# 2019 Noise Exposure Contours

## Billy Bishop Toronto City Airport

Transport Canada

Environment

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March 16, 2022

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Subject: Final Report
2019 Noise Exposure Contours – Billy Bishop Toronto City Airport
O/Ref.: 685281-EG-L01-00

Dear Mr. Shaftoe,

We are pleased to submit our final report following the realization of the above-mentioned mandate.

Please do not hesitate to contact us should you have any question or need additional information.

Best regards,

Jacques Savard, M.Sc.
Team Leader, Acoustics and vibration

/dg

Encl.

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Building what matters

# 2019 Noise Exposure Contours

# Billy Bishop Toronto City Airport

Final Report

TRANSPORT CANADA


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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 2019, including helicopters in the calculation, expands beyond the official 25 NEF Contour for 1990 in the northwest quadrant.

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 but is very close.

According to the Agreement, 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. However, since circumstances related to the COVID-19 pandemic have led to a significant reduction in the number of flights since 2020, it is expected that the 28 NEF contour will shrink significantly and will not extend beyond the official 25 NEF contour for 1990. Further measures to control aircraft movements should therefore not be necessary for the moment. Nevertheless, when air traffic returns to normal, aircraft movements control measures might need to be put in place to maintain the 28 NEF contour within the official 25 NEF contour for 1990 under more normal circumstances.

**Table i Surface area inside 2019 noise contours**

| NEF | Surface area (km$^2$) | |
|---|---|---|
| | With helicopters | Without helicopters |
| 35 + | 0.4 | 0.4 |
| 30 - 35 | 0.9 | 0.8 |
| 28 - 30 | 0.7 | 0.7 |
| 25 - 28 | 1.8 | 1.6 |
| **Total** | **3.8** | **3.5** |

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Summary of movements

# 1 Introduction

This document presents the noise contours for the year 2019 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 2019, presented in this report, have been produced using the NEF methodology on the basis of actual movement 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 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 42% of all 2019 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 2019 from Transport Canada 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 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 for 2019 for the Airport.

The number of movements of the Peak Planning Day is found to be 412 for itinerant movements and 229 for local movements. In comparison, the averages for 2019 are 266 for itinerant movements and 104 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 412 itinerant movements and 229 local movements (115 circuits), with a total of 641 aircraft movements.

Helicopters accounted for 8,578 movements in 2019, of which 1,814 were runway operations, mostly Ornge flights using AgustaWestland AW139 helicopters, and 6,764 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 362 for itinerant movements, and 229 for local movements. In comparison, the averages for 2019 are 243 for itinerant movements, and 104 for local movements per day.

## Table 1 Peak planning day with helicopters

| Itinerant | | Local | |
|---|---|---|---|
| Date | Movements | Date | Movements |
| August 2 | 425 | July 31 | 274 |
| August 11 | 418 | July 12 | 266 |
| August 23 | 410 | July 2 | 258 |
| August 16 | 400 | July 24 | 238 |
| August 25 | 397 | July 23 | 234 |
| August 1 | 397 | July 4 | 228 |
| August 9 | 396 | July 25 | 220 |
| July 7 | 436 | August 13 | 252 |
| July 26 | 434 | August 3 | 244 |
| July 4 | 415 | August 28 | 224 |
| July 24 | 395 | August 16 | 224 |
| July 12 | 388 | August 19 | 212 |
| July 10 | 383 | August 20 | 202 |
| July 25 | 378 | August 7 | 202 |
| June 7 | 469 | June 19 | 266 |
| June 22 | 439 | June 27 | 254 |
| June 23 | 430 | June 23 | 236 |
| June 21 | 414 | June 7 | 210 |
| June 27 | 413 | June 17 | 196 |
| June 9 | 409 | June 29 | 190 |
| June 19 | 407 | June 4 | 188 |

**Table 2 Peak planning day without helicopters**

| Itinerant | | Local | |
|---|---|---|---|
| Date | Movements | Date | Movements |
| July 4 | 375 | July 31 | 274 |
| July 26 | 372 | July 12 | 266 |
| July 23 | 364 | July 2 | 258 |
| July 12 | 357 | July 24 | 238 |
| July 8 | 354 | July 23 | 234 |
| July 15 | 352 | July 4 | 228 |
| July 31 | 350 | July 25 | 220 |
| August 1 | 383 | August 13 | 252 |
| August 2 | 368 | August 3 | 244 |
| August 23 | 356 | August 28 | 224 |
| August 16 | 346 | August 16 | 224 |
| August 20 | 341 | August 19 | 212 |
| August 15 | 341 | August 20 | 202 |
| August 9 | 341 | August 7 | 202 |
| June 7 | 391 | June 19 | 266 |
| June 12 | 377 | June 27 | 254 |
| June 27 | 376 | June 23 | 236 |
| June 19 | 370 | June 7 | 210 |
| June 18 | 368 | June 17 | 196 |
| June 11 | 365 | June 29 | 190 |
| June 21 | 356 | June 4 | 188 |

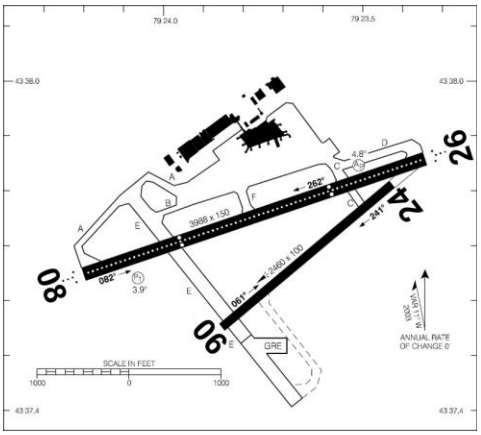
### 3.1.2 Fleet composition and runway use

The data on the composition of the fleet of all operations at the Airport in 2019 including helicopters is presented in Appendix A. 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, were also referenced.

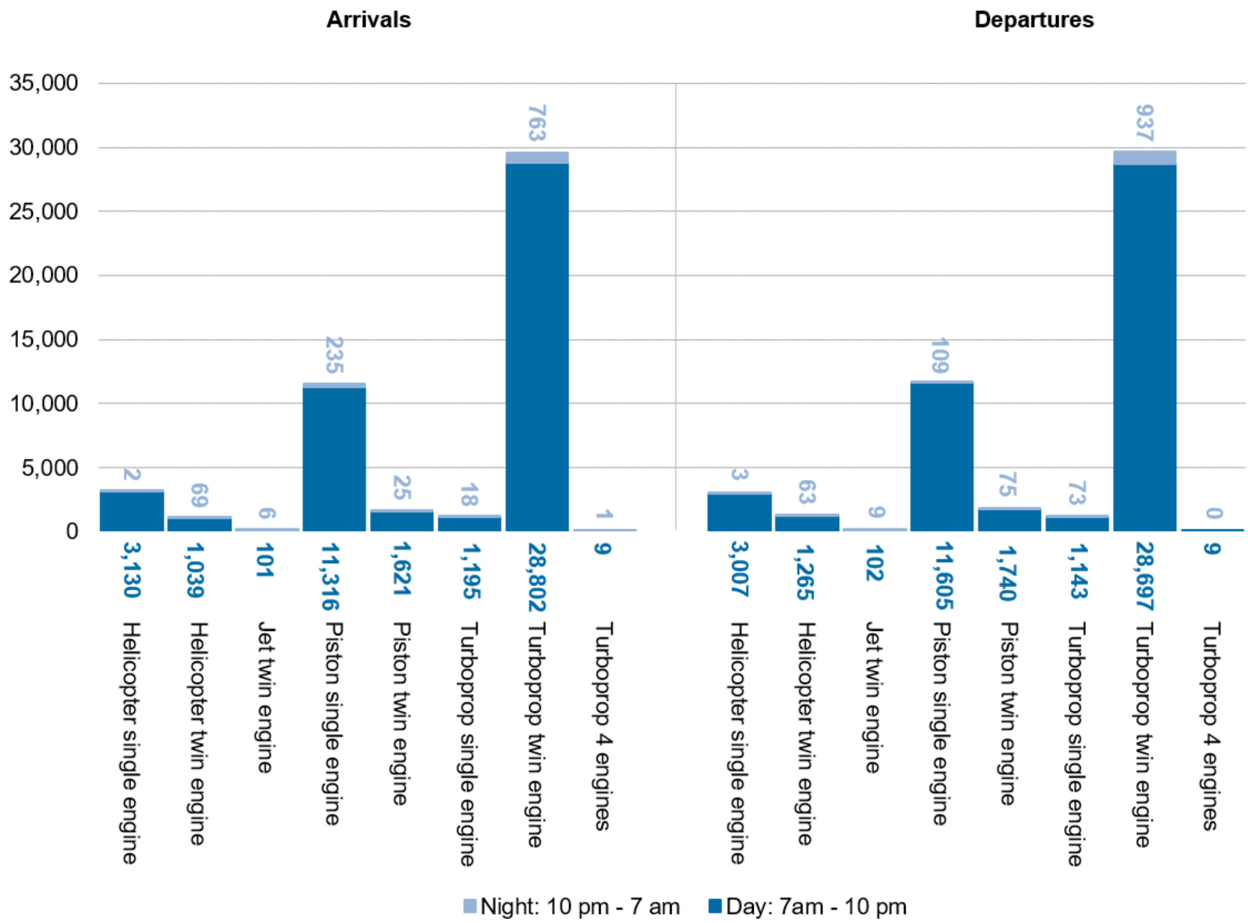
Figure 1 illustrates the configuration of runways, taken from the Canada Air Pilot. Figure 2 and Figure 3 summarize the composition of fleet and runway use for the airport in 2019, compiled from the itinerant movements database from Transport Canada. Detailed data is presented in Appendix B.

The total number of movements in 2019 was 135,027, divided into 97,169 itinerant movements and 37,858 local movements.

### Figure 1 Runway identification



## Figure 2 Summary of fleet composition

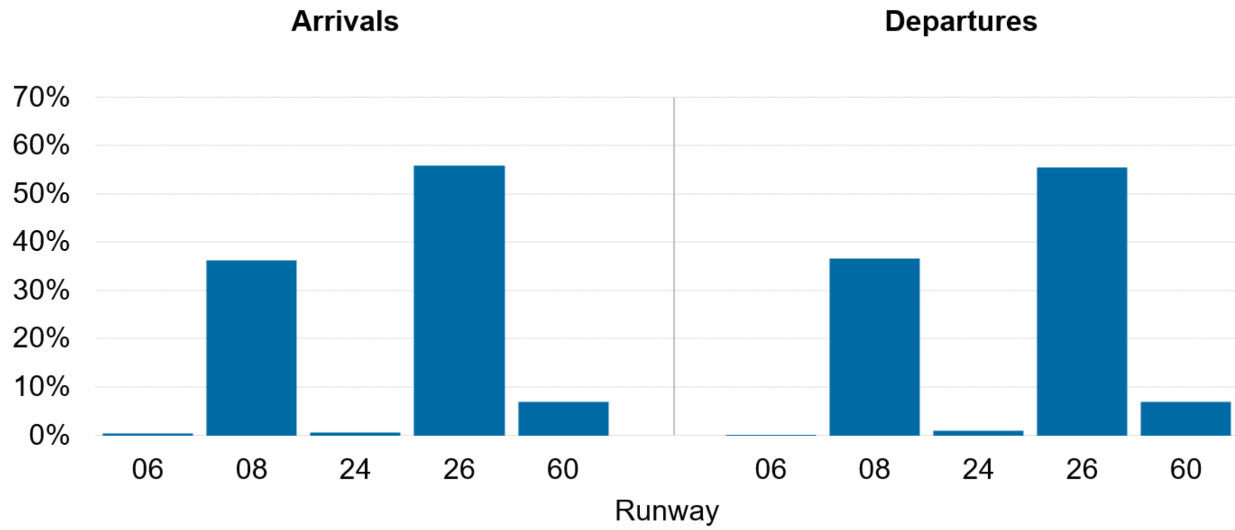



The movements during the night (10 p.m. to 7 a.m.) accounted for 2.2% of total movements in 2019. For the calculation of noise contours, using the methodology, each night-time movement is equivalent to 16.67 daytime movements. The 2,970 night-time movements recorded in 2019 are equivalent to 49,510 daytime movements. The night-time movements represent an important contribution to the noise contours.

Overall, twin-engine turboprops (mostly DASH-8) are the most frequent aircraft at the Airport with 44% of all movements. The DASH-8 Q400 alone accounts for 42% of all movements of 2019. The proportion of single engine piston aircraft is also 44%.

Figure 3 illustrates the summary of runway use and Table 2 shows the runway use by aircraft types.

## Figure 3 Summary of runway use




## Table 3 Runway use by aircraft category

| Runway | Global | | Helicopters | | Jets | | Pistons | | Turboprops | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Arrivals | Departures | Arrivals | Departures | Arrivals | Departures | Arrivals | Departures | Arrivals | Departures |
| 06 | 180 | 6 | 0 | 1 | 0 | 0 | 180 | 5 | 0 | 0 |
| | 0.4% | 0.01% | 0% | 0.02% | 0% | 0% | 1% | 0.04% | 0 % | 0% |
| 08 | 17,493 | 17,862 | 309 | 350 | 38 | 43 | 5,200 | 5,471 | 11,946 | 11,998 |
| | 36% | 37% | 7% | 8% | 36% | 39% | 39% | 40% | 39% | 39% |
| 24 | 317 | 483 | 6 | 0 | 0 | 0 | 311 | 482 | 0 | 1 |
| | 0.7% | 1% | 0.1% | 0% | 0% | 0% | 2% | 4% | 0 % | 0.003% |
| 26 | 26,988 | 27,076 | 571 | 577 | 69 | 68 | 7,506 | 7,571 | 18,842 | 18,860 |
| | 56% | 55% | 13% | 13% | 64% | 61% | 57% | 56% | 61% | 61% |
| 60 | 3,354 | 3,410 | 3,354 | 3,410 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 7% | 7% | 79% | 79% | 0% | 0% | 0% | 0% | 0% | 0% |
| **Total** | 48,332 | 48,837 | 4,240 | 4,338 | 107 | 111 | 13,197 | 13,529 | 30,788 | 30,859 |
| | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** |

Table 4 indicates the aircraft used in the represented categories defined in the calculation. Aircrafts with a small number of movements in 2019 are not shown in this table; they are listed in detail in Appendix A.

**Table 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, Beech 36, Gippsaero GA8 Airvan, Piper PA-28, etc. |
| Piston twin engine | Piper PA-23/27/31, etc. |
| Turboprop single engine | Pilatus PC-12, Cessna 208 Caravan, etc. |
| Turboprop twin engine | Dash 8, etc. |
| Jet twin engine | Dassault Falcon 10/20, 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 Canada Flight Supplement, Porter Airlines and NAV CANADA.

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° (visual) or 4.8° (instrument).

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

## 3.2 Results

Figure 4 illustrates the Airport's noise contours for 2019 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 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 2019, including helicopters in the calculation, expands beyond the official 25 NEF Contour for 1990 in the northwest quadrant.

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 but is very close. There is no margin left for the 28 NEF Contour to expand from the current one.

According to the Agreement, 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. However, since circumstances related to the COVID-19 pandemic have led to a significant reduction in the number of flights since 2020, it is expected that the 28 NEF contour will shrink significantly and will not extend beyond the official 25 NEF contour for 1990. Further measures to control aircraft movements should therefore not be necessary for the moment. Nevertheless, when air traffic returns to normal, aircraft movements control measures might need to be put in place to maintain the 28 NEF contour within the official 25 NEF contour for 1990 under more normal circumstances.

## Figure 4 NEF contours with helicopters

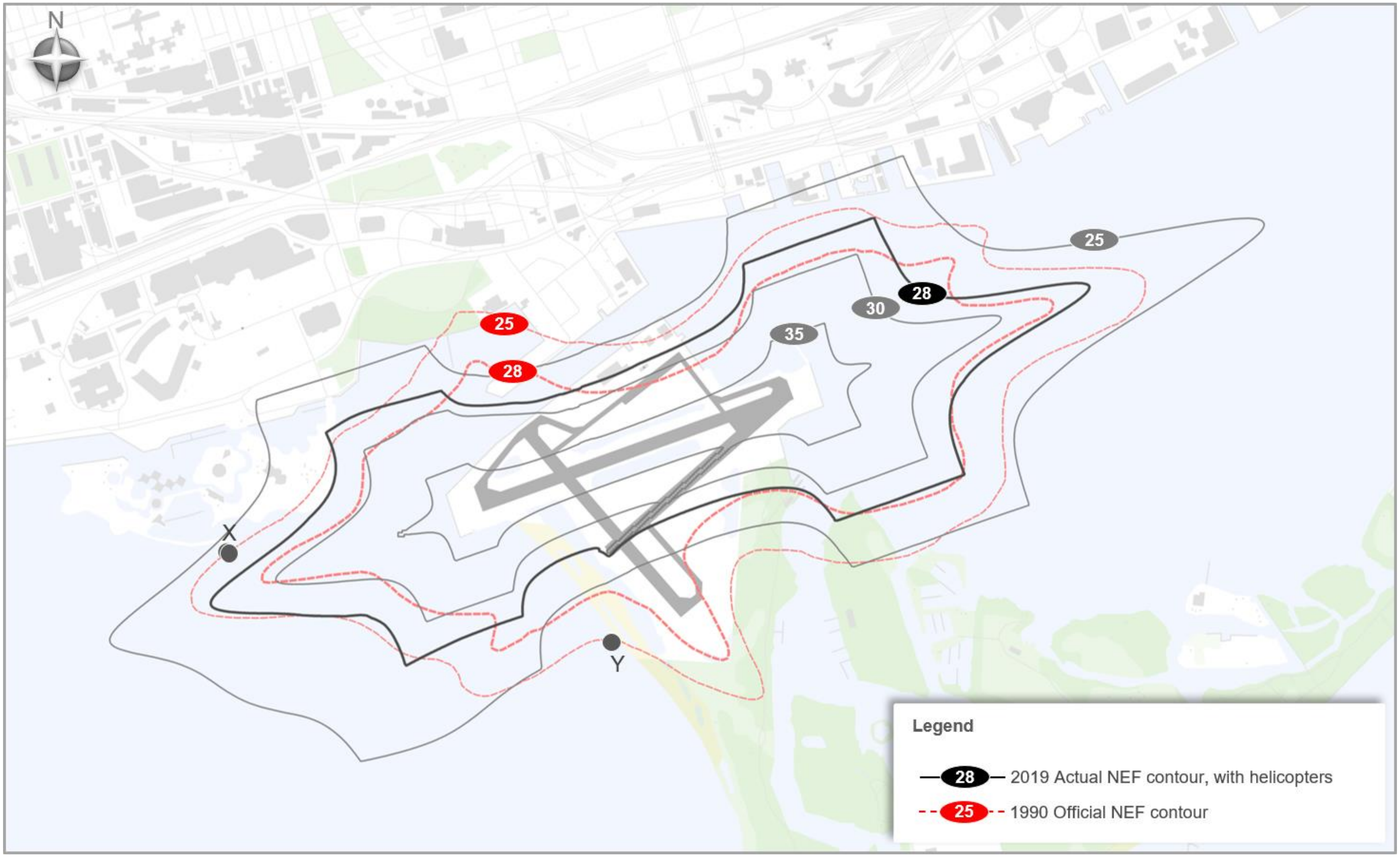


**Figure 5 NEF contours without helicopters**

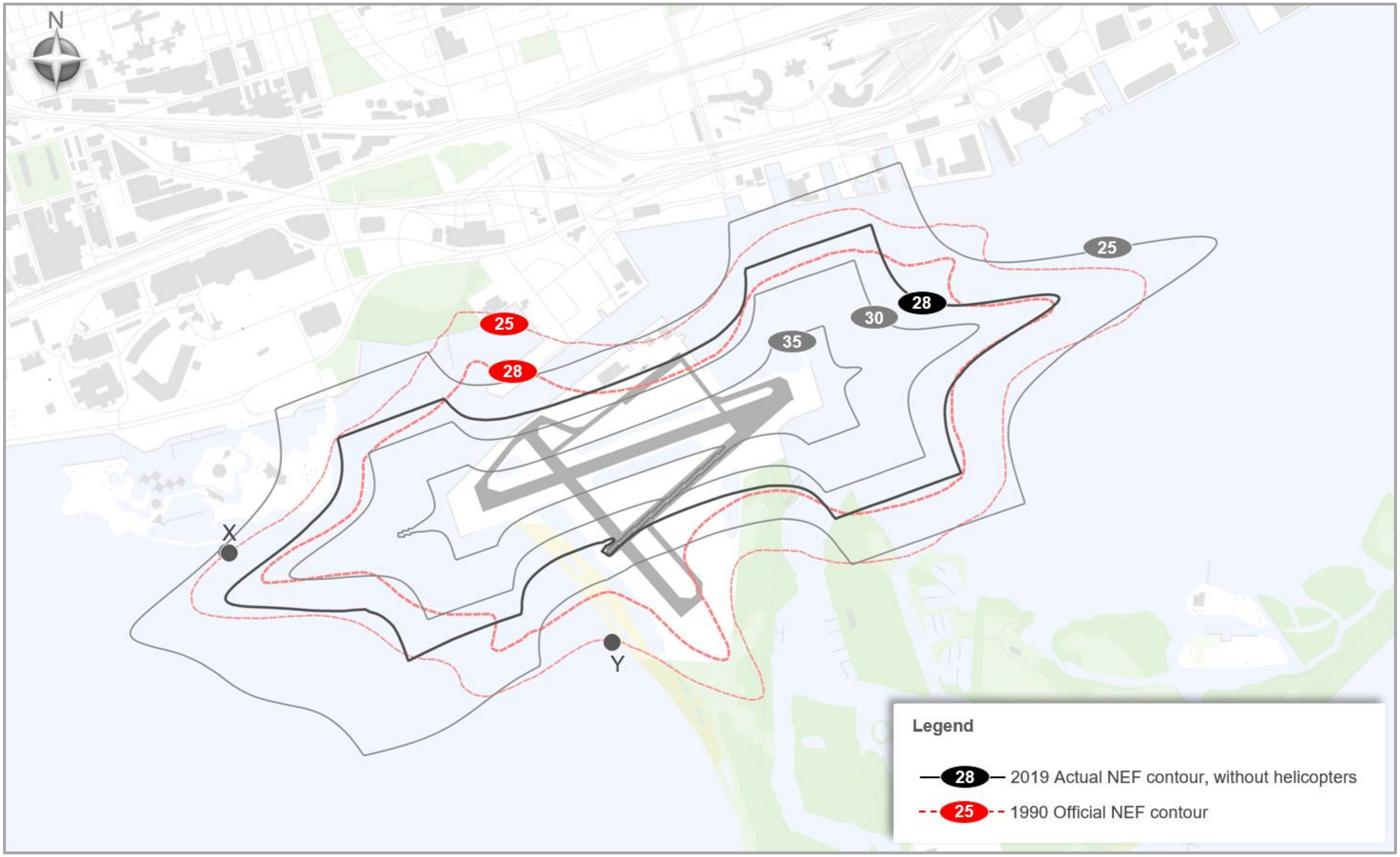


Table 5 shows the surface area within the contours in 2019. It is the total surface area in each range of NEF values.

### Table 5 Surface area ($km^2$)

| NEF | Surface area ($km^2$) | |
|---|---|---|
| | With helicopters | Without helicopters |
| 35 + | 0.4 | 0.4 |
| 30 - 35 | 0.9 | 0.8 |
| 28 - 30 | 0.7 | 0.7 |
| 25 - 28 | 1.8 | 1.6 |
| **Total** | **3.8** | **3.5** |

# 4 Conclusion

The 2019 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 3.8 square kilometers ($km^2$) including helicopters, and 3.5 $km^2$ excluding helicopters. The NEF 28 contour covers an area of 2.0 $km^2$ including helicopters, and 1.9 $km^2$ excluding helicopters.

The 28 NEF contour for 2019, including helicopters, expands 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 but is very close.

According to the Agreement, 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. However, since circumstances related to the COVID-19 pandemic have led to a significant reduction in the number of flights since 2020, it is expected that the 28 NEF contour will shrink significantly and will not extend beyond the official 25 NEF contour for 1990. Further measures to control aircraft movements should therefore not be necessary for the moment. Nevertheless, when air traffic returns to normal, aircraft movements control measures might need to be put in place to maintain the 28 NEF contour within the official 25 NEF contour for 1990 under more normal circumstances.

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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.

# 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 | 14 |
| A139 | M | 2 | T | R | 6,400 | AGUSTAWESTLAND | AW-139 | BH12/CH135MAN | 2,239 |
| A332 | H | 2 | J | R | 230,000 | AIRBUS | A-330-200 | A33034 | 2 |
| AA5 | L | 1 | P | F | 1,000 | AMERICAN | AA-5 Traveler | GASEPF | 6 |
| AC11 | L | 1 | P | R | 2,000 | ROCKWELL | 112, 114 Commander, Alpine Commander | RWCM14 | 24 |
| AEST | L | 2 | P | R | 3,000 | PIPER | PA-60, Aerostar | PA60 | 10 |
| AS50 | L | 1 | T | F | 3,000 | AEROSPATIALE | AS-350/550 Ecureuil, Astar, SuperStar, Fennec | AS350 | 13 |
| AS55 | L | 2 | T | F | 3,000 | AEROSPATIALE | AS-355/555 Ecureuil 2, TwinStar, Fennec | B222 | 39 |
| B06 | L | 1 | T | F | 2,000 | BELL | 206A/B/L, 406, LongRanger (CH-139 JetRanger) | BH06MAN | 59 |
| B190 | M | 2 | T | R | 8,000 | BEECH | 1900 Airliner (C-12J) | BEC190 | 6 |
| B350 | M | 2 | T | R | 6,000 | BEECH | B300 Super King Air 350 | DHC6 | 380 |
| B407 | L | 1 | T | F | 3,000 | BELL | 407 | BH06MAN | 2 |
| B427 | L | 2 | T | F | 3,000 | BELL | 427 | B222 | 2 |
| B429 | L | 2 | T | F | 3,175 | BELL | GlobalRanger | B222 | 10 |
| B430 | L | 2 | T | R | 5,000 | BELL | 430 | B222 | 18 |
| BE10 | L | 2 | T | R | 6,000 | BEECH | 100 King Air (U-21F) | BEC100 | 51 |
| BE18 | L | 2 | P | R | 4,000 | BEECH | 18 (C-45 Expeditor) | BEC18 | 9 |
| BE20 | L | 2 | T | R | 6,000 | BEECH | 200, 1300 Super King Air, Commuter (C-12A) | BEC200 | 158 |
| BE24 | L | 1 | P | R | 2,000 | BEECH | 24 Musketeer Super, Sierra | GASEPF | 14 |
| BE30 | M | 2 | T | R | 7,000 | BEECH | 300 Super King Air | BEC300 | 60 |
| BE33 | L | 1 | P | R | 2,000 | BEECH | 33 Bonanza (E-24) | BEC33 | 20 |
| BE35 | L | 1 | P | R | 2,000 | BEECH | 35 Bonanza | GASEPV | 52 |
| BE36 | L | 1 | P | R | 2,000 | BEECH | 36 Bonanza | GASEPV | 73 |
| BE55 | L | 2 | P | R | 3,000 | BEECH | 55 Baron (T-42) | BEC55 | 2 |
| BE58 | L | 2 | P | R | 3,000 | BEECH | 58 Baron | BEC58 | 37 |
| BE60 | L | 2 | P | R | 4,000 | BEECH | 60 Duke | BEC60 | 4 |
| BE9L | L | 2 | T | R | 5,000 | BEECH | 90, A90-E90 King Air (T-44, VC-6) | BEC90 | 150 |
| BE9T | L | 2 | T | R | 5,000 | BEECH | F-90 King Air | BEC9F | 11 |
| BL17 | L | 1 | P | R | 2,000 | BELLANCA | 17 Viking, Super Viking, Turbo Viking | BL26 | 6 |

| Aircraft | D1* | D2* | D3* | D4* | MTOW | Manufacturer | Model | Equivalent | Number |
|---|---|---|---|---|---|---|---|---|---|
| BL8 | L | 1 | P | F | 2,000 | BELLANCA | 8 Decathlon, Scout | GASEPF | 4 |
| C10T | L | 1 | T | R | 1,814 | CESSNA | P210 | CNA210 | 1 |
| C140 | L | 1 | P | F | 1,000 | CESSNA | 140 | CNA150 | 1 |
| C150 | L | 1 | P | F | 1,000 | CESSNA | 150, A150, Commuter, Aerobat | CNA150 | 18,051 |
| C152 | L | 1 | P | F | 1,000 | CESSNA | 152, A152, Aerobat | CNA152 | 1,887 |
| C172 | L | 1 | P | F | 2,000 | CESSNA | 172, P172, R172, Skyhawk, Cutlass (T-41) | CNA172 | 27,666 |
| C175 | L | 1 | P | F | 2,000 | CESSNA | 175, Skylark | GASEPV | 2 |
| C177 | L | 1 | P | F | 2,000 | CESSNA | 177, Cardinal | CNA177 | 9 |
| C180 | L | 1 | P | F | 2,000 | CESSNA | 180, Skywagon 180 (U-17C) | CNA180 | 58 |
| C182 | L | 1 | P | F | 2,000 | CESSNA | 182, Skylane | CNA182 | 703 |
| 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 | 18 |
| C206 | L | 1 | P | F | 2,000 | CESSNA | 206, P206, T206, TP206, (Turbo) Super Skywagon | CNA206 | 3,030 |
| C207 | L | 1 | P | F | 2,000 | CESSNA | 207 (Turbo) Stationair | CNA207 | 23 |
| C208 | L | 1 | T | F | 4,000 | CESSNA | 208 Caravan 1, (Super)Cargomaster (C-98, U-27) | CNA208 | 734 |
| C210 | L | 1 | P | R | 2,000 | CESSNA | 210, T210, (Turbo)Centurion | CNA210 | 36 |
| C240 | L | 1 | P | F | 1,600 | CESSNA | TTx Model T240 | GASEPV | 14 |
| C310 | L | 2 | P | R | 3,000 | CESSNA | 310, T310 (U-3, L-27) | CNA310 | 80 |
| C337 | L | 2 | P | R | 2,000 | CESSNA | 337, M337 (Turbo)Super Skymaster (O-2) | CNA337 | 34 |
| C340 | L | 2 | P | R | 3,000 | CESSNA | 340 | CNA340 | 44 |
| C414 | L | 2 | P | R | 3,000 | CESSNA | 414, Chancellor | CNA414 | 80 |
| C421 | L | 2 | P | R | 4,000 | CESSNA | 421, Golden Eagle, Executive Commuter | CNA421 | 21 |
| C441 | L | 2 | T | R | 5,000 | CESSNA | 441 Conquest, Conquest 2 | CNA441 | 52 |
| C550 | M | 2 | J | R | 7,000 | CESSNA | 550, S550, 552 Citation 2/S2/Bravo (T-47, U-20) | CNA550 | 2 |
| C72R | L | 1 | P | R | 2,000 | CESSNA | 172RG Cutlass RG | GASEPV | 3 |
| C77R | L | 1 | P | R | 2,000 | CESSNA | 177RG Cardinal RG | CNA17B | 14 |
| C82R | L | 1 | P | R | 2,000 | CESSNA | R182, TR182 (Turbo) Skylane RG | CNA182 | 10 |
| CAT | M | 2 | P | A | 14,000 | CONSOLIDATED | PBY, OA-10, A-10 Catalina, Canso (28) | DHC6 | 4 |

| Aircraft | D1* | D2* | D3* | D4* | MTOW | Manufacturer | Model | Equivalent | Number |
|---|---|---|---|---|---|---|---|---|---|
| CH7A | L | 1 | P | F | 2,000 | CHAMPION | 7EC/ECA/FC/JC Citabria, Traveler, Tri-Con, Tri-Traveler | GASEPF | 1 |
| CL60 | M | 2 | J | R | 15,000 | CANADAIR | CL-600/601/604 Challenger (CC-144) | CL600 | 13 |
| CNUK | L | 1 | P | F | 1,000 | FLEET | 80 Canuck | GASEPF | 1 |
| COL3 | L | 1 | P | F | 1,500 | Lancair | LC40-550FG | BEC58P | 6 |
| COL4 | L | 1 | P | F | 1,633 | CESSNA | 400 Corvalis TT | BEC58P | 62 |
| CRJ2 | M | 2 | J | R | 24,000 | CANADAIR | RJ-200 Regional Jet | CLREGJ | 1 |
| DA40 | L | 1 | P | F | 1,800 | DIAMOND | DA 40 | GASEPF | 95 |
| DA42 | L | 2 | P | R | 1,700 | DIAMOND | DA42 | GASEPV | 114 |
| DA62 | L | 2 | P | R | 2,300 | DIAMOND | DA62 | BEC58P | 25 |
| DC3 | M | 2 | P | R | 13,000 | DOUGLAS | DC-3 (C-41, C-47 Skytrain, Skytrooper, Dakota) | DC3 | 4 |
| DH2T | L | 1 | T | F | 3,000 | DE HAVILLAND | DHC-2 Mk3 Turbo Beaver | CNA441 | 4 |
| DH6 | L | 2 | T | F | 6,000 | DE HAVILLAND | Twin Otter | DHC6 | 3 |
| DH8A | M | 2 | T | R | 16,000 | DE HAVILLAND | DHC-8-100 Dash 8 (E-9, CT-142, CC-142) | DHC8 | 14 |
| DH8B | M | 2 | T | R | 16,000 | DE HAVILLAND | DHC-8-200 Dash 8 | DHC8 | 2 |
| DH8C | M | 2 | T | R | 20,000 | DE HAVILLAND | DHC-8-300 Dash 8 | DHC830 | 2 |
| DH8D | M | 2 | T | R | 26,000 | DE HAVILLAND | DHC-8-400 Dash 8 | DHC830 | 57,320 |
| DHC2 | L | 1 | P | F | 3,000 | DE HAVILLAND | DHC-2 Mk1 Beaver (U-6, L-20) | DHC2 | 28 |
| DHC6 | L | 2 | T | F | 6,000 | DE HAVILLAND | DHC-6 Twin Otter (CC-138) | DHC6 | 4 |
| DHC7 | M | 4 | T | R | 20,000 | DE HAVILLAND | DHC-7 Dash 7 (O-5, EO-5) | DHC7 | 19 |
| DV20 | L | 1 | P | F | 1,000 | DIAMOND | DA-20/22, DV-20 Katana, Speed Katana | GASEPF | 111 |
| E50P | L | 2 | J | R | 5,000 | Embraer | Phenom 100 | CNA501 | 2 |
| EAGL | L | 1 | P | F | 700 | CHRISTEN EAGLE | EAGLE II | GASEPV | 1 |
| EC20 | L | 1 | T | F | 2,000 | EUROCOPTER | EC-120 Colibri | BH06MAN | 11 |
| EC30 | L | 1 | T | F | 2,400 | EUROCOPTER | EC130B4 | AS350 | 20 |
| EC35 | L | 2 | T | F | 3,000 | EUROCOPTER | EC-135 | BH12/CH135 MAN | 16 |
| EVOL | L | 1 | T | R | 2,000 | LANCAIR | Lancair Evolution | GASEPV | 4 |
| EVSS | L | 1 | P | F | 600 | AEROTECHNIC | Sportstar | GASEPF | 4 |
| EXPR | L | 1 | P | F | 1,400 | AURIGA | Phoenix | GASEPF | 6 |
| FA10 | M | 2 | J | R | 9,000 | DASSAULT | Falcon 10, Mystere 10 | FAL10 | 148 |

| Aircraft | D1* | D2* | D3* | D4* | MTOW | Manufacturer | Model | Equivalent | Number |
|---|---|---|---|---|---|---|---|---|---|
| FA20 | M | 2 | J | R | 15,000 | DASSAULT | Falcon 20, Mystere 20 (T-11, TM-11) | FAL20 | 50 |
| FA62 | L | 1 | P | F | 2,000 | FAIRCHILD | M-62 (PT-19/23/26, T-19 Cornell) | GASEPF | 1 |
| G115 | L | 1 | P | R | 2,000 | GROB | G-115A/B/C/D/E, Bavarian (Heron, Tutor) | GASEPF | 136 |
| G200 | L | 1 | P | F | 700 | GILES | G-200 | GASEPV | 1 |
| GA7 | L | 2 | P | R | 2,000 | GRUMMAN AMERICAN | GA-7 Cougar | GA7 | 1 |
| GA8 | L | 1 | P | F | 1,800 | GIPPSAERO | GA8 Airvan | CNA206 | 1,253 |
| GLAS | L | 1 | P | F | 1,088 | STODDARD-HAMILTON | Glasair | GASEPF | 2 |
| HUSK | L | 1 | P | F | 1,000 | CHRISTEN | A-1 Husky | GASEPV | 7 |
| J3 | L | 1 | P | F | 1,000 | PIPER | J-3 Cub (L-4, NE) | GASEPF | 1 |
| JS31 | M | 2 | T | R | 7,000 | BRITISH AEROSPACE | BAe-3100 Jetstream 31 (T.Mk.3) | BAEJ31 | 1 |
| 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 | 37 |
| LNC2 | L | 1 | P | R | 1,000 | LANCAIR | Lancair 200/235/320/360 | GASEPV | 2 |
| LNC4 | L | 1 | P | R | 2,000 | LANCAIR | Lancair 4 | GASEPV | 19 |
| 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 | 155 |
| M20T | L | 1 | P | R | 2,000 | MOONEY | M-20K/M, Bravo, Encore (turbocharged) | M20K | 10 |
| MU2 | L | 2 | T | R | 5,000 | MITSUBISHI | MU-2, Marquise, Solitaire (LR-1) | MU2 | 436 |
| P180 | L | 2 | T | R | 6,000 | PIAGGIO | P-180 Avanti | SD330 | 22 |
| P210 | L | 1 | P | R | 2,000 | CESSNA | P210 Pressurized Centurion | CNA206 | 18 |
| P28A | L | 1 | P | F | 2,000 | PIPER | PA-28-140/150/160/180 Archer, Cadet, Cherokee | PA28CA | 1,819 |
| P28B | L | 1 | P | F | 2,000 | PIPER | PA-28-201T/235/236 Cherokee, Dakota | PA28CA | 103 |
| P28R | L | 1 | P | R | 2,000 | PIPER | PA-28R-180/200/201 Cherokee Arrow, Turbo Arrow | PA28CA | 79 |
| P28T | L | 1 | P | R | 2,000 | PIPER | PA-28RT Arrow 4, Turbo Arrow 4 | PA28CA | 19 |
| P32R | L | 1 | P | R | 2,000 | PIPER | PA-32R Cherokee Lance, Saratoga SP, Turbo | GASEPV | 36 |

| Aircraft | D1* | D2* | D3* | D4* | MTOW | Manufacturer | Model | Equivalent | Number |
|---|---|---|---|---|---|---|---|---|---|
| P32T | L | 1 | P | R | 2,000 | PIPER | PA-32RT Lance 2, Turbo Lance 2 | GASEPV | 2 |
| P337 | L | 2 | P | R | 3,000 | CESSNA | T337G, P337 Pressurized Skymaster | CNA337 | 32 |
| P46T | L | 1 | T | R | 2,000 | PIPER | PA-46T Malibu Meridian | PA46 | 89 |
| PA18 | L | 1 | P | F | 1,000 | PIPER | PA-18 Super Cub (L-18C, L-21, U-7) | PA18 | 4 |
| PA22 | L | 1 | P | F | 1,000 | PIPER | PA-22 Tri-Pacer, Caribbean, Colt | PA22CO | 2 |
| PA23 | L | 1 | P | R | 2,000 | PIPER | PA-23-150/160 Apache | PA23AZ | 1,064 |
| PA24 | L | 1 | P | R | 2,000 | PIPER | PA-24 Comanche | PA24 | 20 |
| PA27 | L | 2 | P | R | 3,000 | PIPER | PA-23-235/250 Aztec, Turbo Aztec (U-11) | PA23AZ | 322 |
| PA28 | L | 1 | P | R | 2,000 | PIPER | Cherokee/ Archer/ Cadet | GASEPV | 3,311 |
| PA30 | L | 2 | P | R | 2,000 | PIPER | PA-30/39 Twin Comanche, Turbo Twin Comanche | PA30 | 89 |
| PA31 | L | 2 | P | R | 4,000 | PIPER | PA-31/31P Navajo, Chieftain, Mojave, T-1020 | PA31 | 2,627 |
| PA32 | L | 1 | P | F | 2,000 | PIPER | PA-32 Cherokee Six, Saratoga, Turbo Saratoga | GASEPV | 29 |
| PA34 | L | 2 | P | R | 3,000 | PIPER | PA-34 Seneca | PA34 | 30 |
| 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 | 6 |
| PA46 | L | 1 | P | R | 2,000 | PIPER | PA-46 Malibu, Malibu Mirage | PA46 | 89 |
| PAY2 | L | 2 | T | R | 5,000 | PIPER | PA-31T-620/T2-620 Cheyenne, Cheyenne 2 | CNA441 | 12 |
| PC12 | L | 1 | T | R | 5,000 | PILATUS | PC-12, Eagle | CNA20T | 1,622 |
| PIVI | L | 1 | P | F | 1,000 | PIPISTEL | Virus SW | GASEPF | 2 |
| PTS1 | L | 1 | P | F | 1,000 | PITTS | S-1 Special | GASEPF | 2 |
| PTS2 | L | 1 | P | F | 1,000 | PITTS | S-2 Special | GASEPF | 18 |
| R22 | L | 1 | P | F | 1,000 | ROBINSON | R-22 | BH06MAN | 6 |
| R44 | L | 1 | P | F | 2,000 | ROBINSON | R-44 Astro | HU30 | 5,994 |
| R66 | L | 1 | T | F | 1,225 | Robinson | R66 | BH06MAN | 37 |
| RV10 | L | 1 | P | F | 1,200 | VAN'S | RV-10 | GASEPV | 7 |
| RV4 | L | 1 | P | F | 1,000 | VAN'S | RV-4 | GASEPF | 4 |
| RV6 | L | 1 | P | F | 1,000 | VAN'S | RV-6 | GASEPF | 8 |
| RV7 | L | 1 | P | F | 815 | VAN'S | RV-7 | GASEPV | 7 |
| RV9 | L | 1 | P | F | 793 | VAN'S | RV9/9A | GASEPF | 2 |

| Aircraft | D1* | D2* | D3* | D4* | MTOW | Manufacturer | Model | Equivalent | Number |
|---|---|---|---|---|---|---|---|---|---|
| S108 | L | 1 | P | F | 2,000 | STINSON | 108 Voyager, Station Wagon | GASEPF | 8 |
| S76 | L | 2 | T | R | 5,000 | SIKORSKY | S-76, H-76, AUH-76, Spirit, Eagle (HE-24) | S76 | 72 |
| S92 | M | 2 | T | R | 12,000 | SIKORSKY | S-92 Helibus | AS332 | 26 |
| SA30 | L | 1 | P | F | 700 | JUST AIRCRAFT | JA35 Super STOL XL | GASEPF | 2 |
| SR20 | L | 1 | P | F | 2,000 | CIRRUS | SR-20 | GASEPF | 35 |
| SR22 | L | 1 | P | F | 1,500 | CIRRUS | SR22 | GASEPF | 488 |
| SW3 | M | 2 | T | R | 6,000 | FAIRCHILD SWEARINGEN | SA-226TB, SA-227TT Merlin 3 | SAMER3 | 4 |
| SW4 | M | 2 | T | R | 7,000 | FAIRCHILD SWEARINGEN | Merlin 4/4C/23, Metro2/2A/3/3A, Expediter | SAMER4 | 397 |
| T18 | L | 1 | P | F | 800 | THROP | Throp T-18 | GASEPV | 2 |
| TAYB | L | 1 | P | F | 600 | TAYLORCRAFT | BC12-D | GASEPF | 1 |
| TBM7 | L | 1 | T | R | 3,000 | SOCATA | TBM-700 | CNA441 | 30 |
| TBM8 | L | 1 | T | R | 7,400 | Socata | TBM850 | CNA441 | 20 |
| TBM9 | L | 1 | T | R | 3,300 | SOCATA | TBM 900 | CNA441 | 14 |
| TOBA | L | 1 | P | F | 2,000 | AEROSPATIALE | Tobago | GASEPF | 6 |
| TRIN | L | 1 | P | R | 2,000 | SOCATA | TB-20/21 Trinidad | GASEPF | 16 |
| Z42 | L | 1 | P | F | 2,000 | ZLIN | Z-42/142/242 | GASEPV | 28 |
| ZZZZ | | | | | | | aircraft not assigned a designator | GASEPV | 12 |

*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

## Summary of movements

## Fleet summary of itinerant movements

| Aircraft | Arrivals | | | Departures | | | Total |
|---|---|---|---|---|---|---|---|
| | Day | Night | Total | Day | Night | Total | |
| Helicopter single engine | 3,130 | 2 | 3,132 | 3,007 | 3 | 3,010 | 6,142 |
| Helicopter twin engine | 1,039 | 69 | 1,108 | 1,265 | 63 | 1,328 | 2,436 |
| Jet twin engine | 101 | 6 | 107 | 102 | 9 | 111 | 218 |
| Piston single engine | 11,316 | 235 | 11,551 | 11,605 | 109 | 11,714 | 23,265 |
| Piston twin engine | 1,621 | 25 | 1,646 | 1,740 | 75 | 1,815 | 3,461 |
| Turboprop single engine | 1,195 | 18 | 1,213 | 1,143 | 73 | 1,216 | 2,429 |
| Turboprop twin engine | 28,802 | 763 | 29,565 | 28,697 | 937 | 29,634 | 59,199 |
| Turboprop 4 engines | 9 | 1 | 10 | 9 | 0 | 9 | 19 |
| **Total** | **47,213** | **1,119** | **48,332** | **47,568** | **1,269** | **48,837** | **97,169** |

- 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 | | | 2 | | 1 | | | | 3,127 | 2 |
| Helicopter twin engine | | | 281 | 26 | 5 | | 532 | 39 | 221 | 4 |
| Jet twin engine | | | 36 | 2 | | | 65 | 4 | | |
| Piston single engine | 177 | 3 | 4,472 | 95 | 310 | 1 | 6,358 | 136 | | |
| Piston twin engine | | | 626 | 7 | | | 995 | 18 | | |
| Turboprop single engine | | | 446 | 6 | | | 749 | 12 | | |
| Turboprop twin engine | | | 11,253 | 239 | | | 17,549 | 524 | | |
| Turboprop 4 engines | | | 2 | | | | 7 | 1 | | |
| **Total** | **177** | **3** | **17,118** | **375** | **316** | **1** | **26,254** | **734** | **3,348** | **6** |

## Runway use - Departures

| Aircraft | 06 | | 08 | | 24 | | 26 | | 60 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Night | Day | Night | Day | Night | Day | Night | Day | Night |
| Helicopter single engine | | | 2 | 1 | | | 11 | | 2,994 | 2 |
| Helicopter twin engine | 1 | | 327 | 20 | | | 530 | 36 | 407 | 7 |
| Jet twin engine | | | 40 | 3 | | | 62 | 6 | | |
| Piston single engine | 5 | | 4,747 | 41 | 473 | 1 | 6,380 | 67 | | |
| Piston twin engine | | | 661 | 22 | 8 | | 1,071 | 53 | | |
| Turboprop single engine | | | 436 | 28 | | | 707 | 45 | | |
| Turboprop twin engine | | | 11,179 | 355 | | 1 | 17,518 | 581 | | |
| Turboprop 4 engines | | | | | | | 9 | | | |
| **Total** | **6** | **0** | **17,392** | **470** | **481** | **2** | **26,288** | **788** | **3,401** | **9** |

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