



Noise Compatibility

1st Quarter, 2014

June 9, 2014

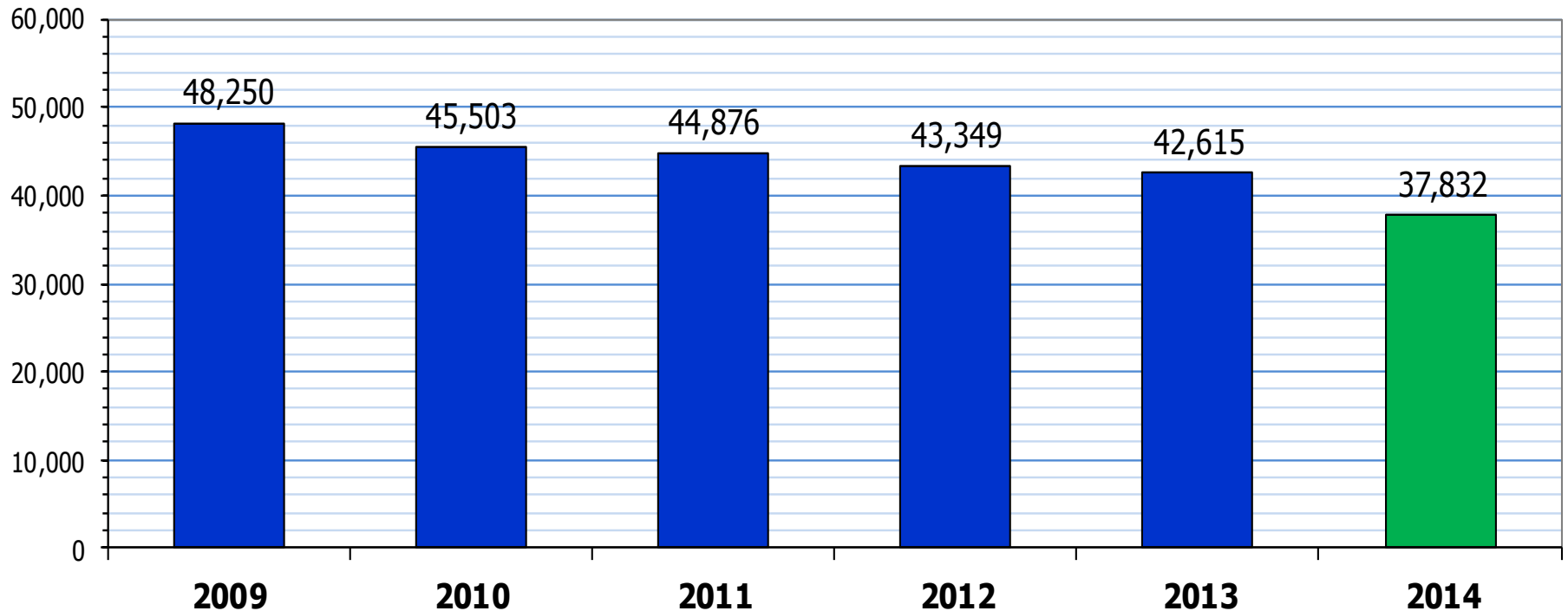
Disclaimer



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

Aircraft Operations

Cleveland 1st Qtr. Operations 2009 - 2014



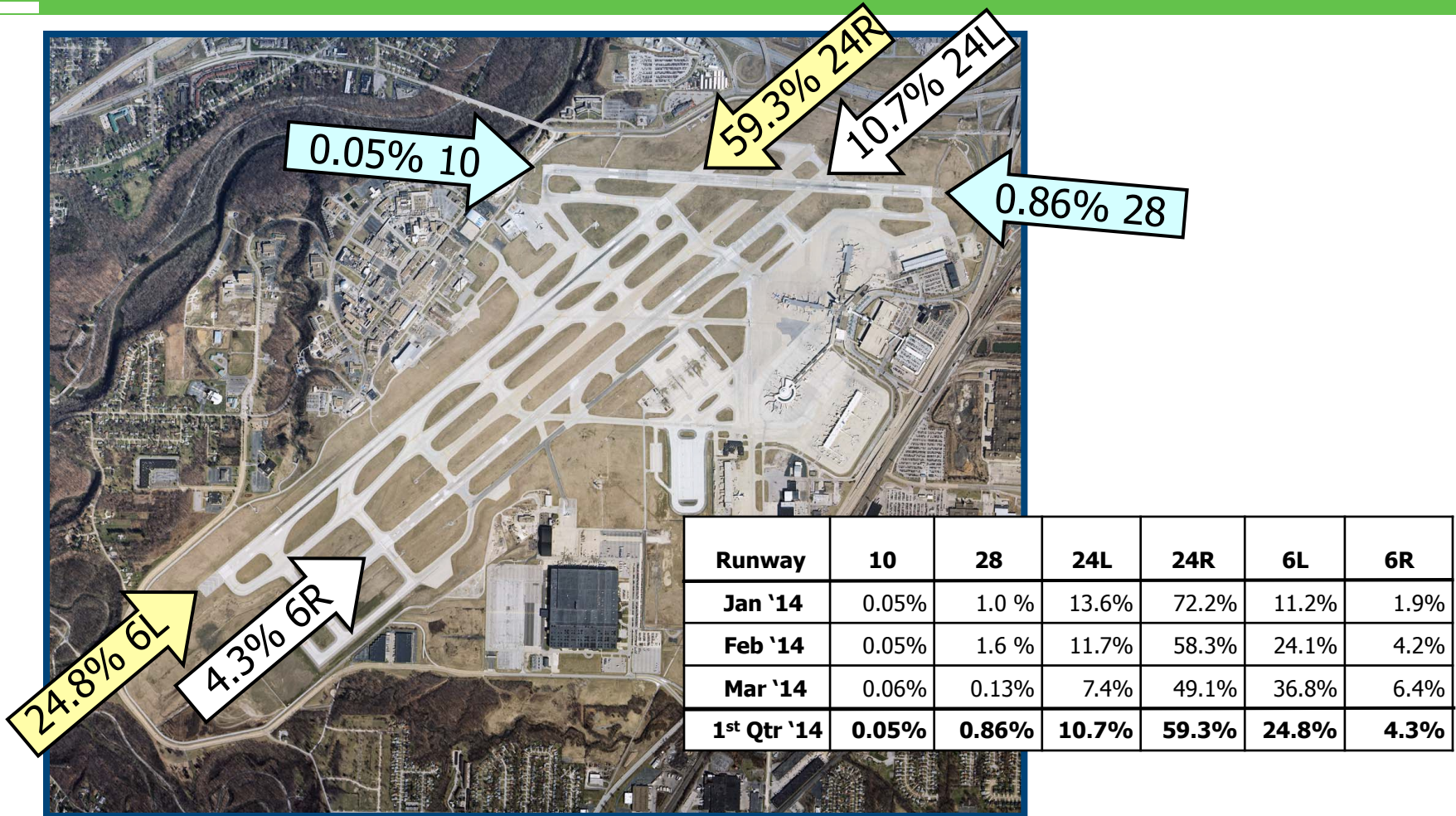
There were 37,832 landings and takeoffs in the 1st Qtr. 2014; this is 11.22% below the 1st Qtr. 2013.

Landings & Takeoffs

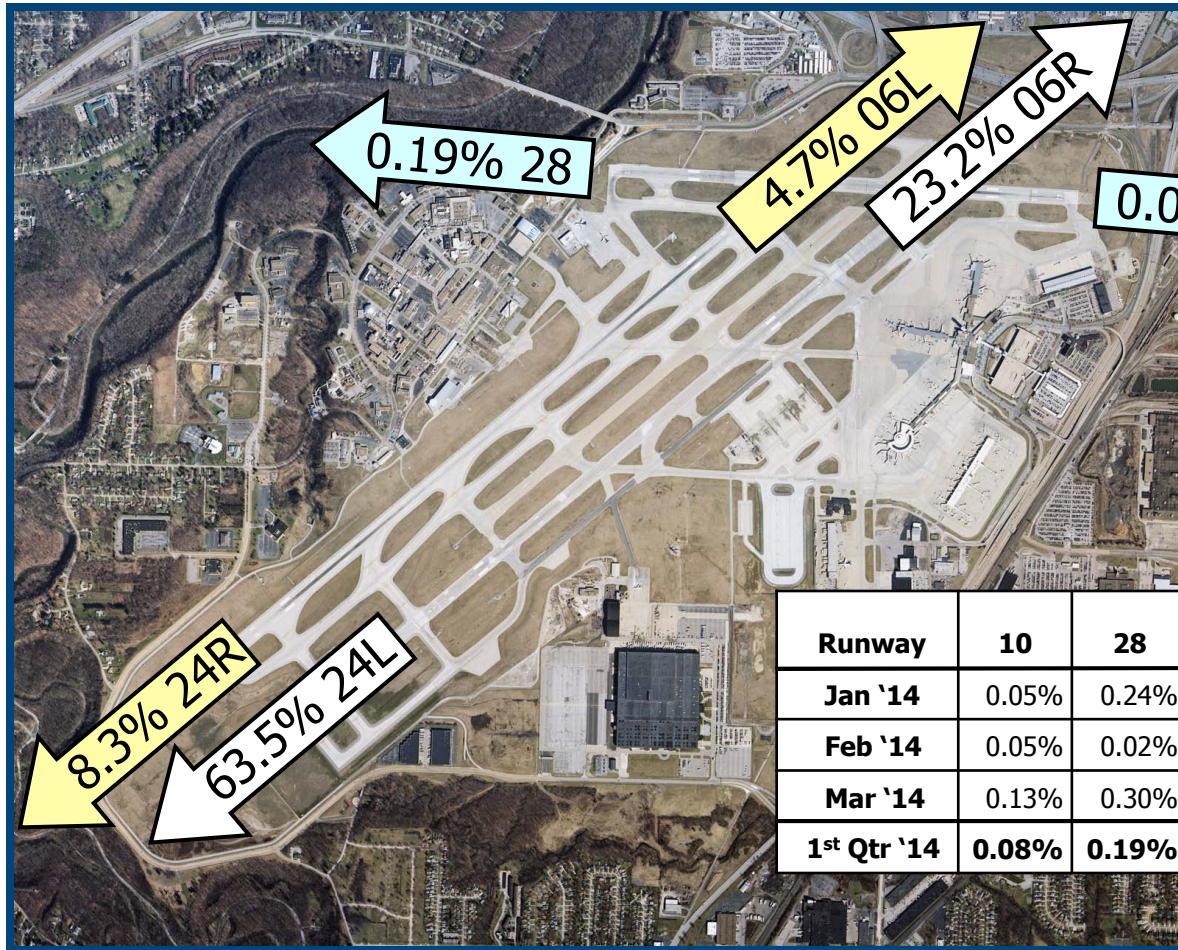
	1 st Qtr, 2014		1 st Qtr, 2013	
Commercial				
-Stage 2 with hush kit	44	0.12%	179	0.42%
-Heavy (incl. all B757s)	569	1.50%	610	1.43%
-MD80 series	48	0.13%	757	1.78%
-Other Stage 3	12,608	33.33%	11,956	28.06%
-Regional Jet	15,807	41.78%	20,116	47.20%
-Turboprop	6,096	16.11%	6,424	15.07%
Air Taxi	640	1.69%	611	1.43%
General Aviation	1,990	5.26%	1,932	4.53%
Military	30	0.08%	30	0.07%
Total	37,832	100.00%	42,615	100.00%

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: 1st Qtr, 2014 Arrivals



Runway Use: 1st Qtr, 2014 Departures



Runway	10	28	24L	24R	6L	6R
Jan '14	0.05%	0.24%	79.1%	8.8%	3.1%	8.6%
Feb '14	0.05%	0.02%	61.3%	11.3%	4.1%	23.2%
Mar '14	0.13%	0.30%	52.1%	5.3%	6.6%	35.6%
1st Qtr '14	0.08%	0.19%	63.5%	8.3%	4.7%	23.2%

Departure Headings – 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 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 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.

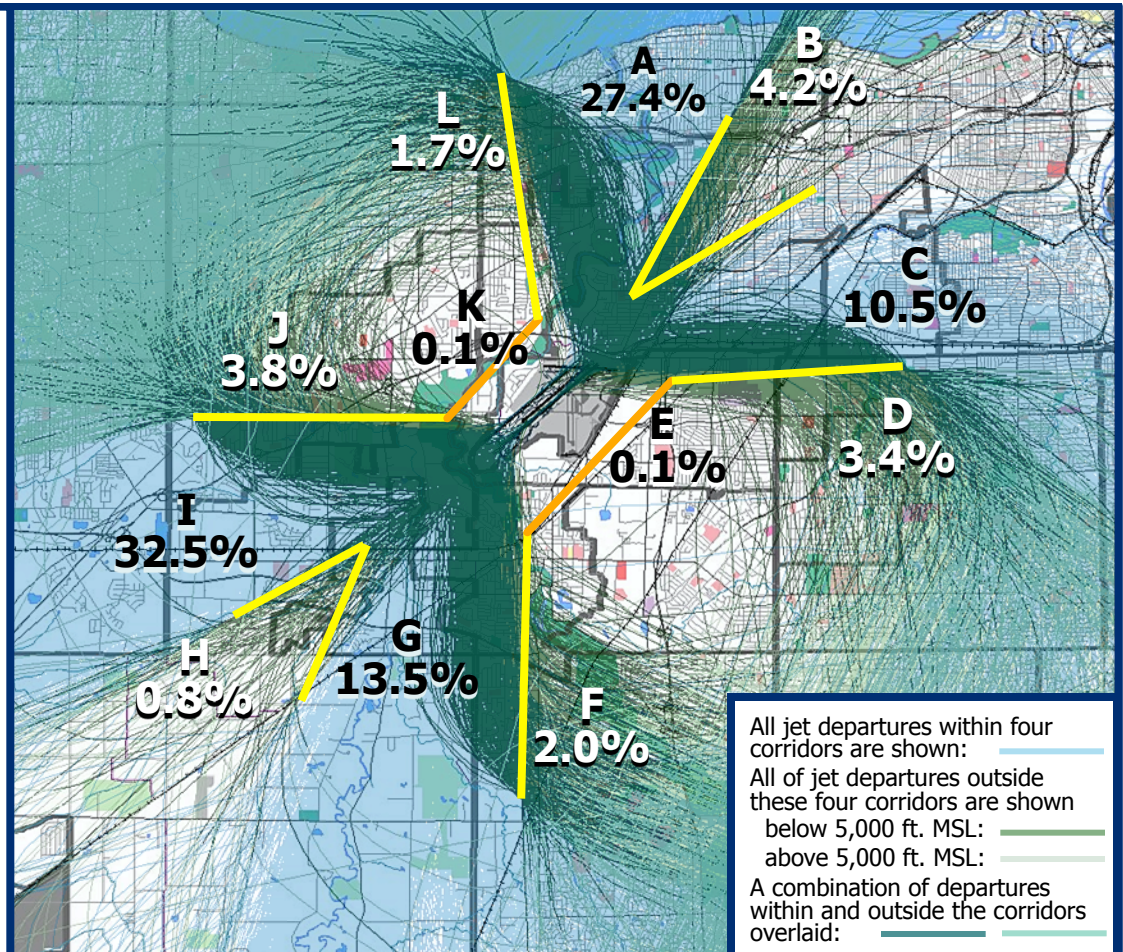
83.9% within corridors

- A. 27.4%:** north corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- C. 10.5%:** east corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- G. 13.5%:** south corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- I. 32.5%:** west corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

16.1% outside corridors

- B. 4.2%:** flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the north and south corridors
- D. 3.4%:** flights crossing the south boundary below 5,000 ft. MSL
- E. 0.1%:** flights turning south before entering the corridor
- F. 2.0%:** flights crossing the east boundary below 5,000 ft. MSL
- H. 0.8%:** flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the west and south corridors
- J. 3.8%:** flights crossing the north boundary below 5,000 ft. MSL
- K. 0.1%:** flights turning north before entering the corridor
- L. 1.7%:** flights crossing the west boundary below 5,000 ft. MSL

(Percentages do not include Rwy 10/28 departures)



Departure Headings – 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.

57.3% within corridors

A. 15.6%: 095 corridor, including flights crossing the 095 corridor boundaries above 5,000 ft. MSL

F. 41.7%: 200 corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

42.7% outside corridors

B. 8.3%: flights crossing the south boundary below 5,000 ft. MSL

C. 1.0%: flights turning south before entering the 095 corridor

D. 1.6%: flights departing south without entering the 200 corridor

E. 12.0%: flights crossing the east boundary below 5,000 ft. MSL

G. 4.2%: flights crossing the west boundary below 5,000 ft. MSL

H. 6.8%: flights departing southwest without entering the corridor

I. 1.6%: flights departing west without entering the corridor

J. 5.7%: flights departing north, not east with the 095 corridor

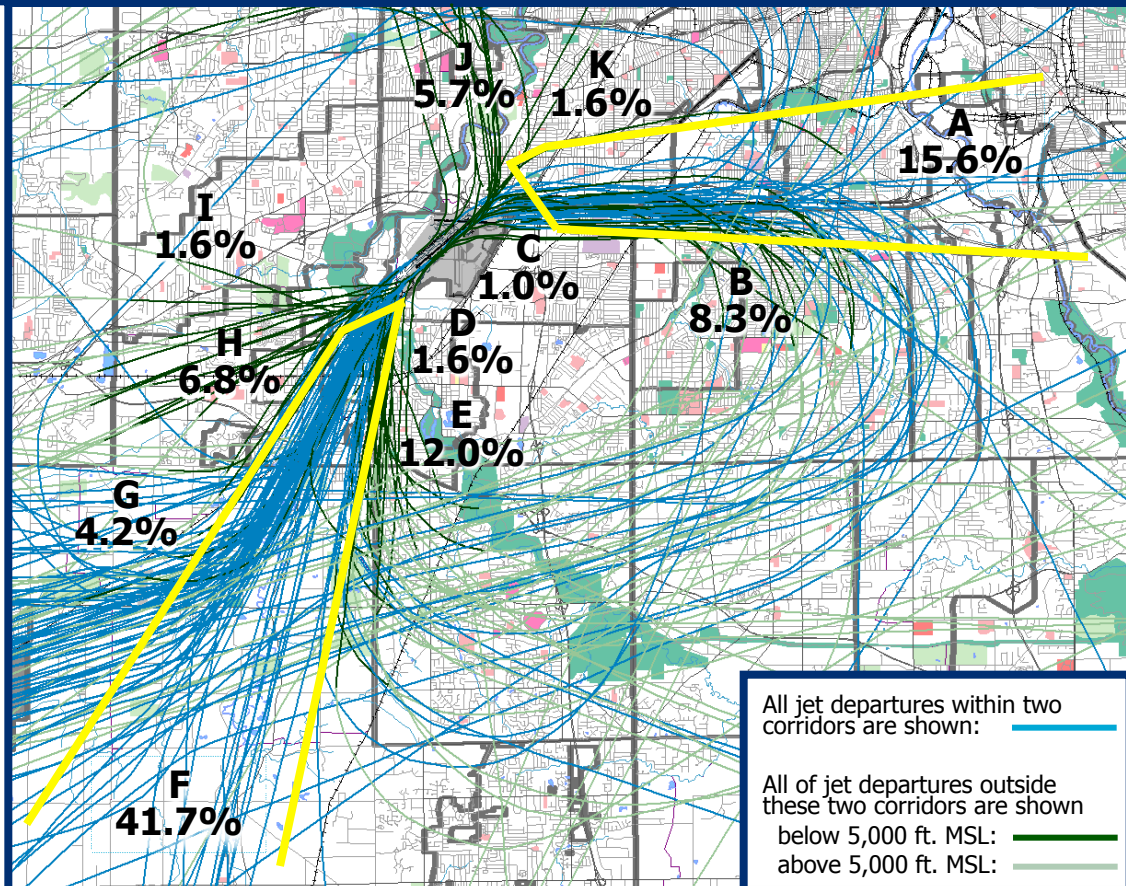
K. 1.6%: flights crossing the north boundary below 5,000 ft. MSL

(There were no Rwy 10 or Rwy 28 jet departures between 11:00 p.m. and 6:00 a.m. during the 1st Qtr. of 2014.)

The percentage of departures on each runway from 11:00 p.m. to 6:00 a.m. during the 1st Qtr. of 2014 were as follows:

Runway	10	28	24L	24R	6L	6R
For jets:	0.0%	0.0%	56.5%	10.9%	5.7%	26.9%
For all aircraft:	0.0%	0.4%	54.8%	10.3%	6.3%	28.2%

82.5% of Jet Departures from Rwy 6L/6R are 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 – Night-time

Arrivals, 10:00 p.m. to 6:59 a.m., 1st Qtr., 2014

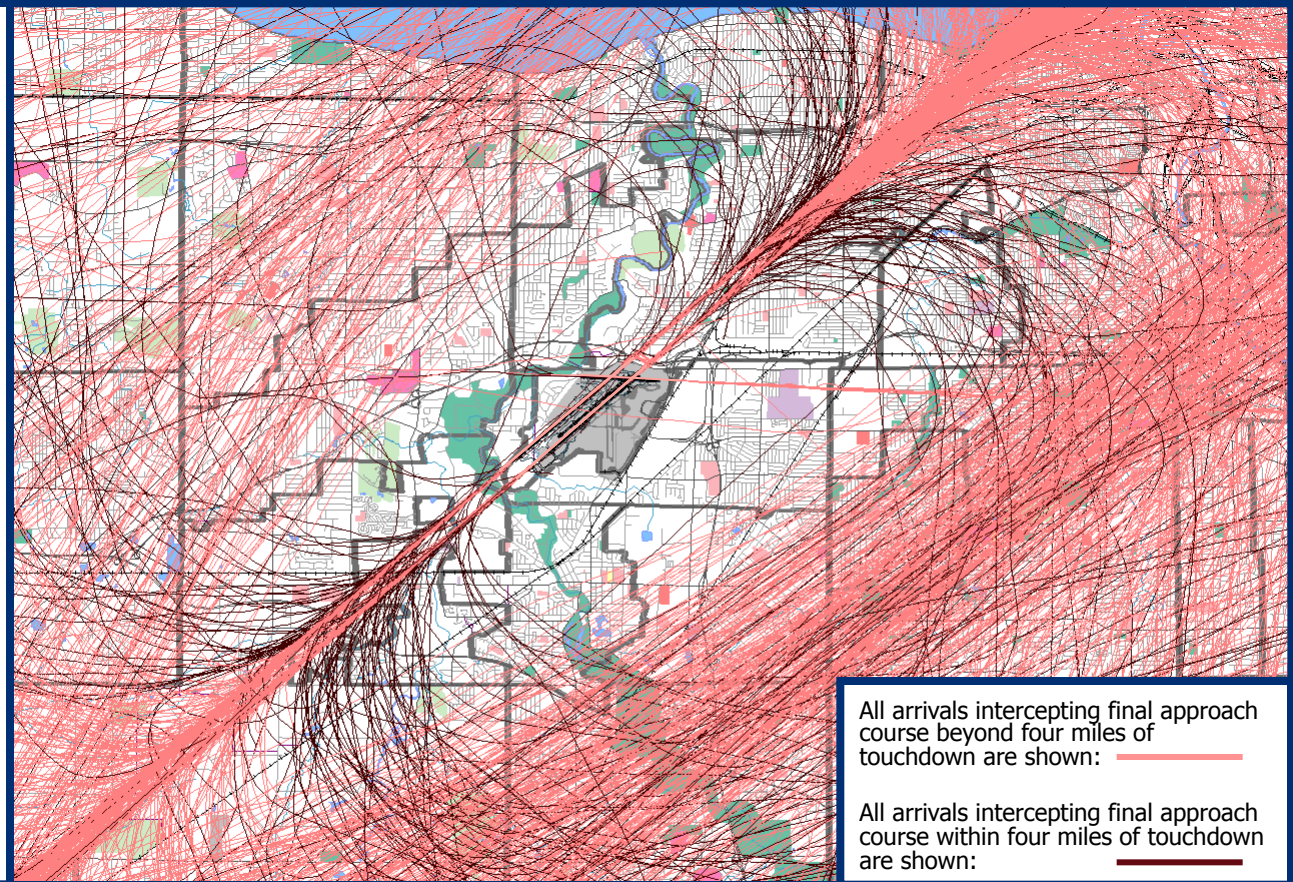
A voluntary measure of the Noise Compatibility Program calls for all aircraft arriving between 10:00 p.m. and 6:59 a.m., wind and weather permitting, to intercept final approach course no closer than four miles before touchdown.

90.5% beyond four miles and 9.5% 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 1st Qtr., 2014 was as follows:

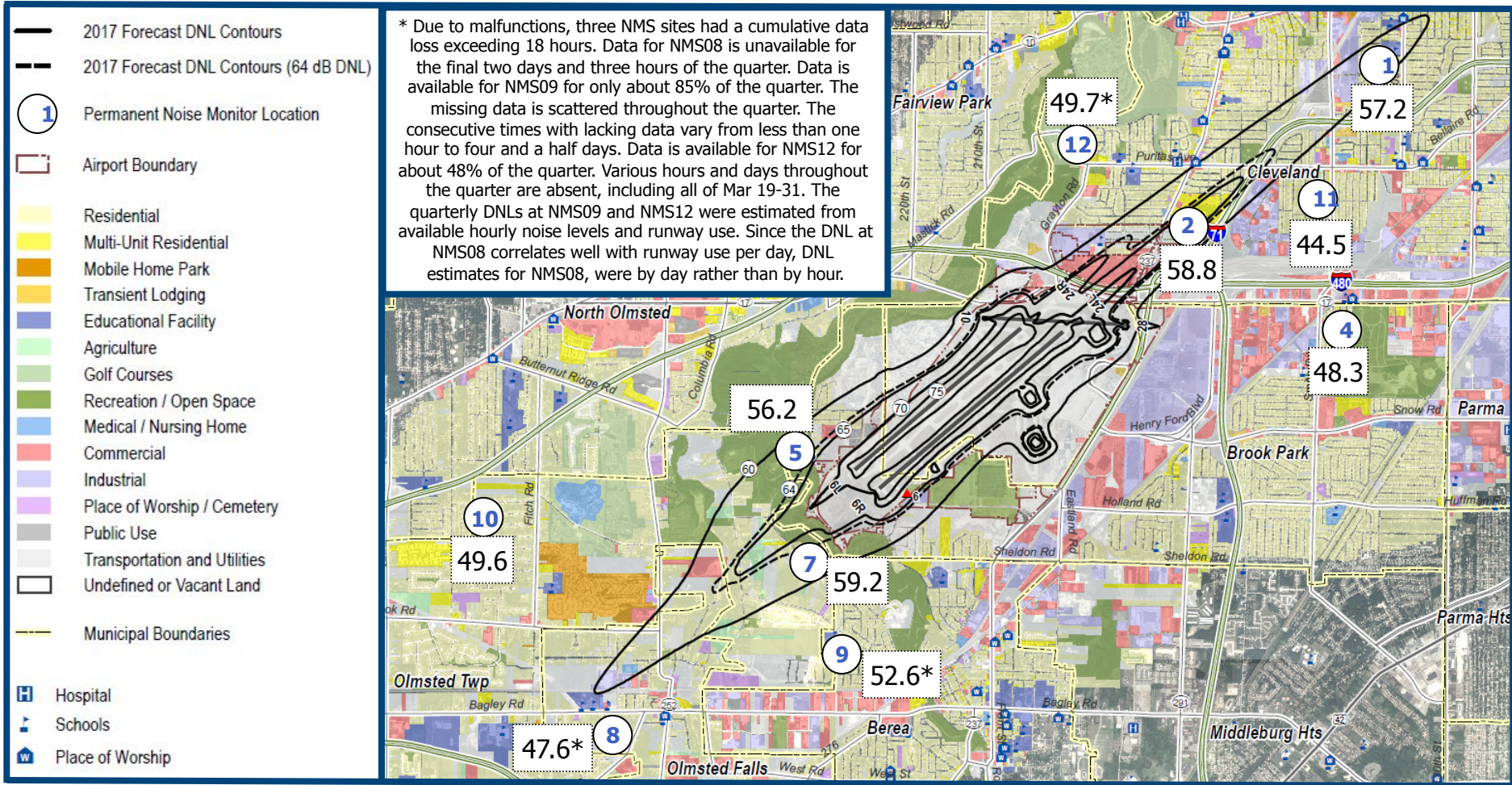
<u>Rwy</u>	<u>Percentage of Arrivals</u>	
	<u>Jets</u>	<u>All Aircraft</u>
10	0.0%	0.2%
28	0.3%	0.4%
24L	17.2%	17.7%
24R	51.8%	51.4%
6L	24.3%	23.5%
6R	6.4%	6.8%



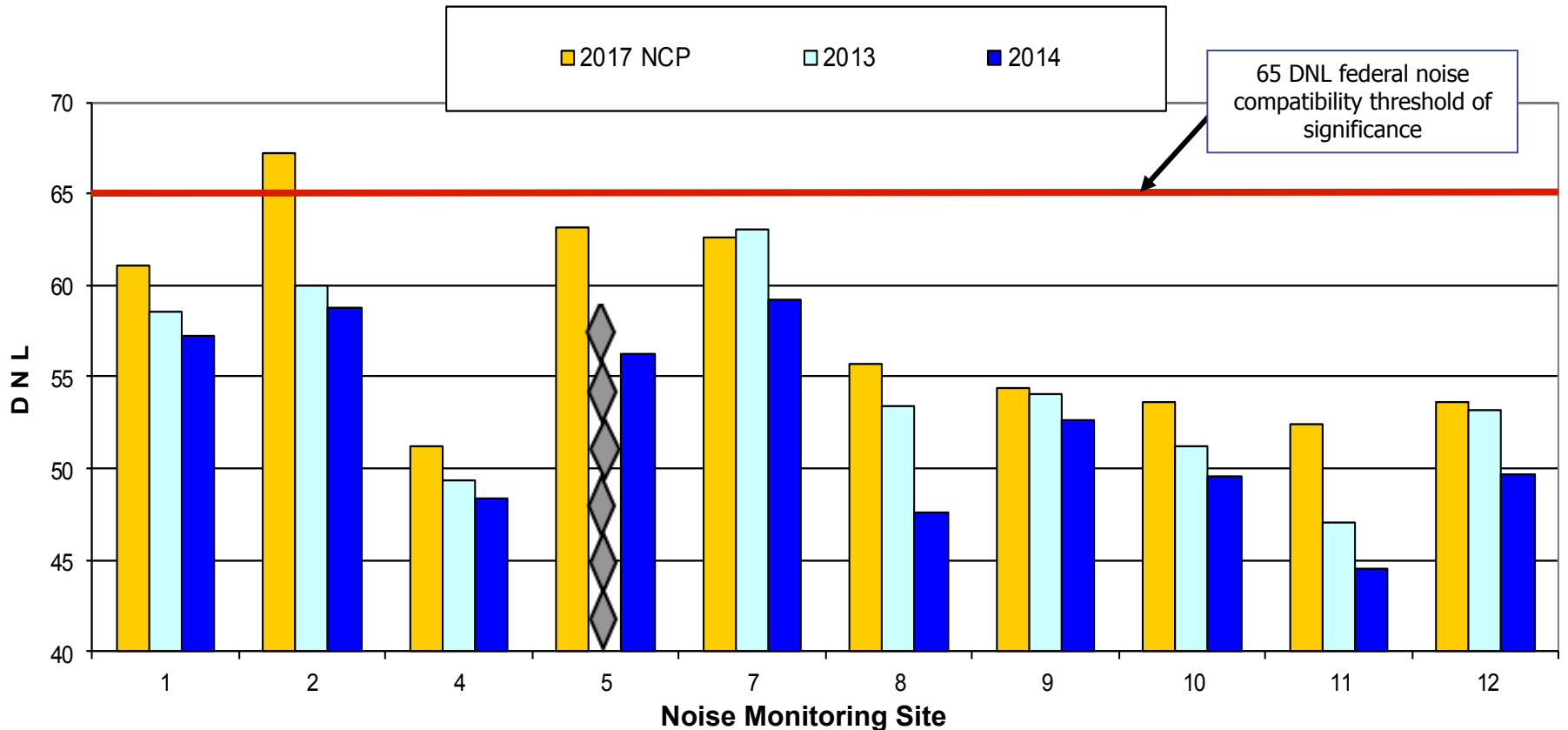
All arrivals intercepting final approach course beyond four miles of touchdown are shown: —————

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

Aircraft Noise – DNL by Noise Monitoring Site

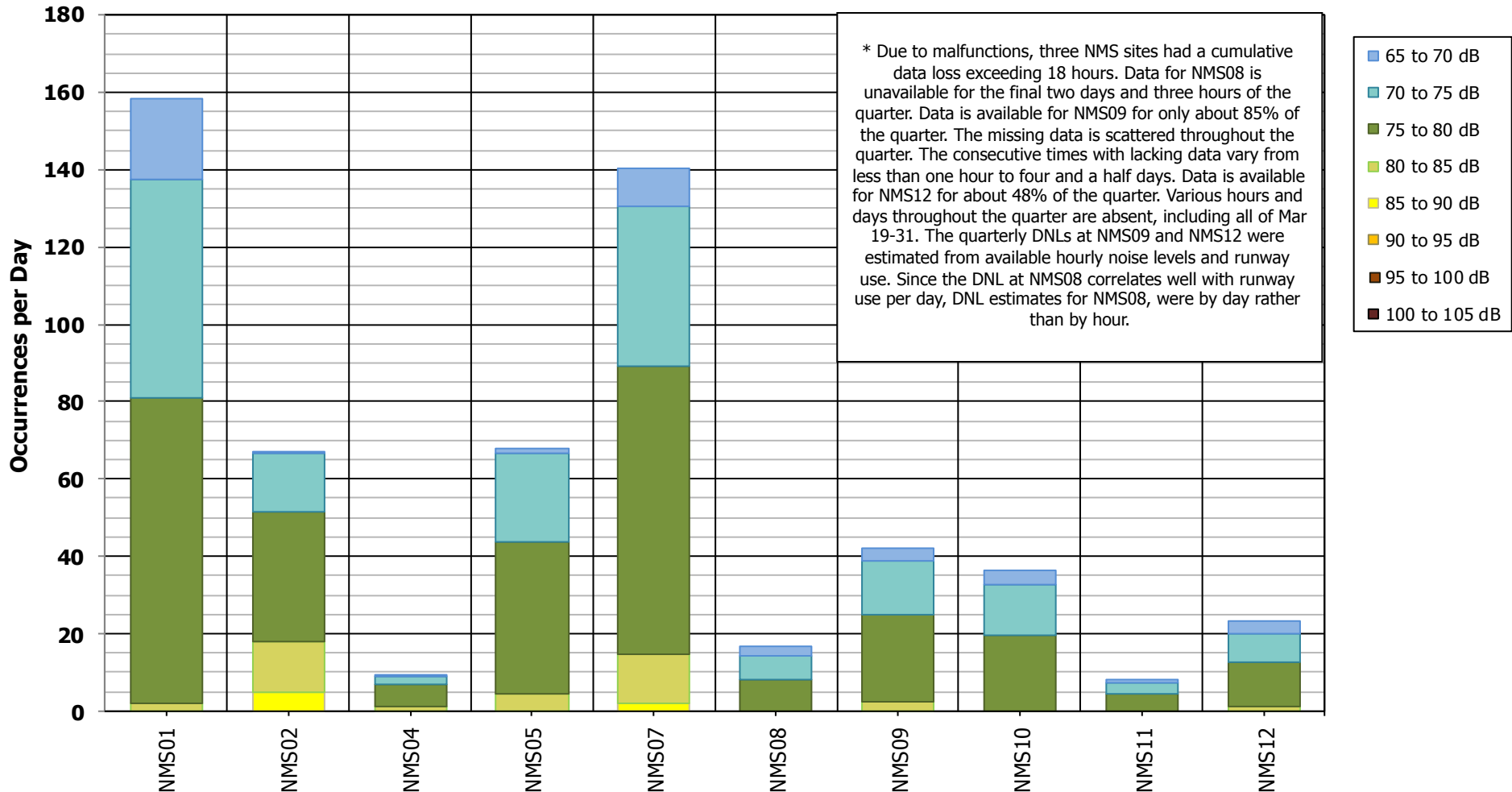


DNL: 1st Qtr, 2014 vs. 1st Qtr, 2013



1st Quarter, 2013 data for NMS05 is unavailable. Due to malfunctions, three NMS sites had a cumulative data loss exceeding 18 hours. Data for NMS08 is unavailable for the final 2 days and 3 hours of the quarter. Data is available for NMS09 for about 85% of the quarter. The missing data is scattered throughout the quarter. The consecutive times with missing data vary from less than 1 hour to 4½ days. Data is available for NMS12 for about 48% of the quarter. Various hours and days throughout the quarter are absent, including all of Mar 19-31. The quarterly DNLs at NMS09 and NMS12 were estimated from available hourly noise levels and runway use. Since the DNL at NMS08 correlates well with runway use per day, DNL estimates for NMS08, were by day rather than by hour.

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



Top 3 Lmaxs at each NMS, (1 of 2)



NMS	Lmax (dB)	Aircraft	Operation	Time and date	Sound Exposure Level (dB) ¹	Duration (sec)
NMS01	89.2	Dash 8-300 Turboprop	Arrival on Rwy 24L	2/28/14 10:37 AM	93.8	18.0
NMS01	87.7	Dash 8-300 Turboprop	Arrival on Rwy 24L	2/7/14 11:26 AM	92.2	17.0
NMS01	87.4	DC9-50	Arrival on Rwy 24R	1/6/14 1:20 PM	97.5	39.5
NMS02	93.8	Bolkow-105 Helicopter	Departure from CLE	3/10/14 2:12 PM	97.9	22.5
NMS02	92.9	MD-11	Arrival on Rwy 24L	1/7/14 6:51 AM	99.0	16.0
NMS02	92.7	Piaggio P.180 Avanti	Arrival on Rwy 24L	1/16/14 7:40 AM	98.0	27.0
NMS04	88.0	B737-300	Arrival on Rwy 28	1/27/14 8:31 AM	92.6	16.0
NMS04	86.8	MD-88	Departure off Rwy 6R	3/6/14 12:35 PM	95.2	24.0
NMS04	86.8	MD-88	Departure off Rwy 6R	3/5/14 12:39 PM	94.7	28.5
NMS05	92.2	B727-200	Departure off Rwy 24R	2/18/14 3:08 PM	100.9	34.5
NMS05	91.6	MD-11	Departure off Rwy 24R	1/10/14 10:35 PM	97.7	27.5
NMS05	91.0	MD-83	Departure off Rwy 24L	1/12/14 6:24 PM	96.6	30.0
NMS07	98.6	B727-200	Departure off Rwy 24L	1/22/14 11:53 PM	106.9	64.5
NMS07	97.1	DC9-50	Departure off Rwy 24L	1/17/14 4:54 PM	105.2	42.0
NMS07	96.9	DC9-50	Departure off Rwy 24L	1/12/14 4:38 PM	103.0	37.5

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

Top 3 Lmaxs at each NMS, (2 of 2)

NMS	Lmax (dB)	Aircraft	Operation	Time and date	Sound Exposure Level (dB)¹	Duration (sec)
NMS08 ²	85.2	Dash 8-200 Turboprop	Arrival on Rwy 6R	3/5/14 1:17 PM	89.1	21.0
NMS08 ²	83.5	DC9-10	Arrival on Rwy 6R	3/12/14 9:17 PM	88.7	17.5
NMS08 ²	81.3	Dash 8-300 Turboprop	Arrival on Rwy 6R	3/23/14 7:36 PM	89.0	23.0
NMS09 ³	90.0	B727-200	Departure off Rwy 24L	1/22/14 11:54 PM	99.6	75.5
NMS09 ³	89.3	MD-88	Departure off Rwy 24L	3/13/14 1:03 PM	96.2	29.0
NMS09 ³	88.6	DC9-50	Departure off Rwy 24L	1/17/14 4:54 PM	98.9	41.5
NMS10	88.5	Glassair III Piston Prop	Arrival on Rwy 6L	3/18/14 2:04 PM	92.1	11.5
NMS10	84.5	MD-83	Departure off Rwy 24L	1/12/14 6:25 PM	92.7	37.5
NMS10	82.3	B737-700	Departure off Rwy 24R	2/2/14 9:19 AM	89.7	19.0
NMS11	88.7	MD-88	Departure off Rwy 6L	3/18/14 1:58 PM	95.5	28.5
NMS11	84.8	WW II Era Aircraft	Departure off Rwy 6L	3/18/14 2:42 PM	94.5	39.5
NMS11	82.2	B737-300	Departure off Rwy 6R	1/5/14 4:54 PM	89.6	26.5
NMS12 ⁴	87.9	DC9-10	Departure off Rwy 6L	3/4/14 9:55 PM	95.0	27.0
NMS12 ⁴	84.0	MD-83	Departure off Rwy 6R	3/1/14 8:01 PM	92.6	37.0
NMS12 ⁴	84.0	Airbus A300-600	Departure off Rwy 6R	3/6/14 10:32 PM	91.1	25.5

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, data for NMS08 is unavailable for the final two days and three hours of the quarter.

³ Due to equipment malfunctions, data is available from NMS09 for only about 85% of the quarter.

⁴ Due to malfunctions, data is available for NMS12 for about 48% of the quarter. Various hours and days throughout the quarter are absent, including all of Mar 19-31.

Noise Complaints







City	Jan	Feb	Mar	1 st Q '14 Calls	%	1 st Q '13 Calls	%	1 st Q '14 Callers	%	1 st Q '13 Callers	%
Berea	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Brook Park	0	0	0	0	0.0%	1	2.4%	0	0.0%	1	12.5%
Cleveland	0	3	3	6	66.7%	34	82.9%	3	60.0%	1	12.5%
Fairview Park	1	0	2	3	33.3%	3	7.3%	2	40.0%	3	37.5%
Lakewood	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Middleburg Hts.	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
North Olmsted	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Olmsted Falls	0	0	0	0	0.0%	1	2.4%	0	0.0%	1	12.5%
Olmsted Twp.	0	0	0	0	0.0%	1	2.4%	0	0.0%	1	12.5%
Parma	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Parma Heights	0	0	0	0	0.0%	1	2.4%	0	0.0%	1	12.5%
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%
Totals	1	3	5	9	100.0%	41	100.0%	5	100.0%	8	100.0%

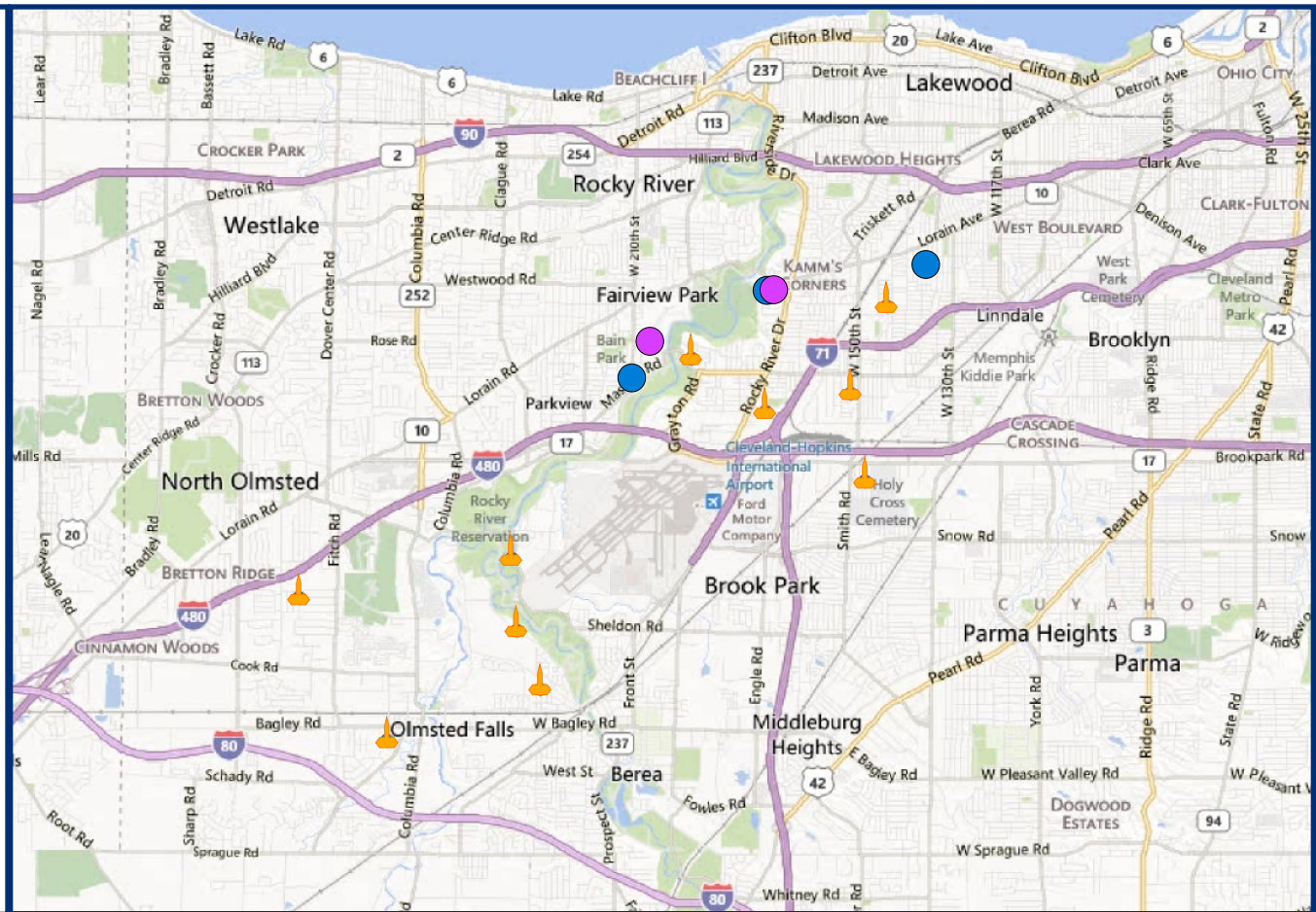
Noise Hotline – (216) 898-5220

Complaint Map

LEGEND

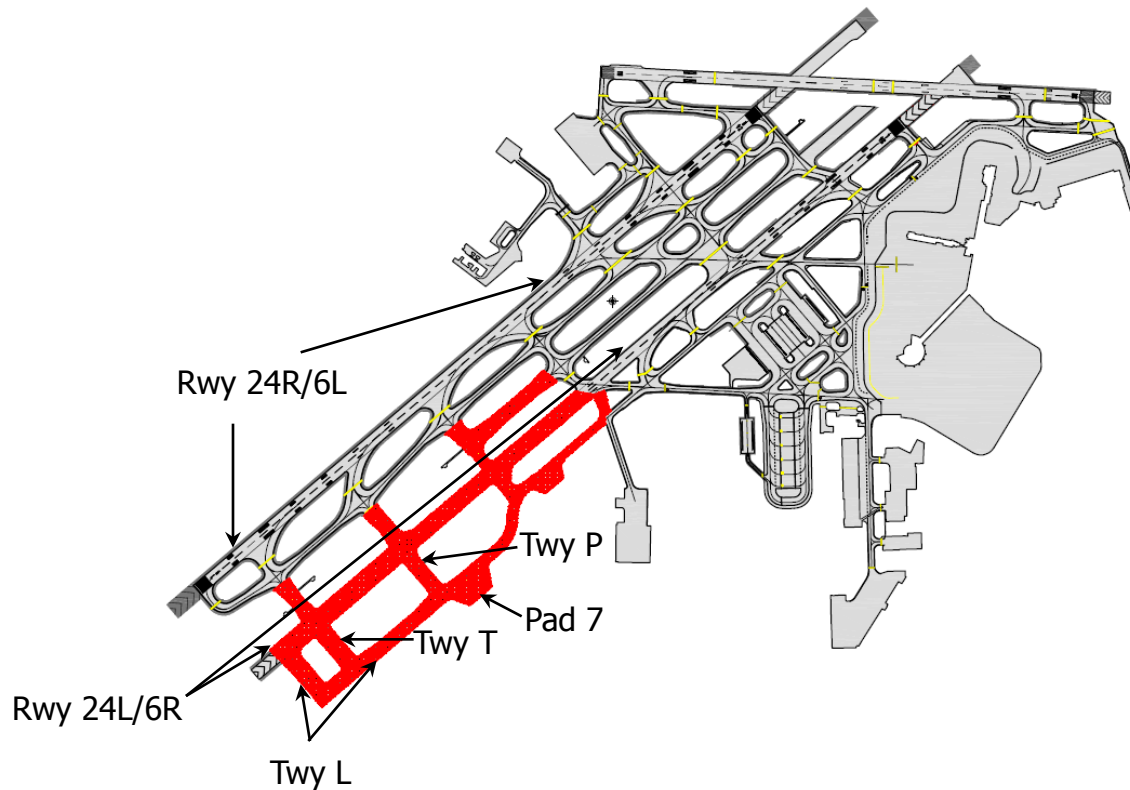
Complaints per household

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



Future Pavement Closures

From approximately July 7 through September 15, 2014, Runway 24L/6R and portions of Taxiways L, T, and P will be closed for rehabilitation. No landings or departures will take place on this runway during that period. In addition, Pad 7 will not be accessible and will be unavailable for aircraft engine run-ups.



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