



# ***Noise Compatibility Report***

**2015 1<sup>st</sup> Quarter**

June 10, 2015

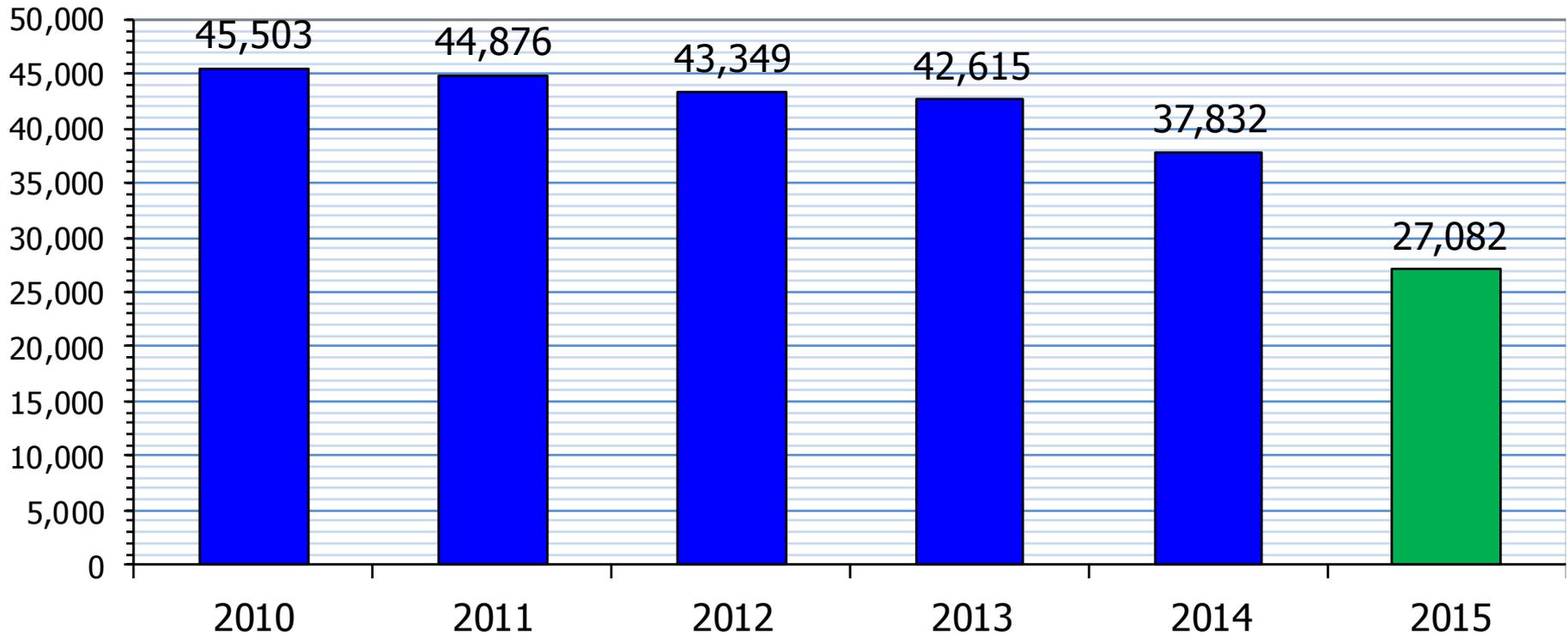
## *Disclaimer*



- 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 1<sup>st</sup> Qtr. Operations 2010 - 2015



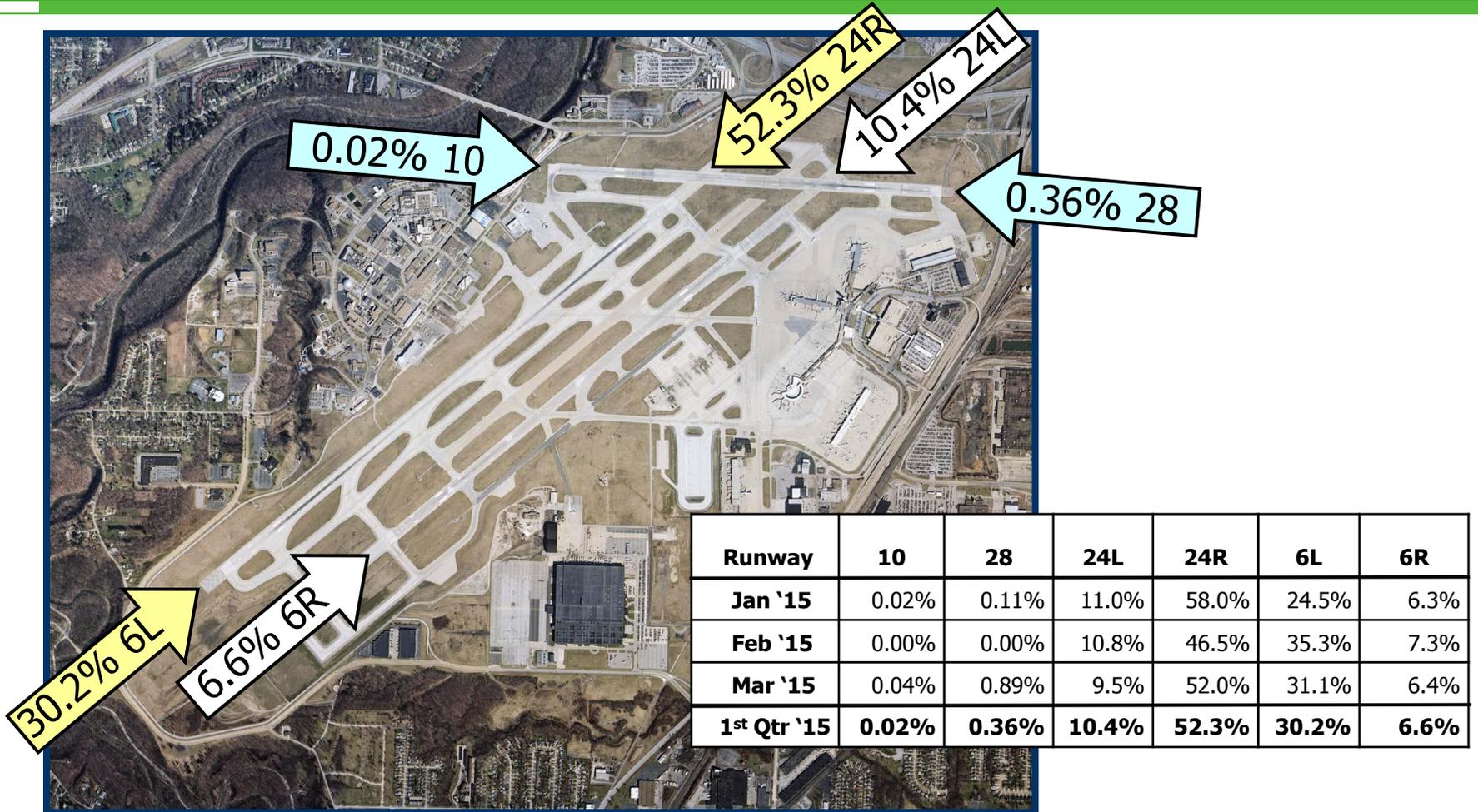
There were 27,082 landings and takeoffs in the 1<sup>st</sup> Qtr. 2015; this is 28.4% below the 1<sup>st</sup> Qtr. 2014.

## Landings & Takeoffs

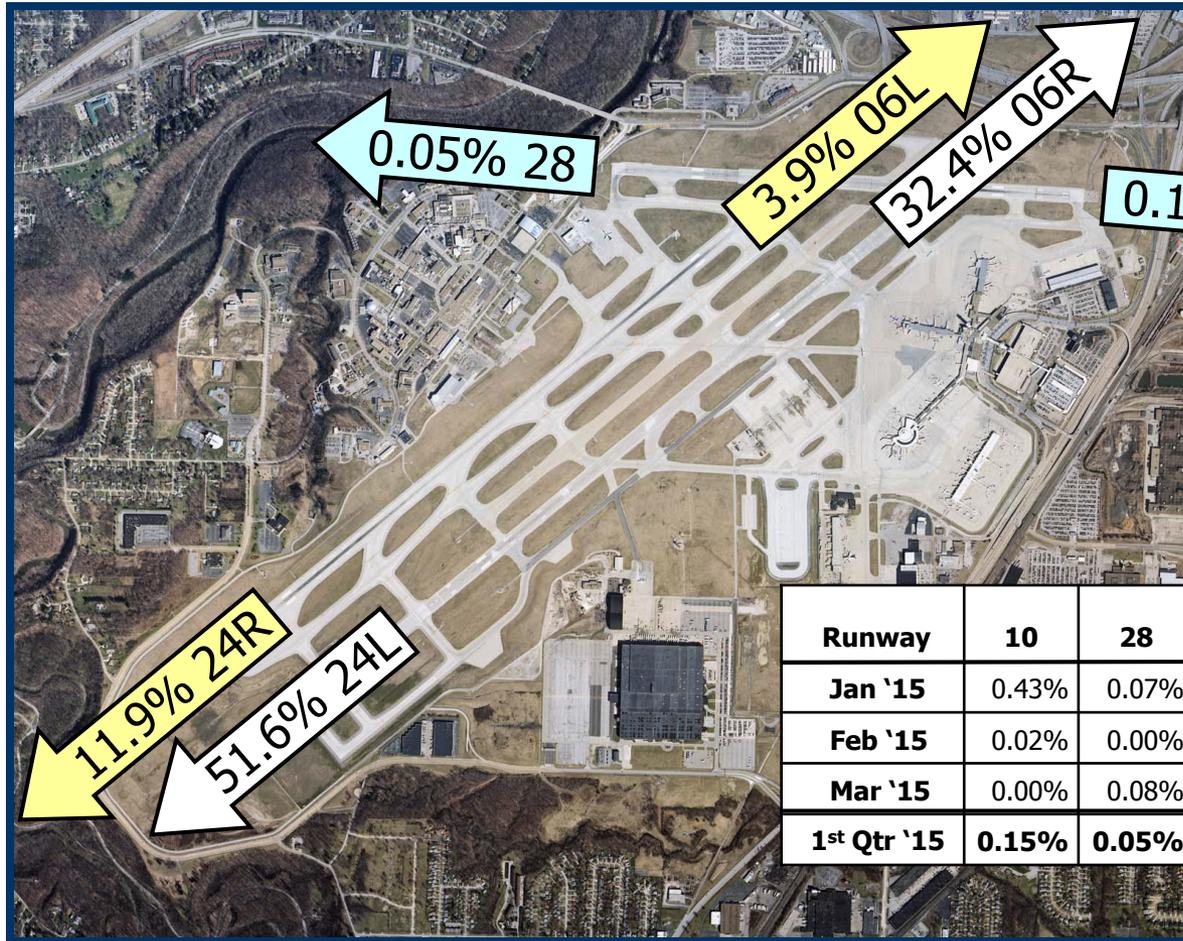
|                          | 1 <sup>st</sup> Qtr, 2015 |                | 1 <sup>st</sup> Qtr, 2014 |                |
|--------------------------|---------------------------|----------------|---------------------------|----------------|
| Commercial               |                           |                |                           |                |
| -Stage 2 with hush kit   | 8                         | 0.03%          | 44                        | 0.12%          |
| -Heavy (incl. all B757s) | 520                       | 1.92%          | 569                       | 1.50%          |
| -MD80 series             | 1,080                     | 3.99%          | 48                        | 0.13%          |
| -Other Stage 3           | 14,421                    | 53.25%         | 12,608                    | 33.33%         |
| -Regional Jet            | 6,904                     | 25.49%         | 15,807                    | 41.78%         |
| -Turboprop               | 1,307                     | 4.82%          | 6,096                     | 16.11%         |
| Air Taxi                 | 722                       | 2.67%          | 640                       | 1.69%          |
| General Aviation         | 2,085                     | 7.70%          | 1,990                     | 5.26%          |
| Military                 | 35                        | 0.13%          | 30                        | 0.08%          |
| <b>Total</b>             | <b>27,082</b>             | <b>100.00%</b> | <b>37,832</b>             | <b>100.00%</b> |

All aircraft above are Stage 3 certified with the exception of some Military and 1.4% of General Aviation (GA) aircraft. Stage 2 GA accordingly is 0.07% of the overall fleet. 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: 1<sup>st</sup> Qtr, 2015 Arrivals



# Runway Use: 1<sup>st</sup> Qtr, 2015 Departures



| Runway                        | 10           | 28           | 24L          | 24R          | 6L          | 6R           |
|-------------------------------|--------------|--------------|--------------|--------------|-------------|--------------|
| Jan '15                       | 0.43%        | 0.07%        | 54.1%        | 13.7%        | 3.7%        | 28.0%        |
| Feb '15                       | 0.02%        | 0.00%        | 48.9%        | 10.7%        | 5.2%        | 35.2%        |
| Mar '15                       | 0.00%        | 0.08%        | 51.5%        | 11.3%        | 3.1%        | 34.0%        |
| <b>1<sup>st</sup> Qtr '15</b> | <b>0.15%</b> | <b>0.05%</b> | <b>51.6%</b> | <b>11.9%</b> | <b>3.9%</b> | <b>32.4%</b> |

# Departure Headings, 1<sup>st</sup> Qtr: Day-time

## Jet Departures, 6:00 a.m. to 11:00 p.m. 1<sup>st</sup> Qtr., 2015

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.

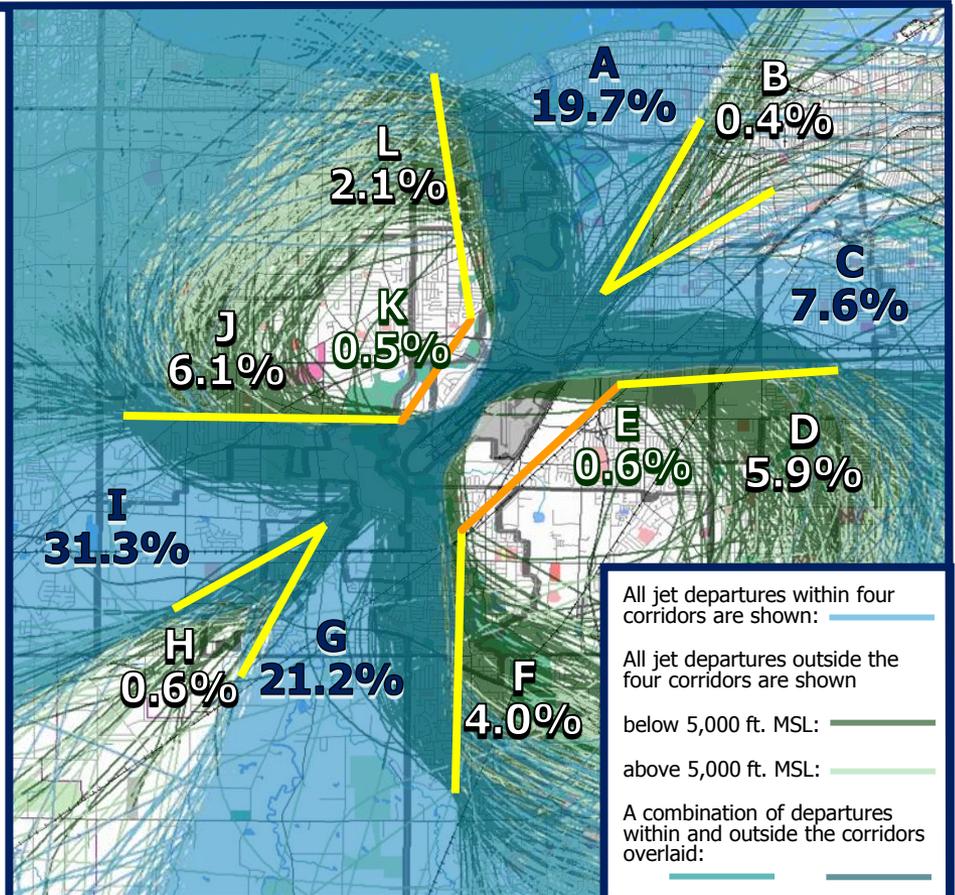
### 82.2% within corridors

- A. 19.7%:** north corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- C. 7.6%:** east corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- G. 21.2%:** south corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- I. 31.3%:** west corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

### 17.8% outside corridors

- B. 0.4%:** flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the north and east corridors
- D. 5.9%:** flights crossing the south boundary below 5,000 ft. MSL
- E. 0.6%:** flights turning south before entering the corridor
- F. 4.0%:** flights crossing the east boundary below 5,000 ft. MSL
- H. 0.6%:** flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the west and south corridors
- J. 6.1%:** flights crossing the north boundary below 5,000 ft. MSL
- K. 0.5%:** flights turning north before entering the corridor
- L. 2.1%:** flights crossing the west boundary below 5,000 ft. MSL

(Percentages do not include Rwy 10/28 departures)



# Departure Headings, 1<sup>st</sup> Qtr : Night-time

## Jet Departures, 11:00 p.m. to 6:00 a.m. 1<sup>st</sup> Qtr., 2015

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.

### 50.2% within corridors

- A. 18.5%:** 095 corridor, including flights crossing the 095 corridor boundaries above 5,000 ft. MSL
- F. 31.7%:** 200 corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

### 49.8% outside corridors

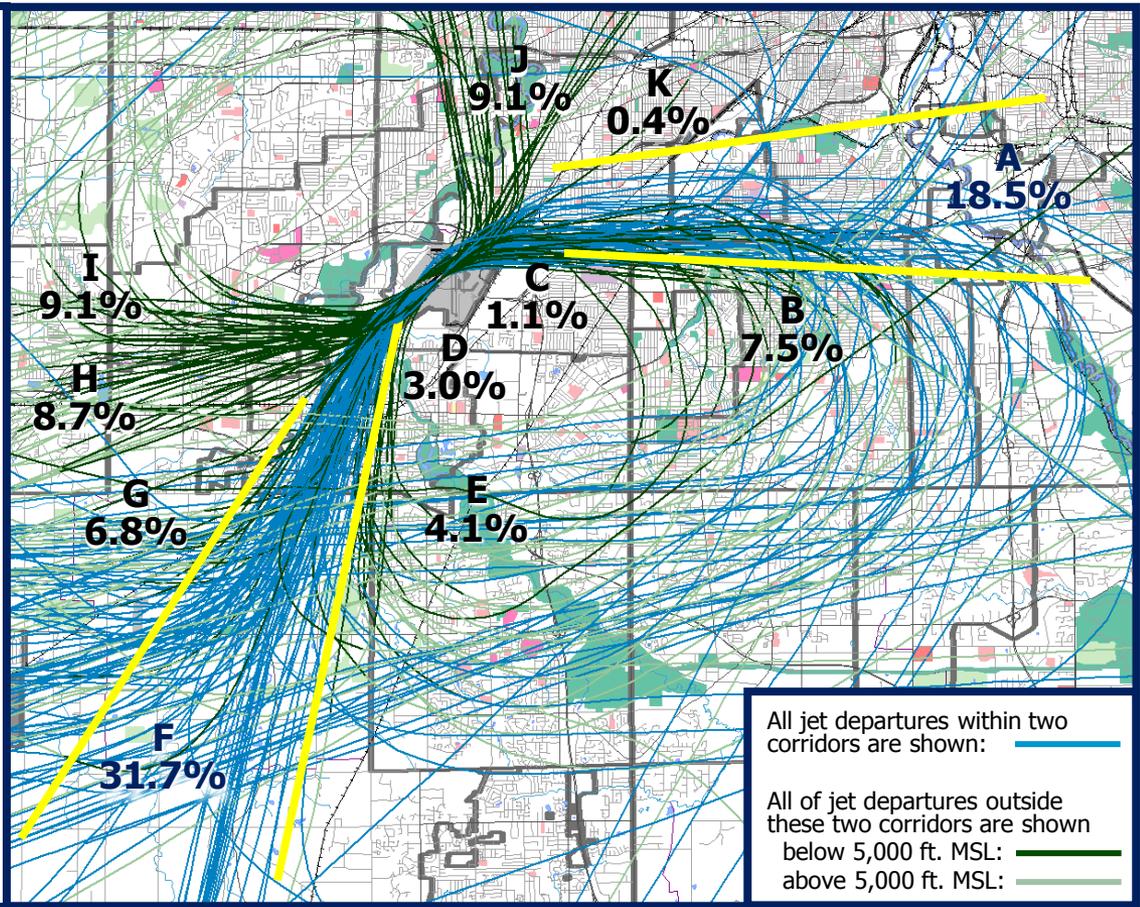
- B. 7.5%:** flights crossing the south boundary below 5,000 ft. MSL
- C. 1.1%:** flights turning south before entering the 095 corridor
- D. 3.0%:** flights departing south without entering the 200 corridor
- E. 4.1%:** flights crossing the east boundary below 5,000 ft. MSL
- G. 6.8%:** flights crossing the west boundary below 5,000 ft. MSL
- H. 8.7%:** flights departing southwest without entering the corridor
- I. 9.1%:** flights departing west without entering the corridor
- J. 9.1%:** flights departing north, not east with the 095 corridor
- K. 0.4%:** flights crossing the north boundary below 5,000 ft. MSL

(There were three 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:

| Runway            | 10   | 28   | 24L   | 24R   | 6L   | 6R    |
|-------------------|------|------|-------|-------|------|-------|
| For jets:         | 0.2% | 0.0% | 52.2% | 11.0% | 3.1% | 33.6% |
| For all aircraft: | 0.2% | 0.1% | 52.0% | 11.6% | 3.4% | 32.8% |

**91.6% 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, 1<sup>st</sup> Qtr : Night-time

## Arrivals, 10:00 p.m. to 6:59 a.m. 1<sup>st</sup> Qtr., 2015

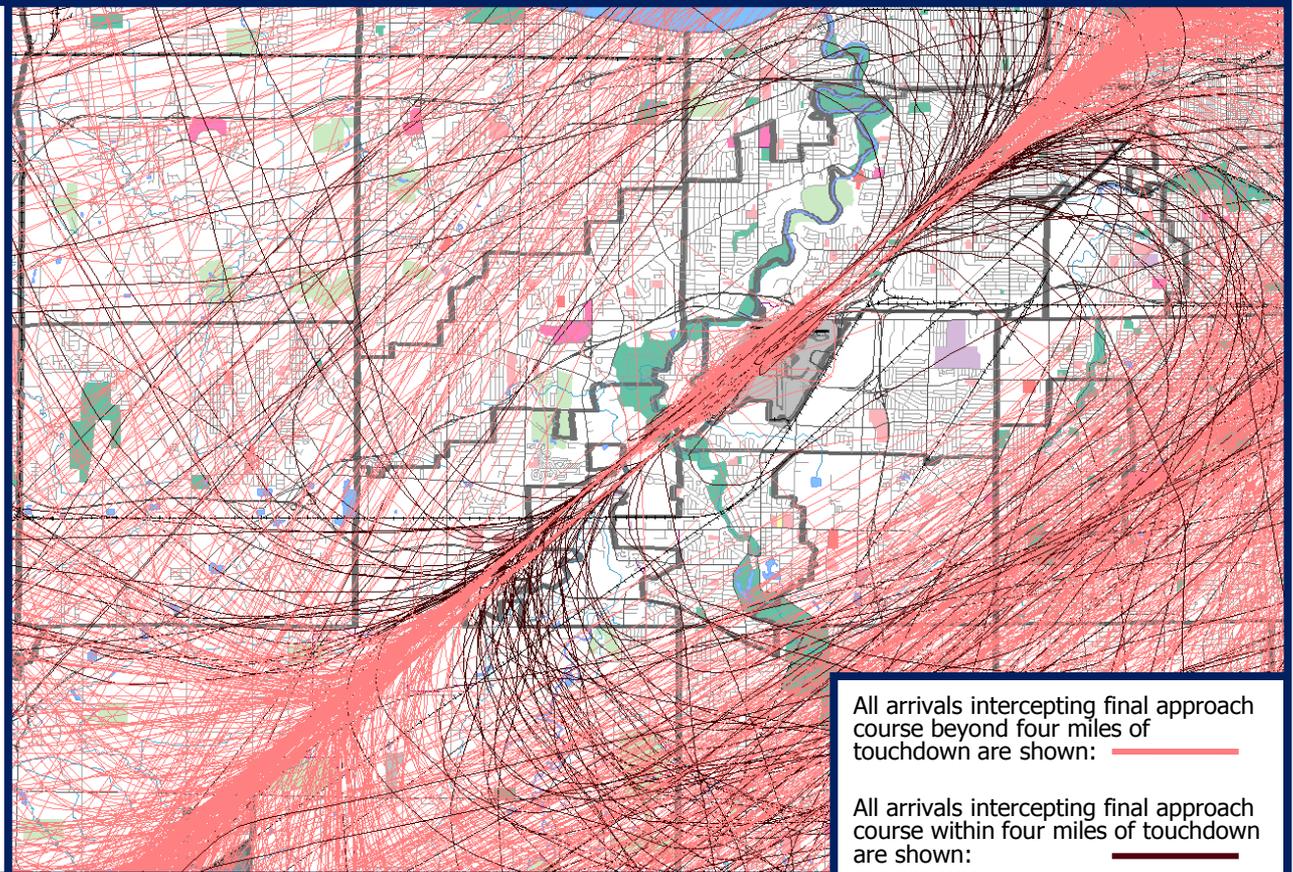
A voluntary measure of the Noise Compatibility Program calls for all aircraft arriving between 10:00 p.m. and 6:59 a.m., wind and weather permitting, to intercept final approach course no closer than four miles before touchdown.

**93.3% beyond four miles and  
6.6% 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:

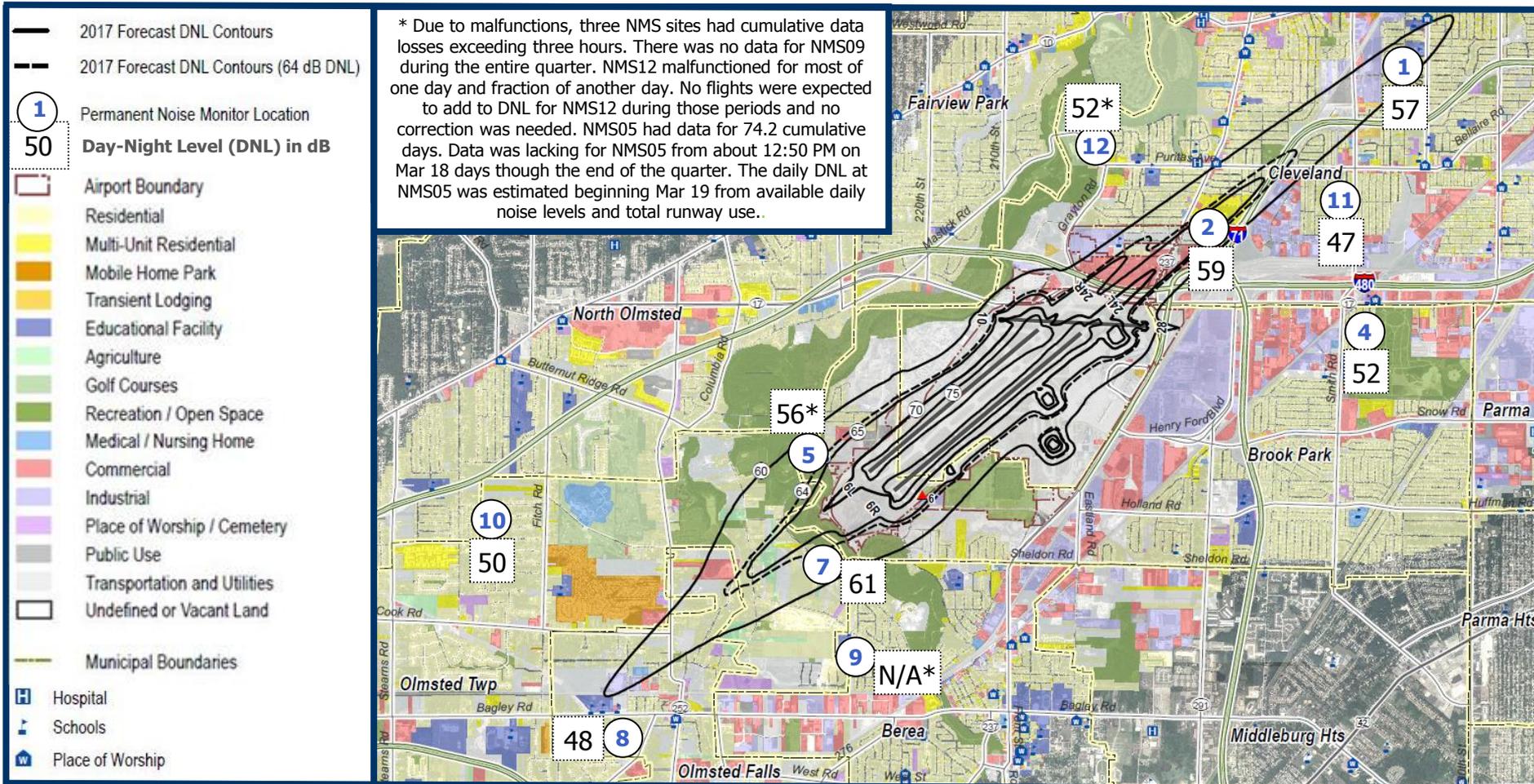
| Rwy | Percentage of Arrivals |              |
|-----|------------------------|--------------|
|     | Jets                   | All Aircraft |
| 10  | 0.1%                   | <0.1%        |
| 28  | 0.0%                   | <0.1%        |
| 24L | 12.0%                  | 12.0%        |
| 24R | 49.0%                  | 48.9%        |
| 6L  | 33.1%                  | 33.1%        |
| 6R  | 5.8%                   | 5.9%         |



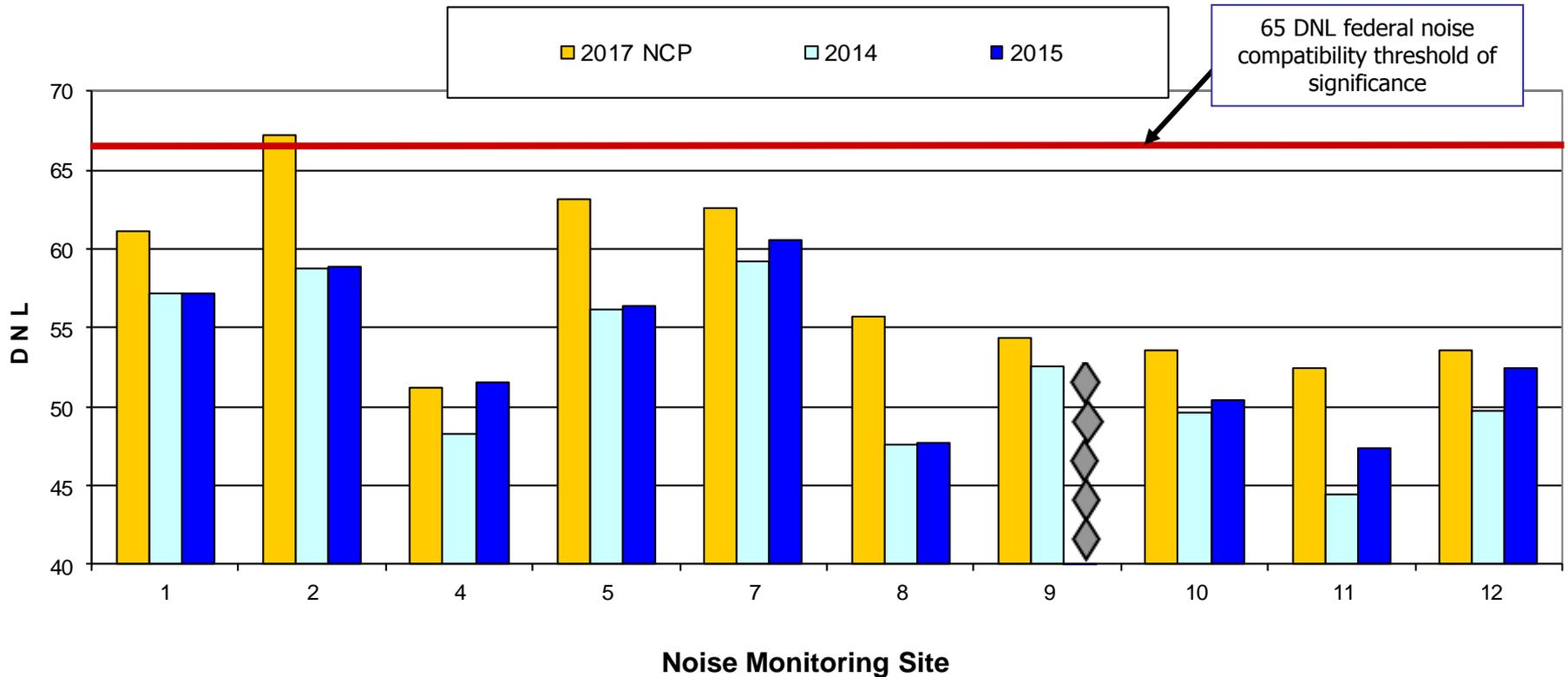
All arrivals intercepting final approach course beyond four miles of touchdown are shown: 

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

# Aircraft Noise: DNL by Noise Monitoring Site



# DNL: 1<sup>st</sup> Qtr, 2015 vs. 1<sup>st</sup> Qtr, 2014

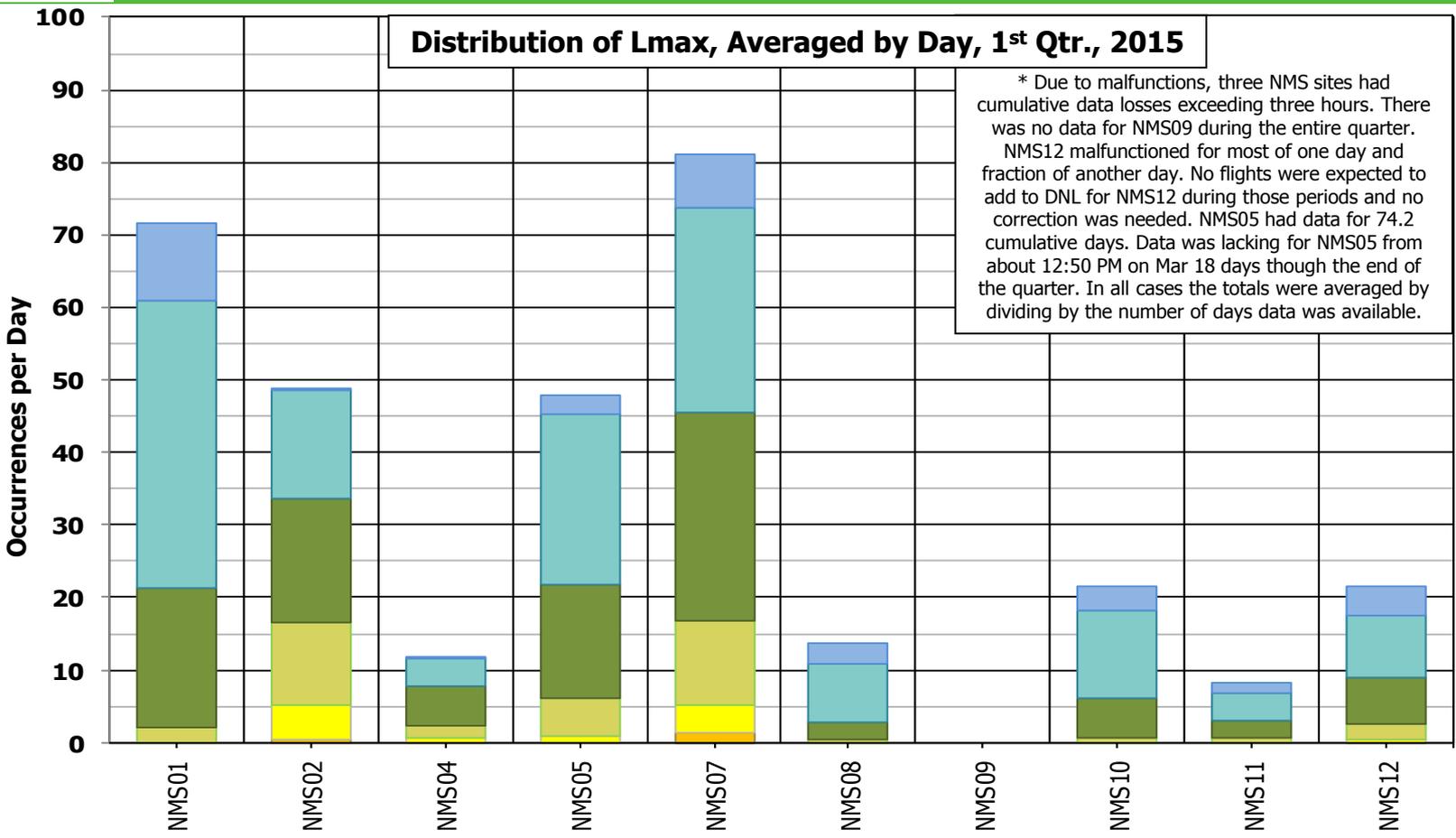
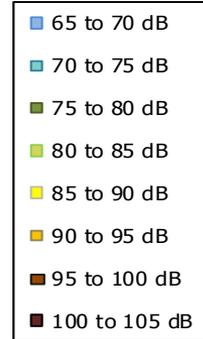


\* Due to malfunctions, three NMS sites had cumulative data losses exceeding three hours. There was no data for NMS09 during the entire quarter. NMS12 malfunctioned for most of one day and fraction of another day. No flights were expected to add to DNL for NMS12 during those periods and no correction was needed. NMS05 had data for 74.2 cumulative days. Data was lacking for NMS05 from about 12:50 PM on Mar 18 days though the end of the quarter. The daily DNL at NMS05 was estimated beginning Mar 19 from available daily noise levels and total runway use.

# Average Daily Occurrences of Aircraft Noise, Grouped by Maximum Decibel Level

**Distribution of Lmax, Averaged by Day, 1<sup>st</sup> Qtr., 2015**

\* Due to malfunctions, three NMS sites had cumulative data losses exceeding three hours. There was no data for NMS09 during the entire quarter. NMS12 malfunctioned for most of one day and fraction of another day. No flights were expected to add to DNL for NMS12 during those periods and no correction was needed. NMS05 had data for 74.2 cumulative days. Data was lacking for NMS05 from about 12:50 PM on Mar 18 days though the end of the quarter. In all cases the totals were averaged by dividing by the number of days data was available.



# Top 3 Lmaxs at each NMS

**Three highest aircraft decibel levels at each Noise Monitoring Site during the 1<sup>st</sup> Qtr., 2015, 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              | 89.2             | MD-83           | Arrival on Rwy 24R              | 1/3/15 4:10 PM       | 95.7   | 33.0                  |
| NMS01              | 88.0             | MD-88           | Arrival on Rwy 24R              | 1/5/15 12:20 AM      | 94.2   | 29.0                  |
| NMS01              | 87.8             | MD-88           | Arrival on Rwy 24L              | 3/17/15 12:39 AM     | 93.4   | 26.5                  |
| NMS02              | 94.2             | Embraer ERJ-170 | Go-Around Rwy 24L (Arrives 24R) | 3/1/15 12:01 PM      | 97.9   | 14.5                  |
| NMS02              | 92.7             | MD-83           | Departure off Rwy 6R            | 3/20/15 6:55 PM      | 100.1  | 28.0                  |
| NMS02              | 92.3             | MD-82           | Departure off Rwy 6R            | 1/21/15 1:37 PM      | 99.1   | 25.5                  |
| NMS04              | 91.1             | MD-88           | Departure off Rwy 6R            | 3/31/15 1:08 PM      | 97.6   | 29.0                  |
| NMS04              | 90.5             | MD-88           | Departure off Rwy 6R            | 3/27/15 7:26 AM      | 97.6   | 74.0                  |
| NMS04              | 90.5             | MD-82           | Departure off Rwy 6R            | 1/28/15 1:12 PM      | 96.6   | 32.0                  |
| NMS05 <sup>2</sup> | 93.5             | Lear Jet 25     | Departure off Rwy 24R           | 3/16/15 2:19 PM      | 98.8   | 30.0                  |
| NMS05 <sup>2</sup> | 90.2             | MD-82           | Departure off Rwy 6L            | 1/25/15 9:45 PM      | 97.8   | 63.0                  |
| NMS05 <sup>2</sup> | 89.4             | MD-11           | Departure off Rwy 24R           | 3/3/15 10:37 PM      | 95.4   | 30.5                  |
| NMS07              | 96.4             | MD-88           | Departure off Rwy 24L           | 2/1/15 7:28 AM       | 101.8  | 30.5                  |
| NMS07              | 95.6             | MD-88           | Departure off Rwy 24L           | 3/20/15 1:36 PM      | 101.4  | 28.5                  |
| NMS07              | 95.4             | MD-82           | Departure off Rwy 24L           | 3/1/15 1:36 PM       | 101.2  | 29.5                  |

<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, data for NMS05 is unavailable between 12:50 PM, March 18<sup>th</sup> and the end of the quarter.

## Top 3 Lmaxs at each NMS

| <b>Three highest aircraft decibel levels at each Noise Monitoring Site during the 1<sup>st</sup> Qtr., 2015, 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   | 88.1             | MD-83           | Departure off Rwy 24L | 3/26/15 6:41 PM      | 95.4   | 35.0                  |
| NMS08   | 85.3             | MD-82           | Departure off Rwy 24L | 3/11/15 7:29 AM      | 93.1   | 27.0                  |
| NMS08 <sup>2</sup>  | 84.5             | MD-82           | Departure off Rwy 24L | 1/9/15 7:47 AM       | 90.7   | 37.5                  |
| NMS10   | 89.1             | MD-83           | Departure off Rwy 24L | 3/31/15 8:07 PM      | 96.6   | 35.5                  |
| NMS10   | 85.5             | MD-82           | Departure off Rwy 24L | 3/6/15 7:39 AM       | 94.2   | 33.0                  |
| NMS10   | 84.4             | MD-83           | Departure off Rwy 24L | 3/3/15 2:36 PM       | 93.6   | 46.0                  |
| NMS11   | 88.2             | MD-88           | Departure off Rwy 6R  | 3/27/15 8:38 AM      | 95.2   | 40.0                  |
| NMS11   | 87.9             | MD-88           | Departure off Rwy 6R  | 3/23/15 8:29 AM      | 96.5   | 42.0                  |
| NMS11   | 86.8             | MD-88           | Departure off Rwy 6R  | 2/1/15 1:37 PM       | 94.4   | 30.0                  |
| NMS12 <sup>3</sup>  | 97.5             | Lear Jet 25     | Departure off Rwy 6R  | 3/27/15 9:08 AM      | 103.1  | 40.0                  |
| NMS12 <sup>3</sup>  | 93.6             | MD-82           | Departure off Rwy 6L  | 3/24/15 1:16 PM      | 99.7   | 30.5                  |
| NMS12 <sup>3</sup>  | 92.0             | MD-82           | Departure off Rwy 6L  | 1/20/15 1:54 PM      | 99.3   | 30.5                  |

<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 NMS09 within the 1<sup>st</sup> Quarter of 2015.

<sup>3</sup> Due to equipment malfunctions, data for NMS12 for portions of January 8<sup>th</sup> and 9<sup>th</sup>.

# Noise Complaints

| City          | Jan      | Feb      | Mar      | 1 <sup>st</sup> Q '15<br>Calls | %      | 1 <sup>st</sup> Q '14<br>Calls | %      | 1 <sup>st</sup> Q '15<br>Callers | %      | 1 <sup>st</sup> Q '14<br>Callers | %      |
|---------------|----------|----------|----------|--------------------------------|--------|--------------------------------|--------|----------------------------------|--------|----------------------------------|--------|
| Brook Park    | 0        | 0        | 0        | 0                              | 0.0%   | 0                              | 0.0%   | 0                                | 0.0%   | 0                                | 0.0%   |
| Cleveland     | 1        | 3        | 6        | 10                             | 83.3%  | 6                              | 66.7%  | 2                                | 50.0%  | 3                                | 60.0%  |
| Fairview Park | 0        | 0        | 1        | 1                              | 8.3%   | 3                              | 33.3%  | 1                                | 25.0%  | 2                                | 40.0%  |
| North Olmsted | 0        | 0        | 0        | 0                              | 0.0%   | 0                              | 0.0%   | 0                                | 0.0%   | 0                                | 0.0%   |
| Olmsted Falls | 0        | 1        | 0        | 1                              | 8.3%   | 0                              | 0.0%   | 1                                | 25.0%  | 0                                | 0.0%   |
| Olmsted Twp.  | 0        | 0        | 0        | 0                              | 0.0%   | 0                              | 0.0%   | 0                                | 0.0%   | 0                                | 0.0%   |
| 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   | 0        | 0        | 0        | 0                              | 0.0%   | 0                              | 0.0%   | 0                                | 0.0%   | 0                                | 0.0%   |
| Westlake      | 0        | 0        | 0        | 0                              | 0.0%   | 0                              | 0.0%   | 0                                | 0.0%   | 0                                | 0.0%   |
| Other         | 0        | 0        | 0        | 0                              | 0.0%   | 0                              | 0.0%   | 0                                | 0.0%   | 0                                | 0.0%   |
| <b>Totals</b> | <b>1</b> | <b>4</b> | <b>7</b> | <b>12</b>                      | 100.0% | <b>9</b>                       | 100.0% | <b>4</b>                         | 100.0% | <b>5</b>                         | 100.0% |

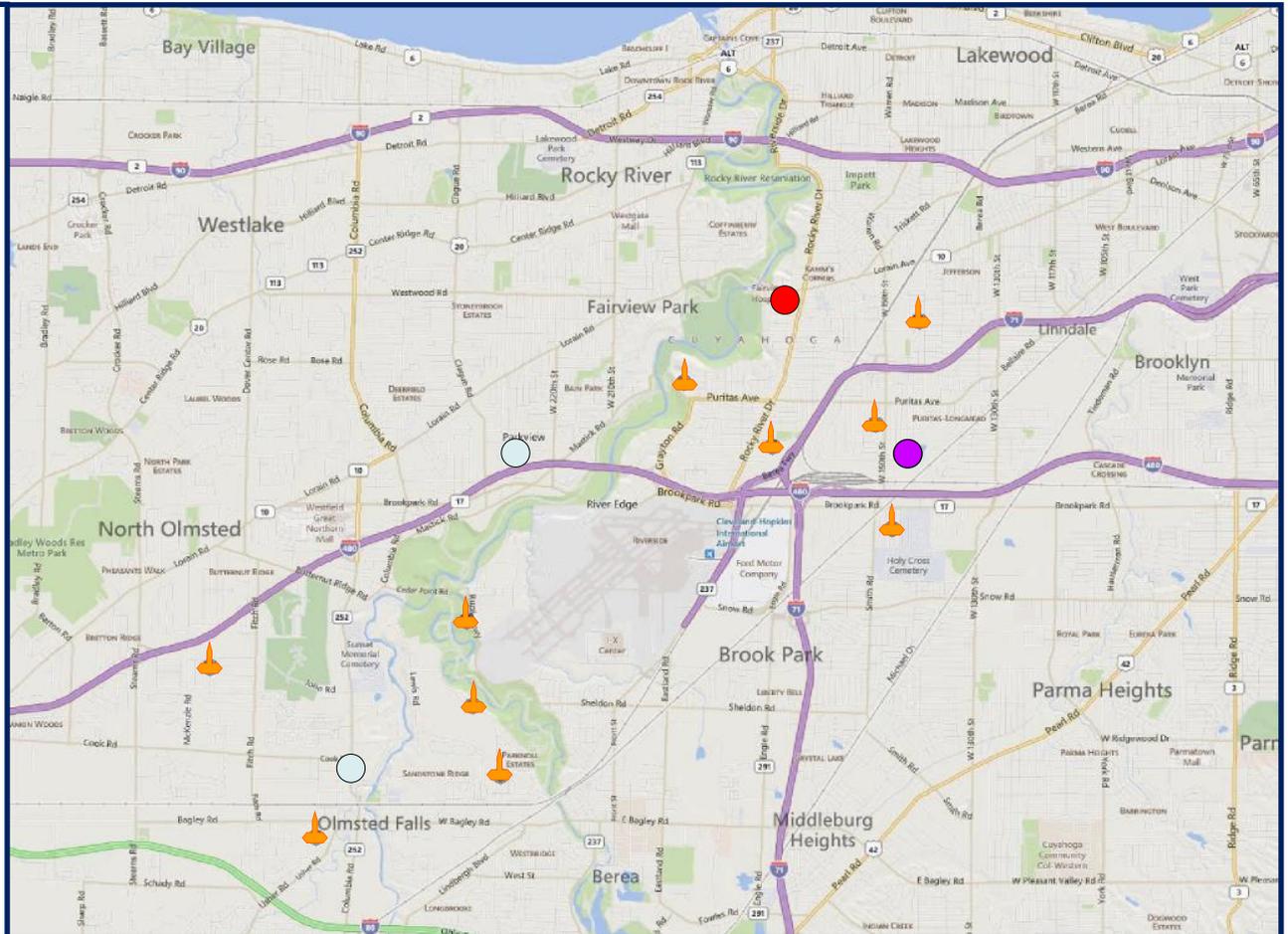
Noise Hotline – (216) 898-5220

# 1<sup>st</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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