

**Casselton Derailment  
Summary of Air Monitoring Results<sup>1</sup>  
January 1, 2014**

This data report discusses air monitoring data recorded from December 31, 2013 07:00 to January 1, 2014 07:00 in support of remediation operations in Casselton, North Dakota.

Real-time air monitoring for Benzene, CO, H<sub>2</sub>S, percent of the Lower Explosive Limit (LEL), NO<sub>2</sub>, O<sub>2</sub>, SO<sub>2</sub>, Volatile Organic Compounds (VOCs), and particulate matter (PM<sub>2.5</sub>) were conducted using hand-held instruments such as the RAESystems<sup>®</sup> MultiRAE Plus, UltraRAE, TSI AM510 SidePak, and Gastec<sup>®</sup> colorimetric detector tubes. Table 1 contains a summary of hand-held real-time air monitoring data. Attachment 1 contains real-time air monitoring location maps.

The community evacuation order was lifted on December 31, 2013 at 15:00.

**Table 1 – Summary of Handheld Real-Time Air Monitoring Results**

**12/31/2013 07:00 – 1/1/2014 07:00**

Work Area				
Analyte	Number of Readings	Number of Detections	Average Detection	Detection Range
Benzene	12	0	NA	< 0.05 ppm
CO	5	0	NA	< 1.0 ppm
H <sub>2</sub> S	18	0	NA	< 1.0 ppm
LEL	27	0	NA	< 1.0 %
NO	1	0	NA	< 0.5 ppm
NO <sub>2</sub>	11	0	NA	0.1 < ppm
O <sub>2</sub>	14	14	20.9 %	20.9 - 20.9 %
PM <sub>2.5</sub>	15	15	0.0725 mg/m <sup>3</sup>	0.009 - 0.44 mg/m <sup>3</sup>
SO <sub>2</sub>	1	0	NA	0.1 ppm
VOC	35	10	2.59 ppm	0.1 - 10.2 ppm

<sup>1</sup> Please note: The data displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.

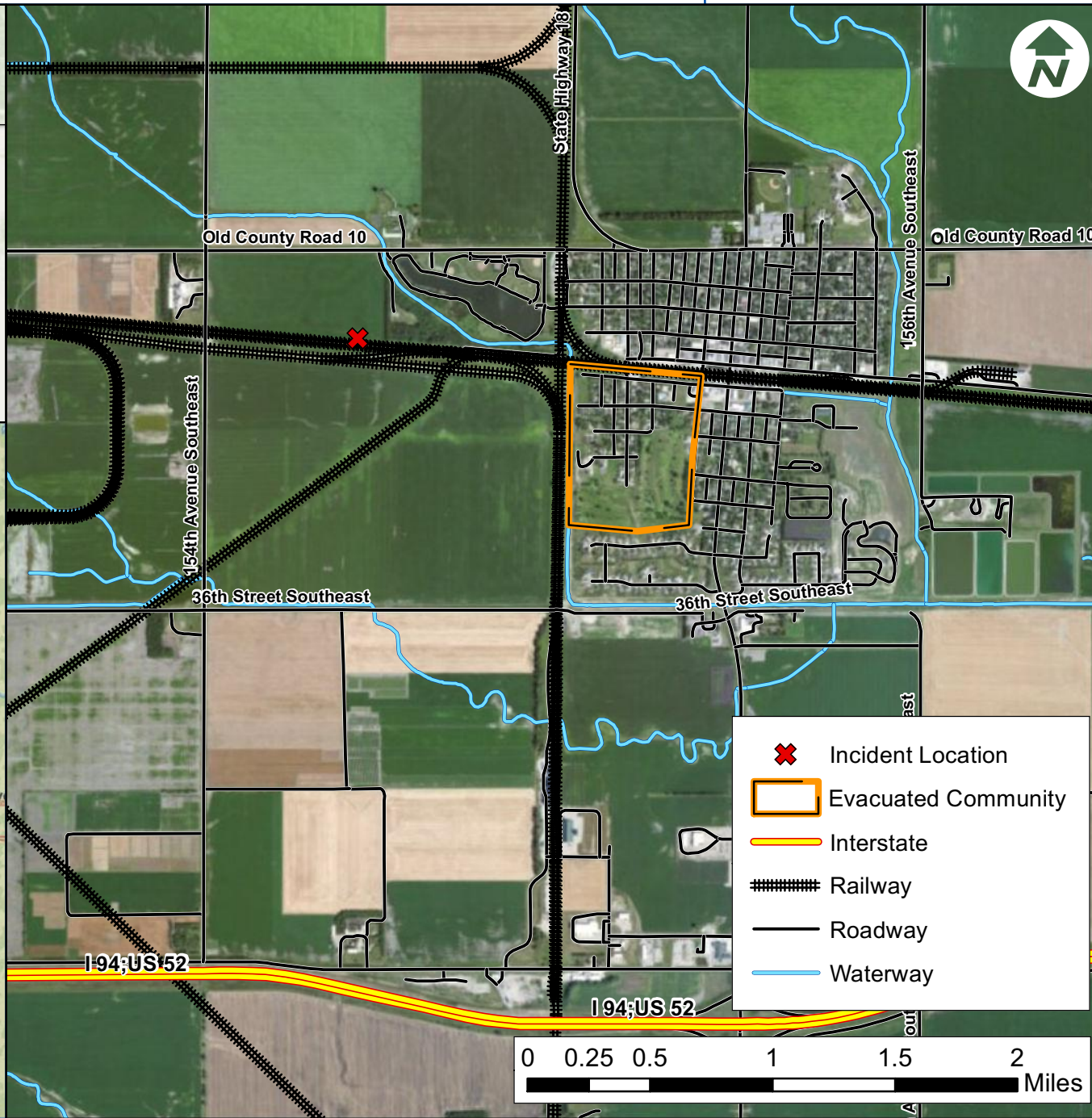
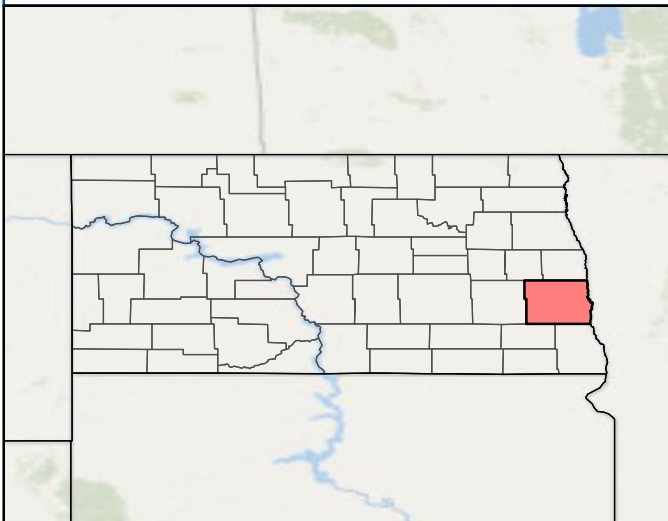
**12/31/2013 07:00 – 12/31/2013 15:00**

<b>Evacuated Community</b>				
<b>Analyte</b>	<b>Number of Readings</b>	<b>Number of Detections</b>	<b>Average Detection</b>	<b>Detection Range</b>
Benzene	4	0	NA	< 0.05 ppm
CO	8	0	NA	< 1.0 ppm
H <sub>2</sub> S	8	0	NA	< 1.0 ppm
NO <sub>2</sub>	3	0	NA	< 0.1 ppm
PM <sub>2.5</sub>	37	37	0.008 mg/m <sup>3</sup>	0.004 - 0.015 mg/m <sup>3</sup>
VOC	8	0	NA	< 0.1 ppm

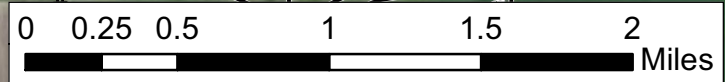
**12/31/2013 15:00 – 1/1/2014 07:00**

<b>Community</b>				
<b>Analyte</b>	<b>Number of Readings</b>	<b>Number of Detections</b>	<b>Average Detection</b>	<b>Detection Range</b>
Benzene	1	0	NA	< 0.05 ppm
CO	18	0	NA	< 1.0 ppm
H <sub>2</sub> S	19	0	NA	< 1.0 ppm
LEL	35	0	NA	< 1.0 %
NO <sub>2</sub>	2	0	NA	< 0.1 ppm
O <sub>2</sub>	19	19	20.9 %	20.9 - 20.9 %
PM <sub>2.5</sub>	42	42	0.019 mg/m <sup>3</sup>	0.003 - 0.222 mg/m <sup>3</sup>
SO <sub>2</sub>	1	0	NA	< 0.1 ppm
VOC	38	0	NA	< 0.1 ppm

**Attachment 1**  
**Maps**



- Incident Location
- Evacuated Community
- Interstate
- Railway
- Roadway
- Waterway

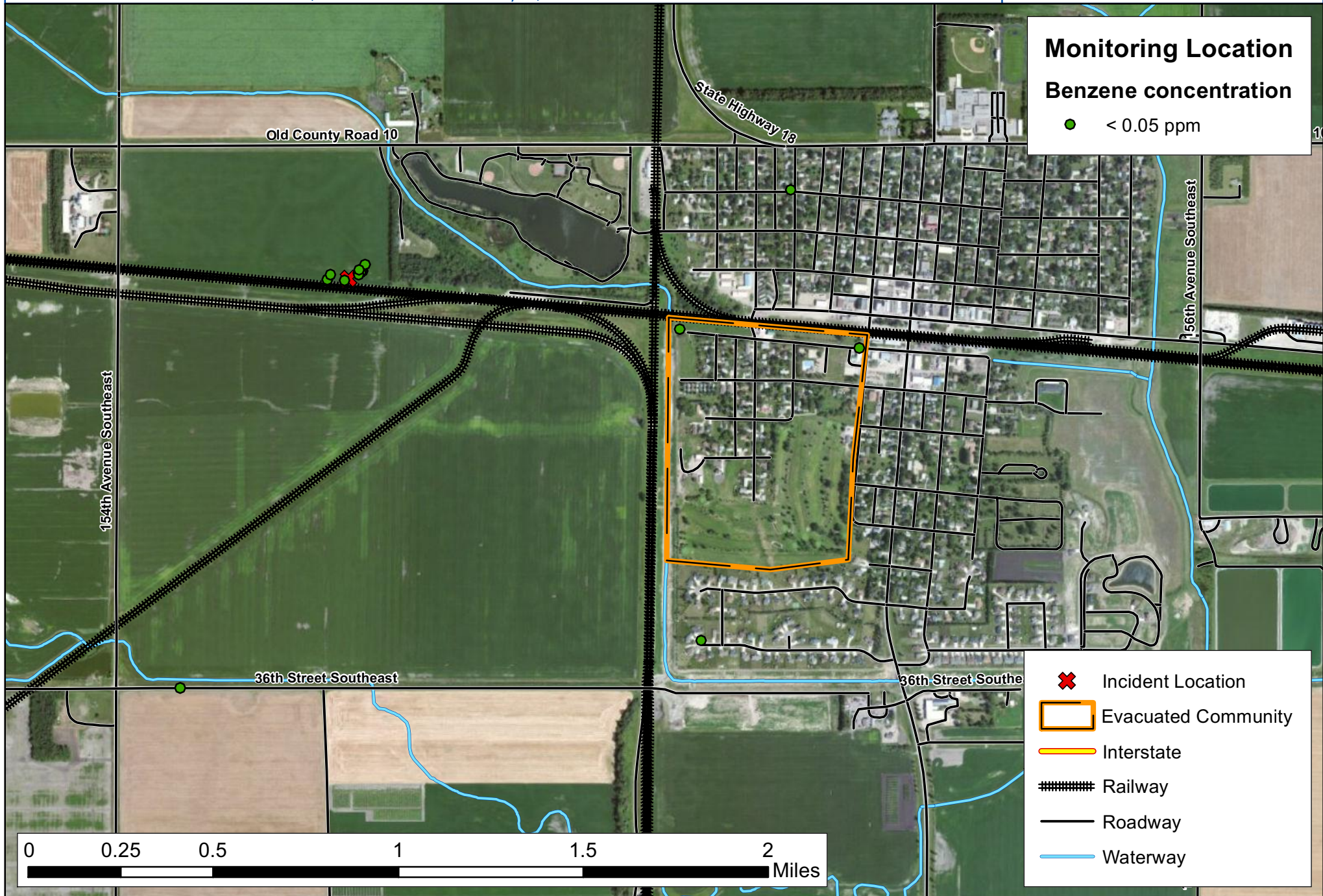




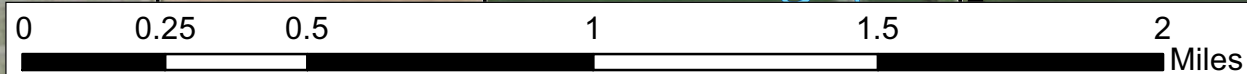
### Monitoring Location

### Benzene concentration

● < 0.05 ppm



- ✘ Incident Location
- ▭ Evacuated Community
- Interstate
- ▬ Railway
- Roadway
- Waterway

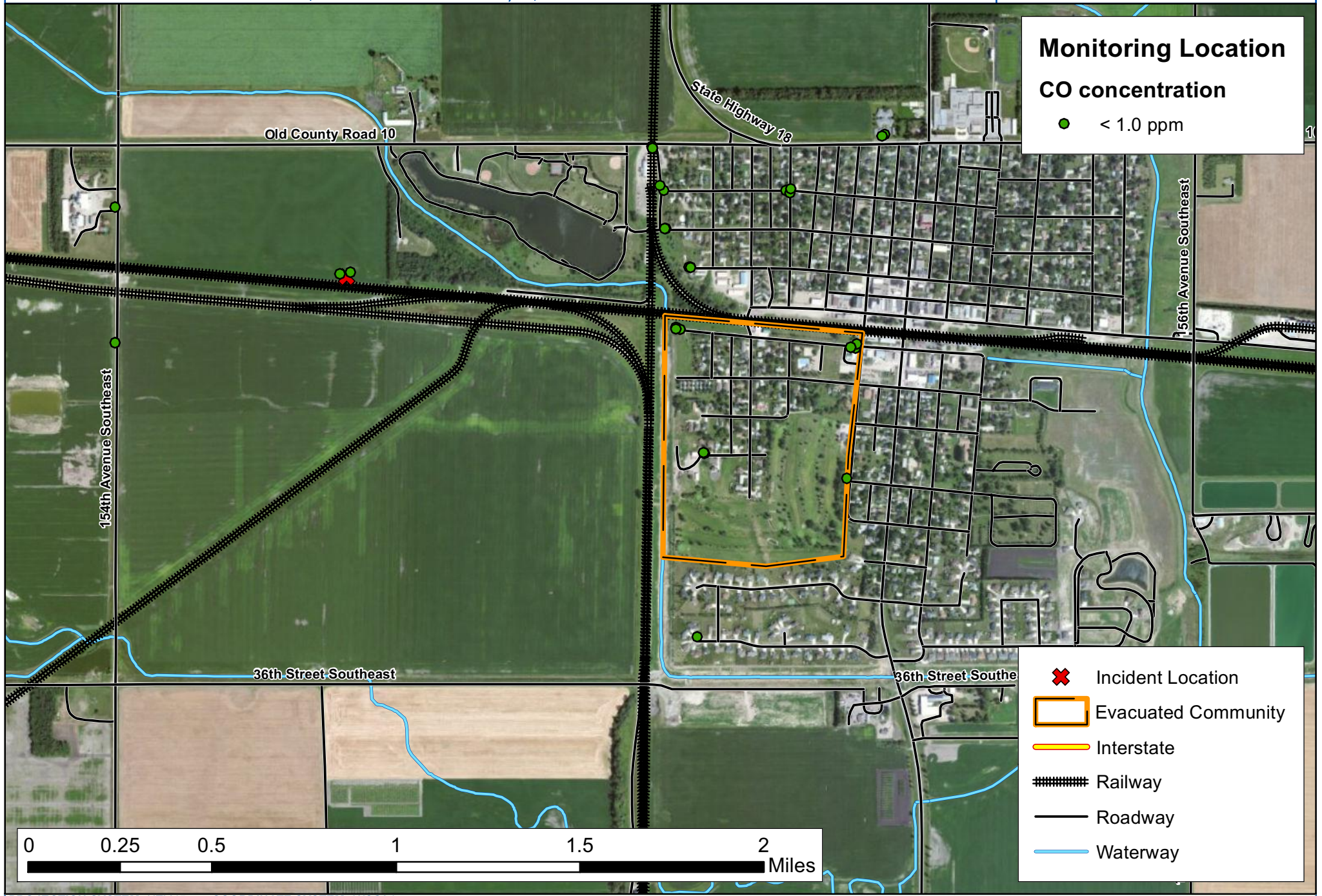




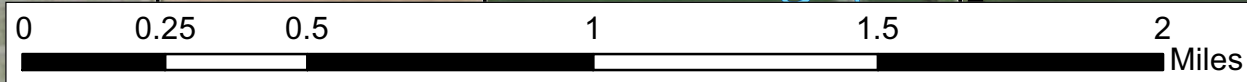
### Monitoring Location

#### CO concentration

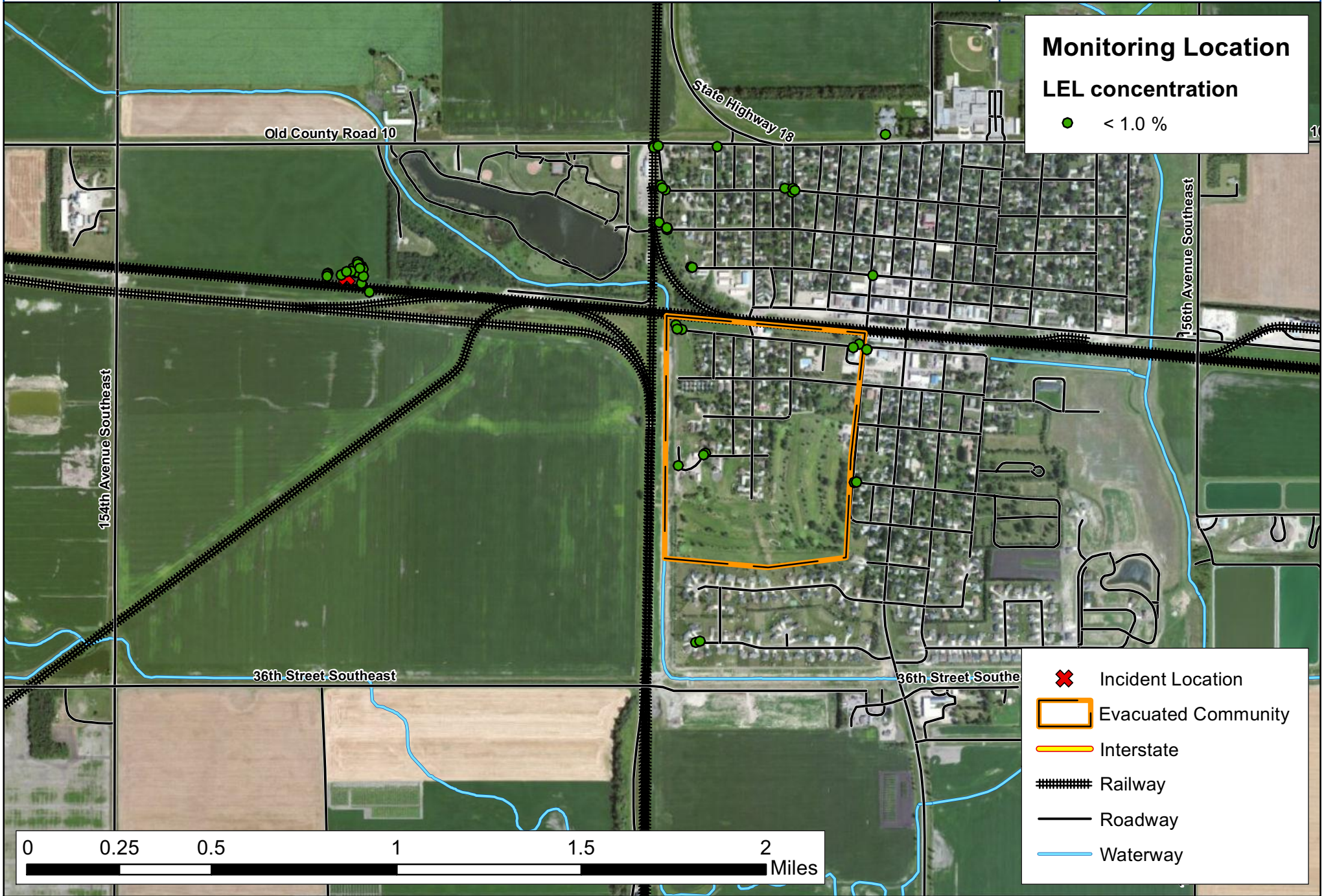
● < 1.0 ppm



- ✘ Incident Location
- ▭ Evacuated Community
- Interstate
- ▬ Railway
- Roadway
- Waterway



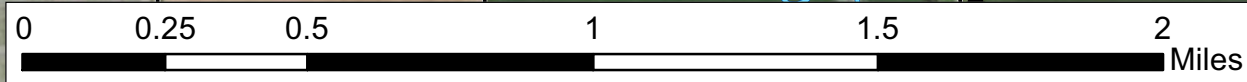




**Monitoring Location**  
**LEL concentration**

- < 1.0 %


- ✘ Incident Location
- ▭ Evacuated Community
- Interstate
- ▬ Railway
- Roadway
- Waterway





### Monitoring Location

#### NO concentration

 < 0.5 ppm

 Incident Location

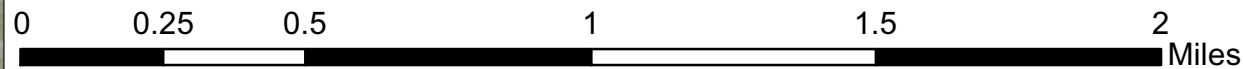
 Evacuated Community

 Interstate

 Railway

 Roadway

 Waterway

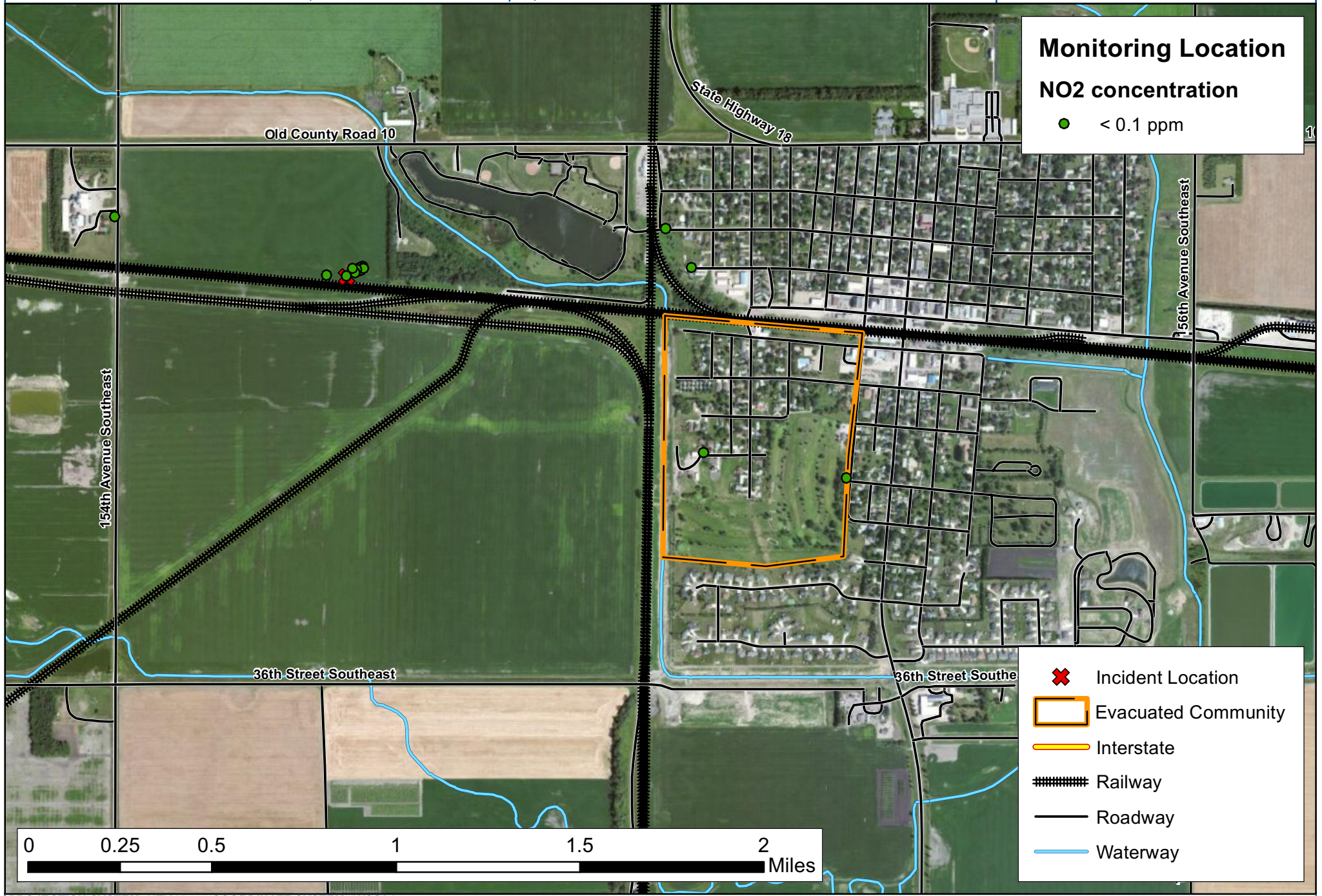




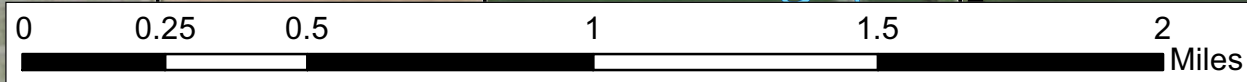
### Monitoring Location

### NO<sub>2</sub> concentration

< 0.1 ppm



- Incident Location
- Evacuated Community
- Interstate
- Railway
- Roadway
- Waterway

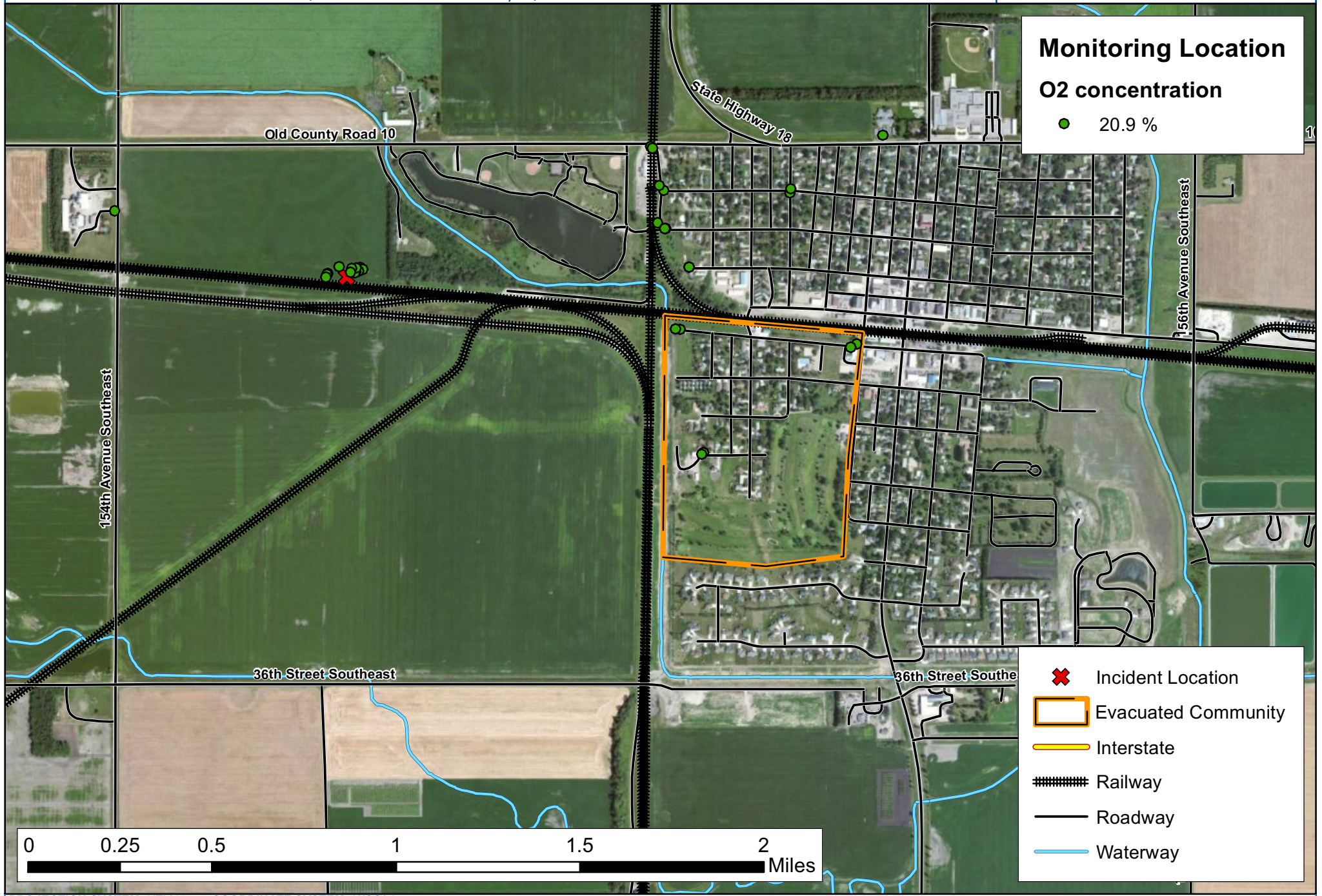




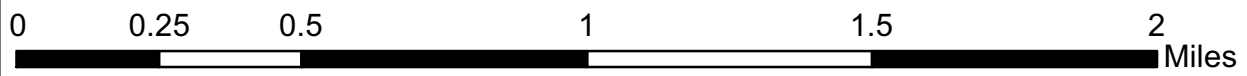
### Monitoring Location

#### O2 concentration

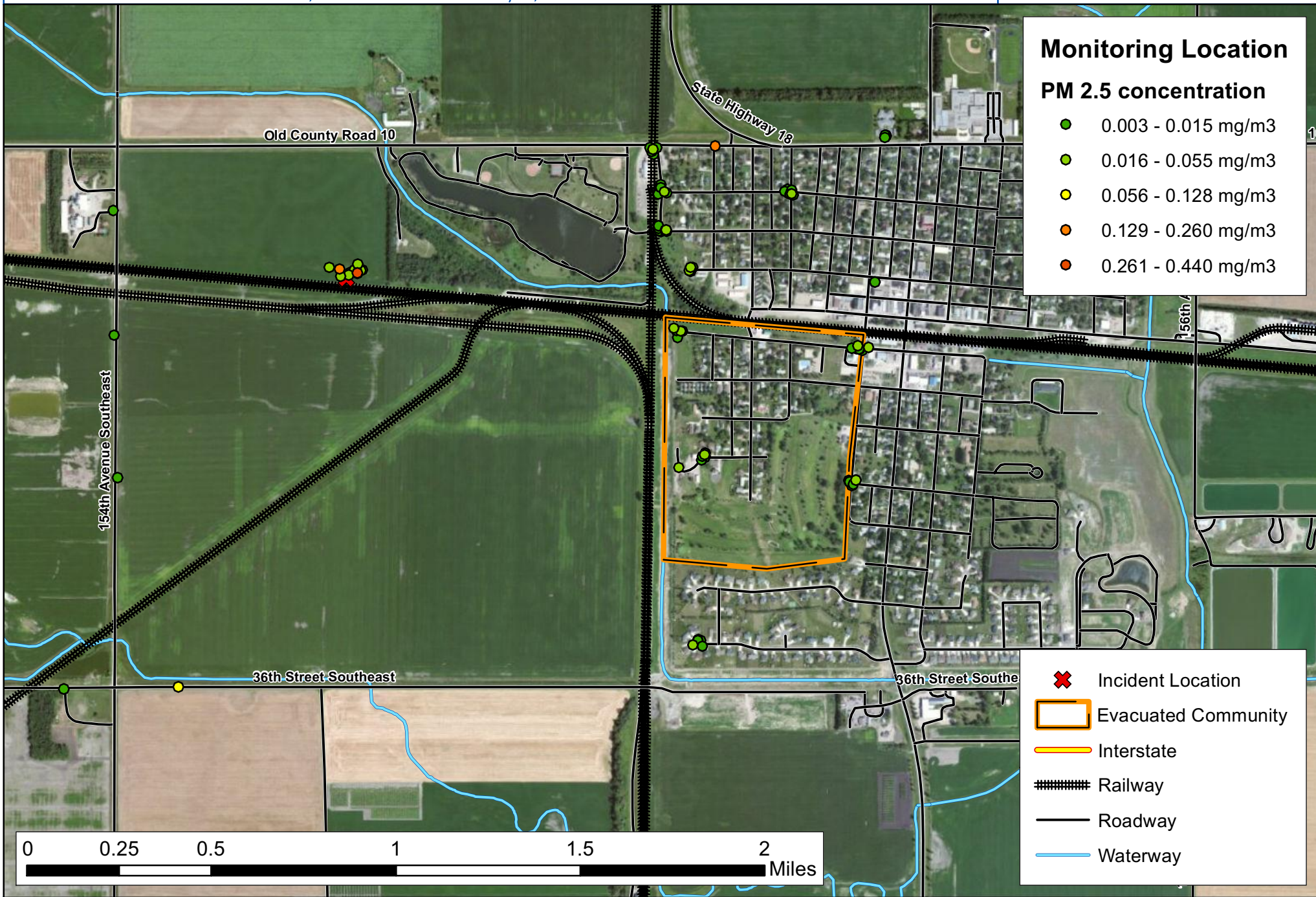
● 20.9 %



- ✖ Incident Location
- ▭ Evacuated Community
- Interstate
- ▬ Railway
- Roadway
- Waterway









### Monitoring Location

#### SO2 concentration

< 0.1 ppm

- Incident Location
- Evacuated Community
- Interstate
- Railway
- Roadway
- Waterway

