



# ***Noise Compatibility Report***

**2016 2<sup>nd</sup> Quarter**

Oct 21, 2016

## *Disclaimer*

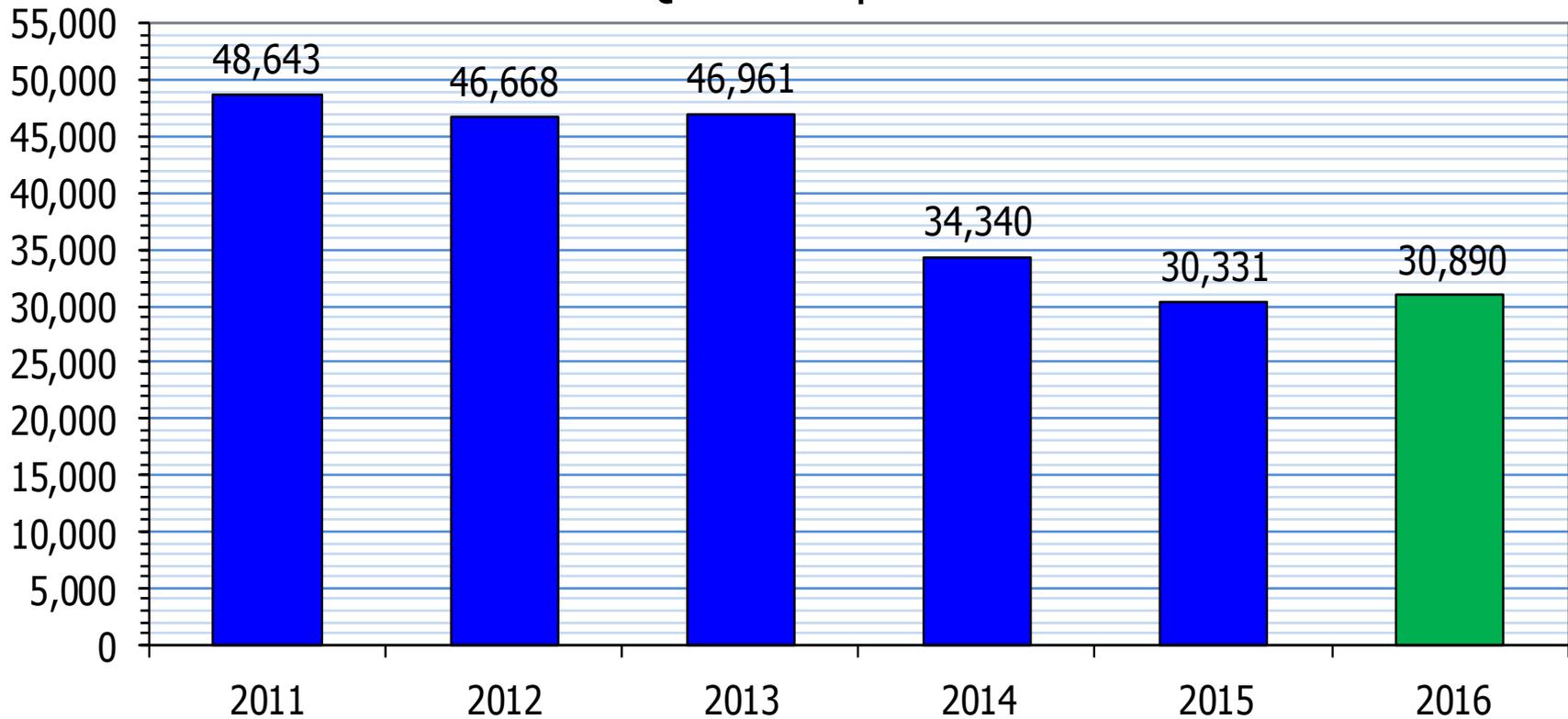


- Adherence to approved noise abatement measures is voluntary and subject to change based on weather, efficiency, and safety.
- The contents of this report are for informational purposes only. The information cannot be used for enforcement of any Noise Abatement Measure.

# Aircraft Operations



## Cleveland 2<sup>nd</sup> Quarter Operations 2011 - 2016



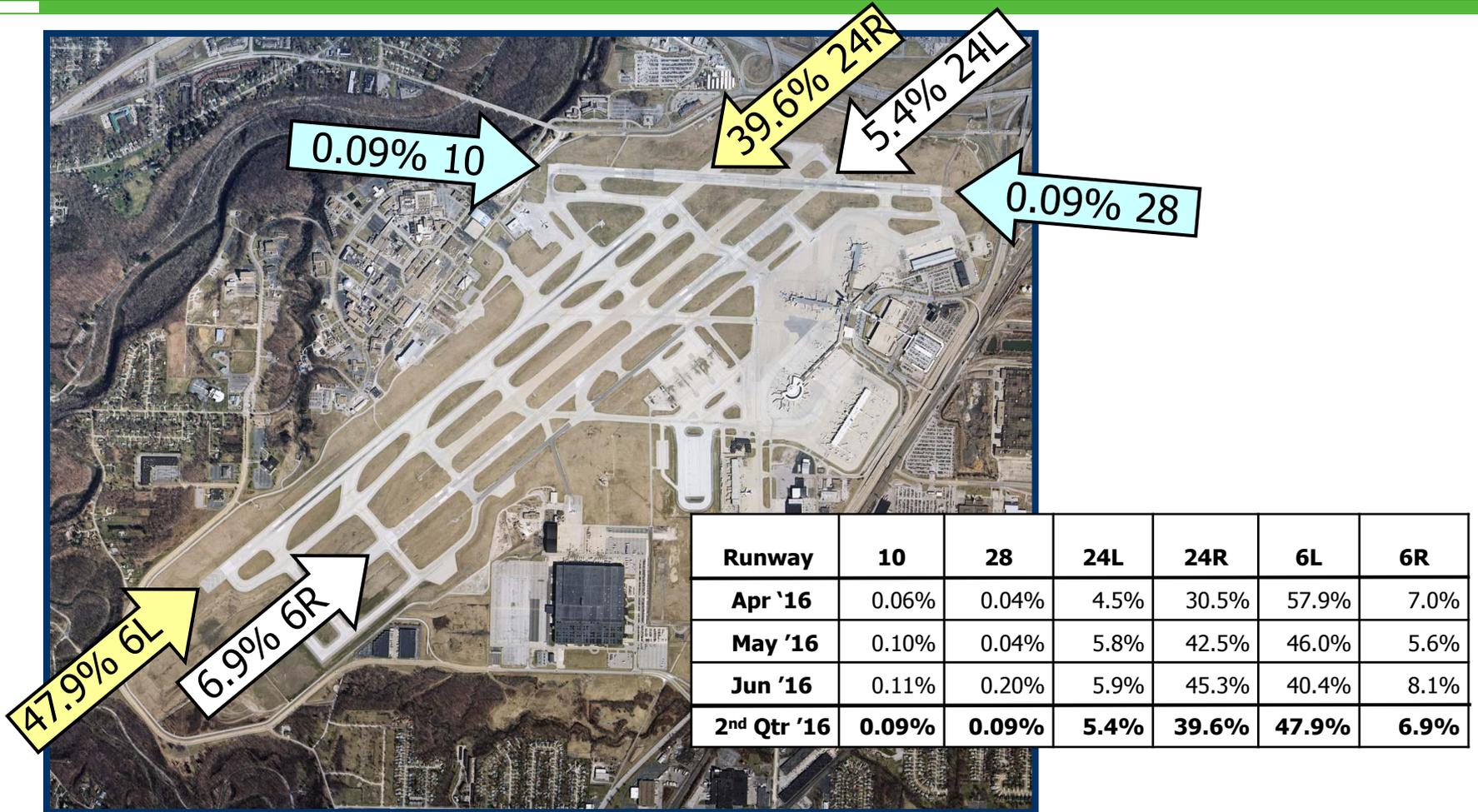
There were 30,890 landings and takeoffs in the 2<sup>nd</sup> Qtr. 2016; this is 1.84% above the 2<sup>nd</sup> Qtr. 2015.

## Landings & Takeoffs

	2 <sup>nd</sup> Qtr., 2016		2 <sup>nd</sup> Qtr., 2015	
Commercial				
-Stage 2 with hush kit	24	0.08%	23	0.08%
-Heavy (incl. all B757s)	385	1.25%	551	1.82%
-MD80 series	1,529	4.95%	1,051	3.46%
-Other Stage 3	17,508	56.68%	18,062	59.55%
-Regional Jet	6,765	21.90%	6,109	20.14%
-Turboprop	1,338	4.33%	1,199	3.95%
Air Taxi	663	2.14%	822	2.91%
General Aviation	2,617	8.47%	2,394	7.89%
Military	61	0.20%	60	0.20%
<b>Total</b>	<b>30,890</b>	<b>100.00%</b>	<b>30,331</b>	<b>100.00%</b>

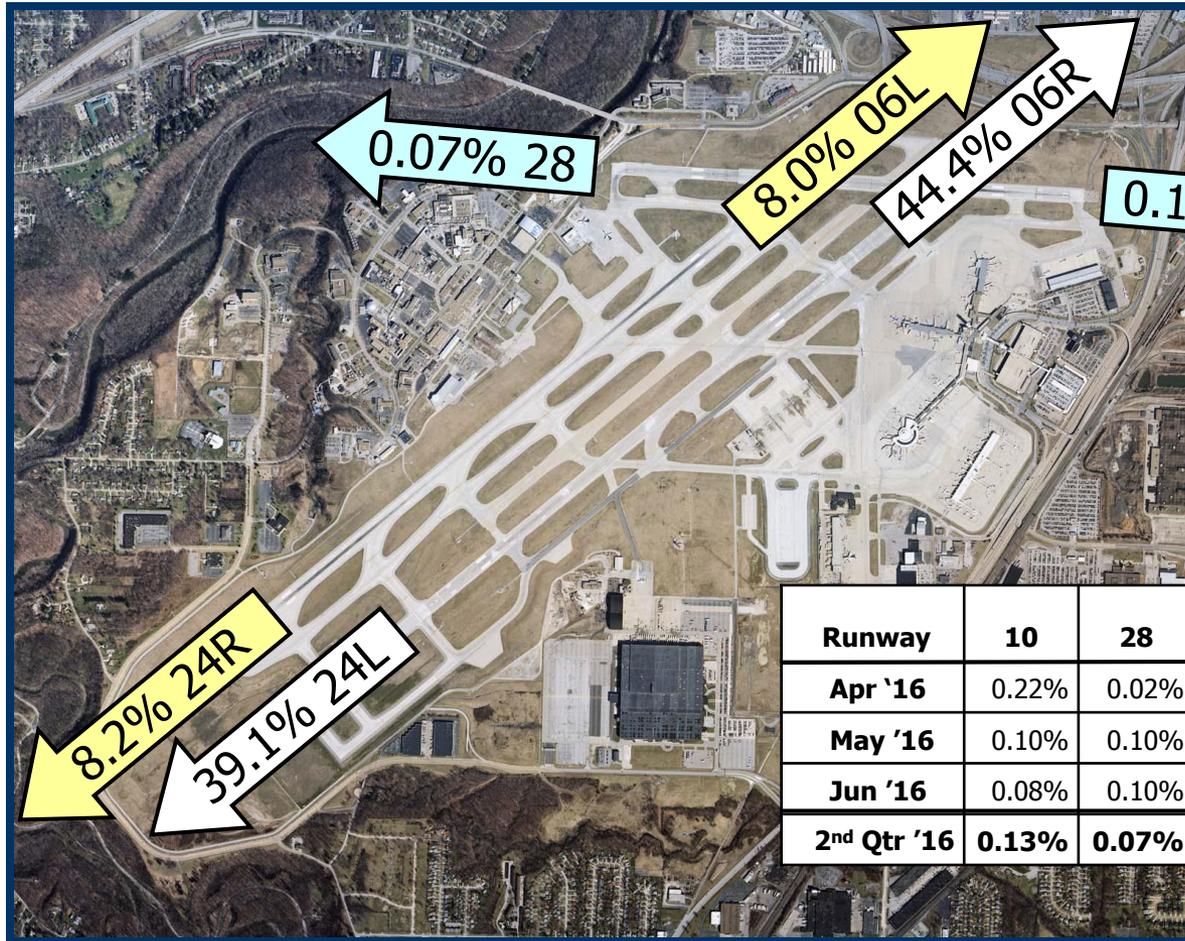
All aircraft above are Stage 3 certified with the exception of some Military aircraft. A hush kit reduces noise enough to meet Stage 3 levels, but well short of the noise level typical of aircraft originally manufactured as Stage 3.

# Runway Use: 2<sup>nd</sup> Qtr, 2016 Arrivals



Totals may be less than 100%, as helicopter operations do not use runways.

# Runway Use: 2<sup>nd</sup> Qtr, 2016 Departures



Runway	10	28	24L	24R	6L	6R
<b>Apr '16</b>	0.22%	0.02%	33.2%	5.2%	9.9%	51.5%
<b>May '16</b>	0.10%	0.10%	41.1%	8.9%	7.3%	42.6%
<b>Jun '16</b>	0.08%	0.10%	42.8%	10.5%	7.0%	39.6%
<b>2<sup>nd</sup> Qtr '16</b>	<b>0.13%</b>	<b>0.07%</b>	<b>39.1%</b>	<b>8.2%</b>	<b>8.0%</b>	<b>44.4%</b>

# Departure Headings, 2<sup>nd</sup> Qtr: Day-time

## Jet Departures, 6:00 a.m. to 11:00 p.m. 2<sup>nd</sup> Qtr., 2016

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.

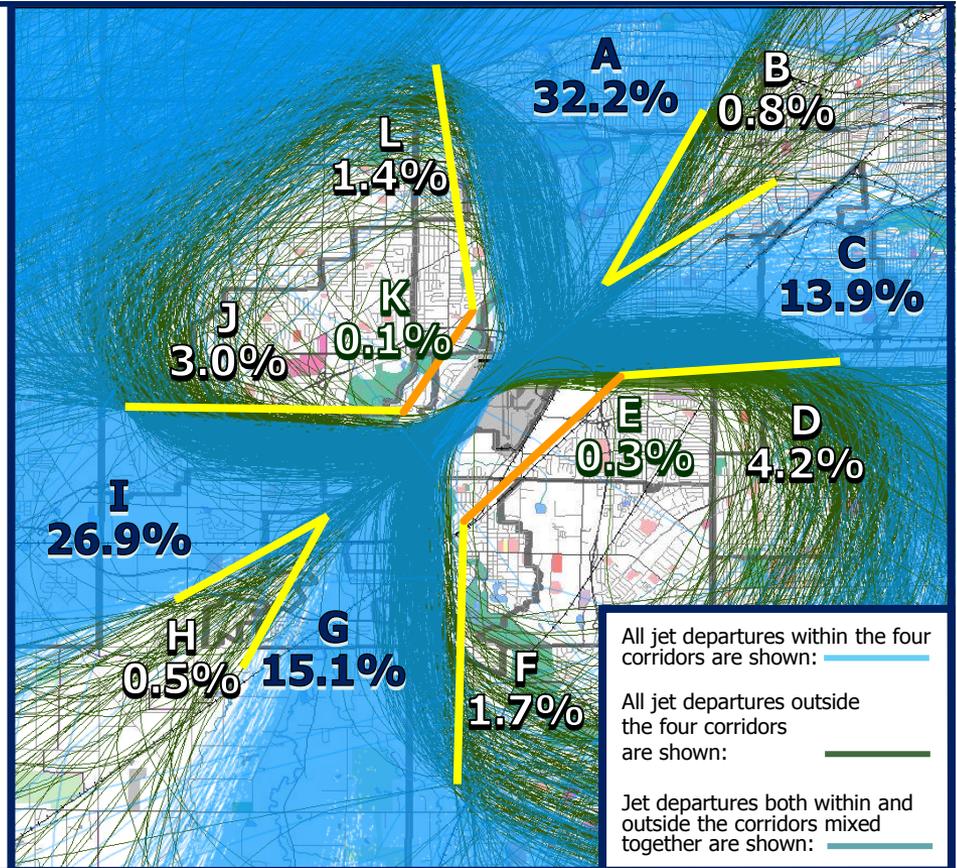
### **88.1% within corridors**

- A. 32.2%:** north corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- C. 13.9%:** east corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- G. 15.1%:** south corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- I. 26.9%:** west corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

### **11.9% outside corridors**

- B. 0.8%:** flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the north and east corridors
- D. 4.2%:** flights crossing the south boundary below 5,000 ft. MSL
- E. 0.3%:** flights turning south before entering the corridor
- F. 1.7%:** flights crossing the east boundary below 5,000 ft. MSL
- H. 0.5%:** flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the west and south corridors
- J. 3.0%:** flights crossing the north boundary below 5,000 ft. MSL
- K. 0.1%:** flights turning north before entering the corridor
- L. 1.4%:** flights crossing the west boundary below 5,000 ft. MSL

(Percentages do not include Rwy 10/28 departures)



# Departure Headings, 2<sup>nd</sup> Qtr : Night-time

## Jet Departures, 11:00 p.m. to 6:00 a.m. 2<sup>nd</sup> Qtr., 2016

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.

### 61.3% within corridors

**A. 32.7%:** 095 corridor, including flights crossing the 095 corridor boundaries above 5,000 ft. MSL

**F. 28.5%:** 200 corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

### 38.7% outside corridors

**B. 9.8%:** flights crossing the south boundary below 5,000 ft. MSL

**C. 0.3%:** flights turning south before entering the 095 corridor

**D. 1.3%:** flights departing south without entering the 200 corridor

**E. 12.4%:** flights crossing the east boundary below 5,000 ft. MSL

**G. 3.5%:** flights crossing the west boundary below 5,000 ft. MSL

**H. 1.3%:** flights departing southwest without entering the corridor

**I. 4.8%:** flights departing west without entering the corridor

**J. 4.4%:** flights departing north, not east with the 095 corridor

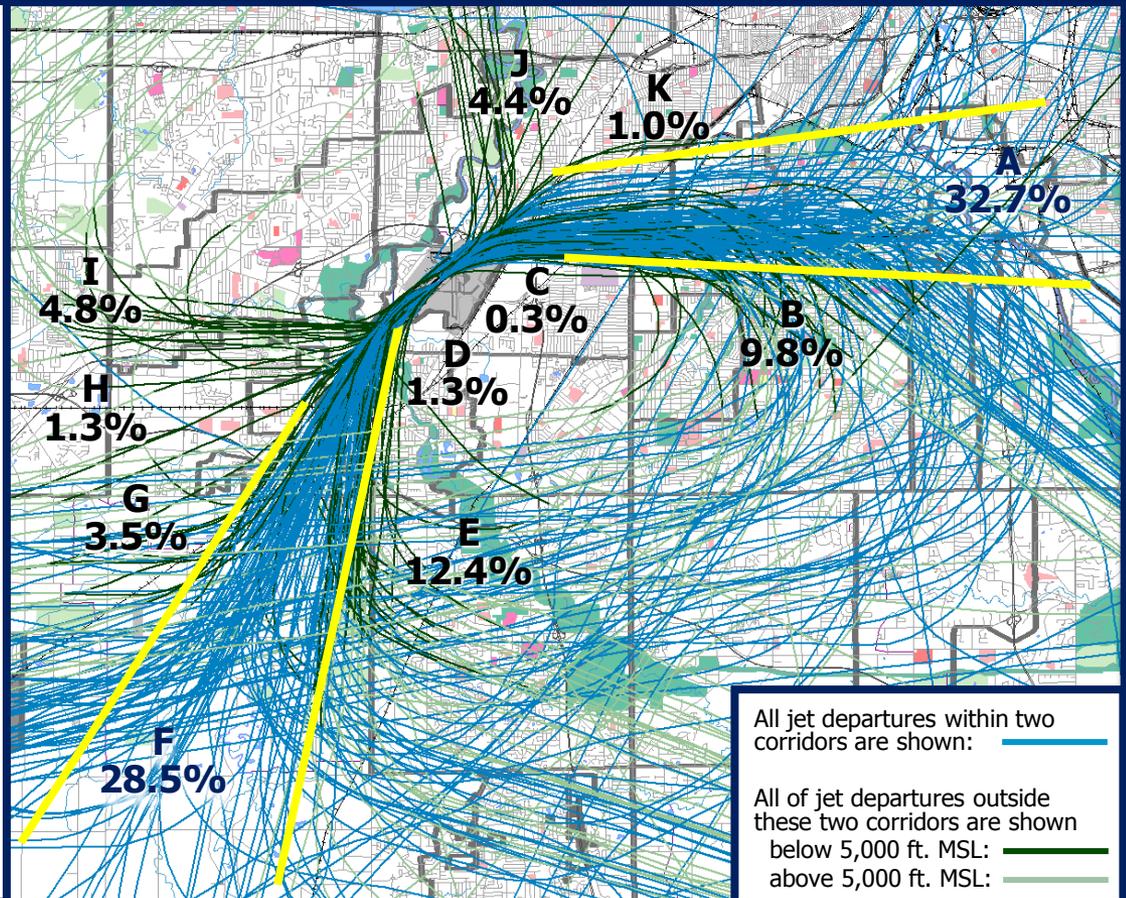
**K. 1.0%:** flights crossing the north boundary below 5,000 ft. MSL

(There was one Rwy 10 and no 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:	0.3%	0.0%	46.8%	4.7%	4.4%	43.7%
For all aircraft:	0.9%	0.0%	46.0%	5.1%	4.5%	43.5%

**90.8% of Jet Departures from Rwy 6L/6R were on the preferred Rwy, 6R.**



All jet departures within two corridors are shown: 

All of jet departures outside these two corridors are shown below 5,000 ft. MSL:  above 5,000 ft. MSL: 

# Arrival Headings, 2<sup>nd</sup> Qtr : Night-time

## Arrivals, 10:00 p.m. to 6:59 a.m. 2<sup>nd</sup> Qtr., 2016

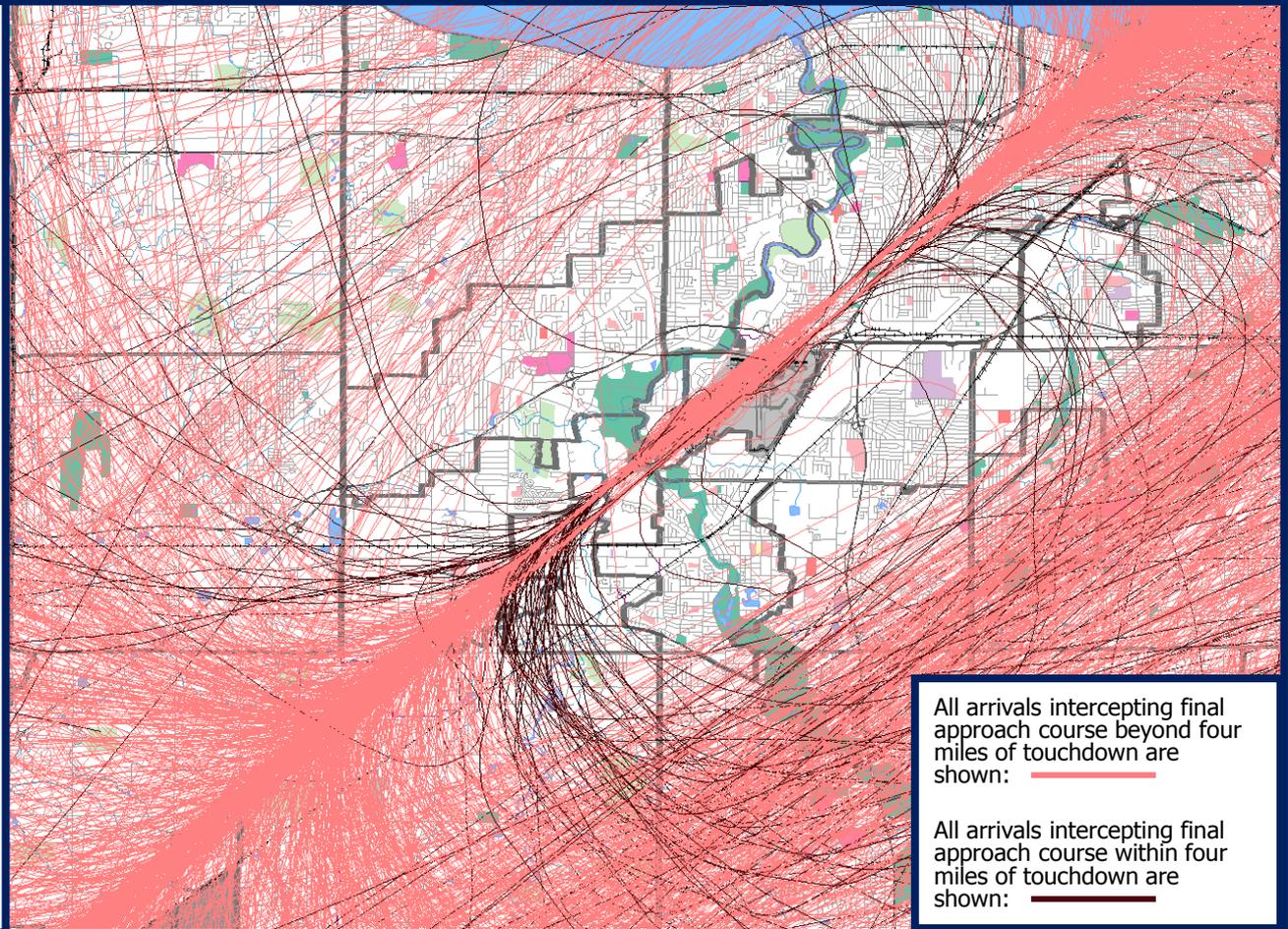
A voluntary measure of the Noise Compatibility Program calls for all aircraft arriving between 10:00 p.m. and 6:59 a.m., wind and weather permitting, to intercept final approach course no closer than four miles before touchdown.

### 95.5% beyond four miles and 4.5% 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:

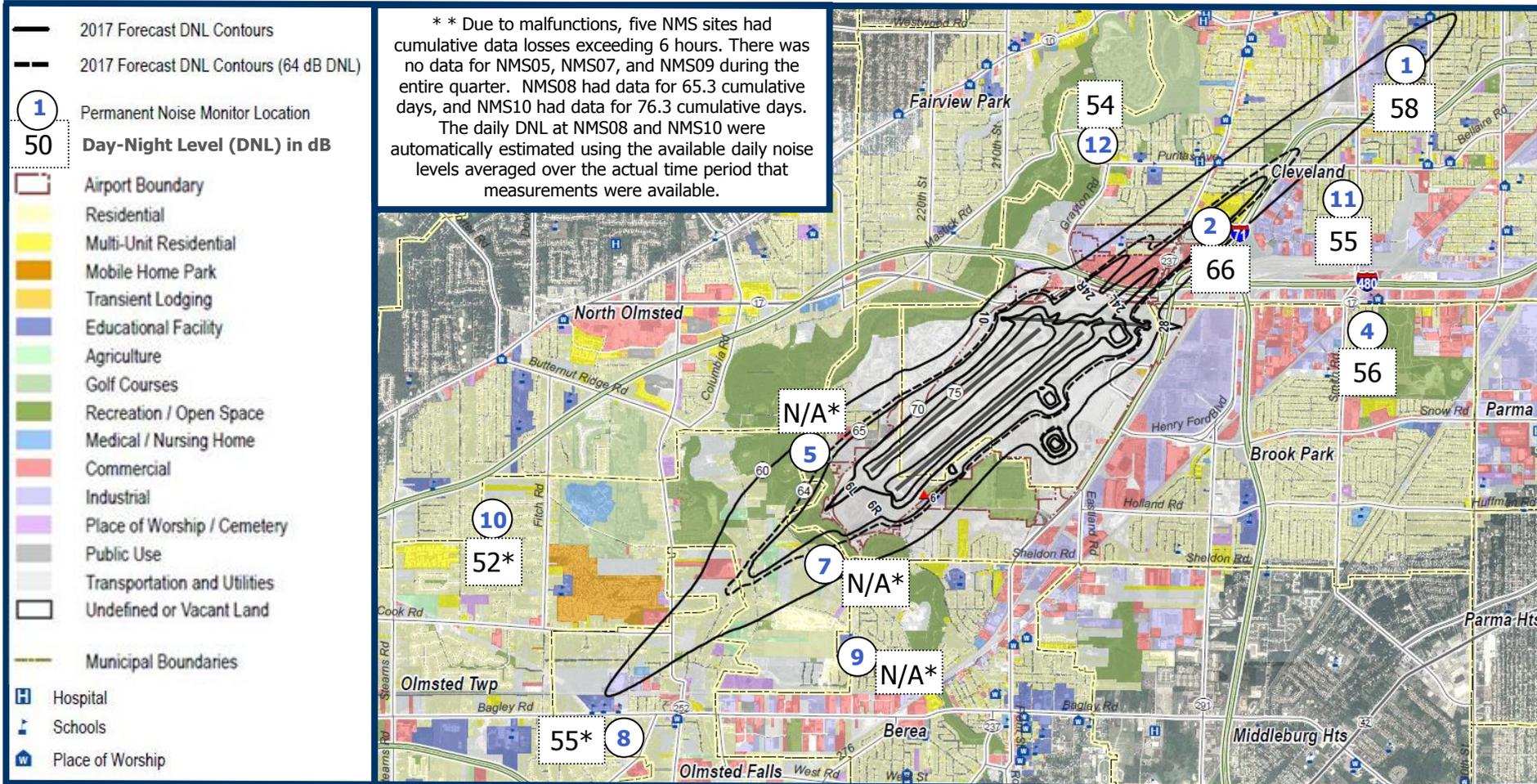
Rwy	Percentage of Arrivals	
	Jets	All Aircraft
10	0.0%	<0.1%
28	0.0%	0.0%
24L	7.8%	8.0%
24R	35.1%	34.8%
6L	50.6%	50.6%
6R	6.5%	6.6%



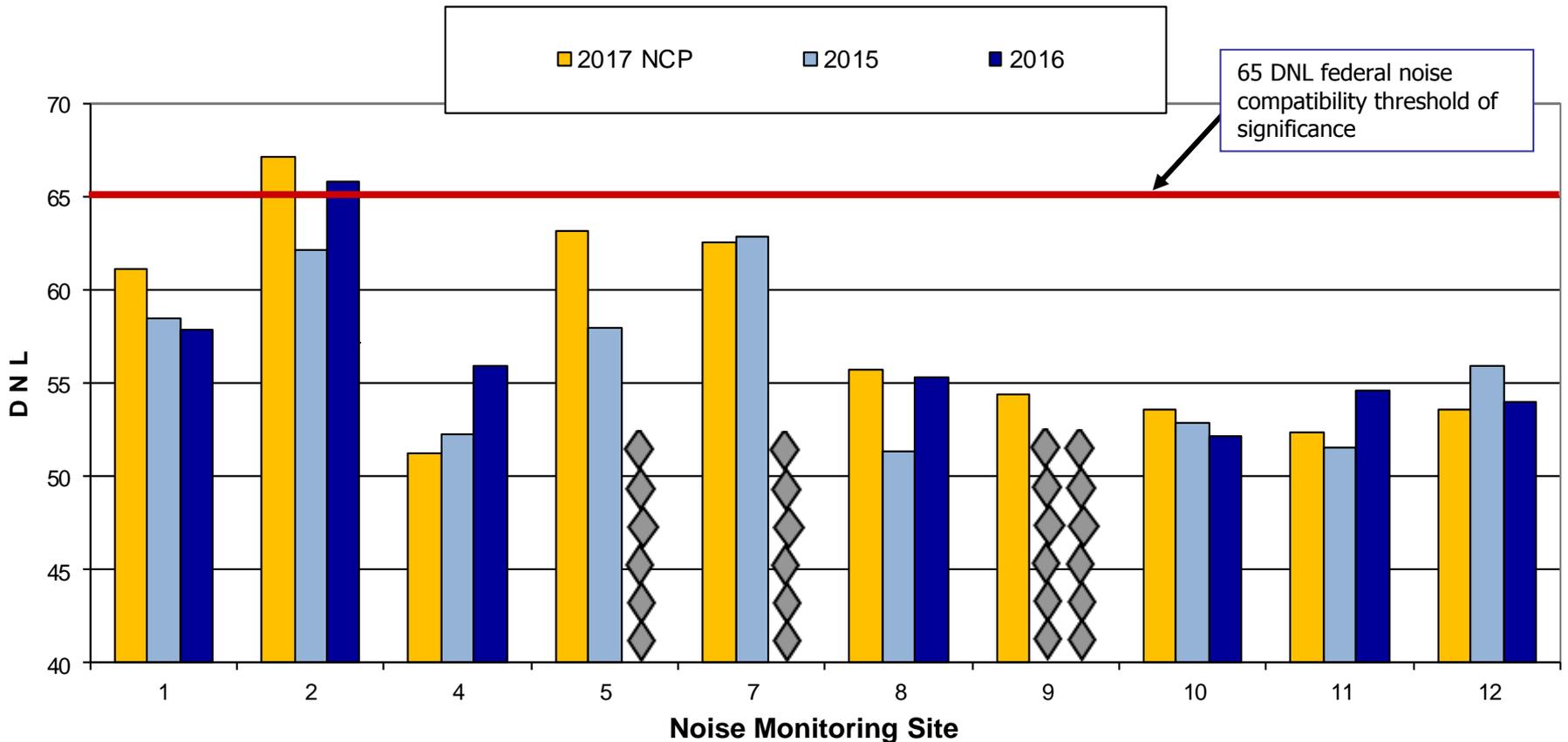
All arrivals intercepting final approach course beyond four miles of touchdown are shown: —————

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

# Aircraft Noise: DNL by Noise Monitoring Site



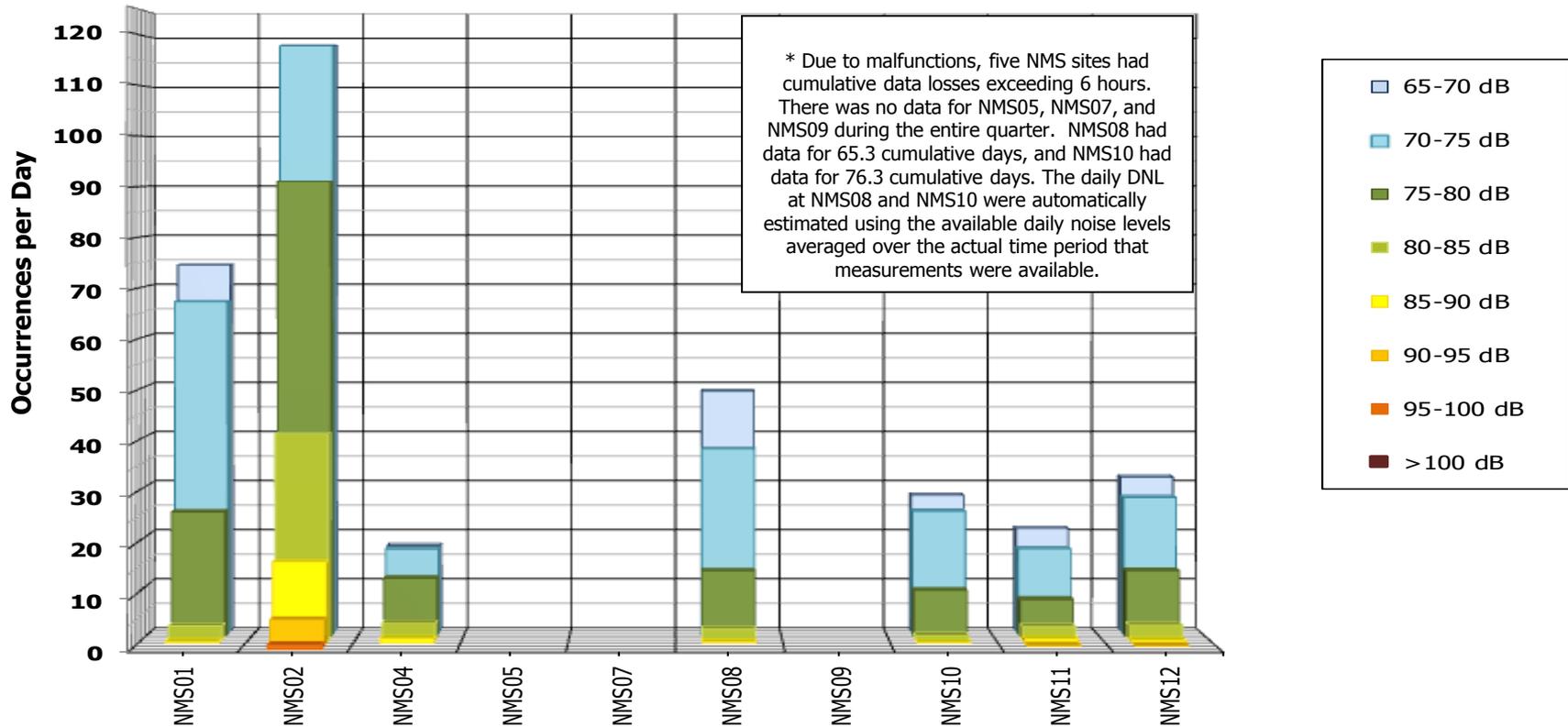
# DNL: 2<sup>nd</sup> Qtr, 2016 vs. 2<sup>nd</sup> Qtr, 2015



\* Due to malfunctions, five NMS sites had cumulative data losses exceeding 6 hours. There was no data for NMS05, NMS07, and NMS09 during the entire quarter. NMS08 had data for 65.3 cumulative days, and NMS10 had data for 76.3 cumulative days. The daily DNL at NMS08 and NMS10 were automatically estimated using the available daily noise levels averaged over the actual time period that measurements were available.

# Average Daily Number of Aircraft Noise Occurrences Above Each 5 dB Increment

## 2<sup>nd</sup> Qtr. Noise Event Lmax Distribution



# Top Three Lmaxs at Each NMS

**Three highest aircraft decibel levels at each Noise Monitoring Site during the 2<sup>nd</sup> Qtr., 2016, p. 1**

<b>NMS</b>	<b>Lmax (dB)</b>	<b>Aircraft</b>	<b>Operation</b>	<b>Time and date</b>	<b>Sound Exposure Level (dB)<sup>1</sup></b>	<b>Duration (sec)</b>
NMS01	89.4	MD-88	Arrival on Rwy 24L	5/13/16 11:54 AM	92.5	23.5
NMS01	89.0	MD-82	Arrival on Rwy 24R	6/3/16 5:58 PM	92.3	20.0
NMS01	87.8	MD-88	Arrival on Rwy 24R	4/26/16 10:03 AM	92.6	23.0
NMS02	99.9	MD-83	Departure off Rwy 6R	5/31/16 7:59 AM	105.6	25.0
NMS02	99.7	MD-83	Departure off Rwy 6R	5/9/16 12:03 PM	105.5	30.5
NMS02	99.0	MD-83	Departure off Rwy 6R	6/12/16 3:39 PM	105.1	26.0
NMS04	92.6	MD-88	Departure off Rwy 6R	5/3/16 7:53 AM	99.7	39.5
NMS04	90.9	MD-88	Departure off Rwy 6R	5/22/16 10:47 AM	97.3	26.0
NMS04 <sup>2</sup>	90.9	MD-88	Departure off Rwy 6R	4/30/16 6:25 AM	99.1	38.0

<sup>1</sup> Sound Exposure Level is a measure that takes into account all noise over the entire duration of an event.

<sup>2</sup> Due to equipment malfunctions, no data is available for NMS05 or NMS07 within the 2<sup>nd</sup> Quarter of 2016.

## Top Three Lmaxs at Each NMS

<b>Three highest aircraft decibel levels at each Noise Monitoring Site during the 2<sup>nd</sup> Qtr., 2016, p. 2</b>						
<b>NMS</b>	<b>Lmax (dB)</b>	<b>Aircraft</b>	<b>Operation</b>	<b>Time and date</b>	<b>Sound Exposure Level (dB)<sup>1</sup></b>	<b>Duration (sec)</b>
NMS08 <sup>2</sup>	89.8	MD-88	Go Around from Rwy 24R	6/7/16 10:33 AM	98.1	51.0
NMS08 <sup>2</sup>	89.4	MD-82	Departure off Rwy 24L	6/9/16 7:29 PM	96.6	30.0
NMS08 <sup>2,3</sup>	89.2	MD-82	Departure off Rwy 24L	6/6/16 8:01 AM	95.4	33.5
NMS10 <sup>4</sup>	88.3	MD-88	Departure off Rwy 24L	6/22/16 7:16 PM	94.8	27.0
NMS10 <sup>4</sup>	87.8	MD-82	Departure off Rwy 24L	6/10/16 11:49 AM	94.1	26.5
NMS10 <sup>4</sup>	85.9	MD-88	Departure off Rwy 24L	6/19/16 8:28 PM	92.4	25.5
NMS11	92.5	MD-88	Departure off Rwy 6R	5/18/16 7:53 AM	98.1	33.5
NMS11	91.7	MD-88	Departure off Rwy 6R	6/18/16 6:07 AM	98.3	32.5
NMS11	91.5	MD-88	Departure off Rwy 6R	5/19/16 6:42 AM	99.1	45.5
NMS12	92.8	MD-82	Departure off Rwy 6L	4/19/16 11:23 AM	98.1	28.5
NMS12	92.6	MD-82	Departure off Rwy 6R	4/26/16 7:00 PM	98.7	31.5
NMS12	91.8	MD-83	Departure off Rwy 6L	4/12/16 3:38 PM	98.0	35.0

<sup>1</sup> Sound Exposure Level is a measure that takes into account all noise over the entire duration of an event.

<sup>2</sup> Due to equipment malfunctions, no data for April 2 to 23 and May 3, 2016 is available for NMS08.

<sup>3</sup> Due to equipment malfunctions, no data is available for NMS09 within the 2<sup>nd</sup> Quarter of 2016.

<sup>4</sup> Due to equipment malfunctions, no data for April 2 to 23 and May 3, 2016 is available for NMS10.

# Noise Complaints

City	Apr	May	Jun	2 <sup>nd</sup> Q '16 Calls	%	2 <sup>nd</sup> Q '15 Calls	%	2 <sup>nd</sup> Q '16 Callers	%	2 <sup>nd</sup> Q '15 Callers	%
Berea	1	0	0	1	3.3%	0	0.0%	1	9.1%	0	0.0%
Cleveland	1	7	8	16	53.3%	5	29.4%	4	36.4%	4	28.6%
Columbia Station	1	0	1	2	6.7%	1	5.9%	1	9.1%	1	7.1%
Fairview Park	0	1	0	1	3.3%	3	17.6%	1	9.1%	3	21.4%
North Olmsted	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Olmsted Falls	0	1	0	1	3.3%	1	5.9%	1	9.1%	1	7.1%
Olmsted Twp.	0	0	7	7	23.3%	2	11.8%	1	9.1%	2	14.3%
Parma	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Parma Heights	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Rocky River	1	0	1	2	6.7%	5	29.4%	2	18.2%	3	21.4%
Westlake	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
<b>Totals</b>	<b>4</b>	<b>9</b>	<b>17</b>	<b>30</b>	<b>100.0%</b>	<b>17</b>	<b>100.0%</b>	<b>11</b>	<b>100.0%</b>	<b>14</b>	<b>100.0%</b>

Percentages shown may not add to 100.0% due to rounding.

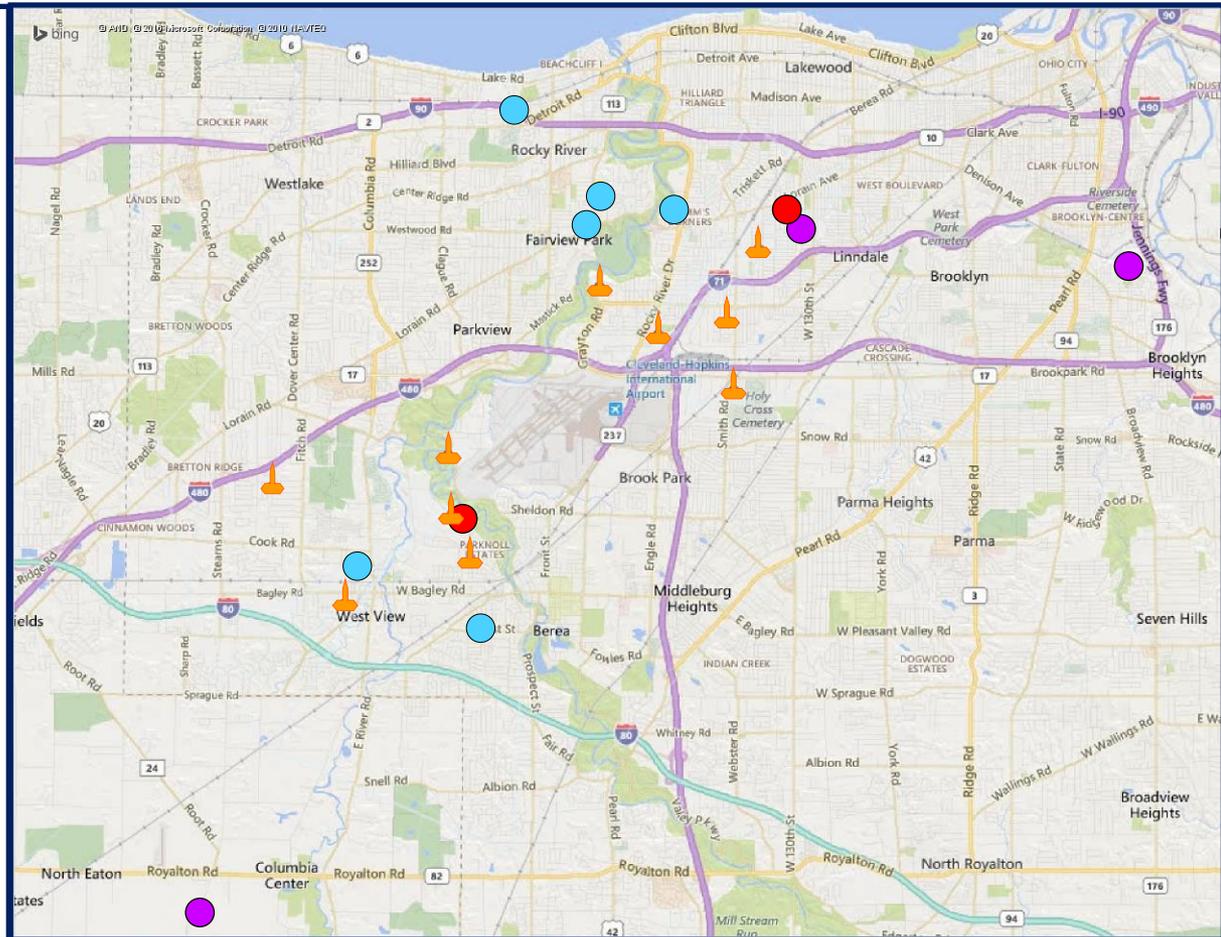
Noise Hotline – (216) 898-5220

# 2<sup>nd</sup> Quarter Complaint Map

## LEGEND

Complaints per household

-  1 complaint
-  2 to 5 complaints
-  6 or more complaints
-  Noise Monitoring Station



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