FINAL REPORT

2012 Noise Exposure Contours Report for Billy Bishop Toronto City Airport

Transport Canada

SNC-LAVALIN INC.

JUNE 2015
Final Report
O/Ref n° 626687-2011_FV-00

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June 5, 2015

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Funded Programs & Administration
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Subject: 2012 Noise Exposure Contour Report for Billy Bishop Toronto City Airport
O/Ref.: 626687-2012_FV-00

Mrs. Canning,

SNC-Lavalin Inc. is pleased to provide you with the final report in PDF format for the above mentioned project. In a few days, you will also receive, by mail, ten paper copies of the present document.

Please do not hesitate to contact us should you require any additional information.

SNC♦LAVALIN INC.

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Director, Acoustics and Vibration

/cg

Encl.

c.c. David Daniel, Airport & Mobile Equipment Technologist

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TEAM WORK

SNC-Lavalin Inc.

Prepared by:	Nicolas Garcia, M.Eng.	Acoustics and Vibration
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EXECUTIVE SUMMARY

The noise exposure contours for Billy Bishop Toronto City Airport have been computed in accordance with Transport Canada's methodology for NEF (Noise Exposure Forecast). The surface area within contours was also compiled.

The analysis of the contours involved a review of the data to ascertain if the actual 28 Noise Exposure Contour is closer at any point, except in a direction westerly of the Billy Bishop Toronto City Airport between points "X" and "Y", to the official 25 NEF Contour for 1990, than to the official 28 NEF Contour for 1990 (reference Schedule F of the Tripartite Agreement). This condition pertains to Section 34 of the Tripartite Agreement on the preparation of NEF contours.

The Tripartite Agreement imposes a limit on the expansion of NEF contours. Section 27 of the Tripartite Agreement requires that the actual 28 NEF contour does not expand beyond the official 25 NEF contour for 1990, except between points "X" and "Y".

The analysis shows that the 28 NEF contour for calendar year 2012, with helicopters included in the calculation, slightly exceeds the 28 NEF Contour for 1990 for a small section of the contour to the north of the main runway. However, the extent of the actual 28 NEF contour is not sufficient to bring it closer at any point to the 25 NEF Contour for 1990 than to the 28 NEF Contour for 1990. The 28 NEF contour for calendar year 2012 does not expand beyond the official 25 NEF contour for 1990 and remains well within the limit set by the Tripartite Agreement for the expansion of the NEF contour.

When helicopters are excluded from the calculation, the NEF contours shrink slightly, achieving an even better compliance with the limits set in the Tripartite Agreement.

Table i Surface area inside 2012 noise contours

NEF	Surface area (km^2)	
	With helicopters	Without helicopters
35 +	0.27	0.26
30 - 35	0.55	0.50
28 - 30	0.44	0.42
25 - 28	1.13	1.09
Total	**2.39**	**2.27**

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1 INTRODUCTION

This document presents the noise contours for the year 2012 for Billy Bishop Toronto City Airport.

Environmental noise or community noise, including airports activities, is not regulated by Canada's government. Nevertheless Transport Canada has developed a methodology for assessing the perceived noise in the vicinity of airports. This method is established across Canada and is used for this study. The interpretation of results it produces will be used to establish the magnitude (intensity of noise) and extent (surface area) of areas affected by airport noise.

2 METHODOLOGY

2.1 METRICS AND PARAMETERS

The representation of noise generated by airport operations has been normalized by Transport Canada using NEF or "Noise Exposure Forecast" contours. The NEF methodology is not by itself a forecast, but a noise calculation based either on a forecast of future movements or on actual movements. The noise contours for 2012, presented in this report, have been produced using the NEF methodology on the basis of actual movements data from Transport Canada. The original data is provided to Transport Canada by Nav Canada, the country's civil air navigation services provider, for all airports where Nav Canada operates a control tower.

The index provided by the noise contours is used to show the public areas affected by airport noise. This single number rating is easy to interpret, but nevertheless, requires a complex evaluation process. It takes into account, for each movement of the whole year, the type of aircraft, the runway used, the flight path, the flight distance, and the period of day. Note that the night period is defined from 10 pm to 7 am.

Flight distances and departure flight path directions have been determined according to geographic coordinates of destination airports; themselves drawn from Transport Canada database and specialized publications.

The "Air Traffic Designators" entitled TP 143 published by Transport Canada, specialized databases published by aeronautical sector companies, as well as internal corporate databases, have been used to determine the aircraft caracteristics.

2.2 METHOD OF CALCULATION

NEF-Calc 2.0.6.1 software was used to produce the noise contours. It has been developed by the National Research Council for Transport Canada. Nef-Calc 2.0.6.1 processes operation-related data from airport and calculates noise levels for the receptor grid. Noise exposure contours are then drawn for the whole study area.

The NEF methodology developed by Transport Canada uses the parameter “Peak Planning Day“, which will be used to calculate the noise contours. The number of movements of the Peak Planning Day is estimated by averaging the seven busiest days of the three busiest months of the year. The detailed calculation of the Peak Planning Day is presented in Section 3.1.1. The calculated noise contours are representative of a near to worst case 24 hour period.

3 NOISE CONTOURS

3.1 CALCULATION ASSUMPTIONS

The aircraft movements’ database from Transport Canada for Billy Bishop Toronto City Airport for 2012 was used to calculate the Peak Planning Day. The composition of the fleet and the average annual runway use have also been computed from the Transport Canada database.

3.1.1 Calculation of Peak Planning Day

Tables 1 and 2 below present the results of the calculation of the Peak Planning Day for itinerant and local movements in 2012 for Billy Bishop Toronto City Airport.

The number of movements of the Peak Planning Day is found to be 332 for itinerant movements and 179 for local movements. In comparison, the **averages** for 2012 are 237 itinerant movements and 82 local movements per day.

The number of circuits is half the number of local movements. A movement is either an arrival or a departure; overflights are excluded from the calculation. Overflights are flights transiting in the control zone of the control tower, going to another destination without landing at the airport. Since they have no real operation at the airport, they are excluded from the calculations. Local movements show much more daily variability than itinerant movements.

The calculation of the noise contours has been made for 332 itinerant movements and 179 local movements (90 circuits), with a total of 511 aircraft movements.

Helicopters accounted for 5,188 movements in 2012, of which 2,333 were runway operations, mostly Ornge flights using AgustaWestland AW139 helicopters, and 2,855 were helipad operations, mostly Heli Tours with Robinson R44 helicopters.

Excluding helicopter movements, the number of movements of the Peak Planning Day is found to be 308 for itinerant movements and 179 for local movements. In comparison, the **averages** for 2012 are 223 itinerant movements and 82 local movements per day.

Table 1 Peak Planning Day with helicopters

Itinerant		Local	
Date	Movements	Date	Movements
May 11	342	May 17	226
May 18	327	May 5	212
May 15	323	May 26	190
May 17	317	May 24	168
May 24	310	May 18	160
May 25	309	May 12	146
May 30	308	May 1	138
July 5	342	June 16	326
July 13	335	June 5	168
July 29	331	June 28	164
July 6	329	June 15	160
July 27	329	June 13	152
July 20	325	June 23	150
July 11	322	June 22	142
August 31	371	August 8	238
August 24	363	August 7	198
August 8	351	August 18	198
August 3	348	August 3	180
August 15	329	August 1	170
August 17	327	August 25	142
August 21	324	August 15	138

Table 2 Peak Planning Day without helicopters

Itinerant		Local	
Date	Movements	Date	Movements
May 18	312	May 17	226
May 15	311	May 5	212
May 24	304	May 26	190
May 17	303	May 24	168
May 11	302	May 18	160
May 30	300	May 12	146
May 31	290	May 1	138
July 5	324	June 16	326
July 11	307	June 5	168
July 30	304	June 28	164
July 27	302	June 15	160
July 6	301	June 13	152
July 12	301	June 23	150
July 20	298	June 22	142
August 31	321	August 8	238
August 24	319	August 7	198
August 8	319	August 18	198
August 3	317	August 3	180
August 7	309	August 1	170
August 15	309	August 25	142
August 21	308	August 15	138

3.1.2 Fleet composition and runway use

The data on the composition of the fleet of all operations at Billy Bishop Toronto City Airport in 2012 is presented in Appendix A, including helicopters. The document TP-143 – Air Traffic Designators from Transport Canada is the primary source of information for the identification of aircraft types. Other sources, such as Transport Canada's aircraft registration database and commercial databases have also been used.

Figure 1 shows the configuration of runways, taken from the Canada Air Pilot. Figures 2 and 3 summarize the composition of fleet and runway use for the airport in 2012, compiled from the itinerant movements database from Transport Canada. Detailed data is presented in Appendix B.

The total number of movements in 2012 was 114,569, divided into 86,717 itinerants movements and 27,852 local movements.

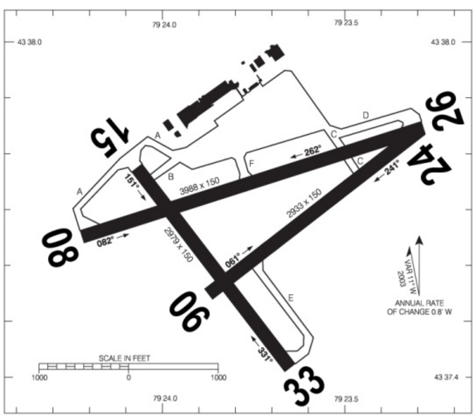

Figure 1 Runway identification

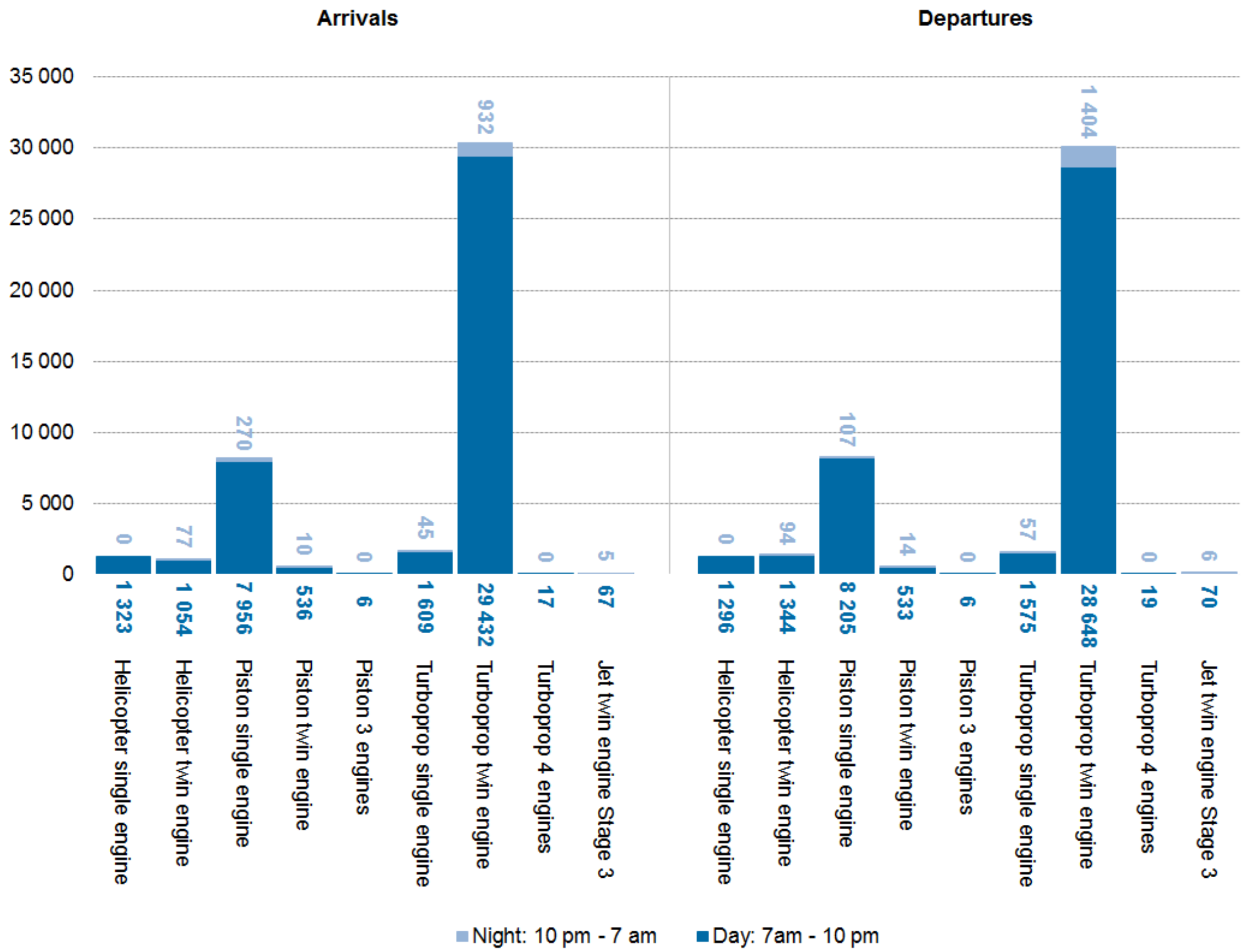

Figure 2 Summary of fleet composition

The movements during the night (10 pm to 7 am) accounted for 3.4% of total movements in 2012. For the calculation of noise contours, using the methodology of Transport Canada, each night-time movement is equivalent to 16.67 daytime movements. The 3,939 night-time movements recorded in 2012 are equivalent to 65,650 daytime movements. The night-time movements represent an important contribution to the noise contours.

Overall, twin engine turboprops (mostly DASH-8) are the most frequent aircrafts at Billy Bishop Toronto City Airport with 53% of all movements. They are followed by single engine piston aircrafts with 38% of operations.

Figure 3 shows the summary of runway use and Table 2 presents the runway use by aircraft type.

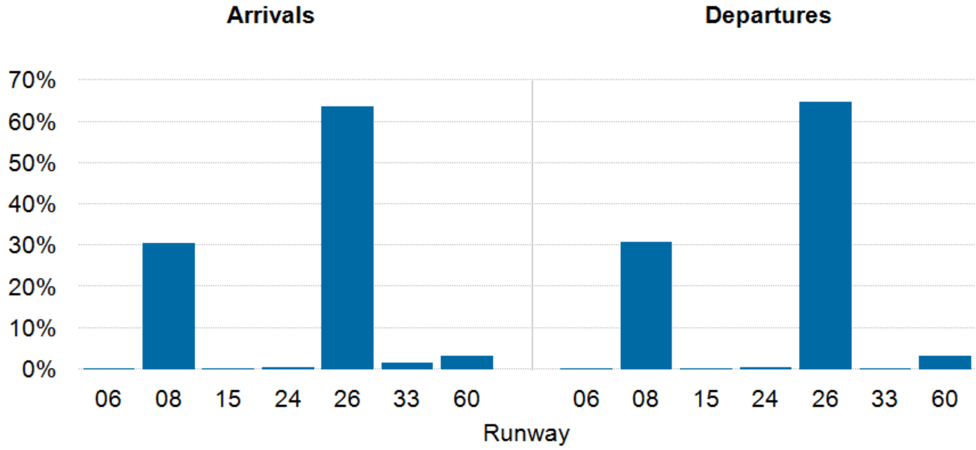

Figure 3 Summary of runway use

Table 3 Runway use by aircraft category

Runway	Global		Jets		Pistons		Turboprops	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
06	48 0.1%	3 0.01%	0 0%	0 0%	46 0.5%	1 0.01%	2 0.01%	2 0.01%
08	13,233 31%	13,384 31%	21 29%	25 33%	2,820 28%	2,879 29%	10,392 31%	10,480 32%
15	39 0.1%	102 0.2%	0 0%	0 0%	1 0.01%	90 1%	38 0.1%	12 0.04%
24	270 1%	252 1%	0 0%	0 0%	259 3%	248 2%	11 0.03%	4 0.01%
26	27,640 64%	28,162 65%	51 71%	51 67%	5,102 51%	5,580 55%	22,487 68%	22,531 68%
33	652 2%	77 0.2%	0 0%	0 0%	552 6%	69 1%	100 0.3%	8 0.02%
60	1,457 3%	1,398 3%	0 0%	0 0%	1,223 12%	1,189 12%	234 1%	209 1%
Total	43,339 100%	43,378 100%	72 100%	76 100%	10,003 100%	10,056 100%	33,264 100%	33,246 100%

Table 4 shows the main types of aircraft in most represented categories defined in the calculation. Aircraft with a small number of movements in 2012 are not shown in this table; they can be found in detail in Appendix A.

Table 4 Aircraft categories

Aircraft categories	Aircraft types
Helicopter single engine	Robinson R44, etc.
Helicopter twin engine	AgustaWestland AW139, etc.
Piston single engine	Cessna series 150/152/172/182/185/206/400, Piper PA-24/26/28, Cirrus SR22, North American T-6 Texan, etc.
Piston twin engine	Piper PA-27/30/31/44, Cessna 421, etc.
Turboprop single engine	Pilatus PC-12, Cessna 208, Socata TBM-700, etc.
Turboprop twin engine	Dash 8, Piaggio P-180, Beech 200/350, Jetstream 31, Mitsubishi MU-2, etc.
Jet twin engine Stage 3	Dassault Falcon 10, etc.

3.1.3 Flight paths

Flight paths for departures, arrivals and circuits have been modelled from information gathered from the Canada Air Pilot and the Canada Flight Supplement.

Departure flight paths:

- Runways 06 and 08: right turn at 1.9 DME, heading 141
- Runway 15: right turn at 650' ASL, heading 201
- Runways 24, 26 and 33: left turn at 650' ASL, heading 201

Approach slopes:

- Runways 06, 15, 24 and 33: 3.0°
- Runway 08: 3.5°
- Runway 26: 4.8°

Runways 24, 26, and 33 have left hand circuits while runways 06, 08, and 15 have right hand circuits.

3.2 RESULTS

Figure 4 shows the noise contours for Billy Bishop Toronto City Airport, year 2012 actual movements including helicopters, along with the 1990 NEF contours. The 1990 NEF contours were prepared in April 1978 by the Canadian Air Transport Administration of the Ministry of Transport for the Canada Mortgage and Housing Corporation. The noise contours without helicopters are shown on Figure 5.

The analysis of the contours involved a review of the data to, in the language of the Tripartite Agreement, ascertain if the actual 28 Noise Exposure Contour is closer at any point, except in a direction westerly of the Billy Bishop Toronto City Airport between points “X” and “Y”, to the official 25 NEF Contour for 1990, than to the official 28 NEF Contour for 1990 (reference Schedule F of the Tripartite Agreement).

The analysis shows that the 28 NEF Contour for calendar year 2012, with helicopters included in the calculation, slightly exceeds the 28 NEF Contour for 1990 for a small section of the contour to the north of the main runway. However, the extent of the actual 28 NEF contour is not sufficient to bring it closer at any point to the 25 NEF Contour for 1990 than to the 28 NEF Contour for 1990. The 28 NEF contour for calendar year 2012 does not expand beyond the official 25 NEF contour for 1990 and remains well within the limits set by the Tripartite Agreement for the expansion of the NEF contour.

When helicopters are excluded from the calculation, the NEF contours shrink slightly, achieving an even better compliance with the limits set in the Tripartite Agreement.

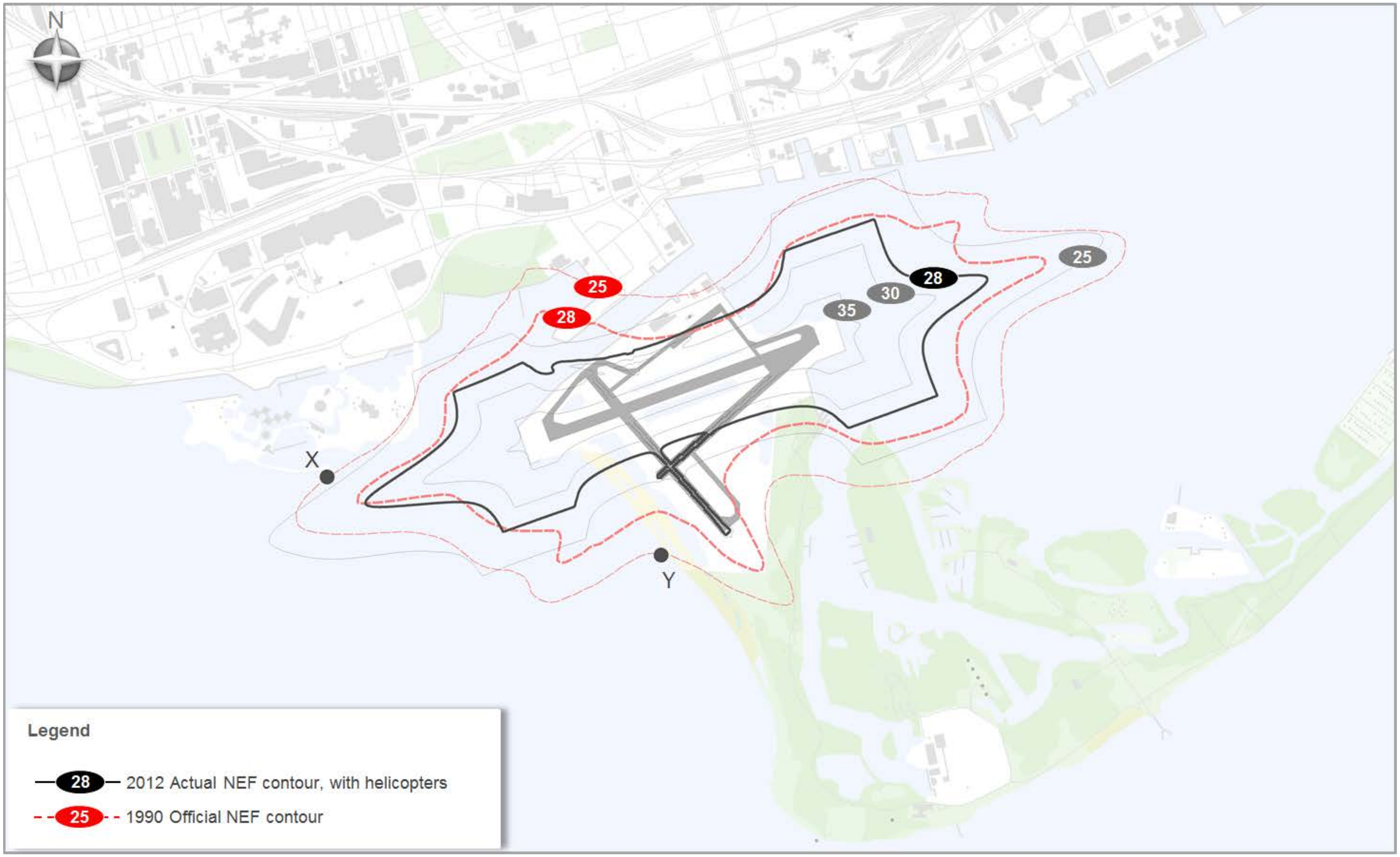

Figure 4 NEF Contours with helicopters

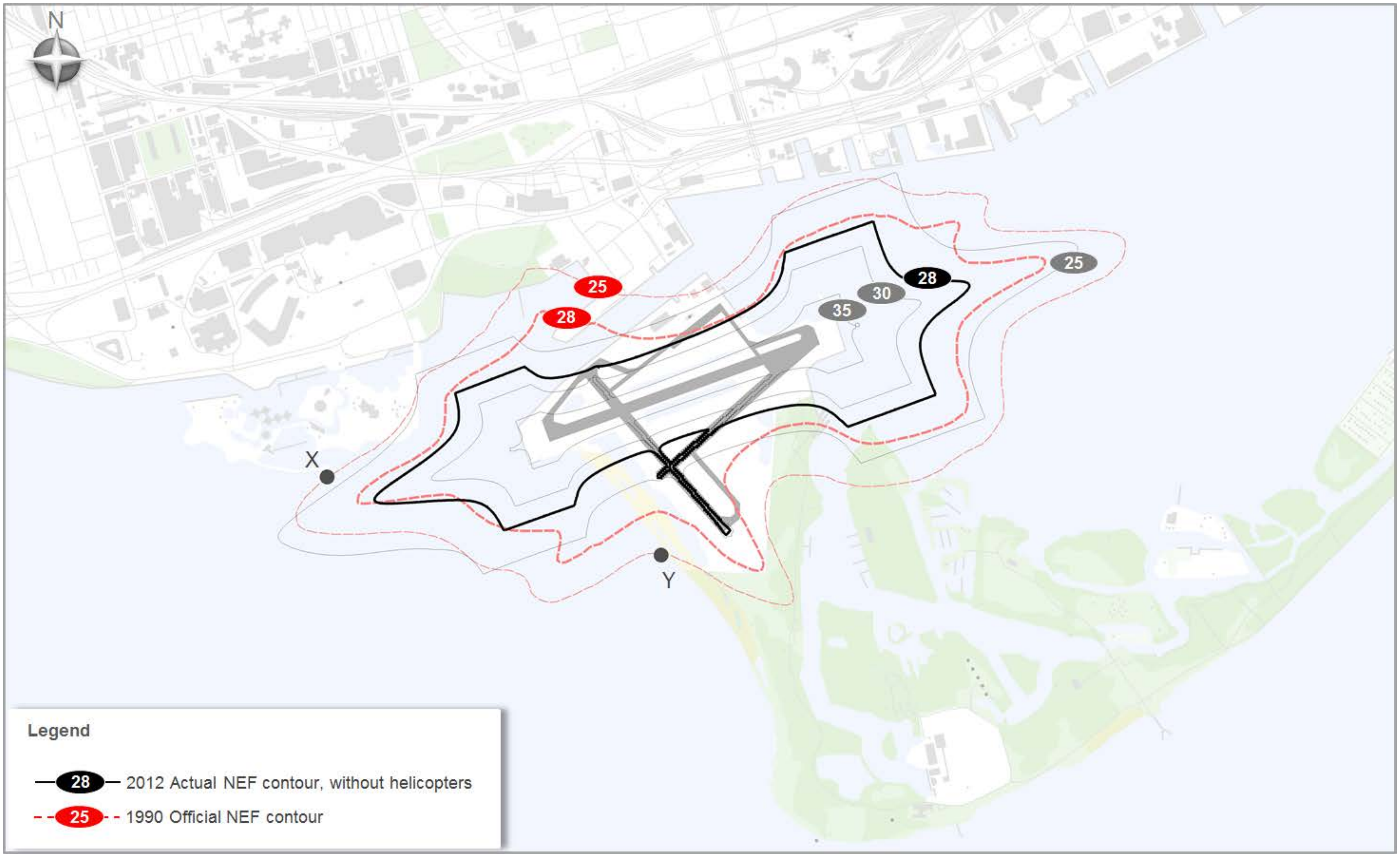

Figure 5 NEF Contours without helicopters

Table 5 shows the surface area within the contours in 2012. It is the total surface area in each range of NEF values.

Table 5 Surface area (km^2)

NEF	Surface area (km^2)	
	With helicopters	Without helicopters
35 +	0.27	0.26
30 - 35	0.55	0.50
28 - 30	0.44	0.42
25 - 28	1.13	1.09
Total	**2.39**	**2.27**

4 CONCLUSION

The 2012 noise exposure contours for Billy Bishop Toronto City Airport have been computed in accordance with Transport Canada methodology. The surface area within contours was also compiled. These contours cover a total area of 2.39 square kilometers if helicopters are included in the calculation, and 2.27 square kilometers if helicopters are excluded. NEF 28 contour covers an area of 1.26 square kilometers if helicopters are included in the calculation, and 1.18 square kilometers if helicopters are excluded.

The actual (2012) 28 Noise Exposure Contours, with and without helicopters, are not closer at any point, including in a direction westerly of the Toronto City Centre Airport between points “X” and “Y”, to the 25 NEF Contour for 1990 than to the 28 NEF Contour for 1990.

The 28 NEF contours for calendar year 2012, with and without helicopters, do not expand beyond the official 25 NEF contour for 1990, and remains well within the limit set by the Tripartite Agreement for the expansion of the NEF contour.

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TRANSPORT CANADA, “Land Use Planning in The Vicinity of Airports”, 8th edition, 2006, TP 1247.

TRANSPORT CANADA, “Air Traffic Designators”, TP 143, 2009.

FAA, U.S. Department of transportation, Advisory Circular, “Noise Levels for U.S. Certificated and Foreign Aircraft”, 2001.

APPENDIX A

Fleet composition

Aircraft	D1*	D2*	D3*	D4*	Chap.	MTOW	Manufacturer	Model	Equivalent	Number
A109	L	2	T	R		3,000	AGUSTA	A-109, Power	AS350	26
A119	L	2	T	R		3,175	AGUSTA	AW109SP	AS350	4
A139	M	2	T	R		6,400	AGUSTAWESTLAND	AW-139	AS332	2,382
AA5	L	1	P	F		1,000	AMERICAN	AA-5 Traveler	GASEPF	52
AC11	L	1	P	R		2,000	ROCKWELL	112, 114 Commander, Alpine Commander	RWCM14	9
AC90	L	2	T	R		5,000	ROCKWELL	690 Turbo Commander, Jetprop Commander 840	RWCM69	10
AC95	L	2	T	R		6,000	ROCKWELL	695 Jetprop Commander 980/1000	RWCM69	4
AEST	L	2	P	R		3,000	PIPER	PA-60, Aerostar	PA60	6
AS50	L	1	T	F		3,000	AEROSPATIALE	AS-350/550 Ecureuil, Astar, SuperStar, Fennec	AS350	31
AS55	L	2	T	F		3,000	AEROSPATIALE	AS-355/555 Ecureuil 2, TwinStar, Fennec	AS350	12
B06	L	1	T	F		2,000	BELL	206A/B/L, 406, LongRanger (CH-139 JetRanger)	AS350	98
B190	M	2	T	R		8,000	BEECH	1900 Airliner (C-12J)	BEC190	33
B212	L	2	T	F		6,000	BELL	212, Twin Two-Twelve (UH-1N, Twin Huey)	AS350	1
B222	L	2	T	R		4,000	BELL	222	AS350	2
B350	M	2	T	R		6,000	BEECH	B300 Super King Air 350	DHC6	214
B407	L	1	T	F		3,000	BELL	407	AS350	2
B412	L	2	T	F		6,000	BELL	412, Griffon (CH-146)	AS350	51
B427	L	2	T	F		3,000	BELL	427	AS350	2
B429	L	2	T	F		3,175	BELL	GlobalRanger	AS350	24
B430	L	2	T	R		5,000	BELL	430	AS350	21
BE10	L	2	T	R		6,000	BEECH	100 King Air (U-21F)	BEC100	81
BE19	L	1	P	F		1,000	BEECH	19 Musketeer Sport, Sport	GASEPF	10
BE20	L	2	T	R		6,000	BEECH	200, 1300 Super King Air, Commuter (C-12A)	BEC200	371
BE23	L	1	P	F		2,000	BEECH	23 Musketeer, Sundowner	GASEPF	18
BE24	L	1	P	R		2,000	BEECH	24 Musketeer Super, Sierra	GASEPF	4
BE30	M	2	T	R		7,000	BEECH	300 Super King Air	BEC300	49
BE33	L	1	P	R		2,000	BEECH	33 Bonanza (E-24)	BEC33	12
BE35	L	1	P	R		2,000	BEECH	35 Bonanza	GASEPV	44
BE36	L	1	P	R		2,000	BEECH	36 Bonanza	GASEPV	86
BE55	L	2	P	R		3,000	BEECH	55 Baron (T-42)	BEC55	12
BE58	L	2	P	R		3,000	BEECH	58 Baron	BEC58	77
BE60	L	2	P	R		4,000	BEECH	60 Duke	BEC60	6
BE9L	L	2	T	R		5,000	BEECH	90, A90-E90 King Air (T-44, VC-6)	BEC90	42
BE9T	L	2	T	R		5,000	BEECH	F-90 King Air	BEC9F	4
BL8	L	1	P	F		2,000	BELLANCA	8 Decathlon, Scout	GASEPF	13

Aircraft	D1*	D2*	D3*	D4*	Chap.	MTOW	Manufacturer	Model	Equivalent	Number
C130	M	4	T	R		71,000	LOCKHEED	C-130	C130	9
C140	L	1	P	F		1,000	CESSNA	140	CNA150	2
C150	L	1	P	F		1,000	CESSNA	150, A150, Commuter, Aerobat	CNA150	15,861
C152	L	1	P	F		1,000	CESSNA	152, A152, Aerobat	CNA152	1,249
C170	L	1	P	F		1,000	CESSNA	170	CNA170	10
C172	L	1	P	F		2,000	CESSNA	172, P172, R172, Skyhawk, Cutlass (T-41)	CNA172	21,238
C175	L	1	P	F		2,000	CESSNA	175, Skylark	GASEPV	7
C177	L	1	P	F		2,000	CESSNA	177, Cardinal	CNA177	84
C180	L	1	P	F		2,000	CESSNA	180, Skywagon 180 (U-17C)	CNA180	69
C182	L	1	P	F		2,000	CESSNA	182, Skylane	CNA182	2,078
C185	L	1	P	F		2,000	CESSNA	185, A185 Skywagon, Skywagon 185 (U-17A/B)	CNA185	145
C205	L	1	P	F		2,000	CESSNA	205	CNA205	2
C206	L	1	P	F		2,000	CESSNA	206, P206, T206, TP206, (Turbo) Super Skywagon	CNA206	604
C208	L	1	T	F		4,000	CESSNA	208 Caravan 1, (Super)Cargomaster (C-98, U-27)	CNA208	666
C210	L	1	P	R		2,000	CESSNA	210, T210, (Turbo)Centurion	CNA210	39
C303	L	2	P	R		3,000	CESSNA	T303 Crusader	CNA303	2
C310	L	2	P	R		3,000	CESSNA	310, T310 (U-3, L-27)	CNA310	44
C337	L	2	P	R		2,000	CESSNA	337, M337 (Turbo)Super Skymaster (O-2)	CNA337	16
C340	L	2	P	R		3,000	CESSNA	340	CNA340	17
C404	L	2	P	R		4,000	CESSNA	404 Titan	CNA404	6
C414	L	2	P	R		3,000	CESSNA	414, Chancellor	CNA414	93
C421	L	2	P	R		4,000	CESSNA	421, Golden Eagle, Executive Commuter	CNA421	176
C425	L	2	T	R		4,000	CESSNA	425 Corsair, Conquest 1	CNA425	2
C441	L	2	T	R		5,000	CESSNA	441 Conquest, Conquest 2	CNA441	80
C550	M	2	J	R	3	7,000	CESSNA	550, S550, 552 Citation 2/S2/Bravo (T-47, U-20)	CNA550	14
C72R	L	1	P	R		2,000	CESSNA	172RG Cutlass RG	GASEPV	14
C77R	L	1	P	R		2,000	CESSNA	177RG Cardinal RG	CNA17B	88
C82R	L	1	P	R		2,000	CESSNA	R182, TR182 (Turbo)Skylane RG	CNA182	23
CAMP	L	1	P	F		490	PIETENPOL	Air Camper	GASEPF	1
CH60	L	1	P	F		1,000	ZENAIR	CH-600/601 Zodiac, Super Zodiac	GASEPV	2
CH7A	L	1	P	F		2,000	CHAMPION	7EC/ECA/FC/JC Citabria, Traveler, Tri-Con, Tri-Traveler	GASEPF	3
CH7B	L	1	P	F		2,000	BELLANCA	7GCBC/KCAB Citabria	BLCH10	2
CL60	M	2	J	R	3	15,000	CANADAIR	CL-600/601/604 Challenger (CC-144)	CL600	1
COL3	L	1	P	F		1,500	LANCAIR	LC40-550FG	BEC58P	8

Aircraft	D1*	D2*	D3*	D4*	Chap.	MTOW	Manufacturer	Model	Equivalent	Number
COL4	L	1	P	F		1,633	CESSNA AIRCRAFT CO.	400 Corvalis TT	BEC58P	121
CRJ2	M	2	J	R	3	24,000	CANADAIR	RJ-200 Regional Jet	CLREGJ	1
DA40	L	1	P	F		1,150	DIAMOND	DA40	GASEPF	89
DA42	L	2	P	R		1,700	DIAMOND	DA42	GASEPV	3
DH2T	L	1	T	F		3,000	DE HAVILLAND	DHC-2 Mk3 Turbo Beaver	CNA441	81
DH3T	L	1	T	R		4,000	DE HAVILLAND	DHC-3 Turbo Otter	CNA441	1
DH8A	M	2	T	R		16,000	DE HAVILLAND	DHC-8-100 Dash 8 (E-9, CT-142, CC-142)	DHC8	16
DH8D	M	2	T	R		26,000	DE HAVILLAND	DHC-8-400 Dash 8	DHC830	58,525
DHC1	L	1	P	F		1,000	DE HAVILLAND	DHC-1 Chipmunk	GASEPV	2
DHC2	L	1	P	F		3,000	DE HAVILLAND	DHC-2 Mk1 Beaver (U-6, L-20)	DHC2	5
DHC7	M	4	T	R		20,000	DE HAVILLAND	DHC-7 Dash 7 (O-5, EO-5)	DHC7	27
DV20	L	1	P	F		1,000	DIAMOND	DA-20/22, DV-20 Katana, Speed Katana	GASEPF	43
EC20	L	1	T	F		2,000	EUROCOPTER	EC-120 Colibri	AS350	58
EC30	L	1	T	F		2,370	AEROSPATIALE	AS350 B3	AS350	7
EDGE	L	1	P	F		800	ZIVCO	Edge 540	GASEPV	12
EVSS	L	1	P	F		550	AEROTECHNIK	SPORTSTAR	GASEPF	8
EXPR	L	1	P	F		1,406	AURIGA	PHOENIX	GASEPF	1
FA10	M	2	J	R	3	9,000	DASSAULT	Falcon 10, Mystere 10	FAL10	132
FBA2	L	1	P	F		2,000	FOUND	FBA-2, Bush Hawk	GASEPV	7
FDCT	L	1	P	F		560	FLIGHT DESIGN	CTSW	GASEPF	6
G115	L	1	P	R		2,000	GROB	G-115A/B/C/D/E, Bavarian (Heron, Tutor)	GASEPF	4
G159	M	2	T	R		16,000	GRUMMAN	G-159 Gulfstream 1 (TC-4 Academe, VC-4)	GULF1	6
GLAS	L	1	P	F		1,043	GLASAIR	GLASAIR 11S-RG	GASEPF	2
H500	L	1	T	F		2,000	MCDONNELL DOUGLAS	MD-500, MD-530F/MG, Defender, Nightfox	AS350	2
HMBD	L	1	P	F		1,000	HOMEBUILT	Homebuilt	GASEPF	1
HUSK	L	1	P	F		1,000	CHRISTEN	A-1 Husky	GASEPV	18
J3	L	1	P	F		1,000	PIPER	J-3 Cub (L-4, NE)	GASEPF	2
JS31	M	2	T	R		7,000	BRITISH AEROSPACE	BAe-3100 Jetstream 31 (T.Mk.3)	BAEJ31	252
JU52	M	3	P	F		9,000	JUNKERS	JU 52	BEC58P	12
LA25	L	1	P	A		2,000	LAKE	LA-250/270 (Turbo)Renegade, Seawolf, Seafury	GASEPF	4
LA4	L	1	P	A		2,000	LAKE	LA-4/200, Buccaneer	LA42	45
LNC2	L	1	P	R		1,000	LANCAIR	Lancair 200/235/320/360	GASEPV	2
M20P	L	1	P	R		2,000	MOONEY	M-20, M-20A-J/L/R (non-turbocharged)	M20J	95
M20T	L	1	P	R		2,000	MOONEY	M-20K/M, Bravo, Encore (turbocharged)	M20K	13
M7	L	1	P	F		2,000	MAULE	M-7-235, MT-7 Super Rocket, Star Rocket	GASEPF	6

Aircraft	D1*	D2*	D3*	D4*	Chap.	MTOW	Manufacturer	Model	Equivalent	Number
MU2	L	2	T	R		5,000	MITSUBISHI	MU-2, Marquise, Solitaire (LR-1)	MU2	245
P180	L	2	T	R		6,000	PIAGGIO	P-180 Avanti	SD330	456
P210	L	1	P	R		2,000	CESSNA	P210 Pressurized Centurion	CNA206	1
P28A	L	1	P	F		2,000	PIPER	PA-28-140/150/160/180 Archer, Cadet, Cherokee	PA28CA	331
P28B	L	1	P	F		2,000	PIPER	PA-28-201T/235/236 Cherokee, Dakota	PA28CA	44
P28R	L	1	P	R		2,000	PIPER	PA-28R-180/200/201 Cherokee Arrow, Turbo Arrow	PA28CA	121
P28T	L	1	P	R		2,000	PIPER	PA-28RT Arrow 4, Turbo Arrow 4	PA28CA	13
P32R	L	1	P	R		2,000	PIPER	PA-32R Cherokee Lance, Saratoga SP, Turbo	GASEPV	28
P32T	L	1	P	R		2,000	PIPER	PA-32RT Lance 2, Turbo Lance 2	GASEPV	63
P46T	L	1	T	R		2,000	PIPER	PA-46T Malibu Meridian	PA46	54
P68	L	2	P	F		2,000	PARTENAVIA	P-68, Victor, Observer	GASEPV	2
PA12	L	1	P	F		1,000	PIPER	PA-12 Super Cruiser	GASEPF	2
PA16	L	1	P	F		1,000	PIPER	PA-16 Clipper	GASEPF	2
PA18	L	1	P	F		1,000	PIPER	PA-18 Super Cub (L-18C, L-21, U-7)	PA18	16
PA22	L	1	P	F		1,000	PIPER	PA-22 Tri-Pacer, Caribbean, Colt	PA22CO	6
PA23	L	2	P	R		2,000	PIPER	PA-23-150/160 Apache	PA23AZ	2
PA24	L	1	P	R		2,000	PIPER	PA-24 Comanche	PA24	109
PA27	L	2	P	R		3,000	PIPER	PA-23-235/250 Aztec, Turbo Aztec (U-11)	PA23AZ	880
PA30	L	2	P	R		2,000	PIPER	PA-30/39 Twin Comanche, Turbo Twin Comanche	PA30	172
PA31	L	2	P	R		4,000	PIPER	PA-31/31P Navajo, Chieftain, Mojave, T-1020	PA31	145
PA32	L	1	P	F		2,000	PIPER	PA-32 Cherokee Six, Saratoga, Turbo Saratoga	GASEPV	36
PA34	L	2	P	R		3,000	PIPER	PA-34 Seneca	PA34	34
PA38	L	1	P	F		1,000	PIPER	PA-38 Tomahawk	PA38	4
PA44	L	2	P	R		2,000	PIPER	PA-44 Seminole, Turbo Seminole	PA44	104
PA46	L	1	P	R		2,000	PIPER	PA-46 Malibu, Malibu Mirage	PA46	108
PAY1	L	2	T	R		5,000	PIPER	PA-31T1-500 Cheyenne 1	PA31T	2
PAY2	L	2	T	R		5,000	PIPER	PA-31T-620/T2-620 Cheyenne, Cheyenne 2	CNA441	4
PAY3	L	2	T	R		6,000	PIPER	PA-42-720 Cheyenne 3	CNA441	2
PAY4	L	2	T	R		6,000	PIPER	PA-42-1000 Cheyenne 400	CNA441	2
PC12	L	1	T	R		5,000	PILATUS	PC-12, Eagle	CNA20T	2,309
PIVI	L	1	P	F		600	PIPISTREL	VIRUS SW	GASEPF	2
PTS1	L	1	P	F		1,000	PITTS	S-1 Special	GASEPF	13

Aircraft	D1*	D2*	D3*	D4*	Chap.	MTOW	Manufacturer	Model	Equivalent	Number
PTS2	L	1	P	F		1,000	PITTS	S-2 Special	GASEPF	6
PTSS	L	1	P	F		700	PITTS	Super Stinker	GASEPV	7
R22	L	1	P	F		1,000	ROBINSON	R-22	AS350	1
R44	L	1	P	F		2,000	ROBINSON	R-44 Astro	AS350	2,415
R66	L	1	T	F		1,225	ROBINSON	R66	AS350	1
RV10	L	1	P	F		1,200	VAN'S	RV-10	GASEPV	2
RV6	L	1	P	F		1,000	VAN'S	RV-6	GASEPF	2
RV7	L	1	P	F		816	VAN'S	RV-7A	GASEPV	11
RV8	L	1	P	F		816	VAN'S	RV 8A	GASEPF	10
RV9	L	1	P	F		794	VAN'S	RV 9	GASEPF	4
S108	L	1	P	F		2,000	STINSON	108 Voyager, Station Wagon	GASEPF	3
S76	L	2	T	R		5,000	SIKORSKY	S-76, H-76, AUH-76, Spirit, Eagle (HE-24)	AS332	28
S92	M	2	T	R		12,000	SIKORSKY	S-92 Helibus	AS332	20
SKRA	L	1	P	F		450	SYNAIRGIE	Sky Ranger	GASEPF	1
SR20	L	1	P	F		2,000	CIRRUS	SR-20	GASEPF	68
SR22	L	1	P	F		1,500	CIRRUS	SR22	GASEPF	213
SREY	L	1	P	F		650	PROGESSIVE AERODYNE	SeaRay	GASEPF	2
SW4	M	2	T	R		7,000	FAIRCHILD SWEARINGEN	Merlin 4C, Metro2/2A, Metro 3, Metro 3A, Expediter, Merlin 23, 4	SAMER4	16
T6	L	1	P	R		4,000	NORTH AMERICAN	T-6, AT-6, BC-1, SNJ, Texan, Harvard	GASEPF	143
TAMP	L	1	P	F		2,000	SOCATA	TB-9 Tampico	GASEPF	2
TBM7	L	1	T	R		3,000	SOCATA	TBM-700	CNA441	130
TBM8	L	1	T	R		7,400	SOCATA	TBM850	CNA441	32
TEX2	L	1	T	R		4,000	RAYTHEON	T-6 Texan 2, CT-156 Harvard 2	GASEPV	11
TOBA	L	1	P	F		1,150	SOCATA	TB 200	GASEPF	2
TRF1	L	1	P	F		953	ROCKET	F1 ROCKET	GASEPF	2
TRIN	L	1	P	R		2,000	SOCATA	TB-20/21 Trinidad	GASEPF	18
VELO	L	1	P	F		1,315	VELOCITY AIRCRAFT	Velocity	GASEPV	2
Z42	L	1	P	F		2 000	ZLIN	Z-42/142/242	GASEPV	22
ZZZ1	L	1	T	A		1,996	BERNIER	G-BAIR 6T	CNA206	2
ZZZ2	L	1	P	F		925	EVO	EVO 1	GASEPV	2
ZZZ5	L	1	P	F		878	PETER DALE	PD12	GASEPF	1
ZZZZ	L	1	P	F		2,000	CESSNA	172, P172, R172, Skyhawk, Cutlass (T-41)	CNA172	1

*D1: Weight:
L – light
M – medium
H – heavy

*D2: Number of engine

*D3: Engine type:
P – pistons
T – turboprops
J – jets

*D4: Landing gear:
F – fixed
R – removable
A – amphibious

APPENDIX B

Movements summary

Fleet summary

Aircraft	Arrivals			Departures			Total
	Day	Night	Total	Day	Night	Total	
Helicopter single engine	1,323	0	1,323	1,296	0	1,296	2,619
Helicopter twin engine	1,054	77	1,131	1,344	94	1,438	2,569
Piston single engine	7,956	270	8,226	8,205	107	8,312	16,538
Piston twin engine	536	10	546	533	14	547	1,093
Piston 3 engines	6	0	6	6	0	6	12
Turboprop single engine	1,609	45	1,654	1,575	57	1,632	3,286
Turboprop twin engine	29,432	932	30,364	28,648	1,404	30,052	60,416
Turboprop 4 engines	17	0	17	19	0	19	36
Jet twin engine Stage 3	67	5	72	70	6	76	148
Total	**42,000**	**1,339**	**43,339**	**41,696**	**1,682**	**43,378**	**86,717**

- Day: 7 am - 10 pm
- Night: 10 pm - 7 am

Runway use - Arrivals

Aircraft	06		08		15		24		26		33		60	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Helicopter single engine					1				1				1 ,321	
Helicopter twin engine	1		257	27	36		1		620	48	5		134	2
Piston single engine	45		2,540	116			257		4,617	154	497			
Piston twin engine	1		157	1			2		324	6	52	3		
Piston 3 engines			6											
Turboprop single engine	1		499	15	1		9		1,020	30	79			
Turboprop twin engine			9,242	347	1		1		20,179	585	9			
Turboprop 4 engines			5						5		7			
Jet twin engine Stage 3			20	1					47	4				
Total	**48**	**0**	**12,726**	**507**	**39**	**0**	**270**	**0**	**26,813**	**827**	**649**	**3**	**1,455**	**2**

Runway use - Departures

Aircraft	06		08		15		24		26		33		60	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Helicopter single engine			2						3				1,291	
Helicopter twin engine	1		407	36	7		1		820	56	3		105	2
Piston single engine	1		2,664	46	86		243		5,142	61	69			
Piston twin engine			155	7	4		5		369	7				
Piston 3 engines			6											
Turboprop single engine			510	18	5		2		1,054	39	4			
Turboprop twin engine			9,061	439			1		19,585	965	1			
Turboprop 4 engines	1		8						10					
Jet twin engine Stage 3			22	3					48	3				
Total	**3**	**0**	**12,835**	**549**	**102**	**0**	**252**	**0**	**27,031**	**1,131**	**77**	**0**	**1,396**	**2**

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