

APPENDIX C

Shadow Flicker Modeling Report

SHADOW FLICKER MODELING REPORT

Walleye Wind Project Rock County, Minnesota

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July 7, 2020

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1.0 EXECUTIVE SUMMARY

The Walleye Wind Project (Project) is a proposed wind power generation facility proposed to consist of 40 wind turbines in Rock County, Minnesota. The Project is being developed by Walleye Wind, LLC, (Walleye Wind) an indirect, wholly-owned subsidiary of NextEra Energy Resources, LLC (NEER). Environmental Consulting & Technology, Inc. (ECT), retained to assist in the permitting of the Project, has retained Epsilon Associates, Inc. (Epsilon) to conduct a shadow flicker assessment for the proposed wind turbines for this Project. This report presents results of the shadow flicker modeling analysis.

Shadow flicker modeling was conservatively conducted for 51 General Electric (GE) wind turbines, which includes eleven (11) alternate wind turbine locations. The purpose of this analysis is to predict the annual durations of wind turbine shadow flicker at nearby receptors.

The maximum expected annual duration of shadow flicker at a modeling receptor in Minnesota resulting from the operation of the 40 proposed and 11 alternate wind turbines are 42 hours, 22 minutes. This is at a targeted receptor. The maximum expected duration of annual shadow flicker at a non-participating receptor is 34 hours, 11 minutes. The modeling results are conservative in that modeling receptors were treated as “greenhouses” (i.e. having windows on all sides) and the surrounding area was assumed to be without vegetation or structures (“bare earth”).

2.0 INTRODUCTION

The Project will consist of 40 wind turbines using a combination of four potential General Electric (GE) models including the 2.82 MW, 114-meter hub height turbine; the 2.82 MW, 89-meter hub height turbine; and the safe harbor 2.32 MW, 80-meter hub height turbine;¹ or the safe harbor 2.5 MW, 90-meter hub height turbine. Figure 2-1 shows the locations of the 40 proposed and 11 alternate wind turbines with the Project Boundary over aerial imagery. Shadow flicker can be defined as an intermittent change in the intensity of light in a given area resulting from the operation of a wind turbine due to its interaction with the sun. An indoor observer experiences repeated changes in the brightness of the room as shadows cast from the wind turbine blades briefly pass by windows as the blades rotate. In order for this to occur, the wind turbine must be operating, the sun must be shining, and the window must be within the shadow region of the wind turbine, otherwise there is no shadow flicker. A stationary wind turbine only generates a stationary shadow similar to any other structure.

Based on the current design and operation of typical modern wind turbines, shadow flicker is not a cause of epileptic seizures. According to the Epilepsy Foundation, “Generally, flashing lights most likely to trigger seizures are between the frequency of 5 to 30 flashes per second (Hertz).”² The wind turbines for this Project have a maximum rotational speed of 15.7 rpm which corresponds to a shadow flicker frequency of 0.8 Hz. This frequency is well below the frequency identified by the Epilepsy Foundation; therefore, the triggering of epileptic seizures is not a concern with this Project.

This report presents the findings of a shadow flicker modeling study for the Project. The wind turbines were modeled with the WindPRO software package using information provided by Walleye Wind and ECT. The expected annual duration of shadow flicker was calculated at modeling receptors and shadow flicker isolines for the area surrounding the Project were generated. The results of the modeling are found within this report.

¹ Epsilon performed shadow flicker modeling for the layout replacing the 4 GE 2.32 MW wind turbines with GE 2.5 MW, 90 m hub height turbines. Results are presented in an appendix to this report (see Section 3.2).

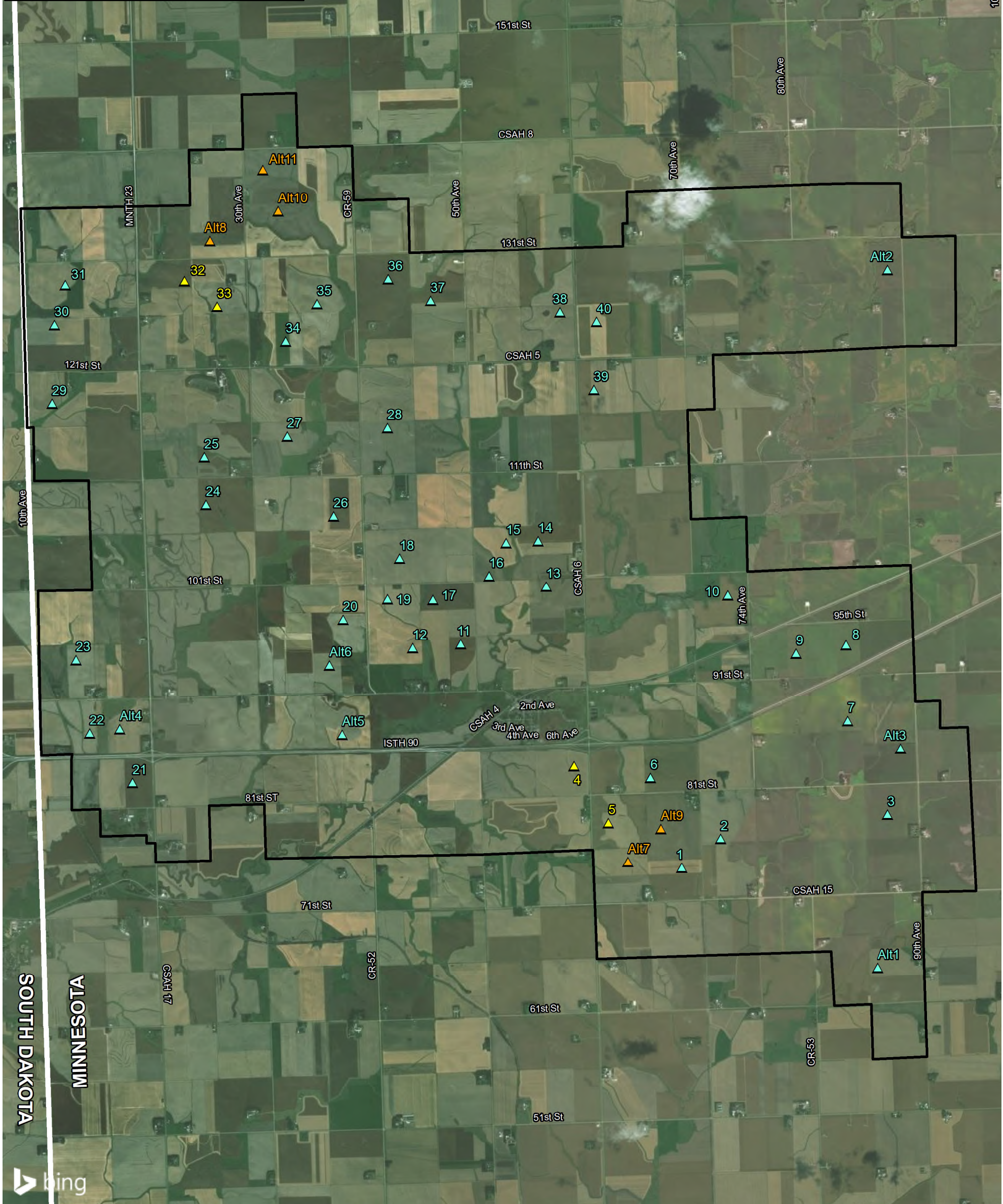
² Epilepsy Foundation, <http://www.epilepsy.com/learn/triggers-seizures/photosensitivity-and-seizures>. Accessed in June 2020.

LEGEND

- ▲ Proposed GE 2.82-127 114m HH Wind Turbine
- ▲ Proposed GE 2.82-127 89m HH Wind Turbine
- ▲ Proposed GE 2.32-116 80m HH Wind Turbine
- ▭ Project Boundary
- ▭ State Boundary

Scale 1:57,000 0 2,375 4,750
1 inch = 4,750 feet Feet

Basemap: Bing Aerial Imagery



Walleye Wind Project Rock County, Minnesota

3.0 SHADOW FLICKER MODELING

3.1 Modeling Methodology

Shadow flicker was modeled using a software package, WindPRO version 3.3. WindPRO is a software suite developed by EMD International A/S and is used for assessing potential environmental impacts from wind turbines. Using the Shadow module within WindPRO, worst-case shadow flicker in the area surrounding the wind turbines was calculated based on data inputs including: location of the wind turbines, location of discrete receptor points, wind turbine dimensions, flicker calculation limits, and terrain data. Based on these data, the model was able to incorporate the appropriate sun angle and maximum daily sunlight for this latitude into the calculations. The resulting worst-case calculations assume that the sun is always shining during daylight hours and that the wind turbine is always operating. The WindPRO Shadow module can be further refined by incorporating sunshine probabilities and wind turbine operational estimates by wind direction over the course of a year. The values produced by this further refinement are known as the “expected” shadow flicker. Both worst-case and expected annual shadow flicker durations are presented in this section.

The Project boundary dated June 3, 2020 and the proposed wind turbine layout for the Project dated June 3, 2020 were provided to Epsilon. Of the 51 wind turbines in the layout, 11 are alternate wind turbine locations. Locations of the turbines are shown in Figure 3-1 and the coordinates are provided in Appendix A. Four (4) wind turbines are GE 2.32-116 wind turbines with a 116.5-meter rotor diameter and a hub height of 80 meters. Forty-two (42) wind turbines are GE 2.82-127 wind turbines with a 127.2-meter rotor diameter and a hub height of 114 meters. Five (5) wind turbines are GE 2.82-127 wind turbines with a 127.2-meter rotor diameter and a hub height of 89 meters. Each wind turbine has the following characteristics based on the technical data provided by ECT, Walleye Wind, or NEER:

		<u>GE 2.32-116</u>	<u>GE 2.82-127</u>
◆ Rated Power	=	2,320 kW	2,820 kW
◆ Hub Height	=	80 meters	114 or 89 meters
◆ Rotor Diameter	=	116.5 meters	127.2 meters
◆ Cut-in Wind Speed	=	3 m/s	3 m/s
◆ Cut-out Wind Speed	=	32 m/s	30 m/s
◆ Maximum RPM	=	15.7 rpm	15.7 rpm

To-date, there are no federal, state, or local regulations regarding the maximum radial distance from a wind turbine to which shadow flicker should be analyzed applicable to this Project. In the United States, shadow flicker is commonly evaluated out to a distance of ten times the rotor diameter. According to the Massachusetts Model Bylaw for wind energy facilities, shadow flicker

impacts are minimal at and beyond a distance of ten rotor diameters.³ Defining the shadow flicker calculation area has also been addressed in Europe where the ten times rotor diameter approach has been accepted in multiple European countries.⁴ Some jurisdictions conservatively require a larger calculation area. The New Hampshire Site Evaluation Committee through rulemaking docket 2014-04 adopted rules on December 15, 2015 outlining application requirements and criteria for energy facilities, including wind energy facilities. As part of these revised regulations, Site 301.08(a)(2) requires an evaluation distance of at least 1 mile from a wind turbine.⁵ Section 16-50j-94, part (g), of the Regulations of Connecticut State Agencies identifies the components required in a shadow flicker evaluation report which includes the calculation of shadow flicker from each proposed wind turbine to any off-site occupied structure within a 1.25 mile radius.⁶ For this Project, ten times the largest rotor diameter of the proposed wind turbines corresponds to a distance of 0.79 miles (1,272 m). Conservatively, this analysis includes shadow flicker calculations out to 1.25 miles (2,012 m) from each wind turbine in the model for the proposed layout.

A dataset containing participation status information for property parcels in the proximity of the Project was provided by ECT on July 6, 2020. Parcels identified as leased within the dataset are participating and are indicated as such on Figure 3-1. Certain parcels in the vicinity of the Project are targeted to be leased by Walleye Wind and these parcels are indicated on Figure 3-1. All other parcels are considered non-participating.

A modeling receptor dataset was provided by ECT on January 20, 2020. A subset of these receptors, 512, which were classified as Noise Area Classification (NAC 1), were input into the WindPRO model in order to remain consistent with the sound level modeling analysis. A supplemental dataset with 153 receptors was provided on June 12, 2020. Therefore, a total of 665 receptors were included in the modeling. Two hundred and twenty-two (222) of these receptors are in South Dakota and have been included for informational purposes only. Each modeling point was assumed to have a window facing all directions (“greenhouse” mode) which yields conservative results. Participation status for each modeling receptor was assigned based on the data presented in Figure 3-1. All modeling receptors are identified in Figure 3-2 and receptors in Minnesota are distinguished as either participating, targeted, or non-participating. The model was set to limit calculations to 2,012 meters from a wind turbine, the equivalent of

³ Massachusetts Department of Energy Resources, “Model As-of-Right Zoning Ordinance or Bylaw: Allowing Use of Wind Energy Facilities” 2009.

⁴ Parsons Brinckerhoff, “Update of UK Shadow Flicker Evidence Base” Prepared for Department of Energy and Climate Change, 2011.

⁵ State of New Hampshire Site Evaluation Committee Site 300 Rules (2015), available at http://www.gencourt.state.nh.us/rules/state_agencies/site100-300.html Accessed in June 2020.

⁶ State of Connecticut CSC Wind Regulations (2014), available at https://eregulations.ct.gov/eRegsPortal/Browse/RCSA?id=Title_16Subtitle_16-50jSection_16-50j-94&content=shadow%20flicker/ Accessed in June 2020.

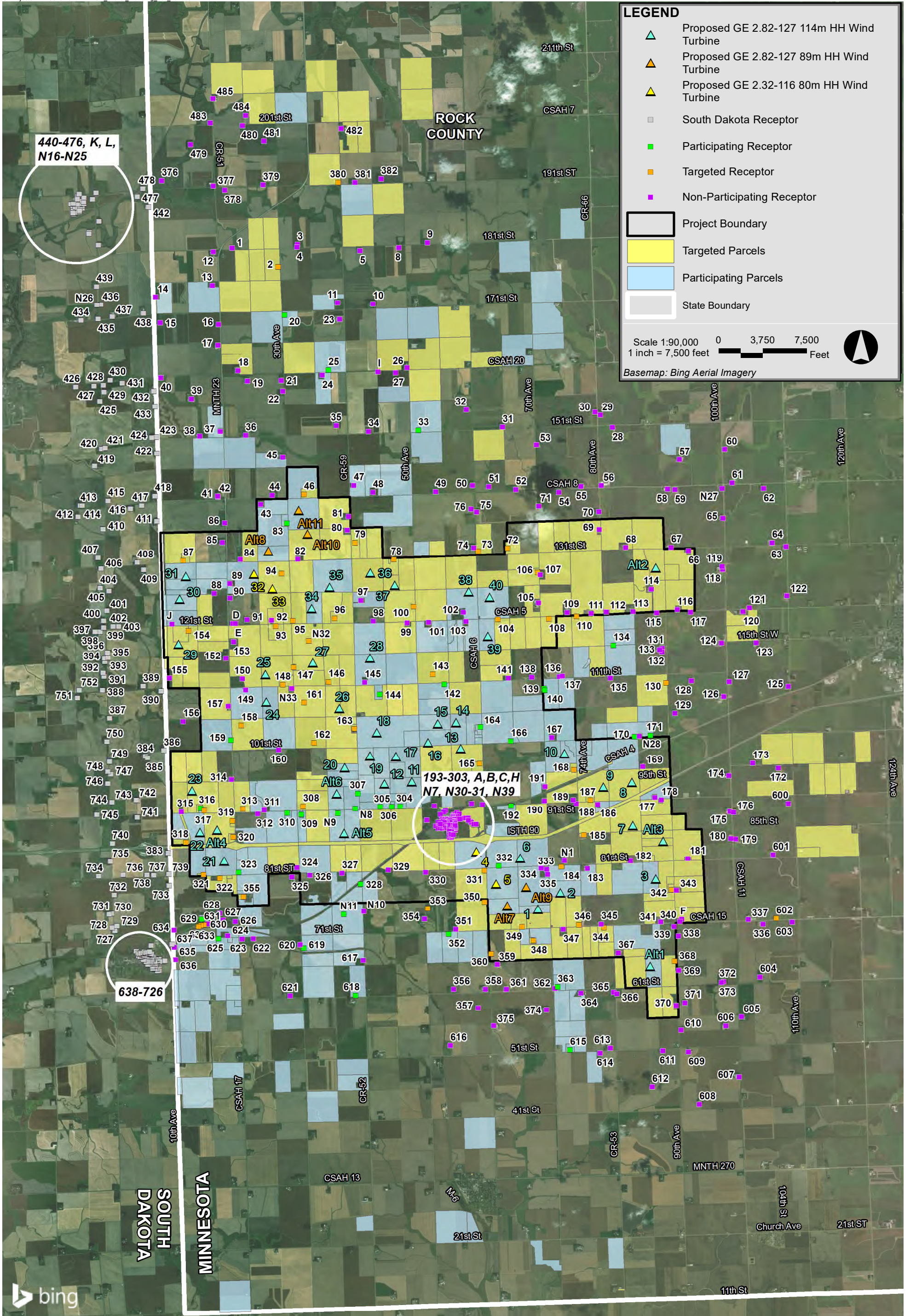
1.25 miles. Consequently, shadow flicker at any of the 665 modeling receptors greater than the corresponding limitation distance from a wind turbine was zero. In addition to modeling discrete points, shadow flicker was calculated at grid points in the area surrounding the modeled wind turbines to generate flicker isolines. A 20-meter spacing was used for this grid.

The terrain height contour elevations for the modeling domain were generated from elevation information derived from the National Elevation Dataset (NED) developed by the U.S. Geological Survey. Conservatively, obstacles, i.e. buildings and vegetation, were excluded from the analysis. This is effectively a “bare earth” scenario which is conservative. When accounted for in the shadow flicker calculations, such obstacles may significantly mitigate or eliminate the flicker effect depending on their size, type, and location. In addition, shadow flicker durations were calculated only when the angle of the sun was at least 3° above the horizon.

Monthly sunshine probability values were input for each month from January to December. These numbers were obtained from a publicly available historical dataset for Sioux Falls, South Dakota from the National Oceanic and Atmospheric Administration’s (NOAA) National Centers for Environmental Information (NCEI).⁷ Table 3-1 shows the percentage of sunshine hours by month used in the shadow flicker modeling. These values are the percentages that the sun is expected to be shining during daylight hours.

The number of hours the wind turbines are expected to operate for the 16 cardinal wind directions was input into the model. An hourly dataset for one year of normalized and scaled wind speed and direction was provided by NEER Analytics for a height of 114 meters. Epsilon used this data to calculate the typical annual number of operational hours per wind direction sector. These hours per wind direction sector are used by WindPRO to estimate the “wind direction” and “operation time” reduction factors. Based on this dataset, the wind turbines would operate 98% of the year. Table 3-2 shows the distribution of operational hours for the 16 wind directions.

⁷ NCEI (formerly NCDC), <https://www1.ncdc.noaa.gov/pub/data/ccd-data/pctpos18.dat>. Accessed in June 2020.



Walleye Wind Project Rock County, Minnesota

Table 3-1 Monthly Percent of Possible Sunshine

Month	Possible Sunshine
January	53%
February	59%
March	46%
April	54%
May	55%
June	58%
July	71%
August	61%
September	59%
October	57%
November	49%
December	55%

Table 3-2 Operational Hours per Wind Direction Sector

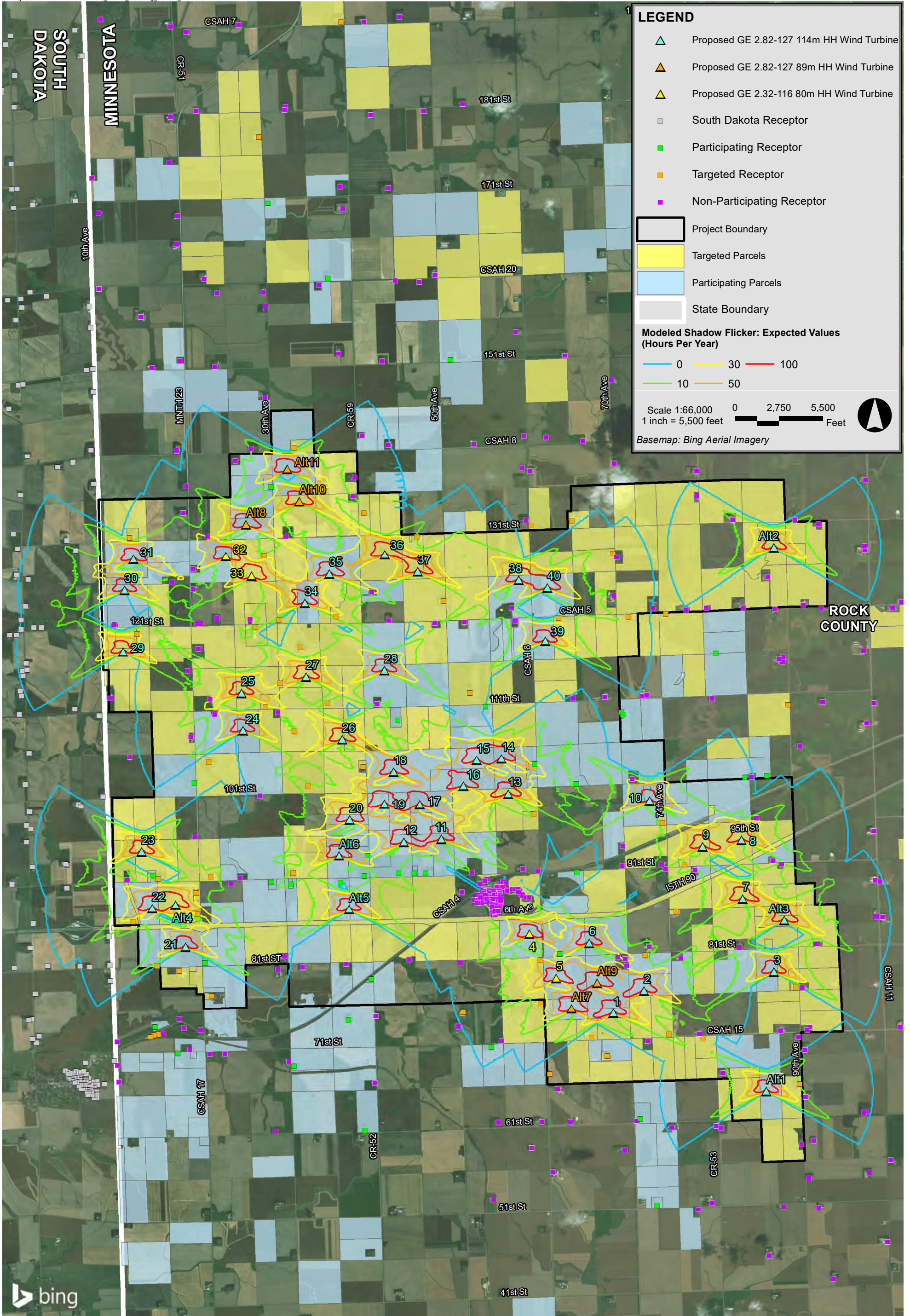
Wind Sector	Operational Hours
N	505
NNE	368
NE	393
ENE	314
E	306
ESE	354
SE	699
SSE	1,070
S	872
SSW	451
SW	289
WSW	255
W	398
WNW	691
NW	853
NNW	674
Annual	8,492

3.2 Results

Following the modeling methodology outlined in Section 3.1, WindPRO was used to calculate shadow flicker at the 665 discrete modeling receptor points and generate shadow flicker isolines based on the grid calculations. Table B-1 in Appendix B presents the modeling results. Both worst-case and expected values are presented. In addition, Epsilon performed shadow flicker modeling for a layout replacing the 4 GE 2.32-116 wind turbines with GE 2.5-116 wind turbines at a hub height of 90 meters. Results of this modeling are presented in a separate memorandum included as Appendix C to this report.

The modeled worst-case annual shadow flicker duration for all the 443 receptors in Minnesota receptors ranged from 0 hours, 0 minutes per year to 120 hours, 4 minutes per year. The maximum flicker was at a targeted receptor (#147) located in Minnesota. The maximum predicted annual flicker at a non-participating receptor (#333) is 104 hours, 55 minutes and the maximum predicted annual flicker at a participating receptor (#332) is 119 hours, 59 minutes. Both of these locations are also in Minnesota.

The predicted expected annual shadow flicker duration ranged from 0 hours, 0 minutes per year to 42 hours, 22 minutes per year for all the 443 receptors in Minnesota. The maximum expected flicker calculated for a Minnesota receptor was at a targeted receptor (#331). The maximum modeled expected annual flicker at a non-participating receptor in Minnesota (#333) is 34 hours, 11 minutes. The maximum modeled expected annual flicker at a participating receptor in Minnesota (#332) is 41 hours, 45 minutes. Many of the Minnesota receptors (206) were predicted to experience no annual shadow flicker. 167 locations in Minnesota were predicted to experience some shadow flicker but less than 10 hours per year. The modeling results showed that 60 locations in Minnesota would be expected to have between 10 hours and 30 hours of shadow flicker per year. Ten (10) receptors in Minnesota are expected to have over 30 hours of flicker per year, three (3) of which are non-participating receptors. Figure 3-3 displays the modeled flicker isolines (expected hrs/yr) over aerial imagery in relation to modeled wind turbines and modeling receptors.



Walleye Wind Project Rock County, Minnesota

Appendix A

Wind Turbine Coordinates

Table A-1: Wind Turbine Coordinates

Wind Turbine ID	Wind Turbine Type	Hub Height (m)	Coordinates NAD83 UTM Zone 14N (meters)	
			X (Easting)	Y (Northing)
1	GE2.82-127	114	715032.84	4829985.74
2	GE2.82-127	114	715609.83	4830412.42
3	GE2.82-127	114	718077.00	4830770.21
4	GE2.32-116	80	713440.20	4831484.78
5	GE2.32-116	80	713948.89	4830646.04
6	GE2.82-127	114	714571.22	4831311.67
7	GE2.82-127	114	717484.91	4832155.66
8	GE2.82-127	114	717463.26	4833275.13
9	GE2.82-127	114	716722.75	4833149.94
10	GE2.82-127	114	715717.65	4834016.28
11	GE2.82-127	114	711768.82	4833289.40
12	GE2.82-127	114	711056.13	4833233.43
13	GE2.82-127	114	713033.37	4834145.01
14	GE2.82-127	114	712909.50	4834817.37
15	GE2.82-127	114	712436.86	4834787.45
16	GE2.82-127	114	712188.64	4834298.29
17	GE2.82-127	114	711359.12	4833945.96
18	GE2.82-127	114	710864.12	4834557.28
19	GE2.82-127	114	710685.96	4833957.87
20	GE2.82-127	114	710029.09	4833654.07
21	GE2.82-127	114	706916.08	4831237.54
22	GE2.82-127	114	706285.74	4831974.17
23	GE2.82-127	114	706083.61	4833053.98
24	GE2.82-127	114	708005.66	4835352.22
25	GE2.82-127	114	707978.92	4836058.90
26	GE2.82-127	114	709891.04	4835182.18
27	GE2.82-127	114	709203.66	4836363.57
28	GE2.82-127	114	710686.84	4836489.39
29	GE2.82-127	114	705731.13	4836844.86
30	GE2.82-127	114	705762.62	4838011.80
31	GE2.82-127	114	705925.80	4838598.69
32	GE2.32-116	80	707682.95	4838655.95
33	GE2.32-116	80	708166.22	4838280.98
34	GE2.82-127	114	709180.49	4837767.43
35	GE2.82-127	114	709642.33	4838319.99
36	GE2.82-127	114	710694.31	4838688.26
37	GE2.82-127	114	711322.39	4838366.99
38	GE2.82-127	114	713236.48	4838199.86
39	GE2.82-127	114	713737.51	4837051.24
40	GE2.82-127	114	713777.92	4838056.94
Alt1	GE2.82-127	114	717930.31	4828508.86
Alt2	GE2.82-127	114	718075.31	4838820.03
Alt3	GE2.82-127	114	718270.60	4831745.15
Alt4	GE2.82-127	114	706728.31	4832036.95
Alt5	GE2.82-127	114	710017.02	4831952.93

Table A-1: Wind Turbine Coordinates

Wind Turbine ID	Wind Turbine Type	Hub Height (m)	Coordinates NAD83 UTM Zone 14N (meters)	
			X (Easting)	Y (Northing)
Alt6	GE2.82-127	114	709827.23	4832975.24
Alt7	GE2.82-127	89	714238.50	4830071.49
Alt8	GE2.82-127	89	708060.09	4839255.90
Alt9	GE2.82-127	89	714725.94	4830560.60
Alt10	GE2.82-127	89	709071.02	4839693.24
Alt11	GE2.82-127	89	708843.72	4840302.49

Appendix B

Shadow Flicker Modeling Results: Modeling Receptors

Table B-1: Shadow Flicker Modeling Results

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
1	707116.78	4847096.66	Non-Participating	Minnesota	0:00	0	0:00	0:00
2	708305.93	4846606.91	Targeted	Minnesota	0:00	0	0:00	0:00
3	708808.42	4847183.67	Non-Participating	Minnesota	0:00	0	0:00	0:00
4	708792.98	4847121.48	Non-Participating	Minnesota	0:00	0	0:00	0:00
5	710426.31	4847027.49	Non-Participating	Minnesota	0:00	0	0:00	0:00
8	711430.37	4847100.31	Non-Participating	Minnesota	0:00	0	0:00	0:00
9	712168.22	4847234.98	Non-Participating	Minnesota	0:00	0	0:00	0:00
10	710761.49	4845648.59	Non-Participating	Minnesota	0:00	0	0:00	0:00
11	709848.84	4845674.79	Non-Participating	Minnesota	0:00	0	0:00	0:00
12	706632.23	4846993.25	Non-Participating	Minnesota	0:00	0	0:00	0:00
13	706608.96	4846127.80	Non-Participating	Minnesota	0:00	0	0:00	0:00
14	705141.88	4845829.90	Non-Participating	Minnesota	0:00	0	0:00	0:00
15	705259.97	4845158.83	Non-Participating	Minnesota	0:00	0	0:00	0:00
16	706765.76	4845113.79	Non-Participating	Minnesota	0:00	0	0:00	0:00
17	706751.88	4844577.57	Non-Participating	Minnesota	0:00	0	0:00	0:00
18	707270.50	4843918.01	Non-Participating	Minnesota	0:00	0	0:00	0:00
19	707512.81	4843649.75	Non-Participating	Minnesota	0:00	0	0:00	0:00
20	708478.92	4845354.11	Participating	Minnesota	0:00	0	0:00	0:00
21	708394.51	4843668.42	Non-Participating	Minnesota	0:00	0	0:00	0:00
22	708430.29	4843394.56	Non-Participating	Minnesota	0:00	0	0:00	0:00
23	709900.19	4845248.40	Non-Participating	Minnesota	0:00	0	0:00	0:00
24	709448.97	4843803.26	Non-Participating	Minnesota	0:00	0	0:00	0:00
25	709614.12	4843929.95	Participating	Minnesota	0:00	0	0:00	0:00
26	711647.33	4843990.24	Non-Participating	Minnesota	0:00	0	0:00	0:00
27	711345.52	4843862.96	Non-Participating	Minnesota	0:00	0	0:00	0:00
28	716954.85	4842454.09	Non-Participating	Minnesota	0:00	0	0:00	0:00
29	716642.97	4842773.33	Non-Participating	Minnesota	0:00	0	0:00	0:00
30	716510.64	4842848.35	Non-Participating	Minnesota	0:00	0	0:00	0:00
31	714115.37	4842462.46	Non-Participating	Minnesota	0:00	0	0:00	0:00
32	713178.15	4842909.97	Non-Participating	Minnesota	0:00	0	0:00	0:00
33	711938.71	4842378.30	Participating	Minnesota	0:00	0	0:00	0:00
34	710644.98	4842349.07	Non-Participating	Minnesota	0:00	0	0:00	0:00
35	709819.25	4842500.41	Non-Participating	Minnesota	0:00	0	0:00	0:00
36	707468.78	4842249.89	Non-Participating	Minnesota	0:00	0	0:00	0:00
37	706814.15	4842351.53	Non-Participating	Minnesota	0:00	0	0:00	0:00
38	706284.12	4842225.69	Non-Participating	Minnesota	0:00	0	0:00	0:00
39	706067.54	4843190.56	Non-Participating	Minnesota	0:00	0	0:00	0:00
40	705275.87	4843735.83	Non-Participating	Minnesota	0:00	0	0:00	0:00
41	706750.62	4840653.78	Non-Participating	Minnesota	0:00	0	0:00	0:00
42	706742.54	4840668.93	Non-Participating	Minnesota	0:00	0	0:00	0:00
43	707861.60	4840458.05	Non-Participating	Minnesota	18:54	90	0:27	6:26
44	708158.48	4840697.92	Non-Participating	Minnesota	30:17	77	0:39	11:02
45	708427.46	4841672.29	Non-Participating	Minnesota	0:00	0	0:00	0:00
46	708976.50	4840717.57	Targeted	Minnesota	0:00	0	0:00	0:00
47	710262.92	4840946.97	Non-Participating	Minnesota	3:33	24	0:14	1:03
48	710762.86	4840767.53	Non-Participating	Minnesota	3:13	35	0:09	0:51
49	712384.27	4840783.97	Non-Participating	Minnesota	0:00	0	0:00	0:00
50	713334.25	4840942.29	Non-Participating	Minnesota	0:00	0	0:00	0:00
51	713754.99	4840911.87	Non-Participating	Minnesota	0:00	0	0:00	0:00
52	714456.02	4840842.55	Non-Participating	Minnesota	0:00	0	0:00	0:00
53	714992.51	4842006.83	Non-Participating	Minnesota	0:00	0	0:00	0:00
54	715567.30	4840772.12	Non-Participating	Minnesota	0:00	0	0:00	0:00
55	716141.80	4840921.50	Non-Participating	Minnesota	0:00	0	0:00	0:00
56	716669.20	4840946.13	Non-Participating	Minnesota	0:00	0	0:00	0:00
57	718688.18	4841612.49	Non-Participating	Minnesota	0:00	0	0:00	0:00
58	718385.04	4840853.05	Non-Participating	Minnesota	0:00	0	0:00	0:00
59	718574.90	4840839.53	Non-Participating	Minnesota	0:00	0	0:00	0:00
60	719858.02	4841887.30	Non-Participating	Minnesota	0:00	0	0:00	0:00
61	720051.79	4841014.92	Non-Participating	Minnesota	0:00	0	0:00	0:00
62	720869.50	4840872.15	Non-Participating	Minnesota	0:00	0	0:00	0:00
63	721441.68	4839367.75	Non-Participating	Minnesota	0:00	0	0:00	0:00
64	721085.12	4839469.21	Non-Participating	Minnesota	0:00	0	0:00	0:00
65	719813.12	4840097.41	Non-Participating	Minnesota	0:00	0	0:00	0:00
66	718919.37	4839262.10	Non-Participating	Minnesota	18:19	47	0:32	5:16
67	718471.98	4839347.33	Non-Participating	Minnesota	28:55	52	0:41	8:04
68	717296.33	4839345.88	Non-Participating	Minnesota	36:52	90	0:33	13:33
69	716610.59	4839807.02	Non-Participating	Minnesota	9:18	57	0:16	3:28
70	716604.40	4840268.87	Non-Participating	Minnesota	0:00	0	0:00	0:00
71	715049.56	4840410.68	Non-Participating	Minnesota	0:00	0	0:00	0:00
72	714242.60	4839322.89	Targeted	Minnesota	0:00	0	0:00	0:00

Table B-1: Shadow Flicker Modeling Results

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
73	713478.59	4839242.77	Targeted	Minnesota	0:00	0	0:00	0:00
74	713369.04	4839338.51	Non-Participating	Minnesota	0:00	0	0:00	0:00
75	713446.60	4840263.13	Non-Participating	Minnesota	0:00	0	0:00	0:00
76	713297.01	4840333.99	Non-Participating	Minnesota	0:00	0	0:00	0:00
78	711303.00	4839031.07	Targeted	Minnesota	37:04	62	0:56	10:39
79	710297.92	4839470.58	Targeted	Minnesota	8:32	56	0:22	3:08
80	710098.76	4839796.54	Non-Participating	Minnesota	26:58	96	0:28	9:57
81	710126.39	4840144.45	Non-Participating	Minnesota	17:49	68	0:25	5:49
82	708819.05	4839037.31	Non-Participating	Minnesota	57:09	152	0:39	21:58
83	708536.61	4839970.02	Participating	Minnesota	48:01	82	0:50	18:11
84	707329.06	4839034.08	Non-Participating	Minnesota	91:05	171	0:53	32:07
85	706870.81	4839475.06	Non-Participating	Minnesota	18:47	68	0:24	5:39
86	706925.99	4839978.62	Non-Participating	Minnesota	13:47	80	0:22	4:56
87	705855.19	4839004.53	Targeted	Minnesota	1:34	16	0:09	0:30
88	706656.02	4838157.19	Non-Participating	Minnesota	44:41	139	0:32	13:56
89	707058.95	4838411.07	Non-Participating	Minnesota	81:23	195	0:43	26:43
90	707064.45	4838031.04	Non-Participating	Minnesota	34:46	136	0:24	12:41
91	707510.54	4837477.67	Non-Participating	Minnesota	9:06	64	0:16	3:05
92	708141.65	4837461.67	Non-Participating	Minnesota	28:18	103	0:28	8:48
93	708243.59	4837310.77	Targeted	Minnesota	34:49	78	0:31	11:13
94	708400.98	4838664.74	Targeted	Minnesota	51:05	118	0:40	16:16
95	708687.83	4837450.43	Targeted	Minnesota	0:00	0	0:00	0:00
96	709771.69	4837511.27	Targeted	Minnesota	57:51	62	1:10	22:57
97	710445.82	4837977.55	Non-Participating	Minnesota	87:49	116	1:07	32:03
98	710772.80	4837437.00	Non-Participating	Minnesota	8:24	56	0:17	2:41
99	711645.42	4837393.46	Non-Participating	Minnesota	18:27	82	0:21	5:32
100	711810.77	4837813.61	Targeted	Minnesota	8:20	46	0:19	2:36
101	712200.34	4837408.33	Non-Participating	Minnesota	15:29	84	0:18	4:48
102	713104.19	4837670.84	Non-Participating	Minnesota	47:41	127	0:35	17:07
103	713167.31	4837435.71	Non-Participating	Minnesota	55:58	110	0:45	20:41
104	713992.36	4837483.37	Targeted	Minnesota	51:54	66	0:58	14:46
105	715042.04	4837912.39	Non-Participating	Minnesota	19:17	71	0:29	6:00
106	715021.68	4838699.63	Targeted	Minnesota	10:27	50	0:22	2:58
107	715090.43	4838637.19	Non-Participating	Minnesota	9:11	46	0:21	2:43
108	715313.77	4837500.27	Targeted	Minnesota	11:48	60	0:18	4:19
109	715783.84	4837663.54	Non-Participating	Minnesota	0:00	0	0:00	0:00
110	716026.85	4837558.63	Targeted	Minnesota	0:00	0	0:00	0:00
111	716411.22	4837638.23	Non-Participating	Minnesota	0:00	0	0:00	0:00
112	716797.43	4837677.61	Non-Participating	Minnesota	0:00	0	0:00	0:00
113	717493.50	4837682.56	Non-Participating	Minnesota	0:00	0	0:00	0:00
114	717959.58	4838266.65	Non-Participating	Minnesota	0:00	0	0:00	0:00
115	718096.72	4837655.04	Non-Participating	Minnesota	0:00	0	0:00	0:00
116	718635.34	4837734.24	Non-Participating	Minnesota	0:00	0	0:00	0:00
117	718973.38	4837665.43	Non-Participating	Minnesota	0:00	0	0:00	0:00
118	719803.30	4838775.43	Non-Participating	Minnesota	3:32	21	0:15	1:11
119	719789.20	4838850.50	Non-Participating	Minnesota	3:36	21	0:16	1:09
120	720329.65	4837683.29	Non-Participating	Minnesota	0:00	0	0:00	0:00
121	720497.83	4837781.83	Non-Participating	Minnesota	0:00	0	0:00	0:00
122	721468.69	4838097.90	Non-Participating	Minnesota	0:00	0	0:00	0:00
123	720672.05	4836880.47	Non-Participating	Minnesota	0:00	0	0:00	0:00
124	719773.40	4836874.47	Non-Participating	Minnesota	0:00	0	0:00	0:00
125	721504.01	4835748.19	Non-Participating	Minnesota	0:00	0	0:00	0:00
126	719835.22	4835489.72	Non-Participating	Minnesota	0:00	0	0:00	0:00
127	719971.96	4835872.49	Non-Participating	Minnesota	0:00	0	0:00	0:00
128	719000.79	4835890.62	Non-Participating	Minnesota	0:00	0	0:00	0:00
129	718569.06	4835055.95	Non-Participating	Minnesota	0:00	0	0:00	0:00
130	718342.87	4835837.33	Targeted	Minnesota	0:00	0	0:00	0:00
131	718247.08	4836742.93	Non-Participating	Minnesota	0:00	0	0:00	0:00
132	718240.47	4836646.55	Non-Participating	Minnesota	0:00	0	0:00	0:00
133	718177.51	4836701.05	Non-Participating	Minnesota	0:00	0	0:00	0:00
134	716977.83	4836815.57	Participating	Minnesota	0:00	0	0:00	0:00
135	716901.55	4835960.23	Non-Participating	Minnesota	0:00	0	0:00	0:00
136	715586.54	4836002.19	Non-Participating	Minnesota	0:00	0	0:00	0:00
137	715661.98	4836017.28	Non-Participating	Minnesota	0:00	0	0:00	0:00
138	714868.50	4835985.41	Non-Participating	Minnesota	0:00	0	0:00	0:00
139	715186.22	4835692.77	Participating	Minnesota	0:00	0	0:00	0:00
140	715206.94	4835652.83	Participating	Minnesota	0:00	0	0:00	0:00
141	714264.50	4835959.15	Non-Participating	Minnesota	7:35	37	0:15	2:05
142	712603.23	4835802.92	Participating	Minnesota	0:00	0	0:00	0:00
143	712308.20	4836059.46	Targeted	Minnesota	5:51	29	0:18	2:12
144	710937.13	4835543.44	Participating	Minnesota	20:53	111	0:27	7:15
145	710551.74	4835854.65	Non-Participating	Minnesota	30:04	91	0:32	9:34

Table B-1: Shadow Flicker Modeling Results

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
146	709610.69	4835866.83	Targeted	Minnesota	26:38	98	0:25	8:28
147	708710.52	4836244.46	Targeted	Minnesota	120:04	206	0:59	38:05
148	708431.38	4835795.37	Targeted	Minnesota	71:03	112	0:51	19:48
149	707467.79	4835655.21	Non-Participating	Minnesota	50:30	100	0:49	19:05
150	707382.61	4835946.18	Non-Participating	Minnesota	75:53	162	0:55	26:05
152	706957.43	4836478.77	Non-Participating	Minnesota	21:46	77	0:28	8:23
153	707156.95	4836908.27	Non-Participating	Minnesota	5:04	25	0:18	1:34
154	705991.93	4837185.67	Targeted	Minnesota	110:35	106	1:12	30:14
155	705492.89	4835958.91	Non-Participating	Minnesota	0:00	0	0:00	0:00
156	705858.11	4834844.91	Non-Participating	Minnesota	0:00	0	0:00	0:00
157	707016.69	4835236.06	Non-Participating	Minnesota	15:25	40	0:30	4:59
158	707356.17	4834741.12	Targeted	Minnesota	0:00	0	0:00	0:00
159	707085.43	4834360.19	Participating	Minnesota	0:00	0	0:00	0:00
160	708322.34	4834109.83	Non-Participating	Minnesota	12:55	61	0:17	4:56
161	708977.90	4835337.39	Targeted	Minnesota	32:25	81	0:32	10:51
162	709241.42	4834293.09	Targeted	Minnesota	40:43	117	0:32	15:03
163	710284.41	4834655.57	Targeted	Minnesota	60:14	144	0:49	20:34
164	713539.68	4834701.97	Participating	Minnesota	99:11	197	0:47	32:52
165	713519.94	4833754.80	Targeted	Minnesota	19:53	86	0:22	8:01
166	714328.91	4834335.98	Participating	Minnesota	27:19	118	0:23	9:37
167	715389.72	4834427.12	Non-Participating	Minnesota	76:08	89	0:59	29:13
168	715960.50	4833594.78	Targeted	Minnesota	32:12	84	0:35	11:41
169	717742.89	4833679.69	Non-Participating	Minnesota	83:33	120	1:03	23:00
170	717526.44	4834457.10	Participating	Minnesota	2:14	17	0:12	0:37
171	717942.71	4834486.94	Participating	Minnesota	0:00	0	0:00	0:00
172	721247.61	4833637.06	Non-Participating	Minnesota	0:00	0	0:00	0:00
173	720587.26	4833766.80	Non-Participating	Minnesota	0:00	0	0:00	0:00
174	719968.80	4833440.58	Non-Participating	Minnesota	0:00	0	0:00	0:00
175	720001.01	4832510.77	Non-Participating	Minnesota	2:48	20	0:13	0:50
176	720086.46	4832488.58	Non-Participating	Minnesota	2:25	18	0:12	0:44
177	718057.16	4832879.43	Non-Participating	Minnesota	8:26	33	0:22	3:04
178	718221.38	4832811.99	Non-Participating	Minnesota	38:57	97	0:33	11:07
179	720138.53	4831804.67	Non-Participating	Minnesota	2:36	19	0:13	0:48
180	720018.46	4831817.27	Non-Participating	Minnesota	3:15	21	0:15	1:00
181	718905.22	4831299.44	Non-Participating	Minnesota	21:13	54	0:31	5:32
182	717421.25	4831235.51	Non-Participating	Minnesota	62:38	156	0:39	22:20
183	716309.79	4831038.21	Non-Participating	Minnesota	52:42	135	0:42	14:51
184	715633.49	4831085.85	Targeted	Minnesota	39:19	150	0:29	12:04
185	716220.40	4831908.27	Targeted	Minnesota	11:18	54	0:22	3:30
186	716577.54	4832695.90	Non-Participating	Minnesota	23:15	75	0:33	8:14
187	716382.77	4832803.70	Targeted	Minnesota	33:08	111	0:27	11:22
188	716021.03	4832717.66	Non-Participating	Minnesota	24:39	96	0:25	7:59
189	715946.91	4832805.42	Non-Participating	Minnesota	58:55	145	0:37	19:21
190	715198.78	4832781.62	Non-Participating	Minnesota	6:03	28	0:19	1:53
191	715208.57	4833157.75	Non-Participating	Minnesota	5:55	24	0:20	1:52
192	714338.84	4832655.97	Participating	Minnesota	0:00	0	0:00	0:00
193	713317.82	4832719.65	Non-Participating	Minnesota	7:01	36	0:17	2:55
194	712633.30	4832532.44	Non-Participating	Minnesota	10:51	58	0:17	4:42
195	712594.49	4832495.72	Non-Participating	Minnesota	13:35	60	0:18	5:47
197	712507.23	4832437.14	Non-Participating	Minnesota	3:41	32	0:10	1:31
198	712346.67	4832653.95	Non-Participating	Minnesota	21:11	68	0:23	9:01
199	712846.95	4832428.39	Non-Participating	Minnesota	5:53	40	0:13	2:33
200	712862.53	4832429.34	Non-Participating	Minnesota	5:31	40	0:13	2:23
201	712882.15	4832429.34	Non-Participating	Minnesota	5:18	38	0:13	2:17
202	712894.50	4832431.01	Non-Participating	Minnesota	5:02	36	0:13	2:10
203	712928.71	4832437.86	Non-Participating	Minnesota	10:40	57	0:16	4:00
204	712936.81	4832480.03	Non-Participating	Minnesota	10:58	50	0:16	4:11
205	712995.55	4832445.10	Non-Participating	Minnesota	11:48	51	0:17	4:30
206	712932.00	4832382.02	Non-Participating	Minnesota	8:05	48	0:17	2:56
207	712889.30	4832379.64	Non-Participating	Minnesota	6:49	41	0:16	2:27
208	712851.04	4832377.53	Non-Participating	Minnesota	8:40	60	0:13	3:43
209	712836.85	4832377.30	Non-Participating	Minnesota	9:05	58	0:13	3:53
210	712823.45	4832370.97	Non-Participating	Minnesota	9:07	56	0:13	3:52
211	712537.69	4832295.51	Non-Participating	Minnesota	0:13	5	0:03	0:05
212	712564.57	4832317.29	Non-Participating	Minnesota	0:00	0	0:00	0:00
213	712605.45	4832307.68	Non-Participating	Minnesota	0:00	0	0:00	0:00
214	712629.62	4832300.88	Non-Participating	Minnesota	0:00	0	0:00	0:00
215	712674.11	4832322.67	Non-Participating	Minnesota	1:16	23	0:05	0:30
216	712679.19	4832298.37	Non-Participating	Minnesota	0:05	5	0:01	0:02
217	712717.98	4832312.61	Non-Participating	Minnesota	1:55	28	0:06	0:47
218	712785.61	4832316.50	Non-Participating	Minnesota	4:24	40	0:10	1:50
219	712778.81	4832299.33	Non-Participating	Minnesota	3:00	34	0:08	1:14
220	712829.55	4832333.38	Non-Participating	Minnesota	6:58	48	0:12	2:57
221	712830.18	4832309.03	Non-Participating	Minnesota	10:11	75	0:15	3:57

Table B-1: Shadow Flicker Modeling Results

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
222	712867.95	4832305.17	Non-Participating	Minnesota	5:26	32	0:16	1:55
223	713109.05	4832338.04	Non-Participating	Minnesota	13:55	58	0:18	5:14
224	713137.94	4832336.46	Non-Participating	Minnesota	14:19	56	0:18	5:25
225	713168.29	4832342.12	Non-Participating	Minnesota	14:04	52	0:19	5:23
226	713226.79	4832342.81	Non-Participating	Minnesota	11:49	44	0:19	4:34
227	713292.76	4832253.02	Non-Participating	Minnesota	16:20	55	0:21	6:14
228	713308.00	4832224.79	Non-Participating	Minnesota	17:32	59	0:21	6:38
229	713375.93	4832184.38	Non-Participating	Minnesota	18:44	59	0:22	7:06
230	713431.00	4832183.48	Non-Participating	Minnesota	17:12	53	0:23	6:36
231	712884.28	4832262.41	Non-Participating	Minnesota	5:18	31	0:16	1:52
232	712831.97	4832268.25	Non-Participating	Minnesota	4:44	29	0:15	1:40
233	712837.31	4832254.52	Non-Participating	Minnesota	4:42	28	0:15	1:40
234	712834.64	4832232.89	Non-Participating	Minnesota	4:35	28	0:15	1:38
235	712848.32	4832199.78	Non-Participating	Minnesota	4:38	27	0:15	1:40
236	712887.35	4832233.70	Non-Participating	Minnesota	5:07	29	0:16	1:49
237	712890.56	4832202.61	Non-Participating	Minnesota	5:02	29	0:16	1:48
238	712780.48	4832264.85	Non-Participating	Minnesota	0:53	20	0:04	0:21
239	712785.27	4832251.36	Non-Participating	Minnesota	0:23	16	0:02	0:09
240	712780.83	4832224.05	Non-Participating	Minnesota	4:11	25	0:15	1:31
241	712787.28	4832192.10	Non-Participating	Minnesota	4:13	25	0:15	1:32
242	712719.68	4832205.22	Non-Participating	Minnesota	0:00	0	0:00	0:00
243	712719.10	4832249.73	Non-Participating	Minnesota	0:00	0	0:00	0:00
244	712718.61	4832266.40	Non-Participating	Minnesota	0:00	0	0:00	0:00
245	712753.58	4832271.17	Non-Participating	Minnesota	0:33	16	0:03	0:13
246	712748.37	4832234.80	Non-Participating	Minnesota	0:00	0	0:00	0:00
247	712673.11	4832238.71	Non-Participating	Minnesota	0:00	0	0:00	0:00
248	712675.00	4832216.30	Non-Participating	Minnesota	0:00	0	0:00	0:00
249	712677.58	4832191.27	Non-Participating	Minnesota	4:10	21	0:15	1:39
250	712618.78	4832190.35	Non-Participating	Minnesota	11:53	38	0:23	4:39
251	712564.96	4832190.52	Non-Participating	Minnesota	16:49	48	0:25	6:31
252	712570.97	4832213.69	Non-Participating	Minnesota	12:16	40	0:23	4:47
253	712571.98	4832232.04	Non-Participating	Minnesota	8:46	33	0:20	3:26
254	712571.88	4832259.87	Non-Participating	Minnesota	3:28	20	0:13	1:22
255	712608.06	4832231.58	Non-Participating	Minnesota	4:10	22	0:15	1:38
256	712456.59	4832228.74	Non-Participating	Minnesota	18:03	53	0:24	6:55
257	712392.84	4832139.24	Non-Participating	Minnesota	13:36	57	0:23	4:53
258	712456.01	4832133.54	Non-Participating	Minnesota	18:45	75	0:25	6:52
259	712503.93	4832139.10	Non-Participating	Minnesota	22:17	68	0:25	8:19
260	712459.29	4832110.14	Non-Participating	Minnesota	16:23	66	0:25	5:55
261	712508.07	4832110.19	Non-Participating	Minnesota	21:34	74	0:26	7:56
262	712450.68	4832077.28	Non-Participating	Minnesota	13:54	52	0:25	4:58
263	712507.77	4832084.46	Non-Participating	Minnesota	19:02	80	0:26	6:55
264	712553.69	4832079.29	Non-Participating	Minnesota	23:55	77	0:27	8:48
265	712626.23	4832098.28	Non-Participating	Minnesota	27:29	65	0:29	10:26
266	712568.90	4832143.05	Non-Participating	Minnesota	23:36	60	0:27	8:59
267	712613.84	4832149.49	Non-Participating	Minnesota	20:26	53	0:28	7:53
268	712636.39	4832149.27	Non-Participating	Minnesota	18:36	49	0:28	7:13
269	712676.17	4832149.03	Non-Participating	Minnesota	14:05	41	0:25	5:31
270	712679.14	4832113.16	Non-Participating	Minnesota	21:31	53	0:29	8:19
271	712678.29	4832087.92	Non-Participating	Minnesota	26:24	61	0:31	10:06
272	712720.39	4832155.88	Non-Participating	Minnesota	6:03	26	0:17	2:23
273	712724.09	4832116.02	Non-Participating	Minnesota	15:35	43	0:27	6:06
274	712724.53	4832087.84	Non-Participating	Minnesota	25:53	75	0:30	10:00
275	712745.94	4832084.47	Non-Participating	Minnesota	24:08	73	0:30	9:21
276	712790.68	4832081.04	Non-Participating	Minnesota	18:46	64	0:27	7:18
277	712790.26	4832095.01	Non-Participating	Minnesota	14:54	58	0:24	5:47
278	712788.37	4832119.07	Non-Participating	Minnesota	8:25	45	0:15	3:14
279	712789.00	4832150.71	Non-Participating	Minnesota	4:08	25	0:15	1:31
280	712759.46	4832158.67	Non-Participating	Minnesota	3:55	24	0:15	1:26
281	712834.02	4832154.99	Non-Participating	Minnesota	4:23	26	0:16	1:36
282	712841.90	4832109.02	Non-Participating	Minnesota	4:19	25	0:16	1:35
283	712845.16	4832086.79	Non-Participating	Minnesota	7:25	42	0:15	2:50
284	712877.12	4832089.52	Non-Participating	Minnesota	4:33	26	0:16	1:41
285	712900.32	4832095.23	Non-Participating	Minnesota	4:42	26	0:17	1:43
286	712889.85	4832123.54	Non-Participating	Minnesota	4:42	26	0:16	1:43
287	712889.80	4832163.62	Non-Participating	Minnesota	4:46	27	0:16	1:43
288	712889.23	4832144.18	Non-Participating	Minnesota	4:43	27	0:16	1:43
289	712730.42	4832035.84	Non-Participating	Minnesota	35:58	90	0:33	13:41
290	712794.99	4832046.39	Non-Participating	Minnesota	27:58	76	0:33	10:50
291	712794.24	4832015.06	Non-Participating	Minnesota	36:48	88	0:35	14:06
292	712796.38	4831988.68	Non-Participating	Minnesota	42:12	96	0:36	16:02
293	712732.53	4831979.23	Non-Participating	Minnesota	40:53	106	0:34	15:13
294	712734.58	4832008.79	Non-Participating	Minnesota	39:41	96	0:33	14:58
295	712733.41	4831929.85	Non-Participating	Minnesota	34:03	102	0:34	12:28

Table B-1: Shadow Flicker Modeling Results

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
296	712732.95	4831902.51	Non-Participating	Minnesota	30:39	89	0:35	11:12
297	712735.50	4831869.27	Non-Participating	Minnesota	28:37	83	0:35	10:35
298	712751.54	4831840.81	Non-Participating	Minnesota	29:09	78	0:36	10:55
299	712791.52	4831841.65	Non-Participating	Minnesota	33:45	87	0:38	12:32
300	712798.77	4831870.72	Non-Participating	Minnesota	37:25	98	0:38	13:43
301	712772.78	4831901.49	Non-Participating	Minnesota	37:01	103	0:36	13:33
302	712790.64	4831921.66	Non-Participating	Minnesota	45:25	114	0:37	16:47
303	712842.90	4831916.61	Non-Participating	Minnesota	52:01	110	0:39	19:27
304	711473.36	4832637.58	Participating	Minnesota	11:00	54	0:19	3:38
305	711252.43	4832635.31	Participating	Minnesota	16:58	66	0:22	5:27
306	710955.15	4832635.80	Participating	Minnesota	36:50	112	0:27	11:40
307	710371.01	4832978.05	Participating	Minnesota	118:51	170	1:12	39:37
308	708958.17	4832642.70	Targeted	Minnesota	47:11	146	0:33	16:11
309	708910.35	4832432.23	Participating	Minnesota	27:48	86	0:27	9:25
310	708545.61	4832471.18	Participating	Minnesota	15:46	80	0:22	5:15
311	707948.72	4832546.75	Non-Participating	Minnesota	13:45	77	0:21	4:24
312	707785.26	4832449.07	Non-Participating	Minnesota	16:29	68	0:28	5:25
313	707392.79	4832577.65	Targeted	Minnesota	65:57	156	0:37	19:15
314	707103.01	4833341.74	Non-Participating	Minnesota	13:03	36	0:28	3:40
315	705808.16	4832506.07	Non-Participating	Minnesota	39:28	94	0:36	15:11
316	706307.90	4832597.14	Participating	Minnesota	0:00	0	0:00	0:00
317	706391.85	4832533.05	Targeted	Minnesota	11:11	30	0:28	4:24
318	705921.04	4831717.10	Targeted	Minnesota	57:29	145	0:36	19:39
319	707124.26	4832268.92	Targeted	Minnesota	92:19	90	1:34	25:54
320	707148.31	4831858.58	Targeted	Minnesota	85:13	125	1:03	34:37
321	706377.57	4830879.08	Targeted	Minnesota	0:00	0	0:00	0:00
322	706795.99	4830788.28	Targeted	Minnesota	0:00	0	0:00	0:00
323	707286.36	4830938.93	Participating	Minnesota	0:00	0	0:00	0:00
324	708796.80	4831061.44	Non-Participating	Minnesota	2:14	18	0:11	0:47
325	708665.52	4830816.87	Non-Participating	Minnesota	3:17	24	0:13	1:13
326	709134.89	4830862.41	Non-Participating	Minnesota	0:00	0	0:00	0:00
327	709959.89	4830915.52	Non-Participating	Minnesota	0:00	0	0:00	0:00
328	710444.83	4830632.98	Participating	Minnesota	0:00	0	0:00	0:00
329	711156.75	4831002.57	Non-Participating	Minnesota	0:00	0	0:00	0:00
330	712129.09	4830942.84	Non-Participating	Minnesota	9:50	53	0:19	3:09
331	713644.87	4830986.83	Targeted	Minnesota	113:21	176	1:18	42:22
332	714014.30	4831109.09	Participating	Minnesota	119:59	199	0:52	41:45
333	715256.78	4831015.51	Non-Participating	Minnesota	104:55	198	0:45	34:11
334	715114.86	4831046.13	Non-Participating	Minnesota	61:56	145	0:44	20:37
335	715280.87	4830888.83	Non-Participating	Minnesota	80:47	170	0:47	24:06
336	720850.87	4829589.22	Non-Participating	Minnesota	0:00	0	0:00	0:00
337	720471.34	4829713.08	Non-Participating	Minnesota	0:00	0	0:00	0:00
338	718660.97	4829287.11	Non-Participating	Minnesota	7:04	28	0:19	1:59
339	718547.55	4829529.40	Non-Participating	Minnesota	0:00	0	0:00	0:00
340	718705.42	4829658.28	Non-Participating	Minnesota	0:00	0	0:00	0:00
341	718207.07	4829650.23	Non-Participating	Minnesota	0:00	0	0:00	0:00
342	718488.68	4830493.21	Targeted	Minnesota	0:00	0	0:00	0:00
343	718614.16	4830476.57	Non-Participating	Minnesota	5:14	22	0:19	2:07
344	716736.70	4829503.83	Targeted	Minnesota	6:12	42	0:15	2:23
345	716664.22	4829593.01	Non-Participating	Minnesota	4:55	27	0:17	1:49
346	716087.40	4829579.09	Targeted	Minnesota	34:44	106	0:28	14:30
347	715685.16	4829460.28	Non-Participating	Minnesota	11:20	54	0:19	4:53
348	714913.69	4829173.93	Targeted	Minnesota	0:00	0	0:00	0:00
349	714617.74	4829521.25	Targeted	Minnesota	0:00	0	0:00	0:00
350	713650.85	4830171.47	Targeted	Minnesota	56:25	125	0:53	18:22
351	712905.87	4829462.35	Non-Participating	Minnesota	8:15	41	0:18	2:40
352	712717.46	4829343.28	Participating	Minnesota	5:12	34	0:13	1:41
353	712178.69	4830005.45	Targeted	Minnesota	2:13	20	0:10	0:40
354	712093.44	4829732.15	Non-Participating	Minnesota	0:00	0	0:00	0:00
355	707416.58	4830311.62	Targeted	Minnesota	0:00	0	0:00	0:00
356	712848.91	4827911.62	Non-Participating	Minnesota	0:00	0	0:00	0:00
357	713480.57	4827427.94	Non-Participating	Minnesota	0:00	0	0:00	0:00
358	713672.96	4827918.96	Non-Participating	Minnesota	0:00	0	0:00	0:00
359	713975.46	4828553.70	Non-Participating	Minnesota	0:00	0	0:00	0:00
360	713820.87	4828830.04	Targeted	Minnesota	0:00	0	0:00	0:00
361	714217.10	4827915.58	Non-Participating	Minnesota	0:00	0	0:00	0:00
362	715474.31	4827938.91	Non-Participating	Minnesota	0:00	0	0:00	0:00
363	715541.50	4827975.19	Participating	Minnesota	0:00	0	0:00	0:00
364	716139.42	4827816.29	Non-Participating	Minnesota	4:24	26	0:15	1:21
365	716987.91	4827842.08	Non-Participating	Minnesota	0:00	0	0:00	0:00
366	717070.79	4827804.48	Non-Participating	Minnesota	0:00	0	0:00	0:00
367	717108.39	4828849.54	Non-Participating	Minnesota	20:39	47	0:34	8:02
368	718562.18	4828640.41	Targeted	Minnesota	33:41	58	0:45	9:34
369	718674.18	4828400.30	Non-Participating	Minnesota	31:09	60	0:40	11:15

Table B-1: Shadow Flicker Modeling Results

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
370	718602.36	4827497.49	Non-Participating	Minnesota	0:00	0	0:00	0:00
371	718830.45	4827566.20	Non-Participating	Minnesota	0:00	0	0:00	0:00
372	719830.43	4828111.38	Non-Participating	Minnesota	2:35	20	0:12	0:56
373	719778.19	4828092.97	Non-Participating	Minnesota	3:01	22	0:13	1:06
374	715248.44	4827383.73	Non-Participating	Minnesota	0:00	0	0:00	0:00
375	713888.51	4826969.27	Non-Participating	Minnesota	0:00	0	0:00	0:00
376	705300.91	4848839.14	Non-Participating	Minnesota	0:00	0	0:00	0:00
377	706631.09	4848703.62	Non-Participating	Minnesota	0:00	0	0:00	0:00
378	706929.07	4848599.18	Non-Participating	Minnesota	0:00	0	0:00	0:00
379	707922.77	4848733.84	Non-Participating	Minnesota	0:00	0	0:00	0:00
380	709860.15	4848794.24	Targeted	Minnesota	0:00	0	0:00	0:00
381	710296.98	4848793.31	Non-Participating	Minnesota	0:00	0	0:00	0:00
382	710975.28	4848884.65	Non-Participating	Minnesota	0:00	0	0:00	0:00
383	705464.17	4831442.94	Non-Participating	South Dakota	23:39	111	0:21	7:33
384	704881.41	4833942.19	Non-Participating	South Dakota	15:49	53	0:22	6:03
385	704934.04	4833903.19	Non-Participating	South Dakota	17:20	55	0:23	6:37
386	705349.51	4834096.40	Non-Participating	South Dakota	0:00	0	0:00	0:00
387	703947.03	4834924.62	Non-Participating	South Dakota	0:00	0	0:00	0:00
388	703763.96	4835653.19	Non-Participating	South Dakota	0:00	0	0:00	0:00
389	704815.83	4835753.70	Non-Participating	South Dakota	0:00	0	0:00	0:00
390	705281.73	4835629.59	Non-Participating	South Dakota	0:00	0	0:00	0:00
391	703806.27	4836008.60	Non-Participating	South Dakota	0:00	0	0:00	0:00
392	703780.24	4836101.13	Non-Participating	South Dakota	0:00	0	0:00	0:00
393	703830.86	4836391.37	Non-Participating	South Dakota	2:07	18	0:10	0:39
394	703819.58	4836476.57	Non-Participating	South Dakota	2:11	18	0:11	0:40
395	703911.83	4836498.35	Non-Participating	South Dakota	2:42	20	0:12	0:50
396	703896.36	4836623.39	Non-Participating	South Dakota	2:14	18	0:11	0:43
397	703578.28	4837163.05	Non-Participating	South Dakota	0:00	0	0:00	0:00
398	703706.65	4837165.34	Non-Participating	South Dakota	0:00	0	0:00	0:00
399	703797.22	4837269.88	Non-Participating	South Dakota	1:25	16	0:08	0:29
400	703798.54	4837450.44	Non-Participating	South Dakota	0:00	0	0:00	0:00
401	703882.11	4837706.72	Non-Participating	South Dakota	3:01	20	0:14	0:57
402	704040.36	4837303.55	Non-Participating	South Dakota	6:17	48	0:13	2:07
403	704182.61	4837300.48	Non-Participating	South Dakota	10:40	59	0:17	3:41
404	703706.65	4838294.81	Non-Participating	South Dakota	0:00	0	0:00	0:00
405	703933.92	4838215.27	Non-Participating	South Dakota	3:04	20	0:14	0:59
406	703729.98	4838798.96	Non-Participating	South Dakota	0:00	0	0:00	0:00
407	703653.42	4839079.13	Non-Participating	South Dakota	0:00	0	0:00	0:00
408	704667.13	4838957.64	Non-Participating	South Dakota	12:06	52	0:23	4:34
409	704830.38	4838768.26	Non-Participating	South Dakota	32:28	89	0:27	11:49
410	703785.10	4839818.54	Non-Participating	South Dakota	0:00	0	0:00	0:00
411	705171.09	4840026.31	Non-Participating	South Dakota	0:00	0	0:00	0:00
412	703132.24	4840141.30	Non-Participating	South Dakota	0:00	0	0:00	0:00
413	703198.00	4840427.17	Non-Participating	South Dakota	0:00	0	0:00	0:00
414	703241.98	4840429.71	Non-Participating	South Dakota	0:00	0	0:00	0:00
415	703913.94	4840550.82	Non-Participating	South Dakota	0:00	0	0:00	0:00
416	704492.38	4840341.24	Non-Participating	South Dakota	0:00	0	0:00	0:00
417	704782.58	4840430.67	Non-Participating	South Dakota	0:00	0	0:00	0:00
418	705123.49	4840673.16	Non-Participating	South Dakota	0:00	0	0:00	0:00
419	703564.36	4841448.22	Non-Participating	South Dakota	0:00	0	0:00	0:00
420	703746.52	4841901.08	Non-Participating	South Dakota	0:00	0	0:00	0:00
421	703834.63	4841918.03	Non-Participating	South Dakota	0:00	0	0:00	0:00
422	705169.14	4841778.72	Non-Participating	South Dakota	0:00	0	0:00	0:00
423	705155.44	4842202.20	Non-Participating	South Dakota	0:00	0	0:00	0:00
424	705039.92	4842185.90	Non-Participating	South Dakota	0:00	0	0:00	0:00
425	703698.42	4843134.63	Non-Participating	South Dakota	0:00	0	0:00	0:00
426	703076.93	4843496.03	Non-Participating	South Dakota	0:00	0	0:00	0:00
427	703543.71	4843522.22	Non-Participating	South Dakota	0:00	0	0:00	0:00
428	703791.36	4843544.69	Non-Participating	South Dakota	0:00	0	0:00	0:00
429	703807.51	4843371.35	Non-Participating	South Dakota	0:00	0	0:00	0:00
430	703964.87	4843675.19	Non-Participating	South Dakota	0:00	0	0:00	0:00
431	704279.70	4843597.33	Non-Participating	South Dakota	0:00	0	0:00	0:00
432	705095.53	4843395.34	Non-Participating	South Dakota	0:00	0	0:00	0:00
433	705119.32	4842994.01	Non-Participating	South Dakota	0:00	0	0:00	0:00
434	703210.31	4845218.38	Non-Participating	South Dakota	0:00	0	0:00	0:00
435	703655.30	4845259.88	Non-Participating	South Dakota	0:00	0	0:00	0:00
436	703718.90	4845630.64	Non-Participating	South Dakota	0:00	0	0:00	0:00
437	704017.84	4845316.26	Non-Participating	South Dakota	0:00	0	0:00	0:00
438	704824.64	4845406.00	Non-Participating	South Dakota	0:00	0	0:00	0:00
439	703610.45	4846099.04	Non-Participating	South Dakota	0:00	0	0:00	0:00
440	703662.42	4847171.38	Non-Participating	South Dakota	0:00	0	0:00	0:00
441	703673.57	4847781.75	Non-Participating	South Dakota	0:00	0	0:00	0:00
442	704957.99	4848148.24	Non-Participating	South Dakota	0:00	0	0:00	0:00
443	703017.12	4847952.56	Non-Participating	South Dakota	0:00	0	0:00	0:00

Table B-1: Shadow Flicker Modeling Results

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
444	703019.78	4847976.89	Non-Participating	South Dakota	0:00	0	0:00	0:00
445	703016.93	4848052.49	Non-Participating	South Dakota	0:00	0	0:00	0:00
446	703080.20	4848056.20	Non-Participating	South Dakota	0:00	0	0:00	0:00
447	703065.43	4848024.42	Non-Participating	South Dakota	0:00	0	0:00	0:00
448	703065.57	4847991.56	Non-Participating	South Dakota	0:00	0	0:00	0:00
449	703129.99	4848006.74	Non-Participating	South Dakota	0:00	0	0:00	0:00
450	703168.99	4848023.70	Non-Participating	South Dakota	0:00	0	0:00	0:00
451	703013.19	4848105.25	Non-Participating	South Dakota	0:00	0	0:00	0:00
452	703005.94	4848179.89	Non-Participating	South Dakota	0:00	0	0:00	0:00
453	703059.93	4848181.42	Non-Participating	South Dakota	0:00	0	0:00	0:00
454	703062.63	4848147.55	Non-Participating	South Dakota	0:00	0	0:00	0:00
456	703124.69	4848133.99	Non-Participating	South Dakota	0:00	0	0:00	0:00
458	703244.13	4848113.26	Non-Participating	South Dakota	0:00	0	0:00	0:00
459	703241.16	4848188.31	Non-Participating	South Dakota	0:00	0	0:00	0:00
460	702954.97	4848228.98	Non-Participating	South Dakota	0:00	0	0:00	0:00
461	703074.13	4848229.08	Non-Participating	South Dakota	0:00	0	0:00	0:00
462	703121.89	4848302.50	Non-Participating	South Dakota	0:00	0	0:00	0:00
463	703121.79	4848256.23	Non-Participating	South Dakota	0:00	0	0:00	0:00
464	703180.66	4848312.57	Non-Participating	South Dakota	0:00	0	0:00	0:00
465	703176.46	4848235.57	Non-Participating	South Dakota	0:00	0	0:00	0:00
466	703242.02	4848232.13	Non-Participating	South Dakota	0:00	0	0:00	0:00
467	703289.44	4848250.13	Non-Participating	South Dakota	0:00	0	0:00	0:00
468	703285.28	4848305.42	Non-Participating	South Dakota	0:00	0	0:00	0:00
469	703238.10	4848313.94	Non-Participating	South Dakota	0:00	0	0:00	0:00
470	703118.81	4848430.03	Non-Participating	South Dakota	0:00	0	0:00	0:00
471	703117.32	4848399.72	Non-Participating	South Dakota	0:00	0	0:00	0:00
472	703118.49	4848369.89	Non-Participating	South Dakota	0:00	0	0:00	0:00
473	703283.34	4848401.65	Non-Participating	South Dakota	0:00	0	0:00	0:00
474	703504.59	4848360.63	Non-Participating	South Dakota	0:00	0	0:00	0:00
475	703164.64	4848496.77	Non-Participating	South Dakota	0:00	0	0:00	0:00
476	703598.30	4848527.13	Non-Participating	South Dakota	0:00	0	0:00	0:00
477	704664.41	4848425.57	Non-Participating	South Dakota	0:00	0	0:00	0:00
478	704813.86	4848633.46	Non-Participating	South Dakota	0:00	0	0:00	0:00
479	706044.71	4849773.17	Non-Participating	Minnesota	0:00	0	0:00	0:00
480	707387.55	4850254.10	Non-Participating	Minnesota	0:00	0	0:00	0:00
481	707945.22	4849861.93	Non-Participating	Minnesota	0:00	0	0:00	0:00
482	709936.28	4850179.20	Non-Participating	Minnesota	0:00	0	0:00	0:00
483	706553.32	4850323.54	Non-Participating	Minnesota	0:00	0	0:00	0:00
484	707466.63	4850517.83	Non-Participating	Minnesota	0:00	0	0:00	0:00
485	706627.42	4850969.47	Non-Participating	Minnesota	0:00	0	0:00	0:00
600	721504.45	4832717.79	Non-Participating	Minnesota	0:00	0	0:00	0:00
601	721107.43	4831397.47	Non-Participating	Minnesota	0:00	0	0:00	0:00
602	721193.76	4829744.37	Targeted	Minnesota	0:00	0	0:00	0:00
603	721607.87	4829645.45	Non-Participating	Minnesota	0:00	0	0:00	0:00
604	720771.23	4828229.30	Non-Participating	Minnesota	0:00	0	0:00	0:00
605	720294.73	4827201.39	Non-Participating	Minnesota	0:00	0	0:00	0:00
606	719889.27	4826965.25	Non-Participating	Minnesota	0:00	0	0:00	0:00
607	720233.54	4825646.32	Non-Participating	Minnesota	0:00	0	0:00	0:00
608	719207.30	4824943.60	Non-Participating	Minnesota	0:00	0	0:00	0:00
609	718925.56	4826292.09	Non-Participating	Minnesota	0:00	0	0:00	0:00
610	718736.06	4826853.88	Non-Participating	Minnesota	0:00	0	0:00	0:00
611	718258.61	4826322.24	Non-Participating	Minnesota	0:00	0	0:00	0:00
612	717984.98	4825391.46	Non-Participating	Minnesota	0:00	0	0:00	0:00
613	716906.43	4826389.27	Non-Participating	Minnesota	0:00	0	0:00	0:00
614	716639.93	4826263.50	Non-Participating	Minnesota	0:00	0	0:00	0:00
615	715859.70	4826343.35	Participating	Minnesota	0:00	0	0:00	0:00
616	712762.52	4826456.76	Non-Participating	Minnesota	0:00	0	0:00	0:00
617	710508.38	4828661.23	Non-Participating	Minnesota	0:00	0	0:00	0:00
618	710312.21	4827758.12	Participating	Minnesota	0:00	0	0:00	0:00
619	708971.55	4828978.11	Participating	Minnesota	0:00	0	0:00	0:00
620	708880.83	4829066.94	Non-Participating	Minnesota	0:00	0	0:00	0:00
621	708621.24	4827744.01	Non-Participating	Minnesota	0:00	0	0:00	0:00
622	707666.58	4829219.47	Non-Participating	Minnesota	0:00	0	0:00	0:00
623	707381.37	4829213.15	Non-Participating	Minnesota	0:00	0	0:00	0:00
624	707003.03	4829294.84	Non-Participating	Minnesota	0:00	0	0:00	0:00
625	706769.91	4829219.83	Participating	Minnesota	0:00	0	0:00	0:00
626	707202.71	4829656.80	Non-Participating	Minnesota	0:00	0	0:00	0:00
627	706884.07	4829695.44	Non-Participating	Minnesota	0:00	0	0:00	0:00
628	706800.75	4829875.13	Non-Participating	Minnesota	0:00	0	0:00	0:00
629	706334.75	4829721.80	Participating	Minnesota	0:00	0	0:00	0:00
630	706496.34	4829597.02	Non-Participating	Minnesota	0:00	0	0:00	0:00
631	706398.43	4829578.24	Targeted	Minnesota	0:00	0	0:00	0:00
632	706314.88	4829561.32	Targeted	Minnesota	0:00	0	0:00	0:00
633	706251.50	4829532.13	Targeted	Minnesota	0:00	0	0:00	0:00

Table B-1: Shadow Flicker Modeling Results

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
634	705621.54	4829441.98	Non-Participating	Minnesota	0:00	0	0:00	0:00
635	705623.53	4828995.44	Non-Participating	Minnesota	0:00	0	0:00	0:00
636	705654.15	4828680.11	Non-Participating	Minnesota	0:00	0	0:00	0:00
637	705562.56	4829075.23	Non-Participating	South Dakota	0:00	0	0:00	0:00
638	705381.51	4828643.03	Non-Participating	South Dakota	0:00	0	0:00	0:00
639	705232.02	4828693.33	Non-Participating	South Dakota	0:00	0	0:00	0:00
640	705156.39	4828687.56	Non-Participating	South Dakota	0:00	0	0:00	0:00
641	705144.00	4828631.96	Non-Participating	South Dakota	0:00	0	0:00	0:00
642	705165.33	4828631.41	Non-Participating	South Dakota	0:00	0	0:00	0:00
643	705188.15	4828631.29	Non-Participating	South Dakota	0:00	0	0:00	0:00
644	705245.87	4828628.25	Non-Participating	South Dakota	0:00	0	0:00	0:00
645	705190.52	4828581.28	Non-Participating	South Dakota	0:00	0	0:00	0:00
646	705171.84	4828565.72	Non-Participating	South Dakota	0:00	0	0:00	0:00
647	705139.58	4828563.76	Non-Participating	South Dakota	0:00	0	0:00	0:00
648	705164.83	4828509.94	Non-Participating	South Dakota	0:00	0	0:00	0:00
649	705193.32	4828510.33	Non-Participating	South Dakota	0:00	0	0:00	0:00
650	705235.30	4828503.99	Non-Participating	South Dakota	0:00	0	0:00	0:00
651	705237.46	4828485.00	Non-Participating	South Dakota	0:00	0	0:00	0:00
652	705236.89	4828464.00	Non-Participating	South Dakota	0:00	0	0:00	0:00
653	705237.97	4828440.75	Non-Participating	South Dakota	0:00	0	0:00	0:00
654	705232.89	4828391.80	Non-Participating	South Dakota	0:00	0	0:00	0:00
655	705192.38	4828390.51	Non-Participating	South Dakota	0:00	0	0:00	0:00
656	705192.04	4828445.68	Non-Participating	South Dakota	0:00	0	0:00	0:00
657	705164.73	4828442.51	Non-Participating	South Dakota	0:00	0	0:00	0:00
658	705141.80	4828441.62	Non-Participating	South Dakota	0:00	0	0:00	0:00
659	705114.53	4828440.47	Non-Participating	South Dakota	0:00	0	0:00	0:00
660	705134.87	4828508.79	Non-Participating	South Dakota	0:00	0	0:00	0:00
661	705112.05	4828508.92	Non-Participating	South Dakota	0:00	0	0:00	0:00
662	705111.94	4828563.26	Non-Participating	South Dakota	0:00	0	0:00	0:00
663	705068.50	4828447.23	Non-Participating	South Dakota	0:00	0	0:00	0:00
664	705084.11	4828507.72	Non-Participating	South Dakota	0:00	0	0:00	0:00
665	705058.41	4828505.66	Non-Participating	South Dakota	0:00	0	0:00	0:00
666	705086.63	4828560.21	Non-Participating	South Dakota	0:00	0	0:00	0:00
667	705058.94	4828563.22	Non-Participating	South Dakota	0:00	0	0:00	0:00
668	705050.52	4828588.54	Non-Participating	South Dakota	0:00	0	0:00	0:00
669	705047.19	4828626.92	Non-Participating	South Dakota	0:00	0	0:00	0:00
670	705071.55	4828628.90	Non-Participating	South Dakota	0:00	0	0:00	0:00
671	705094.47	4828629.96	Non-Participating	South Dakota	0:00	0	0:00	0:00
672	705120.08	4828630.84	Non-Participating	South Dakota	0:00	0	0:00	0:00
673	705079.90	4828684.04	Non-Participating	South Dakota	0:00	0	0:00	0:00
674	705078.44	4828705.43	Non-Participating	South Dakota	0:00	0	0:00	0:00
675	705082.10	4828728.87	Non-Participating	South Dakota	0:00	0	0:00	0:00
676	705076.62	4828751.12	Non-Participating	South Dakota	0:00	0	0:00	0:00
677	705053.61	4828763.25	Non-Participating	South Dakota	0:00	0	0:00	0:00
678	705033.29	4828752.15	Non-Participating	South Dakota	0:00	0	0:00	0:00
679	705028.57	4828727.69	Non-Participating	South Dakota	0:00	0	0:00	0:00
680	705033.40	4828705.87	Non-Participating	South Dakota	0:00	0	0:00	0:00
681	705036.35	4828680.92	Non-Participating	South Dakota	0:00	0	0:00	0:00
682	704996.82	4828679.63	Non-Participating	South Dakota	0:00	0	0:00	0:00
683	704964.38	4828679.57	Non-Participating	South Dakota	0:00	0	0:00	0:00
684	704936.60	4828675.97	Non-Participating	South Dakota	0:00	0	0:00	0:00
685	704908.43	4828676.33	Non-Participating	South Dakota	0:00	0	0:00	0:00
686	704906.09	4828714.84	Non-Participating	South Dakota	0:00	0	0:00	0:00
687	704997.74	4828559.76	Non-Participating	South Dakota	0:00	0	0:00	0:00
688	705001.36	4828584.00	Non-Participating	South Dakota	0:00	0	0:00	0:00
689	704966.68	4828557.88	Non-Participating	South Dakota	0:00	0	0:00	0:00
690	704940.13	4828557.69	Non-Participating	South Dakota	0:00	0	0:00	0:00
691	705006.63	4828625.51	Non-Participating	South Dakota	0:00	0	0:00	0:00
692	704978.65	4828625.25	Non-Participating	South Dakota	0:00	0	0:00	0:00
693	704956.32	4828623.73	Non-Participating	South Dakota	0:00	0	0:00	0:00
694	704934.87	4828623.22	Non-Participating	South Dakota	0:00	0	0:00	0:00
695	704901.75	4828621.37	Non-Participating	South Dakota	0:00	0	0:00	0:00
696	704854.66	4828673.86	Non-Participating	South Dakota	0:00	0	0:00	0:00
697	704822.53	4828673.82	Non-Participating	South Dakota	0:00	0	0:00	0:00
698	704703.29	4828772.50	Non-Participating	South Dakota	0:00	0	0:00	0:00
699	704732.97	4828770.97	Non-Participating	South Dakota	0:00	0	0:00	0:00
700	704743.05	4828746.45	Non-Participating	South Dakota	0:00	0	0:00	0:00
701	704782.48	4828751.87	Non-Participating	South Dakota	0:00	0	0:00	0:00
702	704796.10	4828794.68	Non-Participating	South Dakota	0:00	0	0:00	0:00
703	704817.70	4828795.20	Non-Participating	South Dakota	0:00	0	0:00	0:00
704	704836.47	4828797.77	Non-Participating	South Dakota	0:00	0	0:00	0:00
705	704856.56	4828770.84	Non-Participating	South Dakota	0:00	0	0:00	0:00
706	704855.50	4828801.47	Non-Participating	South Dakota	0:00	0	0:00	0:00
707	704895.68	4828810.27	Non-Participating	South Dakota	0:00	0	0:00	0:00

Table B-1: Shadow Flicker Modeling Results

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
708	704891.61	4828777.74	Non-Participating	South Dakota	0:00	0	0:00	0:00
709	704914.82	4828777.88	Non-Participating	South Dakota	0:00	0	0:00	0:00
710	704923.96	4828810.72	Non-Participating	South Dakota	0:00	0	0:00	0:00
711	704947.07	4828815.31	Non-Participating	South Dakota	0:00	0	0:00	0:00
712	704976.61	4828823.78	Non-Participating	South Dakota	0:00	0	0:00	0:00
713	705004.60	4828829.14	Non-Participating	South Dakota	0:00	0	0:00	0:00
714	705033.09	4828831.35	Non-Participating	South Dakota	0:00	0	0:00	0:00
715	704643.69	4828894.85	Non-Participating	South Dakota	0:00	0	0:00	0:00
716	704685.55	4828860.34	Non-Participating	South Dakota	0:00	0	0:00	0:00
717	704716.03	4828832.45	Non-Participating	South Dakota	0:00	0	0:00	0:00
718	704752.95	4828842.64	Non-Participating	South Dakota	0:00	0	0:00	0:00
719	704775.41	4828844.64	Non-Participating	South Dakota	0:00	0	0:00	0:00
720	704815.16	4828852.78	Non-Participating	South Dakota	0:00	0	0:00	0:00
721	704845.87	4828884.07	Non-Participating	South Dakota	0:00	0	0:00	0:00
722	704881.27	4828861.57	Non-Participating	South Dakota	0:00	0	0:00	0:00
723	704898.75	4828856.59	Non-Participating	South Dakota	0:00	0	0:00	0:00
724	704933.94	4828866.36	Non-Participating	South Dakota	0:00	0	0:00	0:00
725	704983.46	4828881.30	Non-Participating	South Dakota	0:00	0	0:00	0:00
726	705020.82	4829044.05	Non-Participating	South Dakota	0:00	0	0:00	0:00
727	704090.37	4829425.88	Non-Participating	South Dakota	0:00	0	0:00	0:00
728	704015.10	4829497.03	Non-Participating	South Dakota	0:00	0	0:00	0:00
729	704140.49	4829544.72	Non-Participating	South Dakota	0:00	0	0:00	0:00
730	704000.89	4829862.49	Non-Participating	South Dakota	0:00	0	0:00	0:00
731	703944.27	4829849.85	Non-Participating	South Dakota	0:00	0	0:00	0:00
732	704067.63	4830354.06	Non-Participating	South Dakota	0:00	0	0:00	0:00
733	705489.39	4830596.80	Non-Participating	South Dakota	9:34	42	0:20	3:06
734	703668.33	4830842.49	Non-Participating	South Dakota	0:00	0	0:00	0:00
735	703972.01	4831224.31	Non-Participating	South Dakota	0:00	0	0:00	0:00
736	704299.99	4830881.97	Non-Participating	South Dakota	0:00	0	0:00	0:00
737	704916.66	4830874.26	Non-Participating	South Dakota	0:00	0	0:00	0:00
738	705096.30	4830861.02	Non-Participating	South Dakota	3:06	21	0:13	0:58
739	705481.17	4830895.95	Non-Participating	South Dakota	6:40	29	0:20	2:04
740	704028.51	4831683.73	Non-Participating	South Dakota	0:00	0	0:00	0:00
741	704663.19	4832358.83	Non-Participating	South Dakota	14:51	72	0:19	4:58
742	704666.19	4832791.85	Non-Participating	South Dakota	10:59	55	0:21	3:39
743	704643.10	4832809.62	Non-Participating	South Dakota	10:27	53	0:20	3:29
744	704012.68	4832757.85	Non-Participating	South Dakota	0:00	0	0:00	0:00
745	703622.76	4832429.96	Non-Participating	South Dakota	0:00	0	0:00	0:00
746	703900.32	4833237.25	Non-Participating	South Dakota	0:00	0	0:00	0:00
747	703981.67	4833479.14	Non-Participating	South Dakota	0:00	0	0:00	0:00
748	703900.85	4833546.01	Non-Participating	South Dakota	0:00	0	0:00	0:00
749	703953.06	4833803.10	Non-Participating	South Dakota	0:00	0	0:00	0:00
750	703877.92	4834322.90	Non-Participating	South Dakota	0:00	0	0:00	0:00
751	703115.78	4835451.23	Non-Participating	South Dakota	0:00	0	0:00	0:00
752	703164.32	4835650.06	Non-Participating	South Dakota	0:00	0	0:00	0:00
A	712158.94	4832287.00	Non-Participating	Minnesota	8:56	46	0:19	3:12
B	712675.48	4832272.50	Non-Participating	Minnesota	0:00	0	0:00	0:00
C	712885.07	4832032.10	Non-Participating	Minnesota	18:44	62	0:28	7:19
D	707132.31	4837379.49	Non-Participating	Minnesota	21:30	93	0:20	8:38
E	707199.51	4837381.57	Non-Participating	Minnesota	16:09	85	0:18	6:31
F	718750.18	4829719.41	Non-Participating	Minnesota	0:00	0	0:00	0:00
H	712862.66	4832031.39	Non-Participating	Minnesota	22:48	69	0:31	8:54
I	710895.09	4843889.83	Non-Participating	Minnesota	0:00	0	0:00	0:00
J	705563.49	4837361.96	Non-Participating	Minnesota	0:00	0	0:00	0:00
K	703235.27	4848223.84	Non-Participating	South Dakota	0:00	0	0:00	0:00
L	703055.10	4848224.96	Non-Participating	South Dakota	0:00	0	0:00	0:00
N1	715712.50	4831245.52	Non-Participating	Minnesota	38:15	171	0:26	11:18
N7	712508.03	4832184.52	Non-Participating	Minnesota	20:47	57	0:25	7:56
N8	710307.95	4832588.36	Participating	Minnesota	8:40	44	0:18	2:49
N9	709858.42	4832463.19	Participating	Minnesota	3:46	32	0:10	1:06
N10	710527.10	4829926.70	Non-Participating	Minnesota	0:00	0	0:00	0:00
N11	710006.75	4829851.12	Participating	Minnesota	0:00	0	0:00	0:00
N16	703119.22	4848225.24	Non-Participating	South Dakota	0:00	0	0:00	0:00
N18	703012.25	4848234.77	Non-Participating	South Dakota	0:00	0	0:00	0:00
N19	703006.98	4847997.82	Non-Participating	South Dakota	0:00	0	0:00	0:00
N20	703184.00	4848093.37	Non-Participating	South Dakota	0:00	0	0:00	0:00
N21	703175.60	4848057.09	Non-Participating	South Dakota	0:00	0	0:00	0:00
N22	703289.81	4848227.56	Non-Participating	South Dakota	0:00	0	0:00	0:00
N23	703278.77	4848275.25	Non-Participating	South Dakota	0:00	0	0:00	0:00
N24	703426.63	4847498.89	Non-Participating	South Dakota	0:00	0	0:00	0:00
N25	703419.37	4847459.42	Non-Participating	South Dakota	0:00	0	0:00	0:00
N26	703621.29	4845626.04	Non-Participating	South Dakota	0:00	0	0:00	0:00
N27	719788.78	4840865.90	Non-Participating	Minnesota	0:00	0	0:00	0:00
N28	717647.77	4834465.50	Non-Participating	Minnesota	1:49	16	0:10	0:30

Table B-1: Shadow Flicker Modeling Results

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
N30	713229.35	4832282.49	Non-Participating	Minnesota	15:36	56	0:20	5:55
N31	713010.86	4832312.23	Non-Participating	Minnesota	8:23	44	0:17	3:02
N32	709098.10	4836931.87	Targeted	Minnesota	23:22	93	0:23	6:39
N33	708666.86	4835693.48	Non-Participating	Minnesota	41:06	76	1:00	13:08
N39	713597.65	4832689.58	Non-Participating	Minnesota	3:28	26	0:13	1:20

Appendix C

**Memorandum of Shadow Flicker Modeling Results for Alternate Wind Turbine
Type**

MEMORANDUM

Date: July 7, 2020

To: Walleye Wind, LLC

From: Epsilon Associates, Inc.

Subject: Shadow Flicker Modeling Results – Layout 200603 with GE 2.5-116 Wind Turbines

At the time of the shadow flicker modeling report dated July 1, 2020 (“Shadow Flicker Report”), Walleye Wind, LLC is also considering replacing the 4 GE 2.32-116 wind turbines in the layout (200603) with GE 2.5 MW wind turbines at a hub height of 90 meters. The GE 2.5-116 wind turbines have a rotor diameter of 116.2 meters which is consistent with the GE 2.32-116 wind turbines. Epsilon performed shadow flicker modeling for the layout with these alternate wind turbines. Results of the modeling are described in this memorandum.

Following the modeling methodology outlined in Section 3.1 of the Shadow Flicker Report, WindPRO was used to calculate shadow flicker at the 665 discrete modeling receptor points. A revised version of Table B-1 in Appendix B of the Main Report is attached to this memo as Table 1 presenting the modeling results for the 665 modeling receptor locations. Both worst-case and expected values are presented.

The modeled worst-case annual shadow flicker duration for all the 443 receptors in Minnesota ranged from 0 hours, 0 minutes per year to 121 hours, 41 minutes per year. The maximum shadow flicker was at a targeted receptor (#331) located in Minnesota and is 1 hour, 37 minutes higher than with the GE 2.32-116 wind turbines. The maximum predicted annual flicker at a non-participating receptor (#333) is 105 hours, 59 minutes and the maximum predicted annual flicker at a participating receptor (#332) is 119 hours, 59 minutes. Both of these locations are also in Minnesota.

The predicted expected annual shadow flicker durations ranged from 0 hours, 0 minutes per year to 45 hours, 31 minutes per year for all the 443 receptors in Minnesota. The maximum expected shadow flicker calculated for a Minnesota receptor was at a targeted receptor (#331) and is 3 hours, 9 minutes higher than with the GE 2.32-116 wind turbines. The maximum modeled expected annual flicker at a non-participating receptor in Minnesota (#84) is 35 hours, 10 minutes. The maximum modeled expected annual flicker at a participating receptor in Minnesota (#332) is 41 hours, 45 minutes. Many of the Minnesota receptors (205) were predicted to experience no annual shadow flicker. 166 locations in



Minnesota were predicted to experience some shadow flicker but less than 10 hours per year. The modeling results showed that 62 locations in Minnesota would be expected to have between 10 hours and 30 hours of shadow flicker per year. Ten (10) receptors in Minnesota are expected to have over 30 hours of flicker per year, three (3) of which are non-participating receptors.

In summary, as a comparison to the results presented in the Shadow Flicker Report with the GE 2.32-116 wind turbines, a total of 3 receptors in Minnesota decreased, 68 receptors increased, and 372 receptors showed no change when the GE 2.5-116 wind turbines were modeled. The maximum increase of expected shadow flicker at a receptor in Minnesota is at a targeted receptor (#94) with an increase of 4 hours, 13 minutes per year.

Table 1 (Table B-1 in Shadow Flicker Report): Shadow Flicker Modeling Results (GE 2.5-116 at 90m HH)

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
1	707116.78	4847096.66	Non-Participating	Minnesota	0:00	0	0:00	0:00
2	708305.93	4846606.91	Targeted	Minnesota	0:00	0	0:00	0:00
3	708808.42	4847183.67	Non-Participating	Minnesota	0:00	0	0:00	0:00
4	708792.98	4847121.48	Non-Participating	Minnesota	0:00	0	0:00	0:00
5	710426.31	4847027.49	Non-Participating	Minnesota	0:00	0	0:00	0:00
8	711430.37	4847100.31	Non-Participating	Minnesota	0:00	0	0:00	0:00
9	712168.22	4847234.98	Non-Participating	Minnesota	0:00	0	0:00	0:00
10	710761.49	4845648.59	Non-Participating	Minnesota	0:00	0	0:00	0:00
11	709848.84	4845674.79	Non-Participating	Minnesota	0:00	0	0:00	0:00
12	706632.23	4846993.25	Non-Participating	Minnesota	0:00	0	0:00	0:00
13	706608.96	4846127.80	Non-Participating	Minnesota	0:00	0	0:00	0:00
14	705141.88	4845829.90	Non-Participating	Minnesota	0:00	0	0:00	0:00
15	705259.97	4845158.83	Non-Participating	Minnesota	0:00	0	0:00	0:00
16	706765.76	4845113.79	Non-Participating	Minnesota	0:00	0	0:00	0:00
17	706751.88	4844577.57	Non-Participating	Minnesota	0:00	0	0:00	0:00
18	707270.50	4843918.01	Non-Participating	Minnesota	0:00	0	0:00	0:00
19	707512.81	4843649.75	Non-Participating	Minnesota	0:00	0	0:00	0:00
20	708478.92	4845354.11	Participating	Minnesota	0:00	0	0:00	0:00
21	708394.51	4843668.42	Non-Participating	Minnesota	0:00	0	0:00	0:00
22	708430.29	4843394.56	Non-Participating	Minnesota	0:00	0	0:00	0:00
23	709900.19	4845248.40	Non-Participating	Minnesota	0:00	0	0:00	0:00
24	709448.97	4843803.26	Non-Participating	Minnesota	0:00	0	0:00	0:00
25	709614.12	4843929.95	Participating	Minnesota	0:00	0	0:00	0:00
26	711647.33	4843990.24	Non-Participating	Minnesota	0:00	0	0:00	0:00
27	711345.52	4843862.96	Non-Participating	Minnesota	0:00	0	0:00	0:00
28	716954.85	4842454.09	Non-Participating	Minnesota	0:00	0	0:00	0:00
29	716642.97	4842773.33	Non-Participating	Minnesota	0:00	0	0:00	0:00
30	716510.64	4842848.35	Non-Participating	Minnesota	0:00	0	0:00	0:00
31	714115.37	4842462.46	Non-Participating	Minnesota	0:00	0	0:00	0:00
32	713178.15	4842909.97	Non-Participating	Minnesota	0:00	0	0:00	0:00
33	711938.71	4842378.30	Participating	Minnesota	0:00	0	0:00	0:00
34	710644.98	4842349.07	Non-Participating	Minnesota	0:00	0	0:00	0:00
35	709819.25	4842500.41	Non-Participating	Minnesota	0:00	0	0:00	0:00
36	707468.78	4842249.89	Non-Participating	Minnesota	0:00	0	0:00	0:00
37	706814.15	4842351.53	Non-Participating	Minnesota	0:00	0	0:00	0:00
38	706284.12	4842225.69	Non-Participating	Minnesota	0:00	0	0:00	0:00
39	706067.54	4843190.56	Non-Participating	Minnesota	0:00	0	0:00	0:00
40	705275.87	4843735.83	Non-Participating	Minnesota	0:00	0	0:00	0:00
41	706750.62	4840653.78	Non-Participating	Minnesota	0:00	0	0:00	0:00
42	706742.54	4840668.93	Non-Participating	Minnesota	0:00	0	0:00	0:00
43	707861.60	4840458.05	Non-Participating	Minnesota	18:54	90	0:27	6:26
44	708158.48	4840697.92	Non-Participating	Minnesota	30:17	77	0:39	11:02
45	708427.46	4841672.29	Non-Participating	Minnesota	0:00	0	0:00	0:00
46	708976.50	4840717.57	Targeted	Minnesota	0:00	0	0:00	0:00
47	710262.92	4840946.97	Non-Participating	Minnesota	3:33	24	0:14	1:03
48	710762.86	4840767.53	Non-Participating	Minnesota	3:13	35	0:09	0:51
49	712384.27	4840783.97	Non-Participating	Minnesota	0:00	0	0:00	0:00
50	713334.25	4840942.29	Non-Participating	Minnesota	0:00	0	0:00	0:00
51	713754.99	4840911.87	Non-Participating	Minnesota	0:00	0	0:00	0:00
52	714456.02	4840842.55	Non-Participating	Minnesota	0:00	0	0:00	0:00
53	714992.51	4842006.83	Non-Participating	Minnesota	0:00	0	0:00	0:00
54	715567.30	4840772.12	Non-Participating	Minnesota	0:00	0	0:00	0:00
55	716141.80	4840921.50	Non-Participating	Minnesota	0:00	0	0:00	0:00
56	716669.20	4840946.13	Non-Participating	Minnesota	0:00	0	0:00	0:00
57	718688.18	4841612.49	Non-Participating	Minnesota	0:00	0	0:00	0:00
58	718385.04	4840853.05	Non-Participating	Minnesota	0:00	0	0:00	0:00
59	718574.90	4840839.53	Non-Participating	Minnesota	0:00	0	0:00	0:00
60	719858.02	4841887.30	Non-Participating	Minnesota	0:00	0	0:00	0:00
61	720051.79	4841014.92	Non-Participating	Minnesota	0:00	0	0:00	0:00
62	720869.50	4840872.15	Non-Participating	Minnesota	0:00	0	0:00	0:00
63	721441.68	4839367.75	Non-Participating	Minnesota	0:00	0	0:00	0:00
64	721085.12	4839469.21	Non-Participating	Minnesota	0:00	0	0:00	0:00
65	719813.12	4840097.41	Non-Participating	Minnesota	0:00	0	0:00	0:00
66	718919.37	4839262.10	Non-Participating	Minnesota	18:19	47	0:32	5:16
67	718471.98	4839347.33	Non-Participating	Minnesota	28:55	52	0:41	8:04
68	717296.33	4839345.88	Non-Participating	Minnesota	36:52	90	0:33	13:33
69	716610.59	4839807.02	Non-Participating	Minnesota	9:18	57	0:16	3:28
70	716604.40	4840268.87	Non-Participating	Minnesota	0:00	0	0:00	0:00
71	715049.56	4840410.68	Non-Participating	Minnesota	0:00	0	0:00	0:00
72	714242.60	4839322.89	Targeted	Minnesota	0:00	0	0:00	0:00

Table 1 (Table B-1 in Shadow Flicker Report): Shadow Flicker Modeling Results (GE 2.5-116 at 90m HH)

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
73	713478.59	4839242.77	Targeted	Minnesota	0:00	0	0:00	0:00
74	713369.04	4839338.51	Non-Participating	Minnesota	0:00	0	0:00	0:00
75	713446.60	4840263.13	Non-Participating	Minnesota	0:00	0	0:00	0:00
76	713297.01	4840333.99	Non-Participating	Minnesota	0:00	0	0:00	0:00
78	711303.00	4839031.07	Targeted	Minnesota	37:04	62	0:56	10:39
79	710297.92	4839470.58	Targeted	Minnesota	8:32	56	0:22	3:08
80	710098.76	4839796.54	Non-Participating	Minnesota	26:58	96	0:28	9:57
81	710126.39	4840144.45	Non-Participating	Minnesota	17:49	68	0:25	5:49
82	708819.05	4839037.31	Non-Participating	Minnesota	58:03	151	0:39	22:14
83	708536.61	4839970.02	Participating	Minnesota	48:01	82	0:50	18:11
84	707329.06	4839034.08	Non-Participating	Minnesota	99:08	171	0:55	35:10
85	706870.81	4839475.06	Non-Participating	Minnesota	18:47	68	0:24	5:39
86	706925.99	4839978.62	Non-Participating	Minnesota	13:47	80	0:22	4:56
87	705855.19	4839004.53	Targeted	Minnesota	1:52	16	0:10	0:36
88	706656.02	4838157.19	Non-Participating	Minnesota	47:32	138	0:32	14:51
89	707058.95	4838411.07	Non-Participating	Minnesota	84:42	196	0:42	27:50
90	707064.45	4838031.04	Non-Participating	Minnesota	35:55	137	0:24	13:02
91	707510.54	4837477.67	Non-Participating	Minnesota	9:06	64	0:16	3:05
92	708141.65	4837461.67	Non-Participating	Minnesota	28:18	103	0:28	8:48
93	708243.59	4837310.77	Targeted	Minnesota	34:49	78	0:31	11:13
94	708400.98	4838664.74	Targeted	Minnesota	65:42	130	0:50	20:29
95	708687.83	4837450.43	Targeted	Minnesota	0:00	0	0:00	0:00
96	709771.69	4837511.27	Targeted	Minnesota	59:38	62	1:12	23:41
97	710445.82	4837977.55	Non-Participating	Minnesota	87:49	116	1:07	32:03
98	710772.80	4837437.00	Non-Participating	Minnesota	8:24	56	0:17	2:41
99	711645.42	4837393.46	Non-Participating	Minnesota	18:27	82	0:21	5:32
100	711810.77	4837813.61	Targeted	Minnesota	8:20	46	0:19	2:36
101	712200.34	4837408.33	Non-Participating	Minnesota	15:29	84	0:18	4:48
102	713104.19	4837670.84	Non-Participating	Minnesota	47:41	127	0:35	17:07
103	713167.31	4837435.71	Non-Participating	Minnesota	55:58	110	0:45	20:41
104	713992.36	4837483.37	Targeted	Minnesota	51:54	66	0:58	14:46
105	715042.04	4837912.39	Non-Participating	Minnesota	19:17	71	0:29	6:00
106	715021.68	4838699.63	Targeted	Minnesota	10:27	50	0:22	2:58
107	715090.43	4838637.19	Non-Participating	Minnesota	9:11	46	0:21	2:43
108	715313.77	4837500.27	Targeted	Minnesota	11:48	60	0:18	4:19
109	715783.84	4837663.54	Non-Participating	Minnesota	0:00	0	0:00	0:00
110	716026.85	4837558.63	Targeted	Minnesota	0:00	0	0:00	0:00
111	716411.22	4837638.23	Non-Participating	Minnesota	0:00	0	0:00	0:00
112	716797.43	4837677.61	Non-Participating	Minnesota	0:00	0	0:00	0:00
113	717493.50	4837682.56	Non-Participating	Minnesota	0:00	0	0:00	0:00
114	717959.58	4838266.65	Non-Participating	Minnesota	0:00	0	0:00	0:00
115	718096.72	4837655.04	Non-Participating	Minnesota	0:00	0	0:00	0:00
116	718635.34	4837734.24	Non-Participating	Minnesota	0:00	0	0:00	0:00
117	718973.38	4837665.43	Non-Participating	Minnesota	0:00	0	0:00	0:00
118	719803.30	4838775.43	Non-Participating	Minnesota	3:32	21	0:15	1:11
119	719789.20	4838850.50	Non-Participating	Minnesota	3:36	21	0:16	1:09
120	720329.65	4837683.29	Non-Participating	Minnesota	0:00	0	0:00	0:00
121	720497.83	4837781.83	Non-Participating	Minnesota	0:00	0	0:00	0:00
122	721468.69	4838097.90	Non-Participating	Minnesota	0:00	0	0:00	0:00
123	720672.05	4836880.47	Non-Participating	Minnesota	0:00	0	0:00	0:00
124	719773.40	4836874.47	Non-Participating	Minnesota	0:00	0	0:00	0:00
125	721504.01	4835748.19	Non-Participating	Minnesota	0:00	0	0:00	0:00
126	719835.22	4835489.72	Non-Participating	Minnesota	0:00	0	0:00	0:00
127	719971.96	4835872.49	Non-Participating	Minnesota	0:00	0	0:00	0:00
128	719000.79	4835890.62	Non-Participating	Minnesota	0:00	0	0:00	0:00
129	718569.06	4835055.95	Non-Participating	Minnesota	0:00	0	0:00	0:00
130	718342.87	4835837.33	Targeted	Minnesota	0:00	0	0:00	0:00
131	718247.08	4836742.93	Non-Participating	Minnesota	0:00	0	0:00	0:00
132	718240.47	4836646.55	Non-Participating	Minnesota	0:00	0	0:00	0:00
133	718177.51	4836701.05	Non-Participating	Minnesota	0:00	0	0:00	0:00
134	716977.83	4836815.57	Participating	Minnesota	0:00	0	0:00	0:00
135	716901.55	4835960.23	Non-Participating	Minnesota	0:00	0	0:00	0:00
136	715586.54	4836002.19	Non-Participating	Minnesota	0:00	0	0:00	0:00
137	715661.98	4836017.28	Non-Participating	Minnesota	0:00	0	0:00	0:00
138	714868.50	4835985.41	Non-Participating	Minnesota	0:00	0	0:00	0:00
139	715186.22	4835692.77	Participating	Minnesota	0:00	0	0:00	0:00
140	715206.94	4835652.83	Participating	Minnesota	0:00	0	0:00	0:00
141	714264.50	4835959.15	Non-Participating	Minnesota	7:35	37	0:15	2:05
142	712603.23	4835802.92	Participating	Minnesota	0:00	0	0:00	0:00
143	712308.20	4836059.46	Targeted	Minnesota	5:51	29	0:18	2:12
144	710937.13	4835543.44	Participating	Minnesota	20:53	111	0:27	7:15
145	710551.74	4835854.65	Non-Participating	Minnesota	30:04	91	0:32	9:34

Table 1 (Table B-1 in Shadow Flicker Report): Shadow Flicker Modeling Results (GE 2.5-116 at 90m HH)

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
146	709610.69	4835866.83	Targeted	Minnesota	26:38	98	0:25	8:28
147	708710.52	4836244.46	Targeted	Minnesota	120:04	206	0:59	38:05
148	708431.38	4835795.37	Targeted	Minnesota	71:03	112	0:51	19:48
149	707467.79	4835655.21	Non-Participating	Minnesota	50:30	100	0:49	19:05
150	707382.61	4835946.18	Non-Participating	Minnesota	75:53	162	0:55	26:05
152	706957.43	4836478.77	Non-Participating	Minnesota	21:46	77	0:28	8:23
153	707156.95	4836908.27	Non-Participating	Minnesota	5:04	25	0:18	1:34
154	705991.93	4837185.67	Targeted	Minnesota	110:35	106	1:12	30:14
155	705492.89	4835958.91	Non-Participating	Minnesota	0:00	0	0:00	0:00
156	705858.11	4834844.91	Non-Participating	Minnesota	0:00	0	0:00	0:00
157	707016.69	4835236.06	Non-Participating	Minnesota	15:25	40	0:30	4:59
158	707356.17	4834741.12	Targeted	Minnesota	0:00	0	0:00	0:00
159	707085.43	4834360.19	Participating	Minnesota	0:00	0	0:00	0:00
160	708322.34	4834109.83	Non-Participating	Minnesota	12:55	61	0:17	4:56
161	708977.90	4835337.39	Targeted	Minnesota	32:25	81	0:32	10:51
162	709241.42	4834293.09	Targeted	Minnesota	40:43	117	0:32	15:03
163	710284.41	4834655.57	Targeted	Minnesota	60:14	144	0:49	20:34
164	713539.68	4834701.97	Participating	Minnesota	99:11	197	0:47	32:52
165	713519.94	4833754.80	Targeted	Minnesota	19:53	86	0:22	8:01
166	714328.91	4834335.98	Participating	Minnesota	27:19	118	0:23	9:37
167	715389.72	4834427.12	Non-Participating	Minnesota	76:08	89	0:59	29:13
168	715960.50	4833594.78	Targeted	Minnesota	32:12	84	0:35	11:41
169	717742.89	4833679.69	Non-Participating	Minnesota	83:33	120	1:03	23:00
170	717526.44	4834457.10	Participating	Minnesota	2:14	17	0:12	0:37
171	717942.71	4834486.94	Participating	Minnesota	0:00	0	0:00	0:00
172	721247.61	4833637.06	Non-Participating	Minnesota	0:00	0	0:00	0:00
173	720587.26	4833766.80	Non-Participating	Minnesota	0:00	0	0:00	0:00
174	719968.80	4833440.58	Non-Participating	Minnesota	0:00	0	0:00	0:00
175	720001.01	4832510.77	Non-Participating	Minnesota	2:48	20	0:13	0:50
176	720086.46	4832488.58	Non-Participating	Minnesota	2:25	18	0:12	0:44
177	718057.16	4832879.43	Non-Participating	Minnesota	8:26	33	0:22	3:04
178	718221.38	4832811.99	Non-Participating	Minnesota	38:57	97	0:33	11:07
179	720138.53	4831804.67	Non-Participating	Minnesota	2:36	19	0:13	0:48
180	720018.46	4831817.27	Non-Participating	Minnesota	3:15	21	0:15	1:00
181	718905.22	4831299.44	Non-Participating	Minnesota	21:13	54	0:31	5:32
182	717421.25	4831235.51	Non-Participating	Minnesota	62:38	156	0:39	22:20
183	716309.79	4831038.21	Non-Participating	Minnesota	52:42	135	0:42	14:51
184	715633.49	4831085.85	Targeted	Minnesota	39:37	150	0:29	12:09
185	716220.40	4831908.27	Targeted	Minnesota	11:18	54	0:22	3:30
186	716577.54	4832695.90	Non-Participating	Minnesota	23:15	75	0:33	8:14
187	716382.77	4832803.70	Targeted	Minnesota	33:08	111	0:27	11:22
188	716021.03	4832717.66	Non-Participating	Minnesota	24:39	96	0:25	7:59
189	715946.91	4832805.42	Non-Participating	Minnesota	58:55	145	0:37	19:21
190	715198.78	4832781.62	Non-Participating	Minnesota	6:03	28	0:19	1:53
191	715208.57	4833157.75	Non-Participating	Minnesota	5:55	24	0:20	1:52
192	714338.84	4832655.97	Participating	Minnesota	0:00	0	0:00	0:00
193	713317.82	4832719.65	Non-Participating	Minnesota	7:01	36	0:17	2:55
194	712633.30	4832532.44	Non-Participating	Minnesota	10:51	58	0:17	4:42
195	712594.49	4832495.72	Non-Participating	Minnesota	13:35	60	0:18	5:47
197	712507.23	4832437.14	Non-Participating	Minnesota	3:41	32	0:10	1:31
198	712346.67	4832653.95	Non-Participating	Minnesota	21:11	68	0:23	9:01
199	712846.95	4832428.39	Non-Participating	Minnesota	5:53	40	0:13	2:33
200	712862.53	4832429.34	Non-Participating	Minnesota	5:31	40	0:13	2:23
201	712882.15	4832429.34	Non-Participating	Minnesota	5:18	38	0:13	2:17
202	712894.50	4832431.01	Non-Participating	Minnesota	5:02	36	0:13	2:10
203	712928.71	4832437.86	Non-Participating	Minnesota	10:40	57	0:16	4:00
204	712936.81	4832480.03	Non-Participating	Minnesota	10:58	50	0:16	4:11
205	712995.55	4832445.10	Non-Participating	Minnesota	11:48	51	0:17	4:30
206	712932.00	4832382.02	Non-Participating	Minnesota	8:05	48	0:17	2:56
207	712889.30	4832379.64	Non-Participating	Minnesota	6:49	41	0:16	2:27
208	712851.04	4832377.53	Non-Participating	Minnesota	8:40	60	0:13	3:43
209	712836.85	4832377.30	Non-Participating	Minnesota	9:05	58	0:13	3:53
210	712823.45	4832370.97	Non-Participating	Minnesota	9:07	56	0:13	3:52
211	712537.69	4832295.51	Non-Participating	Minnesota	3:22	20	0:12	1:19
212	712564.57	4832317.29	Non-Participating	Minnesota	0:00	0	0:00	0:00
213	712605.45	4832307.68	Non-Participating	Minnesota	0:00	0	0:00	0:00
214	712629.62	4832300.88	Non-Participating	Minnesota	0:00	0	0:00	0:00
215	712674.11	4832322.67	Non-Participating	Minnesota	1:16	23	0:05	0:30
216	712679.19	4832298.37	Non-Participating	Minnesota	0:05	5	0:01	0:02
217	712717.98	4832312.61	Non-Participating	Minnesota	1:55	28	0:06	0:47
218	712785.61	4832316.50	Non-Participating	Minnesota	4:24	40	0:10	1:50
219	712778.81	4832299.33	Non-Participating	Minnesota	3:00	34	0:08	1:14
220	712829.55	4832333.38	Non-Participating	Minnesota	6:58	48	0:12	2:57
221	712830.18	4832309.03	Non-Participating	Minnesota	10:11	75	0:15	3:57

Table 1 (Table B-1 in Shadow Flicker Report): Shadow Flicker Modeling Results (GE 2.5-116 at 90m HH)

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
222	712867.95	4832305.17	Non-Participating	Minnesota	5:26	32	0:16	1:55
223	713109.05	4832338.04	Non-Participating	Minnesota	13:55	58	0:18	5:14
224	713137.94	4832336.46	Non-Participating	Minnesota	14:19	56	0:18	5:25
225	713168.29	4832342.12	Non-Participating	Minnesota	14:04	52	0:19	5:23
226	713226.79	4832342.81	Non-Participating	Minnesota	11:49	44	0:19	4:34
227	713292.76	4832253.02	Non-Participating	Minnesota	16:20	55	0:21	6:14
228	713308.00	4832224.79	Non-Participating	Minnesota	17:32	59	0:21	6:38
229	713375.93	4832184.38	Non-Participating	Minnesota	18:44	59	0:22	7:06
230	713431.00	4832183.48	Non-Participating	Minnesota	17:12	53	0:23	6:36
231	712884.28	4832262.41	Non-Participating	Minnesota	5:18	31	0:16	1:52
232	712831.97	4832268.25	Non-Participating	Minnesota	4:44	29	0:15	1:40
233	712837.31	4832254.52	Non-Participating	Minnesota	4:42	28	0:15	1:40
234	712834.64	4832232.89	Non-Participating	Minnesota	4:35	28	0:15	1:38
235	712848.32	4832199.78	Non-Participating	Minnesota	4:38	27	0:15	1:40
236	712887.35	4832233.70	Non-Participating	Minnesota	5:07	29	0:16	1:49
237	712890.56	4832202.61	Non-Participating	Minnesota	5:02	29	0:16	1:48
238	712780.48	4832264.85	Non-Participating	Minnesota	0:53	20	0:04	0:21
239	712785.27	4832251.36	Non-Participating	Minnesota	0:23	16	0:02	0:09
240	712780.83	4832224.05	Non-Participating	Minnesota	4:11	25	0:15	1:31
241	712787.28	4832192.10	Non-Participating	Minnesota	4:13	25	0:15	1:32
242	712719.68	4832205.22	Non-Participating	Minnesota	0:00	0	0:00	0:00
243	712719.10	4832249.73	Non-Participating	Minnesota	0:00	0	0:00	0:00
244	712718.61	4832266.40	Non-Participating	Minnesota	0:00	0	0:00	0:00
245	712753.58	4832271.17	Non-Participating	Minnesota	0:33	16	0:03	0:13
246	712748.37	4832234.80	Non-Participating	Minnesota	0:00	0	0:00	0:00
247	712673.11	4832238.71	Non-Participating	Minnesota	0:00	0	0:00	0:00
248	712675.00	4832216.30	Non-Participating	Minnesota	2:17	16	0:11	0:54
249	712677.58	4832191.27	Non-Participating	Minnesota	8:00	30	0:20	3:09
250	712618.78	4832190.35	Non-Participating	Minnesota	14:49	44	0:25	5:47
251	712564.96	4832190.52	Non-Participating	Minnesota	19:10	52	0:26	7:24
252	712570.97	4832213.69	Non-Participating	Minnesota	14:53	45	0:24	5:48
253	712571.98	4832232.04	Non-Participating	Minnesota	11:40	39	0:22	4:34
254	712571.88	4832259.87	Non-Participating	Minnesota	6:39	28	0:18	2:37
255	712608.06	4832231.58	Non-Participating	Minnesota	7:33	30	0:19	2:58
256	712456.59	4832228.74	Non-Participating	Minnesota	19:42	57	0:24	7:31
257	712392.84	4832139.24	Non-Participating	Minnesota	14:21	54	0:23	5:09
258	712456.01	4832133.54	Non-Participating	Minnesota	19:43	78	0:25	7:12
259	712503.93	4832139.10	Non-Participating	Minnesota	24:00	72	0:26	8:57
260	712459.29	4832110.14	Non-Participating	Minnesota	17:06	61	0:25	6:10
261	712508.07	4832110.19	Non-Participating	Minnesota	22:58	77	0:26	8:26
262	712450.68	4832077.28	Non-Participating	Minnesota	14:47	51	0:25	5:18
263	712507.77	4832084.46	Non-Participating	Minnesota	19:21	67	0:26	7:00
264	712553.69	4832079.29	Non-Participating	Minnesota	25:11	80	0:27	9:14
265	712626.23	4832098.28	Non-Participating	Minnesota	28:56	69	0:29	10:57
266	712568.90	4832143.05	Non-Participating	Minnesota	25:16	64	0:27	9:36
267	712613.84	4832149.49	Non-Participating	Minnesota	22:35	57	0:28	8:41
268	712636.39	4832149.27	Non-Participating	Minnesota	21:10	54	0:28	8:11
269	712676.17	4832149.03	Non-Participating	Minnesota	17:26	47	0:27	6:48
270	712679.14	4832113.16	Non-Participating	Minnesota	24:09	57	0:30	9:18
271	712678.29	4832087.92	Non-Participating	Minnesota	28:31	65	0:30	10:53
272	712720.39	4832155.88	Non-Participating	Minnesota	10:01	34	0:22	3:56
273	712724.09	4832116.02	Non-Participating	Minnesota	19:02	48	0:29	7:25
274	712724.53	4832087.84	Non-Participating	Minnesota	28:54	80	0:31	11:07
275	712745.94	4832084.47	Non-Participating	Minnesota	27:36	78	0:32	10:39
276	712790.68	4832081.04	Non-Participating	Minnesota	22:49	70	0:30	8:52
277	712790.26	4832095.01	Non-Participating	Minnesota	19:09	65	0:27	7:27
278	712788.37	4832119.07	Non-Participating	Minnesota	13:03	55	0:22	5:03
279	712789.00	4832150.71	Non-Participating	Minnesota	4:08	25	0:15	1:31
280	712759.46	4832158.67	Non-Participating	Minnesota	7:10	43	0:15	2:44
281	712834.02	4832154.99	Non-Participating	Minnesota	4:23	26	0:16	1:36
282	712841.90	4832109.02	Non-Participating	Minnesota	6:09	38	0:16	2:19
283	712845.16	4832086.79	Non-Participating	Minnesota	12:45	54	0:22	4:56
284	712877.12	4832089.52	Non-Participating	Minnesota	5:24	35	0:16	2:01
285	712900.32	4832095.23	Non-Participating	Minnesota	4:42	26	0:17	1:43
286	712889.85	4832123.54	Non-Participating	Minnesota	4:42	26	0:16	1:43
287	712889.80	4832163.62	Non-Participating	Minnesota	4:46	27	0:16	1:43
288	712889.23	4832144.18	Non-Participating	Minnesota	4:43	27	0:16	1:43
289	712730.42	4832035.84	Non-Participating	Minnesota	37:58	94	0:33	14:24
290	712794.99	4832046.39	Non-Participating	Minnesota	31:40	82	0:34	12:13
291	712794.24	4832015.06	Non-Participating	Minnesota	39:36	92	0:35	15:08
292	712796.38	4831988.68	Non-Participating	Minnesota	44:09	100	0:36	16:44
293	712732.53	4831979.23	Non-Participating	Minnesota	42:22	109	0:34	15:46
294	712734.58	4832008.79	Non-Participating	Minnesota	41:12	100	0:33	15:30
295	712733.41	4831929.85	Non-Participating	Minnesota	33:43	93	0:34	12:20

Table 1 (Table B-1 in Shadow Flicker Report): Shadow Flicker Modeling Results (GE 2.5-116 at 90m HH)

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
296	712732.95	4831902.51	Non-Participating	Minnesota	31:13	85	0:35	11:26
297	712735.50	4831869.27	Non-Participating	Minnesota	29:26	79	0:35	10:57
298	712751.54	4831840.81	Non-Participating	Minnesota	29:50	73	0:36	11:14
299	712791.52	4831841.65	Non-Participating	Minnesota	34:14	81	0:38	12:47
300	712798.77	4831870.72	Non-Participating	Minnesota	37:08	92	0:38	13:39
301	712772.78	4831901.49	Non-Participating	Minnesota	36:32	94	0:36	13:23
302	712790.64	4831921.66	Non-Participating	Minnesota	46:17	118	0:37	17:06
303	712842.90	4831916.61	Non-Participating	Minnesota	53:49	114	0:39	20:08
304	711473.36	4832637.58	Participating	Minnesota	11:00	54	0:19	3:38
305	711252.43	4832635.31	Participating	Minnesota	16:58	66	0:22	5:27
306	710955.15	4832635.80	Participating	Minnesota	36:50	112	0:27	11:40
307	710371.01	4832978.05	Participating	Minnesota	118:51	170	1:12	39:37
308	708958.17	4832642.70	Targeted	Minnesota	47:11	146	0:33	16:11
309	708910.35	4832432.23	Participating	Minnesota	27:48	86	0:27	9:25
310	708545.61	4832471.18	Participating	Minnesota	15:46	80	0:22	5:15
311	707948.72	4832546.75	Non-Participating	Minnesota	13:45	77	0:21	4:24
312	707785.26	4832449.07	Non-Participating	Minnesota	16:29	68	0:28	5:25
313	707392.79	4832577.65	Targeted	Minnesota	65:57	156	0:37	19:15
314	707103.01	4833341.74	Non-Participating	Minnesota	13:03	36	0:28	3:40
315	705808.16	4832506.07	Non-Participating	Minnesota	39:28	94	0:36	15:11
316	706307.90	4832597.14	Participating	Minnesota	0:00	0	0:00	0:00
317	706391.85	4832533.05	Targeted	Minnesota	11:11	30	0:28	4:24
318	705921.04	4831717.10	Targeted	Minnesota	57:29	145	0:36	19:39
319	707124.26	4832268.92	Targeted	Minnesota	92:19	90	1:34	25:54
320	707148.31	4831858.58	Targeted	Minnesota	85:13	125	1:03	34:37
321	706377.57	4830879.08	Targeted	Minnesota	0:00	0	0:00	0:00
322	706795.99	4830788.28	Targeted	Minnesota	0:00	0	0:00	0:00
323	707286.36	4830938.93	Participating	Minnesota	0:00	0	0:00	0:00
324	708796.80	4831061.44	Non-Participating	Minnesota	2:14	18	0:11	0:47
325	708665.52	4830816.87	Non-Participating	Minnesota	3:17	24	0:13	1:13
326	709134.89	4830862.41	Non-Participating	Minnesota	0:00	0	0:00	0:00
327	709959.89	4830915.52	Non-Participating	Minnesota	0:00	0	0:00	0:00
328	710444.83	4830632.98	Participating	Minnesota	0:00	0	0:00	0:00
329	711156.75	4831002.57	Non-Participating	Minnesota	0:00	0	0:00	0:00
330	712129.09	4830942.84	Non-Participating	Minnesota	11:19	55	0:20	3:38
331	713644.87	4830986.83	Targeted	Minnesota	121:41	183	1:19	45:31
332	714014.30	4831109.09	Participating	Minnesota	119:59	199	0:52	41:45
333	715256.78	4831015.51	Non-Participating	Minnesota	105:59	203	0:45	34:32
334	715114.86	4831046.13	Non-Participating	Minnesota	63:19	149	0:44	21:04
335	715280.87	4830888.83	Non-Participating	Minnesota	82:04	176	0:47	24:31
336	720850.87	4829589.22	Non-Participating	Minnesota	0:00	0	0:00	0:00
337	720471.34	4829713.08	Non-Participating	Minnesota	0:00	0	0:00	0:00
338	718660.97	4829287.11	Non-Participating	Minnesota	7:04	28	0:19	1:59
339	718547.55	4829529.40	Non-Participating	Minnesota	0:00	0	0:00	0:00
340	718705.42	4829658.28	Non-Participating	Minnesota	0:00	0	0:00	0:00
341	718207.07	4829650.23	Non-Participating	Minnesota	0:00	0	0:00	0:00
342	718488.68	4830493.21	Targeted	Minnesota	0:00	0	0:00	0:00
343	718614.16	4830476.57	Non-Participating	Minnesota	5:14	22	0:19	2:07
344	716736.70	4829503.83	Targeted	Minnesota	6:12	42	0:15	2:23
345	716664.22	4829593.01	Non-Participating	Minnesota	4:55	27	0:17	1:49
346	716087.40	4829579.09	Targeted	Minnesota	34:44	106	0:28	14:30
347	715685.16	4829460.28	Non-Participating	Minnesota	11:20	54	0:19	4:53
348	714913.69	4829173.93	Targeted	Minnesota	0:00	0	0:00	0:00
349	714617.74	4829521.25	Targeted	Minnesota	0:00	0	0:00	0:00
350	713650.85	4830171.47	Targeted	Minnesota	56:25	125	0:53	18:22
351	712905.87	4829462.35	Non-Participating	Minnesota	8:15	41	0:18	2:40
352	712717.46	4829343.28	Participating	Minnesota	5:12	34	0:13	1:41
353	712178.69	4830005.45	Targeted	Minnesota	2:38	21	0:11	0:48
354	712093.44	4829732.15	Non-Participating	Minnesota	0:00	0	0:00	0:00
355	707416.58	4830311.62	Targeted	Minnesota	0:00	0	0:00	0:00
356	712848.91	4827911.62	Non-Participating	Minnesota	0:00	0	0:00	0:00
357	713480.57	4827427.94	Non-Participating	Minnesota	0:00	0	0:00	0:00
358	713672.96	4827918.96	Non-Participating	Minnesota	0:00	0	0:00	0:00
359	713975.46	4828553.70	Non-Participating	Minnesota	0:00	0	0:00	0:00
360	713820.87	4828830.04	Targeted	Minnesota	0:00	0	0:00	0:00
361	714217.10	4827915.58	Non-Participating	Minnesota	0:00	0	0:00	0:00
362	715474.31	4827938.91	Non-Participating	Minnesota	0:00	0	0:00	0:00
363	715541.50	4827975.19	Participating	Minnesota	0:00	0	0:00	0:00
364	716139.42	4827816.29	Non-Participating	Minnesota	4:24	26	0:15	1:21
365	716987.91	4827842.08	Non-Participating	Minnesota	0:00	0	0:00	0:00
366	717070.79	4827804.48	Non-Participating	Minnesota	0:00	0	0:00	0:00
367	717108.39	4828849.54	Non-Participating	Minnesota	20:39	47	0:34	8:02
368	718562.18	4828640.41	Targeted	Minnesota	33:41	58	0:45	9:34
369	718674.18	4828400.30	Non-Participating	Minnesota	31:09	60	0:40	11:15

Table 1 (Table B-1 in Shadow Flicker Report): Shadow Flicker Modeling Results (GE 2.5-116 at 90m HH)

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
370	718602.36	4827497.49	Non-Participating	Minnesota	0:00	0	0:00	0:00
371	718830.45	4827566.20	Non-Participating	Minnesota	0:00	0	0:00	0:00
372	719830.43	4828111.38	Non-Participating	Minnesota	2:35	20	0:12	0:56
373	719778.19	4828092.97	Non-Participating	Minnesota	3:01	22	0:13	1:06
374	715248.44	4827383.73	Non-Participating	Minnesota	0:00	0	0:00	0:00
375	713888.51	4826969.27	Non-Participating	Minnesota	0:00	0	0:00	0:00
376	705300.91	4848839.14	Non-Participating	Minnesota	0:00	0	0:00	0:00
377	706631.09	4848703.62	Non-Participating	Minnesota	0:00	0	0:00	0:00
378	706929.07	4848599.18	Non-Participating	Minnesota	0:00	0	0:00	0:00
379	707922.77	4848733.84	Non-Participating	Minnesota	0:00	0	0:00	0:00
380	709860.15	4848794.24	Targeted	Minnesota	0:00	0	0:00	0:00
381	710296.98	4848793.31	Non-Participating	Minnesota	0:00	0	0:00	0:00
382	710975.28	4848884.65	Non-Participating	Minnesota	0:00	0	0:00	0:00
383	705464.17	4831442.94	Non-Participating	South Dakota	23:39	111	0:21	7:33
384	704881.41	4833942.19	Non-Participating	South Dakota	15:49	53	0:22	6:03
385	704934.04	4833903.19	Non-Participating	South Dakota	17:20	55	0:23	6:37
386	705349.51	4834096.40	Non-Participating	South Dakota	0:00	0	0:00	0:00
387	703947.03	4834924.62	Non-Participating	South Dakota	0:00	0	0:00	0:00
388	703763.96	4835653.19	Non-Participating	South Dakota	0:00	0	0:00	0:00
389	704815.83	4835753.70	Non-Participating	South Dakota	0:00	0	0:00	0:00
390	705281.73	4835629.59	Non-Participating	South Dakota	0:00	0	0:00	0:00
391	703806.27	4836008.60	Non-Participating	South Dakota	0:00	0	0:00	0:00
392	703780.24	4836101.13	Non-Participating	South Dakota	0:00	0	0:00	0:00
393	703830.86	4836391.37	Non-Participating	South Dakota	2:07	18	0:10	0:39
394	703819.58	4836476.57	Non-Participating	South Dakota	2:11	18	0:11	0:40
395	703911.83	4836498.35	Non-Participating	South Dakota	2:42	20	0:12	0:50
396	703896.36	4836623.39	Non-Participating	South Dakota	2:14	18	0:11	0:43
397	703578.28	4837163.05	Non-Participating	South Dakota	0:00	0	0:00	0:00
398	703706.65	4837165.34	Non-Participating	South Dakota	0:00	0	0:00	0:00
399	703797.22	4837269.88	Non-Participating	South Dakota	1:25	16	0:08	0:29
400	703798.54	4837450.44	Non-Participating	South Dakota	0:00	0	0:00	0:00
401	703882.11	4837706.72	Non-Participating	South Dakota	3:01	20	0:14	0:57
402	704040.36	4837303.55	Non-Participating	South Dakota	6:17	48	0:13	2:07
403	704182.61	4837300.48	Non-Participating	South Dakota	10:40	59	0:17	3:41
404	703706.65	4838294.81	Non-Participating	South Dakota	0:00	0	0:00	0:00
405	703933.92	4838215.27	Non-Participating	South Dakota	3:04	20	0:14	0:59
406	703729.98	4838798.96	Non-Participating	South Dakota	0:00	0	0:00	0:00
407	703653.42	4839079.13	Non-Participating	South Dakota	0:00	0	0:00	0:00
408	704667.13	4838957.64	Non-Participating	South Dakota	12:06	52	0:23	4:34
409	704830.38	4838768.26	Non-Participating	South Dakota	32:28	89	0:27	11:49
410	703785.10	4839818.54	Non-Participating	South Dakota	0:00	0	0:00	0:00
411	705171.09	4840026.31	Non-Participating	South Dakota	0:00	0	0:00	0:00
412	703132.24	4840141.30	Non-Participating	South Dakota	0:00	0	0:00	0:00
413	703198.00	4840427.17	Non-Participating	South Dakota	0:00	0	0:00	0:00
414	703241.98	4840429.71	Non-Participating	South Dakota	0:00	0	0:00	0:00
415	703913.94	4840550.82	Non-Participating	South Dakota	0:00	0	0:00	0:00
416	704492.38	4840341.24	Non-Participating	South Dakota	0:00	0	0:00	0:00
417	704782.58	4840430.67	Non-Participating	South Dakota	0:00	0	0:00	0:00
418	705123.49	4840673.16	Non-Participating	South Dakota	0:00	0	0:00	0:00
419	703564.36	4841448.22	Non-Participating	South Dakota	0:00	0	0:00	0:00
420	703746.52	4841901.08	Non-Participating	South Dakota	0:00	0	0:00	0:00
421	703834.63	4841918.03	Non-Participating	South Dakota	0:00	0	0:00	0:00
422	705169.14	4841778.72	Non-Participating	South Dakota	0:00	0	0:00	0:00
423	705155.44	4842202.20	Non-Participating	South Dakota	0:00	0	0:00	0:00
424	705039.92	4842185.90	Non-Participating	South Dakota	0:00	0	0:00	0:00
425	703698.42	4843134.63	Non-Participating	South Dakota	0:00	0	0:00	0:00
426	703076.93	4843496.03	Non-Participating	South Dakota	0:00	0	0:00	0:00
427	703543.71	4843522.22	Non-Participating	South Dakota	0:00	0	0:00	0:00
428	703791.36	4843544.69	Non-Participating	South Dakota	0:00	0	0:00	0:00
429	703807.51	4843371.35	Non-Participating	South Dakota	0:00	0	0:00	0:00
430	703964.87	4843675.19	Non-Participating	South Dakota	0:00	0	0:00	0:00
431	704279.70	4843597.33	Non-Participating	South Dakota	0:00	0	0:00	0:00
432	705095.53	4843395.34	Non-Participating	South Dakota	0:00	0	0:00	0:00
433	705119.32	4842994.01	Non-Participating	South Dakota	0:00	0	0:00	0:00
434	703210.31	4845218.38	Non-Participating	South Dakota	0:00	0	0:00	0:00
435	703655.30	4845259.88	Non-Participating	South Dakota	0:00	0	0:00	0:00
436	703718.90	4845630.64	Non-Participating	South Dakota	0:00	0	0:00	0:00
437	704017.84	4845316.26	Non-Participating	South Dakota	0:00	0	0:00	0:00
438	704824.64	4845406.00	Non-Participating	South Dakota	0:00	0	0:00	0:00
439	703610.45	4846099.04	Non-Participating	South Dakota	0:00	0	0:00	0:00
440	703662.42	4847171.38	Non-Participating	South Dakota	0:00	0	0:00	0:00
441	703673.57	4847781.75	Non-Participating	South Dakota	0:00	0	0:00	0:00
442	704957.99	4848148.24	Non-Participating	South Dakota	0:00	0	0:00	0:00
443	703017.12	4847952.56	Non-Participating	South Dakota	0:00	0	0:00	0:00

Table 1 (Table B-1 in Shadow Flicker Report): Shadow Flicker Modeling Results (GE 2.5-116 at 90m HH)

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
444	703019.78	4847976.89	Non-Participating	South Dakota	0:00	0	0:00	0:00
445	703016.93	4848052.49	Non-Participating	South Dakota	0:00	0	0:00	0:00
446	703080.20	4848056.20	Non-Participating	South Dakota	0:00	0	0:00	0:00
447	703065.43	4848024.42	Non-Participating	South Dakota	0:00	0	0:00	0:00
448	703065.57	4847991.56	Non-Participating	South Dakota	0:00	0	0:00	0:00
449	703129.99	4848006.74	Non-Participating	South Dakota	0:00	0	0:00	0:00
450	703168.99	4848023.70	Non-Participating	South Dakota	0:00	0	0:00	0:00
451	703013.19	4848105.25	Non-Participating	South Dakota	0:00	0	0:00	0:00
452	703005.94	4848179.89	Non-Participating	South Dakota	0:00	0	0:00	0:00
453	703059.93	4848181.42	Non-Participating	South Dakota	0:00	0	0:00	0:00
454	703062.63	4848147.55	Non-Participating	South Dakota	0:00	0	0:00	0:00
456	703124.69	4848133.99	Non-Participating	South Dakota	0:00	0	0:00	0:00
458	703244.13	4848113.26	Non-Participating	South Dakota	0:00	0	0:00	0:00
459	703241.16	4848188.31	Non-Participating	South Dakota	0:00	0	0:00	0:00
460	702954.97	4848228.98	Non-Participating	South Dakota	0:00	0	0:00	0:00
461	703074.13	4848229.08	Non-Participating	South Dakota	0:00	0	0:00	0:00
462	703121.89	4848302.50	Non-Participating	South Dakota	0:00	0	0:00	0:00
463	703121.79	4848256.23	Non-Participating	South Dakota	0:00	0	0:00	0:00
464	703180.66	4848312.57	Non-Participating	South Dakota	0:00	0	0:00	0:00
465	703176.46	4848235.57	Non-Participating	South Dakota	0:00	0	0:00	0:00
466	703242.02	4848232.13	Non-Participating	South Dakota	0:00	0	0:00	0:00
467	703289.44	4848250.13	Non-Participating	South Dakota	0:00	0	0:00	0:00
468	703285.28	4848305.42	Non-Participating	South Dakota	0:00	0	0:00	0:00
469	703238.10	4848313.94	Non-Participating	South Dakota	0:00	0	0:00	0:00
470	703118.81	4848430.03	Non-Participating	South Dakota	0:00	0	0:00	0:00
471	703117.32	4848399.72	Non-Participating	South Dakota	0:00	0	0:00	0:00
472	703118.49	4848369.89	Non-Participating	South Dakota	0:00	0	0:00	0:00
473	703283.34	4848401.65	Non-Participating	South Dakota	0:00	0	0:00	0:00
474	703504.59	4848360.63	Non-Participating	South Dakota	0:00	0	0:00	0:00
475	703164.64	4848496.77	Non-Participating	South Dakota	0:00	0	0:00	0:00
476	703598.30	4848527.13	Non-Participating	South Dakota	0:00	0	0:00	0:00
477	704664.41	4848425.57	Non-Participating	South Dakota	0:00	0	0:00	0:00
478	704813.86	4848633.46	Non-Participating	South Dakota	0:00	0	0:00	0:00
479	706044.71	4849773.17	Non-Participating	Minnesota	0:00	0	0:00	0:00
480	707387.55	4850254.10	Non-Participating	Minnesota	0:00	0	0:00	0:00
481	707945.22	4849861.93	Non-Participating	Minnesota	0:00	0	0:00	0:00
482	709936.28	4850179.20	Non-Participating	Minnesota	0:00	0	0:00	0:00
483	706553.32	4850323.54	Non-Participating	Minnesota	0:00	0	0:00	0:00
484	707466.63	4850517.83	Non-Participating	Minnesota	0:00	0	0:00	0:00
485	706627.42	4850969.47	Non-Participating	Minnesota	0:00	0	0:00	0:00
600	721504.45	4832717.79	Non-Participating	Minnesota	0:00	0	0:00	0:00
601	721107.43	4831397.47	Non-Participating	Minnesota	0:00	0	0:00	0:00
602	721193.76	4829744.37	Targeted	Minnesota	0:00	0	0:00	0:00
603	721607.87	4829645.45	Non-Participating	Minnesota	0:00	0	0:00	0:00
604	720771.23	4828229.30	Non-Participating	Minnesota	0:00	0	0:00	0:00
605	720294.73	4827201.39	Non-Participating	Minnesota	0:00	0	0:00	0:00
606	719889.27	4826965.25	Non-Participating	Minnesota	0:00	0	0:00	0:00
607	720233.54	4825646.32	Non-Participating	Minnesota	0:00	0	0:00	0:00
608	719207.30	4824943.60	Non-Participating	Minnesota	0:00	0	0:00	0:00
609	718925.56	4826292.09	Non-Participating	Minnesota	0:00	0	0:00	0:00
610	718736.06	4826853.88	Non-Participating	Minnesota	0:00	0	0:00	0:00
611	718258.61	4826322.24	Non-Participating	Minnesota	0:00	0	0:00	0:00
612	717984.98	4825391.46	Non-Participating	Minnesota	0:00	0	0:00	0:00
613	716906.43	4826389.27	Non-Participating	Minnesota	0:00	0	0:00	0:00
614	716639.93	4826263.50	Non-Participating	Minnesota	0:00	0	0:00	0:00
615	715859.70	4826343.35	Participating	Minnesota	0:00	0	0:00	0:00
616	712762.52	4826456.76	Non-Participating	Minnesota	0:00	0	0:00	0:00
617	710508.38	4828661.23	Non-Participating	Minnesota	0:00	0	0:00	0:00
618	710312.21	4827758.12	Participating	Minnesota	0:00	0	0:00	0:00
619	708971.55	4828978.11	Participating	Minnesota	0:00	0	0:00	0:00
620	708880.83	4829066.94	Non-Participating	Minnesota	0:00	0	0:00	0:00
621	708621.24	4827744.01	Non-Participating	Minnesota	0:00	0	0:00	0:00
622	707666.58	4829219.47	Non-Participating	Minnesota	0:00	0	0:00	0:00
623	707381.37	4829213.15	Non-Participating	Minnesota	0:00	0	0:00	0:00
624	707003.03	4829294.84	Non-Participating	Minnesota	0:00	0	0:00	0:00
625	706769.91	4829219.83	Participating	Minnesota	0:00	0	0:00	0:00
626	707202.71	4829656.80	Non-Participating	Minnesota	0:00	0	0:00	0:00
627	706884.07	4829695.44	Non-Participating	Minnesota	0:00	0	0:00	0:00
628	706800.75	4829875.13	Non-Participating	Minnesota	0:00	0	0:00	0:00
629	706334.75	4829721.80	Participating	Minnesota	0:00	0	0:00	0:00
630	706496.34	4829597.02	Non-Participating	Minnesota	0:00	0	0:00	0:00
631	706398.43	4829578.24	Targeted	Minnesota	0:00	0	0:00	0:00
632	706314.88	4829561.32	Targeted	Minnesota	0:00	0	0:00	0:00
633	706251.50	4829532.13	Targeted	Minnesota	0:00	0	0:00	0:00

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Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
634	705621.54	4829441.98	Non-Participating	Minnesota	0:00	0	0:00	0:00
635	705623.53	4828995.44	Non-Participating	Minnesota	0:00	0	0:00	0:00
636	705654.15	4828680.11	Non-Participating	Minnesota	0:00	0	0:00	0:00
637	705562.56	4829075.23	Non-Participating	South Dakota	0:00	0	0:00	0:00
638	705381.51	4828643.03	Non-Participating	South Dakota	0:00	0	0:00	0:00
639	705232.02	4828693.33	Non-Participating	South Dakota	0:00	0	0:00	0:00
640	705156.39	4828687.56	Non-Participating	South Dakota	0:00	0	0:00	0:00
641	705144.00	4828631.96	Non-Participating	South Dakota	0:00	0	0:00	0:00
642	705165.33	4828631.41	Non-Participating	South Dakota	0:00	0	0:00	0:00
643	705188.15	4828631.29	Non-Participating	South Dakota	0:00	0	0:00	0:00
644	705245.87	4828628.25	Non-Participating	South Dakota	0:00	0	0:00	0:00
645	705190.52	4828581.28	Non-Participating	South Dakota	0:00	0	0:00	0:00
646	705171.84	4828565.72	Non-Participating	South Dakota	0:00	0	0:00	0:00
647	705139.58	4828563.76	Non-Participating	South Dakota	0:00	0	0:00	0:00
648	705164.83	4828509.94	Non-Participating	South Dakota	0:00	0	0:00	0:00
649	705193.32	4828510.33	Non-Participating	South Dakota	0:00	0	0:00	0:00
650	705235.30	4828503.99	Non-Participating	South Dakota	0:00	0	0:00	0:00
651	705237.46	4828485.00	Non-Participating	South Dakota	0:00	0	0:00	0:00
652	705236.89	4828464.00	Non-Participating	South Dakota	0:00	0	0:00	0:00
653	705237.97	4828440.75	Non-Participating	South Dakota	0:00	0	0:00	0:00
654	705232.89	4828391.80	Non-Participating	South Dakota	0:00	0	0:00	0:00
655	705192.38	4828390.51	Non-Participating	South Dakota	0:00	0	0:00	0:00
656	705192.04	4828445.68	Non-Participating	South Dakota	0:00	0	0:00	0:00
657	705164.73	4828442.51	Non-Participating	South Dakota	0:00	0	0:00	0:00
658	705141.80	4828441.62	Non-Participating	South Dakota	0:00	0	0:00	0:00
659	705114.53	4828440.47	Non-Participating	South Dakota	0:00	0	0:00	0:00
660	705134.87	4828508.79	Non-Participating	South Dakota	0:00	0	0:00	0:00
661	705112.05	4828508.92	Non-Participating	South Dakota	0:00	0	0:00	0:00
662	705111.94	4828563.26	Non-Participating	South Dakota	0:00	0	0:00	0:00
663	705068.50	4828447.23	Non-Participating	South Dakota	0:00	0	0:00	0:00
664	705084.11	4828507.72	Non-Participating	South Dakota	0:00	0	0:00	0:00
665	705058.41	4828505.66	Non-Participating	South Dakota	0:00	0	0:00	0:00
666	705086.63	4828560.21	Non-Participating	South Dakota	0:00	0	0:00	0:00
667	705058.94	4828563.22	Non-Participating	South Dakota	0:00	0	0:00	0:00
668	705050.52	4828588.54	Non-Participating	South Dakota	0:00	0	0:00	0:00
669	705047.19	4828626.92	Non-Participating	South Dakota	0:00	0	0:00	0:00
670	705071.55	4828628.90	Non-Participating	South Dakota	0:00	0	0:00	0:00
671	705094.47	4828629.96	Non-Participating	South Dakota	0:00	0	0:00	0:00
672	705120.08	4828630.84	Non-Participating	South Dakota	0:00	0	0:00	0:00
673	705079.90	4828684.04	Non-Participating	South Dakota	0:00	0	0:00	0:00
674	705078.44	4828705.43	Non-Participating	South Dakota	0:00	0	0:00	0:00
675	705082.10	4828728.87	Non-Participating	South Dakota	0:00	0	0:00	0:00
676	705076.62	4828751.12	Non-Participating	South Dakota	0:00	0	0:00	0:00
677	705053.61	4828763.25	Non-Participating	South Dakota	0:00	0	0:00	0:00
678	705033.29	4828752.15	Non-Participating	South Dakota	0:00	0	0:00	0:00
679	705028.57	4828727.69	Non-Participating	South Dakota	0:00	0	0:00	0:00
680	705033.40	4828705.87	Non-Participating	South Dakota	0:00	0	0:00	0:00
681	705036.35	4828680.92	Non-Participating	South Dakota	0:00	0	0:00	0:00
682	704996.82	4828679.63	Non-Participating	South Dakota	0:00	0	0:00	0:00
683	704964.38	4828679.57	Non-Participating	South Dakota	0:00	0	0:00	0:00
684	704936.60	4828675.97	Non-Participating	South Dakota	0:00	0	0:00	0:00
685	704908.43	4828676.33	Non-Participating	South Dakota	0:00	0	0:00	0:00
686	704906.09	4828714.84	Non-Participating	South Dakota	0:00	0	0:00	0:00
687	704997.74	4828559.76	Non-Participating	South Dakota	0:00	0	0:00	0:00
688	705001.36	4828584.00	Non-Participating	South Dakota	0:00	0	0:00	0:00
689	704966.68	4828557.88	Non-Participating	South Dakota	0:00	0	0:00	0:00
690	704940.13	4828557.69	Non-Participating	South Dakota	0:00	0	0:00	0:00
691	705006.63	4828625.51	Non-Participating	South Dakota	0:00	0	0:00	0:00
692	704978.65	4828625.25	Non-Participating	South Dakota	0:00	0	0:00	0:00
693	704956.32	4828623.73	Non-Participating	South Dakota	0:00	0	0:00	0:00
694	704934.87	4828623.22	Non-Participating	South Dakota	0:00	0	0:00	0:00
695	704901.75	4828621.37	Non-Participating	South Dakota	0:00	0	0:00	0:00
696	704854.66	4828673.86	Non-Participating	South Dakota	0:00	0	0:00	0:00
697	704822.53	4828673.82	Non-Participating	South Dakota	0:00	0	0:00	0:00
698	704703.29	4828772.50	Non-Participating	South Dakota	0:00	0	0:00	0:00
699	704732.97	4828770.97	Non-Participating	South Dakota	0:00	0	0:00	0:00
700	704743.05	4828746.45	Non-Participating	South Dakota	0:00	0	0:00	0:00
701	704782.48	4828751.87	Non-Participating	South Dakota	0:00	0	0:00	0:00
702	704796.10	4828794.68	Non-Participating	South Dakota	0:00	0	0:00	0:00
703	704817.70	4828795.20	Non-Participating	South Dakota	0:00	0	0:00	0:00
704	704836.47	4828797.77	Non-Participating	South Dakota	0:00	0	0:00	0:00
705	704856.56	4828770.84	Non-Participating	South Dakota	0:00	0	0:00	0:00
706	704855.50	4828801.47	Non-Participating	South Dakota	0:00	0	0:00	0:00
707	704895.68	4828810.27	Non-Participating	South Dakota	0:00	0	0:00	0:00

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Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
708	704891.61	4828777.74	Non-Participating	South Dakota	0:00	0	0:00	0:00
709	704914.82	4828777.88	Non-Participating	South Dakota	0:00	0	0:00	0:00
710	704923.96	4828810.72	Non-Participating	South Dakota	0:00	0	0:00	0:00
711	704947.07	4828815.31	Non-Participating	South Dakota	0:00	0	0:00	0:00
712	704976.61	4828823.78	Non-Participating	South Dakota	0:00	0	0:00	0:00
713	705004.60	4828829.14	Non-Participating	South Dakota	0:00	0	0:00	0:00
714	705033.09	4828831.35	Non-Participating	South Dakota	0:00	0	0:00	0:00
715	704643.69	4828894.85	Non-Participating	South Dakota	0:00	0	0:00	0:00
716	704685.55	4828860.34	Non-Participating	South Dakota	0:00	0	0:00	0:00
717	704716.03	4828832.45	Non-Participating	South Dakota	0:00	0	0:00	0:00
718	704752.95	4828842.64	Non-Participating	South Dakota	0:00	0	0:00	0:00
719	704775.41	4828844.64	Non-Participating	South Dakota	0:00	0	0:00	0:00
720	704815.16	4828852.78	Non-Participating	South Dakota	0:00	0	0:00	0:00
721	704845.87	4828884.07	Non-Participating	South Dakota	0:00	0	0:00	0:00
722	704881.27	4828861.57	Non-Participating	South Dakota	0:00	0	0:00	0:00
723	704898.75	4828856.59	Non-Participating	South Dakota	0:00	0	0:00	0:00
724	704933.94	4828866.36	Non-Participating	South Dakota	0:00	0	0:00	0:00
725	704983.46	4828881.30	Non-Participating	South Dakota	0:00	0	0:00	0:00
726	705020.82	4829044.05	Non-Participating	South Dakota	0:00	0	0:00	0:00
727	704090.37	4829425.88	Non-Participating	South Dakota	0:00	0	0:00	0:00
728	704015.10	4829497.03	Non-Participating	South Dakota	0:00	0	0:00	0:00
729	704140.49	4829544.72	Non-Participating	South Dakota	0:00	0	0:00	0:00
730	704000.89	4829862.49	Non-Participating	South Dakota	0:00	0	0:00	0:00
731	703944.27	4829849.85	Non-Participating	South Dakota	0:00	0	0:00	0:00
732	704067.63	4830354.06	Non-Participating	South Dakota	0:00	0	0:00	0:00
733	705489.39	4830596.80	Non-Participating	South Dakota	9:34	42	0:20	3:06
734	703668.33	4830842.49	Non-Participating	South Dakota	0:00	0	0:00	0:00
735	703972.01	4831224.31	Non-Participating	South Dakota	0:00	0	0:00	0:00
736	704299.99	4830881.97	Non-Participating	South Dakota	0:00	0	0:00	0:00
737	704916.66	4830874.26	Non-Participating	South Dakota	0:00	0	0:00	0:00
738	705096.30	4830861.02	Non-Participating	South Dakota	3:06	21	0:13	0:58
739	705481.17	4830895.95	Non-Participating	South Dakota	6:40	29	0:20	2:04
740	704028.51	4831683.73	Non-Participating	South Dakota	0:00	0	0:00	0:00
741	704663.19	4832358.83	Non-Participating	South Dakota	14:51	72	0:19	4:58
742	704666.19	4832791.85	Non-Participating	South Dakota	10:59	55	0:21	3:39
743	704643.10	4832809.62	Non-Participating	South Dakota	10:27	53	0:20	3:29
744	704012.68	4832757.85	Non-Participating	South Dakota	0:00	0	0:00	0:00
745	703622.76	4832429.96	Non-Participating	South Dakota	0:00	0	0:00	0:00
746	703900.32	4833237.25	Non-Participating	South Dakota	0:00	0	0:00	0:00
747	703981.67	4833479.14	Non-Participating	South Dakota	0:00	0	0:00	0:00
748	703900.85	4833546.01	Non-Participating	South Dakota	0:00	0	0:00	0:00
749	703953.06	4833803.10	Non-Participating	South Dakota	0:00	0	0:00	0:00
750	703877.92	4834322.90	Non-Participating	South Dakota	0:00	0	0:00	0:00
751	703115.78	4835451.23	Non-Participating	South Dakota	0:00	0	0:00	0:00
752	703164.32	4835650.06	Non-Participating	South Dakota	0:00	0	0:00	0:00
A	712158.94	4832287.00	Non-Participating	Minnesota	9:42	46	0:19	3:29
B	712675.48	4832272.50	Non-Participating	Minnesota	0:00	0	0:00	0:00
C	712885.07	4832032.10	Non-Participating	Minnesota	23:59	69	0:32	9:22
D	707132.31	4837379.49	Non-Participating	Minnesota	21:30	93	0:20	8:38
E	707199.51	4837381.57	Non-Participating	Minnesota	16:09	85	0:18	6:31
F	718750.18	4829719.41	Non-Participating	Minnesota	0:00	0	0:00	0:00
H	712862.66	4832031.39	Non-Participating	Minnesota	27:30	76	0:34	10:42
I	710895.09	4843889.83	Non-Participating	Minnesota	0:00	0	0:00	0:00
J	705563.49	4837361.96	Non-Participating	Minnesota	0:00	0	0:00	0:00
K	703235.27	4848223.84	Non-Participating	South Dakota	0:00	0	0:00	0:00
L	703055.10	4848224.96	Non-Participating	South Dakota	0:00	0	0:00	0:00
N1	715712.50	4831245.52	Non-Participating	Minnesota	38:41	173	0:26	11:26
N7	712508.03	4832184.52	Non-Participating	Minnesota	22:35	61	0:25	8:35
N8	710307.95	4832588.36	Participating	Minnesota	8:40	44	0:18	2:49
N9	709858.42	4832463.19	Participating	Minnesota	3:46	32	0:10	1:06
N10	710527.10	4829926.70	Non-Participating	Minnesota	0:00	0	0:00	0:00
N11	710006.75	4829851.12	Participating	Minnesota	0:00	0	0:00	0:00
N16	703119.22	4848225.24	Non-Participating	South Dakota	0:00	0	0:00	0:00
N18	703012.25	4848234.77	Non-Participating	South Dakota	0:00	0	0:00	0:00
N19	703006.98	4847997.82	Non-Participating	South Dakota	0:00	0	0:00	0:00
N20	703184.00	4848093.37	Non-Participating	South Dakota	0:00	0	0:00	0:00
N21	703175.60	4848057.09	Non-Participating	South Dakota	0:00	0	0:00	0:00
N22	703289.81	4848227.56	Non-Participating	South Dakota	0:00	0	0:00	0:00
N23	703278.77	4848275.25	Non-Participating	South Dakota	0:00	0	0:00	0:00
N24	703426.63	4847498.89	Non-Participating	South Dakota	0:00	0	0:00	0:00
N25	703419.37	4847459.42	Non-Participating	South Dakota	0:00	0	0:00	0:00
N26	703621.29	4845626.04	Non-Participating	South Dakota	0:00	0	0:00	0:00
N27	719788.78	4840865.90	Non-Participating	Minnesota	0:00	0	0:00	0:00
N28	717647.77	4834465.50	Non-Participating	Minnesota	1:49	16	0:10	0:30

Table 1 (Table B-1 in Shadow Flicker Report): Shadow Flicker Modeling Results (GE 2.5-116 at 90m HH)

Receptor ID	Coordinates NAD83 UTM Zone 14N (meters)		Participation Status	Receptor State (MN or SD)	Worst-Case Shadow Flicker Hours per Year	Worst-Case Shadow Flicker Days per Year	Worst-Case Shadow Flicker Hours per Day	Expected Shadow Flicker Hours per Year
	X (Easting)	Y (Northing)			(HH:MM/year)	(Days/year)	(HH:MM/day)	(HH:MM/year)
N30	713229.35	4832282.49	Non-Participating	Minnesota	15:36	56	0:20	5:55
N31	713010.86	4832312.23	Non-Participating	Minnesota	8:23	44	0:17	3:02
N32	709098.10	4836931.87	Targeted	Minnesota	23:22	93	0:23	6:39
N33	708666.86	4835693.48	Non-Participating	Minnesota	41:06	76	1:00	13:08
N39	713597.65	4832689.58	Non-Participating	Minnesota	3:28	26	0:13	1:20