AtkinsRéalis

Final Report

Transport Canada

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2023 Noise Exposure Contours Billy Bishop Toronto City Airport

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Executive Summary

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

The Tripartite Agreement (Agreement) imposes a limit on the expansion of the NEF contours. Sections 14 and 27 of the Agreement require that the 28 NEF contour does not expand beyond the official 25 NEF contour for 1990, except between points "X" and "Y". If the 28 NEF contour does expand beyond the official 25 NEF contour for 1990, aircraft movements have to be controlled in a way to bring back the 28 NEF contour within the official 25 NEF contour for 1990.

The analysis shows that the 28 NEF Contour for 2023, including helicopters in the calculation, does not expand beyond the official 25 NEF Contour for 1990.

When helicopters are excluded from the calculation, the NEF contours are slightly shrunken, and do not expand beyond the official 25 NEF Contour for 1990.

Table i shows the surface areas inside the noise contours.

NEF	Surface area (km^2)	
	With helicopters	**Without helicopters**
35 +	0.2	0.2
30 - 35	0.5	0.4
28 - 30	0.3	0.3
25 - 28	0.9	0.9
Total	**1.9**	**1.8**

1. Introduction

This document presents the noise contours for the year 2023 for the Billy Bishop Toronto City Airport (Airport).

Environmental noise or community noise, including airport activities, is not regulated by Canada's government, nevertheless Transport Canada's methodology (the methodology) is the standard for assessing the perceived noise in the vicinity of airports. This methodology is established across Canada and is used for this study. The interpretation of the results produced 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 Noise Exposure Forecast (NEF) contours. The NEF methodology is not by itself a forecast, but a noise calculation based either on a forecast of future movements or by actual movements. The noise contours for 2023, presented in this report, have been produced using the NEF methodology on the basis of actual movement data received from Transport Canada.

The index provided by the noise contours is used to show 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 p.m. to 7 a.m.

Flight distances and departure flight path directions have been determined according to geographic coordinates of destination airports 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 characteristics.

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 airports and calculates noise levels for the receptor grid. Noise exposure contours are then drawn for the whole study area.

The software does not include sound data for the aircraft DASH-8 Q400. Noise and performance data of DASH-8-300 were used as surrogate. This hypothesis may have a major impact on the noise contours, especially considering that DASH-8 Q400 is the most represented aircraft in terms of the annual number of movements with 39% of all 2023 movements.

The NEF methodology developed by Transport Canada uses the parameter “Peak Planning Day”, which has been 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 database of aircraft movements for 2023 for the Airport 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 aircraft movement database.

3.1.1 Calculation of peak planning day

Table 3-1 and **Table 3-2** present the results of the calculation of the Peak Planning Day for itinerant and local movements for 2023 for the Airport.

The number of movements of the Peak Planning Day is found to be 308 for itinerant movements and 169 for local movements. In comparison, the averages for 2023 are 203 for itinerant movements and 70 for 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 overflights 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 308 itinerant movements and 169 local movements (85 circuits), with a total of 477 aircraft movements.

Helicopters accounted for 10,541 movements in 2023, of which 2,044 were runway operations, mostly Ornge flights using AgustaWestland AW139 helicopters, and 8,497 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 242 for itinerant movements, and 169 for local movements. In comparison, the averages for 2023 are 174 for itinerant movements, and 70 for local movements per day.

Table 3-1 Peak planning day with helicopters

Itinerant		Local	
Date	**Movements**	**Date**	**Movements**
May 26, 2023	327	May 5, 2023	256
May 21, 2023	325	May 6, 2023	186
May 6, 2023	312	May 10, 2023	160
May 5, 2023	310	May 9, 2023	160
May 28, 2023	309	May 26, 2023	150
May 18, 2023	305	May 12, 2023	150
May 31, 2023	298	May 8, 2023	144
August 27, 2023	334	July 18, 2023	210
August 11, 2023	330	July 19, 2023	210
August 20, 2023	327	July 14, 2023	204
August 2, 2023	301	July 28, 2023	188
August 13, 2023	294	July 27, 2023	154
August 31, 2023	285	July 17, 2023	130
August 9, 2023	283	July 22, 2023	128
July 19, 2023	337	August 9, 2023	192
July 14, 2023	330	August 28, 2023	172
July 30, 2023	315	August 25, 2023	162
July 7, 2023	300	August 21, 2023	158
July 12, 2023	296	August 20, 2023	148
July 9, 2023	281	August 16, 2023	146
July 27, 2023	260	August 14, 2023	142

Table 3-2 Peak planning day without helicopters

Itinerant		Local	
Date	**Movements**	**Date**	**Movements**
May 5, 2023	265	May 5, 2023	256
May 10, 2023	259	May 6, 2023	186
May 18, 2023	256	May 10, 2023	160
May 26, 2023	254	May 9, 2023	160
May 23, 2023	254	May 26, 2023	150
May 22, 2023	251	May 12, 2023	150
May 9, 2023	249	May 8, 2023	144
August 9, 2023	267	July 18, 2023	210
August 11, 2023	253	July 19, 2023	210
August 22, 2023	244	July 14, 2023	204
August 28, 2023	232	July 28, 2023	188
August 27, 2023	229	July 27, 2023	154
August 20, 2023	228	July 17, 2023	130
August 29, 2023	224	July 22, 2023	128
September 20, 2023	245	August 9, 2023	192
September 22, 2023	242	August 28, 2023	172
September 13, 2023	239	August 25, 2023	162
September 29, 2023	226	August 21, 2023	158
September 19, 2023	226	August 20, 2023	148
September 5, 2023	223	August 16, 2023	146
September 14, 2023	222	August 14, 2023	142

3.1.2 Fleet composition and runway use

The data on the composition of the fleet of all operations at the Airport in 2023 including helicopters is presented in **Appendix A**. The document TP 143 – Air Traffic Designators from Transport Canada, Transport Canada's aircraft registration database and commercial databases are the primary sources of information for the identification of aircraft types.

Figure 3-1 illustrates the configuration of runways, taken from the Canada Air Pilot. **Figure 3-2** and **Figure 3-2** summarize the composition of fleet and runway use for the airport in 2023, compiled from the itinerant movements database. Detailed data is presented in **Appendix B**.

The total number of movements in 2023 was 99,632, divided into 74,148 itinerant movements and 25,484 local movements.

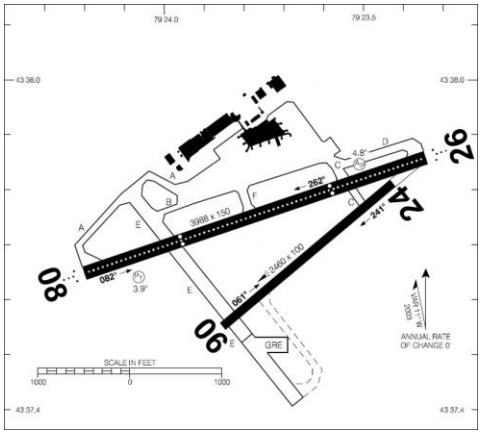

Figure 3-1 Runway identification

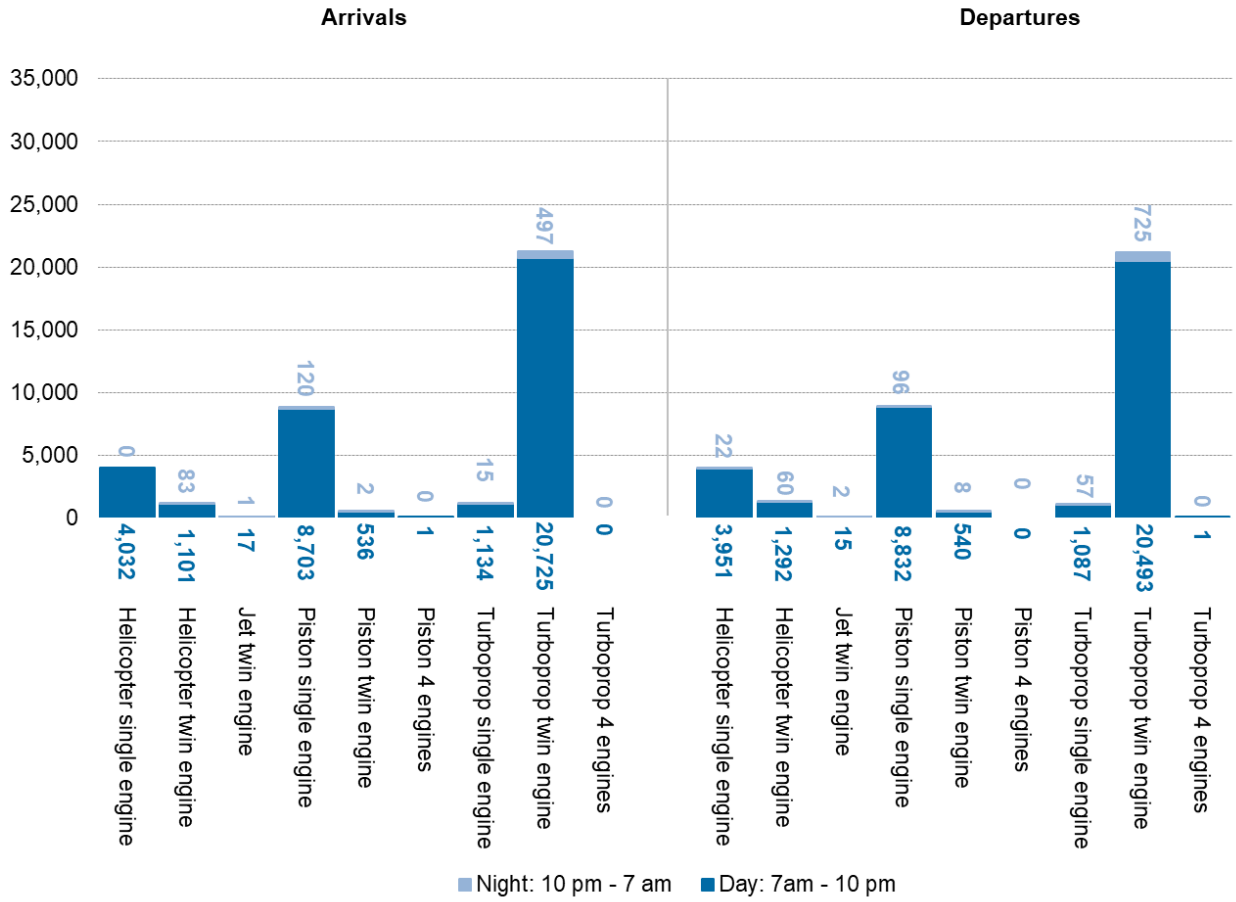

Figure 3-2 Summary of fleet composition

The movements during the night (10 p.m. to 7 a.m.) accounted for 2.0% of total movements in 2023. For the calculation of noise contours, using the methodology, each night-time movement is equivalent to 16.67 daytime movements. The 1,974 night-time movements recorded in 2023 are equivalent to 32,907 daytime movements. The night-time movements represent an important contribution to the noise contours.

Overall, DASH-8 Q400 is the most frequent aircraft at the Airport with 39% of all movements. The twin-engine turboprop category accounts for 43% of all movements. The proportion of movements in the single engine piston aircraft category (mostly Cessna 150, 152, and 172) is 43%.

Figure 3-3 illustrates the summary of runway use and **Table 3-3** shows the runway use by aircraft category.

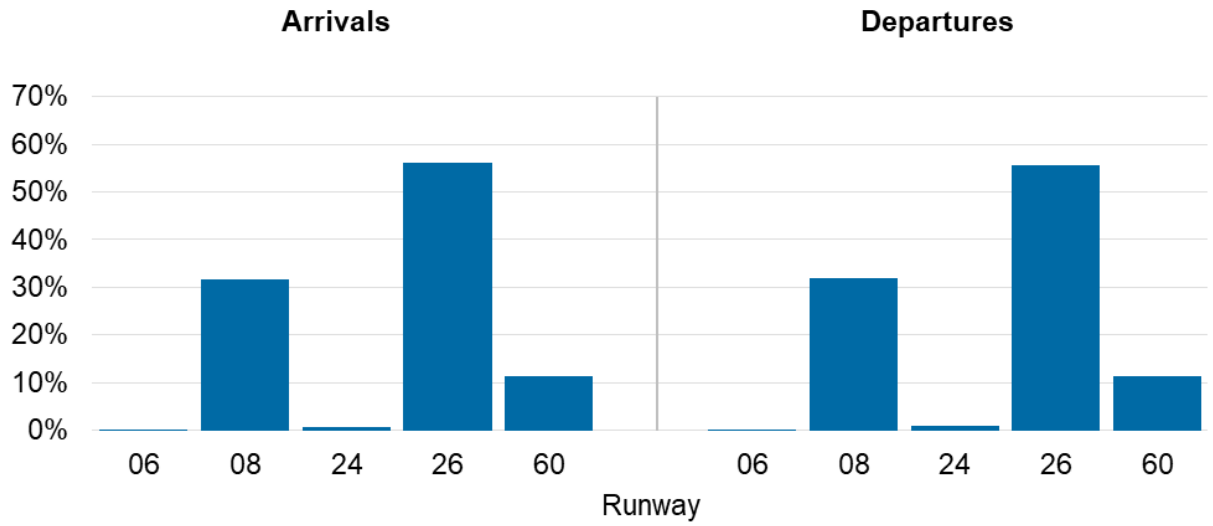

Figure 3-3 Summary of runway use

Table 3-3 Runway use by aircraft category

Runway	Global		Helicopters		Jets		Pistons		Turboprops	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
06	80	2	0	0	0	0	80	2	0	0
	0.2%	0.01%	0%	0%	0%	0%	1%	0.02%	0%	0%
08	11,660	11,838	329	366	7	7	3,220	3,333	8,104	8,132
	32%	32%	6%	7%	39%	41%	34%	35%	36%	36%
24	287	355	1	0	0	0	285	354	1	1
	0.8%	1%	0.0%	0%	0%	0%	3%	4%	0.004%	0.004%
26	20,716	20,713	662	686	11	10	5,777	5,787	14,266	14,230
	56%	56%	13%	13%	61%	59%	62%	61%	64%	64%
60	4,224	4,273	4,224	4,273	0	0	0	0	0	0
	11%	11%	81%	80%	0%	0%	0%	0%	0%	0%
Total	36,967	37,181	5,216	5,325	18	17	9,362	9,476	22,371	22,363
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 3-4 indicates the aircraft used in the represented categories defined in the calculation. Aircrafts with a small number of movements in 2023 are not shown in this table; they are listed in detail in **Appendix A**.

Table 3-4 Aircraft categories

Aircraft categories	Aircraft types
Helicopter single engine	Robinson R44, etc.
Helicopter twin engine	Agusta Westland AW139, etc.
Piston single engine	Cessna series 150/172/207, Grob G-115, etc.
Piston twin engine	Piper PA-23/31, etc.
Turboprop single engine	Pilatus PC-12, Cessna 208 Caravan, etc.
Turboprop twin engine	Dash 8-400, etc.
Jet twin engine	IAI 1124, etc.

3.1.3 Flight paths

Flight paths for departures, arrivals, and circuits have been modelled from information gathered from the Canada Air Pilot, the Restricted Canada Air Pilot, the Canada Flight Supplement, Porter Airlines, and NAV CANADA. The position of the landing site for Heli Tours helicopters was provided by Heli Tours and NAV CANADA provided information on helicopters flight paths.

Departure flight paths:

- Runway 08: right turn at waypoint LODRA (N43 38.31 W79 21.52), heading 090°.
- Runway 26: left turn at 800’ ASL, to waypoint EMDOS (N43 31.08 W79 19.28).

Approach slopes:

- Runways 06, 08, and 24: 3.5°;
- Runway 26: 3.5° or 3.98°.

Runways 24 and 26 have left-hand circuits while runways 06 and 08 have right-hand circuits.

3.2 Results

Figure 3-4 illustrates the Airport’s noise contours for 2023 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 excluding helicopters are shown in **Figure 3-5**.

The Agreement imposes a limit on the expansion of NEF contours. Section 27 of the Agreement requires that the 28 NEF contour does not expand beyond the official 25 NEF contour for 1990, except between points “X” and “Y”. If the 28 NEF contour does expand beyond the official 25 NEF contour for 1990, aircraft movements have to be controlled in such a way to bring back the 28 NEF contour within the official 25 NEF contour for 1990.

The analysis shows that the 28 NEF Contour for 2023, including helicopters in the calculation, does not expand beyond the official 25 NEF Contour for 1990.

When helicopters are excluded from the calculation, the NEF contours are slightly shrunken, and do not expand beyond the official 25 NEF Contour for 1990.

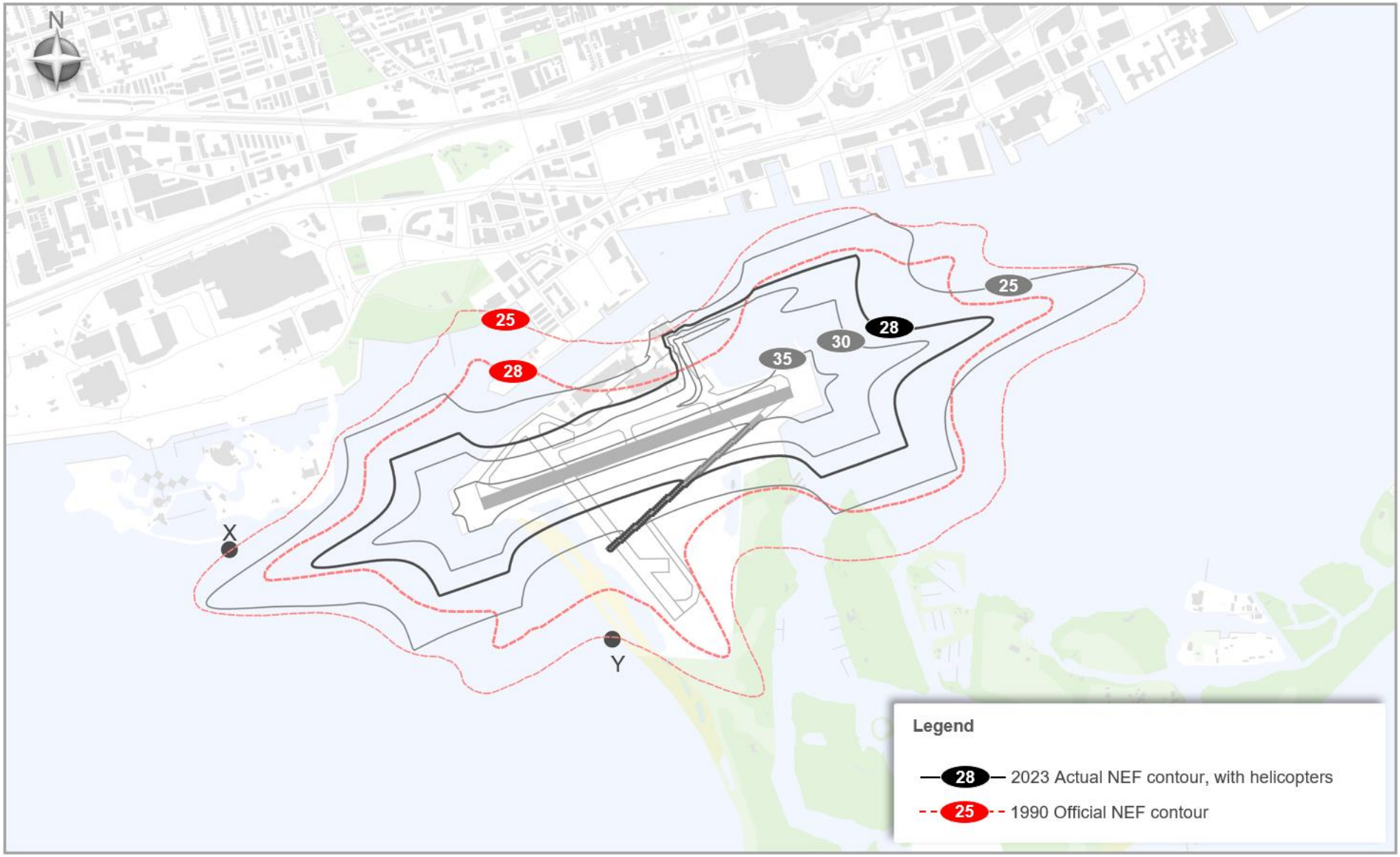

Figure 3-4 NEF contours with helicopters

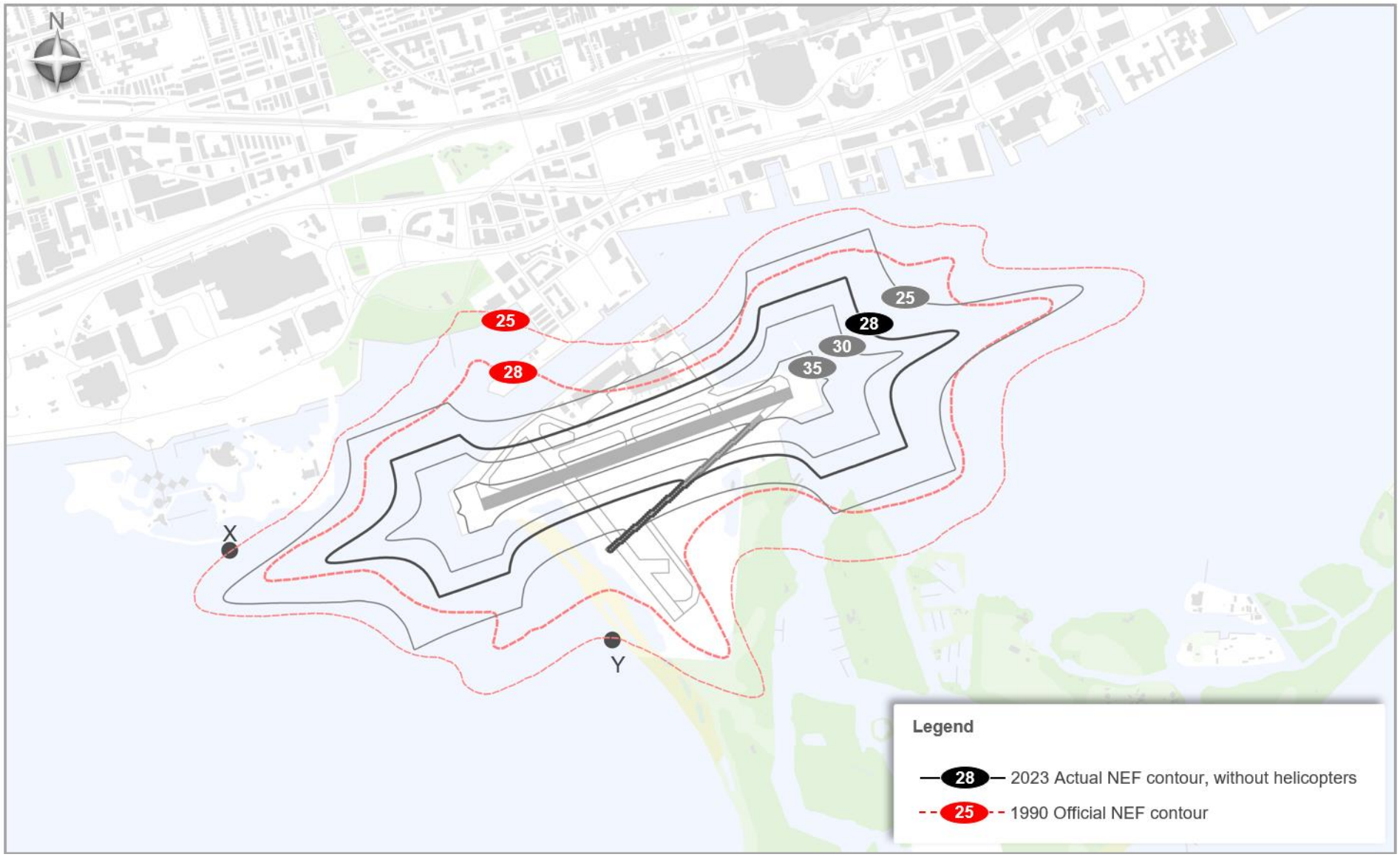

Figure 3-5 NEF contours without helicopters

Table 3-5 shows the surface area within the contours in 2022. It is the total surface area in each range of NEF values.

Table 3-5 Surface area (km^2)

NEF	Surface area (km^2)	
	With helicopters	**Without helicopters**
35 +	0.2	0.2
30 - 35	0.5	0.4
28 - 30	0.3	0.3
25 - 28	0.9	0.9
Total	**1.9**	**1.8**

4. Conclusion

The 2023 noise exposure contours for the 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 1.9 square kilometers (km^2) including helicopters, and 1.8 km^2 excluding helicopters. The NEF 28 contour covers an area of 0.9 km^2 including helicopters, and 0.9 km^2 excluding helicopters.

The 28 NEF contour for 2023, including helicopters, does not expand beyond the official 25 NEF contour for 1990, the limit set by the Agreement for the expansion of the NEF contour.

When helicopters are excluded from the calculation, the NEF contours are slightly shrunken, and do not expand beyond the official 25 NEF Contour for 1990.

5. Bibliography

INTERNATIONAL CIVIL AVIATION ORGANIZATION, International Standards and Recommended Practices, Annex 16 to the Convention on International Civil Aviation, Environmental Protection, Volume 1 - Aircraft Noise, 8th edition, 2017.

TRANSPORT CANADA, Aviation Group, “NEF micro computer system user manual”, June 1990, TP 6907.

TRANSPORT CANADA, “Land Use Planning in the Vicinity of Airports”, 9th edition, 2013/14, 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.

APPENDICES

Appendix A. Fleet Composition

Aircraft	D1*	D2*	D3*	D4*	MTOW	Manufacturer	Model	Equivalent	Number
A109	L	2	T	R	3,000	AGUSTA	A-109, Power	B222	6
A139	M	2	T	R	6,400	AGUSTAWESTLAND	AW-139	BH12/CH135MAN	2,421
AA5	L	1	P	F	1,000	AMERICAN	AA-5 Traveler	GASEPF	39
AC11	L	1	P	R	2,000	ROCKWELL	112, 114 Commander, Alpine Commander	RWCM14	26
AC90	L	2	T	R	5,000	ROCKWELL	690 Turbo Commander, Jetprop Commander 840	RWCM69	4
AC95	L	2	T	R	6,000	ROCKWELL	695 Jetprop Commander 980/1000	RWCM69	2
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	17
AS55	L	2	T	F	3,000	AEROSPATIALE	AS-355/555 Ecureuil 2, TwinStar, Fennec	B222	2
B06	L	1	T	F	2,000	BELL	206A/B/L, 406, LongRanger (CH-139 JetRanger)	BH06MAN	35
B190	M	2	T	R	8,000	BEECH	1900 Airliner (C-12J)	BEC190	263
B350	M	2	T	R	6,000	BEECH	B300 Super King Air 350	DHC6	532
B412	L	2	T	F	6,000	BELL	412, Griffon (CH-146)	BH12/CH135MAN	1
B427	L	2	T	F	3,000	BELL	427	B222	4
B429	L	2	T	F	3,175	BELL	GlobalRanger	B222	31
B767	H	2	J	R	160,000	BOEING COMPANY	Boeing 767	767JT9	1
BE10	L	2	T	R	6,000	BEECH	100 King Air (U-21F)	BEC100	182
BE18	L	2	P	R	4,000	BEECH	18 (C-45 Expeditor)	BEC18	2
BE19	L	1	P	F	1,000	BEECH	19 Musketeer Sport, Sport	GASEPF	3
BE20	L	2	T	R	6,000	BEECH	200, 1300 Super King Air, Commuter (C-12A)	BEC200	162
BE23	L	1	P	F	2,000	BEECH	23 Musketeer, Sundowner	GASEPF	20
BE24	L	1	P	R	2,000	BEECH	24 Musketeer Super, Sierra	GASEPF	18
BE30	M	2	T	R	7,000	BEECH	300 Super King Air	BEC300	40
BE33	L	1	P	R	2,000	BEECH	33 Bonanza (E-24)	BEC33	6
BE35	L	1	P	R	2,000	BEECH	35 Bonanza	GASEPV	49

Aircraft	D1*	D2*	D3*	D4*	MTOW	Manufacturer	Model	Equivalent	Number
BE36	L	1	P	R	2,000	BEECH	36 Bonanza	GASEPV	34
BE55	L	2	P	R	3,000	BEECH	55 Baron (T-42)	BEC55	6
BE58	L	2	P	R	3,000	BEECH	58 Baron	BEC58	26
BE60	L	2	P	R	4,000	BEECH	60 Duke	BEC60	2
BE9L	L	2	T	R	5,000	BEECH	90, A90-E90 King Air (T-44, VC-6)	BEC90	194
BEAR	L	1	P	F	1,100	BEARHAWK	Bearhawk	GASEPF	2
BL8	L	1	P	F	2,000	BELLANCA	8 Decathlon, Scout	GASEPF	76
C140	L	1	P	F	1,000	CESSNA	140	CNA150	2
C150	L	1	P	F	1,000	CESSNA	150, A150, Commuter, Aerobat	CNA150	15,461
C152	L	1	P	F	1,000	CESSNA	152, A152, Aerobat	CNA152	2,242
C170	L	1	P	F	1,000	CESSNA	170	CNA170	2
C172	L	1	P	F	2,000	CESSNA	172, P172, R172, Skyhawk, Cutlass (T-41)	CNA172	18,227
C177	L	1	P	F	2,000	CESSNA	177, Cardinal	CNA177	7
C180	L	1	P	F	2,000	CESSNA	180, Skywagon 180 (U-17C)	CNA180	53
C182	L	1	P	F	2,000	CESSNA	182, Skylane	CNA182	571
C185	L	1	P	F	2,000	CESSNA	185, A185 Skywagon, Skywagon 185 (U-17A/B)	CNA185	102
C195	L	1	P	F	2,000	CESSNA	195 (LC-126)	GASEPV	2
C206	L	1	P	F	2,000	CESSNA	206, P206, T206, TP206, (Turbo) Super Skywagon	CNA206	430
C207	L	1	P	F	2,000	CESSNA	207 (Turbo) Stationair	CNA207	1,060
C208	L	1	T	F	4,000	CESSNA	208 Caravan 1, (Super)Cargomaster (C-98, U-27)	CNA208	458
C210	L	1	P	R	2,000	CESSNA	210, T210, (Turbo)Centurion	CNA210	25
C240	L	1	P	F	1,600	CESSNA	TTx Model T240	GASEPV	10
C310	L	2	P	R	3,000	CESSNA	310, T310 (U-3, L-27)	CNA310	62
C337	L	2	P	R	2,000	CESSNA	337, M337 (Turbo)Super Skymaster (O-2)	CNA337	22
C340	L	2	P	R	3,000	CESSNA	340	CNA340	32

Aircraft	D1*	D2*	D3*	D4*	MTOW	Manufacturer	Model	Equivalent	Number
C414	L	2	P	R	3,000	CESSNA	414, Chancellor	CNA414	27
C421	L	2	P	R	4,000	CESSNA	421, Golden Eagle, Executive Commuter	CNA421	4
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	8
C510	L	2	J	R	6,000	CESSNA AIRCRAFT CO.	Citation Mustang	CNA500	1
C72R	L	1	P	R	2,000	CESSNA	172RG Cutlass RG	GASEPV	2
C77R	L	1	P	R	2,000	CESSNA	177RG Cardinal RG	CNA17B	11
C82R	L	1	P	R	2,000	CESSNA	R182, TR182 (Turbo)Skylane RG	CNA182	12
CH65	L	1	P	F	600	ZODIAC	Zodiac CH 650	GASEPF	2
CH7A	L	1	P	F	2,000	CHAMPION	7EC/ECA/FC/JC Citabria, Traveler, Tri-Con, Tri-Traveler	GASEPF	6
CH7B	L	1	P	F	2,000	BELLANCA	7GCBC/KCAB Citabria	BLCH10	6
CNUK	L	1	P	F	1,000	FLEET	80 Canuck	GASEPF	1
COL3	L	1	P	F	1,500	Lancair	LC40-550FG	BEC58P	2
COL4	L	1	P	F	1,633	CESSNA AIRCRAFT CO.	400 Corvalis TT	BEC58P	28
DA40	L	1	P	F	1,800	DIAMOND AIRCRAFT IND INC	DA 40	GASEPF	133
DA42	L	2	P	R	1,700	DIAMOND	DA42	GASEPV	77
DA62	L	2	P	R	2,300	DIAMOND	DA62	BEC58P	10
DH84	M	2	T	R	30,000	BOMBARDIER	DHC-8-402	DHC830	876
DH8C	M	2	T	R	20,000	DE HAVILLAND	DHC-8-300 Dash 8	DHC830	4
DH8D	M	2	T	R	26,000	DE HAVILLAND	DHC-8-400 Dash 8	DHC830	39,154
DHC2	L	1	P	F	3,000	DE HAVILLAND	DHC-2 Mk1 Beaver (U-6, L-20)	DHC2	94
DHC6	L	2	T	F	6,000	DE HAVILLAND	DHC-6 Twin Otter (CC-138)	DHC6	7
DHC7	M	4	T	R	20,000	DE HAVILLAND	DHC-7 Dash 7 (O-5, EO-5)	DHC7	1

Aircraft	D1*	D2*	D3*	D4*	MTOW	Manufacturer	Model	Equivalent	Number
DV20	L	1	P	F	1,000	DIAMOND	DA-20/22, DV-20 Katana, Speed Katana	GASEPF	4
E300	L	1	P	F	1,000	EXTRA	300, 350	GASEPV	10
EC30	L	1	T	F	2,400	EUROCOPTER	EC130B4	AS350	75
ECHO	L	1	P	F	550	TECNAM	P92 Echo	GASEPF	7
EVOL	L	1	T	R	2,000	LANCAIR	Lancair Evolution	GASEPV	2
EXEJ	L	1	H	F	680	ROTORWAY	Jetexec	BH06MAN	1
FA10	M	2	J	R	9,000	DASSAULT	Falcon 10, Mystere 10	FAL10	6
FBA2	L	1	P	F	2,000	FOUND	FBA-2, Bush Hawk	GASEPV	6
G115	L	1	P	R	2,000	GROB	G-115A/B/C/D/E, Bavarian (Heron, Tutor)	GASEPF	983
GB6T	L	1	T	A	2,000	BERNIER	G-bair 6T (dérivé de CNA206)	CNA206	16
GLAS	L	1	P	F	1,088	STODDARD-HAMILTON	(INDICATIF SUPPRIMÉ EN 2005) Glasair	GASEPF	3
GLSP	L	1	P	F	0	GLASAIR	Sportsman 2+2	GASEPV	1
GYRO	L	1	P	F	500	AUTOGYRO	AutoGyro MT-03 / MTO sport	GASEPV	2
HIGH	L	1	P	F	700	JUST AIRCRAFT	Highlander	GASEPF	1
HMBD	L	1	P	F	1,000	HOMEBUILT	Homebuilt	GASEPF	12
HUSK	L	1	P	F	1,000	CHRISTEN	A-1 Husky	GASEPV	4
KODI	M	1	T	F	3,290	Quest kodiak	kodiak aircraft	CNA20T	4
LA25	L	1	P	A	2,000	LAKE	LA-250/270 (Turbo)Renegade, Seawolf, Seafury	GASEPF	14
LA4	L	1	P	A	2,000	LAKE	LA-4/200, Buccaneer	LA42	2
LNC4	L	1	P	R	2,000	LANCAIR	Lancair 4	GASEPV	14
LNCE	L	1	P	F	1,451	LANCAIR	Lancair ES	GASEPV	2
M20P	L	1	P	R	2,000	MOONEY	M-20, M-20A-J/L/R (non-turbocharged)	M20J	138
M20T	L	1	P	R	2,000	MOONEY	M-20K/M, Bravo, Encore (turbocharged)	M20K	11
M5	L	1	P	F	2,000	MAULE	M-5, Strata Rocket, Lunar Rocket, Patroller	GASEPF	2

Aircraft	D1*	D2*	D3*	D4*	MTOW	Manufacturer	Model	Equivalent	Number
MO10	L	1	P	F	1,000	MOONEY AIRCRAFT INC.	Cadet	GASEPV	4
MU2	L	2	T	R	5,000	MITSUBISHI	MU-2, Marquise, Solitaire (LR-1)	MU2	266
MUS2	L	1	P	F	725	Mustang	Mustang II	GASEPF	2
NSTR	L	1	P	F	1,100	CUSTOM FLIGHT	North Star	GASEPF	1
P06T	L	2	P	R	1,200	TECNAM	P-2006T	GASEPV	1
P180	L	2	T	R	6,000	PIAGGIO	P-180 Avanti	SD330	10
P210	L	1	P	R	2,000	CESSNA	P210 Pressurized Centurion	CNA206	22
P28A	L	1	P	F	2,000	PIPER	PA-28-140/150/160/180 Archer, Cadet, Cherokee	PA28CA	637
P28B	L	1	P	F	2,000	PIPER	PA-28-201T/235/236 Cherokee, Dakota	PA28CA	87
P28R	L	1	P	R	2,000	PIPER	PA-28R-180/200/201 Cherokee Arrow, Turbo Arrow	PA28CA	95
P28T	L	1	P	R	2,000	PIPER	PA-28RT Arrow 4, Turbo Arrow 4	PA28CA	4
P32R	L	1	P	R	2,000	PIPER	PA-32R Cherokee Lance, Saratoga SP, Turbo	GASEPV	12
P32T	L	1	P	R	2,000	PIPER	PA-32RT Lance 2, Turbo Lance 2	GASEPV	4
P337	L	2	P	R	3,000	CESSNA	T337G, P337 Pressurized Skymaster	CNA337	6
P46T	L	1	T	R	2,000	PIPER	PA-46T Malibu Meridian	PA46	123
P51	L	1	P	R	5,000	NORTH AMERICAN	P-51, F-51, A-36 Mustang	GASEPV	6
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	39
PA27	L	2	P	R	3,000	PIPER	PA-23-235/250 Aztec, Turbo Aztec (U-11)	PA23AZ	1,564
PA30	L	2	P	R	2,000	PIPER	PA-30/39 Twin Comanche, Turbo Twin Comanche	PA30	46

Aircraft	D1*	D2*	D3*	D4*	MTOW	Manufacturer	Model	Equivalent	Number
PA31	L	2	P	R	4,000	PIPER	PA-31/31P Navajo, Chieftain, Mojave, T-1020	PA31	136
PA32	L	1	P	F	2,000	PIPER	PA-32 Cherokee Six, Saratoga, Turbo Saratoga	GASEPV	9
PA34	L	2	P	R	3,000	PIPER	PA-34 Seneca	PA34	26
PA38	L	1	P	F	1,000	PIPER	PA-38 Tomahawk	PA38	264
PA44	L	2	P	R	2,000	PIPER	PA-44 Seminole, Turbo Seminole	PA44	10
PA46	L	1	P	R	2,000	PIPER	PA-46 Malibu, Malibu Mirage	PA46	81
PAY2	L	2	T	R	5,000	PIPER	PA-31T-620/T2-620 Cheyenne, Cheyenne 2	CNA441	16
PAY3	L	2	T	R	6,000	PIPER	PA-42-720 Cheyenne 3	CNA441	2
PC12	L	1	T	R	5,000	PILATUS	PC-12, Eagle	CNA20T	1,710
PTMS	L	1	P	F	1,000	PITTS	Pitts Model 12	GASEPV	2
PTS2	L	1	P	F	1,000	PITTS	S-2 Special	GASEPF	8
R44	L	1	P	F	2,000	ROBINSON	R-44 Astro	HU30	7,758
R66	L	1	T	F	1,225	Robinson	R66	BH06MAN	118
RV10	L	1	P	F	1,200	VAN'S	RV-10	GASEPV	10
RV6	L	1	P	F	1,000	VAN'S	RV-6	GASEPF	26
RV7	L	1	P	F	815	VAN'S	RV-7	GASEPV	10
RV8	L	1	P	F	815	VAN'S	RV-8	GASEPF	4
RV9	L	1	P	F	793	VAN'S	RV9/9A	GASEPF	2
S108	L	1	P	F	2,000	STINSON	108 Voyager, Station Wagon	GASEPF	2
S76	L	2	T	R	5,000	SIKORSKY	S-76, H-76, AUH-76, Spirit, Eagle (HE-24)	S76	72
SLG4	L	1	P	F	900	SLING AIRCRAFT	Sling 4	GASEPV	4
SR20	L	1	P	F	2,000	CIRRUS	SR-20	GASEPF	33
SR22	L	1	P	F	1,500	CIRRUS	SR22	GASEPF	822
SW3	M	2	T	R	6,000	FAIRCHILD SWEARINGEN	SA-226TB, SA-227TT Merlin 3	SAMER3	8
SW4	M	2	T	R	7,000	FAIRCHILD SWEARINGEN	Merlin 4C, Metro2/2A, Metro 3, Metro 3A, Expediter, Merlin 23, 4	SAMER4	631

Aircraft	D1*	D2*	D3*	D4*	MTOW	Manufacturer	Model	Equivalent	Number
T18	L	1	P	F	800	THROP	Throp T-18	GASEPV	3
TBM7	L	1	T	R	3,000	SOCATA	TBM-700	CNA441	76
TBM8	L	1	T	R	7,400	Socata	TBM850	CNA441	32
TBM9	L	1	T	R	3,300	SOCATA	TBM 900	CNA441	13
TOBA	L	1	P	F	2,000	AEROSPATIALE	Tobago	GASEPF	4
WW24	M	2	J	R	11,000	IAI	1124 Westwind, Westwind 1/2, Sea Scan	IA1124	27
YK50	L	1	P	R	1,000	YAKOVLEV	Yak-50	GASEPV	9

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

*D2: Number of engines

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

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

Appendix B. Summary of Movements

Fleet summary of itinerant movements

Aircraft	Arrivals			Departures			Total
	Day	Night	Total	Day	Night	Total	
Helicopter single engine	4,032	0	4,032	3,951	22	3,973	8,005
Helicopter twin engine	1,101	83	1,184	1,292	60	1,352	2,536
Jet twin engine	17	1	18	15	2	17	35
Piston single engine	8,703	120	8,823	8,832	96	8,928	17,751
Piston twin engine	536	2	538	540	8	548	1,086
Piston 4 engines	1	0	1	0	0	0	1
Turboprop single engine	1,134	15	1,149	1,087	57	1,144	2,293
Turboprop twin engine	20,725	497	21,222	20,493	725	21,218	42,440
Turboprop 4 engines	0	0	0	1	0	1	1
Total	**36,249**	**718**	**36,967**	**36,211**	**970**	**37,181**	**74,148**

- Day: 7 a.m. - 10 p.m.
- Night: 10 p.m. - 7 a.m.

Runway use - Arrivals

Aircraft	06		08		24		26		60	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Helicopter single engine			9				3		4,020	
Helicopter twin engine			295	25	1		605	54	200	4
Jet twin engine			7				10	1		
Piston single engine	80		2,975	43	283	2	5,365	75		
Piston twin engine			201	1			335	1		
Piston 4 engines							1			
Turboprop single engine			433	5			701	10		
Turboprop twin engine			7,490	176	1		13,234	321		
Total	**80**	**0**	**11,410**	**250**	**285**	**2**	**20,254**	**462**	**4,220**	**4**

Runway use - Departures

Aircraft	06		08		24		26		60	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Helicopter single engine			6				1		3,944	22
Helicopter twin engine			348	12			644	41	300	7
Jet twin engine			7				8	2		
Piston single engine	2		3,105	33	353		5,372	63		
Piston twin engine			190	5	1		349	3		
Turboprop single engine			381	21	1		705	36		
Turboprop twin engine			7,468	262			13,025	463		
Turboprop 4 engines							1			
Total	**2**	**0**	**11,505**	**333**	**355**	**0**	**20,105**	**608**	**4,244**	**29**

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