



Vermilion Municipal Airport Master Plan

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*From Operations Economics Inc. with
Tetra Tech Canada Inc.*

Completed for

The Town of Vermilion



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1. Introduction

The Town of Vermilion (the Town) has undertaken development of a master plan to identify runway and facility improvements that will meet local needs, conform with Transport Canada standards for a registered aerodrome and potentially a certified aerodrome. In addition, the plan will identify potential economic opportunities and a supporting capital plan to increase aviation usage at the Vermilion Municipal Airport (YVG). The plan will ultimately be used to help secure grant funding from the Provincial and possibly Federal government.

Master Plan Objectives

The objectives of this project identified by the Town are to:

1. plan to meet medivac minimum requirements
2. Develop a business plan for a residential subdivision for hangar style homes on the airport land Identify Transport Canada standards for a Registered Aerodrome
3. Develop a short-term capital improvement plan to maintain registered aerodrome status
 - a) Runway, Taxiway, and Apron resurfacing Assessment
 - b) Lighting and Equipment Assessment
 - c) Terminal Building Assessment
4. Identify Transport Canada standards for a certified airport
 - a) Develop a long-term capital improvement plan to become a certified airport
5. Identify economic opportunities that encourage aviation usage
6. Identify minimum upgrade requirements that will encourage increased aviation usage
7. Identify minimum requirements for fixed wing medivac airplanes
8. Develop a capital improvement
9. Gather data/rational to support a grant application to the Provincial and Federal Government

Airport Role and Location

The Town is situated in the County of Vermilion in eastern Alberta, approximately 60 km west of Lloydminster. YVG was built by the Province of Alberta in the 1960s and turned over to the Town during the 1970s and has been owned and operated since then. The Vermilion Municipal Airport (YVG) is a registered aerodrome located in the northeast portion of the Town with a land area of approximately 150 acres. The airport is operational 24 hours per day, 7 days per week;

and is capable of supporting VFR (visual flight rules) and night operations. The aircraft maneuvering areas consists of one asphalt runway and a taxiway, plus a public apron. Runway 10 is 3,378 feet long by 75 feet wide and Runway 28 has a displaced threshold with a runway of 2,292 feet long by 75 feet wide.

The airport's facilities include an air terminal building (ATB) and a hangar. Most of the terminal building space is rented out to local artists and the hangar is currently used for Town storage.

The Airport is located within one kilometer of the Vermilion Health Centre, which has a certified heliport, and a registered helicopter instrument approach.

The airport groundside properties are serviced by municipal water and sewer systems. Non-aviation uses of land at CYVG include 93 acres of hay crop leasing and a mobile home in front of the ATB.

Prior to that, in 2014, approximately 30 acres was subdivided from the airport and developed by the Town for an Industrial Subdivision. Currently, three (3) of the eight (8) lots have been sold.

The Airport properties and adjacent lands are designated within the Town's Land Use Bylaw as "Urban Reserve." This land use zone is restrictive towards development, permitting single family dwellings on existing parcels only, and restricts further subdivision of properties.

Figure 1-1: Vermilion Airport Aerial View

Source: Google Earth, 28 November 2018.

Strategic Context

Vermilion is in a region that supports significant agricultural and energy operations and employment. It is a small, well established and diverse community with a population of approximately 4,000. It boasts a stable economy and pleasant, outdoor-oriented lifestyle alternative.

The Town has strong transportation connectivity. It is located at the junction of Highways 16 (Yellowhead) and Highway 41, a north-south highway linking Cold Lake to Medicine Hat. The Yellowhead Highway is twinned from Lloydminster to Jasper. In addition, the CN Rail mainline passes through Vermilion. Both the CN Rail mainline and the Yellowhead Highway pass within 1 km of YVG.

Vermilion Airport has committed land for agricultural operations as well as undertaken two subdivisions of the airport property for light industrial development. The relative proximity of both the CN Rail Mainline and the Yellowhead Highway do provide the opportunity for the airport to develop as a logistics centre as well as an industrial area with broad continental and/or global connectivity.

The closest scheduled passenger service is available at the Lloydminster and Edmonton airports.

Planning Principles

The following principles were developed to guide the planning process. The Master Plan aims to:

- Guide the development of airport facilities in a safe and cost-effective manner.
- Support the community's sustainability by paying attention to social, economic and environmental factors in the development of the plan.
- Ensure the facility has the capability and flexibility to meet future changes in air transportation, technology and operations.
- Promote economic growth through aviation, aerospace and tourism development and other transportation related initiatives.
- Maintain a low- cost fee structure while meeting customer demand and expectations.

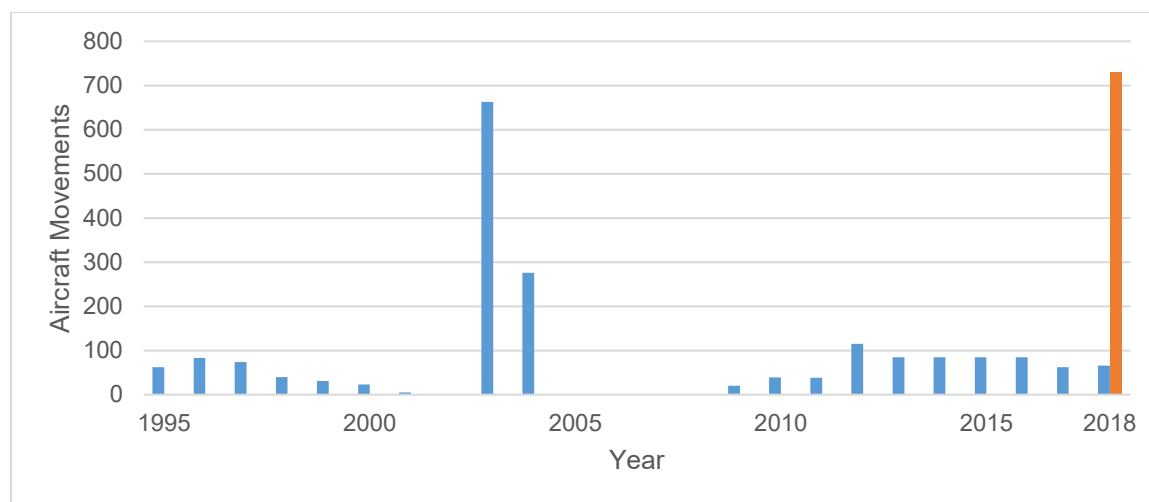
2. Aviation Activity and Scenarios

Aviation Activity

Aviation uses of YVG are a mix of general aviation (GA) uses by recreational and commercial uses. The most recent data indicates 66 aircraft movements annually, but the data is likely inaccurate as it relies on self-reporting. An airport usage study for YVG conducted in 2004 counted 663 movements in 2003 and 276 movements in 2004 – approximately one to three movements per day. Commercial aviation operations at the site have include agricultural spraying operations, daily courier service, aerial medical support services, and charter passenger flights.

Aviation movements at YVG for the past 15 years have been gathered through sign ins of the airport log book (summarised below). They appear underreported, as the annual movements average approximately 100 per year or one movement every two to three days. It should be noted that when an aircraft movement study was undertaken during 2003 – 2004 the average aircraft movement ranged between one and three movements daily. Anecdotally, airport observers indicate that the actual number of movements is most likely to be one to five movements daily. The orange bar in 2018 shows how many movements per year there would be with two movements per day – 730 annual movements. During 2018 the Town installed cameras on the runway to track flights. Between mid May and mid December the cameras recorded 248 flights or approximately 35 flights per month.

Figure 2-1: Annual Recorded Aircraft Movements



Source: Vermilion Airport logbook

Scenarios

Several scenarios for airport development at YVG are considered. These include the following three:

1. Accommodation of fixed wing air ambulance operations.
2. Modification of taxiways and aprons to accommodate significant development of airport properties for a mixture of residential, industrial and commercial uses of both an aviation and non-aviation nature.

> Scenario 1 - Fixed wing air ambulance operations.

In this scenario the airport is upgraded to support fixed wing medevac service. Based on discussions with the medevac operator, Can-West Aviation, medevac flights from Edmonton are made via King Air 350. The operator would require a minimum runway length of 4000' to support fixed wing medevac operations. A new GNSS approach would also have to be designed as the NDB has been decommissioned. It is assumed for this scenario that if the runway was this length, it could support the traffic although only the western end of the runway could be used.

- Key assumption to configure the airport to support fixed wing air ambulance operations include
 - runway lengthening to 4000' including property acquisition (if possible) and possible runway widening;
 - establishment of additional instrument approach
- Site remains a registered aerodrome
- Property development of remaining airport properties would proceed with existing subdivisions – no change in the short term.
- Revenue Streams – no significant change

> Scenario 2 - Development of airport property for a mixture of residential, industrial and commercial uses for both aviation and non-aviation

- Key assumption is that the growth and development at the airport will be based on property development rather than investment in expanded airport infrastructure.
 - Extend or construct new taxiway to provide airside access to new development of GA hangars and residential buildings with hangars
 - Extend taxiway to industrial park to provide airside access to some industrial park subdivision lots
 - Develop residential properties with airside access on the western side of the airport adjacent to 44th Street
 - Property rezoning

- Develop a separate Agricultural Aviation operations base at the eastern end of Runway 10-28 to segregate handling of chemicals from rest of airport and facilitate quick cycles of aircraft
- New Revenue Streams would include:
 - Property lease and or sale
 - Property taxes
 - Airport Sales Tax

Fly-in Homes

There are hundreds of airparks in the U.S., but they have not developed in a robust manner in Canada. The Okotoks Air Ranch was established in 2005 as Canada's first private airpark but voluntarily surrendered its operating certificate to Transport Canada in 2016 over safety concerns and reopened as an operating airport in 2017. The safety concerns related to incursions into the airfield by humans and animals. Some businesses left at the time of the original closure and have not returned. The real estate development approached the municipality about supporting the site around the time of the closure, but no agreement has been reached.

A developer at Wetaskiwin Regional Airport is offering lots where residences can be developed into aviation hangars. Skyport is offering fee simple lots with airside access. The municipality sold the original development to the developer when it had numerous empty and unused hangars. The municipal by-law requires that 75% of the floor space for hangars be used for aviation hangars but other uses such as offices and residences are allowed on mezzanine floors. All lots at the airport are covered under airport zoning of the municipality and are therefore subject to its regulations. An aerial view of hangars at Wetaskiwin is shown in **Figure 2-2**. Aspects of the Wetaskiwin by-law related to airport zoning are provided in **Appendix A**. This flexible zoning approach may be a reasonable model for Vermilion to follow. The airport has a combination of leased and free-lot hangars available. However, the Wetaskiwin developer has not proceeded with a second phase of development because demand is weak. Also, hangars at the airport are taxed at business tax rates whether they have residences or not which is a deterrent to further development.

Cooking Lake Airport is seeking a zoning amendment from the Strathcona County to allow the development of residential spaces within hangars at the site.

Figure 2-2: Wetaskiwin Regional Airport Hangars



Source: Google Earth, 6 January 2019.

3. Regulatory Context

Airports in Canada are governed by the Canadian Aviation Regulations (CARs), which are enabled by the *Canada Aeronautics Act*. Aviation is a federal jurisdiction, and the Act and CARs supersede provincial and municipal related laws and regulations. The CARs contain comprehensive requirements for airport ownership, operation, administration, management, land use development, planning. Transport Canada has prepared a guidance document for Airports entitled, *Aerodrome Standards and Recommended Practises – TP312, 5th Edition*. The latest version became effective on 15 September 2015.

Airport Classification in Canada

Transport Canada issued the National Airports Policy in the mid-1990s at which time they classified airports across the country in terms of their role in air transportation and their locations.

The National Airports System (NAS) includes airports in all national, provincial and territorial capitals, as well as airports with significant annual passenger. Currently, the 26 NAS airports serve approximately 94% cent of all scheduled passenger and cargo traffic in Canada and are the points of origin and destination for almost all interprovincial and international air service in Canada.

Airports maintaining annual passenger levels above 200,000 for three consecutive years may be candidates for inclusion in the NAS. Conversely, airports other than those serving national, provincial or territorial capitals, whose traffic falls below 200,000 passengers for three consecutive years, will no longer be considered part of the NAS.

Regional and Local Airports constituted those airports significantly less active than NAS airports but with scheduled passenger air services.

Small airports are those certified airports that do not have scheduled passenger services.

Remote airports were designated as those sites in the provinces of Canada receiving Transport Canada operational and capital financing where the airport was the only year-round means of accessing the community.

Arctic Airports refers to those airports with commercial air service in the three territories of Canada, excluding the airports in the territorial capital cities.

4. Airport Certification versus Aerodrome Registration

One of the fundamental questions aerodrome operators must address in today's competitive aviation industry is whether there is a requirement for the aerodrome to be certified. Vermilion Airport (YVG) was certified under TP312 4th Edition until 2005, and has since reverted to Registered Aerodrome status, as published in the Canada Flight Supplement.

In Canada, there are approximately; 1,500 registered aerodromes and 550 certified airports. The remaining 5,000 or so aerodromes (airstrips) are neither registered nor certified. Operators must carefully evaluate which designation (certified or registered) best suits the needs of an aerodrome, the market it serves, and, how that designation may impact the operational complexity and cost of the aerodrome.

Registered Aerodrome

A Registered Aerodrome is an aerodrome registered by the Minister pursuant to Subpart 1 of Part III of the Canadian Aviation Regulations (CAR 301). Although registered aerodromes may be inspected by Transport Canada, it is not a frequent occurrence.

A Registered Aerodrome operator must comply with the CAR 301 requirements, including the provision of information respecting the location, markings, lighting, use and operation of the aerodrome. If this information is provided the Minister shall register the aerodrome and publish the information in the Canada Flight Supplement (CFS). The CFS is compiled and printed by Nav Canada.

The information provided includes the markers and markings for closed or unserviceable areas; warning notices identifying hazards; wind direction indicators (or specification of an alternative observation tool e.g., smoke stacks); coloured lights or retro reflective markers for night-time operations. The aerodrome operator is also responsible to maintain safe conditions on manoeuvring areas. Prohibitions include prevention of obstructions on movement areas; proper lighting for towed vehicles; restraint on animals, no open flames and no discharge of firearms without permission from the operator.

Certified Airport

A Certified Airport is also regulated, but under Subpart 2 (CAR 302) and is defined as an aerodrome for which an airport certificate is issued pursuant to the regulation. An airport operator is required to meet a higher level of regulation and is subject to standards in force at the time of certification. Transport Canada undertakes formal surveillance of certified airports: inspections; assessments, etc., to confirm compliance.

If an aerodrome meets any of the following conditions, the to the owner must apply for certification:

- a) the aerodrome that is located within the built-up area of a city or town;
- b) the land aerodrome is used by an air operator for a scheduled service for the transport of passengers; and/or
- c) the Minister believes meeting the requirements necessary for the issuance of an airport certificate would be in the public interest and would further the safe operation of the aerodrome.

If the aerodrome meets any of the conditions the owner must then submit the following information to the Minister for approval:

- a) an application for an airport certificate; and
- b) a copy of the proposed airport operations manual in respect of the airport.

Once approval is obtained the airport operator must ensure that:

- a) the standards set out in the aerodrome standards and recommended practices publications are met; or
- b) based on an aeronautical study, the Minister determines that:
 - i. the level of safety at the aerodrome is equivalent to that provided for by the standards set out in the aerodrome standards and recommended practices publications, and
 - ii the issuance of the airport certificate is in the public interest and not detrimental to aviation safety.

Integral to certification is the existence and use of an Airport Operations Manual (AOM) approved by Transport Canada – Civil Aviation Safety. The AOM must accurately describe the aerodrome’s administrative arrangements; physical specifications; as well as plans and services. The AOM must also stipulate that the airport conforms to the aerodrome standards and recommended practices (TP312) in force on the date the AOM is approved, and the Airport Certificate is issued.

A certified airport carries other significant, and regulated, operating responsibilities:

- A compliant Emergency Response Plan (CAR 302 Division II)
- A compliant Wildlife Management Plan (CAR 302 Division III)
- A compliant Safety Management System (CAR 302 Division V)

Additional regulatory burdens affect certified airport operators, and more regulations are to be introduced in the near term:

- Aerodrome Consultation (CAR 307) – building/expanding aerodromes – currently in force
- Winter Maintenance Operations Plans – Pending
- Global Reporting Format (GRF) - Pending

Discussion

Certified airports are required to conform to more rigorous standards than Registered Aerodrome. It is important however to consider that many aerodromes do not trigger the certification requirement and for several reasons, operators have opted not to certify but to register their aerodromes. These aerodromes may still meet the standards (TP312) that certified airports must meet; however, the not to certify allows aerodrome operators more flexibility (discretion) in day-to-day airport operations. This flexibility can lead to more financial efficiency while still delivering a high level of safety for aircraft operators who may use the facilities.

There is a common misconception that aircraft operators and Transport Canada Aviation Inspectors view certified airports as superior to registered aerodromes. Scheduled airlines, and some corporate aircraft operators, though, are required to operate to/from certified airports only.

A registered aerodrome can meet and exceed all the requirements (standards, plans, services, etc.) of a certified airport. It is the airport operator's responsibility to determine whether meeting that standard is desirable, cost-effective and meets market needs.

Transport Canada Civil Aviation Safety have also indicated that they encourage smaller certified airports to de-certify, if there is no compelling requirement to remain certified, i.e. the airport does not have scheduled airline services and is not located within a built-up area, why certify.

Transport Canada is finding it difficult meet airport surveillance obligations due to resource constraints and has been active in encouraging a reduction in the number of certified airports in Canada. In the mid-1990s there were 726 certified airports, while last year there were only 547. The increased Transport Canada regulations mentioned above, targeting more performance-based requirements, adds to that workload at each individual airport. More and more airport operators are being asked to monitor themselves. So, there is not only an increased regulatory burden, but an administrative one as well which adds to operating costs.

Registered Aerodromes, managed by responsible operators, do not necessarily need, nor are they subject to, regular Transport Canada inspection. Registered aerodromes can be as well managed as certified airports, but for more reasonable cost.

The table shown in **Figure 4-1** identifies some of the positive and negative attributes associated with operating a Registered Aerodrome, as opposed to operating a Certified Airport.

Figure 4-1: Registered Aerodrome versus Certified Airport

POSITIVE	NEGATIVE
Lower Costs associated with Transport Canada regulation are lessened.	Aerodrome does not need to meet TP 312 Standards
Less Regulation	Some corporate aircraft operators will not allow their equipment to use the aerodrome
Fewer regulatory changes	The airport would not be open to scheduled CARS 704 commuter or 705 airline services.
The local taxpayer may be required to fund additional resource needs – however the costs can be managed as and when required.	Regular inspections by Transport Canada inspectors will not occur placing the onus on operators to ensure facilities meet a “reasonable” standard (risk management).
The aerodrome operator has more flexibility on managing the airport e.g. signage, airport appearance, services	Registered Aerodromes are often known to lack on-site airport management and maintenance personnel.
Private pilots prefer well managed low-cost airports.	Lack of an Airport Operations Manual and accountable management personnel.
Overall operating costs are lower.	May impact air medevac services
Transport Canada is considering de-certifying airports that do not have scheduled airlines or are not located in a built-up area.	Access to some grant programs may be limited by the nature of air service or classification of the aerodrome.

The Vermilion Airport is presently a registered aerodrome for the purposes of the Canadian Aviation Regulations (CAR 301). As it was previously a Certified Airport, it likely meets many of the Standards requirements (TP312). Major deficiencies at this point would be the absence of Transport Canada approved Airport Operations Manual; Emergency Response Plan; Wildlife Management Plan and Safety Management System.

A further complication is that to be re-certified would require the Town to ensure that YVG could meet the standards contained in the 5th Edition of TP312 which was promulgated in September of 2015.

A review of the 2005 (former) AOM, as part of the Master Planning process showed several amendments required to the main body of the document. Airport management will have to review the emergency planning regulation (CAR 302 Division II); the wildlife management regulation (CAR 302 Division III); and the safety management system regulations (CAR 107 and CAR 302 Division V) to determine requirements and formulate compliant plans for Transport Canada approval.

The need to re-certify should be considered against the likelihood of scheduled airline service in the future at Vermilion, or urban development around the entire airport location in the future.

By maintaining a recognized standard, the airport can position itself as a quality registered aerodrome while at the same time many of the associated costs e.g., on-site full-time management personnel, regulatory requirements (emergency, wildlife risk assessment and management plans and SMS) will be minimized.

Airport Classification Systems

Beyond this, airports are classified in several ways because planning relates to both air space and land planning. Examples of how airports are classified include

- Aircraft Approach Speed Category.
- Aircraft Classification Number (ACN), expressing an aircraft's loading effect on an airport's pavements.
- Aircraft Group Number (AGN), based on the size of aircraft able to use a runway, taxiway and apron.
- Pavement Classification Number (PCN), expresses the bearing strength of airport pavements.
- Runway types: non-instrument, non-precision and precision.

The diversity of measures is because aviation is complex. The most important of these is the Aircraft Group Number (AGN), which is used to analyze the critical aircraft for an airport and is related to all other classifications. The principles of airport planning in Canada are explained in Transport Canada's "Aerodrome Standards and Recommended Approaches," TP312 5th edition.

The current AGN classification system is new since the Merritt Airport's last planning analysis.

Typically, airports are designed for the aircraft that typically use them, and these are referred to as the airport's critical aircraft. Larger and faster aircraft drive requirements for larger airport infrastructure (runway length, width, etc.)

The Transport Canada classification system is based on standards set by the International Civil Aviation Organization (ICAO).

5. Airfield Infrastructure Assessment

Tetra Tech Canada Inc. (Tetra Tech) conducted an airfield facility assessment at the Vermilion Airport (YVG).

The scope of work included the following:

- Conduct a visual site inspection of existing facilities;
- Review existing airfield pavement construction and rehabilitation documents;
- Provide recommendations for rehabilitation of airfield pavements;
- Review site drainage and provide recommendations for any improvement; and
- Prepare cost estimates for the rehabilitation/replacement options.

YVG is a registered aerodrome owned and operated by Town of Vermilion. Primary users of the airport are private aircraft owners, business/charter aircraft operators, medical evacuation aircraft and itinerant small aircraft operators.

The airport is served by a 3,378 ft x 75 ft asphalt runway (10-28), a single connecting taxiway and one apron. The runway has a 1,095 ft displacement on Runway 28. A small modular building serves as an Air Terminal Building south of the Apron; the parking lot accesses 52nd Avenue in the Town. Several hangars and privately-owned aircraft are located on the land adjacent to and west of the Apron.

According to Transport Canada document ERD No. 121, Guidelines Respecting Airport Pavement Structural Condition Surveys, there is an average service life of approximately 20 years to 25 years for an asphalt pavement structure, 15 years for an asphalt overlay, and 28 years to 35 years for a concrete pavement structure. However, the actual condition of an asphalt and concrete surface will vary depending on location, climate, maintenance and traffic. The most common mode of failure with airport pavements involves structural defects that develop due to environmental influences, with the defects leading to a breakdown of the pavement surface under traffic loadings. Once surface breakdown commences, pavement structures are likely to experience continuing breakdown at a relatively rapid rate. Since YVG does not receive a significant amount of heavy aircraft, it is most likely the asphalt structures will deteriorate due to environmental influences.

The airfield pavement structures consist of Runway 10-28, Taxiway A and the Terminal Apron. Groundside surface structures consist of a paved access road (52nd Ave) and a gravel parking lot. Tetra Tech's cost estimates for asphalt rehabilitation assume an asphalt cost of \$150/tonne. Given recent fluctuations in both material and construction costs, this estimate should be reviewed prior to any rehabilitation project tender.

Runway 10-28

Runway 10-28 is 3,378 feet (1029.61 m) long and 75 feet (22.86 m) wide, and the Runway 28 threshold is displaced by 1,095 feet (333.76 m).

The runway was originally constructed in 1975 with 50 mm of Hot-mix Asphalt Concrete (HMAC) and 200mm of cement treated gravel/sandy base on top of compacted clay sub-grade. In 1995, 60 mm of HMAC was overlaid. This information is sourced from the 2005 Airport Operations Manual, when YVG was certified.

A geotechnical investigation is recommended prior to the next runway rehabilitation to confirm the existing pavement structure, review the condition of the existing asphalt, and verify the subgrade bearing strength. The runway pavement is currently in fair condition. The runway designation continues to be 10-28, given the current Magnetic Variation of 12^o 15.66' East.

Based on our condition assessment, the following comments are offered on the runway conditions:

1. Overall the surface of the runway is weather and displays significant ravelling. The raveling is particularly severe near the thresholds.
2. Transverse cracking: there are many transverse cracks on the runway. The average crack spacing is approximately 5 cm. Most of the cracks are of a medium severity level, and many appear to be tenting (as exhibited by the snow plow blade marks on either side of the crack). All transverse cracks have been filled and sealed at some point in the past.
3. Longitudinal cracking: There are numerous longitudinal cracks on the runway across the surface. Field observation indicates these were primarily joints between the paving lanes. The cracks are classified as low to medium severity level. All longitudinal cracks have been filled and sealed at some point in the past.
4. Block cracking: Severe block cracking is found on the runway, and they have been filled and sealed at some point in the past. Block cracking is caused mainly by shrinkage of the asphalt concrete and daily temperature cycling. It is not load related but indicates the asphalt has hardened significantly.
5. In terms of ride quality, the runway surface is rough overall owing to the age of the asphalt. A geotechnical investigation is therefore recommended before any structural rehabilitation is conducted.
6. The asphalt along the runway edge is slightly higher than the adjacent grass area in some areas, creating a safety hazard should an aircraft run off the edge of the runway. This drop in some areas along the runway edge does not conform to the requirements of TP312 - Aerodrome Standards and Recommended Practices, a Transport Canada publication. Meeting these standards would require granular material (25 mm minus crush) to be placed, levelled, and compacted to provide a smooth transition between the runway and adjacent material. The granular material can be placed without impacting the lights.

7. The crack sealing program should be continued to prevent more water from entering surface cracks and causing subsequent deterioration of the asphalt and granular structure.

Taxiway A

Taxiway A is a 10 m wide and 230 m long asphalt structure originally constructed in 1975. It is perpendicular to the runway and connects the Terminal Apron and runway. This taxiway was resurfaced with 60 mm HMAC in 1995 as part of the runway rehabilitation project. The pavement structure includes 60 mm HMAC (1995), 50 mm HMAC (1975), a 200 mm cement treated gravel/sandy base and a compacted clay sub-grade.

The taxiway is in fair to good condition. The crack sealing program should be continued to prevent more water from entering surface cracks and causing subsequent deterioration of the asphalt and granular structure.

In addition to significant ravelling, there are longitudinal cracks on the pavement at approximate 3 m spacing, as well as transverse cracks. These cracks connected and developed into block cracking pattern. It is also obvious that the pavement has weathered, and asphalt binder has been lost.

The last asphalt overlay has exceeded its service life. Due to age related deterioration, we recommend a rehabilitation program be scheduled along with the runway rehabilitation, in the next five years. An annual crack sealing program should be maintained if a full overlay is not undertaken.

The estimated cost for resurfacing, based on a 60 mm asphalt overlay, including line painting is included in the total cost proposed in #7 above. Refer to Appendix A for a cost estimate breakdown.

Apron I

Apron I is a 91 m x 60 m asphalt surface providing short parking facilities for aircraft, and access for passengers and aircraft services. We understand it was constructed in 1975 and was resurfaced in 1995. The pavement structure is the same as Taxiway A and Runway 10-28. Since that time, it has received crack sealing and marking.

Low to medium severity level ravelling, as well as significant weathering, is evident in more than 50% of the apron area. Longitudinal and transverse cracks intersect across the apron. The cracks are generally at medium severity level and have been filled with crack sealant. There are localized areas that are severely deteriorated.

The crack sealing program should be continued to prevent more water from entering surface cracks and causing subsequent deterioration of the asphalt and granular structure.

Paint Marking

The paint marking was completed in conjunction with the paving programs. In general, the location and dimensions of the line painting appear to conform to the requirements of TP312, Aerodrome Standards and Recommended Practices. Paint markings on the airside pavements are faded/worn and need re-marking.

Drainage

The airport appears to have good overland drainage with a drainage ditches running west, east and south on the south side of the runway. The ditch running south from the mid-point of the runway, parallel to Taxiway A, then runs to the east. The ditch west of Taxiway A runs water to the west.

TP312, Transport Canada's Aerodrome Standards and Recommended Practices, provides guidelines for slopes on runway and taxiway graded strips, with the intent of providing drainage away from the manoeuvring surface. Based on our visual observation, it appears the current topography at the airport meets these requirements.

Airfield Electrical Visual/NAV Aids

Typical expected life for airfield electrical system is 20 years, based on the guidelines in Transport Canada document TP2391 (AK-76-04), Airport Facility Condition Inspection and Reporting Surveys, 1981, Table 3.

However, to provide a more accurate life expectancy of the main electrical system, such as cabling for the edge lights, the airport should continue to conduct megger readings of the electrical system.

Airfield Electrical System

The airfield electrical supply is a circuit breaker control panel constant current regulator installed in the basement of the air terminal building.

The airfield lighting system is controlled by Aircraft Radio Control of Aerodrome Lighting (ARCAL), type K, frequency 122.8 MHz, installed near the control panel.

Records indicate that the airfield electrical system was installed in 2008 and is in good condition.

Runway Lighting

The edge lighting system for Runway 10-28 is a medium intensity system, installed in 2008 and considered to be in good condition. The system consists of elevated edge light and threshold/end, wing bar lights for Runway 28, with fixtures powered from direct bury cable connected through pulpits.

Typical life spans for edge lighting systems are 20 years, based on guidelines in the Transport Canada Document TP2391 (AK-76-04), Airport Facility Condition Inspection and Reporting Surveys. We understand that edge lights have been maintained on a routine basis and therefore recommend that this system be monitored annually and scheduled for replacement when maintenance costs become prohibitive.

An electrical assessment is recommended before any future decision to replace the existing system, given their anticipated life cycle remaining.

Our inspection noted that the edge, threshold, end and wing bar lights appear to be installed at the correct spacing and distance from the runway edge.

Airfield Signage

The current airfield signage at YVG meets TP312 4th Edition standards:

- Mandatory instruction signs: runway designation signs;
- Information signs: direction signs, location signs, destination signs, and
- Runway exit signs.

The airport is equipped with medium intensity runway edge lights and ARCAL. Because the information is published on CFS, the airport is considered available 24 hours a day. These signs complement the lighting system in providing information and guidance to pilots on the ground.

Taxiway/Apron Edge Lights

TP312 compliant taxiway and apron edge lighting is installed on Taxiway A and Apron I.

Illuminated Windsock

There is one illuminated windsock at the airport. It is located at the mid-point and south of Runway 10-28, east of Taxiway A and is in good condition.

We recommend that the illuminated windsock be inspected annually and scheduled for replacement when the condition warrants, along with the other components of the airfield electrical system.

Apron Floodlighting

The existing floodlights are mounted on a tower located on the south edge of Apron I. The average illuminance should satisfy the recommendation in TP312 to allow for efficient and safe use of the apron.

Summary & Recommendations

This assignment focused on the existing facility infrastructure such as: pavements, drainage, airfield lighting, and signage; included an evaluation of the existing facilities; recommendations for rehabilitation and/or replacement; and provided cost estimates. Recommendations for rehabilitation were based on 'what is required for the current airport situation' and do not include options for future expansion or development.

A geotechnical investigation was not provided as part of this assignment.

Based on Transport Canada's estimated average service life for asphalt overlays of less than 62.5 mm, which is 15 years, we recommend the runway be scheduled for resurfacing within the next five years. This is considered as a preventative maintenance measure to address ride quality, surface friction, and FOD issues related to broken pavement pieces. The estimated cost for the resurfacing based on a 60 mm asphalt mill and overlay, including Taxiway A and Apron I, and line painting is \$2,161,800.

Milling and filling a partial depth of the flexible pavement is a cost-effective method of rehabilitation but there are limitations. There will be reflective cracking, little or no structural capacity added, need for ongoing crack sealing maintenance, etc. The estimated cost provided is a Class D cost estimate. The actual project cost and rehabilitation methodology will be determined by the design, tender, and construction process.

Airport Airfield Infrastructure Capital Costs

Figure 6-1 provides the estimated rehabilitation costs for airfield pavements. The class D cost estimates include a 35% contingency to account for unknown conditions and a 10% engineering project management and design cost. **Appendix B** provides detailed cost analysis completed to support this figure.

Figure 5-1: Capital Cost Estimates

Airfield Pavement	Total Cost
Runway rehabilitation	\$1,602,000
Apron rehabilitation	\$370,000
Taxiway rehabilitation	\$190,000
Total Airfield Rehabilitation Costs	\$2,162,000

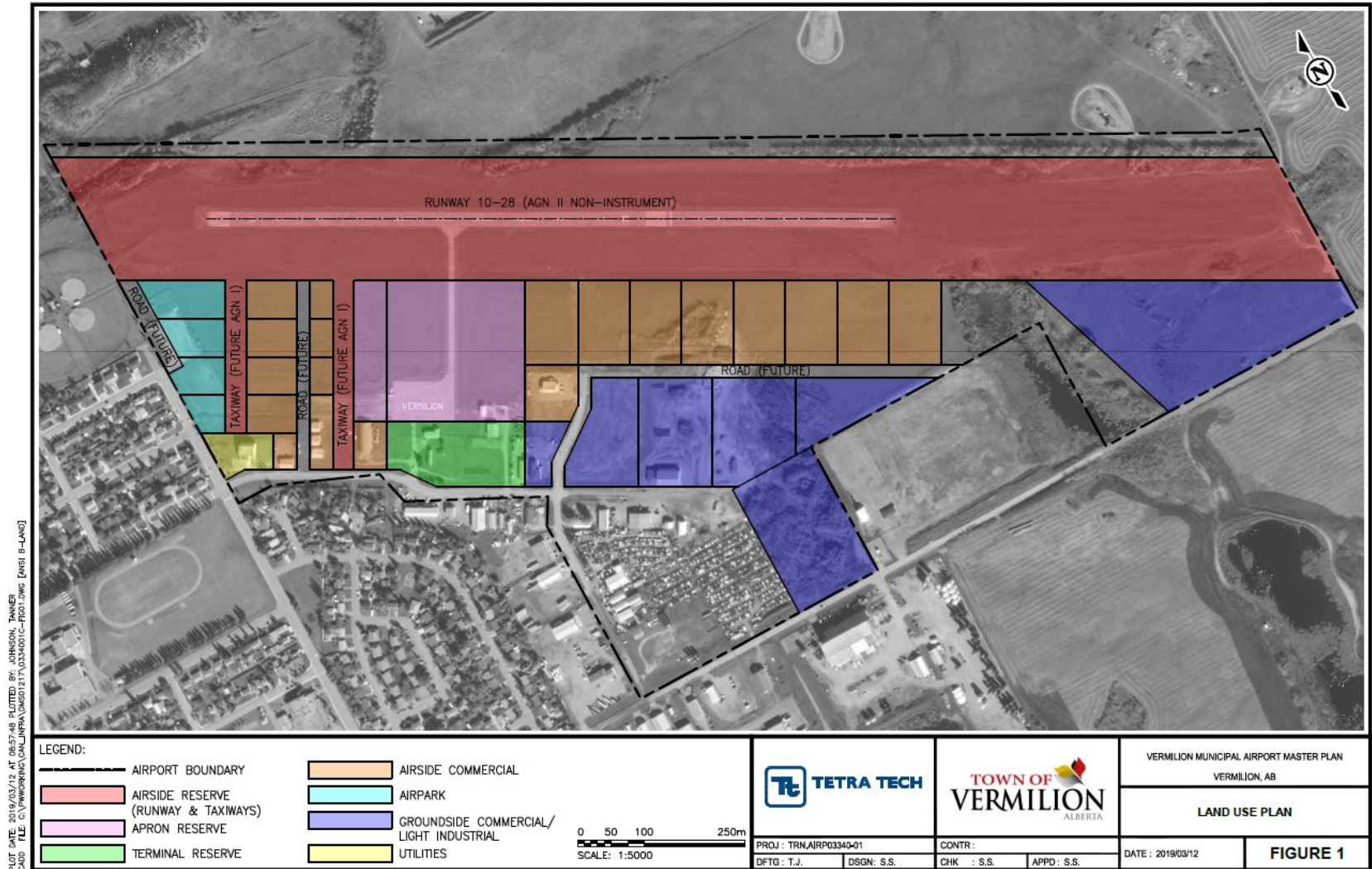
6. Land Use Plan

Figure 6 -1 shows the overall Land Use Plan (LUP) for the airport. In the plan the airport is divided into seven “Reserves.” Each of these are represented with a colour code. Proposed future road access is shown in grey. The other reserves are shown in the diagram in the following colour coding:

1. Airside Reserve (red) – the airport reserve includes those lands that are not required in the short to medium term but are protected for longer term developments that may be well outside the current planning horizon. It also includes reserves for the construction of taxiways to support future airside development.
2. Apron Reserve (pink) – The apron reserve is for expansion of the apron should the airport receive larger and more aircraft in the future.
3. Terminal Reserve (green) – a terminal reserve area is intended to provide adequate lands for airport terminal building (ATB) expansions and associated roadways and parking lots and any other support functions to terminal operations.
4. Airside Commercial (orange) – The airside reserve protects existing developed airfield areas for those types of infill or expanded commercial development where access to the airfield is required. Examples of the types of businesses would include maintenance repair organizations (MRO), fixed base operators (FBO), private hangars for recreational pilots, etc.
5. Airpark (aquamarine) – The airpark reserve is for hangars including recreational GA related structure. This area along 44 Street could include hangars with office and living areas as per developments in Wetaskiwin.
6. Groundside Commercial / Light Industrial Reserve (blue) – the area shows lands suitable for commercial development with groundside (road) access but not airside access.
7. Utilities (yellow) - the utilities reserve is for airport / community utilities.

It is recommended that the municipality not sell further land at the airport, particularly in central areas where it is probable that any future aviation development would occur. In general, airports are encouraged not to sell land because the configuration of airports changes in response to technology and use. If airport lands are leased, sites can be reconfigured and respond. If land is sold, airports can sometimes fail to respond to changing needs and regulations. Leasing at airports is standard and financial institutions have standard methods for setting up financing for businesses seeking leases at airports.

Figure 6-1: Airport Land Use Plan



Appendix A: Wetaskiwin Airport By-Law Excerpt

The following is an excerpt from Wetaskiwin's airport zoning by-law obtained from Skyport Properties web site.

6.24 M3 – Airport Industrial District Regulations

6.24.1 Purpose

The purpose of the Airport district is to allow aviation-related land uses in immediate proximity to the Wetaskiwin Regional Airport. The safety of flight operations has highest priority and shall guide the Development Authority in all their actions and decisions. Buildings and land uses are restricted to aviation-related developments, which add to the viability of the airport or which require a direct connection to airport operations.

6.24.1 Permitted Uses

Aircraft Hangar (see definition)
 Aircraft Sales/Rentals
 Aircraft Parts Store
 Aircraft Maintenance Shop
 Aircraft Manufacturing

6.24.4 Discretionary Uses

Security Suite
 Public Library and Cultural Exhibit
 Utility Structures
 Accessory Building
 Industrial, Commercial and Storage uses that require direct airport access
 Temporary Indoor Storage uses by the owner (temporary means less than 12 months)
 Essential Utility Services

6.24.5 Building Setbacks

The setbacks for new buildings and additions to be constructed on lots that have been subdivided on or before January

1, 1999 shall be:

- a. 8.0m from taxiways right-of-ways to the aircraft door building face; and
- b. 1.0m from other property lines.

The setbacks for new buildings and additions to be constructed on lots that have been subdivided after January 1, 1999 shall be:

- a. 8.0m from taxiways right-of-ways to the aircraft door building face;
- b. 6.0m from a public road right-of-way to the building face;
- c. 1.5m from other property lines to the building face; and
- d. 0.9m from property line to the building eaves.

All buildings constructed prior to January 1, 1999, as determined by assessment records, that do not conform to this Section will be considered to be legal non-conforming. If one or more of these legal non-conforming buildings is damaged or destroyed to the extent of more than 75% above its foundation, the building may not be repaired or rebuilt except in accordance with the Land Use Bylaw.

6.24.6 Other Referrals

The Airport Manager shall be consulted regarding all applications and shall be notified of all decisions of the development officer within the M3 District.

(Wetaskiwin Bylaws Sec 4, Part 2 Definitions)

AIRCRAFT HANGAR means a storage garage used to store aircraft with at least 75% of the floor space being utilized to store aircraft.

AIRCRAFT MAINTENANCE SHOP means a building used primarily for the repair of aircraft.

AIRCRAFT PARTS STORE means a building used primarily for the storage and sale of aircraft parts and accessories.

AIRCRAFT SALES/RENTALS means development used for the sale, charter or rental of aircraft together with incidental maintenance services, and the sale of parts and accessories.

Appendix B: Capital Cost Estimate Calculations

The following table provides Tetra Tech capital cost analysis.



Vermilion Airport
Class 'D' Estimate of Probable Costs

Revised: November 26, 2018

Airside Pavement Rehabilitation

Item	Cost Summary	Total
1.00	General Requirements	\$ 140,000
2.00	Resurface Taxiway	\$ 118,200
3.00	Resurface Apron	\$ 231,300
4.00	Resurface Runway	\$ 1,001,300
	Subtotal General Construction Cost	\$ 1,490,800
	Contingencies (rounded)	35% \$ 522,000
	Engineering and other	10% \$ 149,000
	Total Estimate of Probable Costs	\$ 2,161,800

Item	Description	Unit	Est Quantity	Unit Price	Total Price
1.00	General Requirements				
1.01	Mob / Demob, Survey, Temporary Facilities, QC Testing, etc. (Assume 10%)	LS	1	\$ 140,000	\$ 140,000
	Subtotal General Requirements				\$ 140,000
2.00	Resurface Taxiway				
2.01	Mill Existing Asphalt (Assume 60mm Depth)	m2	2,800	\$ 10	\$ 28,000
2.02	Major Crack Repair	m	120	\$ 110	\$ 13,200
2.03	Supply and Install Tack Coat	m2	2,800	\$ 1	\$ 2,800
2.04	Supply and Install HMAC (Assume 60mm Depth)	T	400	\$ 150	\$ 60,000
2.05	Supply and Install Butt Joint (Assume 60mm Depth)	m	70	\$ 60	\$ 4,200
2.06	Supply and Place Paint Markings	LS	1	\$ 10,000	\$ 10,000
	Subtotal Site Works				\$ 118,200
3.00	Resurface Apron				
3.01	Mill Existing Asphalt (Assume 60mm Depth)	m2	5,800	\$ 10	\$ 58,000
3.02	Major Crack Repair	m	300	\$ 110	\$ 33,000
3.03	Supply and Install Tack Coat	m2	5,800	\$ 1	\$ 5,800
3.04	Supply and Install HMAC (Assume 60mm Depth)	T	830	\$ 150	\$ 124,500
3.05	Supply and Place Paint Markings	LS	1	\$ 10,000	\$ 10,000
	Subtotal Site Works				\$ 231,300
4.00	Resurface Runway				
4.01	Mill Existing Asphalt (Assume 60mm Depth)	m2	24,800	\$ 10	\$ 248,000
4.02	Major Crack Repair	m	1,300	\$ 110	\$ 143,000
4.03	Supply and Install Tack Coat	m2	24,800	\$ 1	\$ 24,800
4.04	Supply and Install HMAC (Assume 60mm Depth)	T	3,570	\$ 150	\$ 535,500
4.05	Supply and Place Paint Markings	LS	1	\$ 50,000	\$ 50,000
	Subtotal Site Works				\$ 1,001,300

1.00 This is a preliminary estimate, which due to little or no site information indicates the approximate magnitude of costs of the proposed project, based on the client's broad requirements. This overall cost estimate may be derived from lump sum or unit costs associated with other recent similar projects. It may be used to obtain approval in principle and for discussion purposes. A contingency allowance of 35% plus engineering and other allowances is appropriate for this class of estimate.

2.00 This estimate of probable costs is provided for budgetary purposes only. It is not to be interpreted as a guarantee by Tetra Tech of the actual project costs. The actual project cost shall be determined by the design, tender, and construction process.



Operations Economics Inc.
Suite 2000 – 1066 West Hastings Street
Vancouver V6E 3X2
Canada

1-604-417-5642

info@operationseconomics.com

Vermilion Airport

Development Briefing

29 April 2019

This briefing reviews development opportunities at Vermilion Airport.

Market Analysis

The interviews and analysis undertaken did not identify a concrete, short-term market opportunity. The analysis did identify that the airport appears well located and situated for rotary wing (helicopter) opportunities. It has significant available land and appears situated along helicopter routes.

If Vermilion wants to explore this, OEI recommends that it survey helicopter operators in Northern Alberta and Saskatchewan. Questions to be asked would focus on what they seek in an airport for a base and whether Vermilion matches their needs. The survey would identify who should be spoken with regarding airport development.

Fuel Sales

Successful fuel sales at an airport require an activity centre such as an FBO or active flying club, or low local fuel sale prices. To have low fuel prices requires significant fuel sales or subsidization. Vermilion does not currently generate enough aviation activity to justify fuel sales by a commercial operation. For example, to sell fuel at relatively low prices, the site would have to sell the equivalent of two 40,000 litre loads of fuel per year at a minimum, and that is probably not the minimum requirement. This is significantly more fuel than it is anticipated that the airport could sell annually now. If the airport wants to explore fuel sales, it is recommended that it seek a third-party to take responsibility for the financial and environmental risks.

Leasing Land

Companies lease land to support business activities. The focus of leasing therefore should be on developing site activity which results in leases. Given the significant available airside and groundside lands available, The Vermilion Airport appears well-positioned to support airside aviation businesses and groundside light industrial opportunities.

If the airport wants to explore those opportunities it is recommended that the Town develop a statement of offering, a two- to four-page PDF advert clarifying the technical offering and the strategic advantages of the site. This could be placed on the community's economic development web site as a web page or a link to a PDF document. Beyond this, it is recommended that the survey of helicopter operators to identify potential related opportunities would be the favoured approach.