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Final Project Site Report

Erie, PA

Project Summary

The Saint Francis University Renewable Energy Center's Community Wind Project installed a meteorological tower at a site near Erie, PA, Erie County, to assess the site's wind energy potential. The mean monthly wind speed was recorded from September 2006 through December 2007 at 3 different levels, 15m (49 feet), 30m (98 feet) and 50m (164 feet). At the highest level 50m (164 feet) the mean average wind speed was 12.7 mph. Other summary data, graphs and tables can be found on the pages to follow. A 115kV line is located 1.25 miles north of the met tower. The tower was located 300 feet from the north and east property lines. The business' annual electricity usage is approximately 1.5 million kilowatt hours.

Project Location

The monitoring equipment was installed on 121 acres of open land for a private business near Erie, PA at an elevation of 1,492 feet. The site is located at N 42° 08' 50.43", W 79° 49' 26.67".

Monitoring Equipment

NRG Symphonie System including one 50m tower, a NRG Symphonie data logger with shelter box, 6 #40C anemometers, 2 #200P wind direction vanes, 1 temperature sensor, sensor cabling, 1 lightning spike with 2 grounding rods and copper grounding wire.

Wind Shear Information

Power law exponent: 0.277
Surface Roughness: 0.735 m
Roughness Class: 3.66

More Site Information

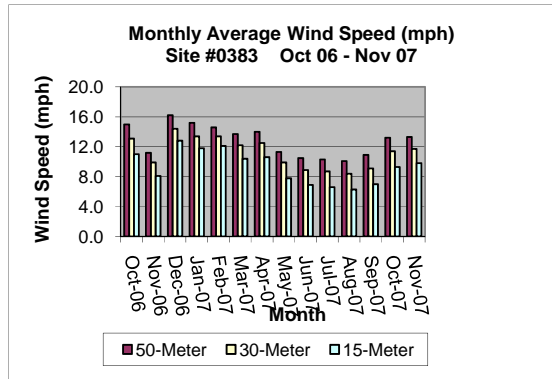
The electric utility provider is Penelec, a division of First Energy Company. The location of the closest most populated town is 15.72 miles. As shown on the following maps. The tree line is 90m north. Trees are 40' tall. There are a couple single trees to the east that are 50' tall. Access is 200m through the leach field (tall grasses, some soft ground) right off the pavement. The racetrack is 500m to the west, with some smaller buildings about 200m. Some low homes are 100m to the east.

The Community Wind project recognizes the vision and generosity of our funders: The Pennsylvania Department of Environmental Protection, MetEd/Penelec Sustainable Energy Funds, U.S. Department of Energy Wind Powering America Program and the Heinz Endowments.

*For contact information for the electric utility provider you can contact the Renewable Energy Center at 814-472-2872 or by email at renewable@francis.edu

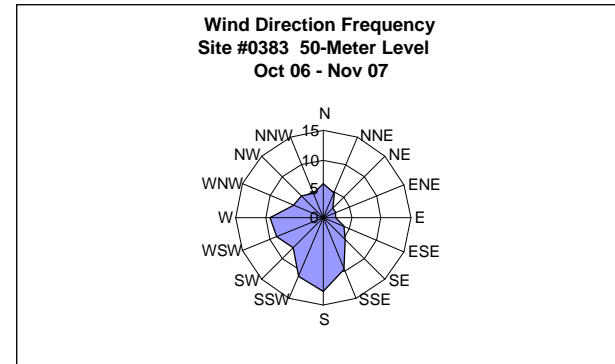
Monthly Variation

The chart below shows the average monthly wind speed throughout the recorded year. December was the only above average month with slightly stronger winds occurring in the winter and early spring.



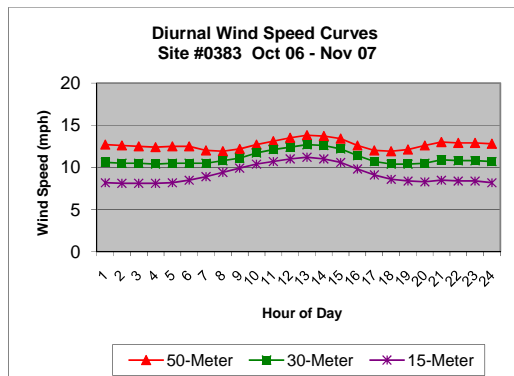
Wind Direction

The chart below displays a frequency wind rose. The majority of the wind comes from the south, south east, south and south west. A small portion of the wind comes from the west south west and west.



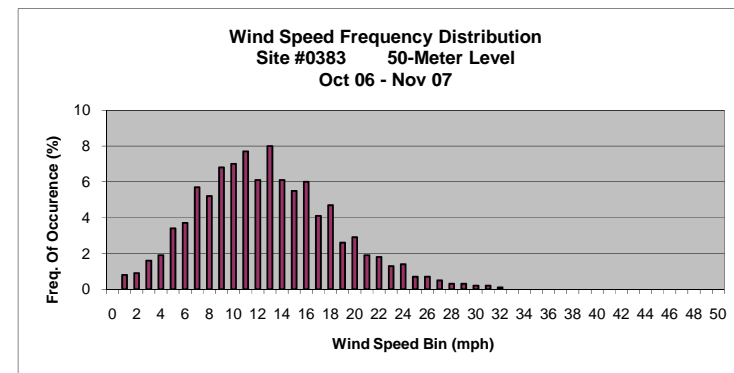
Diurnal Curves

The chart below shows how wind speeds vary on an hourly basis. The winds maintain a somewhat steady speed with slightly stronger winds occurring in the afternoon hours and diminishing in the later evening early morning hours.



Wind Speed Frequency

The chart below shows the frequency distribution of the wind speed. The graph shows what percentage of time the wind speed was at a certain miles per hour (mph).



Erie County Site #0383

Mean Monthly Average Wind Speed (mph)

Month	50-Meter	30-Meter	15-Meter
Oct-06	15.0	13.1	11.0
Nov-06	11.2	9.9	8.1
Dec-06	16.2	14.4	12.8
Jan-07	15.2	13.4	11.8
Feb-07	14.6	13.4	12.1
Mar-07	13.7	12.2	10.4
Apr-07	14.0	12.5	10.6
May-07	11.3	9.9	7.8
Jun-07	10.5	8.9	6.9
Jul-07	10.3	8.7	6.6
Aug-07	10.1	8.4	6.3
Sep-07	10.9	9.1	7
Oct-07	13.2	11.4	9.3
Nov-07	13.3	11.7	9.8

Direction	Percent of Time Wind Blows Comes the Direction
N	5.8
NNE	4.7
NE	2.4
ENE	2.4
E	2.1
ESE	3.7
SE	5.5
SSE	9.5
S	12.6
SSW	11
SW	7.2
WSW	8.7
W	9.1
WNW	5.7
NW	5.2
NNW	4.4

Mean Wind Speed By Hour of the Day

Hour	50-Meter	30-Meter	15-Meter
1	12.7	10.6	8.2
2	12.6	10.5	8.1
3	12.5	10.5	8.1
4	12.4	10.4	8.1
5	12.5	10.5	8.2
6	12.5	10.5	8.5
7	12	10.5	8.9
8	11.9	10.8	9.4
9	12.2	11.1	9.9
10	12.7	11.7	10.4
11	13.1	12.1	10.7
12	13.5	12.4	11
13	13.8	12.7	11.2
14	13.7	12.6	11
15	13.4	12.2	10.6
16	12.6	11.4	9.8
17	12	10.7	9.1
18	11.9	10.4	8.6
19	12.1	10.4	8.4
20	12.6	10.5	8.3
21	13	10.9	8.5
22	12.9	10.8	8.4
23	12.9	10.8	8.4
24	12.8	10.7	8.2

Wind Speed Bin (mph)	Percent of Time Wind Speed Occurs in Each Bin	Wind Speed Bin (mph)	Percent of Time Wind Speed Occurs in Each Bin
0	0		
1	0.8	26	0.7
2	0.9	27	0.5
3	1.6	28	0.3
4	1.9	29	0.3
5	3.4	30	0.2
6	3.7	31	0.2
7	5.7	32	0.1
8	5.2	33	0
9	6.8	34	0
10	7	35	0
11	7.7	36	0
12	6.1	37	0
13	8	38	0
14	6.1	39	0
15	5.5	40	0
16	6	41	0
17	4.1	42	0
18	4.7	43	0
19	2.6	44	0
20	2.9	45	0
21	1.9	46	0
22	1.8	47	0
23	1.3	48	0
24	1.4	49	0
25	0.7	50	0

Description of Attached Maps and Pictures

Maps:

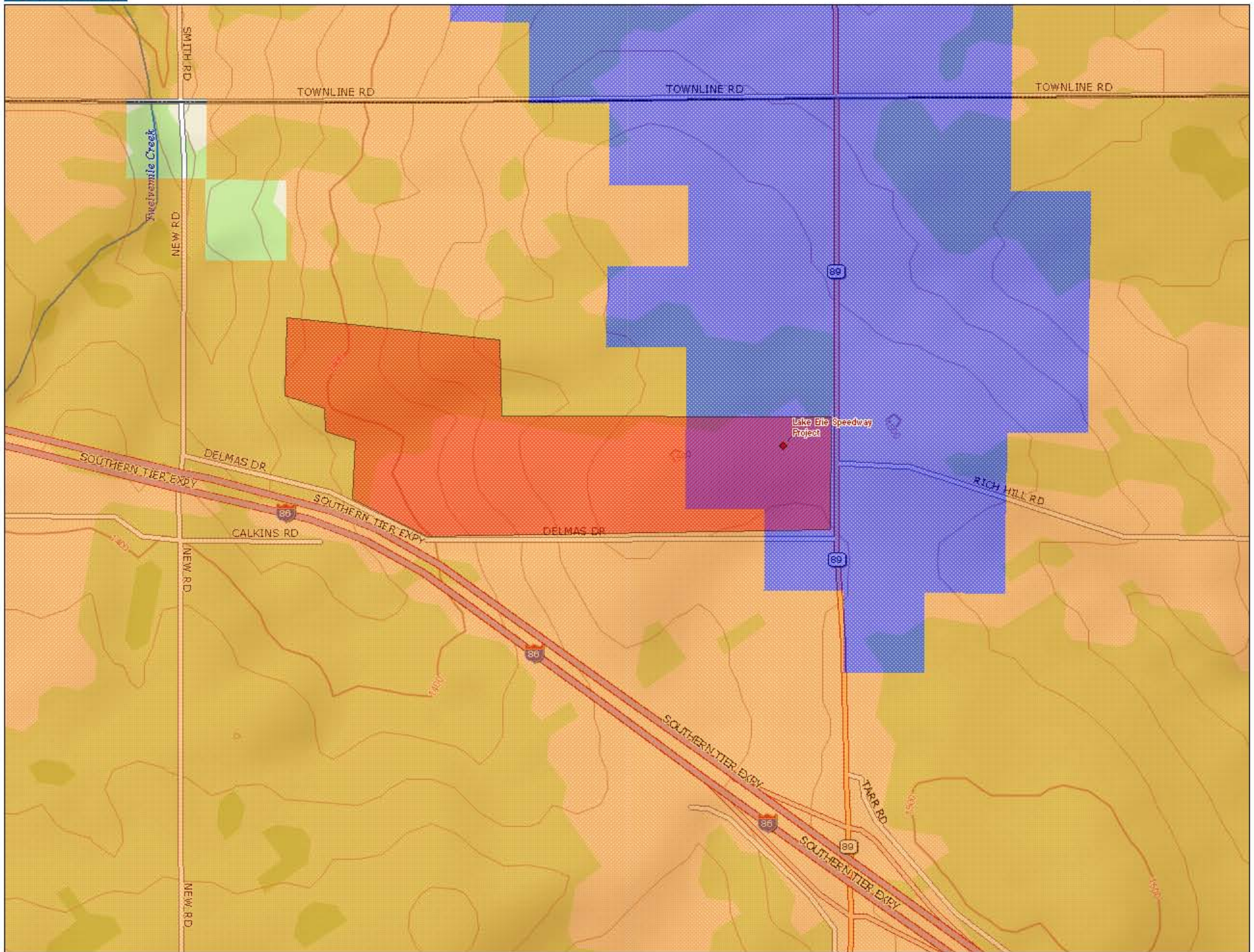
The first map shows the outline of the site's property boundaries and location of the meteorological tower.

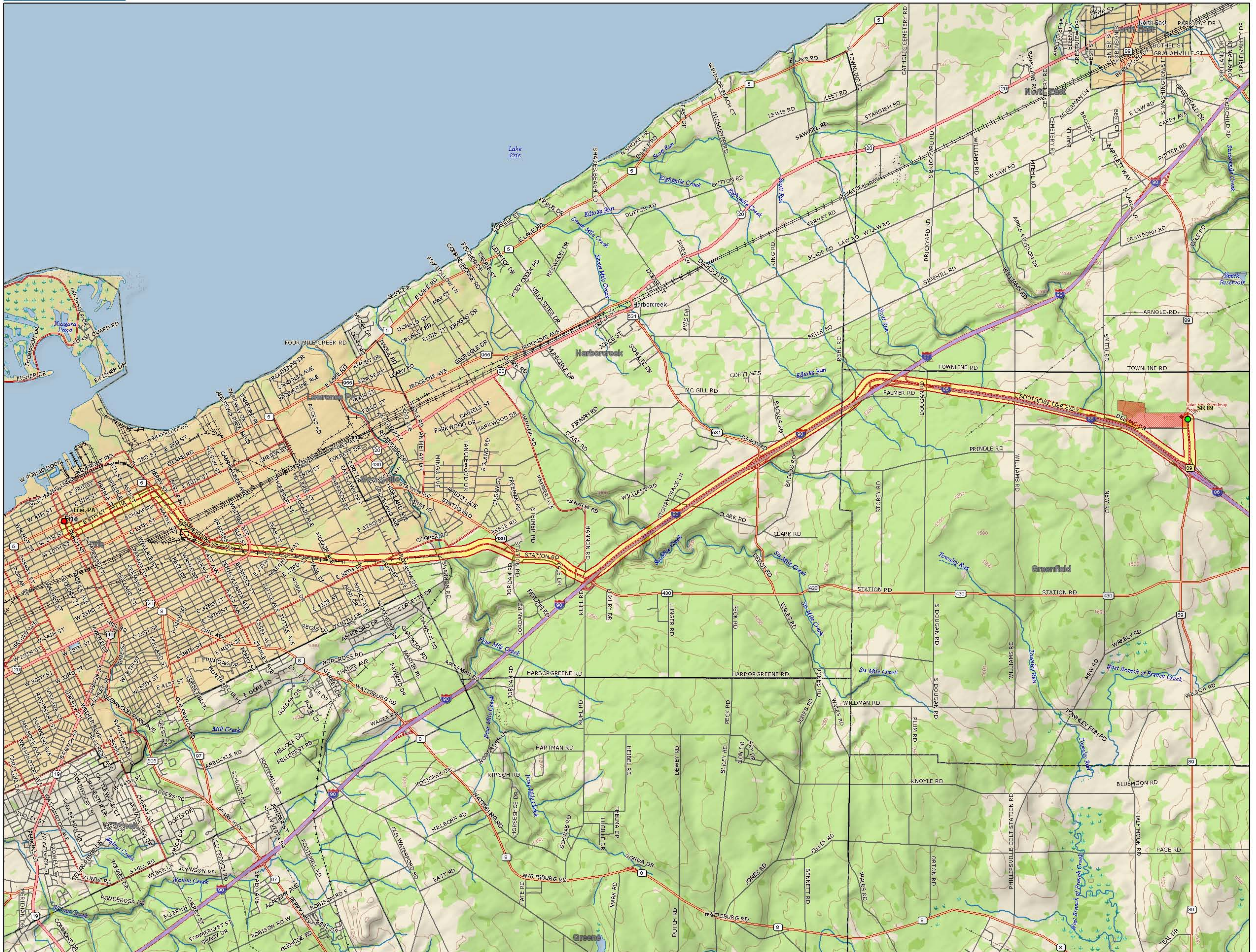
The second map shows the route and distance to the closest, most populated town.

The third and last map gives an overview of the property, showing the location of the meteorological tower, and physical characteristics of the property such as trees, roads, and hills.

Picture:

The picture shows the distance of the tree line in the North direction.

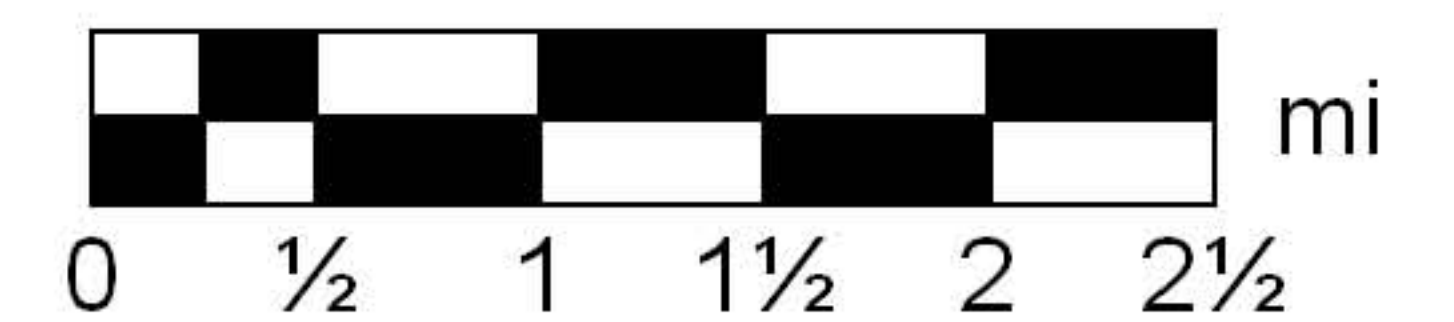
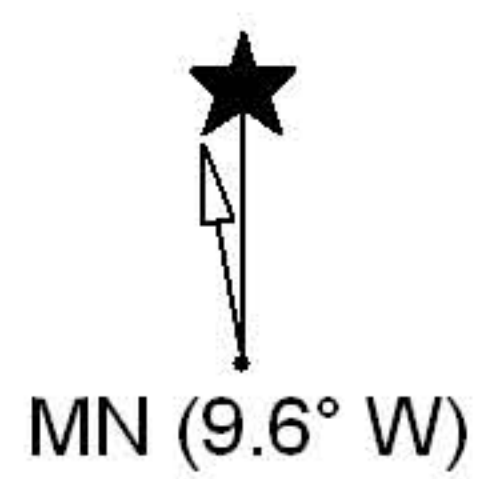




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Lake Erie Speedway Project Site, Erie PA



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