations at an existing facility. The acoustical data from the actual training activities were used in 4 different computer models to estimate sound levels at various locations around the proposed facility as affected by distance, topography and vegetation. Sophisticated military noise prediction programs were also used to independently estimate noise contours based on the projected number of personnel, rounds per day and weapons used in the training exercises. Methods to reduce sound levels were evaluated as well in a series of optimization studies.

SELECTED PROJECT EXPERIENCE

CITY OF VIRGINIA BEACH FIRING RANGE
Virginia Beach, Virginia

Siebein Associates worked with city and police personnel, and residents to conduct a sound assessment and analysis of existing firing range noise on nearby communities. A computer model study was constructed using the SA Environmental Analysis program of design alternatives to provide recommendations for mitigation.

SELECTED PROJECT EXPERIENCE

MAUMEE POLICE AND FIRE TRAINING FACILITY
Maumee, Ohio

Siebein Associates conducted a sound assessment and analysis for the proposed Maumee Fire and Police Training Facility to determine the noise impact of firearms training activities on the surrounding communities. Acoustic measurements were made at the proposed site and in the surrounding community of police officers firing shotguns and pistols at the site of the proposed Firing Range. Noise mitigation strategies were presented.

SELECTED PROJECT EXPERIENCE

BLALOCK LAKES CLAY PIGEON RANGE NOISE STUDY

Blalock, Georgia

Siebein Associates, Inc. conducted a sound assessment and analysis to determine noise mitigation strategies to reduce noise associated with clay pigeon shooting events at an adjoining residential property.

SELECTED PROJECT EXPERIENCE

UNITED STATES CAPITOL POLICE PRACTICAL APPLICATIONS CENTER

Cheltenham, Maryland

Siebein Associates conducted a sound assessment and analysis to establish acoustical design criteria for background noise levels from building and simulation equipment; selection of room finish materials; sound isolation between critical spaces; acoustical measurements and analysis to determine occupational hearing loss issues relative to the range usage by instructors and students during firearms training.

SELECTED PROJECT EXPERIENCE

CASEYVILLE RIFLE AND PISTOL CLUB
Masacoutah, Illinois

Constructed a computer model for proposed shooting range to produce noise contours for the projected number and types of weapons to be used at the new range.

MONTGOMERY COUNTY WEAPONS TRAINING CENTER
Conshohcken, Pennsylvania

Conducted acoustical analysis and design recommendations to reduce noise from gun fire within the firing range and reduce the transfer of gun fire noise to the Fire Academy classrooms and adjoining properties.

ROCKVILLE POLICE ACADEMY FIRING RANGE
Rockville, Maryland

Conducted acoustical analysis and design recommendations for the construction of a new firing range to allow for simultaneous use with adjacent offices and nearby classrooms. Acoustical measurements were taken of firearms training in the existing range to estimate noise impact at nearby receiver properties and to recommend acoustical upgrades to the construction of the building envelope.

AIS QUICK STUDY
Las Vegas, Nevada

Conducted acoustical analysis of sound levels of Quick Range structures in the Control Room and just outside the Range to determine compliance with the performance criteria based on OSHA and NIOSH permissible sound level limits. A computer model was constructed to study alternate range sizes to determine equivalent sound levels with substitute sizes and materials used for the ranges.

RHINO OUTDOOR OPEN GUN RANGE
Williston, Florida

Conducted sound assessment and analysis of shotgun blast noise from the Rhino Outdoors open gun range at the property line of adjacent and nearby residences and businesses to determine the extent to which the noise exceeds the noise level limit described in the Levy County Code of Ordinances.

SELECTED PROJECT EXPERIENCE

MARINE RECRUIT TRAINING FACILITY
Parris Island, South Carolina

Provided acoustical design of a U.S. Marine Corps Large Group Training Facility at Parris Island, South Carolina including room acoustic design, sound isolation for large public restrooms and mechanical equipment and interface with Marine audio-visual systems.

CITY OF PHOENIX POLICE TRAINING FACILITY
Phoenix, Arizona

Conducted acoustical analysis and design recommendations for existing outdoor and indoor firing ranges proposed for a major expansion of this large facility in suburban Phoenix.

DUVAL COUNTY SHERIFF'S OFFICE FIRING RANGE NOISE IMPACT STUDY
Jacksonville, Florida

Conducted acoustical measurements at existing indoor and outdoor firing ranges. Determined existing and future noise impact for expansion of outdoor ranges. Investigated enclosed and partially enclosed options for range development to minimize noise impact on nearby residences.

MANASSAS PARK NEW POLICE STATION INDOOR SHOOTING RANGE
Manassas Park, Virginia

Conducted acoustical analysis and design recommendations to reduce sound from fire arms in the firing range on the ground floor to offices above and to the side of the range. Conducted computer model studies using the SA Environmental Analysis program of design alternatives to proved recommendations for noise mitigation.

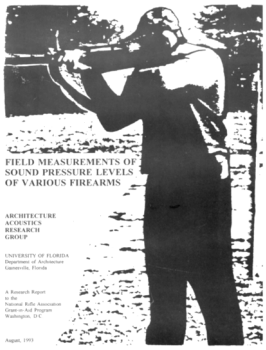
FLORIDA DEPARTMENT OF LAW ENFORCEMENT HEADQUARTERS
Tallahassee, Florida

Conducted acoustical measurements and design for indoor firing ranges located in close proximity to the Director's Office and other noise sensitive locations in this major headquarters facility for a large law enforcement agency.

SELECTED RELEVANT PUBLICATIONS

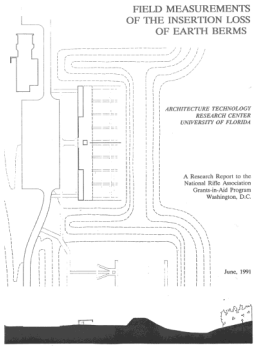
Field Measurements of Sound Pressure levels of Various Firearms

Research to document methods and a digital data acquisition system to record peak pressure levels, sound exposure levels and other metrics of interest produced by a variety of firearms. A catalog of peak pressure levels and octave band sound exposure levels for various firearms was produced to aid the NRA in assessing noise impacts of range facilities.



Field Measurement of the Insertion Loss of Earth Berms

Field measurements of the insertion loss of earth berms surrounding outdoor firing ranges were compared with estimates of insertion loss calculated by a variety of methods in the literature. Advantages and disadvantages of various computational methods and field measurement techniques were evaluated. Presented to the National Rifle Association.

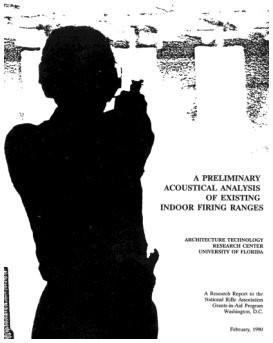


Preliminary Acoustical Analysis of Existing Indoor Firing Ranges

Research presented to the National Rifle Association (NRA) to document methods to accurately measure impulsive sounds produced by firearms; develop acoustical design guidelines for indoor firing ranges including transmission loss of wall, floor and ceiling assemblies and interior finish materials; and present case studies of the acoustical design of ranges.

"Project Design Phase Analysis Techniques to Evaluate the Acoustical Environment of Buildings and Listening to Buildings"

Developed a multi-channel digital data acquisition system to compute acoustical metrics based on impulse response theory to assess interior and exterior situations as part of 10 years of work. The system was used successfully in full size environments as diverse as concert halls, construction sites and firing ranges. It was also used in scale model studies of interior acoustical qualities in concert halls and exterior sound propagation in police training facilities. Impulse responses acquired in the field were also convolved or mixed with recorded sounds to present aural simulations of sounds as they were heard in complex environments. Case studies comparing full size and scale model measurements in actual design situations were presented. Presented to the National Science Foundation.



RESUMES OF SENIOR STAFF

Gary W. Siebein, FASA, FAIA

Senior Principal Consultant

Gary W. Siebein has consulted for military and law enforcement training facilities for over 36 years. He has designed methods to accurately measure, model and predict the effects of impulsive sounds such as gunfire and demolition blasts associated with military and police training activities on adjoining properties as part of environmental assessment and ICUZ processes. He has worked with the military, federal, state and local law enforcement agencies to develop comprehensive cost effective noise management plans for training facilities. This work has included design of baffled ranges, fully enclosed ranges, conducting community workshops and large scale experiments on sites to demonstrate acoustic effects of noise mitigation, computer modeling of noise contours, and auralization of sounds as they are heard at neighboring properties. He consults with communities to develop practical noise ordinances and is currently serving on an ANSI working group to develop a model community noise ordinance. He also serves on ASTM Committee E33 on Environmental Acoustics which develops testing standards for building and environmental acoustics.

As Director of the Architecture Technology Research Center at the University of Florida, Professor Siebein implemented a long-term research agenda to provide a scientific basis for environmental and building acoustic design issues. He has directed multi-year, multi-disciplinary projects in the measurement, modeling and prediction and simulation of building and environmental acoustics under the sponsorship of NSF and other public and private clients. He has developed innovative multi-channel digital acoustical measurement systems for building and environmental acoustics, developed methods to qualitatively assess noise impacts, developed physical scale modeling systems for environmental and building acoustics, developed computer models for a variety of acoustic situations and used these techniques to solve difficult acoustical problems as a Principal Consultant on over 1900 projects.

RELEVANT PROJECT EXPERIENCE (Partial List)

- Aberdeen Firing Range, Aberdeen, MD
- AFETA Firing Range Noise Mitigation, Williamsburg, VA
- AIS Quick Range Study (Picatinny, NJ), Las Vegas, NV
- Albemarle Firing Range, Roanoke, VA
- Albemarle Public Safety Training Facility - Phase 3: Indoor Firearms Range, Roanoke, VA
- Camp LeJeune USMC Firing Range, Camp LeJeune, NC
- Corp for Rifle Practice and Firearms Safety Talladega Range, Talladega, GA
- Dubuque County Sheriff's Range, Dubuque, IA
- Duncan Farms - Troy Acoustics, Tampa, FL
- Everglades Youth Camp Firing Range, Palm Beach, FL
- FBI Proposed 500 Yard Precision Rifle Deck Environmental Acoustic Assessment, Quantico, VA
- Fort AP Hill Indoor Firing Range, Fort AP Hill, VA
- Fort Lewis Special Forces (SOF) Indoor Firing Range, Fort Lewis, WA
- Loudon County Firing Range, Ashburn, VA
- Maxwell Air Force Base New Outdoor Baffled Firing Range, Montgomery, AL
- Michigan Department of Natural Resources:
  - Grand Traverse Shooting Range, Grand Traverse County, MI
  - Allegan & Barry State, Allegan & Barry Game Areas, MI
  - Lapeer Range, Grand Traverse County, MI
  - Marquette Range, Grand Traverse County, MI
- Navy SWG Firing Range, Norfolk, VA
- Omaha Firing Range, Omaha, NE
- Orlando Police Department Gun Range Noise Study, Orlando, FL
- Patrick AFB Firing Range, Patrick AFB, FL
- Pedlar Mountain Firing Range, Core, WV
- Special Weapons Assessment Facility, Crane, IN
- Tampa Police Department Firing Range, Tampa, FL
- Troy Acoustics General Instrumentation, Gainesville, FL
- US Marshal's Firing Range, Tallahassee, FL
- US Secret Service Firing Range (Washington DC), Washington, DC
- Zenith Quest Firing Range, Afton, VA

SIEBEIN ASSOCIATES

AREAS OF EXPERTISE

Soundscape planning and design, Environmental Noise; Architectural Acoustic Design of indoor and outdoor performance spaces; Mechanical System Noise & Vibration Control

EDUCATION

M.A. (Architecture), 1980
University of Florida

Bachelor of Architecture, 1978
Rensselaer Polytechnic Institute

B.S. (Building Science), 1972
Rensselaer Polytechnic Institute

REGISTRATION

Registered Architect:
Florida # 8846
Georgia #RA014816
NCARB # 86214

AFFILIATIONS

Fellow, American Institute of Architects
Fellow, Acoustical Society of America
Member: NCAC, ASTM, ASHRAE, NCARB

PROFESSIONAL EXPERIENCE

40+Years

CONTACT INFORMATION

625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 16
gsiebein@siebeinacoustic.com

Hyun G. Paek, ASA, INCE

Associate Principal Consultant

Hyun has studied and worked in the field of architectural acoustics, architecture, and building construction in various capacities for more than 22 years. He specializes in soundscape planning, architectural acoustical design, and environmental acoustics. Hyun focuses on visionary acoustics, ensuring the final design blends in as a part of the community.

Mr. Paek serves as a mentor to his colleagues, encouraging them to reach beyond the boundaries of the modern acoustical field and to find creative solutions of complex acoustical issues. Hyun has worked on over 800 projects worldwide. From this depth and breadth of knowledge comes an acute understanding of a variety of building types. This extensive experience also allows him to organize and supervise acoustical measurements that are critical to designing the soundscape. He is proficient at analyzing present and future noise impacts of sources. He has extensive experience in noise assessment, 3-D computer modeling and calibrations, planning and analysis of acoustical measurements, and monitoring of sound levels. He is proficient at analyzing present and future noise impacts of sources.

Hyun is deeply experienced in project management; proactively and successfully leading teams through each project phase, organizing, supervising, and analyzing the soundscape design. He enjoys the collaborative process of developing state of the art sonic environments and brings his professional expertise, mechanical capabilities, and aestheticism to every project.

He has written many papers on the subject of architectural acoustics and computer modeling systems and presented them at regional and national acoustics meetings. He also serves as a guest lecturer in graduate architectural acoustics courses at the University of Florida. He is a member of the Acoustical Society of America, the Institute of Noise Control Engineers, and the Florida Chapter Acoustical Society of America.

EXPERIENCE

- Associate Principal Consultant, Siebein Associates, Inc. 2014-present
- Senior Consultant, Siebein Associates, Inc. 2007-2014
- Consultant, Siebein Associates, Inc. 2000-2007
- Project Architect, Jeong Ik Architects and Engineers 1996-1997
- Project Architect, Ilkun C&C Architects 1994-1996

RELEVANT PROJECT EXPERIENCE (partial list)

- Aberdeen Firing Range, Aberdeen, MD
- AIS Quick Range Study (Picatinny, NJ), Las Vegas, NV
- Albemarle Firing Range, Roanoke, VA
- Albemarle Public Safety Training Facility - Phase 3: Indoor Firearms Range, Roanoke, VA
- Camp Lejeune USMC Firing Range, Camp Lejeune, NC
- Corp for Rifle Practice and Firearms Safety Talladega Range, Talladega, GA
- Dubuque County Sheriff's Range, Dubuque, IA
- Duncan Farms - Troy Acoustics, Tampa, FL
- FBI Proposed 500 Yard Precision Rifle Deck Environmental Acoustic Assessment, Quantico, VA
- Fort AP Hill Indoor Firing Range, Fort AP Hill, VA
- Fort Lewis Special Forces (SOF) Indoor Firing Range, Fort Lewis, WA
- Loudon County Firing Range, Ashburn, VA
- Maxwell Air Force Base New Outdoor Baffled Firing Range, Montgomery, AL
- Michigan Department of Natural Resources:
  - Grand Traverse Shooting Range, Grand Traverse County, MI
  - Allegan & Barry State, Allegan & Barry Game Areas, MI
  - Lapeer Range, Grand Traverse County, MI
  - Marquette Range, Grand Traverse County, MI
- Navy SWG Firing Range, Norfolk, VA
- Omaha Firing Range, Omaha, NE
- Patrick AFB Firing Range, Patrick AFB, FL
- Tampa Police Department Firing Range, Tampa, FL
- Troy Acoustics General Instrumentation, Gainesville, FL
- US Secret Service Firing Range, Washington, DC
- Zenith Quest Firing Range, Afton, VA

SIEBEIN ASSOCIATES

AREAS OF EXPERTISE

Architectural Acoustic Design
Mechanical System Noise & Vibration
Environmental Noise

EDUCATION

M.A. (Architecture), 1994
University of Pennsylvania

B.A. (Architectural Studies), 1992
University of Washington

B.S. (Building Construction) 1992
University of Washington

AFFILIATIONS

Member, Acoustical Society of America
Member, Florida Chapter Acoustical Society of America
Member, Institute of Noise Control Engineering
Member, American Society of Heating, Refrigerating & Air-Conditioning Engineers

PUBLICATIONS

Mr. Paek has written papers on the subject of architectural acoustics and computer modeling systems and has presented published papers at regional and national acoustics meetings. He has also served as a guest lecturer in architectural acoustics at the University of Florida.

CONTACT INFORMATION

625 NW 60th Street, Suite C
Gainesville, Florida 32607
352-331-5111 x 15
hpaek@siebeinacoustic.com