CONNECTING WITH THE COMMUNITY:

ANNUAL NOISE REPORT - 2015

YYC CALGARY INTERNATIONAL AIRPORT

DISCLAIMER

This report contains a summary of data collected over the specified period and is intended to convey the best information available at the time. The system databases are to some extent dependent upon external sources and errors may occur. All care is taken in preparation of the report, but its complete accuracy cannot be guaranteed. The Calgary Airport Authority does not accept any legal liability for any losses arising from reliance upon data in this report which may be found to be inaccurate.

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1.0 INTRODUCTION

The 2015 Annual Noise Report outlines the noise management activities undertaken at Calgary International Airport in 2015. The Report is intended to communicate the results of The Calgary Airport Authority's noise monitoring programs, modes of airport operations and noise complaints data.

Calgary International Airport (YYC) holds over 5,390 acres of federally-owned land approximately 12 km north-east of Calgary's city centre. When the airport was initially established in 1939, it was on the outskirts of the city and surrounded by agricultural land. Since then, Calgary and its international airport have grown substantially and cohesively thanks to careful planning and close collaboration with the City of Calgary, and also because of provincial legislation that has set guidelines for land development around Alberta's largest airports.

The Airport Vicinity Protection Area (AVPA) is a regulation that has been in place at YYC since 1979. This regulation prescribes compatible land uses within the Noise Exposure Forecast (NEF) contours surrounding YYC and has been a crucial land development tool, allowing YYC to continue to grow and operate effectively while Calgary grows and develops around the airport. YYC is an urban airport and has the expansion capability to remain in its current location long into the future. The AVPA is a critical tool that ensures that the operational effectiveness of YYC is protected, while the city continues to grow as a vibrant economic hub.

The majority of the air traffic to and from YYC is a mix of scheduled commercial, charter and private air services, along with all-freight cargo activity, which is comprised of a range of small to large jets (61%), turbo prop and propeller aircraft (37%), and piston aircraft (2%).The airport operates 24 hours a day, seven days a week, providing passenger and freight connections throughout Canada and into major international destinations.

The runway system at YYC consists of two north/south parallel runways and two intersecting runways, as illustrated in Figure 1. The parallel runways are referred to as 17R-35L (the west runway) and 17L-35R (the east runway). The diagonal runway 11-29 is mainly used as a 'crosswind runway', meaning it is used in extreme wind conditions that prohibit parallel runway use. The much smaller runway, only used by light aircraft and the general aviation sector, is 08-26.

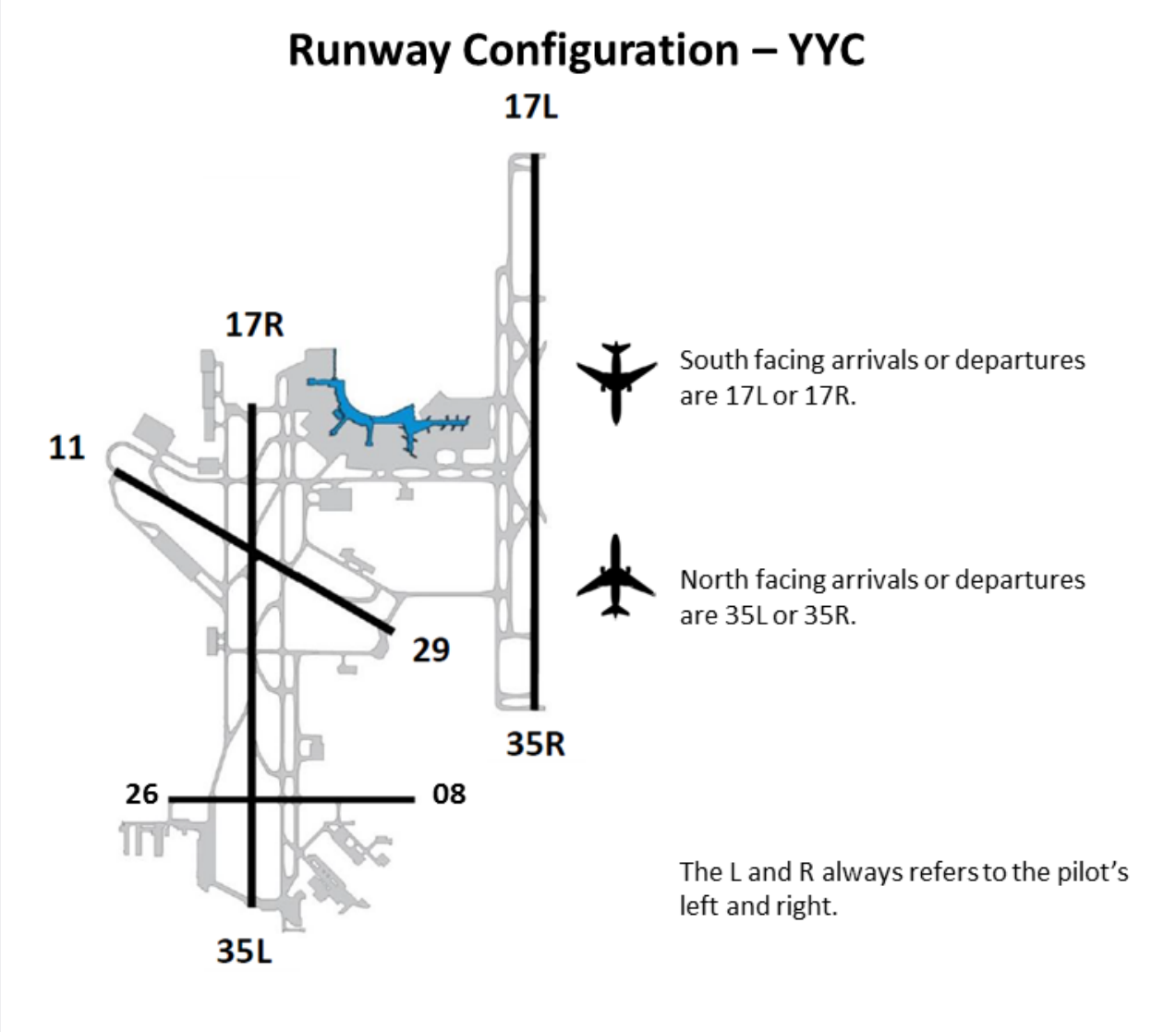

Figure 1 - Runway configuration and names

2.0 PURPOSE

The Authority believes it is important to communicate aircraft noise information in an uncomplicated, easy to understand manner and has prepared the 2015 Annual Noise Report accordingly. The report is intended to provide information, descriptions and clarification of our noise management activities at YYC, including:

- Noise monitoring programs;
- Airport operations and noise abatement procedures;
- Aircraft noise concerns management program; and
- Stakeholder and community engagement on aircraft noise issues.

3.0 NOISE MANAGEMENT

3.1 How Aircraft Noise is Generated

Aircraft noise is an inevitable by-product of aviation activity. While the amount of noise generated by an aircraft varies according to its type, altitude and size, it generally comes from the engines (particularly when taking off and climbing) and air moving over the body of the aircraft (particularly when landing).

In addition to the physical characteristics of aircraft that contribute to the generation of noise, weather conditions influence aircraft operations and, as a result, the amount of noise that communities experience.

Aircraft generally take off and land into the wind, which provides greater lift for departing aircraft and assists with braking for an arriving aircraft.

Ground-based operations can also be a source of noise due to activities such as engine testing and maintenance – also known as engine run-ups. YYC has policies in place that airlines and ground crew must follow that limits the noise from engine run-ups. The procedures include restrictions on location, time, duration and power setting.

3.2 Aviation Regulations, Policies & Guidelines

Regulations and policies dealing with noise management exist at various levels from international standards set by the International Civil Aviation Organization (ICAO) to local Airport Authority policies. Although noise management is an Airport Authority responsibility at airports across Canada, these Authorities have no regulatory enforcement powers for aeronautical regulations and enforcement is administered by Transport Canada.

International standards and operating procedures for aircraft certification and operations are developed by ICAO working committees and referenced in the legislation of the member countries. In Canada, the Aeronautics Act and the Canadian Aviation Regulations (CAR) reference ICAO standards and procedures relating to noise certification and aircraft operations. Appendix I provides a brief synopsis of the regulations and guidelines governing aeronautical noise in Canada and in Alberta.

3.2.1 The Aeronautics Act

The Aeronautics Act (RS, 1985, c. A-2), a federal statute, gives power to the Minister of Transport for regulations regarding noise emanating from aircraft and aerodromes (Section 4.9(f)). This Act also states that other standards, procedures or specifications can be incorporated by reference (e.g. ICAO Annex 16 Chapter 2, Chapter 3 and Chapter 4, which specify noise certification standards for aircraft).

3.2.2 Canadian Aviation Regulations (CAR)

The Canadian Aviation Regulations (CAR) are a compilation of regulatory requirements governing aeronautics in Canada and are designed to enhance safety and competitiveness of the Canadian aviation industry. These regulations address issues ranging from international standards for aircraft noise and air emissions, prescribed minimum aircraft altitudes, noise abatement and flight/maintenance requirements. CAR also correspond to the broad areas of aviation which Transport Canada and Civil Aviation are mandated to regulate (e.g. personnel licensing, airworthiness, commercial air services, etc.). Part IV of the Regulations, General Operating and Flight Rules, provides parameters specific to noise and aerodromes. The following subsections provide a synopsis of the CAR as it relates to noise at aerodromes.

CAR 602.105 - Noise Operating Criteria

This regulation prohibits operations, except in accordance with noise abatement procedures (NAP) and noise control requirements. Noise abatement and control procedures in Calgary include:

- Preferential runways (day and night time)
- Arrival and departure procedures
- Vertical noise abatement procedures

These procedures and requirements are developed locally at YYC in consultation with industry partners and are published in the Canada Air Pilot - Instrument Procedures Manual (CAP), as per the requirements outlined in the Aerodrome Safety Circular ASC 2002-018 issued November 26, 2002.

Noise Abatement Procedures (NAP)

Under the Aeronautics Act, enforceable NAP are a set of published rules outlining how jet aircraft are to be operated on arrival and departure. These procedures are published in the Canada Air Pilot (CAP) and Canadian Flight Supplement (CFS) and violations are subject to investigation by Transport Canada Civil Aviation Enforcement and may result in pecuniary fines. These procedures are designed to minimize the impacts of aircraft noise while allowing for safe departures and arrivals into the airport. The procedures outline runway use, aircraft flight paths on departure and arrival, minimum turning altitudes and climb procedures. NAP are dependent on favorable weather conditions, traffic patterns and the condition of runways (i.e., closure due to maintenance, snow removal).

NAP are comprised of three different operating criteria:

1. Preferential runway use (day and night);
2. Departure procedures (day and night); and
3. Arrival procedures (day and night).

These procedures apply to jet aircraft including turbo-jets, turbo-fans, and fan-jets and are in effect at all times unless otherwise specified. NAP do not apply to propeller aircraft. These procedures are prescribed and must be adhered to unless safety is compromised.

Preferential Runways (All Aircraft)

Air Traffic Control (ATC) will designate runways to divert as many take-offs as possible, consistent with safety of operations, from flight over residential areas adjacent to the airport. Use of other than designated runways should only be requested to meet operational necessity.

Taking into consideration the following conditions and except as authorized by ATC, all aircraft will use the preferential runways as listed in Table 1.

NOISE MANAGEMENT

Table 1 - Preferential Runways, Hours of Operation and Operation Type at YYC

Operation	Local Time		Preferential Runways
ARRIVALS			
	Monday - Friday	06:00 - 07:00	35R
	Monday - Friday Saturday - Sunday	07:00 - 23:00 09:00 - 23:00	35L, 35R
	Monday - Friday Saturday - Sunday	23:00 - 06:00 23:00 - 09:00	17R, 17L, 29, 26
DEPARTURES			
	All hours		35L, 35R
ICAO Annex Chapter 2 (FAA Stage 2) and non-noise certified aircraft departures - ALL HOURS			35L, 35R

1. Physical condition of surface.
2. Effective crosswind component not to exceed 15 knots for arrivals, 20 knots for departures.
3. Effective tailwind component not to exceed 5 knots.
4. Other safety considerations declared by the Captain of the aircraft.
5. For landing on runway 26 at night, aircraft are to fly the runway 29 ILS until interception of the extended centreline of runway 26 for a visual straight-in approach.

Departure Procedures

Runway	Noise Abatement Departure Procedures
All runways	1 or 2

Standard Instrument Departure (SID) cancellation does not terminate NAP. ICAO Annex 16 Chapter 2 (FAA Stage 2) and non-noise certified military aircraft will be assigned runway 35L for departures when runways 29 and 35L are in use.

Table 2 - Runway Noise Abatement Departure Procedures

Runway	Noise Abatement Procedures
26	Restricted to ICAO Annex 16 Chapter 3 (FAA Stage 3) jet aircraft under 44,100 lb gross take-off weight. Climb runway heading to 6500' Above Sea Level (ASL) before proceeding on course.
All runways	Climb to 6500' ASL on ATC assigned SID heading before proceeding on course.

Arrival Procedures – Visual Approach

Clearance for approach or for landing does not cancel the arrival procedures described below. Pilots are requested to use delayed gear and flap extension and low power/drag configurations consistent with operating procedures and safety.

Table 3 - Runway Noise Abatement Arrival Procedures (visual approach)

Runway	Noise Abatement Procedures
All Runways	Military jet aircraft multiple circuits and all overhead breaks prohibited
08	Not authorized
11	Join final approach at or above the PAPI (Precision Approach Path Indicator).
26*	Join final approach at or above the PAPI (Precision Approach Path Indicator).
17R	Intercept final approach from the west at or above 4800' ASL and prior to the NDB (non-directional Beacon) or FAF (Final Approach Fix).
29, 35L, 35R, 17R and 17L	Intercept final approach at or above 4800' ASL and prior to the NDB or FAF for the runway in use.

* For landing on runway 26 at night, aircraft are to fly the runway 29 ILS until interception of the extended centreline of runway 26 for visual straight-in approach.

CAR 602.106 - Noise Restricted Runways

Applies to aircraft over 34,000 kg Gross Take-off Weight (GTOW) that do not have noise certification, a certificate of noise compliance or permission from Transport Canada. These aircraft cannot operate on runways 08, 11, 17R, 26 or 29 at YYC.

CAR 602.150-162 - Transition to Chapter 3 Airplanes

Applies to the phase-out of Chapter 2 aircraft. Chapters refer to noise certification standards with Chapter 3 being more stringent than Chapter 2. Jet aircraft over 34,000 kg GTOW must comply with Chapter 3 noise certification as of April 01, 2002. Some exemptions apply to aircraft operating to/from northern destinations and military aircraft.

International Standards: Aircraft Certification

ICAO was formed to develop acceptable international standards for the aviation industry. Noise certification standards were developed to limit noise at the source (aircraft), which are addressed within the CAR (mentioned above). Noise certification is accomplished by measuring the noise of the aircraft at the maximum take-off weight at three separate positions:

1. On departure (community reference)
2. On arrival
3. Sideline noise: Sideline noise is determined by taking a number of measurements along a line 450 m to the side and parallel to the runway centre line. These sideline measurement points are interpolated to a point at which maximum sideline noise occurs.

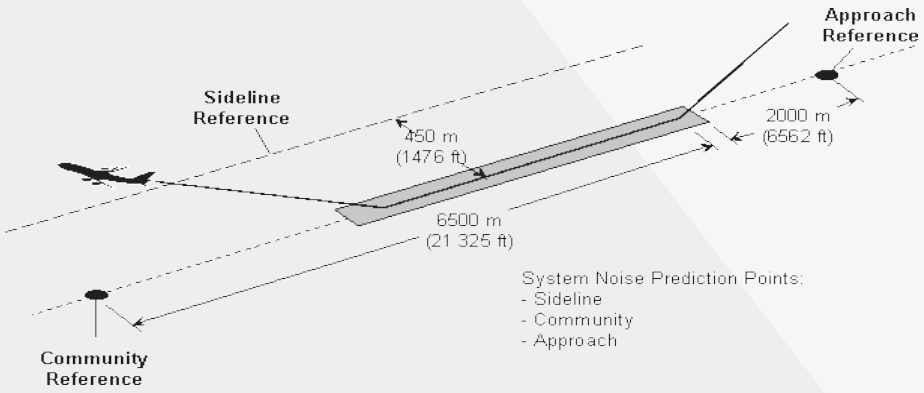

Figure 2 - Runway reference points

The first significant noise standard for aircraft was addressed in ICAO, Annex 16 Chapter 2 where specific noise certification limits were adopted for Aircraft Worthiness Certificates issued prior to 1977. In 1977, ICAO adopted a new standard for noise certification in Annex 16, Chapter 3. Aircraft are referred to as being Chapter 2 or Chapter 3 noise certified aircraft. In addition to the noise certification levels, a phase-out of Chapter 2 aircraft over 34,000 kg was adopted by the Canadian Government in 1992. By April 1, 2002 all Chapter 2 aircraft over 34,000 lb GTOW were phased out or re-certified through engine retrofit or hush-kitting.

Chapter 4 Noise Certification

In moving to more stringent noise certification, much debate occurred over the amount of reduction that should be incorporated into a new aircraft noise certification standard. Airports, including YYC, promoted a cumulative reduction of 14 decibel (dBA) from the Chapter 3 standard. On the basis of recommendations made by the fifth meeting of the Committee on Aviation Environmental Protection (CAEP/5) in June 2001, ICAO adopted a Chapter 4 noise standard that amounts to a 10 A-weighted dBA cumulative reduction from that of Chapter 3. The Chapter 4 noise standard applies to all newly certificated aircraft and to Chapter 3 aircraft for which re-certification to Chapter 4 is requested.

CAR 602.14 - Minimum Altitudes and Distances

This regulation applies to all types of aircraft (jets, propellers, helicopters and hot air balloons). The regulation states that over built-up areas, aircraft must stay at least 1000 ft above any obstacles that are within a 2000 ft radius of the aircraft, and hot air balloons must be at least 500 ft above ground level. This does not apply to aircraft conducting a take-off, approach/landing or those having special permission (e.g. air photo or pipeline patrol flights and flights involving police, fire, ambulance and other provincial or federal agencies).

- Air Traffic Control may require an aircraft within the Calgary Control Zone to fly at an altitude different than the regulation minimum.
- Aircraft must stay at least 500 feet above any obstacle and within a 500 foot radius of the aircraft, with the exception of built-up areas.
- Aircraft may fly, such as STARS Air Ambulance and HAWCS, at less than 500 feet AGL, if performing a special task, as an exemption under the CAR.

3.3 How Aircraft Operations & Noise are Managed

There are several independent organizations who share responsibility for addressing aircraft noise. Together, these stakeholders work to balance the economic and social benefits from aviation and aviation safety, with the need to minimize effects of aircraft noise on communities.

A brief description of the organizations involved is provided in Table 4, with further detail provided in the sections on the next page.

Table 4 - Roles and responsibility for managing aircraft noise

Organization	Summary of responsibilities relating to aircraft noise
ICAO	• Airplanes (and helicopters) built today are required to meet the ICAO's strict aircraft noise certification standards • Canada has adopted the laws and regulations that reflect these international standards at Canada's airports
Transport Canada	• Administration and enforcement of the Aeronautics Act and Canadian Aviation Regulations • Enforcement of noise abatement procedures and operating restrictions
NAV CANADA	• Provides air traffic control management and runway utilization • Determines aircraft flight paths
Airlines	• Maintain aircraft fleets and engines that meet the required ICAO standards and Canadian Aviation Regulations • Implement noise-abatement principles for flight operations
The Calgary Airport Authority	• Manages operations at the airport and ensures the effective delivery and coordination of airport-related services and facilities • Airport noise management program • Stakeholder and community engagement programs • Management of noise concerns

3.3.1 The International Civil Aviation Organization (ICAO)

Canada is a member state of (ICAO), which is a United Nations Specialized Agency. ICAO develops leading practice standards and recommended procedures that are aimed at the sustainable development of international civil aviation. In the last 40 years, ICAO's focus has been on reducing aircraft noise by imposing stringent noise certification standards on engine manufacturers. These standards are updated regularly in accordance with developments in noise reduction technology and aircraft design improvements.

Aircraft manufacturers must ensure that their aircraft are certified to the current ICAO noise standards. All Canadian aircraft undergo the aircraft certification process and subsequently are fully compliant with the ICAO standards[1].

[1] The standards apply to new aircraft being manufactured. Changes in the standards are not applied retroactively to existing aircraft.

3.3.2 Transport Canada

Transport Canada (TC) is the Federal Government department responsible for the development and enforcement of aviation regulations, such as the Aeronautics Act and the Canadian Aviation Regulations. Transport Canada's noise standards, included in the Canadian Aviation Regulations, are adopted from ICAO and set the standards for aircraft noise levels permitted in Canada.

Noise abatement procedures - Noise abatement procedures specify departure and arrival altitude, preferential runway use, nighttime operating restrictions, and other restrictions designed to reduce noise disturbance to surrounding neighbourhoods from jet aircraft.

The application of noise abatement procedures and restrictions at Canadian airports are enforced by Transport Canada. Airline pilots must comply with each airport's noise abatement procedures, which are published in Canada Air Pilot (a NAV CANADA publication).

3.3.3 NAV CANADA

NAV CANADA provides air navigation services in Canada, designs the flight paths through the airspace over the country, as well as the arrival and departure procedures (flight path and altitude) for each towered airport.

The air traffic controllers in each Canadian towered airport, including Calgary, are provided by NAV CANADA. They are responsible for selecting the runways to use for arriving and departing aircraft.

Runway selection - The selection of a runway to be used for the arrival or departure of an aircraft is based on many considerations including the weather, traffic demand and airspace design. Aircraft are designed to take-off and land into the wind, so the weather in particular, wind speed and direction, is generally the primary factor in determining which runways and flight paths are used. The primary modes of operation in 2015 are described in Section 3.5.4.

3.4 National Communications & Consultation Protocol

In 2015, NAV CANADA and Canadian Airports implemented a formalized public engagement protocol – the Air Space Change Communications and Consultation Protocol. The protocol establishes:

1. A formalized, broad-based public consultation process in advance of developing and implementing airspace changes with the potential to have a material noise impact at ground level regardless of where it occurs in proximity to the airport.
2. Provides a clear accountability structure for monitoring and assessing all associated noise issues, with a single point of contact for the public to register concerns.

For more information on the Protocol, go to:
http://www.navcanada.ca/EN/media/Pages/publications-corporate.aspx

3.5 What We Do at YYC

The Calgary Airport Authority recognizes that operating an airport within an urban setting has its challenges – one that is faced by many (if not most) airports globally. Accordingly, the Authority actively engages with other airports as well as industry groups, such as the Canadian Airports Council, with a focus on industry leading best practices and identification of new noise reduction technologies.

As an important part of the community, the Authority works closely with community associations, government agencies and airlines to address noise concerns. As an industry, balancing aircraft operations with community concerns, without compromising the safety of aircraft or the people that visit or work at YYC, is a priority. Ongoing noise management activities at YYC are outlined in

3.5.1 Engine Run-up Policy

Aircraft engine run-ups are performed as a part of a standard maintenance schedule. A run-up usually involves the running of an aircraft's engines at flight specifications for a period of time to simulate flight. The Authority has an Aircraft Engine Run-up Policy that outlines the requirements for operators conducting aircraft engine run-ups at YYC (See Table 5).

Engine run-ups are routine aircraft engine maintenance tests performed to ensure safe and reliable operation of aircraft engines, as required by Transport Canada and aircraft engine manufacturers. In an effort to reduce noise impacts, formal procedures for engine run-ups have been established. The underlying principle is that run-ups will be positioned to address safety issues and to minimize noise impacts on surrounding communities. Run-ups occurring during night time must obtain location assignment from the Airport Duty Manager and the Environmental Services Group is informed of the procedure.

Table 5- Run-up Requirements and Locations at YYC.

Time	Locations	Additional Requirements
Day Weekdays (0700h – 2300h) Weekends (0900h – 2300h)	Leaseholds or on uncontrolled maneuvering areas	
	Hold bays runway 35L, 17R, 29	Runways must not be active as activity in the hold bays provide interference with ILS
	Taxi M	Jet blast / prop wash must not be directed south
	Threshold Runway 07	Must have Calgary Ground Control approval
	Apron I at gate positions	Idle power only
Night (for run-ups over 5 min. duration) Weekdays (2300h – 0700h) Weekends (2300h – 0900h)	Apron II	Must not conflict with cargo activity Jet blast directed towards blast fence Applies to turbojet aircraft Code C or smaller.
	Hold bays runway 35L, 17R, 29	Runways must not be active as activity in the hold bays provide interference with ILS

3.5.2 Airport Community Consultative Committee (ACCC)

The ACCC is a community-based committee comprised of representatives of a number of stakeholder groups, including:

- Community Associations;
- Airlines;
- Municipal Government – City of Calgary, City of Airdrie, Rocky View County and the City of Chestermere;
- Federal Government – NAV CANADA & Transport Canada; and
- The Calgary Airport Authority

The committee meets quarterly (or as often as needed) and is chaired by the Senior Director of Corporate Communications and Stakeholder Relations.

The primary objective of the ACCC is to provide a forum to discuss current activities and concerns regarding airport operations. This community-based approach ensures that all stakeholders are at the table to discuss current and future aircraft operations, keeping at the forefront any impacts on the surrounding communities. In 2015, the primary topics of discussion included:

- The new runway that was completed in 2014 and the changes it brought to departure and arrivals procedures.
- Downwind leg[1] approach flight paths in Calgary.
- NAV CANADA's new Airspace Change Communications and Consultation Protocol – outlined in more detail in Section 3.4.
- The new Required Navigation Performance approaches implemented by NAV CANADA in early 2016.

[1] The downwind leg is the path an arrival flight must follow so it can land into the wind (i.e., upwind). The downwind leg is parallel to the arrival runway – hence the use of "downwind."

3.5.3 Communicating with NAV CANADA, Airlines and Transport Canada

The Authority continues to investigate operational opportunities in collaboration with NAV CANADA and Transport Canada, with the aim of minimizing noise from aircraft. A number of successful operational initiatives were implemented in 2015 that have resulted in positive impacts for communities:

- Transport Canada approved a procedural change for aircraft departing south on Runway 17L – the required 15 degree deviation after take-off was reduced to 10 degrees, which means departing aircraft remain over the industrial corridor for a longer period (see Figure 3).
- Within safe operating parameters, WestJet and Air Canada are commencing the required 10 degree turn no earlier than 1,000 feet AGL.
- The Authority has a published Noise Abatement Procedure that identifies north departures as being preferred. NAV CANADA is following this procedure when it's safe to do so, resulting in more than 50 per cent of the air traffic departing to the north over less densely populated areas.
- YYC has requested that NAV CANADA investigate further reducing the 10 degree turn on Runway 17L to 5 degrees. Any change would require approval by Transport Canada. NAV CANADA is currently investigating the safety of the operation.

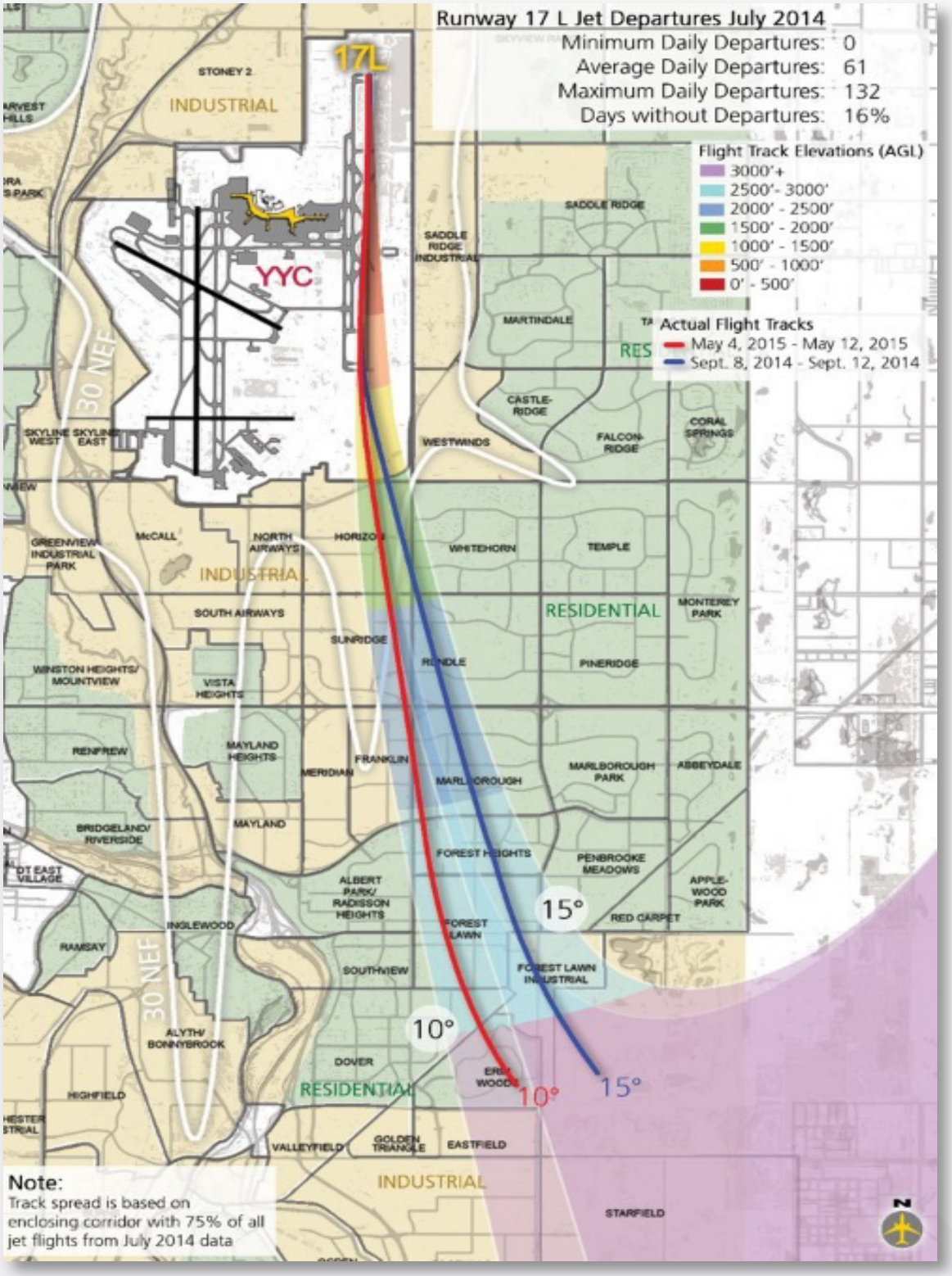

Figure 3 - Flight paths before and after the change from 15 degree deviation to 10 degree deviation.

3.5.4 YYC Runway Operations 2015

The primary mode of operations at YYC are parallel runway operations, meaning most aircraft arrive and depart on either runway 17L-35R or 17R-35L. Aircraft arriving or departing to the east, use the east runway (17L-35R); whereas aircraft arriving or departing to the west use the west runway (17R-35L).

Organizing the aircraft activity by origin-destination has done a good job of evenly distributing aircraft on the parallel runways of YYC and closely follows the intent of the airspace design developed by NAV CANADA in 2014.

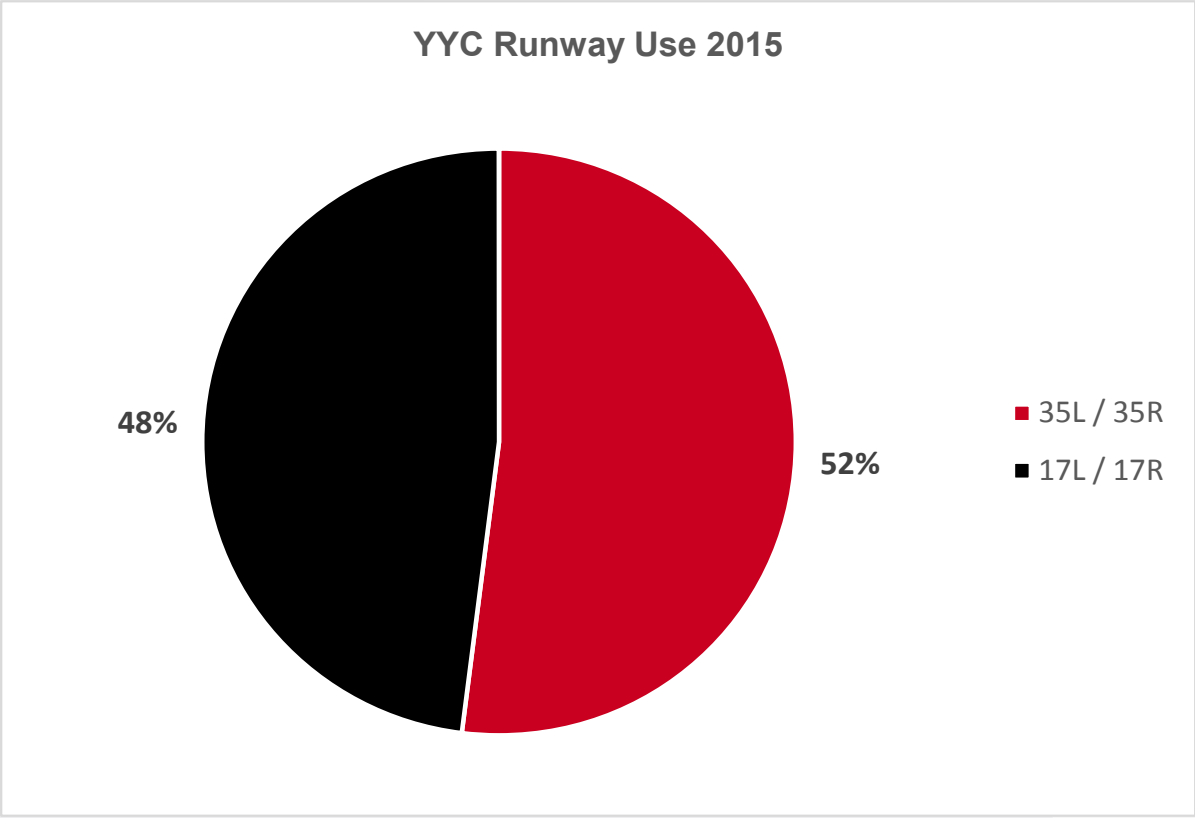

Figure 4 - Parallel runway usage in 2015

3.5.5 YYC Fleet Mix

YYC is a hub airport for a variety of airlines and aircraft types. Below is a chart outlining the types and percentage make-up of the majority of aircraft that operate out of YYC.

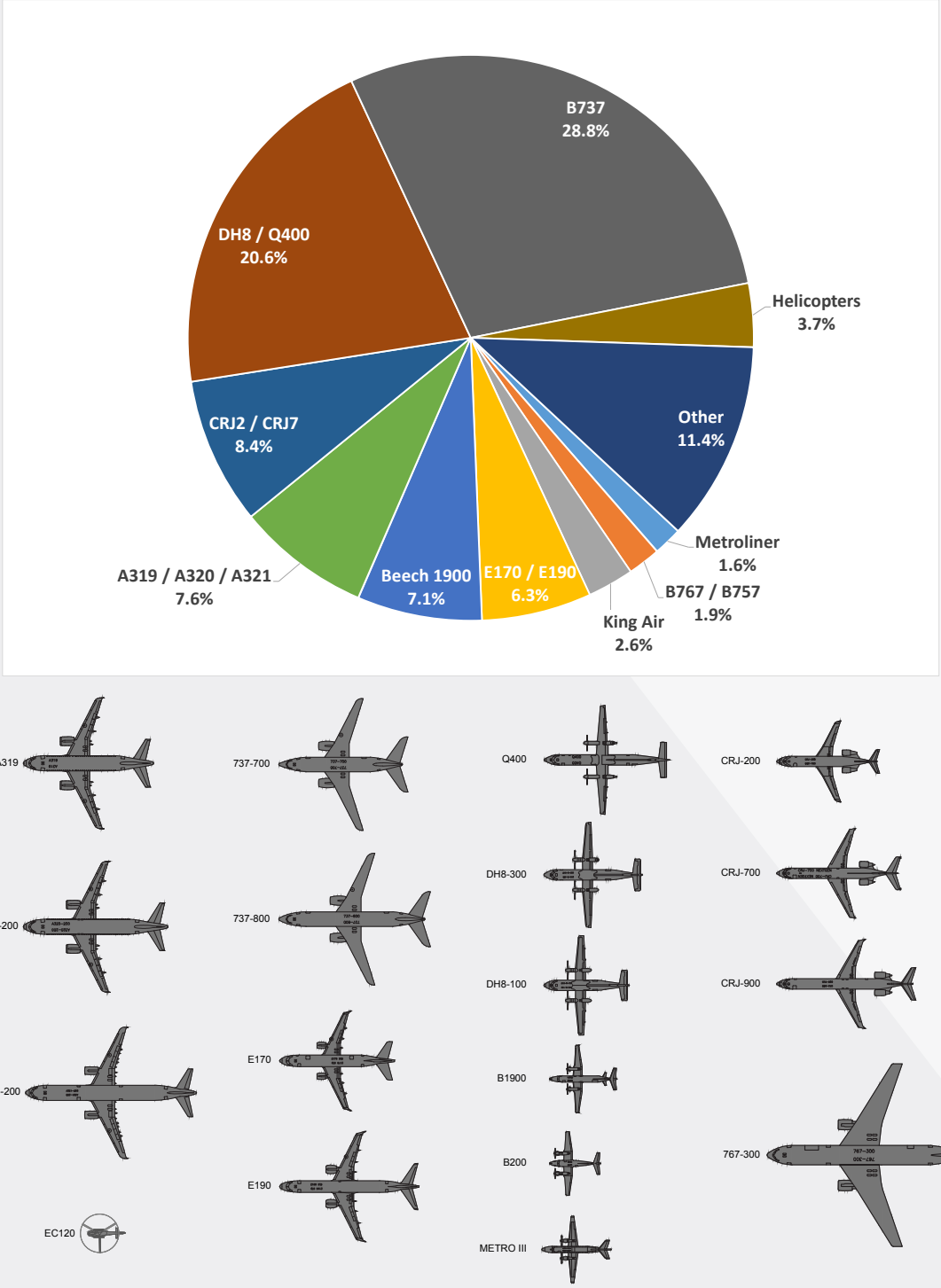

Figure 5 - Fleet mix in 2015

3.5.6 Airport Vicinity Protection Area (AVPA)

The AVPA is an important planning tool that was established specifically to ensure appropriate land use and development in the vicinity of the airport. It was enacted by the Alberta Government in 1979 and has been a vital planning tool for the City, developers and the airport for decades, ensuring that airport operations and Calgary infrastructure and land developments are cohabitating well in our metropolitan city.

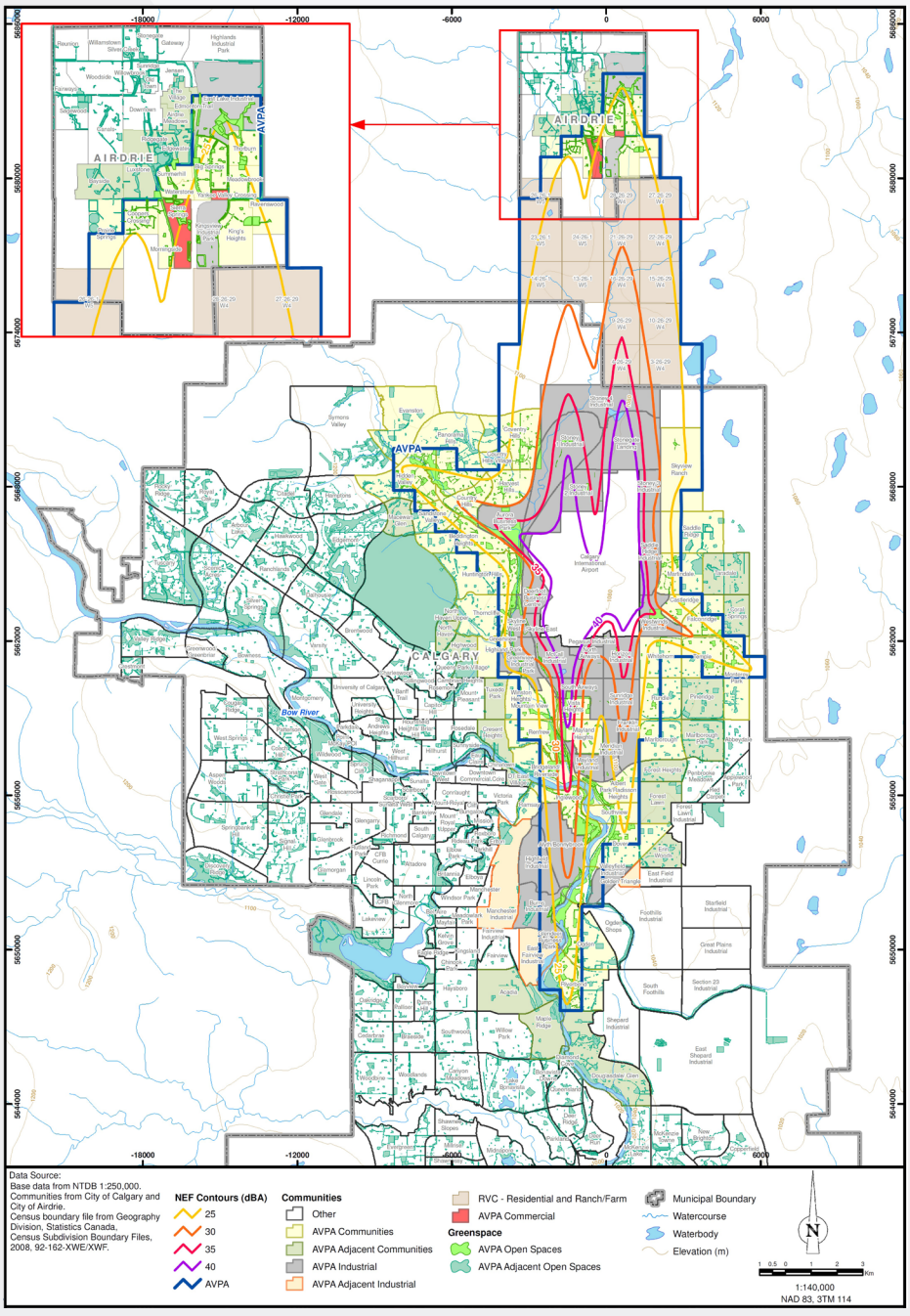

Figure 6 - Airport Vicinity Protection Area Map

3.5.7 Noise Concepts & Terminology

A-Weighted Decibels - Sound emanating from YYC operations is measured in A-weighted decibels (dBA). A-weighted decibels closely emulate the human ear and will hear sounds in the speech-important and middle frequency range. Sound is generally measured in dBA.

Equivalent Sound Level (LAeq) - Community noise from road, rail, aircraft and other local sources is rarely steady and can vary in intensity from second to second, minute to minute or hour to hour. When attempting to describe the overall noise exposure of a community over a period of time, it is necessary to average the noise level in some way. An average noise-level descriptor is the Equivalent Sound Level (LAeq).

The LAeq is a measure of the exposure resulting from the accumulation of A-weighted decibel sound levels over a particular time period (e.g., 1 hour, 8 hours or 24-hours). LAeq may be thought of as a constant sound level over the period of interest that contains as much sound energy as the actual time-varying sound level with its normal peaks and valleys. It is important to realize that the two signals (the constant one and the time-varying one) would sound very different from each other if compared in real life. Variations in the “average” sound level suggested by LAeq are not an arithmetic value, but a logarithmic (“energy-averaged”) sound level. Therefore loud events clearly dominate any noise environment described by the metric.

3.5.8 Decibel Scale

Noise is measured in decibles, often refered to at dBA. The below chart[2] provides a range of different examples of noise events and their dBA rating.

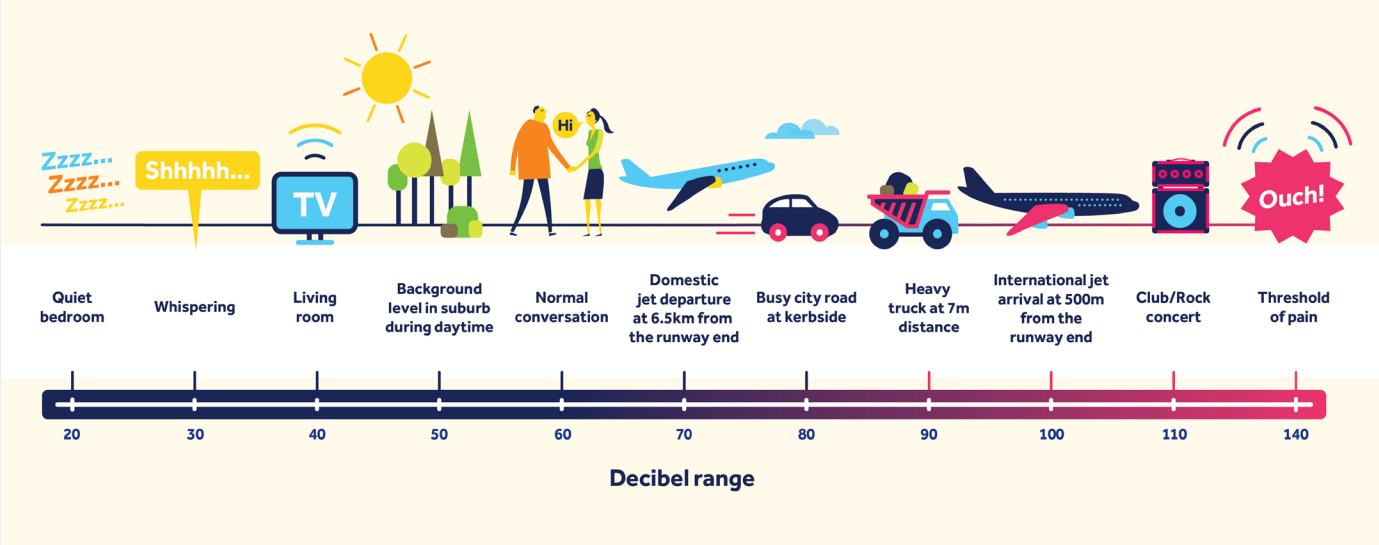

Figure 7 - Noise Level Diagram

[2] Sources: Melbourne Airport
http://melbourneairport.com.au/about-melbourne-airport/planning/aircraft-noise/how-is-noise-generated.html

3.5.9 Noise Monitor Locations

The Authority has noise monitors located throughout the City of Calgary and surrounding area.

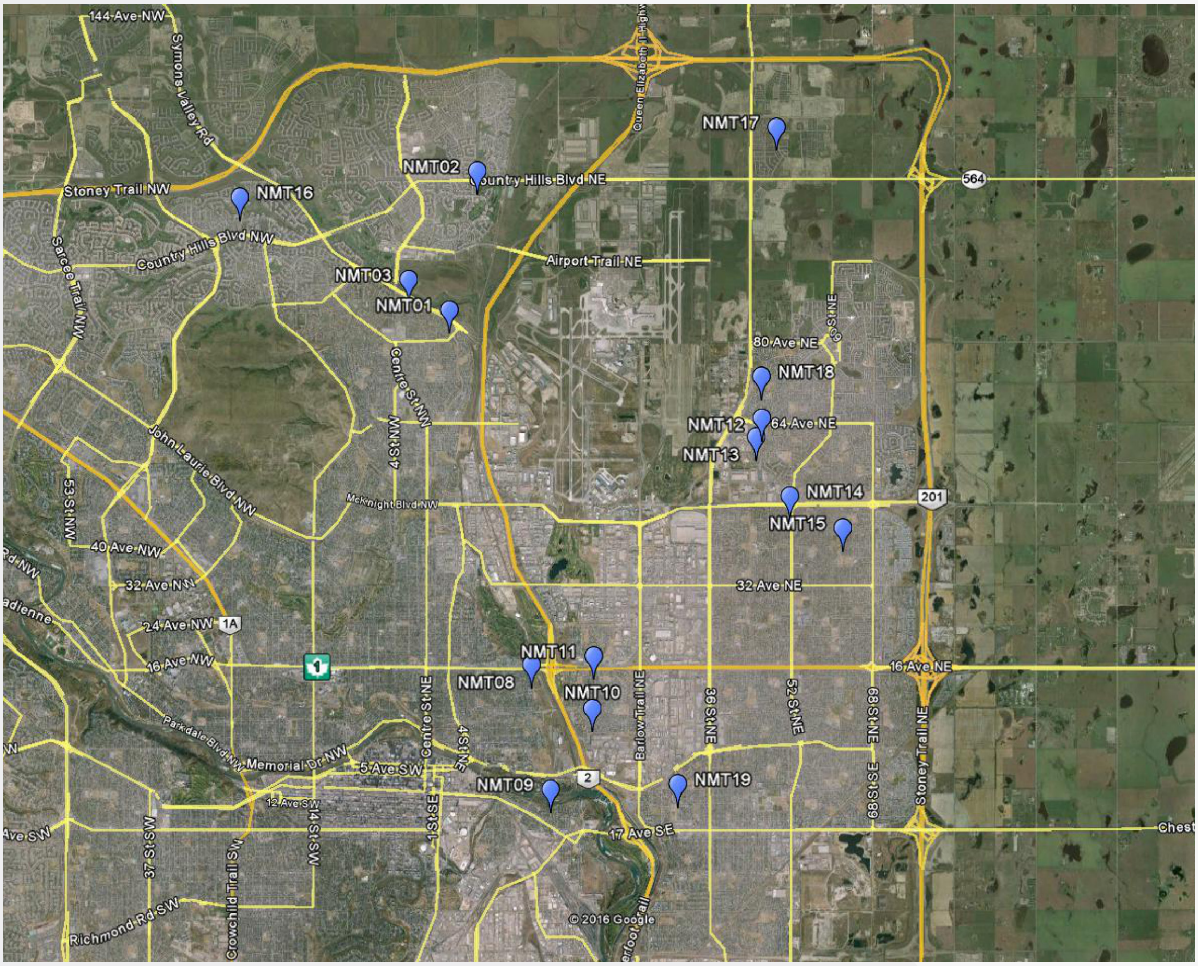

Figure 8 - NMT Locations

3.5.10 Noise Monitor Data Analysis

The YYC noise monitors are equipped with a software system that analyzes community noise. The below graph is a depiction of the measured LAeq (equivalent continuous noise levels) at each of the Noise Monitoring Terminals (NMT). Although the figures show some variation in sound levels over time, there is little indication the overall ambient noise levels in communities are increasing substantially.

Ambient noise is an accumulation of all noise sources in our urban environment. Any increase in decibel reading could come from a multitude of sources, including traffic, construction and aircraft.

NMT locations will be evaluated in 2016 and some NMT will be relocated to better reflect the airspace design in and around Calgary. Data collection and reporting on NMT activities will see an increased focus on gathering data related to noise events that can be correlated to specific aircraft activity and differentiate these events between community ambient noise, verify conformance to published notice abatement procedures, perform trend analysis, and investigate questions from the community.

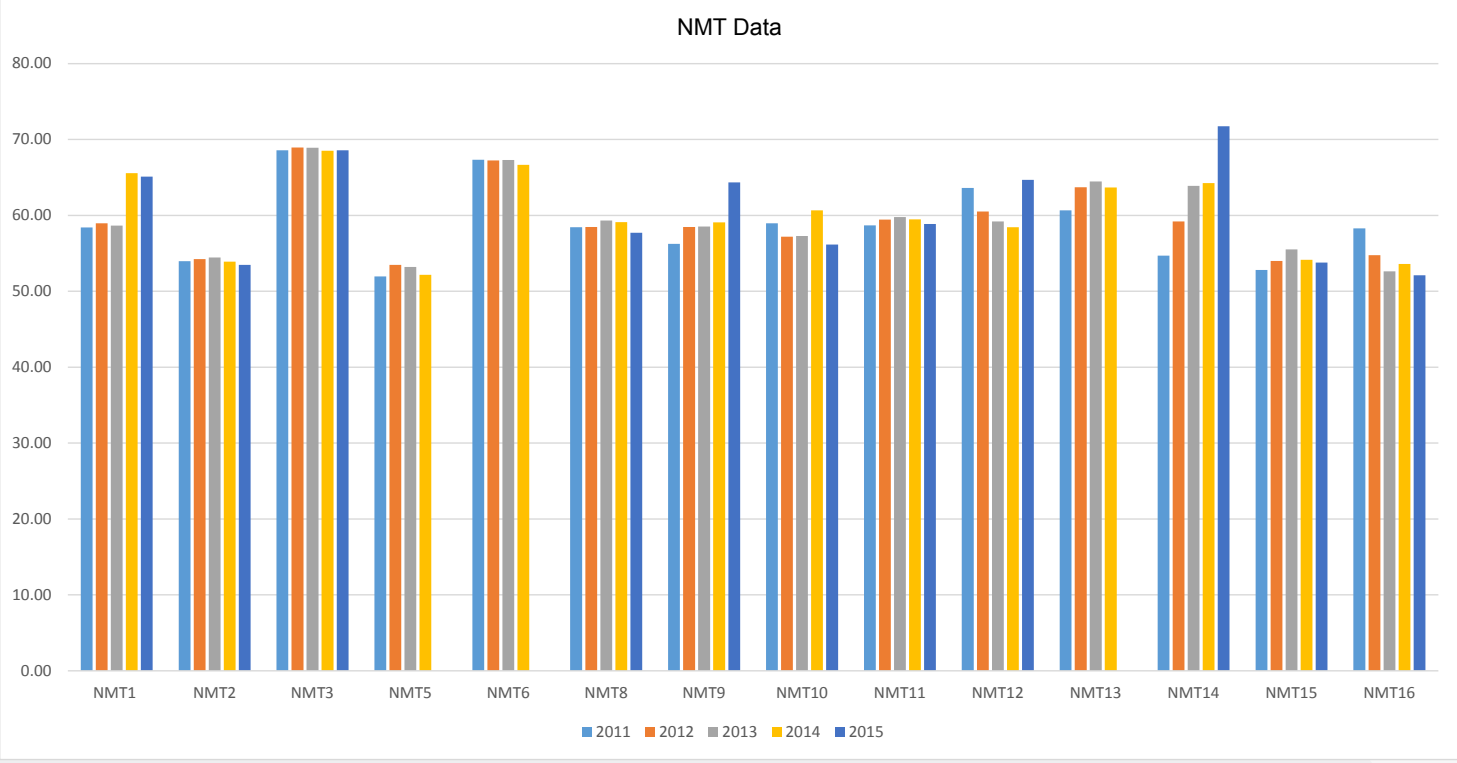

Figure 9 - NMT Data for 2015

Locations of each NMTs are identified on the previous page.

4.0 AIRCRAFT NOISE CONCERNS

4.1 YYC Noise Call/Email Concern Numbers - 2015

The Authority offers two primary ways for individuals to register their questions or concerns regarding YYC operations. The first is the Noise Concern Web Form on our website, and secondly, our dedicated hotline 403-735-1408, both of which are available 24 hours a day, seven days a week.

In 2015, we received 10,314 concerns from 593 different people; however, the numbers of individual calls and email declined 30 per cent in 2014 from 2014 numbers.

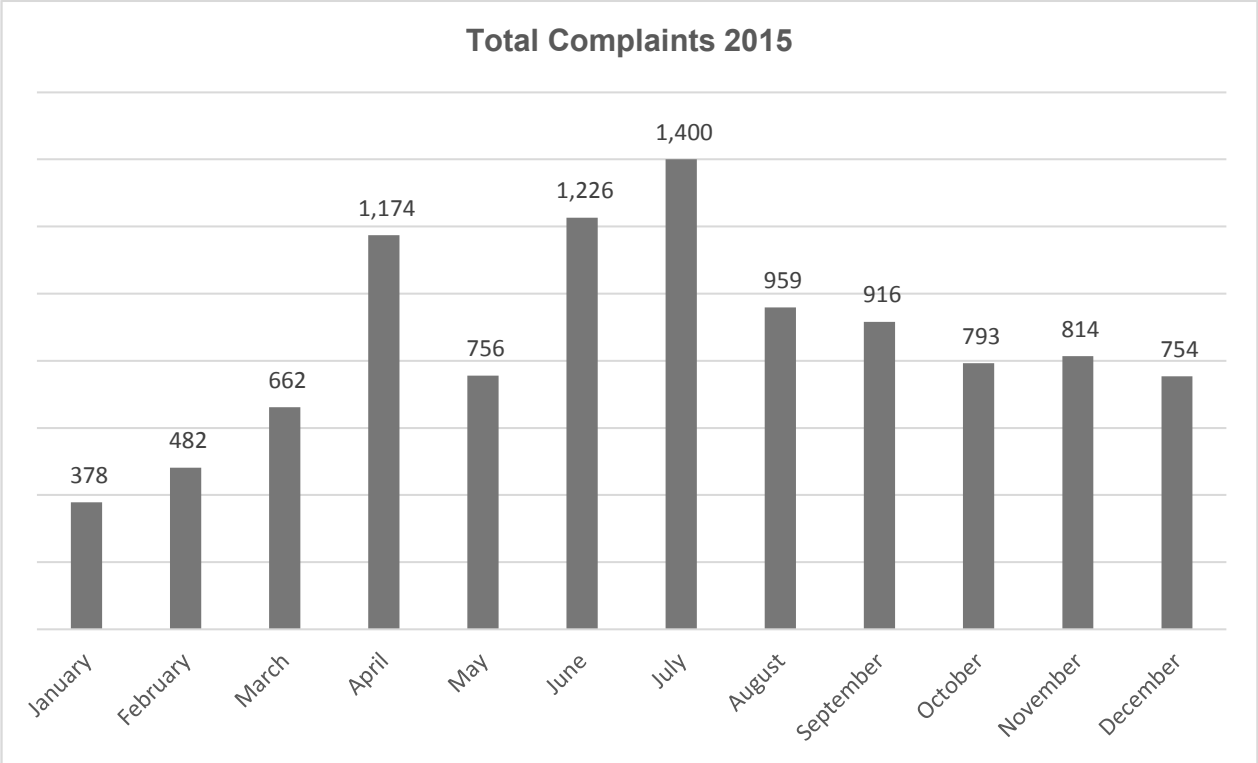

Figure 10 - Total noise concerns received in 2015

AIRCRAFT NOISE CONCERNS

YYC continues to follow the international trend of small groups of individuals submitting proportionally high volumes of concerns. In 2015, two individuals were responsible for 68 per cent of all the calls/emails (6,961 calls/emails) received by the Authority.

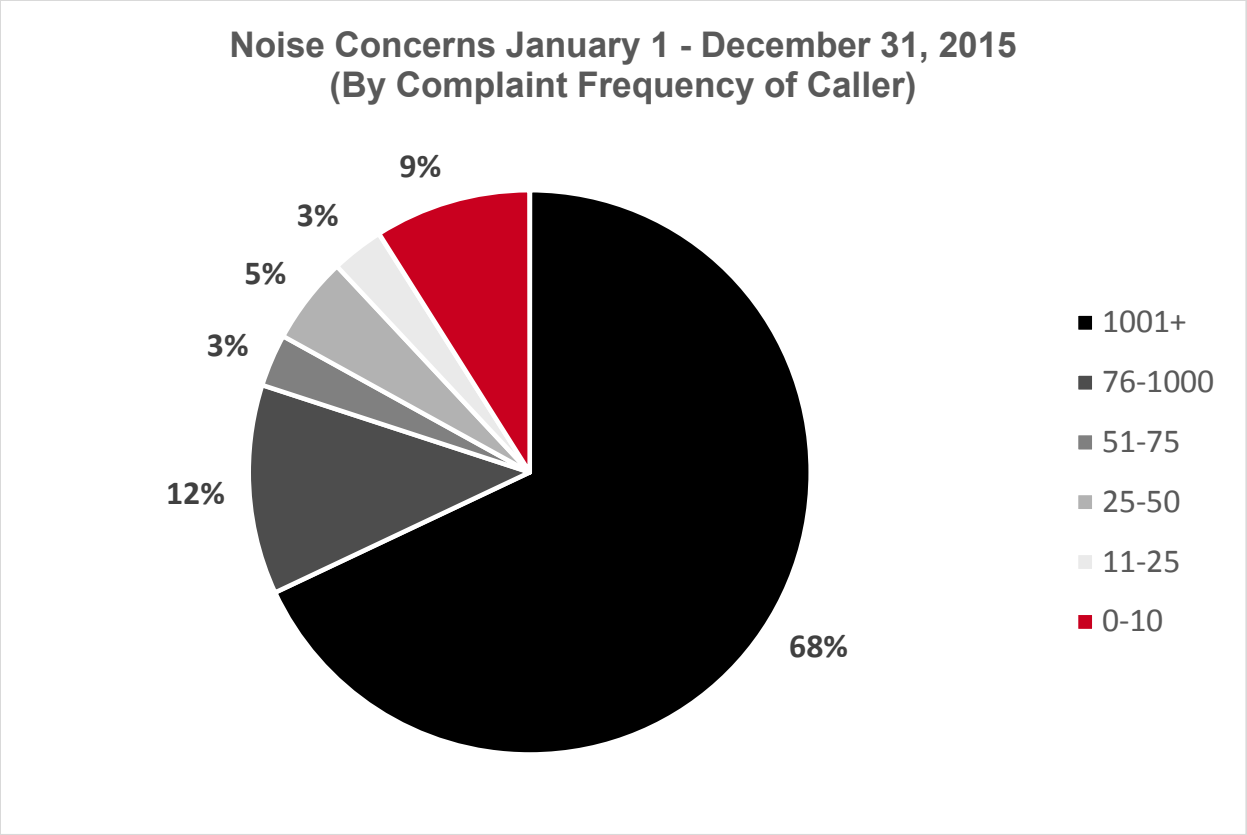

Figure 11 - Complaint Frequency of Caller 2015

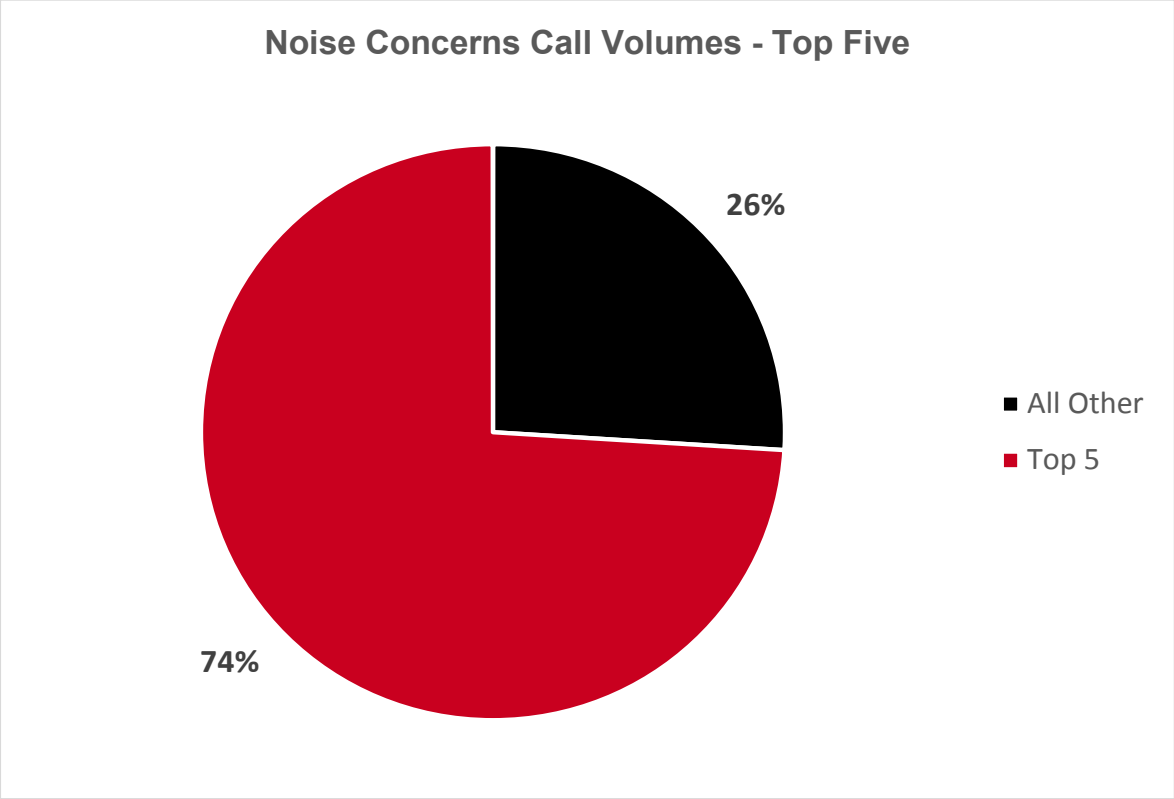

Figure 12 - Breakdown of top five noise concern volumes

As illustrated in Figure 12, analysis of the complaints data reveals that five people make up the majority of the total number of complaints received.

4.2 Aircraft Concern Email/Phone Line Process

YYC takes all concerns received seriously and ensures that all calls and emails are logged in our database. Many of the concerns received are unspecified comments about aircraft noise which are logged in the database as a general concern. All inquiries about specific aircraft operations that require further information or follow up are returned, and the team's average response time is usually within three working days.

4.3 Noise Concern Numbers by Area

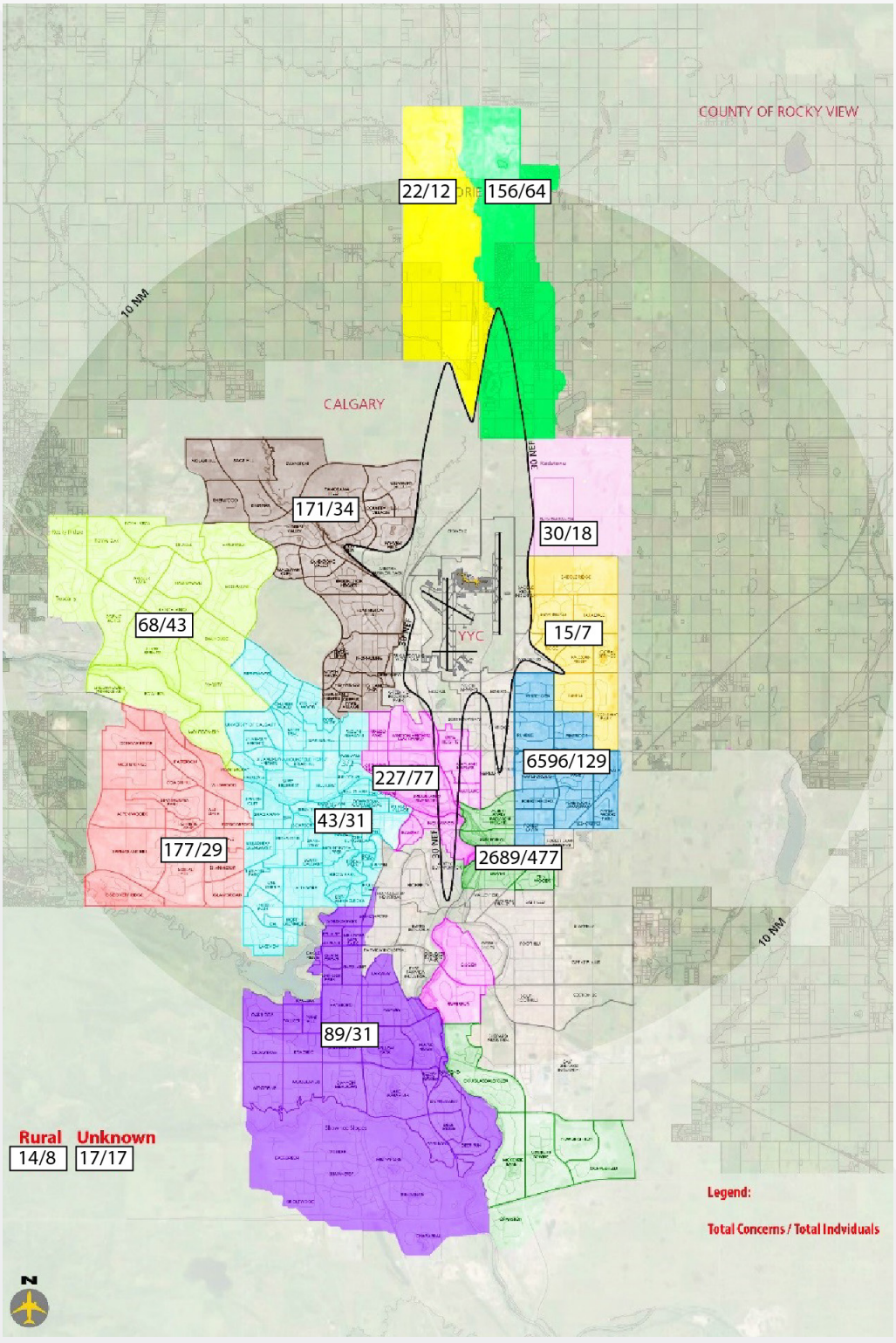

Figure 13 - Distribution of complaints across the city (January-December, 2015)

4.4 Investigation & Response of Noise Concerns

Investigation and response to concerns often involves verifying information with Air Traffic Controllers (NAV CANADA) and the aircraft operator. If the Authority suspects that any operational restrictions, including the Noise Abatement Procedures, have been infringed, the Authority immediately contacts the airline operator for information. Where it appears that the aircraft operation in question may not comply with aviation regulations, the Authority will contact Transport Canada, who will then undertake an investigation. If the investigation determines that a violation occurred, Transport Canada may impose a penalty on the aircraft operator.

5.0 NEXT STEPS

As Alberta's busiest airport, YYC is an important economic hub driving diversification and prosperity for the province. The Authority's mandate is to continue to build and develop YYC and its transportation network, ensuring Alberta's tourism and business gateway to the world is well positioned to continue to be the platform for a healthy economic future for our city, region and province.

YYC is an urban airport that connects Calgary and Alberta to the world. YYC offers travellers and businesses a choice of passenger and cargo airlines, ensuring the best available air service for our region and province.

YYC is a vital part of the Calgary economy, creating:

24,000 on-airport jobs

48,000 jobs for the region

More than $8.28 billion in GDP

As an important part of the community, the Authority works closely with community associations, government agencies and airlines to address noise concerns. As an industry, balancing aircraft operations with community concerns without compromising the safety of aircraft, or the people that visit or work at YYC, is a priority.

In 2016, the Authority will be focusing on improving the efficiency of the management of noise concerns by streamlining systems for receiving and processing community concerns, as well as a review of YYC's noise monitoring program. There will be a number of noise monitoring studies conducted, as well as an evaluation of NMT locations in and around Calgary, the results of which will be published on www.yyc.com as well as in the 2016 Noise Report.

APPENDIX I

APPENDIX I

Regulations & Policies Pertaining to Noise at YYC

Aeronautics Act	Allows the Minister of Transport to regulate aviation in Canada
Noise Abatement Procedures (NAP)	Published in the Canada Air Pilot and intended for jet aircraft. The NAP specifies departure/arrival procedures, reverse thrust usage, preferential runway determination, altitude restrictions and the Vertical Noise Abatement Procedures (VNAP). The NAP are enforceable by Transport Canada Civil Aviation Enforcement. Each Canadian Airport has specific procedures. [CAR 602.105]
Vertical Noise Abatement Procedure (VNAP)	For jet aircraft takeoffs, the 'A' or 'B' procedures specify reduced engine power for noise mitigation at prescribed altitudes, consistent with flight safety requirements. The 'A' procedure results in lower noise close to the airfield (slower climb speed), while the 'B' procedure results in lower noise farther from the airfield (faster climb speed). [CAR 602.105]
Minimum Aircraft Altitudes	This regulation prescribes 1,000 feet as the minimum altitude that an aircraft may fly above a built-up area (500 feet over water) unless the aircraft is conducting a take-off, approach, or landing (other exemptions may apply). This regulation is enforceable by Transport Canada Civil Aviation Enforcement [CAR 602.14- CAR 602.16]
Airworthiness Standards (Chapter 516)- Aircraft Noise	The Canadian Standard prescribes the noise certification requirement for civil aircraft in Canada at time of manufacturing. The standard has adopted the noise classification of ICAO Annex 16, which identifies civil subsonic jet aircraft as either Chapter 2 hush-kitted (old technology and noisier) or Chapter 3 (new technology, quieter). Generally, all civil jet aircraft built after 1985 are Chapter 3. [CAR 516.01]
Federal Aviation Regulations Part 36	The U.S. counterparts of ICAO Annex 16, except classifications are given as Stage 2 and Stage 3. [CAR 602.150]
Canada Flight Supplement	Used as a reference for planning and safe operating procedures at Canadian Aerodromes. These supplements detail aerodrome/runway facilities, navigation aids, and hours of operations. All procedures are airport-specific.
VFR Terminal Area Chart	The charts prescribe VFR (visual flight rules) routes (generally for non-jet aircraft) in the airport control zones to facilitate clearances for air traffic control. These procedures are airport-specific.
Noise Mitigation Procedures: Aircraft Engine Run-ups	Distributed as a YYC Airside Operations Directive, it is applicable to all operators conducting maintenance engine run-ups for fixed or rotary wing aircraft. The procedures designate run-up locations, requires aircraft headings and permissible power settings based on the time of day.
RAC 4.1.2, Aeronautical Information Publication	Transport Canada recognizes the need for proper consultation and has instituted a procedure that will allow aircraft operators to challenge all proposed changes to noise rules at airports. This procedure requires airports to follow a checklist that involves consultation and general consensus amongst all aircraft operators before Transport Canada will publish new noise restrictions.
Canadian Aviation Regulation Advisory Council (CARAC)	Any new noise restrictions and procedures are also subject to new the review by CARAC in Ottawa. CARAC was established to renew Transport Canada Civil Aviation's approach to consultation and rule making and to improve the regulatory system.
Calgary International Airport Vicinity Protection Area (AVPA)	The AVPA regulation is used to manage land use and development around airports. • Ensures that only compatible land uses are located around the airport, thereby minimizing the adverse noise impact of airport operations on people in the surrounding communities; • Recognizes the significant value the airport adds to the air transport system and the provincial economy; • Helps ensure the long-term viability of the Calgary International Airport, which is integral to the continued growth and economic development of the surrounding communities and the province as a whole; and • Recognizes that development in the municipalities adjacent to the airport has to harmonize with airport operations.