STRATEGIC LAND USE PLAN

Yellowknife Airport (YZF)

Prepared by InterVISTAS Consulting Inc.

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InterVISTAS

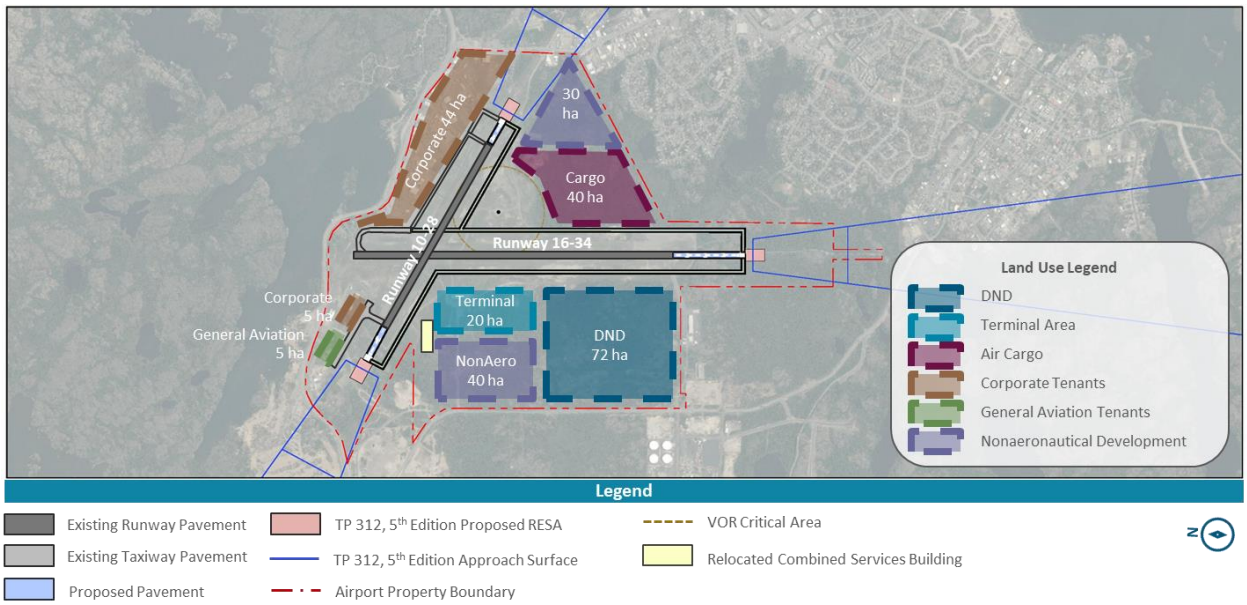
Executive Summary

Yellowknife Airport (YZF) serves as the primary aviation gateway for the Northwest Territories and is the busiest airport in the region. Handling over 510,000 passengers annually and projected to exceed 630,000 by 2025, YZF plays a vital role in connecting northern communities, supporting medical travel, military operations, general aviation, and cargo services. To support its continued growth and long-term operational sustainability, the Government of the Northwest Territories initiated the development of a Strategic Land Use Plan as part of the Gateway Strategy Phase II. The plan provides a forward-looking framework for guiding land use decisions over the next 50 to 100 years, ensuring that future development aligns with the airport's operational needs, infrastructure constraints, and broader regional priorities.

The Strategic Land Use Plan was developed with a clear set of objectives: to identify locations for key facilities that accommodate long-term growth, understand the relationship between aeronautical and non-aeronautical development, provide a definitive roadmap for future terminal placement, and deliver a defensible land use strategy rooted in prior studies and stakeholder input. The planning process reviewed previous technical and planning reports, which offered valuable insights into existing infrastructure, operational constraints, and long-term development opportunities. Early analysis determined that expanding the existing terminal was not a viable option due to its age, limited footprint, and cost inefficiencies. As a result, two new terminal siting options, one on the east and the other on the west side of Runway 16-34, were developed and evaluated.

Each terminal area concept was examined using a methodology that prioritized airfield infrastructure, operational efficiency, and long-term flexibility that aligned with Guiding Principles prepared earlier in the Gateway Strategy Phase II. The design of the future terminal area was informed by benchmarking against peer airports, such as Thunder Bay, Regina, and Saskatoon, to estimate spatial requirements, gate capacity, and support facilities needed to accommodate future growth. These planning assumptions shaped a series of refined land use concepts, each of which considered the needs of passenger services, cargo handling, general aviation, corporate tenants, and non-aeronautical development.

After a detailed evaluation of both options, the West Side Terminal Area Concept was selected as the preferred land use plan as shown on the following page. This concept offers significant advantages, including more efficient access to both runways, reduced operational delays by eliminating the need for aircraft to cross active runways, and improved alignment with prevailing winds. The west side layout allows for better segregation of land uses, dedicating specific zones for Department of National Defence operations, air cargo, general aviation, and nonaeronautical development. Additionally, the terminal's placement on the west side minimizes environmental impacts, avoids overburdening Old Airport Road, and leverages Deh Cho Boulevard to improve traffic circulation. The plan also positions the terminal near future utility infrastructure, which may be advanced through DND investments, offering cost and schedule efficiencies.



Source: InterVISTAS Consulting, 2025

Moving forward with the new terminal is particularly important now because the existing facility is nearing the end of its useful life and no longer meets modern standards for passenger processing, security, or operational efficiency. Delaying action increases the risk of service disruptions, higher maintenance costs, and lost opportunities for economic development. With passenger volumes projected to surpass 630,000 annually and increased pressure on infrastructure, a phased terminal development, guided by the Strategic Land Use Plan, will provide the capacity, flexibility, and user experience needed to support the region's mobility and economic resilience. Furthermore, advancing terminal development now positions the airport to secure funding from federal and territorial sources while aligning with potential Department of National Defence investments, maximizing cost-efficiency and strategic value.

To support the recommended land use plan, the next immediate step is to complete the demand forecasts and future terminal area plan. This foundational work will support future technical, policy, business, and advocacy efforts. To align with the goal of opening the future terminal area in 2031, it is recommended that the demand forecast, and terminal area planning begin in 2025.

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1 Introduction

Yellowknife Airport (YZF) plays a critical role in supporting the Northwest Territories' growing population and serves as a key transportation hub for the territories and Canada's north. It facilitates a wide range of operations, including cargo, charter services, general aviation, medical travel, National Defence programs, and commercial air services. Handling over 604,000 passengers annually through its main air terminal building (ATB) and fixed-base operations (FBO), the airport serves as a gateway to the Northwest Territories and the Western Arctic, all while being conveniently located just ten minutes from downtown Yellowknife.

Beyond air travel, the airport functions as a key connector for ground transportation, serving as a launch point for road access to various northern communities, resource development areas and a growing tourism destination. Additionally, Yellowknife Airport is a significant local economic driver, directly supporting over 1,000 jobs and generating nearly $600 million in economic output. Recent forecasts project continued growth, with passenger traffic expected to again exceed 604,000 in 2025, including 450,000 travelers through the ATB and 150,000 through FBO operations. For additional information, please see the Facilitating Economic and Social Connectivity: Yellowknife Airport report.

YZF plays a critical role in supporting Canadian sovereignty and advancing national interests, particularly in the context of northern and Arctic operations. Strategically located in the capital of the Northwest Territories, YZF serves as a key logistical and operational hub for the Department of National Defence (DND) and other federal agencies involved in Arctic surveillance, response, and security missions. Its proximity to Canada's northern frontier enables rapid deployment of personnel, equipment, and supplies to remote regions where maintaining a visible and sustained federal presence is essential to asserting sovereignty over Arctic territories.

Additionally, the airport's year-round accessibility and robust infrastructure make it a vital base for supporting search and rescue missions, emergency preparedness, and operations that reinforce Canada's commitments under NORAD and international defense cooperation agreements. YZF also facilitates connections to Indigenous and remote communities, supporting the delivery of essential services and the inclusion of northern populations in national policy frameworks. As climate change and geopolitical interest in the Arctic grow, YZF's role in supporting sovereignty, environmental monitoring, and national defense initiatives will become even more significant, making continued investment in its infrastructure and capacity a matter of national importance.

Airport infrastructure including the existing terminal building was originally constructed in 1967, with several expansions occurring in 1998 and 2005. The terminal has reached a point where replacement is necessary, and constraints within the airport's current footprint limit its ability to expand efficiently. To address this challenge, Yellowknife Airport engaged InterVISTAS Consulting to develop a strategic land use plan as part of the Gateway Strategy Phase II project.

The Gateway Strategy Phase II project comprised several integrated studies aimed at guiding Yellowknife Airport's short-term decisions while also establishing a foundation for long-term development. A central component of this effort was the creation of Guiding Principles, criteria designed to evaluate future decisions, facility upgrades, and development strategies to ensure alignment with the airport's overarching goals and priorities. Additionally, a 10-Year Capital Improvement Plan was prepared to identify project costs and outline potential funding sources for implementation. A key objective of this phase was this Strategic Land Use Plan to determine the most suitable location for a future terminal, identify opportunities for

expanding cargo and logistics operations, and provide space for the growth of Department of National Defence facilities.

Several studies had already been conducted prior to this project that defined a land use strategy, and this effort builds upon those previous analyses to develop a well-informed and practical future land use concept. This report summarizes the analysis, findings, and recommendations for Yellowknife Airport, identifying the site that will best support the long-term sustainability of terminal operations and other key airport functions. It also details the methodology used in preparing land use concepts and provides a clear justification for the recommended site selection and overall land use strategy.

1.1 Key Outcomes

Four key project outcomes were identified early in the planning process to establish clear success metrics. These outcomes guided the project's direction and were consistently referenced throughout the development of a land use concept. The key outcomes are outlined below.

- Identify location of key airport facilities that support growth over the next 50 to 100 years
- Understand the balance between aeronautical and nonaeronautical development
- Provide a roadmap on where the future terminal and cargo/logistics areas should be located
- Deliver a rationale and justifiable land use plan

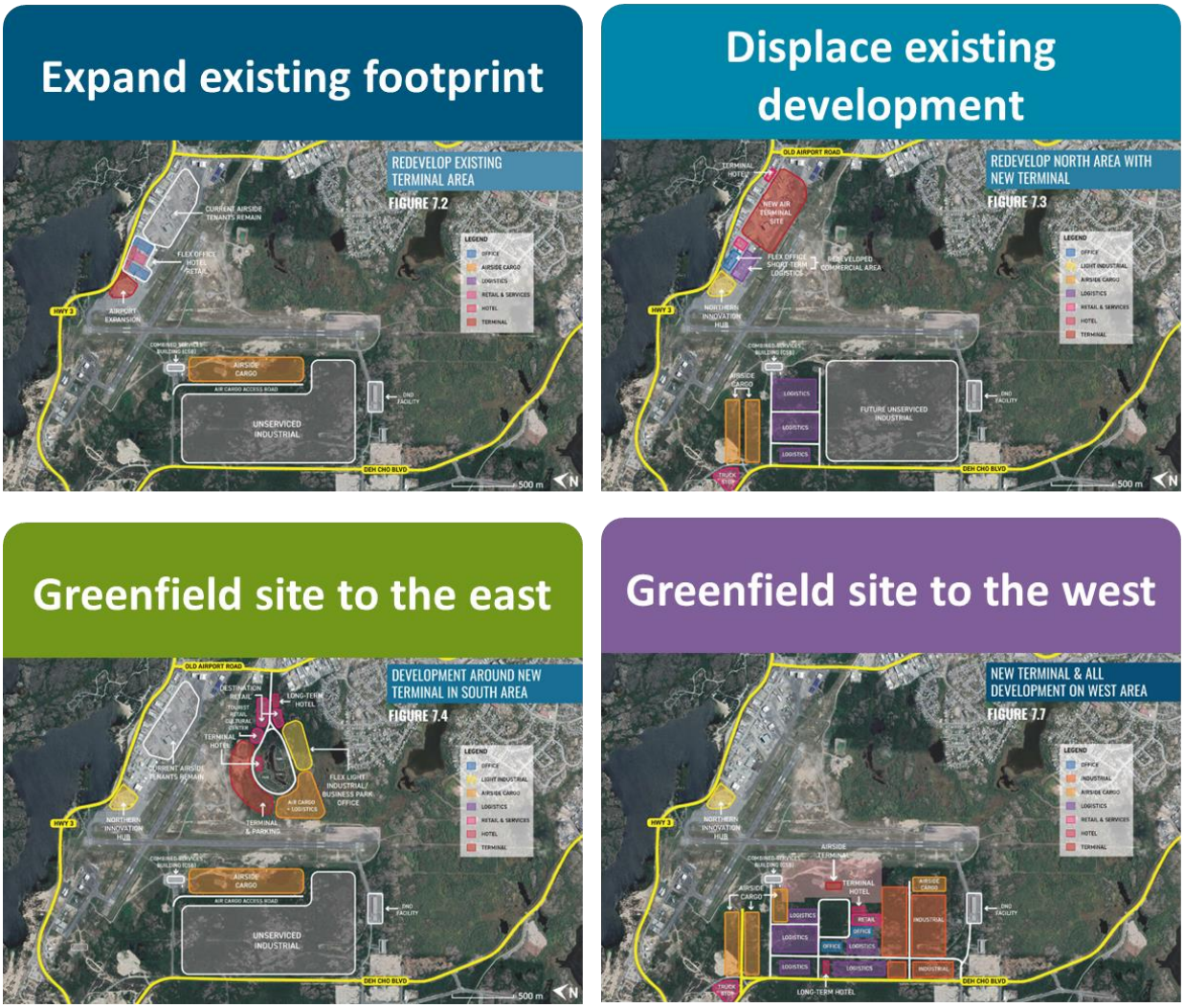
2 Project Starting Point

As a starting point for defining the land use plan, several key reports were evaluated to establish a foundational understanding of existing conditions, past planning efforts, and infrastructure constraints. These reports include:

- Yellowknife Airport Development Plan (2004)
- Yellowknife Airport Development Plan Update (2008)
- MXD Airport Development Program Strategy (2019)
- Stantec Master Plan (2019)
- Tetra Tech Pavement Report (2021)
- Dillon Consolidated Master Plan (2023)
- Tetra Tech Runway Assessment Technical Memo (2024).

Reviewing previous reports adds significant value to the planning process by leveraging past analyses, avoiding redundant efforts, and ensuring continuity with prior strategic initiatives. Many of these studies contain data, forecasts, and recommendations that remain relevant, providing a critical foundation for informed decision-making. For example, pavement condition assessments and runway evaluations help determine infrastructure priorities, while master plans outline long-term development visions that influence land use decisions. Understanding past challenges and solutions allows trends to be identified, assess the effectiveness of previous strategies, and refine the approach to maximize efficiency and sustainability. By incorporating historical context and lessons learned, the land use plan prepared in this study can be an effective strategy to strategically accommodate growth at the airport.

From each of the studies that were conducted, and in consultation with key stakeholders, four land use concepts were identified to consider including where the terminal should be sited in the future. The four options that were identified are shown in the following graphic.



Source: MXD Airport Development Program Strategy, 2019 | InterVISTAS Consulting, 2025

From the initial screening of the concepts, it was determined that upgrading or replacing the existing facility in its current location is impractical for several key reasons. First, the terminal has reached the end of its useful life, and opportunities for modernization, such as meeting current security standards and energy efficiency standards, are severely constrained. Second, the facility no longer accommodates the operational needs of the existing and future aircraft fleet, particularly in the ramp area. Third, the terminal layout is outdated and inadequate for modern passenger services, falling short in areas such as accessibility, circulation flow, queuing, retail space, restrooms, and other essential amenities. Finally, attempting a major reconstruction on the current site would cause significant disruption to airport operations, potentially resulting in operational challenges and high implementation costs that could surpass the expense of building a new facility altogether.

Therefore, expanding the existing terminal by displacing current facilities was determined to be impractical. Although it might seem like a viable option, it would require the removal and relocation of key airport facilities, including aviation support services, hangars, and tenant-occupied buildings which would require a significant cost. Relocating existing cargo and FBO facilities would require replacement facilities to be

developed for a new terminal site. The expenses associated with reconstruction and operational impacts to tenants could outweigh the benefits of a new terminal. A more strategic and sustainable solution would be to explore alternative locations for a new terminal, which would allow more efficient operations and accommodating future growth. Given these challenges, maintaining and expanding the existing terminal footprint through facility displacement is neither a practical nor financially justifiable option.

This study then built upon the previously identified west and east side terminal concepts, carrying them forward for further evaluation. The summary graphic below highlights these two initial concepts selected for further analysis.

Source: MXD Airport Development Program Strategy, 2019 | InterVISTAS Consulting, 2025

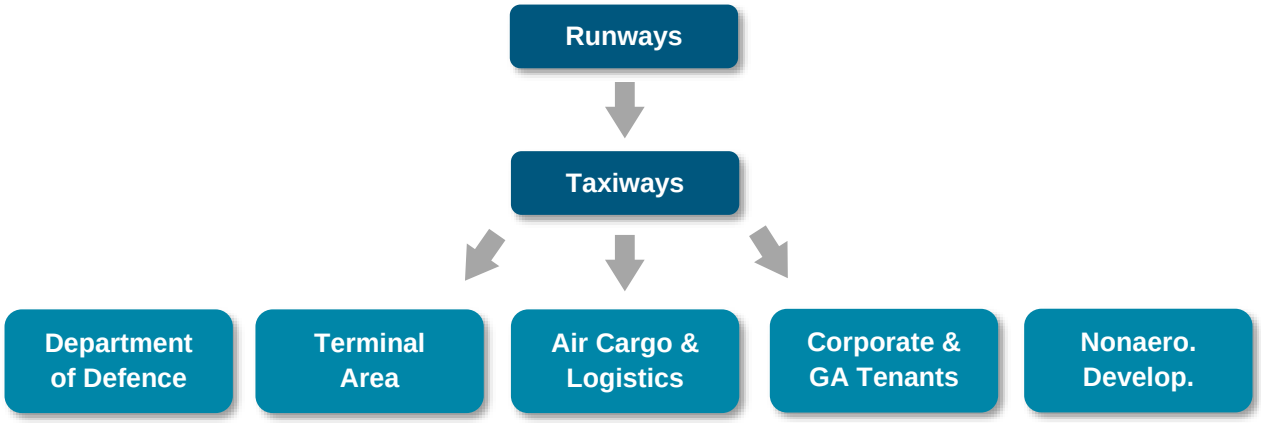
3 Land Use Alternatives

This section presents the process, methodology, and assumptions used for preparing the land use alternative concepts. The objective of evaluating various land use options is to establish a strategic roadmap for the airport, ensuring the incremental development of available land to meet the needs of users and tenants while maximizing its highest and best use.

3.1 Land Use Development Process

The first step in developing land use concepts is to establish the priority of key planning elements. These priorities determine which facilities are least flexible and have the greatest constraints which influence the placement and development of other airport components. At YZF, the highest priority is defining the runway system, as it must adhere to strict setback requirements established by Transport Canada, which, in turn, limits the placement of other facilities nearby. The second priority is the taxiway system, which must be strategically placed to support safe and efficient aircraft operations to the runways and across all movement areas. Finally, the remaining land uses are planned and positioned around these critical airfield components.

The figure below illustrates the prioritization of planning elements at YZF.



Source: InterVISTAS Consulting, 2025

Developing land use alternatives were designed to reflect the Guiding Principles that were defined in a preceding task of the Gateway Phase II study. These principles include:

- Compliance with aerodrome safety and security standards
- Long-term operational readiness
- Optimized facility placement
- Prioritize territorial development
- Community accessibility and convenience
- Coordinated support for Department of National Defence and Arctic Sovereignty

- Environmental sustainability
- Financial sustainability

3.2 Airfield Configuration

The following subsections describe the ultimate airfield configuration for the land use plan.

3.2.1 Runway System Design

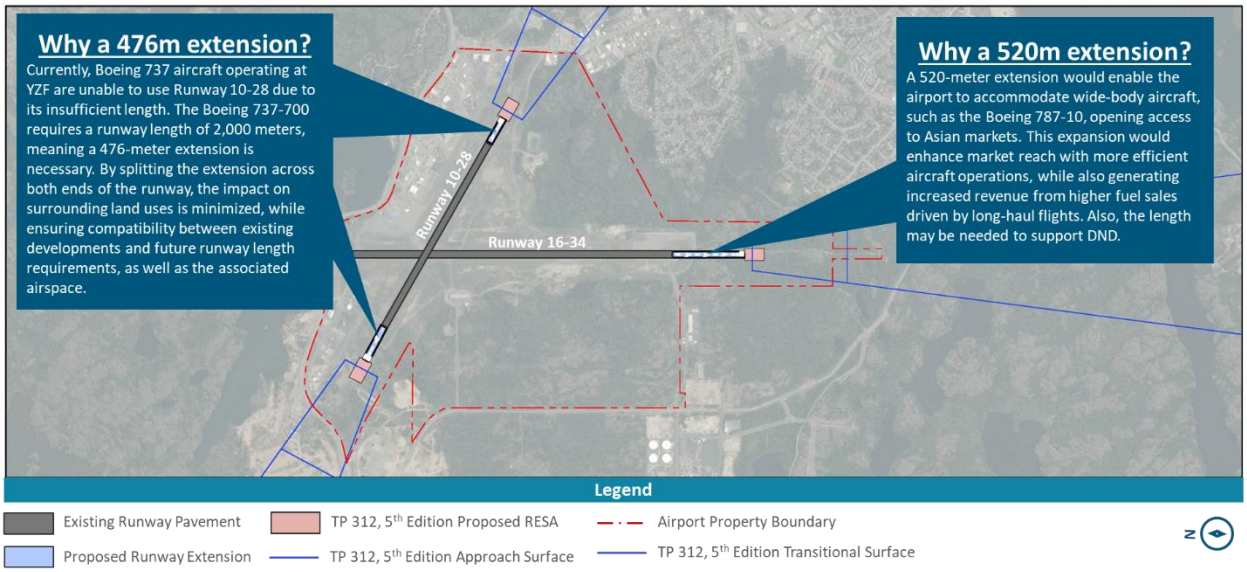
The runway system is the highest priority in airport planning, as they serve the primary function of facilitating the safe movement of aircraft to and from YZF. Additionally, the runway system is the least flexible infrastructure at the airport, as it is heavily influenced by terrain, prevailing meteorological conditions, aircraft performance requirements, the airport's fleet mix, design standards, guidance, regulations, and best practices set by Transport Canada and NAVCanada.

The ultimate runway system design incorporates the recommendations outlined in the current airport master plan. The master plan proposes a 520-meter extension to the south for Runway 16-34. This extension would enable the airport to accommodate wide-body aircraft, such as the Boeing 787-10, allowing the airport to serve new international markets in Asia in the future. By facilitating more efficient long-haul operations, the extension is expected to enhance market reach and generate increased revenue from higher fuel sales and landing fees. Additionally, the added length may be necessary to support Department of National Defence (DND) operations. Given these benefits, the extension remains a valued improvement and should be incorporated into the airport’s ultimate land use plan.

The current airport master plan also evaluated potential extensions for Runway 10-28, with the objective of adding 476 meters of additional runway length. Currently, larger aircraft in the airport’s fleet mix, such as the Boeing 737-700, are unable to operate on this runway. As aircraft continue to increase in size nationally and globally, the utility of Runway 10-28 will diminish unless an extension is implemented. The master plan considered three extension scenarios: a 476-meter extension to the east, a 476-meter extension to the west, and a split extension distributed across both runway ends.

Extending only one end of the runway presents challenges due to adjacent land constraints and potential airspace limitations. Nearby existing development may limit the runway's capabilities, potentially preventing full utilization of the extension for instrument approach procedures and not having the ability to use the full length of the runway for departing aircraft. However, splitting the extension between both ends minimizes impacts on surrounding land uses while ensuring compatibility with existing developments and future operational needs. Additionally, a phased split-extension approach would enable incremental implementation and could be implemented with future runway rehabilitation projects.

The graphic below illustrates the proposed ultimate runway configuration, along with the justification for the recommended extension lengths in the proposed design.



Source: InterVISTAS Consulting, 2025

3.2.2 Taxiway System Design

The taxiway system is the second priority in airport planning, as it plays a critical role in facilitating aircraft movement between parking areas and the runway. While the taxiway system offers more flexibility in development compared to the runway, it remains heavily influenced by the airport's fleet mix, as well as design standards, guidance, regulations, and best practices established by Transport Canada and NAVCanada.

One of the goals of the study was to determine the optimal placement of parallel taxiways for each runway. A parallel taxiway runs alongside a runway, allowing aircraft to move between terminals, aprons, and other airport facilities without occupying the active runway. These taxiways are critical for enhancing airport efficiency, safety, and capacity by reducing the need for aircraft to back-taxi on the runway and minimize the risk of runway incursions.

From a land use planning perspective, parallel taxiways serve as a defining boundary between the runway environment and areas suitable for development. Proper placement is important to maximize developable land while maintaining long-term operational flexibility and efficiency.

It is important to note that taxiway connectors between the runway and parallel taxiways were not defined as part of this planning study. The number and placement of these connectors should be further assessed to ensure their benefits are fully realized before being incorporated into a conceptual plan. Additionally, when placing parallel taxiways, it was assumed that the VOR would remain in place. The location of the VOR at the airport is a significant consideration, as it can directly influence the design and alignment of taxiway systems to ensure aircraft operations remain within safe navigational limits. While taxiways may be permitted within the VOR's critical area, a defined zone where physical structures can affect signal integrity, permanent buildings or fixed structures are generally not allowed within this area due to the potential for signal interference.

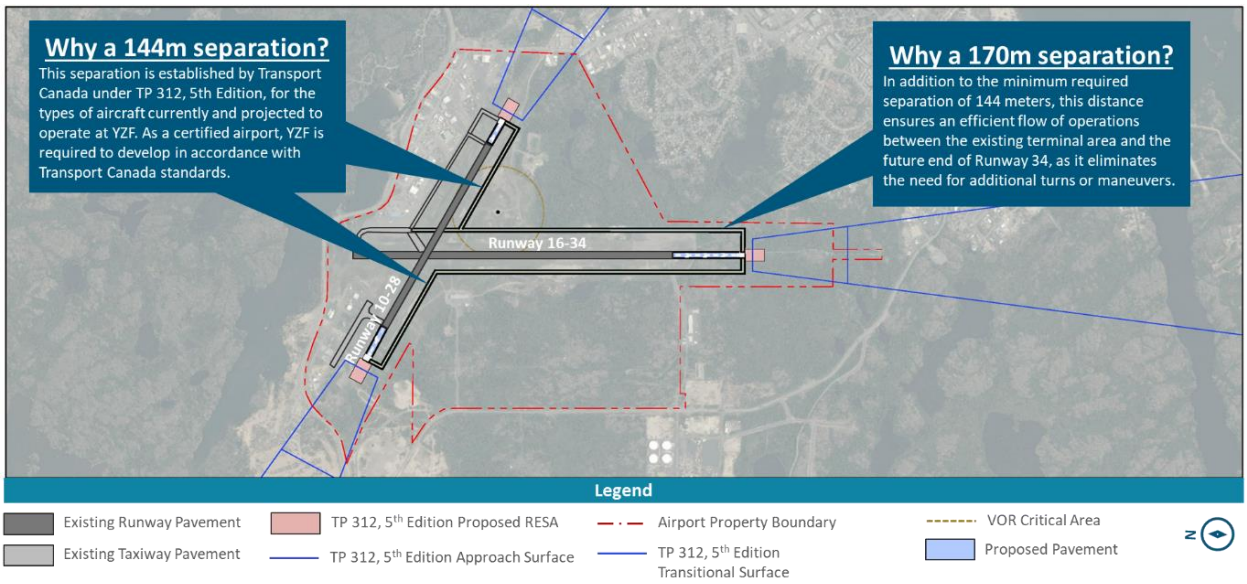
The separation distance between a parallel taxiway and a runway is set by Transport Canada regulations. However, in determining the appropriate placement, this planning effort also considered integration with existing infrastructure. The recommended separation distance for the ultimate parallel taxiway is proposed to be 144 meters from the runway environment along the south side of Runway 10-28 and the west side of

Runway 16-34. This distance aligns with Transport Canada TP 312, 5th Edition, which sets standards based on the aircraft currently operating at and projected for YZF.

Additionally, the recommended separation distance for the parallel taxiway serving Runway 16-34 is proposed to be 170 meters. While the minimum required separation is 144 meters, the increased distance enhances operational efficiency by allowing for a smoother flow of aircraft between the existing terminal area and the future end of Runway 34, eliminating the need for additional turns or maneuvers. The final separation distance between the runway and taxiway should be confirmed during final design of the taxiway system.

As part of the preferred ultimate airfield configuration, it is also recommended that Taxiway A be removed in the future. The acute angle of this taxiway presents operational challenges and should be corrected.

The graphic below illustrates the proposed airfield layout, including runways and taxiways, along with the rationale behind the selected separation distances for each parallel taxiway.

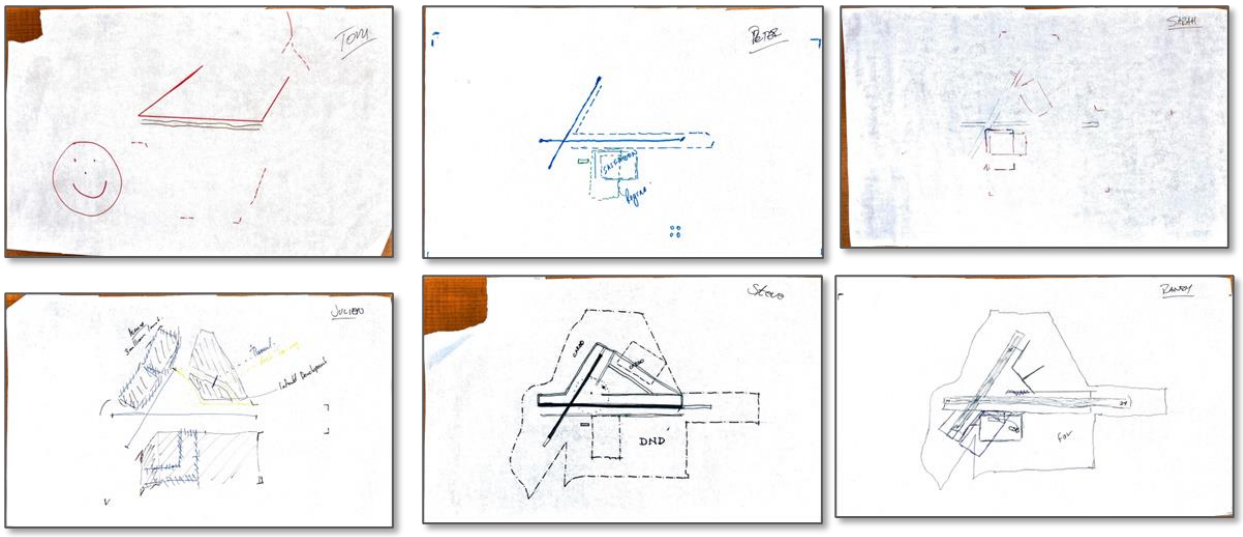


Source InterVISTAS Consulting, 2025

3.3 Initial Land Use Concepts

In October 2024, a workshop was held with airport staff and the consulting team to draft a series of conceptual sketches to outline thoughts and ideas on what a future land use concept could look like with the ultimate airfield configuration defined. The workshop explored various strategies for placing the future terminal on the east or west side of Runway 16-34, expanding both aeronautical and non-aeronautical functions over a 50-year planning horizon, and conceptualizing different land use configurations.

The initial land use sketches from the workshop are illustrated in the figure below. Each concept successfully met all or most of the project objectives and aligned with the Guiding Principles. However, some concepts were expected to require greater capital investment, while others offered higher revenue-generating potential and flexibility for the airport.



Source: InterVISTAS Consulting, 2025

3.4 Terminal Area Programming

From the initial sketches, terminal area concepts were prepared as a stress test to define the space required for the terminal area within a 50-year land use plan. To inform terminal area planning, a benchmarking exercise was conducted, comparing YZF to other airports with higher passenger volumes. The terminal size, apron space, gate capacity, and parking requirements were identified and used from three airports, Thunder Bay International Airport, Regina International Airport, and Saskatoon International Airport. The figure below presents passenger volumes, terminal space, and key operational and capacity metrics for these airports.

Thunder Bay International Airport

Key Metrics
- 714k total passengers in 2023
- 7 aircraft gates
- 3 RON positions
- 4,000 m^2 terminal building
- 31,000 m^2 apron
- 25,000 m^2 parking

Regina International Airport

Key Metrics
- 980k total passengers in 2023
- 7 gates connected with PBBs
- 5 RON positions
- 9,000 m^2 terminal building
- 75,000 m^2 apron
- 60,000 m^2 parking

Saskatoon International Airport

Key Metrics
- 1.27 million total passengers in 2023
- 8 gates connected with PBBs
- 4 RON positions
- 13,000 m^2 terminal building
- 70,000 m^2 apron
- 60,000 m^2 parking

Source: InterVISTAS Consulting, 2025

With terminal requirements established, six terminal area concepts were developed to assess how the spatial needs of the three benchmarked airports could be accommodated on either the east or west side of the airport. The analysis determined that the terminal area should be planned with similar land requirements to Saskatoon International Airport, considering the airport's projected growth in aircraft movements and passenger volumes. Additionally, Saskatoon's terminal footprint and operational layout reflect a scale of development that aligns well with YZF's long-term forecasts, offering a realistic and achievable model for

accommodating future demand while maintaining operational efficiency and flexibility. This approach allows for flexibility and future expansion without disrupting adjacent tenants. It is important to note that space allocated in a 50-year land use plan does not imply immediate full development; rather, it would be built in phases as needed.

The six terminal area concepts were then assessed to determine which ones most aligned with the Guiding Principles as defined in a parallel study under Gateway Strategy Phase II. These principles included:

- Compliance with Aerodrome Safety and Security Standards: Ensures that all infrastructure adheres to relevant safety, security, and operational regulations.
- Long-Term Operational Readiness: Focuses on maintaining infrastructure and systems that are prepared to meet future demands and challenges.
- Optimized Facility Placement: Focuses on efficient placement of terminal facilities to enhance operational effectiveness and resource management.
- Prioritize Territorial Development: Advocates for the growth and expansion of land use in a way that supports territorial development goals.
- Community Accessibility and Convenience: Ensures that land use planning considers the needs and ease of access for local communities.
- Coordinated Support for Department of National Defence and Arctic Sovereignty: Promotes collaboration with the Department of National Defence and interests to align land use with broader strategic goals of the Arctic.
- Environmental Sustainability: Promotes eco-friendly practices in land use, ensuring that development minimizes environmental impact.
- Financial Sustainability: Ensures that the project remains economically viable through careful financial planning and resource allocation.

The graphic on the following page illustrates terminal area concepts for the benchmarked airports, considering both east and west side development options.

Source: InterVISTAS Consulting, 2025

3.5 Defined Land Uses

For this project, land uses were defined specifically to provide a clear foundation for long-term planning. These land uses include Department of National Defense (DND), Terminal Area, Air Cargo, Corporate Tenants, General Aviation Tenants and Non-aeronautical Development. These categories for land uses were developed in combination with airport staff. Defining land uses into major categories is important for developing a strategic land use plan that allows future growth to align with operational needs, regulatory requirements, and economic development goals. Below are definitions of each of the land uses.

- **Department of National Defense** – An area for the allocation for Department of National Defense (DND) facilities.
- **Terminal Area** – An area designated on the airport to support passenger movements. This includes the terminal building itself, as well as support elements such as apron areas, taxiway connections, ground transportation infrastructure and commercial and operational spaces, like concessions, administrative offices and airline support areas.
- **Air Cargo** – Areas allocated for the handling, storage, and transportation of goods and freight by air. This type of land use focuses on supporting the movement of cargo.
- **Corporate Tenants** – Facilities and operations that support corporate, helicopter activity, medical and charter flights, as well as services such as hangars, maintenance facilities, and office space for businesses.
- **General Aviation Tenants** – Areas and facilities allocated for the operations of smaller aircraft. This includes space for small hangars and tie downs.

- **Non-aeronautical Development** – Areas of the airport that are used for commercial, industrial, or other purposes unrelated to the movement of aircraft. These developments typically generate revenue for the airport but do not directly support air traffic or aircraft operations.

Each land use was evaluated to determine the optimal size and configuration for allocation. The graphic below illustrates the recommended space for each designated land use, along with the rationale for these size determinations.

DND

Reserved Area: 72 ha
Rationale: DND has developed plans to support both existing and future development needs. Accommodating DND has a significant economic impact, and their presence can serve as a key driver for justifying future projects and initiatives at the airport.

Terminal Area

Reserved Area: 20 ha
Rationale: YZF has experienced a surge in passenger growth, and the existing facility is at or near capacity. The reserved land will provide enough space to meet needs over the next 50 years, allowing the terminal to grow incrementally while maintaining a high level of service for travelers.

Corporate Tenants

Reserved Area: +/- 50 ha
Rationale: As the surrounding community and region continue to grow, there is an increasing demand for corporations to have aircraft and facilities at YZF to support their operations. The reserved land provides the airport with a valuable opportunity to meet this demand and drive regional business and economic growth.

General Aviation Tenants

Reserved Area: 5 ha
Rationale: General aviation activity enables a variety of operations, such as pilot training, recreational flying, and emerging services, all of which contribute to the aviation ecosystem and the local economy. Preserving this space for these activities allows the airport to promote growth while maintaining its role as a vital community and regional asset.

Air Cargo

Reserved Area: 40 ha
Rationale: Allows YZF to accommodate growth driven by e-commerce and time sensitive goods. Additionally, existing space is not fully optimized and can be further enhanced to ensure the airport remains competitive, supports regional economic growth, and sustain its role.

Nonaeronautical Development

Reserved Area: +/- 55 ha
Rationale: Preserving space for non-aeronautical development enables the airport to offer a variety of services, diversify its revenue streams, and enhance its economic impact, ultimately better supporting the region's needs.

Source: InterVISTAS Consulting, 2025

Additionally, a set of planning parameters and assumptions were defined for each land use concept as noted in the table below.

Element	Planning Parameters & Assumptions
DND Requirements	Develop a plan based on the largest known DND development concept
Terminal	Situated centrally on the airfield, with peer airport benchmarks applied to determine the necessary amount of land to reserve
Air Cargo	While some air cargo facilities may need to be located next to the terminal, the majority can operate independently, away from the terminal area
Corporate Tenants	Maintain corporate tenants in their current location
Small GA Tenants	Maintain small general aviation tenants in their current location
Non-aeronautical Development	Utilize the remaining available land for potential non-aeronautical development

Source: InterVISTAS Consulting, 2025

3.6 Refined Land Use Concepts

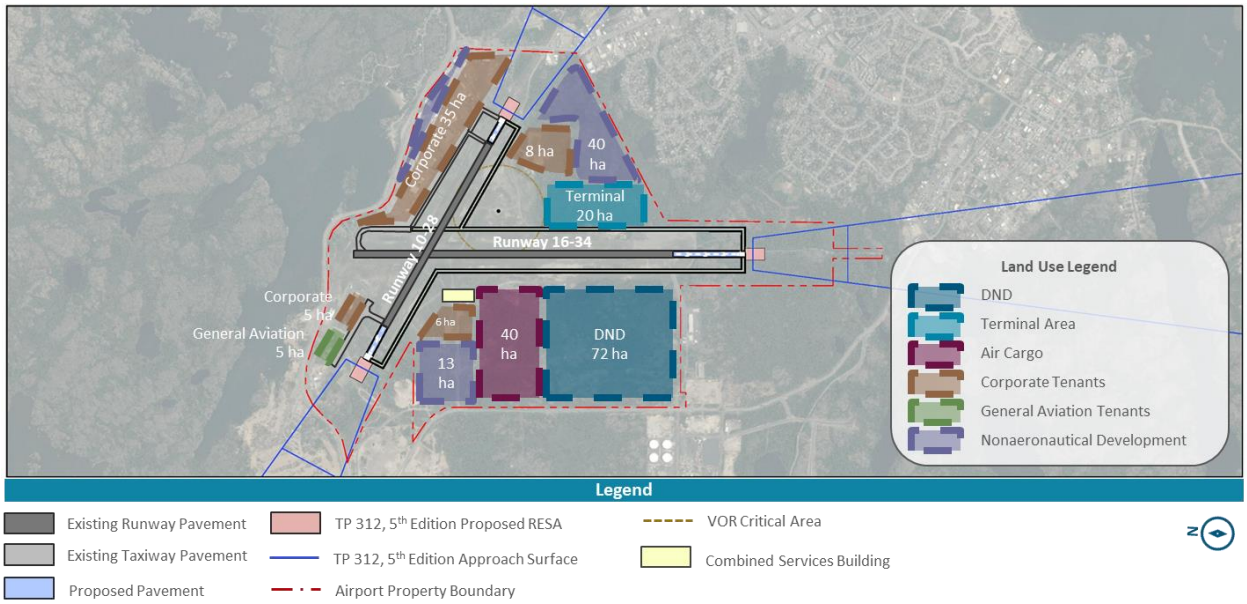
After the initial sketches and the benchmarking exercise of the terminal area, refined concepts were created to align with the direction provided by airport staff. The objective of this refinement process was to develop a set of concepts that focus on the airport's strategic growth while ensuring alignment with the project objectives and guiding principles.

The refined land use concepts were developed by selecting key elements from the initial sketches and programming requirements for a terminal area similar in size to Saskatoon International Airport to best reflect the airport's long-term vision and operational needs. It should be noted that the refined land use concepts show general areas and do not reflect actual location of buildings, aprons or supporting infrastructure that would be built within the specific land use.

The following subsections outline each of the refined land use concepts.

3.6.1 East Side Terminal Area Land Use Concept

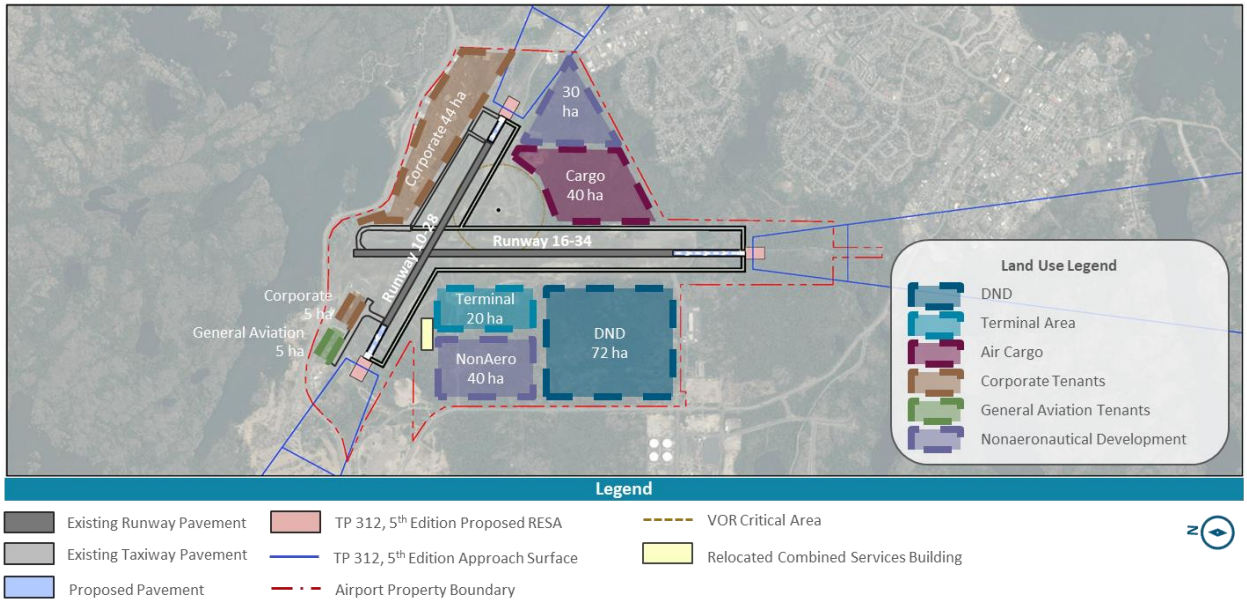
As shown in the figure below, the East Side Terminal Area Land Use Concept reserves 72 hectares on the west side for DND, adjacent to an existing parcel that DND currently occupies but is not on airport property. The terminal area would be situated on the east side, covering 20 hectares between the critical area of the VOR and the airport property boundary. East of the proposed terminal, a mix of corporate tenants and non-aeronautical development would support both corporate activity growth and facilities contributing to community economic development, without requiring airside access. The land use on the northeast side of the airport would remain largely unchanged, combining corporate tenants and non-aeronautical development. The northwest side would be reserved for general aviation and corporate tenants. Lastly, the remaining portion of the west side, south of Runway 10-28, would accommodate a mix of air cargo, non-aeronautical development, and corporate tenants. In this concept, the combined services building would remain in place.



Source: InterVISTAS Consulting, 2025

3.6.2 West Side Terminal Area Land Use Concept

As depicted in the figure below, the West Side Terminal Area Land Use Concept reserves space for DND on the west side, similar to the prior concept. The terminal area would be located on the west side, between DND and Runway 10-28. To the west of the proposed terminal, would be designated for non-aeronautical development. This layout would require the relocation of the combined services building. On the east side, space would be allocated for air cargo, situated between the existing VOR and the airport property boundary. East of the proposed air cargo area, land would be reserved for non-aeronautical development. The northeast side of the airport would be dedicated exclusively to corporate tenants, while the northwest portion would be general aviation and corporate tenants.



Source: InterVISTAS Consulting, 2025

3.6.3 Refined Land Use Concept Evaluation

Evaluation criteria were developed to determine the preferred land use plan and the optimal location for the terminal, specifically whether it should be sited on the east or west side of Runway 16-34. These criteria, outlined in the figure below, compare the two refined land use concepts against the guiding principles. In addition, other evaluation factors such as economic and revenue potential, noise pollution management, air carrier operational costs, and maintenance and operational support were also considered to help further differentiate the two concepts.

Each criterion was subjectively scored as "well," "fair," or "poor" based on how it performed relative to each concept. The evaluation criteria were not weighted, but instead were used to offer insights into which land use concept generally outperformed the other. Based on these criteria, the west side terminal area was determined to be the preferred land use concept.

Evaluation Criteria	East Side Terminal Area	West Side Terminal Area
Compliance with Aerodrome Standards	🟢	🟢
Long-Term Operational Readiness	🟢	🟢
Optimized Facility Placement	🟡	🟢
Prioritize Territorial Development	🟢	🟢
Community Accessibility and Convenience	🔴	🟢
Coordinated Support for Department of National Defense and Artic Sovereignty	🟢	🟢
Environmental Sustainability	🟡	🟢
Financial Sustainability	🟡	🟢
Economic & Revenue Potential	🔴	🟢
Noise Pollution Management	🔴	🟡
Air Carrier Operational Costs	🟡	🟢
Maintenance and Operational Support	🔴	🟢

Legend

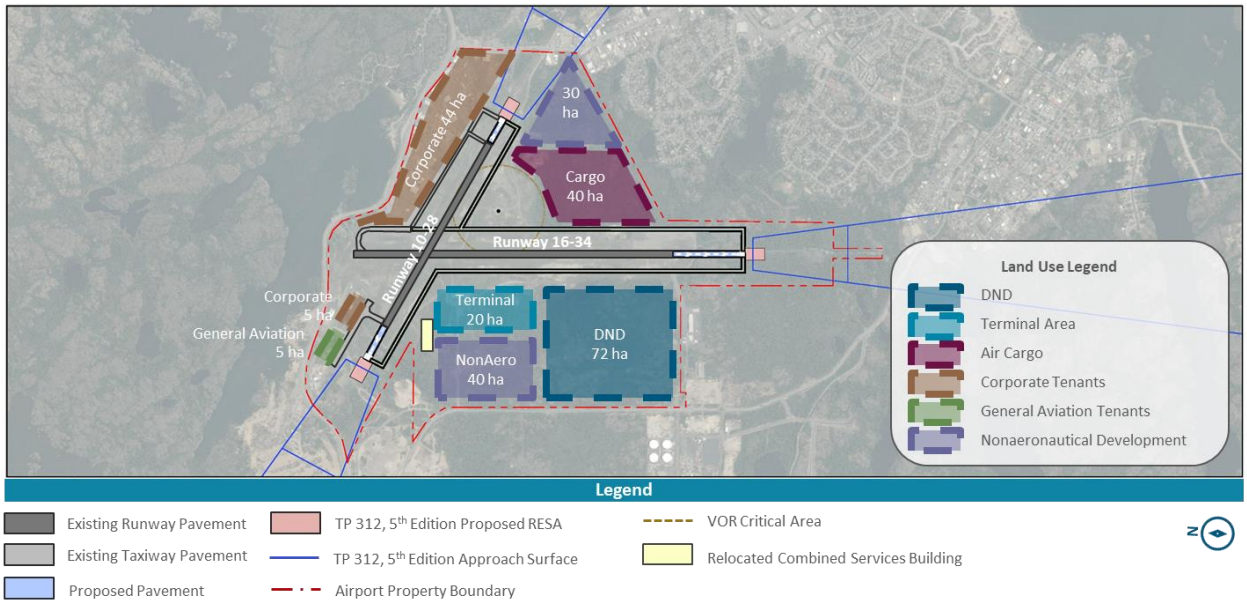
- 🟢 Performs well compared to other alternatives
- 🟡 Performs fair compared to other alternatives
- 🔴 Performs poorly compared to other alternatives

Source: InterVISTAS Consulting, 2025

3.7 Preferred Land Use Concept

Advancing the development of a new terminal at Yellowknife Airport is critical at this time, as the existing facility is reaching the end of its functional life and no longer meets current standards for passenger processing, security, or operational efficiency. Delaying the project could lead to increased maintenance costs, operational disruptions, and missed opportunities for economic growth. With annual passenger volumes expected to exceed 605,000, the existing infrastructure will face mounting pressure that could compromise service quality and regional connectivity. A phased terminal development—anchored by the Strategic Land Use Plan—will ensure the airport can accommodate future demand while enhancing flexibility, efficiency, and the overall passenger experience. Moving forward now also enables YZF to pursue funding opportunities from federal and territorial programs, and to align with potential Department of National Defence investments, strengthening the project's financial feasibility and long-term strategic value.

The West Side Terminal Area Concept as shown below was selected as the preferred land use concept as it aligns most closely with the guiding principles, project objectives and additional evaluation criteria to better define some of the key difference between the two concepts.



Source: InterVISTAS Consulting, 2025

Several key factors contributed to the selection of the West Side Terminal Area Concept as the preferred land use concept, as outlined below.

Strategic Placement for Airfield Efficiency

The terminal's strategic location provides operators with seamless access to both of the airport's runways. By placing the terminal on the west side, it reduces the need for operators to cross an active runway when departing, which is particularly beneficial in aligning departures with the airport's predominant wind direction. By avoiding runway crossings, the terminal's positioning not only enhances operational safety but also streamlines traffic flow, reducing potential delays and improving overall efficiency for both arrivals and departures.

Consolidation of Land Uses

Defining distinct zones for specific tenant needs plays a critical role in maximizing the use of available space, ensuring that every square meter is purposefully used to the fullest extent possible. By organizing the layout based on tenant requirements, the facility can be customized to support the diverse operations of each business, whether it's for aviation services, office spaces, or other specialized activities. This approach not only enhances operational efficiency by minimizing unnecessary movement and congestion but also fosters a tailored environment where tenants have exactly what they need to operate effectively. Creating these dedicated spaces promotes smoother workflows, reduces the potential for conflicts, and ultimately helps tenants thrive in an environment that is aligned with their unique business operations and goals.

Reduced Environmental Impact

By situating the terminal further away from existing developed areas, the potential environmental impact on surrounding residential and commercial properties is reduced. This thoughtful placement helps to mitigate wetland impacts, noise pollution and air quality concerns that may otherwise affect nearby communities. By placing the terminal on the west side, the airfield creates a natural buffer zone between the terminal and established developments and the airport can better manage the effects of its operations, ensuring that

residential neighborhoods and businesses are not adversely impacted by airport activity. Additionally, this strategic location allows for more sustainable planning, potentially incorporating green spaces and noise abatement measures, which can further minimize the environmental footprint and enhance the quality of life for those living and working in the area.

Long-Term Economic Diversification

Portions of undeveloped land on the west side of Deh Cho Blvd present an opportunity for further development, potentially transforming the area into a vibrant hub for amenities or a business district. By utilizing this underdeveloped land, the region can accommodate a variety of commercial enterprises, retail spaces, office buildings, or leisure facilities, creating a dynamic area that serves both local residents and visitors. This development could not only enhance the local economy by attracting businesses and creating jobs, but it could also provide much-needed amenities, such as restaurants, hotels, and entertainment options, which would improve the overall quality of life. Placing the terminal on the west side could be a catalyst for unlocking new economic opportunities along Deh Cho Blvd.

Improved Traffic Flow and Accessibility

Locating the terminal area on the west side would enhance traffic flow for passengers and employees accessing the terminal. By utilizing Deh Cho Blvd, a potentially underutilized roadway, traffic could efficiently reach the west side of the airport with minimal improvements needed to accommodate increased volumes. In contrast, placing the terminal on the east side would exacerbate congestion on Old Airport Road, which is already heavily trafficked. Shifting traffic circulation to the west side would help alleviate pressure on major arterials, reducing congestion and providing benefits for both airport users and the surrounding community.

Foundation for Site Utilities

If DND moves forward with their proposed plan, they have the potential to play a key role in laying the foundation for the utilities necessary to support a future terminal area. By proactively investing in the infrastructure required for utilities such as water, electricity, sewage, and communication systems, DND can set the stage for future development, streamlining the overall construction process. Additionally, by integrating these utilities into the broader planning process, DND can ensure that the systems are optimized for future growth and demand, making the transition to a fully operational terminal area more efficient and cost-effective. This strategic groundwork not only enhances the long-term sustainability of the project but also supports a smoother and more financially viable development process.

A summary of the key rational for the placement of the terminal on the west side is shown in the figure below.

Source: InterVISTAS Consulting, 2025

4 Next Steps/Recommended Actions

YZF plays an essential role in the Northwest Territories' transportation network, serving as a hub for commercial air service, medevac flights, cargo operations, military activity, and general aviation. A well-defined land use plan provides a long-term framework for aligning development decisions with operational needs, regulatory requirements, and economic priorities. It ensures that critical infrastructure such as runways, taxiways, terminals, and support facilities are positioned efficiently, that land is preserved for essential functions, and that opportunities for nonaeronautical revenue generation are maximized without compromising aviation operations.

Moving forward with the new terminal is particularly important now because the existing facility is nearing the end of its useful life and no longer meets modern standards for passenger processing, security, or operational efficiency. Delaying action increases the risk of service disruptions, higher maintenance costs, and lost opportunities for economic development. With passenger volumes projected to surpass 630,000 annually and increased pressure on infrastructure, a phased terminal development, guided by the Strategic Land Use Plan, will provide the capacity, flexibility, and user experience needed to support the region's mobility and economic resilience. Furthermore, advancing terminal development now positions the airport to secure funding from federal and territorial sources while aligning with potential Department of National Defence investments, maximizing cost-efficiency and strategic value.

In order to move forward with the preferred land use concept and the associated placement of the future terminal on the west side for Runway 16-34, there are a series of actions that YZF staff will need to complete. Recommended actions have been summarized into four distinct categories as defined below.

- **Technical** studies and actions involve assessments, analyses, and projects that address the physical, engineering, and operational aspects of airport infrastructure, systems, and technologies for the future terminal. These studies focus on defining growth opportunities, the requirements for the terminal and preparing financial strategies to fund the overall program.
- **Policy** studies and actions involve the creation, review, and modification of policies and planning documents that govern the airport's operation, management, and development. These efforts focus on preserving the airport's functionality and flexibility, preventing encroachment from adjacent land uses, and establishing local guidelines to support future development.
- **Business strategy** studies and actions analyzing and developing plans that focus on the airport's financial sustainability, commercial opportunities, and overall growth. These studies ensure that the airport remains competitive, efficient, and responsive to changing market conditions.
- **Advocacy and engagement** studies and actions focus on building and maintaining relationships with key stakeholders, including the community, government agencies, airlines, and other partners. These studies aim to enhance the airport's public image, secure support for projects, and ensure alignment with local, state, and federal policies.

A summary of recommended actions is provided in the figure below.

Source: InterVISTAS Consulting, 2025

The timing of these actions should be carefully phased rather than implemented all at once. They should be strategically scheduled based on the availability of financial and staff resources, as well as key trigger points in the future terminal program's lifecycle.

However, it is recommended that YZF prioritize the demand forecasts and future terminal area plan as the next critical step. This foundational work will support future technical, policy, business, and advocacy efforts. To align with the goal of opening the future terminal area in 2031, it is recommended that the demand forecast, and terminal area planning begin in 2025.

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