



# *Noise Compatibility Report*

**2017 Year End**

Feb 16, 2018

## *Disclaimer*



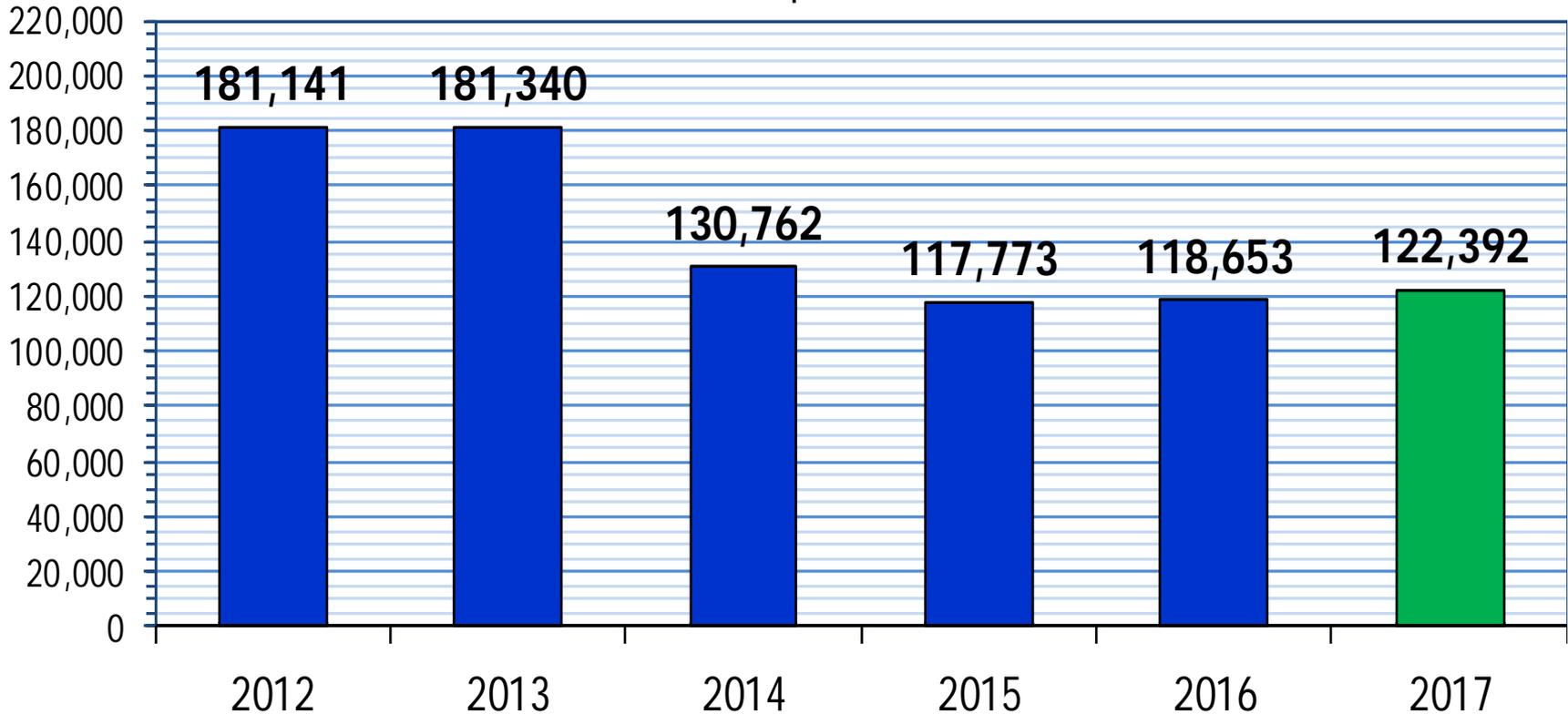
- Adherence to approved noise abatement measures is voluntary and subject to change based on weather, efficiency, and safety.
- The contents of this report are for informational purposes only. The information cannot be used for enforcement of any Noise Abatement Measure.

\* Totals may not add to 100.0%, due to rounding.

# Aircraft Operations



Cleveland Total Operations 2012 - 2017



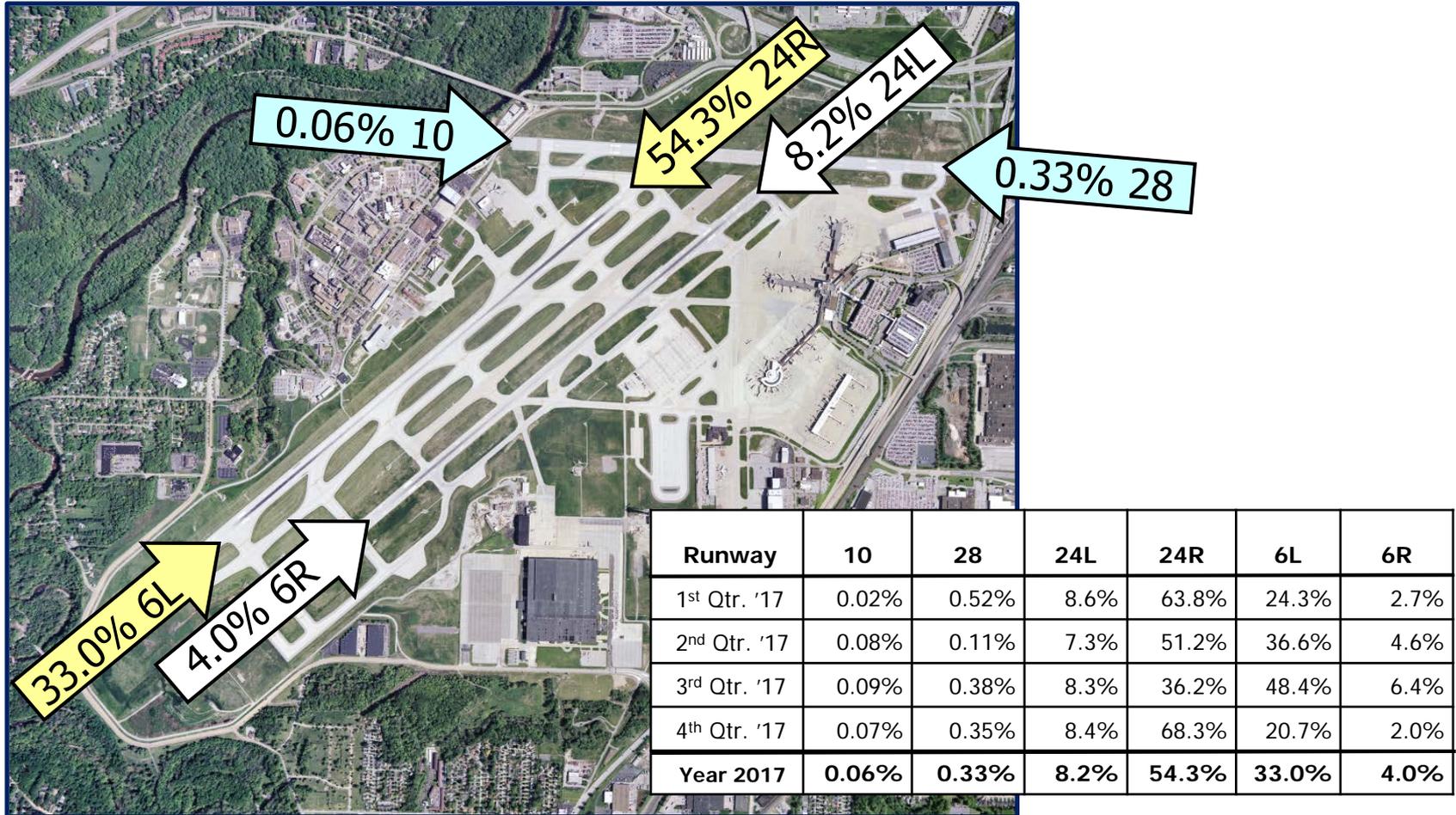
There were 122,392 landings and takeoffs in 2017; this is 3.15% above 2016.

## Landings & Takeoffs

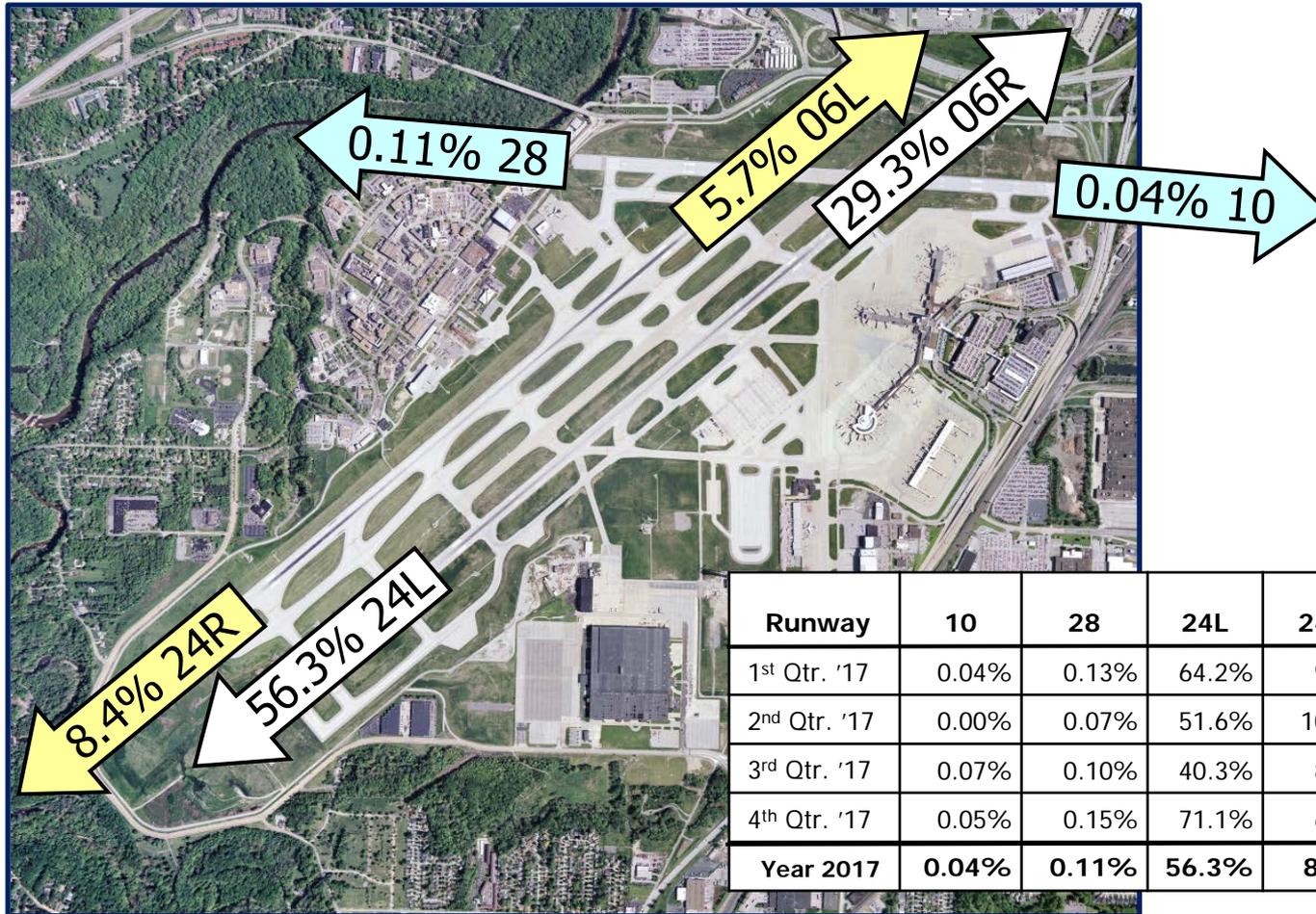
	Year 2017		Year 2016	
Commercial				
-Stage 2 with hush kit	64	0.05%	120	0.10%
-Heavy (excl. all B757s)	1,573	1.29%	1,776	1.50%
-MD80 series	3,785	3.09%	5,079	4.28%
-Other Stage 3	75,239	61.47%	69,000	58.15%
-Regional Jet	26,262	21.46%	26,063	21.97%
-Turboprop	4,179	3.41%	3,742	3.15%
Air Taxi	2,691	2.20%	3,012	2.54%
General Aviation	8,431	6.89%	9,618	8.11%
Military	168	0.14%	243	0.20%
<b>Total</b>	<b>122,392</b>	<b>100.00%</b>	<b>118,653</b>	<b>100.00%</b>

All aircraft above are Stage 3 certified with the exception of some military aircraft. A hush kit reduces noise enough to meet Stage 3 levels, but well short of the noise level typical of aircraft originally manufactured as Stage 3.

# Runway Use: Year 2017 Arrivals



# Runway Use: Year 2017 Departures



# Departure Headings, 4<sup>th</sup> Qtr.: Day-time

## Jet Departures, 6:00 a.m. to 11:00 p.m.

A voluntary measure of the Noise Compatibility Program calls for jets departing between 6:00 a.m. and 11:00 p.m. from Runways 6L and 6R to take magnetic headings between 360° and 35° when turning left and between 65° and 95° when turning right until the jet is either 5 mi. away from the airport or has gained an altitude of 5,000 ft. above Mean Sea Level (MSL).

Another voluntary measure of the Noise Compatibility Program calls for jets departing between 6:00 a.m. and 11:00 p.m. from Runways 24L and 24R to take magnetic headings between 190° and 220° when turning left and between 250° and 280° when turning right until the jet is either 5 mi. away from the airport or has gained an altitude of 5,000 ft. MSL.

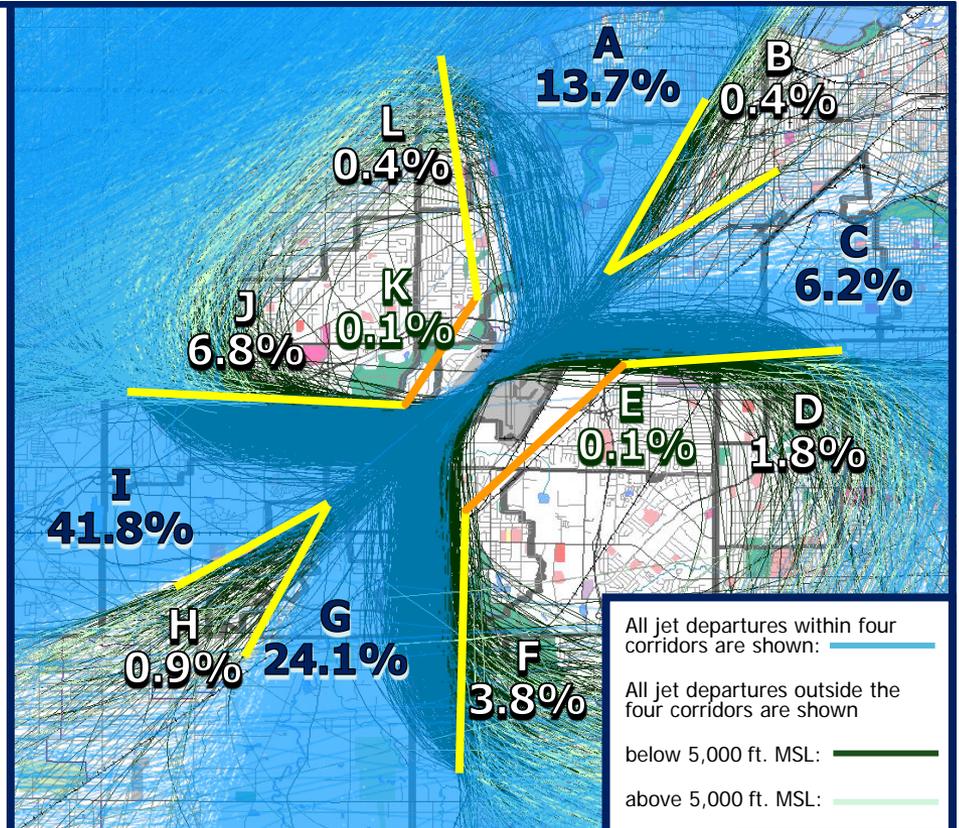
### 85.8% within corridors

- A. 13.7%: north corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- C. 6.2%: east corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- G. 24.1%: south corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- I. 41.8%: west corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

### 14.2% outside corridors

- B. 0.4%: flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the north and east corridors
- D. 1.8%: flights crossing the south boundary below 5,000 ft. MSL
- E. 0.1%: flights turning south before entering the corridor
- F. 3.8%: flights crossing the east boundary below 5,000 ft. MSL
- H. 0.9%: flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the west and south corridors
- J. 6.8%: flights crossing the north boundary below 5,000 ft. MSL
- K. 0.1%: flights turning north before entering the corridor
- L. 0.4%: flights crossing the west boundary below 5,000 ft. MSL

(Percentages do not include Rwy 10/28 departures)



# Departure Headings, 4<sup>th</sup> Qtr. : Late Night

## Late Night Jet Departures are from 11:00 p.m. to 6:00 a.m.

A voluntary measure of the Noise Compatibility Program calls for jets departing between 11:00 p.m. and 6:00 a.m. from Runways 6L and 6R to take headings of roughly 095° to 100° until reaching an altitude of 5,000 ft. MSL.

Another voluntary measure of the Noise Compatibility Program calls for jets departing between 11:00 p.m. and 6:00 a.m. from Runways 24L and 24R to take headings between 200° and 220° until reaching an altitude of 5,000 ft. MSL.

### 64.8% within corridors

- A. 17.3%: 095 corridor, including flights crossing the 095 corridor boundaries above 5,000 ft. MSL
- F. 47.5%: 200 corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

### 35.2% outside corridors

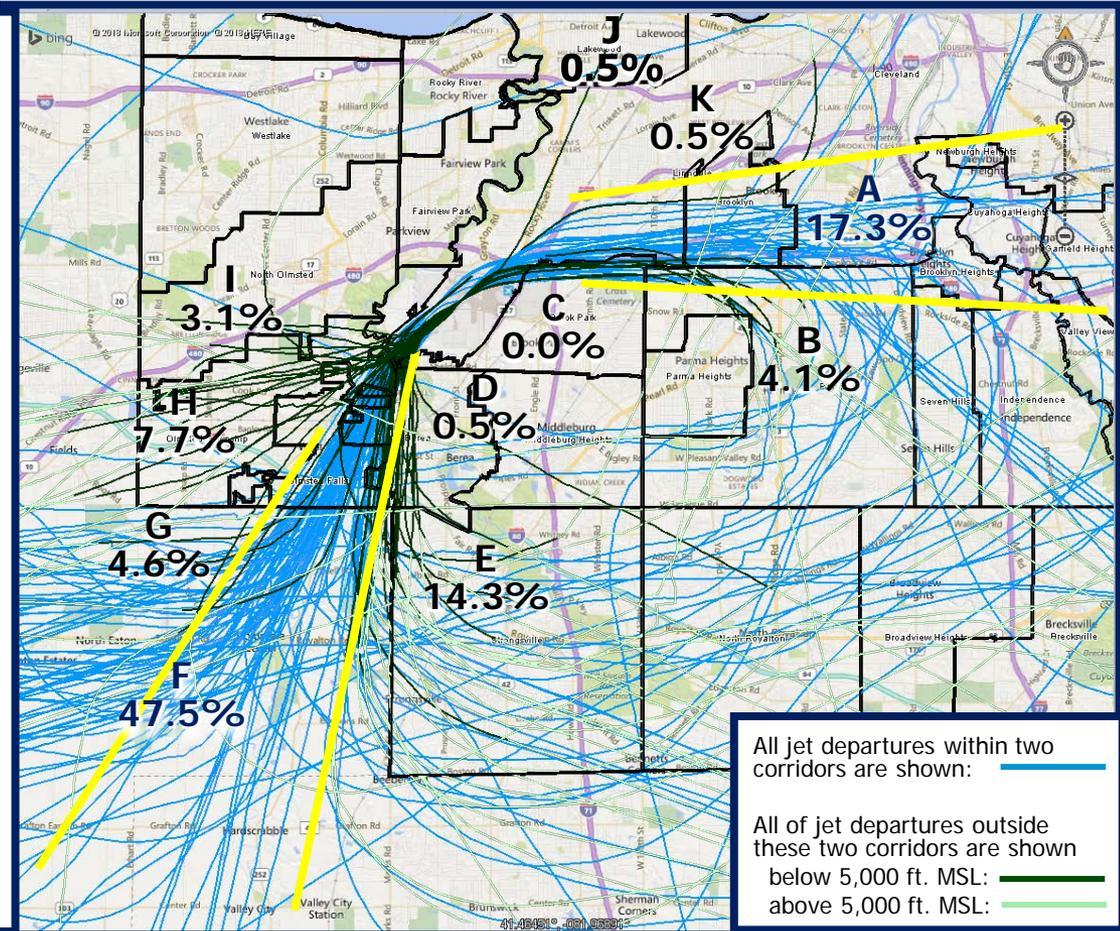
- B. 4.1%: flights crossing the south boundary below 5,000 ft. MSL
- C. 0.0%: flights turning right before entering the 095 corridor
- D. 0.5%: flights departing south without entering the 200 corridor
- E. 14.3%: flights crossing the east boundary below 5,000 ft. MSL
- G. 4.6%: flights crossing the west boundary below 5,000 ft. MSL
- H. 7.7%: flights departing southwest without entering the corridor
- I. 3.1%: flights departing west without entering the corridor
- J. 0.5%: flights departing north, not east with the 095 corridor
- K. 0.5%: flights crossing the north boundary below 5,000 ft. MSL

(There were no Rwy 10 and three Rwy 28 jet departures between 11:00 p.m. and 6:00 a.m. during the quarter.)

The percentage of departures on each runway from 11:00 p.m. to 6:00 a.m. during the quarter were as follows:

Rwy	10	28	24L	24R	6L	6R
For jets:	0.0%	1.5%	65.8%	10.2%	2.6%	19.9%
For all aircraft:	0.4%	1.7%	63.4%	8.4%	2.9%	21.0%

**88.6% of Jet Departures from Rwy 6L/6R were on the preferred Rwy, 6R.**



# Arrival Headings, 4<sup>th</sup> Qtr. : Night-time

## Night-time Arrivals are from 10:00 p.m. to 6:59 a.m.

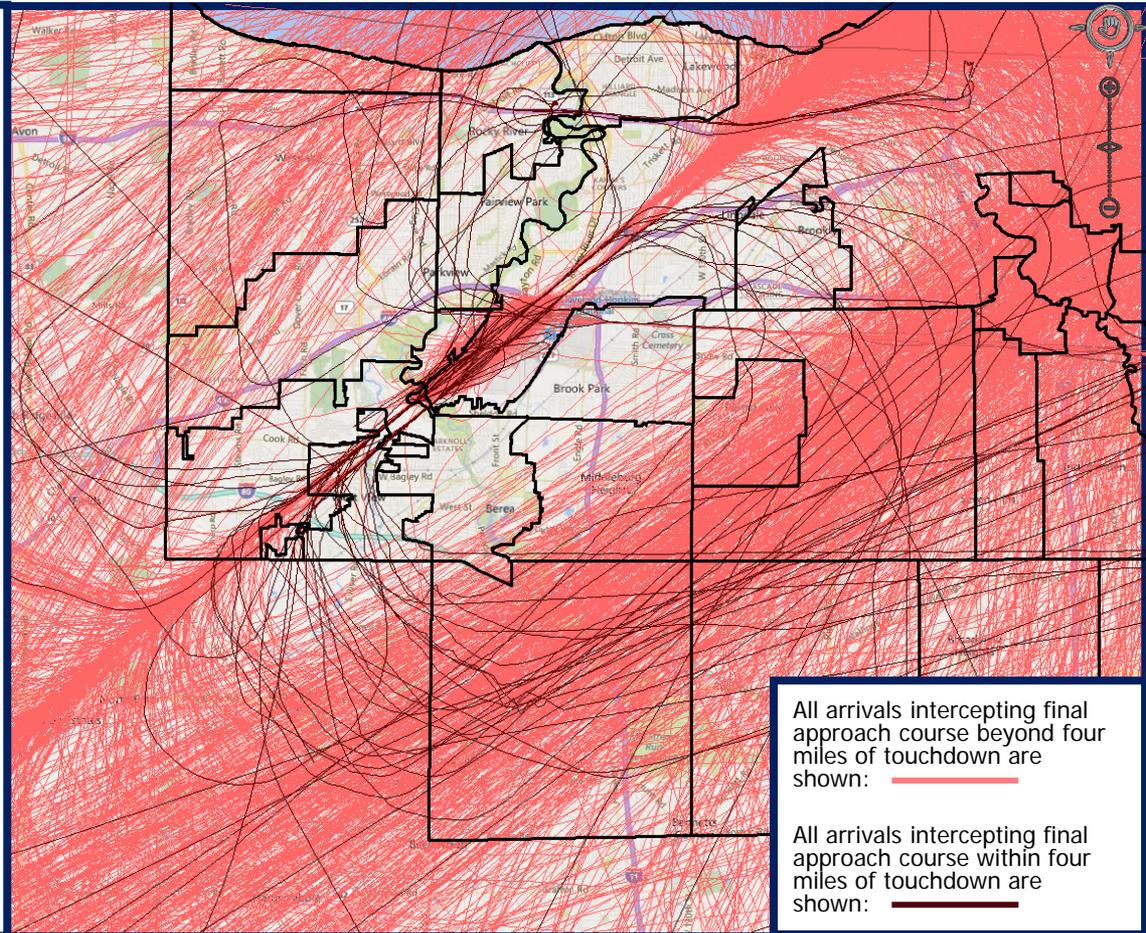
A voluntary measure of the Noise Compatibility Program calls for all aircraft arriving between 10:00 p.m. and 6:59 a.m., wind and weather permitting, to intercept final approach course no closer than four miles before touchdown.

### 98.1% beyond four miles and 1.9% within four miles

There is no comparable NCP measure regarding day-time arrivals.

Runway use by all arriving aircraft from 10:00 p.m. to 6:59 a.m. during the quarter was as follows:

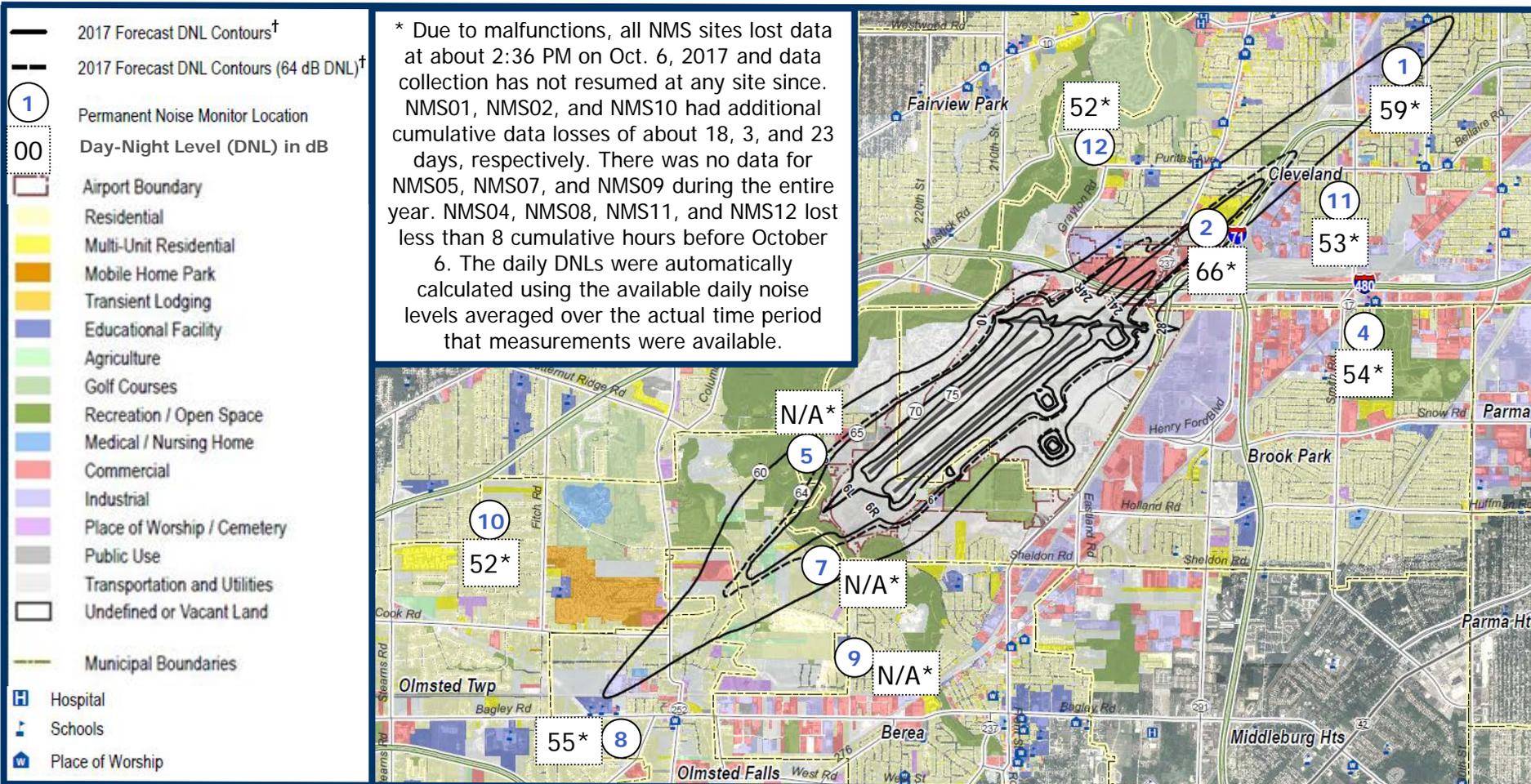
Rwy	Percentage of Arrivals	
	Jets	All Aircraft
10	0.0%	0.2%
28	0.5%	0.6%
24L	9.1%	9.1%
24R	65.9%	65.3%
6L	22.0%	22.0%
6R	2.5%	2.7%
Helicopter	0.0%	0.1%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>



All arrivals intercepting final approach course beyond four miles of touchdown are shown: \_\_\_\_\_

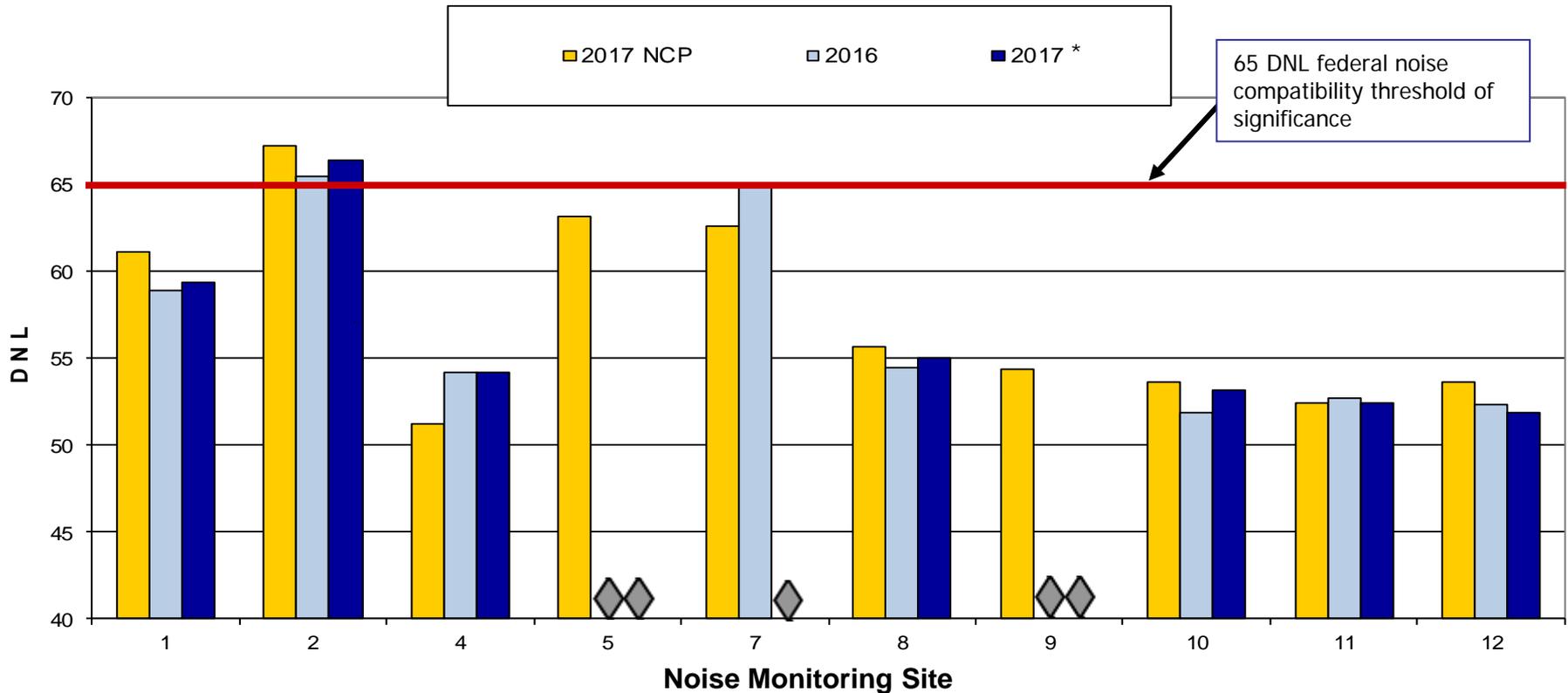
All arrivals intercepting final approach course within four miles of touchdown are shown: \_\_\_\_\_

# Aircraft Noise: DNL by Noise Monitoring Site



Noise Compatibility Report † The 2017 Forecast DNL Contours are a projection made in 2011 and do not necessarily accurately represent current or future conditions.  
 Year End, 2017

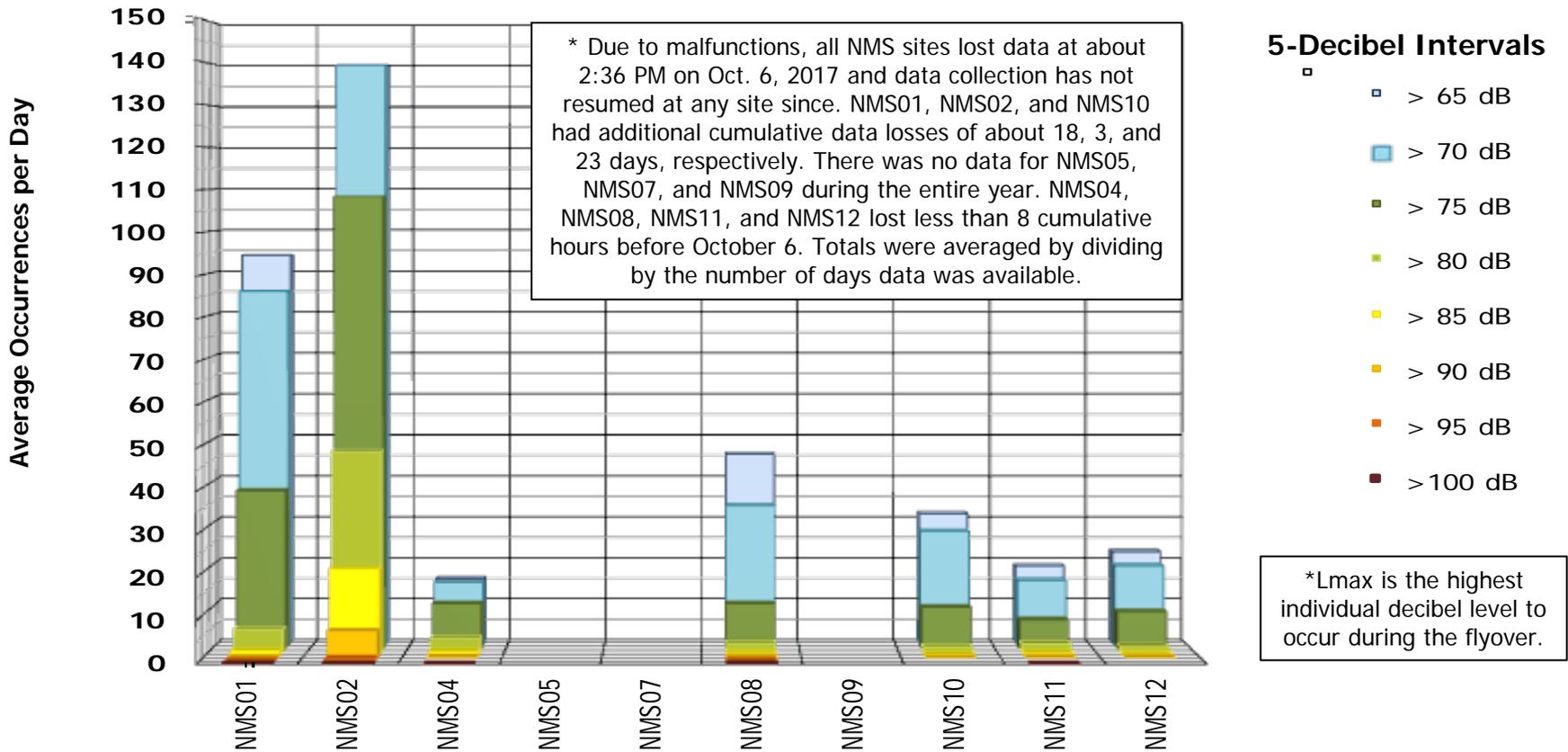
## DNL: Year 2017 vs. Year 2016



\* Due to malfunctions, all NMS sites lost data at about 2:36 PM on Oct. 6, 2017 and data collection has not resumed at any site since. NMS01, NMS02, and NMS10 had additional cumulative data losses of about 18, 3, and 23 days, respectively. There was no data for NMS05, NMS07, and NMS09 during the entire year. NMS04, NMS08, NMS11, and NMS12 lost less than 8 cumulative hours before October 6. The daily DNLs were automatically calculated using the available daily noise levels averaged over the actual time period that measurements were available.

# Average Daily Number of Aircraft Noise Occurrences by Decibel Level

## Year 2017 Noise Event Lmax\* Distribution



# Top Three Lmaxs at Each NMS

**Three highest aircraft decibel levels at each Noise Monitoring Site during the Year of 2017<sup>1</sup>, p. 1**

NMS	Lmax (dB)	Aircraft	Operation	Time and date	Sound Exposure Level (dB) <sup>2</sup>	Duration (sec)
NMS01 <sup>3</sup>	103.0	Military	Arrival on Rwy 24L	6/9/17 11:48 PM	110.7	102.0
NMS01 <sup>3</sup>	100.7	Military	Arrival on Rwy 24R	3/24/17 2:44 PM	106.6	41.0
NMS01 <sup>3</sup>	99.2	Military	Arrival on Rwy 24R	3/24/17 2:32 PM	107.1	62.0
NMS02 <sup>4</sup>	116.5	Military	Arrival on Rwy 24L	6/9/17 11:48 PM	120.7	60.5
NMS02 <sup>4</sup>	105.2	Military	Departure off Rwy 6R	9/1/17 2:12 PM	112.0	65.5
NMS02 <sup>4</sup>	104.7	Military	Departure off Rwy 6R	9/1/17 10:31 AM	110.4	26.0
NMS04	101.2	Military	Departure off Rwy 6R	9/2/17 3:29 PM	109.1	55.5
NMS04	101.1	Military	Departure off Rwy 6R	9/1/17 2:12 PM	109.8	55.5
NMS04 <sup>5</sup>	94.3	MD-88	Departure off Rwy 6R	1/13/17 5:55 PM	101.0	33.5

<sup>1</sup> Due to equipment malfunctions, no data is available for any NMS after Oct. 6<sup>th</sup>, 2017.

<sup>2</sup> Sound Exposure Level is a measure that takes into account all noise over the entire duration of an event.

<sup>3</sup> Due to equipment malfunctions, no 2017 data is available for NMS05 or NMS07.

## Top Three Lmaxs at Each NMS

Three highest aircraft decibel levels at each Noise Monitoring Site during the Year of 2017 <sup>1</sup> , p. 2						
NMS	Lmax (dB)	Aircraft	Operation	Time and date	Sound Exposure Level (dB) <sup>2</sup>	Duration (sec)
NMS08	104.4	Military	Departure off Rwy 24L	9/3/17 3:24 PM	110.5	49.5
NMS08	99.6	Military	Arrival on Rwy 6R	8/31/17 3:24 PM	103.4	17.0
NMS08 <sup>3</sup>	96.1	B737-700	Departure off Rwy 24L	7/26/17 5:41 PM	97.0	17.5
NMS10 <sup>4</sup>	90.3	MD-88	Departure off Rwy 24L	7/2/17 6:37 AM	96.1	28.5
NMS10 <sup>4</sup>	89.4	B737-900	Departure off Rwy 24L	2/7/17 7:54 AM	93.1	31.5
NMS10 <sup>4</sup>	88.8	MD-88	Departure off Rwy 24L	4/21/17 7:11 PM	95.0	34.0
NMS11	105.0	Military	Departure off Rwy 6R	9/2/17 3:29 PM	106.9	58.5
NMS11	101.0	Military	Departure off Rwy 6R	9/1/17 2:12 PM	108.5	63.0
NMS11	92.9	MD-88	Departure off Rwy 6R	4/20/17 8:08 PM	99.0	30.0
NMS12	93.9	Military	Departure off Rwy 6R	9/1/17 10:31 AM	97.1	22.0
NMS12	93.2	Military	Departure off Rwy 6R	2/20/17 11:15 AM	98.0	43.0
NMS12	92.1	Military	Overflight	9/2/17 4:00 PM	94.5	17.0

<sup>1</sup> Due to equipment malfunctions, no data is available for any NMS after Oct. 6<sup>th</sup>, 2017.

<sup>2</sup> Sound Exposure Level is a measure that takes into account all noise over the entire duration of an event.

<sup>3</sup> Due to equipment malfunctions, no 2017 data is available for NMS09.

<sup>4</sup> Due to equipment malfunctions, an additional 23 cumulative days of data is unavailable in 2017 for NMS09 before Oct 6<sup>th</sup>.

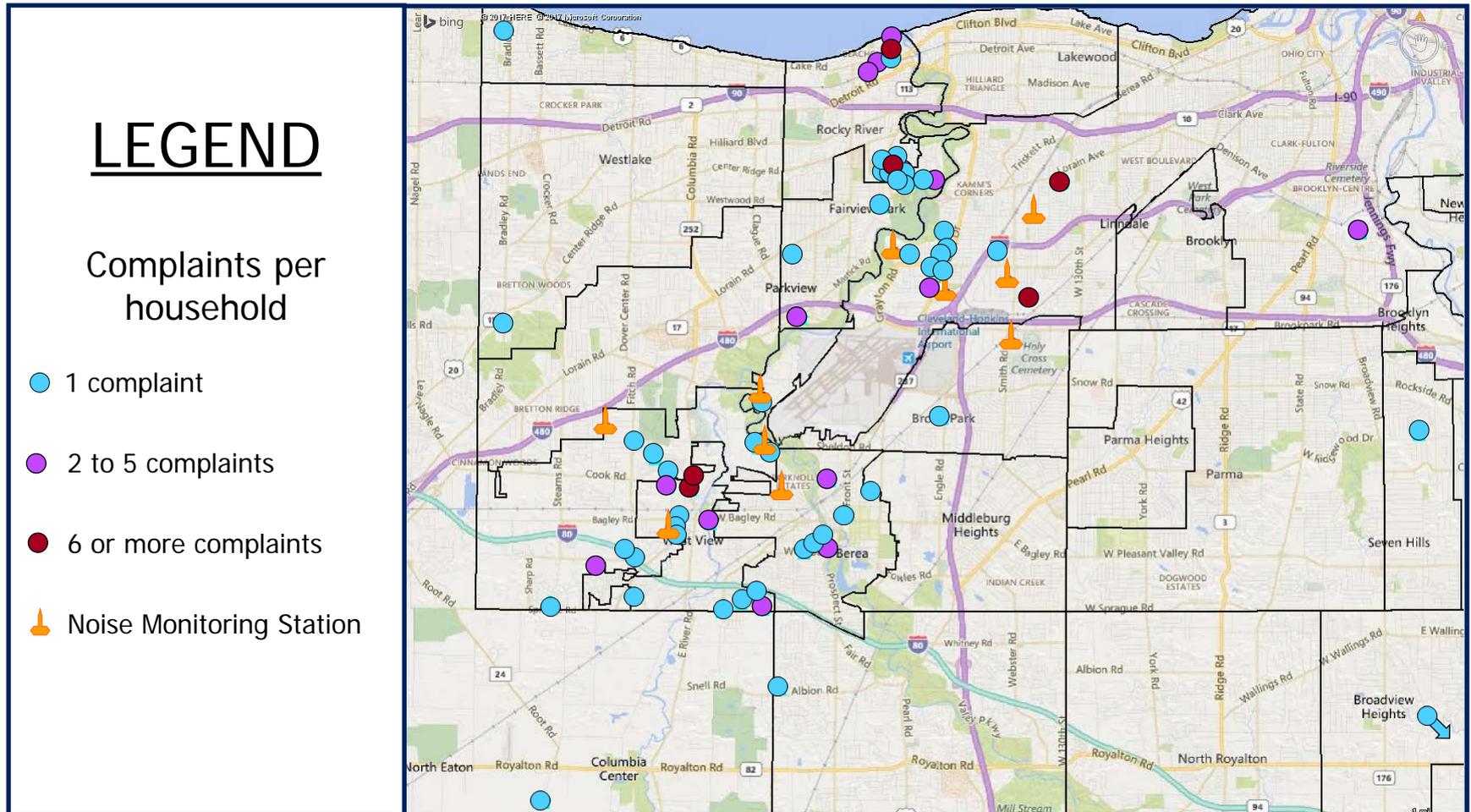
# Noise Complaints



City	1 <sup>st</sup> Qtr.	2 <sup>nd</sup> Qtr.	3 <sup>rd</sup> Qtr.	4 <sup>th</sup> Qtr.	2017 Calls	%	2016 Calls	%	2017 Callers	%	2016 Callers	%
Bay Village	1	0	0	0	1	0.4%	0	0.0%	1	1.4%	0	0.0%
Berea	6	5	1	0	12	5.2%	21	19.4%	6	8.6%	2	6.1%
Brecksville	0	1	0	0	1	0.4%	1	0.9%	1	1.4%	1	3.0%
Brook Park	2	0	0	0	2	0.9%	1	0.9%	2	2.9%	1	3.0%
Cleveland	11	45	11	16	83	36.2%	41	38.0%	13	18.6%	8	24.2%
Columbia Station	0	1	0	0	1	0.4%	2	1.8%	1	1.4%	1	3.0%
Fairview Park	2	0	11	0	13	5.7%	7	6.5%	10	14.3%	5	15.2%
Middleburg Hts.	0	0	0	1	1	0.4%	0	0.0%	1	1.4%	0	0.0%
Olmsted Falls	1	6	33	6	46	20.1%	4	3.7%	12	17.1%	4	12.1%
Olmsted Twp.	0	2	4	2	8	3.5%	16	14.8%	8	11.4%	2	6.1%
Painesville	0	1	0	0	1	0.4%	0	0.0%	1	1.4%	0	0.0%
Rocky River	4	18	33	1	56	24.5%	12	11.1%	10	14.3%	6	18.2%
Seven Hills	0	0	0	1	1	0.4%	0	0.0%	1	1.4%	0	0.0%
Strongsville	0	0	0	1	1	0.4%	1	0.9%	1	1.4%	1	3.0%
Westlake	1	0	0	0	1	0.4%	0	0.0%	1	1.4%	0	0.0%
<b>Totals</b>	<b>28</b>	<b>79</b>	<b>94†</b>	<b>28</b>	<b>229†</b>	<b>100.0%</b>	<b>108*</b>	<b>100.0%</b>	<b>70†</b>	<b>100.0%</b>	<b>33*</b>	<b>100.0%</b>

† 2017 totals include 1 complaint from an unknown location. \* 2016 totals include 1 complaint each from Bratenahl and Parma. Corresponding percentages were added to obtain 100.0%.

# Year 2017 Complaint Map



## *2018 Forward Plan*

- Continue implementation of Part 150 measures that obtained FAA approval.
- Continue coordination with the Air Traffic Control Tower to mitigate residential noise impact.
- Maintain dialogue with the FAA regarding the Cleveland-Detroit Metroplex airspace plan.
- Upgrade and replacement of Noise Monitoring Stations NMS02, NMS05, NMS07, and NMS12 along with implementation of Integrated Noise Monitoring software is scheduled for completion by Spring 2018.
- Improvements to the northern portion of the airfield at Cleveland Hopkins International Airport (CLE) will begin in April 2018. The project will be complete in 2020. Runway 10/28 will close between April 15 and November 15, 2018. Runway 6R/24L will be closed between July 1 to August 15, 2018. In 2019, Runway 6L/24R will be closed from April to July. Runway 6R/24L will be closed again between July and November, 2019. Finally, in 2020, Runway 6R/24L will close in April and could remain closed until November.
- No anticipated construction will take place at Burke Lakefront Airport (BKL) in 2018 that will have a significant impact on noise.
- Labor Day weekend air show to be held at BKL featuring the U.S. Navy Blue Angels.

**CLE.**  
**Going places.™**

