

VANCOUVER INTERNATIONAL AIRPORT

2023 Aeronautical Noise Management Report



2023 ANNUAL NOISE REPORT

INTRODUCTION

Vancouver Airport Authority (Airport Authority) is a non-share capital private corporation that operates Vancouver International Airport (YVR) in service of our community and economy that supports it. The Airport Authority is committed to operating YVR in a manner that minimizes negative impacts on the environment, while providing 24-hour airport services to support the business and travel demands of the region.

To manage noise from aircraft and airport operations, the Airport Authority has a comprehensive noise management program and uses a sustainability framework in its approach. This framework integrates the economic, environmental, social, and governance aspects of our business and provides a balanced approach for our corporate objectives and our commitment to the local community. Annual work plans for the noise management program are guided by a broad set of initiatives contained in the YVR Noise Management Plan, developed with input from the community and support from the YVR Aeronautical Noise Management Committee.

2023 YVR NOISE MANAGEMENT HIGHLIGHTS

In 2023, all sectors of air travel showed signs of recovery from the pandemic, with passenger traffic levels reaching pre-pandemic levels. As air traffic continues to grow, the Airport Authority remains committed to managing noise from aircraft and airport operations. Highlights of noise management activities in 2023 are summarized below:

Vancouver Airspace Modernization Project (VAMP)

The Airport Authority continued to support NAV CANADA on their Vancouver Airspace Modernization Project. The main objective of this project is to enhance safety, ensure the airspace can safely and efficiently support long-term demand for air travel, introduce new procedures that use satellite-based navigation technologies, and reduce the industry's environmental impacts.

As part of the project, NAV CANADA is proposing changes to approach procedures at YVR, which would result in new arrival routes into YVR. The routes used by departing aircraft as well as those used by aircraft operating under Visual Flight Rules will not change as part of

this project. In addition, the project will not change how the runways are used at the airport and will not change any of the published Noise Abatement Procedures for YVR.

While NAV CANADA is committed to minimizing community noise impacts wherever possible, the new proposed routes must be designed to meet strict Transport Canada design criteria. While it is not possible to create new routes that completely avoid overflying residential areas given the specifications of the design criteria, local geography, and complexity of the airspace, careful consideration was made to place new routes over industrial and commercial areas, bodies of water, and less populated areas where technically feasible.

NAV CANADA, with the support of the Airport Authority, undertook community consultations to ensure that residents could learn about the project and the proposed changes over their specific area, as well as to provide an opportunity for feedback on the proposed changes. Community consultations were hosted from December 2022 through February 2023 and consisted of several in-person and on-line information sessions.

No changes to the airspace have been made to-date, and NAV CANADA continues to review the feedback received during the consultation period. Once the review is complete, a public-facing consultation report will be made available. This report will summarize the feedback received as well as provide information on the airspace design recommendations, implementation timelines, and next steps.

In 2023, some residents submitted concerns citing changes to flight paths that they attributed to VAMP. As no changes to the airspace have been implemented yet, these concerns were in fact related to aircraft using current flight paths. The Airport Authority and NAV CANADA worked together to provide correct information in response to these concerns.

Further information on the project can be found on NAV CANADA's website (www.navcanada.ca/VAMP).

South Airfield Rehabilitation Project

From 3 April to 8 December 2023, the Airport Authority completed major work on a series of projects on the South Airfield. Work included: concrete panel replacements; a full length overlay of Taxiway Lima (the main taxiway connecting the main Apron and the west end of the south runway); rehabilitation and upgrades at several taxiway and runway intersections; electrical work to improve safety and energy efficiency; and, modernization of YVR's taxiway system.

This work required prolonged closures of the South Runway, use of the North Runway at night, use of the North Runway for some departures during the day, and the loss of the Lima Holding Bay as a location for engine run-ups.

During the course of the project, the Airport Authority worked with NAV CANADA to implement procedures to further mitigate noise impacts on communities associated with departures using the north runway, including holding departures using Runway 08L, with destinations to the north and north-east, to climb to a higher altitude before turning on course. This provided benefit to communities located to the north of the airport.

To keep the community informed about the project, a dedicated page was created on the YVR website with project information and updates on work progress. Updates on changes to runway operations were also provided as milestones were reached and airside surfaces were returned to service.

Ongoing preventative maintenance and engineering projects are planned for the South Airfield in 2024. Community advisories and information on projects and any associated changes to runway operations will be made as work schedules are developed.

Aeronautical Noise Management Committee Meetings

The Aeronautical Noise Management Committee provides a forum for discussion and consideration of all aeronautical noise management issues at the airport. The membership includes a wide variety of stakeholders representing municipal staff, citizens, Musqueam, and industry partners. In 2023, three meetings were hosted, and meeting minutes are posted on www.yvr.ca/en/about-yvr/noise-management/anmc. An airside tour was also hosted for the Committee members.

Discussions with Canadian Airports

The Airport Authority continues to participate in international and national discussions on noise issues through the International Civil Aviation Organization (ICAO)/Committee on Aviation Environmental Protection (CAEP) and the Canadian Airports Council Noise Working Group.

The Canadian Airports Council Noise Working Group includes members from many airports in Canada, and provides a forum to exchange information on local noise issues and discuss national noise issues with Transport Canada. In 2023, several meetings were hosted with Transport Canada to provide input on their ongoing review of the Noise Exposure Forecast metric, which is used for airport noise assessment and compatible land use planning in Canada.

YVR Fly Quiet Awards

The 18th annual YVR Fly Quiet Awards were presented at the annual YVR Chief Pilots Meeting. The goal of these awards is to support best noise management practices and raise awareness of noise issues within the aviation community. The winners were: WestJet Encore (propeller aircraft category), SkyWest (narrow-body jet aircraft category), and All Nippon Airways (wide-body jet aircraft category).

Noise Concerns & Aircraft Operations

The Airport Authority regularly engages with the community on aircraft noise issues and responds to questions and concerns from residents. In 2023, a total of 1,900 noise concerns were received from 524 individuals across the Greater Vancouver area. Of the 1,900 total concerns, 63% (n=1,204) were from three individuals, with one individual submitting 47% (n=892) of the total concerns.

In 2023, there were 284,403 total runway and non-runway movements at YVR, up by 8% compared to 2022, but 14% lower than in 2019.



Further information on operational statistics, noise concerns, and noise monitoring data can be found in the following appendices:

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APPENDIX A - YVR OPERATIONS IN REVIEW

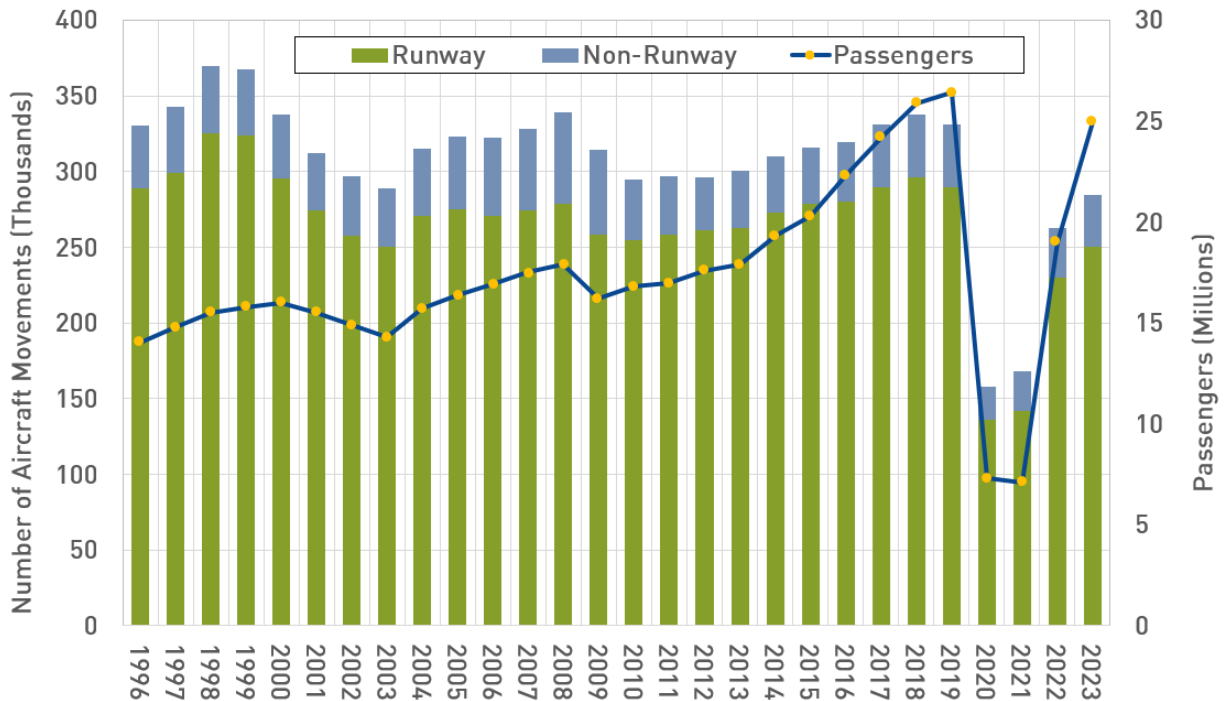
Aircraft movements and passenger traffic at YVR saw a year-over-year increase in 2023 due to continued recovery in air travel. Compared to 2022, total aircraft movements and passenger traffic experienced an 8% and 31% increase, respectively.

TABLE 1: Operational Statistics for YVR, 2019-2023

	2019	2020	2021	2022	2023
Total Aircraft Movements	331,441	157,563	168,323	262,888	284,403
Runway Movements	289,533	136,277	141,699	230,162	250,332
Non-Runway Movements	41,908	21,286	26,624	32,726	34,071
Total Cargo (Tonnes)	304,078	241,895	279,212	302,572	319,033
Total Passengers	26,379,870	7,300,287	7,086,602	19,013,416	24,938,184

Figure 1 illustrates the historical trend of annual aircraft movements and passengers at YVR for the period of 1996-2023.

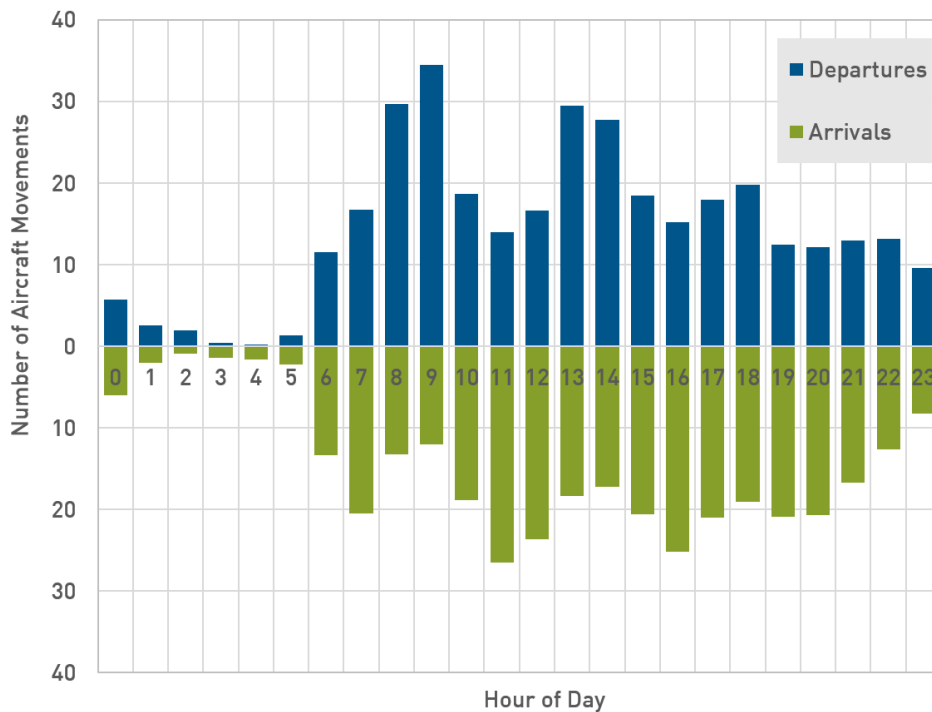
FIGURE 1: Annual Aircraft Movements & Passenger Statistics, 1996-2023¹



¹ This chart includes both runway and non-runway movements. Non-runway movements include helicopter and floatplane operations.

Figure 2 illustrates the annual average hourly runway movements by arrivals and departures in 2023. The runway movements are observed to increase at 6 AM, and peaks are experienced throughout the day. The general trend of operation throughout the course of the day has not changed with the return of air traffic, with most aircraft movements occurring during the day rather than at night.

FIGURE 2: Average Hourly Runway Movements, 2023



NIGHT OPERATIONS

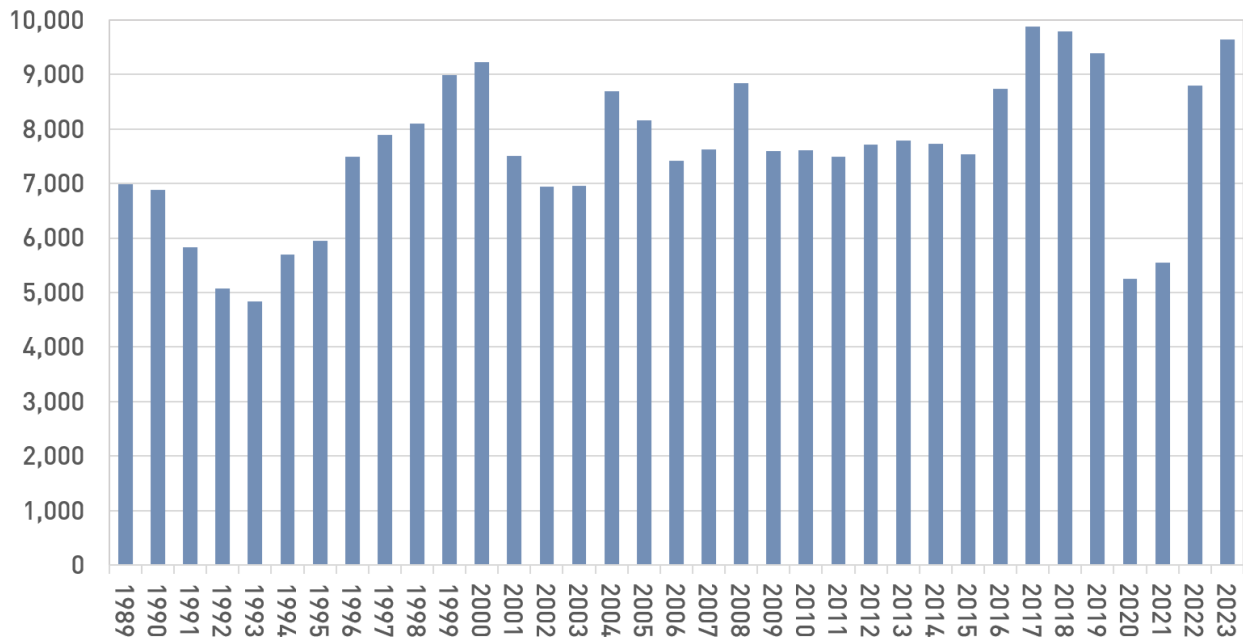
Like most international airports worldwide and all international airports in Canada, YVR is open 24-hours a day to serve the travel and business demands of the region. While movements at night are typically associated with cargo and courier services, there are several long-haul international passenger flights operated using wide-body aircraft.

In 2023, there were a total of 9,642 runway movements during the night-time period², which accounted for 4% of the total runway movements. On average, this equates to approximately 26 movements per night. Of these movements, 54% were arrivals, which are generally quieter than departures.

² For this report, the night-time period is the hours between midnight and 6:00 AM local time.

YVR has always been open 24-hours a day, including when the airport was managed by Transport Canada prior to the transfer to the Airport Authority in 1992. For comparative purposes, **Figure 3** illustrates the annual night-time runway movements at YVR for the years 1989 to 2023. The night-time runway movements in 2023 increased by 10% compared to 2022 and returned to the pre-pandemic level.

FIGURE 3: Annual Night-Time Runway Movements, 1989-2023



To minimize noise at night, YVR has the following practices in its published Noise Abatement Procedures:

- A prior approval requirement for the departure of jet aircraft rated over 34,000 kg (maximum take-off weight) between the hours of midnight and 6 AM.
- Use of preferential runways to keep arriving and departing aircraft over the Strait of Georgia, depending on operational feasibility and weather conditions.
- Early turn and vectoring procedures for aircraft on certain routes to minimize over-flights of populated areas.
- Closure of the north runway between the hours of 10 PM and 7 AM, except in the event of an emergency or maintenance.

JET FLEET MIX BY NOISE CERTIFICATION

The International Civil Aviation Organization (ICAO) is an agency of the United Nations and establishes principles for the planning and development of international air transportation to ensure safe and orderly growth. The ICAO Committee on Aviation Environmental Protection (CAEP) prescribes standards for noise with the goal of promoting reduction at the source. These standards are contained in *Annex 16: Volume I Environmental Protection - Aircraft Noise* and categorize jet aircraft as either Chapter 2, Chapter 3 or Chapter 4 depending on the Gross Take-off Weight (GTOW) of the aircraft and sound level measurements taken at three different locations (take-off, landing, and sideline)³.

The Chapter 14 noise standard was confirmed at the 9th meeting of CAEP in February 2013. This standard applies to new aircraft types over 55,000kg certified after 2017 and to new aircraft types less than 55,000kg after 2020. To meet the Chapter 14 standard, aircraft must be at least 7 EPNdB (Effective Perceived Noise in Decibels) quieter than the current Chapter 4 standard. This reduction is cumulative over the three measurement points: take-off, landing, and sideline.

In 2023, it is estimated that approximately 92% of the movements at YVR by jet aircraft with a GTOW over 34,000kg were with an aircraft type that met Chapter 4 or Chapter 14 noise certification standards. In addition, it is estimated that approximately 88% of movements by jet aircraft with a GTOW over 34,000 kg operating between the hours of midnight and 6:00 AM were with an aircraft type that met Chapter 4 or Chapter 14 noise certification standards.

Airlines worldwide continue to invest billions of dollars to upgrade their aircraft fleets. These new aircraft types have improved noise and emission benefits compared to the older aircraft types they replace.

³ The Government of Canada legislated the phase-out of older noisier Chapter 2 jet aircraft over 34,000kg from operation in Canada by 2002. These aircraft are no longer permitted to operate in Canada and were either retired from operation or modified to meet Chapter 3 standards. A few exemptions were granted for aircraft operating from airfields in northern Canada.

AIR TRAFFIC FLOW

YVR has two main parallel runways and a crosswind runway. The parallel runways, which include the south runway (08R/26L) and the north runway (08L/26R), are aligned in an east-west direction with magnetic headings of 083° and 263°. The crosswind runway (13/31) is oriented in a northwest and southeast direction with magnetic headings of 125° and 305°.

The active runway in use at any given time is determined by wind conditions at the airport as aircraft must take-off and land into the wind for safety reasons. The predominant winds at YVR are typically in an easterly or westerly direction, in line with the parallel runways. Based on historical observations, traffic flow in an easterly direction (Runway 08L and Runway 08R active) is more common during the fall and winter months, and traffic flow in a westerly direction (Runway 26L and Runway 26R active) is more common during the spring and summer months. The crosswind runway is generally only used during periods of high crosswind conditions, which are very infrequent throughout the year and generally experienced during the fall and winter months. Typically, less than 1% of YVR's annual runway movements occur on the crosswind runway.

The published YVR Noise Abatement Procedures prescribe a westerly flow of traffic (Runway 26 active) as the preferred mode of operation whenever possible to reduce noise exposure on the community. Westerly flow places departures, the noisiest type of operation, over the Strait of Georgia. In addition, NAV CANADA will attempt to accommodate two-way flow between the hours of 11:00 PM and 6:00 AM to keep both arriving and departing aircraft over the Strait of Georgia to minimize over-flights and noise on the community. This operation is subject to traffic volume, airfield activities, and weather conditions.

RUNWAY USE

At YVR, during normal operations, the south runway is the primary 24-hour runway, and the north runway is closed every night between the hours of 10:00 PM and 7:00 AM, except during emergencies and airfield maintenance on the south airfield. In addition, between the hours of 7:00 AM and 10:00 PM, the north runway is used primarily for landings, which are quieter than departures; however, it can be used during the day for departures to reduce delays when the airport approaches capacity limits, such as during peak times.

The South Airfield Rehabilitation Project in 2023 necessitated closures of the south runway for an extended period, resulting in a temporary shifting of air traffic to the north runway between 10:00 PM and 7:00 AM. It also required departures on the north runway during Runway 08 operations between 7:00 AM and 10:00 PM due to the overlay work on Taxiway Lima (the main taxiway connecting the main Apron and the west end of the south runway).

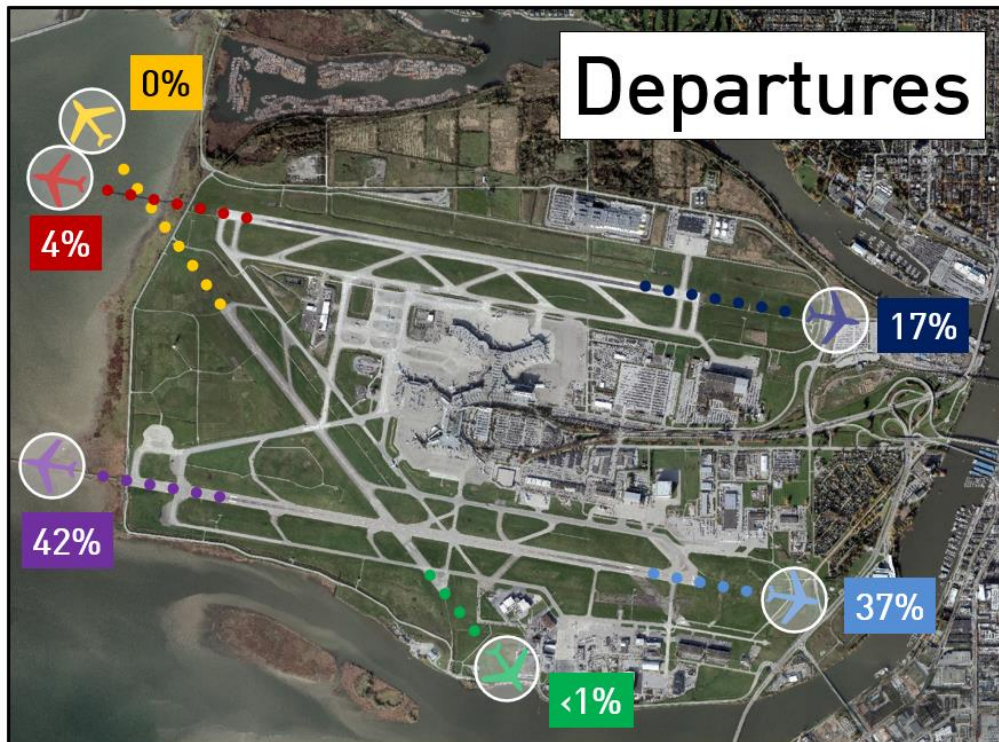
As mentioned in the previous section, the crosswind runway is used very infrequently throughout the year and is generally reserved for periods of high crosswind conditions.

Figures 4 and 5 illustrate the distribution of arrivals and departures on all runways in 2023 respectively.

FIGURE 4: Runway Arrival Distribution, 2023



FIGURE 5: Runway Departure Distribution, 2023

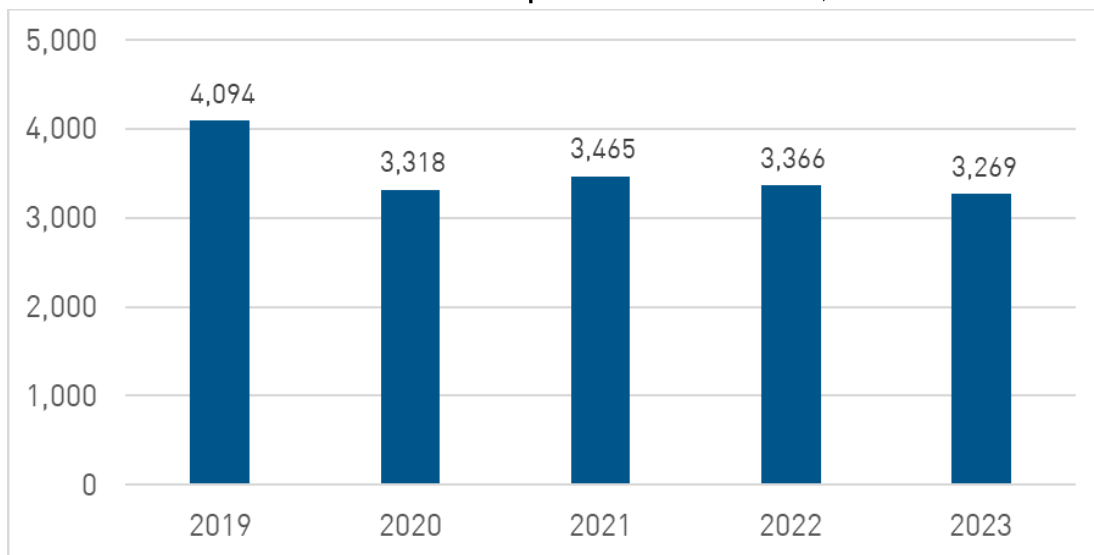


ENGINE RUN-UPS

Transport Canada standards require that aircraft undergo regular maintenance to ensure safe operations. Engine run-ups are a critical part of maintenance work and involve operating the engines at various power settings to test components and to simulate flight conditions. These tests help verify that the aircraft is airworthy and safe for return to service.

To ensure a high level of safety on the airfield and to reduce community noise exposure from run-ups, the Airport Authority maintains directives and procedures that prescribe how, when, and where run-ups can be performed. All approved run-ups are routinely analyzed to track run-up activities and identify trends. **Figure 6** provides the number of run-ups performed each year at YVR between 2019-2023.

FIGURE 6: Number of Run-ups Performed at YVR, 2019–2023



In 2023, there were 3,269 run-ups performed at YVR – an average of nine run-ups per day. This is a 3% decrease from 2022. Further analysis of the 3,269 run-ups shows:

- 53% of the run-ups were performed at an idle power setting, 28% were at an above idle power setting, and 19% were at a full power setting.
- 42% of the total run-ups were performed during the night between midnight and 6:00 AM. Run-ups are performed at all times of the day, and some run-ups do occur at night due to flight schedules and maintenance needs.



- 60% of the run-ups were performed by the operators located on the south side and 40% of the run-ups were performed by the operators located on the north side, with the south runway acting as a dividing line.
- 76% of all run-ups performed by the south side operators were conducted in the Ground Run-up Enclosure (GRE), a three-sided open roof facility whose walls are designed to absorb and redirect noise from run-ups performed in the facility.

APPENDIX B - NOISE CONCERNS

One of the goals of the YVR Aeronautical Noise Management Program is to respond to questions and concerns from the community and provide individuals with up-to-date information on airport operations and noise management initiatives. The community can contact the Airport Authority with their questions and concerns through a variety of means, including:

- Dedicated e-mail (noise@yvr.ca)
- YVR Website (www.yvr.ca)
- Real-time flight and noise tracking system ([WebTrak](#))
- 24-hour YVR Noise Information Line: **(604) 207-7097**

When a concern is received, Airport Authority staff will investigate the concern using the Aircraft Noise and Flight Tracking System as well as other data sources to determine the source of the concern. A response is then provided with information to help the individual better understand the source of their concern. If the aircraft operator is suspected of non-compliance with published Noise Abatement Procedures, the incident will be forwarded to Transport Canada Civil Aviation Enforcement for further investigation.

Information provided by residents and results of investigations are used to analyze and identify trends. A summary of concerns is provided to the YVR Aeronautical Noise Management Committee at each meeting for review and discussion. In addition, customized semi-annual reports are created for City representatives to provide information on the current issues of concern from their community.

NUMBER OF CONCERNS

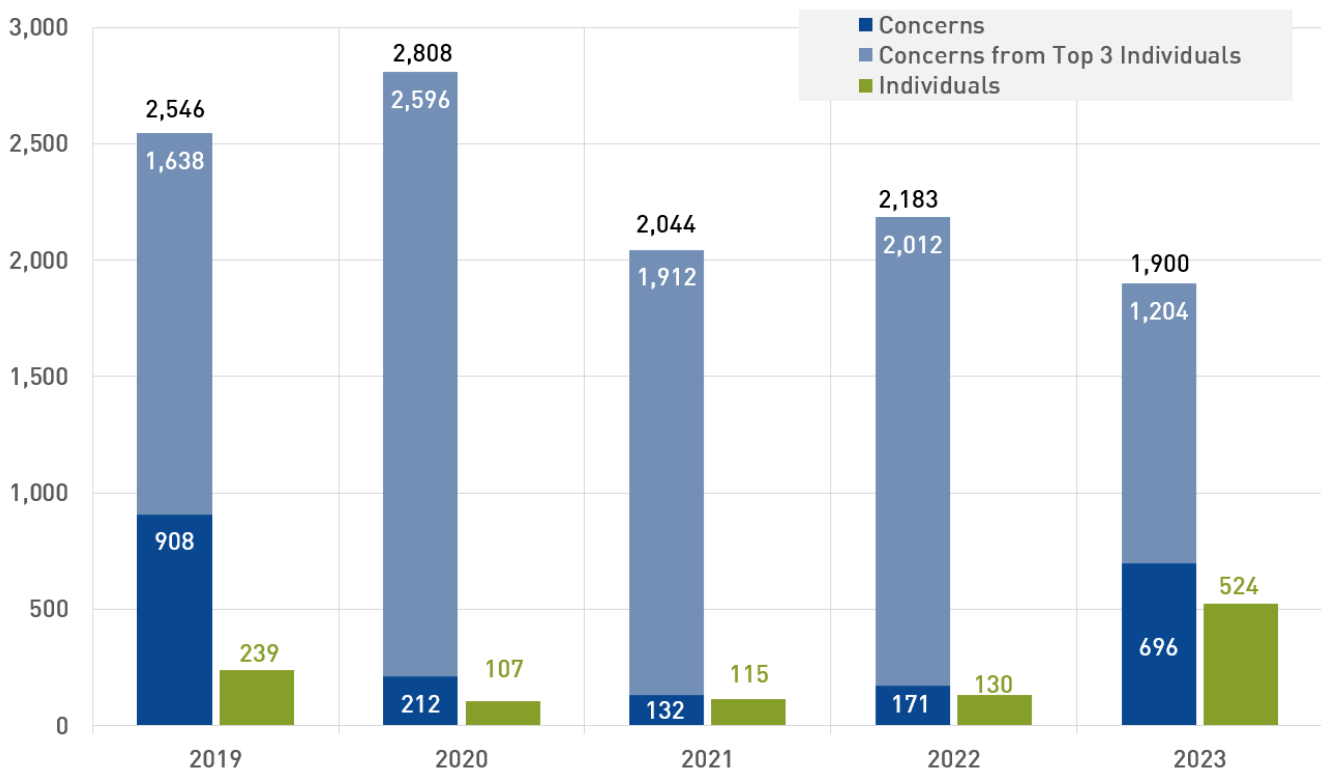
In 2023, the Airport Authority received 1,900 noise concerns from 524 individuals across the Greater Vancouver area, which has a population of 2.6 million⁴. This represents a reduction in the number of concerns but an increase in the number of individuals compared to 2022. The extended irregular use of the north runway during the South Airfield Rehabilitation Project as well as community concerns over the proposed flight path changes and heightened awareness

⁴ 2021 Statistics Canada's Census (<https://www12.statcan.gc.ca>)

around air traffic in some communities during and following community consultations for the Vancouver Airspace Modernization Project contributed to the increase in the number of individuals submitting concerns.

Figure 7 provides a breakdown of the number of concerns and individuals between 2019 and 2023. There are several individuals who register multiple concerns throughout the year. As such, the number of concerns associated with the three individuals that have registered the most concerns is identified for each year. In 2023, 63% (n=1,204) of the total concerns were received from three individuals. One individual registered 47% (n=892) of the total concerns.

FIGURE 7: Number of Noise Concerns and Individuals, 2019-2023



NOISE CONCERNS BY LOCATION

Individuals are asked to provide the location of their residence to better understand the distribution of concerns across the region. **Figure 8** illustrates the number of concerns and the number of individuals submitting the concerns in 2023 by community.

In 2023, there was an increase in concerns received from residents in the Burnaby and Tri-Cities areas. 61% of these concerns were submitted during and following community consultations for the Vancouver Airspace Modernization Project and expressed opposition to the proposed changes. Additionally, while the proposed changes have not been implemented, some residents from these areas submitted concerns citing aircraft using new flight paths. These concerns were related to the current aircraft procedures and operations over the area.

91% (n=303) of the concerns from Vancouver, 19% (n=85) of the concerns from Richmond, and all concerns (n=2) from Musqueam were associated with the irregular use of the north runway during the South Airfield Rehabilitation Project. The project required extended closures of the south runway between April and December 2023, which resulted in the extended use of the north runway at night as well as the use of the north runway for some departures during the day.

FIGURE 8: Number of Concerns and Individuals by Location

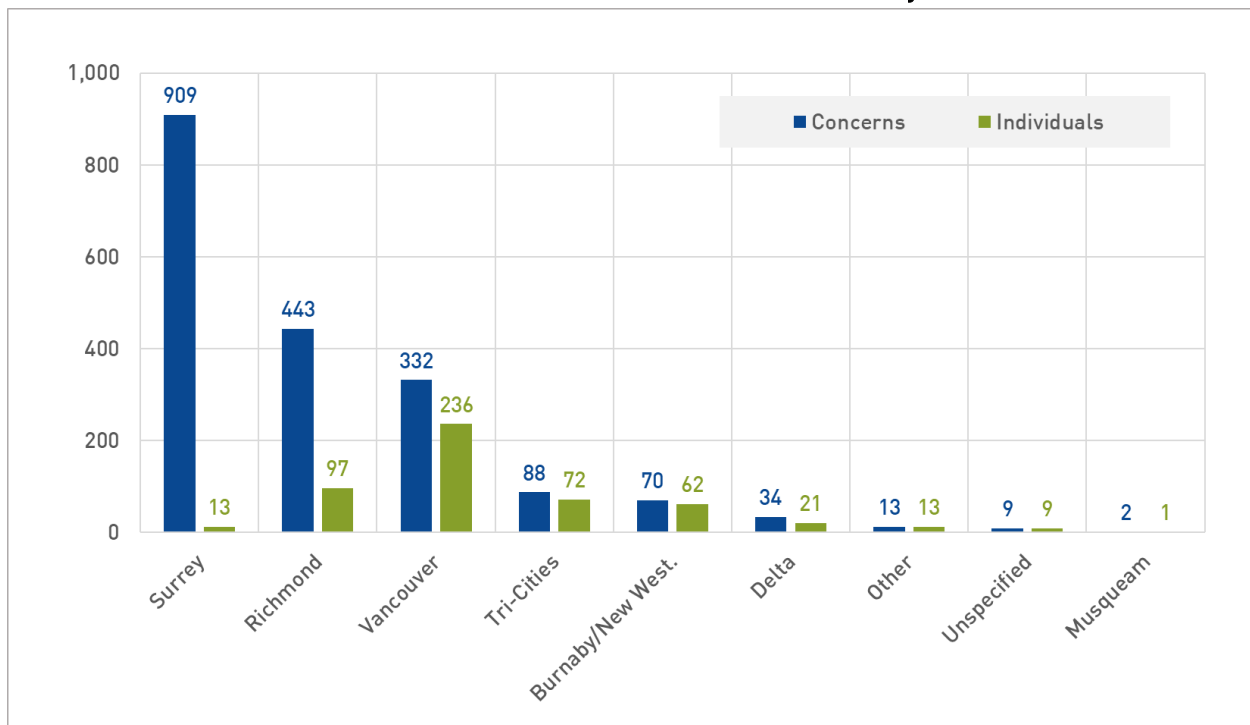


Figure 9 illustrates the geo-distribution of noise concerns across the Greater Vancouver area in 2023. In general, locations closer to the airport exhibit a greater density of noise concerns due to the lower altitude of aircraft and greater regularity of aircraft activity. In 2023, there was an increase in concerns received from areas further away from the airport. This was mainly due to the higher than usual number of individuals contacting the airport from the Burnaby and Tri-Cities areas as mentioned above.

Figure 10 illustrates the geo-distribution and the frequency of concerns in the Greater Vancouver area in 2023. The size and colour of each dot represent the volume of concerns originating from that specific location.

FIGURE 9: Geo-distribution of Noise Concerns, 2023

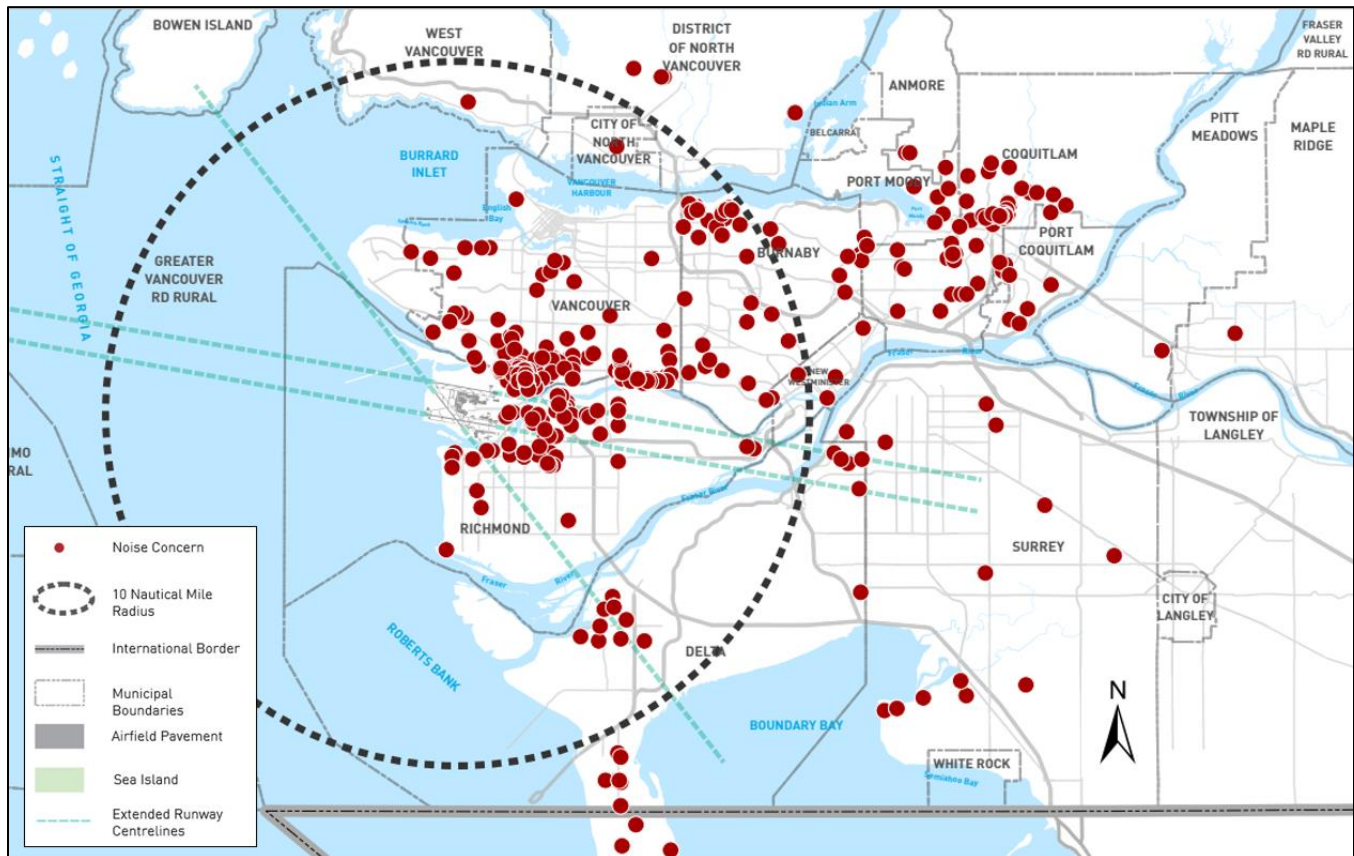


FIGURE 10: Aggregated Geo-distribution of Noise Concerns, 2023



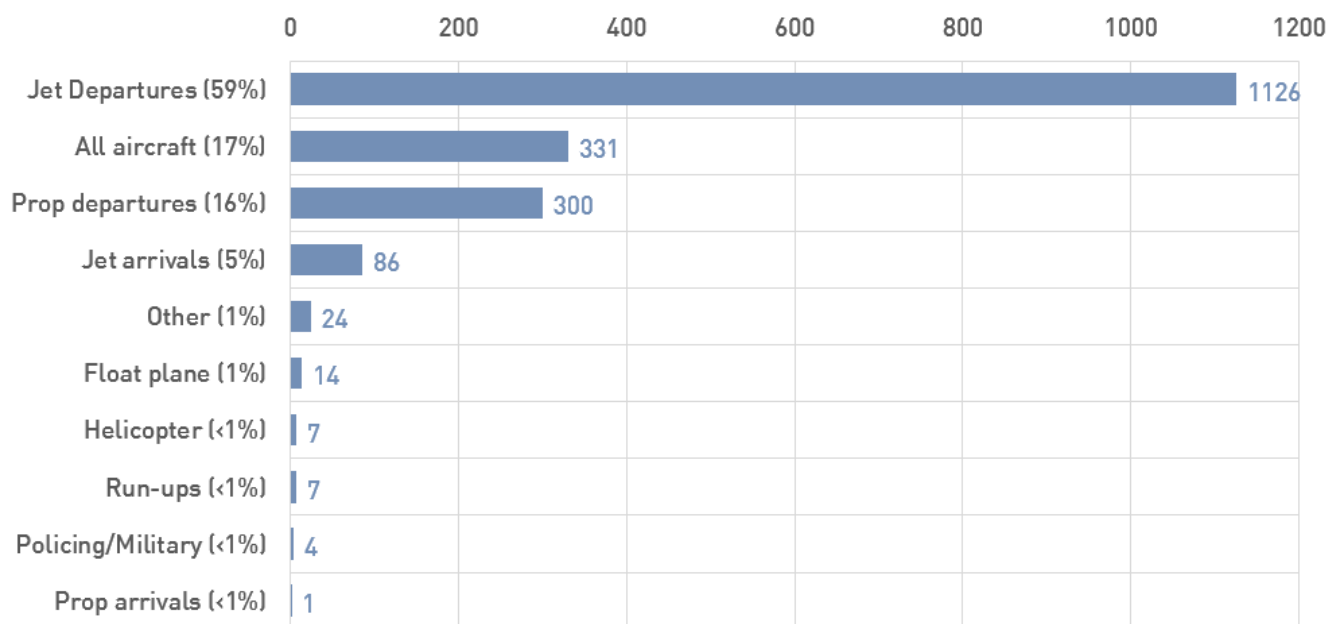
NOISE CONCERN BY OPERATION TYPE

When reporting a noise concern, individuals will generally provide details of date, time, and their location as well as the information related to a specific operation. Based on the information provided and investigations using the airport’s Aircraft Noise Monitoring & Flight Tracking System, each concern is matched and categorized into an operation type such as Jet Departure, Jet Arrival, Helicopter, and Run-Ups. In some cases, concerns are general in nature and the individual does not reference a specific operation or activity. These types of concerns are categorized as “All Aircraft”. Concerns that cannot be matched against an operation for the time and location provided by the individual are categorized as “Other”.

While all areas of the region are exposed to some level of aircraft activity, the level of exposure will vary depending on the location of the area in relation to the airport and its proximity to flight paths. As such, depending on the individual’s location, the nature and category of concerns may differ. **Figure 11** illustrates the breakdown of all noise concerns received in 2023 by operational category.

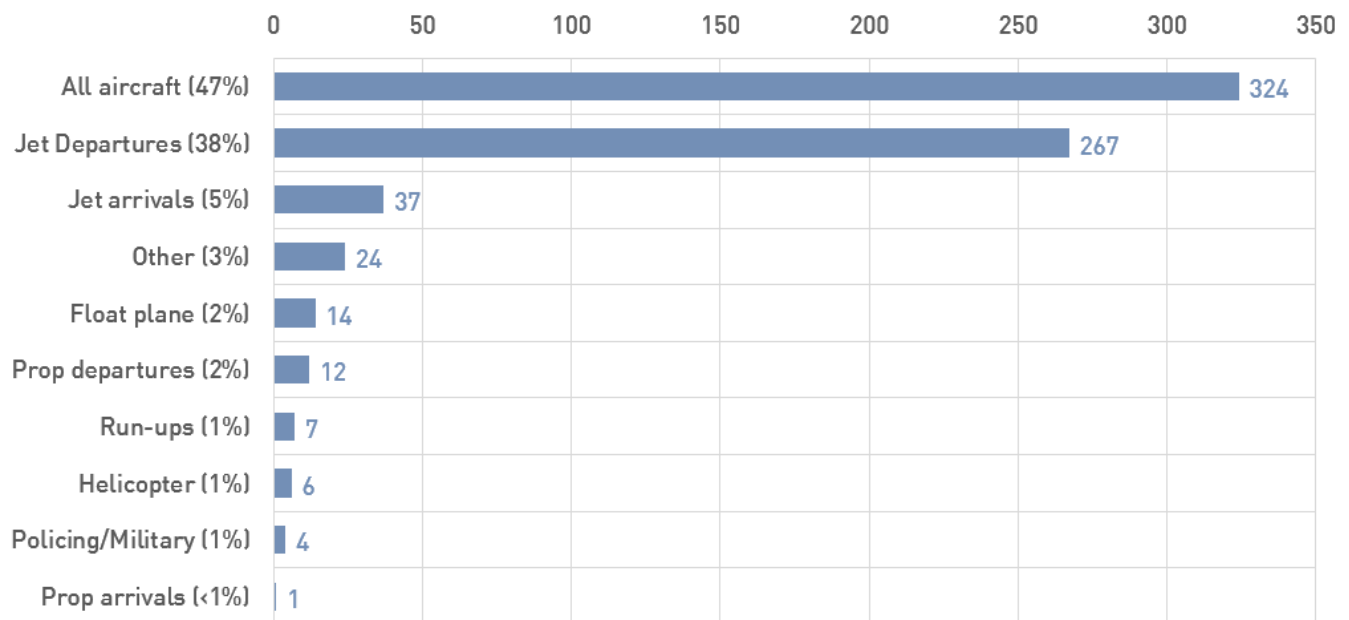
As illustrated, the three operational categories associated with the most concerns in 2023 were Jet Departures, All Aircraft, and Prop Departures.

FIGURE 11: Concerns (n=1,900) by Operational Category



With a small number of individuals registering many concerns, further analysis was performed by excluding the 1,204 concerns received from three individuals who registered the most concerns. **Figure 12** illustrates the remaining 696 concerns received from 521 individuals, by operation type.

FIGURE 12: Concerns (n=696) by Operational Category, Excluding the 3 Individuals with the Most Frequent Number of Concerns



Analysis of the 696 concerns indicates that “All Aircraft”, “Jet Departures”, and “Jet Arrivals”, were the top three operational categories cited, accounting for 628 of the 696 concerns (90%).

- For operations categorized as ‘**All Aircraft**’ (general concerns), 65% were from Vancouver, 13% from Richmond, and 10% from Burnaby. These areas are closest to the airport and were more significantly affected by the irregular runway use associated with the South Airfield Rehabilitation Project.
- For **Jet Departures**, 37% of these concerns were from Vancouver, 27% were from the Tri-Cities, and 21% from Richmond. Residents in Vancouver and Richmond commented about the use of the North Runway for departures during the rehabilitation project. The concerns from the Tri-Cities were attributed to jet departures from Runway 08 headed for destinations to the north and the northeast. These aircraft are following long-established Standard Instrument Departure procedures and routes as well as instructions from Air Traffic Control.

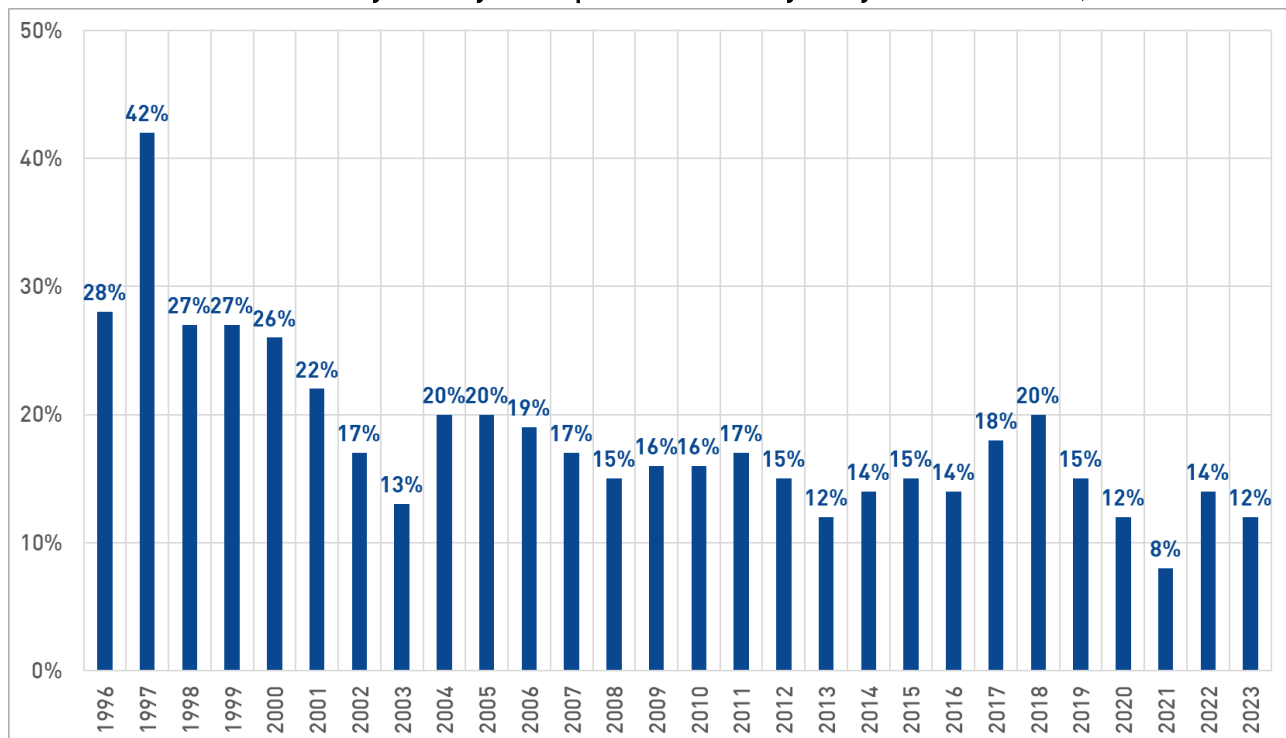
- Of the concerns associated with **Jet Arrivals**, 35% were cited by residents of Vancouver, 19% from Surrey, and 14% from Delta.
- There were 7 concerns regarding engine **Run-ups** - 5 from Richmond and 2 from Vancouver. All associated run-ups were approved and performed at their assigned location and heading.

COMMUNITY SURVEY

Since the mid-1990s, the Airport Authority has commissioned a third-party survey to track public attitudes and opinions about YVR on several topics including aircraft noise. The community survey represents the opinions of approximately 1,000 to 1,600 residents selected at random from across communities in the Greater Vancouver area and provides one gauge of the broader population’s perception of aircraft noise annoyance.

When asked, “*While you have been at home during the past year, have you been annoyed by aircraft noise in your neighbourhood?*”, approximately 12% of the survey respondents in 2023 stated that they were annoyed by aircraft noise, a decrease from 14% cited in 2022. **Figure 13** illustrates the trend since 1996.

FIGURE 13: Community Survey - Respondents Annoyed by Aircraft Noise, 1996-2023

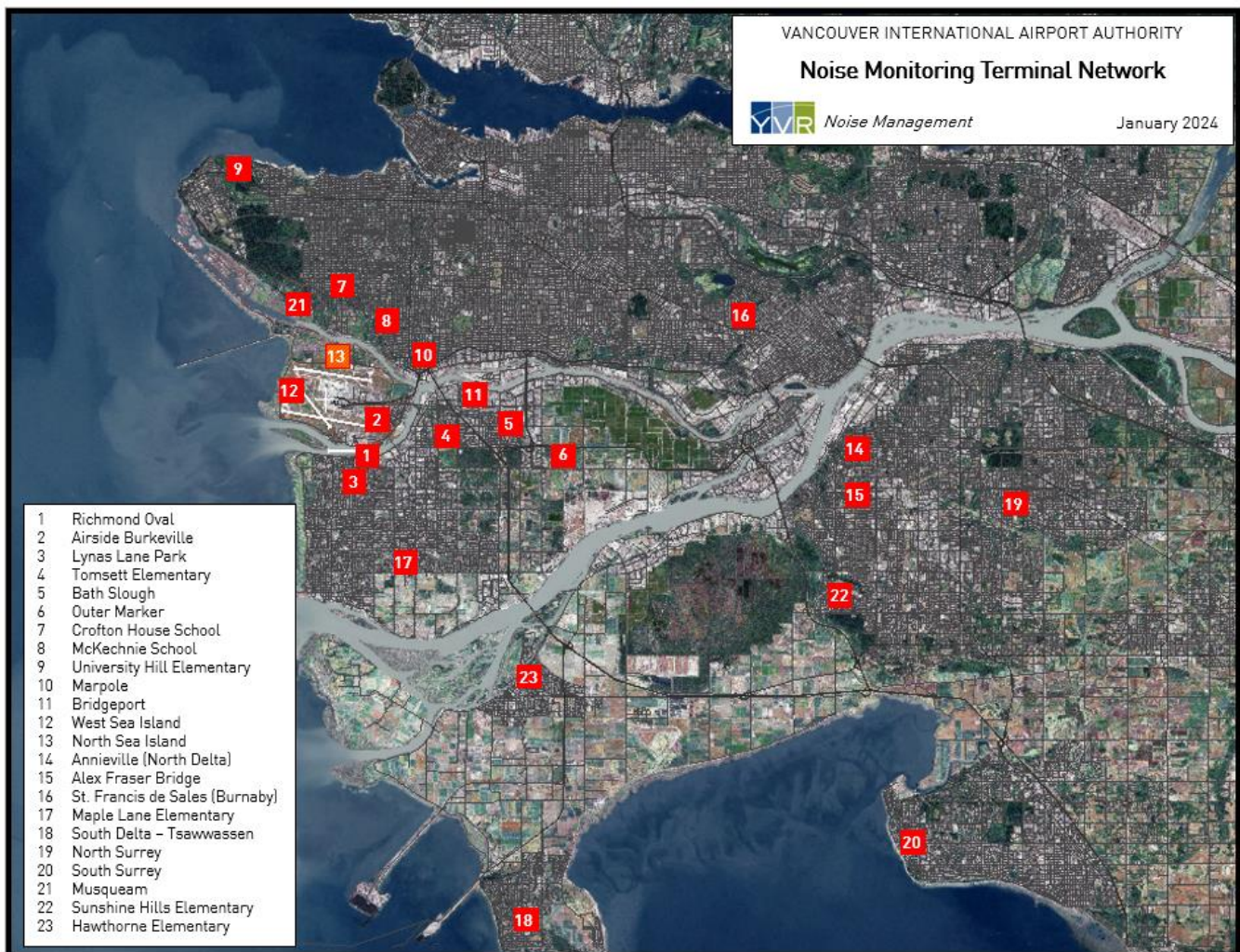


APPENDIX C - NOISE MONITORING DATA

The Airport Authority uses the Aircraft Noise & Operations Monitoring System (ANOMS) to monitor noise levels and assess the contribution of aircraft noise in communities around the airport.

ANOMS combines noise data collected at NMTs with radar flight tracking data provided by NAV CANADA. **Figure 14** illustrates the NMT network and their relationship to runways at YVR. The current network of NMTs consist of 22 fixed NMTs. In June 2023, Site #13 at Ferguson Road / North Sea Island was removed due to potential land development, and a new location will be determined.

FIGURE 14: NMT Locations in the Greater Vancouver Area



ANNUAL AVERAGE NOISE LEVELS (LEQ)

One common metric for community noise assessment is the equivalent sound level, or average noise level (Leq), measured over a given period of time. **Table 2** presents the annual average Leq, measured in units of A-weighted decibel or dBA, at each NMT location for the last five years. It is important to note that the average noise levels, presented below, include contributions from all sources in the community, including aircraft, motor vehicles, people, lawn mowers, barking dogs, etc.

To provide context on sound exposure, **Figure 15** illustrates example sounds levels ranging from 0 to 130 dBA associated with typical sources. As a note, a 3 dBA increase in noise level is achieved by doubling equal noise sources and is the smallest difference in noise level that is perceptible by a receiver. A 6 dBA increase in noise level is clearly perceived, and a 10 dBA increase is perceived as being twice as loud.

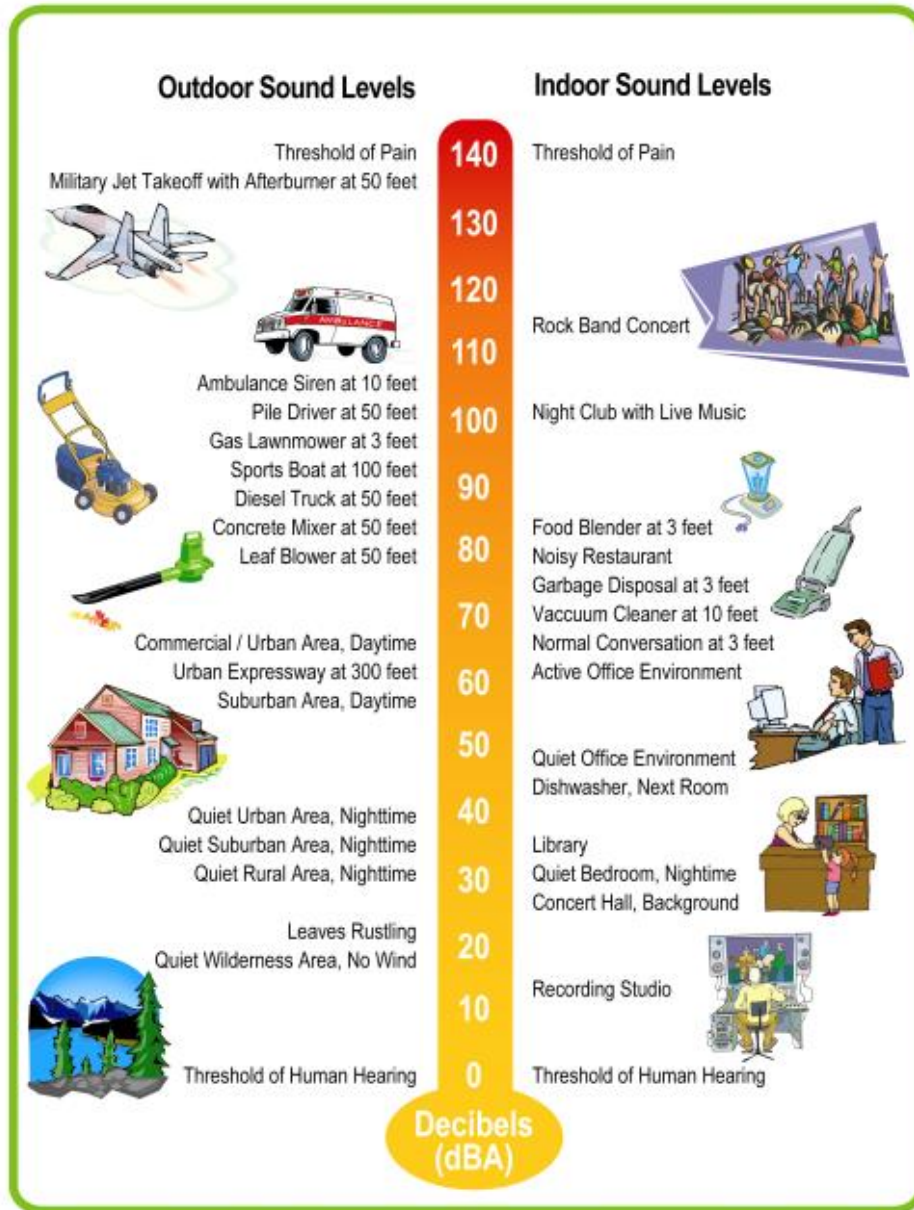
TABLE 2: Annual Average Noise Level (in dBA), 2019-2023

NOISE MONITORING TERMINAL											
YEAR	1	2	3	4	5	6	7	8	9	10	11
2019	66.2	66.7	53.6	60.6	58.3	57.6	58.7	59.9	50.5	56.7	61.3
2020	74.4	62.8	51.7	59.6	56.3	56.0	57.6	51.4	49.3	60.6	58.3
2021	72.4	62.2	53.5	60.1	55.6	56.4	58.0	50.2	49.7	57.2	57.0
2022	67.8	63.0	51.1	59.1	56.5	55.8	57.6	50.2	49.1	55.2	59.2
2023	74.2	62.5	51.2	59.1	57.8	55.5	57.5	50.9	49.2	55.1	61.2

YEAR	12	13	14	15	16	17	18	19	20	21	22	23
2019	71.9	62.3	60.2	53.9	54.4	53.9	53.9	60.5	53.2	52.5	-	-
2020	68.7	59.8	55.4	55.4	58.5	53.9	53.5	55.1	52.6	51.0	-	-
2021	65.8	59.5	55.3	59.8	54.5	57.1	53.8	54.8	56.9	51.0	51.0	49.7
2022	74.9	60.5	54.6	54.7	53.4	53.6	51.8	53.2	61.8	51.2	51.2	52.0
2023	71.5	61.9 ⁵	55.5	54.0	53.7	52.5	51.3	53.6	53.3	51.3	51.2	51.3

⁵ The annual average noise level at NMT 13 is based on the data collected between January and June 20 before the NMT was removed from the site.

FIGURE 15: Example Sound Level and Associated Sources



Source: URS Corporation, 2008

NUMBER OF EVENTS - SINGLE EVENT NOISE LEVEL

Another metric used to assess noise is the single event noise level (SEL), measured in dBA. For an aircraft fly-over, either a landing or take-off, the SEL represents the total acoustic energy above a prescribed reference threshold and is typically 10 dBA greater than the maximum noise level experienced during the aircraft fly-over. The primary use of the SEL is to provide a comparison of noise events with different noise levels and durations.

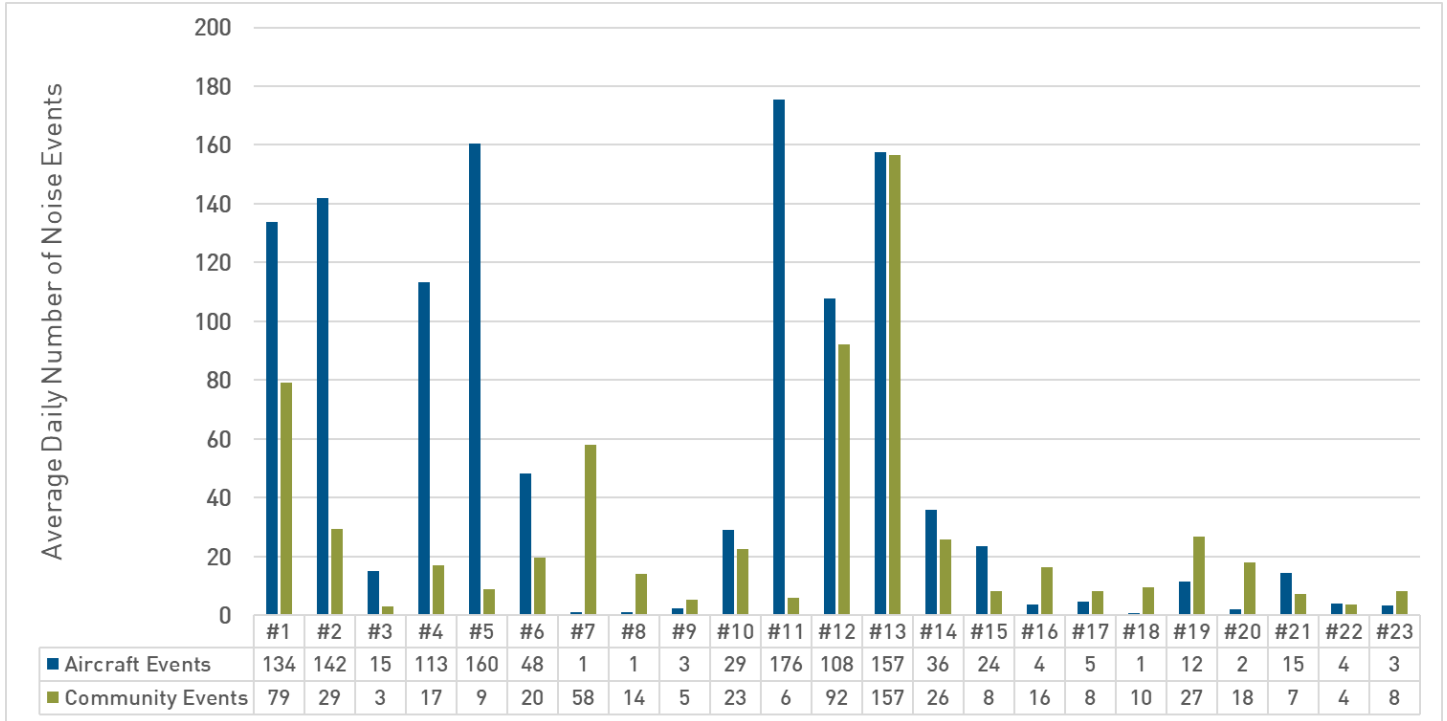
At each NMT, a sound level reference threshold is set according to the ambient background noise level in the area. Reference thresholds are typically set between 65 and 70 dBA during the day (7:00 AM to 10:00 PM) and between 55 and 60 dBA during the night (10:00 PM to 7:00 AM). When the sound level measured by the NMT exceeds the reference threshold, a noise event is captured.

Noise events are then analyzed together with radar flight tracks by ANOMS and are categorized as either correlated or uncorrelated. Correlated noise events are those associated with aircraft activities and uncorrelated noise events are those associated with other sound sources in the community. For those NMT sites located under flight paths and where aircraft operate at lower altitudes, the captured noise events tend to be more associated with aircraft than community sources. Conversely, for those NMT sites located farther away from the airport or where aircraft tend to operate at higher altitudes, the captured noise events tend to be more associated with community sources.

Figure 16 illustrates the daily average number of aircraft versus community noise events⁶ captured at the NMTs in 2023.

⁶ Noise events with durations less than 60 seconds and a SEL greater than 70dBA are included in this count.

FIGURE 16: Average Daily Number of Noise Events at NMTs, 2023





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Note on Reported Figures and Data:

The Airport Authority receives aircraft operations data from NAV CANADA. This data includes daily aircraft arrivals and departures at YVR as well as aircraft transiting through the Vancouver Control Zone. Every effort is made to verify and correct anomalies in the dataset, and numbers stated in this report may vary slightly from those reported by others.

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