



Noise Compatibility

Year End, 2013

March 27, 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.

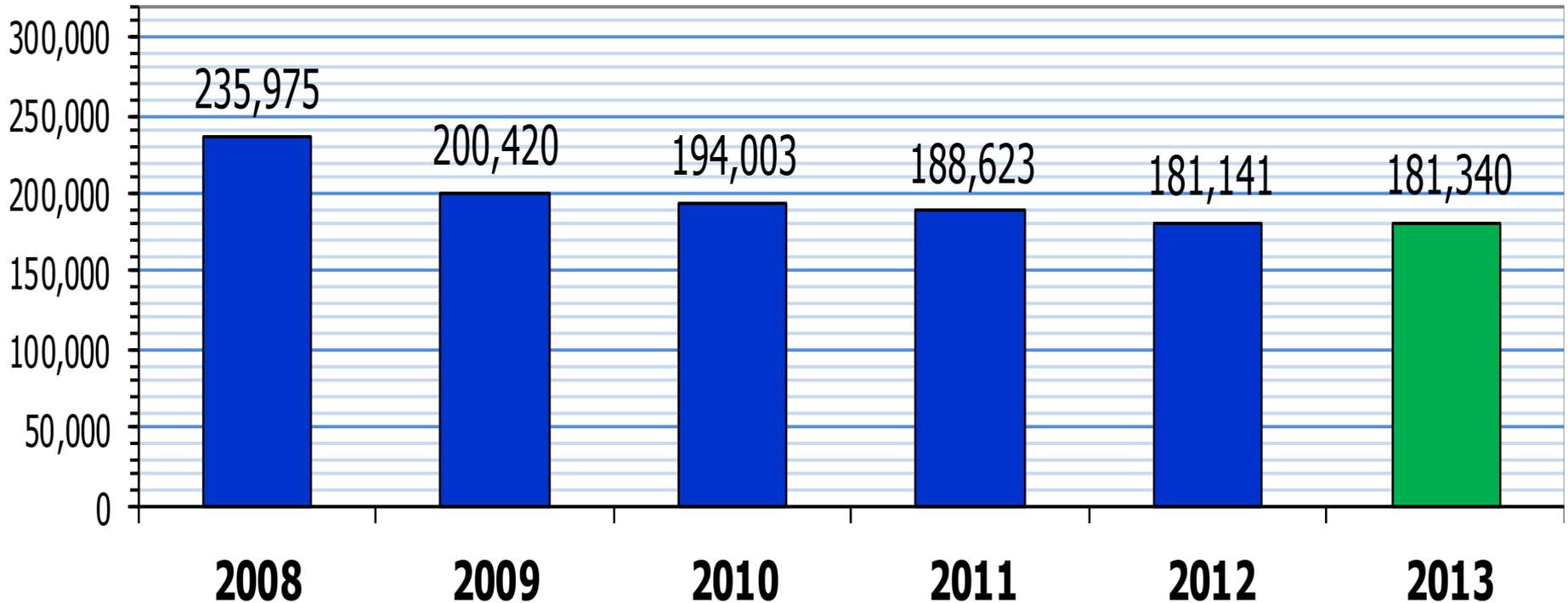
Noise Highlights of 2013



- Airport operations for Year 2013 were up 0.11%, compared to Year 2012.
- Noise Complaints for Year 2013 were up 91.8%, compared to Year 2012
- Runway 24R/6L at Burke Lakefront Airport was closed Jun–Dec, 2013 for construction to relocate the threshold and install Engineered Material Arresting System (EMAS)
- Received statement of qualifications from three noise consultants for the evaluation of the current Noise and Operations Monitoring System

Aircraft Operations

Cleveland Total Operations 2008 - 2013



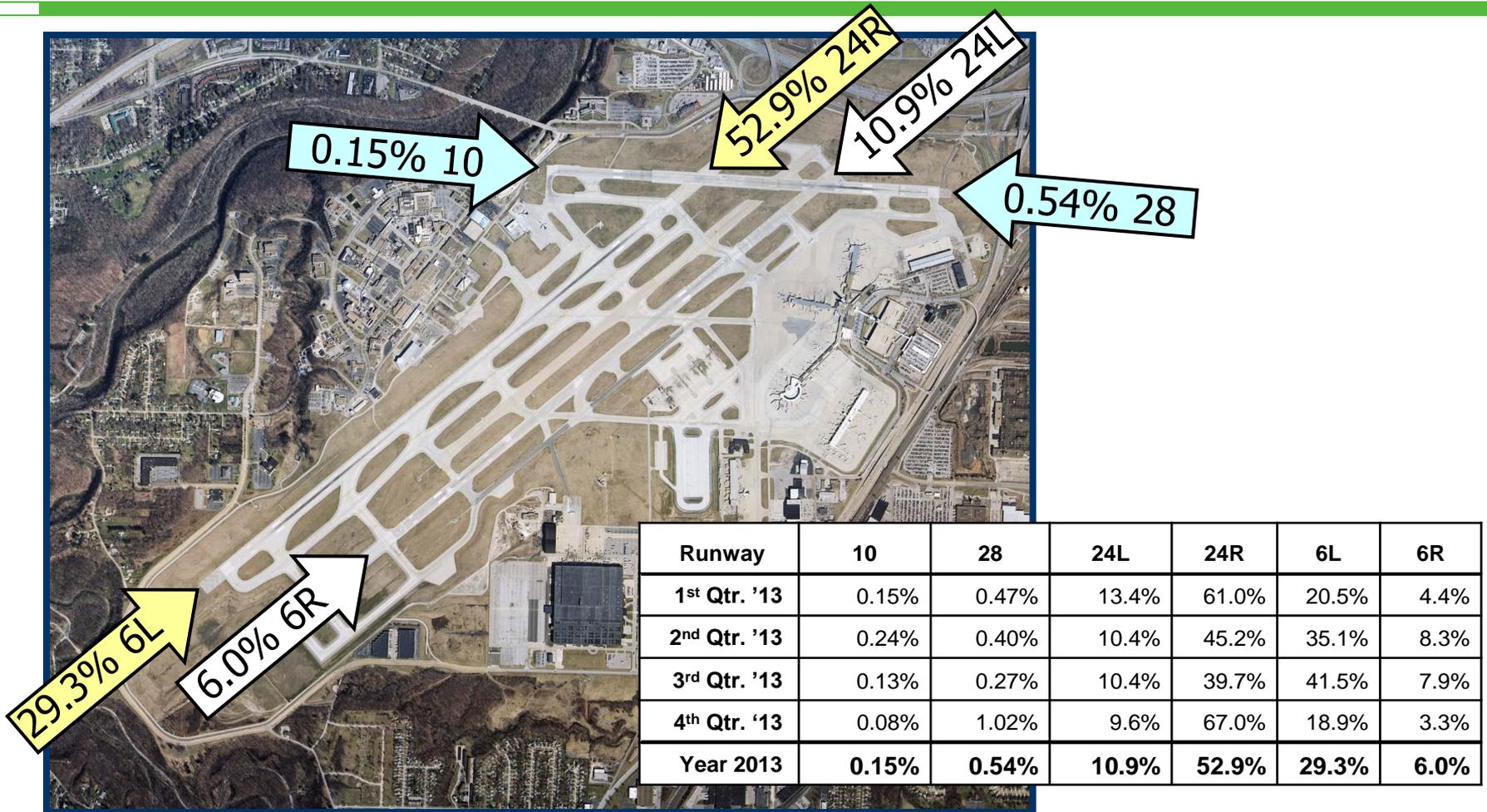
There were 181,340 landings and takeoffs in 2013; this is 0.11% above 2012 and 3.87% below 2011.

Landings & Takeoffs

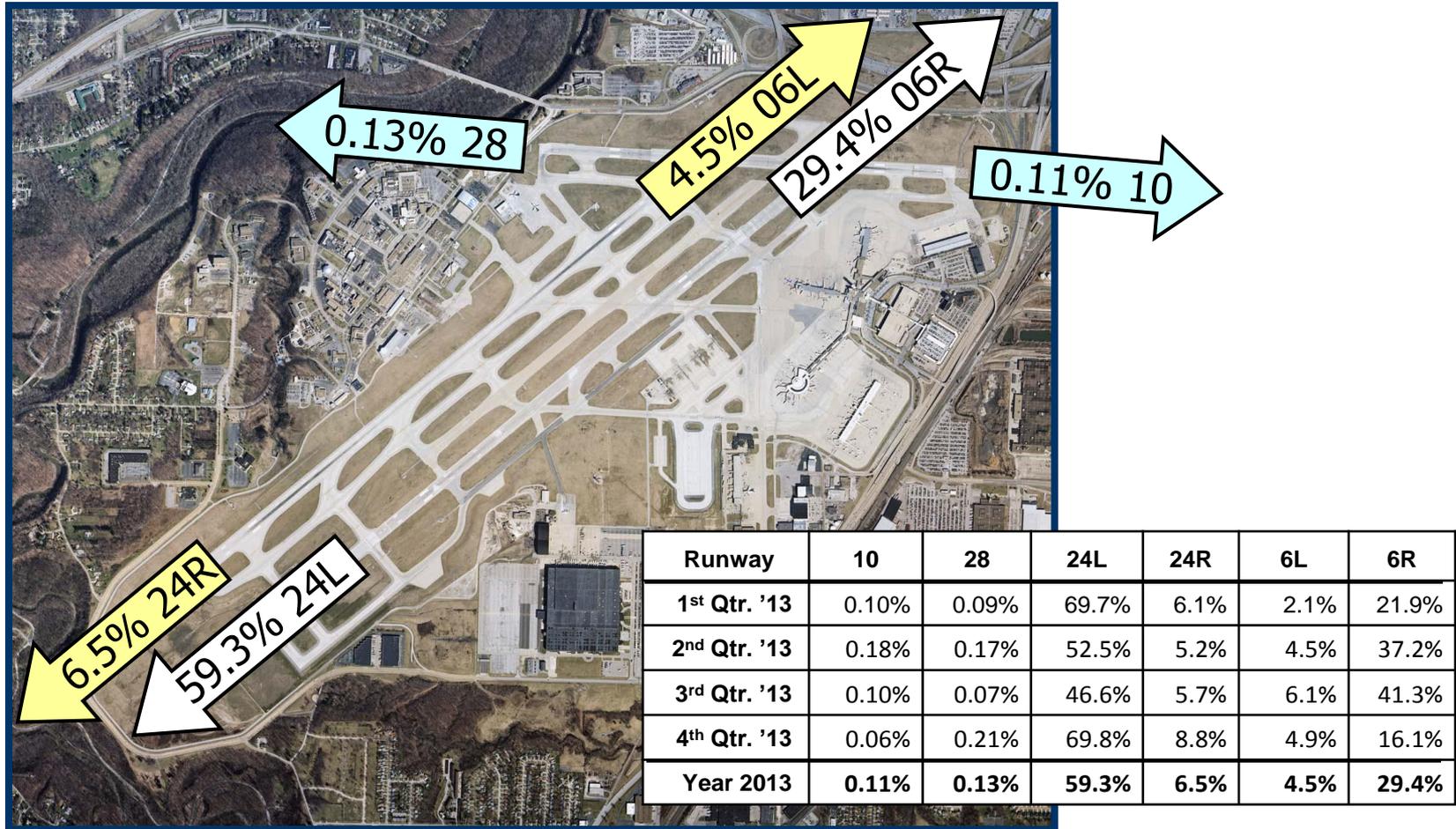
	Year 2013		Year 2012	
Commercial				
-Stage 2 with hush kit	752	0.42%	945	0.52%
-Heavy (incl. all B757s)	3,031	1.67%	3,493	1.93%
-MD80 series	2,914	1.61%	3,161	1.75%
-Other Stage 3	49,745	27.43%	46,234	25.52%
-Regional Jet	83,340	45.96%	84,981	46.92%
-Turboprop	30,870	17.02%	31,736	17.52%
Air Taxi	1,831	1.01%	1,794	0.99%
General Aviation	8,638	4.76%	8,575	4.73%
Military	219	0.12%	221	0.12%
Total	181,340	100.00%	181,141	100.00%

All aircraft above are Stage 3 certified with the exception of some Military and 1.5% of General Aviation (GA) aircraft, excluding helicopters. 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: Year 2013 Arrivals



Runway Use: Year 2013 Departures



Departure Headings – Day-time

Jet Departures, 6:00 a.m. to 11:00 p.m., 4th Qtr., 2013

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).

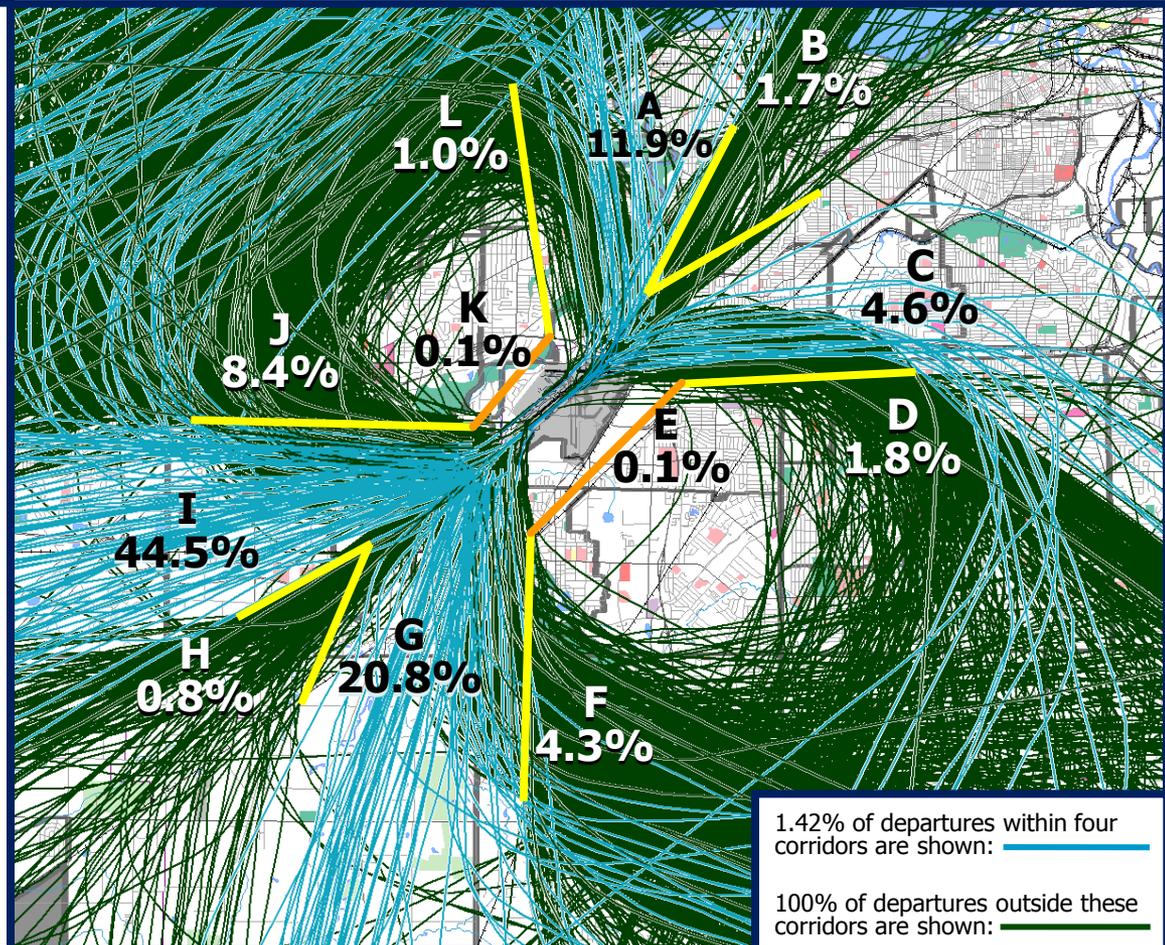
Another voluntary measure of the Noise Compatibility Program calls for jets departing between 6:00 a.m. and 11:00 p.m. from Runways 24L and 24R to take headings between 190° and 220° when turning left and between 250° and 280° when turning right until the jet is either 5 mi. away from the airport or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

83.9% within corridors

- A. 11.9%:** north corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- C. 4.6%:** east corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- G. 20.8%:** south corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL
- I. 44.5%:** west corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

16.1% outside corridors

- B. 1.7%:** flights crossing inner boundaries below 5,000 ft. MSL and then exiting between the north and south 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. 4.3%:** 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. 8.4%:** flights crossing the north boundary below 5,000 ft. MSL
 - K. 0.1%:** flights turning north before entering the corridor
 - L. 1.0%:** 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., 4th Qtr., 2013

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.

57.8% within corridors

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

F. 42.2%: 200 corridor, including flights crossing the corridor boundaries above 5,000 ft. MSL

42.2% outside corridors

B. 6.7%: flights crossing the south boundary below 5,000 ft. MSL

C. 0.4%: flights turning south before entering the 095 corridor

D. 1.8%: flights departing south without entering the 200 corridor

E. 11.3%: flights crossing the east boundary below 5,000 ft. MSL

G. 6.7%: flights crossing the west boundary below 5,000 ft. MSL

H. 12.1%: flights departing southwest without entering the corridor

I. 0.4%: flights departing west without entering the corridor

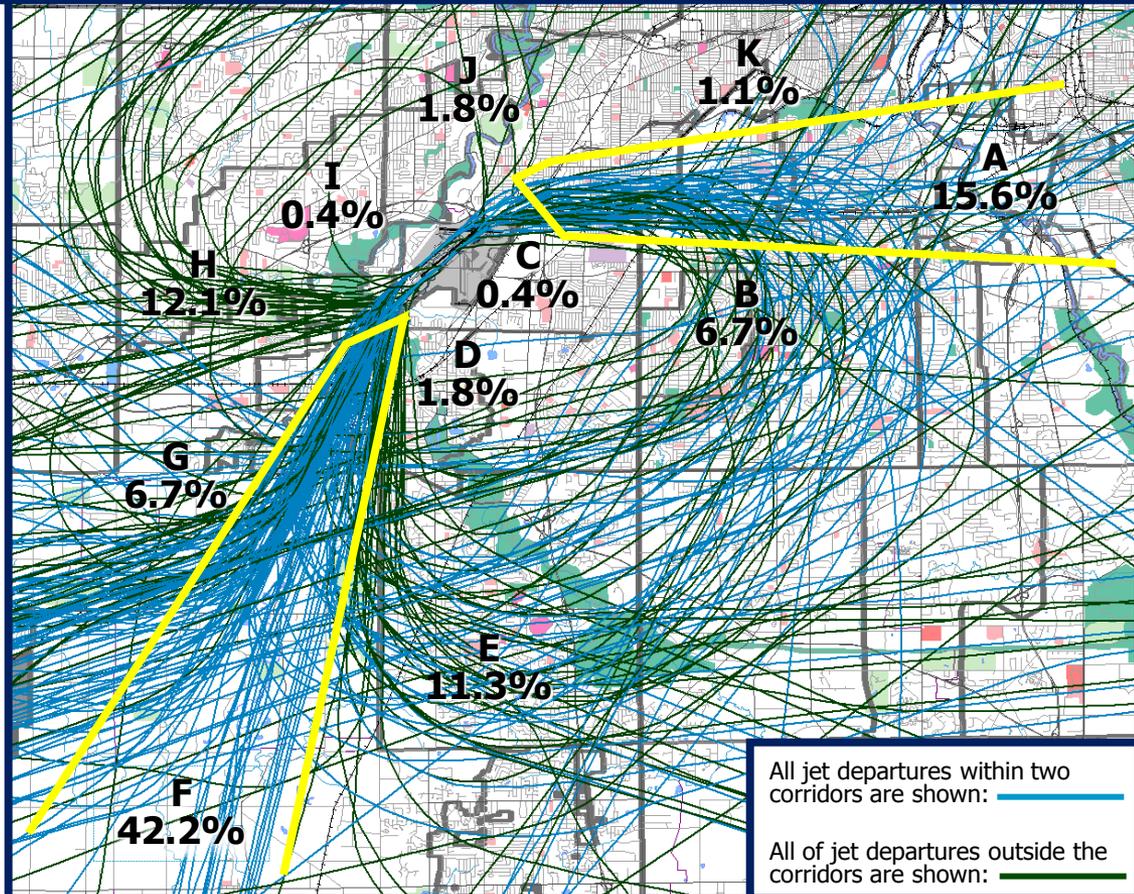
J. 1.8%: flights departing north, not east with the 095 corridor

K. 1.1%: flights crossing the north boundary below 5,000 ft. MSL

(There was one Rwy 10 and one Rwy 28 jet departure between 11:00 p.m. and 6:00 a.m. during the 4th Qtr. of 2013.)

The percentage of departures on each runway from 11:00 p.m. to 6:00 a.m. during the 4th Qtr. of 2013 were as follows:

Rwy	10	28	24L	24R	6L	6R
For jets:	0.4%	0.4%	63.0%	10.9%	5.6%	19.7%
For all aircraft:	0.3%	0.3%	63.3%	11.3%	5.8%	19.1%
77.8% 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 the corridors are shown: ———

Arrival Headings – Night-time

Arrivals, 10:00 p.m. to 6:59 a.m., 4th Qtr., 2013

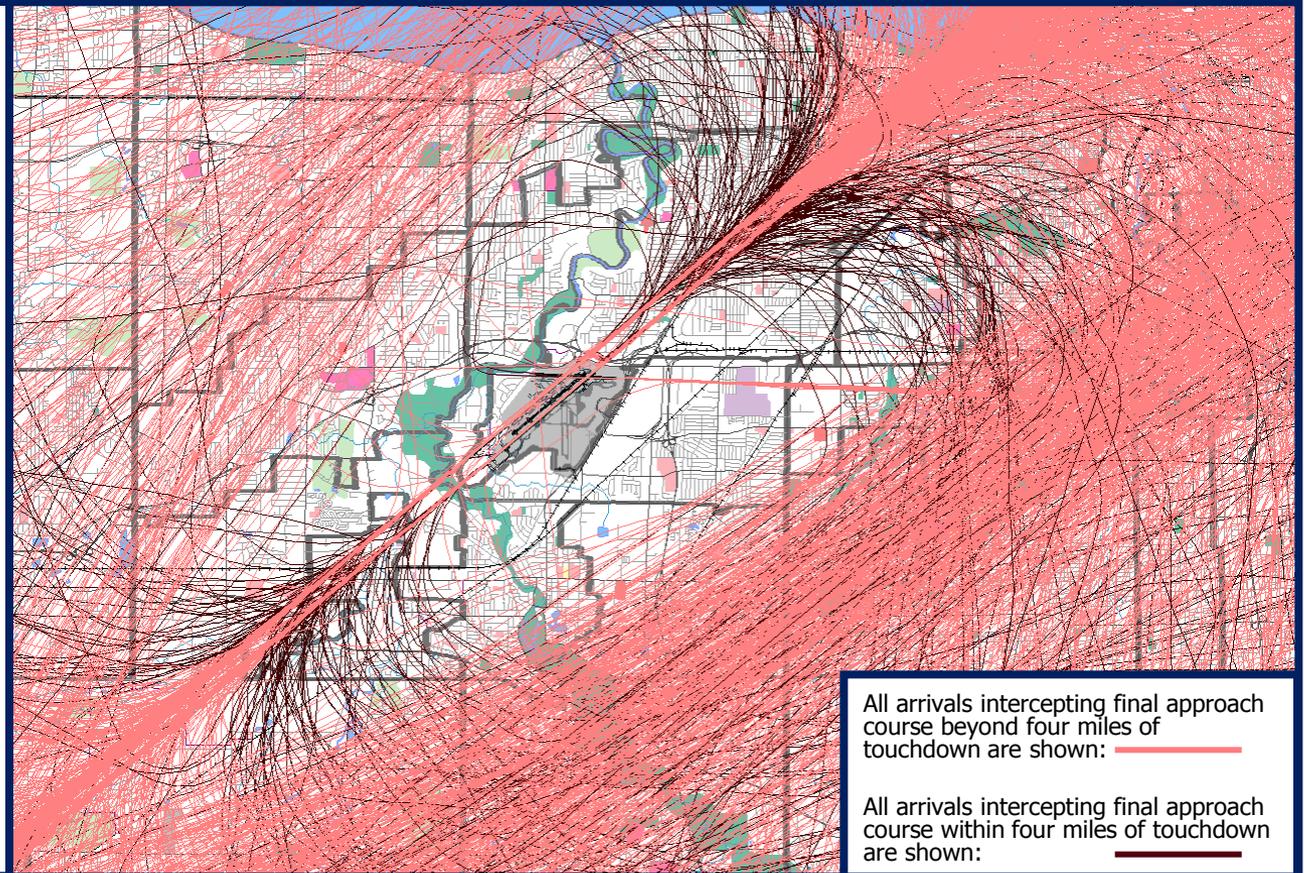
A voluntary measure of the Noise Compatibility Program calls for all aircraft arriving between 10:00 p.m. and 6:59 a.m., wind and weather permitting, to intercept final approach course no closer than four miles before touchdown.

90.9% beyond four miles and
9.1% 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 4th Qtr., 2013 was as follows:

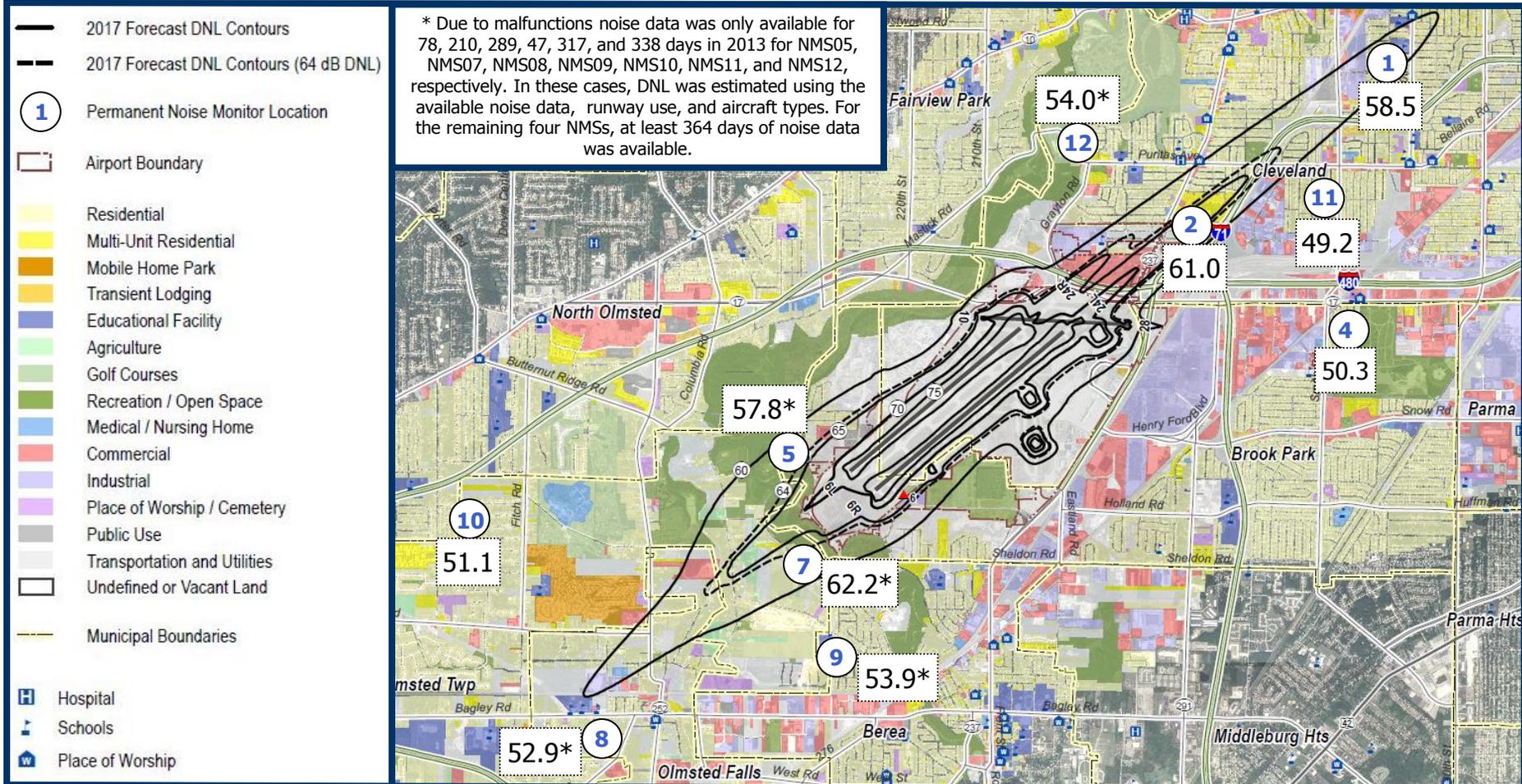
Rwy	Percentage of Arrivals	
	Jets	All Aircraft
10	0.0%	0.1%
28	0.3%	0.4%
24L	12.9%	13.4%
24R	61.0%	61.0%
6L	19.7%	19.1%
6R	6.1%	6.0%



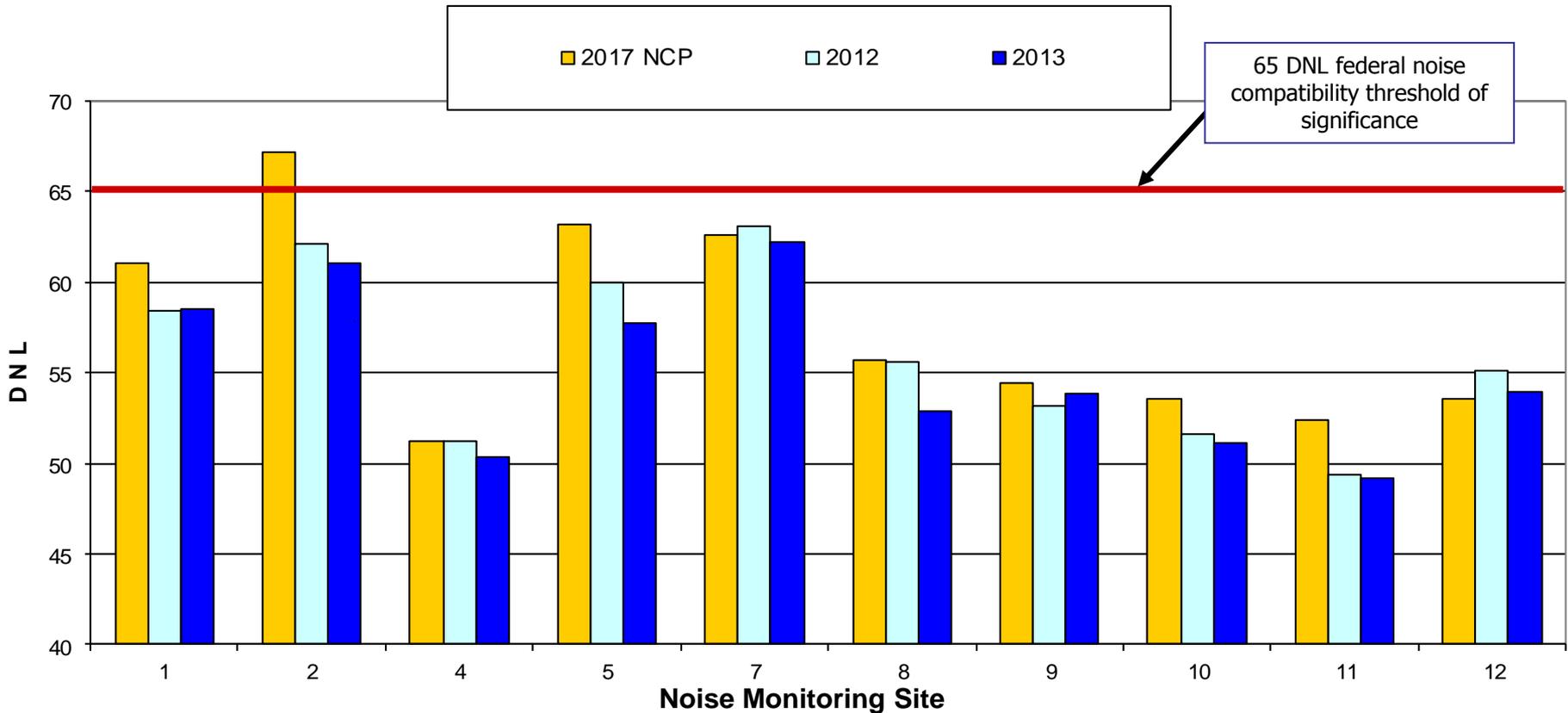
All arrivals intercepting final approach course beyond four miles of touchdown are shown: 

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

Aircraft Noise – DNL by Noise Monitoring Site

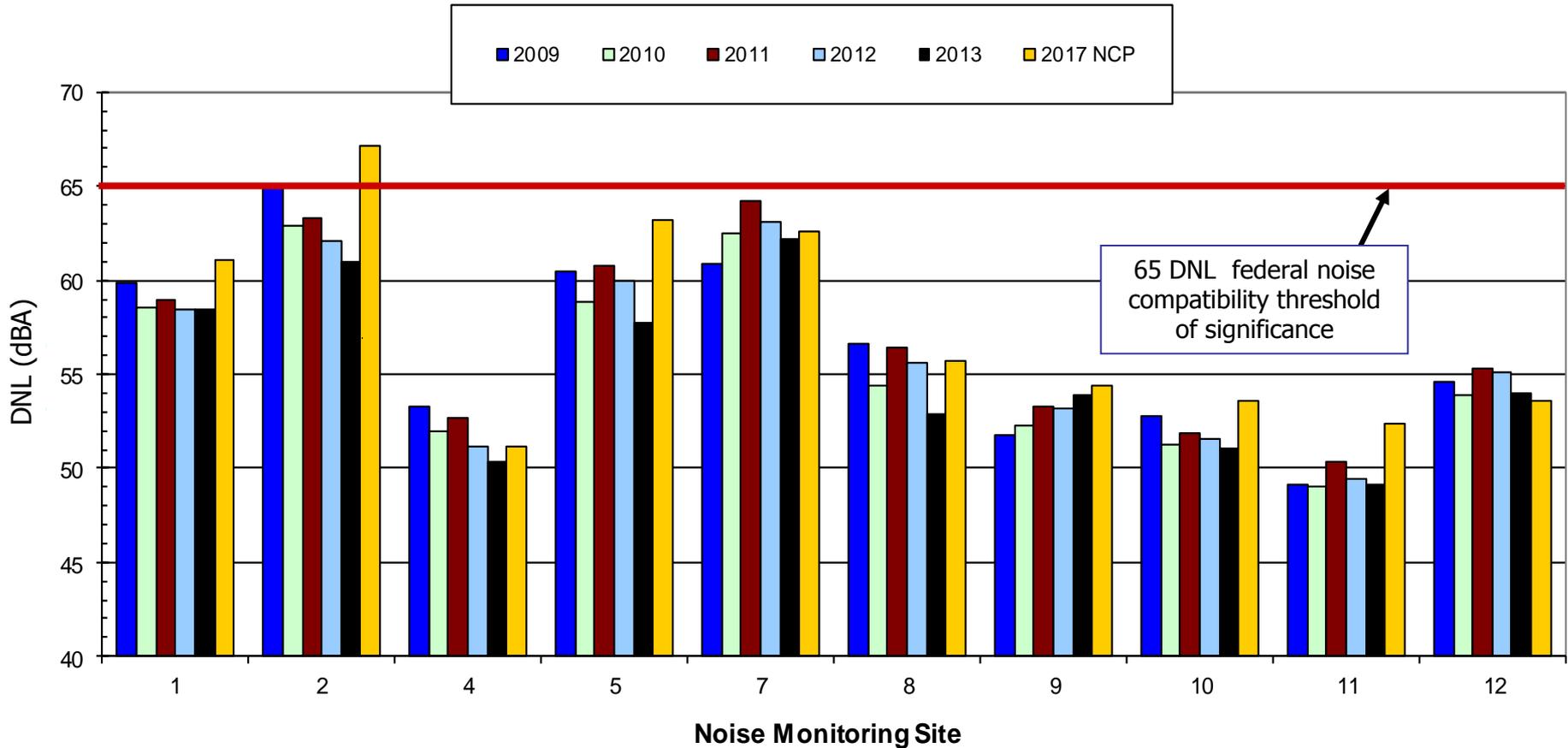


DNL: Year 2013 vs. Year 2012



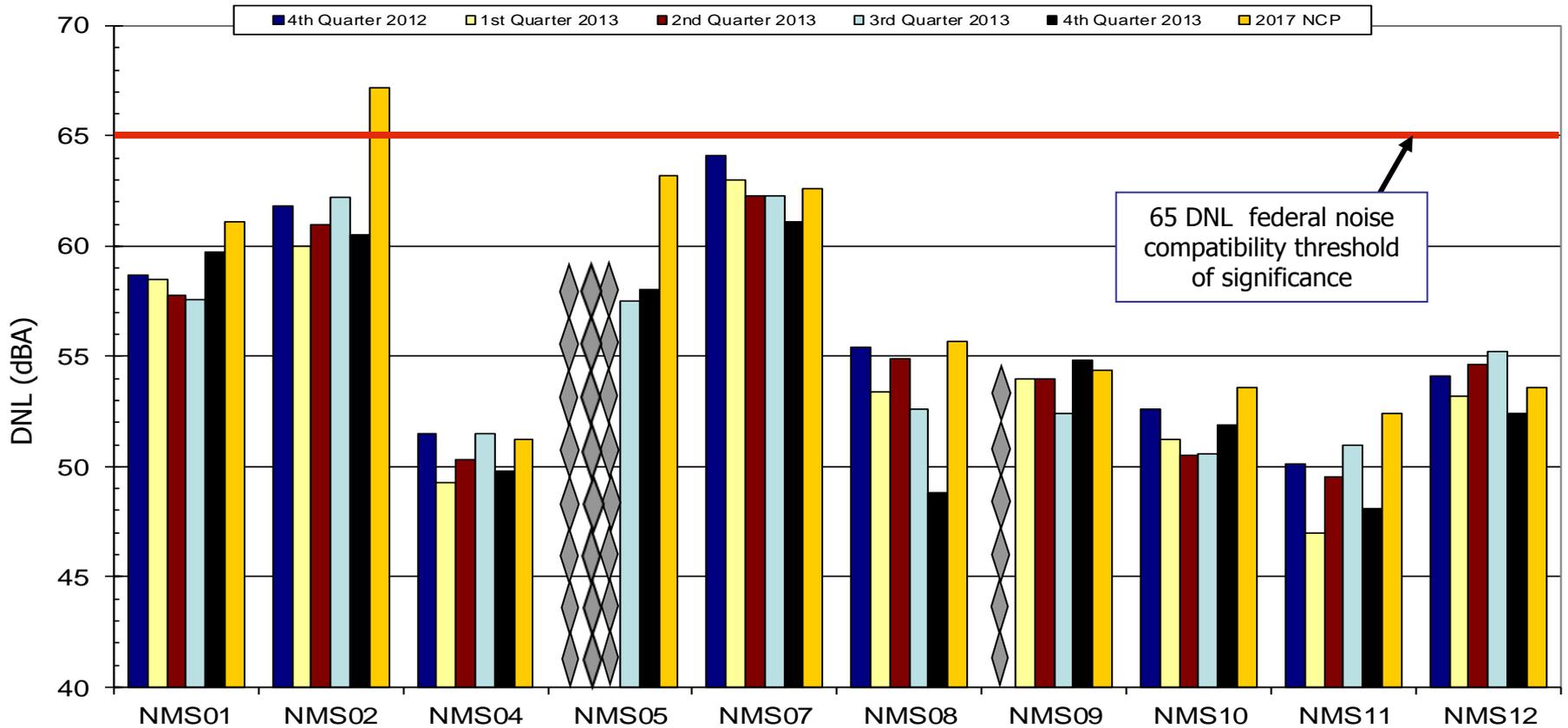
* Due to malfunctions noise data was available for 78, 210, 289, 47, 317, and 338 days in 2013 for NMS05, NMS07, NMS08, NMS09, NMS10, NMS11, and NMS12, respectively. In these cases, DNL was estimated using the available noise data, runway use, and aircraft types. For the remaining four NMSs, at least 364 days of noise data was available.

DNL Comparison by Year



* Due to malfunctions noise data was available for 78, 210, 289, 47, 317, and 338 days in 2013 for NMS05, NMS07, NMS08, NMS09, NMS10, NMS11, and NMS12, respectively. In these cases, DNL was estimated using the available noise data, runway use, and aircraft types. For the remaining four NMSs, at least 364 days of noise data was available.

Five Qtr. DNL Comparison

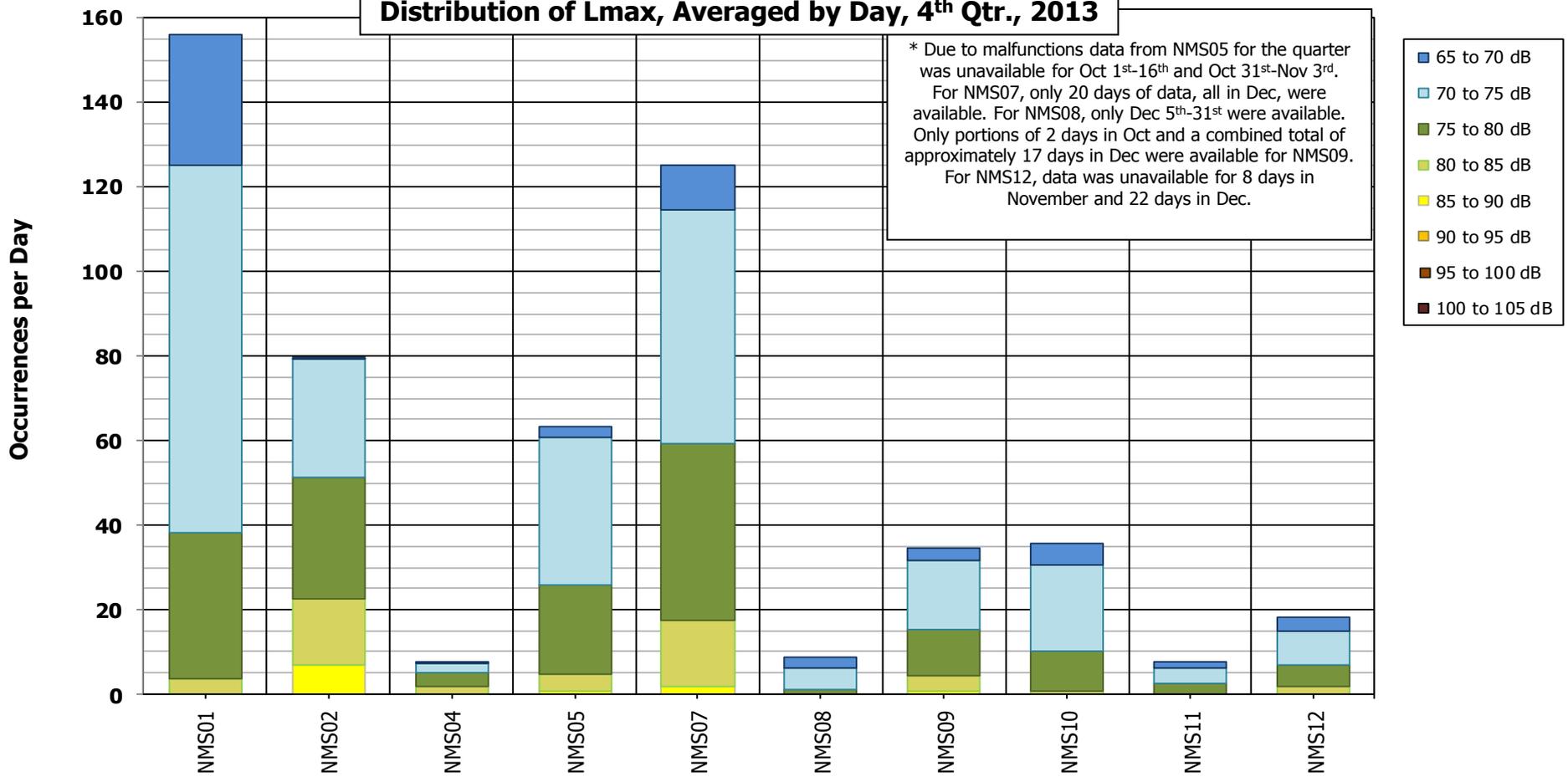


* Due to malfunctions noise data was available for 78, 210, 289, 47, 317, and 338 days in 2013 for NMS05, NMS07, NMS08, NMS09, NMS10, NMS11, and NMS12, respectively. In these cases, DNL was estimated using the available noise data, runway use, and aircraft types. For the remaining four NMSs, at least 364 days of noise data was available.

Maximum Level per Noise Event, Occurrences Averaged by Day

Distribution of Lmax, Averaged by Day, 4th Qtr., 2013

* Due to malfunctions data from NMS05 for the quarter was unavailable for Oct 1st-16th and Oct 31st-Nov 3rd. For NMS07, only 20 days of data, all in Dec, were available. For NMS08, only Dec 5th-31st were available. Only portions of 2 days in Oct and a combined total of approximately 17 days in Dec were available for NMS09. For NMS12, data was unavailable for 8 days in November and 22 days in Dec.



Top 3 Lmaxs at each NMS, 4th Qtr (1 of 2)

NMS	Lmax (dB)	Aircraft	Operation	Time and date	Sound Exposure Level (dB) ¹	Duration (sec)
NMS01	99.8	B757-200	Arrival on Rwy 24L	12/5/13 5:00 AM	105.0	47.5
NMS01	90.2	B757-200	Arrival on Rwy 24L	12/6/13 5:11 AM	97.0	32.5
NMS01	87.4	DC9-50	Arrival on Rwy 24R	11/18/13 2:05 PM	94.2	39.5
NMS02	103.1	B757-200	Arrival on Rwy 24L	12/5/13 5:01 AM	107.0	26.0
NMS02	97.8	B757-200	Arrival on Rwy 24L	12/6/13 5:12 AM	101.5	20.0
NMS02	96.2	DC9-50	Departure off Rwy 6L	10/29/13 11:25 AM	101.0	24.5
NMS04	90.5	MD-88	Departure off Rwy 6R	11/11/13 7:10 PM	98.0	37.0
NMS04	89.5	MD-88	Departure off Rwy 6R	10/14/13 8:17 AM	97.5	34.0
NMS04	88.9	MD-88	Arrival on Rwy 28	10/6/13 8:02 PM	94.7	17.0
NMS05 ²	96.1	B727-200	Departure off Rwy 24R	11/30/13 11:31 PM	103.6	38.5
NMS05 ²	94.5	Beech 1900 Turbo-prop	Departure off Rwy 24L	11/15/13 8:54 AM	101.2	42.5
NMS05 ²	90.4	DC9-50	Departure off Rwy 24R	11/5/13 11:17 AM	99.0	39.0
NMS07 ³	96.0	DC9-50	Departure off Rwy 24L	12/11/13 1:31 PM	103.7	36.5
NMS07 ³	95.7	DC9-50	Departure off Rwy 24L	12/19/13 11:45 AM	103.4	36.0
NMS07 ³	95.5	DC9-50	Departure off Rwy 24L	12/10/13 1:17 PM	102.6	32.0

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, data from NMS05 was unavailable for Oct 1st-16th and Oct 31st-Nov 3rd.

³ Due to equipment malfunctions, a combined total only 20 days of data of the quarter, all in Dec, were available from NMS07.

Top 3 Lmaxs at each NMS, 4th Qtr (2 of 2)

NMS	Lmax (dB)	Aircraft	Operation	Time and date	Sound Exposure Level (dB) ¹	Duration (sec)
NMS08 ⁴	80.5	MD-11	Departure off Rwy 24R	12/9/13 10:55 PM	88.8	24.0
NMS08 ⁴	80.2	ERJ-145XR	Arrival on Rwy 6L	12/14/13 7:50 AM	87.8	21.5
NMS08 ⁴	79.7	MD-88	Departure off Rwy 24R	12/13/13 9:39 AM	88.4	29.0
NMS09 ⁵	95.1	DC9-50	Departure off Rwy 24L	12/9/13 8:33 AM	102.1	38.5
NMS09 ⁵	94.7	MD-88	Departure off Rwy 24L	12/27/13 8:15 AM	99.0	34.5
NMS09 ⁵	89.4	MD-88	Departure off Rwy 24L	10/7/13 4:37 PM	96.8	35.0
NMS10	89.7	Learjet 24	Departure off Rwy 24L	10/23/13 5:19 PM	97.4	56.5
NMS10	86.5	MD-83	Departure off Rwy 24L	10/17/13 10:58 PM	91.5	32.0
NMS10	85.8	CRJ-700	Departure off Rwy 24L	12/9/13 3:01 PM	89.4	31.5
NMS11	91.4	MD-88	Departure off Rwy 6R	10/10/13 4:50 PM	97.7	31.5
NMS11	88.9	MD-88	Departure off Rwy 6R	12/21/13 8:29 AM	96.2	26.5
NMS11	88.6	MD-88	Departure off Rwy 6R	10/28/13 4:40 PM	95.0	46.5
NMS12 ⁶	88.4	MD-11	Departure off Rwy 6L	10/11/13 10:39 PM	96.2	32.0
NMS12 ⁶	87.9	MD-88	Departure off Rwy 6R	10/29/13 6:46 PM	95.6	30.0
NMS12 ⁶	87.9	MD-11	Departure off Rwy 6L	12/13/13 10:38 PM	95.8	30.0

⁴ Due to malfunctions, the only data available for the quarter from NMS08, was for Dec 5th - 31st.

⁵ Due to malfunctions, only portions of 2 days in Oct and a combined total of approximately 18 days in Dec were available from NMS09.

⁶ Due to malfunctions, data from NMS12 was unavailable for 8 days in November and 22 days in Dec.

Noise Complaints



City	1 st Qtr.	2 nd Qtr.	3 rd Qtr.	4 th Qtr.	2013 Calls	%	2012 Calls	%	2013 Callers	%	2012 Callers	%
Berea	0	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Brook Park	1	0	0	1	2	0.9%	7	5.7%	2	3.6%	4	10.3%
Cleveland	34	83	37	18	172	73.8%	73	59.8%	25	45.5%	10	25.6%
Fairview Park	3	6	6	1	16	6.9%	21	17.2%	13	23.6%	13	33.3%
Lakewood	0	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	0.0%
North Olmsted	0	0	0	1	1	0.4%	2	1.6%	1	1.8%	2	5.1%
Olmsted Falls	1	3	2	0	6	2.6%	3	2.5%	4	7.3%	3	7.7%
Olmsted Twp.	1	1	27	1	30	12.4%	9	7.4%	5	9.1%	3	7.7%
Parma	0	0	0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Parma Heights	1	0	0	0	1	0.4%	0	0.0%	1	1.8%	0	0.0%
Rocky River	0	0	5	0	5	2.1%	7	5.7%	3	5.5%	4	10.3%
Westlake	0	0	0	0	0	0.0%	0	0.00%	0	0.0%	0	0.0%
Other	0	0	1	0	1	0.4%	0	0.0%	1	1.8%	0	0.0%
Total 2013	41	93	78	22	234	100.0%	122	100.0%	55	100.0%	39	100.0%

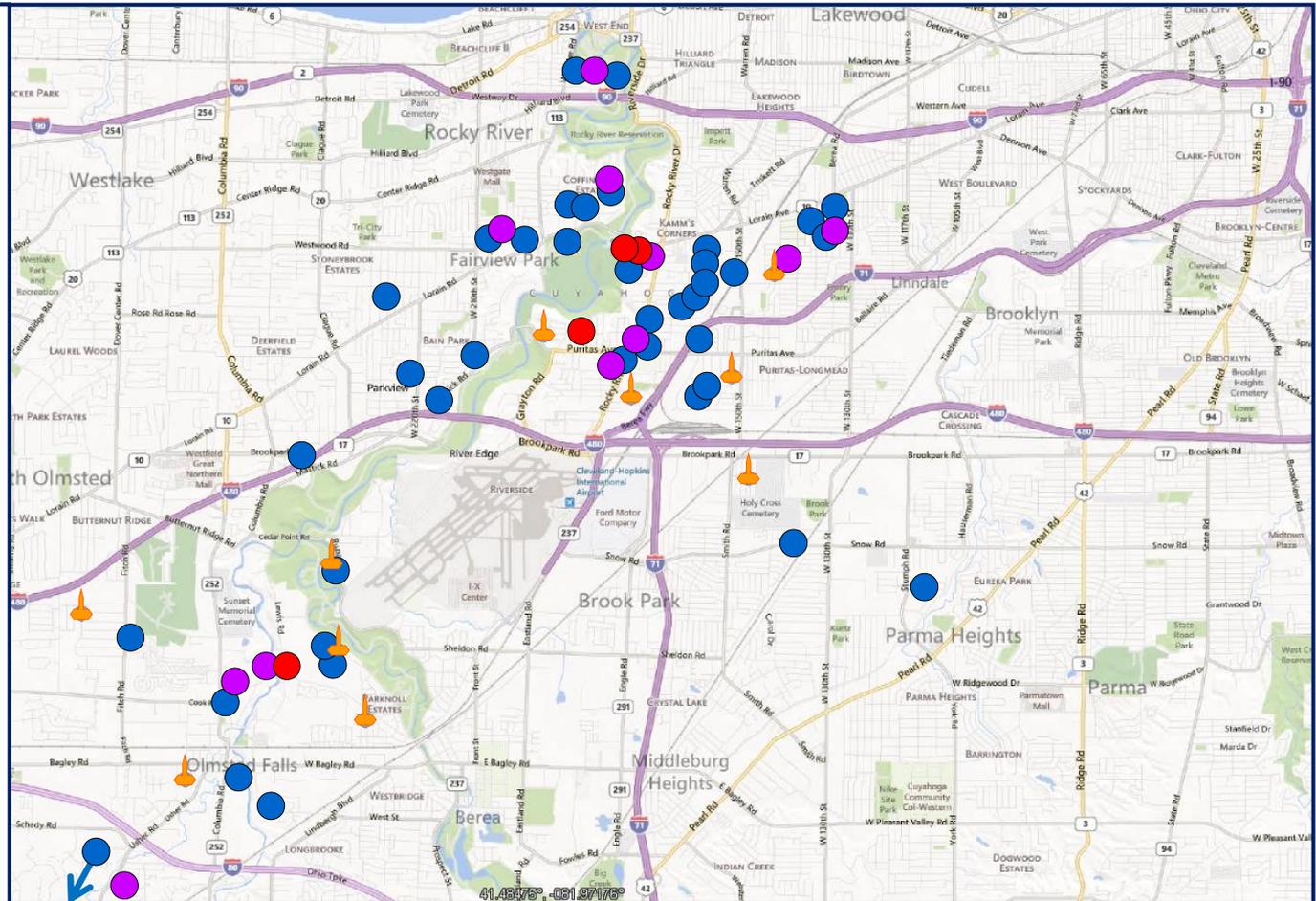
Noise Hotline – (216) 898-5220

2013 Annual Complaint Map

LEGEND

Complaints per household

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



2014 Forward Plan



- Continue implementation of FAA approved Part 150 measures
- Continue coordination with the Air Traffic Control Tower
- Engage noise consultant to evaluate the current Noise and Operations Monitoring System and make recommendations for new equipment
- Monitor potential noise impact due to the reduction of United Airlines service beginning April 1st
- Runway 24L/6R at Hopkins Airport will be closed for approximately 45 days beginning July 1st, due to construction.
- Labor Day Air show to be held at Burke Lakefront Airport featuring the Blue Angels

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