YUKON'S FLIGHT PATH: 2020-2030 AVIATION SYSTEM INVESTMENT STRATEGY

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Prepared for:

Government of Yukon

Prepared by:

Stantec Consulting Ltd.

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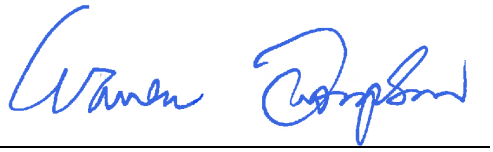
Prepared by 
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EXECUTIVE SUMMARY

Stantec Consulting Ltd. is pleased to submit the report Yukon's Flight Path: 2020-2030 Aviation System Investment Strategy to the Government of Yukon for consideration in its future planning of Yukon's aviation system. The Aviation System Investment Strategy is comprehensive and includes tools developed to support the Government of Yukon's investments in the aviation system for the next 10 years.

The recommendations in the Aviation System Investment Strategy will be one of the inputs that informs the Government of Yukon as they address aviation infrastructure to better meet the public's air travel needs. The aviation system in Yukon has a broad range of demands placed on it. These demands vary from the major gateway to Yukon, Erik Nielsen Whitehorse International Airport (ENWIA), to essential remote outposts for an active general aviation community.

Aviation system investments require a focus on safety, first and foremost, while also ensuring the ability to support community and emergency services, economic development, tourism, mining and other industries The balancing act of achieving regulatory and safety compliance, offering services compatible with passenger and flight volumes, and working within fiscal realities is complex anywhere, but even more so in a jurisdiction like Yukon where the population is small and geographically expansive. It is recognized that the Government of Yukon has many priorities, and that the needs of the Yukon aviation system must be balanced with all the other infrastructure needs across Yukon, such as the highway network, hospitals and schools for example.

The Aviation System Investment Strategy presents an opportunity for the Government of Yukon to continue prioritizing and informing its infrastructure investments. The recommended approach has been developed to enhance Government of Yukon's ability to be accountable and transparent while ensuring a safe operating environment that meets the needs of its airport/aerodrome stakeholders and travelling public. The Aviation System Investment Strategy provides an opportunity for Government of Yukon to discuss next steps with other governments, stakeholders and the public for investing in Yukon's aviation system.

Methodology and what we heard

As outlined in Section 2 – Flight Path Methodology, Stantec reviewed and synthesized all relevant planning, technical, and operational documentation. In addition to the comprehensive document review, Stantec interviewed several dozen Government of Yukon staff to understand and document the current state of all 28 airports and aerodromes in the Yukon aviation system. Based on the comprehensive document review and interviews with Government of Yukon staff, Stantec established a 10-year system and service maintenance baseline.

The Aviation System Investment Strategy is also informed by an extensive community and stakeholder engagement process which gathered input from hundreds of Yukoners including passengers, First Nations and municipal governments, and various aviation and business organizations. The engagement

process was designed to gather input on four topic areas related to Yukon's aviation system: priorities, expectations, opportunities and challenges, and financial sustainability. What we heard regarding each topic area is described at a high-level in the *What We Heard* communications document (presented in Appendix A). For reference only, key themes heard have been summarized below and in Section 2 – Flight Path Methodology.

Priorities

- Yukon's aviation system is highly valued for its many roles (i.e., emergency services, supporting the economy, and allowing relatively easy movement of people and cargo).
- All those engaged agreed the most important decision-making factor regarding the aviation system should be the health, safety, and security of all users and Yukoners.
- When asked specifically which investments should be prioritized, the top three investments identified in the survey were those that support public health and safety, communities and the tourism sector.

Expectations

- Respondents expect all airports/aerodromes/airstrips to be safe for users and nearby residents; to remain open and available for public use; to continue to be used to protect Yukoners' health and safety; and for capital investments and maintenance to not unfairly increase their cost of living.
- While levels of satisfaction varied by airport/aerodrome/airstrip, respondents said Yukon's aviation system was generally meeting their expectations with the highest satisfaction for passengers using Erik Nielsen Whitehorse International Airport and for members of the aviation community using Dawson City Airport.

Areas for improvement

Below is a snapshot of what could be improved.

- Passengers expressed wanting to see:
  - Enhanced passenger amenities, specifically food services; entertainment amenities (e.g., Wi-Fi, play areas, shopping); larger lounge areas with more comfortable seating; and enhanced general aesthetics and design of terminals
- Members of the aviation community expressed wanting to see:
  - Enhanced maintenance
  - Better navigation, communication, and weather aids
  - Access to more aircraft services (e.g., fuel, plug-ins, aircraft parking, and tie-downs)
  - Access to terminal buildings and construction of new facilities such as picnic areas, campgrounds, or outhouses

- A focus on land development and leasing opportunities and changes to the existing application and approval process
- Enhanced passenger amenities (i.e., shared technology for airlines such as shared check-in desks and baggage drop areas, self-serve kiosks, common use terminal equipment, and flight information screens)
- More transparent and cooperative communication between members of the aviation community and the Government of Yukon
- Improved governance and policies within the Government of Yukon to better support aviation users and businesses

Opportunities

Participants see the key opportunities as:

- Increasing safety and reliability of the system
- Land development and leasing
- Supporting local communities through collaboration and partnerships
- Enhanced collaboration and communication with the aviation community

Financial sustainability

Many respondents were open-minded considering some modifications to how the aviation system is funded; however, the following views must also be considered.

- Importance of the system and cost of living:
  - All airports/aerodromes/airstrips are important and must safely accommodate emergency uses.
  - Would like to see the aviation network expanded to better support safety and the economy
  - Concern that reducing maintenance (modifying the level of service) would create unsafe conditions or lead to some airports/aerodromes/airstrips being closed
  - Fear that any increase in aviation fees would be passed down to Yukoners, their everyday cost of living would increase, and they would no longer be able to afford flights making travel very difficult
- Accountability:
  - Concern that the Government of Yukon exploring alternative revenue sources would not result in better infrastructure or services
  - Want to see the Government of Yukon increase governance, management, and operations efficiency; and explore existing revenue generation methods (i.e., land development, leasing, advertising in terminals) before introducing new fees

- Partnerships:
  - Support of potential partnerships with private contractors, First Nations governments, or municipal governments assisting with maintenance of airports/aerodromes/airstrips (i.e., snow plowing, tree clearing, cleaning, or providing food and drink services in terminals)
  - Did not want to see the Government of Yukon release ownership of airports/aerodromes/airstrips

General findings

The Stantec assessment of the current Government of Yukon oversight associated with its 28 airports and aerodromes, as well as the extensive public feedback received in Flight Path engagements has identified the following:

- There is a need for a regular maintenance regime at all 28 airports and aerodromes, based on a standard "level of service" for the associated use and activity;
- There is an opportunity for Government of Yukon to standardize its programs that address obstacle limitation surfaces at its aerodromes;
- There is a need to further develop clear objectives for the aviation system, prioritize investments to align with approved objectives, and to more robustly report back to stakeholders and the public on progress against these objectives;
- There is an opportunity to improve the decision-making process and coordination for aviation infrastructure investments;
- The passenger experience at its certified airports could be improved starting with facility investments;
- There is an opportunity for greater collaboration with internal and external partners that provide services airside, groundside and in the terminals;
- There are several potential revenue opportunities whose viability should be further explored, which could also lead to visible service level improvements for both travellers and airport tenants; and
- There is a critical need to resolve the land leasing issues in order to provide the aviation community and investors the opportunity to plan and develop businesses and contribute to community growth.

General recommendations

These findings are further explored and addressed through recommended approaches in the Aviation System Investment Strategy, such as:

- Categorize the airports and aerodromes into classes that are consistent with other Government of Yukon program approaches and then standardize levels of service;
- Establish an investment approach to prioritize capital spending in aviation infrastructure that is evidence-informed, transparent and adaptable and then implement a multi-year planning approach to aviation capital spending;
- Increase collaboration with First Nations and local governments and other stakeholders to provide regular feedback on program initiatives;

- Increase collaboration with other groups within Government of Yukon who are involved in aviation infrastructure planning; and
- Consider targeted revenue opportunities to improve the sustainability of its airports and aerodromes.

Investing for a sustainable aviation system

Maximizing funding through effective planning mechanisms, including the continued development of a standard asset management approach, will continue to enhance Highways and Public Works' ability to maintain and properly sustain valuable aviation infrastructure to a level that meets stakeholder expectations. It should be noted that Transportation Division has a number of initiatives underway to improve aviation infrastructure maintenance including creation of the Transportation Planning Branch and the application of a division-wide asset management approach to aviation infrastructure.

The Aviation System Investment Strategy tells the story of what is needed to maintain the Yukon's airport and aerodrome infrastructure as well as sustain the Yukon aviation system to meet the needs of its many and varied users.

The Existing Environment

The Government of Yukon's capital program has six priority areas, which includes transportation infrastructure. Over the next five years, with a budget of $559 million, or $111.8 million per annum[1] a portion is allocated to the 28 airports and aerodromes. For the purposes of this report, the capital budget is estimated at $13 to $25 million per annum for aviation infrastructure over the next ten years and $1.5 to $8 million per year for buildings within the aviation system (such as airport terminal buildings and maintenance buildings)[2], with no annual increases due to inflation. These estimates are based on historical expenditures and take into consideration the Government of Yukon's five-year capital plan. It is noted that the Government of Yukon is continuing to move forward with advancing its multi-year capital planning approach (including five-year capital budgeting), which was initiated in the 2017/18 fiscal year by the Government of Yukon.

It is estimated that between $45 million and $68 million is required for capital maintenance during the ten year investment period and the overall projected capital program recommendations (including capital maintenance) for this period will be between $217 million and $356 million (or between $21.7 and $35.6 million per annum). Additionally, the projected operating and maintenance expenditures are expected to be approximately $15 million per year during the ten-year investment period. The operating and maintenance expenditures are expected to increase with inflation and if service levels increase within the aviation system.

Moving to a sustainable aviation system

Sustainability is not necessarily "catching up" on capital investments to address the backlog associated with infrastructure deficits for the 28 airports and aerodromes. The move to sustainability will require a shift to:

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[1] Government of Yukon's Five-Year Capital Plan – March 2020
[2] Note that the vertical infrastructure is not under the jurisdiction of TAB and it is managed by Property Management Division.

- An asset management approach;
- Determination of levels of service at each site;
- Creation of a classification system for airports and aerodromes;
- Regular maintenance based on the class of aerodrome;
- A multi-year planning approach; and
- Implementation of an Investment Model to assess and evaluate capital investment priorities based on the investment's risk profile and a broad multiple accounts evaluation (MAE).

The model will also categorize the investments into non-discretionary and discretionary capital budget items. The recommended rankings coming out of the Investment Model will be supportable and transparent in relation to the spending program in any given fiscal year. The investment priorities will identify items that can be realistically funded given existing operating and financial constraints, as well as establish a "waiting list" of investments that could be considered if funding, resources and time became available in the future. It is recommended that this prioritization be re-evaluated on a 3-year basis.

Formalizing classification of airports and aerodromes allows Government of Yukon to group sites based on their functions, traffic volumes and/or user requirements. It then allows levels of service to be assigned by class. These levels will be expressed as ranges, since there can be diversity between sites within a class. There will also be some sites within a class that will fall outside of a defined level of service, either above or below it. The costing for achieving these levels of service will be captured through the 10-year maintenance baseline. Over the coming years, levels of service will be further defined and refined based on asset management principles and by capturing site data.

Sites require ongoing maintenance programs and this requires resources. Ongoing preventative maintenance is less expensive than "repair on demand" maintenance. Connected to levels of service, the 10-year maintenance baseline will show which activities and investments are required to maintain each airport and aerodrome.

The cost to reach the 10-year maintenance baseline may exceed the available financial resources that are allocated to the aviation system; however, it is recognized that Government of Yukon is currently able to fund the aviation system from general revenues to a level that meets current service levels.

Asset management approach

Asset Management is a framework for managing assets to meet defined levels of service and ensuring investment in the right things, at the right time, to maximize value.

Transportation Aviation Branch (TAB) is working to move from reactive maintenance to a more predictive and prescriptive approach, which necessitates a long-term, multi-year view for managing its assets. To accomplish this, Government of Yukon is evaluating levels of service for different assets and asset classes, collecting current usage and condition data, and using this data to predict future conditions and to inform long-term capital spending plans.

TAB's new approach to asset management will take several years to fully implement. Once implemented, users can expect to see decisions about aviation assets better aligned with overall system needs and a more consistent approach to aviation maintenance.

Future considerations

The aviation system currently collects approximately $1.4 million in aeronautical and non-aeronautical revenues annually (including vehicle parking), which goes into general Government of Yukon revenues. Government of Yukon's financial capacity could be enhanced through:

- Additional revenues through various aeronautical and non-aeronautical sources such as land leasing, advertising and other services that add value to the system; and
- Contributions from accessing aviation-eligible funding programs. This would need to be a planned and phased multi-year approach, as the capital support would likely need to be applied for at least two years in advance (i.e. Airports Capital Assistance Program - ACAP).

Impacts of COVID-19

The aviation sector and air travel have been significantly impacted from COVID-19. The aviation environment for travel, for both airports and air operators, requires a reset and shift in both infrastructure and operations to ensure health and safety of passengers and the aviation community.

Airports will need to increase their focus on supporting wellness and creating a healthy environment as the new norm for the air passenger experience.

The Government of Yukon has the opportunity to adapt planning and investment activities to address the changing aviation landscape and any potential regulatory requirements stemming from COVID-19. While feedback from the public and stakeholders was received before COVID-19 response, what we heard still resonates in respect to investment priorities: the most important decision-making factors should support health, safety and security of all users and Yukoners; and communities.

Glossary

Accountable Executive – the individual accountable for an airport to Transport Canada for safety and compliance at the airport, who controls the airport's human and financial resources. In Yukon, this is the Deputy Minister of Highways and Public Works.

Advisory Circular – Transport Canada produced guidance documents to help the civil aviation community understand how to comply with current regulations and standards in aviation.

Aerodrome – An area designated for the movement of aircraft. Aerodromes in Canada can be unregistered, registered or certified.

Aircraft Group Number (AGN) – TP312 5th Edition categorization of aircraft based on approach speed, wingspan, outer main gear span and tail height. Aircraft Group Numbers range from AGN I to AGN VI.

Aircraft Movement - A take-off, landing, or simulated approach by an aircraft as defined by NAV Canada.

Aircraft Radio Control of Aerodrome Lighting (ARCAL) – Airfield lighting that can be activated by pilots on demand.

Airport Authority - An independent entity charged with the operation and oversight of an airport or group of airports.

Airport Operations Manual (AOM) – This manual is required for certified airports and describes the physical facilities of the airport and outlines the services provided. It is based on the Transport Canada approved airport certificate and which forms the basis of audits and performance validation inspections.

Airports Capital Assistance Program (ACAP) – Transport Canada funding program which helps offset the costs of major infrastructure projects and capital equipment.

Airside - The part of an aerodrome allocated for aircraft operations, including runways, taxiways and aprons, and excludes public areas.

Air Terminal Building (ATB) – The facility that provides the passenger interface between groundside and airside in the travellers' experience including passenger and airline services as well as security.

Air Traffic Control (ATC) – Indicates both the ground-based personnel and equipment required to direct and control aircraft and the building that houses these services and equipment at an airport or aerodrome.

Automated Weather Observing System (AWOS) – Equipment that measures weather conditions at an airport or aerodrome without the need for a human observer.

Aviation System Investment Strategy – Yukon's Flight Path: 2020-2030 Aviation System Investment Strategy report.

Canadian Aviation Regulations (CARs) – Regulations under the federal *Aeronautics Act* respecting aviation and activities relating to aeronautics.

Canadian Aviation Security Regulations (CASR) – Regulations under the federal *Aeronautics Act* to enhance preparedness for acts or attempted acts of unlawful interference with civil aviation and to facilitate the detection of prevention in, response to and recovery from acts or attempted acts of unlawful interference with civil aviation.

Canadian Transportation Agency (CTA) - An independent administrative tribunal of the Government of Canada that makes decisions relating to federally regulated modes of transportation

Capital Maintenance – Ongoing capital projects prioritized within defined programs in order to maintain existing service levels. These defined programs include but are not limited to runway resurfacing, dust and suppressant.

Capital Program - A plan for capital expenditures over a multi-year period. In Government of Yukon, this is typically expressed through the 5-year capital plan.

Capital Project – major new investments, investments required to replace an asset at the end of its useful life or to extend its useful life. Examples include runway rehabilitation; major equipment purchase or electrical system replacement.

Certified Airport – An airport that has been certified by Transport Canada. Certification allows the airport to provide scheduled passenger service. It also means that the airport must meet a number of conditions including compliance with TP312 standards, the development of various airport manuals including the AOM and dedicated maintenance services.

Class D estimate - An estimate based on the initial functional program and broad concept approach.

Community Aerodrome Radio Station (CARS) – Local airport stations that provide weather and communications services to pilots. These services are provided by trained CARS staff or contractors.

Critical Aircraft – The critical aircraft is typically considered the most demanding aircraft type, with respect to physical characteristics such as wingspan and operational characteristics such as approach speed that regularly uses the airport or aerodrome.

Financial Administration Act (Yukon) – The territorial act governing the financial operations of Government of Yukon.

General Aviation (GA) – Aviation for private commercial or recreational purposes which excludes commercial air carriers and government service providers (i.e., Wildland Fire Management, Canadian Forces).

Global Navigation Satellite System (GNSS) – The worldwide position, velocity, and time determination system, that includes one or more satellite constellations, receivers, and system integrity monitoring, supporting navigation performance.

Groundside – The part of an aerodrome allocated to functions that are not aircraft use and that has public access.

Human Weather Observation Station (HWOS) – A station where weather conditions are assessed and monitored by a human operator trained in weather observation for aeronautics. Among other duties, CARS operators provide HWOS services.

Incursion - Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and takeoff off aircraft.

Instrument Flight Rules (IFR) - A set of regulations that dictate how aircraft are to be operated when the pilot is unable to navigate using visual references under visual flight rules.

Instrument Landing System (ILS) – A radio navigation aid that is required for aircraft on a flight approach to a runway that uses a precision approach; the ILS includes a glideslope antennae (near the touchdown zone) and a localizer antennae array (at the opposite end of the approach runway).

International Air Transport Association (IATA) – An international trade organization for the world's airlines. It focuses on industry support, training, safety, and business best practices for aviation.

Itinerant Aircraft - Any aircraft using an airport on an irregular basis or without regular scheduling.

LNAV (lateral navigation) - Azimuth navigation without vertical guidance.

Management Board (Government of Yukon) – The Cabinet committee which provides oversight over Yukon Government financial decision-making. It authorizes expenditures for major capital projects and major changes to Yukon Government programs.

Meteorological Terminal Air Report (METAR) - A weather report for aviators.

Multiple Accounts Evaluation (MAE) – A broad evaluation process that establishes accounts of areas that are important in decision-making, each with its own categories and metrics for weighting and scoring.

National Trade Corridors Fund (NTCF) - A merit-based federal government program designed to help infrastructure owners and users invest in the critical assets that support economic activity and the physical movement of goods and people in Canada.

NAV Canada – The private not-for-profit agency that manages civil air navigation.

Net Present Value - is a method of balancing the current value of all future cash flows or financial savings generated by a project against initial capital investment.

Non-directional Beacon (NDB) – An instrument navigational aid that emits a low frequency radio wave that can be detected by aircraft.

Non-instrument Approach (visual approach) – A flight approach to a runway that does not require instrument navigation aids.

Non-precision Instrument Approach – A flight approach to a runway that enables use of instrument air navigation aids to pilots on approach.

Notice to Airmen (NOTAM) - A notice filed with an aviation authority to alert aircraft pilots of potential hazards along a flight route or at a location that could affect the safety of the flight.

Obstacle Limitation Surfaces (OLS) – A surface that establishes the limit to which objects may project into the airspace associated with an aerodrome. OLS generally have to be cleared of vegetation periodically, and the amount of obstacles and vegetation projecting into the OLS need to be assessed periodically.

Operations and Maintenance (O&M) budget – budgets that support the day-to-day operations of an organization and ensure the proper functioning of assets and processes.

Orders of Magnitude Estimate – An estimate developed during the project selection and approval period and prior to project initiation in most cases.

Precision Approach Path Indicator (PAPI) – An approach path indicator system consisting of four lights units situated on the left side of the runway in the form of a wing bar.

Precision Instrument Approach – A precision flight approach to a runway that allows an aircraft to descend down to 200 feet or lower and which requires the use of an Instrument Landing System (ILS) approach and SSALR (short simplified approach lighting system) with Runway End Identifier Lights (REILS).

Property Management Division (PMD) – a division within the Yukon Department of Highways and Public Works responsible for maintaining Government of Yukon's vertical infrastructure.

Public Airports Act (Yukon) – An act which enables the Government of Yukon to legally designate airports at the territorial level, effectively manage airport lands, and consolidate airport fees currently under other territorial legislation, such as the *Financial Administration Act*.

Public-Private Partnership (P3) – A long-term agreement between a government entity and a private partner whereby the private partner delivers and funds public services using a capital asset, sharing the associated risks.

Registered Aerodrome – Aerodromes that are registered with Transport Canada and which are listed in the Canada Flight Supplement. These sites do not receive scheduled service and do not have to comply with the conditions that certified sites have to meet.

Required Navigational Performance (RNP) – A family of navigation specifications under Performance Based Navigation (PBN) which permit the operation of aircraft along a precise flight path with a high level of accuracy.

Road and Airport Equipment Reserve Fund (RAERF) – A Government of Yukon revolving fund which collects annual capital contributions to fund future fleet replacements.

RNAV (area navigation) – A method of IFR navigation which permits the operation of an aircraft on any desired flight path; it allows its position to be continuously determined wherever it is, rather than only along tracks between individual ground navigation aids.

Runway End Safety Area (RESA) - An area symmetrical to the extended runway centreline, intended to reduce the severity of damage to an airplane undershooting or overrunning the runway;

Runway Safety Area (RSA) – A defined area, within the runway strip intended to reduce the risk of damage to aircraft running off a runway.

Runway Strip – A defined area, which includes the runway and stopway where provided, intended to protect aircraft flying over it during take-off or landing operations.

Safety Management System (SMS) – Safety management systems help aviation organizations identify and manage safety risks before they become bigger problems. Transport Canada regulations require the aviation industry to put safety management systems in place.

Standard Operating Procedure (SOP) – A set of step-by-step instructions an organization using in order to achieve uniformity of process and adherence to standards.

Terminal Aerodrome Forecasts (TAF) - Aviation meteorological forecasts; they are generally issued at least four times a day.

Tie-down – Anchors used to minimize the possibility of movement of a parked, non-hangered aircraft due to high winds or rotor wash/jet blast from taxiing aircraft.

TP1247 – Transport Canada guidelines for land use in the vicinity of aerodromes to support the mitigation of aviation hazards near airports.

TP312 – Transport Canada design standards for Canadian land aerodromes.

Transport Canada – The federal department of transportation, which regulates civil aviation, among other functions.

Transportation Aviation Branch (TAB) – also known simply as Aviation Branch, it is the branch of Government of Yukon responsible for the safe and effective management, planning, operations and development of Yukon's aviation system.

Transportation Maintenance Branch (TMB) – A branch within the Yukon Department of Highways and Public Works responsible for the summer and winter maintenance of Yukon highways.

Visual Approach Slope Indicator (VASI) - An approach slope indicator system consisting of four light units situated on the left side of the runway in the form of two wing bars referred to as the upwind and downwind wing bars.

Visual Flight Rules (VFR) – A set of regulations under which a pilot operates an aircraft in weather conditions generally clear enough to allow the pilot to see where the aircraft is going.

Vertical Infrastructure - Buildings, all supporting structures, utilities, incidental street improvements including sidewalks, site development features, recreational trails, and parking facilities.

Yukon Aviation Advisory Committee (YAAC) – A ministerial appointed committee of the Government of Yukon that reports and is accountable to the Minister of Highways and Public Works. The committee makes recommendations to the Minister of Highways and Public Works on the following matters in relation to the administration of the Public Airports Act; the development and changes to service levels to capitalize on opportunities for economic growth and proposed regulatory changes affecting Yukon airports and aerodromes.

Yukon Aviation System (also Yukon Airports) – the 28 airports and aerodromes owned and operated by the Government of Yukon.

1.0 INTRODUCTION AND BACKGROUND INFORMATION

1.1 PROJECT OBJECTIVES

Project goal

The primary goal of Yukon's Flight Path project is to create a recommended 10-year Aviation System Investment Strategy for the 28 aerodromes and airports owned and operated by the Government of Yukon.

The Aviation System Investment Strategy will help guide investments in the aviation system through an objective and adaptable framework focused on safety, regulatory compliance, asset management, economic opportunity, and access. The Aviation System Investment Strategy was developed and informed through an inclusive process led by Stantec Consulting Ltd. with inputs from the Government of Yukon, other governments, stakeholders, and the public.

It is noted that the infrastructure needs of all kinds across Yukon are significant. The recommendations and tools developed for the Aviation System Investment Strategy will help inform decisions regarding aviation related infrastructure during the investment period.

The guiding principles

The following guiding principles were foundational elements during the development of the Aviation System Investment Strategy:

- Safety comes first – always.
- Regulatory compliance is non-negotiable.
- The Yukon aviation system is a valuable asset for all Yukoners.
- Engagement must be open, fair, transparent, inclusive, and comprehensive.
- Recommendations must be defensible on technical, economic, and social basis.
- Recommendations must be responsive and adaptable, but also realistic, feasible, and sustainable.
- Recommendations must reflect best practice according to current industry standards and aspire to improve on them to Yukoners' benefit.

Project objectives

The objectives of Yukon's Flight Path project include:

- Meaningful engagement with the public, communities, governments, stakeholders, and Government of Yukon departments to facilitate dialogue and gather valued input on Yukon's current aviation system and identify opportunities for improvement.
- Development of a 10-year system and service maintenance baseline for all Yukon airports and aerodromes (non-discretionary investments to maintain current service levels).
- Identifying and detailing discretionary investment opportunities for all Yukon airports and aerodromes.

- Development of an investment ranking model for guiding the consideration and prioritization of all investment opportunities.

Expected benefits

The Aviation System Investment Strategy will provide the Government of Yukon with recommendations on an improved method for investing in its aviation infrastructure. Benefits include informed public dialogue and enhanced transparency with respect to how the aviation system is managed; levels of service reflective of a maintenance baseline for all airports and aerodromes; and an investment ranking model for prioritizing all aviation investment opportunities strategically.

The Aviation System Investment Strategy outlines a recommended course of action for Yukon's aviation system; however, it is important to note that investment decisions related to the recommendations to maintain, expand or improve infrastructure or service offerings within Yukon's aviation system require review and approval by the Government of Yukon through its standard planning and budgeting processes. Also, investment decisions for the Yukon aviation system must be balanced with broader infrastructure needs and investments across Yukon.

1.2 HISTORY OF THE YUKON SYSTEM

Aviation has always been integral to the history of Yukon. The Yukon aviation system started in the 1920s, 1930s and 1940s, largely before development of the Alaska Highway and Yukon's highway system.

With the development of the Alaska Highway in 1942–43, the American military, and then the Canadian military, further developed and took over management of the Whitehorse Airport. Eventually, Transport Canada took over management of most of the airports in Yukon, thereby creating the Yukon aviation system.

In the 1980s and 1990s, Transport Canada began divesting or leasing out most of the airports it operated, which was most of Canada's airports and aerodromes at the time. These airports were expensive to run and transferring responsibility for operating these sites created opportunities for many of them to become airport authorities. These airport authorities were run as non-profit business enterprises, which focused their attention on air service development and passenger amenities to generate revenues.

Transport Canada devolved Arctic B and C airports (most of the community airports) in 1990 and the management of these airports was incorporated into the Government of Yukon. Haines Junction became the headquarters of the Government of Yukon's Aviation and Marine Branch at the time of transfer.

Arctic A airports included Whitehorse and Watson Lake, and these were devolved to the territorial government in 1996.

Yukon's airports and aerodromes were similarly expensive to run. However, Yukon airports went in a different direction, remaining a government service (not becoming an airport authority) and retaining the same fee structure from the 1960s and 1970s. These fee structures remain largely intact to this day.

When devolution of the airports in 1990 occurred, Transport Canada divested its aviation assets and staff, many of which stayed within the Government of Yukon's new Aviation and Marine Branch in the Department of Community and Transportation Services (a predecessor to the Department of Highways and Public Works), while others were diverted to other areas within the Government of Yukon. Transport Canada also transferred a portion of its funding to the Government of Yukon to support the management of these sites, although it was understood that the Government of Yukon would also need to absorb some of the costs.

Over the years, the Aviation and Marine Branch, which later became Transportation Aviation Branch (TAB), expanded to support the increasing maintenance and operational demands of the system. This included the need to support increased security requirements after the attacks on September 11, 2001, as well as greater user expectations and higher industry standards.

1.3 CONNECTING YUKON COMMUNITIES

The Yukon Territory is sparsely populated with the majority of people living in, or in close proximity, to Whitehorse, the capital. The remaining population lives in small and/or remote villages, towns and rural settings throughout the territory.

The Yukon aviation system connects the hub city of Whitehorse with the outlying communities. All Yukon communities have access to an aerodrome or airport within 100 km, but not all communities have close access to scheduled air services. The highway network provides connectivity to all communities except for Old Crow.

Community aerodromes provide basic services related to social services, policing, health services and other governmental/administrative purposes. The following communities have certified airports: Dawson, Mayo, Old Crow, Watson Lake, and Whitehorse. The other communities listed have registered aerodromes.

1.3.1 First Nations and airport/aerodrome lands

Airport and aerodrome lands are located in the traditional territories of Yukon First Nations. Some Government of Yukon airports and aerodromes are located on Yukon First Nations Settlement Lands and are subject to Final and Self-Government Agreement provisions.

1.3.2 Overview of Yukon communities or towns with airports or aerodromes

Beaver Creek is served by various government services, including the Canadian Border Services Agency. The Beaver Creek Aerodrome (CYXQ) is primarily used for emergency services and supporting mining exploration and tourism.

Burwash Landing is served by various government services. The Burwash Aerodrome (CYDB) is used primarily to support tourism.

Carcross is located on Bennett Lake and Nares Lake and supports recreational activity in the area. The Carcross Aerodrome (CFA4) is primarily used for general aviation and has some commercial operations.

Carmacks is located on the Yukon River along the Klondike Highway and is surrounded by significant mining activities and mineral deposits. The Carmacks Aerodrome (CEX4) has a Wildland Fire Management regional air tanker base, and supports a variety of emergency services, recreational users, and air charter operators.

Dawson City is a hub for mining, government services and tourism. The Dawson City Airport (CYDA) supports scheduled service and is a critical link for the local economy.

Faro is located in central Yukon and is known for eco-tourism. The Faro Aerodrome (CZFA) primarily supports emergency services and some commercial operators.

Haines Junction is located at the junction of the Alaska Highway and the Haines Highway. The Haines Junction Aerodrome (CYHT) is primarily used by commercial operators in the tourism sector.

Mayo is served by its airport which is certified to support scheduled air services and is a vital link for the local economy. The Mayo Airport (CYMA) supports significant mining projects, which drive the local economy and the need for air services into Mayo.

Old Crow is a remote community and the only one in the territory with no road access. The Old Crow Airport (CYOC) supports scheduled service and is a vital transportation link for residents, government services and businesses.

Pelly Crossing is a community in central Yukon. The Pelly Crossing Aerodrome (CFQ6) is primarily used to support emergency services and general aviation.

Ross River is a community located at the junction of the Pelly River and Ross River along the Canol Road. The Ross River Aerodrome (CYDM) supports mining projects, and government services, such as Medevac.

Teslin is located on the Alaska Highway between Watson Lake and Whitehorse. The Teslin Aerodrome (CYZW) is a regional base for Wildland Fire Management and supports a few commercial operators.

Watson Lake is the first community encountered after crossing the southern territorial border from British Columbia on the Alaska Highway. The Watson Lake Airport (CYQH) supports mining, tourism, and outfitting.

Whitehorse is the territorial capital and largest community in Yukon. It is a hub for municipal, territorial and federal government services and administration. It is a territorial centre for tourism, the service sectors, construction and mining. The Erik Nielsen Whitehorse International Airport (CYXY) supports scheduled flight service to a number of Canadian provinces as well as flights outside Canada.

1.4 ECONOMIC GROWTH IN YUKON

As of June 2020, Yukon is anticipated to post strong economic growth in 2020 and 2021 due to increased production in Yukon's mining sector[3]. However, the global economy has been impacted by the COVID-19 pandemic, adding to an already weaker growth in global trade (a result of higher tariffs, capacity constraints, and tightening financial conditions in some countries).

Despite the weakening state of global and Canadian economic growth, the mining sector is showing signs of getting back on its feet in Yukon seven years after the end of the last commodity cycle[4]. This is expected to maintain Yukon's unemployment rate well below the national average over the investment forecast period. Wages are expected to grow at an average annual pace of 3% between now and 2025, much faster than inflation4. Domestic migration is expected to account for most of the population growth projected in Yukon over the investment forecast period[3].

Yukon's aviation system infrastructure is critical to supporting the local economy. It supports community access, emergency services, the mining sector and provides valuable regional tourism opportunities. The future 10-year capital infrastructure budget required to meet maintenance and regulatory compliance will be impacted by the level of aviation demand anticipated in the territory.

Yukon's population growth[5] over the 10-year period is forecast to be 1.6% per annum with Whitehorse and Dawson having growth rates of 1.8% and 2.2% respectively per annum. Note that Yukon's population growth is largely driven by economic migration as individuals seek work[4].

The population shift is expected to increase aviation activity at the major centres and result in an increase in infrastructure demands. Similarly, the cyclical nature of mining and tourism, is expected to result in an increase in both infrastructure demand and operating and maintenance costs for the aviation system.

Average annual economic growth in Yukon is expected to be 3.6% per year for the duration of the 10-year investment period[6].

Due to the COVID-19 pandemic, it is expected that tourism will have slow growth for 2020, 2021, and 2022 before returning to 2019 levels[5]. It is expected that tourism will see revenue growth of 3% and visitation growth of 2% per year in each of the remaining years of the Aviation System Investment Strategy[5]. The related impacts of the COVID-19 pandemic on the tourism industry will need to be monitored for potential longer-term impacts on flight volumes in Yukon[7].

The Canadian dollar is expected to remain around $0.75 relative to the U.S dollar in the forecast period (a higher dollar may depress some foreign investment).

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[3] The Conference Board of Canada – Territorial Snapshot (June 2020)
[4] The Conference Board of Canada – Territorial Outlook Economic Forecast (Summer 2019)
[5] Yukon Bureau of Statistics – June 2018 Population Report
[6] Yukon Department of Finance
[7] Provided by Yukon Department of Tourism and Culture

1.5 AVIATION INDUSTRY

The Yukon aviation system has evolved from pioneering and exploration-based services to include all types of modern aviation activities, including scheduled passenger services, charter and private commercial services, rotary-wing services, recreational/general aviation, aerial fire suppression, Medevac and policing air services.

The volume of traffic, whether it be passenger or cargo aircraft movements, is generally dictated by the growth in the economy, particularly related to leisure (both personal and tourism) and mining activities; however, it is also linked to population growth and to the availability of skilled aviation personnel, which are in high demand.

Yukon air traffic has grown positively and is led primarily by passengers flying into Erik Nielsen Whitehorse International Airport (ENWIA). In 2019, passenger traffic at ENWIA totaled 412,522 scheduled passengers and 45,837 aircraft movements.

Other communities with scheduled air passenger traffic include Dawson City and Old Crow airports. Watson Lake has had scheduled services at various times in the past, and as recently as 2019. However, this market is generally related to mining activity in the area and is currently served by on-demand air charter services. Mayo Airport is certified to support scheduled air services, but currently is not used for scheduled service.

There are currently two year-round and three seasonal carriers providing scheduled service at Yukon airports. These carriers operate international and trans-border flights, flights to Yukon communities as well as flights to various destinations in B.C., Alberta, N.W.T., and Ontario. Theses carriers are operating a variety of AGN IIIA, AGN IIIB and AGN IV aircraft including the ATR-42/ATR-42 combi, various B737 models, A319 and A320, CRJ 700, and B767. This mix of aircraft can seat anywhere from 42 passengers (ATR-42 combi) to 240 passengers (B767). While there have been adjustments to this mix of aircraft due to COVID-19 and the subsequent changes in passenger volumes, this mix has been typical and consistent over the previous 5 years.

There is considerable fixed-wing general aviation activity, both commercial and private. Most aircraft are single engine/twin-engine aircraft types with between 2 and 9 seats; larger aircraft types (19 seats to 42 seats) may also be active depending on the operation. Private general aviation/recreational flying is also common in Yukon year-round.

The commercial fixed-wing general aviation sector supports mining and exploration, aerial firefighting, wildlife surveys, cargo and fuel hauling, parachuting and paragliding, outfitting, government services (e.g., courts), tourism and flight-seeing, and search and rescue. Many of these activities, such as tourism related operations, outfitting and parachuting and paragliding are more popular in the summer.

Rotary-wing operations are also common in the Yukon aviation system; there are a number of helicopter operations across the territory, the majority of which are in Whitehorse, Haines Junction and Dawson City.

Rotary-wing operations are typically used in mining exploration and aerial fire-fighting, avalanche monitoring, search and rescue, infrastructure monitoring, wildlife surveys, cargo and fuel hauling, pilot re-certification and training, and tourism and flight-seeing. Yukon airports and aerodromes with significant rotary activity include Dawson City, Mayo, Watson Lake, Haines Junction and Burwash Landing.

1.6 THE MINING INDUSTRY

Mining companies rely on Yukon's aviation system and various fixed-wing and rotary-wing operators to support exploration, deposit appraisal and movement of staff members and contractors to active quartz and placer mining sites. The mining industry is vital to Yukon's economy and Yukon's aviation system is critical to the mining industry's continued operation. According to Natural Resource Canada's "Annual and Revised Spending Intention Statistics of Mineral Exploration", approximately $168.7 million and $182.3 million were spent on exploration and deposit appraisal activities in Yukon in 2017 and 2018 respectively. These exploration activities are supported by a variety of aerodromes across Yukon, ranging from Finlayson Aerodrome in the southeast to Dawson City Airport further north.

According to Natural Resource Canada's "Annual Statistics of Mineral Production", Yukon had total mineral production of approximately $217.8 million in 2018, and $318.1 million in 2017. Yukon is expected to have three active mines over the 10-year investment period. Yukon's Department of Energy, Mines and Resources expects gold prices to be historically high for the first couple years of the investment period.

It is expected that new mining initiatives coming online in the near term will drive economic growth during the 10-year investment period.

1.7 YUKON TOURISM

Yukon's tourism sector focuses on the territory's Gold Rush history and natural beauty through a variety of outdoor activities, including fishing, hunting, boating, hiking, watching the northern lights, observing wildlife, cultural experiences and many others. Many of these tourism activities are supported by Yukon's aviation system, either by transporting tourists into and around the territory or as part of the tourism activity itself (i.e., site seeing).

According to the Yukon Bureau of Statistics' 2017/18 Visitor Exit Survey there were estimated to be 491,300 visitors to Yukon during the 12-month period of November 2017 to October 2018, and approximately 13% of visitors entered Yukon by plane, which is almost 64,000 visitors. According to the 2017/18 Visitor Exit Survey, over 85% of all visitors come to the Yukon between May and September inclusive. A dynamic and responsive Yukon aviation system is key to moving so many visitors in a short time.

Yukon's tourism sector has enjoyed substantial growth from 2008 to 2016. Yukon business revenue attributable to tourism increased by an average of 5.3% per year according to the 2017/18 Visitor Exit Survey from the Yukon Bureau of Statistics. Revenues to Yukon businesses that were attributable to tourism were forecasted to be $312.5 million in 2019 according to the Yukon Tourism Development

Strategy. Unfortunately, due to the COVID-19 pandemic, it is expected that it will take approximately 3 years for tourism revenues and visitation to return to 2019 levels. Impacts of the COVID-19 pandemic on the tourism industry will need to be monitored for potential longer-term impacts on flight volumes in Yukon.

Figure 1-1: Map of Yukon Aviation System

2.0 FLIGHT PATH METHODOLOGY

As part of the Flight Path project, Stantec reviewed and synthesized all relevant planning, technical, and operational documentation, including site-based plans, asset condition reports, consulting studies and many other reports. In total, over 100 reports and documents were reviewed, including: Yukon Aviation System Review, Dawson City Airport Functional Plan, and draft ENWIA 2040 Master Plan, Yukon Tourism Development Strategy 2018-2028, Strategic Asset Management Plan for Transportation Division, airport operations manuals, airport emergency plans, and airport wildlife management plans.

In addition to the comprehensive document review, Stantec interviewed several dozen Government of Yukon staff to understand and document the current state of all 28 airports and aerodromes in the Yukon aviation system.

Based on the comprehensive document review and interviews with Government of Yukon staff, Stantec established a 10-year system and service maintenance baseline, focused on non-discretionary investments, by confirming known and additional potential investment requirements associated with delivery of the Yukon aviation system's current core mandate and continuation of established levels of service.

In addition, Stantec developed and executed a comprehensive engagement process with other governments, stakeholders and the public to understand their needs and hopes for the Yukon aviation system over the next 10 years. Findings from the engagement processes were integrated with relevant technical, operational, and other inputs to create the Aviation System Investment Strategy.

2.1 STAKEHOLDER AND COMMUNITY ENGAGEMENT

To inform Yukon's Flight Path, Stantec undertook an extensive stakeholder and community engagement process. The purpose was to gather input from stakeholders: Yukoners, including passengers, First Nations and municipal governments, and various aviation and business organizations. The Flight Path What We Heard report was released in summer 2020 and is available in Appendix A – What We Heard.

2.1.1 Engagement approach

2.1.1.1 Why were stakeholders and the public engaged?

As written in Minister Richard Mostyn's mandate letter for the Department of Highways and Public Works (January 6, 2017), "completing a review of the territory's airports and aerodromes to inform government investments to enhance economic opportunities and improve community safety" was identified as a key priority.

2.1.1.2 Desired outcomes

The engagement process aimed to accomplish the following desired outcomes.

Educate stakeholders and the public	Improve understanding about Yukon's existing aviation infrastructure, network (28 airports and aerodromes), operations, and services.
Learn from stakeholders and the public	Gain a deeper understanding of how stakeholders are using and experiencing the aviation system in Yukon today and intend to in the future.
Connect with stakeholders and the public	Improve existing relationships with stakeholders by ensuring that stakeholders feel heard and that their ideas and needs are being actively considered by the Government of Yukon. Increase engagement and establish a lasting sense of ownership by providing an opportunity for stakeholders and the public to help inform priorities that influence future decision-making.

2.1.1.3 Determining engagement levels

Engagement activities undertaken for this project aimed to reach those who may be impacted by the outcome of outcomes of this project. To increase effectiveness in engagement planning, five different engagement levels were determined as outlined in the table below based on each group's connection with Yukon's aviation system. The list of stakeholders associated with each engagement level was reviewed by the Stantec project team and Government of Yukon prior to engagement. All stakeholders identified were contacted although not all responded.

Engagement Level		Description	Stakeholder Categories
Collaborative Partners		Collaborative Partners are part of the overall approval and regulatory process for aviation activities undertaken in Yukon; as such, they are generally considered 'internal' stakeholders.	Federal agencies (Canada Border Services Agency, NAV Canada, Transport Canada and Canada Border Services Agency) Government of Yukon departments Yukon Aviation Advisory Committee
Stakeholders-	*Primary Stakeholders*	Primary Stakeholders are major participants in Yukon's aviation system. These stakeholders hold in-depth knowledge regarding the operation of facilities, processes, and services; the status of infrastructure; and requirements needed to maintain or improve them in the future.	First Nations governments Major non-public airport and aerodrome users Reliant on the aviation system for emergency response and medical services Municipal government, advisory council, or association responsible for the planning of communities that have a certified airport or aerodrome with a known concern An organization representing more than 100 multi-industry Yukon businesses
	Secondary Stakeholders	Secondary Stakeholders have a direct connection to Yukon's aviation system; however, do not meet the criteria of Primary Stakeholders.	Airport tenants Representative of major industries in Yukon An organization representing less than 100 multi-industry Yukon businesses
	Tertiary Stakeholders	Tertiary Stakeholders are those that rely on Yukon's aviation system, without a direct connection to the aviation system.	Other non-public airport and aerodrome users Municipal government responsible for the planning of communities that do not have a certified airport or aerodrome with a known concern First Nation Development Corporations
Public		The public may or may not rely on Yukon's aviation system.	All Yukoners Yukon business owners and operators Visitors and tourists

Table 2-1: **Engagement level descriptions**

2.1.1.4 Members of the aviation community

It was well understood that the aviation system is a shared asset. Many Yukoners wear multiple hats, relying on the system in various ways including as a passenger and for their business. To address this, members of the aviation community were engaged separately from the public. This allowed them to share their professional input in a focused context as well as sharing personal input through public methods. An online survey was also designed to gather feedback from respondents who are both members of the aviation community and passengers.

2.1.1.5 Government of Yukon departments

Government of Yukon departments were considered internal collaborative partners to the Flight Path process and feedback from this group has been incorporated into the development of the Policy Goals, Investment Model, identified investments and recommendations as described in this report.

2.1.2 Selecting engagement methods

As shown in the table below, engagement methods were chosen to gather meaningful, consistent, and reliable feedback from those engaged. Messaging and questions were consistent during the engagement period; it was only engagement methods that varied.

	Application to Engagement Level				
Engagement Method	**Collaborative Partners**	**Stakeholders**			**Public**
		Primary	**Secondary**	**Tertiary**	
Project introduction letters	✓	✓	✓	✓	
Project announcement	✓	✓	✓	✓	✓
Project website	✓	✓	✓	✓	✓
Stakeholder interview guides	✓	✓	✓		
In-person meetings	✓	✓			
Telephone meetings	✓	✓	✓		
Invitation to complete the online survey and attend community meetings	✓	✓	✓	✓	
Online survey	✓	✓	✓	✓	✓
Community meeting advertisements	✓	✓	✓	✓	✓
Community meetings	✓	✓	✓	✓	✓

Table 2-2: Engagement method by level

Feedback was collected through in-person meetings, telephone interviews, stakeholder interview guides, public events held in nine Yukon communities (with a total of 65 attendees), and an online survey through Engage Yukon (517 surveys were completed). Stakeholder meetings were used to engage with five collaborative partners (i.e., federal agencies and Yukon Aviation Advisory Committee) and 28 primary stakeholders.

2.1.3 What we heard

The engagement process was designed to gather input on four topic areas related to Yukon's aviation system: priorities, expectations, opportunities and challenges, and financial sustainability. These topics were discussed with stakeholders, governments, and the public.

What we heard regarding each topic area is described at a high-level in Appendix A - What We Heard. For quick reference, key themes from the engagement have been summarized below.

2.1.3.1 Priorities

- Yukon's aviation system is highly valued for its many roles (e.g., emergency services, supporting the economy, and allowing relatively easy movement of people and cargo).
- Most of those engaged agreed the most important decision-making factor regarding the aviation system should be health, safety, and security of all users and Yukoners.
- When asked specifically which investments should be prioritized, the top 4 investments identified in the survey were those that support public health and safety, communities, tourism sector and mining.

2.1.3.2 Expectations

- Respondents expect all airports/aerodromes/airstrips to be safe for users and nearby residents, open and available for public use, used to protect Yukoners' health and safety, and not unfairly increase their cost of living.
- While levels of satisfaction varied by airport/aerodrome/airstrip, respondents said Yukon's aviation system was generally meeting their expectations with highest satisfaction for passengers using Erik Nielsen Whitehorse International Airport and for members of the aviation community using Dawson City Airport.

2.1.3.3 Areas for Improvement

- Passengers expressed wanting to see:
  - Enhanced passenger amenities, specifically food services; entertainment amenities (e.g., Wi-Fi, play areas, shopping); larger lounge areas with more comfortable seating; and enhanced general aesthetics and design of terminals
- Members of the aviation community expressed wanting to see:
  - Enhanced maintenance
  - Better navigation, communication, and weather aids
  - Access to more aircraft services (e.g., fuel, plug-ins, aircraft parking, and tie-downs)
  - Access to terminal buildings and construction of new facilities such as picnic areas, campgrounds, or outhouses
  - A focus on land development and leasing opportunities and changes to the existing application and approval process

- Enhanced passenger amenities (e.g., shared technology for airlines such as shared check-in desks and baggage drop areas, self-serve kiosks, common use terminal equipment, and flight information screens)
- More transparent and cooperative communication between members of the aviation community and the Government of Yukon
- Improved governance and policies within the Government of Yukon to better support aviation users and businesses

2.1.3.4 Opportunities and Constraints

Participants see the key opportunities as:

- Increasing safety and reliability of the system
- Land development and leasing
- Supporting local communities through collaboration and partnerships
- Enhanced collaboration and communication with the aviation community

2.1.3.5 Financial Sustainability

Many respondents were open minded about considering some financial modifications for the aviation system; however, the following views were identified.

- Importance of the system and cost of living
  - All airports/aerodromes/airstrips are important and must safely accommodate emergency uses
  - Would like to see the aviation network expanded to better support safety and the economy
  - Concern that reducing maintenance by modifying the level of service would create unsafe conditions or lead to some airports/aerodromes/airstrips being closed
  - Fear that any increase in aviation fees would be passed down to Yukoners, their everyday cost of living would increase, and they would no longer be able to afford flights making travel very difficult
- Accountability
  - Concern that the Government of Yukon exploring alternative revenue sources would not result in better infrastructure or services
  - Want to see the Government of Yukon increase governance, management, and operations efficiency and explore existing revenue generation methods (e.g., land development, leasing, advertising in terminals) before introducing new fees
- Partnerships
  - Support of potential partnerships with private contractors, First Nations governments, or municipal governments assisting with maintenance of airports/aerodromes/airstrips (e.g., snow plowing, tree clearing, cleaning, or providing food and drink services in terminals)
  - Do not want to see the Government of Yukon release ownership of airports/aerodromes/airstrip

3.0 GOVERNANCE

3.1 CERTIFICATION, REGISTRATION AND AERODROME OVERSIGHT

3.1.1 Overview

The Yukon aviation system supports a variety of aircraft owners, operators (commercial, public and private), which include, but are not limited to, the following:

- Scheduled, year-round and seasonal passenger air carriers;
- Air charter operations;
- Government services;
- Private commercial and private recreational aircraft operators;
- Flight school and flight training activities; and
- Helicopters and various rotary wing air operations.

The Yukon aviation system is comprised of 28 airports and aerodromes that are owned and operated by the Government of Yukon (Mule Creek, BC, is owned by the Government of British Columbia). There is a mix of five certified airports and 23 registered aerodromes as defined by Transport Canada. Certified aerodromes are officially referred to as airports, while registered aerodromes are often commonly referred to as aerodromes, airports and/or airstrips.

The management of Yukon's airports and aerodromes requires ongoing inspection and review of aerodrome conditions and operational processes. Many of these are guided by strict requirements under the Canadian Aviation Regulations (CARs), the Canadian Aviation Security Regulations (CASR), other relevant laws and industry best practices.

3.1.2 Roles and responsibilities

The roles and responsibilities of the Government of Yukon as an airport operator are outlined under CARs.

The Transport Canada Accountable Executive is the Deputy Minister of Highways and Public Works, who is responsible for ensuring adequate resources are available to manage the Yukon aviation system. The Accountable Executive is also responsible for ensuring that the certified airports meet the regulatory requirements under CAR 302 related to Airport Safety Management Systems (SMS).

The Assistant Deputy Minister of Transportation provides senior leadership and oversight of the Transportation Aviation Branch.

The Yukon aviation system is under the management and direction of Transportation Aviation Branch which has administrative offices in Whitehorse, Haines Junction and Dawson City. The Director of TAB is supported by functional area managers in operations, business and development, safety and security, and maintenance. Transport Canada airport operating certificates are held by the Superintendent, Yukon Airports at the branch level.

3.1.3 TP312 Aerodrome Standards and Recommended Practices

The standards found in TP312 - Aerodrome Standards and Recommended Practices are Transport Canada standards which guide the development and management of operations and airside facilities at aerodromes and airports and are meant to complement subpart 302 of CARs. TP312 sets out requirements such as physical characteristics, obstacle limitation surfaces (OLS), visual aids, lighting and specific services the aerodrome operator provides to support aircraft operations.

Certified airports are required to meet TP312 standards when they are certified. However, as a best practice, no aerodrome is planned without considering the opportunity to meet the minimum standards outlined in TP312.

Current TP312 standards are operationally driven by a number of factors including critical aircraft, whether the site has non-instrument, non-precision, or precision approaches, and aeronautical visibility.

3.1.4 Airport certification

An aerodrome must be certified by Transport Canada, when:

a) It is located within the built-up area of a city or town;
b) It is a land aerodrome that is used by an air operator for the purpose of a scheduled service for the transport of passengers; or
c) the federal Minister of Transport is of the opinion that meeting the requirements for certification would be in the public interest.

Currently, Erik Nielsen Whitehorse International Airport, Watson Lake Airport, Old Crow Airport, Mayo Airport and Dawson City Airport are certified airports within the Yukon aviation system.

Aerodrome certification requires the airport operator to create an airport operations manual (AOM) in order to indicate how the aerodrome operator will meet certification requirements under CARs. The AOM must accurately describe the physical characteristics of the aerodrome and provide confirmation that the aerodrome conforms to the requirements set out in the aerodrome standards and recommended practices publications (TP312 and related Advisory Circulars).

Failure to comply with certification requirements can result in fines, sanctions, or the revocation of the certificate.

The remainder of the aerodromes in the Yukon aviation system are considered registered aerodromes and are not required to meet more stringent certification requirements, typically because there are no scheduled air operators serving these sites.

3.1.5 TP1247 – Land Use in the Vicinity of Aerodromes and airport zoning regulations

One of the more challenging aspects of managing the Yukon aviation system relates to the management of obstacles or hazards to aviation such as land development or the natural growth of vegetation adjacent to airports and aerodromes. TP1247 - Land Use in the Vicinity of Aerodromes provides clear guidance for the safe and responsible development and management of aviation hazards in the adjacent lands and protected airspace for the runway system.

This publication describes different types of land uses outside the aerodrome property boundary and provides guidelines for those land uses where they could have impacts on airport or flight operations. These include:

- Installations which may cause electronic interference to air navigation aids, or obstructions to airport visual aids;
- Tall structures that would create an aviation hazard close to an airport, (i.e., wind turbines, telephone poles, power lines, buildings and antennae);
- Trees and other vegetation which may grow into flight paths; and
- Garbage dumps and ponds, since they attract wildlife and birds that are hazardous to aviation.

Additionally, airport zoning regulations legally protect an airport's OLS under federal legislation which cannot be superseded by provincial, territorial or municipal laws or by-laws. Currently, Whitehorse, Old Crow, Mayo, Teslin, Faro, Ross River, and Watson Lake have registered airport zoning regulations under the *Aeronautics Act*.

TP1247 is accessible to the general public and is a useful resource for municipal governments and other land planning authorities that manage development around airports and aerodromes.

3.1.6 Other legislative oversight

The Government of Yukon passed the *Public Airports Act* in 2017. The Act provides a framework to consolidate aviation-related fee regulations currently housed under other legislation and gives Government of Yukon the authority to effectively manage airport lands. The Act also mandates the creation of a Yukon Aviation Advisory Committee. This committee was struck in 2019 and met for the first time in January 2020. Regulations under the Act related to lands, the designation of airports and airport fees are currently under development and are expected to be brought in to force in 2021.

As part of the Government of Yukon, TAB must follow the Yukon *Financial Administration Act*. The Act sets out the role of Management Board, stipulates the conditions under which public money can be collected and spent, how those funds are managed, how government can enter contracts, and sell or

dispose of land, among other things. These laws are in place to ensure public funds are managed effectively and in a way that ensures government accountability.

3.1.7 Transportation Aviation Branch mandate

The mandate of TAB is the safe and effective operation, maintenance, planning and development of Government of Yukon airports and aerodromes in order to maintain Yukon's air transportation network. This mandate is necessary to enable other critical functions and community services such as those provided by EMS Air Ambulance (Medevac flights), Wildland Fire Management (aerial fire suppression services) and the RCMP (policing).

3.1.8 Financial overview of the aviation system

In the 2020-2021 fiscal year TAB's operations and maintenance (O&M) budget is $13 million and its capital budget is $14 million.

In the 2019–2020 fiscal year, O&M expenditures were $14.4 million and capital expenditures were $22 million. Branch revenues derived from aeronautical and non-aeronautical fees were approximately $1.4 million. Cost recoveries were approximately $2 million.

The O&M budget includes most staff salaries, winter and summer maintenance activities, electrical system maintenance and equipment maintenance.

Capital budgets fund projects and programs to maintain, replace or upgrade major assets that depreciate over time like runways, heavy equipment, and electrical systems.

NAV Canada is responsible for funding and managing navigation and weather services and equipment in accordance with its Level of Service Policy. NAV Canada also funds the Community Aerodrome Radio Station (CARS) program, which TAB administers.

TAB's budget does not include expenses associated with buildings, which are managed by Property Management Division, within the Department of Highways and Public Works.

3.2 CANADIAN AIRPORT BENCHMARKING

The Canadian aviation landscape has changed dramatically over the past 25 years with the shift from the Transport Canada owned and operated model for airports to other ownership models. The transfer was the product of the National Airports Policy (NAP), which came about because the federal government was struggling to meet the infrastructure requirements of Canada's airports.

Airports and aviation infrastructure are costly to manage and maintain. In the period before the devolution or transfer of responsibility for airports, the federal government had not kept pace with the infrastructure requirements to meet the growing air travel demands in the country. Ultimately, this infrastructure deficit was passed along to the provinces and territories, communities, and authorities that took on the local oversight for their airports.

These gaps in required infrastructure were of particular concern at the larger or gateway airports that regions relied on for economic growth and access to services. In the situations where airports took advantage of the airport authority model and its long-term leases, the federal government established an airport rent associated with revenues.

Yukon airports, while owned and operated by Government of Yukon, retain the governance structure that most other Canadian airports had when they were owned by Transport Canada. They are entirely government run, generate relatively little in revenue and provide basic services to users.

Under this model, revenue generation is not a priority because it treats airports as a government service. The current fee structure is designed to support a lower-cost operating environment for aviation businesses and other users, particularly in a remote, northern context. For this model to function optimally, it requires adequate and sustained public investment to maintain infrastructure.

This preamble to the benchmarking of airport fees and revenues is important as Yukon and its aviation system has significant infrastructure needs and a growing demand for travel while not using the revenue generation tools used by other airports or authorities.

Due to infrastructure challenges outlined above, the larger Canadian airports have all shifted away from the government owned and operated model toward the airport authority model and adapted suites of passenger- and business-driven services to raise appropriate revenues in order to support investment.

The revenues from these initiatives, when retained within an airport authority or aviation system, go a long way in providing the funding foundation to make necessary investments in the aviation infrastructure and provide safe and satisfactory service levels for passengers and aviation businesses alike.

Likewise, larger northern airports such as Juneau, Fairbanks, Iqaluit and Yellowknife have also all moved to more business-like operating models to ensure timely investment in infrastructure and programs. These airports are all government owned, and the Juneau, Fairbanks and Yellowknife airports are government run.

It is recognized that the pandemic has affected the aviation industry and the Government of Yukon has been finding ways to support the aviation industry, such as the Yukon Business Relief Program, various aviation relief funds, and through the suspension of fees.

3.2.1 How are fees approached at other airports?

There are a variety of fee structures used at airports across Canada. The section below presents a comparison of some common fees charged at Canadian airports. The areas of benchmarking compared 13 Canadian regional and international airports (including ENWIA) and considered both aeronautic and non-aeronautic fees and revenues. The airport comparators included: Yellowknife, other NWT passenger sites, Vancouver, Deer Lake, Prince George, Nanaimo, Comox, Gander, Thunder Bay, Moncton, Fort McMurray and London.

Currently, the aeronautical fees (landing fees, aircraft parking, bridge fees and general terminal fees) for ENWIA are the lowest of all regional airports in Canada (see tables 3-1 and 3-2 for comparison of landing fees and general terminal fees). It is the only airport in the comparator sites that has no general terminal fee. This type of fee charges the air carrier based on the seats on the aircraft that is being processed through the airport's passenger terminal facility. ENWIA also has the lowest bridge and landing fees and is the only site outside of Thunder Bay to not use the Airport Improvement Fee (AIF) as an infrastructure investment tool.

Table 3-1: Landing fees across Canadian Airports and Aerodromes

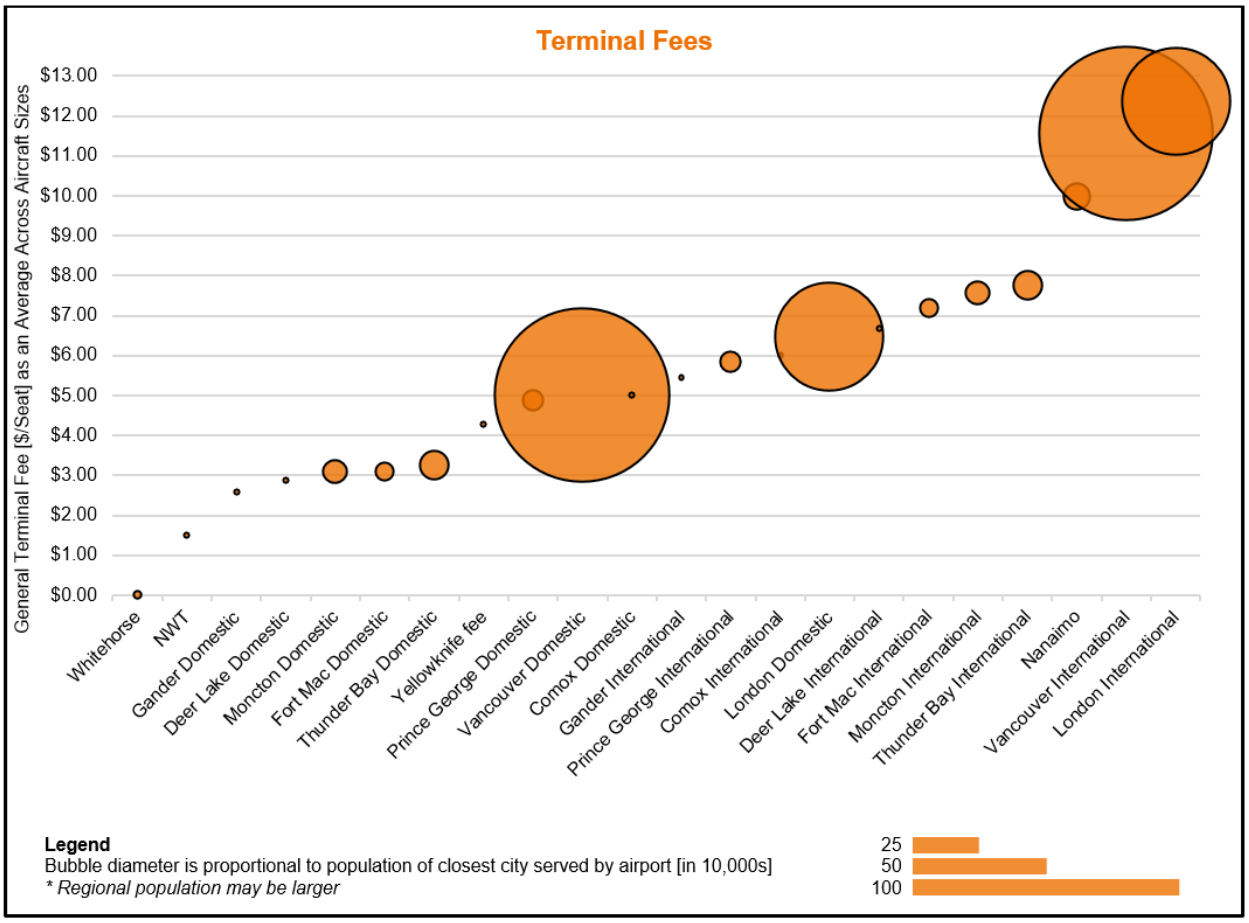


Table 3-2: General terminal fees with relative population sizes across Canada

As a reference, the following table (table 3-3) shows O&M expenditures, capital budgets and revenues for ENWIA for the previous three years.

Fiscal Year	ENWIA fee revenues	ENWIA O&M Expenditures	ENWIA Capital Expenditures
17/18	$1,417,523	$3,532,219	$4,238,558
18/19	$1,462,880	$3,613,805	$12,066,495
19/20	$1,302,946	$4,125,701	$5,455,209
Totals	**$4,183,349**	**$11,271,725**	**$21,760,262**
Annual average	$1,394,449	$3,757,242	$7,253,420

Table 3-3: ENWIA annual cost-revenue gap

Using the three fiscal years 2017/18, 2018/19 and 2019/20 as an average, approximately $9.62 million in additional revenue would be needed annually for the ENWIA to become self-funded.

3.2.2 Territorial airports – retaining funds and AIFs

The Iqaluit and Yellowknife airports have created fee structures to move closer to self-funding. Revenues generated by the Yellowknife Airport are retained by the airport instead of being absorbed into general government revenues. Iqaluit Airport has a Public Private Partnership (P3) contract which allows the Iqaluit Airport to retain its revenues but its contract charges the operator with all the significant capital investments (including a new terminal and maintenance facilities) and maintaining them for 30 years.

Yellowknife Airport, which is moving toward a self-funding model, implemented an Airport Improvement Fee (AIF) of $20 for southbound flights and $10 for northbound flights (to NWT communities). Based on 2018 passenger volumes at ENWIA, a $20 AIF on outbound passengers would generate about $3.4 million in revenue annually and a portion, related to an administration fee for collection on the ticket, would be returned to the carriers.

3.2.3 Other revenue opportunities

There are a number of other fees that are commonly charged at other airports across Canada.

ENWIA charges a fee for passenger bridge rental of $27.34 per use that generates $51,000 per annum. In contrast, the Vancouver Airport charges $380.90 for bridge use for a B737 domestic flight. Although this may seem like a mismatched comparison, it should be noted that most of the Whitehorse southbound flights connect through Vancouver and the same carrier is paying those fees on the other end of the route. Increasing the bridge fee to $300 per use would generate about $500,000 in additional revenue annually. For reference, Yukon government spent $1 million replacing a passenger bridge in 2018/2019.

Yellowknife Airport charges a general terminal fee of $10 per arriving passenger for use of terminal facilities. A general terminal fee of $10 would generate approximately $1.1 million per year based on 2017/2018 passenger volumes.

Landing fees at Whitehorse airport are much lower than other regional airports as noted earlier. Landing fees vary depending on aircraft weight and whether it is a domestic or international flight. The landing fees for a B737-700 domestic flight would increase revenues by an additional $921,000 over the busier April to September period had ENWIA charged the same rates as Yellowknife. Currently, landing fees are not charged at Yukon airports outside Whitehorse, which is common practice for smaller, remote airports and aerodromes in Canada.

Aircraft parking at ENWIA is also the lowest in the comparator airports benchmarking and generated $22,826 in revenue in 2017/2018.

Non-aeronautical revenue streams, such as land development, parking, and food services and other concessions in ATBs represent some of the most versatile and profitable revenue streams for a growing number of airports.

In all types of airport environments, the development and ongoing administration of non-aeronautical revenue opportunities and other amenities generally require financial and human resources. This means

that in lower fee environments, such as Yukon's, the revenues generated generally do not contribute substantially toward cost recovery or sometimes present a net cost to the airport operator.

At $5 per day, ENWIA has the lowest vehicle parking rates when compared to the other regional airports in the benchmarking review. Only Gander had the same rates and the next lowest was double this rate at $10 per day. In 2017/2018, revenues from parking were $495,920.

Government of Yukon is currently developing and implementing a land management program that will enable industry use of available airport and aerodrome lease land parcels. It is common industry best practice for airports to re-coup the costs associated with land development and maintenance through rents and maintenance fees.

As previously noted, the current Yukon airport fee structure contributes to a lower-cost flying environment in Yukon. Airports everywhere, particularly government airports, must work to balance their financial and infrastructure requirements with their own mandates and their need to support a sustainable flying environment for the public and system users.

4.0 POLICY GOALS FOR THE AVIATION SYSTEM

4.1 THE POLICY GOALS

These recommended policy goals for the Yukon aviation system provide statements that relate to and guide the Aviation System Investment Strategy. The Policy Goals are meant to be a high-level framework that will help guide decision-making for the Yukon's aviation system. The Policy Goals are:

- Promote safety of aerodrome operations.
- Support aviation and the aviation industry in Yukon.
- Optimize service levels and operational processes to improve service reliability of the aviation system.
- Support safety, emergency management and community development in Yukon communities.
- Improve economic sustainability of Yukon's aviation system.
- Define the requirements and standards for the passenger and user experience within Yukon's aviation system.

4.1.1 Policy Goal 1 - Promote safety of aerodrome operations

Within the aviation system, safety is achieved through the development of a culture which includes training, standard operating procedures (SOPs), regular site inspections, maintenance (e.g., grading of gravel runways) and through critical capital investments such as airfield lighting and equipment.

SMS is essential to directing and supporting safety culture at all levels of the organization. TAB uses its SMS to systematically identify and mitigate hazards within the aviation system. Continuing to enhance the use and understanding of the SMS throughout the Government of Yukon will better position SMS as the primary management tool guiding operational, maintenance and development decision-making.

It is important that SOPs are logical, consistent and enable Government of Yukon employees to perform activities safely and to a defined standard. Training is a critical component of safety culture both for airport operators and anyone operating at the airport and helps ensure everyone at the airport knows their duties and obligations.

Likewise, standard site inspections by class allow TAB to assess the condition of airport and aerodrome assets but also to identify any hazards. There can be hazards at an airport that impact aviation safety as well as compliance with other regulations, such as environmental hazards like fuel spills. It is important that TAB continues to be proactive in identifying hazards and mitigating them before they become larger issues.

NAV Canada is responsible for providing navigation and weather services and equipment according to their standards and level of service. It is important for TAB to work with NAV Canada and air operators to support the development and enhancement of approaches to runways and the provision of weather services at key aerodromes and airports.

Transport Canada is the federal department of transportation, which regulates civil aviation, and provides design standards for Canadian land aerodromes (TP312) and guidelines for land use in the vicinity of aerodromes to support the mitigation of aviation hazards near airports (TP1247).

4.1.2 Policy Goal 2 - Support aviation and the aviation industry in Yukon

The aviation industry is dynamic with often rapidly evolving needs. This presents a challenge for the Government of Yukon because the government needs to take into account planning cycles, approvals, and policies as well as be fair, transparent, and responsible with taxpayer funds. Government of Yukon and industry must continue to work together to address the unique challenges and opportunities facing Yukon's aviation system.

Decisions about maintaining and operating aerodromes are informed by needs of users and by the governments, communities and sectors supported by the aviation system. It is important that the Government of Yukon continues to keep lines of communication open with other governments, stakeholders and the public to ensure that it continues to hear the needs of aviation system users.

4.1.3 Policy Goal 3 - Optimize service levels and operational processes to improve service reliability of the aviation system

Better, more comprehensive data helps the Government of Yukon understand the current and future needs of the system, develop assumptions about capacity and growth, and create robust plans for Yukon's airports and aerodromes in the short-, medium- and long-term. Enhancing the planning tools utilized throughout the Transportation Division will increase service reliability across the system.

TAB has identified that more data is needed regarding how the aviation system is being used. It's important to have the processes and systems in place to capture data. TAB should continue to work closely with airport users, government and non-government bodies to collect data and information.

An aerodrome classification has been developed that builds from TAB's existing classification approach and will enable TAB to consistently manage Yukon's airports and aerodromes.

Similarly, a regulatory framework for the effective management of airport lands is essential to ensuring Yukon airports and aerodromes can continue to support safety, operational effectiveness and the needs of aviation businesses and airport users. This regulatory framework is under development and when implemented the regulations will help support the advancement of the effective management of airport lands.

Another component of effective planning is developing minimum specifications for different types of assets. This means that maintenance and capital costs associated with that kind of asset become more predictable over a multi-year period. Asset management programs provide a consistent and evidence-based approach to maintenance. TAB is in the process of revising its strategic asset management plan that will further support this initiative.

Because a considerable amount of the programs and resources required to support the aviation system are managed by areas outside of TAB, TAB needs to continue to work with internal partners to develop service agreements and standards and integrate planning activities, wherever possible.

TAB needs to maintain adequate staffing levels to support its safety management systems, and operational and organizational requirements. Aligning human resources with service delivery requirements is critical for the Government of Yukon. It is also important that the Government of Yukon plans human resourcing proactively, continues to hire the right people with the right skills and continues to invest in TAB staff development, training and retention.

4.1.4 Policy Goal 4 - Support safety, emergency management and community development in Yukon communities

One of the important roles that aerodromes play in communities is facilitating emergency services such as Medevac, policing services and Wildland Fire Management services, in addition to other critical services such as territorial circuit court and other government services. It is critical that TAB incorporates the needs of these user groups and provides a level of service that supports them.

It is also important that Government of Yukon continues to work with communities, First Nations and land planning authorities to support a mutual understanding of the role of airports and aerodromes in communities. Not only are airports and aerodromes economic drivers in communities, they have a unique operating environment that is impacted by and has impacts on adjacent land. Because airports and aerodromes are unique, there are numerous constraints as well as opportunities regarding their role in communities.

Investing in Yukon communities is vital for a thriving territory. When making investments in the aviation system, consideration should be given to how an investment supports community development and safety, as well as access, culture, and economic opportunity.

4.1.5 Policy Goal 5 - Improve economic sustainability of the Yukon aviation system

The aviation system is expensive to operate and there are continuous demands from stakeholder groups, regulators, and other governments for a variety of different investments in the system. The Investment Model developed as part of Flight Path will support the Government of Yukon to objectively evaluate different investments using evidence-informed decision-making in order to maximize value to users, the public, other governments and for its own purposes. Additionally, the Government of Yukon's approach to 5-year capital planning is expected to increase the predictability of multi-year capital planning during the investment period.

Although the Government of Yukon is responsible for the provision and maintenance of aerodromes in the territory, there are other agencies which provide funding support to off-set investments in the aviation system. Identifying these funding opportunities and aligning TAB's processes with their requirements is critical to being able to predictably and effectively secure external funding.

As government, TAB cannot enter into partnerships with private sector the way an airport authority or other private entity could. However, there may be a potential for external parties to provide services to Yukon airports.

4.1.6 Policy Goal 6 - Define the requirements and standards for the passenger and user experience within Yukon's aviation system

The customers of the Yukon aviation system (i.e., passengers) are shared between the air operators and the aerodrome operator, Government of Yukon; therefore, it is important to have a common understanding and approach to service and passenger experience. This is also true of all the other government and non-government groups that play a part in the passenger experience. The flying public are key users of the system and their satisfaction and customer experience can and should be considered in a holistic manner.

While Yukon airports and aerodromes may not have the full spectrum of amenities available at some airports in other jurisdictions, it is important for TAB to provide services that are aligned with airport classifications to support passenger convenience and comfort.

This is also true of airport aesthetics, cultural relevance and sense of place. Yukon's airports, particularly ENWIA, are the gateways to Yukon and have an opportunity to showcase its beauty and unique character.

The Policy Goals and their supporting initiatives are outlined further in Appendix B – Policy Objectives for the Aviation System.

4.2 RECOMMENDATIONS

The following is a summary of the recommendations in section 4.0:

- 4-1 - Adopt the Policy Goals developed for the Aviation System Investment Strategy.
- 4-2 - Enhance use of the SMS throughout Government of Yukon aviation to better position SMS as the primary management tool guiding operational, maintenance and development decision-making for the aviation system.
- 4-3 - Government of Yukon and industry to continue to work together to address the unique challenges and opportunities facing Yukon's aviation system.
- 4-4 - Keep lines of communication open with other governments, stakeholders and the public to ensure that the Government of Yukon is continuing to hear the needs of aviation system users.
- 4-5 - Continue to put processes and systems in place to capture data and work closely with airport users, government and non-government bodies in order to collect information about system use.
- 4-6 - Complete the regulatory framework and develop programs to effectively manage airport lands, ensuring Yukon airports and aerodromes can continue to support safety, operational effectiveness and the needs of aviation businesses and airport users.
- 4-7 – Continue to work with internal delivery partners to develop service standards and integrate planning activities, wherever possible.

- 4-8 - Maintain adequate staffing levels to support the Government of Yukon's SMS, and operational and organizational requirements and invest in the Government of Yukon staff development, training and retention.
- 4-9 – Continue to work proactively with communities, First Nations and land planning authorities to develop a mutual understanding of the role of airports and aerodromes in communities.
- 4-10 - Identify funding opportunities and align Government of Yukon's processes with requirements to predictably and effectively secure external funding.
- 4-11 - Further explore potential for external parties to provide services to Yukon airports.
- 4-12 - Align services with aerodrome classifications and the related passenger and user service levels to support passenger convenience and comfort, as well as effective maintenance

5.0 TECHNICAL ASSESSMENTS

5.1 THE AVIATION ENVIRONMENT

5.1.1 Aviation industry and Yukon-related trends and assumptions

The formulation of the Aviation System Investment Strategy is based around a number of trends and assumptions which are informed by broad industry trends, historical precedence, and data from various sources (e.g., IATA publications, flight traffic volumes). Any changes in these trends or assumptions may impact the implementation of the Aviation System Investment Strategy. It will be necessary for TAB to monitor or take into account these factors as the Aviation System Investment Strategy is implemented over the 10-year period.

The following factors and trends will likely affect the implementation of the Aviation System Investment Strategy.

5.1.1.1 Canada's aviation environment

The Canadian regulatory environment is stable and generally well communicated with aviation industry stakeholders, including airport and aerodrome operators. TAB will be required during the 10-year Aviation System Investment Strategy period to fulfil emerging regulatory requirements regarding Runway End Safety Areas (RESAs). There is also a possibility that 100% non-passenger screening may also be required. Currently, no other major regulatory changes are anticipated in the 10-year period.

Improvements and availability of satellite navigational aids and improved airspace management by NAV Canada over the past decade are leading to opportunities to improve the reliability of safe air access to runways year-round at airports and aerodromes across Canada. While currently only in place at a few of the larger, southern airports, required navigation performance (RNP) approaches may support improved navigation within the 10-year period.

Across Canada, airport operators are focusing on improving the passenger experience to support the growth and demand for services and amenities. In addition, the global aviation industry has collaborated to create airport service quality key performance indicators (KPIs) and measures required to satisfy the needs of users, which is shown to support the growth in passenger traffic to the airports achieving higher scores. It is anticipated that this industry drive toward increased service quality will push expectations for services and amenities at Canadian airports.

Conversely, the increasing implementation of governance models to support financial sustainability and the development and expansion of non-aeronautical revenue streams at Canadian and northern airports is an important strategy that is offsetting operating costs and capital requirements. Airports are able to attract new air services and/or flights by maintaining sustainable aeronautical fees (e.g., landing fees, gate parking fees) that are augmented by revenues from competitively priced non-aeronautical products

and services. Expanded non-aeronautical revenues may come in the form of airline lounges, restaurants, food and beverage services, service/facility sponsorships and advertising.
Non-aeronautical revenues at airports in North America are driven largely by parking services which have become some of the most significant non-aeronautical revenues available to airports. Improved parking management and security systems, high-quality wayfinding signage and lighted signals, lighting and pedestrian covers, are all common methods that have been employed at airports to improve the level of service on groundside. Parking lots are commonly divided into pricing categories that accommodate the majority of users and creates the highest rate of return. Airport terminal curbs are commonly organized to accommodate key commercial ground transportation service providers.

New initiatives related to environmental sustainability are becoming common. This includes promoting the energy efficiency of buildings, reductions in operational energy consumption, and the development of sustainable energy production. This can include solar, wind, geo-thermal, natural lighting, and other sustainable practices, on and around airports. These are being combined with the use of efficient electrical systems such as airside and groundside LED lighting systems in place of halogen or other high-consumption systems.

5.1.1.2 Yukon's aviation environment

In 3-5 years (post pandemic), Stantec anticipates modest increases in aviation traffic system-wide, with more significant increases at several key airports within the 10-year investment period. Based on documented aircraft movements from 2015 to 2019 it is anticipated:

- Traffic will increase at Erik Nielsen Whitehorse International Airport (ENWIA) and Dawson City airports
- Traffic will remain stable or increase modestly at Old Crow, Mayo and Watson Lake airports
- Traffic will remain stable or increase modestly in the 10-year period at the remaining Yukon aerodromes
- Traffic at select sites will fluctuate considerably from year to year, particularly if it links to exploration or other localized economic activity.

The historical strength of the mining industry has relied on the Yukon aviation system to access remote mining sites. Any substantial changes in mining activity within the 10-year period could potentially significantly increase traffic at certain sites and put a significant financial burden on the system. There is currently no anticipated large increase in mining activity that could prompt such an increase, though smaller spikes in mining exploration activity will likely drive smaller changes in traffic at a few sites.

The majority of general aviation commercial operators and private aircraft owners in Yukon are based at either ENWIA or Dawson City. Demand for airport lease lots at these sites will continue to be high. Demand for lease lots at other sites will be significant, though to a lesser degree. Demand at some key sites will be challenging to address due to these sites' constrained footprint and lack of easily or economically developable land.

The overall amount of growth within the various aviation sectors (i.e., rotary, air charter/taxi, air carrier, and general aviation) cannot be forecasted accurately at this time, as rates have varied over time with no overarching trends. The general mix of aircraft activity is expected to remain largely unchanged.

The overall organizational structure of TAB and staffing levels are anticipated to remain largely the same during the investment period.

Revenues generated from fees and concessions will continue to make up a small portion of the funding required to operate the aviation system.

At the divisional level, Transportation Division is currently implementing an asset management approach to guide decision-making for capital maintenance and fleet renewal for aviation. Asset management requires significant operational, financial and political discipline to implement properly and relies on data collected over a multi-year period. It is currently anticipated that it will take 5-10 years to realize the tangible benefits associated with asset management programs.

A considerable amount of resources are spent responding to issues reactively. This is due to a variety of emerging operational, political, economic, and social priorities. Asset management will help mitigate this in the longer term, but not eliminate it entirely.

Government of Yukon is moving toward increased digitization of services and development of systems to drive more effective and efficient operations.

The effects of climate change are having a disproportionate impact on northern infrastructure. These effects are difficult to predict, but it is currently anticipated that climate change will have impacts on aviation surfaces, vertical infrastructure, and may influence the mix of equipment and resourcing required to support airport operations within the 10-year investment period.

The development of regulations under the *Public Airports Act* will allow Government of Yukon to more effectively manage airport lands. Land use plans for Yukon airports are also under development, these plans will help ensure that sites can support operational and user needs in the future.

5.1.2 COVID-19

Similar to other recent, globally disruptive events such as the attacks of September 11, 2001, SARS, and the financial crisis in 2007-2008, the COVID-19 pandemic is impacting aviation in unprecedented ways. It is anticipated that COVID will continue to have broad impacts on the aviation industry in the short- to medium-term.

As a result of the COVID-19 pandemic, it is expected that air traffic will remain suppressed for the next few years, with traffic likely not returning to 2019 levels for at least 3 to 5 years. The obvious result is reduced aircraft traffic forecasts and changes to airports and the aviation industry.

To support passenger safety and prevent transmission, physical distancing measures (i.e., 6 feet or 2 m apart) and mask wearing is required in terminal buildings. Airports are also restricting non-passenger

access to air terminal buildings (ATB). Both of these will result in potential changes in space requirements to support the safety of passengers and airport workers.

New and innovative measures to support the healthy and safe facilitation of passengers and users at terminals are being implemented at airports. There are a number of considerations for improving and optimizing processing such as the advent of touchless systems and bio-security technologies (e.g., self-service passenger check-in, self-bag drops).

5.2 AVIATION SYSTEM GOVERNANCE AND SWOT

5.2.1 Governance and TAB functions

TAB consists of four units reporting to the Director: Yukon Airports Operations, Maintenance, Business and Development, and Safety and Security.

The Yukon Airports unit is responsible for airport operations including issues of airport certification and promoting safe and effective operations at all sites. The unit consists of a superintendent, airport managers and airport duty managers to manage day-to-day operations, as well as industrial mechanics, who maintain industrial equipment such as the baggage system and passenger boarding bridges at ENWIA. This unit also administers the Community Aerodrome Radio Stations (CARS) program, a program fully funded by NAV Canada.

The Maintenance unit is responsible for maintaining airfield electrical systems, wildlife control, vegetation control, and surface maintenance. The unit consists of a superintendent, airport maintenance supervisors, and maintenance operators and labourers. They are responsible for performing maintenance activities to support regulatory compliance at certified sites where they are based as well as some maintenance activities at registered sites. The unit also has airfield electricians who conduct electrical inspections according to Transport Canada requirements and maintain and repair airfield electrical systems, as required.

The Business and Development unit is responsible for managing the branch's capital program, airport lands, and environmental, realty and business services. The unit has a manager, as well as project managers to deliver various airfield, terminal, groundside, and lands-related projects. Staff within the unit also coordinate leases and licences for various activities at Yukon airports.

The Safety and Security unit is responsible for safety, security, quality assurance and emergency preparedness and response. The unit is managed by a superintendent who is supported by the Emergency Preparedness and Response group, who provide fire service at ENWIA and manage emergency management plans at certified sites. There is also a security group that provides security services at ENWIA. The unit also performs internal audits and manages the branch's SMS according to Transport Canada requirements.

TAB is also supported by a number of other groups within Government of Yukon. A few examples of these services include:

- Property Management Division is responsible for managing Government of Yukon's vertical infrastructure, including aviation buildings;
- Transportation Maintenance Branch provides winter maintenance at registered sites not covered by TAB's maintenance unit and maintains aviation heavy equipment;
- Transportation Engineering Branch administers the delivery of airfield and groundside civil works projects;
- Transportation Planning Branch manages capital and transportation network planning, and;
- Department of Tourism and Culture performs air service development for airlines.

There are opportunities for TAB to enhance collaboration with these internal delivery partners to support alignment of service delivery with aviation requirements.

5.2.2 Land use policy and approach

In the past, the Yukon aviation system's land management practices were characterized by:

- ad-hoc land planning and management which, given a low overall level of activity and uncertain forecasts, met needs for many years;
- a first-come, first-served land leasing regime; and
- planning informed by the near-term needs of individual proponents without an overarching system-wide strategic focus.

In the 2010s, however, an upturn in the Yukon economy saw a steady increase in aviation activity and in demand for leases.

In 2017, Government of Yukon passed the *Public Airports Act*. Regulations under the *Public Airports Act* are currently being developed and are intended to clearly define the authorities around airport lands management and allow TAB to enter into new leases under Government of Yukon authority.

In the past in both the federal regime and after transfer to the Government of Yukon, many aviation leases were not delineated as legally subdivided parcels, but by less formal mapping mechanisms within overall airport/aerodrome lots or reserves.

This approach no longer meets requirements for title and financing, and both existing and new lease parcels are in the process of being legally subdivided. Legal subdivision also means that leases for subdivided lots can be registered as leasehold titles with the Yukon Land Titles Office and potentially used as collateral by aviation companies looking to borrow to finance business development.

To adequately reflect these changes, as well as a best practice, TAB is working to develop land use plans for Yukon's 28 airports and aerodromes to support current and future operational and business needs. Having and following a living, long-term plan in place for Yukon's sites, as well as the system as a whole, will provide assurances for users and investors.

Many of Yukon's sites, particularly the busier sites, are physically constrained for both operations and for the development of new lots, making proper planning critical. Land development and servicing projects are expensive and must go through the same capital budgeting process to which all other government infrastructure projects are subject to.

5.2.3 Aviation System SWOT

Strengths (Internal) - Centralized management of 28 airports and aerodromes which takes advantage of organizational capacity within HPW to deliver maintenance and capital projects and balance and offset these against its larger portfolio - The organization demonstrates strong issue identification capabilities including a strong understanding of requirements for supporting the current system and of known and forecasted issues, risks and liabilities - Strong organizational commitment to make system-wide improvements and deliver strong programs and good user experiences	**Weaknesses (Internal)** - Historically variable planning and decision-making frameworks have led to inconsistent investment and missed opportunities for optimization of funding, including external funding opportunities - Organizational culture and structure is often slow to address issues or alternatively reactive and focused on short-term solutions - Not having a formalized aviation asset management approach has made it challenging to set priorities, establish clear service levels and to manage investment on a system-wide level - Challenges in not having multi-year budget approvals to ensure sustained capital programming over a longer period of time - Organization lacks agility due to administrative and regulatory requirements - Focus on high priority safety or regulatory compliance related projects means that medium-to-low priority or medium-risk items are often de-prioritized
Opportunities (External) - Interest from aviation industry in expanding business operations and investing in Yukon airports - Investigating revenue generation opportunities to support financial sustainability and service levels - Advocacy for Yukon and northern aviation interests on the national stage - Development and implementation of clear regulations for managing airport lands and fees - Northern airport and economic development related funding opportunities to offset the cost of improvements - Investigating alternative governance or service delivery models to support future operations - Formalize channels for stakeholder engagement and collaboration	**Threats (External)** - Difficult to anticipate and react to emerging industry needs or economic changes - Increasing passenger and user expectations for facilities and service delivery - Increasing traffic at sites putting greater demand on aviation infrastructure - The impacts of climate change are uncertain and difficult to plan for - Difficult to manage changes in the aviation regulatory environment that impact operations and planning - Uncertainty related to the effects of COVID-19

5.3 AERODROME CLASSIFICATIONS AND LEVELS OF SERVICE

To help address the challenges identified in the SWOT, the need to define service levels by aerodrome type has been identified. Creating a standardized classification system for all airports and aerodromes in the Yukon aviation system will help meet the needs of users and stakeholders alike while helping to support investment decision making over the long term.

5.3.1 Approach for developing classifications

As a foundational piece to the Aviation System Investment Strategy and future investment decision-making, a classification system has been developed for the 28 aerodromes that form the Yukon aviation system. The 28 aerodromes connect communities and support economic development (e.g., tourism, mining exploration) to varying degrees. Government of Yukon's highways functional classification system was considered as an input when developing the Aerodrome Classification System.

The classification system assigns a class for each site based on usage (e.g., flight volumes) and the socioeconomic function of the site. Application of the classification system will, in turn, enable the establishment of service levels by class to help streamline decision-making by the Government of Yukon. This classification system also supports consistency and impartiality with respect to the way decisions are made in order to better direct investments and meet stakeholder expectations over the long term.

The aerodromes are divided into five distinct classes from Class 1 through to Class 5 as shown in table 5-1.

Class	General Description
Class 1	This class is reserved for airports that have the highest aircraft movement volumes in the territory and are critical to the functioning of Yukon territory's central population areas, such as Whitehorse. This class of aerodromes provides crucial social and economic links both nationally and for the territory.
Class 2	These airports link Yukon communities, support major economic activity (e.g., resource extraction) and provide critical access for fly-in communities both internally for Yukon and externally to other jurisdictions.
Class 3	These aerodromes support moderate aircraft traffic. They link most Yukon communities. They support cargo movement for communities, medevac and other emergency services for local area populations.
Class 4	These aerodromes support low traffic volumes. They support minor economic activity, particularly on a seasonal basis. They can also act as emergency alternate sites for aircraft and can support some kinds of emergency services.
Class 5	These aerodromes support very low aircraft traffic and are used to group airports not covered under classes 1-4. They can also act as emergency alternate sites for aircraft and can support some kinds of emergency services. No new aerodromes would be built and classified as class 5.

Table 5-1: **Class descriptions**

This Aerodrome Classification System, shown in table 5-2, was developed using a combination of published data sources, Government of Yukon data, and anecdotal evidence. Additional data, such as flight movements, may need to be collected for specific aerodromes (where practical) to better inform the classification process. The classification scheme is an important input to support decision-making throughout the Aviation System Investment Strategy. To be included in a particular class, an aerodrome must meet several specified criteria.

The criterion "linking Yukon communities" is where the aerodrome provides a key link between Yukon communities, with thresholds based on the population size of the communities being linked and the lack of a class 1 or 2 aerodrome within a one-hour drive. Refer to Appendix C – Aerodrome Classification System for more criteria definitions.

Aerodrome Classification Level	Number of Criteria to meet	Traffic Usage (Volumes)	Social and Economic Functions	
		Annual Aircraft Movements	Linking Yukon communities	Commerce route
Class 1	Must meet all criteria	>25,000	Links communities with population(s) >20,000 and lack of class 1 or 2 airport within a 1 hour drive	Key economic trade route for Yukon (from outside territory)
Class 2	At least 2 criteria, including 1 traffic usage criteria	>1,000	Links communities with population(s) >1,000 and lack of class 1 or 2 airport within a 1 hour drive	Key internal Yukon trade route
Class 3	At least 2 criteria	>250	Links communities with population(s) >250 and lack of class 1 or 2 airport within a 1 hour drive	Minor internal Yukon trade route
Class 4	Must meet all criteria	>50	N/A	Marginal internal Yukon trade route
Class 5	Must not meet criteria for classes 1 to 4	N/A	N/A	N/A

Table 5-2: Criteria for the Aerodrome Classification System

5.3.2 Classifications

Application of the Aerodrome Classification System yields the following results, presented in table 5-3.

Class	Aerodrome Names
1	Erik Nielsen Whitehorse International Airport
2	Dawson City, Mayo, Old Crow, Watson Lake
3	Beaver Creek, Burwash Landing, Carmacks, Faro, Haines Junction, Pelly Crossing, Ross River, Teslin
4	Carcross, Cousins, Finlayson, Fork Selkirk, Hyland, MacMillan Pass, Silver City, Wiley
5	Braeburn, Chapman, McQuesten, Minto Landing, Ogilvie, Pine Lake, Twin Creeks

Table 5-3: Classification results

For further details on the classification results see Appendix C – Aerodrome Classification System.

5.3.3 Mechanisms for changing aerodrome classifications

It is expected that the traffic usage and/or socioeconomic functions of an aerodrome will change over time. The Aerodrome Classification System and the classifications should be periodically reviewed.

5.3.4 Levels of service

The levels of service are designed from the perspective of aviation users in order to support the safe, comfortable, and efficient use of the system. While there may be a desire on the part of some users to increase service levels beyond what is currently indicated, there is a need to balance service provision against the availability of financial and human resources.

Level of service targets are driven by regulatory requirements, industry best practices, known site uses, user expectations, critical aircraft, passenger volumes, emergency service requirements, and Government of Yukon mandate commitments.

However, as indicated in the Policy Goals, while service levels at Yukon airports may be lower than those at airports with other types of operating models, it is still important that users feel that Yukon's airports are meeting their basic needs.

There are opportunities for TAB to develop key performance indicators (KPIs) to assess and support service delivery, as is indicated in the Policy Goals.

The Class 1 and 2 certified airports are governed by federal regulatory requirements and must also support similar airline regulatory standards. This often makes levels of service for regulated activities such as security, airfield maintenance and emergency management at these sites very clear and they are generally supported by the development and implementation of a number of required manuals and the mitigation of hazards through SMS.

Service levels at Class 3, 4, and 5 sites are informed by CARs (e.g., requirements for windsocks), but they are not governed by the strict regulatory requirements for certified sites. Requirements at these sites are largely driven by emergency service requirements and user needs.

Currently, the ability to meet some of these service levels is influenced by a variety of factors including, but not limited to, terrain issues, ATB capacity, human resources, and available funding.

There are a number of instances where services at airports are managed by groups outside of TAB. These service providers include other government branches and departments (e.g., Tourism and Culture for artwork and cultural displays), non-government or other government agencies (i.e., NAV Canada for navigation) or private commercial enterprises (e.g., food service, aircraft fuel).

While some services are outside the functional control of TAB, many are also governed by industry standards and regulatory requirements. These include the National Building Code, CARs, CASR, Canadian Transportation Agency accessibility requirements and various environmental regulations.

Where a service is entirely outside the control of Government of Yukon, such as security screening or navigation, TAB works collaboratively with service partners and others to support appropriate levels of service at its sites.

The application of standards varies based on the classification of airports and aerodromes within the aviation system. There is considerable variability between and within the different classes of sites with many of these criteria not being applicable for smaller sites. Some of these associated service levels are still under development, as well, and not in place for certain sites or classes of sites.

The overall level of service criteria incorporates the following components:

- Airside-related services and facilities
    - Navigation – provision of GNSS approaches or other instrumentation
    - Weather and advisory services – provision of CARS/weather advisory services appropriate to demand, based on hours of availability
    - Airfield maintenance – provision of summer and winter maintenance to meet standards
    - Airfield levels of service – absence of known deficiencies affecting usability of the site
    - Airfield lighting – provision of lighting and maintenance to standard
    - Land and aircraft parking – availability of land or tie-downs/aircraft parking once operational needs are met

- Air terminal buildings
    - Building condition – meets accessibility requirement, is clean, safe, and aesthetically appealing and complies with standards
    - Terminal level of service – meets IATA level of service standard with adequate passenger throughput and space.[8]

[8] Additional information about the IATA Level of Service concept can be found at https://www.iata.org/en/services/consulting/airport-pax-security/level-of-service/

  - Passenger amenities – includes the provision of services such as Wi-Fi, food, shopping, or electronic plug-ins
  - Information – wayfinding signage and Flight Information Display Screens are appropriate and sized for purpose
  - Terminal services – office space is available when operational needs are met, baggage handling is appropriate

- Groundside
  - Access roads – enable service provision in a safe and efficient manner, wayfinding is adequate
  - Parking – wayfinding signage and parking lot design are appropriate, enables service provision in a safe and efficient manner
  - Terminal curb – key modal change point, enables service provision in a safe and efficient manner
  - Signage – road signage directing people to the aerodrome or denoting the aerodrome is adequate, and appropriate aesthetically

5.3.4.1 Class 1 level of service

ENWIA supports a number of domestic carriers and transborder and international service and is considered a gateway airport to Yukon. As such, it has higher service demands upon it and a greater diversity of passengers, users, and services available. Partner agencies that provide air traffic control services, weather information, border control and security processing support operations.

ENWIA is inspected daily as are its electrical systems, and it has dedicated staff onsite to support summer and winter maintenance as well as operations. Equipment is inspected at least annually. Airfield line painting is done 1-2 times annually and crack-sealing and surface maintenance are performed as required.

The following summarizes the appropriate service level for Class 1 sites:

- Airfield maintenance according to regulated standards
- Airfield lighting maintained according to regulated standards
- Precision approach(es) augmented by non-precision approaches
- TAF[9] and METAR[10] available from ATC, 24/7
- Building is clean, safe and meets accessibility standards
- Provides tourism and cultural displays, visitor information centre services and is aesthetically appealing
- Terminal provides a reasonable level of service, either optimal or slightly sub-optimal by IATA standards

[9] Terminal Aerodrome Forecast - Aviation meteorological forecasts; they are generally issued at least four times a day.

[10] Meteorological Terminal Air Report (METAR) - A weather report for aviators.

- Basic Wi-Fi, electronic plug-ins, flight information displays, food service, and indoor baggage handling are available
- Land, aircraft parking and office space are available once operational requirements have been met
- Aircraft ground handling and third-party fuel are available
- Security services provided according to CASR requirements
- Ground transportation is available
- Paid public parking is available; groundside and access roads are maintained to support safe access by airport users year-round

5.3.4.2 Class 2 level of service

Class 2 airports support scheduled passenger flights and other aviation users including rotary operations, air charter, recreational flying as well as Medevac, RCMP and Wildland Fire Management. These airports are certified and are located in larger communities, economic hubs or fly-in communities around Yukon.

These sites are inspected daily with their electrical systems being inspected monthly. They have dedicated staff onsite to support summer and winter maintenance. Equipment is inspected at least annually. Dust suppressant is applied and blading and packing are performed regularly at gravel sites. Painting is applied annually at paved sites and crack-sealing and surface maintenance are performed as required.

The following summarizes the appropriate service level for Class 2 sites:

- Airfield maintenance according to regulated standards
- Airfield lighting maintained according to regulated standards
- Non-precision or precision approaches available
- TAF and METAR available from CARS operator, based on CARS operating hours
- Building is clean, safe, and meets accessibility standards
- Provides tourism and/or cultural displays and services and is aesthetically appealing
- Terminal provides a reasonable level of service, either optimal or slightly sub-optimal by IATA standards
- Basic food service, and indoor/outdoor baggage handling are available
- Land, aircraft parking and office space are available once operational requirements have been met
- Public parking is available; groundside and access roads are maintained to support safe access by airport users year-round

5.3.4.3 Class 3 level of service

Class 3 aerodromes all have gravel surfaces and do not have scheduled passenger flights, but do serve Medevac, RCMP and Wildland Fire Management. These aerodromes also support cargo transfer, mining, tourism, government services, and fuel hauls, among other functions. They are all registered and are located in smaller communities around Yukon.

Sites with CARS stations are assessed daily by CARS operators with their electrical systems being inspected monthly. They do not have dedicated staff onsite and are supported by TMB equipment operators and CARS contractors. TAB mobile maintenance crews also perform summer maintenance. Dust suppressant is applied and blading and packing are performed when appropriate.

The following summarizes the appropriate service level for Class 3 sites:

- Airfield maintenance performed year-round according to priority
- Airfield lighting maintained according to regulated standards
- Non-precision approaches are available
- TAF and METAR available from CARS operator, based on CARS operating hours, where available
- Building is clean, safe, and meets accessibility standards
- Public parking is available
- Land, aircraft parking and office space are available once operational requirements have been met

5.3.4.4 Class 4 level of service

Class 4 aerodromes are all gravel surfaces and do not have scheduled passenger flights. The RCMP and Wildland Fire Management may operate occasionally at these sites, but they do not support Medevac. These sites generally support tourism, recreation, mining, fuel hauls, and flight training.

These sites do not have dedicated staff, but TAB mobile maintenance crews provide summer maintenance. Blading and packing are performed when appropriate and annual site inspections are required.

The following summarizes the appropriate service level for Class 4 sites:

- Airfield maintenance performed in summer
- Public apron is available
- Land and aircraft parking are available once operational requirements have been met and when supported by business case
- Public parking is available at sites where it is required to facilitate public access

5.3.4.5 Class 5 level of service

Class 5 aerodromes are all gravel surfaces and have limited use. These sites do not generally accommodate emergency services. Basic level of service standards for these aerodromes are primarily related to safety.

These sites do not have dedicated staff but TAB mobile maintenance crews provide summer maintenance. Blading and packing are performed when appropriate and annual site inspections are required.

The following summarizes the appropriate service level for Class 5 sites:

- Airfield maintenance performed in summer
- Public apron is available
- Land and aircraft parking are available once operational requirements have been met and when supported by business case

5.4 OVERVIEW OF MAINTENANCE AND INVESTMENT OPPORTUNITIES

Maintenance and investment opportunities have been identified and discussed in the following areas: electrical, equipment, surfaces and buildings (vertical infrastructure).

5.4.1 Electrical

The electrical systems at Yukon airports and aerodromes are, on average, reaching or beyond the end of their useful lives. Class 1 and 2 airports and Class 3 aerodromes with airfield lighting systems require a growing amount of electrical maintenance and servicing. Government of Yukon continues to invest annually to upgrade existing electrical systems.

Most of the electrical systems are over 20 years old and vulnerable to failures. Few of the systems have electrical as-built drawings, meaning that they are nearly impossible to standardize and challenging to maintain. Most were also not installed to current standards, with cabling that is not buried deep enough, which creates ongoing maintenance problems.

Most of the existing systems are also low-intensity systems. They are grandfathered in, but do not meet current TP312 5th edition standards. Most of the Class 3 sites still have antiquated VASI units, which are planned to be replaced with PAPI units during the investment period.

Mayo's lighting system upgrades have commenced with a planned completion in 2021; Watson Lake Airport and Old Crow Airport also have older, halogen lighted airfield lighting systems, which should be considered for replacement within the 10-year investment period. Airfield lighting at ENWIA is also dated and maintenance is increasingly challenging; lighting for the main runway will be replaced when the runway is rehabilitated/reconstructed. Electrical systems at Class 3 sites are largely at the end of their useful lives as well and should also be considered for upgrades or replacement during the 10-year investment period.

Several aerodrome electrical generators, typically used to provide back-up power for the airfield and occasionally to the ATBs, require replacement within the 10-year investment period. Some are currently non-functional.

Generators and electrical systems are regularly tested and maintained by airfield electricians. Current requirements are that electrical systems are tested on a monthly basis and ENWIA's electrical systems are tested daily.

5.4.2 Equipment

A minimum complement of airport equipment at Class 1 and 2 sites is required to deliver on regulatory requirements as well as meet safety and redundancy requirements. Certified Yukon airports have dedicated equipment for the provision of year-round airport maintenance services. Some registered aerodromes also have maintenance equipment onsite.

Maintaining newer fleets of equipment supports improved reliability and cost effectiveness, particularly at smaller, more remote airports where there is less access to mechanical facilities and services. Often, older equipment is moved from ENWIA and used at smaller aerodromes or as secondary equipment to ensure redundancy.

The Aviation System Investment Strategy considers a more robust mobile maintenance program from three mobile maintenance centres: ENWIA, Dawson City and Watson Lake. Mobile maintenance related trailers and equipment are required during the investment period at some of these certified sites to support crews performing summer maintenance activities at nearby registered aerodromes.

ENWIA acquired several pieces of new airport maintenance equipment in 2018-2019, and much of its frontline fleet is in good condition and is well-maintained. ENWIA will require new fire apparatus in the investment period. Much of the equipment at ENWIA is stored outdoors.

Equipment dedicated to the Class 2 airports is generally in fair condition. Some equipment is at or past its useful life and lacks sufficient redundancy to effectively support operations. This is particularly challenging in Old Crow where shipping equipment is challenging and expensive. Much of the equipment at these sites is also stored outdoors.

Exposure to the elements daily may ultimately reduce the life expectancy of equipment, and result in overall higher maintenance and repair costs. Maintenance garages are therefore an important part in maintaining airport equipment and supporting airport maintenance crews. These garages should have appropriate capacity and facilities and some garages are not able to support this. Currently, all certified sites have maintenance garages, with the exception of the Mayo Airport.

There are some snow blowers at smaller Class 3 aerodromes, where winter maintenance is provided by Transportation Maintenance Branch (TMB). The strategy of equipping all Class 3 aerodromes with maintenance equipment has been contemplated, but appropriate resourcing is a concern. TMB does maintain some Class 3 sites in winter, but typically prioritizes highway maintenance.

5.4.3 Surfaces

Airport and aerodrome surfaces are in a variety of conditions, with some being good or recently upgraded and others, mostly Class 4 and 5 sites, being in poor condition.

Airfield surfaces at certified Class 1 and 2 sites are maintained year-round by dedicated onsite TAB maintenance crews who inspect the surfaces daily and perform a variety of maintenance functions

including plowing, sweeping, crack sealing, painting, packing and mowing. CARs regulations apply to the maintenance and condition of airfield surfaces at certified sites.

Most attention is given to ENWIA, where there is a significant amount of paved surface area requiring maintenance to keep the airport operational year-round. The pavements at ENWIA are in overall fair condition with some nearing, or past, their useful life. Minor surface repairs are often required, and the Government of Yukon will need to complete a major rehabilitation or reconstruction of the main runway in the short to medium term.

Dawson City has a new paved runway and it is in good condition. The runway at Watson Lake Airport is nearing the end of its useful life, and although well maintained, requires restoration and rehabilitation during the investment period. The Old Crow Airport runway is in good condition, and receives regular dust suppressant, blading and packing. The Mayo Airport runway was upgraded in 2019 and is also in good condition.

Class 3, 4 and 5 airfield surfaces are in a variety of conditions with most being characterized as fair; many surfaces have stood up well over the years, while others have known or ongoing issues. Some runways are stabilized gravel with turf and are mowed accordingly. Other granular runways are maintained as required but may have issues related to frost heaves, rutting, gopher holes or subsurface degradation. Flooding over runways can also cause surface damage to runway strips that are close to rivers. These sites are maintained according to best practice.

Many of the Class 4 and 5 aerodromes do not have aprons off the runway strip. However, to support safety at busier aerodromes, aprons should be provided off the runway strip to accommodate transfers of passengers, fuel and cargo. At aerodromes where there is no apron, passenger transfer, fueling and cargo transfers generally occur in the runway strip.

All airports and aerodromes require site-wide water management plans, in order to improve surface drainage and to prevent ponding. Plans for priority sites are currently under development.

Most airport sites require regular inspections, particularly seasonal inspections after spring thaw or before the winter.

Accessing appropriate sources for aggregate can be challenging at some sites, particularly those that are remote or that lack road access. Opportunities to stockpile aggregate should continue to be identified, where appropriate.

5.4.4 Vertical infrastructure

There are a number of different types of buildings required to support service levels at airports. The most fundamental are ATBs, which support airport operations and house CARS offices. There are also maintenance garages at certified sites and some sheds at registered sites. There are some field electrical centres, which house controls for airport and aerodrome electrical systems. ENWIA has a number of additional buildings, including the Air Traffic Control tower, fire hall and electrical shop.

The Whitehorse ATB itself is in relatively good condition and some upgrades having been identified. Most Class 2 and 3 ATBs are generally well maintained but are showing their age. These buildings commonly require additional accessible ramps, washroom upgrades, or energy envelope upgrades (e.g., insulation). CARS offices are kept in good condition generally but do require minor improvements and updates. Buildings are required to align with National Building Code and other standards.

Airport maintenance garages and equipment sheds are located at ENWIA, Dawson City, Old Crow, Watson Lake, Faro, and Haines Junction. There is a new maintenance building planned for ENWIA in the short term. A new maintenance garage was built at Dawson City in 2018-2019. The Old Crow garage requires some improvements related to its building envelope. The Watson Lake garage does not adequately support the equipment required for airport maintenance due to its configuration. At Mayo, an area has been set aside to accommodate a new maintenance garage.

Airport access roads, parking lots and laneways are generally adequate for their purpose. There are several aerodromes with very narrow access roads, and some that are in poor condition. Most parking lots are adequate but some are undersized for their current uses or require maintenance. At certified airports, parking lots, sidewalks and access roads are maintained by airport maintenance staff. Groundside maintenance is a secondary priority to airside maintenance. Landscaping at many sites is in need of maintenance as well. Site identification and airport directional signage needs improvements throughout the aviation system and should be reviewed system wide.

Airport terminal building level of service standards are generally fair, although in peak operating hours all airport terminals facilitating passenger traffic had components that scored as sub-optimal according to IATA Level of Service standards. ENWIA, Old Crow and Watson Lake all provide good or fair terminal service levels while Dawson City and Mayo are constrained for space and as a result struggle to meet passenger needs, particularly during peak passenger flight times.

A new baggage handling system is currently being installed at ENWIA, while baggage at Class 2 airports is generally handled outdoors. Wayfinding improvements have been identified at ENWIA specifically. Vending machines are available at a number of Class 2 sites and ENWIA. Ground transportation options are available at ENWIA but are limited at Class 2 sites.

5.5 AIRPORT AND AERODROME CURRENT ASSESSMENTS

Through the development of the Aviation System Investment Strategy, current assessments for each of Yukon's 28 airports and aerodromes were developed; these assessments provide a snapshot in time for each site. They look at each site's existing infrastructure, levels of service, functions and impacts.

Using the Aerodrome Classification System (see Appendix C) and the Passenger and User Levels of Service (see Appendix D), sites were rated based on the various kinds of critical assets or services at Yukon's airport. These are aligned to classifications with higher standards being imposed on Class 1, 2, and 3 sites. The ratings are as follows:

- Good – Asset meets standards or provides an adequate level of service
- Fair – Asset has some known deficiencies or provides a suboptimal level of service

- Poor – Asset has a number of known deficiencies or provides an inadequate level of service; or the asset or service has a high negative risk profile potentially affecting critical service delivery or safety

5.5.1 Conditions related to stakeholder inputs

Generally, some of these proposed activities may require significant stakeholder engagement, require extensive or complex infrastructure upgrades, present operational risks or liabilities, require displacement of existing infrastructure or uses, or require the appropriation of adjacent lands, among other considerations. A number of these investments had previously been identified by TAB and some are already planned or in progress or else were examined and deemed incompatible with safety, operational or regulatory requirements, outside the branch mandate or financially or practically unfeasible.

5.5.2 Class 1 airport: Erik Nielsen Whitehorse International Airport (CYXY)

ENWIA (CYXY) is located on the Alaska Highway, 6 km from downtown Whitehorse by road. The airport is situated on a plateau, surrounded on the north, east and south sides by steep bluffs.

ENWIA is certified by Transport Canada and is the primary aviation hub in Yukon and host to scheduled passenger airlines, air charter operators, private commercial and recreational aircraft activities, rotary-wing operations, and flight training. The airport supports emergency response and preparedness, tourism and mining industries, government services, and many other business and private/leisure activities.

There are two year-round carriers serving the airport and three seasonal carriers. The airport connects Whitehorse with destinations in Yukon, Inuvik, British Columbia, and Alberta year-round. It also connects the city with Frankfurt, Germany, Yellowknife, Ottawa and Fairbanks, Alaska, on a seasonal basis. The contracted Medevac service provider, the RCMP Air Division, and Wildland Fire Management each have air bases at CYXY.

The capacity to accommodate significant changes to level of service for the airside at ENWIA is limited due to terrain and aging infrastructure. The OLS for CYXY are impacted by terrain, and other obstacles that result in a reduction of the landing distances available for aircraft. Domestic passenger flights and other flights that cannot land at CYXY due to weather (or other situations closing runways) are able to use Watson Lake Airport as an emergency alternate.

The airport accommodates large jet aircraft (AGN IV) and the critical aircraft is the B767; however, the B737, ATR-42, and A319 are also common.

The airport has 3 runways: the main runway (14R-32L), the parallel runway (14L-32R) and the crosswind runway (02-20). CYXY has adequate navigational aids with an air traffic control tower and advisory/control services provided by NAV Canada. The airport has an ILS for Runway 32L and there are GNSS/RNAV approaches for Runway 14R-32L. There is no ILS on Runway 14R due to terrain constraints. There are no other navigational aids on the other runways.

The airside pavements (i.e., taxiways, runway, and aprons) are maintained to standard, and are a mix of ages and conditions ranging from fair to good. Runway 14R-32L requires a substantial rehabilitation or reconstruction in approximately the next 5 years. Portions of the concrete apron pavements on Apron I were rehabilitated in 2019-2020, although there are still sections of the apron that are in fair condition. Lighting is aging, and significant parts of the airfield electrical infrastructure would benefit from upgrades or replacement. A site-wide water management plan is under development.

There are a number of tenants at CYXY including commercial, government, institutional, recreational and non-profit organizations. This includes both fixed-wing and rotary operations as well as services for aviation. Land is leased and licensed to various tenants.

There are also licensing agreements with a number of government entities and commercial operators for building space. Itinerant aircraft parking, for both fixed wing and rotary, is primarily located on Apron I and based aircraft parking is primarily located on Apron II. The footprint of the site has various constraints (i.e. terrain, geotechnical) and there is an overall lack of easily or economically developable land.

The ATB is in good condition. Some upgrades related to accessibility and building code have been identified. CYXY hosts both domestic and international passenger processing facilities; the building was expanded to support international flights in 2009.

The ATB provides passengers with a fair level of service; limited processor capacity (e.g., passenger check-in, passenger screening, etc.) may result in long queues in the peak hour. The public areas around the check-in hall and arrivals halls are frequently congested in peak hours, as are the security screening area and departure lounges, particularly when domestic flights mix with international flights.

Overall, the space pressures effect the southern part of the airport more than the northern addition, which is comparatively underutilized, although it still can be congested at peak periods. Typically, there are very busy peak hours and other times where the terminal is empty of passengers (between peak flight hours) due to CYXY's position as a spoke rather than a hub airport.

There is a gift shop onsite and vending machines pre- and post-security. There are no additional food services post-security due to space constraints. Pre-security food services are in the process of being re-scoped in response to evolving conditions. The original ATB's aesthetics are dated and the finishes and fixtures generally have not been significantly upgraded since the ATB was first constructed in the 1980s. However, some upgrades have been made to bathrooms and the secure boarding lounge in 2018.

Ground transportation services at CYXY include scheduled public bus service, charter bus service, private taxis, hotel shuttle vans and car rental services, all of which are available during flight hours. There is an adequate amount of parking. Passengers arriving by private car have access to short- or long-term parking, depending on the duration of their trip. Airport employee parking, privately rented stalls and rental car areas are mixed into the groundside parking area. There is a terminal access lane, which allows passengers to be dropped off/picked-up directly on the curb; this is supported by a new cell phone lot for individuals waiting for arriving passengers.

There is an adequate amount of parking and condition and access is generally good; the main airport access road intersects with the Alaska Highway. Additionally, the current parking lot configuration and access creates some inefficiencies with traffic flow and access control. Additional studies are underway to look at potential mitigations.

The overall condition of CYXY is good, while the overall level of service is fair.

Land use and development

The City of Whitehorse has an Official Community Plan (OCP) which is being updated and includes the airport. The airport has airport zoning regulations under the *Aeronautics Act*, which the City's OCP must adhere to. The City and Government of Yukon have agreed that there shall be no development within 30 metres of the edge of the cliffs/bluffs, with the exception of the perimeter pedestrian trail.

There are over 150 lease agreements in place, in addition to shorter-term land/building-use licences.

Land is constrained for future development. New lease lots are currently being developed in Chipmunk Place, off of Lodestar Lane. Feasibility studies are underway related to land development at CYXY. Any additional land development of significance would require considerable capital investment.

Stakeholder inputs

There are several investments that aviation stakeholders and others would like to see to support aviation at ENWIA.

These include:

- Expand/renovate ATB for future traffic growth
    - -Develop more extensive airside food options and appropriate space for them
    - -Develop additional lounges
    - -Create additional office space for tenants and staff
- Improve level of service standards with short-, medium- and long-term improvements to the terminal building
- Add tie-downs and plug-ins
- Improve ground transportation options
- Perform aesthetic improvements (e.g., art, culture, flooring, carpeting, lighting)
- Expand check-in area and provide self-serve kiosks and bag-drop facilities
- Develop vehicle service road for ground services traffic to move off Taxiway E
- Improve navigational aids, particularly on 14R
- Install common use terminal equipment
- Develop small- to medium- sized serviced lease lots

5.5.3 Class 2 airports

5.5.3.1 Dawson City Airport (CYDA)

The Dawson City Airport is located on the North Klondike Highway, just outside of the town of Dawson City. The site is generally busy, being the second busiest airport in Yukon. However, it is currently constrained due to topography and existing terminal and apron capacities. The original gravel runway was paved in 2018 and a new maintenance facility was constructed in 2018-19.

The airport supports year-round passenger service and is used by a variety of users including private recreational, rotary, emergency services (Medevac, RCMP, Wildland Fire Management), and air charter operators to support tourism, mining, government services, and other types of business activity.

The critical aircraft is the ATR-42 (AGN IIIA) and the Boeing 737-500 (AGN IIIB) provides charter service. Apron I is currently constrained and attention needs to be paid in respect to how aircraft are parked so as to not violate the OLS. A second apron and service area on the south side of the runway is currently under development in order to ease congestion.

The runway is restricted to day-use only for non-emergency users. There are penetrating obstacles in the OLS and terrain on approach, which are frequently combined with low cloud or heavy precipitation. This can result in delayed or cancelled flights to and from CYDA. Due to the terrain approach, landing minimums are relatively high resulting in Runway 03-21 being classed under TP312 as a non-instrument, day-use runway only.

The airfield surfaces are in good condition. The lighting is in fair condition.

There is very little room available within the ATB when the ATR-42 arrives. This is exacerbated when the Boeing 737-500 is using the airport. This leads to a downgraded level of service for passengers. A number of building upgrades to meet standards have been identified.

The parking lot is large enough for current uses and is in good condition but is on the opposite (northwest) side of the Klondike Highway and users must cross the highway to enter the terminal. The terminal curb lane is small and constrained.

Land use and development

There are currently over a dozen land leases and licences in place at CYDA and several building/office space licenses. Additional hangars and lands are required to meet demand in the medium- to long-term. Government of Yukon is working to complete a land use plan and a regulatory process to enable it to lease land in a planned fashion. Once these two initiatives are completed, Government of Yukon will be in a position to consider developing additional lease lots at this site.

The site is constrained for development. Adjacent land impacts the airport and the airport conversely impacts the land around it. It is located close to residential developments and residents have expressed concerns about noise pollution. The Tr'ondek Hwech'in First Nation also has expressed concerns about run-off and soil and water contamination.

Stakeholder inputs

There are several investments that aviation stakeholders and others would like to see to support aviation at the Dawson City Airport.

These include:

- Add tie-downs and plug-ins
- Expansion of ATB, including increased seating and washroom upgrades
- Improve navigational aids; lower minimums for RNAV approaches
- Develop small- to medium- sized serviced lease lots
- Fencing and enhanced access control
- Provide ARCAL
- Install hazard beacons
- Create appropriate vehicle parking lot on airport lot

5.5.3.2 Old Crow Airport (CYOW)

The Old Crow Airport (CYOC) is a critical transportation asset for the community of Old Crow, since it is the only Yukon community not accessible by road. The facilities and infrastructure at CYOC enable year-round air passenger services; the critical aircraft is the ATR-42 (AGN IIIA). Cargo and fuel hauls (fuel flown by aircraft) are also critical to the community.

There is currently scheduled air service linking the community to Whitehorse, Dawson City and Inuvik. Other key users are emergency services (Medevac, RCMP, Wildland Fire Management) along with aviation users that support government services, tourism, and other economic activity in the community.

The airport has RNAV approaches on both Runways 04 and 22 and is characterized as a non-instrument runway. It is lighted and allows for flight operations both day and night. The OLS is generally clear of obstacles and the terrain is generally flat, with good approach and departure paths.

The runway is certified to TP312 4th edition standards; airfield surfaces are in good condition and support current traffic. However, the apron can become congested, particularly when the C-130 Hercules is operating at the airport; the Hercules supports cargo hauls. The lighting is in fair condition.

The parking lot and groundside area can be congested when the airport is busy. The existing terminal is in good condition and appropriate for its intended uses. However, there are some constraints for the expansion of current storage space, office space, and baggage handling. There is sufficient room within the ATB for most departing passengers when the ATR-42 arrives; however, the mix of greeters and arriving passengers may result in a crowded terminal area.

There is an airport maintenance facility, and the building supports current operations, though energy envelope upgrades have been identified.

Land use and development

There are a few land lease agreements in place at CYOC; one is held for the aviation fuel service provided by Vuntut Gwitchin First Nation and another includes licence space for deicing and ground handling equipment. There is also space leased in the ATB. There is limited space available for lease lot development, and areas of known contamination for which remediation is currently being planned. The airport has a registered airport zoning regulation under the *Aeronautics Act*.

The airport site is constrained by the community of Old Crow which surrounds the airport. Due to its close proximity to residential areas, community members have expressed concerns about noise pollution and dust from the airport.

Stakeholder inputs

There are several investments that aviation stakeholders and others would like to see to support aviation at the Old Crow Airport.

These include:

- Review fuel services
- Investigate the environmental and health effects aircraft operations in the community
- Expand of the apron parking area to accommodate larger aircraft while small aircraft may be present on the ramp, add tie-downs for light aircraft and power outlets for aircraft block heaters
- Develop small- to medium- sized serviced lease lots
- Consider relocating airport to an alternate location

5.5.3.3 Mayo Airport (CYMA)

The Mayo Airport (CYMA) is located in the town of Mayo, off the Silver Trail. It can currently support daytime scheduled service, as well as non-scheduled flights, passenger charter flights and rotary wing operations. The facilities and infrastructure at CYMA allow year-round air passenger services; the critical aircraft is the ATR-42 (AGN IIIA).

The airport was certified in 2019 and there were a number of upgrades to bring it up to TP312 5th edition standards. While the landing minimums are high, the approaches are good and generally unobstructed. Work is currently underway to upgrade the airfield lighting.

Fuel hauls are also a key activity. Key users are Medevac and RCMP, and Wildland Fire Management has a regional base onsite. The airport also facilitates aviation activity which supports mining, tourism, outfitting, government services and recreational activities.

The airfield surfaces are gravel and in good condition. Significant earthworks were executed in 2019 to address frost heaves. There is sufficient apron space for operations as the apron was recently expanded to support increased traffic.

Regular scheduled flight operations push the capacity limits of the ATB. When scheduled service began at the site, a modular building was brought in to provide additional capacity for passengers.

Some features of the ATB are not aligned with current standards and should be upgraded if changes were made to the building. Unlike other certified airports in Yukon, Mayo currently does not have a heated maintenance facility.

Land use and development

There are currently a number of land leases and building space use licenses at the Mayo Airport for fuel as well as for aviation users. There are also a number of already subdivided lots at the site. Land use plans are under development.

The site is generally unconstrained, with the exception of the area to the northeast and east, which is a wetland area.

Stakeholder inputs

There are several investments that aviation stakeholders and others would like to see to support aviation at the Mayo Airport. Generally, some of these proposed activities may require significant stakeholder engagement, require extensive or complex infrastructure upgrades, present operational risks or liabilities, require displacement of existing infrastructure or uses, or require the appropriation of adjacent lands, among other considerations.

These include:

- Review fuel services
- Add tie-downs and plug-ins
- Increase collaboration with the Na-Cho Nyäk Dun First Nation
- Develop small- to medium- sized serviced lease lots
- Install a wildlife fence to keep animals off the runway, and additional fence and fence gates to prevent vehicles from unauthorized access into the airport
- Put gravel matts in place for large turboprop aircraft start-up operations

5.5.3.4 Watson Lake Airport (CYQH)

The Watson Lake Airport (CYQH) is located off the Robert Campbell Highway within the town of Watson Lake and is used by a variety of users including private recreational, rotary, and emergency services users (Medevac, RCMP, Wildland Fire Management), and air charter operators to support tourism, mining, government services, and other types of business activity. While there are currently no scheduled flights, airport infrastructure can support scheduled passenger air services with AGN IIIB type aircraft (B737).

CYQH supports moderate levels of air traffic; however, without scheduled service, it is somewhat over-serviced for the functions it currently provides. The airport acts as an alternate airport to ENWIA; aircraft can land here in the event of in-air emergency due to its capacity to handle up to B737 aircraft. It also has

an Instrument Landing System (ILS) and is the only Yukon airport outside of Whitehorse that has an ILS. Additionally, the terrain is generally flat and devoid of obstacles as both approaches are somewhat over water.

There is a single paved runway at CYQH, which is in fair condition. The remaining airside pavements (taxiways, aprons) are in a variety of conditions, from poor to good. The lighting is at the end of its useful life, and planning for replacement in conjunction with surface rehabilitation.

The ATB and CARS office provides a good level of service with generally adequate seating and space. The interior includes displays and visual representations of Yukon history. However, the building has some known issues, such as lack of potable drinking water.

The former air traffic control tower (which is part of the current ATB) was designated as a heritage site in fall 2019, but the historic tower requires significant renovations to meet standards and is not currently accessible to the public. It is in overall fair condition. The well-known B.C.-Yukon Air Services building is located at the site.

The parking lot and groundside level of service is also generally adequate for current uses. The airport is close to a water aerodrome, which is not on airport property, and is not operated by Government of Yukon.

Land use and development

The Watson Lake Airport has several lease lots and licences primarily to support fueling as well as fixed and rotary-wing operations. The site is of an adequate size for the level of service the airport provides. There is a long airport road connecting the airport to the Robert Campbell Highway, and the site is otherwise surrounded by water or public land. The airport has a registered airport zoning regulation under the *Aeronautics Act*.

The Watson Lake Official Community Plan is currently under review. The airport has a numbers of areas of potential environmental contamination. However, under the Arctic A Devolution Agreement, these liabilities are still owned and managed by Transport Canada.

Stakeholder inputs

There are several investments that aviation stakeholders and others would like to see to support aviation at the Watson Lake Airport.

These include:

- Add tie-downs and plug-ins
- Provision of and maintenance of campground amenities/services for itinerant pilots
- Re-establishment of the crosswind runway
- Renovations of the historical tower
- Increased collaboration for planning and development between local community and Government of Yukon.
- Develop small- to medium- sized serviced lease lots

- Review weather reporting and fuel services

5.5.4 Class 3 aerodromes

5.5.4.1 Beaver Creek Aerodrome (CYXQ)

The Beaver Creek Aerodrome (CYXQ) in located in the community of Beaver Creek, off the Alaska Highway, and supports both fixed wing and rotary operations. The aerodrome is near the U.S. border and CBSA has a customs facility adjacent to the aerodrome. The aerodrome supports emergency services (Medevac, RCMP, Wildland Fire Management), recreational flying, and aviation activity related to government services and mining. The critical aircraft is the ATR-42 (AGN IIIA).

The gravel runway, Runway 14-32, apron and taxiway are in good condition and were recently rehabilitated (2018-2019). The airfield lighting is maintained but is at the end of its useful life and replacement is underway.

CYXQ has good navigational aids that support non-precision instrument approaches. The airport is currently supported by a non-directional beacon (NDB) for non-precision instrument approaches to Runway 14-32, but it is slated to be decommissioned. New GNSS/satellite-based approaches (LNAV) are now operational at CYXQ.

The ATB is in relatively good condition but requires some repairs and accessibility upgrades.

Land use and development

Preliminary land use planning is currently underway. There is currently a few land leases in place for private and institutional users and a land licence for fuel drum storage.

Stakeholder inputs

There are several issues and items that users and stakeholders would like to see addressed to support aviation at the Beaver Creek Aerodrome.

These include:

- Additional fuel service
- Provision of and maintenance of campground amenities/services for itinerant pilots
- Add tie-downs/improve tie-downs

5.5.4.2 Burwash Landing Aerodrome (CYDB)

The Burwash Landing Aerodrome (CYDB) is located in the community of Burwash Landing off the western Alaska Highway. The critical aircraft is the ATR-42 (AGN IIIA). The aerodrome supports emergency services (Medevac, RCMP, Wildland Fire Management), recreational flying, and aviation activity related to tourism, government services, and mining.

The approaches are generally unobstructed, but it is common for pilots to experience low-level wind shear on approach to Runway 11 due to rising terrain on the north side of the runway. The Burwash Landing aerodrome's navigational aids are considered good.

The gravel runway 11-29 is 5,007 feet by 100 feet and was resurfaced in 2020. It is in good condition. The runway lighting is at the end of its useful life and replacement planning is underway.

The ATB is in fair condition, and a number of minor building and accessibility renovations have been identified.

Land use and development

There are a number of land use parcels at CYDB.

Stakeholder inputs

There are several investments that aviation stakeholders and others would like to see to support aviation at the Burwash Landing Aerodrome.

These include:

- Provision of and maintenance of campground amenities/services for itinerant pilots
- Add tie-downs

5.5.4.3 Carmacks Aerodrome (CEX4)

The Carmacks Aerodrome (CEX4) is located off the Klondike Highway, northeast of the Village of Carmacks. The ATR-42 aircraft is considered the critical aircraft (AGN IIIA). Wildland Fire Management has a regional tanker base at CEX4. The aerodrome also supports other emergency services as well as recreational flying and commercial aviation activity. There is no weather reporting equipment, only a weather camera; all approaches are made under visual flight rules.

The aerodrome has a single gravel runway, Runway 09-27, which is 5,000 ft x 100 ft. The runway and taxiway were resurfaced in 2018 and dust suppressant was applied in 2019. The runway, taxiway and apron are in good condition and support the critical aircraft. Airfield lighting is at the end of its useful life and replacement planning is underway.

There is a small ATB, which is in good condition, although there are minor building renovations required.

Land use and development

Preliminary land use planning is currently underway. Demand for lease lots is low at present. There are number of land lease agreements in place – both with private users and other government agencies.

Stakeholder inputs

There are several investments that aviation stakeholders and others would like to see to support aviation at the Carmacks Aerodrome.

These include:

- Install wildlife fencing around the aerodrome
- Develop a GPS approach
- Create CARS station
- Upgrade the runway to AGN IIIB standards to support L-188 Electra; design and extend runway, expand runway strip and OLS clearing
- Additional snow plowing

5.5.4.4 Faro Aerodrome (CZFA)

The Faro Aerodrome (CZFA) is located off the Robert Campbell Highway between Pelly River and Johnson Lake. The aerodrome is located within the Traditional Territories of the Kaska Dena/Ross River and Liard First Nations.

The aerodrome is used by a variety of aviation and non-aviation users – emergency services (Medevac flights are common), private air charter operations (commercial and tourism activities), and recreational flying. The critical aircraft is the ATR-42 (AGN IIIA). There are also regular operations by private aircraft operators and recreational pilots that visit the region.

The Faro Aerodrome has a single, gravel Runway 09-27 that is 3,997 ft. x 100 ft. A runway surface rehabilitation was completed in 2018, and dust suppressant applied in 2019. The runway is in good condition.

Land use and development

Preliminary land use planning is currently underway. A site-wide water management plan is required to inform detailed planning. There are currently a few small lease lots with tenants at CZFA.

Stakeholder inputs

There are several issues and items that users and stakeholders have identified to support aviation at the Faro Aerodrome.

These include:

- Add tie-downs and plug-ins
- Develop fueling services
- Additional snow plowing

5.5.4.5 Haines Junction Aerodrome (CYHT)

The Haines Junction Aerodrome (CYHT) is located just north of the Alaska Highway, just east of the Village of Haines Junction. The aerodrome is used as a staging area for the region and nearby Kluane National Park. The site supports rotary operations, as well as recreational flying, commercial aviation activity, particularly for recreational and tourism purposes, and emergency services.

The ATR-42 aircraft is considered the critical aircraft (AGN IIIA). There are no navigational aids or weather reporting at CYHT, though there are two weather cameras. An ARCAL is in place that allows pilots to activate the hazard beacons (on high, mountainous terrain near the aerodrome) and airfield lighting.

The airfield surfaces are in good condition and are available for use 24/7. The aerodrome lighting is in fair condition; it is nearing the end of its useful life.

The aerodrome has a small ATB that is in good condition. There is a small maintenance garage that houses airport maintenance equipment.

Land use and development

Preliminary land use planning is currently underway. There are currently a few lease-lots for mainly rotary operators at the Haines Junction Aerodrome as well as a number to support government services.

Stakeholder inputs

There are several investments that aviation stakeholders and others would like to see to support aviation at the Haines Junction Aerodrome.

These include:

- Install wildlife fencing around the aerodrome.
- Develop fuel service
- Create CARS station
- Develop a GPS approach
- Additional snow plowing

5.5.4.6 Pelly Crossing Aerodrome (CFQ6)

The Pelly Crossing Aerodrome (CFQ6) is registered with Transport Canada as a day-use only aerodrome. It is located along the Pelly River, north of the Klondike Highway in the community of Pelly Crossing. The primary activities at the aerodrome are Medevac and RCMP flights. CFQ6 is also used by general aviation users, outfitters and private recreational flyers.

The King Air 350 aircraft is considered the critical aircraft (AGN II). Runway 09-27 is classed as a non-instrument, day-use only runway, although there are restricted GPS approaches for each runway end for use by emergency services. There is no lighting, weather information or utilities onsite.

The aerodrome is limited in its uses because of a sloping runway, the absence of aerodrome lighting and a short runway length. The single runway aerodrome has some terrain and vegetation that penetrate the OLS. The runway is in good condition while the taxiway and apron are in need of maintenance, which is underway. Overall, the airfield surfaces are in fair condition.

There are no buildings at Pelly Crossing Aerodrome and there is no maintenance equipment based at the site.

Land use and development

Land use plans are under development. There are currently no aviation tenants onsite.

Stakeholder inputs

There are several investments that aviation stakeholders and others would like to see to support aviation at the Pelly Crossing Aerodrome.

These include:

- Develop a publicly available GPS approach
- Install airfield lighting system (runway, taxiway, apron edge lighting, lighted WDIs, back-up power generator) to enable night operations
- Extend runway to 4,000 ft or longer to accommodate Medevac flights and to improve the landing performance on a down-sloping runway
- Additional snow plowing

5.5.4.7 Ross River Aerodrome (CYDM)

Ross River Aerodrome (CYDM) is located on the south-east corner of the community of Ross River. The critical aircraft is the ATR-42 (AGN IIIA). The aerodrome supports general aviation, small commercial operators, outfitters and mining exploration activities as well as recreational flyers. There are also rotary wing operations at CYDM.

The airport is generally available for daytime operations only. CYDM has a restricted GNSS/RNAV approach for Runway 09. The airport also has ARCAL for use by emergency services. The aerodrome lands are generally unobstructed, except for rising terrain which penetrates the Runway 27 Approach Surface, approximately 2 nautical miles from threshold of Runway 27. Lighting is at the end of its useful life and replacement planning is underway.

There is a single, lighted gravel runway at CYDM and the airfield surfaces were resurfaced in 2019. A taxiway connects the runway with the apron adjacent to the ATB. The airfield surfaces are generally in good condition.

There is a small ATB and the overall condition of the ATB is poor.

Land use and development

There are multiple commercial land leases in place. There are government leases and fuel storage licences in place. Airport zoning regulations are currently in place under the A*eronautics Act*.

Stakeholder inputs

There are several investments that aviation stakeholders and others would like to see to support aviation at the Ross River Aerodrome.

These include:

- Develop a publicly available GPS approach
- Make ARCAL available to private pilots
- Develop fuel service
- Additional snow plowing

5.5.4.8 Teslin Aerodrome (CYZW)

The Teslin Aerodrome (CYZW) is situated on the north side of the Alaska Highway within the community of Teslin.

The aerodrome is used by a few key operators, particularly Wildland Fire Management who have an Initial Attack Base onsite. The aerodrome supports Medevac and occasional aircraft operations for commercial purposes as well as private and recreational flying; rotary operations are also common. The critical aircraft is the Convair 580 (AGN IIIA), operated by Wildland Fire Management.

The runway was resurfaced with additional granular material (blading/packing) in 2020 and is in good condition. The aerodrome is served with good navigational aids and a CARS station provides weather advisory services to pilots. There is low intensity lighting and VASIs; the lighting is at the end of its useful life and replacement planning is underway.

There is a small ATB that houses the CARS office, which is in fair condition. There are minor repairs and upgrades needed, such as barrier-free access for persons with reduced mobility.

Land use and development

The land use plans are under development. There is fuel storage as well as a number of institutional leases at the site.

Stakeholder inputs

There are several investments that aviation stakeholders and others would like to see to support aviation at the Teslin Aerodrome.

These include:

- Add tie-downs and plug-ins
- Develop fuel service
- Additional snow plowing

5.5.5 Class 4 aerodromes

5.5.5.1 Carcross Aerodrome (CFA4)

The Carcross Aerodrome (CFA4) is within the community of Carcross. The aerodrome hosts a variety of aviation uses, including general aviation operations such as private pilot training, skydiving and sight-seeing flights by commercial aviation tourism operators, and recreational flying. The critical aircraft for the Carcross Aerodrome is the Cessna C-206 (AGN I).

There is a single, 2,200 ft x 75 ft gravel runway. It is in fair condition and may be soft and sandy in some places. There is also a small apron. A temporary fence was erected at the site in 2016 to manage runway incursions. The site is small and constrained, and partially within the highway right-of-way.

Land use and development

The Carcross/Tagish First Nation offices and cultural centre are located adjacent to the aerodrome. There are currently no tenants within the aerodrome reserve area; however, adjacent land owners with recreational aircraft frequently use the site. The site is also used for parachuting operations.

Stakeholder inputs

There are several investments that aviation stakeholders and others would like to see to support aviation at the Carcross Aerodrome.

These include:

- Close or re-locate the airport to an alternative location, if feasible
- Install a permanent fence around aerodrome
- Create a new aircraft parking apron with aircraft tie-downs, off the runway strip
- Additional snow clearing

5.5.5.2 Cousins Aerodrome (CFP8)

The Cousins Aerodrome (CFP8) is located off the Alaska Highway at the north end of the city of Whitehorse. The aerodrome is primarily used by flight schools and general aviation pilots including recreational pilots. The critical aircraft for Cousins Aerodrome is the de Havilland DHC-6 Twin Otter (AGN II). Runway 12-30 at CFP8 has a sandy/granular surface and is 2,800 ft x 100 ft; the runway is in overall good condition, having been resurfaced in 2020; it can become rutted with soft spots but generally drains well. The apron is soft and in poor condition. The airfield surfaces are in overall fair condition.

Land use and development

There are currently no tenants at Cousins. The tenant of an adjacent property has an informal access lane crossing near the runway threshold. Vehicle incursions at Cousins are an ongoing issue.

Stakeholder inputs

There are several investments that aviation stakeholders and others would like to see to support aviation at the Cousins Aerodrome.

These include:

- Construct an appropriate access road to adjacent property (around north end of runway) and restrict access to current informal access road
- Add fencing to reduce incursions
- Increase level of service to support smaller fixed-wing general aviation and/or rotary operations
- Additional snow plowing

5.5.5.3 Finlayson Aerodrome (CFT3)

The Finlayson Aerodrome (CFT3) is located off the Robert Campbell Highway. The aerodrome is primarily used by small commercial operators, often to support mining and exploration. CFT3 may also be used as an emergency airstrip for light aircraft flying between Watson Lake and Ross River. There is no apron and the runway is in poor condition. The critical aircraft for Finlayson Aerodrome is the Cessna C-206 (AGN I).

Land use and development

There are currently no tenants at Finlayson Aerodrome.

Stakeholder inputs

An investment was identified that aviation stakeholders would like to see to support aviation at the Finlayson Aerodrome was expansion of the runway to the southeast to AGN II standards to support the operation of larger aircraft

5.5.5.4 Fort Selkirk Aerodrome (CFS3)

The Fort Selkirk Aerodrome is primarily used by general aviation users, supporting outfitting, tourism, and mining and exploration. The airport is located beside the historic Fort Selkirk and is not accessible by road. A 60-year old grader and flail mower are onsite for maintenance. The critical aircraft for Fort Selkirk aerodrome is the Cessna C-206 (AGN I). The runway is in fair condition and there is a small apron available.

Land use and development

There are currently no tenants at the Fort Selkirk Aerodrome. However, there has been a history of fuel storage at the site.

Stakeholder inputs

There are several investments that aviation stakeholders and others would like to see to support aviation at the Fort Selkirk Aerodrome.

These include:

- Provision of campground amenities/services for itinerant pilots
- Complete brushing/OLS clearing

5.5.5.5 Hyland Aerodrome (CFT5)

The Hyland Aerodrome (CFT5) is located on the Nahanni Range Road. It is primarily used by commercial operators, often to support mining activity. The critical aircraft for the Hyland Aerodrome is the de Havilland DHC-6 Twin Otter (AGN II). The runway is in fair condition and can have soft spots; tundra tires are recommended.

Land use and development

There are no tenants at the Hyland Aerodrome.

Stakeholder inputs

Aviation stakeholders and others would like to see clearing of vegetation and removal of trees from the OLS and runway strip to support aviation at the Hyland Aerodrome.

5.5.5.6 MacMillan Pass Aerodrome (CFC4)

The MacMillan Pass Aerodrome (CFC4) is located off the North Canol Road. Primary users of CFC4 are both commercial (mining, exploration, survey) and private general aviation users. The critical aircraft is the Cessna C-206 (AGN I). However, AGN II aircraft are known to use CFC4, such as the DHC-6 Twin Otter. The runway is in fair condition. There is no apron or taxiway off the runway strip. Additional challenges for CFC4 include the fact that there are no suitable aggregate/granular sources nearby for airfield maintenance and site access is difficult. Alternative sources and methods are currently under investigation.

Land use and development

There are no tenants onsite at MacMillan Pass Aerodrome.

Stakeholder inputs

There are were no specific investments identified by aviation stakeholders for the MacMillan Pass Aerodrome.

5.5.5.7 Silver City Aerodrome (CFQ5)

The Silver City Aerodrome (CFQ5) is located adjacent to Kluane Lake and off the Alaska Highway between Haines Junction and Destruction Bay. The aerodrome is primarily used by small commercial operators with one fixed-wing operator located onsite. The aerodrome also provides support for a research base leased to the Arctic Institute of North America. The critical aircraft for the Silver City Aerodrome is the Cessna C-206 (AGN I). OLS clearing was performed in 2019. The runway is in fair condition and there is no public apron.

Land use and development

There are several tenants onsite at Silver City Aerodrome.

Stakeholder inputs

There are several investments that aviation stakeholders and others would like to see to support aviation at the Silver City Aerodrome.

These include:

- Develop public apron
- Develop fuel service

5.5.5.8 Wiley Aerodrome (CAJ2)

The Wiley Aerodrome (CAJ2) is located on the Dempster Highway, approximately 20 km north of Eagle Plains. The primary users of the aerodrome are small, commercial operators. It can also support cargo hauls to Old Crow. The critical aircraft is the Cessna C-206 (AGN I), operated by Wildland Fire Management. The runway's orientation is such that it is often impacted by a crosswind, affecting its overall utility. The runway has been reported to have rutting issues and large stones are present on the runway surface. It is in overall fair condition.

Land use and development

There are currently no tenants at Wiley Aerodrome.

Stakeholder inputs

Aviation stakeholders and others would like to see research into mitigations for crosswind conditions to support aviation at the Wiley Aerodrome.

5.5.6 Class 5 aerodromes

There are several investments that aviation stakeholders and others would like to see to support aviation at the class 5 aerodromes.

These include:

- Complete vegetation control and tree clearing
- Develop fuel service
- Additional snow clearing
- Provision of campground amenities/services for itinerant pilots

There are currently no tenants at any of the Class 5 aerodromes.

5.5.6.1 Braeburn Aerodrome (CEK2)

The Braeburn Aerodrome (CEK2) is located on the east side of the Klondike Highway, between Whitehorse and Carmacks. The primary users of CEK2 include commercial and recreational pilots and itinerant pilots heading north or south. The critical aircraft is the Cessna C-206 (AGN I). There is no apron or taxiway off the runway strip. The runway can be soft in the spring with gopher holes. It is in generally fair condition.

5.5.6.2 Chapman Aerodrome (CEZ2)

The Chapman Aerodrome (CEZ2) is located just east of the Dempster Highway in between two arms of the Blackstone River. Users of CEZ2 include commercial operators supporting tourism, outfitting, exploration and survey, as well as private recreational pilots. The critical aircraft is the de Havilland DHC-6 Twin Otter (AGN II). There is no apron or taxiway off the runway strip. The runway is subject to subsurface erosion which impacts the runway surface; melting permafrost has created depressions within the runway strip and it is in generally poor condition.

5.5.6.3 McQuesten Aerodrome (CFP4)

The McQuesten aerodrome (CFP4) is located by the Stewart River, between Stewart Crossing and Dawson City. Users of CFP4 include small, commercial operators supporting mining operations in the Dawson City goldfields, tourism, exploration, outfitting, and survey as well as private recreational pilots. The critical aircraft for the AGN II runway at CFP4 is the de Havilland DHC-3 Otter. The runway surface is a mix of turf and granular materials. It is in fair condition and requires mowing during the summer season. There is no apron or taxiway off the runway strip.

5.5.6.4 Minto Landing Aerodrome (CML7)

The Minto Landing Aerodrome (CML7) is off the North Klondike Highway, between Pelly Crossing and Stewart Crossing. Primary users of the CML7 runway are commercial operators that support the mining industry with fuel hauls and other activities. Secondary users are general aviation, tourism, survey and private recreational pilots. The critical aircraft for the AGN II runway at CML7 is the de Havilland DHC-3 Otter. There is no apron or taxiway off the runway strip. There is an access road that leads to the aerodrome from the Klondike Highway. The runway surface is granular/turf and is in good condition.

5.5.6.5 Ogilvie Aerodrome (CFS4)

The Ogilvie Aerodrome (CFS4) is located between the Dempster Highway and the Ogilvie River. The primary users of the CFS4 runway are small, commercial operators supporting tourism, outfitting, airborne survey and recreational pilots. The critical aircraft for the AGN I runway at CFS4 is the Cessna C-206. The runway is in overall poor condition, with rutting and loose rock. There is no taxiway or apron although there is a small turn-around bay at the Runway 02 end. However, there is not enough room to park aircraft when the runway is in use.

5.5.6.6 Pine Lake Aerodrome (CFY5)

The Pine Lake Aerodrome (CFY5) is located west of the Rancheria River on the Alaska Highway, between Watson Lake and Teslin. The primary users of the runway are small, commercial air charter operators for tourism, exploration, and survey as well as recreational pilots and itinerant pilots heading east or west along the Alaska Highway. The critical aircraft for the AGN II runway at CFY5 is the de Havilland DHC-6 Twin Otter. The runway is in fair condition with vegetation having been cleared from the runway strip in 2020. There is no taxiway or apron.

5.5.6.7 Twin Creeks Aerodrome (CFS7)

The Twin Creeks Aerodrome, (CFS7) is located on the North Canol Road, north of Ross River. The primary users of the runway are small, commercial air operators supporting mining and exploration, wildlife survey, and outfitters. The critical aircraft for the AGN I runway at CFS7 is the Cessna C-206. The turf/granular runway is in fair condition. There are no taxiway or apron at the Twin Creeks aerodrome.

5.6 RECOMMENDATIONS

The following is a summary of the recommendations in section 5.0:

- 5-1 - Formally adopt the Aerodrome Classification System.
- 5-2 - Review the Aerodrome Classification System periodically. Additional data, such as flight movements, may be collected for specific aerodromes (where practical) to better inform the classification process.
- 5-3 - Continue implementation of an asset management approach to guide decision-making for capital maintenance and fleet renewal for the aviation system.
- 5-4 - Formalize the mechanisms for reviewing and approving changes to classification at a particular aerodrome and changes to the classification criteria. This formalization should also include the consideration of other social and economic criteria for future versions of the classification system.
- 5-5 - Complete seasonal inspections after spring thaw and before the winter.
- 5-6 - Electrical systems at across the aviation system are largely at the end of their useful lives and should be considered for upgrades or replacement during the 10-year investment period.
- 5-7 - Complete airports and aerodromes site-wide water management plans in order to improve surface drainage and to prevent ponding.
- 5-8 - Opportunities to stockpile aggregate should be identified, where appropriate.
- 5-9 - Site identification and airport directional signage needs improvements throughout the aviation system and should be reviewed system wide.
- 5-10 - Many Class 4 and 5 aerodromes should have aprons off the runway to support safety at busier aerodromes to accommodate transfers of passengers, fuel and cargo.
- 5-11 - Complete a major rehabilitation or reconstruction of the main runway at ENWIA in the short-to-medium term.
- 5-12 - Airfield lighting for the main ENWIA runway should be replaced when the runway is rehabilitated/reconstructed.
- 5-13 - Watson Lake Airport and Old Crow Airport have older, halogen lighted airfield lighting systems, which should be considered for replacement within the 10-year investment period.
- 5-14 – Complete a major rehabilitation or reconstruction of the Watson Lake airport runway in short to medium turn.

6.0 INVESTMENT PLANNING MODEL

6.1 OVERVIEW AND APPROACH

6.1.1 Current Budgeting Approach

The Government of Yukon prepares and publishes an annual update to its Five-year Capital Plan as a means to communicate its capital priorities and increase the transparency of the government's long-term capital plans. In 2018 this function was transferred from Finance to Highway and Public Works and the Capital Planning Office was established. The Capital Planning Office works across Government of Yukon departments and corporations as well as directly with Management Board to develop and approve the Five-year Capital Plan and the annual main capital estimates. The Capital Planning Office also undertakes variance reporting throughout the year and works with the Office of the Comptroller to help ensure that budgets are linked accurately to the Government of Yukon's financial accounting.

Completion of the main estimates and the annual update to the Five-year Capital Plan begins when departments and agencies review their planned spending and submit their requirements to the Capital Planning Office in late September. The Capital Planning Office then works to undertake analysis which includes reconciliation against previous plans and an assessment of how planned spending aligns to government priorities. Budget decisions are made from November to January and the government then prepares the main estimates and budget documents for release during the spring sitting of the Legislative Assembly. The main estimates are voted and approved in the *First Appropriation Act*, which then provides departments the legal authority to commit and expend their budgets. The Five-year Capital Plan is approved by Management Board and is tabled in the Legislative Assembly as an information item.

Throughout the fiscal year, departments can request adjustments to their voted appropriations up to three times and the supplementary estimates must also be voted and approved by the Yukon Legislative Assembly through subsequent appropriation acts. The Capital Planning Office works throughout to review these budget variances and to monitor overall budget performance by departments.

6.1.2 Discretionary versus Non-Discretionary

Stantec worked with Highway and Public Works to identify capital investments and maintenance activities needed to sustain Yukon's aviation system. The majority of investments identified through the current state assessments and gap analysis are categorized as non-discretionary investments. Non-discretionary investments are critical in sustaining the current aviation system as well as preserving the current levels of service.

In addition to non-discretionary investments identified through this process, Stantec and Highways and Public Works, with inputs from other governments, stakeholders, the public and other Government of Yukon departments, identified investments and activities that are not part of TAB's current levels of service or mandate, which are categorized as discretionary investments.

To inform conversations with other governments and stakeholders around the viability of certain investments, as well as how they are connected to the Yukon aviation system's levels of service, Stantec has further divided discretionary and non-discretionary investments into the following four distinct investment categories:

1. **Non-discretionary existing (ND_{EX}):** These investments need to be made to maintain current assets and service levels at Yukon airports and aerodromes to ensure consistency of service levels across the aviation system. These investments form part of regular planning for TAB's capital program. An example of non-discretionary existing investment is runway resurfacing at the Teslin aerodrome.
2. **Non-discretionary gap (ND_{GAP}):** These are investments that fill a gap between TAB's actual levels of service and defined or proposed levels of service. Gaps may be a result of competing priorities, a change to externally developed standards or best practices, or for more significant changes in service, pending decisions. These investments are required to support safety, utility, and user experience. An example of a non-discretionary gap investment is apron development at Finlayson aerodrome.
3. **Discretionary upgrade (D_{UPG}):** These investments represent an increase in level of service from the defined level of service for a site. In many cases, these investments would be considered non-discretionary at sites with higher user needs and therefore would fall within TAB's mandate at those sites. However, they are considered discretionary at sites with lower traffic and demand. These sites would be good candidates for investment if they were justified on the basis of safety and supported by business cases. Some discretionary upgrade investments would be good candidates for receiving contributions from industry. An example of a discretionary upgrade investments is airfield lighting at the Cousins aerodrome, which currently has no airfield lighting.
4. **Non-mandate (NMAN):** These are proposed investments that are not part of TAB's current mandate. As a result, there is a high likelihood that TAB does not currently have available resources to administer these investments. These investments may be part of the mandates of other government or non-governmental bodies and may require consultation, agreement, and coordination in planning, resourcing, execution and administration. An example of a non-mandate investment is a serviced groundside campground at the Watson Lake aerodrome.

It should be noted that navigational aids and weather reporting equipment and services do not fall under any of these categories since they are the responsibility of NAV Canada and not TAB.

6.2 NON-DISCRETIONARY INVESTMENTS

Both non-discretionary existing and non-discretionary gap investments contribute to the safety, utility, and sustainability of the Yukon aviation system. These investments can be categorized further, including at site level or across an entire class of sites. Analysis at the class level is particularly important given the relationship between levels of service and airport classification. To support this analysis, the actual level of service is distinguished as separate from, yet related, to the appropriate defined level of service. The defined level of service is a target in terms of quality from both the users' and Government of Yukon's perspective, whereas the actual level of service is the quality experienced by the user.

The actual levels of service provide the basis for distinguishing between non-discretionary existing and non-discretionary gap investments. In a case where the actual level of service aligns with an appropriate defined level of service for a site as determined by regulators, Government of Yukon or industry best practice, the investment can be categorized as a non-discretionary existing investment. If the actual level of service does not align with the appropriate defined level of service, the investment can be categorized as a non-discretionary gap investment.

All non-discretionary investments should be pursued in principle to sustain the existing aviation system, which includes the maintenance of assets within an established set of condition ratings and the administration of aviation programs and services. Therefore, non-discretionary investments are generally of higher priority than discretionary investments.

Pursuing these non-discretionary investments also prioritizes safety through adherence to standards and regulations. Transport Canada's Aerodrome Standards and Recommended Practices (TP312) is a key document and an example of applicable standards for airside safety as well as compliance; however, many other standards such as building codes for vertical infrastructure and accessibility standards for groundside access also apply.

The primary decision point concerning individual non-discretionary investments is when the investment should be made to keep the asset in a reasonable range of condition. For tangible assets such as runways and buildings, the scheduling of maintenance activities and strategic investments can be optimized by using condition data and other asset-specific knowledge. There are similar optimizations that can be made for the inputs and resources required to maintain that asset (e.g., labour, materials).

The constrained nature of capital and O&M budgets can lead to scheduling challenges of non-discretionary investments and can contribute to a deficit in infrastructure investment. Transportation Division uses an integrated planning approach across the division to facilitate the budgeting of critical investments and has developed an asset management strategy that is being extended to the Yukon aviation system in an effort to decrease scheduling challenges and improve project delivery.

The Investment Model developed by Stantec seeks to strategically approach the complex process of selecting and scheduling aviation system capital investments.

6.3 DISCRETIONARY INVESTMENTS

In principle, discretionary investments do not necessarily need to be pursued. Therefore, decision-making concerning discretionary investments needs to consider both if an investment should be pursued and, if justified and supported, when the investment should be pursued.

The pursuit of discretionary investments will require significant pre-planning, budgeting, and priority setting. For example, pursuing discretionary investments to increase defined level of service cannot come at the expense of non-discretionary investments required to maintain assets to levels needed for safety and regulatory compliance.

However, many discretionary investments correlate with high stakeholder demand, as identified through the stakeholder and public engagements. Pursuit of discretionary investments represents an opportunity to support stakeholders and foster a stronger aviation sector. Therefore, finding the right balance between non-discretionary investments and discretionary investments will be integral to maintaining a system that aligns with the needs and goals of other governments, stakeholders and the public.

In order to successfully integrate discretionary investments with non-discretionary investments, discretionary investments must be justified through safety and business cases. Communicating the results of these assessments and the rationale for advancing a particular discretionary investment would help manage stakeholder expectations and increase understanding in respect to how the Government of Yukon is making investment decisions and implementing the Investment Model.

Additional information about potential discretionary investments, and consideration for alignment with the Policy Goals for the aviation system (see Section 4.0) will be needed to assess potential discretionary investments. This is because the potential scope of many of the discretionary investments through the stakeholder engagements is either wide or unknown and investigations would be needed to define scope, requirements and risks prior to evaluating the investment itself.

6.4 INVESTMENT MODEL OVERVIEW

There are two key components of the Investment Model Stantec developed for the Yukon aviation system: the risk filters and the Multiple Accounts Evaluation (MAE). These represent different tools for assessing the benefits and costs of an investment and can be applied to either non-discretionary or discretionary investments. Each component comes with unique inputs and outputs. The integration of the two components enables the prioritization of investments across the 10-year investment period.

Prior to applying the investment model, a comprehensive list of discretionary and non-discretionary investments was populated for consideration. In replicating this process in future years, it is recommended that potential investments are identified through the following steps:

- **Stakeholder and public relations:** Information collected through stakeholder and public input is funneled into the investment model process along with historical input.
- **Staff consultation:** Staff within TAB identify and submit investment priorities.
- **Environmental scanning:** Staff perform an environmental scan to identify potential investments. This includes review of new standards and regulations, as well as identifying changes to best practice.
- **Categorization:** Investments are categorized within the four investment categories.
- **Compilation:** Potential investment ideas are aggregated for evaluation in the investment model. Additional information is collected such that input fields to the investment model are complete.

This recommended multi-step process will be discussed further in the Section 8: Flight Path Results.

In order to better promote alignment of investments with the Policy Goals for the Investment Strategy (Section 4), a minimum of one Policy Goal must be supported for each proposed investment.

6.4.1 Risk Profile and Filter/Assessment Discussion

The recommended Investment Model developed as part of the Aviation System Investment Strategy uses an integrated approach. It starts with qualifying investments being assessed for both positive and negative risk.

The first aspect of the design of the risk assessment is to establish a risk profile for TAB. A risk profile is a determination of an agency's willingness and ability to assume risk across its activities. The risk profile for the Investment Model is aligned with the mandate of TAB as well as the Policy Goals developed through the Flight Path project.

Establishing a consistent understanding of risk, corporate risk profiles, and risk tolerances from a Government of Yukon perspective is necessary for assessing risk at the investment level:

- **Risk** is an uncertain event or condition (positive or negative) that, if it occurs, has an effect on Government of Yukon's capacity to deliver on at least one Policy Goal.
- **Risk tolerance** is the degree of uncertainty that the organization is willing to tolerate to achieve its mandate. It can be influenced by a combination of factors, including budget and financial capacity, stakeholder priorities and pressures, social and environmental concerns, and significant events outside of the normal course of business. It is assumed that the Government of Yukon's risk tolerance is moderate.
- **Risk capacity** is the amount of risk that an organization can actually take on; the risk tolerance can never exceed the risk capacity.
- **Risk statements** either describe threats (i.e., if the event occurs, the consequences could result in a negative impact) or opportunities (i.e., if the event occurs, the consequences could result in a positive impact).

These concepts establish the foundation for the Government of Yukon risk assessment process and support a consistent approach to risk across government.

There are three categories for which risk is assessed within the Government of Yukon aviation environment:

Category	Definition
Legal and Financial	Legal and financial risk is a function of environmental liability, regulatory compliance, and economic opportunities such as funding from other parties.
Critical Service Provision	Critical service provision risk is a function of public health and safety and operations that support essential air service, goods movement, and other critical services (e.g., Medevac, Wildland Fire Management).
Reputational	Reputational risk is a function of public confidence in the aviation system, whether related to political direction, exposure through the media and community engagement, or historical performance.

Table 6-1: Risk categories and definitions

All investments are initially described and identified as having either positive or negative risk attached to them in the form of a risk statement. This risk statement should represent the most severe risk associated with an investment. Note that the primary area for risk assessment is airside; however, consideration for groundside, facilities, and other areas need to be considered as well.

The next step is to assess the risk within each risk category using a 5x5 risk matrix design. Risk is assessed by assigning a score (very low, low, moderate, high, or very high) to both the likelihood of an event occurring as well as the impact of the event if it were to occur.

The descriptors and definitions for the likelihood ratings are listed below. Only one likelihood rating is assigned across the three categories of risk.

Likelihood Rating	Likelihood Descriptor	Definition
1	Rare	Less than 10% chance of occurrence
2	Unlikely	10% up to 25% chance of occurrence
3	Possible	25% up to 65% chance of occurrence
4	Likely	65% up to 90% chance of occurrence
5	Almost Certain	90% or greater chance of occurrence

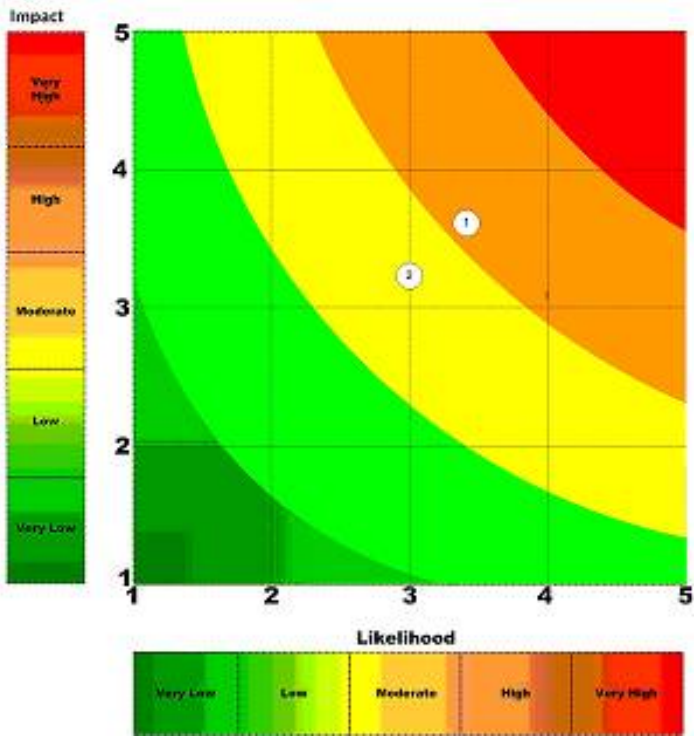
Table 6-2: Likelihood ratings, descriptors and definitions

The descriptors and definitions for the impact ratings are listed below. Separate impact ratings are assigned for each of the three categories of risk.

Impact Rating	Impact Descriptor	Definition for Legal and Financial	Definition for Critical Service Provision	Definition for Reputational
1	Minimal	The impact may minimally affect the financial aspects of investment nor have any liability impacts.	The impact may minimally affect the level of service or safety noticeably	The impact may minimally affect decision making and can be ignored with little reputational impact.
2	Minor	The impact may affect the financial aspects of investment without liability impacts.	The impact could affect level of service or safety and can be managed with some action.	The impact could affect outcomes but in a manageable way with some action.
3	Moderate	The impact will affect the financial aspects of investments and may have some liability impact.	The impact would affect operational programs/project or safety outcomes and there would be a noticeable level of service shift.	The impact would affect programs or projects, and there would be a noticeable reaction from stakeholders and media.
4	Significant	The impact will cause a shift in future financial planning and liability and/or legal impacts.	The impact will cause significant shift in operational programs/projects or safety that would have a sustained outcome.	The impact will cause a significant shift in activities and elicit a strong reaction from stakeholders and media.
5	Program Altering	There are liability or legal impacts that drive change in financials or legislation.	There are massive impacts that would change the operational approach to aviation infrastructure and its oversight by the Government of Yukon.	There are massive impacts to the aviation program. Reaction from stakeholders and media drives immediate change for Yukon aviation.

Table 6-3: Impact ratings, descriptors, and definitions

The result of assessing impact and likelihood can be effectively visualized as a 5x5 risk matrix, providing a tool in communicating the organization's risk profile, shown below.



The overall risk assessment for a proposed investment is then determined as the highest product between the likelihood rating and impact ratings across the three risk categories. This overall risk assessment determines the risk response. For proposed capital investments with high and very high negative risks, or very high positive risks, a management review of the proposed investment is triggered. All other items with lower scores proceed to the MAE evaluation. Management review may trigger various actions in response to the risk. These are:

1. Establish investment as an immediate priority based on the severity of the risk and exposure,
2. Defer prioritization of investment to the MAE process for further evaluation and assessment in determining the short-, medium-, and long-term priorities for the Yukon aviation system.

The management review should elevate the investment and its associated risk to the Accountable Executive for consideration. The overall risk assessment was developed and tested through the Flight Path project, however not all investments have been assigned risk statements and scores.

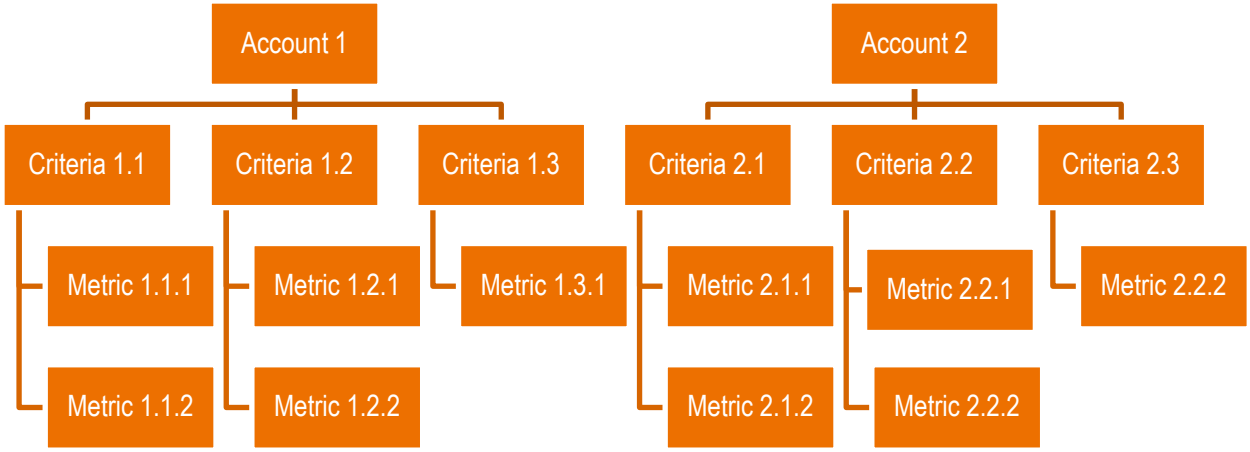
6.4.2 Multiple accounts evaluation (MAE) model

The second major component to the investment model is the MAE. This evaluation was developed using the following references as a guide:

- Policy Goals for the Yukon aviation system;
- A collaborative partner workshop on November 14, 2019, that included the identification of criteria for consideration;
- The Alaska Department of Transportation's (DOT) Aviation Project Evaluation Board program, for which interviews were conducted with DOT staff and reference material was reviewed; and
- The S. Oliver article (2019) on the process for the development of a MAE framework, titled *Prioritization and Pizza; Applying a Solution to a Pizza Problem as a Proxy for a Transportation Problem* (Appendix E).

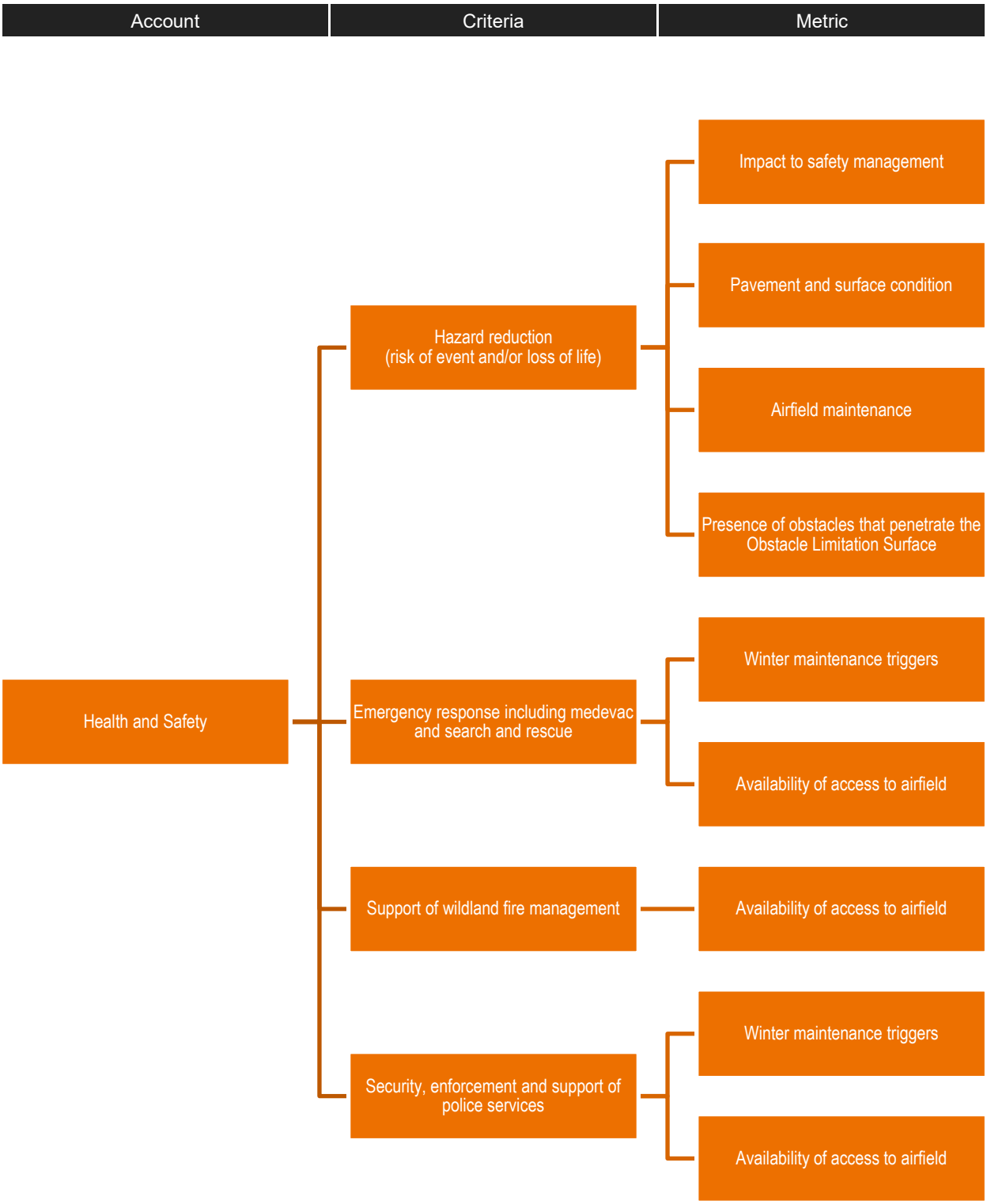
Additionally, the investment prioritization approaches from other airports within North America were examined, including Kelowna International Airport, Nanaimo Airport, Powell River Airport, Medicine Hat Airport, Region of Waterloo International Airport, and Ontario's remote airports system.

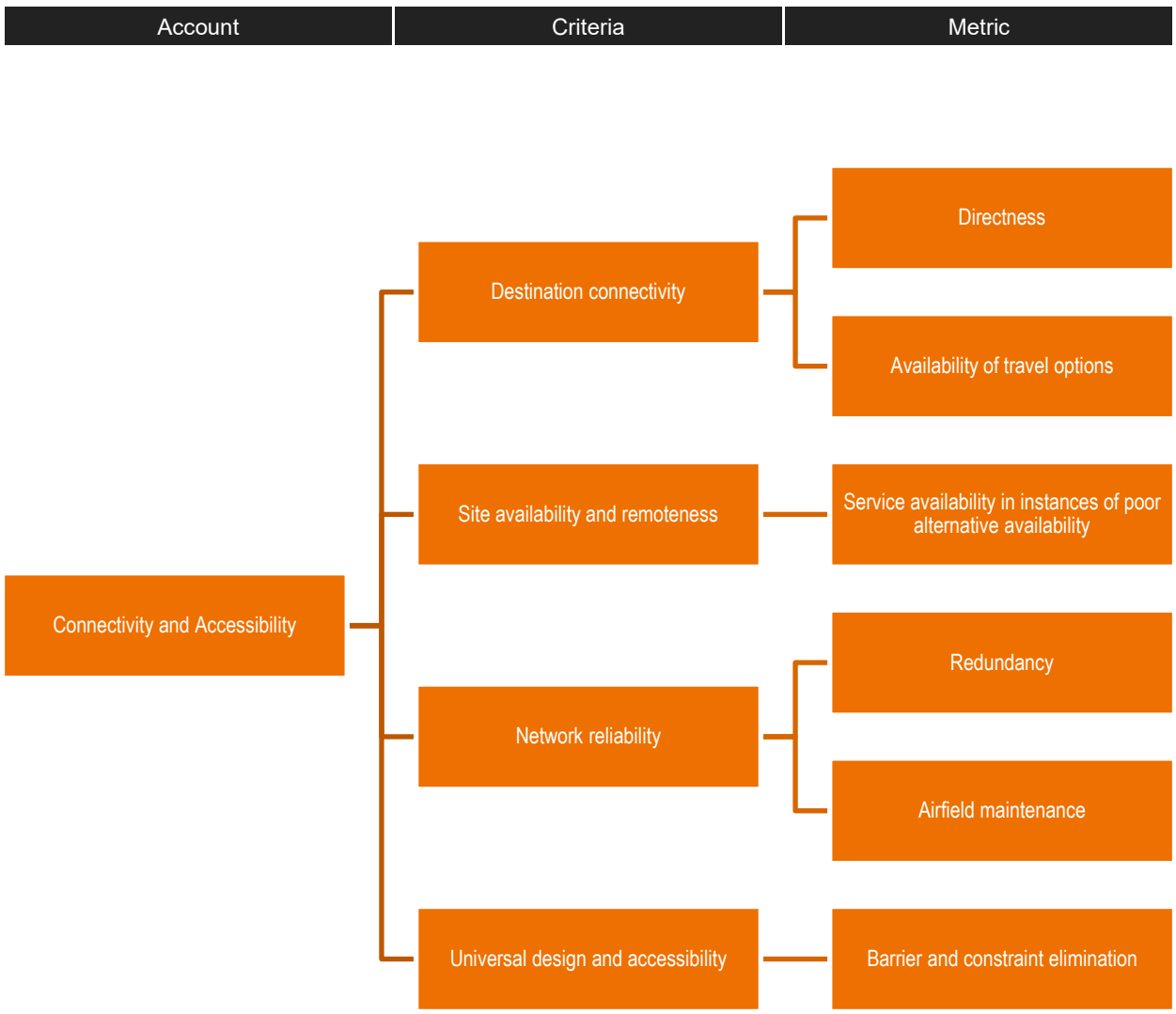
The following graphic represents the general structure associated with MAE with accounts, criteria, and metrics. Accounts align with high-level, thematic areas where users and/or passenger experience are impacted. Criteria then identify the mechanism by which users and/or the public are impacted. Finally, metrics present options for measuring the scale of the impact for each criterion. In this specific case, presented in the following graphic, the evaluation includes two top-level accounts, three criteria for each account, and either one or two metrics for each criterion.

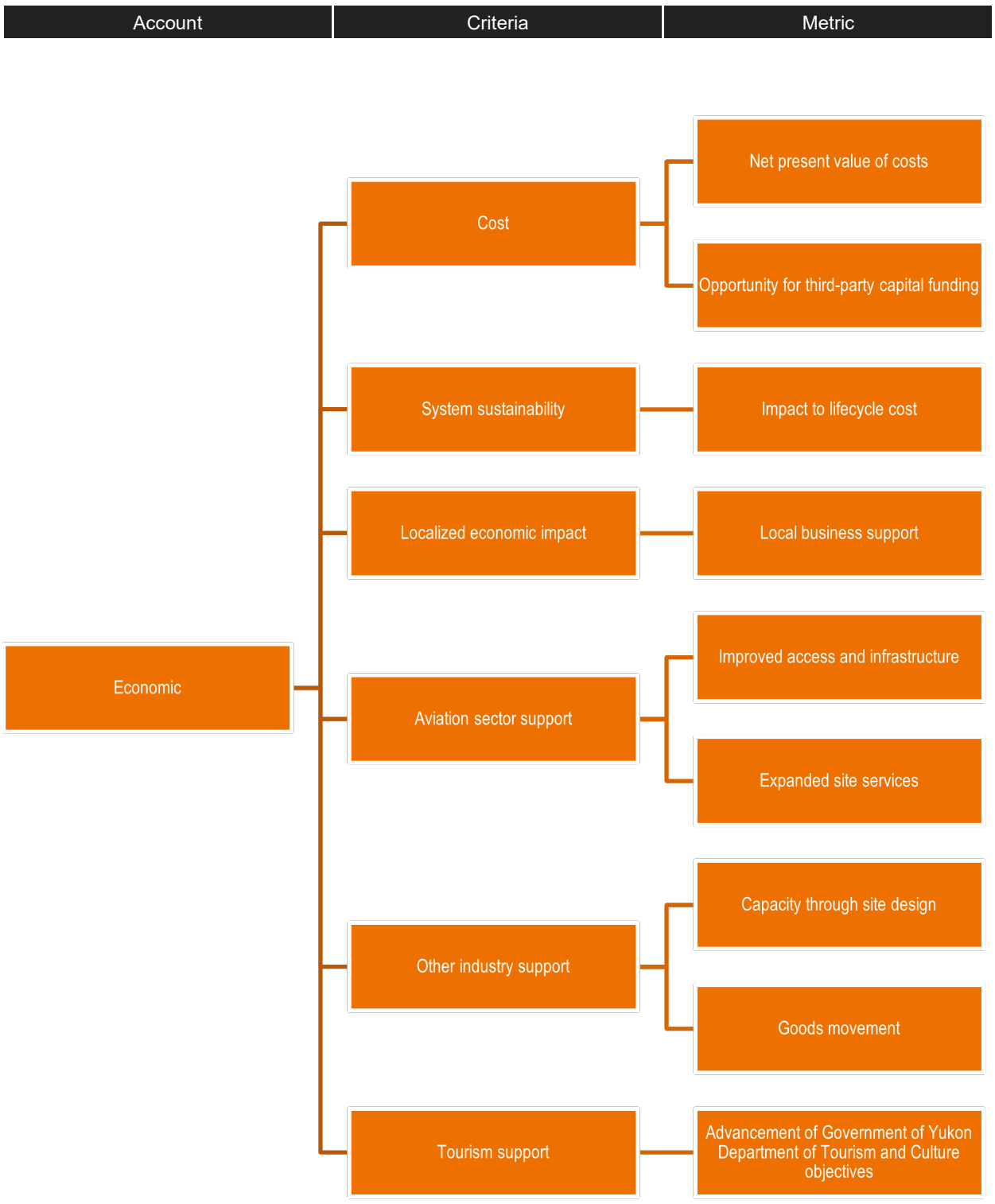


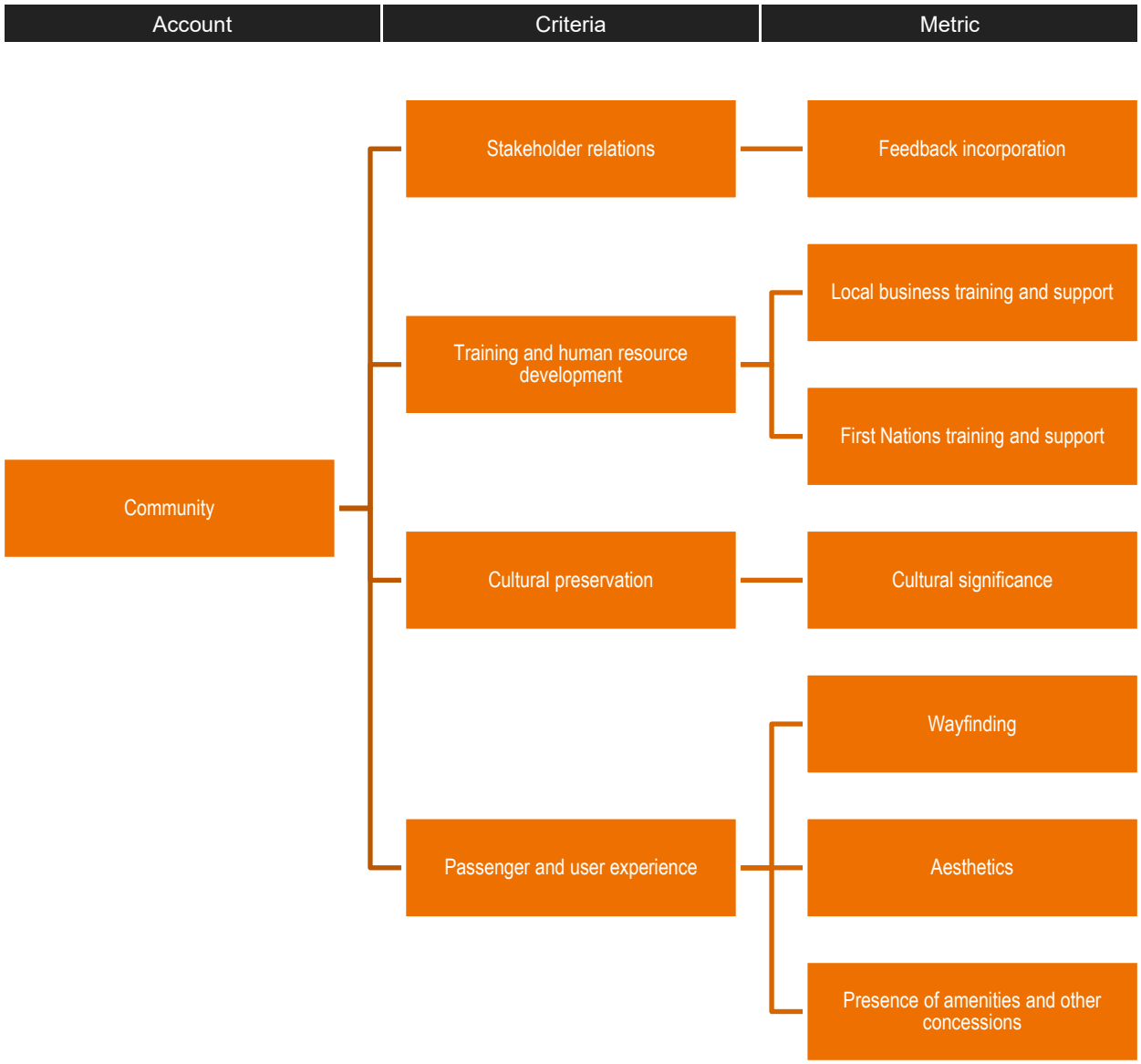
Following review of the background information, Stantec defined the top-level accounts. These are necessary for framing criteria and metrics. In addition to alignment with Yukon's aviation system mandate, these accounts are closely aligned with the outcomes experienced by aviation system users and the public.

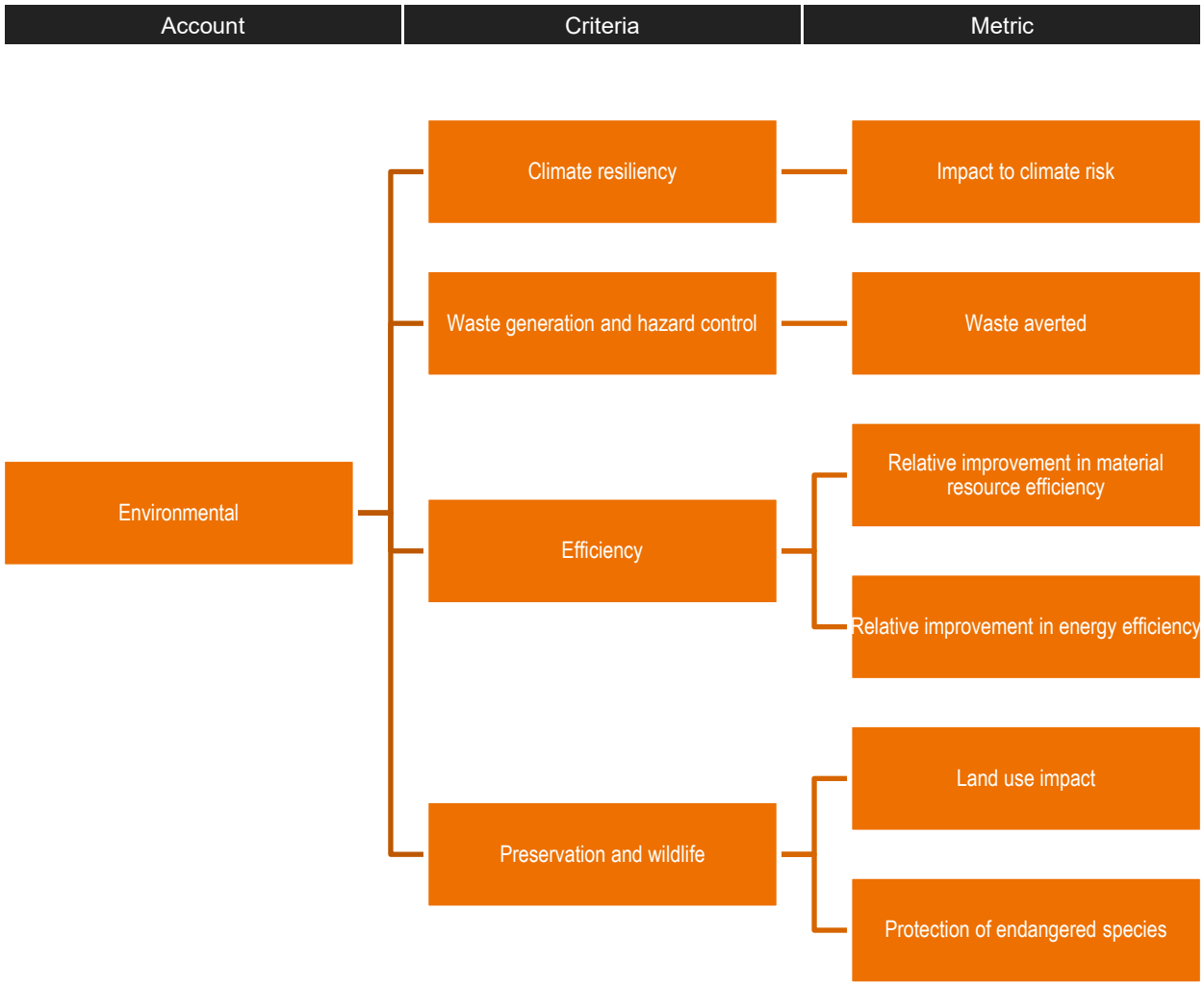
Stantec then defined criteria and metrics within each account to enable evaluation of an investment. The account breakdown for each of the five accounts as shown in the following five graphics.


Account
Criteria
Metric
Health and Safety
Hazard reduction (risk of event and/or loss of life)
Impact to safety management
Pavement and surface condition
Airfield maintenance
Presence of obstacles that penetrate the Obstacle Limitation Surface
Emergency response including medevac and search and rescue
Winter maintenance triggers
Availability of access to airfield
Support of wildland fire management
Availability of access to airfield
Security, enforcement and support of police services
Winter maintenance triggers
Availability of access to airfield


Account
Criteria
Metric
Connectivity and Accessibility
Destination connectivity
Directness
Availability of travel options
Site availability and remoteness
Service availability in instances of poor alternative availability
Network reliability
Redundancy
Airfield maintenance
Universal design and accessibility
Barrier and constraint elimination


Account
Criteria
Metric
Economic
Cost
Net present value of costs
Opportunity for third-party capital funding
System sustainability
Impact to lifecycle cost
Localized economic impact
Local business support
Aviation sector support
Improved access and infrastructure
Expanded site services
Other industry support
Capacity through site design
Goods movement
Tourism support
Advancement of Government of Yukon Department of Tourism and Culture objectives


Account
Criteria
Metric
Community
Stakeholder relations
Feedback incorporation
Training and human resource development
Local business training and support
First Nations training and support
Cultural preservation
Cultural significance
Passenger and user experience
Wayfinding
Aesthetics
Presence of amenities and other concessions


Account
Criteria
Metric
Environmental
Climate resiliency
Impact to climate risk
Waste generation and hazard control
Waste averted
Efficiency
Relative improvement in material resource efficiency
Relative improvement in energy efficiency
Preservation and wildlife
Land use impact
Protection of endangered species

Weightings were first assigned based on accounts, with the total weighting of all accounts adding up to 100%. Then, weightings were developed across all metrics within each account by assigning a relative importance for each weighting. Finally, the global weighting for each metric across the MAE model was calculated. It is recommended the weightings are refined over the years the Investment Model is implemented to reflect changes to priorities, government mandates and the operational environment.

Scoring options were then defined for each metric. Upon assessing an investment, the evaluator selects a score for each metric which determines the proportion of the weighting that is awarded as a contribution to its global score. The sum total of scores across all metrics for an investment produces the global score out of 100%. As an extension of this, an indexed score is also produced which represents the proportion of the global score for an investment to the highest score produced through evaluation of all potential investments. These metrics and scoring methodologies are defined in further detail in the Investment Model User Manual.

Upon determination of the global MAE score, prioritization is performed through consideration of risk, the MAE score, and the investment category (ND_{EX}, ND_{GAP}, D_{UPG}, NMAN). This is described in section 8 along with prioritization results across the investment period.

6.5 RECOMMENDATIONS

The following is a summary of the recommendations in section 6.0:

- 6-1 – Use the Investment Model to evaluate investments based on the asset's condition, capacity, level of service and alignment with the mandate of the aviation system to make well-planned capital investments.

7.0 YUKON AVIATION SYSTEM INVESTMENT PRIORITIES

Upon completion of the multiple accounts evaluation (MAE) of all non-discretionary and discretionary investments, Stantec prioritized the investments within the 10-year investment timeframe. This did not include a formalized risk assessment of investments, as it is recommended that Government of Yukon do further work to test and refine the risk filters as it moves toward full adoption of the Investment Model.

Justification for deviation

Stantec reviewed each individual investment, its MAE score (which includes consideration for passenger and user experience outcomes), cost, and any other important attributes in order to identify potential justification for deviation from use of the MAE score as the primary driver for prioritization.

- **Risk:** As a proxy for the risk filters developed as part of the Investment Model, significant known sources of both positive and/or negative risk may warrant a deviation from the MAE score.
- **Dependency:** Investments may have dependencies on one another in multiple ways. For example, some investments may require that other investments be completed before they can start. Similarly, some investments may need to run simultaneously. Overlap or redundancy may also exist between separate proposed investments, where selection of one investment nullifies the need to pursue another.
- **Bundling:** Some investments may be bundled together to achieve efficiencies including lower procurement costs, simplified procurement, better economies of scale, more efficient project management, and reductions in mobilization and demobilization costs. This is often the case if there is an opportunity to do multiple related projects at the same location or area, or to do the same kind of project at multiple sites.
- **Expert judgement:** Expert judgement may be applied to augment or enhance the MAE score. Examples of justifications based on expert judgement include reprioritization based on stakeholder input and other regulatory or compliance reasons. Contractor and organizational capacity is another consideration that may be incorporated through expert judgement as part of future renewals and upgrades to the Aviation System Investment Strategy.

Prioritizing investments

To assist with the analysis, Stantec sorted and analyzed the investment lists in several ways, including reviewing investments at both the site and class levels and reviewing investments by type (e.g., electrical, vertical infrastructure).

The ordering of investments by MAE score was performed separately for non-discretionary and discretionary investments. Ordering by MAE score provided the basis for prioritization. Select investments exhibited justifications for deviation from the MAE score. After identifying any justifications for deviation for each of the proposed non-discretionary and discretionary investment, the Stantec team performed a second ordering of investments by MAE score and deviation.

The estimates of probable non-discretionary and discretionary costs were completed by civil and electrical engineers, architects and airport management specialists who are familiar with the Yukon aviation system's operating requirements and cost environment. Local engineering reviews of cost estimates ensure that estimates match the current cost of services in the Yukon. Since the estimates of probable costs were completed based on preliminary concepts and agreed assumptions, an average of a 25 to 30% contingency has been added to the base estimates.

7.1 NON-DISCRETIONARY CAPITAL INVESTMENT PRIORITIES

Beginning with non-discretionary investments ordered by MAE score from highest to lowest, the Stantec team assessed the total capital budget needs for all proposed ND_{EX} and ND_{GAP} investments.

Total non-discretionary capital budget need

The total non-discretionary capital budget need includes both required non-discretionary existing investments and non-discretionary gap investments. Non-discretionary existing investments are investments that need to be made to maintain current assets and current service levels at Yukon airports and aerodromes and ensure consistency of service levels across the aviation system. These investments would be part of the regular planning for TAB's capital program. These investments also ensure compliance with Transport Canada aviation regulations and other regulatory requirements.

Non-discretionary gap investments are investments that fill a gap between the current level of service and what would be considered an appropriate level of service for a site.

There are a total of 188 non-discretionary investments identified through the Aviation System Investment Strategy. The estimated total capital budget needed for these investments is $154 million to $257 million, excluding capital maintenance and not factoring in inflation. With inflation and consideration of recommended term, this range is $172 million to $287 million. Non-discretionary existing investments represent $140 million to $233 million without inflation, whereas non-discretionary gap investments represent $14 million to $24 million without inflation. By definition the implementation of these 188 investments within the 10-year investment period is necessary.

To provide a cautious approach to expenditure management, the cost associated with the most expensive option given was generally used for the purposes of this exercise. A combination of both Class D and Orders of Magnitude estimates were used depending on the level of uncertainty associated with the proposed investment. These options would normally be evaluated during project planning, and would be assessed based on risk, projected life cycle costs, and a number of other considerations.

There are multiple factors that may impact these costs. First, these costs are gross estimates and do not factor in third party funding, such as the Transport Canada ACAP program or the National Trade Corridors Fund. Additionally, the Government of Yukon has a number of funding programs that support building and other infrastructure upgrades. There may also be opportunities to recapitalize some airport equipment through the Road and Airport Equipment Reserve Fund.

Estimates are given as ranges, based on a reasonable amount of uncertainty around the delivery of a capital program over the 10-year period. This kind of uncertainty is inherent to the delivery of complex public capital programming and includes, but is not limited to, procurement considerations, commodity prices, economic instability, and labour costs.

Consideration for the net present value of aviation assets has been excluded from the calculation of these ranges as the phasing has to be in future dollars based on annualized budgets for aviation.

The ability to program the recommended set of investments will be driven by year-to-year investment-level decision-making, successful capitalization of external funding, expanded revenue generation initiatives (discussed in section 10) and other programming considerations.

MAE score results for non-discretionary investments

The highest rated individual non-discretionary investment scored through the MAE is the rehabilitation or reconstruction of the 14R-32L runway at Erik Nielsen Whitehorse International Airport; it was assigned a 64% global MAE score, and a 100% indexed score. The top-rated non-discretionary investments through the MAE process are identified in table 7-1 below, organized by investment type.

Investment	Airport / Aerodrome	Investment Category	Applicable Class(es)	MAE Score
Civil				
Rehab or reconstruction of 14R-32L including electrical and parallel runway	Whitehorse	ND_{EX}	1	64%
Groundside and parking lot re-configuration	Whitehorse	ND_{EX}	1	47%
Taxiway F extension to button of 14R including removal of existing taxiway	Whitehorse	ND_{EX}	1	47%
Electrical				
Replace airfield electrical systems	Whitehorse	ND_{EX}	1	48%
Replace airfield electrical systems	Old Crow	ND_{EX}	2	46%
Replace airfield electrical systems	Faro	ND_{EX}	2	45%
Vertical Infrastructure				
Demolition of air terminal building including hazardous materials report	Faro	ND_{EX}	3	33%
New aviation maintenance facility	Whitehorse	ND_{EX}	1	32%
Heated equipment storage shed	Whitehorse	ND_{GAP}	1	30%
Equipment				
One vibratory packer	Whitehorse	ND_{EX}	1	51%
One vibratory packer	Old Crow	ND_{EX}	2	49%
One wobbly-wheeled packer	Whitehorse	ND_{GAP}	3	49%

Table 7-1: Highest MAE ranked infrastructure related non-discretionary investments

Higher cost non-discretionary items

A number of the non-discretionary investments have high costs, particularly when compared to typical annual capital budgets. These high cost investments would require more than 5% of the average Transportation Division capital budget for a given year and were automatically flagged in the investment model. These investments are often complex and would typically require a greater degree of planning. The current threshold for higher-cost non-discretionary items is $4 million; for costs specified in ranges, the average value was compared to this threshold.

Non-discretionary investments were identified with higher cost capital budget estimates, with a total capital budget requirement of $99 million to $165 million, excluding inflation. The majority of the higher cost items pertain to Erik Nielsen Whitehorse International Airport. The rehabilitation or reconstruction of Runway 14R-32L is the single most expensive non-discretionary investment identified through the Aviation System Investment Strategy. The 10 highest cost non-discretionary investments are presented as estimates in table 7-2 below (without inflation). Examples of remaining items include routine pavement rehabilitation/reconstruction, electrical replacements and upgrades, and groundside improvements.

Investment	Airport / Aerodrome	Investment Category	Applicable Class(es)	Estimated Capital Budget
Rehabilitation/reconstruction of 14R-32L including electrical and parallel runway	Whitehorse	ND_{EX}	1	$49,050,000 to $81,750,000
Apron I rehabilitation/reconstruction	Whitehorse	ND_{EX}	1	$13,875,000 to $23,125,000
New aviation maintenance facility	Whitehorse	ND_{EX}	1	$7,125,000 to $11,875,000
Taxiway Echo rehabilitation/reconstruction	Whitehorse	ND_{EX}	1	$6,825,000 to $11,375,000
Airfield electrical systems	Whitehorse	ND_{EX}	1	$5,076,000 to $8,460,000
East side access road (feasibility study required)	Whitehorse	ND_{GAP}	1	$4,500,000 to $9,000,000
Groundside and parking lot re-configuration	Whitehorse	ND_{EX}	1	$3,300,000 to $5,250,000
Rehabilitation of 02-20	Whitehorse	ND_{EX}	1	$3,150,000 to $5,250,000
Heated equipment storage shed	Whitehorse	ND_{GAP}	1	$3,000,000 to $5,000,000
Rehabilitation/reconstruction of main runway	Watson Lake	ND_{EX}	2	$3,000,000 to $5,000,000

Table 7-2: Highest cost non-discretionary investments

It should be noted that all the estimates listed above are Class D estimates with the exception of the East Side Access Road for which a feasibility study is required and which has an Orders of Magnitude estimate.

Prioritization of non-discretionary investments

The remaining investments were sorted into short (1 to 3 years), medium (4 to 6 years), and long (7 to 10 years) term categories based on their MAE evaluation. The total cost of all investments sorted into each preliminary term was proportional to the length of that term in relation to the 10-year period. Approximately the highest scoring 30% of investments were sorted into the 3-year short term, the next 30% of investments sorted into the 3-year medium term, and the lowest 40% of investments sorted into the 4-year long term. The approach creates a balanced starting point between terms.

Stantec then assigned higher cost non-discretionary investments into terms based on their MAE score, their individual budget requirements, dependencies and other considerations identified during the development of justifications for deviation from the MAE score.

With all non-discretionary investments assigned a preliminary term, the prioritization of investments could be further enhanced through more in-depth analysis, including looking at whether additional justifications for deviation could be applied. Stantec did this through an iterative process to determine the recommended term and to balance capital requirements between terms. This recommended term is a key component to the Aviation System Investment Strategy, as it provides the basis for annual capital programming while also considering long-term planning needs.

As an extension of the recommended term, investments recommended for implementation within the short term were assigned a recommended year (years 1 to 3). A similar process was pursued for investments recommended for the medium term; however, focus was placed on identifying only investments that should be frontloaded to year 4 within the medium term since significant shifting within a period can occur in the medium and long term. The term recommendation results for non-discretionary investments are summarized in Section 8.2.

7.2 DISCRETIONARY CAPITAL INVESTMENT PRIORITIES

Following the sorting of all proposed non-discretionary investments by recommended term, a similar approach to identifying justifications for deviation of discretionary investments was applied.

Total discretionary capital budget proposed

The total discretionary capital budget proposed includes discretionary upgrade investments and non-mandate investments. Discretionary upgrade investments are investments that may be considered non-discretionary at sites with higher user needs, and that would be considered within TAB's mandate. However, they are considered discretionary at sites with lower traffic and demand. Non-mandate investments are proposed investments that are not part of TAB's current mandate. As a result, TAB will likely not have available resourcing or in-house expertise to plan, implement, and administer discretionary non-mandate investments.

There are 131 potential discretionary investments identified through the Aviation System Investment Strategy. The estimated total capital budget need for pursuing all of these investments would be $119 million to $199 million. However, their implementation within the 10-year investment time horizon is not

required, by definition. This is addressed through the assignment of priority levels, including some investments receiving a priority level of "Do Not Pursue" within the 10-year time horizon.

However, not pursuing select discretionary investments from this list identified with a priority level of "High", "Moderate", or "Low" may introduce risk, including the misalignment of the Yukon aviation system with its users and lost opportunities to add strategic value to the system. This is particularly true for discretionary investments identified with a "High" priority level.

The provision of service levels beyond what is required can increase operating, maintenance and repair costs across the aviation system. Such investments can have the effect of raising expectations that cannot be sustained going forward and can reduce the ability to remain flexible with such investments.

Discretionary upgrade investments represent $116 million to $194 million, whereas non-mandate investments (most of which are costed as business cases or investigations) represent $3 million to $5 million. As these investments are not assigned to a specific term, no inflation is included.

Because of the scope of the Aviation System Investment Strategy, all proposed investments were estimated where possible, and where not possible, business cases and feasibility studies were suggested and estimated. Some of these estimates have not been considered beyond the business case stage and it should be noted that many of the discretionary investments may not be feasible in Yukon's operating environment. This is generally for safety (i.e., campgrounds, which can pose a risk to aircraft operations), financial (i.e., expensive land development or servicing projects) or legal reasons (i.e., the proposed investment conflicts with the *Financial Administration Act*).

Similarly, to non-discretionary investments, the ability to advance the recommended set of discretionary investments will be driven by year-to-year investment-level decision-making, successful capitalization of external funding, expanded revenue generation opportunities (outlined in section 10), strong business cases and other programming considerations.

MAE score results for discretionary investments

The highest rated discretionary investment scored through the MAE process is the airfield electrical systems at Pelly Crossing, scoring a 50%. This represents 78% indexed score in relation to the non-discretionary rehabilitation or reconstruction of the 14R-32L runway at Erik Nielsen Whitehorse International Airport. The top-rated discretionary investments through the MAE process are identified in table 7-3 below.

Investment	Airport / Aerodrome	Investment Category	Applicable Class(es)	MAE Score
Airfield electrical systems	Pelly Crossing	D_{UPG}	3	50%
Large front-end loader with bucket and paddle-plow blade at any Class 3 aerodrome	Specific aerodromes	D_{UPG}	3	49%
Front end loader mounted snow blower at any Class 3 aerodrome	Specific aerodromes	D_{UPG}	3	48%
Access road/groundside development for new ATB/fencing	Dawson City	D_{UPG}	2	46%
Business case/impact assessment and potential implementation of AWOS (estimate includes installation costs)	Across class	NMan	3	45%

Table 7-3: Highest MAE ranked discretionary investments

Other discretionary investments with high MAE scores included business cases for new programs, level of service increases or expanded facilities at sites, and business cases for the provision of additional navigation or weather services throughout the territory.

High cost discretionary investments

High cost items categorized as discretionary were flagged on the same basis as non-discretionary investments. A total of 4 discretionary investments were identified with high cost capital budget estimates, with a total capital budget requirement of $91 million to $152 million. These 4 high cost items pertain to certified sites. The largest proposed high cost discretionary investment is the development of the south fixed-wing area at ENWIA. The other high cost discretionary investments include historical building renovations at Watson Lake, a combined maintenance/ARFF/electrical shop building at ENWIA, and a new air terminal building at Dawson City.

Assigning priority levels to discretionary investments

As discretionary investments developed through the Aviation System Investment Strategy do not necessarily need to be incorporated within the 10-year investment timeframe, there was no preliminary term assigned for the full list of non-high cost investments. Instead, Stantec sorted and analyzed discretionary investments by MAE score from highest to lowest, assigning a recommended discretionary investment priority level (high, moderate, low, and do not pursue).

As an extension of this, some discretionary investments were identified as "necessary" based on Stantec's judgement. Stantec recommends that these investments, along with their investment priority, should be considered directly alongside non-discretionary investments when possible.

7.3 FUTURE CONSIDERATIONS FOR THE INVESTMENT MODEL

Through the process of evaluating the complete list of discretionary and non-discretionary aviation investments, Stantec identified a number of relevant trends which should be taken into consideration as the MAE and risk filters are refined over the coming years.

Firstly, the MAE does an effective job in assigning high scores to important safety and compliance related investments at Class 1 and 2 airports, particularly those related to airfield infrastructure and equipment. Safety and airfield infrastructure related investments at Class 3, 4, and 5 aerodromes also ranked relatively high.

However, it should be noted that non-discretionary vertical infrastructure items, particularly capital maintenance investments for aviation buildings, generally rated lower than expected and investments for non-discretionary airfield maintenance equipment generally rated higher than expected.

Only investments that were estimated at $50,000 or more were rated through the MAE model. In general, the MAE model was more effective in rating higher cost capital items, than it was in rating lower cost items. It is recommended that Government of Yukon look at this threshold in the future.

The future development of the risk filters by Government of Yukon has the potential to mitigate some of these issues seen with the MAE by filtering out high risk investments through the risk filters, before they reach the MAE. It is recommended that Government of Yukon considers this moving forward.

7.4 10-YEAR INVESTMENT STRATEGY FOR YUKON AVIATION SYSTEM

The capital budget needs by term were reviewed based on the results of the recommended terms for non-discretionary investments and assigned discretionary investment priority levels. The annual budget needs were reviewed for years 1 through 4, along with the average budget needs by year for years 1 through 10.

A total of 109 non-discretionary investments are recommended for the short term, 37 for the medium term, and 43 for the long term. The following table 7.4 includes inflation adjustments by term using the inflation rate (assumed at 3% per year) and the median year within a term.

Recommended Term	ND_{EX}	ND_{GAP}	Total
Short	$33,000,000 to $56,000,000	$10,000,000 to $16,000,000	$43,000,000 to $72,000,000
Medium	$99,000,000 to $166,000,000	$1,000,000 to $2,000,000	$100,000,000 to $167,000,000
Long	$24,000,000 to $39,000,000	$6,000,000 to $9,000,000	$29,000,000 to $49,000,000
		Subtotal	*$172,000,000 to $288,000,000*
		Capital Maintenance	$45,000,000 to $68,000,000
		Total	**$217,000,000 to $356,000,000**

Table 7-4: Capital needs summary by term

A total of 33 discretionary investments are assigned a high priority level, 47 a moderate priority level, 36 a low priority level, and 15 with a 'do not pursue' priority level. The total capital estimate for all discretionary investments assigned a priority level of high, moderate, or low is $42,000,000 to $71,000,000, excluding inflation and the cost of any investments identified as 'do not pursue'. The total cost of items identified as "Do Not Pursue" is $77,000,000 to $128,000,000.

7.5 RECOMMENDATIONS

The following is a summary of the recommendations in section 7.0:

- 7-1 - Government of Yukon should review the MAE model and risk filters to ensure alignment with aviation programming and priorities.
- 7-2 - Government of Yukon should look for project dependencies and synergies by pursuing and timing multiple related investments (bundling) at one site or area together. This applies to both discretionary and non-discretionary investments

8.0 FLIGHT PATH RESULTS

8.1 EXPENDITURE PROJECTIONS

There are many critical and necessary expenditures required to maintain the aviation system over the 10-year investment period. These expenditures are needed to support continuous safe, reliable operations for airports and aviation programs. The key areas are as follows:

- Repair and maintenance of asphalt/gravel runways, taxiways and apron surfaces
- Grading and vegetation clearing for the runway and taxiway safety areas, runway strip and OLS
- Airfield electrical systems upgrades and maintenance
- Drainage systems and surface water management
- Environmental control systems and associated equipment
- Airport maintenance equipment and mobile equipment fleet resources
- ATB and other building maintenance, repairs and building code compliance issues
- Repair and maintenance of groundside access roads and parking lots
- Clear wayfinding/information signage
- Maintenance of existing and development of new, improved navigation aids (e.g., GPS approaches) and aviation related information (e.g., weather reporting, LWIS/AWOS), provided by NAV Canada
- General operational costs related to staffing, planning, equipment, systems, etc.

8.1.1 Aviation system operating and maintenance expenditures – system management

Airport programs such as wildlife management, apron management and safety, electrical maintenance, summer/winter maintenance programs, aircraft rescue firefighting, security operations, and SMS reporting require dedicated human resources accompanied by investments in facilities, training, and equipment.

The contemplated future human resource requirements will depend on regulatory changes, program and mandate requirements, and level of service requirements.

ENWIA has the greatest resource requirements of all the sites in the system, with security services that are compliant with Canadian Air Security Regulations (CASR) and with Category 7 firefighting capabilities. It also requires dedicated, onsite operations and maintenance teams, including airfield electricians. Centralized support services (e.g. regulatory compliance, operations management) for the entire aviation system are provided from the Class 1 and 2 airports.

The Class 2 airports have fewer employees than ENWIA due mainly to scope and size of operations, with only maintenance staff being dedicated and required onsite. The Class 3 aerodromes have no dedicated employees. Transportation Maintenance Branch provides winter maintenance services at these sites. There is currently no business case for employees at Class 3 aerodromes. Employees from ENWIA and the Class 2 airports manage and provide services to the Class 3 aerodromes.

There are no dedicated human resources or equipment at the Class 4 and 5 aerodromes. Aerodrome maintenance work is generally completed by TMB and the mobile maintenance crews based at the Class 1 and 2 airports. Employees from ENWIA and the Class 2 airports manage and provide services to the class 4 and 5 aerodromes.

For the purposes of this report, the projected O&M expenditures are expected to be at least approximately $15 million per year during the investment period. The O&M expenditures are expected to increase with inflation and if service levels increase within the aviation system.

CARS operators are not included in this assessment, as this service is funded through NAV Canada.

8.1.2 System-wide capital requirements

TAB has a number of capital maintenance programs that are necessary to support current minimum service levels for critical infrastructure.

Capital maintenance projects and activities include dust suppressant, OLS clearing, pavement maintenance and repairs, and routine runway resurfacing. Activities within these programs are not budgeted per site, but rather at the system or class level or by the type of activity. This ensures there is enough long-term flexibility to fund these programs while retaining the ability to be responsive.

Capital program allowances support the delivery of capital projects and programs. Work within this category also helps TAB identify requirements related to capital programming in order to support longer-term aviation system business and infrastructure planning. This includes OLS surveys, land management program resources, aeronautical studies, and environmental monitoring.

The facilities and equipment capital allowance helps TAB to maintain service levels at all sites and to be responsive to emerging issues and needs at an operational level; it is typically used to purchase goods and services with smaller dollar values such as parts and small equipment and small building repairs and improvements.

Capital requirements for capital maintenance, capital program support and for facilities and equipment are estimated to be between $45 million and $68 million, not including building infrastructure during the investment period. This range allows for a reasonable amount of uncertainty, with the amount of budget uncertainty decreasing as condition assessments for major infrastructure are updated and asset management programs continue to be developed and implemented.

8.1.3 Class 1 airport – Erik Nielsen Whitehorse International Airport

Significant investments and budget expenditures are required to maintain and repair airport facilities at ENWIA. Currently, the majority of the costs to operate the system are allocated to ENWIA, in terms of staffing requirements, surface maintenance and management, terminal facilities and other vertical infrastructure, equipment, groundside infrastructure, equipment and electrical infrastructure.

It is currently estimated that non-discretionary capital requirements for ENWIA will be between $126 million to $209 million over the investment period.

The largest single expenditure for the system will be the rehabilitation of the main runway (14R-32L) and associated improvements to the parallel runway (14L-32R) and lighting. This is a complex and multi-phased project with a number of critical dependencies. These improvements are needed in order to meet relevant standards and to meet future demand beyond the 10-year investment period.

A new airport maintenance building is also required during the investment period. It too has a number of critical dependencies. These dependencies include the demolition of the existing maintenance building and necessary site work.

Other parts of the airfield also require extensive electrical upgrades and/or replacement. Airfield surfaces (i.e., aprons, taxiways) will require routine resurfacing/reconstruction. New equipment will be required to support ENWIA's maintenance requirements and for the mobile maintenance program. Groundside and parking upgrades will also be required to support safe and efficient access to the airport.

Capital maintenance for the terminal building and other airport buildings will be required including upgrades to building systems. Additionally, minor upgrades to the building itself to support safety and compliance will be required.

The expansion of the ATB is not included in the investment period. Any major building upgrades or expansions would need to be justified through a business case.

8.1.4 Class 2 airports

There have been a number of recent investments in Class 2 airports, including at Mayo and Dawson City Airports to support increased levels of service. As certified sites, these have maintenance and regulatory requirements support scheduled passenger service. They also have staff that support the system-wide mobile maintenance program. A number of critical investments are required at these sites to support the system over the investment period.

It is estimated that the cost associated with this work over the investment period will be between $28 million and $47 million.

Upgrades and/or replacements of electrical systems at all sites are required as are replacements/upgrades to generators and Field Electrical Centres at a number of sites. Equipment will be required at all sites; there will be challenges and high costs associated with purchasing and shipping maintenance equipment to Old Crow, in particular. Dawson City and Watson Lake Airports will require additional equipment to support their respective mobile maintenance programs.

There is an ongoing need for aggregate to be stockpiled and available at gravel sites; this is of particular concern at the Old Crow Airport.

Mayo Airport requires a heated maintenance garage to support operations; this project is underway. Modular expansions to the Mayo Airport are also required during the investment period. There are also

energy envelope upgrades, accessibility and building code upgrades identified at a number of sites, which should be addressed. There will be a number of upgrades required related to building systems including new boilers, furnaces, water heaters, etc.

The construction of a new ATB at Dawson City Airport is not being considered for the investment period because the development of a second apron is intended to decrease the overall pressure on the ATB. However, there will be a requirement for several energy efficiency and facility upgrades associated with the existing ATB, unless the construction of a new facility is supported by a robust business case.

8.1.5 Class 3 aerodromes

Class 3 aerodromes support critical emergency services including Medevac, RCMP and Wildland Fire Management. They also support government services, cargo, fuel hauls and economic activity in Yukon communities. A number of these sites have benefitted from recent resurfacing, though work is required at others. Many of the buildings at these sites are also showing their age.

It is anticipated that the costs for maintaining Class 3 sites over the investment period will be between $14 million and $24 million. This does not include the cost of capital maintenance such as runway resurfacing or OLS clearing. It is also anticipated that these sites will require crushed and stockpiled aggregate.

The electrical systems for airfield lighting at many Class 3 aerodromes with existing airfield lighting systems require either upgrades or replacement during the investment period. This would include the replacement of a number of generators, several of which are currently non-functional.

Additional aggregate, with grading and compaction of the RSA and runway slope at Pelly Crossing Aerodrome are recommended to support safety. There is an abandoned ATB at Faro which is also recommended for demolition during the investment period.

Energy envelope upgrades, accessibility and building code upgrades are identified for a number of sites. There will be a number of upgrades required related to building systems including new boilers, furnaces, water heaters, etc.

8.1.6 Class 4 and 5 aerodromes

Class 4 and 5 aerodromes support economic activity related to mining, tourism, cargo and fuel hauls, and outfitting; they also provide redundancy in case of an emergency.

It is estimated that the required investment for Class 4 and 5 sites over the investment period is $4 million to $8 million (with rounding adjustments included on low budget dollars).

The provision of granular materials for runways is required during the investment period but is not included in the estimates, as this is highly dependent on sourcing location. These sites will also require capital maintenance such as routine resurfacing, which are included in capital maintenance allowances.

Most of these sites consist of only a runway with no other infrastructure. Apron/taxiway infrastructure development is required to support safe cargo and passenger transfer and fueling.

8.1.7 Discretionary expenditures

Discretionary investments have the potential to bring strategic value to the system and its users. It is recommended that Government of Yukon consider discretionary investments to support site access (e.g., runway lighting, additional navigational aids, parking lots), studies looking at the cost-benefit of providing additional services for users, and other safety focused studies for improved service levels.

Given the estimated costs of the non-discretionary capital needs for the system, any proposed discretionary investments should be evaluated through the Investment Model and be supported by strong business and safety cases. These kinds of investment should be pursued when there is value to the system, users, or opportunities for greater efficiency. Potential cost-recovery may also enhance an investment's business case.

8.1.8 Other expenditures

Section 5 outlines the trends, assumptions and known uncertainties impacting the development and standardization of the maintenance baseline, levels of service and implementation plan over the 10-year investment period.

The majority of investment requirements can be identified for the 10-year period, as they are connected to known level of service or regulatory requirements. However, some projects cannot be anticipated in the longer-term; these projects often to fulfil emerging stakeholder demands or respond to changing industry, operational or regulatory requirements. Any implementation plan must be flexible enough to adapt to these emerging needs and provide a framework for managing any trade-offs that may result.

Currently, TAB is in the process of developing land use plans for Yukon's airports. These plans need to be completed before the scope of land development and leasing opportunities at Yukon's airports can be determined, in order to ensure compatibility with current and future operational requirements and the needs of stakeholders. It is likely that new land development and servicing projects will proceed during the investment period as a result of the land use planning work. Since these projects can run into the millions of dollars, it is likely that they will add to the overall capital requirements of the system. Alternative business models for land development could potentially offset these costs.

8.1.9 Summary

Currently, the anticipated capital requirements over the investment period are between $217 million and $356 million for non-discretionary investments, including inflation and contingency costs.

For the purposes of this report, the capital budget is estimated at $13 to $25 million per year for aviation infrastructure over the next ten years and $1.5 to $8 million per year for vertical infrastructure within the aviation system, with no annual increases due to inflation. The high ends of these ranges generally support years where a major capital or several major capital investments are required. These estimates

are based on historical expenditures and take into consideration the Government of Yukon's five-year capital plan. The Government of Yukon is continuing to advance its approach to five-year capital budgeting which is expected to provide predictability for multi-year planning.

In conclusion, given the cost of non-discretionary investment to support the aviation system, it is recommended that the Government of Yukon examine its budget needs to ensure it can meet its current and projected non-discretionary investment needs over the 10-year investment period. It is also recommended that any discretionary projects that move ahead will need to be supported by strong business and safety cases.

Class	Low Range	High Range
System-wide and capital maintenance	$45,000,000	$68,000,000
Class 1	$126,000,000	$209,000,000
Class 2	$28,000,000	$47,000,000
Class 3	$14,000,000	$24,000,000
Class 4 and Class 5	$4,000,000	$8,000,000
Total	*$217,000,000*	*$356,000,000*

Table 8-1: Summary of capital requirements including inflation and contingency

8.2 PHASING AND SEQUENCING OF INVESTMENTS

The resulting priorities of non-discretionary investments are outlined below. This includes the major infrastructure requirements over the next 10 years. Numerous smaller investments have also been identified and these have been allotted to a specific term.

Capital maintenance activities such as dust suppressant and routine runway resurfacing will be performed across the entire investment period and these sorts of investments will be programmed for individual sites within their allotted capital allowances.

8.2.1 Short term investments (1 – 3 years)

Class 1 Airport

A significant proportion of non-discretionary investments at ENWIA have high scores according to the MAE model and are recommended for the short term at ENWIA. These span across a wide range of investment types.

There are several capital maintenance items required for various ENWIA buildings in the short-term. Several equipment purchases are also recommended as well to support both onsite maintenance and the mobile maintenance program.

A new aviation maintenance facility and the demolition of the existing facility, construction of a heated equipment storage shed, and the reconfiguration of the groundside access roads and parking lot will also be required.

Class 2 Airports

Short term non-discretionary recommendations for Dawson City Airport include upgrades to the ATB and equipment purchases.

The short term sees significant non-discretionary investment recommended at Mayo Airport, with ATB and CARS office renovations and modular expansions, as well as several equipment purchases.

Airfield electrical system upgrades are also recommended at Old Crow Airport, along with maintenance garage upgrades, foundation repairs to the ATB, fencing repairs, and various equipment purchases.

Similar to Dawson City Airport, short-term non-discretionary recommendations for Watson Lake Airport include minor upgrades to the ATB and various equipment purchases. Rehabilitation/reconstruction of the Watson Lake main runway is recommended as well, coinciding with airfield electrical upgrades.

Class 3 Aerodromes

The two most significant non-discretionary investments for Class 3 sites recommended within the short term are airfield electrical system upgrades at Faro Aerodrome and Ross River Aerodrome.

ATB repairs are recommended for Carmacks and Haines Junction. Runway slope and RSA reductions are also recommended for Pelly Crossing, as well as resurfacing of the taxiway and apron.

Class 4 and 5 Aerodromes

Apron and taxiway development will take place in conjunction with planned crushing and routine runway resurfacing.

8.2.2 Medium term investments (4-6 years)

Class 1 Airport – ENWIA

The rehabilitation or reconstruction of runway 14R-32L at ENWIA will need to take place in the medium term. This represents a high cost multi-year project. There are four other exceptional projects also recommended for the medium term at ENWIA, including airfield electrical system upgrades, work on Taxiways F and A, and rehabilitation of parts of Apron I.

A number of these proposed investments are interdependent. This will require extensive planning and coordination and will represent a significant cost.

Class 2 Airports

Recommended non-discretionary investments at Dawson City Airport including airfield electrical system upgrades, and various equipment purchases.

Investments in equipment will be required at Mayo Airport and Old Crow Airport.

Class 3 Aerodromes

Airfield electrical system upgrades are recommended at Beaver Creek, Burwash Landing, Carmacks, Haines Junction, and Teslin.

Class 4 and 5 Aerodromes

Apron and taxiway development should take place in conjunction with planned routine runway resurfacing.

8.2.3 Long term investments (7-10 years)

Class 1 Airport – ENWIA

Taxiway E rehabilitation represents a high cost civil project at ENWIA recommended for the long term. Other major investments recommended for the long term at ENWIA include rehabilitation of 02-20 and large equipment purchases, namely self-propelled snow blowers and snow plows.

Class 2 Airports

ATB and CARS office renovations are recommended for Watson Lake Airport within the long term, as are electrical upgrades at Mayo Airport.

Class 3 Aerodromes

Office renovations are recommended for a number of sites across the system.

It is also recommended that the abandoned Faro Aerodrome ATB be demolished.

Class 4 and 5 Aerodromes

Apron and taxiway development will take place in conjunction with planned routine runway resurfacing.

8.3 IMPLEMENTING THE STRATEGY

Successful implementation of the Aviation System Investment Strategy relies upon a consistent approach to transferring outputs from the Investment Model to the annual capital budgeting process.

In order to facilitate a consistent implementation approach, the following methodology is proposed based on one-year updates and three-year renewals to the Investment Model. This methodology builds on the

development of capacity and demand assumptions, the aerodrome classification scheme, risk filters, and the MAE model.

The prioritized list of investments put forward as part of the Aviation System Investment Strategy will stand within the investment period, the specific investments for each term will shift year-by-year through annual updating and programming:

- *Short-term:* A three-year period from Year 1 to Year 3.
- *Medium-term:* A three-year period from Year 4 to Year 6.
- *Long-term:* A four-year period from Year 7 to Year 10.

Investments are to be allocated to these terms as part of the development of the Aviation System Investment Strategy's implementation plan.

8.3.1 Assumptions

Several assumptions are necessary for implementation of the Aviation System Investment Strategy.

- Non-discretionary existing and gap investments must be pursued, however the timeframe for their implementation is dependent on the outcomes of the Investment Model. Delays of pursuing defined non-discretionary investments would impact Government of Yukon's ability to meet the service levels established through the Aviation System Investment Strategy.
- Discretionary upgrades and non-mandate investments not aligned with the Policy Goals, which present safety, legal or feasibility concerns, or which are not supported by the MAE or robust business cases will not be pursued.
- Discretionary investments may be pursued simultaneously or preceding non-discretionary investments, if full consideration has been given to budget, scheduling, stakeholder demand, strategic alignment with Policy Goals, and other factors such as year-to-year programming and other funding sources.

8.3.2 Aviation System Investment Strategy Update Protocols

Replicating the full Flight Path process on an annual basis is not practical. Therefore, the following Aviation System Investment Strategy update protocols are proposed as the standard method for updating inputs and outputs to the Investment Model in order to support capital budgeting moving forward.

Protocols are presented for two different processes - an annual update and three-year renewals. These protocols must balance the need for up-to-date inputs with the resources and organizational capacity required to renew the Aviation System Investment Strategy and support annual capital programming, while also allowing flexibility to address new investments that may be of high priority or address new items of high risk.

This approach uses annual updates (minor effort) and a three-year refresh or renewal (major effort, similar yet less intensive to the Flight Path project) throughout the 10 year investment cycle, as detailed below. Renewals occur every 3 years, whereas updates occur annually with the exception of renewal years.

Annual Update

The annual update serves to update the Investment Model by incorporating data from the previous year and preparing for upcoming capital programming. The annual update requires less data collection and relies heavily on past results and a robust capital investment request process in order to prioritize investments within the short term (3 years).

Prioritization of investments within the short term drives the annual capital programming process. Efforts should be made annually to seek external funding, particularly when identified for bundled investments identified in the original Aviation System Investment Strategy or from the 3-year renewal. The recommended annual update protocol is demonstrated in figure 8-1. This update process runs in parallel to implementation of the results of prioritization from the prior year.

Three-Year Renewal

The 3-year renewal features a more rigorous data collection phase, including formal stakeholder engagement. This data collection phase enables a reprioritization of investments across the three terms. Emphasis should be given during the 3-year renewal on prioritization (particularly when assigning years to the investments within the short term) to support and increase external funding. The recommended three-year update protocol is demonstrated in figure 8-2. The 3-year renewal process runs in parallel to implementation of the results of prioritization from the prior year.

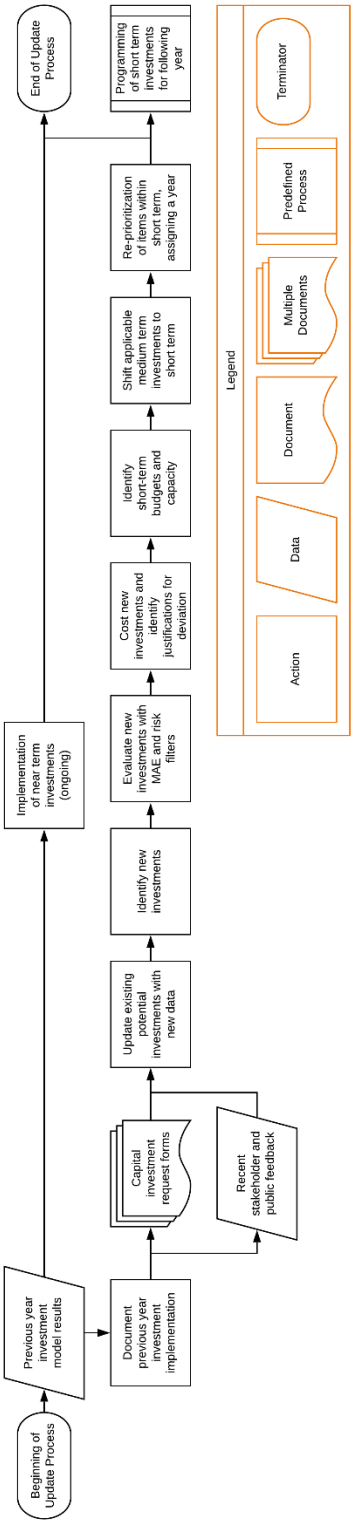


Figure 8-1: Annual update protocols

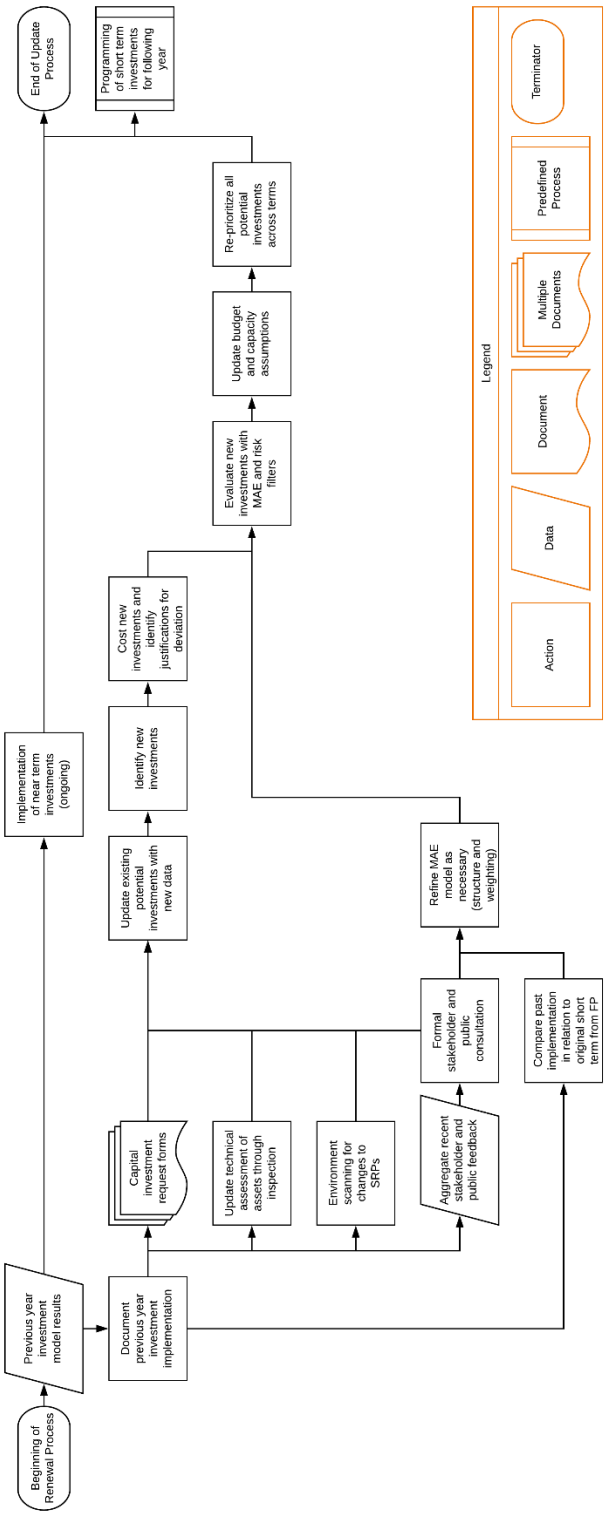


Figure 8-2: 3-year renewal protocols

8.4 ADAPTING TO CHANGE AND SHIFTING PRIORITIES

The formalization of the following items identified through the Aviation System Investment Strategy will support the sustainability of the aviation system:

- An asset management approach, which is aligned with industry standards;
- Adoption and refinement of the classification system for airports and aerodromes;
- Well-planned capital investments that use the Investment Model to evaluate investments on the asset's condition, capacity, level of service and consistency with the mandate of the aviation system;
- Appropriate maintenance consistent with the class, regulatory requirements, level of service, and aviation-specific requirements; and
- Ongoing communications and collaboration with stakeholders.

The overall Aviation System Investment Strategy and Investment Model are a dynamic approach to planning resources and aligning them with system needs. The Aviation System Investment Strategy is not meant to be static; it will need to be examined on a regular basis to ensure it continues to align with the evolving needs of the system over the investment period.

The tools developed through the Aviation System Investment Strategy provide a framework for supporting evidence-informed decision-making in the system. The Investment Model is a holistic approach to priority setting within the system and is expected to be refined and adjusted as Government of Yukon gains expertise and comfort with the model.

These tools will help TAB to be more responsive to the economic and social changes that drive airport service requirements, and to better plan for the financial investments needed to support them. It will ultimately help drive investments that provide broad or sustained benefit to the overall system.

Aligned with classification, levels of service need to be responsive to the needs of industry and the travelling public. Any changes to levels of service need to be supported by a robust business case where capital and ongoing maintenance costs are analyzed relative to the benefit the service provides.

Asset management programs for various different types of aviation investments are currently under development. While these programs will take several years to develop, they will provide value to the system in the medium- to long-term. Once these programs are in place, a combined approach through both the Investment Model and asset management, will be required to evaluate potential investments, where applicable.

In addition to using this Aviation System Investment Strategy and Investment Model, the Government of Yukon's investments in the aviation system would be well served through established and robust multi-year funding and programming, as well as increased resourcing for projects in the immediate term. This requires strong planning functions, regular communication with internal and external stakeholders, and a sustained organizational commitment to making positive changes in the aviation system.

This will need be supported by formal collaboration between TAB and other groups within Government of Yukon. Because aviation services are often provided by groups outside TAB's functional control, there will need to be alignment between these groups and corresponding governance frameworks and service

agreements to support service delivery according to aviation standards. This combined with the development of shared priorities and a common vision for Yukon's aviation system will support the evolution and implementation of Aviation System Investment Strategy over the investment period.

This substantial shift in approach and alignment of resource commitments with the Policy Goals will take leadership, dedication and patience of all concerned. The approach is more than simply converting to a new model of prioritizing spending, it is a shift in overall planning and management of the aviation system as well.

In addition to capital resources required to deliver on the investments identified in the Implementation Plan, there is a need to align or possibly add human resources to deliver on the Policy Goals in a way that allows TAB to fully operationalize the recommendations in the Aviation System Investment Strategy. This too will need to be re-evaluated as the recommendations evolve over the investment period.

There is an identified need to manage the aviation system in a way that is more business-like. Given the many competing demands on the system, this needs to be managed through the Investment Model as well as by strong policies to manage land, non-aeronautical revenue opportunities, stakeholder-generated investment opportunities and discretionary maintenance. Without these tools, it is nearly impossible to prioritize stakeholder-driven investments in a way that is open, fair and transparent.

These kinds of policies should be flexible enough to support business needs, but also align with government obligations and priorities. If Yukon develops cost-recovery mechanisms for aviation investments and services, these too should be considered as part of any business case.

The Aviation System Investment Strategy recommendations will need to be continually evaluated to support evolving business needs. Feedback and input presented by YAAC and other stakeholders should continue to be considered by the Government of Yukon as it develops investment commitments for the Yukon aviation system. This allows for the development of a collaborative strategy, which is informed by the operational realities of both Government of Yukon and aviation users.

8.4.1 Impacts of Covid-19

COVID-19 is having a devastating impact on the aviation industry: it is changing air traffic, introducing social distancing or mask wearing requirements for air terminal buildings and airplane cabins, prompting companies to introduce COVID mitigations for crews delivering construction projects, and forcing both airports and airline staff to limit their time in the office or to work at home entirely, among other impacts.

It is difficult to know what the short-, medium-, and long-term impacts of these will be. It is also difficult to predict what effects COVID-19 will have on the economy and society at large during the investment period. The Government of Yukon should continue to monitor the effects of COVID-19 and understand its effects on the delivery of government programs and services and the implementation of the Aviation System Investment Strategy.

8.5 RECOMMENDATIONS

The following is a summary of the recommendations in section 8.0:

- 8-1 - Invest in the upgrades for the airports and aerodromes outlined in subsections 8.1.4 through 8.1.9 inclusive.
- 8-2 - Develop shared priorities and a common vision within the Government of Yukon for Yukon's aviation system to support the evolution and implementation of the Aviation System Investment Strategy over the investment period.
- 8-3 - Align resource commitments and management of the aviation system with the Policy Goals.
- 8-4 - The Government of Yukon's investments in the aviation system would be well served through established and robust multi-year funding and programming, as well as increased resourcing for projects in the immediate term. This requires strong planning functions, regular communication with internal and external stakeholders, and a sustained organizational commitment to making positive changes in the aviation system.
- 8-5 - Manage the aviation system in a way that is more business-like. Use the Investment Model and strong policies to manage land, non-aeronautical revenue opportunities, stakeholder-generated investment opportunities and discretionary maintenance so that stakeholder-driven investments are managed openly, fairly and transparently.
- 8-6 - Ensure changes to levels of service are supported by a robust business case where capital and ongoing maintenance costs are analyzed relative to the benefit the service provides.
- 8-7 - Follow the Aviation System Investment Strategy update protocols, which include annual and three-year updates, to ensure the Aviation System Investment Strategy continues to be aligned with the evolving needs of the system over the investment period.
- 8-8 - Cost-recovery mechanisms for aviation investments and services should be considered as part of any business case.
- 8-9 - Feedback and input presented by YAAC and stakeholders should continue to be considered by the Government of Yukon as it develops investment commitments for the Yukon aviation system.

9.0 OPERATIONAL CONSTRAINTS AND MOVING FORWARD

9.1 LIABILITIES AND REGULATORY NON-COMPLIANCE

9.1.1 Federal regulatory compliance – safety management systems

It is the responsibility of airport operators to identify, measure, mitigate, and monitor risks, and to look for opportunities to improve safety through SOPs and other formal processes.

The liabilities associated with risks at certified airports are managed through the lens of SMS, which supports compliance with applicable Canadian Aviation Regulations (CARs). Transport Canada requires that airports identify the senior executive, known as the Accountable Executive, who will act on their behalf regarding ongoing compliance with regulations.

SMS program management is defined by Transport Canada as a documented process for managing risks that integrates operations and technical systems with the management of financial and human resources to ensure aviation safety or the safety of the public. SMS helps inform investment decisions, financial and human resource requirements, and allows Government of Yukon's to address the overall liabilities for the aviation system.

A proactive and well-planned investment approach to managing risks and liabilities is necessary to support safety and operational effectiveness. It also supports the development and delivery of ongoing and planned maintenance programs according to aviation standards (e.g. crack sealing, OLS clearing and winter snow removal), through appropriate planning and provision of resources.

If SMS is not effectively linked to investment priorities, the risk increases for programming to become misaligned from overarching aviation business and regulatory requirements. TAB's investment models and tools will need to be fully integrated with SMS. It is important that the broader Government of Yukon has an understanding of the SMS framework and its implications.

The SMS framework promotes the development of an organization's safety culture, with a focus on being proactive. All employees involved in operating airports must consider not just their own safety, but the safety of others and of the airports and aerodromes they are maintaining and managing. The employee must be aware of the SMS Safety Policy and should be capable of identifying and communicating hazards through appropriate channels.

The continued enhancement of Standard Operating Procedures (SOPs) into the SMS will benefit TAB by improved reporting of hazardous conditions, mitigation measures and the ability to monitor and analyze long-term maintenance and repair trends. This would result in improved planning and budgeting information for aerodrome rehabilitation, and ultimately improve overall conditions and aerodrome safety.

9.1.2 Federal regulatory compliance – aerodrome standards

The application of aerodrome standards, TP312 – Aerodrome Standards and Recommended Practices, is a requirement for certified airports that facilitate scheduled passenger service flights. Registered

aerodromes are not legally bound to meet TP312 5th edition standards typically applicable to certified airports; however, best practice indicates that the application of TP312 5th edition standards, where feasible and economical to do so, will reduce and limit liabilities.

These aerodrome standards include:

1. Runway surface condition reporting, and identification of surface conditions;
2. Airport surface maintenance according to priority and standards;
3. Visual aids and markings must meet standards and be replaced when faded or damaged (i.e. wind direction indicators, runway threshold marker boards);
4. Airfield lighting must meet specific requirements and standards, and required inspection must be performed;
5. Obstacles such as trees (the most common obstacles) or power poles near airports, particularly under the approach surfaces, must be surveyed and removed if they penetrate the OLS surface; and
6. Runways, runway safety areas and taxiway safety areas, must be graded appropriately to ensure that water and surface contamination drains adequately, while ensuring a smooth, properly crowned runway surface for aircraft to operate from.

Failure to adequately meet minimum aerodrome standards at certified sites can result in fines, sanctions, or the revocation of the certificate. In a worse-case scenario, the liability increases if an airport is found to not meet standards, and there is a loss of life or property.

By continuing to meet minimum aerodrome standards, TAB will continue to manage operating liabilities and limit hazards for aircraft operators.

Yukon airports have a strong safety record and it is important for TAB to maintain its focus on safety for the Yukon aviation system. An effective allocation of resources and maintenance at Class 1 and 2 sites supports TAB in meeting defined levels of service and achieving a safe and effective operating environment.

As a best practice, minimum aerodrome standards could be applied at registered sites as a basis for surface maintenance and rehabilitation design. Government of Yukon's use of SMS at registered aerodromes contributes to a safer and more effective network of airports. Government of Yukon could look at opportunities to further standardize SMS philosophy and culture at registered aerodrome sites, without the full implementation cost burden of SMS required for certified airports.

The most effective way to mitigate hazards at registered aerodromes is to monitor in the spring and again before winter to identify any new hazards that may appear with the changing seasons. Typical concerns include frost heaves, potholes and settlements, washouts, flooding, poor drainage on runway surfaces, soft spots, and trees growing into the OLS.

A multi-year program for surface inspection and maintenance at the registered Class 3, 4, and 5 sites is under development. Programs to manage OLS survey and clearing and to assess visual aids and other known aviation hazards are also being developed. These programs will be driven by regular inspections and remote data collection and will continue to advance the safety of the system of aerodromes and

airports, reduce the liabilities to Government of Yukon and continue to increase the level of service for the users.

Government of Yukon maintains the responsibility for ensuring certified and registered sites can safely support airport operations. It is important that resources continue to be prioritized to address hazards across the aviation system. Focus on high, medium and low priority hazards at all sites is critical to continue to maintain the overall safety of the Yukon aviation system.

Aircraft operators using the aerodromes have the capability to communicate hazards identified at these sites with TAB, and they should be encouraged to continue to do so. Timely reporting will help identify hazards and allow TAB to initiate NOTAMs and any required maintenance or repairs.

A safety and business case analysis should be conducted where gaps between existing operations and the earlier noted best practice of implementing minimum standards at registered sites have been identified. TAB should them quantify and prioritize the necessary investments to meet these minimum aerodrome standards and recommended best practices.

9.1.3 Environmental management in the aviation system

Environmental liabilities are common at Yukon aerodromes. This includes soil and groundwater contamination at some locations due to historically poor disposal of fuel drums, fuel spills and leaking containers. The federal government still owns and manages several environmental liabilities at the Watson Lake and Whitehorse airports; however, there are areas of potential contamination and known environmental hazards at a number of other sites throughout the system.

The Government of Yukon continues to identify, monitor and mitigate contamination concerns, and it is implementing a system-wide approach to environmental monitoring and protection. It is less costly to implement preventative environmental protection measures than it is to address environmental contamination once it has occurred. This approach must be shared between Government of Yukon and airport users. Failure to appropriately manage environmental hazards will ultimately place a high cost on future generations of Yukoners.

9.1.4 System-related organizational challenges

While the Aviation System Investment Strategy supports the identification and prioritization of the overall capital and O&M resources needed to meet aviation system demands, it alone does not achieve the desired outcomes. It is critical to have the right mix of resources supported by appropriate organizational structures and strong commitment to the Aviation System Investment Strategy's execution.

For instance, a well-trained complement of maintenance operators is required to operate sweeping, plowing and de-icing equipment. This is likewise the case for the provision of appropriate equipment with adequate spare parts and access to mechanical services. This alignment of resources and commitment to execution is achieved by sustained funding, strong programs and policies, ongoing investment in training, program mapping and proactive human resource planning.

However, current organizational processes and structures could present challenges for service delivery. A number of critical aviation functions are performed by other Government of Yukon branches or divisions. This may cause challenges because non-aviation personnel are generally less familiar with aviation business and regulatory requirements. These staff are generally not integrated into TAB systems, including SMS. There is an opportunity to align Government of Yukon staff that are involved in operating airports to the same aviation standards through internal service agreements and training.

Similarly, with capital budgeting, capital projects are often prioritized and delivered according to the capacity and business priorities of branches and divisions within Highways and Public Works. Capital projects are prioritized again according the overall business priorities of Government of Yukon as a whole. The implementation and refinement of the Investment Model for aviation investments will help support the prioritization of projects according to aviation requirements and overarching aviation system priorities.

9.2 MOVING FORWARD – THE BENEFITS OF IMPLEMENTING THE INVESTMENT STRATEGY

The formation and shaping of the Aviation System Investment Strategy and the establishment of a unique Investment Model has evolved through the following key elements:

- The Aviation System Investment Strategy will ensure alignment of future investments and use of resources with the established Policy Goals.
- The inputs gained through the public and stakeholder engagement process have informed the development of the accounts and metrics associated with the Investment Model.
- The establishment of the five classes of airports and aerodromes supports a transparent and accountable framework for maintenance, investment and levels of service within the aviation system.
- As TAB implements defined service levels for the Yukon aviation system, TAB will align governance structures and programs to ensure effective delivery of services.

The below outlines key considerations in respect of the implementation plan and phasing of the investment recommendations in the Aviation System Investment Strategy.

- Securing greater overall capital program resourcing, accompanied by predictable multi-year resourcing aligned with the SMS, asset management principles, levels of service and the Investment Model, this could lead to enhanced and streamlined management of the physical assets and the overall aviation system.
- Predictable multi-year funding and resources may support the effective implementation of the Aviation System Investment Strategy. This is particularly important given the number of high cost, complex projects anticipated during the investment period.
- Informing the public and stakeholders about how the Aviation System Investment Strategy may be used to guide investments, may lead to more effective implementation. Many of the improvements identified cannot be delivered quickly or without appropriate resourcing and expectations must align

with this. There will also be a need to adjust the plan over time, as well as a need to communicate these adjustments.
- Appropriate human and financial resources and alignment of these resources will ensure the successful implementation of the Aviation System Investment Strategy.
- Robust reporting and measurement of how the Policy Goals and Aviation System Investment Strategy are implemented, will better demonstrate the Government of Yukon's commitment to continuous improvement and transparency. The Policy Goals must be accompanied by concrete action plans on how they will be achieved, how success will be measured against the Policy Goals.
- With the implementation of the Investment Model, it is likely that projects that are driven by transitory or low needs will not be approved, meaning that other non-discretionary projects required to support the core functions of the system will be appropriately prioritized.
- The success of the main gateway to Yukon at ENWIA drives the success and reputation of the entire aviation system. The Government of Yukon should assess the opportunities to update its airport amenities and facilities to ensure it does not lag behind the expectations of the public and in comparison to other gateway airports in Canada.
- There is an opportunity for Government of Yukon to work with stakeholders to determine where additional revenue generation within the aviation system could support or contribute to desired services for stakeholders and system users.
- Appropriate levels of investment in the aviation system are needed, or it may put pressure on Government of Yukon to consider other organizational models for managing airports and aerodromes or to downgrade service levels within the aviation system as needed.
- Implementation of priority discretionary investments identified in the Aviation System Investment Strategy may increase public and stakeholder confidence and build goodwill between Government of Yukon and stakeholders. Discretionary investments create the potential for enhancing the overall airport system and the ability to maintain and attract economic gains and benefits.
- An open and honest dialogue between Government of Yukon and stakeholders will allow for the Aviation System Investment Strategy to move forward. The Government of Yukon and stakeholders need to consider the constraints and opportunities of working in different operating environments.

9.3 RECOMMENDATIONS

The following is a summary of the recommendations in section 9.0:

- 9-1 - TAB should integrate the Investment Model and its tools with SMS to align it with overarching aviation business and regulatory requirements and support integration into Government of Yukon capital prioritization processes.
- 9-2 - Increase understanding of the SMS framework within Government of Yukon as well as understanding about how SMS requirements guide TAB decision-making.
- 9-3 - For enhanced management of aerodromes, TAB should continue to integrate SOPs into SMS to improve monitoring and reporting of hazardous conditions, mitigation measures, and maintenance and repair trends.
- 9-4 - Government of Yukon should continue to consistently apply and meet minimum aerodrome standards to manage operating liabilities and hazards.

- 9-5 - Look at opportunities to further standardize SMS philosophy and culture at registered aerodrome sites, without the full implementation cost burden of SMS required for certified airports.
- 9-6 - Complete multi-year program for surface inspection and maintenance at Class 3, 4, and 5 sites.
- 9-7 - Complete programs to manage OLS survey and clearing, assess visual aids and other aviation hazards.
- 9-8 - Aircraft operators using the aerodromes should be encouraged to continue to communicate hazards identified at sites to TAB and receive feedback on actions taken or scheduled.
- 9-9 - Continue to improve the system-wide approach to environmental monitoring and protection measures for Government of Yukon and airport users to limit the impacts and occurrence of environmental contamination.
- 9-10 - Within the Government of Yukon, clarify the vision and goals for the aviation system in order to continue to build shared accountability and coordinate resources.
- 9-11 - Report and measure how the Policy Goals and Aviation System Investment Strategy are implemented to demonstrate the Government of Yukon's commitment to continuous improvement and transparency.
- 9-12 - Government of Yukon should continue to assess the opportunities to update amenities and facilities at airports (e.g., ENWIA) to ensure airports do not lag behind the expectations of the public.
- 9-13 - Government of Yukon should consider conducting further business analysis on priority discretionary investments identified in the Aviation System Investment Strategy to build confidence and build goodwill between Government of Yukon and stakeholders.
- 9-14 - Work together with industry and stakeholders to explore opportunities for additional revenue generation within the aviation system.

10.0 OPTIONS ANALYSIS AND RECOMMENDATIONS

The Yukon aviation system's overall performance and ability to invest and maintain its network of airports and aerodromes depends on a transparent and accountable process for prioritizing infrastructure and service demands and requests. Other success factors include:

- Utilizing multi-year budgeting approaches to properly plan and coordinate capital projects, including increased operating and capital budget delegations to regional and site levels;
- Efficient decision making and approval processes, to expedite the ability to achieve results and deliver on commitments and priorities. This should include the ranking of medium-to-low priority items or medium-risk events that are often deferred and create stakeholder tensions because of the lack of action;
- Expanding revenue generating initiatives (aeronautical and non-aeronautical) that funnel funds directly back into the aviation system to improve user experience and achieve desired levels of service; and
- The capital cost and expenditure side of the equation is much of the focus in the Aviation System Investment Strategy but as noted earlier, the overall budget impacts for the aviation system and the Government of Yukon's investments can be offset by external cost recoveries and alternative service delivery opportunities.

10.1 ALTERNATIVE SERVICE DELIVERY OPPORTUNITIES

There are alternatives to the government funded and operated model that exists today in Yukon' aviation system. These include Public Private Partnerships (P3s), an airport authority model, contracting out a portion of services (such as airports in Canada operated by Vantage Airport Group like Kamloops and Fort St. John), airport commissions or a combination of these. There are examples of these alternatives that have been explored or used by Canada's other territorial governments.

These include P3 contracting and an airport authority consideration. Specifically, the Nunavut Government used a Stantec/PriceWaterhouseCooper team to assess the infrastructure deficit at its major gateway in Iqaluit and the cost/benefits of a P3 versus continuing to provide the capital and operating budgets through government appropriations on an annualized basis. There was an inability to fund a large amount of capital associated with deferred or capacity-driven infrastructure requirements. Stantec estimated these requirements at $300 million (including a major redevelopment of its air terminal building). The federal program, P3 Canada, contributed to the re-development of the airport equivalent to 25% of overall costs, or $77 million, to be paid out over the life of the P3 contract. The P3 decision was determined to be a good opportunity on a number of levels and the Government of Nunavut moved forward with this service delivery shift and tendered a 30-year contract to Design, Build, Finance, Operate and Maintain (DBFOM) for the Iqaluit Airport.

This contract was awarded to a consortium of finance companies, design team members and an airport operator with northern experience. It required that there be local and indigenous hiring associated with the contract award. This contract has had a significant impact on Nunavut and its capital city of Iqaluit in "catching up" on its infrastructure deficit and bringing in operating and maintenance best practices while

still retaining government ownership of the airport. The government's role essentially shifted to being the lessor to support Transport Canada in regulatory compliance while also ensuring employment provisions for citizens without being the employer.

The opportunity for this alternative would be best suited for ENWIA. The challenge in this alternative is associated with the infrastructure investments made at the front end of the 30-year contract. Although this is a positive, it has to be recognized that the operator will then operate and maintain the infrastructure for the balance of the term and assets would depreciate without further investment unless this is well structured in the contract. There has to be strong oversight that ongoing maintenance is performed to ensure the assets turned over at the end of the 30 year period are in good condition and not needing immediate replacement. Alternatives to this option could also include a P3 structure that would require the operator to provide the investments and upgrades to a "sister" airport/aerodrome or a cluster of aerodromes. This could include Cousins Aerodrome (and others in the vicinity) in the mix.

The Yellowknife International Airport has been slowly transitioning to an airport authority model that would make it independent from the Government of Northwest Territories (GNWT) but bound to meet all federal regulations and certification requirements. In its case, the intent would be for the airport authority to take out a long-term lease with the GNWT to operate the airport and, unless negotiated as part of a transfer, would be require it to be self-sustaining. The government and airport introduced an Airport Improvement Fee (AIF) in 2013 and there has been significant investments made at Yellowknife that are noticeable to the travelling public.

Other service delivery models are operator contracts for airports that could also include oversight for aerodromes that are regionally linked but without passenger traffic.

The Government of Yukon should also consider the benefits and opportunities of transferring some service delivery or maintenance to parties outside Government of Yukon.

It is recommended that Government of Yukon investigates these various service delivery models to establish the feasibility of these models for the Yukon aviation system.

Stakeholder and public inputs

We heard during the engagement period that there is general support for the Government of Yukon to pursue alternative maintenance delivery approaches for airports, aerodromes and airstrips. This could include working closely with aviation users, communities, local contractors and First Nations or municipal governments to maintain airports/aerodromes/airstrips. Maintenance services could include snow plowing, tree clearing, or cleaning service in terminals.

Although partnerships were generally supported, most respondents did not want to see the Government of Yukon release ownership of airports/aerodromes/airstrips.

10.2 REVENUE GENERATION OPPORTUNITIES

The earlier section on Benchmarking of Fees and Charges highlights how different the Government of Yukon's approach to fees and charges are in contrast to similar sized airports and northern airports and aerodromes in Canada (i.e., significantly lower or absent - see Section 3.2 for examples). The public feedback, including from the aviation community, highlights a concern about increasing fees and charges and the possibility of this resulting in higher costs of travel and possible market contraction.

The public input received on fees or charges highlighted that consideration for any increases or new fees need to directly relate to tangible and visible improvements in infrastructure, systems, processes and/or services. This is an important distinction as it clearly sends a message that revenues gained should not go into general government revenues but be invested back into improving the aviation system and operations for carriers and passengers.

Examining the fees and revenue environment in Yukon is an opportunity to support the mandate of providing a safe and secure aviation environment and promote a positive travel experience. It is recommended that the Government of Yukon examines the role of future fees and charges in Yukon to align with industry and system needs.

It is recommended that the connection between revenues and infrastructure and service improvements be clear to the public and aviation community if the Government of Yukon considers any future fee changes. Recommended discretionary investments that are linked to revenues could not only improve the infrastructure through increased investment but can address level of service and passenger experience improvements.

There is elasticity in pricing and market demand but markets are impacted by level of service and experience factors as well. Improvements in level of service at other gateway airports have contributed to new revenues and an improved passenger experience. TAB should examine the potential positive market impacts of any improvements in the key markets of Whitehorse and Dawson.

For Whitehorse in particular, the success of this main gateway to Yukon drives the success and reputation of the entire aviation system and therefore revenue generation opportunities should support investments that upgrade amenities and facilities to meet public expectations and keep pace with offerings at other gateway airports in Canada.

As managing amenities and non-aeronautical revenue opportunities have operational costs, there is currently a risk that, with fees being stagnant, the noted infrastructure deficit, and the fact that costs for managing the system continue to rise with inflation, it may become less financially sustainable for Government of Yukon to invest in developing non-aeronautical revenue streams and user amenities. This may be particularly true for opportunities that involve significant sunk infrastructure costs. This presents a potential lost opportunity to enhance service delivery at Yukon airports.

It is recognized that at this time, full cost-recovery is not a practical objective for ENWIA or other Yukon airports or aerodromes. It is important to note that the Yukon aviation system would likely need government funding in spite of any potential revenue. Also, there are likely positive impacts from the current low fee environment that should be considered and further studied, such as impacts on the tourism industry.

10.2.1 Aeronautical revenues

Aeronautical revenues have been the limited source of revenue for airports and aerodromes in the Yukon aviation system. The fee categories found at the certified airports should include landing fees, general terminal charges, aircraft parking, fueling and other aviation services. As noted earlier, the Government of Yukon has minimal revenue generated through landing fees and does not charge a General Terminal Charge or other ancillary fees for its airports or aerodromes.

Airports typically maintain and regularly update their aeronautical revenues in line with inflation and the cost to provide airport/aerodrome services and facilities; this is important for maintaining competitive position while adopting a user-pay philosophy where customers pay their fair share for use of services provided.

The Government of Yukon has an infrastructure deficit to close and the benchmarking review indicated that there are aeronautical revenue opportunities to address some of the gaps. The approach to any consideration of aeronautical revenues has to balance the benefits to be accrued with the increased ability to provide a safe and positive travel experience along with the overall cost to Yukoners to travel. It is recommended that the Government of Yukon consider the class of airport or aerodrome if implementing any revenue initiatives as well as clearly communicate the relationship between revenues gained and planned project investments to the public.

Most larger airports and international airports in Canada have added an AIF to pay for infrastructure to meet both capacity demands and passenger and process improvements. The AIF also has a program requirement to relate the projects invested in with the AIF dollars. As noted earlier in the Aviation System Investment Strategy, when an airport has an AIF the airlines do collect an administration fee for the inclusion of the AIF on the airline ticket for a seamless process for the passenger. Implementing an AIF at any airport needs to be thoroughly assessed and have a cost/benefit analysis completed.

A General Terminal Charge could be introduced to support new terminal investments such as capacity enhancements, level of service upgrades and post COVID-19 safety processes and spatial distancing. Related to facilities, the General Terminal Charge is best targeted to ENWIA and Dawson City Airport. It could be charged to the air carrier based on number of seats on a passenger aircraft arriving and the use of the air terminal building (ATB). This limited or temporary fee could be collected and invested into required facility upgrades needed to provide the safe travel environment and amenities expected at these sites. The design opportunity could also stimulate a "sense of place" in these valuable Yukon tourism gateways.

The ability to increase landing fees in a broad and simple format of $3.00 per 1000 lbs would still position Yukon as having the lowest cost environment of any regional or international airport in Canada. Other aeronautical fees are related to fueling and aircraft parking. Aircraft parking fees as well as fueling concession fees at ENWIA are far below other markets. The end cost to air carriers can be kept lower through continuing the fuel tax approach exemption on the international flights and the competitive tax on other flights.

Landing fees for all scheduled passenger service certified airports (currently Dawson, Old Crow, Watson Lake and Mayo) could be considered but with a greatly reduced fee structure. It would be recommended to not implement any landing fees at the Class 3, 4 and 5 sites due to the administrative burden of collecting such fees, and the low volume of aircraft movements.

Stakeholder and public inputs

During engagement the public highlighted concerns about higher travel costs. Stantec heard feedback that the Government of Yukon should increase governance, management and operational efficiency as well as explore existing revenue generation methods before introducing new fees; however, there was a caveat: the aviation community is prepared to consider some aeronautical revenue initiatives that would directly link to improved infrastructure or level of service at the sites they are using. There also seemed to be a greater sensitivity to an AIF.

10.2.2 Non-aeronautical revenues

There has been a growing trend over the past two decades, both in Canada and globally, to focus on the development and growth of non-aeronautical revenues versus aeronautical revenues. Non-aeronautical revenues can offset operational costs while enabling airports to maintain a competitive position in the wider aviation market.

The trend in airport management is to increase the non-aeronautical revenues at airports and aerodromes to reduce the risk associated with the passenger activity fluctuations. These revenues, such as land rent, are those that are not directly tied to aviation or passenger activity and volumes. The approach is one that diversifies the revenue portfolio for an airport with the cyclical nature or downturns in aviation activity as is being experienced on a global basis due to COVID-19. Some non-aeronautical revenues, such as retail concessions, have also been impacted due to resistance to personal contact in many airports in Canada and globally.

There are potential opportunities for Government of Yukon to consider opportunities for the development of non-aeronautical revenues, particularly at ENWIA. Often such opportunities – expanded retail, food services, and passenger amenities – can bring in revenues while enhancing the passenger experience. As the main gateway to Yukon, the amenities, services offered and overall passenger experience impact the reputation of the entire aviation system.

Areas that may have opportunity for greater non-aeronautical revenues in Yukon include: land leasing, advertising in terminals and on airport property, concession opportunities at the certified sites and other cost recovery mechanisms such as vehicle parking fees.

It is recommended that in addition to looking at its current fee structures, and potential positive impacts of level of service enhancements, TAB should at the same time examine specifically which additional revenue opportunities would be viable from a business perspective. While the public engagement indicated demand for increased services and amenities for passengers and users, that demand must be sufficient to allow the business offering that service to be profitable and to generate revenue or at the very least be cost neutral to Government of Yukon.

For this reason, Government of Yukon should first examine smaller, low cost service upgrades that do not require significant infrastructure investment or increased maintenance or administrative costs. These include items like vending machines or airport advertising opportunities. This could support greater passenger experience while minimizing risks to business and Government of Yukon.

Government of Yukon has been dedicated over the past five years to overcome the regulatory restrictions to creating new development and land use plans to accommodate current and future demand for leased lots.

The land leasing opportunity is a significant one for Yukon and is available to many of the airports and aerodromes. There are challenges related to legislation which are currently being addressed on an expedited basis to improve the operations and increase private investment at the airports and aerodromes.

Government of Yukon is currently developing land use and up-to-date zoning plans for all airports and aerodromes to ensure a coordinated effort in ensuring land is reserved for current and future aviation operational demands and future land development opportunities are realized. This work will identify the lands that can be designated as airside access with a higher value and rate, as well as non-aviation lands that can be groundside and not require airside access.

It is suggested that Government of Yukon continues to review the fee structure and financial sustainability of airport and aerodrome lease land opportunities. It is suggested that the Government of Yukon reviews the business case for land development projects and considers models where land development projects can be cost neutral or provide revenue to support the funding of critical public infrastructure projects (e.g. electrical upgrades, runway resurfacing).

TAB should also retain all land for ensuring compatible use on its property but could grant longer term leases to financially qualified aviation businesses with sound business plans. Subject to land constraints, any long-term leases for non-aviation purposes must be carefully considered in order to not negatively impact aviation businesses and to not infringe on the airport or aerodrome's primary purpose of providing a safe operating environment for aviation. The benefit of leasing revenue is that it is not tied to the number of flights or passengers at a site but is set on a multiple-year basis with fixed monthly fees.

Revenue generated through vehicle parking is important and common at airports throughout Canada, Increased parking costs may also have a positive effect on local taxi services and/or provide a business opportunity for a shuttle service by encouraging travellers to use alternative modes of transportation. It may also discourage people from using airport parking for long-term storage, which will increase parking availability.

The area of cost recovery is an often overlooked opportunity and one that is not unwelcome to a tenant or stakeholder. This was noted in the Benchmarking section (section 3.2) earlier and there are services that can get added and passed along to the end user where they see good value and generally are satisfied that it is a benefit for them. Some of these areas are providing snow clearing or power for aircraft parking.

Stakeholder and public inputs

The public and stakeholders said that the Government of Yukon should first increase governance, management, and operational efficiency as well as explore existing non-aeronautical revenue generation methods (e.g., land development, leasing, advertising in terminals) before introducing any new fees.

Members of the aviation community said that leasing demand and lack of available lots to lease is a major concern and missed opportunity. Aviation tenants are prepared to not only invest in a facility at an airport or aerodrome but consider leasing land commensurate with the level of services provided. The feedback highlighted frustration in not being able to go ahead with plans and investments in facilities and equipment due to government red-tape.

There is demand for leasing land to an extent that alternative approaches (such as a lottery) to award leases are being developed. Aviation stakeholders seem to be prepared to pay if they see value. The renewal of public disposition models and the leasing of land commensurate with the level of service will ensure appropriate investment in airport lands.

The opportunity to expand revenue through advertising and enhanced amenities such as food services and retail offerings aligns with feedback heard in respect to improving the passenger experience at airports and supporting the tourism sector.

Particularly at ENWIA and Dawson City Airport, there are potential opportunities for local business to showcase themselves in terminals (e.g., accommodations, entertainment and tours, restaurants, shops) and to create more welcoming gateways to Yukon. Passengers also noted amenity improvement should include larger lounge areas with comfortable seating and enhanced general aesthetics with the inclusion of more local art and culture.

10.3 GENERAL RECOMMENDATIONS

The Aviation System Investment Strategy and recommendations are primarily aligned with an improved understanding of what it takes to manage the aviation system and a transparent process to prioritize the challenging decision making required for infrastructure in such a diverse operating environment. As noted earlier, the aviation system could be greatly enhanced with some adjustments to the existing operating structure and roles, its oversight and decision-making authorizations.

10.3.1 Governance

Government of Yukon's aviation system of 28 airports/aerodromes can be effectively managed and operated through the current governance model with the adoption of clear classes of certified airports and registered aerodromes to guide a consistent and accountable level of service. Alignment of service levels

and capital investment is required along with improved operating budgets, planning and informed decision-making associated with level of service expectations.

Aviation infrastructure in Yukon provides access and support to many people in the territory and is an essential service. The increased cost envelope to address the noted deficiencies can be partially offset in a targeted and strategic "user pay" approach that adds value for system users and does not overly burden residents with additional cost or taxes.

Clearer collaboration between internal and external service providers regarding navigation (Nav Canada), Medevac, Wildland Fire Management, tourism and policing requirements would improve the service delivery and planning of investments as well. TAB has oversight responsibilities over Yukon's airports and aerodromes. Where the resource support (such as planning, engineering, air service development and vertical infrastructure responsibilities) is provided by another department or external partner, TAB should ensure that appropriate service agreements are in place and that services from providers align with aviation standards and adhere to defined performance metrics. TAB should review the effectiveness of the service agreements and performance metrics in three years, and if the services provided are not meeting expectations, the Government of Yukon should consider alternative approaches to the provisioning of these services.

10.3.2 Maintenance

The aviation system benefits from the establishment of classes of airports/aerodromes. This directly relates to the implementation of a regular maintenance program with level of service standards established by the class of aerodrome. The certified airports in the system have a legislated requirement and regular inspections from Transport Canada to fulfill its certification obligations or risk the possibility of fines, sanctions or the revocation of the certificate. The registered sites also require regular maintenance and a response to repairs and rehabilitation requirements as a best practice. There are safety risks associated with not addressing site issues and, as a minimum, there should continue to be a Notice to Airmen (NOTAM) published for pilots on any airfield or safety issues at an aerodrome.

Government of Yukon should standardize its maintenance approaches based on the Aerodrome Classification System and the associated Passenger and User Service Levels. To properly implement this class-driven level-of-service environment requires site-associated equipment, improved storage facilities, and regular maintenance upkeep.

10.3.3 Safety

The existing safety oversight team for the airports and aerodromes is very knowledgeable and administratively adept at dealing with the CARs and the Transport Canada requirements for a fulsome SMS. The challenge is that while there is some capacity to address the risks and liabilities in the aviation system, additional resources are required to continue to support and grow the organization's SMS program and to address priorities in a timely manner.

Government of Yukon should review its current safety management program to ensure that the staffing and resourcing levels are in alignment with the capacity needs to respond on SMS items in a timely manner.

This culture of safety needs to be championed by a dedicated team and funded to a level that can appropriately respond to the identified issues.

10.3.4 Other recommendations

TAB should pursue a consistent decision making process, both by utilizing the Investment Model and establishing a clear planning cycle for review of investment decisions. This will improve quality and consensus on major items such as funding, revenues and implementation programs.

Dedicated resources and personnel to support the adoption of the Investment Model, advance the program recommendations as well as manage stakeholder relations activities will help the Government of Yukon to operationalize and implement the Aviation System Investment Strategy.

10.4 RECOMMENDATIONS

The following is a summary of the recommendations in section 10.0:

- 10-1 - If the Government of Yukon updates fees, the connection between levels of service and fees must be clearly communicated to the public and aviation community in advance of any changes.
- 10-2 - Consider introducing a General Terminal Charge to support new terminal investments such as capacity enhancements, level of service upgrades and post COVID-19 safety processes and spatial distancing at ENWIA and Dawson City Airport.
- 10-3 - Continue development of non-aeronautical revenues at certified airports, particularly at ENWIA. Opportunities to consider are land leasing, advertising, space rentals, concession opportunities and other cost recovery mechanisms.
- 10-4 - Examine potential non-aeronautical revenue opportunities for their viability from a business perspective; consider pursuing opportunities that are profitable to business and cost-neutral or revenue-generating for Government of Yukon.
- 10-5 - Explore smaller-scale non-aeronautical revenue streams that do not require extensive infrastructure upgrades or management but could potentially enhance passenger experience while minimizing financial risks to Government and Yukon and businesses.
- 10-6 - Yukon government should retain all land for ensuring compatible use on its property but can grant longer-term leases to financially qualified aviation businesses with sound business plans.
- 10-7 - Review the business case for land development projects and consider models where land development projects can be cost neutral or provide revenue to support the funding of critical public infrastructure projects
- 10-8 - Investigate various service delivery models (public private partnerships, an airport authority model, contracting and/or combinations) to establish the feasibility of these service delivery models for the Yukon aviation system.

- 10-9 – Increase collaboration between departments regarding Medevac, Wildland Fire Management, tourism and policing requirements to improve the service delivery and planning of investments.
- 10-10 - Champion a culture of safety and review the current safety management program to ensure that the staffing and resourcing levels are in alignment with the capacity needs to respond on SMS items in a timely manner.
- 10-11 - Do not implement any landing fees at the class 3, 4 and 5 sites due to administrative burden of collecting such fees and the low volume of aircraft movements.
- 10-12 - TAB should ensure that appropriate service agreements are in place and that services from providers align with aviation standards and adhere to defined performance metrics. The effectiveness of the service agreements should be reviewed in 3 years.

10.5 CONCLUSION

Yukon's airports and aerodromes are vital to life in the North. The aviation system brings friends and family together, supports Yukon businesses and communities, and enables the delivery of critical emergency services.

Yukon's Flight Path: 2020-2030 Aviation System Investment Strategy builds on years of technical data, research and input from the aviation community, governments and public, and takes a critical look at infrastructure, services, investments and potential revenue generation opportunities to address the evolving needs of the aviation sector.

10.5.1 Investing for a sustainable aviation system

The Aviation System Investment Strategy will help guide the Government of Yukon to continue to make strategic investments in the aviation system – from the major gateway at ENWIA to essential remote aerodromes used by an active general aviation community – in an accountable and transparent manner.

The Aviation System Investment Strategy prioritizes investments required for safety and regulatory compliance, first and foremost, while also ensuring the ability to support community and emergency services, economic development, tourism and mining, and regional programs. The foundational elements for managing and investing in the system effectively and sustainably include:

- Implementation of the proposed classification system and Passenger and User Service Levels for airports and aerodromes;
- Regular asset maintenance baseline established on the class of aerodrome;
- A multi-year planning approach;
- Implementation of the Investment Model;
- Decision-making guided by the Policy Goals; and
- Ongoing communication and collaboration with stakeholders.

10.5.2 Next Steps

The Aviation System Investment Strategy identifies many necessary expenditures to maintain the aviation system over the 10-year investment period; there is much work ahead for the Government of Yukon.

Implementing the recommendations and investments in the short, medium and long term will require dedication as well as a significant commitment of capital and resources estimated at between $217 million and $356 million for capital and at least approximately $15 million per year for O&M expenditures over the 10-year period. There are also possible discretionary investments of between $42 million and $71 million that could potentially provide benefits to the aviation system.

Furthermore, implementation will require ongoing collaboration between governments, communities, aviation industry, stakeholders, and citizens. This is important given the unprecedented challenges for the aviation industry as a result of COVID-19. Only time will tell what the full impacts will be and what is required to recover and rebound.

With the Aviation System Investment Strategy as guidance, the Government of Yukon is positioned to adapt planning and investment activities to address its infrastructure and program requirements to support the safe and effective operation of the aviation system over the next 10 years.

APPENDICES

Appendix A

WHAT WE HEARD

Yukon

What We Heard

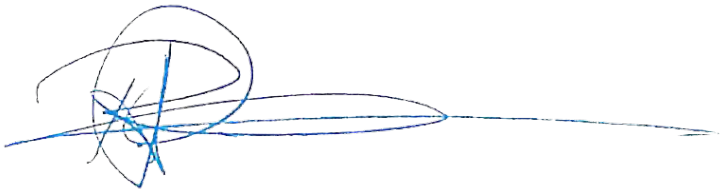
Yukon's Flight Path:
Aviation System Investment Strategy for 2020-2030

Message from the Minister

Yukon's Flight Path: Aviation System Investment Strategy for 2020-2030 is a plan to guide future investments in the aviation system. The strategy will be completed by taking a critical look at infrastructure, services, and processes and proposing investments that will maintain safety, meet national aviation regulations, and enhance users' experiences. The strategy will build on years of technical data, research, and stakeholder feedback to show where Yukon aviation is now and where it can go over the next decade.

This report outlines what we heard during our engagement period and what issues matter most to those who were engaged. Between November 2019 and February 2020, we heard from over 200 members of the aviation community, several First Nation and municipal governments, and many members of the public about how Yukon's aviation system is used, how it's meeting expectations, and what opportunities users see for the future. All feedback received has been incorporated into this report and will be invaluable to the creation of the strategy, anticipated for completion Fall 2020.

As Minister of Highways and Public Works, I would like to thank everyone who participated in this engagement; the insight you shared will help guide decision-making moving forward and showcases our shared goal of working together to support the wellbeing of all Yukoners.



Richard Mostyn
Minister of Highways and Public Works

Project information

Yukon's airports and aerodromes are vital to life in the North. Aviation connects us to one another and the larger world outside. Our aviation system brings friends and family together, supports Yukon businesses, enables the delivery of vital emergency services, and connects Yukon communities.

Activity

All locations may support tourism, mining, policing services, and medevac as needed.

Port of Entry
Has a Canada Border Services Agency border-clearance process

Medical Evacuation (Medevac)
Air ambulance service providing timely, efficient movement and en route medical care

Wildland Fire Management
Wildfire suppression using specially designed firefighting aircraft

Schedule Air Service
Publicly-available passenger air transport service with a published schedule, charged per seat.

Certified Airport
Meets specific criteria, regulations, and standards from Transport Canada with ongoing inspections.

Registered Aerodrome
Operates in compliance with Canada Aviation Regulations with periodic inspections.

Airstrip
A runway maintained for takeoff and landing of aircraft with no other permanent infrastructure at the site.

Note:
Yukon government does not own or manage any water aerodromes.

Engagement overview

Who

To inform Yukon's Flight Path, we did extensive engagement to gather input from all Yukoners including passengers, First Nation and municipal governments, and various organizations. In addition, those with more direct connections to Yukon's aviation system (e.g. pilots, aviation-based businesses) were specifically engaged to provide their insight and expertise; in total, **over 200 members of the aviation community provided input to this project.**

Members of the aviation community

Those relying directly on Yukon's aviation system:

- *pilots,*
- *private businesses relying on aviation (e.g. mining, fly-in tourism),*
- *private sector aviation businesses (e.g. airline or helicopter companies, aircraft maintenance), or*
- *public services that rely directly on aviation (e.g. medevac, wildland fire management, policing services).*

How

We used newspaper, social media, and radio ads; an infographic; and community posters to let the public know about the project and how they could provide input. We also used telephone calls and e-mails to reach out to First Nation and municipal governments, members of the aviation community, community and industry associations, and regulators to further encourage participation. Feedback was collected through in-person meetings, telephone interviews, stakeholder interview guides, public events held in 9 Yukon communities, and an online survey through EngageYukon that ran from November 20 to February 17 and collected **500+ responses**.

What

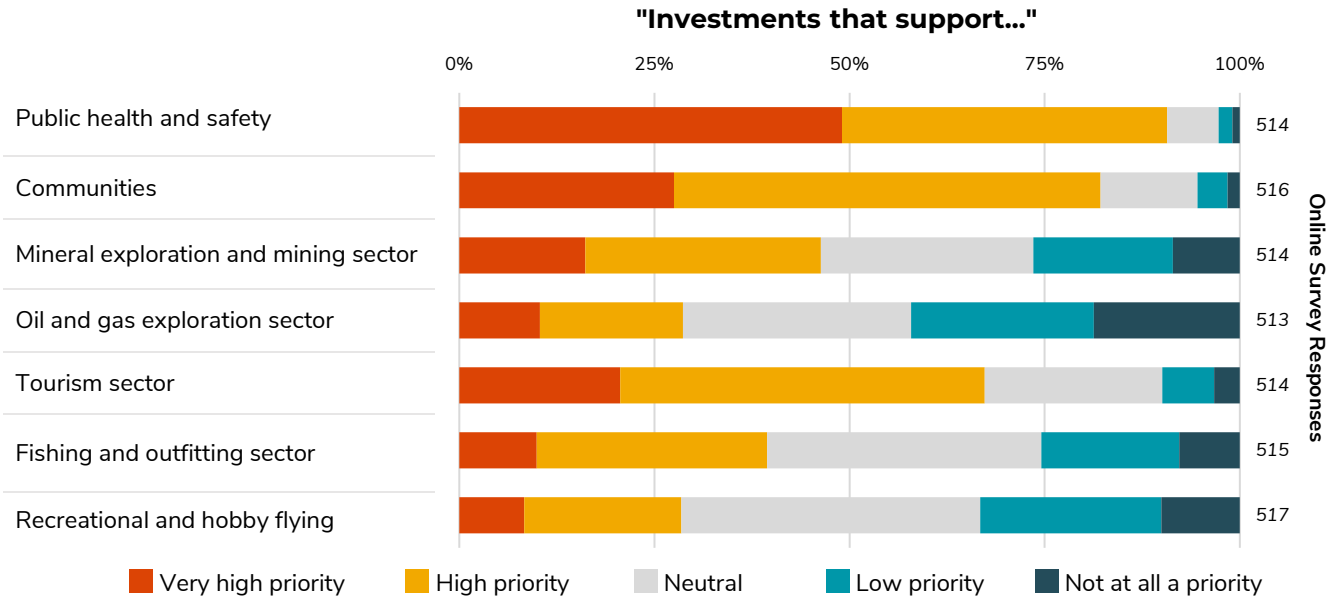
During the engagement process for Yukon's Flight Path, we asked respondents (e.g. members of the aviation community, passengers, governments, and other stakeholders) to provide input on four topic areas:

- Priorities
- Expectations and areas of improvement
- Opportunities and challenges
- Financial sustainability

Priorities

We asked, “how should the Yukon government prioritize aviation infrastructure and services investments?”; what we heard was:

- **Yukon’s aviation system is valued for its many roles.** Respondents said that the aviation system provides important emergency services (e.g. medevac services, emergency preparedness, wildfire management, RCMP), supports many different economic opportunities, and allows relatively easy movement of people and cargo.
- Respondents believed that the **most important decision-making factor should be health, safety, and security** of all users and Yukoners.
- When asked specifically which investments should be prioritized, the top 3 investments identified in the survey were those that support:
  - **public health and safety** (e.g. medevac, wildland fire management, policing),
  - **communities** (e.g. access and cargo deliveries to isolated or remote communities), and
  - the **tourism sector.**



Expectations and areas for improvement

Expectations

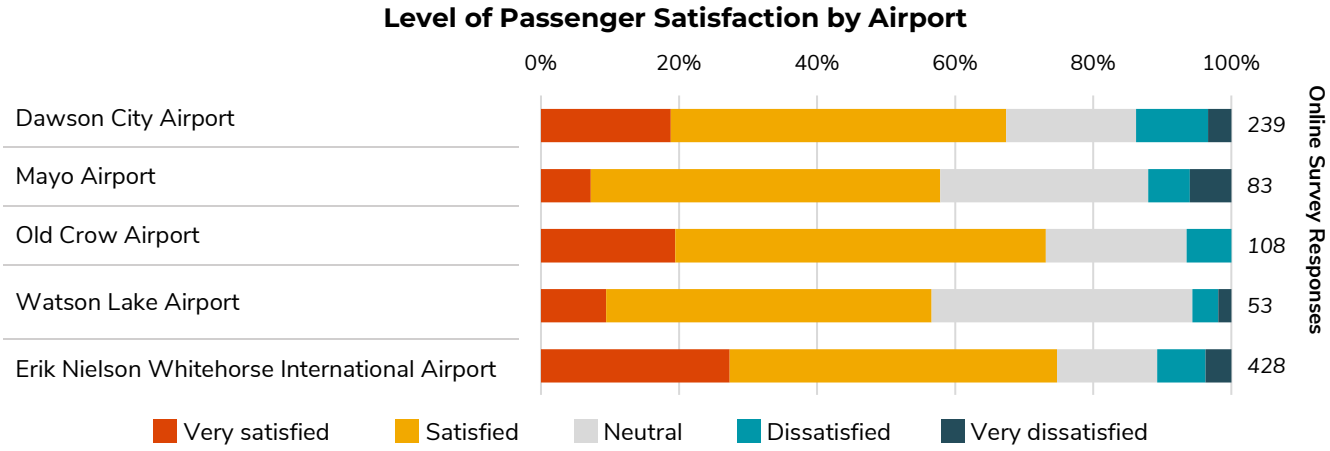
We asked how Yukon's aviation system was meeting the expectations of respondents; what we heard was:

- Respondents expect:
  - all airports/ aerodromes/ airstrips are safe for users and nearby residents.
  - all airports/ aerodromes/ and airstrips will remain open and available for public use.
  - Yukon's aviation system will continue to be used to protect Yukoners' health and safety.
  - the future of Yukon's aviation system will not unfairly increase their cost of living.
- Expectations are different for each airport/ aerodrome/ airstrip.
- While levels of satisfaction varied by airport/ aerodrome/ airstrip, respondents said Yukon's aviation system was generally meeting their expectations.

> *"All Yukoners have a right to access to services that rely on airports - they are part of the safety of our territory and increased access will also make tourism options more viable and allow residents to live a better life in Yukon - there has to be equal access..."*

Passengers experience Yukon's aviation system in a much different way than members of the aviation community. While passengers fly into many of Yukon's 28 airports/ aerodromes/ airstrips; Yukon's certified airports are of primary focus.

As shown below, online survey responses showed **passenger satisfaction at Yukon's airports ranged from 58% to 75%** with the highest level of passenger satisfaction being at the Erik Nielsen Whitehorse International Airport.

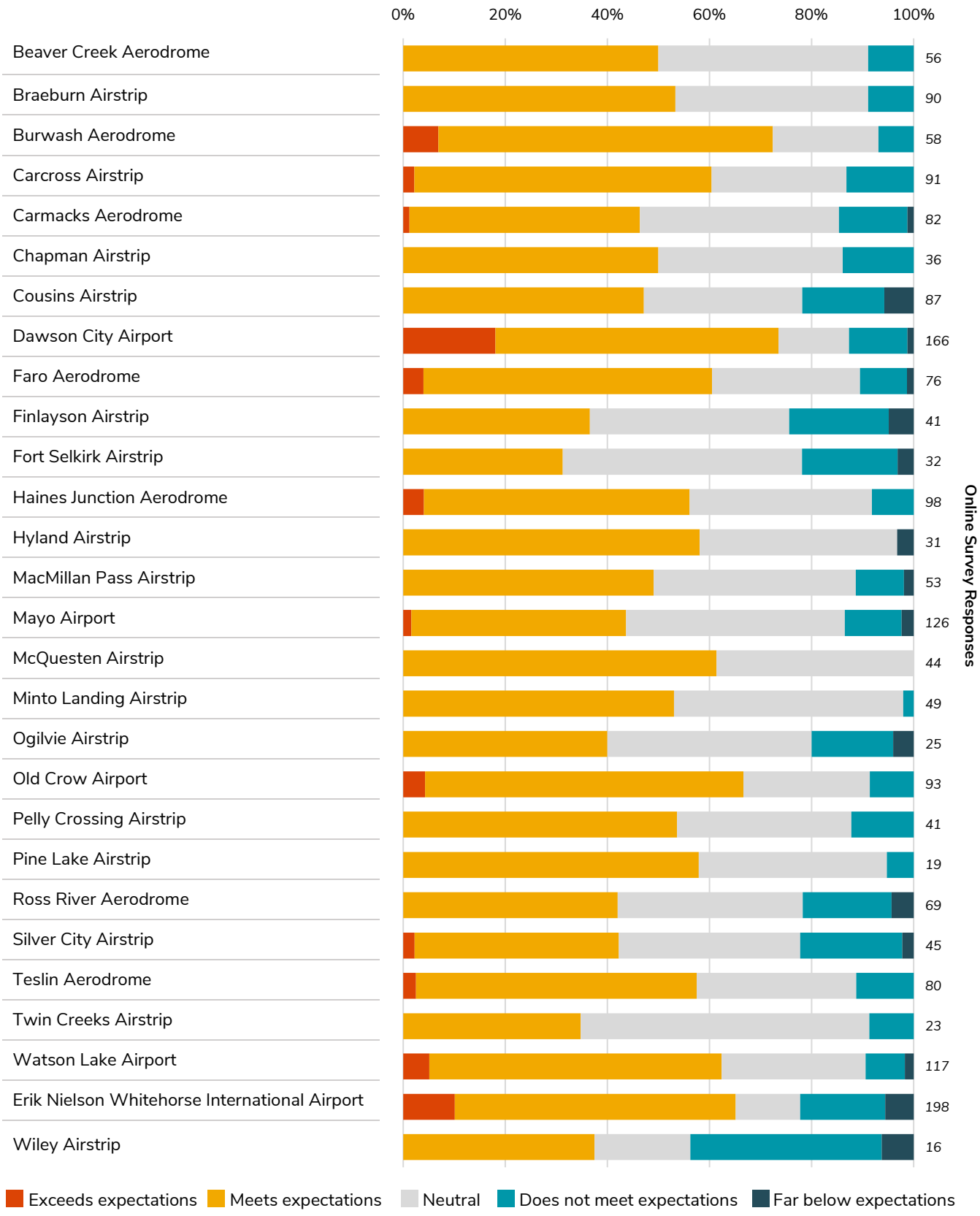


Although the online survey gathered passenger feedback, 95% of responses were Yukon residents; as such, it does not represent the opinions of all visitors.

Members of the aviation community are users of Yukon's aviation system and have detailed understanding of airports/ aerodrome/ airstrip operations and requirements.

As shown on the next page, online survey responses showed that **the level of satisfaction members of the aviation community have with Yukon's airports/ aerodromes/ airstrips ranged from 31% to 73%** with the highest level of positive responses being at the Dawson City Airport.

Members of the Aviation Community's Level of Satisfaction by Airports/ Aerodromes/ Airstrips



Areas for improvement

When asked about what **passengers** would like to see improved at airports, we heard:

- Enhanced **passenger amenities,** specifically food services. They felt that providing food services at Yukon's airports was a good way to encourage passengers to arrive early for flights and was especially important due to how often flights are delayed. Access to food services was particularly important past security.
- Other desired passenger amenities included WIFI, televisions, play areas, shopping opportunities, or other means of **entertainmen**t.
- Larger **lounge areas** with more comfortable seating as existing lounge areas were described as uncomfortable, poorly designed, or not well maintained.
- Enhanced **general aesthetics** and design of terminals such as airline check-in areas and washrooms. They also think that airports should showcase local culture and be more welcoming gateways to Yukon.

> *Food service inside security at Whitehorse would be appreciated. And the signage at Whitehorse airport is really confusing and too small to read while driving. Passenger waiting area at Dawson is too small and needs way more chairs. Old Crow airport is amazing for travelers. Please put the priority on keeping our airports safe and convenient.*

> *It mostly serves its purpose but needs some tweaks. Cosmetics would go a long way. The tourism offer in Yukon is still hazy and the airport should be a major component of a new in integrated tourism strategy rather than standalone, aside from ensuring food service and basic amenities.*
> *[ENWIA]*

Passengers shared the same themes for all airports but agreed that improvements should be focused at the Erik Nielsen Whitehorse International Airport.

When asked to review airports/ aerodromes/ airstrips that they use, **members of the aviation community** provided **more than 600 specific comments about** what they would like to see improved. Key recommendations were:

- **Enhanced maintenance** including snow clearing, grading, tree-clearing, and runway repairs.
- Better **navigation, communication, and weather aids.**
- Access to more **aircraft services** such as fuel, plug-ins, aircraft parking, and tie-downs.
- Access to terminal buildings and construction of new **facilities** such as float plane bases, picnic areas, campgrounds, or outhouses.
- A focus on **land development and leasing** opportunities and changes to the existing application and approval process.
- **Enhanced passenger amenities**, specifically at ENWIA.
- **Shared technology for airlines** such as shared check-in desks and baggage drop areas, self-serve kiosks, common use terminal equipment, and flight information screens.
- More transparent and cooperative **communication** between members of the aviation community and the Yukon government.
- Improved **governance and policies** within the Yukon government to better support aviation users and businesses.

> *Aviation infrastructure seems to be suffering from deferred maintenance--things are just always being patched up.*

> *There is no capability of landing medivacs at night or in bad weather because of lack of infrastructure.*
> *[Ross River Aerodrome]*

Opportunities and challenges

Yukon's Flight Path will guide the aviation system over the next decade, so we asked, "What are some opportunities or challenges you see for the system over the next 10 years?" The most common themes were:

Safety and reliability

- Yukoners understand that ensuring the safety of all users and community members is the most important challenge; and that it must be the top consideration for all decisions over the next 10 years.
- Reliability was mentioned often. Yukoners rely on the aviation system for access, safety, security, business, and many other things but delays and cancellations happen often due to poor weather. Although flights are delayed to protect user safety, they are frustrating and can negatively impact entire communities.
- To increase safety and reliability, members of the aviation community would like to see more navigation, communication, and weather aids introduced across Yukon.
- Reliable access to fuel is critical and is a challenge for pilots which impacts all aviation users.
- Limited access to plug-ins and terminals is a safety concern for pilots and is especially important during bad weather conditions or cold snaps.
- Residents living near airports/ aerodromes/ airstrips were concerned about dust, noise, and their communities' ability to respond to potential fires, fuel spills, or accidents.

> *Improving the reliability of flights to the higher use airports such as Dawson City is important to the local economy.*

> *As an operator of helicopters, we need very little. Namely, FUEL and ELECTRICITY, especially for overnight parking during the winter.*

Land development and leasing

- Land development and leasing was identified as a priority by members of the aviation community; they felt the Yukon government's land development and leasing process was holding them back with some saying they have been trying to get leases for over 10 years.
- Members of the aviation community said being able to develop and lease land would allow them to grow their businesses and better serve their clients.
- Municipal and First Nation governments also identified land development and leasing to create economic opportunities, grow Yukon's economy, provide better services to Yukoners, and boost local skills and employment.

Supporting local communities

- During the community meetings, many governments and residents of communities with airports/ aerodromes/ airstrips said they want the Yukon government and aviation users to work more closely with their community. They view their local airports/ aerodromes/ airstrips as an important asset and have ideas about how to improve connections with the community.
- Opportunities mentioned by governments and residents included: partnerships with local contractors to do maintenance, showcasing local businesses in the terminal (e.g. accommodations, entertainment and tours, restaurants, shops), and having reliable transportation between the airport/ aerodrome/ airstrip and the community.
- Respondents want to see the Yukon government consider ways to support local businesses, such as hiring local contractors to complete maintenance or reducing leasing fees for aviation users based in Yukon.

> *"For communities where community members aren't reliant on aviation, I think we should seek to find ways to encourage community members to utilize local airports more, as an alternative to driving. I want to see airports become long-term community benefits and not just pop up or be revitalized when large industry is present in the area."*

Collaboration with the aviation community

- Throughout the engagement process, we heard that many relationships between the Yukon government and members of the aviation community are strained.
- Many members of the aviation community feel their role in protecting Yukoners' safety is not recognized and their contributions to Yukon's economy are not valued.
- Many members of the aviation community expressed frustration about how the aviation system is managed and how investment decisions are made; they feel their opinions are not considered and their expertise in the industry is overlooked.
- Despite the frustration or challenges they encounter; members of the aviation community are committed to Yukon's aviation system and would like to work with the Yukon government to improve the system.

> *General aviation is begging for a hub, and there are dollars and resources (management) opportunities in these organizations (COPA).*

Financial sustainability

Yukon's aviation system is expensive to maintain and is currently subsidized by the Yukon government. Although the Yukon government is not considering modifications at this time, the economic sustainability of Yukon's aviation system is an important consideration over the course of the 10-year investment strategy.

To gain insight into how Yukoners feel about the aviation system's financial sustainability, we asked if the Yukon government should consider modifications.

This topic was a very important discussion area for many of those engaged. As shown on the following page, many online survey respondents were openminded about the Yukon government considering some modifications; however, we heard clearly through comments from those engaged that the following themes must also be considered.

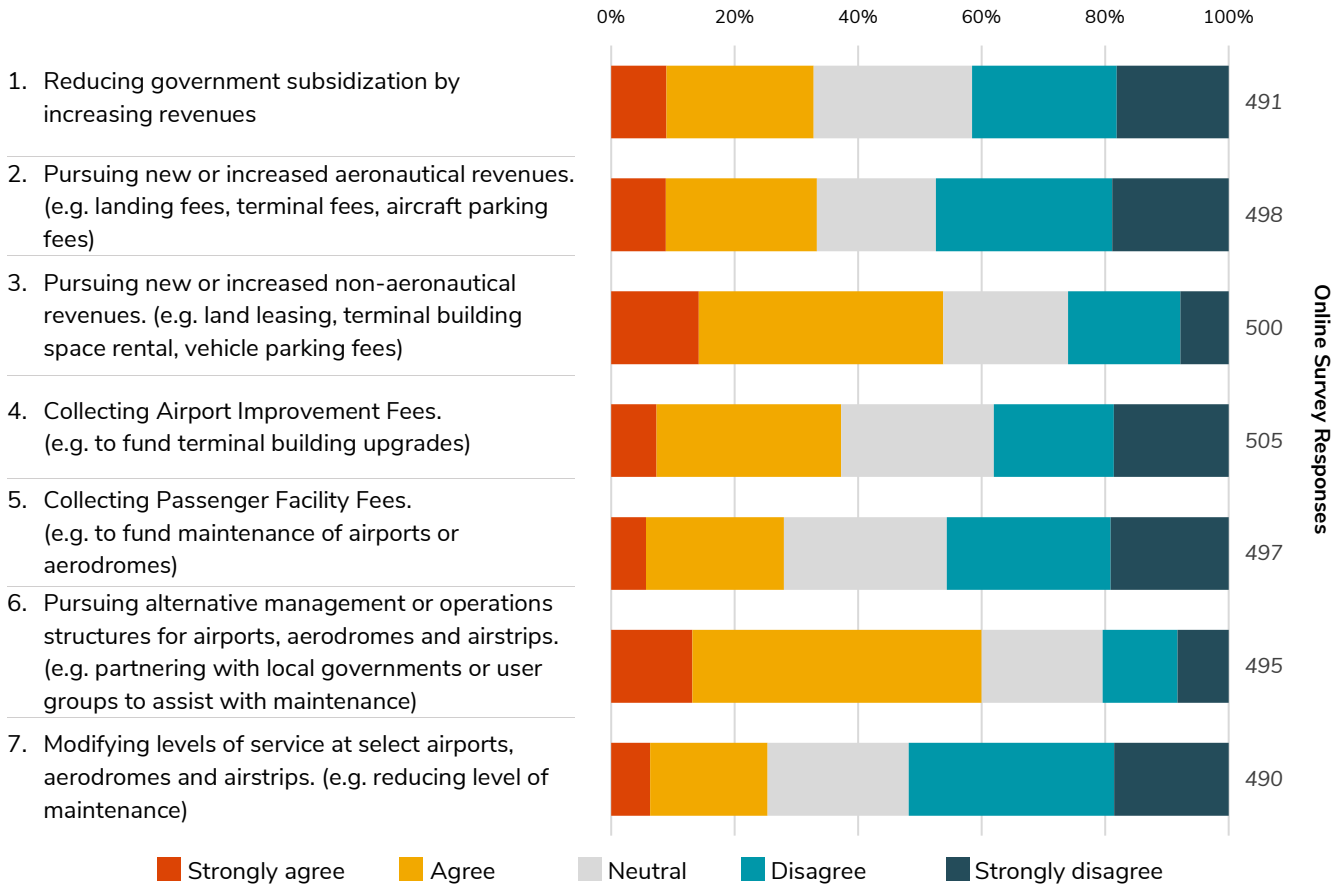
> *Living in the north makes air travel a necessity. With the cost of living already high here passing more fees/taxes on the operators and consumers would make living in Whitehorse even more expensive and challenging. If companies can't afford to operate here then that will impact many other sectors of the economy.*

Importance of the system and cost of living

- All of Yukon's airports/ aerodromes/ airstrips are important to respondents so many were concerned that reducing maintenance by modifying the level of service would create unsafe conditions or lead to some airports/ aerodromes/ airstrips being closed.
- There was also fear that any increase in aviation fees would be passed down to Yukoners, their everyday cost of living would increase, and they would no longer be able to afford flights making travel very difficult.

> *My concern is in relation to increasing costs to people living in the Yukon as it can feel quite isolated and can be quite costly to leave the territory already.*

Q: To increase the economic sustainabilty of providing an aviation system that meets certification and safety standards in the future, Government of Yukon should consider...



- To further expand the aviation network and its role in supporting safety and the economy, many respondents would like to see old mining strips reopened.
- We also heard that while all airports/ aerodromes/ airstrips are important and must safely accommodate emergency uses, it was agreed that the level of other services provided should vary based on site-specific needs.

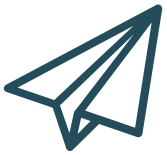
> *Every single strip is of high priority for safety reasons of pilots and passengers no matter if they are flying privately, with cargo, or passengers.*

Accountability

- Although some members of the aviation community and public would support the Yukon government exploring alternative revenue sources; there is concern that it would not result in better infrastructure or services.
- Many respondents want to see the Yukon government increase governance, management, and operations efficiency; and explore existing revenue generation methods (e.g. land development, leasing, advertising in terminals) before introducing new fees.

Partnerships

- Respondents were supportive of potential partnerships with private contractors, First Nation or municipal governments to assist with maintenance of airports/ aerodromes/ airstrips. Maintenance services could include snow plowing, tree clearing, cleaning, or providing food and drink services in terminals.
- Although partnerships for maintenance was generally supported, most respondents did not want to see the Yukon government release ownership of airports/ aerodromes/ airstrips.



What's next?

The feedback received in the survey, community open houses, and meetings with stakeholders and governments will be used to help identify strategic investments and inform the decision-making process.

Yukon's Flight Path: Aviation System Investment Strategy for 2020-2030 will be completed in Fall 2020, with work on reviewing specific investments opportunities coming soon after.

Appendix B

POLICY OBJECTIVES FOR THE YUKON AVIATION SYSTEM

Appendix B POLICY OBJECTIVES FOR THE YUKON AVIATION SYSTEM

The Policy Goals and related initiatives provide high-level statements that will help guide Yukon's aviation system investments and airport/aerodrome management fundamentals. The Policy Goals and initiatives will help support an accessible, safe, efficient, cost-effective and sustainable Yukon aviation system that meets the needs of communities and stakeholders.

Policy Goal 1 – Promote safety of aerodrome operations

Initiatives:

- Further develop the culture of safety within the aviation system
- Implement regular, formalized inspection and reporting with timely addressment of deficiencies identified
- Full implementation of SOPs (standard operating procedures) at all aerodromes
- Improve existing aerodrome and approach lighting according to Transport Canada standards
- Participate in discussions with Nav Canada and relevant aviation stakeholders to understand needs and opportunities related to modernized IFR (Instrument Flight Rules) operations and weather condition reporting

Policy Goal 2 – Support aviation activity and industry in Yukon

Initiatives:

- Improve collaboration between HPW and industry groups to understand emerging issues and to align Yukon government service priorities with industry needs while considering budget and resource constraints
- Develop mechanisms to enhance accountability to stakeholders, industry and public
- Participate in the development of formal policies and programs that support the healthy and sustainable growth of all types of aviation in Yukon
- Enhance day-to-day communications with stakeholders to build relationships and ensure timely and appropriate sharing of information
- Explore policies to support increased access and utility of sites
- Continue to develop land use plans, regulations and policies to support sustainable development

Policy Goal 3 – Optimize service levels and operational processes to improve service reliability of the aviation system

Initiatives:

- Enhance data collection and management to support evidence-informed decision making
- Continue to install cameras and tracking devices to monitor traffic and aerodrome activity
- Ensure staffing levels are aligned with safety, operational and organizational requirements through training and proactive human resource planning
- Enhance recruitment, retention and skills development of staff and support the development of policies which allow these activities
- Standardize minimum specifications for facilities and infrastructure
- Develop asset management programs to support operational efficiencies and best use of resources
- Implement baseline service levels at all aerodromes per classification for critical infrastructure

- Maintain regular planning and priority setting cycles to inform short (1-3 years), medium (4-9 years), and long-term (10+ years) decision-making, including investments
- Develop or re-visit service level agreements with maintenance service providers to ensure appropriate resourcing, quality of service and accountability
- Explore new or emerging technologies that can enhance efficiency, safety and access and work with partners to implement them, as required
- Develop a program-wide risk register to identify, address and mitigate risk across the aviation system

Policy Goal 4 – Support safety, emergency management and community development in Yukon communities

Initiatives:

- Define critical aerodrome roles in the community and formalize service levels with partners, where applicable, for the: provision of aerodrome facilities to support Medevac and patient transfer, policing by RCMP, and wildfire management by Wildland Fire Management services
- Support or prioritize projects and programs that enhance community safety and development
- Explore ways HPW can engage and support the development of Local Area, Municipal, First Nation and other community development plans
- Work with partners to define and formalize role of aerodromes in emergency management systems (i.e. post-disaster, pandemic)

Policy Goal 5 – Improve economic sustainability of Yukon's aviation system

Initiatives:

- Enhance project prioritization through defined investment models and evidence informed decision-making
- Identify and access external funding opportunities to off-set costs
- Leverage partnerships and alternative service or maintenance models to support financial sustainability and/or service
- Explore revenue generation activities and reasonable fee-for-service provisions

Policy Goal 6 – Define the requirements and standards for the passenger and user experience within Yukon's aviation system

Initiatives:

- Develop and implement levels of service and standards, by classification, for passenger amenities related to airside and groundside facilities
- Work with non-government service providers to complete a gap analysis, and establish and maintain standard levels of services
- Conduct a periodic review of all terminal operational processes and terminal building capacities
- Further develop capabilities to track passenger and cargo volumes, as well as aircraft traffic across Yukon's aviation system
- Increase collaboration with internal and external partners to support consistent branding and sense of place within Yukon's aviation

Appendix C

AERODROME CLASSIFICATION SYSTEM

Appendix C AERODROME CLASSIFICATION SYSTEM

INTRODUCTION

The Transportation Division within Highways and Public Works is responsible for managing Government of Yukon's aviation system, which includes 28 aerodromes that are owned and operated by Government of Yukon. These aerodromes connect communities, support economic development (e.g. tourism, mining exploration), and support the provision of critical services (e.g. policing, medevac, wildland fire management, and other social services).

This document details the aerodrome classification system that has been developed for Yukon's aviation system. This aerodrome classification system will allow Highways and Public Works to group aerodromes into like categories, called classes, based on their traffic usage (aircraft movements) and socioeconomic functions.

The aim of the classification system is to provide consistency and impartiality to the way decisions are made, in order to better direct investments and meet stakeholders' expectations over the long term.

This Aerodrome Classification System has been developed using a combination of published data sources, Government of Yukon data and anecdotal evidence. Additional data, such as aircraft movements, may also need to be collected for specific aerodromes (where practical) to better inform the classification process.

Aerodrome classifications

The aerodromes are divided into five distinct classifications, named Class 1 to Class 5. The classes are based on the volume of aircraft movements at an aerodrome and the aerodrome's social and economic function. To be included in a particular class, an aerodrome must meet several specified criteria thresholds, which can be found in table C-4. An overall description of each class is included in table C-1.

Class	General Description
Class 1	This class is reserved for airports that have the highest aircraft movement volumes in the territory and are critical to the functioning of Yukon territory's central population areas, such as Whitehorse. This class of aerodromes provides crucial social and economic links both nationally and for the territory.
Class 2	These airports link Yukon communities, support major economic activity (e.g., resource extraction) and provide critical access for fly-in communities both internally for Yukon and externally to other jurisdictions.
Class 3	These aerodromes support moderate aircraft traffic. These airports link most Yukon communities. They support cargo movement for communities, medevac and other emergency services for local area populations.
Class 4	These aerodromes support low traffic volumes. They support minor economic activity, particularly on a seasonal basis. They can also act as alternate landing sites for aircraft and can support some kinds of emergency services.
Class 5	These aerodromes support very low aircraft traffic and are used to group airports not covered under classifications 1-4. They can also act as alternate landing sites for aircraft and can support some kinds of emergency services. No new airports would be built and classified as class 5.

Table C-1: Aerodrome classifications and descriptions

A description of the basis for traffic usage criteria is included in table C-2.

Criteria	Description
Annual Aircraft Movements	The annual number of aircraft movements at an aerodrome, based on flights recorded throughout the year (where available) or estimates. Note that annual number of aircraft movements for Class 3, 4 and 5 aerodromes are difficult to estimate.

Table C-2: Traffic usage (volume) criteria

A description of the basis for socioeconomic criteria is included in table C-3.

Criteria	Description
Linking Yukon communities	The aerodrome provides a key link between Yukon communities, with thresholds based on the population size of the communities being linked and the lack of a class 1 or 2 aerodrome within a one-hour drive.
Yukon municipality	A city or town that is an incorporated municipality under Yukon's Municipal Act.
Commerce route	The aerodrome supports commerce such as tourism (e.g. outfitters, eco-tourism), mining (e.g. exploration, worker transportation), extensive general aviation activity, the movement of goods or other commercial activity. • Key economic trade route for Yukon: the aerodrome accommodates large amounts of people and cargo traffic, such that any delays, restrictions, or closures at the aerodrome would have significant negative impacts on the movement of people and goods into and out of Yukon and within the territory. • Key internal Yukon trade route: the aerodrome accommodates sustained moderate amounts of people and cargo traffic and any delays, such that restrictions and closures at the aerodrome would have isolated impacts within Yukon, impacting some communities, but not all. • Minor internal Yukon trade route: the aerodrome generally accommodates sustained (including seasonally) low amounts of people and cargo traffic to support communities and commerce; or delays, restrictions and closures at the aerodrome would impact 1 or more Yukon communities. • Marginal internal Yukon trade route: the aerodrome has an above average amount of activity reported in at least one activity category, including tourism, mining (including exploration), pilot training, general aviation, goods movement or other commercial activity.

Table C-3: Social and economic functions criteria

Table 5-2, in section 5.3, identifies the five aerodrome classes, their applicable criteria, and minimum number of criteria required for the class, presented in matrix form and shown in table C-4. Aerodromes automatically revert to the lowest class in the case that criteria for higher classes are not met.

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Aerodrome Name	Number of criteria to meet for aerodrome classification	Annual Aircraft Movements	Linking Yukon communities	Commerce route
Class 1	Must meet all criteria	>25,000	Links communities with population(s) >20,000	Key economic trade route for Yukon (from outside territory)
ENWIA		✓	✓	✓
Class 2	At least 2 criteria, including 1 traffic usage criteria	>1000	Links communities with population(s) >1,000	Key internal Yukon trade route
Dawson City		✓	✓	✓
Old Crow		✓		✓
Watson Lake		✓	✓	✓
Mayo		✓		✓
Class 3	At least 2 criteria	>250	Links communities with population(s) >250	Minor internal Yukon trade route
Faro		✓	✓	✓
Burwash Landing		✓		✓
Teslin		✓	✓	✓
Beaver Creek		✓		✓
Haines Junction		✓	✓	✓
Ross River			✓	✓
Carmacks			✓	✓
Pelly Crossing			✓	✓
Class 4	Must meet all criteria	>50	N/A	Marginal internal Yukon trade route
Cousins		✓		✓
Fort Selkirk		✓		✓
Silver City		✓		✓
Hyland		✓		✓
Finlayson		✓		✓
MacMillan Pass		✓		✓
Wiley		✓		✓
Carcross		✓		✓
Class 5	Must not meet criteria for classes 1 to 4	N/A	N/A	N/A
Braeburn				
Chapman				
Ogilvie				
McQuesten				

Minto Landing				
Pine Lake				
Twin Creeks				

Table C-4: Aerodrome classification results

Mechanisms for changing levels of service for aerodromes

It is expected that the traffic usage and/or socioeconomic functions of an aerodrome will change over time. The Aerodrome Classification System and the classifications should be periodically reviewed.

Reference information

Aerodrome	Number of Aircraft Movements
Erik Nielsen Whitehorse International Airport	45,837
Dawson City Airport	9,536
Mayo Airport	5,388
Watson Lake Airport	3,518
Old Crow Airport	1,304
Beaver Creek Aerodrome	700
Burwash Landing Aerodrome*	> 500
Haines Junction Aerodrome*	> 500
Faro Aerodrome	701
Teslin Aerodrome	293
Carmacks Aerodrome	>50
Pelly Crossing Aerodrome	>50
Ross River Aerodrome	>50

- *estimated data
- Note that the data from aerodromes equipped with CARS is only collected during published CARS operating hours.

Table C-5: Aircraft movements at aerodromes in 2019 or as otherwise indicated (as reported by Transportation Aviation Branch)

Community	Population
Beaver Creek	116
Burwash Landing	108
Carcross	521
Carmacks	574
Dawson City	2,634
Destruction Bay	55
Faro	419
Haines Junction	981
Mayo	500
Old Crow	265
Pelly Crossing	394
Ross River	407
Tagish	281
Teslin	522
Watson Lake	1,486
Whitehorse area	32,304

Table C-6: Yukon Populations (from Yukon Bureau of Statistics' Population Report, Second Quarter, 2019)

Aerodrome	Class	Nearest class 1 or 2 aerodrome in terms of driving	Drive time (as reported by Google Maps in hrs:mins)	Distance (kilometers)
Faro	3	ENWIA	3:57	352.6
Burwash Landing	3	ENWIA	3:00	279.6
Teslin	3	ENWIA	1:51	174.8
Beaver Creek	3	ENWIA	4:53	448.9
Haines Junction	3	ENWIA	1:36	152.7
Ross River	3	ENWIA	4:38	410.1
Carmacks	3	ENWIA	2:03	185.4
Pelly Crossing	3	Mayo Airport	1:24	120.1
Cousins	4	ENWIA	0:17	14.1
Fort Selkirk	4	Mayo Airport	No road access	
Silver City	4	ENWIA	2:19	216.2
Hyland	4	Watson Lake Airport	3:42	213.6
Wiley	4	Dawson City Airport	7:21	408.0
Finlayson	4	Watson Lake Airport	2:39	238.0
MacMillan Pass	4	Watson Lake Airport	9:05	570.0
Carcross	4	ENWIA	0:49	70.4
Braeburn	5	ENWIA	1:10	103.4
Chapman	5	Dawson City airport	2:01	146.0
Ogilvie	5	Dawson City airport	4:26	259.3
McQuesten	5	Dawson City airport	1:12	107.0
Minto Landing	5	Mayo airport	1:49	157.0
Pine Lake	5	Watson Lake airport	1:42	149.0
Twin Creeks	5	ENWIA	7:22	523.0

Table C-7: Drive times from class 3, 4 and 5 aerodromes to the nearest class 1 or 2 aerodrome

Aerodrome	Type of activity	Activity detail	
Cousins	Pilot training	Flight schools and other private flight training companies use Cousins for pilot training.	
Fort Selkirk	Tourism	General aviation and charter operators use the Fort Selkirk aerodrome to support tourism related to camping, fishing and sightseeing at the adjacent Fort Selkirk historical site, which is inaccessible by road.	
Silver City	Tourism	The onsite sight-seeing operator has indicated that their aircraft movements at Silver City are approximately 1,300 per year.	
Hyland	Mining	Several mining projects are active in the area and use the Hyland aerodrome.	
Wiley	Goods movement, general aviation	Wiley is used as a staging area for movement of goods to Inuvik and Old Crow. General aviation uses the Wiley aerodrome for access to Eagle Plains for fuel and repairs, and as a stopover before flying into NWT.	
Finlayson	Mining	There are currently significant mining/exploration activities supported by Finlayson aerodrome.	
MacMillan Pass	Mining	There is currently significant mining activities supported by MacMillan Pass aerodrome.	
Carcross	Skydiving / Pilot training	There are significant skydiving operations from Carcross aerodrome. There is also significant pilot training completed from Carcross aerodrome.	

Table C-8: Notable activities for class 4 aerodromes (from the current state assessment for each aerodrome)

Appendix D

PASSENGER AND USER SERVICE LEVELS

Appendix D PASSENGER AND USER SERVICE LEVELS

INTRODUCTION

After considering feedback from other governments, collaborative partners, stakeholders and the public, Stantec is recommending the following service levels for each classification based on regulatory requirements, user needs, and industry practices.

While many of these service levels are within the operational control of Transportation Aviation Branch, there are a number of service levels that are dependent on other internal and external partners.

SYSTEM-WIDE

Services

- Information – public website
- Inquiries/client relations – public, general business, lease/licence, filming, special events
- Airport advisory

SERVICE LEVELS

Class 1 service levels

Air terminal building

- 24/7 access
- Adequate seating based on peak traffic*
- Adequate space per passenger based on International Air Transport Association (IATA) level of service
- Accessible facilities (i.e. ramps, washrooms)*
- Terminal is clean and comfortable (i.e. heating/cooling, ventilation)
- Food service (currently provided through vending machines)*
- Gift shop
- Cultural/artistic display
- Advertising space*
- Wi-Fi in terminal
- TVs
- Electronic charging stations in terminal
- Flight Information Display Screen
- Baggage handling inside terminal
- Passenger boarding bridge or walk-out access to apron stands
- Visitor Information Centre

*Any service denoted with an asterisk is not implemented either in full or in part one or more sites within that class.

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Groundside

- Enough room in parking lot during peak periods
- Safe access to Air Terminal Building (i.e. snow clearing, road/sidewalk access)*
- Paid parking

Airfield

- Lighting is available and in good condition
- Surfaces support aircraft at level of service indicated (AGN IV)
- Onsite maintenance operators maintaining according to Winter Maintenance Plan

Apron

- Itinerant aircraft parking available after operational requirements have been met, where feasible
- Plug-ins available after operational requirements have been met, where feasible

Land development

- Lease lots where available after operational requirements have been met, based on viable business plan for commercial operators, where feasible
- Aircraft parking available after operational requirements have been met, where feasible

Navigation/weather

- Precision approach augmented by non-precision approaches
- Air Traffic Control tower (ATC)
- TAF and METAR from ATC

Office space

- Office space available after operational requirements have been met, based on demonstrated need, where feasible

Services – passenger

- Taxi service
- Rental car service

Services - business

- Ground handling available
- Third party fuel available

Emergency services/security

- Aircraft Rescue Fire Fighting available 24/7
- Security – according to Canadian Aviation Security Regulations

*Any service denoted with an asterisk is not implemented either in full or in part one or more sites within that class.

Class 2 service levels

Air terminal building

- Adequate seating based on peak traffic*
- Adequate space per passenger based on IATA levels of service*
- Accessible facilities (i.e. ramps, washrooms)*
- Food service (currently provided through vending machines)*
- Cultural/artistic display*
- Advertising space*
- Terminal is clean and comfortable (i.e. heating/cooling, ventilation)
- Baggage handling inside or outside terminal
- Visitor Information Centre – card rack*

Groundside

- Enough room in parking lot during peak periods
- Safe access to ATB (i.e. snow clearing, road/sidewalk access)*

Airfield

- Lighting and visual aids available and in good condition*
- Surfaces support aircraft at level of service indicated (AGN IIIA – AGN IIIB)
- Onsite maintenance operator(s) maintaining according to Winter Maintenance Plan
- After-hours call-out maintenance

Apron

- Itinerant aircraft parking available after operational requirements have been met, where feasible
- Plug-ins available after operational requirements have been met, where feasible

Land development

- Lease lots available after operational requirements have been met, based on business plan for commercial operators, where feasible
- Aircraft parking stalls available after operational requirements have been met, where feasible

Navigation/weather

- Precision/Non-precision/Non-instrument approach
- Human Weather Observation Station (HWOS) – 8 hours+ per day
- After-hours call-out Community Aerodrome Radio Stations (at sites without 24-hour CARS)

Office space

- Office space available after operational requirements have been met, supported by demonstrated need, where feasible

Services

*Any service denoted with an asterisk is not implemented either in full or in part one or more sites within that class.

- Third party fuel available

Class 3 service levels

Air terminal building

- Accessible facilities (i.e. ramps, washrooms)*
- Terminal is clean and comfortable (i.e. heating/cooling, ventilation)

Groundside

- Safe access to Air Terminal Building (snow clearing, road/sidewalk access)

Airfield

- Lighting and visual aids available and in good condition*
- Surfaces support aircraft at level of service indicated (AGN II – AGN IIIA)
- Winter maintenance performed by Transportation Maintenance Branch, according to their priority

Apron

- Itinerant aircraft parking available after operational requirements have been met, where feasible
- Plug-ins available after operational requirements have been met, where feasible

Land development

- Lease lots available after operational requirements have been met, based on business plan for commercial operators, where feasible
- Aircraft parking available after operational requirements have been met, where feasible

Navigation

- Non-precision/non-instrument approach*
- Automated Weather Observations Station (AWOS)/HWOS/weather camera*

Office space

- Office space available after operational requirements have been met

Class 4 service levels

Airfield

- Visual aids in good condition*
- Surfaces support aircraft at level of service indicated (AGN I – II)
- Summer maintenance

Apron

- Apron available*

*Any service denoted with an asterisk is not implemented either in full or in part one or more sites within that class.

Land development

- Lease lots available after operational requirements have been met, based on business plan for commercial operators, if supported by site, where feasible
- Aircraft parking available after operational requirements have been met, where feasible

Class 5 service levels

Airfield

- Visual aids in good condition*
- Surfaces support aircraft at level of service indicated (AGN I – II)
- Summer maintenance

Apron

- Apron available*

Land development

- Lease lots available after operational requirements have been met, based on business plan for commercial operators, if supported by the site

*Any service denoted with an asterisk is not implemented either in full or in part one or more sites within that class.

Appendix E

PLAN CANADA: PRIORITIZATION AND PIZZA

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PRIORITIZATION AND PIZZA:

APPLYING A SOLUTION TO A PIZZA PROBLEM AS A PROXY FOR A TRANSPORTATION PROBLEM

By Stephen Oliver, CD, NA, RPP, MCIP

SUMMARY

The complexity of transportation issues and diversity of stakeholder opinions directs that project teams and government agencies are often required to defend every aspect of their decision-making. To defend these decisions, it is that much more important to have followed sound decision-making processes such as those a Multiple Accounts Evaluation (MAE) provides. A MAE is a structured approach that employs accounts, criteria, and metrics in developing a common score for use in project-to-project comparisons. This article will use the process of selecting pizza to illustrate how the processes and structuring of an MAE support the implementation of transportation projects.

RÉSUMÉ

La complexité des enjeux liés au transport et la diversité des opinions des intervenants font en sorte que les équipes de projet et les organismes gouvernementaux sont souvent tenus de défendre tous les aspects de leurs décisions. Pour défendre ces décisions, il est d'autant plus important d'avoir suivi des processus décisionnels solides comme ceux qu'offre une évaluation de comptes multiples (ÉCM). Une ÉCM repose sur une approche structurée qui emploie des comptes, des critères et des mesures pour établir une cote commune à utiliser dans les comparaisons de projets à projets. Cet article se basera sur le processus de sélection de pizzas pour illustrer comment les processus et la structuration d'une ÉCM soutiennent la mise en œuvre des projets de transport.

When strategy and policy work have been completed and attention turns to project delivery, all city builders are reminded that good policy does not in itself build a good city. Transportation planning, like other city-building initiatives, requires a comprehensive understanding of project prioritization and evaluation. The scope of work in the transportation field requires a sound approach that works equally with costly initiatives, such as new transit services, as with the less expensive, such as a sidewalk or cycling infrastructure.

The complexity is compounded by the mixture of uses inherent in the transportation network, a place where different facilities or uses interact, forcing tradeoffs within the limited available space. Because of the complexity of transportation issues, interaction with surrounding land uses, and diversity of stakeholder opinions, project teams are often required to defend every aspect of their decision-making. Having followed sound decision-making processes such as those a Multiple Accounts Evaluation (MAE) provides makes it that much easier to defend these decisions.

The MAE mechanism goes by many names and is not a new approach for project prioritization. An MAE is a structured approach that employs accounts, criteria, and metrics in developing a common score for use in project-to-project comparisons. MAE has been applied across the transportation

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planning practice, with a proven track record in complete street retrofits, prioritizing the implementation of a high-level policy (like a transit master plan or cycling strategy), selecting the corridor for a new transportation facility, or determining where actions should be targeted within a city-wide initiative like an active and safe routes to school program. While an MAE can be effectively employed in a range of transportation projects, it can also be utilized in the critical decision-making process of ordering pizza.

The use of pizza as an analogy speaks to the broad applicability of the MAE as a tool, and avoids an example caught in the specifics of a transportation project. Besides, as most planners have experienced a long pizza-worthy week, a better process for selecting pizza is something we can all equally employ. So, once the decision to order pizza has been made, how does the group decide where and what to order? If everyone has an opinion, how is this decision to be made? It is in addressing these questions that an MAE process provides a structured approach to providing accurate and defendable decisions (**Figure 1**).

One should be wary of two early pitfalls when starting an MAE. First, do not assume the strategic objectives/vision are also the implementation objective. Given that the vision statement or project objectives are important in shaping recommendations on a strategic scale, be critical when someone recommends carrying that statement from higher policy. Likely, the implementation objectives are much more restrictive and measurable than the higher-level strategic objective. There is substantive difference between "let's all go to my house tonight and order some pizza" and "let's order pizza from ...[insert favorite local pizza place here]". If the MAE builds off the former, the number of decisions to be evaluated is much larger, open-ended and harder to execute.

The second pitfall is personality-based; it is the failure to properly identify and seek the representation of all stakeholders that have authority in the decision-making process. This is sometimes done to avoid conflict or to progress a project. If all the stakeholders are not meaningfully invited to the process, they will not provide support to the conclusion in the end. Just as any pizza party would begin by confirming who is interested in having pizza, so should a transportation project.

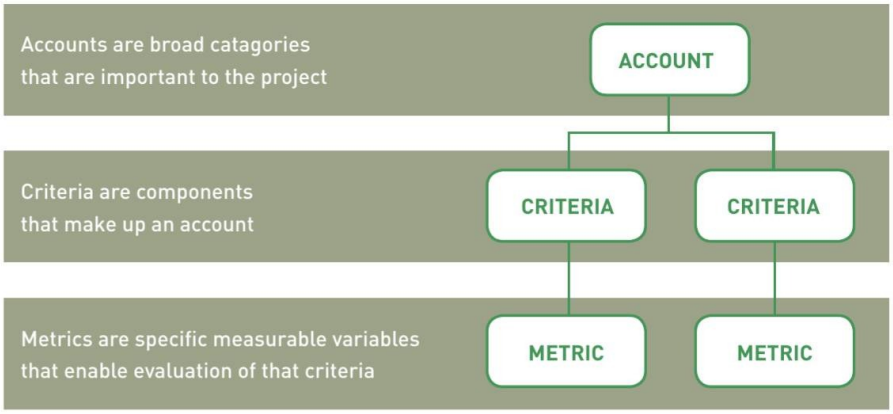

Figure 1.

Having established the objectives for implementation, and knowing the stakeholders, the structure of the MAE can start to take form. The first component of the MAE is the identification of accounts, the high-level themes that link to the objective of implementation. These may be expressly outlined in the objectives, like having enough pizza to be full, or implicitly by stakeholder concerns, like topping preferences. Accounts must answer: "What is important for the project?" Pick several accounts to sufficiently encompass what is trying to be achieved. While three to five accounts are generally enough, the initial list is often longer. At these initial stages consulting with stakeholders helps establishes an understanding of what matters. When developing the list of accounts for the implementation of a transportation project a permutation that speaks to the project's integration with surrounding land use, constructability, affordability, and network connectivity are good places to start. These accounts are reliable and have been employed across a range of cycling, transit, and complete street projects. In the case of the pizza night it may be that everyone wants to eat promptly, or there is debate about toppings and overall cost. Very few implementation plans can avoid cost, even pizza. (**Figure 2**.)

Accounts
Value
Access
Toppings

Figure 2.

With the accounts established, it is now time to determine what *criteria* make up and provide the structure for evaluation of those accounts. Again, look for a maximum of five criteria per account lest the MAE become overly complicated. In some cases you may find one strong criterion suitable. The criteria need to encompass the sub-components of the higher-level account (do not focus on how they are going to be measured yet; that step is next). For a transportation MAE, one selecting cycling infrastructure for example, an account of 'appropriate design' could use criteria such as: the presence of vulnerable users, observed driver behavior and number of available design solutions. For the selection of a pizza, examining the account of 'toppings', the variety of toppings available and customizability are both criteria that could measure this account. The criteria selected will ideally avoid overlap, and when combined fully encompass the intent of the account.

If weighting of criteria is to be considered this is where that conversation should be explored. In some cases, this makes sense, when one account is clearly more important. This can often lead to a much more complicated output, which is harder to communicate both to stakeholders and the public. For example, on a transit project the need to fit within an operational service model could require an increased weight in the evaluation, when compared to other criteria like the proximity to Transit Oriented Development, or capital costs. For pizza, perhaps one of the guests is on a time constraint and can only come for a short time. In this case the 'timeliness' is particularly important and may be weighted heavier than the other accounts. (**Figure 3**.) Ensure before the scoring is completed that the weighting has been tested, the impact of the weighting understood, and

the stakeholders are comfortable with the results. Diligence at this stage avoids some guests being unhappy with a rushed pizza order on account of only one person.

With an understanding of what needs to be measured, how to measure it must be determined. You need to understand both *what* you are measuring, and *why* you are measuring it. A metric should not be introduced simply because the data is available. In transportation projects this extraneous data often appears as a measurement of vehicle volumes or vehicle levels of service when traffic impacts are not linked to the outcome of the project. Work within the criteria established, using a mixture of qualitative and quantitative variables to build out and identify metrics. (**Figure 4**.) With few exceptions one metric per criteria is correct. Unpacking the criteria of 'size of pizza' under the account 'value' the metric must determine the most appropriate method of measurement. The m^2 of total pizza? Perhaps the number of slices? Work with stakeholders to ensure they are comfortable with the collection methods and any required data manipulations. Similarly, for qualitative variables work with stakeholders to define as much as possible, definitions of terms like "spicy and mild" are perfect examples of potential conflict in the process that can lead to an unhappy crowd.

Only a couple items remain prior to conducting the scoring exercise of the MAE: selecting the pizza and, of course, eating. The first is generally completed at the strategic planning level, but if it was not, it is time to define the potential projects to be evaluated. In reviewing or developing projects, be diligent to ensure the projects are equal. In the context of transportation projects be sensitive to the differences between corridor projects and intersections. When using the MAE to differentiate between a new pedestrian crossing and a new length sidewalk, be sensitive to their similarities, dependencies, and differences. Ensure the MAE that has been established in a manner that can evaluate the differences without bias.

At this point revisit the established criteria, understand what risk is presented by a low score in each criterion and what that score means for a resulting project. The high scoring projects will rarely be high scoring across the board; therefore, establish a common understanding of how

Account	Criteria
Value	Total cost
	Size of pizza
	Bundled items in order
Access	Delivery options
	Timeliness
	Previous experience or reviews
Toppings	Number of toppings available on any one pizza
	Ability to remove allergens
	Number of pre-constructed pizzas available for selection

Figure 3.

Account	Criteria	Metric
Value	Total cost	Total cost including taxes
	Size of pizza	Diameter of pizzas in total centimeters
	Bundled items in order	Total number of drinks, desserts and other sides
Access	Delivery options	Availability of delivery as an option
	Timeliness	Time until the pizza is on the table ready to be eaten
	Previous experience or reviews	Opinion on the pizza company
Toppings	Toppings available	Number of toppings available on any one pizza
	Ability to remove allergens	That all listed allergens be removed from a pizza without limiting the entire order
	Pre-constructed pizza selection	Number of pre-constructed pizzas available for selection

Figure 4.

to mitigate the risk associated with the low score at the criteria level. The pizza account 'toppings', with the criteria 'allergens' is likely an example of a criteria that is critical to not have a low score. If it scores low the option may need to be entirely removed from evaluation. Alternatively, it is more often a matter of mitigation. Within transportation projects, for example, a poor score in directness could be mitigated through improved investment in wayfinding.

At this stage in the MAE process, the path forward is to collect the data and apply the scoring. Scoring should be applied using a consensus-based approach, with as many stakeholders represented as possible. Some version of a workshop format tends to be practical. Proceed project by project, or account by account, applying the scores, but do not expose the final scores until all projects are completely scored. Scoring without knowing how the results are emerging is one of the more useful methods of minimizing bias. Certainly, the data collection and scoring will always provide challenges and disagreement, and working through these with stakeholders will keep the project together and on track. The results of a properly constructed and executed MAE will lead to an implementable, defendable decision that can gain broad positive support from stakeholders both in relation to a range of transportation projects and in the selection of pizza.

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