

**Louisville Metro Air Pollution Control District**  
**PM<sub>2.5</sub> Monitoring Report**  
**July 2023**

This report summarizes PM<sub>2.5</sub> data collected by Federal Reference Method (FRM) and Federal Equivalent Method (FEM) instruments. Measurements are reported as 24-hour averages in micro-grams per cubic meter (µg/m<sup>3</sup>). The data are subject to further quality assurance checks and are not final.

**PM<sub>2.5</sub> Monthly Data Summary for June 2023**

Site Name	Maximum		Minimum		Sample	Monthly
	Conc.	Date	Conc.	Date	Recovery	Average
Algonquin Parkway	81.5	6/28/23	5.2	6/22/23	93.3%	22.4
Durrett Lane	85.8	6/28/23	5.3	6/22/23	100.0%	24.1
Cannons Lane	81.1	6/28/23	4.4	6/22/23	100.0%	22.3
Watson Lane	61.8	6/28/23	5.4	6/22/23	100.0%	21.0
Overall	85.8	6/28/23	4.4	6/22/23	98.3%	22.4

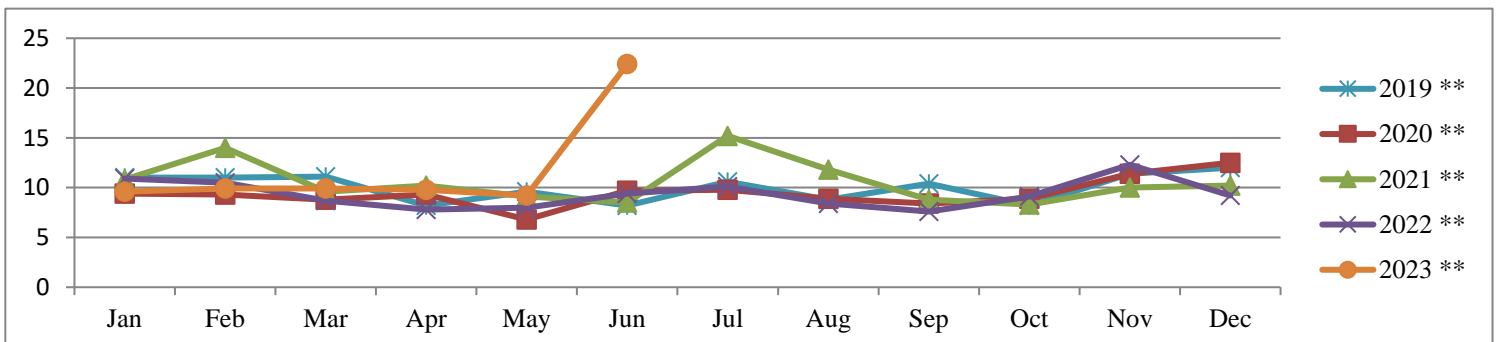
**PM<sub>2.5</sub> Monthly Averages Tracking Table for 2013-2023**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Months >Annual Standard
2013*	10.5	10.0	8.5	7.6	8.8	11.6	10.1	12.7	11.9	9.3	7.2	10.7	0
2014	7.5	14.3	11.7	9.6	10.7	14.0	16.4	13.6	9.9	7.9	9.8	12.4	1
2015	10.9	11.0	11.3	6.9	10.2	10.1	13.1	10.0	9.7	7.5	8.5	7.7	0
2016	8.9	9.5	6.4	7.1	7.1	8.5	7.4	8.9	9.3	8.1	11.3	9.3	0
2017	7.7	8.1	6.6	5.8	7.2	6.7	11.3	9.3	8.5	6.8	10.5	10.7	0
2018	9.7	9.6	8.4	6.5	11.0	10.4	11.9	11.7	7.2	7.1	12.9	11.0	1
2019 **	11	11.0	11.1	8.2	9.6	8.2	10.6	8.8	10.4	8.2	11.4	12.0	0
2020 **	9.4	9.3	8.8	9.3	6.8	9.7	9.8	8.9	8.4	8.9	11.4	12.5	1
2021 **	10.8	14.0	9.6	10.2	9.1	8.5	15.2	11.8	8.8	8.3	10.0	10.2	2
2022 **	10.9	10.5	8.7	7.8	8.0	9.4	10.1	8.4	7.6	9.1	12.3	9.2	1
2023 **	9.6	9.9	9.9	9.8	9.2	22.4							1
Average	9.7	10.7	9.2	8.1	10.3	10.9	11.6	10.4	9.2	8.1	10.5	10.6	

\*The new PM<sub>2.5</sub> standard of 12 µg/m<sup>3</sup> became effective on March 18, 2013

\*\* Data from continuous FEM Instruments

**PM<sub>2.5</sub> Monthly Averages 5-Year Trend**



**National Ambient Air Quality Standards (NAAQS):**

National Ambient Air Quality Standards consist of primary and secondary standards. The primary standards define levels of air quality which EPA judges are necessary, with an adequate margin of safety, to protect the public health. The secondary standards define levels of air quality which EPA judges necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. For PM<sub>2.5</sub> the levels of the primary and secondary standards are the same.

**National Ambient Air Quality Standard for PM<sub>2.5</sub> - Annual Standard:**

The annual standard is designed to provide an appropriate level of protection from long-term exposure to PM<sub>2.5</sub>. The standard is met when the annual design value is less than or equal to 12 µg/m<sup>3</sup>. The standard changed from 15 µg/m<sup>3</sup> to 12 µg/m<sup>3</sup> on March 18, 2013. The annual design value is calculated by averaging the annual means of 3 consecutive complete years of air quality data. The table below compares data collected from 2017 through year-to-date 2023 to the PM<sub>2.5</sub> annual standard.

**PM<sub>2.5</sub> Annual Means and Annual Design Values**

Site Name	Annual Means µg/m <sup>3</sup>							Annual Design Values				
	2017	2018	2019	2020	2021	2022	2023	2017-2019	2018-2020	2019-2021	2020-2022	2021-2023
Algonquin	8.3	9.5	10.2	9.3	10.2	9.0	11.4	9.3	9.6	9.9	9.5	10.2
Durrett Lane	8.9	10.2	10.4	9.7	11.2	9.8	12.7	<b>9.8</b>	<b>10.1</b>	<b>10.4</b>	<b>10.2</b>	<b>11.2</b>
Cannons Lane	7.9	9.1	9.6	9.2	9.9	8.5	11.0	8.8	9.3	9.6	9.2	9.8
Watson Lane	8.1	10.5	10.0	9.6	10.6	9.9	12.0	9.6	10.1	10.1	10.0	10.8

**Bold:** Design value for Louisville

**National Ambient Air Quality Standard for PM<sub>2.5</sub> - 24-Hour (Daily) Standard:**

The 24-hour standard is designed to provide an appropriate level of protection from short-term exposure to PM<sub>2.5</sub>. The standard is met when the 24-hour design value is less than or equal to 35 µg/m<sup>3</sup>. The design value is based on 3 consecutive complete years of air quality data and is calculated by taking the average of the 98<sup>th</sup> percentile value for each of the 3 years. The 98<sup>th</sup> percentile value is the 24-hour average out of a year of PM<sub>2.5</sub> monitoring data below which 98 percent of all 24-hour averages fall. The table below compares data collected from 2017 through year-to-date 2023 to the 24-hour standard for PM<sub>2.5</sub>.

**PM<sub>2.5</sub> Annual 98<sup>th</sup> Percentiles and 24-Hour Design Values**

Site Name	Annual 98 <sup>th</sup> Percentile Value µg/m <sup>3</sup>							24-Hour Design Values				
	2017	2018	2019	2020	2021	2022	2023	2017-2019	2018-2020	2019-2021	2020-2022	2021-2023
Algonquin	17.8	23.0	20.2	18.9	26.0	18.3	33.7	20.3	20.7	21.7	21.1	26.0
Durrett Lane	20.7	24.7	22.9	22.4	28.3	22.1	36.2	<b>22.8</b>	<b>23.3</b>	<b>24.5</b>	<b>24.3</b>	<b>28.9</b>
Cannons Lane	17.2	22.2	20.5	20.6	26.1	19.2	34.7	20.0	21.1	22.4	22.0	26.7
Watson Lane	17.7	24.3	21.4	21.3	27.2	21.8	31.5	21.1	22.3	23.3	23.4	26.8

**Bold:** Design value for Louisville

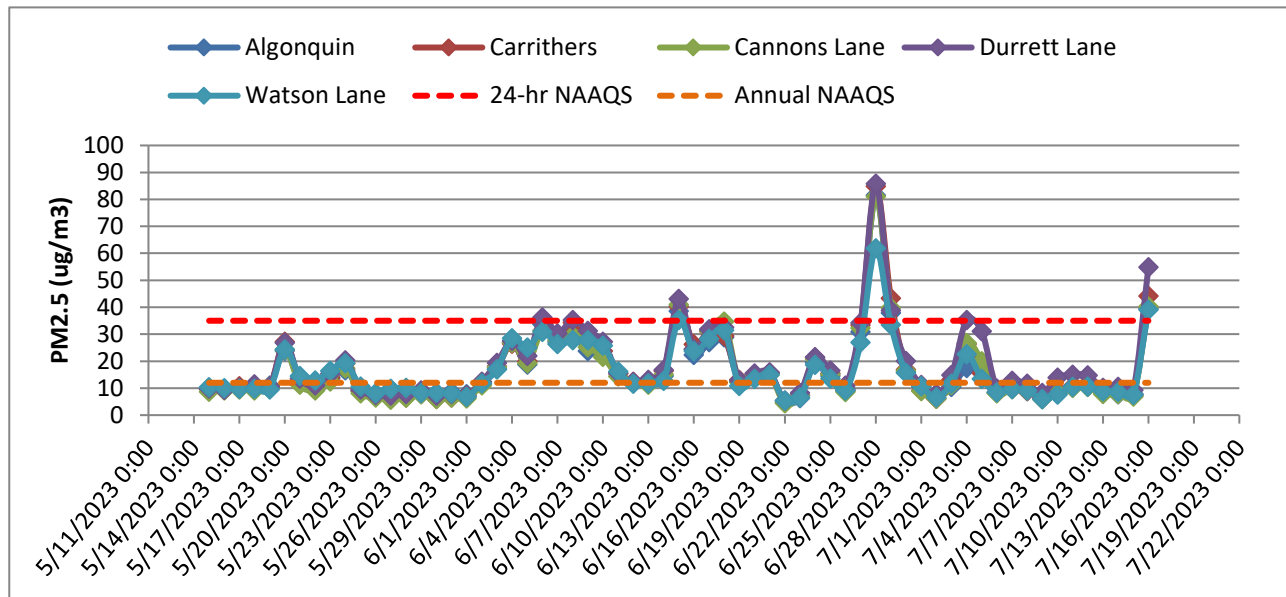
## Louisville Metro Air Pollution Control District

### Special Report for May - July, 2023 Elevated PM from Wildfire Smoke

This Special Report shows PM<sub>2.5</sub> data for a period of time when the Louisville Metropolitan area was impacted by elevated PM concentrations due to long range transport of wildfire smoke from fires in Canada.

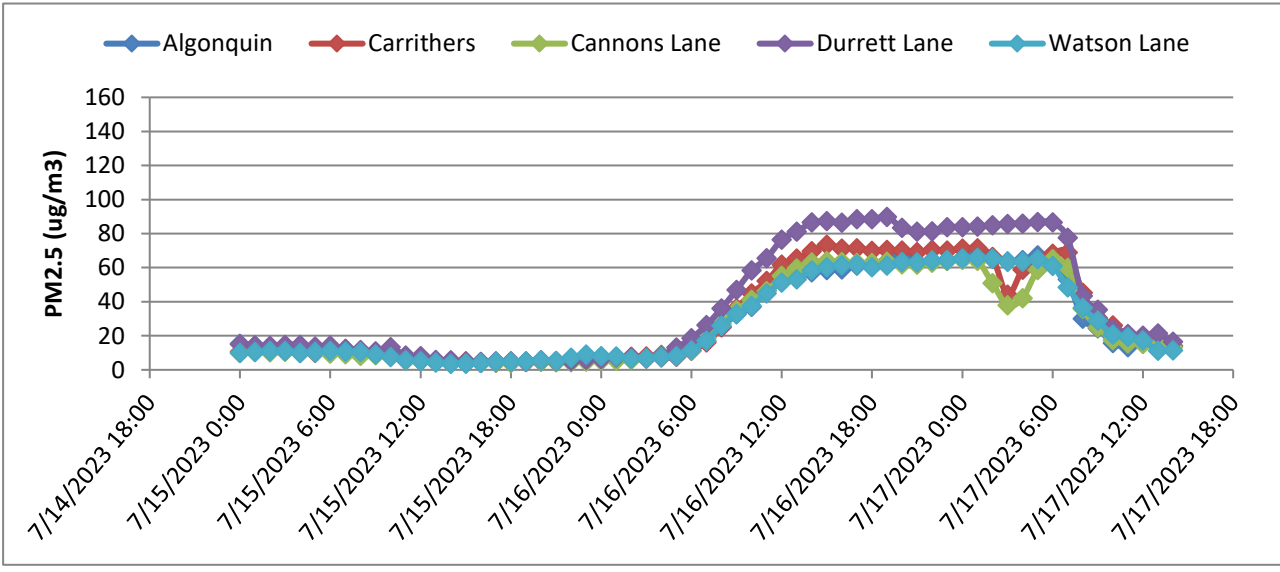
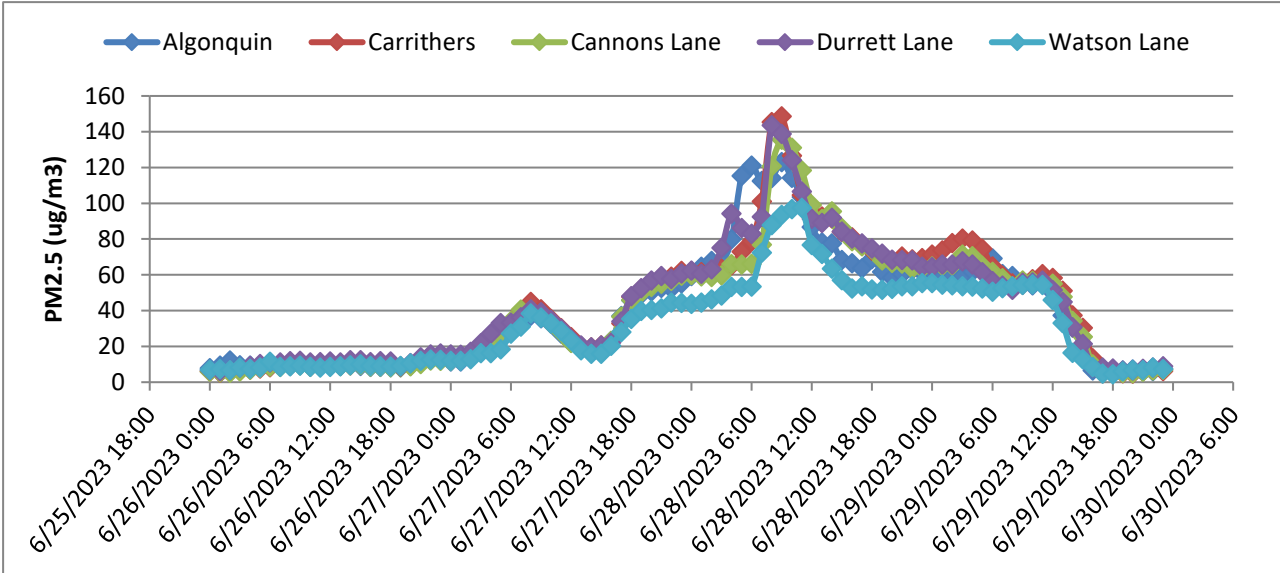
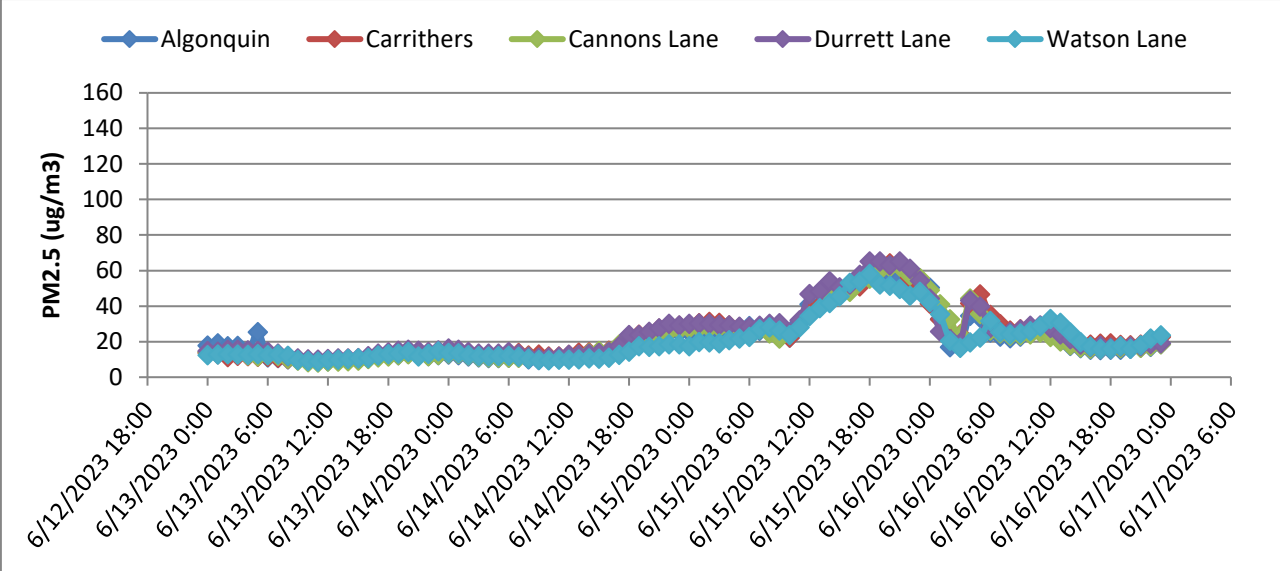
Date	Cannons Lane	Algonquin Parkway	Carrithers	Watson Lane	Durrett Lane
	24 hr avg (ug/m3)	24 hr avg (ug/m3)	24 hr avg (ug/m3)	24 hr avg (ug/m3)	24 hr avg (ug/m3)
05/20/23	24.2	23.9	27.2	24.4	26.8
06/06/23	31.4	33.7	35.2	30.9	36.2
06/15/23	40.9	38.6	40.3	35.3	43.1
06/28/23	81.1	81.5	84.8	61.8	85.8
07/16/23	40.2	39.4	44.2	39.1	54.8

The NAAQS is a health based standard. The negative health effects of PM<sub>2.5</sub> are regulated based on 24-hour averages (35 µg/m<sup>3</sup>) and annual averages (12 µg/m<sup>3</sup>). Select days that were significantly impacted by the wildfire smoke are listed above along with the 24-hour average PM<sub>2.5</sub> concentrations on those days. The graph below shows the daily 24-hr average PM<sub>2.5</sub> concentrations for a broader period. This period included days that saw no smoke impacts, moderate smoke impacts, and significant smoke impacts. While the Canadian fires persisted throughout the entire time period, the impacts in Louisville varied based on changes in atmospheric wind patterns.



The data presented in this special report show data collected from **continuous FEM (Federal Equivalent Method) monitors**. The hourly FEM data are used to update the Air Quality Index (alerts) and allow LMAPCD to evaluate spikes on a higher resolution than the traditional 24-hour filter-based method. While the summarized data presented here show 24-hour averages calculated from the hourly data, the maximum hourly concentrations measured during these wildfire smoke events ranged from 50-150 µg/m<sup>3</sup>.

The charts below show hourly PM<sub>2.5</sub> concentrations for days that saw the most significant smoke impacts from Canadian wildfires.



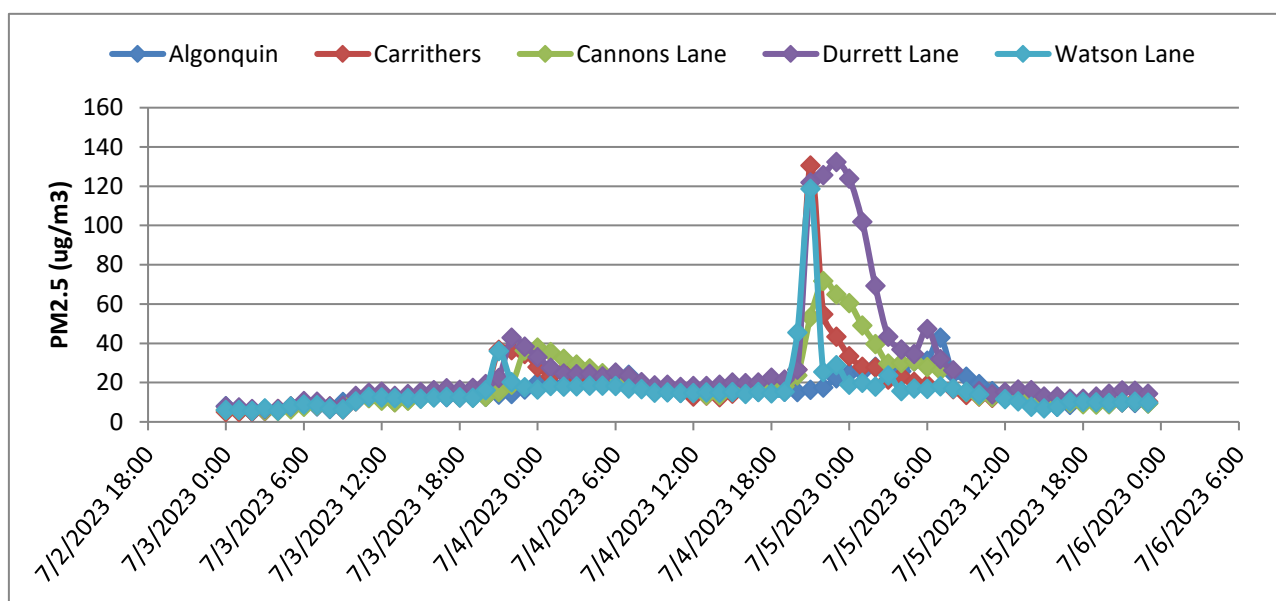
## Louisville Metro Air Pollution Control District

### Special Report for PM<sub>2.5</sub> July 3-5, 2023

This Special Report shows the 24-hour PM<sub>2.5</sub> averages for July 3 through July 5. A 24-hour average above 35 µg/m<sup>3</sup> exceeds the NAAQS.

Date	Algonquin Parkway	Carrithers	Cannons Lane	Durrett Lane	Watson Lane
	24 hr avg (ug/m3)	24 hr avg (ug/m3)	24 hr avg (ug/m3)	24 hr avg (ug/m3)	24 hr avg (ug/m3)
07/03/23	10.5	13.0	11.1	14.7	11.6
07/04/23	17.4	26.3	26.7	35.3	22.5
07/05/23	18.2	15.5	19.9	31.1	13.3

The NAAQS is a health based standard. The negative health effects of PM<sub>2.5</sub> are regulated based on 24-hour averages (35 µg/m<sup>3</sup>) and annual averages (12 µg/m<sup>3</sup>). The hourly spikes over the July 4<sup>th</sup> holiday are shown below. Durrett Lane had the highest one-hour average peaks during the evening of July 3 and July 4. PM<sub>2.5</sub> concentrations declined during the early morning hours of July 4 and July 5.



The data presented in this special report show data collected from continuous FEM (Federal Equivalent Method) monitors. The hourly FEM data are used to update the Air Quality Index (alerts) and allow LMAPCD to evaluate spikes on a higher resolution than the traditional 24-hour filter-based method.

**Louisville Metro Air Pollution Control District**  
**8-Hour Ozone Monitoring Report**  
**July 2023**

This report summarizes ozone data collected by Automated Equivalent Method (AEM) ozone analyzers located within the Louisville Metropolitan Statistical Area. Measurements are reported as 8-hour averages in parts-per-billion (ppb). The data are subject to further quality assurance checks and are not final.

**2023 8-Hour Ozone Maximum Values and Exceedances through July 16th**

Date	# of 8-Hour Exceeds	# of Days Exceeds	Charlestown Clark County IN	New Albany Floyd County IN	Carrithers Jefferson County KY	Watson Lane Jefferson County KY	Cannons Lane Jefferson County KY	Algonquin Parkway Jefferson County KY	Buckner Oldham County KY	Shepherdsville Bullitt County KY
03/01/23	0	0	58.1	57.7	59.6	55.1	56.8	53.1	57.1	60.5
04/12/23	0	0	62.5	63.7	62.0	53.2	61.7	59.5	62.6	61.0
04/13/23	0	0	66.3	65.8	61.8	63.0	62.5	62.5	62.2	60.6
04/19/23	0	0	61.8	63.3	64.0	59.8	62.6	59.1	61.6	64.1
04/20/23	0	0	67.3	69.8	69.0	63.6	67.3	65.0	64.8	70.2
05/23/23	1	1	59.0	62.6	64.0	<b>71.6</b>	65.1	64.5	56.7	63.7
05/24/23	0	0	65.3	NA	67.6	70.0	70.1	70.6	63.5	67.3
06/02/23	7	1	<b>74.2</b>	<b>75.8</b>	<b>71.6</b>	<b>71.8</b>	<b>72.5</b>	<b>74.5</b>	<b>72.1</b>	68.2
06/03/23	5	1	<b>71.1</b>	<b>73.0</b>	70.2	<b>76.3</b>	70.6	<b>72.5</b>	69.0	<b>74.0</b>
06/04/23	2	1	61.0	66.0	68.3	<b>71.2</b>	67.5	67.0	57.1	<b>71.6</b>
06/05/23	1	1	60.6	63.8	68.3	70.5	67.2	66.1	59.1	<b>76.7</b>
06/06/23	3	1	69.1	70.0	<b>74.6</b>	70.3	<b>74.2</b>	69.7	66.3	<b>78.3</b>
06/10/23	3	1	68.6	66.7	<b>72.8</b>	65.0	<b>73.7</b>	67.8	69.0	<b>71.7</b>
06/15/23	2	1	68.2	66.2	<b>77.1</b>	60.5	<b>75.0</b>	64.0	68.8	64.5
06/24/23	2	1	68.6	69.7	<b>72.2</b>	66.3	<b>72.6</b>	66.5	64.8	68.7
06/28/23	6	1	<b>82.7</b>	<b>96.1</b>	70.3	<b>79.1</b>	<b>86.8</b>	<b>91.1</b>	68.3	<b>77.7</b>
<b>Exceeds</b>	32	10	3	3	5	5	6	3	1	6
<b>Truncated 4th Maximum</b>			69	70	72	71	73	70	68	74

Values in **BOLD/RED** exceed the level of the 2015 ozone standard of 70 ppb (parts-per-billion).

This standard applies to air monitoring data beginning with the 2016 ozone season.

NA - Indicates data were not available.

### 8-Hour Ozone Exceedances:

The National Ambient Air Quality Standard for ozone is measured as an 8-hour average. An ozone exceedance occurs when the highest 8-hour average for each day is greater than the NAAQS. The NAAQS was lowered from 80 ppb to 75 ppb in 2007 and from 75 ppb to 70 ppb in 2016. The data below lists the number of exceedances based on the NAAQS at the time the data was collected.

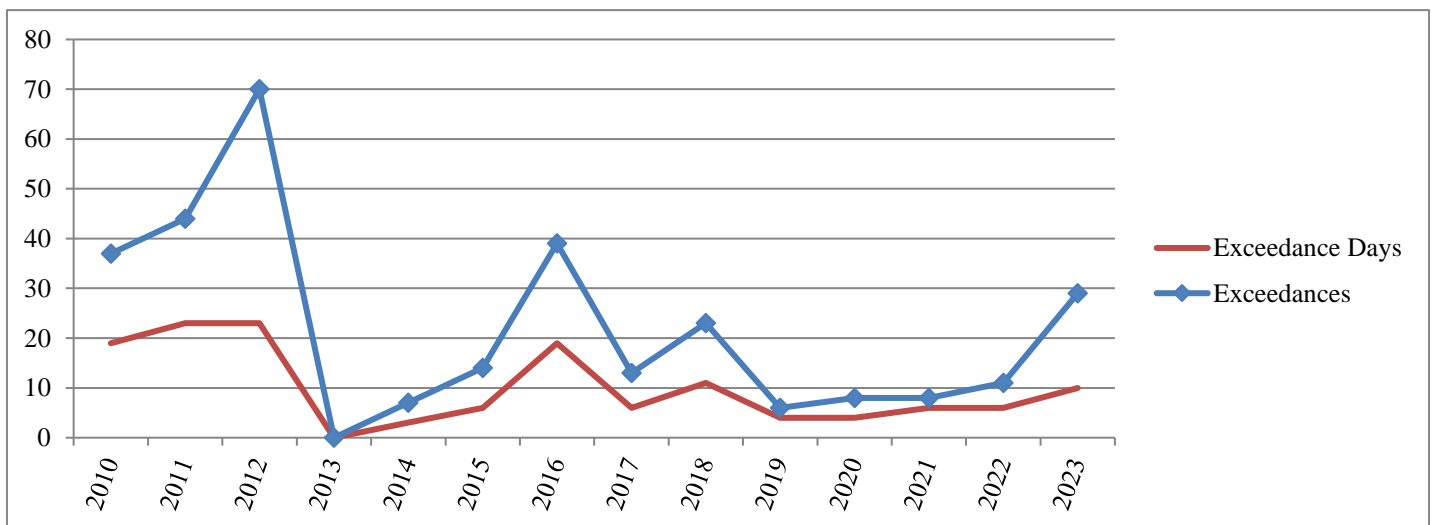
**2010-2023 8-Hour Ozone Exceedance Summary through July 16th**

Year	Charles-town	New Albany	Bates & Carrithers	Watson	WLKY & Cannons Lane	Buckner	Shepherds-ville	Louisville MSA Total		Jefferson County Total	
								Exceedances	Days	Exceedances	Days
2010	4	2	3	3	15	8	2	37	19	21	15
2011	6	5	6	5	8	13	1	44	23	19	14
2012	8	13	7	11	13	14	4	70	23	31	17
2013	0	0	0	0	0	0	0	0	0	0	0
2014	1	2	0	2	2	0	0	7	3	4	3
2015	3	0	4	1	4	2	0	14	6	9	5
2016	7	6	5	3	14	3	1	39	19	22	16
2017	1	5	1	1	4	1	0	13	6	6	4
2018	4	5	3	2	6	1	2	23	11	11	8
2019	1	0	2	0	2	1	0	6	4	4	2
2020	0	1	1	1	4	0	1	8	4	6	4
2021	0	0	4	1	1	1	1	8	6	6	5
2022	1	0	1	1	6	2	0	11	6	8	6
2023	3	3	5	5	6	1	6	29	10	16	9

\* Cannons Lane replaced WLKY in 2010. Data through 2009 are from WLKY.

\*\* Carrithers replaced Bates in 2018. Data through 2017 are from Bates.

**Historical Graph of 8-Hour Ozone Exceedances**



## National Ambient Air Quality Standard for Ozone - 8-Hour Standard:

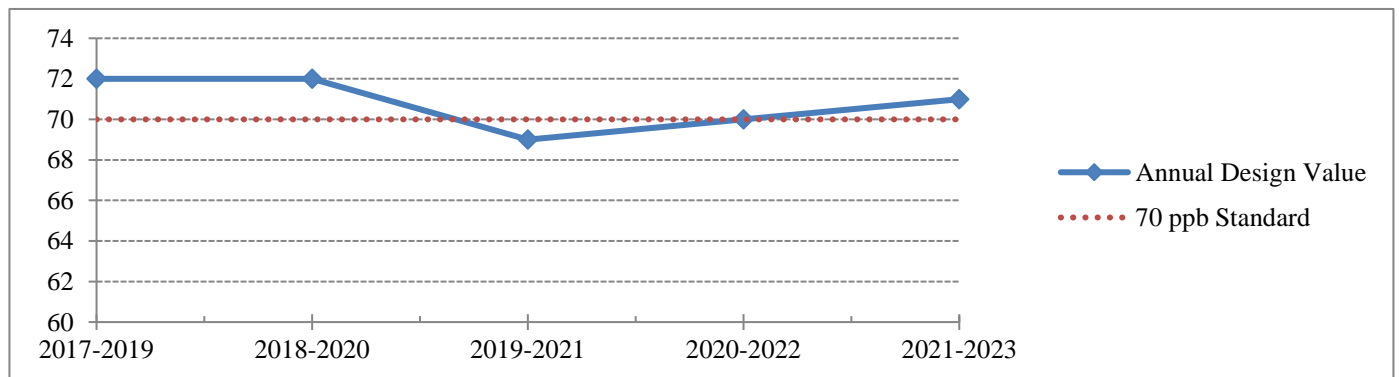
Attainment of the 8-hour standard for ozone at an individual monitor is achieved when the three-year average of the annual fourth-highest daily maximum (4<sup>th</sup> maximum) 8-hour average ozone concentration is less than 71 ppb. This three-year average is the design value for that monitor. The Louisville MSA row represents the largest 4<sup>th</sup> maximum and design value\* for all monitors within the MSA.

### 8-Hour Ozone 4<sup>th</sup> Maximums and Design Values through July 16th

Site Name	4 <sup>th</sup> Maximums							8-Hour Design Values				
	2017	2018	2019	2020	2021	2022	2023	2017-2019	2018-2020	2019-2021	2020-2022	2021-2023
Charlestown	68	71	64	63	63	64	69	67	66	63	63	65
New Albany	74	73	63	66	64	63	70	70	67	64	64	65
Bates/Carrithers	65	70	64	68	73	67	72	66	67	68	69	70
Watson Lane	66	69	65	63	67	67	71	66	65	65	65	68
Cannons Lane	72	77	68	71	69	72	73	72	72	69	70	71
Algonquin	NA	NA	NA	NA	NA	NA	70	NA	NA	NA	NA	
Buckner	64	69	65	61	65	63	68	66	65	63	63	65
Shepherdsville	63	68	63	65	65	63	74	64	65	64	64	67
<b>Louisville MSA</b>	74	77	68	71	73	72	74	72	72	69	70	71

\* Design Value calculations are approximations based on preliminary summary data and may differ from official design value calculations

### 8-Hour Ozone Design Value Trend Chart





**Louisville Metro Air Pollution Control District**  
**Air Monitoring Report for Sulfur Dioxide (SO<sub>2</sub>)**  
**July 2023**

On June 2, 2010, EPA strengthened the primary National Ambient Air Quality Standard for SO<sub>2</sub>. Specifically, EPA replaced the existing annual (30 ppb) and 24-hour (140 ppb) primary standards with a new 1-hour standard set at 75 ppb. The 1-hour standard was set to better protect public health by reducing exposure to high short-term concentrations of SO<sub>2</sub>. The new standard took effect August 23, 2010.

**Exceedances of the 1-Hour SO<sub>2</sub> Standard:**

An exceedance occurs when a measured 1-hour average is greater than 75 ppb. Since up to twenty-four 1-hour averages are recorded each day, multiple exceedances may occur in one day. However, only the maximum 1-hour average (Daily Max) for each day is used in determining if the area is in compliance with the standard. The table below indicates the number of exceedances and the daily maximums reported thus far this year. The data are subject to further quality assurance checks and are not final.

**SO<sub>2</sub> Daily Maximums and Exceedances through June 30th**

Date	Algonquin Parkway		Watson Lane Elementary		Cannons Lane NCore		New Albany Indiana	
	Exceeds	Daily Max	Exceeds	Daily Max	Exceeds	Daily Max	Exceeds	Daily Max
01/10/23		1.4		4.1		1.8		NA
01/19/23		3.5		3.7		1.4		NA
01/24/23		1.5		2.7		4.2		NA
02/02/23		3.6		4.0		2.4		3.6
02/05/23		1.3		4.4		1.7		1.4
02/19/23		3.6		0.8		4.8		2.1
02/23/23		4.7		1.9		2.3		1.1
03/01/23		3.6		6.5		5.4		5.4
03/16/23		7.1		1.9		2.7		3.8
03/18/23		1.9		0.7		7.6		1.2
03/20/23		1.9		10.3		3.5		1.5
04/01/23		1.5		3.6		4.6		1.0
04/13/23		3.4		4.2		1.0		5.3
04/18/23		1.0		12.6		0.5		0.8
05/04/23		2.7		3.4		-0.2		2.7
05/19/23		0.7		0.6		3.3		1.2
05/23/23		1.5		7.9		0.7		1.4
06/04/23		1.3		1.0		2.8		2.1
06/10/23		3.3		14.9		3.4		1.6
Totals/Max	0	7.1	0	14.9	0	10.5	0	5.4
99 <sup>th</sup> Percentile		4.7		12.6		7.6		5.3

NA - Indicates data were not available

**Louisville Metro Air Pollution Control District**  
**Air Monitoring Report for Sulfur Dioxide (SO<sub>2</sub>)**  
**July 2023**

**Continuation of SO<sub>2</sub> Daily Maximums and Exceedances through June 30th**

Date	Algonquin Parkway		Watson Lane Elementary		Cannons Lane NCore		New Albany Indiana	
	Exceeds	Daily Max	Exceeds	Daily Max	Exceeds	Daily Max	Exceeds	Daily Max
06/15/23		0.5		7.8		10.5		1.0
Totals/Max	0	7.1	0	14.9	0	10.5	0	5.4
99 <sup>th</sup> Percentile		4.7		12.6		7.6		5.3

NA - Indicates data were not available

**Attainment of the SO<sub>2</sub> Standard:**

Attainment of the new standard is achieved when the 3-year average of the 99<sup>th</sup> percentile annual distribution of the daily maxima is less than or equal to 75 ppb. Since this value can be calculated from historical data, the table below indicates those values based on 2017-2023 data.

**SO<sub>2</sub> Annual 99<sup>th</sup> Percentiles and Annual Design Values**

Site Name	Annual 99 <sup>th</sup> Percentiles (ppb)							Annual Design Values				
	2017	2018	2019	2020	2021	2022	2023	2017-2019	2018-2020	2019-2021	2020-2022	2021-2023
Watson Lane	14	16	15	15	13	12	13	15	15	14	13	12
Algonquin	11	12	6	5	4	4	5	10	8	5	4	4
Cannons Lane	7	8	9	8	9	8	8	8	8	9	8	8
New Albany	8	9	7	4	4	5	5	8	7	5	4	5

\* Design Value calculations are approximations based on preliminary summary data and may differ from official design value calculations