Edina and St. Louis Park Noise Monitoring Study

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Environment Department, Noise Program Office

Metropolitan Airports Commission
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MetroAirports.org

St. Louis Park and Edina Noise Monitoring Study

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St. Louis Park and Edina Noise Monitoring Study

Introduction

On May 8, 2014, the members of the Minneapolis – St. Paul International Airport (MSP) Noise Oversight Committee (NOC) directed the Metropolitan Airports Commission (MAC) Noise Program Office staff to conduct a noise monitoring study in the cities of St. Louis Park and Edina subject to the following conditions:

- The noise monitoring will be focused on assessing existing aircraft noise levels.
- The noise monitoring will be conducted for a period of two weeks in the fall of 2014.
- The monitoring will be limited to three locations in the area bound by I-494 on the south, Xerxes Avenue on the east from the intersection of I-494 and Xerxes Avenue extending in a straight line north to I-394, I-394 on the north, and Trunk Highway 169 on the west.
- Two of the monitoring locations will be within the City of Edina and one will be located in the City of St. Louis Park.
- The specific location of the monitors shall be determined by the respective cities, in consultation with MAC staff.
- The final report is due by December 1, 2014.

The NOC members identified the need for the study due to increased public concern regarding the potential changes in noise levels in the affected communities from the proposed implementation of Area Navigation (RNAV) flight procedures for arrivals and departures at MSP. In February 2014 the Federal Aviation Administration (FAA) notified the MAC that RNAV departures would not be implemented due to safety concerns arising from the MAC proposal to have RNAV departure procedures implemented on all runways except 30L and 30R. However, the FAA did indicate that Standard Terminal Arrival Routes (STARs) using RNAV would be implemented at MSP. Further, the STARs procedures would include Optimized Profile Descents (OPDs) for the aircraft approaches to MSP. STARs implementation at MSP is expected to begin in March and April, 2015.

Sound Level Meter Site Selection Process

The NOC At-Large representatives from the cities of St. Louis Park and Edina and the MAC Noise Program Office staff collaborated on an analysis leading to the final site selection for the three sound level meters (SLM). This analysis focused on a number of specific criteria designed to ensure the security of the SLMs and to accurately and completely capture aircraft noise levels. These criteria are provided below:

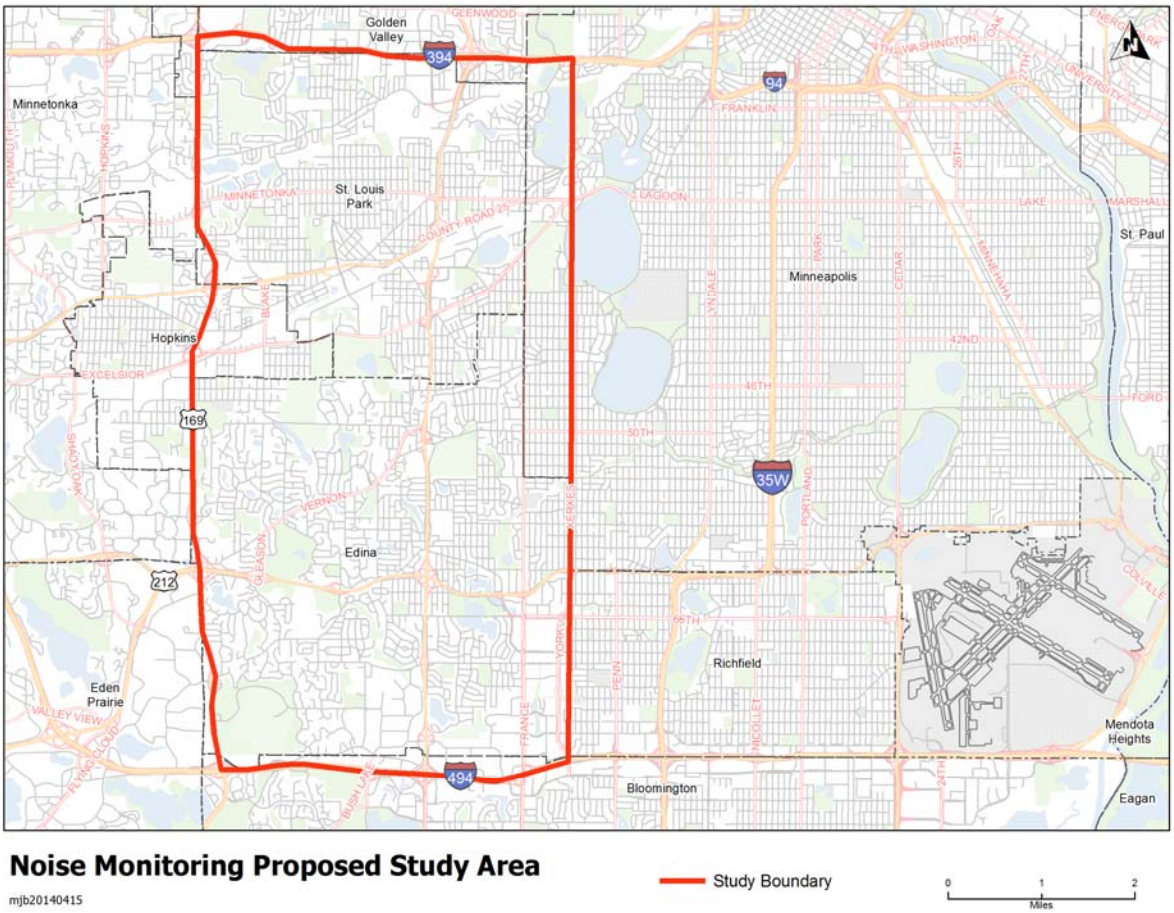
1. Public land, owned by the city (parks, easements, out-lots, etc.) was preferred for the site due to the short-term duration of the study and the monitoring schedule.
2. The noise monitoring sites needed to be distant from community noise sources such as highways, arterial streets, active construction sites, areas where crowds assemble, and railroad tracks, etc.

3. The noise monitoring sites needed to correspond with the departure density maps provided in the NOC Technical Advisor's Monthly Reports. Areas with increased density of overflights were preferred to meet the objective of measuring aircraft noise levels.
4. Residential areas were preferred for the final locations in order to capture aircraft noise levels within residential areas.

In keeping with the criteria, the NOC At-Large members representing Edina and St. Louis Park and MAC staff examined radar flight track patterns within the proposed study area using the Metropolitan Airports Commission Airport Noise and Monitoring System (MACNOMS) flight track data.

The boundaries of the study area are shown in the map below:

Figure 1

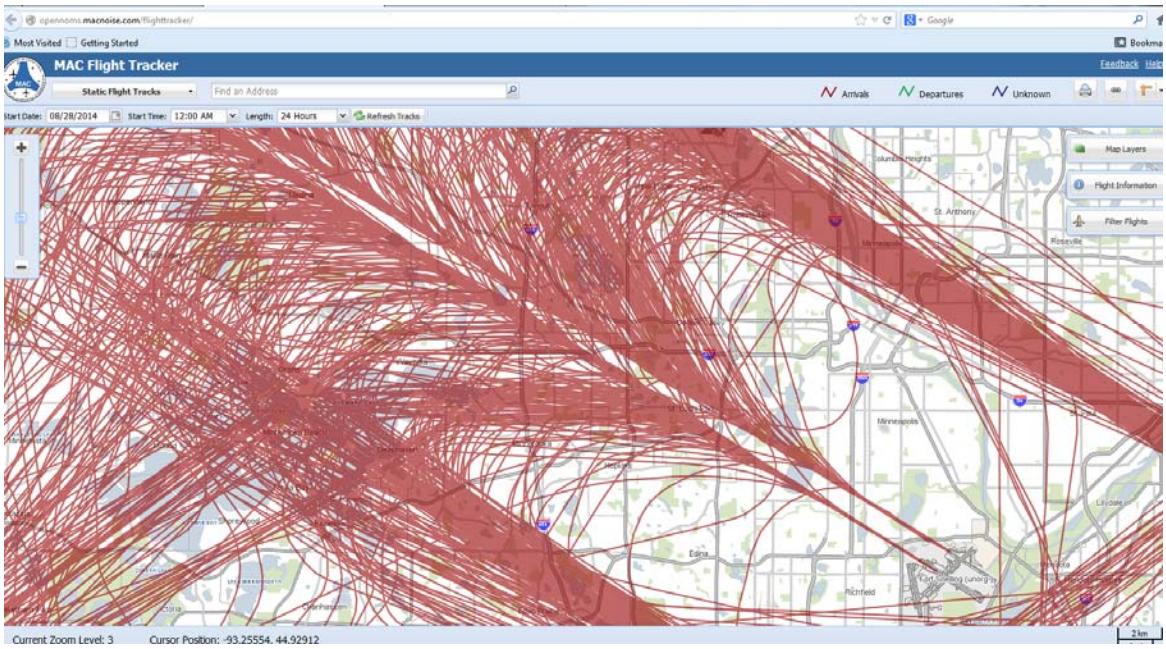


Source: MAC Noise Program Staff map.

The City of St. Louis Park was found to have a number of operations on the final approach flight path associated with arrivals on Runways 12R and 12L, and, to a lesser extent, straight out departures from Runways 30L and 30R. Arrival flight tracks are shown in Figure 2. The City of Edina has a greater flight track density in the southwest and southeastern quadrants of the city comprised of departures from Runway 30L

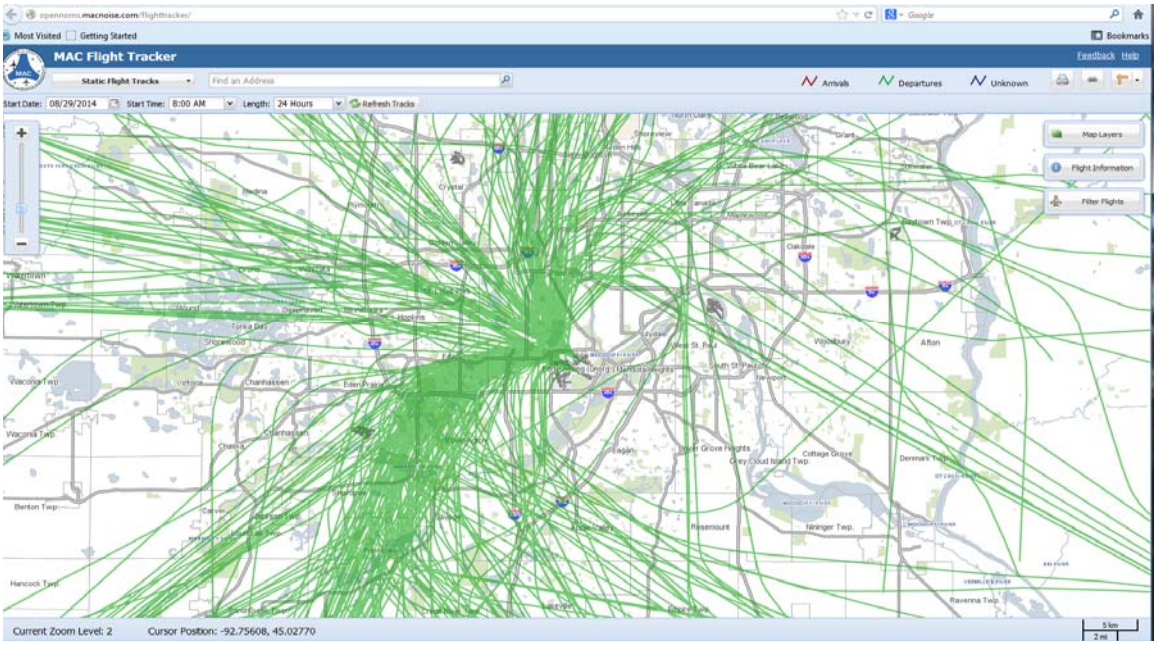
and, to a lesser extent, westbound departures from Runway 30R. Departure flight tracks are shown in Figure 3.

Figure 2



Source: MACNOMS Flight Tracker, August 28, 2014, 24 hours of arrivals.

Figure 3



Source: MACNOMS Flight Tracker August 29, 2014, 24 hours of departures.

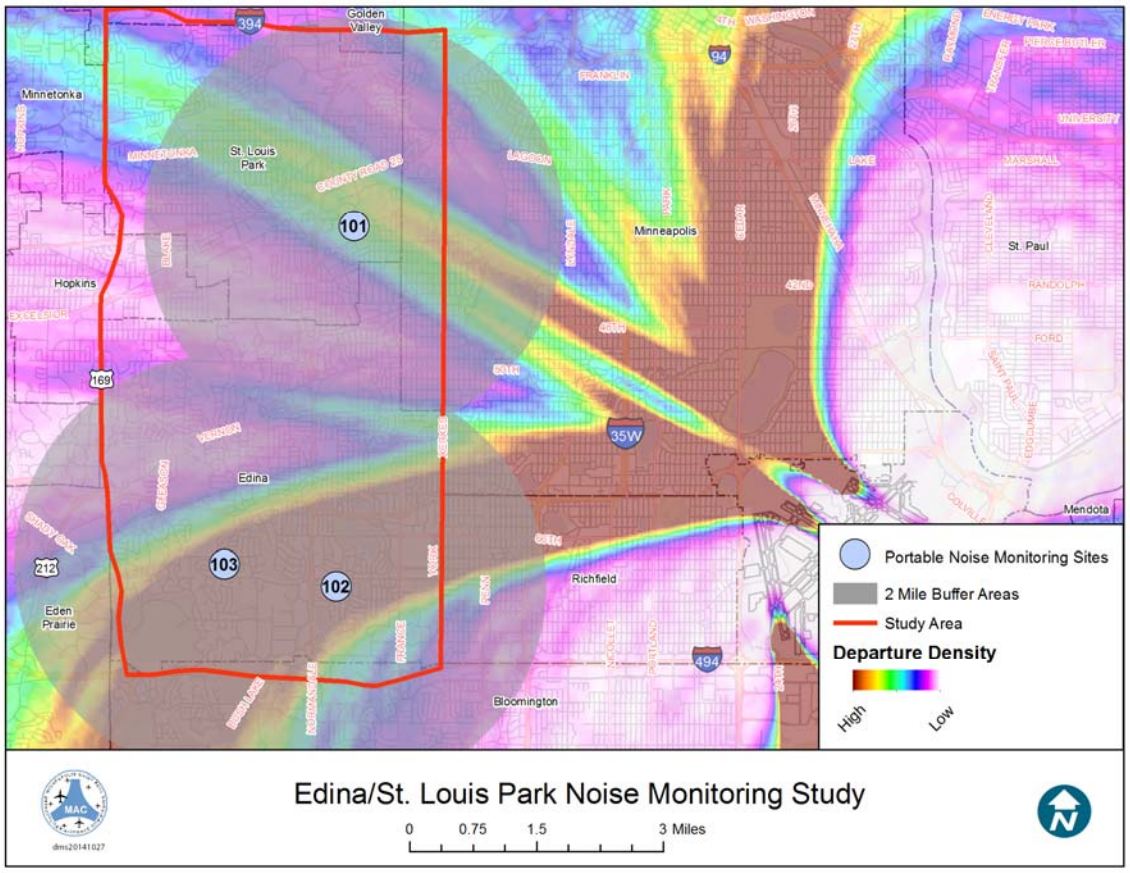
Figure 4 shows the final site locations of the sound level meters overlaid on a departure density gradient map that depicts typical departure operations at MSP. The addresses of the site locations selected were:

RMT #101
St. Louis Park Recreation Center
3700 Monterey Drive
St. Louis Park, MN

RMT #102
Edina Greenhouse and Arneson Acres Park
4711 W. 70th Street
Edina, MN

RMT #103
Edina McGuire Park
McGuire Road and W. 69th Street
Edina, MN

Figure 4



Source: MAC Noise Program Staff map and MACNOMS data

Noise Monitoring Measurement Methods

Monitoring Period

Noise event monitoring and data collection began at 12:00 a.m. on August 22, 2014 and concluded at 11:59 p.m. on September 4, 2014. This monitoring project was conducted by the staff of the MAC Noise Program Office.

Equipment

Laboratory-quality noise monitoring equipment manufactured by Larson Davis Incorporated (LD) was placed at each site. The main sound measurement components of each set up included a Type 1- LD 824 sound level meter, a LD PRM902 preamplifier, and a LD 2541 microphone. This equipment is calibrated and certified annually by the manufacturer.

Analysis Parameters

The sound level meter at each site monitored noise levels continuously utilizing slow response with A-weighting, as directed by 14 CFR Part 150. The sound level meter detected an event when the sound pressure level (SPL) reached a threshold of 65 dB and recorded events when the SPL remained at or above 63 dB for eight seconds or longer. Recorded events were then correlated with flight track data obtained from MACNOMS to determine whether the noise source was associated with a specific aircraft operation. Parameters used to correlate noise events and radar flight tracks included two-dimensional distance, altitude and time. Aircraft noise events that were not generated by operations associated with MSP were excluded from the data.

DNL Noise Metric

The Day-Night Average Sound Level (DNL) metric is utilized by the FAA to assess aircraft noise impact. The DNL is a cumulative measure of noise exposure during a 24-hour day with a 10 dB penalty added to noise events occurring between the hours of 10:00 p.m. and 7:00 a.m. Aircraft DNL reflects only aircraft events. Aircraft noise is generally considered by the FAA to be significant when levels reach an annual average daily DNL of 65 dB or greater, (cumulative measure of 365 days). An annual aircraft DNL at or above 65 dB is considered by the FAA to be incompatible with residential areas and other noise sensitive land uses.

Runway Use and Operations during the Monitoring Period

The arrival and departure operations from August 22, 2014 to September 4, 2014 on the runways of interest are shown in Table 1 below:

Table 1

Runway	Arrival Count – All Operations	% of All Runway Use
12L	1,689	21.90%
12R	1,947	25.20%
Total	3,636	47.10%
Runway	**Departure Count – All Operations**	**% of All Runway Use**
30L	2,168	28.10%
30R	1,656	21.50%
Total	3,824	49.60%

Source: MACNOMS data

Table 1 Notes:

1. "All operations" includes carrier jet, cargo, and general aviation aircraft types.
2. "% of All Runway Use" is the percentage of operations on listed runways as a portion the total arrival and departure operations on all MSP runways during the monitoring period.

Noise Monitoring Results

This study effectively collected aircraft event data in the cities of Edina and St. Louis Park. Given that the purpose of the study was to measure existing aircraft noise levels, a number of evaluation methods used in the Monthly NOC Technical Advisor's Report and similar reports prepared for the St. Paul Downtown Airport were used for data analysis. These techniques include Flight Density Maps, Time Above dB Thresholds for Arrival and Departure Related Noise Events, Arrival and Departure Related Noise Event Counts, and aircraft event monitoring site average daily DNL levels.

Flight Density Maps

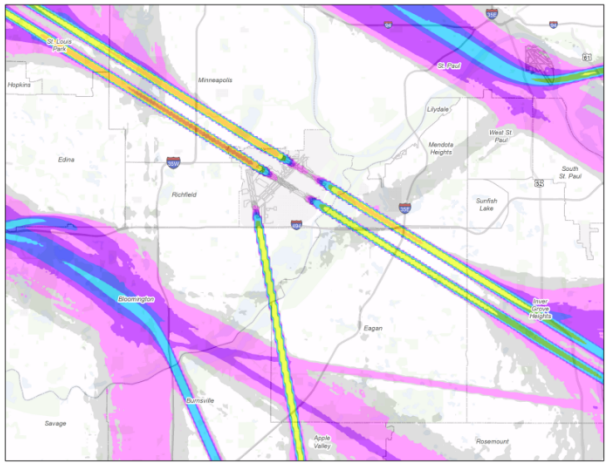
Figure 5 shows the density of flight tracks for arrivals and departures for all hours and the flight tracks of nighttime hours of the monitoring period. The flight density and nighttime operations flight tracks shown are typical of normal operations at MSP. Arrivals on Runways 12R and 12L are depicted as a narrow track over St. Louis Park as the aircraft align with the runways on the final approach heading (shown in the yellow, orange and red density tracks). Aircraft departing on Runway 30L and bound for destinations south of Minnesota are given instructions by the air traffic controllers to initiate a turn on a 260° or a 280° heading, which places the flight track on a path toward Edina. Because the turn is executed at slightly different times

by each aircraft, and because there are specific aircraft separation requirements, the departure flight tracks over Edina show more dispersion (shown in the pink, purple and blue density tracks).

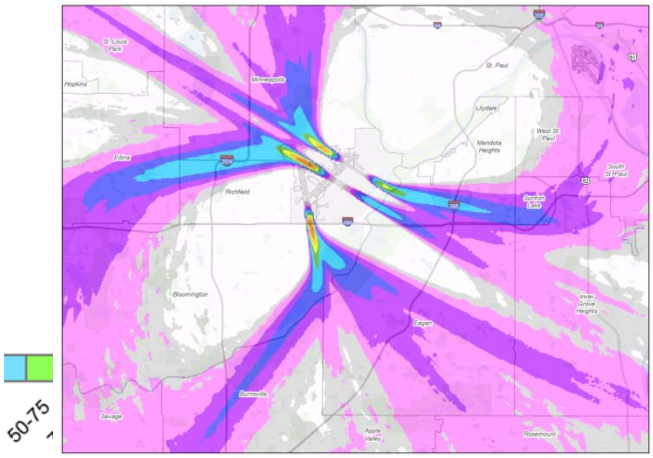
Figure 5

Airport Noise and Operations Monitoring System Flight Tracks
Carrier Jet Operations – August 22 – September 4, 2014

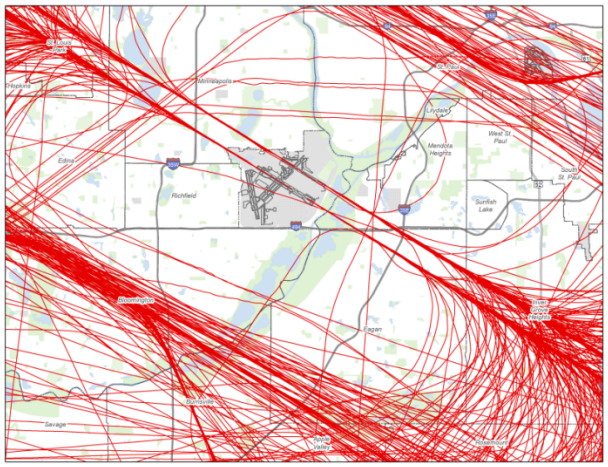
Aug 22 thru Sept 4 – 7,190 Carrier Jet Arrivals



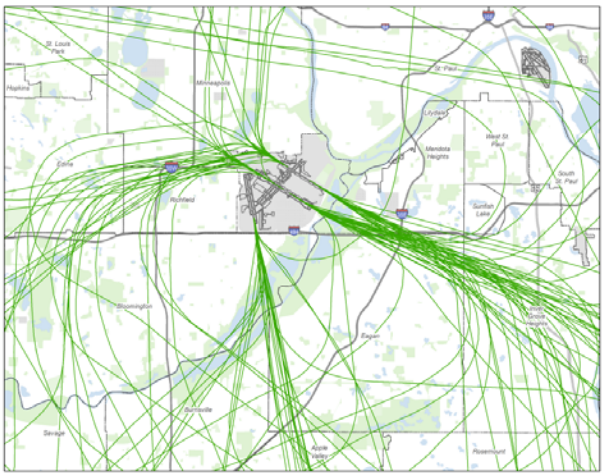
Aug 22 thru Sept 4 – 7,179 Carrier Jet Departures



Aug 22 thru Sept 4 – 511 Nighttime* Carrier Jet Arrivals



Aug 22 thru Sept 4 – 110 Nighttime* Carrier Jet Departures



*Note: Nighttime is 10:30 p.m. to 6:00 a.m.

Time above dB Thresholds for Arrival- and Departure-Related Noise Events

The time above a set dB threshold is used to evaluate the length of time, or duration, at the monitoring site above a given sound level. Runway use configuration at MSP is the sole responsibility of the FAA Air Traffic Control Tower (ATCT), and runway use can vary from hour to hour and day to day. There are times when the ATCT may be using Runways 30L and 30R for departures in a north flow of air traffic and other times when Runways 12L and 12R may be used for arrivals in a south flow of air traffic. There are hours during the day with high air traffic demand and hours during the night when air traffic demand is low. Over the 14 days of monitoring, there were a total of 336 hours of noise measurements recorded.

Table 2 shows the Time Above the thresholds of 65 dB and 80 dB in hours, minutes, and seconds for the arrivals at MSP during the monitoring period at each monitoring site. There were no aircraft arrival events with one-second Leq values greater than 90 dB. The "Leq" is an average sound level over a given time period; it is a single number that is the equivalent of the average sound pressure level of a noise event that has fluctuating sound pressure level values throughout the event.

Table 2

RMT ID	City	Address	Arrivals Time >= 65dB	% of Total (336 hours)	Arrivals Time >= 80dB	% of Total (336 hours)
101	St Louis Park	3700 Monterey Dr.	4:36:52	1.37%	0:00:02	<0.00%
102	Edina	4711 W. 70th St.	0:00:12	<0.00%	0:00:00	0.00%
103	Edina	McGuire Rd. & W 69th St.	0:00:39	<0.00%	0:00:00	0.00%

Source: MACNOMS data

Table 2 Note: These time values and dB levels are based upon one-second Leq levels.

Table 3 shows the Time Above 65 dB and 80 dB in hours, minutes and seconds for the departures at MSP during the monitoring period at each monitoring site. There were no aircraft departure events with one-second Leq values greater than 90 dB.

Table 3

RMT ID	City	Address	Departures Time >= 65dB	% of Total (336 hours)	Departures Time >= 80dB	% of Total (336 hours)
101	St Louis Park	3700 Monterey Dr.	0:37:56	0.19%	0:00:15	<0.00%
102	Edina	4711 W. 70th St.	1:54:31	0.57%	0:00:27	<0.00%
103	Edina	McGuire Rd. & W 69th St.	1:39:07	0.49%	0:00:16	<0.00%

Source: MACNOMS data

Table 3 Note: These time values and dB levels are based upon one-second Leq levels.

Arrival- and Departure-Related Noise Event Counts

Table 4 shows the number of aircraft and non-aircraft noise events at each monitoring location that met the analysis parameter of 65 dB and a sustained sound pressure level of 63 dB for eight seconds. These data affirm the effect of arrival operations on Runway 12R at the St. Louis Park site and the effect of departure operations from Runway 30L at the Edina sites. In addition, the data affirm the selected site locations met the objective of data collection for arrival and departure noise events. "Aircraft" events are those events that correlate the aircraft flight tracks with the correct time frame and the location of the sound level meter.

Table 4

Site 101 - 3700 Monterey Dr., St. Louis Park

	Rwy 12L	**Rwy 12R**	**Rwy 30L**	**Rwy 30R**	**Total**
Arrival	169	1244	0	0	**1413**
Departure	1	0	110	77	**188**
Total Aircraft Events					**1601**

Site 102 - 4711 W. 70th St., Edina

	Rwy 12L	**Rwy 12R**	**Rwy 30L**	**Rwy 30R**	**Total**
Arrival	0	2	0	0	**2**
Departure	0	0	542	22	**564**
Total Aircraft Events					**566**

Site 103 - McGuire Rd. & W. 69th St., Edina

	Rwy 12L	**Rwy 12R**	**Rwy 30L**	**Rwy 30R**	**Total**
Arrival	0	6	0	0	**6**
Departure	0	0	479	15	**494**
Total Aircraft Events					**500**

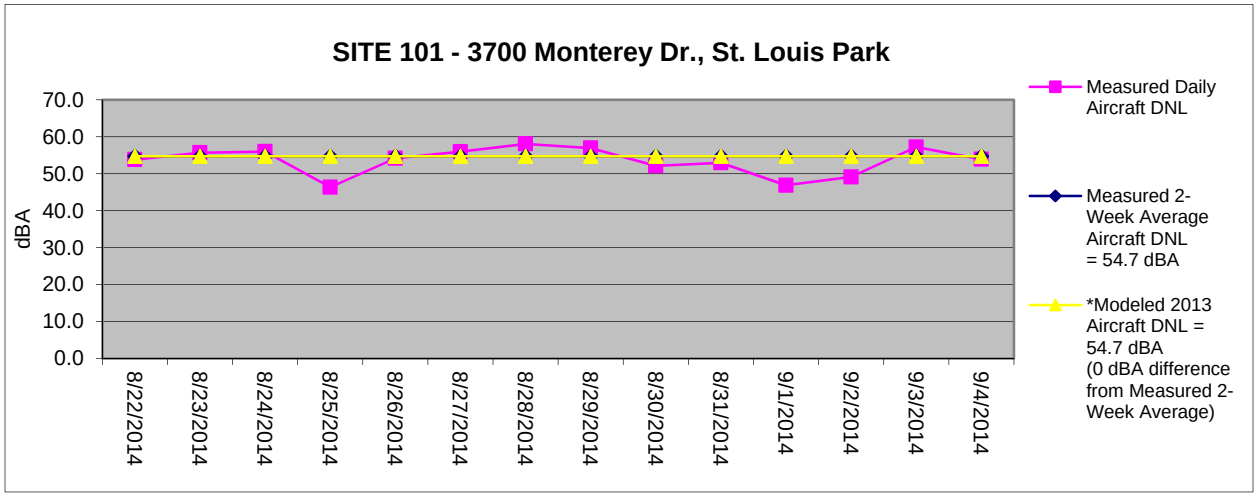
Aircraft DNL by Site

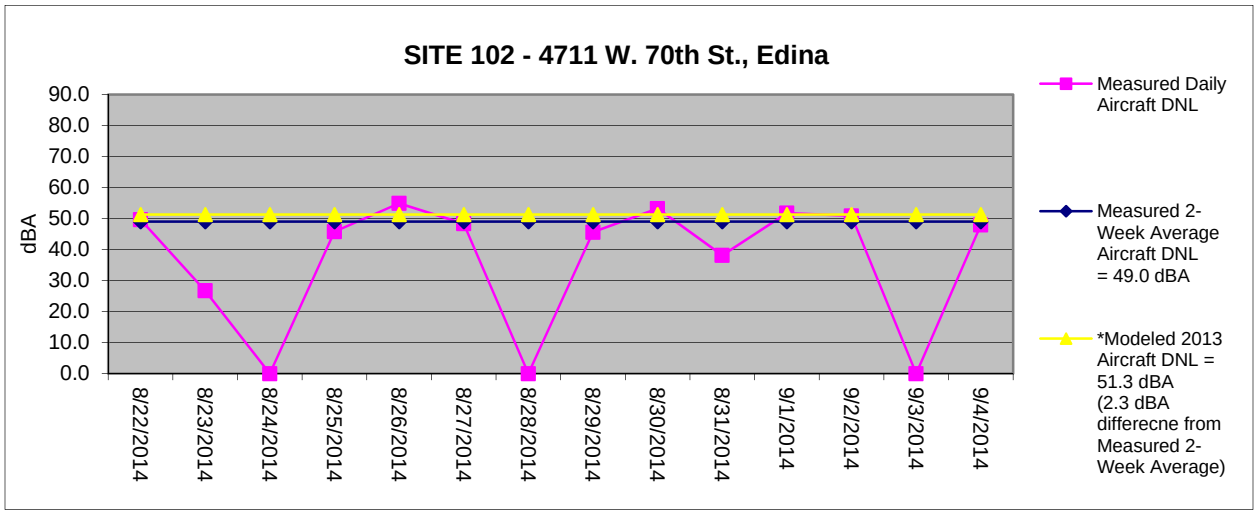
The Aircraft DNL charts for Sites 101, 102 and 103, shown in Figure 6 below, depict the average sound level for aircraft noise events in decibels. Due to the logarithmic nature of noise events, the loudest noise levels control the 24-hour average. In addition, the DNL calculation adds a 10 dB penalty to each aircraft operation during the nighttime hours from 10 p.m. to 7 a.m. The Measured Daily Aircraft DNL represents the DNL levels for each day while the Measured 2-Week Average Aircraft DNL represents the average DNL level for the duration of the study period. For comparison and validation purposes, the Integrated Noise Model 2013 Annual Actual Noise Contour study was utilized to calculate the Modeled 2013 Aircraft DNL values at the monitoring location. While this modeled DNL value takes an average of 365 days of operations, the levels correlate well with the Measured 2-Week Average Aircraft DNL levels at each site, as shown by

the blue and yellow lines in the charts below. At St. Louis Park Site 101, these lines are overlapping since the Measured 2-Week Average Aircraft DNL and the Modeled 2013 Aircraft DNL are both 54.7 dBA.

The chart for Edina Site 102 shows that on August 24, August 28 and September 3 there were no aircraft noise events that influenced the DNL levels on those specific days. Further analysis of flight data determined that, over the 24 hours of each day, MSP operations were departing to the south and aircraft were not proximate to the Edina monitoring sites. The chart for Edina Site 103 also shows that there were no aircraft noise events that influenced the DNL levels on August 24 and 28.

Figure 6





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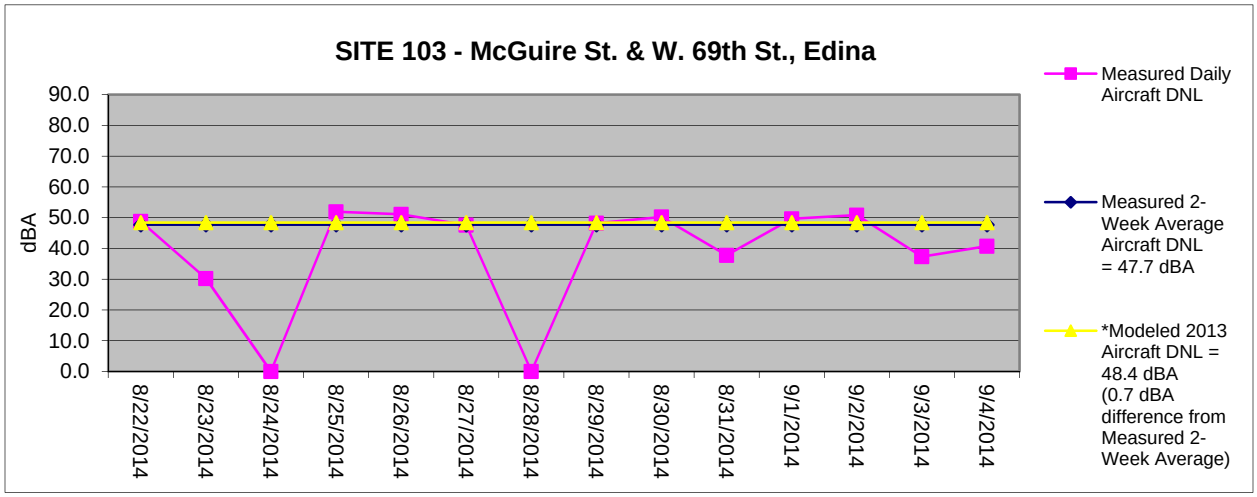

**Modeled 2013 Aircraft DNL values are derived from the 2013 Actual Annual Noise Contour*

The combined measured daily aircraft event DNL levels are compared in Figure 7 and the daily and overall average of aircraft noise event DNL levels are shown in Table 5 below:

Figure 7

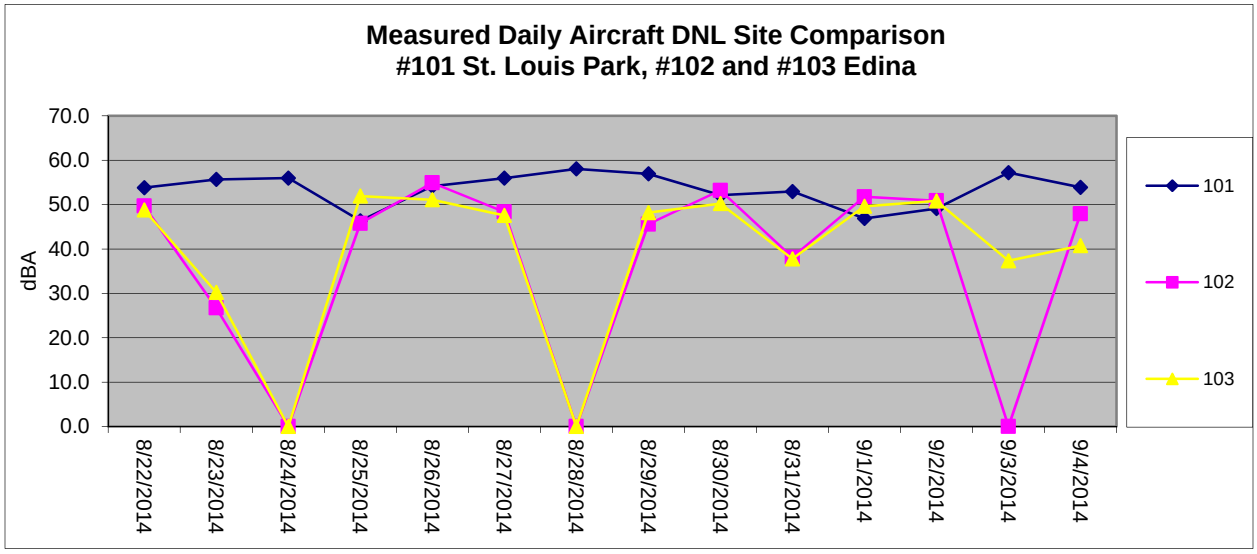

Table 5

Date	#101	#102	#103
8/22/2014	53.8	49.7	48.8
8/23/2014	55.7	26.7	30.2
8/24/2014	56.0	0.0	0.0
8/25/2014	46.4	45.8	51.9
8/26/2014	54.2	54.9	51.1
8/27/2014	56.0	48.4	47.6
8/28/2014	58.1	0.0	0.0
8/29/2014	56.9	45.6	48.2
8/30/2014	52.1	53.2	50.2
8/31/2014	53.0	38.1	37.8
9/1/2014	46.9	51.8	49.6
9/2/2014	49.1	50.9	50.8
9/3/2014	57.2	0.0	37.3
9/4/2014	53.9	47.9	40.7
Total DNL	**54.7**	**49**	**47.7**

Summary

This report presents noise measurement data that were collected between August 22, 2014 and September 4, 2014 for two monitoring sites in Edina and one in St. Louis Park. The purpose of the data collection was to measure the effects of aircraft events. Aircraft noise events caused by arrivals on Runway 12R were predominant at St. Louis Park site 101 and the daily average aircraft DNL ranged from 46 dB to 58 dB.

Aircraft noise events caused by departures on Runway 30L were predominant at the Edina sites, and the daily average aircraft DNL ranged from 0 dB to 55 dB at site 102, and from 0 dB to 52 dB at site 103. On August 24 and August 28, there were no aircraft noise events at sites 102 or 103 and on September 3, there were no aircraft noise events at site 102.

The aircraft noise monitoring in the cities of St. Louis Park and Edina and the analysis provided in this report offer baseline aircraft noise levels for the areas surrounding these noise monitoring sites in accordance with the May 8, 2014 NOC direction to the MAC Noise Program Office.

Appendix

Edina – St Louis Park Noise Monitoring Study

August 22 – September 4, 2014

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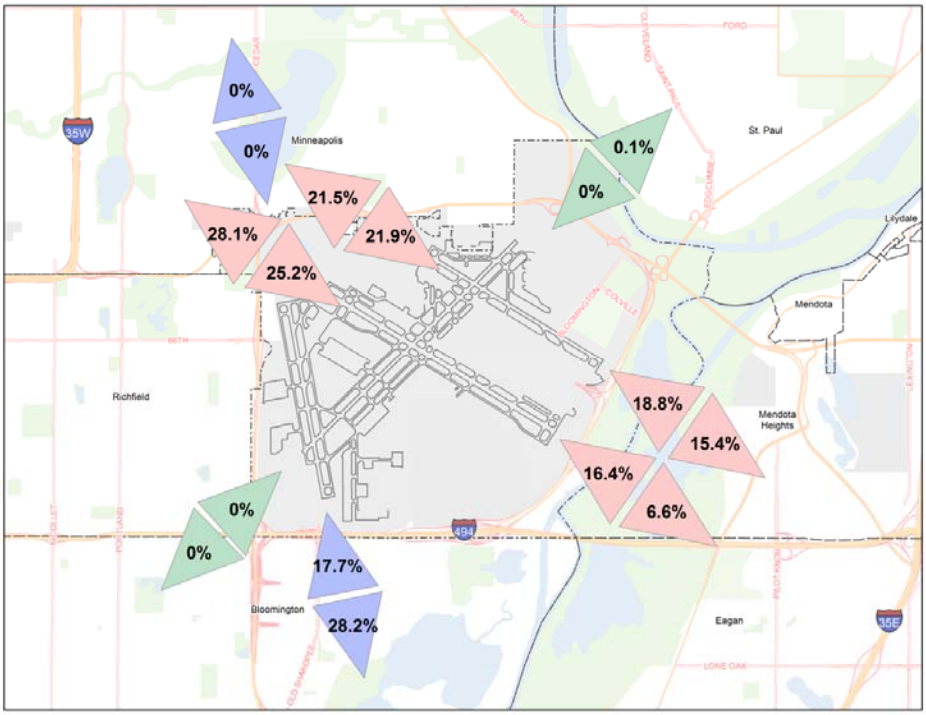
All Operations
Runway Use Report August 22 – September 4, 2014

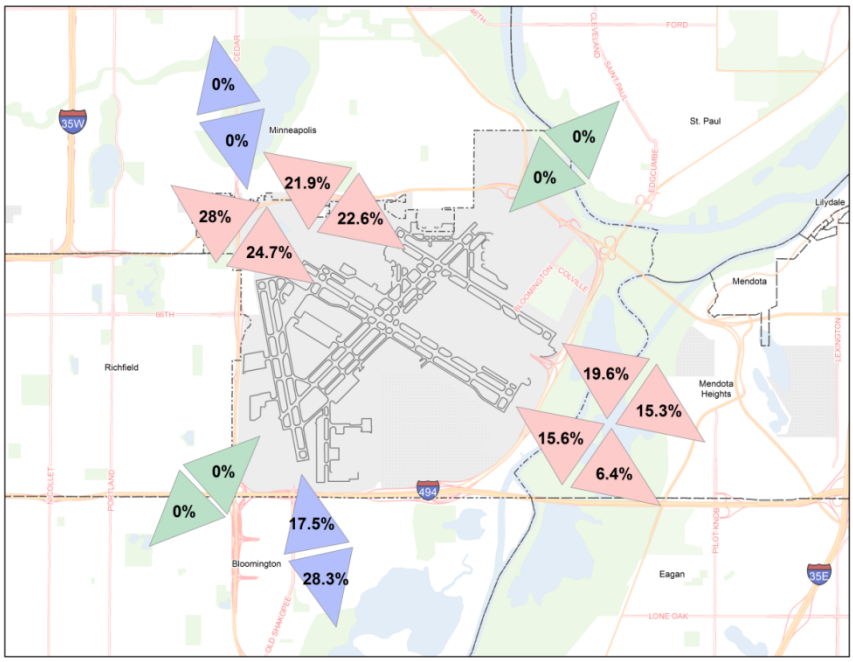


RWY	Arrival/ Departure	Overflight Area	Count Operations	Percent	Last Year Count	Last Year Percent
04	Arr	So. Richfield/Bloomington	0	0%	1	0%
12L	Arr	So. Minneapolis/No. Richfield	1689	21.9%	1901	22.7%
12R	Arr	So. Minneapolis/No. Richfield	1947	25.2%	1971	23.5%
17	Arr	So. Minneapolis	0	0%	0	0%
22	Arr	St. Paul/Highland Park	0	0%	2	0%
30L	Arr	Eagan/Mendota Heights	1265	16.4%	1457	17.4%
30R	Arr	Eagan/Mendota Heights	1447	18.8%	1614	19.2%
35	Arr	Bloomington/Eagan	1367	17.7%	1439	17.2%
Total Arrivals			**7715**		**8385**	
RWY	**Arrival/ Departure**	**Overflight Area**	**Count Operations**	**Percent**	**Last Year Count**	**Last Year Percent**
04	Dep	St. Paul/Highland Park	5	0.1%	0	0%
12L	Dep	Eagan/Mendota Heights	1189	15.4%	1282	15.3%
12R	Dep	Eagan/Mendota Heights	512	6.6%	541	6.5%
17	Dep	Bloomington/Eagan	2173	28.2%	2414	28.8%
22	Dep	So. Richfield/Bloomington	3	0%	3	0%
30L	Dep	So. Minneapolis/No. Richfield	2168	28.1%	2264	27%
30R	Dep	So. Minneapolis/No. Richfield	1656	21.5%	1872	22.3%
35	Dep	So. Minneapolis	0	0%	0	0%
Total Departures			**7706**		**8376**	
Total Operations			**15421**		**16761**	

Sum of RUS % may not equal 100% due to rounding.

Carrier Jet Operations

Runway Use Report August 22 – September 4, 2014



RWY	Arrival/ Departure	Overflight Area	Count Operations	Percent	Last Year Count	Last Year Percent
04	Arr	So. Richfield/Bloomington	0	0%	0	0%
12L	Arr	So. Minneapolis/No. Richfield	1628	22.6%	1737	23.4%
12R	Arr	So. Minneapolis/No. Richfield	1775	24.7%	1709	23.1%
17	Arr	So. Minneapolis	0	0%	0	0%
22	Arr	St. Paul/Highland Park	0	0%	1	0%
30L	Arr	Eagan/Mendota Heights	1124	15.6%	1219	16.4%
30R	Arr	Eagan/Mendota Heights	1408	19.6%	1477	19.9%
35	Arr	Bloomington/Eagan	1255	17.5%	1268	17.1%
Total Arrivals			**7190**		**7411**	
RWY	**Arrival/ Departure**	**Overflight Area**	**Count Operations**	**Percent**	**Last Year Count**	**Last Year Percent**
04	Dep	St. Paul/Highland Park	3	0%	0	0%
12L	Dep	Eagan/Mendota Heights	1099	15.3%	1111	15%
12R	Dep	Eagan/Mendota Heights	459	6.4%	475	6.4%
17	Dep	Bloomington/Eagan	2033	28.3%	2198	29.7%
22	Dep	So. Richfield/Bloomington	3	0%	0	0%
30L	Dep	So. Minneapolis/No. Richfield	2007	28%	1990	27%
30R	Dep	So. Minneapolis/No. Richfield	1575	21.9%	1629	22%
35	Dep	So. Minneapolis	0	0%	0	0%
Total Departures			**7179**		**7403**	
Total Operations			**14369**		**14814**	

Sum of RUS % may not equal 100% due to rounding.

August 22 – September 4, 2014 MSP Carrier Jet Fleet Composition

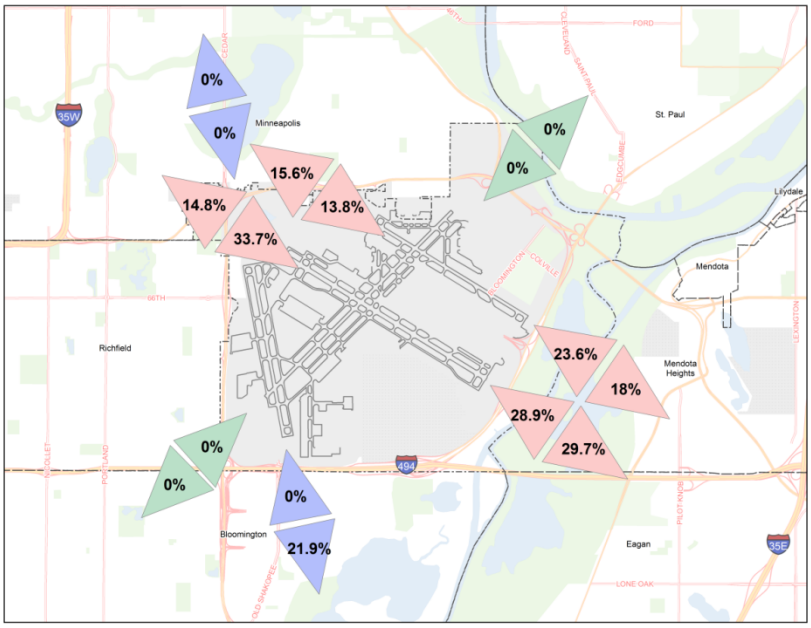
Type	FAR Part 36 Take-Off Noise Level*	Aircraft Description	Stage	Count	Percent
A124	109.9	Antonov An-124	3	2	0%
DC10	101.8	McDonnell Douglas DC10	3	26	0.2%
B744	101.6	Boeing 747-400	3	16	0.1%
A340	96.9	Airbus A340	3	20	0.1%
B777	96.2	Boeing 777	3	14	0.1%
B763	95.7	Boeing 767-300	3	170	1.2%
A330	95.6	Airbus Industries A330	3	108	0.8%
MD11	92.8	McDonnell Douglas MD11	3	72	0.5%
B762	92.1	Boeing 767-200	3	19	0.1%
MD80	91.5	McDonnell Douglas MD80	3	612	4.3%
A300	91.5	Airbus Industries A300	3	12	0.1%
B757	91.4	Boeing 757-200	3	959	6.7%
B764	91.2	Boeing 767-400	3	30	0.2%
DC9Q	91	McDonnell Douglas DC9 Modified Stage 3	3	2	0%
A321	89.8	Airbus Industries A321	3	113	0.8%
B738	88.6	Boeing 737-800	3	692	4.8%
B739	88.4	Boeing 737-900	3	124	0.9%
A320	87.8	Airbus Industries A320	3	1193	8.3%
B733	87.5	Boeing 737-300	3	77	0.5%
A319	87.4	Airbus Industries A319	3	1184	8.2%
E190	86.9	Embraer 190	3	8	0.1%
B7377	85.9	Boeing 737-700	3	710	4.9%
CRJ9	84.6	Canadair Regional Jet CRJ-900	3	1655	11.5%
MD90	84.2	McDonnell Douglas MD90	3	1295	9%
B717	84.1	Boeing 717	3	77	0.5%
E170	83.7	Embraer 170	3	1462	10.2%
E145	83.7	Embraer 145	3	323	2.2%
CRJ7	83.2	Canadair Regional Jet CRJ-700	3	589	4.1%
CRJ1	79.8	Canadair Regional Jet CRJ-100	3	65	0.5%
CRJ2	78.7	Canadair Regional Jet CRJ-200	3	2729	19%
E135	77.9	Embraer 135	3	3	0%
J328	76.5	Fairchild Dornier 328	3	8	0.1%
Total				**14369**	

Sum of fleet mix % may not equal 100% due to rounding.

	Count	Current Percent	Last Year Percent
Stage 2	0	0%	0%
Stage 3	2	0%	0%
Stage 3 Manufactured	14367	100%	100%
Total Stage 3	**14369**		

**Stage 3 represent aircraft modified to meet all Stage 3 criteria as outlined in the Federal Aviation Regulation (FAR) Part 36. This includes hushkit engines, engine retrofits or aircraft operational flight configurations. The provided noise levels from FAR Part 36 are the loudest levels documented for the representative aircraft type during take-off measured in EPNL dBA (Effective Perceived Noise Level). EPNL is the level of the time integral of the antilogarithm of one-tenth of tone-corrected perceived noise level of an aircraft flyover measured in A-weighted decibels.*

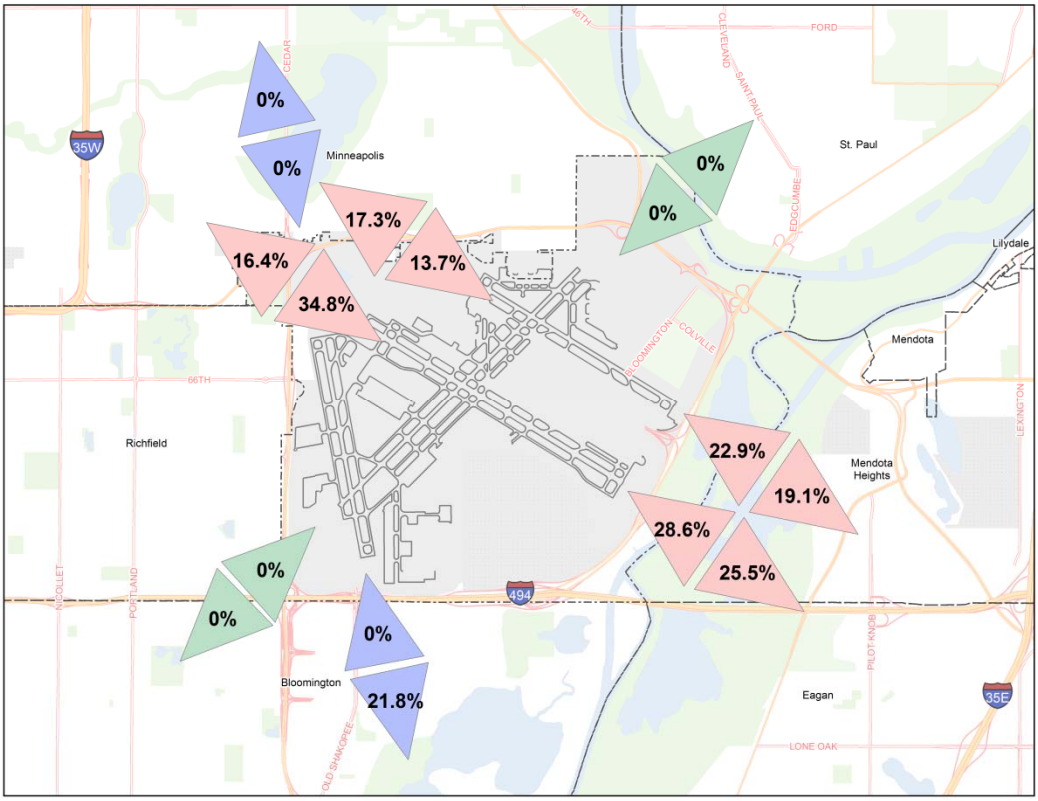
Nighttime All Operations 10:30 p.m. to 6:00 a.m.
Runway Use Report August 22 – September 4, 2014



RWY	Arrival/ Departure	Overflight Area	Count Operations	Percent	Last Year Count	Last Year Percent
04	Arr	So. Richfield/Bloomington	0	0%	0	0%
12L	Arr	So. Minneapolis/No. Richfield	74	13.8%	86	19%
12R	Arr	So. Minneapolis/No. Richfield	181	33.7%	147	32.5%
17	Arr	So. Minneapolis	0	0%	0	0%
22	Arr	St. Paul/Highland Park	0	0%	0	0%
30L	Arr	Eagan/Mendota Heights	155	28.9%	153	33.8%
30R	Arr	Eagan/Mendota Heights	127	23.6%	52	11.5%
35	Arr	Bloomington/Eagan	0	0%	14	3.1%
Total Arrivals			**537**		**452**	
RWY	**Arrival/ Departure**	**Overflight Area**	**Count Operations**	**Percent**	**Last Year Count**	**Last Year Percent**
04	Dep	St. Paul/Highland Park	0	0%	0	0%
12L	Dep	Eagan/Mendota Heights	23	18%	40	35.1%
12R	Dep	Eagan/Mendota Heights	38	29.7%	32	28.1%
17	Dep	Bloomington/Eagan	28	21.9%	28	24.6%
22	Dep	So. Richfield/Bloomington	0	0%	0	0%
30L	Dep	So. Minneapolis/No. Richfield	19	14.8%	12	11%
30R	Dep	So. Minneapolis/No. Richfield	20	15.6%	2	1.8%
35	Dep	So. Minneapolis	0	0%	0	0%
Total Departures			**128**		**114**	
Total Operations			**665**		**566**	

Sum of RUS % may not equal 100% due to rounding.

Nighttime Carrier Jet Operations 10:30 p.m. to 6:00 a.m.
Runway Use Report August 22 – September 4, 2014



RWY	Arrival/ Departure	Overflight Area	Count Operations	Percent	Last Year Count	Last Year Percent
04	Arr	So. Richfield/Bloomington	0	0%	0	0%
12L	Arr	So. Minneapolis/No. Richfield	70	13.7%	80	20%
12R	Arr	So. Minneapolis/No. Richfield	178	34.8%	135	33.8%
17	Arr	So. Minneapolis	0	0%	0	0%
22	Arr	St. Paul/Highland Park	0	0%	0	0%
30L	Arr	Eagan/Mendota Heights	146	28.6%	126	31.5%
30R	Arr	Eagan/Mendota Heights	117	22.9%	45	11.2%
35	Arr	Bloomington/Eagan	0	0%	14	3.5%
Total Arrivals			**511**		**400**	
RWY	**Arrival/ Departure**	**Overflight Area**	**Count Operations**	**Percent**	**Last Year Count**	**Last Year Percent**
04	Dep	St. Paul/Highland Park	0	0%	0	0%
12L	Dep	Eagan/Mendota Heights	21	19.1%	37	41.1%
12R	Dep	Eagan/Mendota Heights	28	25.5%	23	25.6%
17	Dep	Bloomington/Eagan	24	21.8%	21	23.3%
22	Dep	So. Richfield/Bloomington	0	0%	0	0%
30L	Dep	So. Minneapolis/No. Richfield	18	16.4%	7	8%
30R	Dep	So. Minneapolis/No. Richfield	19	17.3%	2	2.2%
35	Dep	So. Minneapolis	0	0%	0	0%
Total Departures			**110**		**90**	
Total Operations			**621**		**490**	

Sum of RUS % may not equal 100% due to rounding.

August 22 – September 4, 2014 Top 15 Actual Nighttime Jet Operations
By Type 10:30 p.m. to 6:00 a.m.

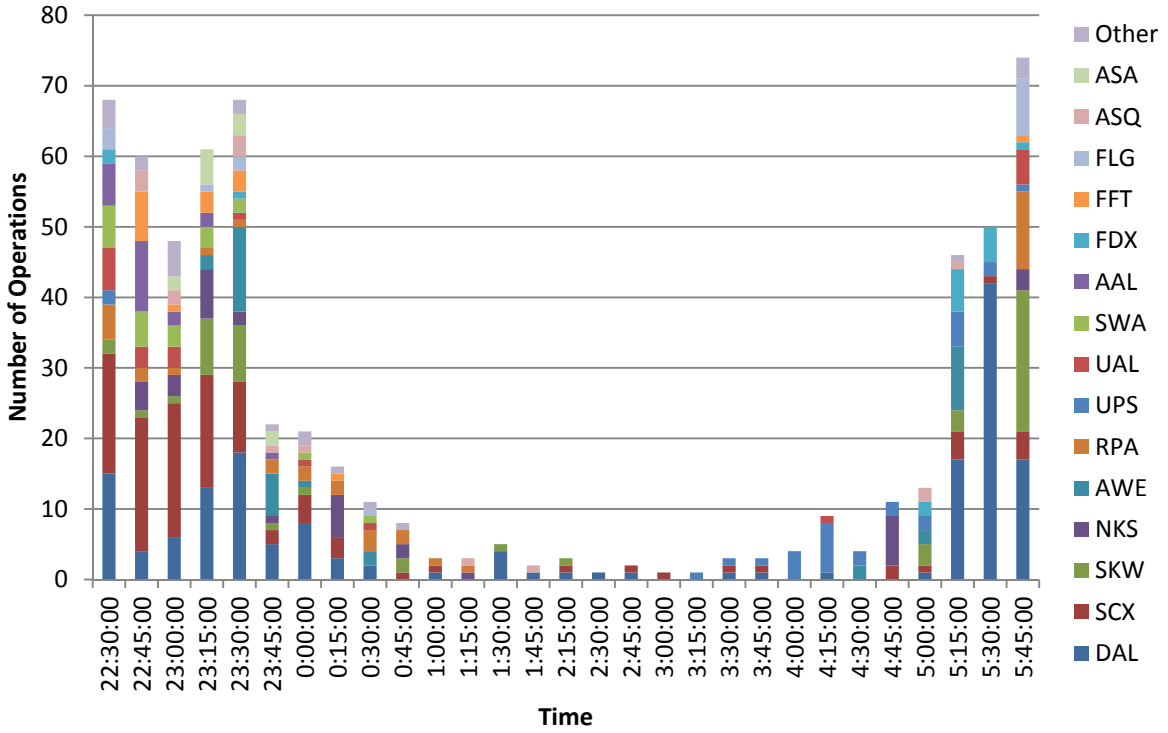
Airline	ID	Stage	Type	Count
Alaska	ASA	3	B738	1
Alaska	ASA	3	B739	11
American	AAL	3	B738	10
American	AAL	3	MD80	11
America West	AWE	3	A320	23
America West	AWE	3	A321	13
Atlantic Southeast	ASQ	3	CRJ7	5
Atlantic Southeast	ASQ	3	CRJ9	1
Atlantic Southeast	ASQ	3	E145	9
Delta	DAL	3	A319	2
Delta	DAL	3	A320	5
Delta	DAL	3	A330	1
Delta	DAL	3	B738	18
Delta	DAL	3	B739	14
Delta	DAL	3	B757	74
Delta	DAL	3	B763	19
Delta	DAL	3	MD90	30
FedEx	FDX	3	B757	2
FedEx	FDX	3	DC10	2
FedEx	FDX	3	MD11	13
Frontier Airlines	FFT	3	A319	1
Frontier Airlines	FFT	3	A320	15
Pinnacle	FLG	3	CRJ2	9
Pinnacle	FLG	3	CRJ9	6
Republic Airlines	RPA	3	E170	34
SkyWest Airlines	SKW	3	CRJ2	21
SkyWest Airlines	SKW	3	CRJ7	22
SkyWest Airlines	SKW	3	E170	9
Southwest	SWA	3	B733	3
Southwest	SWA	3	B7377	15
Southwest	SWA	3	B738	3
Spirit	NKS	3	A319	12
Spirit	NKS	3	A320	24
Sun Country	SCX	3	B7377	51
Sun Country	SCX	3	B738	58
United	UAL	3	A319	7
United	UAL	3	A320	13
United	UAL	3	B738	1
UPS	UPS	3	B757	21
UPS	UPS	3	B763	1
UPS	UPS	3	MD11	8
Total				**598**

Total Nighttime Jet Operations by Hour

Hour	Count
22:30	128
23:00	199
0:00	56
1:00	13
2:00	6
3:00	8
4:00	28
5:00	183
Total	**621**

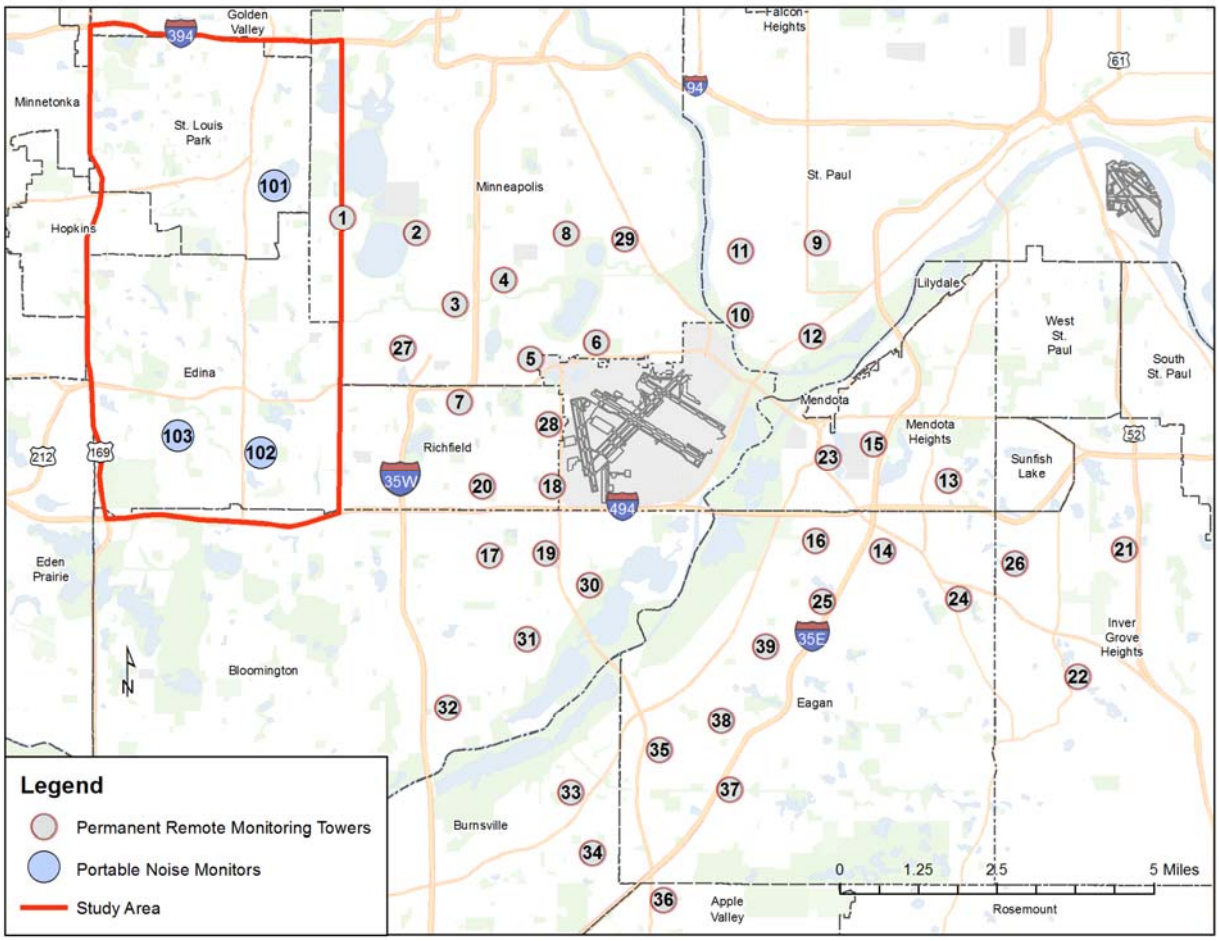
Note: The top 15 nighttime operators represent 96.3% of the total nighttime carrier jet operations.

August 22 – September 4, 2014 Nighttime Carrier Jet Operations Mix for Top 15 Airlines 10:30 p.m. to 6:00 a.m.



Airline	Stage 2	Stage 3	Manufactured Stage 3	Total
Delta Air Lines (DAL)	0	0	163	163
Sun Country (SCX)	0	0	109	109
SkyWest Airlines (SKW)	0	0	52	52
Spirit (NKS)	0	0	36	36
America West (AWE)	0	0	36	36
Republic Airlines (RPA)	0	0	34	34
UPS (UPS)	0	0	30	30
United (UAL)	0	0	21	21
Southwest (SWA)	0	0	21	21
American (AAL)	0	0	21	21
FedEx (FDX)	0	0	17	17
Frontier (FFT)	0	0	16	16
Pinnacle (FLG)	0	0	15	15
Atlantic Southeast (ASQ)	0	0	15	15
Alaska Airlines (ASA)	0	0	12	12
Other	0	0	23	23
Total	**0**	**0**	**621**	**621**

MSP International Airport
Permanent Remote Monitoring Tower (RMT) and
Portable Noise Monitoring Locations



Time Above dB Threshold for Arrival-Related Noise Events
August 22 – September 4, 2014

RMT ID	City	Address	Time >= 65dB	Time >= 80dB	Time >= 90dB	Time >= 100dB
101	St Louis Park	3700 Monterey Dr.	4:36:52	0:00:02	0:00:00	0:00:00
102	Edina	4711 W. 70th St.	0:00:12	0:00:00	0:00:00	0:00:00
103	Edina	McGuire St. & W 69th St.	0:00:39	0:00:00	0:00:00	0:00:00

Time Above dB Threshold for Departure-Related Noise Events
August 22 – September 4, 2014

RMT ID	City	Address	Time >= 65dB	Time >= 80dB	Time >= 90dB	Time >= 100dB
101	St Louis Park	3700 Monterey Dr.	0:37:56	0:00:15	0:00:02	0:00:00
102	Edina	4711 W. 70th St.	1:54:31	0:00:27	0:00:00	0:00:00
103	Edina	McGuire St. & W 69th St.	1:39:07	0:00:16	0:00:00	0:00:00

Arrival-Related Noise Events
August 22 – September 4, 2014

RMT ID	City	Address	Arrival Events >= 65dB	Arrival Events >= 80dB	Arrival Events >= 90dB	Arrival Events >= 100dB
101	St Louis Park	3700 Monterey Dr.	1413	1	0	0
102	Edina	4711 W. 70th St.	2	0	0	0
103	Edina	McGuire St. & W 69th St.	6	0	0	0

Departure-Related Noise Events
August 22 – September 4, 2014

RMT ID	City	Address	Departure Events >= 65dB	Departure Events >= 80dB	Departure Events >= 90dB	Departure Events >= 100dB
101	St Louis Park	3700 Monterey Dr.	188	2	1	0
102	Edina	4711 W. 70th St.	564	10	0	0
103	Edina	McGuire St. & W 69th St.	494	8	0	0

Top Ten Loudest Aircraft Noise Events for MSP
August 22 – September 4, 2014

RMT Site #101 - 3700 Monterey Dr., St. Louis Park

Date/Time	Flight Number	Aircraft Type	Arrival/ Departure	Runway	Lmax(dB)
8/26/2014 16:08	ADB2104	A124	D	30L	90.6
9/4/2014 20:25	DAL1089	B757	D	30L	83.2
8/31/2014 11:55	ASQ5278	CRJ7	A	12L	80.1
9/4/2014 12:03	DAL965	A320	A	12R	79.3
8/24/2014 8:01	DAL1620	A320	A	12R	78.6
8/24/2014 12:26	DAL285	B777	A	12R	78.5
8/23/2014 17:50	DAL1528	MD90	A	12R	78.2
8/31/2014 11:38	DAL386	A319	A	12R	78
8/24/2014 12:10	DAL259	A330	A	12R	77.6
8/23/2014 17:36	DAL2168	B763	A	12R	77.4

RMT Site #102 - 4711 W. 70th St., Edina

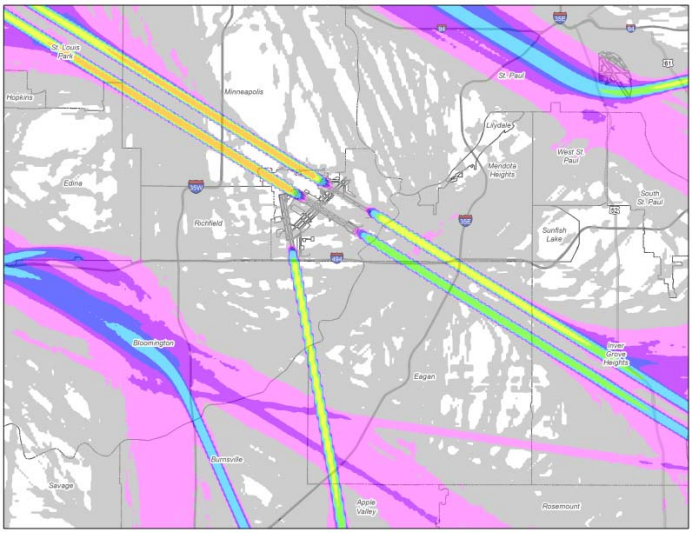
Date/Time	Flight Number	Aircraft Type	Arrival/ Departure	Runway	Lmax(dB)
8/26/2014 10:10	FLG3628	CRJ9	D	30L	87.3
9/1/2014 15:26	DAL1781	B757	D	30L	84
8/30/2014 9:10	DAL2492	MD80	D	30L	83.9
8/30/2014 8:48	AAL1301	MD80	D	30L	82.4
8/26/2014 6:14	DAL9931	MD80	D	30L	82.3
9/2/2014 9:25	DAL1329	MD80	D	30L	80.8
9/1/2014 13:54	AAL1633	MD80	D	30L	80.7
8/30/2014 12:02	AAL1363	MD80	D	30L	80.7
8/27/2014 13:25	DAL1461	MD80	D	30L	80.7
9/4/2014 21:04	DAL864	MD80	D	30L	80.4

RMT Site #103 - McGuire St. & W. 69th St., Edina

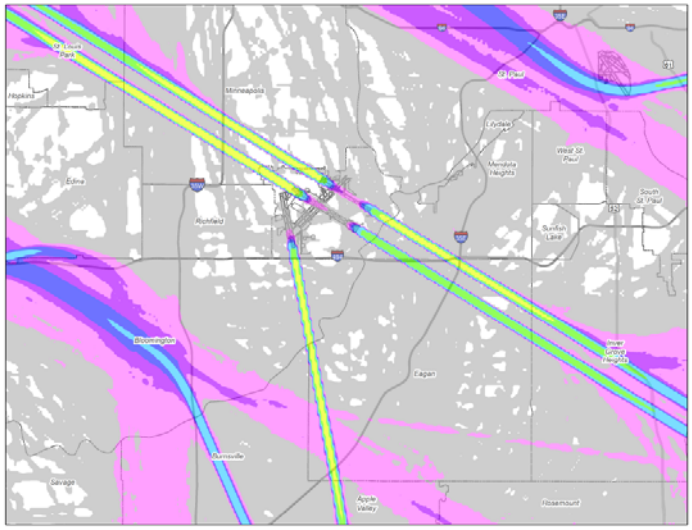
Date/Time	Flight Number	Aircraft Type	Arrival/ Departure	Runway	Lmax(dB)
9/1/2014 9:35	DAL1103	MD80	D	30L	83.7
9/2/2014 18:24	DAL1505	B757	D	30L	82.6
8/30/2014 9:32	DAL1103	MD80	D	30L	82.2
8/29/2014 18:08	DAL2552	MD80	D	30L	81.9
8/26/2014 12:23	AAL1363	MD80	D	30L	81.3
8/25/2014 13:41	DAL2464	MD80	D	30L	81.1
8/27/2014 13:39	DAL2464	MD80	D	30L	80.4
8/22/2014 19:56	DAL2410	MD80	D	30L	80.4
8/22/2014 14:06	AAL1363	MD80	D	30L	79.9
8/27/2014 8:28	AAL1301	MD80	D	30L	79.9

Note: Lmax is the highest Root Mean Square sound pressure level within the measuring period

Arrival Flight Density
Aug 22 thru 28 – 3,868 Carrier Jet Arrivals



Aug 29 thru Sept 4 – 3,322 Carrier Jet Arrivals



Monitoring Site Photographs

Site #101 St. Louis Park, 3700 Monterey Dr.

Site #102 Edina, 4711 W. 70th St.

Site #103 Edina, Brook Dr. and McGuire Rd.