

# Technical Support Document:

EPA's Intended Redesignation  
of the Canton, Ohio Area for the  
2008 Lead National Ambient Air Quality Standard

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U.S. Environmental Protection Agency

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# Technical Support Document

## OHIO

### EPA's Intended Redesignation of the Canton, Ohio Area for the 2008 Lead National Ambient Air Quality Standard

#### 1. Overview

For the 2008 Lead (Pb) National Ambient Air Quality Standard (NAAQS), the United States Environmental Protection Agency (EPA) has set the level for the primary (health-based) standard at 0.15 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) measured as total suspended particles (TSP). EPA has set the secondary (welfare-based) standard for the 2008 Pb NAAQS to be identical in all respects to the primary standard. 73 FR 66964 (November 12, 2008).

Pursuant to section 107(d) of the Clean Air Act (CAA), EPA must designate as "nonattainment" those areas that violate the NAAQS and those nearby areas that contribute to violations. Once an area has been designated, the EPA Administrator, under CAA section 107(d)(3), "may at any time" notify a state that a designation should be revised. 42 U.S.C. § 7407(d).

EPA designated all areas of the country as "unclassifiable," "unclassifiable/attainment," or "nonattainment" for the 2008 Pb NAAQS in two rounds on November 16, 2010, and November 8, 2011. In the November 8, 2011 action, Stark County, along with the remaining unmonitored areas of Ohio, was initially designated as unclassifiable/attainment because available information did not indicate that the air quality in this area exceeded the 2008 Pb NAAQS. 75 FR 71033 (November 22, 2010); 76 FR 72097 (November 22, 2011). Once an area has been designated, the EPA Administrator, under CAA section 107(d)(3), "may at any time" notify a state that a designation should be revised. 42 U.S.C. § 7407(d).

Based on recent data from an ambient air quality monitoring site and EPA's technical analysis described below, Table 1 identifies portions of one county in Ohio that EPA intends to redesignate from "unclassifiable/attainment" to "nonattainment" for the 2008 Pb NAAQS. As explained in the technical analysis below, EPA's intended nonattainment area is centered around the Republic Steel plant in Canton, Ohio and is smaller than the presumptive county-wide boundary in the 2008 Pb NAAQS Final Rule.

**Table 1. Summary of Area Monitoring Information, Current Area Designation, and EPA's Intended Area Redesignation**

Area	County	AQS ID	2018 – 2020 Design Value ( $\mu\text{g}/\text{m}^3$ )	Current Designation	Intended Redesignation
Canton, Ohio	Stark (partial)	39-151-0024	0.21	Unclassifiable/Attainment	Nonattainment

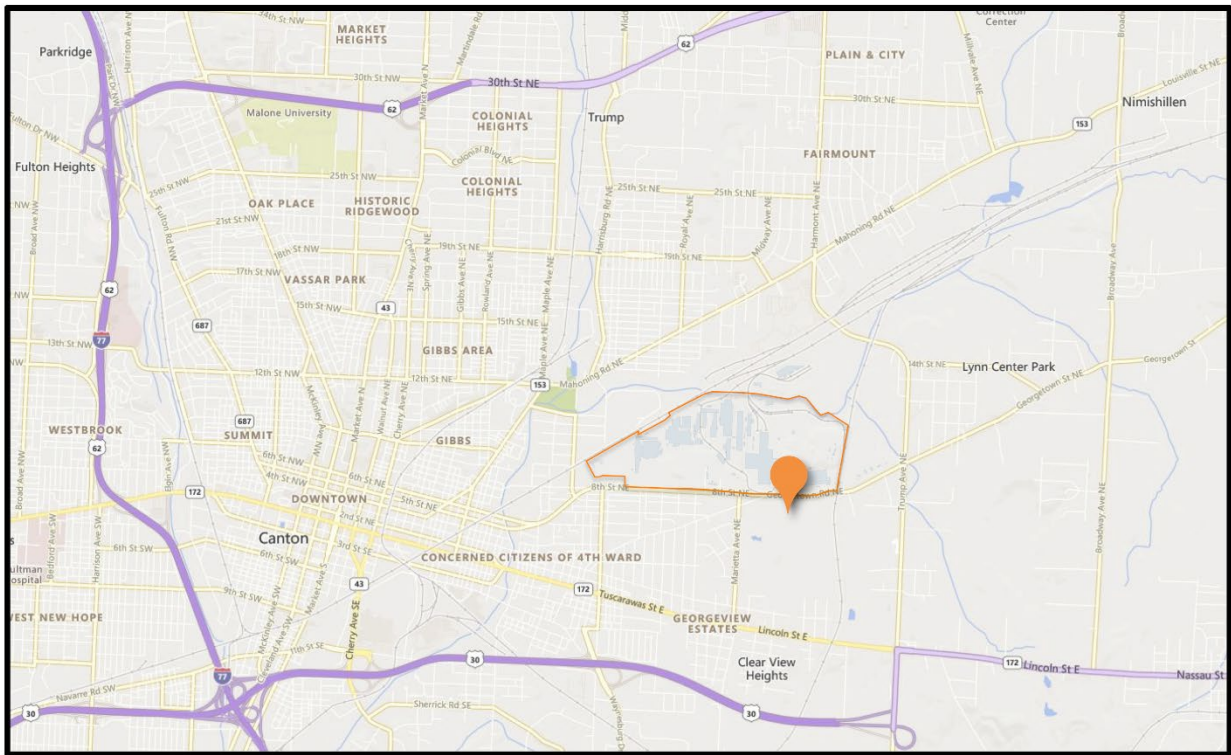
Figure 1 contains maps of Stark County and the Canton, Ohio area showing the location of the ambient air quality monitoring site with violations of the 2008 Pb NAAQS and sources of Pb emissions greater than 0.5 tons per year (1000 pounds per year) in Stark County.

**Figure 1. Canton, Ohio Area showing the Pb Ambient Air Monitoring Site and Pb Emissions Sources > 0.5 tons per year in Stark County**

**Legend**

 Violating Pb Monitor (2018 – 2020 Design Value)

 Perimeter of Pb Sources > 0.5 tons/year (2017 NEI), Republic Steel



CAA section 107(d)(3) identifies the schedule for the redesignation process. Per CAA section 107(d)(3)(B), EPA will notify the State of Ohio of our intended redesignation, establishing a 120-day period for the state to respond. EPA will also make our intended redesignation decision and supporting documentation for Stark County, OH available to the general public and announce a 30-day public comment period in the *Federal Register*. Comments may be submitted to EPA's public docket for this redesignation, Docket No. EPA-HQ-OAR-2022-0195, located at [www.regulations.gov](http://www.regulations.gov). Consistent with CAA section 107(d)(3)(C), EPA shall promulgate any redesignation for this area not later than 120 days after the first 120-day response period. If EPA deems any modifications necessary to its intended redesignation, including modifications based on the state's response, EPA will inform Ohio of such modification at least 60 days prior to issuing the redesignation, providing Ohio an opportunity to comment.

A final redesignation of the Canton, Ohio area to nonattainment for the 2008 Pb NAAQS would impose certain planning requirements on the State of Ohio to reduce Pb concentrations within this area. These include, but are not limited to, the requirement per CAA section 191(a) to submit, within 18 months of redesignation, a revision to the Ohio state implementation plan (SIP) that provides for attainment of the Pb standards as expeditiously as practicable, but no later than 5 years after the date of redesignation to nonattainment per CAA section 192(a).

## 2. Definitions

The following are definitions of important terms used in this document.

- 1) **Designated "nonattainment" area** - an area which EPA has determined, based on a State recommendation and/or on the technical analysis included in this document, has violated the 2008 Pb NAAQS, based on the most recent 3 years of quality assured air quality monitoring data including at least one valid 3-month site mean above the level of the 2008 Pb NAAQS, or that contributes to a violation in a nearby area.
- 2) **Designated "unclassifiable/attainment" area** - an area which EPA has determined does not contribute to a violation of the 2008 Pb NAAQS in a nearby area and either: (1) meets the 2008 Pb NAAQS, based on the most recent 3 years of quality assured air quality monitoring data including 36 consecutive valid 3-month site means, or (2) has no monitors or has incomplete air quality monitoring data but has no violations of the 2008 Pb NAAQS.
- 3) **Designated "unclassifiable" area** - an area which EPA has determined cannot be classified on the basis of available information as meeting or violating the 2008 Pb NAAQS, based on the most recent 3 years of quality assured air quality monitoring data, but for which available monitoring data from the same or a recent period indicate a significant likelihood that the area may be violating the 2008 Pb NAAQS.
- 4) **Violating monitor** - an ambient air monitor whose valid design value exceeds 0.15 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). As described in Appendix R of part 50 of Title 40 of the Code of Federal Regulations (CFR), a violation can be based on either Pb-TSP or

Pb-PM<sub>10</sub> data and only 3 months of data are necessary to produce a valid violating design value, where PM<sub>10</sub> is particulate matter less than 10 microns in diameter.

- 5) **1978 Pb NAAQS** - 1.5 µg/m<sup>3</sup>, National Ambient Air Quality Standard for Pb promulgated in 1978. Based on Pb-TSP indicator and averaged over a calendar quarter.
- 6) **2008 Pb NAAQS** - 0.15 µg/m<sup>3</sup>, National Ambient Air Quality Standard for Pb promulgated in 2008. Based on Pb-TSP indicator and a 3-month rolling average. Pb-PM<sub>10</sub> data may be used in limited instances, including to show nonattainment.
- 7) **Design value** – the site-level metric (i.e., statistic) that is compared to the NAAQS level to determine compliance; the design value for the Pb NAAQS is selected according to the procedures in 40 CFR part 50, Appendix R from among the valid 3-month Pb-TSP and Surrogate Pb-TSP (Pb-PM<sub>10</sub>) arithmetic mean concentration for the 38-month period consisting of the most recent 3-year calendar period plus two previous months (i.e., 36 3-month periods) using the last month of each 3-month period as the period of report.

### **3. Background**

#### **3.1. History of 2008 Pb NAAQS**

On October 15, 2008, EPA substantially strengthened the NAAQS for Pb. The revised standard was lowered from the 1.5 µg/m<sup>3</sup> set in 1978, to a level of 0.15 µg/m<sup>3</sup> based on a 3-month averaging time. EPA also established minimum ambient air monitoring requirements for source-oriented and population-oriented sampling for sources with Pb emissions greater than a 1.0 ton per year threshold. 43 FR 46246 (October 5, 1978); 73 FR 66964 (November 12, 2008). On December 14, 2010, EPA revised the Pb emissions threshold for source-oriented monitoring to 0.5 tons per year except for airports. 75 FR 81126 (December 27, 2010).

On September 16, 2016, EPA announced its decision to retain, without revision, the 2008 Pb NAAQS, finding that the existing primary (health based) standard provided health protection for at-risk groups, especially children, and the existing secondary (welfare based) standard provides protection against adverse effects to public welfare, including harm to aquatic and terrestrial ecosystems. 81 FR 71906 (October 18, 2016).

#### **3.2. History of 2008 Pb NAAQS Area Designations**

On November 16, 2010, EPA completed an initial round of nonattainment designations for the 2008 Pb NAAQS. 75 FR 71033 (November 22, 2010). On November 8, 2011, EPA designated all remaining areas of the country as meeting or not meeting the 2008 Pb NAAQS attainment because available information did not indicate that the air quality in this area exceeded the 2008 Pb NAAQS. In the November 8, 2011 action, Stark County, along with the remaining unmonitored areas of Ohio, was initially designated as unclassifiable/attainment. 76 FR 72097 (November 22, 2011).



### 3.3 History of 2008 Pb NAAQS Violations in Stark County

On June 6, 2017, an ambient air quality monitoring site began operating in Stark County to measure concentrations of Pb. The site is known as the Republic Steel ambient air monitoring site (AQS Site No. 39-151-0024) and is located at 3150 Georgetown Road NE, Canton, Ohio. The most recent certified, quality-assured air quality monitoring data collected at the Republic Steel ambient air monitoring site indicate that the 2018-2020 design value is  $0.21 \mu\text{g}/\text{m}^3$ , which shows a violation of the  $0.15 \mu\text{g}/\text{m}^3$  level of the 2008 Pb NAAQS. Preliminary data from 2019-2021 indicate a design value of  $0.40 \mu\text{g}/\text{m}^3$ .

## 4. Technical Analysis

### 4.1 General Approach

This technical analysis for the Canton, Ohio area identifies a monitor in Stark County that violates the 2008 Pb NAAQS, evaluates sources and nearby counties contributing to Pb concentrations in the area, and determines the intended area boundaries for redesignation.

To determine whether areas are in violation, the 2008 Final Rule for the Pb NAAQS adopted guidance (2008 EPA Pb Guidance) for using monitoring data from the 3 most recent calendar years to identify a violation. 73 FR 67033 (November 12, 2008).

To determine the boundaries of an area where violations support a nonattainment designation, the 2008 EPA Pb Guidance stated that the perimeter of a county containing the violating monitor would be the initial presumptive boundary for nonattainment areas. If the intended boundaries are smaller than the full county, as here, EPA requires a demonstration to show that violations are not occurring in the excluded portions of the county and that the excluded portions are not source areas that contribute to the observed violations. To justify establishing either a larger or smaller area, the 2008 EPA Pb Guidance indicated the following eight factors should be considered (73 FR 67033 (November 12, 2008)):

- 1) Air quality in potentially included versus excluded areas;
- 2) Emissions in areas potentially included versus excluded from the nonattainment area;
- 3) Level of control of emissions sources;
- 4) Population density and degree of urbanization including commercial development in included versus excluded areas;
- 5) Expected growth (including extent, pattern, and rate of growth);
- 6) Meteorology (weather/transport patterns);
- 7) Geography/topography (mountain ranges or other air basin boundaries); and
- 8) Jurisdictional boundaries (e.g., counties, air districts, reservations, etc.).

In addition to an analysis of the eight factors above, states can choose to recommend Pb nonattainment boundaries by using any one, or a combination of the following techniques (*id.*):

- Qualitative analysis;
- Spatial interpolation of air quality monitoring data; or

- Air quality simulation by dispersion modeling.

EPA is following 2008 EPA Pb Guidance in this intended redesignation to nonattainment. In the technical analysis below, EPA evaluated the violating monitoring site, contributing sources, and area boundaries based on the weight of evidence of the factors listed above. The boundaries of the intended nonattainment area will be smaller than the county boundary, as explained below.

## 4.2 Ambient Air Quality Monitors

On June 6, 2017, an ambient air quality monitoring site was installed and began operating in Stark County to measure concentrations of Pb and other toxic metals. Ohio EPA, through its partnership with the Canton City Public Health Department, installed the special purpose monitor (SPM) to meet the requirements of a permit<sup>1</sup> issued on December 12, 2016, to Republic Steel as part of operational changes made to its plant at 2633 Eighth Street NE, Canton, Ohio 44704-2311 (Republic Steel). Republic Steel manufactures leaded steel and other steel products. The Republic Steel ambient air monitoring site (AQS Site No. 39-151-0024) is located at 3150 Georgetown Road NE, Canton, Ohio, which is near a residential area across the street from and south of the Republic Steel plant.

In April 2019, Ohio EPA converted the designated primary Pb sampler at the Republic Steel ambient air monitoring site from an SPM to a State or Local Air Monitoring Station (SLAMS) monitor. The conversion was made as a result of Ohio EPA's 2017 emissions inventory, which indicated that Republic Steel's Pb emissions were at 0.81 tons per year. 40 CFR Part 58 Appendix D, Section 4.5(a) requires ambient air monitoring of Pb emissions around any facility that reports actual Pb emissions greater than 0.5 tons per year. EPA requires SLAMS monitors to collect Pb samples at a minimum frequency of 1-in-6 days and those data be reported to EPA's Air Quality System (AQS). Ohio EPA continued to also collect SPM samples to sample air quality specifically during leaded production at the Republic Steel plant; however, the SPM monitoring data are not reported to EPA's AQS. Ohio EPA posts the SLAMS and SPM data on its website.<sup>2</sup>

Two ambient air quality monitors (Parameter Occurrence Code - POC 1, POC 4) at the Republic Steel monitoring site measure ambient concentrations on a microscale level of 0 to 100 meters with a staggered schedule. POC 1 operates on the EPA sampling schedule of 1-in-6 days, and POC 4 operates on a randomized schedule. The POC is used to distinguish different instruments that measure the same parameter at the same site. The collection method uses Manual Equivalent Method EQL-0170-192: *Heated Nitric Acid Block Digestion and Inductively Coupled Plasma / Mass Spectrometry (ICP/MS) Analysis for Lead (Pb)* on total suspended particulate matter (TSP) High-Volume Filters. In this method, total suspended particulate matter is collected on glass

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<sup>1</sup> Ohio EPA Air Pollution Permit-to-Install (PTI), Permit Number: P0121793, Facility ID: 1576050694, Republic Steel. [http://wwwapp.epa.ohio.gov/dapc/permits\\_issued/1499790.pdf](http://wwwapp.epa.ohio.gov/dapc/permits_issued/1499790.pdf)

<sup>2</sup> Ohio EPA, Air Pollution Control, Reports & Data, Special Sampling Projects. <https://epa.ohio.gov/wps/portal/gov/epa/divisions-and-offices/air-pollution-control/reports-and-data/special-sampling-projects>

fiber filters according to 40 CFR Appendix B to part 50, EPA Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method), extracted with a solution of nitric acid, heated on a hot block to 95°C for one hour, and brought to a final volume of 50 milliliters (mL). The Pb content of the sample extract is analyzed by Inductively Coupled Plasma / Mass Spectrometry (ICP-MS) based on EPA Method 200.8 and SW-846 Method 6020A. Both POC 1 and POC 4 met quality assurance criteria to be deemed as valid and the requirements of 40 CFR Part 58 Appendix A<sup>3</sup> and the Quality Assurance Handbook Volume II, Appendix D, Measurement Quality Objectives and Validation Templates.<sup>4</sup>

### 4.3 Ambient Air Quality Monitoring Data

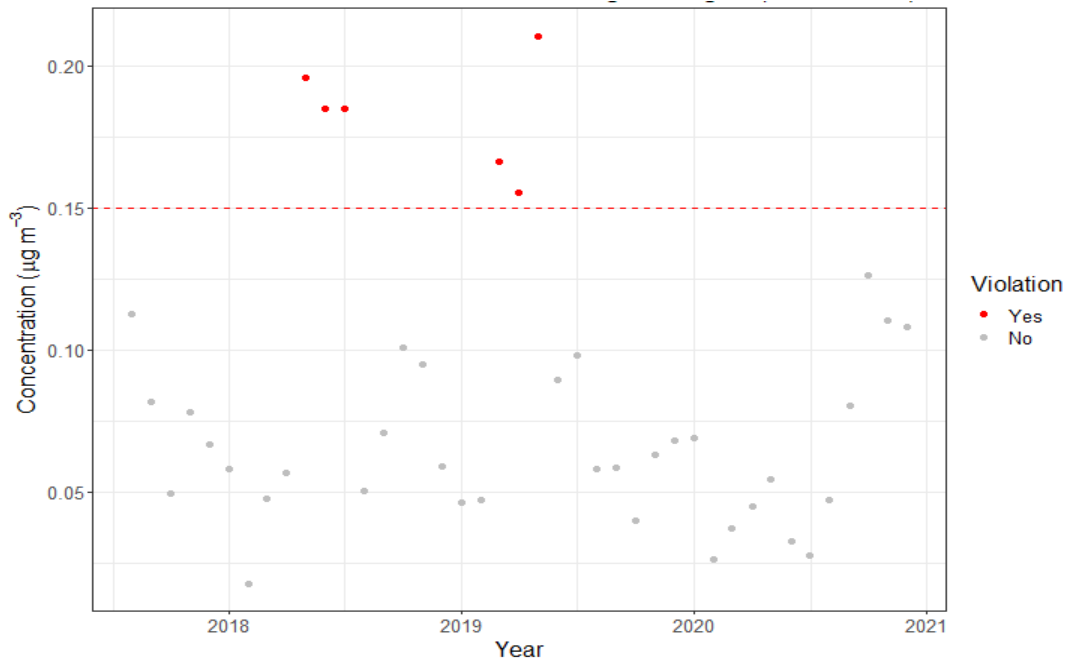
Ambient air quality monitoring data for the Republic Steel ambient air monitoring site are reported in EPA's AQS. Both monitors POC 1 and POC 4 at the site were used in summary statistics of annual max 3-month rolling averages and design value calculations. Figure 2 shows the plot of AQS reported Pb concentrations as 3-month rolling averages at the Republic Steel ambient air monitoring site for 2017–2020.

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<sup>3</sup> Appendix A to Part 58 – Quality Assurance Requirements for Monitors used in Evaluations of National Ambient Air Quality Standards  
<https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-58/appendix-Appendix%20A%20to%20Part%2058>

<sup>4</sup> Quality Assurance Handbook Volume II, Appendix D, Measurement Quality Objectives and Validation Templates  
[https://www.epa.gov/sites/default/files/2020-10/documents/app\\_d\\_validation\\_template\\_version\\_03\\_2017\\_for\\_amtic\\_rev\\_1.pdf](https://www.epa.gov/sites/default/files/2020-10/documents/app_d_validation_template_version_03_2017_for_amtic_rev_1.pdf)

**Figure 2. Republic Steel Pb Ambient Air Monitoring Site, Three-Month Rolling Averages (2017 – 2020)**



The Republic Steel monitoring site is the only EPA AQS monitoring site in Stark County. The nearest downwind AQS monitors for Pb are approximately 69 kilometers (km) east southeast of the Republic Steel ambient air monitoring site and located in Liverpool, Ohio in adjacent Columbiana County. No other AQS ambient air monitors for Pb are located in the counties adjacent to Stark County besides Columbiana County. Table 2 contains the annual maximum Pb 3-month rolling averages for the ambient air monitors in Stark and Columbiana Counties for 2016 – 2020.

**Table 2. Ambient Air Quality Monitoring Data for Stark and Columbiana Counties**

County	Monitor Name	Monitor AQS ID	Monitor Location	Maximum Pb 3-Month Rolling Average* (µg/m <sup>3</sup> )				
				(Number of Complete Months in Parentheses)				
				2016	2017	2018	2019	2020
Stark	Republic Steel	39-151-0024	3150 Georgetown Road NE, Canton, Ohio	N/A	0.11 (5)	0.20 (12)	0.21 (12)	0.13 (12)
Columbiana	Columbiana	39-029-	1250 George	0.02	0.02	0.02	0.01	0.01

	Port Authority	0019	Street, East Liverpool, Ohio	(12)	(12)	(12)	(12)	(8)
Columbiana	Eastside Elementary	39-029-0023	500 Maryland Avenue, East Liverpool, Ohio	0.01 (12)	0.01 (12)	0.01 (12)	0.01 (12)	0.01 (8)
Columbiana	East Liverpool WTP	39-029-0020	2220 Michigan Avenue, East Liverpool, Ohio	0.01 (9)	0.01 (12)	0.03 (12)	0.01 (12)	0.01 (8)

\* Information on the ambient air quality monitors and data used to calculate the Pb design values is publicly available at: <https://www.epa.gov/aqs>

The 2008 Pb NAAQS design values for Stark County and surrounding area were calculated based on the most recent quality assured and certified AQS ambient air quality monitoring data for 2016 – 2018, 2017 – 2019, and 2018 – 2020 as shown in Table 3. For Columbiana County, the 2008 Pb NAAQS design values for 2018- 2020 are incomplete due to data completeness issues during the beginning of the COVID-19 pandemic. Thus, the 2017 – 2019 design values for Columbiana County should be used for comparison. The design values were calculated according to the data handling procedures in 40 CFR part 50, Appendix R, and are valid for comparison to the NAAQS.

**Table 3. 2008 Pb NAAQS Design Values for Stark and Columbiana Counties**

County	Monitor Name	Monitor AQS ID	Monitor Location	Pb Design Value* ( $\mu\text{g}/\text{m}^3$ )		
				2016-2018	2017-2019	2018-2020
Stark	Republic Steel	39-151-0024	3150 Georgetown Road NE, Canton, Ohio	0.20	0.21	0.21
Columbiana	Columbiana Port Authority	39-029-0019	1250 George Street, East Liverpool, Ohio	0.02	0.02	0.02
Columbiana	Eastside Elementary	39-029-0023	500 Maryland Avenue, East Liverpool, Ohio	0.01	0.01	0.01
Columbiana	East Liverpool WTP	39-029-0020	2220 Michigan Avenue, East Liverpool, Ohio	0.03	0.03	0.03

\* Information on the ambient air quality monitors and data used to calculate the Pb design values is publicly available at <https://www.epa.gov/aqs>

#### 4.4 Violations based on Ambient Air Quality Monitoring Data in Stark County

A monitor's design value indicates whether that monitor attains a specified air quality standard. The 2008 Pb NAAQS are met at a monitoring site when the identified design value is valid and less than or equal to  $0.15 \mu\text{g}/\text{m}^3$ . A design value is only valid if minimum data completeness

criteria are met. A Pb design value that meets the NAAQS is generally considered valid if it encompasses 36 consecutive valid 3-month site means (specifically for a 3-year calendar period and the two previous months). For this purpose, a 3-month site mean is valid if valid data were obtained for at least 75 percent of the scheduled monitoring days in the 3-month period. A Pb design value that does not meet the NAAQS is considered valid if at least one 3-month mean that meets the same 75 percent requirement is above the NAAQS. That is, a site does not have to monitor for 3 full calendar years to have a valid violating design value; a site could monitor just 3 months and still produce a valid (violating) design value.

EPA considered the Pb NAAQS design value for the Republic Steel ambient air monitoring site in Stark County by assessing the most recent 3 consecutive years (i.e., 2018 – 2020) and two previous months of quality-assured, certified ambient air quality data in EPA's AQS using data from Federal Reference Method and/or Federal Equivalent Method monitors that are sited and operated in accordance with 40 CFR parts 50 and 58. Procedures for using monitored air quality data to determine whether a violation of the 2008 Pb NAAQS has occurred are given in 40 CFR part 50 Appendix R.

Data collected at the Republic Steel monitoring site indicate that the 2018 – 2020 design value representative of the Stark County area is  $0.21 \mu\text{g}/\text{m}^3$ . With a design value of  $0.21 \mu\text{g}/\text{m}^3$ , the Republic Steel ambient air monitoring site shows a violation for 2018 – 2020 of the 2008 Pb NAAQS of  $0.15 \mu\text{g}/\text{m}^3$ . Preliminary data from 2019-2021 indicate a design value of  $0.40 \mu\text{g}/\text{m}^3$ .

#### **4.5 Intended Nonattainment Redesignation Boundary Determination**

Under CAA section 107(d)(3), the EPA Administrator may at any time notify the Governor of any State that available information indicates that the designation of any area or portion of an area within the State should be revised. For purposes of this intended redesignations action, EPA is following the same analytical steps applied in the initial area designations process following promulgation of a new or revised NAAQS. That is, under CAA section 107(d)(1)(A)(i), the statutory authority for initial area designations, EPA must designate as nonattainment any area that violates the NAAQS and any nearby area that contributes to ambient air quality in the violating area. Air quality data from 2018-2020 indicate that ambient lead concentrations in Stark County do not meet the NAAQS, and, therefore, some area in Stark County and possibly additional areas in surrounding counties must be redesignated nonattainment. The absence of monitors indicating violations in nearby counties is not a sufficient reason to eliminate nearby counties as candidates for nonattainment status.

A nonattainment area should contain the area violating the NAAQS (e.g., the area around a violating monitor or encompassing modeled violations), as well as any nearby areas (e.g., counties or portions thereof) that contain emissions sources contributing to the violation. *See* CAA section 107(d)(1). Accordingly, although EPA considers county boundaries as the analytical starting point for determining nonattainment areas for the 2008 Pb NAAQS, an evaluation of the eight factors listed above may be considered in determining the geographic scope of a nonattainment boundary. In the sections below, we consider the appropriate geographical extent of the intended nonattainment area.

#### **4.5.1 Factor 1: Air Quality in Potentially Included Versus Excluded Areas**

This factor considers the Pb design values (in  $\mu\text{g}/\text{m}^3$ ) for the ambient air quality monitors in Stark County and the surrounding area based on data for the 2018 – 2020 period. Ambient air quality data are discussed in section 4.3.

The Republic Steel ambient air monitor is the only EPA AQS monitor in Stark County. The nearest downwind ambient air monitors reporting Pb data to EPA's AQS are approximately 69 km east southeast of the Republic Steel ambient air monitoring site in adjacent Columbiana County, Ohio. The three Columbiana County ambient air monitors are all located in Liverpool, Ohio on the border of West Virginia and Pennsylvania, and 11 km west and upwind of the Lower Beaver Valley, Pennsylvania 2008 Pb Nonattainment Area, which was designated in 2010.<sup>5</sup> As shown in Table 3, the 2018 – 2020 design values for the three Liverpool ambient air monitors meet the 2008 Pb NAAQS.

There are no other EPA AQS monitors for Pb in the counties surrounding Stark County. The absence of AQS monitors is consistent with emissions reported in the 2017 National Emissions Inventory (NEI) discussed under Section 4.5.2 below, which indicates there are no other sources with actual Pb emissions greater than 0.5 tons per year that warranted a source-oriented monitor under 40 CFR Part 58 Appendix D, Section 4.5(a). *See* Table 5 below.

#### **4.5.2 Factor 2: Emissions in Areas Potentially Included Versus Excluded from the Nonattainment Area**

Evidence of Pb emissions sources in the vicinity of a violating monitor is an important factor in determining whether a nearby area is contributing to a monitored violation. For this factor, EPA evaluates county-level emissions data for Pb and growth in Pb emitting activities.

Figure 3 is a map of Stark County, Ohio and surrounding areas that shows all sources of Pb emissions listed in the 2017 NEI (January 2021 version). The January 2021 version of the 2017 NEI was the most current version of the national inventory available in 2021 when these data were compiled for the redesignation process. Sources with Pb emissions greater than 5 pounds per year are labeled.

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<sup>5</sup> 75 FR 71033 (November 22, 2010) <https://www.govinfo.gov/content/pkg/FR-2010-11-22/pdf/2010-29405.pdf#page=1>

**Figure 3. Sources of Pb Emissions in Stark County, Ohio Area based on 2017 NEI<sup>6</sup>**

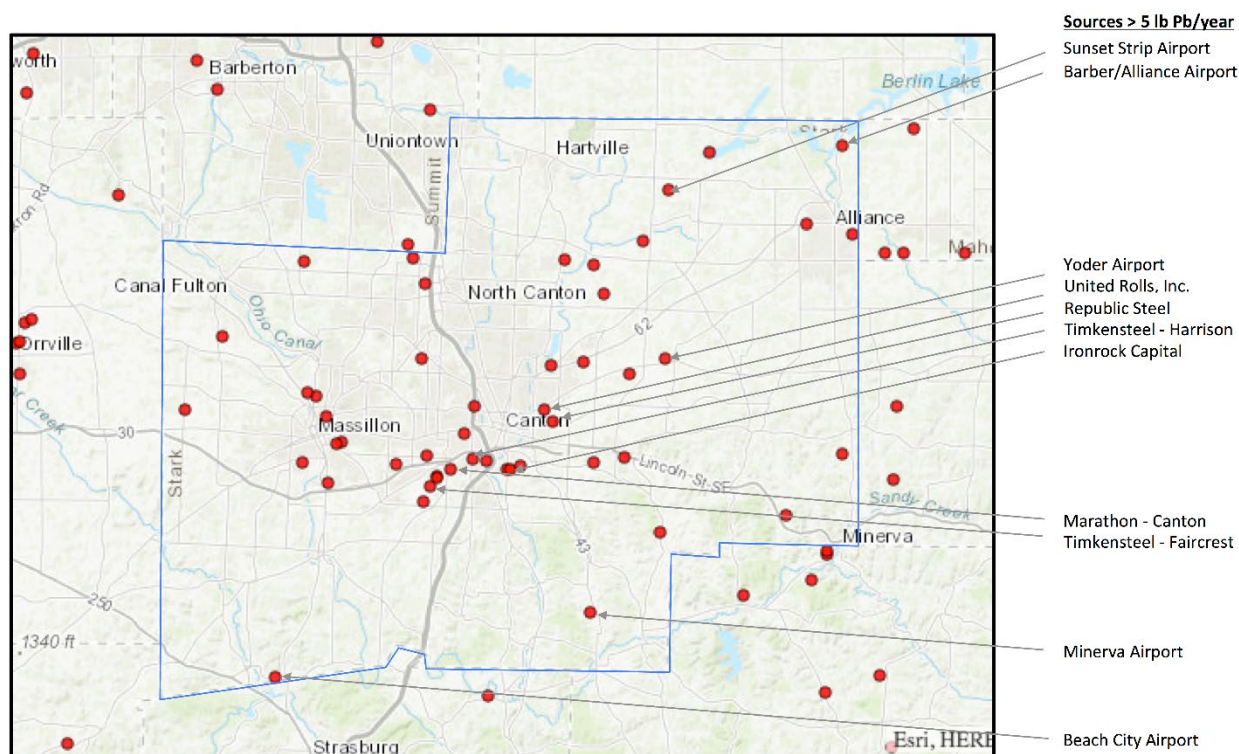


Table 4 lists sources located in Stark County depicted in Figure 3 with emissions of Pb greater than 5 pounds per year for 2016, 2017, 2018, and 2019. Emissions data were derived from the 2017 NEI and Ohio EPA’s Emission Inventory System (EIS) for 2016, 2018, and 2019. The data for 2019 is the most recent data available online in Ohio EPA’s EIS.

**Table 4. Sources of Pb Air Emissions Greater than 5.0 Pounds/year in Stark County, Ohio for 2016, 2017, 2018, and 2019**

Facility	Address	Facility Type	Pb Emissions (pounds)			
			2016*	2017**	2018*	2019*
Republic Steel Plant	2633 Eighth Street NE, Canton, OH	Steel Mill	722.4	1620.5	1324.6	1423.6
United Rolls, Inc.	1400 Grace Avenue, NE, Canton, OH		90.0	122.1	123.2	123.8
Barber/Alliance	Alliance, OH	Airport***		52.6		
Timkensteel	1835 Dueber	Steel Mill	35.4	48.6	39.8	26.4

<sup>6</sup> Source: <https://enviro.epa.gov/enviro/nei.htm?pType=FACILITY&pYear=2017&pWho=NEI&pState=&pState=39&pPollutant=&pPollutant=7439921&pReport=county&pCounty=&pTier=&pSector=>



Corporation - Harrison Steel Plant	Avenue, SW, Canton, OH					
Marathon Petroleum Company LP - Canton Refinery	2408 Gambrinus Avenue SW, Canton, OH	Petroleum Refinery	27.0	37.7	33.8	31.2
Beach City	Beach City, OH	Airport***		33.8		
Timkensteel Corporation - Faircrest Steel Plant	1835 Dueber Avenue, SW, Canton, OH	Steel Mill	18.4	32.6	36.4	26.4
Minerva	Minerva, OH	Airport***		17.2		
Sunset Strip	Marlboro, OH	Airport***		15.5		
Yoder	Louisville, OH	Airport***		11.6		
Ironrock Capital, Inc.	1201 Millerton Road SE, Canton, OH	Brick, Structural Clay, or Clay Ceramics Plant	7.0	6.6	6.6	7.4

\* Source: Ohio EPA, Emissions Inventory System, <https://epa.ohio.gov/divisions-and-offices/air-pollution-control/reports-and-data/download-eis-data-and-reports>

\*\* Source: 2017 NEI, <https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data>

\*\*\* Emissions data for airport sources (there are approximately 20,000 airport facilities in the U.S. at which leaded aviation gasoline is consumed) were derived from the 2017 NEI. EPA recognizes that we have no information on emissions changes that may have occurred at airport sources since 2017.

Of the sources listed in Table 4, the predominant source, and only source with Pb emissions greater than 0.1 tons per year (i.e., greater than 200 pounds/year), is Republic Steel’s plant at 2633 Eighth Street NE, Canton, Ohio 44704-2311. This plant accounted for 80% of the 2017 total Pb emissions from all the sources in Stark County that were reported in the 2017 NEI.

To evaluate growth in Pb emitting activities, EPA considered annual emissions from the sources in Table 4 from 2016 to 2019. The Pb air emissions from the Republic Steel plant have increased since 2016 from 722.4 lb to 1423.6 lb in 2019. As noted in Section 4.2 above, on December 12, 2016, Ohio EPA issued a Permit-to-Install to Republic Steel to make operational changes to its plant at 2633 Eighth Street NE, Canton, Ohio.

In addition to sources in Stark County, EPA also evaluated potentially contributing sources in counties around Stark County. Table 5 shows sources located in the counties surrounding Stark County that emitted greater than 0.1 tons Pb based on emissions data derived from the 2017 NEI. As described in EPA’s 2008 “Proposed Lead NAAQS Regulatory Impact Analysis”, Pb particles in the air tend to deposit rapidly with distance from the source according to their particle size and

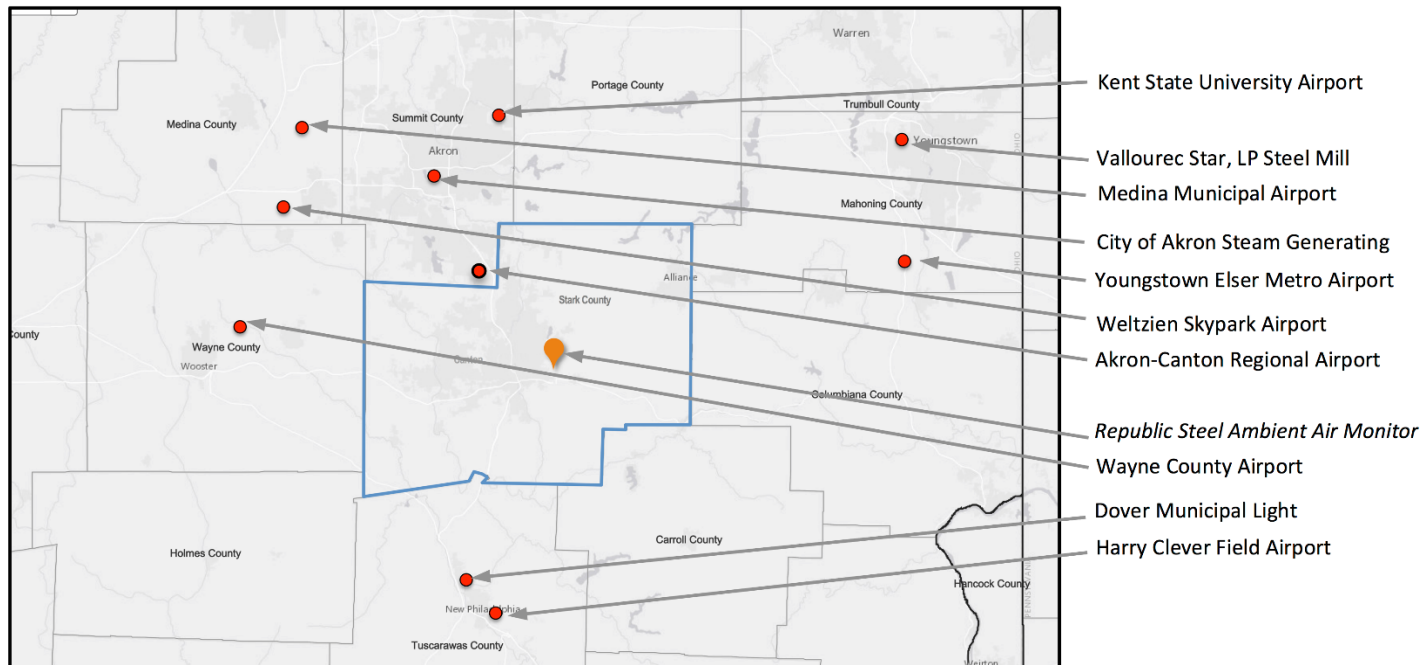
weight, and lead air concentrations in some cases can display significant gradients with distance from a source-oriented monitor.<sup>7</sup> As discussed more fully in Section 4.5.6, a polar plot centered on the Republic Steel ambient air monitor shows the Pb concentrations reach as low as nearly 0.0 µg/m<sup>3</sup> within the windspeed variability a few blocks from the Republic Steel parcel, indicating that the majority of Pb detected at the Republic Steel ambient air monitoring site is coming only from the Republic Steel plant. Located several kilometers outside the Republic Steel parcel, the sources in Table 5 are not anticipated to be contributing to violations of the 2008 Pb NAAQS at the Republic Steel ambient air monitoring site. Figure 4 is a map of counties surrounding Stark County and the locations of sources listed in Table 5.

**Table 5. Facilities Located in Counties Surrounding Stark County, Ohio with Pb Emissions Greater than 0.1 tons/year (200 lbs) in 2017**

County	Facility	City	Facility Type	Approximate Distance from Monitoring Site (km)	2017 NEI Pb Emissions (lbs)
Wayne	Wayne County	Wooster	Airport	50	482.4
Mahoning	Vallourec Star, LP	Youngstown	Steel Mill	66	471.8
Medina	Weltzien Skypark	Wadsworth	Airport	42	437.9
Medina	Medina Municipal	Medina	Airport	51	436.6
Tuscarawas	Dover Municipal Light Plant	Dover	Electricity Generation	34	434.0
Summit	Kent State University	Kent	Airport	39	393.7
Summit	City of Akron Steam Generating	Akron	Steam / Heating Facility	35	380
Tuscarawas	Harry Clever Field	New Philadelphia	Airport	37	301.5
Summit	Akron-Canton Regional	Akron	Airport	16	271.5
Mahoning	Youngstown Elser Metro	Youngstown	Airport	58	259.9

<sup>7</sup> “Proposed Lead NAAQS Regulatory Impact Analysis” U.S. EPA Office of Air Quality Planning and Standards (June 2008). Section 2.2 Air Quality Modeling on page 2-5 states, “This may be particularly true for Pb as metals tend to deposit rapidly with distance from the source according to their particle size and weight.” Section 5.5 Radius Method on page 5-18 states, “[L]ead air concentrations can in some cases display significant gradients with distance from a source-oriented monitor.”  
[https://www3.epa.gov/ttnecas1/regdata/RIAs/pb\\_ria\\_6-25-08\\_proposal.pdf](https://www3.epa.gov/ttnecas1/regdata/RIAs/pb_ria_6-25-08_proposal.pdf)

**Figure 4. Locations of Sources of Pb Emissions Greater than 0.1 tons/year in 2017 in Counties Surrounding Stark County, Ohio**



#### 4.5.3. Factor 3: Level of Control of Emissions Sources

Under this factor, EPA considers the existing level of control of emissions sources. The emissions data used by EPA in this technical analysis and provided in Tables 4 and 5 above represent emissions levels taking into account any control strategies implemented on stationary sources in Stark County by 2019 and in the surrounding counties by 2017.

The predominant source of Pb emissions in Stark County, the Republic Steel plant (Facility ID 1576050694), operates under a Title V permit (P0101210) and a synthetic minor New Source Review permit specifically for Pb. Emissions at the facility are subject to Ohio EPA rules, regulations, and orders. Emissions controls for Pb include the Continuous Bloom Casting Facility main Ladle Metallurgical Facility baghouse, FlexCast baghouse, and Meltshop baghouse. Emissions include fugitive emissions from the Continuous Bloom Casting Facility, FlexCast Building, and Meltshop Building.<sup>8</sup>

<sup>8</sup> Ohio EPA Director’s Final Findings and Orders, May 14, 2019.  
<http://edocpub.epa.ohio.gov/publicportal/ViewDocument.aspx?docid=1063293>

**4.5.4 Factor 4: Population Density and Degree of Urbanization including Commercial Development in Included Versus Excluded Areas**

The analysis for this factor considered population density for 2010 – 2020 in the area considered for the intended redesignation to nonattainment. Table 6 shows the 2010 and 2020 population data for Stark County and Canton, Ohio. These data help assess the extent to which the concentration of human activities in the area and concentration of population-oriented commercial development may indicate emissions-based activity contributing to elevated ambient Pb levels. This may include ambient Pb contributions from activities that would disturb Pb that has been deposited on the ground or on other surfaces. Re-entrainment of historically deposited Pb typically is not reflected in the emissions inventory. EPA does not believe the population data provided in the analysis of this factor affects the boundary recommendation.

**Table 6. Population and Population Density Data for Canton and Stark County, Ohio**

Area	2010 Population*	2020 Population*	2010 Population Density (population / square mile)**	2020 Population Density (population square mile)**
Stark County, Ohio	375,586	374,853	652.9	651.6
Canton, Ohio	73,007	70,872	2,867.3	2,805.7

\* Source: U.S. Census Bureau estimates for 2010 and 2020 (<https://www.census.gov/quickfacts/fact/table/US/PST045221>)

\*\* Based on 25.26 square miles for Canton, Ohio and 575.27 square miles for Stark County, Ohio.

**4.5.5 Factor 5: Expected Growth**

This factor considers population growth for 2010 – 2020 in the area evaluated for the intended redesignation to nonattainment. Table 7 shows the population change for Canton and Stark County, Ohio from 2010 to 2020.

**Table 7. Change in Population and Population Density from 2010 to 2020 for Canton and Stark County, Ohio**

Area	Population Change 2010 - 2020	Population % Change 2010 - 2020	Population Density Change (pop/sq mi)* 2010 - 2020	Population Density % Change 2010 - 2020
Stark County, Ohio	-733	-0.2	-1.3	-0.2
Canton, Ohio	-2135	-2.9	-61.6	-2.1

\* Based on 25.26 square miles for Canton, Ohio and 575.27 square miles for Stark County, Ohio.

\*\* Source: U.S. Census Bureau estimates for 2010 and 2020  
(<https://www.census.gov/quickfacts/fact/table/US/PST045221>)

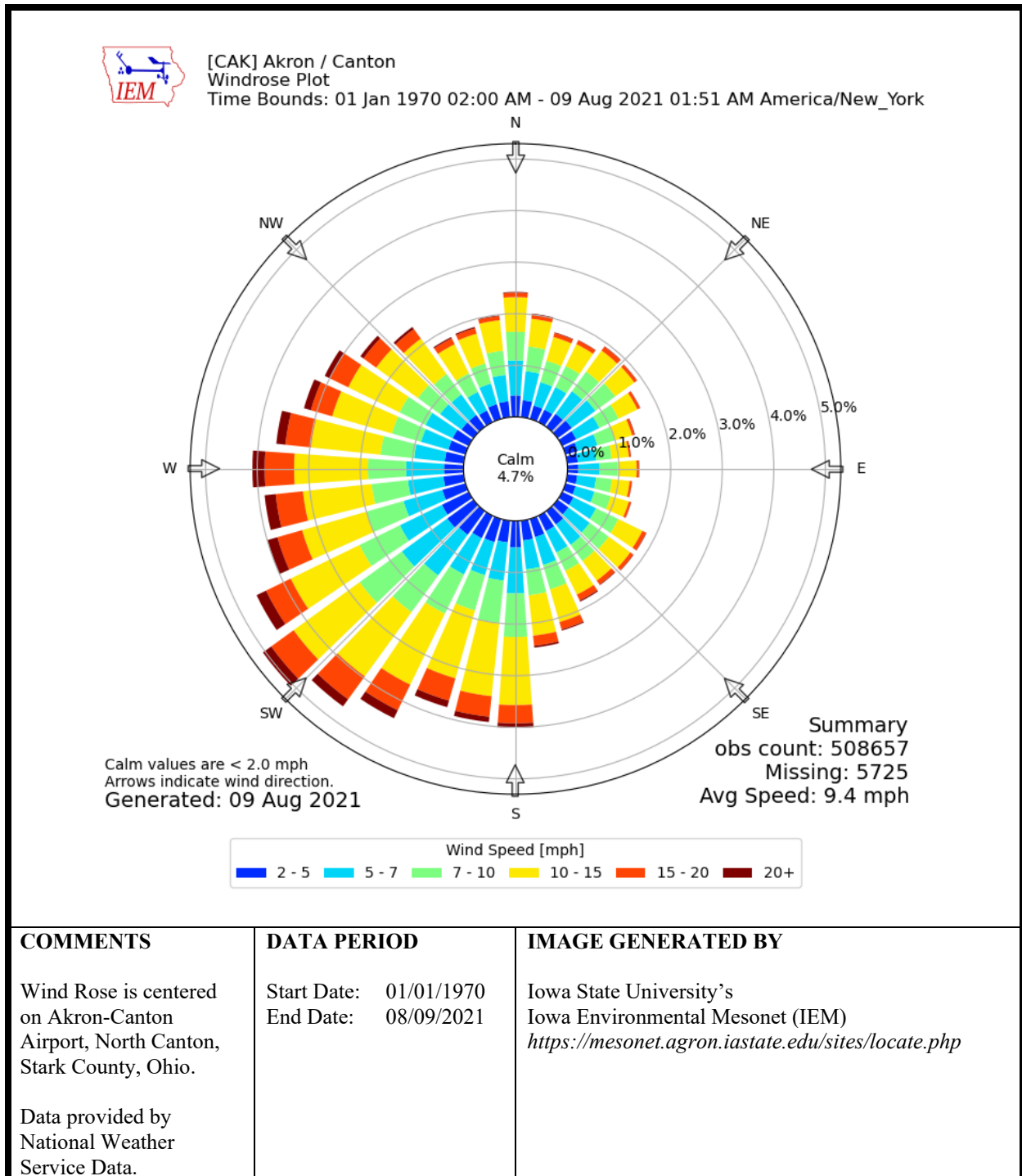
From 2010 to 2020, population in Stark County declined by 0.2%, while population in the City of Canton declined by 2.9%. For the same time period, population density in Stark County declined by 0.2%, while population density in the City of Canton declined by 2.1%. EPA has considered the growth rate for the population and population density for this area and does not believe that it affects the boundary determination.

#### **4.5.6. Factor 6: Meteorology**

For this factor, EPA evaluates meteorological data to determine how weather conditions, including wind speed and direction, affect the plumes from sources contributing to the ambient Pb concentrations. Figure 5 below depicts a wind rose covering the 51-year period of meteorological records from 1970 to 2021 from the National Weather Service meteorological station at the Akron-Canton Airport in Akron, Stark County, Ohio near the Republic Steel ambient air monitoring site, 16 kilometers away. These data help depict the potential for Pb emissions sources located near a violating monitor to contribute to ambient Pb levels at the violation location.

The wind rose depicts frequency and magnitude of wind speed and direction. The wind rose shows the distribution of wind direction independently from wind speed by dividing the data into 36 wind directions and six wind speed classes in addition to calm conditions. As shown in Figure 5, winds blow predominantly from the southwest 5% of the time at speeds of 16 - 24 kilometers per hour (10 – 15 miles per hour) 1.7% of the time.

**Figure 5. Wind Rose for North Canton, Stark County, Ohio**



Evidence of source-receptor relationships between specific emissions sources and high Pb concentrations at violating monitors is another important factor in determining the appropriate contributing areas and the appropriate extent of EPA's intended nonattainment area.

Figures 6 and 7 below, generated by EPA, depict a pollution rose and polar plot centered at the Republic Steel ambient air monitoring site covering the 3-year design value period from 2018 – 2020. The pollution rose and polar plot were developed using open-source software in the coding language, R. The graphical user interface, RStudio, was used along with the open-source R packages, *openair* and *openairmaps*.<sup>9</sup> Figures 6 and 7 are based on data from a local meteorology site, which was only available from October 2018 through December 2020.

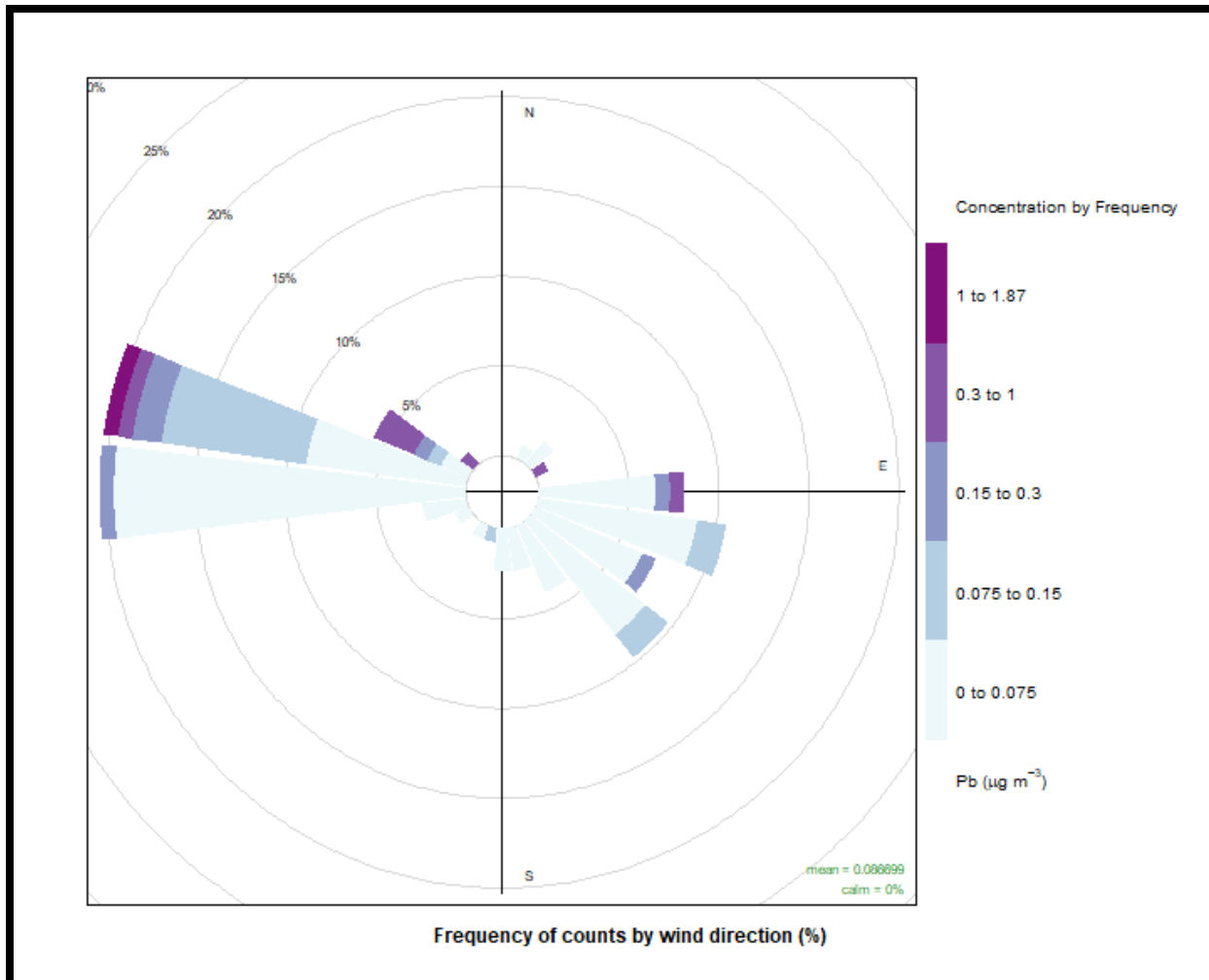
As shown in Figure 6, the pollution rose illustrates the frequency distribution of wind direction correlated with Pb concentrations. The pollution rose is divided into 24 wind directions and five concentration ranges. Pb concentrations are based on the mean daily readings from the Republic Steel ambient air monitoring site during October 2018 – December 2020.<sup>10</sup> Of the winds from the east that reach the Republic Steel ambient air monitoring site, Figure 6 shows that approximately 1% of the winds range in Pb concentration from 0.075 to 0.30  $\mu\text{g}/\text{m}^3$ , and 1% of the winds range from 0.15 to 0.30  $\mu\text{g}/\text{m}^3$ . Of the winds from the west northwest, Figure 6 shows that approximately 8% of the winds range in Pb concentration from 0.075 to 0.15  $\mu\text{g}/\text{m}^3$ , 1% of the winds range from 0.15 to 0.30  $\mu\text{g}/\text{m}^3$ , 1% of the winds range from 0.30 to 1.00  $\mu\text{g}/\text{m}^3$ , and 1% of the winds range from 1.00 to 1.87  $\mu\text{g}/\text{m}^3$ .

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<sup>9</sup> Carslaw DC, Ropkins K (2012). “openair – An R Package for air quality data analysis.” *Environmental Modeling & Software*, 27-28(0), 52-61. ISSN 1364-8152, doi: 10.1016/j.envsoft.2011.09.008.

<sup>10</sup> EPA AirData Air Quality Monitors, Daily Data for 2018 – 2020  
<https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=5f239fd3e72f424f98ef3d5def547eb5&extent=-146.2334,13.1913,-46.3896,56.5319>

**Figure 6: Pollution Rose for Pb Concentrations from Republic Steel Ambient Air Monitoring Site, Canton, Stark County, Ohio**

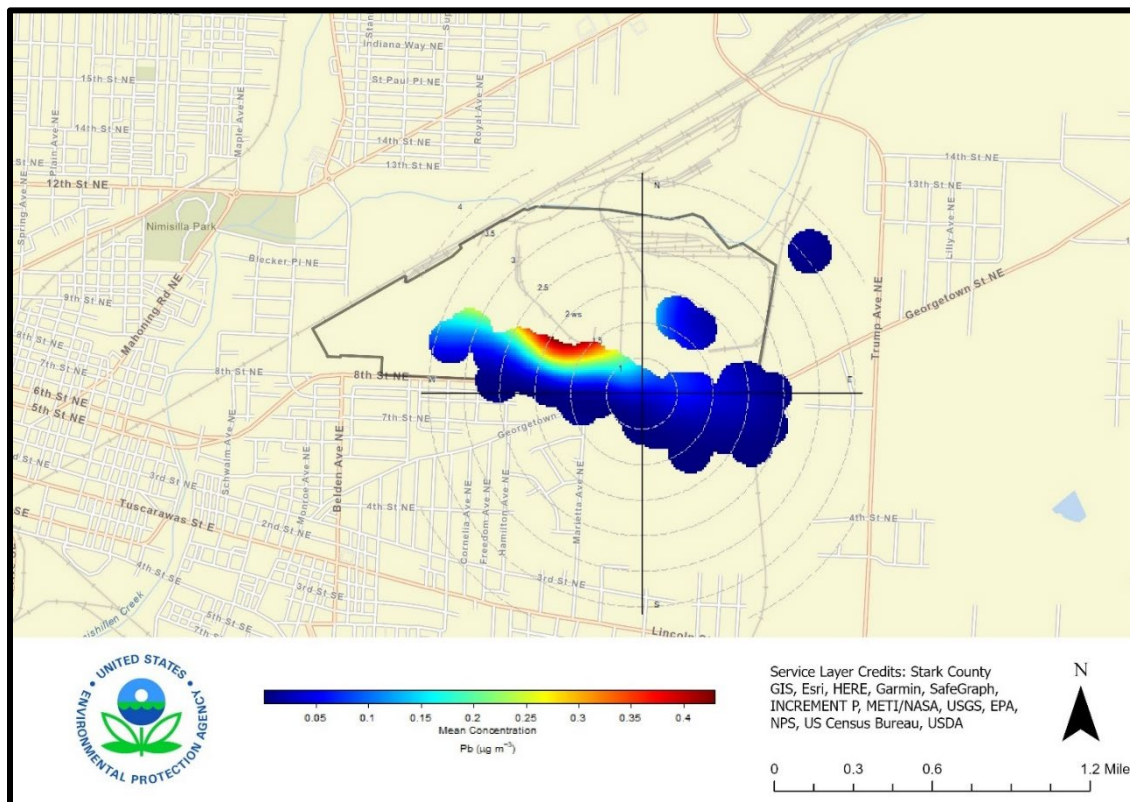


<p><b>COMMENTS</b></p> <p>Pollution Rose is centered on the Republic Steel Pb Ambient Air Monitoring Site, 3150 Georgetown Road NE, Canton, Stark County, Ohio.</p> <p>Local meteorological data was obtained from a local meteorology site and was only available from October 2018 through December 2020. This figure only shows concentration data when winds were above calm (<math>&gt; 0.45 \text{ m s}^{-1}</math>) and during the timeframe when meteorology data was available (October 2018 – December 2020).</p>	<p><b>DATA PERIOD</b></p> <p>Start Date: 01/01/2018 End Date: 12/31/2020</p>	<p><b>IMAGE GENERATED BY</b></p> <p>U.S. EPA, Region 5</p>
	<p><b>CALM WINDS</b></p> <p>0%</p>	<p><b>SOFTWARE</b></p> <p>R coding language</p>



Figure 7 is a polar plot centered around the Republic Steel ambient air monitoring site and superimposed on a map of the local area. The map also shows an outline of the Republic Steel parcel across the street at 2633 Eighth Street NE in Canton, Ohio. Polar plots are used to visualize mean pollutant concentrations across an area that vary by wind speed and wind direction. The concentric circles in the polar plot show wind speed in 0.5 meters/second (m/s) intervals. Superimposing a polar plot on a map is useful in exploring source directions of atmospheric pollutants. As shown in Figure 7, the polar plot demonstrates that a majority of Pb detected at the Republic Steel ambient air monitoring site is coming from the northwest and is distributed according to the concentration color palette. The highest Pb levels of  $0.25 \mu\text{g}/\text{m}^3$  and greater are observed when wind is blowing from the northwest at speeds of 1.25 – 2.5 m/s. Pb concentrations are lower and less than  $0.05 \mu\text{g}/\text{m}^3$  when wind is blowing from the south and east.

**Figure 7. Polar Plot Map of Mean Pb Ambient Air Concentrations (October 2018 – December 2020)**



For this area, winds can be from any direction. Therefore, sources in all directions can have some potential contribution. However, as noted in Section 4.5.2, Pb particles in the air tend to deposit rapidly with distance from the source according to their particle size and weight. The Republic Steel plant is the closest NEI source to the Republic Steel ambient air monitoring site and is the only source in Stark County with Pb emissions greater than 0.1 tons per year, and accounts for 80% of the Pb emissions in the county. Based on the Pb concentration frequencies in the pollution rose and polar plot in Figures 6 and 7, the majority of Pb detected at the Republic Steel ambient air monitoring site is coming from the northwest, where the Republic Steel plant is located; this analysis indicates that the Republic Steel plant is the primary contributor to the violations at the monitoring site. With wind directionality potentially affected by building downwash and vehicular traffic, elevated Pb levels at the Republic Steel ambient air monitoring site might also be coming from the north corresponding to the location of the larger emission sources at Republic Steel.

#### **4.5.7 Factor 7: Geography/topography**

The geography/topography analysis evaluates the physical features of the land that may have an effect on the airshed and, therefore, on the distribution of Pb over the intended Stark County nonattainment area.

Stark County does not have any geographical or topographical barriers significantly limiting air pollution transport within its airshed. The terrain in Stark County is generally flat, rising in elevation from approximately 1000 feet above mean sea level in the western portion of the county to 1200 feet above mean sea level in the eastern portion of the county.<sup>11</sup> There are no mountain ranges, basins, or other physical features that may affect distribution of emissions that would define area boundaries.

#### **4.5.8 Factor 8: Jurisdictional Boundaries**

Existing jurisdictional boundaries may be helpful in determining a boundary for purposes of the intended redesignation to nonattainment, and for purposes of carrying out the governmental responsibilities of planning for attainment of the Pb NAAQS and implementing control measures. These existing boundaries may include an existing nonattainment or maintenance area boundary, a county or township boundary, a metropolitan area boundary, an air management district, or an urban planning boundary established for coordinating business development or transportation activities. We typically base designations on clearly defined legal boundaries that align with existing administrative boundaries, when reasonable.

In accordance with the 2008 Pb NAAQS Final Rule, the presumptive boundary of the nonattainment area is the entire county with a violating monitor as described above under Section 4.1. The State and/or EPA may conduct additional area-specific analyses that could lead to a departure from the presumptive boundary.

The Republic Steel plant and violating ambient air monitoring site are located within a small portion of the jurisdictional boundary of Stark County, Ohio. Based on the directionality of elevated Pb concentrations depicted in the pollution rose and polar plot in Figures 6 and 7, the absence of other contributing sources and consideration of the other seven factors above, EPA's intended nonattainment area is smaller than the entire county.

Rather than jurisdictional boundaries, EPA's intended nonattainment area is centered around the Republic Steel plant and is bounded by the following major roadways within Canton, Ohio:

North: State Route OH-153 (12<sup>th</sup> Street NE; Mahoning Road)

East: Broadway Avenue

South: State Route OH-172 (Tucarawas Street E; Lincoln Street E)

West: State Route OH-43 – Northbound (Cherry Avenue NE)

EPA's intended nonattainment area includes the area surrounding the violating monitor, the source most likely contributing to the violating monitor, the area where Pb concentrations in the ambient air violate the 2008 Pb NAAQS, and boundaries that are easily recognizable by the public.

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<sup>11</sup> EPA AirData Air Quality Monitors, Topographic Basemap, <https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=5f239fd3e72f424f98ef3d5def547eb5&extent=-146.2334,13.1913,-46.3896,56.5319>

#### **4.5.9 Additional Information provided by the State**

In addition to an analysis of the eight factors above, states can choose to recommend Pb nonattainment boundaries by using any one, or a combination, of the following techniques (73 FR 67033):

- Qualitative analysis;
- Spatial interpolation of air quality monitoring data; or
- Air quality simulation by dispersion modeling.

These techniques are more fully described in “Procedures for Estimating Probability of Nonattainment of a PM10 NAAQS Using Total Suspended Particulate of PM10 Data,” December 1986. *See* 57 FR 13549.

EPA has not yet received additional information from the state relevant to establishing a nonattainment area boundary for this area, but encourages the state to provide any such information during the 120-day period established by EPA’s letter.

#### **4.6 Summary of EPA’s Assessment and Intended Redesignation for the Canton, Ohio Area**

The Republic Steel ambient air monitoring site in Stark County indicates violations of the 2008 Pb NAAQS based on the 2018 – 2020 design value. Under CAA section 107(d)(1), following promulgation of a new or revised NAAQS, EPA must designate areas that violate the NAAQS and nearby areas that contribute the violations as nonattainment areas. Although Stark County was designated as unclassifiable/attainment in 2011, the EPA Administrator may notify the state that a designation should be revised. *See* CAA section 107(d)(3). After careful evaluation of the information in this TSD, EPA is notifying the state that it intends to redesignate a portion of Stark County, specifically around Canton, Ohio, as nonattainment for the 2008 Pb NAAQS. To determine the geographic extent of the intended nonattainment area in Stark County, EPA evaluated the eight factors in the 2008 EPA Pb Guidance.

The Republic Steel ambient air monitoring site is the only Pb monitoring site that reports to EPA’s AQS in Stark County, and Columbiana County is the only surrounding county with such Pb monitoring sites. Of these monitoring sites, only the Republic Steel monitoring site measured violations of the 2008 Pb NAAQS based on the 2018-2020 design value of 0.21  $\mu\text{g}/\text{m}^3$ . The remaining three monitoring sites, located approximately 69 kilometers southeast in neighboring Columbiana County, are well below the 2008 Pb NAAQS with 2017 – 2010 design values of 0.01 – 0.03  $\mu\text{g}/\text{m}^3$ .

The Republic Steel plant, located at 2633 Eighth Street NE, Canton, Ohio, is the largest source of Pb emissions located near the violating monitor and the only source in Stark County with Pb emissions greater than 0.1 tons per year. Other sources of Pb emissions greater than 0.1 tons per year in surrounding counties were more than 15 kilometers away and, as noted in Section 4.5.2.,

are not anticipated to contribute to violations of the 2008 Pb NAAQS at the Republic Steel ambient air monitoring site. The Pb concentration frequencies depicted in the pollution rose and polar plot in Figures 6 and Figure 7 demonstrate the majority of Pb detected at the Republic Steel ambient air monitoring site is coming from the west northwest, in the direction of the Republic Steel plant. As such, the relevant information indicates the Republic Steel plant is the primary contributor to the violations at the monitoring site for the 2018-2020 design value period.

Based on the directionality of elevated Pb concentrations, as depicted in the pollution rose and polar plot in Figures 6 and 7, as well as the absence of other contributing sources and consideration of the eight factors above, EPA's intended nonattainment area is centered around the Republic Steel plant and is smaller than the presumptive county-wide boundary in the 2008 Pb NAAQS Final Rule. The technical analysis shows that the excluded portions are not source areas that contribute to the observed violations.

After considering the factors above, EPA's intended revision to the area's designation is to designate the area to nonattainment, and to revise the boundaries of the nonattainment area to encompass the area surrounding the violating monitor, the source most likely contributing to the violating monitor, and the area that does not meet the 2008 Pb NAAQS.

Population, expected growth, geography, and topography did not play a significant role in determining the intended nonattainment boundary.

The intended nonattainment area, bounded by the following major roadways within Canton, Ohio, will have clearly defined boundaries, and we find these intended boundaries to be a suitable basis for defining the nonattainment area.

North: State Route OH-153 (12<sup>th</sup> Street NE; Mahoning Road)

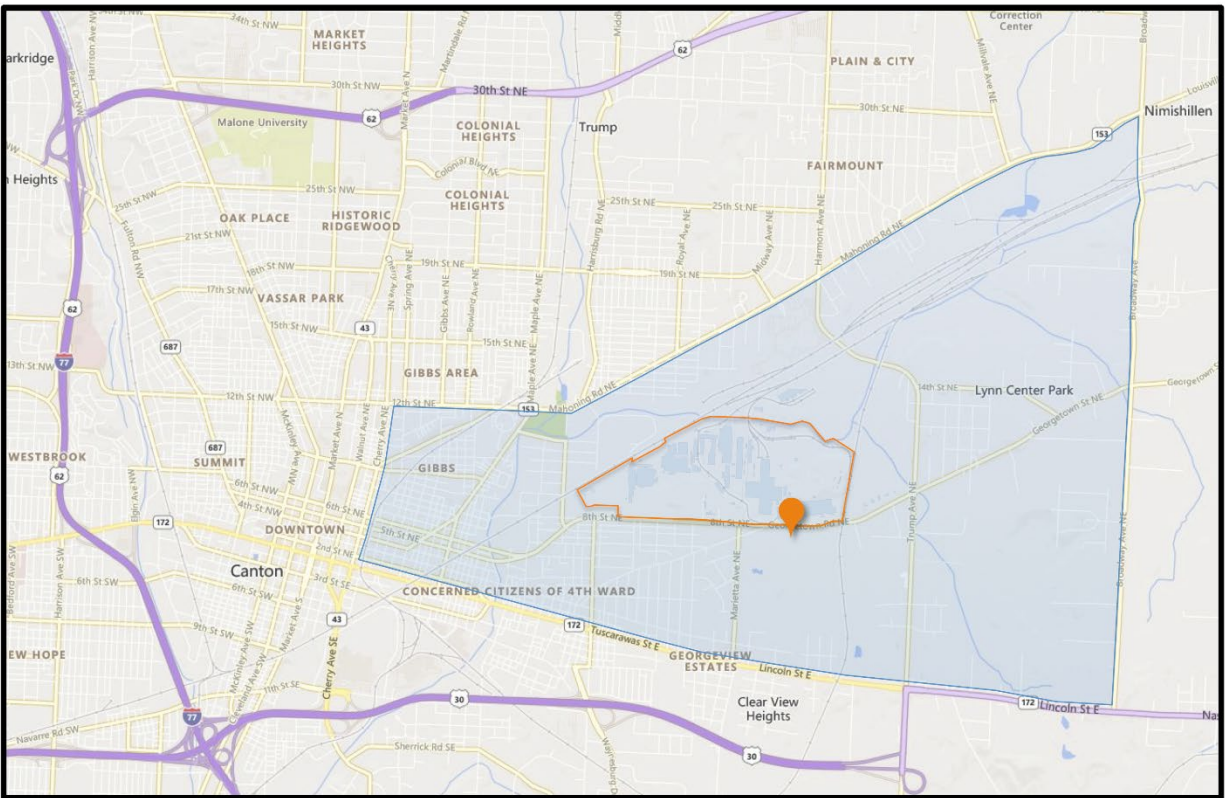
East: Broadway Avenue

South: State Route OH-172 (Tucarawas Street E; Lincoln Street E)




West: State Route OH-43 – Northbound (Cherry Avenue NE)

Figure 8 shows the boundaries of this intended designated area.

**Figure 8. Boundaries of the Canton, Ohio Intended Nonattainment Area for the 2008 Pb NAAQS**



**Legend**

-  Violating Pb Monitor (2018 – 2020 Design Value)
-  Perimeter of Pb Source > 0.5 tons/year (2017 NEI), Republic Steel, 2633 Eighth Street NE, Canton, Ohio, Stark County
-  EPA's Intended Nonattainment Boundary
  - North:** State Route OH-153 (12<sup>th</sup> Street NE, Mahoning Road)
  - East:** Broadway Avenue
  - South:** State Route OH-172 (Tucarawas Street E, Lincoln Street E)
  - West:** State Route OH-43 - Northbound (Cherry Avenue NE)