



Noise Compatibility Report

2016 Year End

Mar 27, 2017

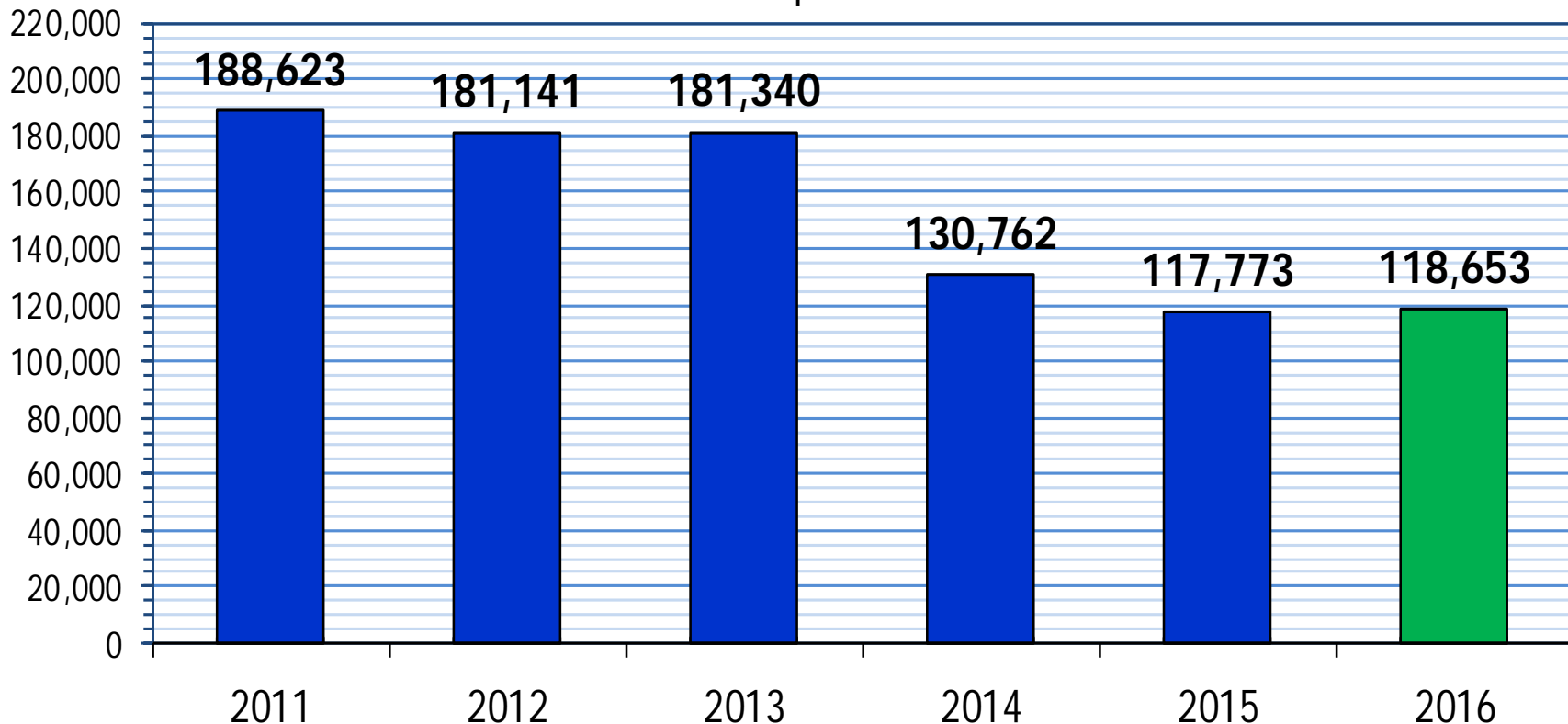
Disclaimer



- 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 Total Operations 2011 - 2016



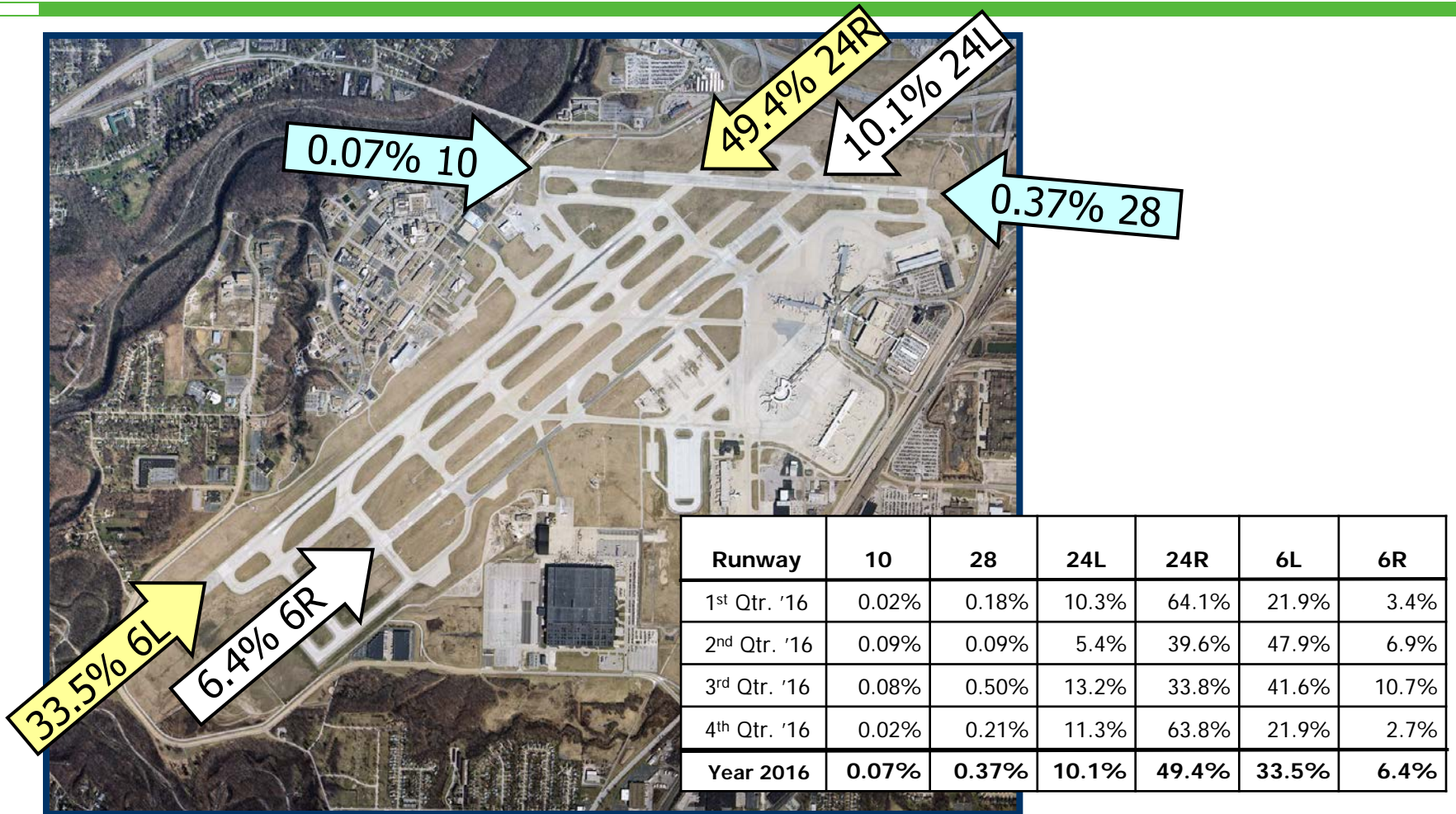
There were 118,653 landings and takeoffs in 2016; this is 0.75% above 2015.

Landings & Takeoffs

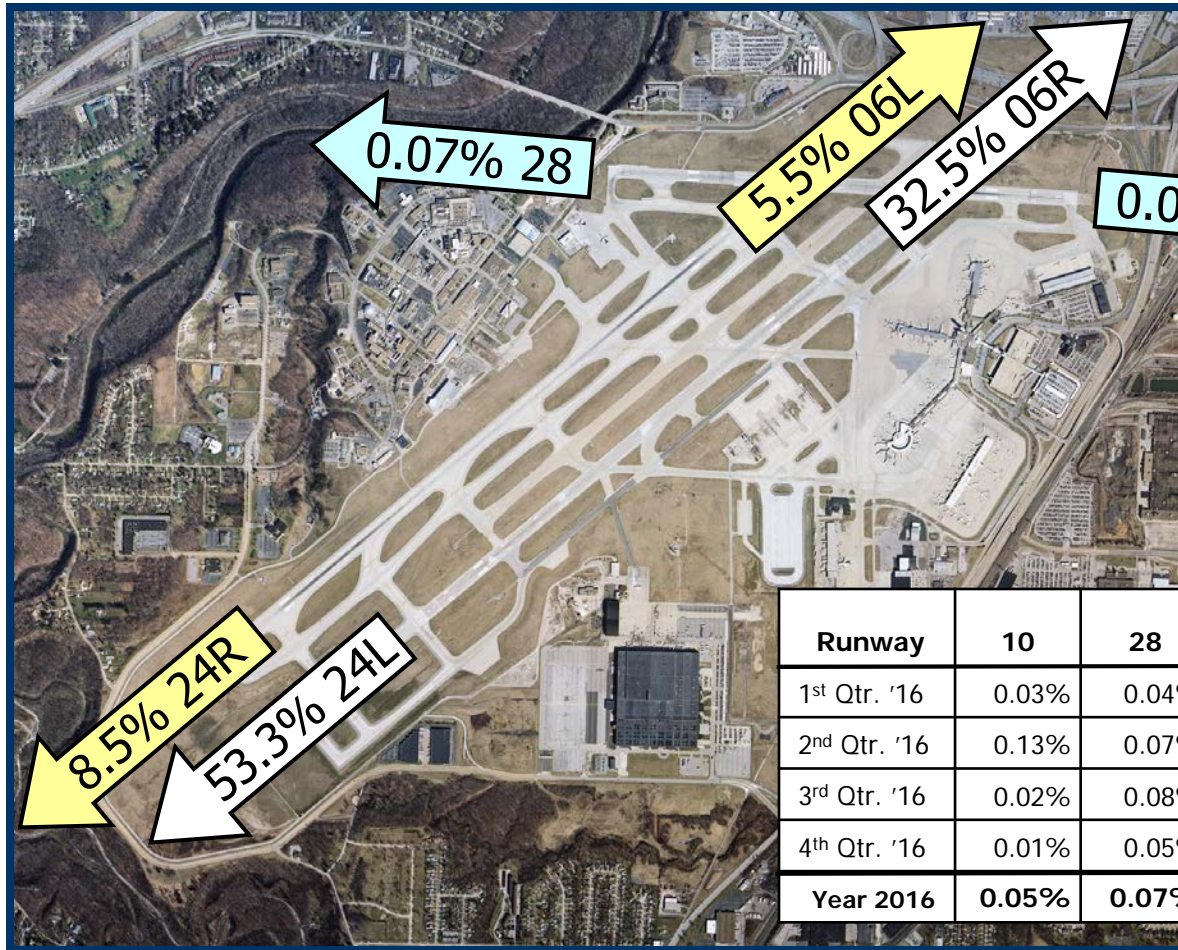
	Year 2016		Year 2015	
Commercial				
-Stage 2 with hush kit	120	0.10%	138	0.12%
-Heavy (excl. all B757s)	1,776	1.50%	2,292	1.95%
-MD80 series	5,079	4.28%	5,312	4.51%
-Other Stage 3	69,000	58.15%	67,267	57.12%
-Regional Jet	26,063	21.97%	25,045	21.27%
-Turboprop	3,742	3.15%	5,146	4.37%
Air Taxi	3,012	2.54%	3,108	2.64%
General Aviation	9,618	8.11%	9,261	7.86%
Military	243	0.20%	204	0.17%
Total	118,653	100.00%	117,773	100.00%

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 2016 Arrivals



Runway Use: Year 2016 Departures



Runway	10	28	24L	24R	6L	6R
1st Qtr. '16	0.03%	0.04%	67.7%	8.7%	1.6%	21.8%
2nd Qtr. '16	0.13%	0.07%	39.1%	8.2%	8.0%	44.4%
3rd Qtr. '16	0.02%	0.08%	43.7%	6.4%	6.3%	43.3%
4th Qtr. '16	0.01%	0.05%	64.8%	10.8%	5.5%	18.7%
Year 2016	0.05%	0.07%	53.3%	8.5%	5.5%	32.5%

Departure Headings, 4th 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.

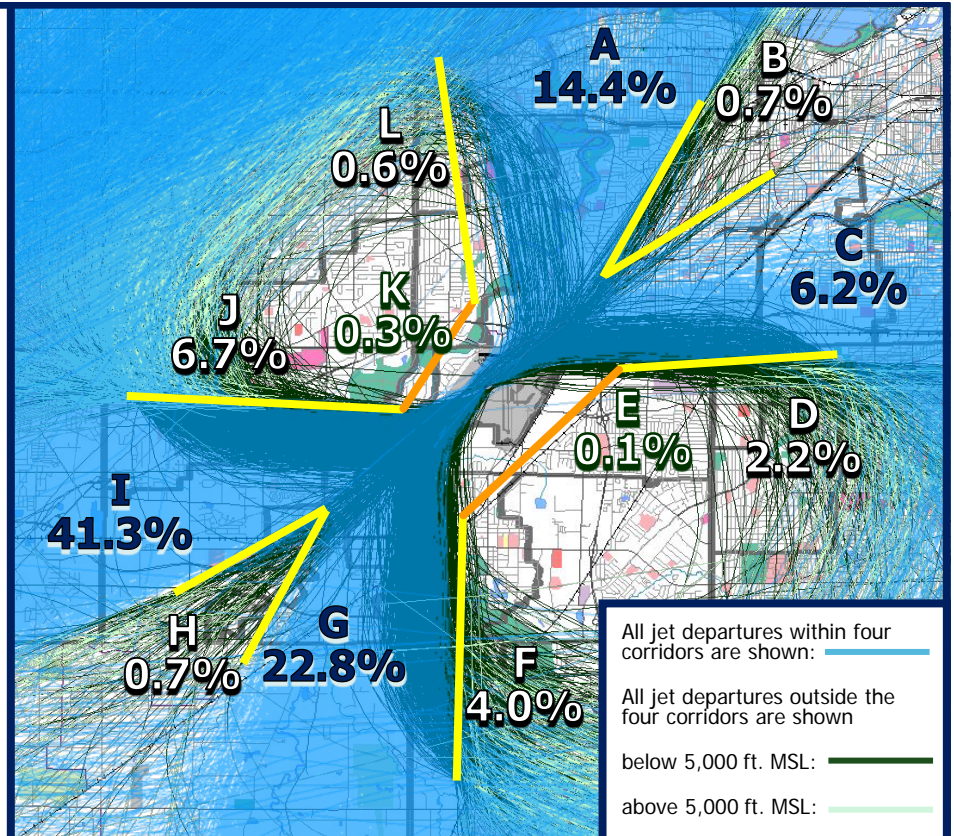
84.7% within corridors

- A. 14.4%: 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. 22.8%: south corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- I. 41.3%: west corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

15.3% outside corridors

- B. 0.7%: flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the north and east corridors
- D. 2.2%: flights crossing the south boundary below 5,000 ft. MSL
- E. 0.1%: flights turning south before entering the corridor
- F. 4.0%: flights crossing the east boundary below 5,000 ft. MSL
- H. 0.7%: flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the west and south corridors
- J. 6.7%: flights crossing the north boundary below 5,000 ft. MSL
- K. 0.3%: flights turning north before entering the corridor
- L. 0.6%: flights crossing the west boundary below 5,000 ft. MSL

(Percentages do not include Rwy 10/28 departures)



Departure Headings, 4th Qtr : Night-time

Jet Departures, 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.

60.3% within corridors

- A. 14.8%: 095 corridor, including flights crossing the 095 corridor boundaries above 5,000 ft. MSL
- F. 45.5%: 200 corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

39.7% outside corridors

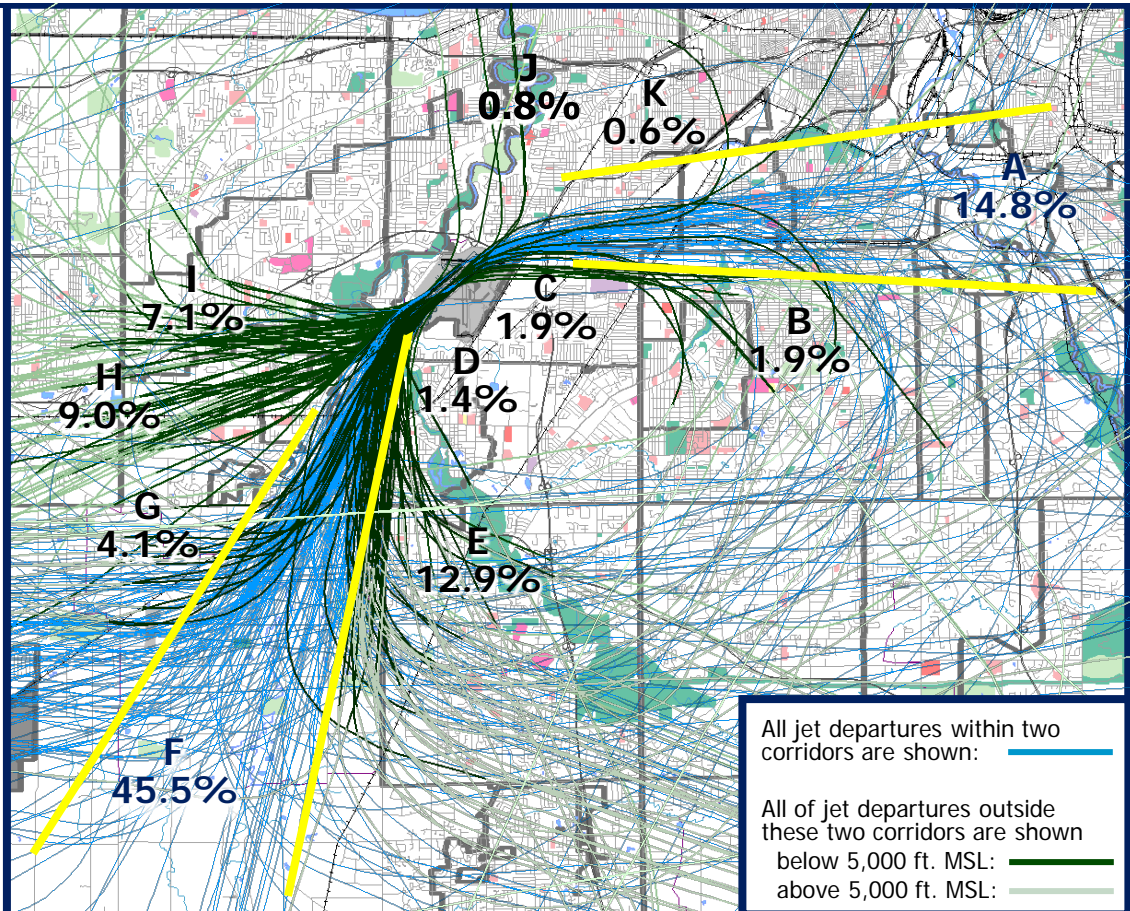
- B. 1.9%: flights crossing the south boundary below 5,000 ft. MSL
- C. 1.9%: flights turning south before entering the 095 corridor
- D. 1.4%: flights departing south without entering the 200 corridor
- E. 12.9%: flights crossing the east boundary below 5,000 ft. MSL
- G. 4.1%: flights crossing the west boundary below 5,000 ft. MSL
- H. 9.0%: flights departing southwest without entering the corridor
- I. 7.1%: flights departing west without entering the corridor
- J. 0.8%: flights departing north, not east with the 095 corridor
- K. 0.6%: flights crossing the north boundary below 5,000 ft. MSL

(There were no Rwy 10 or 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%	0.0%	58.1%	23.1%	1.1%	17.8%
For all aircraft:	0.0%	0.2%	56.5%	24.1%	1.4%	17.8%

94.4% 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, 4th Qtr. : Night-time

Arrivals, 10:00 p.m. to 6:59 a.m. 4th Qtr., 2016

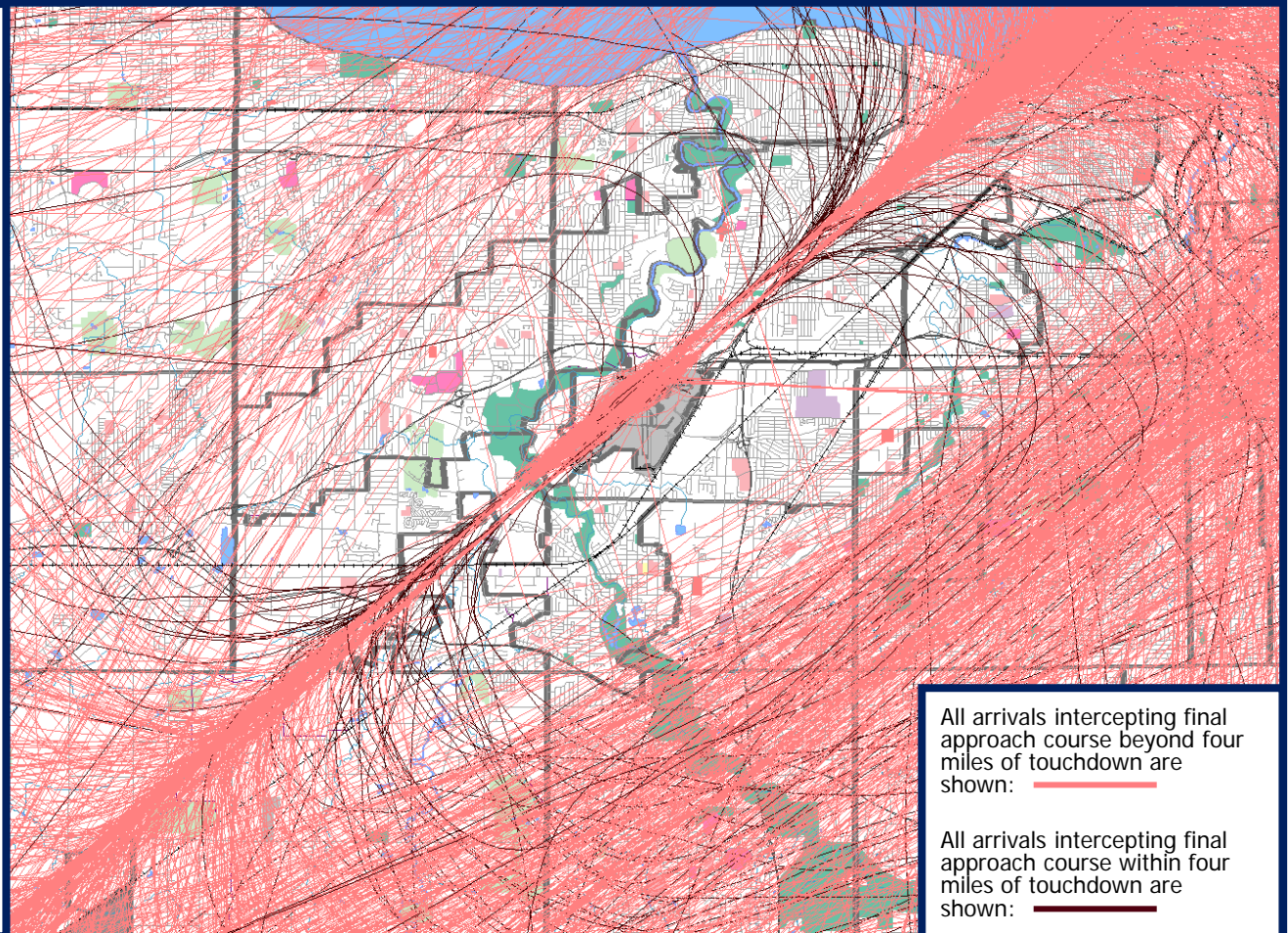
A voluntary measure of the Noise Compatibility Program calls for all aircraft arriving between 10:00 p.m. and 6:59 a.m., wind and weather permitting, to intercept final approach course no closer than four miles before touchdown.


**95.9% beyond four miles and
4.1% 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:

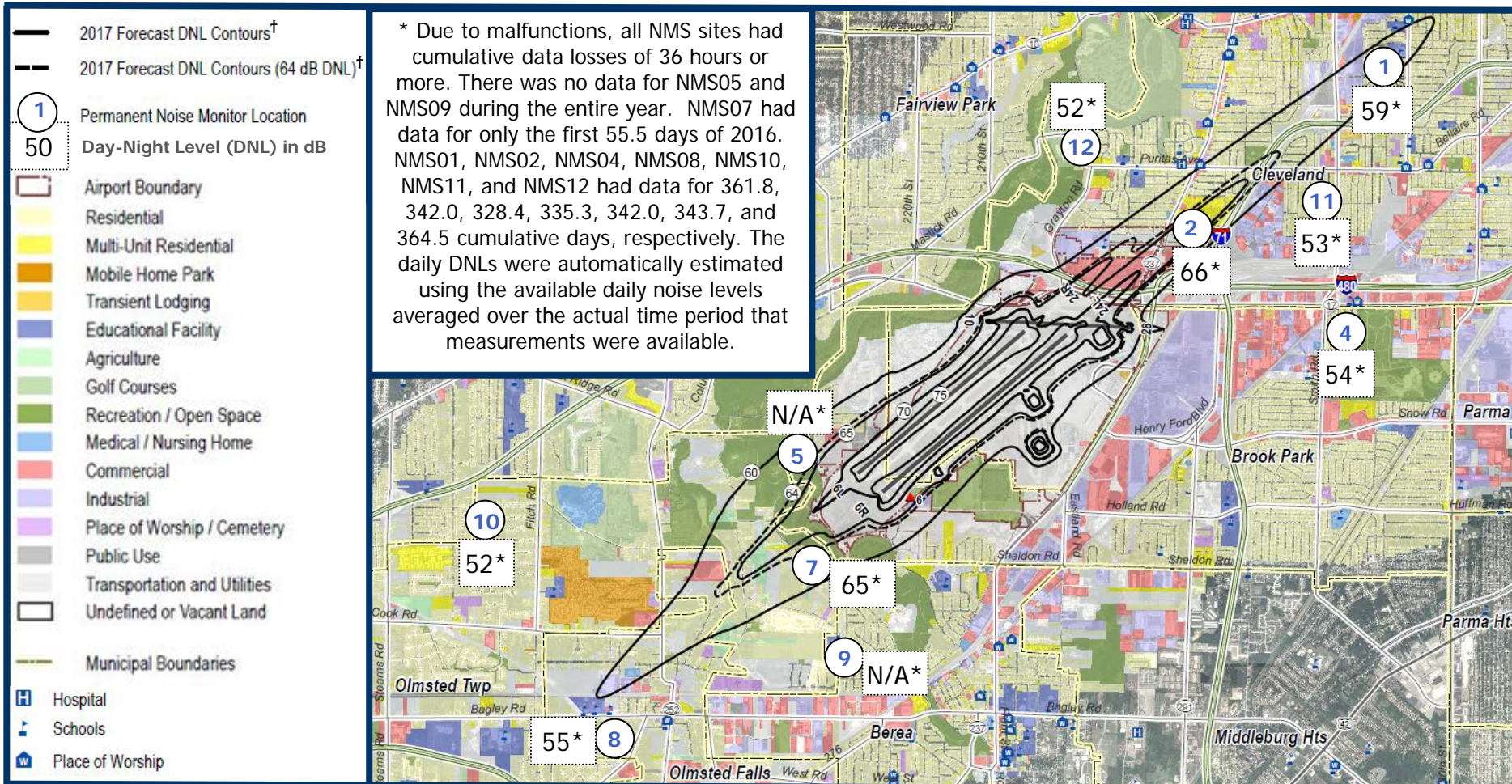
Rwy	Percentage of Arrivals	
	Jets	All Aircraft
10	0.0%	0.0%
28	0.4%	0.4%
24L	9.4%	9.4%
24R	63.2%	62.8%
6L	24.1%	24.4%
6R	2.8%	3.0%
Total	100.0%	100.0%



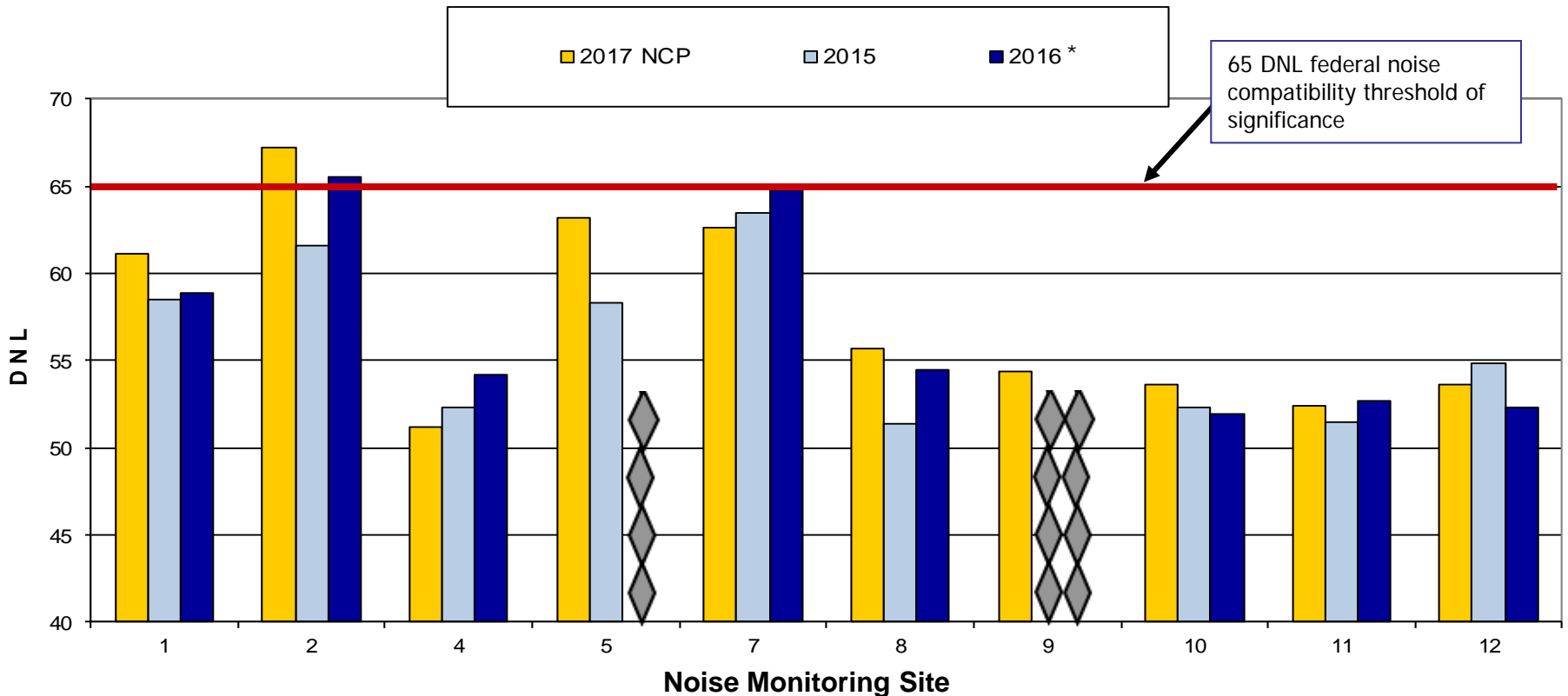
All arrivals intercepting final approach course beyond four miles of touchdown are shown: 

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

Aircraft Noise: DNL by Noise Monitoring Site



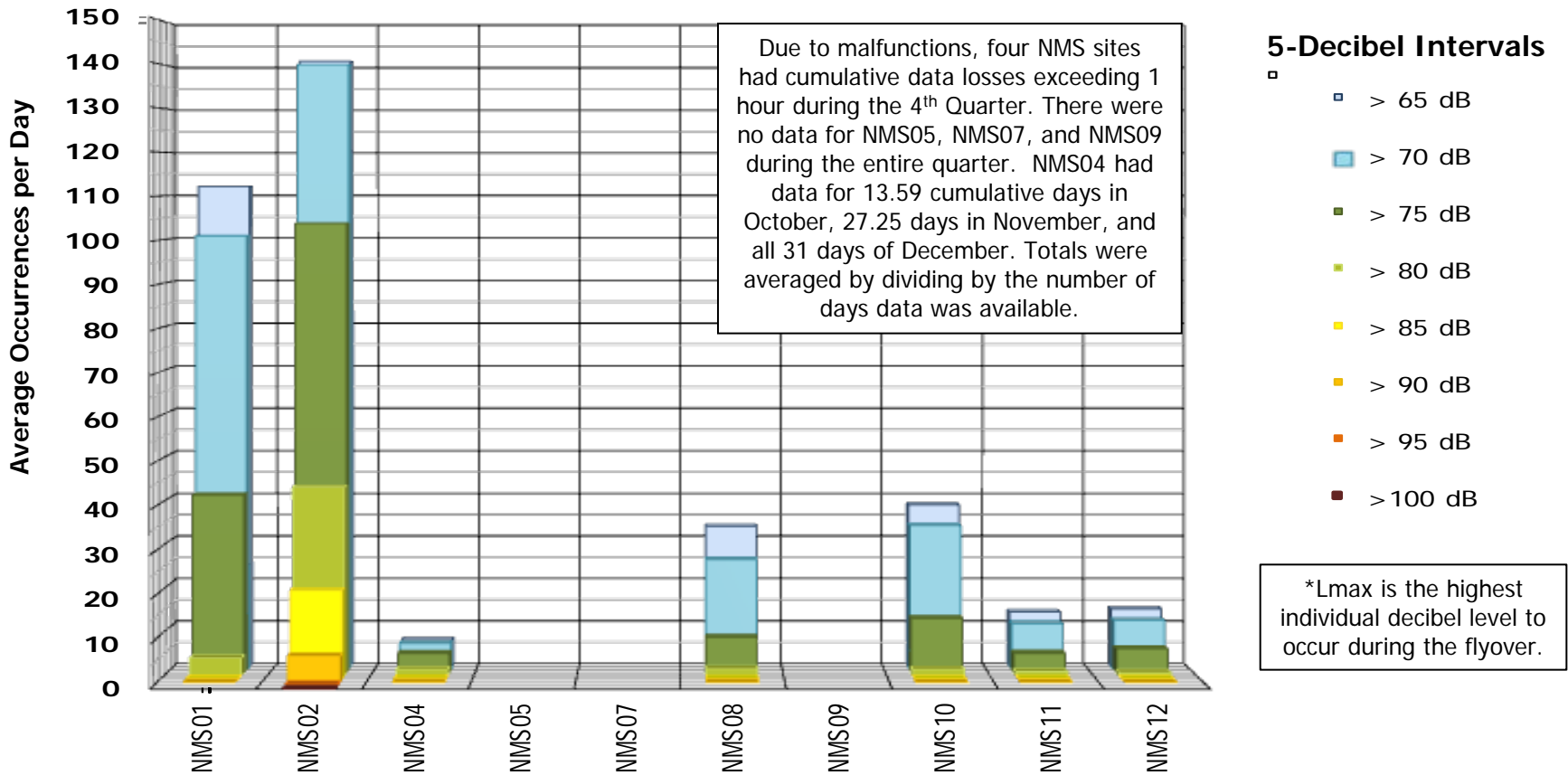
DNL: Year 2016 vs. Year 2015



* Due to malfunctions, all NMS sites had cumulative data losses of 36 hours or more in 2016. There was no data for NMS05 and NMS09 during the entire year. NMS07 had data for only the first 55.5 days of 2016. NMS01, NMS02, NMS04, NMS08, NMS10, NMS11, and NMS12 had data for 361.8, 342.0, 328.4, 335.3, 342.0, 343.7, and 364.5 cumulative days, respectively. The daily DNLs 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 by Decibel Level

4th Qtr. Noise Event Lmax* Distribution



Top Three Lmaxs at Each NMS

Three highest aircraft decibel levels at each Noise Monitoring Site during the 4th Qtr., 2016, p. 1

NMS	Lmax (dB)	Aircraft	Operation	Time and date	Sound Exposure Level (dB) ¹	Duration (sec)
NMS01	92.7	B757-200	Arrival on Rwy 24R	11/25/16 11:51 PM	99.2	41.0
NMS01	89.0	MD-88	Arrival on Rwy 24R	11/26/16 10:26 AM	92.7	20.5
NMS01	88.4	B757-200	Arrival on Rwy 24R	12/23/16 6:28 AM	95.6	35.5
NMS02	106.0	Military Aircraft	Arrival on Rwy 24L	11/15/16 1:22 PM	109.0	29.5
NMS02	99.6	B727-200	Arrival on Rwy 24L	10/18/16 6:08 PM	103.3	18.0
NMS02	99.2	MD-82	Departure off Rwy 6R	10/8/16 8:12 AM	105.1	30.5
NMS04 ²	91.8	MD-88	Departure off Rwy 6R	11/11/16 1:06 PM	98.8	42.0
NMS04 ²	91.3	MD-88	Departure off Rwy 6R	11/11/16 11:11 AM	98.5	37.0
NMS04 ^{2,3}	90.6	MD-88	Departure off Rwy 6R	10/13/16 1:19 PM	97.6	35.5

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

² Due to equipment malfunctions, no data is available for NMS04 from October 14th to November 2nd.

³ Due to equipment malfunctions, no data is available for NMS05 or NMS07 within the 4th Quarter of 2016.

Top Three Lmaxs at Each NMS

Three highest aircraft decibel levels at each Noise Monitoring Site during the 4 th Qtr., 2016, p. 2						
NMS	Lmax (dB)	Aircraft	Operation	Time and date	Sound Exposure Level (dB) ¹	Duration (sec)
NMS08	92.3	MD-88	Departure off Rwy 24R	11/6/16 12:58 PM	98.5	26.0
NMS08	90.9	MD-88	Departure off Rwy 24L	10/14/16 1:20 PM	97.3	38.0
NMS08 ²	89.8	MD-83	Departure off Rwy 24L	12/17/16 8:09 AM	94.7	37.0
NMS10	89.1	MD-82	Departure off Rwy 24L	11/30/16 9:21 AM	94.1	31.5
NMS10	88.8	MD-82	Departure off Rwy 24L	12/12/16 7:20 PM	95.9	34.0
NMS10	88.6	MD-83	Departure off Rwy 24L	10/12/16 8:34 PM	94.0	28.0
NMS11	92.4	MD-88	Departure off Rwy 6R	10/21/16 1:14 PM	98.4	36.0
NMS11	88.7	MD-88	Departure off Rwy 6R	11/9/16 3:54 PM	94.0	38.0
NMS11	87.3	MD-88	Departure off Rwy 6R	10/10/16 1:03 PM	94.3	28.0
NMS12	90.9	MD-83	Departure off Rwy 6L	10/19/16 9:53 AM	97.9	27.5
NMS12	89.4	MD-83	Departure off Rwy 6L	11/9/16 9:34 AM	96.7	31.0
NMS12	88.9	MD-82	Departure off Rwy 6L	10/30/16 7:08 PM	95.1	30.0

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

² Due to equipment malfunctions, no data is available for NMS09 within the 4th Quarter of 2016.

Noise Complaints



City	1 st Qtr.	2 nd Qtr.	3 rd Qtr.	4 th Qtr.	2016 Calls	%	2015 Calls	%	2016 Callers	%	2015 Callers	%
Berea	0	1	18	2	21	19.4%	0	0.0%	2	6.1%	0	0.0%
Bratenahl	0	0	0	1	1	0.9%	0	0.0%	1	3.0%	0	0.0%
Brecksville	0	0	0	1	1	0.9%	0	0.0%	1	3.0%	0	0.0%
Brook Park	1	0	0	0	1	0.9%	0	0.0%	1	3.0%	0	0.0%
Cleveland	2	16	16	7	41	38.0%	35	34.0%	8	24.2%	11	28.2%
Columbia Station	0	2	0	0	2	1.8%	3	2.9%	1	3.0%	1	2.6%
Fairview Park	3	1	3	0	7	6.5%	9	8.7%	5	15.2%	7	17.9%
Lakewood	0	0	0	0	0	0.0%	1	1.0%	0	0.0%	1	2.6%
Olmsted Falls	1	1	2	0	4	3.7%	19	18.4%	4	12.1%	6	15.4%
Olmsted Twp.	0	7	8	1	16	14.8%	19	18.4%	2	6.1%	4	10.3%
Parma	0	0	1	0	1	0.9%	2	1.9%	1	3.0%	1	2.6%
Rocky River	1	2	9	0	12	11.1%	13	12.6%	6	18.2%	6	15.4%
Strongsville	0	0	1	0	1	0.9%	1	1.0%	1	3.0%	1	2.6%
Valley City	0	0	0	0	0	0.0%	1	1.0%	0	0%	1	2.6%
Totals	8	30	58	12	108	100.0%	103	100.0%	33	100.0%	39	100.0%





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

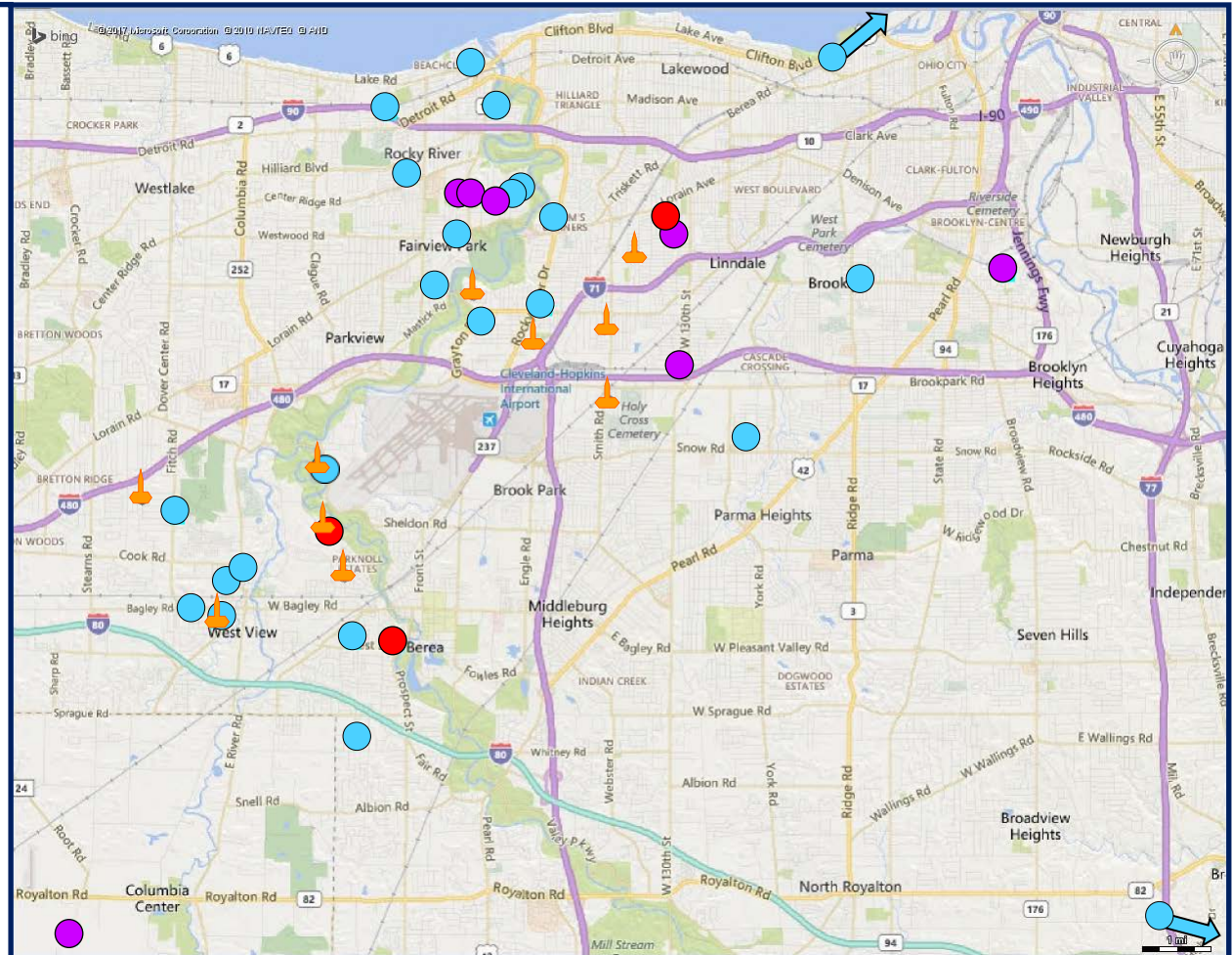
Noise Hotline – (216) 898-5220

Year 2016 Complaint Map

LEGEND

Complaints per household

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



2017 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.
- Request For Proposals to upgrade/replace the equipment and software of the Noise and Operations Monitoring System planned for 2018 release.
- Improvements to the northern portion of the airfield at Cleveland Hopkins International Airport (CLE) will begin in late 2017. Phase 1 will be the closure of Runway 6R/24L for approximately three months, starting in November 2017. During Phase 2 both runways will be open for approximately two months, following Phase 1. Phase 3 will consist of the closure of Runway 6L/24R for approximately three months.
- No anticipated construction will take place at Burke Lakefront Airport (BKL) in 2017 that will have an impact on noise.
- Labor Day weekend air show to be held at BKL featuring the U.S. Air Force Thunderbirds.

CLE.
Going places.™

