Squamish Municipal Airport – Don Patrick Field

Strategic Plan

Interim Recommendations

Final Report | June 27, 2022

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Glossary of Acronyms

Acronym	Definition
ADS-B	Automatic Dependent Surveillance-Broadcast
AGN	Aircraft Group Number
ATF	Aerodrome Traffic Frequency
BCEHS	British Columbia Emergency Health Services
CAR	Canadian Aviation Regulation
CASARA	Civil Air Search and Rescue Association
CFS	Canada Flight Supplement
ECCC	Environment and Climate Change Canada
ICAO	International Civil Aviation Organization
IFP	Instrument Flight Procedure
NOTAM	Notice to Airmen
PEP Air	Provincial Emergency Program Air
STOL	Short Take-Off and Landing
TEAAM	Technical Evacuation Advanced Aero Medical Society
VFR	Visual Flight Rules
VTPC	VFR Terminal Procedures Chart

1 INTRODUCTION

Squamish Municipal Airport – Don Patrick Field (the "Airport") is owned and operated by the District of Squamish (the "District"). In December 2021, District Council approved the scope for the preparation of the Squamish Airport Strategic Plan (the "Strategic Plan"). HM Aero Aviation Consulting ("HM Aero") was subsequently retained by the District in March 2022 to prepare the Strategic Plan in alignment with Council's approved direction.

The scope outlined by the District for the Strategic Plan follows a four-phased approach:

1. Interim Recommendations Report;
2. Draft Strategic Plan;
3. Community Engagement; and
4. Final Strategic Plan.

The following document, referred to as the Interim Recommendations Report, has been prepared to address the first phase of the Strategic Plan – the preparation of interim recommendations for implementation in 2022 and 2023 to address priority items identified by the District and HM Aero. The objectives for the Interim Recommendations Report are as follows:

1. Articulate a clear and transparent profile of the Airport based on its current conditions, including its regulatory context; governance, administration, and operations; tenants; social and economic benefits; and financial performance.
2. Supported by a research and evidence-based approach, provide recommendations for areas of focus identified by the District including matters of aircraft noise; ambient air quality; apron operations; administration and operations; rules and regulations; and tenant lease rates; and
3. Combine all recommendations into a practical implementation strategy.

The action items identified through this report are recommendations that can be implemented within the funding approved through the District's 2022 budget, or that can be implemented in 2023 pending District Council's approval for additional funding.

Longer-term recommendations to be implemented in subsequent years (i.e., 2024 and onwards) will be articulated through the Draft and Final Strategic Plan. All recommendations made in the Interim Recommendations Report are subject to approval by District Council as the Airport's governing body.

2 AIRPORT PROFILE

The Airport Profile has been prepared to document the existing conditions of the Airport, identify the responsibilities and jurisdiction of the District as the facility's owner and operator, and articulate the economic and social benefits of the Airport.

2.1 Airport History

The initial concept to develop an airport in Squamish was spearheaded by a group of private individuals in the early 1960s. In 1967-1968, the newly formed Squamish Flying Club evaluated two potential locations for an airport in Squamish in cooperation with the Department of Transportation (now referred to as Transport Canada); this process resulted in the Airport's current location being chosen. In 1972, a 20-year lease agreement was signed between the District and Squamish Flying Club, with the latter organization to become the managing organization for the Airport. The construction of the initial gravel runway was completed in 1970, and federal grants were subsequently awarded in 1972 for its paving and repaving in 1979. Early users of the Airport included the Squamish Flying Club, who provided training as an approved Flight Training Unit. Other users included the Royal Canadian Air Cadets, Garibaldi Tours, Squamish Air Services, and Quasar Helicopters. The operational responsibility of the Airport was transferred from the Squamish Flying Club to the District in 1991 at the end of its lease agreement. The District maintains its status as the owner and operator of the Airport.

2.2 Regulatory Context

2.2.1 Sponsored Crown Grant

Squamish Airport was transferred to the District from the Province of British Columbia (the "Crown") through a Sponsored Crown Grant in 1973. Through the Sponsored Crown Grant disposition process, the use of the property is for a specified purpose through a reversionary clause within the Grant text and the use of restrictive covenants. The covenant applicable to the Airport requires that:

> *"…the site for the said airport, approved by the Minister[1], shall be set aside and maintained by the Corporation for the purpose of establishing a permanent public airport, and the Corporation shall not sell or convert the said site for any other purpose without first receiving the consent, in writing, of the Minister."*

Taken together, the Sponsored Crown Grant and the implementing covenant on title provide for the lands to be used for a public airport.

2.2.2 Federal Regulatory Requirements

The Airport is a registered aerodrome[2] and must be operated in compliance with Subpart 301.01 of the Canadian Aviation Regulations (CARs). The CARs impose limited obligations on registered aerodrome operators, and the regulatory environment is significantly less involved compared to certified airports. The provisions applicable to registered aerodrome operators articulated in Subpart 301 are summarized as follows[3]:

[1] In this instance, referring to the federal Minister of Transport.
[2] The Canadian Aviation Regulations include provisions for registered aerodromes and certified airports ("airports"). Despite its name, Squamish Airport is a registered aerodrome.
[3] The list provided is only a summary, and the Canadian Aviation Regulations may be amended. Please refer to the Canadian Aviation Regulations for current applicable provisions.

- **301.02 – Inspection:** Permitting access by Transport Canada to inspect the facility;
- **301.03 – Registration:** Ensuring that the Canada Flight Supplement (CFS) is maintained with current information regarding the Airport;
- **301.04 – Markers and Markings:** Marking unserviceable movement areas and closed runways and taxiways;
- **301.05 – Warning Notices:** Posting warning notices where low-flying or taxiing aircraft may cause a hazard to pedestrians and vehicles;
- **301.06 – Wind Direction Indicator:** Maintaining a minimum of one Wind Direction Indicator (windsock);
- **301.07 – Lighting:** Not applicable;
- **301.08 – Prohibitions:** The operator is to ensure that compliance with a number of prohibitions, including limiting the obstruction of the movement area, preventing the removal or defacement of markers and markings, preventing birds or animals from being unrestrained at the facility, and discharging firearms; and
- **301.09 – Fire Prevention:** Limiting smoking and open flames on aprons or where a hazard would be posed that would endanger persons or property.

2.2.3 Federal and Municipal Jurisdictional Matters[4]

Note: *The following discussion is provided by HM Aero based on our understanding of jurisdictional matters related to aviation and shall not be considered as a professional legal opinion. The intent of the content provided herein is to identify factors that may affect the District's administration of the Airport and the options that can be pursued through the Interim Recommendations Report.*

The law concerning jurisdiction over matters related to aviation is complex and beyond the scope of this document to comprehensively review. A series of court decisions have established that the federal government has exclusive jurisdiction over aeronautics. The federal jurisdiction arises from the authority of the federal government to make laws pertaining to "peace, order, and good government" under Section 91 of the *Constitution Act, 1867*. Therefore, the jurisdiction of the federal government over aeronautics is based on interpretations of Section 91.

Two legal doctrines that have been applied by the courts to determine the relationship between federal and provincial / municipal laws are:

1. **Interjurisdictional Immunity:** Federal competencies are protected from provincial, regional, and municipal legislation in instances where such legislation impairs the core of a matter that is subject to federal jurisdiction, and vice versa; and
2. **Paramountcy:** if otherwise valid provincial or municipal legislation is inconsistent with federal legislation, the provincial or municipal enactment is inoperative to the extent of the inconsistency.

[4] Please note that the information provided in the following section and other sections of the report is based on guidance offered by external legal counsel and research of existing sources. This section should not be construed as offering legal advice and is provided for information purposes solely.

However, the jurisprudence in this area continues to evolve and the manner in which these doctrines are applied will vary with the facts of a case. In instances where municipalities own and operate aerodromes, control is commonly exercised in ways that include, but that are not limited to:

- Operating airports and aerodromes, including decisions regarding the initiation of infrastructure projects and strategic directions;
- Establishing the level of service (ground operations) provided at an airport;
- Setting rates and fees for the use of the airport and aeronautical services provided by the municipality;
- Serving as the landlord for lease agreements; and
- Establishing voluntary procedures for pilots.

However, matters that would ordinarily be within the jurisdiction of a local government, such as the application of the provincial Building Code and the regulation of land use through zoning bylaws, have tended to be limited by the courts in the case of aerodromes.

2.2.4 Noise and Air Quality

One area of interest is how to address noise and air quality impacts of aircraft.

Aircraft Noise

Transport Canada recognizes that noise from aircraft may be a concern for communities near airports, and Health Canada has indicated that aircraft noise can induce a short-term and / or chronic human stress response. The federal Aeronautics Act (R.S.C., 1985) states in Section 4.9(f) that the Governor in Council may make regulations respecting *"noise emanating from aerodromes and aircraft."*

Transport Canada's role in addressing aircraft and airport noise generally includes the following:

1. **Aircraft Source Noise:** Transport Canada is responsible for the certification of new aircraft prior to their entry into service in Canada. At the time of certification, testing will occur against the noise emission standards that are applicable at that time. Generally, newer aircraft are subject to more stringent noise standards at the time of certification as Transport Canada adopts increasingly restrictive limits over time. Aircraft certified under historical noise standards continue to be permitted to operate unless regulations to the contrary are established – i.e., aircraft are "grandfathered".
2. **Land Use Planning:** Transport Canada uses the Noise Exposure Forecast System to guide proactive land use planning (i.e., the separation of sensitive uses from airports) through the prediction of subjective levels of community response to aircraft noise.
3. **Mandatory Noise Abatement:** Mandatory noise abatement procedures enacted per the authority of the CARs provide that no person shall operate an aircraft at or in the vicinity of an aerodrome except in accordance with applicable noise abatement procedures and noise control requirements specified by the Minister. Transport Canada is responsible for investigating instances of alleged noncompliance with mandatory noise abatement procedures. Where a non-compliance has been identified, Transport Canada may choose to investigate and / or penalize the operator. However, Transport Canada will not investigate alleged non-compliances with voluntary procedures. Squamish Airport only has voluntary noise mitigation procedures and no mandatory procedures have been approved by Transport Canada.
4. **Guidance:** Transport Canada provides guidance materials on noise-related initiatives that may be undertaken by airport operators, such as the establishment of noise management committees.

Transport Canada does not publish regulatory standards for maximum noise levels near airports (e.g., decibel limits or maximum exposure durations). It is noted that other federal and provincial agencies may provide guidance on noise within their respective mandates, with examples including:

- Health Canada advises Transport Canada on the health effects of noise. Health Canada does not regulate or enforce aircraft noise;
- The Canada Labour Code and Canada Occupational Safety and Health Regulations establish limits for occupational noise exposure; and
- The Worker's Compensation Act and Occupational Health and Safety Regulations address occupational limits for noise exposure.

Detailed commentary on recommendations pertaining to aircraft noise is provided in Section 3.

Ambient Air Quality

Health Canada recognizes that outdoor air pollution can have various impacts on human health, and it is understood that aircraft emissions can affect air quality. Examples of air pollutants or chemicals of concern that may be found at or near airports include particulate matter, airborne lead, and combustion by-products (nitrogen dioxide).

As with the evaluation of noise against applicable standards for new aircraft at the time of certification, Transport Canada has adopted engine emission standards established by the International Civil Aviation Organization for smoke, gaseous emissions, and non-volatile particulate matter. These standards apply to new certification requests, and older aircraft already certified and in operation are grandfathered.

With respect to regulations concerning ambient air quality near airports:

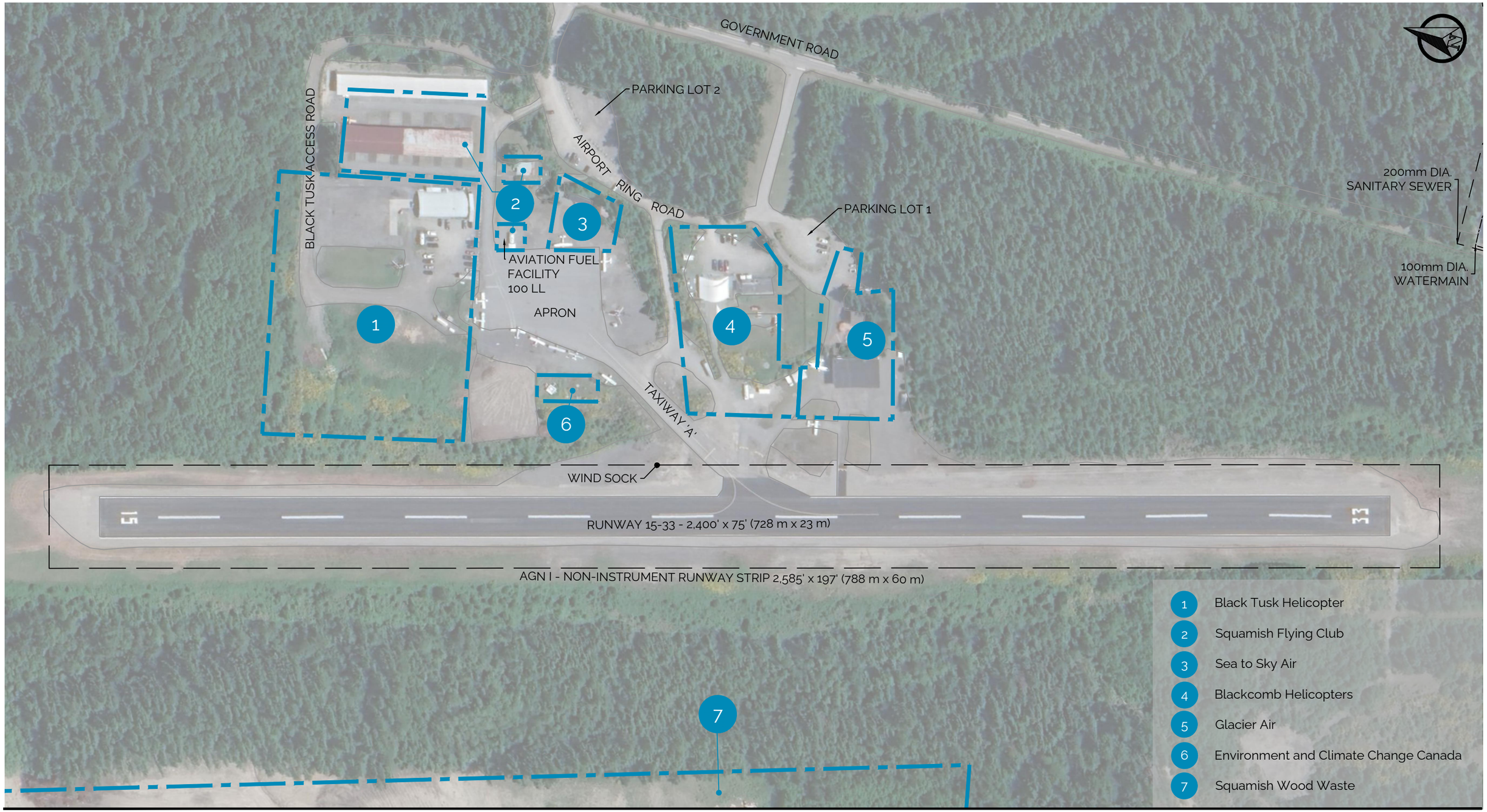
- Transport Canada has not established binding regulations pertaining to ambient air quality levels for the areas surrounding airports;
- The Canadian Ambient Air Quality Standards are air quality objectives for air pollutants that include nitrogen dioxide, sulphur dioxide, fine particulate matter, and ozone. The Canadian Ambient Air Quality Standards are not binding in nature and are intended to be used to track progress towards air quality objectives; and
- The Province of British Columbia has established non-statutory Air Quality Objectives in relation to atmospheric contaminants. These objectives are not mandatory but are used to guide decision-making on new or modified facilities, develop long-term air quality strategies and regulations, and assess air quality levels.

Therefore, the Canadian Ambient Air Quality Standards and the Province's Air Quality Objectives may be used as tools to assess ambient air quality near airports and inform decision-makers about the impact of aircraft operations.

2.3 Infrastructure

The Airport's current site plan is presented in Figure 2.1.

As a registered aerodrome, the Airport's infrastructure is not required to be designed in accordance with the provisions applicable to certified facilities through TP312 – Aerodrome Standards and Recommended Practices. TP312 5th Edition adopts a performance-based approach to infrastructure standards, whereby requirements are identified based on categories of aircraft size and performance referred to as Aircraft Group Numbers (AGN). Airfield infrastructure requirements also consider the airport's Instrument Flight Procedure (IFP) level of service, with three categories established: Non-Instrument, Non-Precision, and Precision. Although the Airport is not required to comply with the provisions of TP312, doing so is advisable when reasonable to ensure appropriate safety measures can be applied – accordingly, TP312 is used herein to evaluate each airfield infrastructure element. Based on HM Aero's understanding of the aircraft types that regularly operate at the Airport and the lack of Instrument Flight Procedures, the airfield is currently classified as an AGN I – Non-Instrument environment for assessment purposes.



SQUAMISH MUNICIPAL AIRPORT STRATEGIC PLAN

FIGURE 2.1 - AIRPORT SITE PLAN

JUNE 2022

0 100 200 Meters

*FOR PLANNING PURPOSES ONLY

2.3.1 Airfield Infrastructure

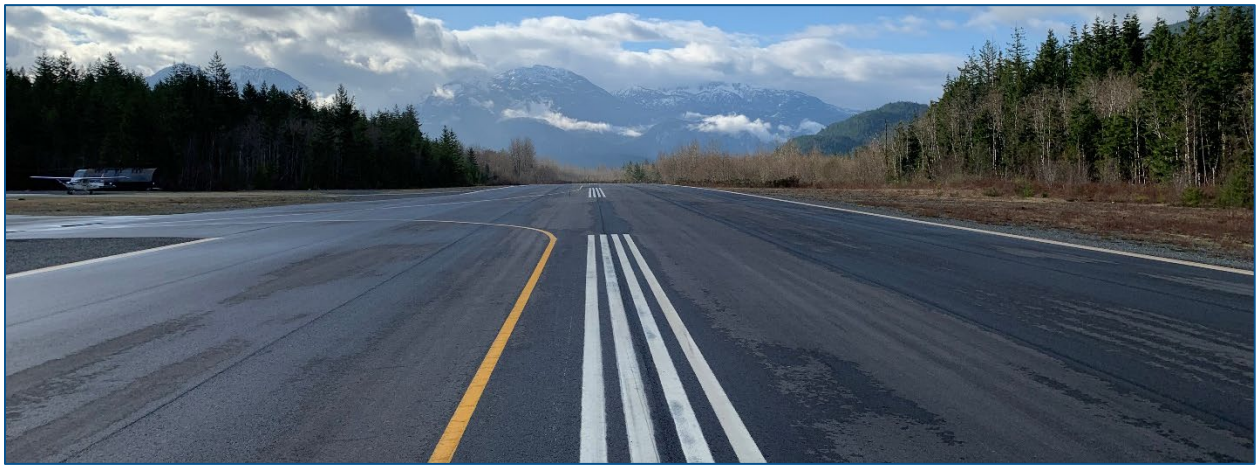
Runway 15-33

Runway 15-33 is a 2,400 ft. x 75 ft. (732 m x 23 m) paved facility that is used for fixed-wing and rotary-wing arrivals and departures. Runway 15-33 was rehabilitated in 2021 through funding provided by the British Columbia Air Access Program and was observed to be in very good condition by HM Aero in March 2022. Based on TP312 5th Edition, the width of Runway 15-33 permits operations by fixed-wing aircraft with outer main gear wheel spans of up to 6.0 m. This is adequate for the full range of single and twin-engine aircraft that typically operate at the Airport.

The length of Runway 15-33 (2,400 ft.) limits operations to fixed-wing general aviation and utility aircraft that can safely depart and arrive based on their required Take-Off Distance Available and Landing Distance Available, respectively. Fixed-wing aircraft takeoff and landing performance requirements that dictate runway length needs are influenced by numerous interrelated factors, including but not limited to the:

- Skill of each pilot;
- Wind speeds and directions;
- Temperature and density altitude;
- Runway surface condition and contaminants (e.g., snow or water);
- Aircraft weight;
- Power settings used and performance profile chosen (e.g., short field vs. normal takeoffs); and
- Runway slope.

Accordingly, the primary fixed-wing users of Runway 15-33 are AGN I private, commercial / charter, and flight training single-engine aircraft, such as the Cessna 152, Cessna 172, Cessna 206, Cessna 208, Piper PA-28, Beechcraft Bonanza, and Mooney M20. Occasional operations by larger aircraft are understood to have occurred historically, including the Douglas DC-3 and De Havilland Canada DHC-5 Buffalo (CC-115 Buffalo). Larger users that have operated at the Airport are generally limited to aircraft with Short Take-Off and Landing (STOL) capabilities and may have had to operate at reduced weights. While the current length of Runway 15-33 restricts the types of aircraft that can operate at the Airport, the facility is adequate for the current types of single and twin-engine general aviation-sized aircraft operations. Rotary-wing aircraft operate at the Airport without runway length restrictions related to takeoff and landing performance.



Runway 15-33 at the intersection with Taxiway A

Taxiways

Taxiway A is a 9 m (30 ft.) wide paved facility that connects the apron with Runway 15-33. Taxiway A was rehabilitated in 2015 through funding provided by the British Columbia Air Access Program and was observed to be in very good condition in March 2022. The width of Taxiway A meets the TP312 standards for aircraft with a maximum outer main gear wheel span of up to 4.5 m and is adequate for the regular users requiring access to the apron.

TP312 stipulates that a protected obstacle-free area measuring 15.5 m from the taxiway centreline is to be provided for AGN I taxiways (the taxiway strip). The perimeter fence of the Environment and Climate Change Canada (ECCC) observation station currently penetrates the taxiway strip by approximately 3 m, and any aircraft parked along the northern edge of Taxiway A also infringe on this protected area. Given the operations on Taxiway A by larger aircraft such as the Sikorsky S-76 air ambulance platform, the recommended apron management plan (Section 5) removes aircraft parking in this area to better protect the taxiway environment.

Secondary taxiways connect the Squamish Flying Club hangars with the apron, Blackcomb Helicopters' fuelling area with Runway 15-33, and Glacier Air's apron with Runway 15-33. These taxiways were rehabilitated in 2015 and range in width between 4 m and 5 m. While these facilities are substandard relative to the minimum width and taxiway strip provisions of TP312, they are currently adequate for regular operations by their intended users. Opportunities for taxiway improvements are not identified through the Interim Recommendations Report.

Apron

The aircraft parking apron consists of a 70 m x 50 m paved area, 50 m x 40 m gravel area to the west, and additional gravel areas adjacent to the south and west. The apron was rehabilitated in 2015 and was observed to be in very good condition in March 2022. Detailed commentary on the existing utilization of the apron and recommended short-term improvements is provided in Section 5.

Taxiway A (left) and Apron (right)

Visual Navigation Aids

A Wind Direction Indicator of a conspicuous size and colour is located at the intersection of Runway 15-33 and Taxiway A in compliance with the Airport's obligations per the CARs.

Three signs have been installed on the airfield, including a mandatory instruction sign at the Taxiway A holding position and noise mitigation information signs installed adjacent to Taxiway A and the Runway 15 threshold. All sign faces were observed to be conspicuous, readable, and sufficient for their intended purpose. However, each sign was observed to be mounted on steel posts in concrete bases. TP312 requires that airside signs be mounted on frangible couplings, meaning that the sign will break flush with grade upon impact to limit aircraft damage. While the Airport is not required to be compliant with TP312, the proximity of these signs to Runway 15-33 and their non-frangible construction present an increased hazard to aircraft during runway excursions. Their replacement with frangible units is recommended in the short-term, as described in Section 10.4.

Lighting is not provided to support aircraft operations during hours of darkness, with the exception of rotary-wing aircraft equipped with night vision technology and operated by appropriately trained crews (e.g., British Columbia Emergency Health Services).

Mandatory instruction sign and Wind Direction Indicator (left) and Runway 15 noise mitigation information sign (right)

2.3.2 Aviation Support Services

Aircraft Fuelling Facilities

The District does not own or operate aircraft fuelling facilities. Four tenants of the Airport operate fuel systems on an independent basis:

- The Squamish Flying Club maintains an above-ground 100 Low Lead ("avgas") self-service fuelling facility adjacent to the apron, which is available 24 hours per day through a payment kiosk collocated with their clubhouse;
- Glacier Air operates an above-ground avgas facility for use by its fleet;
- Blackcomb Helicopters maintains above-ground Jet A ("jet fuel") fuel facilities for its fleet, and also sells jet fuel to itinerant operators; and
- Black Tusk Helicopter operates above-ground jet fuel facilities.

Terminal Building

Currently, there is no terminal building provided for the use of itinerant pilots and aircraft operators that do not maintain facilities on private leasehold lots. The Squamish Flying Club's clubhouse near the apron and avgas fuel facility historically has served as an unofficial terminal building. However, the availability of this facility is at the discretion of the Squamish Flying Club, and unrestricted access to the general public was withdrawn in 2022 due to the mistreatment of the facility by some aircraft operators. The Squamish Flying Club is not obligated to make its clubhouse for use by the public, and the decision to do so in the future rests with the organization.

Meteorological Observation and Reporting

NAV CANADA does not maintain meteorological observation / reporting infrastructure at the Airport, such as an Automated Weather Observation System or Limited Weather Information System. The ECCC weather observation site is not a listed resource in the CFS and is not published through the NAV CANADA Aviation Weather Web Site, although data from this station is issued through third-party aviation programs such as ForeFlight.

Communications

Squamish Airport is an uncontrolled facility, and NAV CANADA does not maintain an Air Traffic Control Tower, Flight Service Station, or other similar facilities at the Airport. Aircraft are responsible for communicating their intentions and coordinating with other operators to ensure safety. An Aerodrome Traffic Frequency (ATF) is established through the CFS for use by aircraft operating at, and in the vicinity of, the Airport.

The District, tenants and businesses, and aircraft operators do not have the authority to issue instructions or clearances to aircraft operating at the Airport. While information can be provided between pilots on the ATF to support safe operations, pilots ultimately have decision-making authority to ensure the safety of their flight.

Aircraft Storage Facilities

The District is not involved in maintaining hangars for use by itinerant or based aircraft. The Squamish Flying Club maintains two hangars with a combined total of 19 bays for long-term rent; as of April 2022, all hangar bays were fully occupied, and demand for space was noted to be high. Glacier Air, Blackcomb Helicopters, and Black Tusk Helicopter each maintain hangar facilities on their leasehold lots for their aircraft fleets.

Aircraft Support Businesses

There are no businesses located at the Airport that provide support services to aircraft operators, such as Aircraft Maintenance Organizations or Fixed-Base Operators. Apart from businesses with in-house maintenance teams (e.g., Black Tusk Helicopter), aircraft based at the Airport requiring maintenance must be flown to other airports in the region with Aircraft Maintenance Organizations.

Instrument Flight Procedures

Instrument Flight Procedures are not published to support arrivals and departures during Instrument Meteorological Conditions. Aircraft operating at the Airport do so under Visual Flight Rules only, meaning that minimum visibility and cloud conditions must be met (Visual Meteorological Conditions), and pilots are able to operate with visual reference to the surface.

2.3.3 Groundside Infrastructure

Groundside Access Roads

The Airport Ring Road is a two-way access road that connects with Government Road at two unsignalized intersections. The Airport Ring Road is the sole groundside access from Government Road and was observed to be in poor to fair condition in March 2022, with alligator and transverse cracking along its paved portions, and potholes and irregularities along its gravel portion.

Two gravel access roads are provided from the Airport Ring Road to the airfield for use by ambulances, maintenance vehicles, and tenants. The accesses are located adjacent to the Squamish Flying Club and Blackcomb Helicopters leaseholds and are reportedly acceptable for their intended users.

A gravel access road extends from the Airport Ring Road to the Black Tusk Helicopter leasehold lot, referred to as the Black Tusk Access Road. This roadway was observed to be in poor to fair condition.

Parking Lots (1 and 2)

In addition to the vehicle parking areas designated for the sole use of tenants within their respective leasehold lots, two parking areas are provided for use by the general public. Parking Lot 1 is located adjacent to the Glacier Air and Blackcomb Helicopters leasehold lots, while Parking Lot 2 is adjacent to the Squamish Flying Club and Sea to Sky Air facilities. Both parking lots are gravel surfaced and were observed to be in fair condition.

2.3.4 Servicing and Utilities

The District's potable water network does not extend to the Airport, and the five tenants with water needs rely on private wells. The nearest watermain is a 100 mm line that extends from Squamish Valley Road to the Mount Garibaldi Cemetery, terminating approximately 500 m to 700 m south of the core Airport area when measured along Government Road. An additional potable watermain runs along Ross Road to its intersection with Government Road, located approximately 900 m to 1,100 m south of the Airport when measured along Government Road.

Sanitary sewer services are not available at the Airport, with the septic needs of each tenant met through private sanitary drainfields. The nearest sanitary main is a 200 mm line collocated with the watermain described above, with its closest connection point located at the Mount Garibaldi Cemetery.

Electrical services are provided by BC Hydro through their transmission lines located along Government Road. All tenants are supported by BC Hydro services, although consultations suggest that the existing transformer is at capacity.

The servicing needs of the Airport will be examined in detail through future phases of the Strategic Plan.

2.4 Governance, Administration, and Operations

2.4.1 Governance

The Airport is owned by the District and is governed by Squamish District Council. In the context of this report, governance encompasses how decisions pertaining to the Airport's strategic direction are made, including its funding, objectives and goals, and the actions to be implemented by District Staff at the administrative and operational levels. The governing body is the forum for the consideration of a full range of inputs on each Airport decision, including feedback from the residents of Squamish to whom District Council is accountable.

Recommendations are raised by District Staff to Council for their decision, including but not limited to:

- Annual capital and operating budget requests;
- Lease agreements for approval or termination;
- Scopes of work for contracted services and procurement projects; and
- Action to be taken on various Airport initiatives (e.g., noise management).

The governance of the Airport by District Council is the predominant model among municipally owned airports across Canada – similar to how Council exercises its decision-making authority over other municipal services.

2.4.2 Administration

The administration of the Airport is the responsibility of Real Estate Services under the Corporate Services Department. Governance directions from District Council are received through the Chief Administrative Officer and General Manager of Corporate Services for implementation by the Manager of Real Estate and their team (Portfolio Administrator and Real Estate Coordinator). The Manager of Real Estate and their team together function as the Airport Manager, although no such position is formally designated within the municipality, nor are typical Airport Manager duties or expectations documented. The administrative oversight of the Airport generally occurs on an as-required basis when sufficient residual District Staff capacity exists.

Commentary on recommended short-term administrative changes is provided in Section 6.

2.4.3 Operations

The District's Engineering and Public Works Division under the Community Planning & Infrastructure Department is responsible for operational and maintenance tasks associated with the Airport on an as-assigned basis. Airport-specific positions are not allocated within the Engineering and Public Works Division, and resources are assigned based on the identification of required tasks, the availability of staff and equipment, and the Division's other responsibilities and priorities. No documented operational or maintenance procedures have been established for the Airport, nor are there processes in place for regular proactive inspections. Examples of tasks completed by the Engineering and Public Works Division on an as-requested basis include:

- Snow clearing and winter maintenance;
- Maintenance tasks, such as the installation of signage; and
- Vegetation management.

Commentary on recommended short-term operational changes is provided in Section 6.

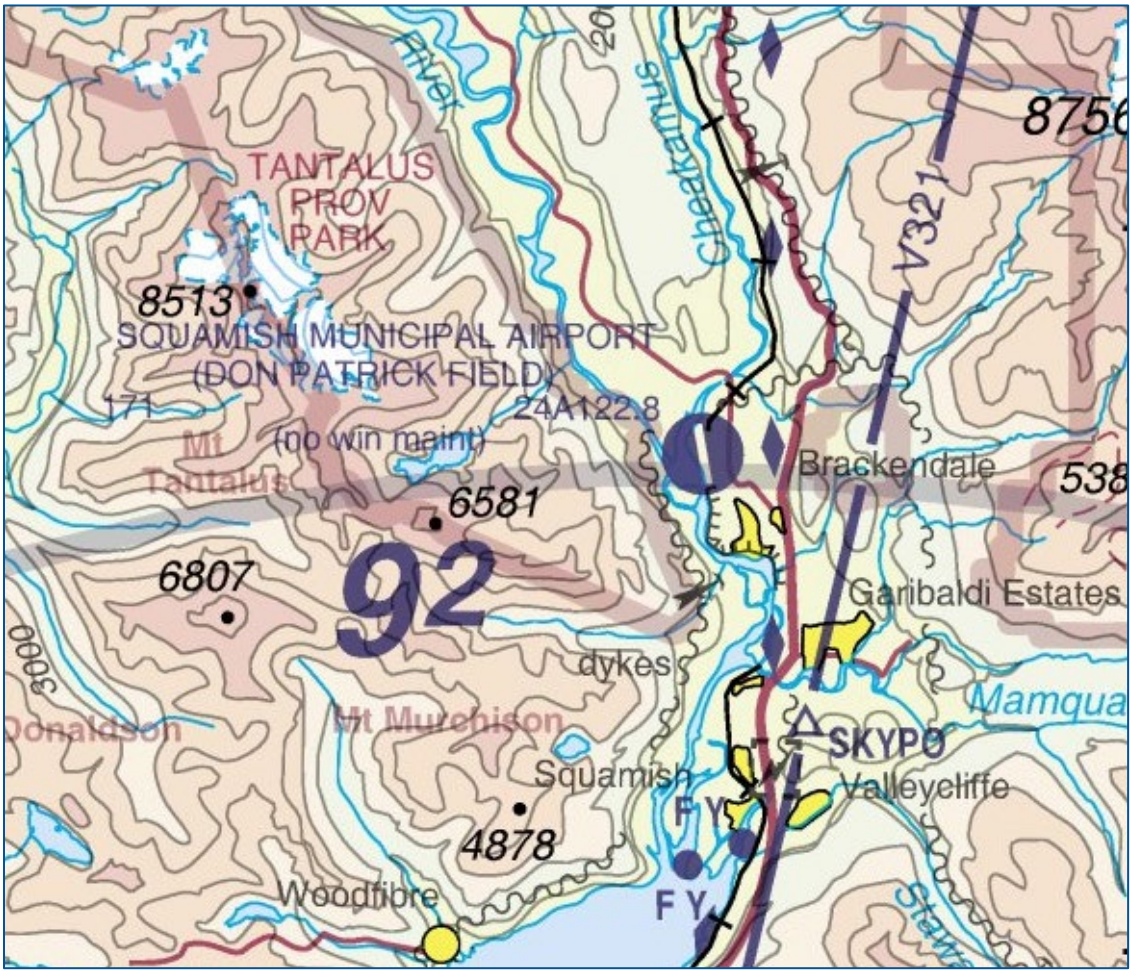
2.5 Air Navigation System Context

2.5.1 Provincial Air Navigation System

Squamish Airport is located along a Visual Flight Rules (VFR) navigation route that follows Highway 99 from the numerous airports in the Lower Mainland to Whistler, Pemberton, Lillooet, and onwards into British Columbia. VFR navigation routes are designated in the mountainous regions of British Columbia to assist pilots with choosing safe paths through hazardous terrain environments. Flying while VFR in mountainous areas, such as in the vicinity of Squamish, is complicated by factors that include rapidly changing meteorological conditions that can limit visibility and obscure terrain, as well as the reduced room for aircraft to safely maneuver.

Airports located along VFR navigation routes are used by pilots as both planned stops to refuel and evaluate the next phase of their flight, as well as emergency diversion points in the event of mechanical issues, fuel exhaustion, or inclement weather conditions. For an aircraft entering the Highway 99 VFR navigation route at Gambier Island, for example, the Airport is located approximately 20 nautical miles along their route. The next airport (Pemberton Airport) is located approximately 40 nautical miles further, with no alternative landing sites between Squamish and Pemberton. While a minimum network of airports within the VFR air navigation system has not been designated or mandated, the availability of the Airport for planned and unplanned stops enhances the safety for aircraft transiting the Highway 99 route.

Figure 2.2 - Highway 99 VFR Navigation Route (blue diamonds)



2.5.2 Local Air Navigation System

The Canada Flight Supplement is published by NAV CANADA on a 56-day cycle and includes a comprehensive directory of all registered aerodromes and certified airports, including information such as airfield diagrams, services available, and facility-specific procedures. Except where noted through a reference to an enabling section of the Canadian Aviation Regulations, airport information published in the CFS is for reference only and is not a regulatory standard. Reviewing the CFS prior to their flight assists pilots in their determination that the facility suitable for their intended operation and that the flight can be completed in accordance with applicable provisions of the Canadian Aviation Regulations.

The CFS entry for the Airport includes a diagram titled the Squamish VFR Terminal Procedures Chart (VTPC). The VTPC, shown in Figure 2.3, provides recommended flightpaths for aircraft operating under Visual Flight Rules (VFR) at the Airport – the VTPC is a set of guidelines as opposed to a set of regulatory standards enforceable pursuant to the Canadian Aviation Regulations. The intent of the VTPC, as will be explored in Section 3, is to route aircraft in a manner that will reduce overflights to noise sensitive residential areas.

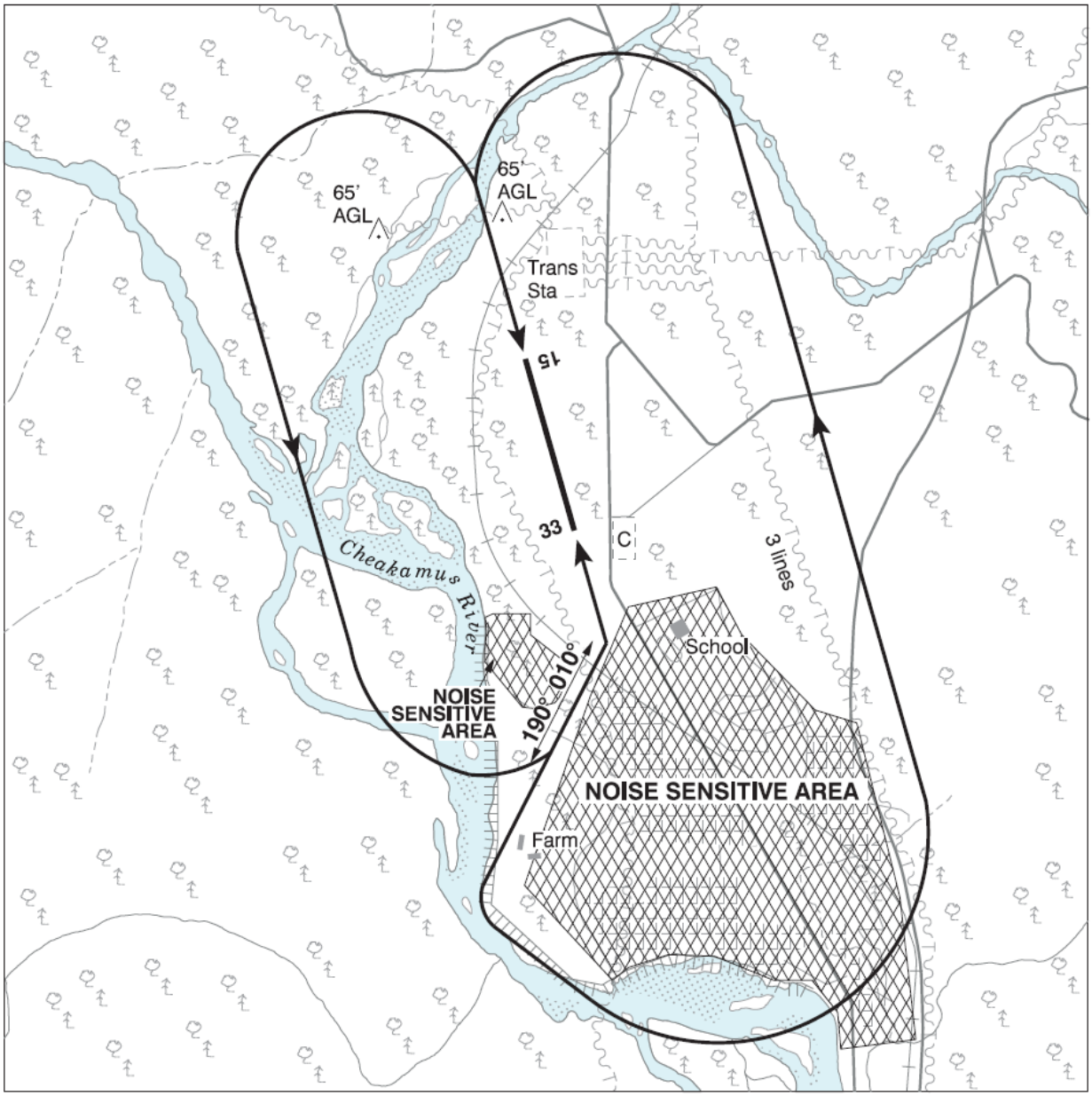
Where possible, pilots should endeavour to follow the flightpaths shown in the VTPC. However, pilots may deviate to avoid a collision, conform to or avoid the pattern of traffic formed by other aircraft, or otherwise to ensure the safety of aircraft operations (e.g., to avoid a bird strike). Pilots are trained in their decision-making process to follow a three-step prioritization:

1. Aviate – Pilots are first and foremost to ensure that their airspeed, altitude, and attitude is safe for the stage of flight that they are at, and that safe aircraft operations can be ensured;
2. Navigate – Once safe flight operations are assured, pilots are to navigate along their intended route using resources that are available; and
3. Communicate – Pilots are to broadcast their intentions and communicate with other aircraft and ground stations to ensure safe operations.

It is recognized that pilots early in their training with less experience often focus on ensuring safe flight operations (“aviate”) while they learn over time to implement all three priorities simultaneously. Therefore, the guidelines of the VTPC should be referred to by pilots to support effective navigation and in the case of the Airport, to avoid noise sensitive areas. However, ensuring safe flight operations must always take priority in the event of a conflict between safely flying the aircraft and navigating.

Figure 2.3 - Squamish Airport VFR Terminal Procedures Chart (CFS, Effective 19 May 2022 to 14 July 2022)

SQUAMISH VFR TERMINAL PROCEDURES CHART



PRO	Rwy 33 Dep: Preferred calm wind rwy when safe, due to noise sensitive areas. Rwy 33 Arr: Offset approaches. Avoid noise sensitive areas (see VTPC). Rwy 15 Dep: Initial climb on rwy hdg, when safe turn to aprx 190° to avoid noise sensitive areas. Climb at best rate, follow river SE (see VTPC).

2.6 Airport Tenants and Users

Six tenants are established at the Airport and are currently operating on month-to-month leases as summarized in Table 2.1. The operations of each tenant located at the Airport are described in the following sections, as well as commentary on the referendum on leaseholds that occurred in 2000.

Table 2.1 - Airport Businesses and Organizations

Tenant	Aircraft Type	Role	Workforce
Black Tusk Helicopter	Rotary-Wing	Aerial Logging Commercial Services Wildfire Suppression Aerial Tourism	25 – 30 (varies seasonally)
Blackcomb Helicopters / Signal Systems	Rotary-Wing	Utility Sector Support Aerial Tourism Commercial Services Wildfire Suppression Search and Rescue Communication and IT Services	4-5 Year-Round 16 Peak Season
Glacier Air	Fixed-Wing	Flight Training – Professional and Recreational Aerial Sightseeing Charter Services	8 Year-Round 9 Peak Season
Sea to Sky Air	Fixed-Wing	Aerial Sightseeing Charter Services Wildfire Detection	3 Year-Round 6 Peak Season
Squamish Flying Club	Fixed-Wing Rotary-Wing	Aircraft Hangarage Aviation Fuelling Aircraft Parking	0
Environment and Climate Change Canada	N/A	Meteorological Observation Site	0

Black Tusk Helicopter facilities

2.6.1 2000 Airport Referendum

Important context to the discussion of tenants at the Airport is provided through a non-binding municipal referendum that occurred in 2000 (the "Airport Referendum"). In response to widespread public discourse regarding the Airport, partially as a result of the proposed air service plans considered in the 1990s, District Council deemed it advisable to determine the opinion of the electors of the District about the use of the Airport. Pursuant to the District of Squamish Community Airport Referendum Bylaw (No. 1618, 2000), the following question was posed:

> *"Do you support a community airport focussed on servicing the community of Squamish with a maximum of ten (10) leases for airport related businesses with no night flights?"*

The Airport Referendum was held on October 14, 2000; voters answered "YES" with 25% of eligible voters turning out to cast their ballot. As noted above, the Airport Referendum was non-binding in nature. However, the question posed provides useful insights into the perspectives of voters in 2000, and night operations or more than 10 leases have not been considered by the District since the Airport Referendum.

2.6.2 Black Tusk Helicopter Inc.

Black Tusk Helicopter is a multiservice commercial helicopter operator headquartered at the Airport. Black Tusk Helicopter provides a wide range of services using its fleet of 8 helicopters based at the Airport (Kaman K-1200, Aerospatiale AS350, Bell 206, and Bell 214), including but not limited to:

- Outdoor recreation and tourism, including heliskiing, helibiking, sightseeing, backcountry and glacier access, and weddings / engagements;
- Aerial logging;
- Aerial construction and site air support;
- Wildfire suppression; and
- Charter flights.

Of the sectors described above, aerial logging, wildfire suppression, and aerial tourism / recreation are the three segments that comprise the majority of Black Tusk Helicopter's operations in a typical year.

Black Tusk Helicopter maintains three separate facilities in Squamish, including its primary aerial base at the Airport, off-site engine overhaul facility, and off-site structural / component overhaul facility. The company's presence at the Airport includes a hangar and supporting office area, jet fuel facilities, aircraft parking apron, and vehicle parking areas. The addition of a second temporary hangar is planned for 2022. Black Tusk Helicopter currently employs between 25 and 30 individuals, with approximately two thirds of their workforce residing in Squamish.

2.6.3 Blackcomb Helicopters / Signal Systems

Blackcomb Helicopters

Blackcomb Helicopters is a commercial helicopter service provider that is headquartered in Whistler with operational bases in Squamish, Lillooet, Sechelt, Pemberton, Vancouver, and Terrace. The Airport is Blackcomb Helicopters' local base, with infrastructure on-site including an office building, hangar, jet fuel facility, aircraft parking areas, and vehicle parking. Blackcomb Helicopters operates a fleet of 22 helicopters across its various bases, including the Bell 206, 212, and 407; Eurocopter EC130 and EC135; and Aerospatiale AS350 and AS355.

The size of Blackcomb Helicopters' Squamish base varies throughout the year based on operational priorities, and typically ranges between 2 aircraft and 3-4 employees in the off-peak season and 7 aircraft and 15 employees in the peak season. A total of 12 employees currently reside in Squamish, with additional employees staying in hotels in Squamish during peak operations. Blackcomb Helicopters provides a wide range of mountain access services from its Squamish base, including but not limited to:

- Outdoor recreation and tourism, including sightseeing, heliskiing, heli-fishing, and weddings;
- Charter flights;
- Utility support, including crew moves and powerline maintenance and patrols;
- Support to the film industry;
- Environmental and wildlife services, including wildlife surveys;
- Wildfire suppression; and
- Search and Rescue assistance to Squamish Search and Rescue and Technical Evacuation Advanced Aero Medical Society.

Among the business lines described above, Blackcomb Helicopters' Squamish base is predominantly involved in supporting the utility sector (approximately 70% of its operations) and tourism activities (approximately 25% of its operations).

With respect to Search and Rescue, Blackcomb Helicopters provides all rotary-wing transportation to Squamish Search and Rescue, including human external loads. Blackcomb Helicopters provides approximately 200 hours of training services to Squamish Search and Rescue annually, including helicopter safety, hover exits, longline transportation, and hoists. Blackcomb Helicopters also supports the Technical Evacuation Advanced Aero Medical Society as the organization's rotary-wing transportation provider, including associated training.

Signal Systems

Signal Systems is collocated with Blackcomb Helicopters on the same leasehold lot at the Airport and is owned by the same parent company (Mclean Group). Signal Systems provides communication and Information Technology services to support the film industry and a wide range of other public and private customers. At its Squamish office, this includes two-way handheld and vehicle radio sales, programming, installation, and repairs; remote repeater design and installation services; and radio over internet communication networks. Signal Systems also maintains a radio repeater station at the Airport for use by Lions Bay Search and Rescue. Signal Systems employs one individual at its Squamish office.

Blackcomb Helicopters

2.6.4 Glacier Air

Glacier Air is a Transport Canada-approved Flight Training Unit, aerial work / air taxi provider, and a registered institution with the Private Training Institution Branch of the Ministry of Advanced Education and Skills Training. The company has been operating since 1974 and has been under its current ownership since 2002. Glacier Air maintains a fleet of 6 aircraft that are based at the Airport, including 2 Cessna 172s, 1 Cessna 152, 1 Cessna 206, 1 American Champion Decathalon, and 1 American Champion Citabria. Through their fleet of aircraft, Glacier Air operates between 2,000 and 2,400 flight hours per year. Glacier Air's operations at the Airport are supported by a two-storey integrated aircraft hangar and administrative space, aircraft apron, above-ground fuel storage facility, and a second two-storey structure. Glacier Air employs 4 year-round full-time Certified Flight Instructors, 3 part-time year-round administrative staff, and the president / Chief Flight Instructor.

Flight training comprises approximately 60% of Glacier Air's operations. As of March 2022, Glacier Air has between 50 and 60 active students with a waitlist of approximately 100 students, all located in the area between the North Shore and Pemberton. In the past 20 years, approximately 240 students have undergone training at Glacier Air. Approximately 40% of students are training to complete their Commercial Pilots License and associated ratings to fly as a career, while approximately 60% of students are training for recreational purposes. Through consultations with Glacier Air, it is understood that an increasing number of students are seeking flight training. Given the challenging terrain environment of Squamish, Glacier Air has developed considerable expertise and a positive reputation within the aviation industry for training pilots in the intricacies of mountain flying.

Glacier Air also provides a variety of charter and commercial services under its aerial work and air taxi operating certificates, which comprise the remaining 40% of its operations. Examples of services provided under this scope include aerial sightseeing, aerial photography and filming, wildfire spotting, passenger transfers, and just-in-time cargo shipments.

2.6.5 Sea to Sky Air

Sea to Sky Air is a year-round fixed-wing air taxi and aerial work provider that is based at the Airport. Sea to Sky Air primarily provides aerial sightseeing packages, floatplane transportation to Phantom Lake through a provincial adventure tourism permit, and charter services. Sea to Sky Air operates a fleet of 3 aircraft (2 Cessna 172s and 1 Cessna A185) and maintains a mobile office structure adjacent to the apron at the Airport. During peak season operations, Sea to Sky Air typically employs up to 6 individuals and carries approximately 2,500 passengers on an annual basis.

Sea to Sky Air is also engaged through a standing agreement with the British Columbia Wildfire Service to provide wildfire detection patrols and for personnel transportation.

Glacier Air (left) and Sea to Sky Air (right) aircraft

2.6.6 Squamish Flying Club

The Squamish Flying Club is a not-for-profit organization that was founded in 1950 and is based at the Airport. Between 60 and 70 individuals are currently members of the Squamish Flying Club, including approximately 30 general aviation aircraft owned by members. Consultations with the Squamish Flying Club indicate that most of their members reside in Squamish and within the area north of Lions Bay and south of Whistler.

The Flying Club maintains a series of facilities at the Airport on leasehold lots, including:

- Two unenclosed hangar buildings with a combined area of approximately 2,000 m^2 and capacity for 19 aircraft;
- A small clubhouse and washroom facility;
- A 100 Low Lead ("avgas") fuel tank and self-service facility.

The Flying Club also uses portions of the parking apron for outdoor aircraft storage and in 2021 prepared an expanded gravel parking area to the west of the apron.

2.6.7 Environment and Climate Change Canada

ECCC leases a 500 m^2 lot adjacent to the apron for an unstaffed meteorological observation facility.

Squamish Flying Club hangar facilities

2.7 Airport Activity Levels

Airport activity levels are typically expressed in terms of the number of aircraft movements that occur, with a movement being a single take-off, landing, low approach, or overshoot. Therefore, each flight includes a minimum of two aircraft movements (one take-off, one landing). The number of aircraft movements that occur at the Airport is not regularly tracked by the District given the lack of a staffed presence at the facility and the absence of a remote recording system.

Avcon Consultants Ltd. ("Avcon") completed an anecdotal estimate on the number of aircraft movements and circuits that occurred at the Airport in 2017, 2018, and 2019. The accuracy of these values or the methodology used to support the estimates cannot be independently verified by HM Aero; however, these estimates are a useful starting point in quantifying activity at the Airport. As shown in Table 2.2 and Table 2.3:

- In 2017, Avcon estimated that 8,604 flights were operated by the Airport's five tenants and itinerant fixed-wing users, generating a total of 27,514 movements (i.e., take-offs, landings, low approaches, and overshoots);
- In 2018, Avcon estimated that activity increased modestly to 8,968 flights that resulted in an estimated total of 25,783 movements. While total flights were estimated to have increased, the decrease in movements is primarily due to the reduced operations by Glacier Air versus 2017; and
- In 2019, Avcon estimated that a total of 26,977 movements occurred. The increase versus 2018 was primarily driven by increased operations by Glacier Air.

Table 2.2 - Estimated Total Flights, 2017-2019 (Avcon Consultants)

Year	Glacier Air	Sea to Sky Air	Squamish Flying Club	Itinerant – Fixed-Wing	Black Tusk Helicopter	Blackcomb Helicopters	Total
2017	2,552	1,151	1,132	169	1,800	1,800	8,604
2018	2,448	1,496	1,195	179	1,825	1,825	8,968
2019	Data Not Available						
Note: The values provided are estimates only.							

Table 2.3 - Estimated Total Movements, 2017-2019 (Avcon Consultants)

Year	Glacier Air	Sea to Sky Air	Squamish Flying Club	Itinerant – Fixed-Wing	Black Tusk Helicopter	Blackcomb Helicopters	Total
2017	14,844	2,302	2,830	338	3,600	3,600	27,514
2018	12,144	2,992	2,989	358	3,650	3,650	25,783
2019	13,830	2,647	2,902	348	3,650	3,600	26,977
Note: The values provided are estimates only.							

Among the five tenants of the Airport, Glacier Air appears to be responsible for the highest proportion of movements as shown in Table 2.4, accounting for between 47% and 54% of estimated activity in 2017-2019. Sea to Sky Air, the Squamish Flight Club, Black Tusk Helicopter, and Blackcomb Helicopters each operate between 8% and 14% of total estimated movements, and itinerant traffic is responsible for a very limited 1% of total estimated movements.

Table 2.4 - Proportional Breakdown of Estimated Total Movements, 2017-2019 (Avcon Consultants)

Year	Glacier Air	Sea to Sky Air	Squamish Flying Club	Itinerant – Fixed-Wing	Black Tusk Helicopter	Blackcomb Helicopters	Total
2017	54%	8%	10%	1%	13%	13%	100%
2018	47%	12%	12%	1%	14%	14%	100%
2019	51%	10%	11%	1%	14%	13%	100%
Note: The values provided are estimates only.							

In August and September 2021, the District commissioned three days of aircraft overflight counts to better understand the flight paths taken by aircraft operating at the Airport. The three days selected (August 28, August 29, and September 11) were all weekend days during the peak summer season. As shown in Table 2.5, an average of between 3.5 and 7.9 overflights per hour were recorded from arriving and departing aircraft. When evaluating the distribution of overflights throughout each day, the maximum number of overflights in a one-hour period ranged between 10 and 14, or an overflight every 4 to 6 minutes. Overflights of this frequency are commonplace at airports that support flight training as student pilots practice their take-offs and landings while conducting continuous circuits.

Table 2.5 - 2021 Aircraft Overflight Counts (District of Squamish)

Metric	August 28, 2021 Saturday	August 29, 2021 Sunday	September 11, 2021 Saturday
Observation Hours	8h49m	4h45m	2h25m
Total Overflights	31	32	19
Average Overflights per Hour	3.5	6.7	7.9
Peak Hour	10:00 AM – 11:00 AM	11:00 AM – 12:00 PM	11:00 AM – 12:00 PM
Peak Hour Overflights	10	10	14

Recording the number and type of aircraft movements that occur at the Airport is an important exercise to inform the effective administration of the facility. By logging detailed information about the number and type of aircraft movements that occur, the District can:

- Make informed decisions based on actual operations that occur;
- Providing supporting information for grant funding applications;
- Be able to provide the public with accurate and detailed information about activity at the Airport;
- If implemented in the future, support the collection of aeronautical fees; and
- Analyze the distribution of activity over time.

An aircraft movement logging system would only be used to track the number and type of aircraft movements. Without the availability of approved or future surveillance technologies (i.e., radar and Automatic Dependent Surveillance – Broadcast), data will not be available on aircraft flight paths, altitudes, or other flight-specific metrics.

Further commentary on the recommended aircraft movement logging system is provided in Section 10.3.

2.8 Social Benefits

The value of the Airport can be expressed in terms of its support of services that improve the quality of life of residents and visitors to the region, its support of essential public air services, and the involvement of Airport tenants in the community.

2.8.1 Air Ambulance Access

British Columbia Emergency Health Services (BCEHS) is the provincial agency tasked with interfacility patient transportation, including air ambulance operations. Air ambulance missions do not regularly operate from the helipad at Squamish General Hospital as the existing facility does not meet Transport Canada's standards for certification and is subject to a range of operational limitations. The Airport is the primary centre for air ambulance missions in the area and was confirmed through consultations with BCEHS to be of significant operational importance. Aside from cleared roadside landing sites that can be used on an as-required basis, the Airport is one of the three primary air ambulance facilities in the region, alongside the Whistler Health Care Centre helipad and Pemberton Airport.

Helijet is contracted by BCEHS to provide rotary-wing transportation services using its fleet of Sikorsky S-76 helicopters based at Vancouver International Airport and is the primary air ambulance operator at the Airport. Squamish's runway precludes operations by fixed-wing air ambulance aircraft such as the Beechcraft King Air 350 that require a minimum length of 3,500 ft.

As shown in Table 2.6, a total of 85 air ambulance missions were operated at the Airport between 2016 and 2021, or an average of 14 flights per year. Activity increased between 2019 and 2021 and averaged 22 flights per year in that period. Based on total activity levels between 2016 and 2021, activity at the Airport peaks in the winter (December to January) and summer (May to September) months, corresponding with periods of challenging driving conditions and increased outdoor recreation activities. An average of 22 air ambulance flights per year have occurred at the Airport between 2019 and 2021, or 1 flight every 17 days.

Air ambulance operations are essential in providing timely access to higher level of care medical facilities and achieving improved patient outcomes when their requirements cannot be met by Squamish General Hospital. Based on consultations with BCEHS, it is understood that a significant number of the air ambulance missions that occur from Squamish are a result of outdoor recreation accidents and vehicle accidents along the Sea to Sky Highway. Supporting year-round air ambulance access is also important when ground ambulance transfers along the Sea to Sky Highway are limited due to rockslides, vehicle crashes, and inclement weather conditions.

Table 2.6 - Annual Air Ambulance Missions (2016-2021)

2016	2017	2018	2019	2020	2021
4	4	11	21	24	21

Figure 2.4 - Monthly Air Ambulance Missions (2016-2021)

2.8.2 Search and Rescue

Squamish Search and Rescue

Squamish Search and Rescue is a volunteer-based organization that provides accident response services in the area generally extending from Porteau Cove to Whistler. The organization's missions are funded by the Crown. Squamish Search and Rescue collaborates with Blackcomb Helicopters to complete rotary-wing patient extraction and medical care missions and is primarily involved in incidents relating to outdoor recreation activities. On an annual basis, Squamish Search and Rescue collaborates with Blackcomb Helicopters on approximately 50 operational missions and Blackcomb Helicopters provides approximately 200 hours of training services to the organization annually.

Technical Evacuation Advanced Aero Medical Society

The Technical Evacuation Advanced Aero Medical Society (TEAAM) is a not-for-profit organization funded through private contributions that was founded in 2018 to provide advanced life support medical care in remote and challenging terrain environments common throughout the province through helicopter-based hoist and long-line patient extraction methods. TEAAM is not funded by the Crown. TEAAM maintains an operational base at the Airport, and Blackcomb Helicopters is the primary provider of rotary-wing transportation to the organization through its hoist-equipped Eurocopter EC135. TEAAM and Blackcomb Helicopters collaborate on approximately 30 medical extraction missions per year from the Squamish base, and consultations with TEAAM indicate that an increasing number of missions are being operated on an annual basis in response to forestry, industrial, and outdoor recreation incidents.

Provincial Emergency Program Air / Civil Air Search and Rescue Association

The Provincial Emergency Program Air (PEP Air) is a volunteer organization that is an associate member of the Civil Air Search and Rescue Association (CASARA). PEP Air volunteers provide air search support services as part of the National Search and Rescue Program, with members including pilots, navigators, and spotters. Volunteers work with the Royal Canadian Air Force's 442 Transport and Rescue Squadron, Royal Canadian Mounted Police, and other responding agencies in searching for missing aircraft, boaters, and hikers from the air.

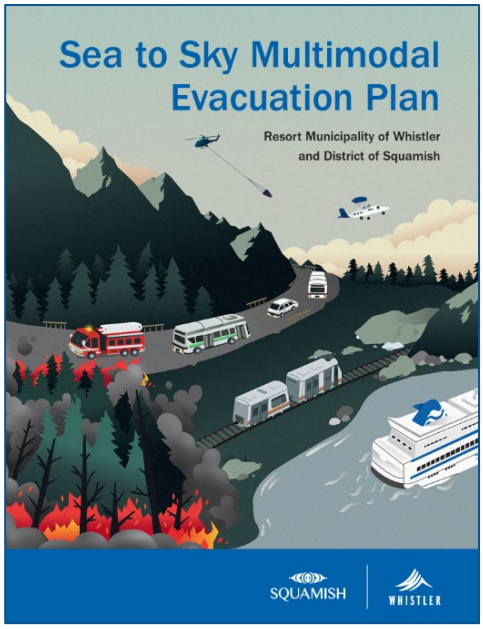
Approximately 10 individuals in Squamish volunteer as pilots, navigators, spotters, and in other capacities with PEP Air and CASARA. Glacier Air's Cessna 206 is currently the sole aircraft that is based at Squamish that supports PEP Air / CASARA operations, with this platform being uniquely well equipped to support air search support missions in the mountainous terrain of the province. The facilities of Glacier Air and the Squamish Flying Club are both used to support training and operational missions.

Through consultations with PEP Air, it is understood that the location of the Airport is advantageous, as its distance from the Lower Mainland can enable operations to continue when weather conditions at other PEP Air / CASARA staging points such as Abbotsford and Boundary Bay preclude flights from departing.

2.8.3 Emergency Management

District of Squamish

The District maintains a Comprehensive Emergency Management Plan and is responsible for preparing for, responding to, and recovering from significant disaster and emergency events. The Sea to Sky Multimodal Evacuation Plan, which is one of the several components of the Comprehensive Emergency Management Plan, outlines the approach and available infrastructure for coordinated evacuations in the District. Mass transportation and evacuation issues are recognized to be of critical importance in the event of a major emergency. The Multimodal Evacuation Plan outlines the following potential roles for the the Airport:



- Supporting reconnaissance flights
- Transporting emergency personnel, resources, and freight into the community;
- Evacuating specific groups out of the community, such as vulnerable populations or serious medical cases;
- Aircraft operators based at the Airport being tasked to support emergency operations; and
- Supporting the deployment of aviation resources of supporting agencies, such as BCEHS, Squamish Search and Rescue, and the Royal Canadian Air Force.

In the event of a major emergency requiring the widespread use of aviation assets, the Airport may be activated under the oversight of the District's Emergency Operations Centre or other responding agencies such as the BC Wildfire Service.

The Airport has been utilized to support response during a number of significant emergencies, including the 2019 and 2020 Upper Squamish wildfires, 2008 Porteau Cove rockslide, and the 1980-1981 Boxing Day flood event. During the Porteau Cove rockslide, the Airport supported a significant number of flights to and from the Lower Mainland for the transportation of goods and people. Among the Airport tenants, Blackcomb Helicopters operated geotechnical observation and goods / passenger transportation flights while Glacier Air transported approximately 240 people and cargo loads between Squamish and Vancouver. During the 1980-1981 flood event, the Airport served as a receiving base for rotary-wing resident evacuation efforts.

The District's Community Risk Assessment Report recognizes that a range of hazards at various risk levels could impact the community, such as debris flows, floods, wildfires, earthquakes, hazardous materials release, landslides, and utility failures. As part of emergency preparedness, the Airport's potential role must be recognized, and steps taken to ensure its availability in the event of a major emergency or disaster. The emergency response roles served by comparable community and regional airports during the widespread flooding events in the fall of 2021 exemplify this importance. Chilliwack Airport, for example, was used to support Royal Canadian Air Force operations, transport patients requiring medical care (e.g., dialysis), and receiving supplies.

The rotary-wing operators based at the Airport (Blackcomb Helicopters and Black Tusk Helicopter) are commonly engaged in emergency management roles, including wildfire suppression and Search and Rescue, and may be tasked to respond based on operational requirements. The fixed-wing operators (Sea to Sky Air and Glacier Air) may also be tasked based on their capabilities and the requirements of the emergency management situation.

Squamish-Lillooet Regional District

The Airport also plays a role in the wider Squamish-Lillooet Regional District. The Regional District's All Hazards Plan provides strategic direction on how risk-based emergency management will be implemented across the region. The Airport is designated under the Government and External Agency Support category as a regional response asset, along with the airports in Pemberton and Lillooet. The All Hazards Plan recognizes the potential emergency roles of the airport and states the following:

> *"The ability to move people and equipment and supplies by air is a critical part of emergency response when roads may be inaccessible and needs are urgent.*
>
> *At the request of the SLRD, Airport and Heliport facility operators may assist with air transportation coordination to support the emergency transfer of people, supplies and equipment."*

Provincial Emergency Response Capabilities

In addition to the Airport's role in supporting local or regional emergencies, Squamish may also be used to support emergency response efforts in the Lower Mainland. Given its proximity to Vancouver and the surrounding urban area, Squamish is well-positioned to support response efforts if the aviation system in the Lower Mainland is negatively impacted by an emergency event, such as an earthquake. While not used in an emergency capacity, the extensive utilization of the Airport by the Royal Canadian Air Force's fixed-wing and rotary-wing aircraft during the 2010 Winter Olympics illustrates the strategic value of the Airport's presence to the Lower Mainland.

2.8.4 Wildfire Suppression

The British Columbia Wildfire Service is the provincial agency responsible for wildfire suppression. The Airport is located within the boundaries of the Coastal Fire Centre. In recent years, the Coastal Fire Centre has experienced:

- 2021: 216 wildfires and 7,100 hectares burned;
- 2020: 124 wildfires and 1,194 hectares burned; and
- 2019: 168 wildfires and 337 hectares burned.

On a local scale, the Squamish Community Risk Assessment Report identifies the risk for a wildfire burning adjacent to or in an urban area, referred to as an interface fire, as moderate. Historical examples have included the 1986 Hospital Hill interface fire and an additional major fire in 1957. The Community Risk Assessment Report notes that interface fires primarily occur during hot, dry weather when activated by lightning or by human sources, and the potential for such fires may increase in the future as a result of changing climate conditions.

Aircraft are a key element of British Columbia's wildfire suppression operations, with private helicopter operators contracted on a long-term and seasonal basis. In the vicinity of Squamish, the challenging terrain environment means that rotary-wing suppression platforms are an appropriate tool for responding to fire events. Both rotary-wing operators (Blackcomb Helicopters and Black Tusk Helicopter) based at the Airport are trained and appropriately equipped for wildfire suppression and support operations and are regularly tasked by British Columbia Wildfire Services throughout the province. The based commercial fixed-wing operators (Glacier Air and Sea to Sky Air) are contracted by the British Columbia Wildfire Service to complete wildfire reconnaissance missions. The Airport was used in a significant capacity to support rotary-wing wildfire suppression operations during major nearby fire events in 2019 and 2020.

The Airport therefore fulfills two critical roles with respect to wildfire suppression. First, the availability of the facility, including its refuelling facilities and parking areas, is an operational advantage for sustaining suppression operations when wildfires are burning in the surrounding region. Second, the four commercial operators based at the Airport are each contracted on an as-required basis by the British Columbia Wildfire Service in support of response activities throughout the province, thereby contributing to the broader functioning of the wildfire suppression system.

2.9 Economic Benefits

The benefits of the Airport include the degree to which the availability of the facility to itinerant users and the activities of its based operators contribute to local employment, the efficient functioning of economic sectors of importance, and intercommunity access.

2.9.1 On-Airport Employment

The five businesses based at the Airport each employ individuals that:

- Permanently reside in the District;
- Reside in surrounding municipalities; or
- Temporarily reside in the community through hotels or other lodging based on operational priorities.

Given the seasonal nature of the employers based at the Airport, the workforce associated with the facility varies throughout the year. At peak season in the summer with all businesses operating at their highest stated workforces, up to 61 full-time and part-time positions are supported at the Airport. The composition of this employee group includes:

- Commercial fixed-wing and rotary-wing pilots;
- Aircraft maintenance engineers;
- Administrative staff; and
- Corporate leadership / managers.

Whether permanently residing in Squamish or temporarily based in the community, each employee generates spin-off economic benefits through their spending within the community.

Table 2.7 - Airport Business Employment Levels

Business	Workforce	Business	Workforce
Black Tusk Helicopter	25 – 30 (varies seasonally)	Glacier Air	8 Year-Round 9 Peak Season
Blackcomb Helicopters / Signal Systems	4-5 Year-Round 16 Peak Season	Sea to Sky Air	3 Year-Round 6 Peak Season

2.9.2 Economic Sector Support

While each of the businesses based at the Airport are directly engaged in providing aviation services and are therefore part of the aviation sector, each operator also serves customers in other economic sectors. The businesses based at the Airport therefore support to the degree to which other sectors can perform effectively and in doing so contribute to the overall economic health of the region and province. By supporting other economic sectors, businesses based at the Airport can also result in indirect economic benefits experienced within the community, such as utility crews and tourists patronizing local accommodation and hospitality providers.

Examples of cross-sector provided by businesses based at the Airport include:

- **Utility Sector:** Approximately 70% of the operations of Blackcomb Helicopters from its Squamish base are centred around supporting the utility sector. A significant proportion of the operations of Blackcomb Helicopters involves conducting infrastructure inspection patrols and transporting BC Hydro and telecommunication crews and supplies to remote / inaccessible work sites. Notably, Blackcomb Helicopters' Squamish base is tasked with inspecting BC Hydro's 230 kV and 500 kV transmission lines that follow Highway 99, including the 500 kV line servicing Vancouver Island.
- **Forestry Sector:** Black Tusk Helicopter is primarily engaged in aerial logging operations, including crew transportation and timber movement.
- **Aerial Construction:** Both Blackcomb Helicopters and Black Tusk Helicopter support construction operations in inaccessible or challenging to reach areas, including crew transportation, equipment and materials movement, and construction-specific tasks such as concrete pours and steel installation. Black Tusk Helicopter, for example, has been engaged to support the construction of ski lifts in Whistler, repairs to the Sea to Sky Gondola, municipal trails construction, and light house maintenance projects for Fisheries and Oceans Canada.
- **Tourism and Outdoor Recreation:** The tourism and outdoor recreation sector is a significant element of the local and regional economies, and each of the businesses located at the Airport. As noted previously, Black Tusk Helicopter and Blackcomb Helicopters are both engaged in providing helicopter-based outdoor experiences, including helibiking, skiing, fishing, hiking, and remote engagements / weddings. All four businesses offering sightseeing packages, with this segment being Sea to Sky Air's primary business line. The services offered by each of the four businesses at the Airport contribute to Squamish's tourism and outdoor recreation value proposition by further expanding the choices available to visitors according to their individual priorities.

Blackcomb Helicopters conducting a long-line cargo transportation flight

2.9.3 Flight Training

Flight Training Units are the Transport Canada-approved businesses through which the next generation of professional pilots undergo their training. As noted previously, Glacier Air is an approved fixed-wing Flight Training Unit that can accommodate students pursuing their:

- Private Pilot and Commercial Pilot Licenses;
- Flight Instructor and Aerobatic Instructor ratings; and
- Specialized mountain flying and tailwheel ratings.

Through information provided by Glacier Air, approximately 240 students in the past 20 years have undergone training at Glacier Air. As approximately 40% of students at Glacier Air are training to fly as a career, it is estimated that approximately 100 commercial pilots have been trained at Glacier Air between 2002 and 2022. A unique element of Glacier Air's training is the location of the Airport in a mountainous environment and the exposure of students to challenging terrain and weather conditions, which is conducive to the graduation of highly skilled pilots.

In addition to the Flight Training Unit based at the Airport, students from other institutions also utilize the facility. Cross-country training flights are an important component of Transport Canada's prescribed curricula for the Private Pilot and Commercial Pilot Licenses and additional ratings in order to ensure student pilots are skilled in navigation and operating at unfamiliar airports. A significant concentration of fixed-wing and rotary-wing Flight Training Units are based at airports throughout the Lower Mainland and Vancouver Island. The Airport is used as a cross-country training destination by student pilots from these institutions, just as other airports in the region are used by students from Glacier Air. As movements are not recorded at the Airport, the annual ongoing frequency of such operations cannot be determined beyond the anecdotal data provided in Table 2.2 and Table 2.3, the observational data in Table 2.4 and Table 2.5, and responses from noise complainants.

The COVID-19 pandemic and resultant downturn in the air travel sector has had short-term negative impacts to the aviation workforce, as hiring is reduced based on limited travel demand. However, industry forecasts indicate that widespread pilot training and hiring will be required to replace an aging and retiring workforce, and to accommodate future growth. The Canadian Council for Aviation and Aerospace in March 2018 published its Labour Market Information Report – Aviation and Aerospace Industries that forecast the need for 55,000 new aviation and aerospace workers nationwide by 2025. Forecasts completed during the pandemic, while acknowledging the temporary downturn, continue to indicate that training and hiring will be required in the future.

Although there is no obligation on airports to host Flight Training Units, student pilots will continue to require facilities at which to proceed through their various licenses and ratings, and the availability of sufficient nationwide training capacity is one element that contributes to the long-term sustainability of the aviation workforce. Therefore, the Airport's role in supporting based and itinerant flight training should be considered in the context of national workforce requirements.

2.9.4 Intercommunity Access

General aviation users include fixed-wing and rotary-wing aircraft owners and renters that are operating to and from Squamish for a variety of purposes, such as for business, tourism, visiting friends and relatives, attending aviation community events, or as an enroute stop as part of a larger trip. In addition to the use of the Airport by itinerant aircraft, Blackcomb Helicopters, Black Tusk Helicopter, Sea to Sky Air, and Glacier Air each offer intercommunity charter services.

2.10 Financial Performance

The District provided 2021 financial data to HM Aero for review, which are summarized as follows:

- The Airport's operating revenues include land lease payments from Black Tusk Helicopter, Blackcomb Helicopters, Glacier Air, Sea to Sky Air, the Squamish Flying Club, and Squamish Wood Waste (off-site). ECCC also pays an annual maintenance and security fee for its meteorological observation station. In 2021, total operating revenues were $62,222 and are budgeted at the same level in 2022.
- Operating expenses include general consulting and contracting services, operational supplies, and property insurance. In 2021, total operating expenses were $17,198 and are budgeted to increase to $45,000 in 2022 as level of service improvements and operational projects are implemented. An additional $36,000 is budgeted in 2022 for special projects, including line painting and safety initiatives.
- In 2021, the Airport realized a surplus of $45,024. Surpluses of $36,855 and $46,220 were realized in 2020 and 2019, respectively. All surpluses are directed to the Airport Reserve Fund. In 2022, a minor deficit of approximately $19,000 funded through the Airport Reserve Fund is budgeted to address special projects related to safety and line painting.

The surplus realized in 2021 and modest withdrawal from the Airport Reserve Fund in 2022 are comparable to, or better than, the financial performances of similar regional airports with limited service levels.

Table 2.8 - Airport Financial Information (2021-2022)

	2021 (Actual)	2022 (Budget)
Operating Revenues		
Land Leases, Maintenance, and Security Fees	$62,222.00	$62,222.00
Total Operating Revenues	**$62,222.00**	**$62,222.00**
Operating Expenses		
Consulting - General	$7,013.00	$5,000.00
Contracting - General	$1,105.00	$13,000.00
Contracting - Maintenance	-	$7,000.00
Contracting - Snow Removal	-	$5,000.00
Supplies - Operational	$80.00	$5,000.00
Insurance - Property	$9,000.00	$10,000.00
Total Operating Expenses	**$17,198.00**	**$45,000.00**
Special Projects – Airport Safety	-	$20,000.00
Special Projects – Line Painting	-	$16,000.00
Total Expenses	**$17,198.00**	**$81,000.00**
Financial Position		
Contribution to Airport Reserve (Withdrawal From Airport Reserve)	**$45,024.00**	**($18,778.00)**

3 AIRPORT NOISE MANAGEMENT

3.1 Existing Conditions

3.1.1 Resident Noise Concerns

Noise is an externality from aircraft operations and is noted by the International Civil Aviation Organization (ICAO) to be *"…the most significant cause of adverse community reaction to the operation… of airports."*

Through the data provided previously in Section 2.7, it is estimated that there were approximately 25,800 to 27,500 aircraft movements annually between 2017 and 2019. Based on counts commissioned by the District on three days in August and September 2021, overflights during peak operational periods occurred approximately ever 4 to 6 minutes as measured between 10:00 AM and 12:00 PM – overflights occur on a less frequent basis during non-peak periods. While the Airport supports operations year-round, activity is understood to be concentrated during the peak summer months (May to September) and during favourable weather days when Visual Meteorological Conditions permit operations under Visual Flight Rules.

The proximity of the Airport to residential areas to the south, southwest, and north results in residents being potentially exposed to the noise associated with aircraft overflights. The areas understood to have higher potential exposure to aircraft noise are shown in Figure 3.1 and are described as follows[5]:

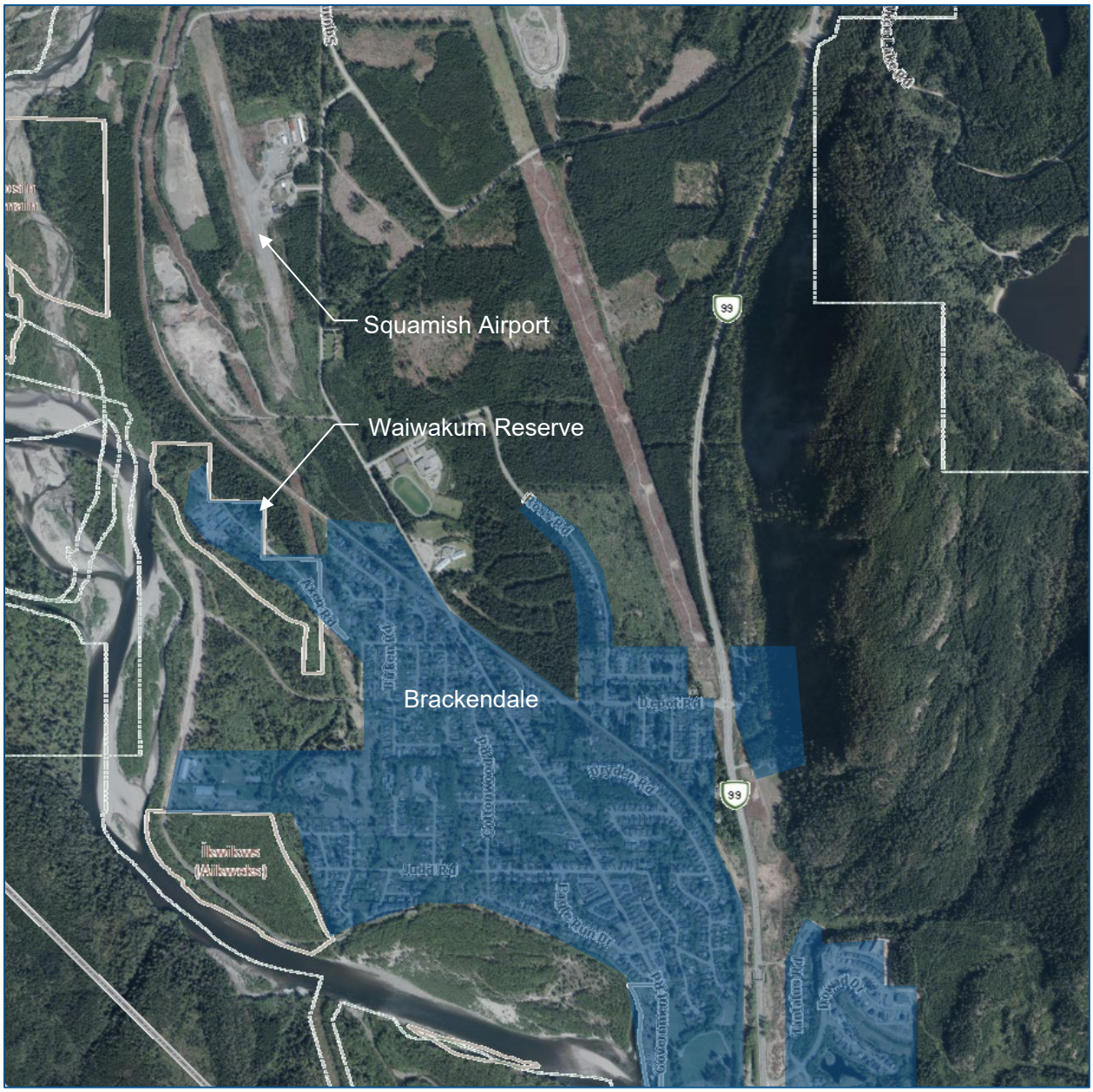
- **Squamish Nation / Waiwakum Reserve:** Residential dwelling units located in the Waiwakum Reserve are located between 700 m and 1,000 m south of the Runway 33 threshold, under the Runway 15 departure and Runway 33 arrival paths. Based on 2021 census data, the population of this area is approximately 220 individuals[6].
- **Brackendale:** The closest residential dwelling units in Brackendale along Government Road and Birken Road are approximately 950 m south of the Runway 33 threshold and are proximate to the Runway 15 departure path and Runway 33 arrival path. The population of this area in 2021 was approximately 3,280 individuals[7].

As a result, it is estimated that up to 3,500 individuals live in areas that may be exposed to aircraft noise from arrivals, departures, and overflights. Although the number of overflights and noise exposure per overflight can be quantitatively measured, individual reactions to aircraft noise can be subjectively based and depend on a wide variety of non-acoustic factors that include:

- Individual sensitivity to noise;
- Subjectivity;
- Individual attitudes, concerns, or expectations regarding aircraft noise;
- Mistrust or misunderstanding of the Airport and / or aircraft operators;
- Fear of accidents and / or concerns regarding safety; and
- Distribution of noise over time (e.g., increased operations after a prolonged quiet period).

[5] Other areas in and around Squamish may also be affected by aircraft noise – the areas described herein were identified based on the submission of noise concerns and their immediate proximity to the Airport.
[6] Census Dissemination Area 59310255
[7] Census Dissemination Areas 59310190, 59310191, 59310253, 59310191, and 59310192,

Figure 3.1 - Airport Residential Land Use Context [8]



[8] Figure 3.1 has been prepared by HM Aero and shows residential areas to the south of the Airport. Residential areas to the north are not shown. Figure 3.1 may differ from the noise sensitive areas shown in Figure 2.3 as prepared by NAV CANADA.

The District does not maintain a standardized noise concern tracking system; however, noise concerns are received by District Staff through written and verbal comments provided by residents. Based on data made available to HM Aero, comments about noise have been received and recorded by District Staff from 10 residences in the area near the Airport since 2011. The number of recorded concerns attributed to each residence in a given year ranges from a minimum of 1 to a maximum of 79.

Taking into account the historical noise complaints, insights gained through consultations completed by HM Aero, perspectives shared by aircraft operators based at the Airport, and input received from District Staff, it can be concluded that a small number of residents in areas around the Airport have expressed concerns about aircraft noise. A formal data collection system demonstrating the scale and geographic distribution of noise concerns throughout Brackendale and the broader community is not in place.

3.1.2 Voluntary Noise Mitigation Procedures

Voluntary noise mitigation procedures have been established at the Airport via the Canada Flight Supplement as detailed in Table 3.1. These voluntary procedures are used in combination with the VFR Terminal Procedures Chart previously shown in Figure 2.3 and described in Section 2.5.2. The twofold intent of the voluntary noise mitigation procedures is to:

1. Route departures to the northwest by using Runway 33 where possible, reducing the exposure of residents to aircraft operating at their highest power settings; and
2. Provide flight paths that reduce the total number of dwellings exposed to aircraft noise on arrival and departure.

Table 3.1 - Current Voluntary Noise Mitigation Procedures

Canada Flight Supplement Text	Explanation
Rwy 33 Dep: Preferred calm wind rwy when safe, due to noise sensitive areas.	Wind conditions influence pilot decision-making, as optimum performance and safety are achieved when departing into the wind. In calm wind conditions, Runway 33 (departing to the northwest) is the preferred runway for use as it routes aircraft operating at their highest power settings away from residential areas to the south. Wind conditions often preclude the use of Runway 33.
Rwy 33 Arr: Offset approaches. Avoid noise sensitive areas.	Aircraft arriving on Runway 33 are requested to modify their base and final approach legs to avoid noise sensitive residential dwellings by following a non-standard angled approach path when safe to do so.
Rwy 15 Dep: Initial climb on rwy hdg, when safe turn to aprx 190° to avoid noise sensitive areas. Climb at best rate, follow river SE.	When departing from Runway 15 to the south, aircraft are to depart following the runway centreline. Upon reaching a safe altitude, aircraft are to turn to the right at approximately 190 degrees to overfly the less densely populated area between Brackendale and the Squamish Nation. The decision as to when it is safe to make this turn is solely dependent upon pilot judgement. Upon reaching the river, aircraft are to turn left to follow the rest of their circuit.

3.1.3 Tenant Lease Clauses

The land lease agreements that each of the five tenants at the Airport have entered into with the District each contain the following clause pertaining to noise abatement:

> ***4.14 Noise Abatement***
>
> *The Tenant acknowledges and understands that the Airport Lands are located near to surrounding residential neighbourhoods whose residents may be disturbed by the noise of the Tenant's operations at the Airport. The Tenant agrees to take all reasonable efforts to minimize the level of noise produced when carrying out its operations and to implement such noise abatement measures and methods as may be published in the Canada Flight Supplement or as may be established or recommended by the Airport Manager or the District, from time to time.*

The intent of the noise abatement lease clause is to require that tenants 1) understand the noise-related challenges associated with the Airport; 2) familiarize themselves with the published voluntary noise abatement procedures; and 3) take all reasonable efforts to minimize noise and operate per the voluntary noise abatement procedures.

3.2 Comparator Airport and Recommended Practices Review

To better understand the approaches taken with respect to noise management, airports throughout British Columbia were sampled and publicly available information was retrieved as summarized in Table 3.2. Flight training aircraft operate a significant proportion of the movements that occur at the Airport and, both at Squamish and at other airports in HM Aero's experience, the high frequency nature of such operations can contribute to resident noise concerns. Therefore, sampled airports were chosen based on their listing in Transport Canada's database of approved Flight Training Units in British Columbia. For each airport, the following characteristics were analyzed:

- **Flight Training Services:** The type of training provided by Transport Canada-approved Flight Training Units with bases at the airport;
- **Distance to Built-Up Area:** The distance from the airport to the nearest built-up residential area based on aerial imagery;
- **Distance to Significant Rising Terrain:** The distance from the airport to areas of rising terrain based on aerial imagery that may pose an obstacle to aircraft operations (airports with terrain further than 4,000 m away are not noted);
- **CFS – Mandatory Noise Abatement Procedures:** Whether mandatory procedures are identified in the CFS pursuant to CAR 602.105;
- **CFS – Voluntary Noise Abatement Procedures:** Whether voluntary procedures are identified under the Noise category, or procedures were observed by HM Aero to likely be associated with noise. Right-hand aircraft traffic circuit provisions are excluded as such procedures may be in place for non-noise reasons, such as obstacle avoidance;
- **Airport Noise Management Program:** If a publicly available noise management policy or program is available online, such as a noise management committee, neighbourly flying procedures, provisions for informing aircraft operators, etc.; and
- **Noise Concern Tracking System:** Whether information is published online for how noise concerns can be submitted by email or phone.

Table 3.2 - Comparator Airport Noise Management Review

Airport	Aircraft Movements (2019)	Flight Training Services	Distance to Built-Up Area	Distance to Significant Rising Terrain	CFS – Mandatory Noise Abatement Procedures	CFS – Voluntary Noise Abatement Procedures	Airport Noise Management Program	Noise Concern Tracking System
Squamish	27,000 (Estimated)	Fixed-Wing	700 m – 850 m	2,000 m	No	Avoid Noise Sensitive Areas Flight Path Restrictions Preferred Noise Runway	No	No
Boundary Bay	217,000	Fixed-Wing	1,800 m	-	No	Avoid Noise Sensitive Areas	No	Yes
Abbotsford	165,000	Fixed-Wing Rotary-Wing	1,200 m	-	No	Night Training Restrictions	No	Yes
Pitt Meadows	143,000	Fixed-Wing Rotary-Wing	600 m	-	No	Noise Sensitive Areas Designated Avoid Noise Sensitive Areas Night Training Restrictions Continuous Helicopter Circuits Approval Required	Yes	Yes
Victoria	113,000	Fixed-Wing	300 m	-	No	Night Training Restrictions Preferred Noise Runway	No	Yes
Kelowna	86,000	Fixed-Wing Rotary-Wing	700 m	2,000 m	No	No	Yes	Yes
Langley	78,00	Fixed-Wing Rotary-Wing	250 m	-	No	Noise Sensitive Areas Designated Avoid Noise Sensitive Areas Night Training Restrictions	No	No

Airport	Aircraft Movements (2019)	Flight Training Services	Distance to Built-Up Area	Distance to Significant Rising Terrain	CFS – Mandatory Noise Abatement Procedures	CFS – Voluntary Noise Abatement Procedures	Airport Noise Management Program	Noise Concern Tracking System
Chilliwack	60,000 (Estimated)	Fixed-Wing Rotary-Wing	200 m	-	No	No	No	No
Kamloops	40,000	Fixed-Wing Rotary-Wing	300 m	1,800 m	No	No	No	Yes
Prince George	40,000	Fixed-Wing Rotary-Wing	N/A	-	No	No	Yes	No
Nanaimo	36,000	Fixed-Wing	700 m	-	No	Noise Sensitive Areas Designated Avoid Noise Sensitive Areas	Yes	Yes
Penticton	35,000	Fixed-Wing	250 m	800 m	No	No	No	Yes
Campbell River	34,000	Fixed-Wing Rotary-Wing	1,200 m	-	No	No	No	No
Courtenay	20,000 – 25,000 (Estimated)	Fixed-Wing	100 m	-	No	Avoid Noise Sensitive Areas	No	No
Vernon	17,000	Fixed-Wing	100 m	1,700 m	No	No	No	No
Qualicum Beach	13,000 – 15,000 (Estimated)	Fixed-Wing	300 m	-	Flight Path Restrictions	Avoid Noise Sensitive Areas Night Restrictions Continuous Helicopter Circuits Approval Required	No	No
Powell River	3,500 (2017)	Fixed-Wing	200 m	-	No	No	No	No
Dawson Creek	Not Available	Fixed-Wing	1,900 m	-	No	No	No	No
Nelson	Not Available	Fixed-Wing	400 m	700 m	No	No	No	No
Vanderhoof	Not Available	Fixed-Wing	1,400 m	-	No	No	No	No

From a land use standpoint, the proximity of the Airport to residential dwelling units introduces complexity to noise management and is a recurring challenge at other airports in British Columbia. Among the 19 airports reviewed, 13 had concentrations of residential dwellings at a similar or lesser distance from the airfield. Notable examples of comparable airports that support Flight Training Units near residential neighbourhoods located under arrival / departure paths include Langley Airport, Pitt Meadows Airport, Powell River Airport, and Vernon Airport. Only five of the 19 comparator airports that support Flight Training Units were located near areas of significant rising terrain similar to Squamish that have the potential to constrain flight operations.

Of the 19 reviewed airports, only one facility (Qualicum Beach, a certified airport) has mandatory noise abatement procedures approved by Transport Canada pursuant to CAR 602.105, while eight facilities have voluntary procedures published in the CFS similar to the steps that have been taken for Squamish Airport. Based on publicly available information, four reviewed airports have noise management programs or various elements thereof, with this approach being more common at larger airports supporting scheduled passenger services (Kelowna, Nanaimo, and Prince George) or with very high volumes of flight training (Pitt Meadows). Finally, half of the reviewed airports publish telephone numbers, emails, or standardized web forms for the submission of noise concerns.

Although each of the reviewed airports vary in their annual movement activity, types and volume of flight training accommodated, and distance from residential land uses that are more sensitive to noise disturbance, Table 3.2 illustrates the variability that exists in how noise is managed on an airport-specific basis. Mandatory noise abatement procedures were the least common tool utilized, with voluntary procedures being more prevalent among the sampled airports. The reasons for mandatory procedures not being more commonly adopted could include the adequacy of other mitigation measures, the costs and timelines associated with proceeding through the Transport Canada submission and approval process, implementation concerns associated with monitoring and Transport Canada's ability to enforce adopted procedures, and / or the perceived lack of this being a need. In addition, Qualicum Beach's flightpaths implemented through its mandatory noise abatement procedures were required to be geographically broader in nature by Transport Canada to provide pilot flexibility to ensure safe aircraft operations, versus the narrow and prescriptive voluntary flightpath established in the CFS for the Airport. Non-mandatory noise measures such as noise management programs and complaint receipt systems were adopted at several airports, further illustrating the range of options that are available to the District. Mechanisms that are not available for review include any terms that may be integrated in tenant lease agreements.

From a recommended practices standpoint, ICAO in 2001 adopted its Balanced Approach to Noise Management that outlines four pillars to reducing noise-related annoyance:

1. **Reduction of Noise at the Source:** The first pillar is limiting aircraft source noise at the time of certification. As noted previously, Transport Canada is responsible for certifying new aircraft against the applicable noise standards that are in effect at that time. Source noise reduction on a local scale can be achieved through tenants and operators renewing their fleets with quieter aircraft. Retrofit options for existing aircraft are also explored, depending on available technology that can be implemented through a Supplemental Type Certificate.
2. **Land Use Planning and Management:** Proactively separating sensitive land uses that can be disturbed by aircraft noise from airports limits the number of residents that will be exposed to disruption. In Canada, the Noise Exposure Forecast System described in Section 2.2.4 is the tool provided by Transport Canada to assist in forward-looking land use planning.

   In addition to the separation of land uses through planning, the approvals process for sensitive land uses near airports can involve the requirement for the completion of sound studies, the identification of acoustic insultation requirements and building design standards, and notes / caveats being registered on title.

3. **Mandatory Noise Abatement Operation Procedures:** Noise abatement procedures, as mentioned throughout this document, address the way daily operations occur, including mechanisms such as noise-preferred runways and flightpaths. ICAO notes that all procedures must give priority to safety considerations. The responsibility for the enforcement of mandatory procedures enacted pursuant to CAR 602.105 would reside with Transport Canada, not the District.
4. **Mandatory Operating Restrictions:** This includes banning the operation of certain aircraft types at noise-sensitive airports, the responsibility for which is Transport Canada's under CAR 602.105, as well as measures such as curfews / night-time restrictions and airport movement capacity limits.

In addition to ICAO's four-pillar approach to noise management, an increasing level of attention is being given in academia and by airport operators to non-acoustic factors of community annoyance as described previously. Under the spectrum of approaches that can be taken to address non-acoustic factors, examples include:

- Building trust within the community regarding the District's role as the Airport owner and operator, as well as trust among community members and aviation stakeholders;
- Clearly communicating the operations that occur at the Airport and the economic and social roles that it serves to aid in community understanding;
- Establishing a forum for the sharing of perspectives between the community and aircraft operators to facilitate mutual learning;
- Proactively communicating notice of upcoming periods of increased noise to residents with the associated reason;
- Transparently and proactively reporting on noise-related matters, such as annual aircraft movements and concerns; and
- Applying comprehensible language when communicating with non-aviation stakeholders to empower community members in their understanding.

A balanced response to noise management must also be tempered by the impacts that will be realized with each intervention or initiative by businesses, tenants, and aircraft operators, as well as the community. Transport Canada in its evaluation criteria for mandatory noise abatement procedures assesses proposals based on factors that include, but are not limited to:

- Effectiveness and noise impacts;
- Costs, including revenue impacts and direct and indirect costs for businesses, airport operators, and the community;
- Impacts on airport operations;
- Implementation challenges and practicalities; and
- Safety impacts.

Therefore, recommended practices for consideration when designing an effective noise management program that responds to community concerns include:

- Considering the needs of both the community and aircraft operators;
- Utilizing a data-driven approach to designing interventions;
- Addressing, where such matters are within the District's purview and are expected to be effective, noise at the source, land use planning, , and operating restrictions;
- Applying lessons learned in the role of non-acoustic factors; and
- Considering the range of impacts that may be realized by both the community and aviation stakeholders.

3.3 Opportunities for Improvement

3.3.1 Data Availability

As noted in Section 3.1, limited data is available concerning whether individuals in the community have concerns about Airport noise (beyond complainants); their geographic distribution, number of households, and severity; the factors that may be influencing whatever annoyance is realized by residents; and the number of aircraft movements that occur at the Airport.

The lack of a standardized reporting format for noise concerns, however, limits the degree to which this data can be used to inform long-term recommendations regarding noise management that will accompany the Strategic Plan. For example:

- Complaint times of day are not currently formally tracked, although preliminary analysis by the District suggests that complaints increase on favourable weather days when aircraft operations increase. Targeted noise management actions addressing times of day of concern (e.g., early morning restrictions) cannot be formulated in absence of this information;
- The distribution of complaints throughout the week is unknown;
- The degree to which rotary-wing and fixed-wing operations cause concern is unclear; and
- Year-over-year data that would illustrate increases or decreases in noise concerns is unavailable.

The collection of robust and standardized data is important in ensuring that resident noise concerns are properly documented and can be analyzed to inform future management activities. Also, in the event that the District requests that mandatory noise abatement procedures be established in the future by Transport Canada, the obligation will be on the municipality through the procedure submission process to clearly describe the problem at a level of detail that is to the satisfaction of Transport Canada.

3.3.2 Voluntary Noise Mitigation Procedures

To the extent that concerns may be raised that aircraft are not following the voluntary noise abatement flightpaths shown in the CFS, it should be noted that the voluntary noise abatement procedures, while appropriately intentioned as a tool to reduce noise-related disturbance, are limited by several factors, as summarized as follows.

Regulatory Basis

The flightpaths shown in the CFS are voluntary guidelines. Transport Canada will not enforce compliance with noise mitigation procedures published in the CFS unless they are made mandatory pursuant to the authority of CAR 602.105 and are submitted to Transport Canada for consideration per the standard process described in Advisory Circular 302-002 – Implementation of New or Amended Noise Abatement Procedures. Transport Canada is the entity responsible for determining whether a request by the District for mandatory noise abatement procedures will be approved under the authority of CAR 602.105.

Operational Factors

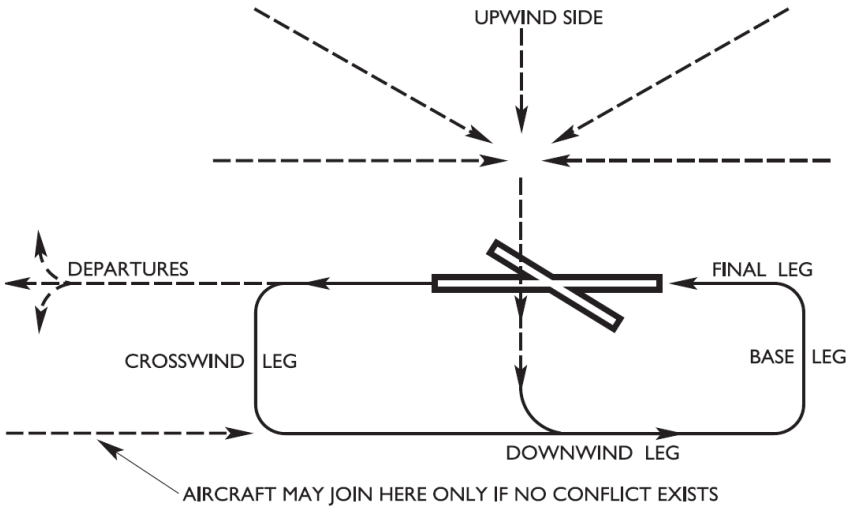
Returning to the commentary provided in Section 2.5.2, pilots are first and foremost responsible for ensuring the safety of flight operations through the Aviate, Navigate, Communicate hierarchy. This does not mean that pilots should act without regard for navigating to avoid noise sensitive areas – instead, it recognizes that deviations may be required to minimize safety risks, with an example including a turn to avoid a collision with a bird or other aircraft or to maintain safe separation distances with other aircraft.

The flightpath map shown in the CFS historically has lacked detailed guidance on the visual cues that can be relied upon by pilots to follow the procedure, including the initial turn at the Don Ross Middle School. Additional landmarks (school and farm) will be published in the May 2022 CFS update. As aircraft on departure operate with a high nose-up angle as they climb away from the Airport, forward visibility is limited for pilots, further challenging their ability to recognize landmarks such as the middle school, residential areas, and the barns near the Cheakamus River.

A final operational factor is the level of pilot skill and familiarity required to properly follow the voluntary flightpaths. For a Runway 15 departure, the low-level turn and irregular upwind / crosswind leg leading towards rising terrain to the west of the Cheakamus River introduce additional complexity during a high workload phase of flight as aircraft climb away from the Airport. This is a nonstandard procedure compared to the straight-out upwind and 90° crosswind legs flown as part of the standard traffic circuit at the majority of Canadian airports shown in Figure 3.2. While this irregular procedure can be learned:

- The Airport is used for the training of new pilots with limited experience; and
- Itinerant pilots from other airports may be less experienced with nonstandard procedures such as those used at Squamish.

Figure 3.2 - Standard Left-Hand Traffic Circuit



To better understand the challenges associated with flying the Runway 15 departure, a representative from HM Aero with a Commercial Pilot License and 300 hours of flying experience completed two departures in a Cessna 206 under the supervision of a Certified Flight Instructor. Despite the pilot's years of experience and review of the voluntary flightpaths before their flight, the challenges associated with properly executing the procedure as a pilot new to the Airport were confirmed.

Restated, the voluntary noise mitigation procedures published in the CFS should be followed to the degree possible by pilots. The operational factors described above do not diminish the need for proper airmanship but recognize that deviations may occur to ensure flight safety or because of varying pilot experience levels.

Tracking and Alleged Violations

The Airport is not supported by radar coverage that permits the tracking of aircraft close to the ground and most general aviation aircraft in Canada do not currently have to operate with Automatic Dependent Surveillance – Broadcast transponders, limiting the ability for aircraft flightpaths to be tracked to determine whether they operated in accordance with the voluntary procedures. The challenges associated with accurately tracking aircraft flightpaths and measuring the degree to which a deviation occurred, in combination with the operational factors associated with flying the route described previously, introduces further complexity regarding the enforceability of the voluntary procedures. As mentioned earlier, the flightpath chosen remains the decision of the pilot based on conditions experienced.

3.3.3 Tenant Lease Clauses

Through the lease clause described previously pertaining to noise abatement, tenants are to: 1) understand the noise-related challenges associated with the Airport; 2) familiarize themselves with the voluntary noise abatement procedures; and 3) take all reasonable efforts to minimize noise and operate per the voluntary noise abatement procedures.

The wording used in the lease agreements requires that (emphasis added): *"The Tenant agrees to take all reasonable efforts to minimize the level of noise produced when carrying out its operations and to implement such noise abatement measures…"* Making a finding as to whether "reasonable efforts" are used is highly fact-specific, and HM Aero is not able to provide an opinion regarding whether the tenants at the Airport have done so. However, returning to the commentary provided in Section 3.3.2, it is recognized that factors such as aviation safety, pilot experience, and weather conditions may affect the degree to which "reasonable efforts" have been used. That is, while tenants are to use all reasonable efforts, numerous factors as explained in Section 3.3.2 influence how pilots implement the voluntary noise abatement procedures.

3.3.4 Non-Acoustic Factors

Non-acoustic factors can also influence the perception of aircraft noise and may contribute to overall feelings of annoyance:

- Limited information is published on the nuanced and interconnected roles of the District, as the owner and operator of the Airport, and Transport Canada, as a regulator, regarding responsibilities surrounding aircraft noise. This could create misunderstandings regarding steps the District should be taking and / or tools that it has within its jurisdiction;
- There may be a perception that the District has not been effective in its role as the Airport owner and operator in how it has addressed aircraft noise;
- It is anticipated that the operations that occur at the Airport, including its social and economic benefits, are not widely understood by non-aviation stakeholders. Similarly, the causes of certain activities that result in aircraft noise but that may otherwise be accepted within the community (e.g., rotary-wing Search and Rescue training) are not made publicly available; and
- As noise concern data is not consistently tracked or published, residents may feel unheard or question whether their comments were appropriately considered.

3.4 Interim Recommendations (2022-2023)

After further consideration of the applicable regulatory and jurisdictional context, it is recommended that the District proceeds to address noise management on an interim (2022-2023) basis per the recommendations presented below.

3.4.1 Noise Concern Tracking, Analysis, and Reporting

A recommended priority in future noise management efforts is improving the way any noise concerns are received from the community to allow for effective tracking, analysis, and reporting. Through the development of an online form and database, the District will be able to collect robust data to further analyze noise challenges; at minimum, it is recommended that the following fields be included:

- Name and Contact Information;
- Location;
- Date and Time;
- Concern Type – e.g., too early / late in the day, frequency of overflights, noise of overflight;
- Aircraft Characteristics – e.g., rotary-wing / fixed-wing, registration;
- Operation Type – e.g., take-off, landing, touch-and-go, overflight; and
- Disturbance Description.

It is recommended that District Staff report to District Council on an annual basis (or more frequently, at the direction of Council) with information that includes: the volume of complaints received, aircraft activity in the same period, analysis undertaken on the complaint dataset and identified trends, and any additional action that may be taken. Transparent reporting of received concerns is imperative, as failure to do so may result in a loss of confidence among complainants.

In 2022, it is recommended that the noise concern submission system be launched as part of the webpage upgrades recommended in Section 10.2, and that additional options for the submission of concerns be provided for individuals without regular web access or accessibility challenges.

3.4.2 Voluntary Noise Mitigation Procedure Updates

Despite the implementation and enforcement limitations described in Section 3.3.2, it is recommended that the voluntary noise mitigation procedures continue to be used as a tool at the Airport. Although such procedures are guidelines, pilots that follow these procedures on a voluntary basis assist in achieving noise management objectives. Implementing mandatory procedures pursuant to CAR 602.105 and Advisory Circular 302-002 is an option that may be considered in the future and will be addressed through the Strategic Plan – however, owing to the insufficient level of data available to define the problem and inform the preparation of mandatory procedures, the extended timeline (6 months or longer) of pursuing such procedures, and the costs of doing so ($40,000 or greater), this option is not advanced within the Interim Recommendations Report.

Although the current traffic circuit route is atypical in Canada versus the standard rectangular traffic circuit flown at other airports shown previously in Figure 3.2, the current flightpath directs aircraft away from the largest concentration of residential dwellings in Brackendale. Reinstating a standard left-hand circuit for Runway 15 would reduce noise exposure to residents of the Waiwakum Reserve and dwelling units along the western periphery of Brackendale, but implementing a rectangular left-hand circuit would result in the upwind and crosswind legs overflying a significant number of residents in central and eastern portions of Brackendale, as well as the future Cheekeye Fan neighbourhood proposed.

Table 3.3 details two additional voluntary noise mitigation procedures recommended for inclusion in the CFS. The two procedures as recommended are intended to limit continuous circuit training by aircraft that are not based at the Airport, the operations of which are addressed separately in Section 3.4.3, and to limit aircraft departures before 8:00 AM and after 8:00 PM with the exception of emergency flights. The intent of the two recommended procedures is to reduce the frequency of overflights during operational hours and in the mornings and evenings.

Table 3.3 - Recommended Voluntary Noise Mitigation Procedures

Status	Canada Flight Supplement Text	Explanation
Recommended	Dep proh before 0800 lcl and after 2000 lcl unless approved by opr exc air ambulance and emerg.	The recommended voluntary restriction would limit departures before 8:00 AM and after 8:00 PM unless approved by the District, with the exception of air ambulance and emergency missions. Arrivals would be permitted outside of these hours to limit unsafe pilot decision-making that may result from rushing to return to the Airport (e.g., flying through inclement weather).
	Circuit tng proh unless approved by opr.	The recommended voluntary restriction would limit continuous circuit training flights by visiting aircraft except where approved by the District. The intent would be that authorization would not be provided unless if occurring at a time that would minimize noise impacts. The existing Airport tenants would be excepted from this voluntary restriction.
Existing – Maintain	Rwy 33 Dep: Preferred calm wind rwy when safe, due to noise sensitive areas.	Wind conditions influence pilot decision-making, as optimum performance and safety are achieved when departing into the wind. In calm wind conditions, Runway 33 (departing to the northwest) is the preferred runway for use as it routes aircraft operating at their highest power settings away from residential areas to the south. Wind conditions often preclude the use of Runway 33.
	Rwy 33 Arr: Offset approaches. Avoid noise sensitive areas.	Aircraft arriving on Runway 33 are requested to modify their base and final approach legs to avoid noise sensitive residential dwellings by following a non-standard angled approach path when safe to do so.
	Rwy 15 Dep: Initial climb on rwy hdg, when safe turn to aprx 190° to avoid noise sensitive areas. Climb at best rate, follow river SE.	When departing from Runway 15 to the south, aircraft are to depart following the runway centreline. Upon reaching a safe altitude, aircraft are to turn to the right at approximately 190 degrees to overfly the less densely populated area between Brackendale and the Squamish Nation. The decision as to when it is safe to make this turn is solely dependent upon pilot judgement. Upon reaching the river, aircraft are to turn left to follow the rest of their circuit.

3.4.3 Tenant Leases

Given that the jurisdiction to regulate aeronautics rests with the federal level of government, it is recommended that the District consider advancing any noise management initiatives with operators at the Airport through future lease negotiations. As mentioned above, however, the District presently lacks data to clearly identify desired initiatives to bring to a lease negotiation process. Also, it is doubtful that a lease negotiation process can be concluded in time for the upcoming 2022 peak season of June to September. As result, it is recommended that short-term lease extensions identified in the Airport Strategic Plan scope for the summer of 2022 be deferred until after the other recommended initiatives (including data collection) can be evaluated at the end of the peak season in October / November 2022. At that time, the District can consider whether to pursue lease terms that are determined to be appropriate and that reflect the District's interests, goals, and authority.

3.4.4 Community Noise Management Communication

Communication and information sharing are anticipated to be important components of the District's overall approach to noise management. To this effect, a two-part approach is recommended for implementation in the short-term:

1. Concurrent with the Airport webpage upgrades described in Section 10.2 and the recommended addition of a noise concern logging system in Section 3.4.1, it is recommended that discussion about noise management be added to the District's webpage. This should cover the voluntary noise abatement procedures, the intent of the current lease language regarding noise, the role of Transport Canada, guidance on how noise concerns are handled, and profiles on the roles of each of the Airport tenants and common aircraft operators. The intent is to provide a clear source of information to proactively address common questions and concerns.
2. It is recommended that an email-based resident mailing list for the Airport be created and maintained by the District's recommended future Airport Ambassador. The intent is that this mailing system would be used to proactively inform residents of anticipated heightened periods of activity at the Airport, or abnormal operations that may generate interest or concern in the community. In this model, the District's Airport Ambassador would rely on advance notice being provided from tenants or aircraft operators on planned periods of additional activity, its estimated duration, what residents should expect, and its purpose. This information would then be communicated by the District's Airport Ambassador to residents in advance to pre-emptively address their queries and allow for expectations to be set. Examples of situations that would trigger an email notification could include spring training for Search and Rescue crews, high intensity rotary-wing wildfire suppression operations, and filming.

3.4.5 Land Use Planning Review

It is recommended that the District explore the use of notification tools to inform future owners and residents of the potential for aircraft noise through the use of notes / covenants on title, notices in real estate brochures, and / or signage on-site. It is recommended that this review be led by the District's Planning Department in 2022 or 2023, depending on Staff availability.

4 AMBIENT AIR QUALITY

4.1 Existing Conditions

It is recognized by Health Canada that outdoor air pollution can negatively impact human health, and that aircraft emissions can affect air quality, along with other sources such as road vehicles. Examples of air pollutants or chemicals of concern near airports include particulates, airborne lead, and combustion by-products (nitrogen dioxide).

Monitoring has not been completed to determine the specific impacts of aircraft operations at Squamish Airport on the ambient air quality in the surrounding area, including the residential neighbourhoods of the Squamish Nation and Brackendale. Air quality impacts are highly context specific; while air quality monitoring studies completed at other airports are available, site-specific monitoring and analysis is required to identify any air quality impacts of aircraft at Squamish Airport.

4.2 Comparator Airport and Recommended Practices Review

Air quality studies have been completed at a number of airports in North America, with examples including Toronto Pearson International Airport and Oshawa Executive Airport in Canada, and Van Nuys Airport, Santa Monica Airport, and Teterboro Airport in the United States. However, the completion of such studies at community and regional airports in Canada that are comparable to Squamish has historically been limited, potentially owning to factors that include the cost of such projects and the lack of an identified need among decision-makers.

4.3 Interim Recommendations (2022-2023)

Based on the above, interim recommendations have not been prepared with respect to ambient air quality. Future recommendations with respect to air quality impacts of aircraft operations will be explored through the Final Strategic Plan development in late 2022 and early 2023.

5 APRON MANAGEMENT

5.1 Existing Conditions

The apron consists of a 70 m x 50 m paved area, a 50 m x 40 m gravel area to the west, and additional gravel areas adjacent to the south and west. The apron is used to support the following operations:

- Aircraft taxiing and hover-taxiing to and from the Squamish Flying Club hangars;
- Rotary-wing and fixed-wing aircraft refuelling at the Squamish Flying Club avgas facility;
- Passenger loading and unloading for Sea to Sky Air flights;
- Long-term parking for based aircraft, including members of the Squamish Flying Club;
- Short-term parking for fixed-wing and rotary-wing itinerant aircraft; and
- Patient transfers from land ambulances to the Sikorsky S-76 helicopters operated by Helijet on behalf of BCEHS.

5.2 Opportunities for Improvement

Based on consultations with Airport users and District Staff, video footage submitted of historical operations, and HM Aero's analysis, the following deficiencies have been identified:

1. Aircraft parking positions are not clearly marked on the apron according to their intended user, and itinerant aircraft that are unfamiliar with the Airport are often unaware of where to park.
2. Conflicts between fixed-wing and rotary-wing aircraft operating on the apron have been reported. These concerns include rotary-wing aircraft that hover-taxi to the avgas fuel facility, as well as itinerant rotary-wing aircraft that park near other aircraft. In both cases, downwash causes a Foreign Object Debris hazard as gravel and dust is disturbed, and can also result in aircraft control surfaces and doors being forcibly moved.
3. The single taxiway providing access between the apron and Runway 15-33 restricts efficient aircraft operations during peak times.
4. Consultations with BCEHS indicate that the efficiency and safety of air ambulance operations may be improved through the designation of a dedicated parking facility. The larger Sikorsky S-76 helicopters operated by BCEHS further constrain operations on the apron.

Apron / Taxiway A congestion (Warwick Patterson)

5.3 Comparator Airport and Recommended Practices Review

In order to identify appropriate apron management plans, each airport must be approached on a case-specific basis given the uniqueness of factors such as the apron size and layout, mix of users and aircraft types, and services accommodated on-apron. As such, a review of apron management configurations at comparable airports has not been completed; however, the project team has considered safety, capacity, and efficiencies while evaluating options for improvements to the apron.

5.4 Interim Recommendations (2022-2023)

In 2022, it is recommended that the apron management plan shown in Figure 5.1 be implemented through the recommended improvements in 2022:

- Aircraft parking that infringes on the Taxiway A strip is recommended to be relocated to provide sufficient clearances as per TP312 standards for arriving and departing aircraft[9];
- Two apron taxi-lanes should be established to provide intuitive wayfinding for pilots while ensuring that the design category of aircraft with wingspans of up to 11 m (e.g., Cessna 172 / 182 / 185, Piper PA-28, Maule M-4) can taxi with sufficient clearance from obstacles and parked aircraft;
- A designated air ambulance parking position is recommended to ensure that patient transfers can occur in an expedient and safe manner, while separating the larger Sikorsky S-76 helicopter and its rotor-wash from parked aircraft; and
- Designated parking positions are recommended for the Squamish Flying Club (13 fixed-wing tie-down positions), Sea to Sky Air (3 fixed-wing tie-down positions), and itinerant users (3 fixed-wing tie-down positions and 1 rotary-wing parking position. The number of positions allocated for itinerant users is based on anecdotal information on traffic levels at the Airport provided to HM Aero, and changes to the parking allocation may occur during implementation.

To implement the apron management plan in 2022, the following tasks are recommended:

1. Prior to implementation, notify the following users and tenants informing them of the forthcoming changes and timelines: Squamish Flying Club, Sea to Sky Air, and BCEHS.
2. Publish the apron parking plan on the Airport website and on a new sign affixed on or adjacent to the avgas fuelling facility.
3. Decommission the parking positions currently located within the Taxiway A strip through the relocation of the tie-down infrastructure.
4. Relocate the itinerant tie-down payment facilities from adjacent to the ECCC weather station to the newly designated itinerant parking area.
5. Implement the paint markings shown in Figure 5.1.
6. Update the CFS with the following instructions in the Runway Data – Apron section:

   Acft with wingspans of 11 m (36 ft) or more ctc opr for approval
   S end of apron avbl for itinerant acft prkg. Prkg fees after 6 hours, ctc opr
   Designated air ambulance prkg on apron. Other users ctc opr for approval

7. Integrate the areas shown in Figure 5.1 within the demised premises of the short-term lease agreement to potentially be negotiated with the Squamish Flying Club.

[9] The perimeter fence of the ECCC compound will continue to infringe on the AGN I taxiway strip by approximately 3 m. Consideration to the treatment of this leasehold lot will be given in the Strategic Plan.

PARKING LOT 2

GOVERNMENT ROAD

AIRPORT RING ROAD

PARKING LOT 1

AVIATION FUEL FACILITY 100 LL

3 m WINGTIP CLEARANCE, 11 m AIRCRAFT WINGSPAN

BLACK TUSK ACCESS ROAD

APRON

TAXIWAY 'A'

AGN I - TAXIWAY STRIP

AGN I - NON-INSTRUMENT RUNWAY STRIP

WIND SOCK

RUNWAY 15-33

1 Black Tusk Helicopter

2 Squamish Flying Club

3 Sea to Sky Air

4 Blackcomb Helicopters

5 Glacier Air

6 Environment and Climate Change Canada

SQUAMISH MUNICIPAL AIRPORT STRATEGIC PLAN

FIGURE 5.1 - APRON MANAGEMENT PLAN

JUNE 2022

ITINERANT SHORT-TERM PARKING

SEA TO SKY AIR PARKING

SQUAMISH FLYING CLUB PARKING

BCEHS AIR AMBULANCE

*FOR PLANNING PURPOSES ONLY

6 AIRPORT ADMINISTRATION

6.1 Existing Conditions

As described in Section 2.4.2, the management of the Airport is the responsibility of the Real Estate Services team. The Real Estate Services team has a wide-ranging series of responsibilities, including all matters pertaining to the acquisition, disposition, and leasing of municipally owned land. In the absence of documented minimum requirements and acknowledging the considerable number of competing priorities assigned to the Real Estate Services team, the ongoing administrative oversight of the Airport generally occurs on an as-required basis when sufficient residual District Staff capacity exists. On an yearly basis, Real Estate Services prepares an annual budget for the Airport, including identifying special projects for the upcoming year for Council's consideration. Real Estate Services also will seek our grant funding opportunities to support special projects proposed to Council. Aviation subject matter expertise was previously provided to the District through a contracted consultant (Avcon) on an as-requested basis.

6.2 Opportunities for Improvement

Through consultations with District Staff and tenants and observations made by HM Aero, the following findings are made with respect to the administration of the Airport:

- The Real Estate Services team has endeavoured to increase their knowledge on administrative matters associated with the Airport and has worked diligently in recent years to implement strategic priorities at the direction of District Council;
- The responsibilities of the Real Estate Services team are diverse and numerous, with the Airport being only one item within their purview. While District Staff address Airport-related matters among their competing priorities, their residual capacity to absorb additional tasks is limited; and
- For itinerant pilots seeking operational information regarding the Airport (e.g., fuel availability, parking locations), it is unclear who the appropriate point of contact is. Businesses based at the Airport unofficially take on this role, on occasion.

It is the opinion of HM Aero that the Real Estate Services team is the appropriate division of the District to be responsible for the administration of the Airport, including implementing priorities associated with the Airport, serving as the interface with tenants and administering lease agreements, leading strategic initiatives, addressing the facility's regulatory obligations, and serving as the liaison with Transport Canada. The effective administration would be improved in the short-term through:

- The resumed availability of aviation subject matter expertise on an as-required basis when specialized advice is required by District Staff through the retention of such services; and
- The establishment of a role responsible for advising pilots on the specifics of the Airport to assist in achieving other objectives of the Interim Recommendations Report, including increased awareness of noise abatement procedures and apron parking.

6.3 Comparator Airport and Recommended Practices Review

Among municipally owned airports that are of a comparable operational scale to the Airport, three primary approaches are taken for administrative responsibilities:

1. **Non-Dedicated Municipal Administration:** A commonplace model at smaller regional airports that have fewer administrative responsibilities is the management of the facility by a municipal employee as one part of their broader portfolio – for example, the Director of Public Works, Economic Development, Corporate Services, or the Chief Administrative Officer. In this model, administrative tasks are completed by the assigned employee on an as-required basis while considering their other competing priorities and residual capacity. The airport is typically a secondary or tertiary responsibility of the municipal employee in this model. Examples of airports that utilize this approach are numerous and include Pemberton Airport (Chief Administrative Officer), Lillooet Airport (Director of Public Works), Merritt Airport (Director of Public Works and Engineering Services). The Airport's existing administrative structure is also an example of this model.

   A strength is that this model minimizes operating expenses associated with an airport, as a dedicated staff member is not employed to oversee administration. Resources can be assigned to administration on an as-required basis and be directed to the core responsibilities of the position when not needed, and a 1.0 Full-Time Equivalent position may not be required if the subject airport is limited in its administrative requirements. However, municipal employees are recruited on the basis of their expertise in their core area of responsibilities (e.g., public works, financial management) – while experience in aviation can be gained over time, there is often a skills and knowledge gap in airport oversight. Further, the capacity that municipal employees can dedicate to airport matters may be limited by their competing responsibilities.

2. **Dedicated Municipal Administrative Position:** For airports with increased administrative duties and / or the need to satisfy regulatory requirements associated with holding certification, a dedicated municipal Airport Manager or Airport Administrator position may be created. In this model, a 1.0 Full-Time Equivalent position is created whose primary responsibility is the oversight and operation of the airport. Examples of municipalities that employ dedicated Airport Managers include Tofino Airport, Texada/Gillies Bay Airport, and Langley Airport. The requirement for a dedicated Airport Manager position within a municipality is typically triggered on the identification of a workload that: 1) exceeds the capacity of non-dedicated municipal positions; 2) requires specialized aviation expertise; and / or 3) is driven by other strategic priorities, such as the desire for a full-time on-site presence. As retaining a dedicated Airport Manager position increases the operating costs associated with the facility, this decision is most prudently made on the basis of a clearly identified and tangible need for a full-time on-site staff presence.

3. **Contracted Administrative Position (Airport Manager):** Similar to the second model, certain municipal airport owners engage the services of a contracted Airport Manager to assume the administrative responsibilities of their facility. Examples of this model include Revelstoke Airport and Chilliwack Airport. The justification for a contracted Airport Manager position is like that of a dedicated municipal position, although the third-party model is often used to overcome challenges in recruitment and / or to solicit competitive bids for the provision of such services by appropriately qualified firms.

4. **Airport Ambassador**: A fourth model that is less commonly implemented is the administrative oversight being the responsibility of a non-dedicated municipal employee, but with certain daily tasks being delegated to a contracted Airport Ambassador position. In British Columbia, Golden Municipal Airport has successfully used this model to supplement the capacities of the Chief Administrative Officer and Director of Public Works. In Golden, an individual that is already employed in a full-time capacity by a tenant of the airport is contracted by the Town of Golden to provide an on-site presence when required, respond to pilot inquiries, and track movement activity. This approach reduces the operating costs borne by the municipality while fulfilling a gap in the workload capacity of Town Staff.

From a recommended practices standpoint, the consideration of an appropriate administrative model is recommended to involve a fulsome evaluation of the site-specific factors associated with the airport in question. Summarized generally, triggers observed at comparable airports in Canada for the establishment of a full-time municipal or contracted Airport Manager commonly include:

- The airport being certified by Transport Canada and requiring a full-time position to keep up with ensuring that the facility's regulatory obligations are being met. Squamish Airport is a registered aerodrome and is not a certified airport;
- A significant number of itinerant operators unfamiliar with the airport that would benefit from an on-site presence;
- The existence of a dedicated maintenance and operations team that require leadership and a clear reporting structure, or the justification of an Airport Manager position by also assigning this individual with both administrative and operational duties (e.g., snow clearing);
- The degree to which tenants and users require routine touchpoints with the airport owner / operator to address concerns and administer lease agreements; and / or
- A significant number of year-round administrative duties that exceed the capacity of municipal staff.

Based on the current and anticipated short-term future conditions of the Airport, the conditions that commonly necessitate a full-time Airport Manager are not applicable at the Airport – however, interim recommendations are provided in Section 6.4.1 for the creation of an Airport Ambassador position in 2022 / 2023. Potential future requirements for dedicated management will be evaluated following the 2022 peak season and through the preparation of the Final Strategic Plan.

6.4 Interim Recommendations (2022-2023)

6.4.1 Airport Ambassador Services Provider

Based on the identified opportunities for improvement, the requirement to hire a full-time Airport Manager as an employee of the District has not been identified in the short-term. It is the opinion of HM Aero that the Real Estate Services team is appropriately equipped to spearhead the implementation of strategic initiatives related to the Airport at the direction of Council, with the assistance of subject matter experts on an as-required basis to supplement the growing level of in-house aviation knowledge being developed within the District. It is recognized that the workload associated with the administration of the Airport has been uniquely high on account of three factors:

1. The lack of overall strategic direction regarding the future of the Airport;
2. Noise-related concerns from complainants; and
3. Requests from tenants for long-term lease agreements and operational certainty.

Each of these matters will be addressed through the Interim Recommendations Report, Strategic Plan, and through the establishment of District Council's preferred direction regarding the Airport – ideally, the administrative tasks associated with the Airport will decrease as each matter is successfully resolved.

To reduce the workload borne by District Staff in handling routine queries and requests and to support the implementation of other priorities articulated in the Interim Recommendations Report (improved awareness of noise abatement procedures and apron management), it is recommended that a Request for Proposals process be initiated for contracted Airport Ambassador services. The successful proponent (company or individual) engaged to provide Airport Ambassador services would assist the District in effectively administering the Airport through the completion of the following tasks (specific tasks and service levels would be described through the Request for Proposals):

- Completing a daily inspection of the airfield, rectifying matters that can easily be addressed (e.g., removing Foreign Object Debris), and informing the District of tasks that require action by the Engineering and Public Works team;
- Providing a contact phone number for inclusion in the CFS and on the Airport website that can be reached during prescribed days and hours, and responding to phone inquiries from pilots requesting Airport information;
- Informing itinerant pilots, by phone or in-person, of local noise mitigation procedures upon request;
- Directing itinerant aircraft to parking areas when required;
- Notifying residents requesting email updates of upcoming events that could generate increased noise;
- Administering the aircraft movement logging system (Section 10.3) and submitting activity reports to the District on a quarterly basis; and
- Promptly documenting and informing District Staff of potential violations to the Airport's rules and regulations (ground-related only) and supporting follow-up activities.

The proponent engaged to provide Airport Ambassador services would not have independent decision-making authority or fulfill the entire set of duties and responsibilities typical of an Airport Manager. The District would continue to be responsible for the administration of the Airport, with the Airport Ambassador role intended to serve as a resource to support the effective oversight of District Staff.

Based on HM Aero's experience at comparable airports, the most successful and cost-effective model would involve a tenant with a staffed presence at the Airport bidding on the Airport Ambassador services contract as a source of supplemental revenues. Depending on the service levels described through the Request for Proposals, the proponent engaged to provide Airport Ambassador services would not be required to provide a dedicated employee. Instead, the requested services could be delivered by one or more employees (e.g., existing administrative staff, management, etc.) while they perform the core duties associated with their primary employment.

The Request for Proposals for Airport Ambassador services would be released in the second quarter of 2022, and it is anticipated that the earliest that a contract could be initiated would be the third quarter of 2022. The ability to commence contracted Airport Ambassador services is contingent on the financial proposals received aligning with the District's approved budget for 2022; if all financial proposals exceed the budgeted total, services may need to commence in 2023 pending the approval of the next operating budget.

6.4.2 Contracted Aviation Subject Matter Expertise

As noted previously, an aviation subject matter expert (Avcon) was historically retained on an as-required basis by the District. With the retirement of this individual, it is recommended that the District retain the services of a new aviation consultancy to fill this gap on an as-required basis. The District may require the advisory services of a qualified aviation consultancy where specialized knowledge is required that is not held within the municipality.

7 AIRPORT OPERATIONS

7.1 Existing Conditions

7.1.1 Roles and Responsibilities

Operational and maintenance tasks are managed by the Real Estate Services team and are implemented by the District's Engineering and Public Works Division. Currently, maintenance and operational tasks at the Airport are completed on an as-requested basis and are completed when sufficient resources are available given the numerous responsibilities of the Engineering and Public Works Division. From a procedural standpoint, routine tasks and minimum service levels are not established, with examples including airfield inspection items, winter maintenance service levels, procedures for issuing Notices to Airmen (NOTAMs), and asset maintenance practices (e.g., crack sealing, vegetation control).

7.1.2 Winter Maintenance

Based on historical data from Environment and Climate Change Canada, Squamish received an annual average of 87 cm of snowfall between 1981 and 2010, with snowfall concentrated between November and March. Generally, the temperate climate of Squamish means that the accumulation of snowfall is limited.

Winter maintenance activities in the District are initiated pursuant to the prioritization established through the municipal Snow Removal Policy (Policy No. D061-01). The Airport is not specifically identified within the Snow Removal Policy and based on consultations with District Staff it is understood that Engineering and Public Works staff are typically deployed following the clearing of the primary, secondary, and tertiary priority roads to ensure emergency responder (e.g., fire, police, ambulance) access within the community. Through information provided by District Staff, the current Airport snow clearing protocol is generally described as follows:

- During a snow event, Real Estate Services monitors the forecast to determine the optimal time to begin snow removal activities. Tenants will often contact Real Estate Services requesting snow removal during this process;
- Typically, snow removal does not commence until the snow fall has ceased and there is no further snow in the immediate forecast;
- Once a snow removal window is established, Real Estate Services contacts Engineering and Public Works to determine an expected date / time when the Airport can be cleared. Engineering and Public Works does not clear the Airport at its own discretion as the budget for snow removal is the responsibility of Real Estate Services; and
- If a significant delay is expected as to when Engineering and Public Works can complete snow clearing, Real Estate Services will contract private contractors that responded to an earlier Request for Proposals in 2017 or others recommended by Engineering and Public Works.

This approach often provides reasonable response times but in the event of major multi-day snow events, it is possible that all of the options above cannot provide snow removal in a time frame that meets the expectations of the Airport's tenants. If an emergency is declared in Squamish, the Emergency Program Coordinator has the ability to prioritize snow removal resources to the Airport.

The CFS states that no winter maintenance is provided for the runways, taxiways, and aprons at Squamish Airport; pilots are responsible for determining local conditions prior to arriving or departing.

7.2 Opportunities for Improvement

7.2.1 Procedural Documentation

The District is highly reliant on the organizational knowledge accumulated within the Real Estate Services and Engineering and Public Works teams in how the Airport is operated. The departure of key positions with significant knowledge of the Airport in either part of the District would hinder the degree to which operational and maintenance tasks could be effectively managed and performed in the future.

The establishment of procedural documentation associated with the Airport would decrease the risk associated with the loss of organizational knowledge and improve the degree to which the Airport is maintained in a safe and effective manner.

7.2.2 Winter Maintenance

Notwithstanding the limited average annual snowfalls in Squamish, significant snowfall events such as those that occurred in the 2021-2022 winter season have resulted in multiple day periods where the Airport was unavailable and not maintained. The current winter maintenance level of service was identified as a deficiency by:

- BCEHS, who noted that air ambulance missions to the Airport have been cancelled on account of snow and ice conditions on the airside surfaces and groundside access roads. Having a cleared surface is a priority to ensure both safe aircraft operations and to facilitate the movement of gurneys and paramedics without slipping;
- Rotary-wing tenants, primarily due to challenges with accessing their leasehold lots if groundside roads are not cleared; and
- Fixed-wing tenants, who require that all airfield surfaces and groundside access roads are usable.

Provisions are not identified for clearing the Airport in advance of an air ambulance arrival and doing so in a timely manner may not be achievable if a significant amount of snow and ice has been permitted to accumulate. Increasing the winter maintenance level of service for BCEHS air ambulance operations has been identified as a recommendation for implementation in 2022 / 2023 through the Interim Recommendations Report, recognizing the time-sensitive and critical nature of such flights. Increasing the winter maintenance level of service must be considered within the context of the increased cost or impacts. First, the District has operated the Airport on a cost-neutral basis without input from the taxpayer. Second, for the District to prioritize increased winter maintenance, one of the following options would be required:

- Delaying the clearing of other District roads required for public safety (e.g. fire, police);
- Acquiring dedicated mobile equipment (i.e., a grader and loader) to be stationed at the Airport. Financial implications for the acquisition of dedicated mobile equipment are estimated at approximately $1,000,000 for a 10 to 15-year life span. The rental of a loader (one of the two pieces of equipment required) is estimated at $8,000 or more per month. Additional District Staff resources would also be required for the operation of this equipment; or
- Establishing a priority snow clearing contract with a third-party contractor.

7.3 Comparator Airport and Recommended Practices Review

7.3.1 Procedural Documentation

As a registered aerodrome, the Airport is not required to hold or maintain operational manuals and procedures as is the case with certified airports. Airports that are certified to Transport Canada standards are required to maintain the following documents, each of which detail different elements of the facility's operation:

- Airport Operations Manual
- Winter Maintenance Plan;
- Emergency Response Plan;
- Wildlife Management Plan; and
- Safety Management System.

Additional operating procedures may also be established by airport operators to document how specific tasks are to be completed. While the Airport is not required to maintain the manuals and plans described above, such requirements are imposed on certified airports by Transport Canada to ensure that minimum service levels and safety standards are being met. Registered aerodrome operators may choose to voluntarily establish documented processes and procedures that address some or all of the areas described above without seeking certification. Doing so is at the initiative of these operators with the same objectives of ensuring safety and effective maintenance. Examples of registered aerodromes that have non-certified processes and procedures documented including Golden Municipal Airport, operated by the Town of Golden; and Revelstoke Airport, overseen by the Columbia Shuswap Regional District and operated by a private contractor.

7.3.2 Winter Maintenance

Transport Canada does not prescribe minimum winter maintenance service levels that must be provided at the Airport. The winter maintenance level of service provided is at the discretion of each airport and aerodrome operator. Decision-making factors related to winter maintenance include, but are not limited to:

- The local climate and winter conditions;
- The volume of activity that occurs at the facility;
- Emergency access requirements, such as routine handling of air ambulance missions;
- The availability of operational funding; and
- Resources available to support winter maintenance (i.e., staff and equipment).

A review has been completed of the winter maintenance service levels declared in the CFS for a sample of comparable regional and community airports and aerodromes. As shown in Table 7.1, a variety of approaches are taken by airport and aerodrome operators given the priority that each municipality assigns, the resources that are available, and local winter maintenance needs.

Table 7.1 - Comparator Airport Winter Maintenance Service Levels

Airport	Owner	Average Annual Snowfall [1]	Declared Service Level (CFS)	Notes
Revelstoke Airport	Columbia Shuswap Regional District	367 cm [2]	Limited Winter Maintenance	Snow clearing completed by dedicated airport staff with on-site equipment
Pemberton Airport	Village of Pemberton	166 cm [2]	Limited Winter Maintenance	Completed by municipal staff as resources permit No on-site mobile equipment
Golden Airport	Town of Golden	158.7 cm	Not Declared	Completed by municipal staff as resources permit No on-site mobile equipment Provisions in place for emergency snow clearing
Princeton Airport	Town of Princeton	125.1 cm	Limited Winter Maintenance	Completed by municipal staff; identified within the municipal snow clearing plan as the lowest priority asset No on-site mobile equipment
Squamish Airport	District of Squamish	87.0 cm	No Winter Maintenance	Completed by municipal staff as resources permit No on-site mobile equipment
Chilliwack Airport	City of Chilliwack	85.3 cm	Limited Winter Maintenance	Snow clearing completed by airport staff with on-site equipment Air ambulance parking position cleared on a priority basis Provisions in place for call-out snow clearing
Merritt Airport	City of Merritt	66.7 cm	No Winter Maintenance	No on-site mobile equipment
Lillooet Airport	District of Lillooet	27.5 cm	Not Declared	Completed by municipal staff as resources permit No on-site mobile equipment
Powell River Airport	City of Powell River	46.5 cm	Service Levels Established: Mon-Fri	Completed by municipal staff On-site mobile equipment Scheduled air carrier services supported
Sechelt Airport	District of Sechelt	22.8 cm	No Winter Maintenance	Local conditions typically do not necessitate extensive snow clearing Snow clearing completed by contracted Airport Manager on an as-required / best efforts basis

Notes

[1] Average annual snowfall data is based on 1981 to 2010 Canadian Climate Normals station data published by ECCC. Where data for two or more monitoring stations is available in a community, the airport station (if available) is used.

[2] Data for these airports was not sourced from ECCC and is based on external sources.

The current arrangement for winter maintenance at the Airport whereby District Staff clear the facility when resources permit, and other municipal priorities have been met is comparable to that of other similarly sized airports in British Columbia and Canada more broadly. Only Revelstoke, Chilliwack, and Powell River have the equipment to prioritize snow removal at their respective airports among the reviewed sample. For municipal airports without the identified need and / or financial capacity for dedicated maintenance crews, the allocation of public works employees is a commonplace approach used both in British Columbia and at comparable airports across Canada. The variation in the approaches taken across Canada centres around the needs of the primary airport users, the financial capacity of the airport operator, local winter conditions, and the level of service decisions made by the airport operator.

Although not shown above, HM Aero is aware that some airports include a service surcharge for services such as winter maintenance. As a result, if increased winter maintenance requires expenditures beyond the current airport operating budget, the precedent exists whereby the existing tenants could contribute towards the cost.

7.4 Interim Recommendations (2022-2023)

7.4.1 Procedural Documentation

The preparation of an Airport Processes and Procedures Manual by qualified personnel in coordination with District Staff is recommended to occur in 2024. The initiation of the Airport Processes and Procedures Manual is recommended to commence following the completion of the Strategic Plan process. This document would address matters including, but not limited to:

- The Airport's administrative and operational structure, including responsibilities of District Staff members;
- Provisions for safety when persons and vehicles are operating on the airside movement area;
- Proactive maintenance and oversight, including routine inspection, NOTAM requirements, vegetation management, winter maintenance, crack sealing and pavement repairs, and line painting;
- Procedures for on-site construction, development, and alterations; and
- Incident reporting processes and responsibilities.

7.4.2 Winter Maintenance

As noted previously, the winter maintenance level of service provided at the Airport is at the discretion of the District given its role as the facility's owner and governing authority. However, the current winter maintenance prioritization of the facility has been identified by BCEHS as a significant limitation that hinders the organization's ability to conduct essential air ambulance missions, and by tenants that are challenged in accessing their leasehold lots and operating their aircraft on favourable weather days following a snowfall event.

In the short-term (2022 / 2023) planning horizon, it is recommended that implementing revised procedures for clearing the Airport on an as-required basis to support BCEHS operations be prioritized. This can be achieved by expediently clearing the critical areas (groundside roads, apron, taxiway, and part of Runway 14-32) required to support the arrival of a BCEHS helicopter. Given the expected costs of acquiring District-owned mobile equipment to be stationed at the Airport and the need to maintain service on other priority routes in the Snow Removal Policy, it is recommended that the District initiate a Requests for Proposals process in advance of the 2022-23 winter season for a standby private contractor to provide services during the heaviest snowfall months (e.g., December, January, and February) and to assess the feasibility of this model upon the receipt of proposals.

Further, to implement this short-term model, it is recommended that the District convene a series of working sessions in advance of the 2022-23 winter season with Real Estate Services, Engineering and Public Works, BCEHS, and Squamish General Hospital. The intent of these sessions would be to:

- Identify the critical snow removal areas required to support an air ambulance arrival;
- Outline the roles and responsibilities for each entity in a winter air ambulance arrival scenario; and
- Establish points of contact to determine the Airport's condition, mobilize snow clearing personnel, and provide operational information to BCEHS.

It must be recognized that although this short-term solution is expected to improve the level of service for air ambulance operations, major snowfall events may still limit the ability to expediently clear the required areas prior to a BCEHS arrival.

Through the Request for Proposals for increased winter maintenance to support air ambulance operations, the District can also explore as a separate item the feasibility of contracting a standby private contractor to prioritize the remainder of the Airport for the existing tenants.

Winter maintenance procedures would be recommended for inclusion in the previously described Airport Processes and Procedures Manual.

8 RULES AND REGULATIONS

8.1 Existing Conditions

Rules and regulations pertaining to the Airport are currently included in tenant lease agreements and are reproduced as follows:

1. Refuse

(a) All trash, rubbish, waste material and other garbage shall be kept within the Premises until the day of removal, such removal to be at the expense of the Tenant on a regular basis as determined by the District.

(b) The Tenant shall not burn any garbage in or about the Premises or anywhere within the Airport Lands.

(c) If the Tenant's garbage is of a deteriorating nature, creating offensive odours, the Tenant shall utilize and maintain at its cost and expense registered facilities as required by the District.

(d) In the event the District considered necessary, or otherwise consents in writing to, the placing of the Tenant's garbage outside the Premises, such garbage shall be placed by the Tenant in containers approved by the District but provided at the Tenant's expense and kept at a location designated by the District.

1.2 Infestations

Should the Premises become infested with rodents, vermin or the like, the Tenant shall forthwith remedy the same and shall use, at the Tenant's cost, such pest extermination contractor as the District may direct and at such intervals as the District may require as being necessary by reason of the conditions in the Premises.

1.3 Notice of Accident, Defects

The Tenant shall give immediate notice to the District in case of fire or accident in the Premises or of defects therein or to any fixtures or equipment thereon.

1.4 Emergency Contacts

The Tenant shall provide the District with the names, addresses and telephone numbers of two (2) authorized employees of the Tenant who may be contacted by the District in the event of an emergency relative to the Premises.

1.5 Permits, Licences

The Tenant alone shall be responsible for obtaining, from the appropriate governmental authority or other regulatory body having jurisdiction, whatever permits, licenses or approvals as may be necessary for the operation of its business, the whole to the entire exoneration of the District.

1.6 Timber

Except as authorized by the District in writing, all trees situated upon or cleared from the Premises shall at all times remain the property of the District.

1.7 Further Rules and Regulations

For the general benefit and welfare of the Airport Lands and the tenants therein, the District may amend these rules and regulations, by alteration or addition, and such amended rules and regulations shall be binding on the Tenant.

Additional provisions are made in Items 4.13 and 4.14 pertaining to rotor-wash / prop-wash and noise abatement, respectively. Item 4.13 is reproduced below as Item 4.14 is addressed separately in this Report:

> ***4.13 Down-drafts, Rotor Wash or Prop Wash***
>
> *It will be the sole responsibility of the Tenant to ensure no problems relating to down-drafts, rotor wash or prop wash occur to the property of the District or the properties leased to other Tenants on the Airport Lands, as a result of flying gravel, dirt, or other substances, during the operation of the business of the Tenant. Any such damage to the surrounding District's property or the tenants' property will be the sole responsibility of the Tenant to rectify said damages and no acceptance of rent subsequent to any breach or default, other than non-payment of rent, nor any condoning, excusing, or overlooking by the District on previous occasions of breaches or defaults similar to that for which re-entry is made will be taken to operate as a waiver of this condition nor in any way to defeat or affect the rights of the District hereunder.*

8.2 Opportunities for Improvement

The existing rules and regulations address the manner in which District-owned lands are used by controlling matters such as the disposal of refuse, infestations, notification and contact requirements, permits, and timber clearing with existing tenants. The rules and regulations do not:

- Address the manner in which tenants use the Airport for aviation;
- Apply to parties other than the tenants (e.g., itinerant aircraft operators);
- Make provisions for the levying of fees for aircraft parking, the establishment of maximum durations for parking, and the use of Airport lands for commercial purposes by non-tenants; or
- Establish a rates and fees schedule for services such as aircraft parking.

8.3 Comparator Airport and Recommended Practices Review

The application of rules and regulations, whether through internal policies or a municipal airport establishment bylaw, is commonplace at airports across Canada as operators seek to establish further control over the daily activities that occur at their facilities, especially by visiting aircraft. Additionally, bylaws enacted by municipalities have been used elsewhere to establish the rates and fees schedule applicable to aircraft operators for the use of their airport and the various services provided, including:

- Campbell River Airport – City of Campbell River Bylaw No. 3211, Consolidated to Bylaw No. 3738;
- Nelson Airport – City of Nelson Bylaw No. 3078.
- Pemberton Airport – Village of Pemberton Bylaw No. 817; and
- Qualicum Beach Airport – Town of Qualicum Beach Bylaw No. 457.08.

8.4 Interim Recommendations (2022-2023)

To clarify the District's expectations regarding user conduct at the Airport, ensure that rates and fees are clearly communicated and applied, it is recommended that the preparation of an Airport bylaw be considered in 2023. The Airport bylaw would include:

- Definitions that are applied through the bylaw;
- The legal description of the Airport lands;
- Rules pertaining to the use of the Airport lands by commercial operators, aircraft parking, and other areas of interest to the District acting within its authority as the landowner;
- The ability for the District to charge rates and fees, and the schedule of those fees; and
- Provisions for offences and penalties for non-compliance.

9 TENANT LEASE RATES

9.1 Existing Conditions

The tenants of the Airport each pay rent to the District for their use of their respective demised premises. For the five aviation tenants, rent values are calculated on a square footage basis; Squamish Wood Waste and ECCC have separate lump sum rent agreements. For aviation tenants, two lease rates have been established:

- Commercial Purposes: $0.16 per ft^2 per year; and
- Recreational Purposes: $0.08 per ft^2 per year.

Four tenants are charged the Commercial Purposes lease rate, while the Squamish Flying Club is charged the Recreational Purposes rate on account of its not-for-profit status.

Both rates were most recently established in 2009 and have been applied consistently through lease extension agreements in subsequent years. These rates continue to apply in 2022. In total, the District receives $62,222 in annual rent from the tenants listed in Table 9.1. As described previously in Section 2.10, the rents paid by the tenants are the primary source of operating revenues for the facility and are instrumental in minimizing Airport-related tax-supported costs.

Table 9.1 - Current Airport Lease Rates

Tenant	Lease Rate (per ft^2)	Leased Area (ft^2)	Annual Rent
Black Tusk Helicopter	$0.16	190,672	$30,507.52
Blackcomb Helicopters	$0.16	70,848	$11,335.68
Glacier Air	$0.16	43,109	$6,897.44
Sea to Sky Air	$0.16	8,660	$1,385.60
Squamish Flying Club	$0.08	68,816	$5,505.36
Squamish Wood Waste	N/A	618,116	$4,190.00 [1]
Environment and Climate Change Canada	N/A	3,229	$2,400.00 [2]
Total		**1,003,450**	**$62,221.60**

[1] The Squamish Wood Waste lease is negotiated using a different process from the aviation tenants.

[2] ECCC does not pay a lease rate to the District; the $2,400 is an annual maintenance and security fee.

9.2 Opportunities for Improvement

The lease revenues of the Airport are integral to the financial sustainability of the facility, and the strong revenue base has contributed to the financial surpluses realized in 2021, 2020, and 2019, in combination with the minimal operating costs. With the District intending to execute new lease agreements with the Airport tenants, the opportunity exists to evaluate the current lease rates and determine if changes should be made. The following factors underscore the appropriateness of such a review:

- The Commercial Purposes and Recreational Purposes rates have not been updated since 2009 or earlier and have not been adjusted to address the impacts of inflation and the Consumer Price Index. Based on data provided by the Bank of Canada, between 2009 and 2022 the average annual rate of inflation was 2.08%; and
- Several initiatives described through the Interim Recommendations Report, and later advanced through the Strategic Plan could increase the operating costs associated with the Airport (e.g., improved winter maintenance, Airport Ambassador services, and capital improvement projects). Operating revenue streams should be optimized if the District seeks to continue operating the Airport on a cost-neutral basis to the taxpayer.

9.3 Comparator Airport and Recommended Practices Review

Lease rate data was retrieved from publicly available sources and from outreach with operators for 12 community and regional airports in British Columbia to determine whether the Airport's current rates fall within a reasonable range. The data provided in Table 9.2 includes lease rates for both serviced and unserviced lots to illustrate the variations that exist while also capturing comparators across the province. As shown in Table 9.2, the Commercial and Recreational Purposes lease rates currently charged at the Airport are the lowest versus the 12 comparator airports, including the consideration of both unserviced and service rates. The two-tiered approach (Commercial and Recreational) used at Squamish is used at Powell River Airport and Sechelt Airport, while the remaining comparator airports have adopted standard rates that vary on servicing and airside / groundside access.

From a recommended practices standpoint, the following factors should be considered when determining the appropriateness of revised lease rates:

- The operational level of service being provided by the District should align with the lease rates paid by tenants, including matters such as winter maintenance and the state of repair of airside and groundside infrastructure;
- The continued lack of potable water and sanitary sewer servicing. While all tenants benefit from access to the airside system, fully serviced lots typically command a premium compared to unserviced lots; and
- The duration of the leases offered. Typically, shorter lease terms do not command as high a lease rate when compared to longer-term leases.

Table 9.2 - Comparator Airport Lease Rate Review

Airport	Annual Rate (per ft^2)	Notes
Unserviced Lots		
Princeton	N/A	• Lease rates are to be negotiated by the Economic Development Department and approved by Town Council
Squamish	**$0.08**	• **Recreational use rate, no annual increase provisions**
	$0.16	• **Commercial use rate, no annual increase provisions**
Pemberton	$0.20	• Subject to annual CPI increases
Oliver	$0.28	
Vernon	$0.31	
Trail	$0.40	
Serviced Lots		
Williams Lake	$0.17	• Subject to annual CPI increases
Merritt	$0.28 - $0.35	
Vernon	$0.44	
Chilliwack	$0.37	• Subject to annual CPI increases
Servicing Information Unavailable		
Powell River	$0.095	• Non-profit use rate, increases by 1% - 2% annually
	$0.191	• Commercial use rate, increases by 1% - 2% annually
Courtenay	$0.20	• Increases by 4.5% annually
Sechelt	$0.09	• Private use rate (2012)
	$0.235 - $0.24	• Commercial use rate
Qualicum Beach	$0.25 - $0.35	

9.4 Interim Recommendations (2022-2023)

As noted previously, the Airport's lease rates have not been updated since 2009 or earlier and adjustments have not been made to account for the impacts of inflation in subsequent years. Lease revenues are integral to ensuring its financial sustainability. Considering the review of the lease rates levied at comparable airports, a rate increase is considered appropriate for the Airport in the short-term.

Based on information provided by the Bank of Canada, inflation between 2009 and 2022 would result in a 30.61% change or an average rate of inflation of 2.08% per year. Applying these values to the base lease rates, the adjusted Commercial Purposes rate would be $0.21 per ft^2 and the Recreational Purposes rate would be $0.10 per ft^2. Applying these values against the comparator airport data, both rates would continue to fall in a reasonable range compared Powell River and Sechelt and would continue to be competitive against the balance of reviewed airports. This Consumer Price Index-based increase also provides a defensible justification and, while the additional lease costs would be borne by tenants, is limited in nature.

It is recommended that the short-term lease rates be $0.21 per ft^2 for Commercial Purposes and $0.10 per ft^2 for Recreational Purposes. It is also recommended that provisions be integrated in revised lease agreements that enable the District to update rates on an annual basis according to the annual Consumer Price Index increase. If tenants request additional certainty in their lease rates and / or District Staff do not wish to implement Consumer Price Index-based calculations annually, a predetermined increase of 2% per year (or an alternative value set by the District) could be included as a provision.

The increase recommended to the lease rates is based on the continued unavailability of municipal servicing and limited duration lease terms. A further increase to align with the rates charged at comparable airports with full servicing and longer lease terms would be justified and could be implemented if such initiatives are advanced in the future at the Airport and would be based on a feasibility analysis completed through the Strategic Plan.

10 OTHER RECOMMENDED INITIATIVES

In addition to the recommendations made in the preceding sections pertaining to the areas of focus established by the District, five matters were identified by HM Aero and are recommended to be addressed in 2022 / 2023 to:

- Reduce observed safety concerns or hazards;
- Achieve compliance with applicable provisions of the CARs; and
- Facilitate the successful implementation of recommendations made in preceding sections.

10.1 Obstacle Limitation Surfaces

Obstacle Limitation Surfaces are three-dimensional planes that are designated to limit the heights of structures, vegetation, and other obstacles, thereby protecting the airspace surrounding runways. These include:

- Approach Surfaces that protect the airspace along the extended runway centreline; and
- Transitional Surfaces that protect the airspace along the sides of the runway.

As a registered aerodrome, the Airport is not required to maintain Obstacle Limitation Surfaces to the specifications of TP312 – Aerodrome Standards and Recommended Practices. However, doing so is highly recommended in the interest of aviation safety. Through a review of the Civil Aviation Daily Occurrence Reporting System database, an aircraft has impacted trees in the vicinity of the Airport on at least one occasion. In July 2017, a single-engine Aero Commander 100-180 made contact with trees while on short final to Runway 15 and came to rest approximately 300 ft. short of the runway. While it cannot definitively be determined if the impacted trees penetrated the Runway 15 Approach Surface, this incident underscores the importance of maintaining a clear obstacle environment.

During HM Aero's site visit, several stands of trees were identified as areas of potential concern, given their height and proximity to Runway 15-33. Concerns regarding the proximity of trees to Runway 15-33 were also noted during consultations with aircraft operators.

Stands of nearby trees viewed while approaching (top) and departing from (bottom) Runway 15

It is recommended that funds be allocated through the 2023 capital budget for the completion of a LiDAR survey of the surrounding obstacle environment and subsequent Obstacle Limitation Surface assessment to identify penetrations recommended for trimming or removal (estimated at $40,000). The survey and assessment will quantify the number of penetrations to be addressed and assist in future budgeting efforts for removals. Based on the number of penetrations identified and the municipality's financial capacity, it is recommended that obstacles be removed (potentially over a multiyear period) per the following prioritization:

1. Priority 1 – Runway 15 and Runway 33 Approach Surfaces, on-Airport;
2. Priority 2 – Runway 15-33 Transitional Surfaces, on-Airport;
3. Priority 3 – Runway 15-33 Approach and Transitional Surfaces, off-Airport.

In 2023, it is recommended that $25,000 be budgeted for tree clearing and trimming. Off-Airport removals will require cooperation from the affected landowners; while important, the improvement of the on-Airport obstacle environment in the preceding phases will yield shorter-term benefits for aircraft safety and should be advanced.

10.2 Airport Webpage

The Airport webpage is hosted on the District's website (squamish.ca) and provides basic information about the facility, including its tenants, contact information, excerpts from the CFS, guidance on the noise mitigation procedures, and notes on the jurisdiction of the District. The existing webpage has a clean design and based on its current functionality, it is not anticipated that a separate Airport website will be required. However, limited information required by pilots is available on the Airport webpage.

It is recommended that the District internally update the Airport webpage in 2022 through the inclusion of information pertaining to:

- The social and economic benefits of the Airport;
- The tenants of the Airport and the services that they provide
- Local noise mitigation procedures;
- The availability and location of fuel, services, and itinerant parking;
- Rates and fees;
- The process for submitting noise concerns. It is recommended that a standardized fillable form for submitting noise concerns be included, similar to the Bylaw Complaint Process portal;
- The process for reporting safety concerns;
- The use of Remotely Piloted Aircraft Systems ("drones") near the Airport; and
- If the District's existing web hosting system includes the appropriate functionality, a portal for paying parking fees and other aeronautical fees that may be applied in the future.

In subsequent years, additional updates will be required based on the implementation of various Airport projects and initiatives.

10.3 Aircraft Movement Logging System

As described in Section 2.7, the District does not have a standardized process for recording the number of aircraft movements that occur at the Airport. While estimates have been prepared for 2017, 2018, and 2019, the accuracy of these values cannot be verified. Recording aircraft movement activity at the Airport is an important exercise to inform the effective administration of the facility, provide information to the public, and to support grant applications.

At airports comparable to Squamish where financial resources are limited and an on-site presence by NAV CANADA is not provided, recording devices are typically used that are activated when a pilot transmits on the Aerodrome Traffic Frequency (ATF). Pilots operating at the Airport declare their registration and intentions (e.g., “Cessna ABC on final Runway 15 full-stop”) to assist other pilots in maintaining separation and safety. These transmissions, when recorded, can be interpreted and logged by a qualified individual at the end of each day or week to establish movement records for the Airport.

The aircraft movement logging system would require the procurement of a Very High Frequency radio scanner, an audio input cable to a computer, and a computer with recording software. While this system is a low-cost option in terms of its acquisition costs, a qualified individual still needs to regularly (e.g., daily or weekly) review the recorded transmissions, interpret the transmissions, and log each movement. The daily workload associated with this task would vary with activity levels and could range between 5 and 60 minutes.

It is important to note that the aircraft movement logging system will not be able to track or record the position or altitude of aircraft – this would be a tool that is limited to gathering data about the number and type of operations at the Airport. Aircraft flightpaths cannot be reliably monitored or recorded without radar, Automatic Dependent Surveillance–Broadcast (ADS-B), or operators installing third-party transponder-based hardware and software systems and consenting for the District to use this data.

Research is ongoing on options for radio, camera, and GPS-based automated systems for recording aircraft movements, including their associated costs and benefits. Recommendations for such systems may be included through the Strategic Plan.

10.4 Airside Signage Replacements

The three mandatory instruction and information signs located near Taxiway A and Runway 15-33 were identified in Section 2.3.1 to not meet the standards described in TP312 for frangibility – while TP312 is not binding on the Airport as a registered aerodrome, the location of these signs within the runway strip presents a potential hazard to aircraft. It is recommended that the existing signage units be remounted on frangible bases in 2023.

10.5 Taxiway Strip Clearing

While Taxiway A is not required to comply with TP312, the protection of a 31 m wide taxiway strip is recommended to limit obstacles that could damage aircraft. In addition, providing unobstructed sightlines to Runway 15-33 from the holding position is important to ensure that pilots can verify the vacancy of the runway prior to entering. During HM Aero's site visit in March 2022, areas of low-lying vegetation were also observed near the Taxiway A / Runway 15-33 holding position that have the potential to obscure visibility for pilots holding short on the taxiway while waiting for arriving or departing traffic. A series of small boulders were also identified within the taxiway strip on and near Blackcomb Helicopter's leasehold area.

In 2022, it is recommended that the low-lying vegetation in the vicinity of the Taxiway A / Runway 15-33 holding position be cleared and that all movable obstacles within the 31 m taxiway strip be relocated. It is anticipated that this task can be completed by District Staff without the requirement for an external contractor.

Taxiway A strip items of concern

10.6 Pilot Acknowledgement Form

Although through discussions with existing operators at the Airport it appears that there is an awareness of the noise management objectives of the voluntary / preferred flight path published in the CFS and the language included in tenant leases, it is recommended that each individual pilot operating from leased land at the Airport be asked to sign a form acknowledging their awareness of these objectives. Notwithstanding the fact that adherence to the published voluntary flight path is solely decided upon by the pilot to ensure safety, this acknowledgement will provide for each existing operator to be able to show that noise management is considered in their flight decisions.

11 FINANCIAL IMPLICATIONS AND IMPLEMENTATION STRATEGY

For recommended initiatives with cost implications (e.g., capital projects, consultant fees), preliminary cost estimates are provided in Table 11.1. The total estimated costs for projects recommended for completion in 2022 ($30,500) are within the funds budgeted for the Airport in 2022 ($81,000 [10]). Four additional projects totalling $76,000 are also identified in Table 11.1 for consideration in the first year of the 2023-2027 Five Year Financial Plan:

1. Airport Bylaw Preparation;
2. Obstacle Survey and Penetration Analysis;
3. Obstacle (Tree) Trimming and Removal; and
4. Airside Signage Frangible Base Procurement.

An additional potential increased budget item not shown for consideration in future years but warranted prior to entering into long-term leases includes whether to continue / increase the proposed role of the Airport Ambassador. The determination of whether to increase this service in 2023 and beyond will be based on the evaluation of the 2022 pilot project.

Based on the timing considered for each of the items identified through the Interim Recommendations Report, a recommended Implementation Strategy is shown in Figure 11.1. The Implementation Strategy provides a systematic and prioritized approach to actioning the recommended projects outlined through this Report and identifies District and third-party resources that are anticipated to be required to deliver each task. The timing of each task may vary from the schedule shown based on the availability of District Staff and third-party resources, timelines associated with procurement, and emergent priorities not considered through the Implementation Strategy.

[10] The 2022 budget total also includes funds dedicated to other priorities, including insurance, snow removal, line painting, landscaping, etc.

Table 11.1 - Estimated Financial Implications

Expense	Expense Description	2022	2023
Airport Noise Management			
Voluntary Noise Abatement Procedure CFS Updates	Consultant Fees	$1,500	
Aircraft Movement Logging System	Capital Costs	$5,000	
Total - Airport Noise Management		**$6,500**	
Airport Administration			
Airport Ambassador Services Procurement Support	Consultant Fees	$2,000	
Airport Ambassador Services	Contractor Fees	$15,000	
Total - Airport Administration		**$17,000**	
Apron Management			
Apron Paint Marking Specifications	Consultant Fees	$1,000	
Apron Paint Markings	Contractor Fees	$5,000	
Apron Management Plan Signage	Capital Costs	$1,000	
Total - Apron Management		**$7,000**	
Total - 2022 Estimated Project Costs		**$30,500**	
Total - 2022 Budget (Includes other items including snow removal, insurance, line painting, etc.)		**$81,000**	
Other Initiatives Recommended for 2023 Budget Consideration			
Airport Bylaw Preparation	Consultant Fees		$5,000
LiDAR Obstacle Survey and Penetration Analysis	Consultant and Contractor Fees		$40,000
Obstacle Trimming and Removal	Contractor Fees		$25,000
Airside Signage Frangible Base Procurement	Capital Costs		$6,000
Total - 2023 Estimated Project Costs			**$76,000**

Figure 11.1 - Implementation Strategy

Task		Lead	2022 - Q2		2022 - Q3			2022 - Q4			2023 - Q1			2023 - Q2			2023 - Q3			2023 - Q4		
			May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Strategic Plan Process																						
Interim Recommendations Report	Presentation to District Council	Real Estate / Consultant																				
2023 Requested Budget Items	District Council Budget Deliberation Process	Real Estate																				
Strategic Plan	Completion - Draft Report	Consultant																				
	Completion - Final Report	Consultant																				
	Presentation to District Council	Real Estate / Consultant																				
Airport Noise Management																						
Voluntary Noise Abatement Procedure CFS Updates	Submission of Requested Updates	Real Estate / Consultant																				
	Anticipated Publishing of Requested Updates	NAV CANADA																				
Noise Concern Tracking	Launch of Noise Concern Submission System and Public Outreach	Real Estate / Information Technology																				
	Noise Concern Evaluation	Real Estate																				
Community Noise Management Communication Improvements		Real Estate / Information Technology																				
Land Use Planning Review		Real Estate																				
Apron Management																						
Apron Management Plan Implementation	Notify Tenants and Airport Users, Issue CFS Update, Update Airport Webpage	Real Estate																				
	Relocate Itinerant Parking Positions	Real Estate / Public Works																				
	Apply Apron Paint Markings and Signage	Real Estate / Contractor																				
Airport Administration																						
Airport Ambassador Services	Request for Proposals and Evaluation	Real Estate																				
	Start of Contract (Ongoing)	Real Estate / Airport Ambassador																				
Airport Operations																						
Winter Operations	District / BCEHS / Hospital Working Sessions	Real Estate / Public Works																				
	Third-Party Winter Maintenance Request for Proposals and Evaluation	Real Estate / Public Works																				
	Third-Party Winter Maintenance Period	Real Estate / Public Works																				
Rules and Regulations (Fees and Apron Usage)																						
Airport Rules and Regulations (Fees and Apron Usage)	Preparation of Airport Bylaw	Real Estate / Consultant																				
	Enactment of Airport Bylaw by District Council	Real Estate																				
Tenant Lease Rates																						
Short-Term Tenant Lease Agreements	Negotiations With Existing Tenants	Real Estate																				
	Presentation to District Council for Approval	Real Estate																				
Other Recommended Initiatives																						
Taxiway Strip Clearing		Real Estate / Public Works																				
Airport Webpage Updates		Real Estate / Information Technology																				
Airport Movement Logging System Procurement and Implementation		Real Estate / Information Technology																				
Obstacle Limitation Surfaces	LiDAR Obstacle Survey and Penetration Analysis	Real Estate / Consultant																				
	Obstacle Trimming and Removal	Real Estate / Contractor																				
Airside Signage Frangible Base Procurement and Installation		Real Estate / Public Works																				

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