

CLIENT | MUNICIPALITY OF KINCARDINE

KINCARDINE MUNICIPAL AIRPORT AIRPORT STRATEGIC PLAN

GENIVAR NO. 00703 (FINAL)

Prepared For:

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1. PREAMBLE

This Airport Strategic Plan looks at the typical 20-year planning horizon and beyond and includes strategic planning considerations. Taking this "strategic" approach, a comprehensive outlook regarding the airport's future growth potential, aeronautical role as a regional general aviation airport and as a platform for potential economic growth within the municipality of Kincardine is presented herein for consideration.

Recommendations related to future airport facility planning, land acquisition and future land uses, as presented within this Airport Strategic Plan are based upon the Municipality of Kincardine's goal of planning for these potential developments. This strategic plan requires that other local and regional surface transportation and land use planning be developed in a parallel and in a cooperative fashion. In other words, the airport's long range planning goals may potentially require changes to local zoning or proposed developments surround the airport. These potentially needed changes to local zoning and proposed developments are beyond the control of the Kincardine Municipal Airport.

To that end, it is the intent of this Airport Strategic Plan to provide meaningful and timely airport and land use planning guidance that can be referenced and utilized by other planning agencies. Through this type of cooperative strategic planning the envisioned future development of Kincardine Municipal Airport may be realized.

2. BACKGROUND

2.1 STUDY BACKGROUND

The Municipality of Kincardine in partnership with the Penetangore Regional Economic Development Corporation (PREDC) commissioned in the fall of 2012 the development of this Airport Strategic Plan to provide the framework with which to guide the Municipality in order to meet the long-term needs of airport stakeholders and general aviation community while at the same time presenting a vision for the Airport that can be endorsed by the broader community.

Kincardine Municipal Airport is recognized by the municipality as being a critical component in supporting economic growth for the region. As such it must be developed in a manner that allows it to reach its full potential in a fiscally responsible manner while accommodating the operational and business objectives of the municipality and other airport stakeholders.

2.2 STUDY OBJECTIVES

Given the improvements made to the Airport over its 40+ year history, the changes in airport governance, the development of several new hangars and the challenges arising from wind turbine developments in the proximity of the Airport, the need for a strategic plan has become essential to ensure the continued viability of Kincardine Municipal Airport.

The objective of the Strategic Plan is to provide a framework in which the airport can grow to meet the changing demands of its users over the next 20 years, while at the same time presenting a vision of the Airport that can be endorsed by the broader community.

Specific objectives of the study include:

- Better defining the airports current role in the community along with a projection of the possible role it could serve over the next 20 years;
- Defining a business and marketing strategy for the Airport to explore development opportunities and revenue generation options;
- Identifying impacts on the viability of the Airport from proposed wind farm turbine developments in the area.

2.3 PLANNING CRITERIA

This report and analysis has been prepared in accordance with industry accepted planning criteria and according to the following Transport Canada, NAV CANADA and International Civil Aviation Organization (ICAO) publications:

- Canadian Aviation Regulations (CARs)
- TP312 – Aerodrome Standards and Recommended Practices (4th Edition)
- TP1247 – Aviation Land Use in the Vicinity of Airports (8th Edition)
- TP308 – Criteria for the Development of Instrument Approach Procedures (Change 5.3)
- Canada Flight Supplement and Canada Air Pilot
- ICAO Annex 14 – Volume 1 Aerodrome Design and Operations
- ICAO Aerodrome Design Manual

2.4 AIRPORT INFORMATION

The Kincardine Municipal Airport (the Airport), Transport Canada identifier CNS7, is a registered public aerodrome, owned by the Municipality and operated under contract by Evans Aviation. The Airport is approximately three (3) kilometres northeast from the Town of Kincardine along Queens Highway 21 and can be accessed by car from Kincardine’s downtown centre and business district in under than ten (10) minutes.

The Airport is served by two (2) paved asphalt runways, one primary and one secondary. Runway 13-31 is the longer of the two (2) runways at 4,085 feet and is considered the primary runway by Airport users and tenants. Runway 13-31 has an operational classification of instrument non-precision, supporting operations in instrument meteorological conditions to minimums as low as 252 feet Above Ground Level (AGL) with 1 statute mile visibility. The Airport’s secondary runway, Runway 05-23 is 2,083 feet in length and serves as a crosswind runway for light general aviation aircraft.

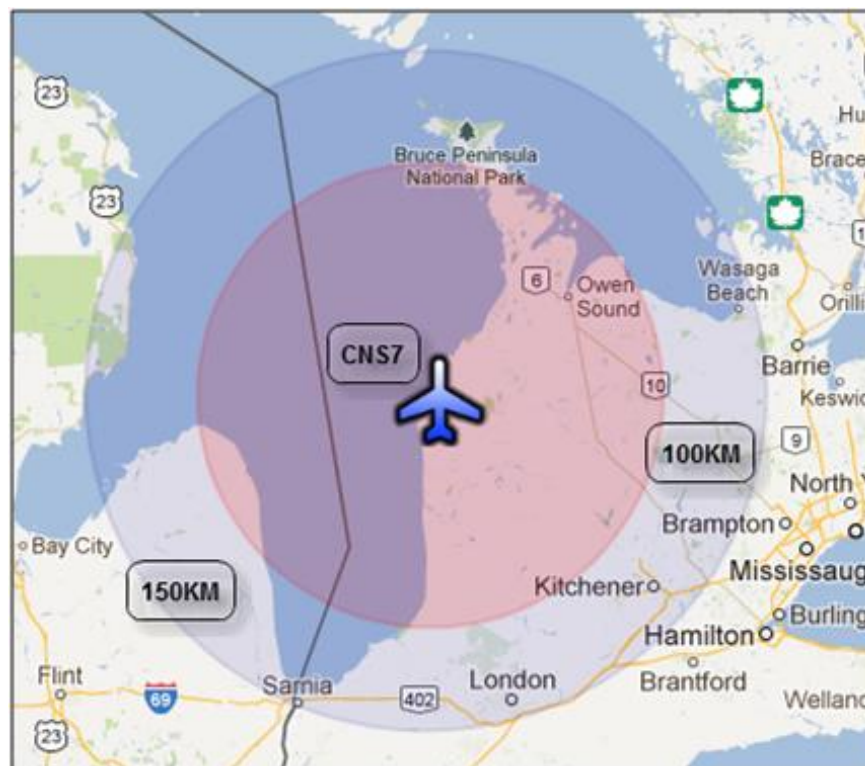
The Airport sees a mix of light, medium and large general aviation aircraft and routinely accommodates corporate charters from places such as Kitchener-Waterloo, Toronto, New York City, Miami, Calgary and Winnipeg.

The Airport also serves a vital role in health care services for the region, serving Air Ambulance (Medevac) fixed and rotary wing aircraft on a regular basis.

Kincardine Municipal Airport and the Municipality of Kincardine are located in the lower northwest quadrant of Bruce County along the shores of Lake Huron approximately 135 kilometers north of London, Ontario and 180 kilometers northeast of Toronto. Regional surface access to the Airport is via Queens Highway 21.

The official published geographic location of the Airport is Latitude North 44° 12’ 05” Longitude West 81° 36’ 20”.

Figure 1 Regional Location



2.4.1 Airport Ownership and Management

Originally developed in 1970 through a partnership formed between the Town and Township of Kincardine and Bruce Township, the Kincardine Airport in 2000 became the responsibility of their amalgamated government now called the Municipality of Kincardine. The overall operation of the Airport along with the administration of funds became the responsibility of the Municipality of Kincardine.

Along with the amalgamation of the two (2) governments, oversight of the Airport was delegated to a committee of local representatives with onsite management contracted to a private company (Evans Aviation) reporting directly to the Chief Administrative Officer (CAO) for the Municipality of Kincardine. By operating the Airport with a Fixed Base Operator (FBO), the Airport was able to continue to supply commercial services such as fuel sales, aircraft parking and storage with onsite customer service.

2.4.2 Airport History

Since its initial development, the Airport has experienced continued growth in facility development and level of services offered. A brief listing of notable airport development actions including project-specific airport improvements is presented below.

1966

- Industrial Committee of the Town of Kincardine recommends construction of a municipal airport to serve the Town and Township of Kincardine

1969

- Agreement formed between the two (2) Councils of the Town and Township of Kincardine to establish a municipal airport north of the Town of Kincardine.

1970

- Purchase of 35.8 ha. (88.4 ac.) on Concession A by the two (2) municipalities.
- Construction of a single grass runway oriented southeast-northwest.

1973

- Expansion of the airport property towards the north for the development of a secondary runway.
- Construction a secondary runway.

1975

- Construction of a multi-purpose hangar for aircraft storage, management office that included a pilot's lounge, kitchen and washroom.

1982

- Airport Master Plan developed by R.S. Wallace and Associates.

1983-1984

- Relocation of vehicle parking.
- Acquisition of additional property & easement established over adjoining lands.
- Relocation of aviation fuel facility.

1985

- Airport Master Plan updated by the Kincardine Town and Township Airport Committee.

1986

- Reconstruction of Runway 13-31 to a paved length of 1,180m (3,871 ft.) and width of 23m (75 ft.).
- Construction of a paved apron and connecting taxiway.
- Installation of visual aids including runway and taxiway edge lights, signage and windsock required for night operations.
- Construction of drainage outfall.
- Preparation of a grass tie-down parking area north of the Runway 31 threshold.

1988-1990

- Construction an Airport Terminal Building partially funded by the Province of Ontario.
- Expansion of Terminal Apron.
- Installation of a Non-Directional Beacon (NDB) and Distance Measuring Equipment (DME) ground based navigational aids funded by Transport Canada.

1992-1993

- Acquisition of property and private house located directly north and immediately adjacent the Airport lands along Queens Highway 21.
- Construction of Canadian Agra office complex and associated apron and taxiway.
- Reconstruction of Runway 05-23 and associated works.
- Airport Master Plan update completed by AirPlan Aviation Technical Services.

1994

- Construction of Runway 13-31 extension and additional taxiway connection.

2001

- Acquisition of Canadian Agra office complex and associated apron and taxiway by the amalgamated local government of the Municipality of Kincardine.

2008-2010

- Development of Airport Vicinity Protection Mapping.
- Establishment of airport zoning bylaw.

2010-Present

- Development of new GNSS based Instrument Approach Procedures (IAPs) for Runway 13-31.
- Installation of new above ground fuel tanks for Jet A / 100LL with 24 hour card lock system.
- Development of several general aviation hangars.

2.4.3 Surrounding Airports

Six (6) public-use general aviation airports are located within a 75 kilometre (40 nautical mile) radius of Kincardine Municipal Airport and include: Goderich Municipal Airport, Wingham / Richard W. LeVan Airport, Hanover / Saugeen Municipal Airport, Port Elgin Airport, Owen Sound / Billy Bishop Regional Airport and Wiarton Municipal Airport.

There are no overlapping Airport Traffic Patterns or operational conflicts between Kincardine Municipal Airport and any of the six (6) airports listed. The surrounding airports are listed in Table 1 below.

**Table 1
SURROUNDING AIRPORTS**

Airport	Identifier	Status	Relative Location (Dist. / Bearing)	Longest Runway (Length x Width)	Lowest Minima	Key Navigational Facilities
Goderich Municipal Airport	CYGD	Registered	48km / 190°M	5,034' x 100'	508' 1 ½ sm	NDB
Wingham / Richard W. LeVan Airport	CPR7	Registered	44km / 146°M	4,000' x 75'	508' 1 ½ sm	-
Hanover / Saugeen Municipal Airport	CYHS	Registered	44km / 96°M	4,000' x 75'	611' 2 sm	NDB
Port Elgin	CNL4	Registered	28km / 32°M	3,800' x 175' Grass	n/a	-
Owen Sound / Billy Bishop Regional Airport	CYOS	Registered	74km / 54°M	3,933' x 75'	632' 2 sm	-
Warton Municipal Airport	CYVV	Certified	72km / 33°M	5,033' x 150'	374' 1 ¼ sm	NDB, VOR/DME

Sources:

1. NAV CANADA Canadian Flight Supplement (CFS) and Canada Air Pilot (CAP4) November 2012

3. ROLE / OBJECTIVES / MISSION STATEMENT

3.1 AIRPORT ROLE

To date, Kincardine Municipal Airport has served as a general aviation airport providing services to a wide spectrum of users including corporate/business aviation, air charter services, rotary wing operators and recreational pilots. The Airport is also occasionally used by the Canadian Armed Forces to support training exercises, and by various government agencies including the Royal Canadian Mounted Police (RCMP) and the Ontario Provincial Police (OPP). The Airport has been host to a number of charitable events and continues to support the local Flying Club (COPA Flight 172) a strong advocate for Kincardine Municipal Airport and general aviation in the region.

Currently there are approximately 20+ aircraft based at Kincardine Municipal Airport with increased numbers through the summer months. The Airport is home to local flying clubs including COPA Flight 172 and the Kincardine Cloudbusters a Model Flying Club.

An objective for the Kincardine Municipal Airport is to continue providing aviation services as its primary role as a general aviation airport, supporting the surrounding communities and businesses.

3.2 MISSION STATEMENT

The 1993 Master Plan update identified the primary purpose / mission of Kincardine Municipal Airport as “attracting and accommodating corporate aviation serving local business, as well as encouraging commercial scheduled and charter air passenger and freight services using aircraft in the Code “B” category”. The 1993 Master Plan also recommended that the airport “facilitate commercial activities on the airport site and particularly commercial development of aviation services for aircraft storage, parking, maintenance, sales, and flight training”.

While this purpose is well rounded, the emphasis in the short-term (0-5 years) to medium-term (6-10 years) should not be on encouraging commercial scheduled and freight services as the population and industrial base in the region is not forecasted to grow significantly enough to make any such services viable at Kincardine Municipal Airport.

That being said, the possibility of more regularly scheduled charter operations serving Bruce Power remains high and should be considered in planning future developments.

The purpose of Kincardine Municipal Airport can be summarized as follows:

- 1) To support the continued use of the airport and its facilities for business and general aviation use.
- 2) To accommodate changes in aircraft mix supporting demand for light to medium business jet use.
- 3) To where possible maximize revenue generation.

Several factors have influenced the direction and development of Kincardine Municipal Airport. These include but are not limited to:

- 1) A strong supportive community
- 2) An increase in investment (both foreign and domestic) in the region
- 3) A strong need for easy access to the area from Toronto
- 4) Significant government investment
- 5) Local growth in the general aviation sector
- 6) Tourism

4. AIRPORT EXISTING CONDITIONS

This section of the Strategic Plan provides information regarding the existing conditions of the airport's various supporting facilities and systems. It also discusses the availability of services, established fee structures, and the existing business environment.

As part of the Study, GENIVAR conducted an inventory and infrastructure assessment of the Airport's existing conditions. The assessment has been provided to the Town of Kincardine in Adobe® PDF format and is attached as Appendix 'A' of this report.

4.1 CURRENT LAND AREA

The current land area based on property boundary limits, as provided by the Municipality of Kincardine, is approximately 50.89 ha. (126 ac.) with an additional 8.59 ha. (21 ac.) located northeast of the Threshold of Runway 23 and occupied in part by the Municipal Offices of Kincardine.

The delineation between airside¹ and landside² is accomplished in part by a perimeter fence running the length of the property boundary and along part of the terminal access road.

Of the total 50.89 ha. (126 ac.) 43.39 ha. (107 ac.) is presently occupied or reserved for airside system expansion. An additional 7.39 ha. (18 ac.) is available for development but currently inaccessible leaving 0.11 ha. (0.27 ac.) currently available for airside commercial development.

As shown in Drawing SK-1 of Appendix 'B', the Airport's property boundary closely follows the footprint of the existing airside system leaving limited area for commercial development or expansion. The expansion of the airport's property may be necessary in the medium- to long-term to accommodate additional facilities.

4.2 AIRSIDE SYSTEM

The following subsections describe in detail the existing airside system found at Kincardine Municipal Airport. Physically observed conditions are noted in general conformance with Transport Canada Document AK-76-04, Airport Facility Condition Inspection and Report Surveys. As a result, specific descriptive terms including "very poor", "poor", "fair", "good", and "excellent" are used throughout to describe the physical condition associated with a rating establish using AK-76-04.

4.2.1 Runways

Runway 13-31

Runway 13-31 is the Airport's primary runway. The published runway length is 1245m (4,085 ft.) with a width of 23m (75 ft). The runway is designed for use by Code 'B'3 aircraft and has been assessed for use by aircraft with wingspans less than 24m (79 ft.).

Based on in field observations taken in accordance with Transport Canada AK76-04 the general condition of pavements is 'poor' to 'fair' with moderate to severe cracking, rutting and ravelling along the major extent of the runway.

Runway 05-23

Runway 05-23 serves as a crosswind runway for light general aviation aircraft. The published runway length is 634m (2,083 ft.) with a width of 15m (50 ft.). The runway is designed for use by Code 'A' aircraft and has been assessed for use by aircraft with wingspans less than 15m (49 ft.).

¹ Airside – area which is considered entirely aviation in function.

² Landside – area which is non-aviation in function.

³ Code letter refers to Transport Canada defined class/category of aircraft based on wingspan and gear dimensions.

Based on observations the general condition of pavements for Runway 05-23 is in 'fair' condition with only minor to moderate cracking and ravelling along the major extent of the runway.

As part of the previous 1993 Airport Master Plan prepared by AirPlan Aviation Technical Services Inc., the existing pavement strength for both runways was identified as suitable for supporting the design aircraft. The pavement strengths were identified as capable of supporting aircraft tire pressures up to 0.88 MPa and 0.70 MPa for Runways 13-31 and 05-23 respectfully. The characteristics of both runways are summarized in Table 2 below.

**Table 2
EXISTING RUNWAY CONDITIONS**

Item	Runway				
	13-31		05-23		
Length x Width	1245m x 23m (4,085' x 75')		635m x 15m (2,083' x 50')		
Runway Reference Code (Transport Canada)	Code 2B Instrument Non-Precision		Code 1A Non-Instrument		
Critical Design Aircraft	Code B (Aircraft Not Specified)		Code A (Aircraft Not Specified)		
Runway Slope (%)	0.29%		0.28%		
Pavement Type	Asphalt		Asphalt		
Pavement Strength	0.88 MPa (PLR Not Specified)		0.70 MPa (PLR Not Specified)		
Runway Lighting	Medium Intensity ARCAL Type K		Medium Intensity ARCAL Type K		
Runway Markings	Non-Instrument		Non-Instrument		
Runway Thresholds	13	31	05	23	
Threshold Elevations	230.36m (756')	234.06m (768')	233.23m (765')	235.27m (772')	
Approach Lighting	n/a	n/a	n/a	n/a	
Runway Touch Down Zone (TDZ) Elevations	768'	768'	n/a	n/a	
Navigational Aids (NAVAIDs)	NDB "D7" Elevation 802' ASL				
Instrument Approach Minimums	13	31	05	23	
RNAV	LPV	1020' (252') 1 sm	1020' (252') 1 sm	n/a	n/a
	LNAV	1080' (312') 1 sm	1140' (372') 1 ¼ sm	n/a	n/a
	Circling	1280' (508') 1 ½ sm	1280' (508') 1 ½ sm	n/a	n/a
NDB	NDB	1180' (412') 1 ¼ sm	1500' (732') 2 ¼ sm	n/a	n/a
	Circling	1280' (508') 1 ½ sm	1500' (728') 2 ¼ sm	n/a	n/a
Visibility Minimums	Approach	1 sm	1 sm	n/a	n/a
	Departure	½ sm	½ sm	n/a	n/a
Runway End Safety Areas	n/a		n/a		
Runway Declared Distances	TORA	4085'	4085'	2083'	2083'
	TODA	4285'	4285'	2083'	2083'
	ASDA	4085'	4085'	2083'	2083'
	LDA	4085'	4085'	2083'	2083'

Sources:

1. Instrument Approach Minimums as published in Canada Air Pilot effective March 7, 2013 for Category 'A' and 'B' only.
2. Physical characteristics as recorded on engineering drawings supplied by the Municipality of Kincardine and retained by GENIVAR Inc.
3. Declared distances as published in Canada Air Pilot effective March 7, 2013.

4.2.2 Taxiways

The primary runway, apron and commercial development areas are served by four (4) taxiways.

Taxiway A

Designed for use by Code 'B' aircraft, Taxiway Alpha was constructed in 1994 along with the extension of Runway 13-31 to provide a connection to the Threshold of Runway 31 from the terminal apron. Based on observations the condition of Taxiway Alpha is 'fair' to 'good' with minor cracking and moderate raveling along the extent of the taxiway.

Taxiway B

Originally designed as the primary connection to Runway 13-31, Taxiway Bravo now serves as the primary runway exit and secondary connection to the main Apron. Based on observations the condition of Taxiway Bravo is 'fair' with only minor cracking moderate raveling along the extent of the taxiway.

Taxiway C

Providing access to existing commercial development lots, Taxiway Charlie connects the existing hangars to the apron, adjoining taxiways and runway system. Based on observations the general condition of Taxiway Charlie is 'fair' to 'good' with minor cracking moderate raveling.

Taxiway D (Abandoned)

Taxiway Delta was constructed in 1993 to provide access to the then Canadian Agra office complex and Apron II (Abandoned). The taxiway has since been abandoned. The condition of the pavement was observed to be in 'fair' condition with only minor cracking and moderate raveling throughout.

4.2.3 Aircraft Parking and Storage

Apron I and Tie-Downs

The main apron (Apron I), located adjacent the existing terminal building on the northeast side of the airfield, is designed for temporary and overnight parking of itinerant aircraft. Based on observations the general condition of pavement is considered 'fair' with minor cracking and moderate raveling throughout the apron.

Apron II (Abandoned)

Apron II was constructed in 1993 along with Taxiway Delta to serve the Canadian Agra office complex development. Since then both Taxiway Delta and Apron II have been abandoned. Based on observations the pavement condition is considered 'fair' with only minor to moderate cracking and moderate raveling throughout.

Tie-Downs

A grass tie-down area is located west of the terminal building. This area sees regular use by 2-3 aircraft during winter months and increased numbers throughout the summer months.

Drainage in this area is considered 'good', however the ground tends to become soft during heavy amounts of rainfall.

Hangars

The airport provides seven (7) hangars of varying sizes. The first hangar built in 1975 by the municipality is in 'poor' condition with damage to the hangar door requiring service. As a result the hangar is not regularly used for aircraft storage. Efforts are presently underway to install a new hangar door and extend the life of the facility.

4.2.4 Airfield Lighting and Visual Aids

Airfield Edge Lighting Systems

Both runways are provided with medium intensity runway edge lighting. The existing edge lighting is nearing its anticipated lifespan of 20 years with annual maintenance requirements reported to be increasing yearly for all edge lighting systems.

Airfield Signage

No airfield signage is presently provided. However, the Airport does have in storage some signage that could be installed in conformance with TP312 recommendations.

Wind Direction Indicators

Presently only one (1) wind direction indicator or "windsock" is installed at the airport. The windsock serves to provide visual information on wind direction and velocity to pilots operating on the ground and when flying overhead in the Airport circuit. The windsock is lighted to ensure guidance is available at night. The existing windsock is located northwest of the intersection of both runways and is noted to be in working condition.

Visual Approach Aids

Abbreviated Precision Approach Path Indicator (A-PAPI) systems are installed for Runway 13 and 31. Both systems are designed for use by small general aviation aircraft and provide visual guidance to pilots to help maintain obstacle clearance on approach to landing.

No issues were noted with the existing systems.

4.2.5 Airfield Drainage

In general, site drainage is from east to west towards Lake Huron. Overall site drainage was observed to be in 'good' condition

4.2.6 Security / Perimeter Fencing

The existing perimeter fencing consists of 1.2m (4 ft.) high page-wire fencing with wooden posts. While the existing fencing clearly denotes the property boundary, it should be noted that the existing fencing does not comply with Transport Canada guidelines for wildlife or security fencing.

In addition to the existing perimeter fencing a 1.2m (4 ft.) high chain link fence is provided east of the terminal building to more clearly delineate restricted airside areas. Similar to the perimeter, the existing chain link fencing also does not comply with Transport Canada guidelines.

No condition issues have been noted.

4.2.7 Instrument Approach Procedures (IAPs)

The Airport is presently served by four (4) straight-in instrument approaches to Runway 13-31. This includes two (2) Area Navigation (RNAV) Global Navigation Satellite System (GNSS) approaches and two (2) Non-Direction Beacon (NDB) approaches.

With the advent of more accurate GNSS transmitters and receivers, RNAV instrument approaches now often provide GNSS based Localizer Performance with Vertical Guidance (LPV) to near instrument precision minima at a fraction of the cost of a full ground based Instrument Landing System (ILS).

The inclusion of LPV allows properly equipped and certified aircraft to reach lower altitudes prior to requiring visual contact with the airport. This results in improved airport usability and accessibility.

Each RNAV (GNSS) Approach for Kincardine Municipal Airport is provided LPV in addition to Lateral Navigation (LNAV) and circling minima.

For a complete summary of the instrument approaches and associated minimums for Kincardine Municipal Airport please refer to Table 2.

4.3 LANDSIDE SYSTEM

The following subsections describe in detail the existing landside system found at Kincardine Municipal Airport. Physically observed conditions are noted in general conformance with Transport Canada Document AK-76-04, Airport Facility Condition Inspection and Report Surveys. As a result, specific descriptive terms including “very poor”, “poor”, “fair”, “good”, and “excellent” are used throughout to describe a physical condition associated with a rating established with AK-76-04.

4.3.1 Approach / Access Road

Access to the Airport Site is via the two-lane entrance road from Highway 21. The existing pavement appears to be in ‘good’ condition with only minor cracking and moderate raveling.

4.3.2 Vehicular Parking

Vehicular parking is provided north of the Apron I and east of the Air Terminal Building. Existing parking lot provides approximately 15 stalls and is considered sufficient for the Airport’s day to day operational demands.

4.3.3 Accessibility

Concerns have been expressed over public accessibility to the airport for disabled patrons. Currently only one disabled parking spot is provided near the eastside entrance to Apron I.

4.3.4 Airport House

The Airport’s existing house located north of the parking lot has in the past been used as a source of rental income for the municipality. However, conditions in the house had since deteriorated and it was no longer considered suitable for rental purposes. House repairs have been done and the house is now in rentable condition, yet still remains untenanted. A detailed assessment of the building has been excluded from the scope of this assignment.

4.4 AIR TERMINAL BUILDING

The existing Air Terminal Building (ATB) is located on the northwest side of the Airport in proximity to Queens Highway 21 and adjacent to the terminal apron. Originally built in 1988 the ATB presently provides an office for Airport Management, an office for lease to tenants, a reception area, public lounge/meeting room, kitchenette, utility room and washrooms.

As indicated in the 1993 Airport Master Plan, the ATB design allows for an expansion to be added towards the west if desired.

Space issues have been identified as a possible constraint to attracting significant business use.

The ATB is in need of exterior repair and interior upgrade. Recent issues as indicated by Airport Management include mold, water damage and exterior weathering. As part of the strategic planning process these issues have been re-examined. Efforts are presently underway to address exterior concerns.

4.5 AIRPORT / AVIATION SUPPORT

4.5.1 Fueling Services

The Airport's aviation fuel storage facilities are located east of the ATB immediately south of the public parking lot. The facility is comprised of two (2) above ground fuel tanks connected to a self-serve card lock dispensing system. A single 15,000 Litre (3,963 Gal) 100 Low Lead fuel tank and a single 10,000 Litre (2,642 Gal) Jet A1 fuel tank is provided.

Issues with the systems pumping capacity and serviceability have been raised. As a part of the strategic planning process recommendations have been put forth to resolve these issues. Efforts are presently underway to address system deficiencies.

4.6 AIRPORT UTILITIES

4.6.1 Water Services

No municipal water services are provided to the Airport. Water is obtained from a well located west of the Airport House. The well was drilled in 1981 to a depth of 79m and is reported to provide a flow of approximately 20 gallons/minute.

Water is treated in the Airport House prior to being shared with the ATB and Municipal Hangar. No water service is presently provided to private hangars.

4.6.2 Sewage Services

There are no municipal sewage collection or disposal systems in the area. Sewage disposal is via three (3) separate septic systems.

- The septic system and tile bed for the ATB is located immediately south of the building.
- The septic system and tile bed for the Municipal Hangar is located at the extreme east end of the property.
- The septic system and tile bed for the Airport House is located immediately east of the building.

All systems are reported to be able to accommodate present levels of demand. Any further expansion of facilities would require additional capacity to be added to the existing system.

There are no reported problems with the three (3) septic systems, and the septic tanks are pumped regularly.

4.6.3 Hydro

Electrical power is supplied to the Airport and the surrounding community by Ontario Hydro. The Airport is provided service from along Highway 21 with incoming power fed from overhead lines at 600V (3-phase) to the Municipal Hangar where it is transformed and distributed to load centres on the Airport. Presently, private hangars are serviced through one hydro metre, with no billing back to the tenants. Leases require that each hangar be metered separately, so a decision has been made to give 90 days' notice that will require compliance with this condition. The Airport's electrical service is understood to be adequate for the needs of the airport at its present levels of development. Concerns over occasional power drop causing reduced voltage/amperage have been raised by tenants and is being investigated by the municipality.

An emergency power supply system is provided at the Airport and located along the north wall of the Municipal Hangar. The Sommers diesel generator installed in 2007 is capable of providing a 120V / 400A service.

4.6.4 Gas

No natural gas services are provided at the Airport.

4.6.5 Communications

Data and voice communication services and infrastructure are supplied to the Airport by Bruce Telecom.

4.7 AIRSPACE AND ZONING

4.7.1 Existing Aeronautical Zoning

Obstacle Limitation Surfaces

The Kincardine Municipal Airport is a Federally registered aerodrome with published Instrument Approach Procedures. As such the Airport is required to maintain free of obstruction a defined set of Obstacle Limitation Surfaces in accordance with Transport Canada Advisory Circular (AC) 301-001 and TP308 for registered airports. These are imagery 3D surfaces rising from the airfield at defined slopes and distances. They are designed to protect aircraft during takeoff and landing manoeuvres.

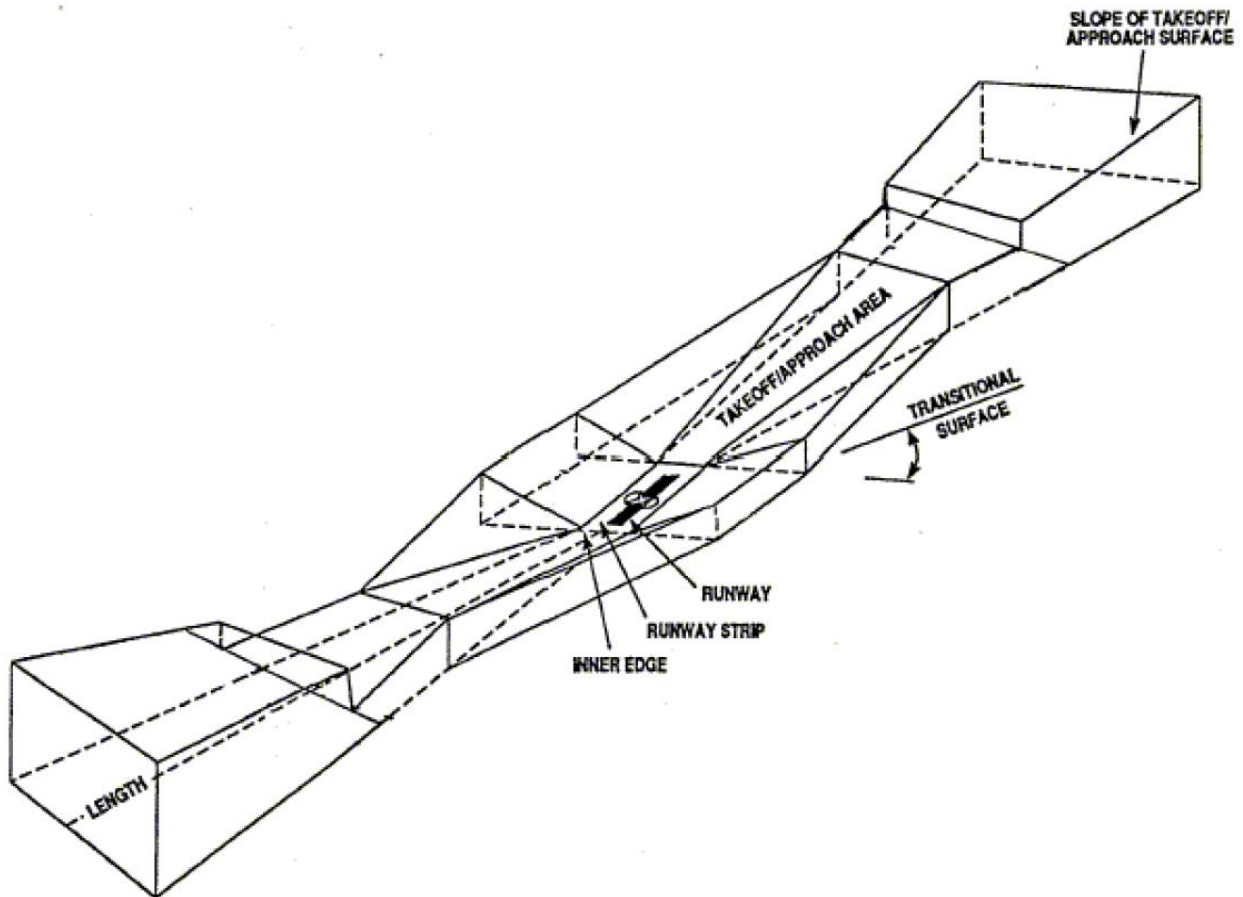
The highlighted column in Table 3 below describes the required operational zoning for Kincardine based on aircraft size and instrument approach procedure classification.

Table 3

AERODROME PHYSICAL CHARACTERISTICS Minimum Requirements								
	TYPE OF RUNWAY							
	Non-Instrument Runway				Non-Precision Runway			
AIRCRAFT SIZE (Based on wing span)	Up to but not including 15 m (49 ft)	15 m (49 ft) up to but not including 24 m (79 ft)	24 m (79 ft) up to but not including 36 m (118 ft)	36 m (118 ft) up to but not including 52 m (171 ft)*	Up to but not including 15 m (49 ft)	15 m (49 ft) up to but not including 24 m (79 ft)	24 m (79 ft) up to but not including 36 m (118 ft)	36 m (118 ft) up to but not including 52 m (171 ft)*
CHARACTERISTICS								
Strip Specifications:								
Strip width (each side of centre line)	30 m (98.5 ft)	30 m (98.5 ft)	45 m (148 ft)	75 m (246 ft)	45 m (148 ft)	45 m (148 ft)	75 m (246 ft)	150 m (492 ft)
Strip length (Prior to threshold and beyond departure end)	30 m (98.5 ft)	60 m (197 ft)	60 m (197 ft)	60 m (197 ft)	60 m (197 ft)	60 m (197 ft)	60 m (197 ft)	60 m (197 ft)
Approach / Take-off Slopes and Dimensions:								
Length of the inner edge	60 m (197ft)	60 m (197 ft)	90 m (295ft)	150 m (492ft)	90 m (295ft)	90 m (295ft)	150 m (492ft)	300 m (984ft)
Distance from threshold	30 m (98.5ft)	60 m (197 ft)	60 m (197 ft)	60 m (197 ft)	60 m (197 ft)	60 m (197 ft)	60 m (197 ft)	60 m (197 ft)
Divergence (minimum each side)	10%	10%	10%	10%	10%	10%	15%	15%
Length (minimum)	2500 m 8202 ft	2500 m 8202 ft	2500 m 8202 ft	2500 m 8202 ft	2500 m 8202 ft	2500 m 8202 ft	3000 m 9843 ft	3000 m 9843 ft
Slope (maximum)	5% (1:20)	4% (1:25)	2.50% (1:40)	2.50% (1:40)	3.33% (1:30)	3.33% (1:30)	2.50% (1:40)	2.50% (1:40)
Transition Surfaces (Slope)	20.00% (1:5)	20.00% (1:5)	14.30% (1:7)	14.30% (1:7)	14.30% (1:7)	14.30% (1:7)	14.30% (1:7)	14.30% (1:7)
NOTE * : aircraft of 52 m (171 ft) and wider will be evaluated individually.								

Figure 2 below provides a typical 3D illustration of the Obstacle Limitation Surfaces surrounding an airport. For an illustration of the Kincardine Municipal Airport's existing Obstacle Limitation Surfaces please refer to *Drawing SK-2 in Appendix 'C'*.

Figure 2
OBSTACLE LIMITATION SURFACES



Municipal Zoning

In addition to the Obstacle Limitation Surfaces described above, Kincardine Municipal Airport and Municipality of Kincardine enacted through revisions to the Municipality's Comprehensive Zoning Bylaw No. 2003-25 to establish an area inside which no wind turbines should be developed. The adopted zoning as illustrated in *Maps 3 and 4* as contained in *Appendix 'C'* incorporate the obstacle limitation surfaces for the existing airport and protected a sufficient amount of airspace the Instrument Approach Procedures.

The zoning was specifically developed with consideration for the maximum height of wind turbine developments at the time. Since then proposed wind turbine developments of increased heights have posed a challenge for the protecting the long term usability of the Airport. Efforts are currently underway to address these concerns.

4.7.2 Navigable Airspace

The Kincardine Municipal Airport is located 41 kilometres (22 nautical miles) west of Victor Airway 5 between Wiarton and London. The closest Very High Frequency Omni-directional Range (VOR) stations are London YXU, Waterloo YWT and Wiarton YVW. As a consequence, the Kincardine Municipal Airport is not positioned along any existing low level victor airways.

The Kincardine Municipal Airport is located approximately halfway between Goderich Airport and Port Elgin Airport and a similar distance to Hanover / Saugeen Municipal Airport. The area attracts heavy VFR traffic through the summer and fall tourism season.

4.7.3 Obstructions to Navigable Airspace

The Kincardine Municipal Airport is located in close proximity to existing wind farm developments to the North and the proposed Armow Wind Farm approximately five (5) kilometers to the east.

The proximity of existing wind turbine developments have successfully been mitigated through the development of municipal zoning and the cooperation of wind turbine farm developers. However, with increases in Turbine Heights as proposed with the Armow Wind project the protection may need to be expanded to ensure accessibility can be maintained with as low approach minimums as possible.

4.7.4 Off-Airport Land Use

The Airport is mainly surrounded by farm land with low density industrial developments towards the east and southeast. Residential development is noted both south and west of the Airport and is highest in density towards the south.

4.8 BUSINESS ENVIRONMENT

4.8.1 Aviation

At present Kincardine Municipal Airport serves a mix of general aviation/recreational aviation activities, which include single and twin engine piston aircraft, as well as light turbine aircraft and occasionally corporate jets. The airport is used by Medevac fixed and rotary wing aircraft. The Airport is also occasionally used by the Canadian Armed Forces to support training exercises, and by various government agencies including the RCMP and the Ontario Provincial Police.

4.8.2 Current Airport Fee Structure

Current airport revenues are derived from three (3) primary sources: fuel sales, landing fees and property leases including tie-down rentals.

A flat fee structure is in place for landing fees and is enforced by Airport Management during regular hours and when notice of afterhour's activity is given. Landing fees are collected when airport staff is present. Currently there is no ability to track landings outside staffed hours.

Through the development of the Strategic Plan recommendations have been put forth to implement an automated landing information system to record aircraft movements.

For a copy of the Airport's currently published fees refer to *Appendix 'D'*.

4.8.3 Existing Airport Users

Based Aircraft

Approximately 20 aircraft are based at the Airport. All aircraft currently based at the airport are single-engine piston aircraft and are primarily used for recreational and individual business travel.

Flight Schools

In addition to providing contract Management for the Airport, Evans Aviation provides local flight training and sightseeing tours of the Bruce Peninsula. Evans Aviation currently operates three (3) single-engine aircraft and employs three (3) people.

Business/Corporate and Air Taxi Operations

Kincardine Municipal Airport has seen regular use by business jet and turbine aircraft being flown for several corporations with a presence in Bruce County. As a result Kincardine Municipal Airport sees regular use by several air taxi operators such as FlightExec, Image Air, Flight Path, Air Express Ontario, D.B. Aviation Ltd., West Wind Aviation, NetJets and NovaJet.

Other Users

Other users of the Airport include:

- Medevac (Air Ambulance and Patient Transfer Flights)
- Canadian Armed Forces
- Royal Canadian Mounted Police (RCMP)
- Ontario Provincial Police (OPP)

5. COMMUNITY ENGAGEMENT

5.1 STAKEHOLDER CONSULTATIONS

One of the core components of the study are stakeholder consultations. Stakeholders included any group or organization that currently or potentially utilizes, directly or indirectly, the Airport or air services. The purpose of these consultations is to obtain the following information:

- A. How each company utilizes the existing facilities.
- B. Opportunities and constraints of the existing facility.
- C. Potential future opportunities for each company to better utilize the facility in the future.

This information is critical in evaluating the operational objective of the Airport and to understand the intended use of the Airport by its tenants and users. This information is also used throughout the study, and specifically as part of the opportunities and constraints analysis, SWOTCH analysis and business opportunity assessment.

The following is a list of the stakeholders that provided comment as part of this study:

- Municipality of Kincardine
- Kincardine Municipal Airport Management
- Evans Aviation
- NovaJet (on behalf of Bruce Power)
- FlightExec
- Canadian Agra Corporation
- Canadian Owners and Pilots Associated (COPA) Flight 172
- Evans Media
- Penetangore Regional Economic Development Corporation (PREDC)

In addition to the stakeholders listed above individuals owning a hangar, leasing a tie-down or regularly using the Airport were provided the opportunity to comment on the Airport, its operation and facilities.

5.2 EVANS AVIATION

As the sole commercially registered aviation business at the Airport and the primary airport operator, GENIVAR conducted several interviews with Evans Aviation in order to understand the existing overall operational aspects and services at the Airport.

Evans Aviation is contracted by the Municipality of Kincardine to provide maintenance, operations and services at the airport. This includes, but is not limited to fuel sales, fuel distribution, aircraft parking and storage at the airport, and the day-to-day interaction with its users. Additionally, Evans Aviation is an owner and operator of a flight training school based at the airport providing services that include training services, sightseeing, aerial photography and videography.

5.3 BRUCE POWER

Bruce Power operates the largest nuclear facility in the world and is the largest investor in Ontario's electricity infrastructure. Bruce Power is located in rural southwestern Ontario approximately twelve (12) kilometers (7.5 miles) north of Kincardine Municipal Airport and is the largest employer in the region. Bruce Power is also the highest corporate user of Kincardine Municipal Airport.

On average Kincardine Municipal Airport receives approximately one-hundred (100) flights per year for Bruce Power through NovaJet an air taxi/charter operator based in Toronto.

Based on conversations with NovaJet and Airport Management it is believed that approximately 50 additional flights are diverted each year to London International Airport or Goderich Airport due to weather and runway length restrictions. This represents potential lost gross proceeds for the Airport of approximately \$25,000 and \$40,000 dollars per year depending on fuel sale volumes and costs per litre.

5.4 STAKEHOLDER COMMENTS

The following summarizes the comments received by stakeholders as part of the consultations. This summary is intended to provide a general overview of the comments and not detail comments made by the stakeholders. Where possible, the comments were grouped together in an effort to maintain basic level of confidentiality. Finally, the following is intended solely to summarize the comments, as presented, by the various stakeholders and does not necessarily reflect the views or recommendations of GENIVAR.

- The Airport was specifically identified as an important but possibly underutilized asset.
- Underutilization is suspected to be the result of shorter than adequate existing runway length for air taxi /charter operators in the region.
- The Airport is used on occasion by government agencies including the Royal Canadian Mounted Police, the Ontario Provincial Police (OPP) and the Department of National Defence (DND).
- Medevac (Air Ambulance) and Patient Transfer Flights occur on occasion.
- The Airport is an important strategic asset for Bruce Power and other large businesses in the region.
- The Airport is an important strategic asset for attracting large businesses to the region.
- The Airport is an important strategic asset for emergency services in the region.
- The Air Terminal Building needs to be maintained to the Municipalities standards for public use facilities.
- Additional services such as Wi-Fi and available pilot kiosk are useful to visiting flight crews.
- Upgrades to the Terminal's interior and exterior could boost attractiveness of Airport.
- Water damage and mold issues are a concern for many using the Airport.
- Paving of access road to hangars is needed to minimize dirt and debris from being tracked onto aircraft movement areas.
- Additional parking for itinerant and overnight aircraft is needed.
- A second access to the Airport is desired from Concession Road 5.
- Terminal parking is adequate for regular demand. Additional parking is required for seasonal charitable events and gatherings.
- The existing GNSS LPV approaches are a welcome addition.
- The existing NDB should be maintained.
- Concerns have been expressed over the proposed Armow Wind Farm in close proximity to the airport.
- DME equipment would be a useful addition and allow aircraft not equipped for LPV approaches to still be provided minima lower than circling.
- The installation of a certified Automated Weather Observation Station (AWOS) would provide useful information to pilots on weather conditions at the airport.

- Available public and private transportation services to the airport are lacking. A flat rate would be preferred for taxi services to/from downtown Kincardine and the Airport.
- Support for a restaurant or seasonal food services at the airport are needed.
- Rotating beacon angle needs checked.
- Condition of Runway 13-31 requires repair.
- A large corporate style hangar may help to attract commercial tenants.
- Streamlined development approval process is needed.
- A more clear definition of lease and lease terms is needed both for existing and future land leases.
- Continued support of charitable events.
- The primary runway orientation is favourable and with no concerns of usability.
- Runway length continues to be an issue for business jets.

5.5 CONSULTATIONS SUMMARY

In general, the comments obtained from the stakeholders during the consultations reflect, to some extent, the observations found by GENIVAR during airport meetings. These can be briefly summarized as follows:

1. There is significant opportunity at the Airport to build and expand upon its current core function:
 - Supporting flight training and charter operations
 - Supporting aviation development
2. The Airport is somewhat underutilized due to the following:
 - Lack of supporting infrastructure, specifically runway length
 - Limited resources for support of aviation related developments
 - Insufficient guidance for land development application and approval process

As a result, the Airport Strategic Plan will focus on these two (2) main areas as summarized above.

However, there is one (1) additional point observed by GENIVAR during site meetings and subsequent discussions:

3. The Airport is without an approved plan.
 - Lack of a phased airport development plan
 - Lack of capital cost estimates for budgetary planning

This last point should be rectified as part of the Municipality's implementation of the Airport Strategic Plan and its subsequent recommendations. Adopting the phased recommendations detailed within this study should provide sufficient direction for the Municipality to focus on the core function of the Airport.

6. AVIATION ACTIVITY FORECASTS

6.1 INTRODUCTION

This Section presents the aviation activity forecasts for the Kincardine Municipal Airport. As presented, these forecasts were developed by GENIVAR to provide projections of aviation activity for the 15-year planning period 2013 through 2027 as part of the Airport Strategic Plan. The forecast provides input for the assessment of airport facility requirements and the evaluation of airport development alternatives. It also provides information needed to assess the type and timing of new airport facilities. The aviation activity forecast assumes landside and airfield capacity, whether through existing lands or future land acquisitions, will be available at time of actualized demand.

It is the goal of this aviation activity forecasting effort to:

- 1) Develop a realistic approach regarding the methodology, formulation and derivation of the various elements of the aviation activity forecasts;
- 2) Utilize the latest available relevant information and data;
- 3) Reflect the current and anticipated conditions at Kincardine Municipal Airport; and
- 4) Provide adequate justification for airport planning and development.

Forecasts of aviation activities include general aviation aircraft movements and were, in part, developed based on data obtained from Airport Management, Transport Canada and Statistics Canada.

It is important to note that forecasting is an inexact science. Departures from forecast levels in the local and national economy, and in the business environment, may have a significant effect on the projections of general aviation presented herein, with these uncertainties increasing towards the end of the forecast period.

Additionally, new technologies and recreational trends may have an unpredictable impact on aviation activity at Kincardine Municipal Airport. For these reasons, the aviation activity forecasts should periodically be compared with actual Kincardine Municipal Airport activity levels, and airport plans and policies be adjusted accordingly.

6.2 REGIONAL POPULATION GROWTH

In developing an aviation activity forecasting, it is important to where possible find a correlation between aviation activity (local and itinerant movements) and local / regional population growth. However, with the limited amount of historical aircraft movement data available for Kincardine Municipal Airport there is no mechanism available to establish a relationship between population growth and aviation activity levels. Therefore the counts as presented in the following subsection are simply for information purposes.

6.2.1 Population for Bruce and Huron Counties, Ontario

The Statistics Canada provides census profile for population characteristics for Bruce County. In 2006 the population is shown at 65,349 counts, whereas in 2011 the population is shown at 66,102 counts, a population change of 1.2 percent respectively. This provides an average annual growth rate of 0.23 percent in population. Similar data is provided for Huron County that is located south of Bruce County. In 2006 the population is shown at 59,325 counts, whereas in 2011 the population is shown at 59,100 counts, a population change of -0.4 percent respectively. This provides an average annual growth rate of -0.08 percent in population.

6.2.2 Population for Kincardine Municipality, Ontario

Based on the Statistics Canada census profile, it is important to note that the population of 11,173 remained same for the past five (5) years (2006 through 2011) for Kincardine Municipality. Therefore, growth in population remains at zero (0) percent.

6.2.3 Population for Town of Kincardine, Ontario

The Statistics Canada provides census profile for population characteristics at Kincardine. In 2006 the population shows 6,449 counts, whereas in 2011 the population shows 6,725 counts, a population change of 4.3 percent respectively. This provides an average annual growth rate of 0.84 percent in population.

6.3 HISTORICAL AVIATION ACTIVITY AT KINCARDINE MUNICIPAL AIRPORT

Understanding trends in aviation activity and the factors influencing activity levels is important in projecting future growth at Kincardine Municipal Airport. Therefore, activity statistics were compiled for historical aircraft movements at Kincardine Municipal Airport. However, aviation activity data is limited to include aircraft movements by fleet mix and aviation segment that is presented and discussed in the following paragraphs.

It is also important to note that previous studies developed for the Kincardine Municipal Airport did not include aviation activity forecasts and, therefore, there is no past aviation activity data available (except for the last five years) for detail analysis and comparison purposes.

Table 4 shows the historical aircraft movements by aircraft fleet mix at the Kincardine Municipal Airport. This data indicates that the airport experienced 3,430 aircraft movements in 2012. Between 2008 and 2012, the number of aircraft movements increased from 2,590 to 3,430 (approximately 32 percent) providing an average annual growth rate (AARG) of 7.28 percent.

Table 4
HISTORICAL AIRCRAFT MOVEMENTS BY AIRCRAFT FLEET MIX
AT KINCARDINE MUNICIPAL AIRPORT

Year	Single Engine	Multi Engine	Jet Engine	Helicopter	Other	Total	Annual % Change
2008	2,230	218	16	26	0	2,590	--
2009	2,968	68	18	32	0	3,086	19.1%
2010	2,630	152	66	46	0	2,894	-6.2%
2011	2,185	248	24	38	0	2,495	-13.8%
2012	2,947	303	61	119	0	3,430	37.5%
Average Annual Growth Rates (AAGR)							
2008-2012	7.22%	8.58%	39.73%	46.27%	0.00%	7.28%	--
Notes:							
1. Data of aircraft movements for 2012 was provided for ten months only (January through October) by the airport personnel. GENIVAR estimated aircraft movements for the remaining two months (November and December) to provide a full 2012 year.							
Sources:							
1. Kincardine Municipal Airport Management Personnel, 2013. Compiled by GENIVAR, 2013.							

Because there has been no detail record keeping of past itinerant Air Taxi/Commuter, air cargo, or military operational activity at the Kincardine Municipal Airport, based on interviews with the airport management; military and air cargo operations have occurred only on an occasional basis and will most

likely remain at very low and inconsistent levels throughout the 15-year planning period. If demand for Air Taxi/Commuter services supported sustained offerings of Air Taxi/Commuter at the Kincardine Municipal Airport, it is recommended that the aviation activity forecast be revisited at that time.

6.4 GENERAL AVIATION ACTIVITY FORECASTS

6.4.1 Review of Transport Canada Aviation Forecasts

The Transport Canada Aviation Forecasts report presents the 2008-2022 Transport Canada (TC) forecasts of national aviation activity and was referenced in the development of a forecast of aviation activity for the Airport Strategic Plan. This publication provides a 14-year outlook and is updated annually; however it has been discontinued recently.

Based on Transport Canada Aviation Forecasts, general aviation aircraft movements were negatively affected by the record high fuel prices and the economic recession and were expected to continue to decline in 2009 by 2.9 percent. General Aviation (GA) movements were projected to increase at a low average annual rate of 0.4 percent in through 2008 to 2012. In the longer term, average annual growth rates for total GA aircraft movements are expected to be 1.2 percent and 1.3 percent through to the year 2017 and 2022 respectively and grow to approximately 1.6 million movements from 1.4 million in 2008.

In light of the grim economic climate, total itinerant aircraft movement growth was expected to fall in 2009 by 5.7 percent before recovering in 2010 with meager growth of 0.2 percent. By the end of the short-term period (2008-2012), total itinerant movements were anticipated to reach 5.0 million with an average annual growth rate of 0.3 over the forecasting period. For the longer-term, average annual growth rates for total itinerant aircraft movements are expected to be 1.4 percent and 1.5 percent through the year 2017 and 2022 respectively.

6.4.2 Kincardine Municipal Airport Forecast Scenarios

In developing projections of future general aviation activity levels at Kincardine Municipal Airport, three unique Kincardine Municipal Airport-specific growth scenarios were developed and described below as Scenario 1 - Low, Scenario 2 - Medium, and Scenario 3 - High.

Scenario 1 – Low was based on an assumed average annual growth rate of 0.85 percent. The aircraft movements are projected to increase from 3,459 in 2013 to 3,894 in 2027. This forecast anticipates an approximate 12.6 percent increase in aircraft movements for the 15-year planning period. Scenario 1 assumes that the most significant growth at the Airport has already occurred and only minimal increases in air charter operations or flight training would occur.

Scenario 2 – Medium was developed based on average annual growth rate of 1.40 percent derived from Transport Canada Aviation Forecasts, for longer term, average annual growth rates for total itinerant aircraft movements. The aircraft movements are projected to increase from 3,478 in 2013 to 4,225 in 2027. Scenario 2 – Medium forecast anticipates an approximate 21.5 percent increase in aircraft movements for the 15-year planning period. Scenario 2 assumes that the economy and aviation industry will continue to slowly improve. However, with increasing to fuel costs and decreases in the number of recreational pilots only moderate growth is anticipated.

Scenario 3 – High was developed based on average annual growth rate of 2.50 percent. The aircraft movements are projected to increase from 3,516 in 2013 to 4,968 in 2027. This forecast anticipates an approximate 41.3 percent increase in aircraft movements for the 15-year planning period. Scenario 3 assumes that the economy and aviation industry will continue to improve and demand for air charter operations will increase year-over-year. In addition, this scenario assumes that a re-vitalisation of the flight training sector would occur and contribute to local movements.

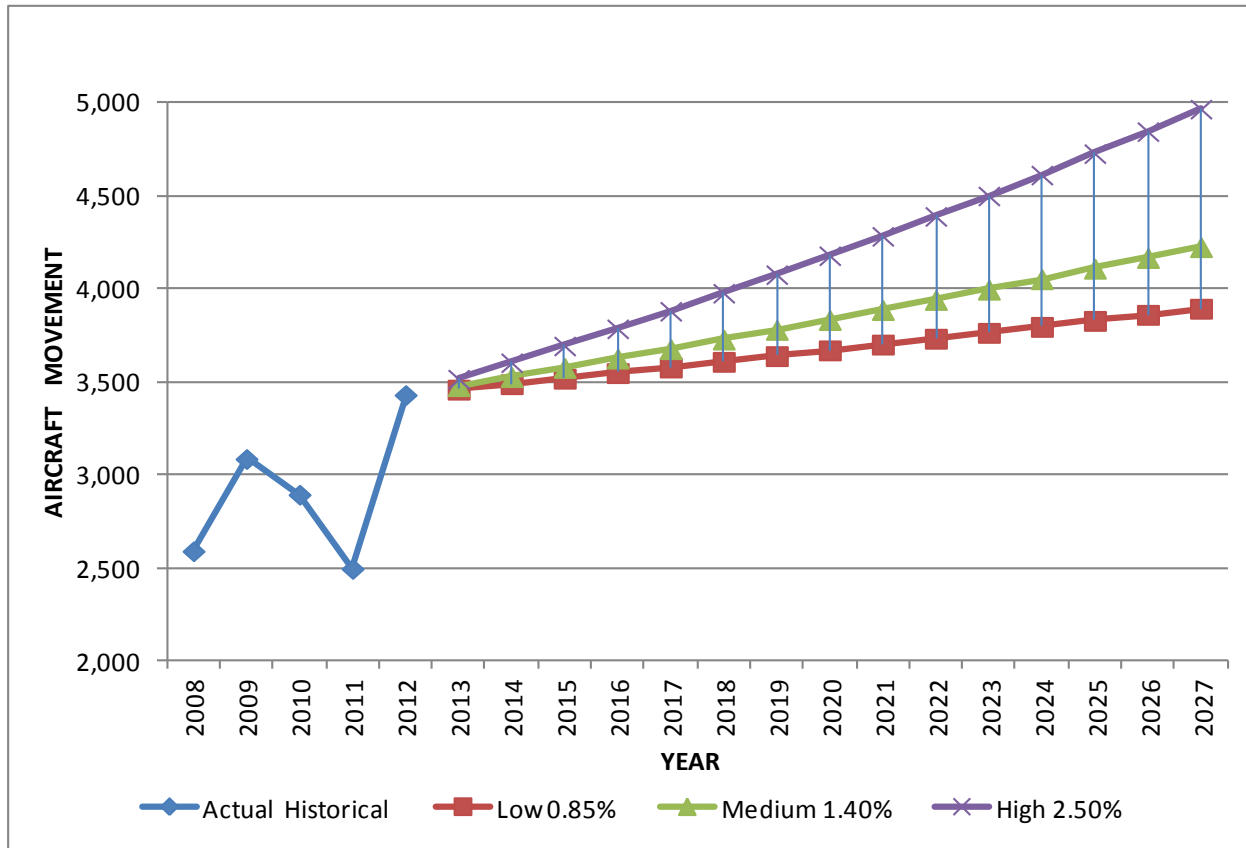
In developing the future aircraft movements, a review was performed on available historical activity data, financial data, general aviation industry growth trends and, where available, energy and tourism sector outlooks that could potentially impact activity at Kincardine Municipal Airport. Based on the considerations of general aviation activity growth as presented in Transport Canada report and the likelihood of the airport growing at similar rate, Scenario 2 - Medium was selected as the preferred forecast for aircraft movements, and reflects an annualized compound growth rate of 1.40 percent for 15-year period.

The total annual number of general aviation movements is presented for each forecast in *Table 5* and *Figure 3*. Each projection was predicated on the use of data available obtained through national and local records, Statistics Canada and Transport Canada.

Table 5
GENERAL AVIATION AIRCRAFT MOVEMENTS FORECAST

Year	Scenario 1 Low	Scenario 2 Medium	Scenario 3 High
2013	3,459	3,478	3,516
2014	3,489	3,527	3,604
2015	3,518	3,576	3,694
2016	3,548	3,626	3,786
2017	3,578	3,677	3,881
2018	3,609	3,728	3,978
2019	3,639	3,781	4,077
2020	3,670	3,834	4,179
2021	3,701	3,887	4,284
2022	3,733	3,942	4,391
2023	3,765	3,997	4,500
2024	3,797	4,053	4,613
2025	3,829	4,109	4,728
2026	3,862	4,167	4,847
2027	3,894	4,225	4,968
Average Annual Growth Rate (AAGR)			
2013-2017	0.85%	1.40%	2.50%
2018-2022	0.85%	1.40%	2.50%
2023-2027	0.85%	1.40%	2.50%
Sources:			
1. Compiled by GENIVAR 2013.			

Figure 3 Aircraft Movement Forecasts 2013-2027



Source: Prepared by GENIVAR 2013.

6.5 FORECAST SUMMARY AND RECOMMENDATION

There are a number of events that could occur over the 15-year forecast period that would cause aviation traffic growth at Kincardine Municipal Airport to exceed the levels of selected forecast, including an improvement in the local economy; an increase in general aviation network service, and lower fuel costs making general aviation as well as jet-powered aircraft more popular.

While it is not anticipated that all of the above events would occur, one or more such events could boost growth significantly over the forecast period. The resulting rate of growth is difficult to predict. For the purpose of this Airport Strategic Plan, the moderate (Scenario 2 – Medium) growth rate was selected as the preferred forecast for aircraft movements, and reflects an annualized compound growth rate of 1.40 percent.

Again, should an unforeseen opportunity or economic development have a significant impact on aircraft movements at Kincardine Municipal Airport, it is recommended that the aviation activity forecast be revisited at that time. It is also recommended that the aircraft movements at the airport be collected and recorded in detail so that the future forecasting of aviation activity at the airport would have a comprehensive data base to compare and analyze any aircraft movements.

7. COMMERCIAL DEVELOPMENT STRATEGY

7.1 General

The Kincardine Municipal Airport has in the short-term approximately 7.5 ha. (18.53 ac.) available for additional airside commercial development. Provided additional lands may be acquired on an as needed basis the Airport would have sufficient lands available for airside and landside commercial development.

Subject to further need and land acquisition, the airport could, in the long-term, acquire all remaining open lands west of Runway 05-23 for future commercial development.

7.2 LAND DEVELOPMENT PRINCIPLES

It is essential that there is a clear Land Use Plan and set of land development principles to guide and direct the land related activities of Kincardine Municipal Airport. The increased awareness of Kincardine Municipal Airport through present concerning surrounding wind turbine development sets a timely stage to establish a clear approach and policy for land development at the Airport. It is worth noting that the more aviation activity that occurs at an airport, the more valuable the airport's land becomes. Thus, efforts to generate diversified revenues and secure land development opportunities will be enhanced through actions to stimulate aviation activity.

By maintaining airport land ownership, Kincardine Municipal Airport has the best assurance of managing the Airport's infrastructure in a safe, secure and effective manner with compatible land uses. In reviewing the aviation industry and airport lands, several related issues have been explored.

Before a decision is made to develop airport lands, an Airport should first have in place a framework and an approach to attracting interest in the airport lands for development. The position of airport lands as a business park is a common practise at airport (particularly large airports). The business parks are tailored to support the core business at the airport and in the region. The framework for airport land development begins with the decision on whether the Airport strictly leases its land or considers land sales, and under what conditions. The following subsections have been developed to provide guidance for the Airport and the Municipality on topics of land leases and sale of lands on Airport property.

7.2.1 The Industry Norm

The industry norm is for airports to lease land and not to sell unless it is surplus to the airport's immediate and long term requirements. This surplus land can be sold for the benefit of generating cash to reinvest in the airport (or put into a reserve fund) and to remove the land from its inventory and reduce its tax (or grant in lieu of tax) exposure and cost. There are occasionally reduced operating costs associated with the sale of airport land.

Land is the only asset category that does not depreciate and the airport can hold onto this asset through leasing while providing the future tenant/lessee the opportunity to development the 'improvement' on the property that is depreciable. The 'improvement' is the structure or development that is added to the land, consistent with the purpose clause in the lease. Its scope and investment is generally tied to the length of term of the lease. The more significant the capital and the financing requirements to pay for the 'improvement' (or asset) the longer the lease term that is usually granted.

There is occasion where a developer or prospective airport client has difficulty getting financing associated with leasing of land. This is generally not strictly related to the concept of leasing but rather the term and the renewal opportunities associated with the lease. The financing party wants to have security to hold against the loan or mortgage and this can be simplified if it has title to the land. The provision of a legal description and the naming of a financial institution in any insurance policy against the leased land, as well as their interest in the developed asset, can assist in meeting the security requirements.

7.2.2 Sale of Airport Lands

The selling of land is referred to as a ‘Fee Simple’ transaction and it transfers permanent title to the buyer. Fee Simple is “absolute ownership unencumbered by any other interest or estate, subject only to the limitations imposed by the government powers of taxation, etc.” If Kincardine Municipal Airport or the Municipality of Kincardine has sold interest in its property for development in the past it is recommended that the template sale agreement be reviewed.

A change in use of airport property has the potential to endanger the survival of the airport through incompatible land use, encroachment, safety implications, and loss of revenue, all combining to decrease the viability of the airport. This threat is why it is imperative that all parties involved in the process, including users, become familiar with both the implications of such an action and the procedures that have to be followed. Too often, poorly planned development projects on airport have subsequently created a precarious situation for the airport. This occurs when changes to the airport property are made with intentions other than to improve the viability of the airport.

The importance of protecting airport lands against incompatible uses has been demonstrated in the United States, where the Federal Aviation Administration (FAA) will only consider sale of airport land when the action protects, advances, or benefits the public interest in civil aviation. This means that there is a need for the sponsor, users, and the FAA to ascertain the benefit to aviation in real and documented terms. The interests of real-estate developers, businesses, or other non-aviation interests do not take precedence over the aviation interests, especially at a federally obligated airport.

In many cases, use of airport property for non-aviation revenue-producing activities that provide revenue back to the airport is not necessarily an adverse activity. This is especially true when lands in question have no aviation-related value. What is important is that the airport benefits from the activity, usually financially.

7.2.3 The Pros and Cons of Selling Airport Land

With respect to Kincardine Municipal Airport there are both benefits and drawbacks associated with the sale of airport lands. These are summarized in *Table 6* below.

Table 6
PROS AND CONS OF SELLING AIRPORT LAND

Pros of Selling Airport Land	Cons of Selling Airport Land
It generates greater cash up front for the airport.	The airport loses title to the land and can lose some control over its environment and protection of its investment in the longer term.
It can support airport development in underdeveloped areas of the airport.	The revenue potential is mostly up front and then its is reduced compared to leasing of land.
It can be of assistance in financing significant private investments and development at the airport through title transfer (and land transfer in perpetuity).	The land owner has rights of quite enjoyment and can create a disruptive environment for the airport while still meeting the terms of sale.
It can secure a long term commitment from a desirable partner/investor.	The land owner may dispute fees associated with the airport it may create a challenging environment to isolate or remove access for the owner to the airport once the land is sold.
It can reduce the airport's footprint reduce its tax or grant in lieu of taxes.	The land owner may not maintain the property to a degree that is satisfactory and there is limited ability to enforce on the land owner's property. The land owner has the right to re-sell and can benefit from the expansion and development of the airport while not participating in its continuing investment or development.

The Kincardine Municipal Airport at present has minimal land available for lease or sale. To accommodate future development, land acquisition would be required to the west of Runway Threshold 13 and north of the existing terminal building.

In the short- to medium-term (0-10 years) it is not recommended that any Airport lands be considered for sale unless a significant development that can be secured, and the sale of land is an incentive to attracting a business proponent, establishing itself at the Airport.

The land would create a major investment in the airport community, create jobs and possibly contribute to further commercial development. If such a sale require airside access it would be with a through the 'fence' access license and the cost of developing the airside connections and taxiway could be shared with the Airport or borne entirely by the developer. "Through-the-Fence" access license and charges are discussed later in this section.

7.2.4 Lease of Airport Lands

Commercial real estate developers and investors often favor total Fee Simple ownership of income property. The propensity to own – and the emotions attached to it – sometimes can result in misguided decisions and strategies, and lost opportunities. Once developers move beyond the notion of ownership as an investment goal, new opportunities that may not have been visible before, such as ground leases, become apparent. In its most basic form, a ground lease, or land lease, separates the ownership of land from the ownership of the improvements on the land, such as an office building or aircraft hangar. The landowner leases the land to the developer of the improvements, who pays rent for use of the land. Typically ground leases are long-term and include set rent escalations, foreclosure rights should the lessee default, and a reversionary right, which means improvements on the property revert to the landowner (in this case the airport) at the end of the lease term. While such lease terms do not particularly favor developers, ground leases offer some distinct advantages.

Ground leases transfer control – not ownership – of a property and for landowners, are considered one of the most secure forms of real estate investment. But landowners are still investors through supply of the land and may be open to developers who offer them a stake in the improvements erected on their land. Generally the land leases will have 20 to 50 year terms to provide the timeframe to properly amortize the investment and provide it with a correlated 'useful life' of the asset. Prior to the end of the lease there may or may not be the opportunity to re-lease the land and/or the improvement. The developer/lessee is responsible for the operating costs associated with the leased property (i.e. parking lot and landscaping/grass cutting) and may contribute to other common use costs (airport maintenance costs or AMC) associated with the airport. The general structure for revenue of the lease includes the following components:

Airport Revenue Components

- Land (Ground) Rent (market based)
- Improvements (facilities – market based; if the improvement has been developed or transferred to the landlord/airport)
- Common Use Charges (Airport Maintenance Charges)
- Development Levies
- Taxes
- Tenant Operating Cost i.e. utilities by other non-airport agencies

7.2.5 The Pros and Cons of Leasing Airport Lands

With respect to Kincardine Municipal Airport there are both benefits and drawbacks associated with the leasing of airport lands. These are summarized in *Table 7*.

Table 7
PROS AND CONS OF LEASING AIRPORT LANDS

Pros of Leasing Airport Lands	Cons of Leasing Airport Lands
Lower entry price for the developer/tenant than Fee Simple property	The Lessee improvements revert to the Land owner at the end of the Lease and this can cause conflict with Lease's/tenants
Lease payment may be tax deductible where Fee Simple land cannot be depreciated or written off against income	
The airport can generate a good rental income with annual increases that match inflation and cost indexes	There may be some environmental exposure to the land use (although this is passed along to the tenant in the Lease, there is always some residual responsibility of the land owner)
The airport can recover common use charges and taxes on the property with no concerns about payment (terms for disputes and non-payment are clearly spelled out)	
A tenant that has not maintained the property or breaches the conditions of the agreement can be dealt with and can lead to termination of the lease and forfeiture of the improvements	
The airport maintains complete development control over the land and its improvements	
The airport can coordinate the long term development of the airport through its leasing environment while protecting its assets	
The airport can have improvements removed or transferred to the airport in title through divesting	

7.3 FEES AND CHARGES FRAMEWORK

The following principles are identified as a possible framework in establishing a fees and charges environment for Kincardine Municipal Airport.

7.3.1 General Principles

- The fee/rate setting methodology for the Kincardine Municipal Airport should be consistent with current nationally acceptable practises.
- As a Municipal run facility, the Municipality is responsible for determining economic and commercial policies for the Airport to ensure its financial independence.
- Rates and changes will take into account national and local policy, and commercial competitive rates.

7.3.2 Management Principles

- Airport management has the right and responsibility to ensure a safe and secure airport operation and to achieve and maintain quality service to users.
- Costs and revenues should be allocated in a manner that is clear and transparent to tenants and aircraft operators. The allocation of costs and revenues to specific operating areas will be the basis for fee setting.
- The Airport will develop non-aeronautical revenue sources to their fullest to attract investment, job creation and revenues to work toward a sustainable aviation operation environment.

7.3.3 Financing Principles

- The Airport should consider the establishment of a independent capital reserve fund to provide for asset replacement and expansion to meet forecast demand.
- The Airport will ensure it applies sound economic and business principles to its operations to protect the interests of all users.

7.3.4 Establishing Land Lease Rates

Most lease rates are established by using local market rates that reflect the supply of and demand for rental land in a local area. The general approach used to determine an appropriate rental rate is to gain information on a lease transaction in the region. This can be difficult with few transactions for comparison so a market capitalization rate is often used. Where sufficiently detailed information is not available, the capitalization rate will be useful in calculating out a rent. It should be noted that competitive airport rates from larger (and high land value) airports can provide a cost advantage for an operator in targeting a prospective tenant.

Capitalization rates, or cap rates, provide a tool for investors to use for roughly valuing a property based on its Net Operating Income. Reciprocally, when there is an indication of the value of property, it can use a cap rate to determine the appropriate rent to charge an occupant. The variables are the land value, the cap rate and the rental rate.

A comparably lower cap rate for a property would indicate less risk associated with the investment (increasing demand for the product), and a comparably higher cap rate for a property might indicated more risk (reduced demand for the product). Some factors considered in assessing risk include creditworthiness of a tenant, term of lease, quality and location of property and general volatility of the market.

It is recommended that the established land lease rates for Kincardine Municipal Airport be 'sustainable' and that they should represent the true market value of the land.

It should be noted that achieving 'sustainable' land lease rates is the desired objective. However, competition from other airports to attract aviation related business may influence lease rates offered to tenants if the lease rate is significant factor in the decision to relocate at one airport versus another.

Land lease rates should be applied to the entire lot area as they reflect the market value of the land. Some airports have separate land lease rates for the area covered by building footprint and for remaining lands. This practice may lead to a poor utilization of available commercial land and does not recognize that aviation-related tenants often derive significant income from their apron areas.

It is recommended that land leases at Kincardine Municipal Airport be established based on lot area rather than building footprint.

7.3.5 Land Values

Before establishing land values and lease rates for Kincardine Municipal Airport a determination of market value for unserviced and serviced land should be conducted. This analysis would examine a number of current land sale opportunities in the area to serve as a regional proxy. The result of such an analysis would provide an approximate value for lands available for development at the Airport. Recommendations can then be formed to establish lot values for development at Kincardine Municipal Airport.

A factor in attracting new aviation activity and businesses to an airport is the airport's competitive positioning with respect to rates and charges. The 'sustainable' land lease rates which are recommended here are generally higher than what other airports may be charging. Most airports do not publicly share their land lease rates in order to protect their competitive position. However, rates and charges available from a number of regional and municipal airports across Canada suggest an average lease rate of approximately \$0.25 per square foot for serviced airside land. It should be noted that airports derive revenues from many sources. For those airports where lease rates were available, a significant amount of revenue is derived from charges associated with scheduled air services. Similarly, it is difficult to ascertain the competitiveness of the land lease rates without understanding the full spectrum of fees which may be charged to the lessee. This includes airport maintenance charges, sewage and water fees, etc. It should be noted that many airports are reluctant to publish fixed lease rates, but instead indicate in marketing materials that land lease rates are 'negotiable'.

Airports may also charge varying land lease rates based on the amount of land which is leased. As example, one US airport advertises lease rates which begin at \$0.19 per square foot, for parcels less than 0.10 ha. (0.25 ac.) in size, and reduces to \$0.06 per square foot for parcels over 20.23 ha. (50 ac.) in area.

After determining a recommended lease rate for serviced and unserviced lands, it is recommended that the Airport then use the recommended lease rate as a starting point of any negotiation as it will reflect the market value of the land. For larger parcels of land, where lands may be less intensively utilized, a reduced lease rate should be considered.

After an initial appraisal of airport lands, subsequent appraisals should be undertaken every 5 years.

7.4 COMMERCIAL DEVELOPMENT CHARGES

In addition to land lease / land sale revenues there are a number of additional fees which should be charged to airport lease tenants. These are described in the following sections.

7.4.1 Airport Maintenance Charges (AMC)

Airport Maintenance Charges (AMCs) are established based on annual costs to maintain the airport in an operational state. AMCs generally apply only to those lands which have been sold and have been used as a source of annual revenues from these properties, in the same manner that other airports may charge a 'Through-the-Fence' license. AMCs should be applied to all airport tenants and should be based on the common use costs of the development areas (roads, utility corridors, and public access areas that are utilized by airport tenants and the airport maintains) and divided by the total commercial development area.

It is recommended that an Airport Maintenance Charge (AMC) be applied to all airport properties including the properties that have been leased. The AMC should be recalculated every five years with an annual CPI increase to annually adjust the charge.

Due to the current setup of leases, it may require a phased implementation and transition for the fully implemented AMC to be in effect. A first step is to carry out a detailed cost analysis to establish an accurate AMC for the Airport over a project 5 year period.

A review of the Airport Maintenance Charges available from a number of municipal and regional airports suggests a range in fees from \$0.032 per square foot to \$0.12 per square foot.

7.4.2 Airport Development Service Fee

A one-time Airport Development Service Fee (ADS) would be an administrative fee to cover the cost of the Airport's commercial development review process. All developments occurring on airport lands should be subject to this fee. As an example, Waterloo Regional International Airport has a development service fee of \$1.43 per square foot based on building area. This is over and above a development levy imposed by the regional municipality.

An alternative would be for developers to provide a security deposit from which administrative costs would be deducted as incurred with a 10 percent administrative fee. The remaining amount would then be returned once the project has been completed. Consideration should be given to implementing a flat fee per square foot and possibly having an upset limit for very large projects.

It is recommended that an Airport Development Service Fee be implemented for all new developments on airport lands.

7.4.3 Airport Development Levy

An Airport Development Levy is typically applied as a one-time charge on all new building construction to assist with funding airport capital improvements. Airport Development Levies provide a great tool for capturing funds that could contribute to new capital and/or possibly be set aside for future capital requirements through a reserve fund.

As a municipally owned airport, it is assumed that this levy would be directed to the Airport and would be in lieu of a development levy charged by the municipality. The current non-residential development charge for the Municipality of Kincardine is typically a flat rate of \$32.83 per square metre (\$3.28 per square foot). However, the fee may increase depending on the type of development. As a comparison, commercial development at Waterloo Regional International Airport is subject to regional municipality development fees of approximately \$51.7 per square metre (\$5.17 per square foot). This fee is applied to office, manufacturing and servicing facilities, but excludes floor space used for the 'storage' of aircraft where there is little demand for services.

It is recommended that new construction on the airport leased land be charged an Airport Development Levy, equivalent to the Municipality of Kincardine development fee.

In this manner, the Airport Development Levy would be charged against those uses which place demands on services and utilities but would not penalize owners of storage hangars or smaller private/T-hangars which do not require services and utilities.

If a developer is required to spend capital on installing new airfield infrastructure (such as water, fire and sanitary systems) that will benefit the airport, this fee could be waived or discounted.

7.4.4 Water/Sewer Connection Charges

Commercial lots which benefit from provision of water and sewer, the capital cost of providing such services should, in part be, shouldered by the developer. For commercial lots which benefit from provision of a fire service, the capital cost of providing such services should, in part be, shouldered by the developer.

A present no sewer or fire connection services are provided by the municipality to the Airport.

7.4.5 Through-the-Fence License

If in the event that Airport land is sold off by the Municipality or where land adjacent the Airport is provided access to airport infrastructure a 'Through-the-Fence' License Agreement should apply. The fee is essentially a license which permits land owners the right to access the airport property and utilize its facilities including runways and taxiways. It acknowledges the value that the adjacency and access to the airport adds to the business or property. As land leases are typically the norm for commercial airside development there are few examples of 'Through the Fence' agreements and no information is available on similar fees charged at other airports. Likely such fees are negotiated on a case by case basis. A fee of \$0.05 per square foot per annum based on lot size is a suggested starting point. For a 2 ha (5 acres) site this would equate to approximately \$10,000. Another possibility would be to charge a Through-the-Fence License based on a percentage of gross revenues.

It is recommended that the Airport Implement a Through the Fence License wherever off-airport lands are provided airside access and utilize airport infrastructure.

7.4.6 Security Deposit

A Security Deposit is a fee payable to the Airport which is a financial commitment from the developer/applicant to guarantee that the proposed project will be completed on time and meeting the full intent of the project as per the development application. The fee would be 100 percent refundable with interest upon total completion of the project. Any default in work, damage to Airport or tenant infrastructure/property, or no-performance would be paid out from this deposit after 60 days of no action by the developer/applicant without due cause.

The security deposit would not be released until certain items have been submitted to the Airport. They typically include:

- Legal survey
- Occupancy Permit from the Municipality
- Electrical Inspection Permit
- As-built drawings
- Signed Certificate of Complete

7.5 LAND MARKET POSITIONING OPPORTUNITIES/CONSTRAINTS

7.5.1 Key Markets

The key markets for attention are:

- General aviation/corporate aviation markets
- Aircraft maintenance (Maintenance, Repair, and Overhaul)
- Flight training schools and facilities
- Other commercial development opportunities (including landside)

General Aviation

The general aviation and corporate/business market globally is slowly on the upswing after being impacted by the economic downturn of the past few years. With an established vision for the Airport and a strategy for the development of available lands the Airport will be well suited for this market.

The growth of corporate general aviation will be dependent on the economic growth of the surrounding region. Increases in domestic and foreign investment in the region and specifically the energy and technology sectors will help strengthen airport utilization.

Large industrial developments and incentives for establishing manufacturing and technology based businesses in the region will also help to bolster aviation activity at the airport.

Competition for corporate general aviation activity in Huron and Bruce County will primarily come from Goderich and Wiarton Airports which can accommodate similar sized aircraft. However both Goderich and Wiarton Airports do not provide as low of an operational minima and will should therefore remain a close second choice. In addition, both for London International Airport and Waterloo International Airport will attract some corporate general aviation activity away from Kincardine Municipal Airport as additional services and infrastructure provide these airports with greater all weather access.

With respect to lighter general aviation, the municipal hangar provides some rental space available for aircraft storage, however there is presently no excess storage available. The potential development of T-hangars at Kincardine Municipal Airport may also attract recreational aircraft from other airports in the region. Although this segment of general aviation in itself often generates little revenue for the Airport, the presence of a strong contingent of aircraft based at the Airport may attract aviation businesses and services which in turn do generate revenue. This includes aircraft maintenance, avionics repairs, and aircraft/parts sales. As a general rule, every 25 aircraft based at an airport will generate one (1) full time position with respect to aircraft maintenance.

Given recent increases in General Aviation hangar developments at the Airport, it can be expected that similar growth is possible in the short-term and should where possible be accommodated using existing lands. T-hangars or traditional square hangars should be accommodated in land presently reserved west of the existing hangar rows.

Maintenance, Repair and Overhaul (MRO)

Capturing a major MRO operation will require a solid benefits package as well as strong indication that there is a market to serve in the region. This type of operation will not locate at the airport if there are no aircraft to service. This can be a major 'game changer' for the Airport if it could attract the interest and investment of a major maintenance facility in this category.

In North America the business aviation MRO market is worth about \$4.1 billion. Between 2009 and 2018 this market is expected to grow by approximately 7.2 percent annually, with the value of work undertaken nearly doubling.⁴ The commercial airline MRO market is worth approximately \$40 billion worldwide and work is expected to increase by approximately 5.6 percent annually over the next 10 years⁵.

There is strong competition from other airports for this type of activity. Peterborough Airport has an established MRO facility, and both Waterloo and Windsor Airports have recently attracted new MRO operations. There is also strong competition from large MRO facilities located at airports in northern New York State.

From an infrastructure perspective, Kincardine Municipal Airport is ideally equipped for a small general aviation MRO facility geared to piston single and multi-engine aircraft. Lot space available off the Abandoned Apron II would be ideal for a maintenance operation serving aircraft locally and regionally.

Flight Training

Flight training is recognized in aviation industry as a necessary and essential for supporting the industry. Kincardine Municipal Airport is home to one flight training school that provides single engine recreational, private and commercial flight training. Continued support for this type of business is essential.

⁴ Aero Strategy Management Consulting, 2010

⁵ Aviation Week, 2006

Commercial Air Services

The prospect of attracting scheduled passenger air service to Kincardine Municipal Airport has been discussed extensively in the past and throughout the 1993 Airport Master Plan update. As part of this Strategic Plan the prospect of scheduled air service was again reviewed. However, the population density required in order to support schedule passenger air service is not currently present in Kincardine and surrounding municipalities and is not projected to be reached within the 20-year planning period.

Based on airports located in southern Ontario with scheduled air passenger service it appears that a minimum population of approximately 75,000 to 100,000 within a 50 to 100 km radius of an airport is required to support scheduled air service. This is subject to a number of factors including the remoteness of the community the proximity to other airport's offering scheduled air service, the availability of travel alternatives such as rail or bus service and the demand for air travel.

While Kincardine does not have the population base for schedule passenger air service it may have the industry base to support regular charter operations from large urban centres such as Toronto. Where a large industry such as Bruce Power is required to bring skilled labour from across the province to complete long-term projects the opportunity may exists to establish a regular air charter shuttle service to minimize associated temporary living and relocation costs.

7.6 COMMERCIAL DEVELOPMENT SWOTCH ANALYSIS

7.6.1 Strengths

- Overall good infrastructure and facilities capable of supporting continued general aviation development.
- Lands available for immediate commercial development.
- Ample lands potentially available for Airport acquisition on which to expand commercial development in the long term.
- Potential pool of skilled labour available as a result of recent MRO closures to support MRO type operations in the region.

7.6.2 Weaknesses

- Weak short term growth projections for general aviation market.
- Lack of established aircraft maintenance facilities at the Airport.
- Runway length considered short for many business jets.
- Existing lands limit depth and size of commercial development lots.

7.6.3 Opportunities

- Support for light to heavy industrial developments in region may introduce new synergies which may encourage commercial development at the Airport.

7.6.4 Threats

- Competition from similar sized airports in close vicinity for aviation-related business and commercial developments.
- Continued development of wind turbines in close proximity to the Airport may impact long-term development of airport if unchecked.

7.6.5 Challenges

- Creating greater awareness within the aviation community regarding Kincardine and its attributes, and expanding marketing/promotional efforts.
- Building on existing momentum with respect to general aviation hangar developments.
- Development of a branded program by the Airport and the municipality to market commercial development opportunities at the Airport.

In summary, Kincardine Municipal Airport needs to take action to ensure that additional lands can be made available to accommodate new commercial development and a broad mix of aviation related businesses. The greatest challenge to achieving growth objectives in the short-term may be the weak economy and competition from other regional airports with similar aspirations to capture limited market share.

7.7 COMMERCIAL DEVELOPMENT STRATEGY

As a general aviation airport Kincardine can cater to a diverse cross section of aviation-related businesses and activities. At present, there is a single commercial development area identified in which to accommodate new business interests and private hangars. The area located directly north of Taxiway Charlie and west of the Air Terminal Building provides sufficient space to accommodate up to five (5) general aviation Code 'A' hangars. Increased numbers are possible where T-hangars are provided.

Currently, no lot plan has been established and services are not provided to open lots. It is recommended that a Lot Layout Plan be created for the remaining available lands.

8. RECOMMENDED FUNCTIONAL, OPERATIONAL & INFRASTRUCTURE IMPROVEMENTS

This section of the Airport Strategic Plan evaluates the combined runway and airfield system and supporting landside facilities to accommodate existing and future projected aviation activity at the Kincardine Municipal Airport.

Based on the foregoing, the following summarizes the recommended functional and operational objective of Kincardine Municipal Airport:

- *To maintain a safe and usable registered aerodrome that supports general aviation, flight training and air taxi operations in the region.*

Based on the above, the following identifies the recommended functional, operational and infrastructure improvements for Kincardine Municipal Airport.

8.1 AIRSIDE SYSTEM

8.1.1 Runways

Kincardine Municipal Airport's existing runway system provides sufficient capacity for its current mix of light general aviation aircraft and business aircraft.

Runway 13-31

The Airport's primary runway, Runway 13-31, provides a length of 1,245m (4,085 ft.) and is considered sufficient for small to medium sized turboprop aircraft and very light business jets. However, at its present length the runway is not considered suitable for light to medium sized business jets.

There are two (2) primary concerns with the existing runway system as expressed by air operators:

The first is concerning the condition of the runway, particularly the roughness of the pavement as felt on landing and take-off. This can be attributed to pavement degradation associated with age and frost heaving.

The second concern is with the runway's existing takeoff length. The missions that air taxi/charter operators are being requested to fly often dictate that jet aircraft rather than turboprop aircraft are used. The runway length required by jet aircraft for departure is considerably longer than turboprop aircraft. As a result, jet aircraft are often restricted in payload and/or range when operating in and out of Kincardine Municipal Airport.

Preliminary Length Analysis

Standard take-off distances obtained from various aircraft manufacturers were used to assess potential future runway lengths at Kincardine Municipal Airport (CNS7). These distances represent take-off distances based on Maximum Take-Off Weights (MTOW), zero runway longitudinal gradient (slope end-to-end), sea level field elevation and standard temperature of 15°C (59°F) (Standard Atmospheric Day).

Using industry-accepted practices, GENIVAR adjusted "standard atmospheric day" runway take-off distances for the fleet of aircraft that are, in part, utilizing the airport today or may be anticipated to use the airport in the future. These adjustments were based on the airport's elevation, airport reference temperature as taken from TP 312E 3rd Edition, and runway longitudinal gradients. A copy of the spreadsheets developed by GENIVAR that were used to adjust standard runway lengths is provided in *Appendix 'E'*.

As shown in *Appendix 'E'*, the runway take-off and landing length requirements are listed for specific general aviation propeller and business jet engine aircraft operating at their respective maximum gross take-off and maximum landing weights during no wind, hottest day, and contaminated runway (wet) conditions at Kincardine Municipal Airport. Each take-off length data table is sorted by take-off lengths in increasing values.

When considering potential future plans to extend Runway 13-31, such a decision will be most likely based upon or guided by: 1) demonstrated demand, and 2) available land on which to extend the runway. Assuming any lengthening of the Runway 13-31 would be to the east and then west, a preliminary planning exercise revealed that, given the ability to acquire land parcels immediately west of the runway that are centered about the extended runway centerline, the runway could be potentially extended to an interim length of 4,500 feet and an ultimate length of 5,000 feet.

Based on the “what-if” alternative planning analysis, 24 propeller-driven and jet-powered general aviation aircraft are presented on a spreadsheet. Seven aircraft or 29 percent can operate without operational restrictions (e.g. payload and/or non-stop trip length) utilizing the airport’s existing 4,085-foot long runway. At a length of 4,500 feet and 5,000 feet, the percentage increases to approximately 58 percent and 63 percent, respectively. The remaining percentage of general aviation aircraft can still operate at the airport; however, they would experience operational restrictions.

Support for Runway Extension

The runway extension at the Kincardine Municipal Airport must be documented to support the need for longer runway. Such document or forms should be distributed by the Kincardine Municipal Airport staff to existing and potential aircraft operators at Kincardine Municipal Airport that require additional runway length. A customized form should be used in the collection of pertinent aircraft and operational data from existing and potential airport users. The form will solicit information regarding specific aircraft types used at the airport, number of annual departures at the airport, typical routes and haul lengths, and specific types of operational restrictions encountered at the airport (i.e., weight or seat restrictions). Aircraft operators having a significant need for additional runway length at the Kincardine Municipal Airport may be asked to also provide a letter stating the company’s need for a specific runway length at Kincardine Municipal Airport. Such letters should list in detail the type of aircraft being used and the runway take-off length requirements based on local conditions at Kincardine Municipal Airport. These forms and letters, once completed, should be collected and further analyzed, and if justified, to determine the minimum runway length requirements for runway extension.

Runway 05-23

The Airport’s secondary runway, Runway 05-23, provides a length of 635m (2,083 ft.) and is considered sufficient for light single-engine aircraft. The length of runway 05-23 should be suitable to the majority of aircraft based on the airfield. It is recommended that an extension and upgrade of the runway be protected in very long-term to ensure that if it becomes necessary to accommodate a larger range of light single- and multi-engine aircraft, that the airport has the ability to expand its crosswind runway to support these aircraft.

Short-Term Improvements (0-5 Years)

- Rehabilitation of the primary runway, Runway 13-31.

Medium- to Long-Term Improvements (6-10 Years)

- Rehabilitation of the secondary runway, Runway 05-23.
- Extension of Runway 13-31 to a length of not less than 1,371.6m (4,500 ft.) and ideally to 1,524m (5,000 ft.) should be planned. With an extension of Runway 13-31 to 1,524m (5,000 ft.) the width of the runway should be increased from 23m (75 ft.) to 30m (100 ft.) in line with Transport Canada recommendation for Code 3 runways.

Very Long-Term Improvements

- Extension of the secondary runway, Runway 05-23, if GA movements increase sufficiently to support the expansion. Further investigation with consideration to runway wind coverage and usability should be given prior to considering an extension of the crosswind runway.

For an illustration of recommended improvements refer to *Drawings SK-3 and SK-4* in *Appendix 'F'*.

8.1.2 Taxiways

Short-Term

- Rehabilitation of Taxiway Bravo. Pavements should be maintained to the same strength as Runway 13-31 and the terminal apron.
- Extension of Taxiway Charlie west to connect with Runway 05-23 is recommended to provide increased access to Hangar facilities.
- Rehabilitation of Taxiway Delta if it is intended to be returned to service. It is recommended that the rehabilitation of Taxiway Delta only be initiated if the Airport requires the taxiway to be returned to service.

Medium- to Long-Term

- Rehabilitation of Taxiways Alpha and Charlie. It is recommended that their rehabilitation coincide with the rehabilitation of apron pavements and the extension of Runway 13-31.
- Extension of Taxiway Charlie east to connect with threshold proposed threshold Runway 31.
- Construction of an additional connection to Runway 13-31 immediately east of the intersection of Runway 13-31. When supported by traffic levels it is recommended that the addition of this connection only take place if traffic levels are sufficient to realize some operational benefit. Otherwise this connection will only become necessary once lands in the northeast quadrant of the airport need to be developed.

Very Long-Term

- Construction of parallel taxiway for Runway 05-23.
- Extension of Taxiway Charlie west of Runway 05-23 to provide a full length parallel taxiway.

8.1.3 Aircraft Parking and Storage

Short- to Medium Term

- Expansion of the Terminal Apron towards the north and west is recommended in the short-term to provide:
 - Additional space for itinerant overnight corporate and GA parking
 - Additional paved tie-downs
 - Relocation of fuel facilities

Long-Term to Very Long-Term

No additional expansion is envisioned for the Terminal Apron over the 20 year planning period. However, this does not preclude the development private apron elsewhere on the Airport.

8.1.4 Airfield Lighting and Visual Aids

Short- to Medium-Term

- Replacement of the existing edge lighting system. Consideration should be given to LED light replacements to minimize electrical and maintenance costs over the long-term.
- Installation of airfield guidance signage. At a minimum, airfield guidance signage meeting TP312 4th Edition requirements should be installed.
- Relocation of the existing windsock to allow an extension of Taxiway Charlie to occur. With the relocation of the existing windsock the airport should consider the installation of a secondary windsock position near the threshold Runway 13.
- Upgrade of the Abbreviated Precision Approach Path Indicator (A-PAPI) systems to standard Precision Approach Path Indicators is recommended based on the length of Runway 13-31. To minimize cost and avoid the need to relocate the systems in the future, the installation of the new PAPI's should where possible coincide the extension of the primary runway.
- Installation of A-PAPI's for Runway 05-23 is recommended where instrument approach procedures are planned. The relocation of the existing A-PAPI system from Runway 13-31 to Runway 05-23 may be an option for the airport to consider.

8.1.5 Airfield Drainage

Overall site drainage was observed to be in good condition. It is recommended that future funds be allocated for maintenance and repair.

8.1.6 Security / Wildlife Fencing

Airside should be separated by security fencing to preclude unauthorized pedestrian or vehicle access and to prevent the grazing or traversing of the airport by wildlife. The most widely used method of controlling vehicular and pedestrian access is through perimeter fencing and the use of automated or manual access gates. The existing airport security fencing that is approximately 1.2m (4 ft.) feet high is considered to be inadequate.

At a minimum a 2.4m (8 ft.) chain link perimeter fence is recommended to replace the existing fencing for the entirety of the airport along its property boundary. With the future recommended airport development and associated land acquisition for potential runway extensions, additional security fencing will be required to maintain safety and security at the airport. Potential upgrades for a secure access gate to the airfield near the terminal may be required to provide quick access to airside apron areas.

8.1.7 Hangar Development

Short-Term

In the short-term hangars may continue to be developed west of the terminal building in a linear north direction. A fourth hangar row intended for T-hangar development may be added. However, height restrictions associated with the Obstacle Limitations Surfaces for Runway 05-23 will preclude certain styles of hangars from being constructed.

Large hangar developments such as an Maintenance, Repair and Overhaul Service (MRO) facility or corporate hangar may be accommodated adjacent the existing Abandoned Apron II. This area is still in good condition and should not require significant investment until 2016 when it is anticipated that a full rehab of pavement will be required.

Medium- to Long-Term

In the medium- to long-term lands may need to be acquired to allow for continued development of general aviation hangars to the north.

Very Long-Term

Beyond the 20 year planning period it can be expected that further general aviation developments may dictate the acquisition of further land. To accommodate these developments lands may need to be acquired east of Runway 05-23.

To accommodate significant commercial development lands to the northwest would need to be acquired or leased.

8.1.8 Airfield Capacity

Airfield capacity analysis provides a numerical metric measure of the airfield's (i.e., runways, taxiways, and taxiway connectors) inherent capability to accommodate the safe and efficient movement of aircraft activities. The capacity of the airfield is primarily affected by several factors that include the physical layout of the airfield, local prevailing meteorological conditions, aircraft fleet mix, runway utilization rates, percent of aircraft arrivals to each runway, relative level of aircraft touch-and-go activity on one or more of an airport's runways, and the location of exit taxiways relative to the approach end of the runway. An airport's airfield capacity is expressed in terms of Annual Service Volume (ASV) and represents a reasonable estimate of the maximum level of aircraft operations that can be accommodated in a year without induced aircraft operational delay.

The ability (i.e., capacity) of the airport's runway system to accommodate existing and future levels of operational demand was determined through the use of published Federal Aviation Administration (FAA) guidelines (commonly used in aviation industry to determine airfield capacity) as detailed in the FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*. The estimated ASV for the Kincardine's Airport's runway configuration is considered to be in the range of 220,000 to 230,000 operations. Since the forecast for the airport indicates that existing and projected future aircraft operational activity levels will remain well below this level (3,430 aircraft operations in 2012 and projected 3,894 in 2027), the capacity of the existing airfield system will not be reached. Accordingly, the airfield has the capability and capacity to fully satisfy existing and projected future aircraft operational demands throughout the 20-year planning period and beyond without induced adverse effects to aircraft operations and associated aircraft operational delay.

8.2 AIRPORT TERMINAL BUILDING

Short-Term

- Improvements to resolve mold issues and repair water damage.

Medium- to Long-Term

- Expansion or facility relocation.

Very Long-Term

- No further expansion is foreseen beyond the long-term. However, it is recommended that the condition of the ATB be monitored and its size re-examined with any significant change in airfield development or activity level.

8.3 AIRPORT / AVIATION SUPPORT

The Airport Support area would accommodate facilities required to support and maintain the ongoing operation of the Airport. They include maintenance garages, storage sheds, etc.

Short-Term

- Improvements to the municipal hangar

Medium- to Long-Term

- Construction of a dedicated maintenance facility and equipment
- Purchase of snow plow and blower for airport. It is recommended that the airport be provided with its own winter maintenance equipment to better control Foreign Object Debris (FOD) and to prevent salt from being tracked onto airside areas from common use equipment.
- Increases to fuel storage capacity and capabilities
- Purchase of multi-use Ground Support Equipment (GSE) (aircraft tugs, portable lavatory service cart, fueling truck) to allow increased servicing of aircraft parked on the apron.

8.4 LANDSIDE SYSTEM

8.4.1 Approach / Access Road

The existing pavement appears to be in good condition, and based on observations will not require rehabilitation until 2019.

Short-Term

- Paving of existing hangar access road west of ATB. It is recommended that existing gravel access extending west of the ATB be paved to prevent FOD from being tracked onto airside surfaces.
- Relocation of main access north of the Airport House along the existing north property boundary. It is recommended that the Airport's main access be relocated north to allow room for apron expansion. The existing entrance would be maintained until the apron expansion is initiated.

Medium- to Long-Term

- Extension of access into future hangar lots.

Very Long-Term

- Construction of an additional access road from Concession Road 5. In the very long-term following the acquisition of lands north the ATB and east of Runway 05-23 it is recommended that a second access road be constructed to service future lots and provide an additional emergency response route.

8.4.2 Vehicular Parking

Short- to Medium Term

- Relocation of parking lot to coincide with relocation of access road and/or terminal building.
- Expansion of Parking Lot as needed to meet demand.

Long-Term to Very Long-Term

No further expansion is foreseen over the long-term. However, it is recommended that parking demand be re-examined with any significant change in airfield development or activity level.

8.4.3 Accessibility

Concerns have been expressed over public accessibility to the airport for disabled patrons. As a municipally run facility it is recommended that wheelchair accessibility be built into any facility upgrades going forward. It is recommended that wheelchair parking be positioned in close proximity to the ATB.

8.4.4 Airport House

Short- to Medium-Term

- Removal of the Airport House. The removal of the Airport House will be necessary for the expansion of the terminal apron. It is recommended that the removal of the house coincide with improvements to the ATB and access road.

8.5 EQUIPMENT AND AVIATION SERVICES

8.5.1 Fueling Services

Short- to Medium-Term

- Improvements to existing fuel facilities to resolve issues of capacity and system reliability. It is recommended that prior to the commitment of any funds the Municipality consider the relocation of the fuel facilities that would accompany an apron expansion. It is also recommended that the municipality consider increasing the capacity of Jet A1 fuel to take advantage of more competitive pricing. A 30,000 Litre (7,925 Gal) tank would be considered suitable for Jet A1 fuel storage to accommodate demand and avoid excessive refilling.

Long- to Very-Long Term

- No further expansion is foreseen over the long-term. However, it is recommended that fueling demand be closely monitored and capacity re-examined with any significant change in airfield development or activity level.

8.5.2 Navigational Aids

The installation of Distance Measuring Equipment (DME) and the development of DME approaches would increase accessibility to the Airport and improve approach minimums. This equipment allows fixed distance procedures to be implemented and would allow aircraft not capable of flying GNSS based procedures to “step” over obstacles in the vicinity of the aerodrome. While this equipment is often viewed as old or antiquated technology it is still very much used today. The airport would benefit from its installation.

8.5.3 Weather Monitoring and Reporting Equipment

Currently, the only form of local weather monitoring and reporting is through NAV CANADA’s on airport live weather cameras and through on request airport advisories conducted by Airport management.

To improve weather monitoring and reporting, an Automated Weather Observation Systems (AWOS) could be installed. The typical cost for such equipment and installation is approximately \$400,000 for a NAV CANADA system. More inexpensive systems are available but not all are approved by Environment

Canada. Annual operating costs including maintenance, software licensing, and data publication will vary between \$48,000 and \$70,000 depending on what service options are chosen.

The installation of an AWOS with broadcast capability would help to improve weather awareness at the Airport and allow lower minimums to be flown afterhours when no airport advisory service is provided.

8.6 AIRPORT UTILITIES

Consideration should be given to bringing services and utilities into developable lots. Kincardine Municipal Airport needs to monitor expansion of any regional water or sanitary sewer systems including any proposals made for lands north and west of the airport. Where practical, interconnection to these services may be beneficial to expanding servicing within the airport lands and these opportunities should be explored and carefully assessed.

9. AIRPORT LAND USE AND DEVELOPMENT

9.1 GENERAL

This Airport Land Use and Development Plan is intended to provide the required direction and recommendations to Kincardine Municipal Airport to expand its commercial development capacity and options through a structured and rationalized plan for future development. It is recognized that Kincardine Municipal Airport requires flexibility to meet strategic objectives and attract new commercial and general aviation revenue generating opportunities.

The Airport Land Use Plan is not intended to define a specific order of development or specify exact timeframes for implementation. Various options have been developed as a means to understand the flexibility of development opportunities and the plan serves as a framework for possible future development. The general planning timeframe for airport development is a 20 year period, but is subject to change based on future growth of the Airport and Region.

9.2 MUNICIPAL ZONING PROVISIONS

Both Bruce County and the Municipality of Kincardine identify Kincardine Municipal Airport in Official Plans and Zoning Bylaws. Sections B1.13 and F4.1.1 of the Municipality of Kincardine Official Plan make reference to the Airport and the protection of its lands. Kincardine's Community Sustainability Plan recognizes the role of the airport as a key strategic asset and one that needs to be protected.

Under the Comprehensive Zoning Bylaw for the Municipality of Kincardine, the airport lands are designated AP (Airport). Setbacks from the Airport and height constraints in the vicinity of the airport are also defined and presented in Schedule 'C' of the By-Law. It is recommended that the by-law be revisited to determine what changes are necessary following the adoption of this strategic plan.

9.3 DEVELOPMENT CONSIDERATIONS

In developing a Land Use Plan for Kincardine Municipal Airport, a number of objectives were taken into consideration. These include:

- Protect the safe and efficient operation of aircraft.
- Improve existing facilities to accommodate additional aircraft parking.
- Protect for potential expansion of the runway to better accommodate business jet aircraft.
- Optimize the use of available airport lands.
- Optimize opportunities for the phased development of commercial lands.
- Provide for varying scales and types of commercial development.
- Provide for the potential expansion or relocation of terminal facilities to accommodate increased business service demand.
- Accommodate potential irregular operations by passenger charter aircraft.

9.3.1 Airside Commercial Development

Due diligence is required for airside commercial development. Only developments that have a direct requirement for airside access should be located on airside lots. Even though there may be a direct requirement for airside access, the expected use of the facility must also be considered, with respect to neighbouring lots and tenants. General aviation businesses and larger corporate hangars should be physically separated from hangar development associated with private recreational aircraft.

The Land Use Plan, as contained in *Appendix 'F'*, identifies three (3) primary areas for commercial development. These areas include:

1. Existing developable areas located directly west of the ATB and extending north through acquisition of additional lands.
2. Existing developable area surround abandoned Apron II.
3. Future developable lands north Runway 13-31 and west of Runway 05-23.

These three areas as shown in *Drawing SK-3* in *Appendix 'F'* would provide a mix of lot sizes suitable for various private and commercial developments.

9.3.2 Landside Commercial Development

Landside Commercial Development Areas have been identified south of Concession Road 5 immediately west of Highway 21.

Although these areas have the potential to be developed for aviation related uses, there may be opportunities to utilize these lands for other uses. One potential opportunity which has been discussed is a solar farm. A number of airports in the US and Canada have or are considering the installation of solar farms. Such an installation could generate revenue for the Airport and/or provide a cheaper source of electrical power.

Other development opportunities may include but not limited to industrial manufacturing, warehousing and cold storage, and business park developments.

9.3.3 Land Acquisition

The demand for commercial land at Kincardine Municipal Airport is dependent on various factors including aviation activity levels, demand for aviation-related business and services, and global and regional economic factors. Historically, the demand for commercial land at Kincardine Municipal Airport has been relatively low. At present, there are no commercial developments beyond the municipal hangar and ATB. Interest in redeveloping the northwest lands has been looked at but remains in conceptual phases. Events which could increase the demand for commercial land development in the short term include continued development of the Bruce Power nuclear plant, the extension of natural gas services into the region and the development of the Deep Geological Repository site.

An expansion of the primary runway would improve the attractiveness of Kincardine Municipal Airport for aviation business. The demand for land at Kincardine Municipal Airport cannot be predicted; however, the Airport should plan to accommodate such developments to be ready should an opportunity present itself.

With only 7.89 ha. (18 ac.) of land available and of that only 0.11 ha. (0.27 ac.) currently available for commercial development the Airport should consider acquiring lands available north of the ATB and existing hangar developments.

This Airport Strategic Plan anticipates that Kincardine Municipal Airport will acquire in the future additional land for aviation-related airport development purposes as identified and recommended in this study. This phased land acquisition program has the potential to stretch over the next several decades as land need only be acquired to accommodate new airport tenants or potential aviation-related businesses or new Fixed Based Operators (FBO).

Although strategically planned as separate phases of land acquisition, it is clearly recognized that real-world dynamics will influence the timing, methodology and financial considerations regarding when, how and to what extent additional land would be acquired by the Kincardine Municipal Airport. These factors may include, but would not be limited to, the availability of needed land offered by a willing seller, the

price of land, the availability of funding required to purchase land, income generation potential of land under consideration for purchase and the need for land under consideration for purchase to directly support aviation-related activities. Thus, Kincardine Municipal Airport might find itself acquiring land within the next 10 to 20 years that was not anticipated for purchase until a later time because of unforeseen circumstances, opportunities or a common sense decision to undertake such actions. Accordingly, because this Airport Strategic Plan cannot accurately predict when these circumstances might occur, the timeline for such land acquisition, as recommended, should be considered a guide rather than a rule.

9.4 AERONAUTICAL ZONING AND LAND USE ASSESSMENT

Strategic planning for future airport development must identify, preserve and protect airport-compatible land uses located both on and off the airport. While Kincardine Municipal Airport has direct control of land uses within the confines of the airport's property boundary, land uses that are located adjacent to and around the airport are controlled by Municipality of Kincardine and other municipalities that the airport serves. The decisions made by the governing bodies of these jurisdictions will have a direct and pronounced influence on Kincardine Municipal Airport's ability to grow.

The Municipality of Kincardine has the responsibility to develop the Airport in a manner that provides the highest and best use of existing and future land and facilities for aeronautical and revenue-generation purposes.

As such the Municipality should continuously consider the aeronautical zoning requirements of Kincardine Municipal Airport and the suitability of off-airport land uses in the developmental review and approval process. The following subsections provide details and recommendations concerning the long-term aeronautical zoning requirements of the airport and the suitability of off-airport land uses for consideration in developmental planning.

9.4.1 Obstacle Limitation Surfaces

The Obstacle Limitation Surfaces (OLS) are based on the physical dimensions of the Runway, its operational classification and the size of aircraft the runway is designed to accommodate. A change to any one of these will affect the characteristics (size and shape) of the Obstacle Limitation Surfaces.

With reference to *Drawing SK-5* in *Appendix 'G'* the long-term OLS for the airport is based on extensions of Runway 13-31 towards the east and west to an ultimate length of 1,524m (5,000 ft.) and an extension of Runway 05-23 towards the south to an ultimate length of 1,199m (3,934 ft.). These extensions would have a direct impact on the configuration of the Obstacle Limitation Surfaces for the Airport.

For Runway 13-31 the Approach Surface associated with Threshold 13 would shift east with each extension while the Approach Surface associated with Threshold 31 would remain in the same location due to the proximity of Highway 21 to the runway.

For Runway 05-23 a reclassification of the runway from Non-Instrument to Instrument Non-Precision is proposed with the extension. The reclassification of the Runway would allow instrument approach procedures to be developed, while the runway extension would allow larger aircraft to use the runway. Both changes would have a significant impact on the characteristics of the OLS. Overall the area covered by the OLS would become larger similar to that of Runway 13-31. The Approach Surface associated with Threshold 05 would shift south with the extension and become wider. The Approach Surface associated with Threshold 23 would also shift south but not because of the extension but rather because of the change in Approach Surface slope requiring a change in the touchdown location to avoid conflict Concession Road 5.

It is recommended that the Municipality consider the long-term constraints of the OLS associated with the runway extensions in any development review process to ensure that the long-term aeronautical zoning requirements of the Airport are preserved.

9.4.2 Municipal Zoning

With the proposed runway extensions and in light of recent wind turbine developments, the existing municipal zoning intended to protect the Airport's long-term usability should be re-examined to ensure sufficient area is identified for protection.

As part of this study, an Area of Interest Zone was developed using the previously development zoning maps with consideration for increased wind turbine heights. The proposed "Area of Interest Zone" as shown in revised *Map 3*, contained in *Appendix 'G'*, identifies that the proposed Armow Wind Project may conflict with the Airport's existing Instrument Approach Procedures. As such it is recommended that further investigation be commissioned to review the potential impacts and determine whether mitigation measures are feasible.

Since starting the strategic planning process discussions between the Municipality and the proponents for the Armow Wind Project have led to further investigation and the inclusion of proposed mitigations. It is recommended that the Armow Wind Project be assessed not only for impact on existing airport operations but also future operations associated with the extension of both primary and secondary runways.

9.4.3 Off-Airport Land Use

Land Use in the vicinity of Kincardine Municipal Airport should be restricted to land uses considered suitable in accordance with the Transport Canada guidelines contained in TP1247 8th Edition.

Base on these guidelines, off-airport land uses should be restricted with consideration for following:

- 1) Obstacle Limitations Surfaces
- 2) Electronic Zoning
- 3) Bird Hazards
- 4) Aircraft Noise
- 5) Restrictions to Visibility

In addition to the five (5) areas listed above and described in detail in TP1247, the Municipality should also consider the Instrument Approach Procedures (IAP's) associated with each runway.

These procedures are developed with Obstacle Clearance Surfaces (OCS) similar to OLS but more complex and extending further out from the Airport. These surfaces when penetrated by an obstacle can force revision to Instrument Approach Procedures which often lead to increases in the minimum descent altitudes. In extreme cases a penetration of the OCS which cannot be mitigated through a change of the instrument approach procedure design can force the procedures to be rescinded. It is therefore in the best interest of the Municipality to where possible protect the Obstacle Clearance Surfaces from penetration to ensure that the maximum usability of the airport is maintained.

In reviewing the Municipalities existing zoning, it was found that land uses are prescribed in detail but lack additional guidance concerning the suitability of specific developments.

It is recommended that the Municipality consider the development of Bird Hazard / Wildlife Mapping and the creation of a Noise Exposure Forecast (NEF) for the Airport to prevent unsuitable developments in proximity to the Airport.

9.5 COMMERCIAL DEVELOPMENT RECOMMENDATIONS

9.5.1 Airport Land Tenure Principles

- All commercial development at the Airport should be based on the premise that airport lands shall be leased. The exception to this is those lands located behind the Municipal offices and connecting to Apron II.
- For those lands located behind the Municipal offices the Airport/Municipality should only sell that land when the intended use presents an economic benefit to the community in terms of a strong tax base and long-term employment, and in situations where the developer will not consider leasing land. Examples of potential uses include MRO facilities and aviation related office complexes.
- In the area immediately northeast of the intersection of Runways 13-31 and 05-23 consideration should be given to the development of condominium-style T-hangar developments for light general aviation, whereby individual hangar units could be sold, but lands would continue to be leased from the Airport. Only minimal service would be required for T-hangar type development. The initial phases can continue west of the existing hangar rows and south of the existing access road, this airside development could then expand north as additional lands are acquired and demand dictates.

9.5.2 Commercial Development Principles

- The east development areas should continue to be developed for general aviation and cater towards light general aviation and recreational pilots. Development in this area would include expanded paved tie-down areas and T-hangar development.
- The area south of the Municipal offices should be allowed to be developed for corporate general aviation needs or MRO facilities, GA maintenance facilities or business aviation office complex.
- Area north of Runways 13-31 and west of 05-23 could be acquired in the long term and allowed to be developed to cater to operators/businesses requiring large lot sizes.

9.6 COMMERCIAL DEVELOPMENT INITIATIVES / NEXT STEPS

Efforts to promote commercial development at Kincardine Municipal Airport should include the following initiatives:

- Creation of an Airport Development Guide and Commercial Development Opportunities Brochure to promote commercial development at the Airport.
- Advertise available lots through industry media, its website and COPA.
- Plan for and implement as demand and budget permits the relocation of the entrance road to the ATB to allow for apron expansion.
- Plan for and implement as demand and budget permits the acquisition of lands north of the ATB to allow for continued development of general aviation hangar north.
- Explore the financial viability of constructing T-hangars which could then be sold or leased to private aircraft owners.
- Explore the financial viability of constructing a large corporate hangar which could then be leased for corporate aircraft storage and temporary overnight parking.
- Undertake a land valuation to establish current market value of airport lands. This should be done every five years.

- Review and update all rates and charges for land development and regularly compare to regional airports in Ontario for market comparison. This should be done on a revolving period of no more than two years or as significant changes occur in the economy.
- Consider the establishment of a solar farm on lands of low development value.

9.7 RECOMMENDED LAND USE AND DEVELOPMENT PLAN

9.7.1 Airport Land Use Plan

The recommended Land Use and Development Plan for Kincardine Municipal Airport is provided in *Drawing SK-3* in *Appendix 'F'*. Land Use designations for reference with the plan are summarized in *Table 8* below.

Table 8
AIRPORT LAND USE PLAN RECOMMENDED USES

Land Use	Description	Recommended Uses
Airside Reserve	Reserved solely for the use of all fixed-wing and rotary-wing manoeuvring surfaces on the Airport.	Runway Strips, Taxiway Strips, Aprons, Airport Parking Areas, Primary NAV AID Protection Areas, and Lands otherwise not suitable for other development.
Terminal Reserve	Includes the Air Terminal Building and associated infrastructure. Includes existing building and protection for future expansion.	Air Terminal Building, Ancillary Infrastructure, and Parking.
Airside Commercial	Commercial developments that have a direct requirement for access to the Airside System of the Airport.	Aircraft hangars or storage, Aircraft Maintenance Facilities, Fixed-Based Operators, other aeronautical uses.
Landside Commercial	Commercial developments that do not require direct access to the Airside System.	Non-Aviation related uses, including agriculture, and warehousing.
Airport Support	Developments that support the operations of the airports and its essential systems.	Airport administration, utility buildings, equipment storage, and airport maintenance garages.
Transportation Reserve	Ground transportation system that facilities the movement of vehicles.	Access Roads, Parking Lots, Terminal Road System, Terminal Curb frontage.
Airport Reserve	Areas where development is not forecast during the planning period and may be considered surplus.	Short-term non-permanent development that do not impact airport operations such as agricultural.

9.7.2 Airport Development Phasing Plan

Having established the overall Airport Land Use Plan, *Drawing SK-4* in *Appendix 'F'* presents the phased commercial development plan for Kincardine Municipal Airport. The purpose of the phased development plan is to provide Kincardine Municipal Airport with a logical progression of development at the airport based on the availability of land and the most practical and cost effective approach.

10. CAPITAL IMPROVEMENT PLAN AND FINANCING

A preliminary capital cost estimate for infrastructure improvements associated with the recommended Land Use Plan is provided in *Appendix 'H'*.

The capital cost estimate does not include the cost of additional airport maintenance equipment, nor does it include airport operating costs.

It is recommended that order of priority be established based on the estimated timeline proposed in the Infrastructure Assessment and Development Phasing Plan.

10.1 FINANCING OPPORTUNITIES

To assist with managing operating and capital costs, the Municipality should consider the following subsections and consider exploring outside sources of financing.

10.1.1 Operating Costs

New revenues to offset operating costs would come from potential new business opportunities as discussed above. Further, as a discussion item with Ontario Power Generation and Bruce Power, there may be an opportunity to negotiate with them to provide regular funding to offset operational costs.

10.1.2 Capital Costs

It is our understanding that the Municipality would not be able to fund the required capital costs projected in the short-term on its own. Therefore, a source of third party funding is required. The most likely source will be from the Federal or Provincial Government.

At present there are no government programs available that will provide funding for the anticipated capital costs. Past funding programs including the Building Canada Fund or Infrastructure Stimulus Fund are not currently available. However, preparations should be made to capitalize on this funding should it again become available.

It is recommended that the Municipality review the capital cost estimate provided and consider the recommended existing facility needs as top priority.

11. AIRPORT GOVERNANCE AND DIRECTION

11.1 GENERAL

While larger airports in Canada are typically operated by quasi-independent Airport Authorities with mandates to operate the airports as not-for-profit corporations, the majority of airports in Canada are owned and operated by local or regional municipalities. These smaller airports typically do not generate sufficient revenues to be self-sufficient and must rely on the municipality and other levels of government for financial assistance to cover both capital and operating costs. Because of this, they do not lend themselves to the 'financially independent airport authority' model.

As municipally operated facilities, airports are managed and operated in a variety of ways. At some airports, the day-to-day operations are managed by municipal staff. At other airports, the actual operation of the airport is contracted out to a private operator, often a business enterprise located directly on the airport. Often an Airport Committee or Airport Advisory Board will be created to provide guidance on the overall development and operation of the airport. The Airport Committee or Advisory Board is usually comprised of elected officials plus representatives from the community and airport stakeholders. Typically, the Airport Committee or Advisory Board has no authority to make decisions but rather provide guidance to municipal council. At some airports, the Airport Committee receives funding directly from the municipality or a group of municipalities and has some authority regarding financial and operational management decisions.

11.2 GOVERNANCE MODELS

11.2.1 Contract Management

At present, the Kincardine Municipal Airport is managed under contract by Evans Aviation who reports to the C.A.O for the Municipality of Kincardine. There is an Airport Committee in place to oversee the governance and growth of the airport.

Under this management option, the Municipality retains ownership of the airport land and physical assets. A contractor, in this case Evans Aviation, assumes management and operational responsibility and is paid an annual/monthly fee by the municipality to manage the facility and/or receive revenues from airport rates and charges. The municipality is not involved in the day-to-day operations, staffing, or maintenance of the airport, but does control development direction and share in airport revenues subject to specific terms and conditions of the contract. The C.A.O maintains operational oversight and the Airport Committee in turn advises on governance and direction.

For Municipality's consideration three (3) alternative governance models presented below. In addition to contract management these forms of airport governance are widely used across Canada by airport owners and operators. It is recommended that the alternative governance models be examined closely by the Municipality to determine if any changes to the existing governance model are needed to sustain the airport over the long-term.

11.2.2 Private Ownership

The airport could be sold to a private enterprise. The new owner would be responsible for operation and maintenance and any financial shortfall.

11.2.3 Municipal Management

The municipality could take back operation and oversee the day to day operation. Under this management option the Airport Manager would be an employee of the Municipality. Efficiencies could be created in terms of operational cost and oversight.

11.2.4 Municipal Service Corporation

Under Section 203 of the Ontario Municipal Act, Municipalities are permitted to create and own Municipal Service Corporations provide they comply with Ontario Regulation 599/06. A Municipal Services Corporation incorporated under the Ontario Business Corporations Act, for the purpose of providing economic development services through owning and operating the an Airport within the confines of the Municipality can provide a number benefits the most significant being limitations of liability to shareholders (i.e. the Municipality).

As the best governance model may not be readily apparent it is recommended that the Municipality conduct a pro-form evaluation and cost/benefit analysis of each option and then develop a business case for the preferred option before any decision that would result in change from the Airport's current governance model.

11.3 AIRPORT STATUS – CERTIFIED VS. REGISTERED

In the absence of scheduled passenger air service, Transport Canada certification is not required for Kincardine Municipal Airport. However, the Municipality should know that in the unlikely event that Transport Canada deems the airport to be in a built-up area then certification would be required under TP312 4th Edition and the Canadian Aviation Regulations.

Given the proximity of existing buildings and taxiway to the runway, certification would require the removal of hangars or the relocation of the existing runway. The cost of proactively completing these infrastructure changes would place undue burden on the Municipality and the tax payer and therefore cannot be recommended.

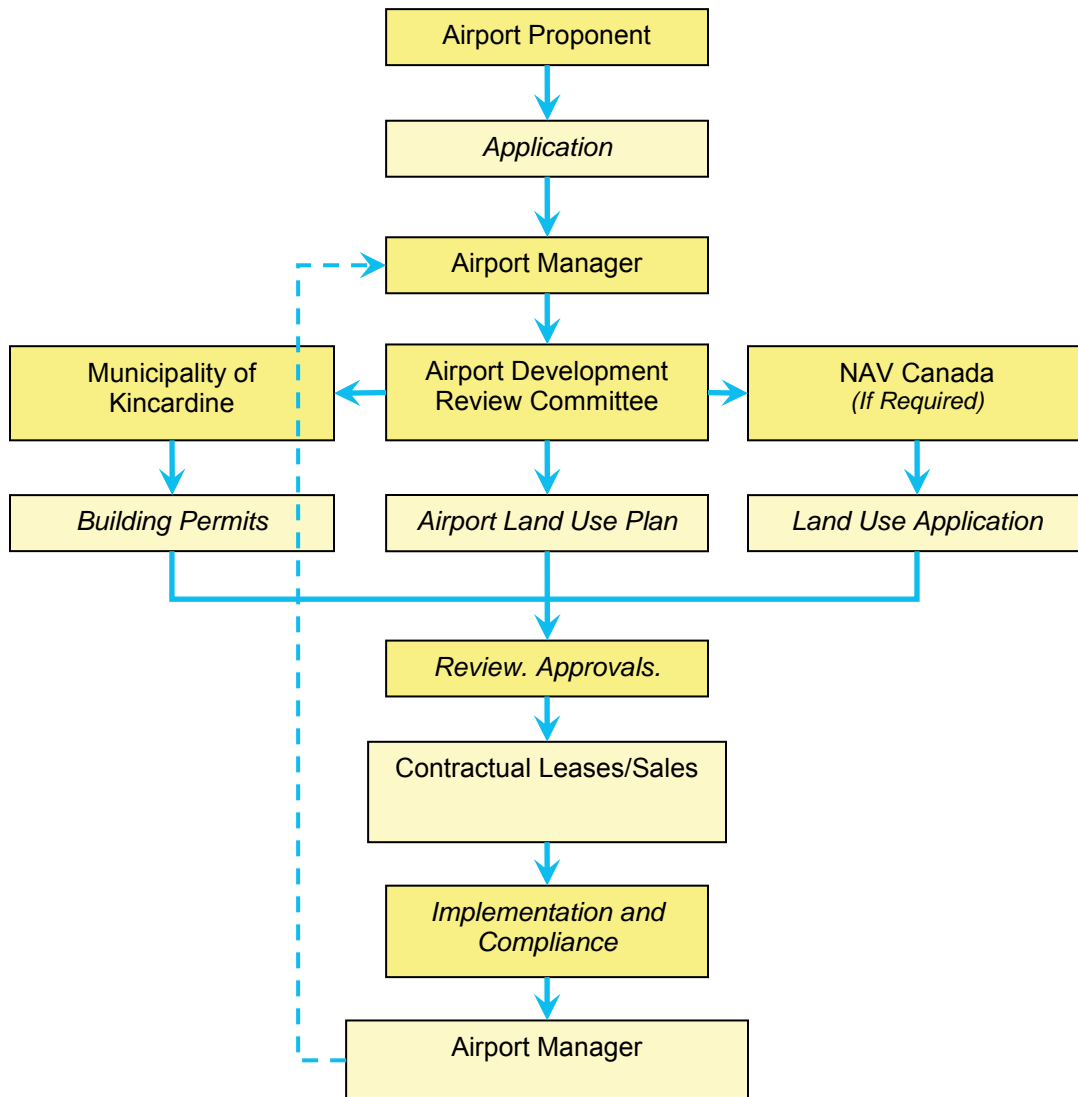
Given the low prospect of scheduled passenger service and the minimal growth projections for the population of the region there are no specific shortcomings to remaining uncertified. Throughout Canada there are numerous examples of registered municipal airports which do not have scheduled passenger service, but serve a broad spectrum of general aviation operators. Remaining uncertified would have little to no impact on the current operation of the airport.

11.4 LOCAL GOVERNMENT LAND USE ZONING INTERGRATION

It should be recognized that the Federal Government has primary jurisdiction over the operation and regulation of aeronautical functions of airport lands. The regulation of the airport lands and uses by the Municipality must not conflict with any existing licences or regulations regarding the use of the airport and the Municipality must consult and c-operate with the appropriate federal authorities when considering site planning issues such as the location of buildings and structure on the airport lands.

A more effective and streamlined approach is required to integrate the actual Airport Land Use Plan with an appropriate process for reviewing and approving development applications. In general, the recommended approach is illustrated in *Figure 4* and described below.

Figure 4 Recommended Development Review and Approval Process



Airport Manager

- Administers the entire system, whereby the Airport Manager:
 - Receives the application.
 - Reviews the application against the Airport Land Use Plan.
 - Where necessary, distributes that application to the Municipality of Kincardine and/or NAV CANADA.
 - Where necessary, collects and reviews the permits from the Municipality of Kincardine.
 - Approves the development/site plan.
 - Enters into a contractual lease with the airport tenant.
 - Is responsible for lease implementation and compliance.
- Co-maintains with the Municipality of Kincardine the current Airport Land Use Plan that describes appropriate uses of all airport lands.
- Provides additional input and review for all applications to ensure that the proposed development is safe, does not impact airport operations and is in line with the general land use recommendations.
- Evaluates the application to ensure that it does not impact the usability of the Airport and its long term plans.

Municipality of Kincardine

- Co-maintains with Airport Management the current Airport Land Use Plan that describes uses of all airport lands.
- Directs all land use applications to Airport Management.
- Where necessary, reviews airport tenant applications regarding construction codes and building permits.
- Where necessary, issues building permits.

NAV CANADA

- Where necessary, reviews applications to ensure that the proposed development does not interfere with electronic navigational aids, and instrument approach procedures.

11.5 AIRPORT LAND USE PLAN ADMINISTRATION

The Airport Land Use Plan is to be maintained by Airport Management. This system ensures that only one version of the Airport Land Use Plan is used at any time. The following summarizes the recommended administrative process of the Airport Land Use Plan for Kincardine Municipal Airport.

- The Airport Land Use Plan on record is kept with the Airport Manager (Kincardine Municipal Airport) and a copy with the Planning Department (Municipality of Kincardine).
- All applications must be in accordance with the Airport Land Use Plan on record.
- If a development (existing or proposed) is not in accordance with the Airport Land Use Plan, the applicant must apply for a deviation.
- The application for deviation is submitted to the Kincardine Municipal Airport. If approved by Airport Management, interim approval is awarded.

- Prior to final approval being awarded, the Airport Land Use Plan must be revised to reflect the development.
- The Airport Manager initiates all Airport Land Use Plan revisions.
- The updated Airport Land Use Plan is submitted to the Municipality of Kincardine for review.
- Once reviewed internally, the Municipality of Kincardine Zoning By-Law is updated to reflect the revised Airport Land Use Plan.
- Following the changes to the Municipality of Kincardine Zoning By-Law, the revised Airport Land Use Plan becomes the Airport Land Use Plan on record.
- Final approval for the deviation application is awarded.

This system ensures accountability for Airport Land Use management while not hindering the operation and development opportunities of the Kincardine Municipal Airport.

- Prior to final approval being awarded, the Airport Land Use Plan must be revised to reflect the development.

11.6 SITE PLANNING AND DEVELOPMENT GUIDELINES

The development of structures and facilities on airport lands is controlled by various bylaws, standards and recommended practices. Guiding documents include:

- Transport Canada – TP312 Aerodrome Standards and Recommended Practices, 4th Edition.
- Transport Canada – TP1247, Aviation Land Use in the Vicinity of Airports, 8th Edition.
- Transport Canada – TP308 Change 5.3, Criteria for the Development of Instrument Procedures.
- The Municipality of Kincardine Comprehensive Zoning Bylaw 2003-25.

It is recommended that with the development of a lot layout plan for the airport, that a Commercial Development Guide and Commercial Development Opportunities brochure be created. The Commercial Development Guide would provide information related to development opportunities, development rates and charges, and site planning guidelines. The Commercial Development Opportunities brochure would provide a quick handout to prospective developers to help them make their decision.

11.7 RECOMMENDED ACTION

Recommended actions include the following:

- That the Airport become responsible for the site plan/development review of all development which takes place on airport lands or those lands which may be sold off by the Airport.
- That the Airport prepares a Development Guidelines document for airport lands. These guidelines should incorporate both aeronautical zoning requirements plus relevant municipal zoning requirements.
- It is recommended the Airport enter into a contract with the Municipality of Kincardine regarding the division of responsibilities and authority with respect to the development approval and permit process. The Airport should be the authority responsible for overseeing the development approval process and establishing appropriate site plan/development guidelines, whereas the Municipality should retain authority for the review and issuance of building permits.
- It is recommended that the Municipality of Kincardine update its Office Plan and Zoning Bylaws to reflect these changes with respect to responsibility and jurisdiction.

12. CONCLUSION

12.1 SUMMARY OF KEY RECOMMENDATIONS

Based on the forgoing the following Top 10 List of Key Recommendations has been developed:

- 1) Extend Runway 13-31 to a minimum length of 1372m (4,500 ft.) and where possible to an ultimate length of 1,524m (5,000 ft.)
- 2) Address concerns surrounding the Arrow Wind Project with consideration for the long-term development of the Airport.
- 3) Adopt new Mission Statement to focus on revenue generation and support of commercial development.
- 4) Address concerns of pavement degradation with the rehabilitation of Runway 13-31.
- 5) Address concerns surrounding the condition of the Air Terminal Building (ATB) and Fuel Facilities.
- 6) Address concerns of electrical degradation with the replacement of all edge lighting systems.
- 7) Create a Long-Term Lot Layout Plan and Land Acquisition Strategy for the Airport.
- 8) Create a new Lease Agreement template with consideration for additional commercial development charges.
- 9) Create a Development Guidelines Document and Brochure to facilitate future commercial development initiatives.
- 10) Acquire lands north of the ATB and west of Runway Threshold 13 to preserve ability to accommodate future development and extend the primary runway.
- 11) Removal of the Airport House, as it still remains untenanted.

12.2 CLOSING REMARKS

As detailed in the foregoing Strategic Plan, it is clear that the operation of the Kincardine Municipal Airport is a key economic facilitator and generator for the Municipality and surrounding region. It plays a central role in the corporate and business community as a quick, efficient and effective means to connect the Municipality to the rest of Ontario, Canada and the World. However, the Airport also plays a vital role within the region as a community centre, through various events and fundraisers. These are important for the community, such that they can understand the function that the Airport serves within the community and the opportunities that it brings.

However, from an economic perspective, it is critical that the Airport attract business to mitigate the overall cost of airport operating and capital expenditures, while still promoting events that engage with the community. It is a careful balance, and one that is not easy, but is important to encourage community involvement in a vibrant and successful Municipal Airport whose long-term objective is to be self sufficient.

The Airport Strategic Plan detailed above provides the Municipality with the framework to achieve such success, in establishing and attracting development that will facilitate and encourage growth. It is the Airport's responsibility to manage this growth sustainably, in keeping with current spirit of community engagement and community partnership.

Appendix A

Infrastructure Assessment

Date: May 14, 2013
To: Municipality of Kincardine
Copies: Project File
From: Chris Timmerman, CET
Project No.: 00703
Subject: Kincardine Airport
Airport Facilities Condition Inspection

On 11 December 2012, GENIVAR Inc. personnel completed an Airport Facilities Condition Inspection at the Kincardine Airport. The condition inspection was performed in general conformance with Transport Canada AK-76-04, Airport Facilities Condition Inspection and Reporting Surveys.

The scope of the inspection included airport surface structures (pavements), airport buildings and airport utilities. Airport mobile equipment was not included in the condition inspection as it was understood at the time of inspection that all mobile equipment associated with the Airport are owned and operated by the Municipality of Kincardine.

1. AIRPORT SURFACE STRUCTURES

1.1. Airfield Pavements

1.1.1. Runway 13-31

The existing Runway 13-31 pavements appear to be nearing their 20 year life expectancy, and were observed to have a general condition rating of 4, or poor to fair.

The main pavement defects observed were:

- Alligator cracking of moderate extent,
- Transverse cracking of major extent and moderate to major severity,
- Longitudinal cracking of major extent and moderate to major severity,
- Rutting of major extent and moderate to major severity, and
- Ravelling of major extent and moderate severity.

Typical Pavement Conditions on Runway 13-31



Due to the extent and severity of deficiencies observed, it is recommended that the pavements be rehabilitated via milling and paving, with localized repairs to major cracks and settlement areas. It is estimated that this rehabilitation method would provide an acceptable level of service for a period of 10 years.

It is recommended that the Runway 13-31 pavements be rehabilitated in 2014 at an estimated capital cost of \$1,002,000.

1.1.2. Runway 05-23

The existing Runway 05-23 pavements have reached their 20 year life expectancy, and were observed to have a general condition rating of 5, or fair.

The main pavement defects observed were:

- Transverse cracking of minor extent and minor severity,
- Longitudinal cracking of major extent and moderate severity, and
- Ravelling of major extent and moderate severity.

Due to the extent and severity of deficiencies observed, it is recommended that the pavements be rehabilitated via milling and paving, with localized repairs to major cracks. It is estimated that this rehabilitation method would provide an acceptable level of service for a period of 10 years.

It is recommended that the Runway 05-23 pavements be rehabilitated in 2016 at an estimated capital cost of \$340,000.

Typical Pavement Conditions on Runway 05-23



1.1.3. Taxi A

The existing Taxi A pavements appear to be nearing their 20 year life expectancy, and were observed to have a general condition rating of 6, or fair to good.

The main pavement defects observed were:

- Transverse cracking of minor extent and minor severity,
- Longitudinal cracking of minor extent and minor severity, and
- Ravelling of moderate extent and moderate severity.

Due to the extent and severity of deficiencies observed, it is recommended that the pavements be rehabilitated via asphalt overlay.

It is estimated that this rehabilitation method would provide an acceptable level of service for a period of 7 years.

It is recommended that the Taxi A pavements be rehabilitated in 2018 at an estimated capital cost of \$58,000.

Typical Pavement Conditions on Taxi A



1.1.4. Taxi B

The existing Taxi B pavements appear to be nearing their 20 year life expectancy, and were observed to have a general condition rating of 5, or fair.

The main pavement defects observed were:

- Transverse cracking of minor extent and minor severity,
- Longitudinal cracking of major extent and moderate severity, and
- Ravelling of moderate extent and moderate severity.

Due to the extent and severity of deficiencies observed, it is recommended that the pavements be rehabilitated via milling and paving, with localized repairs to major cracks.

It is estimated that this rehabilitation method would provide an acceptable level of service for a period of 10 years.

It is recommended that the Taxi B pavements be rehabilitated in 2016 at an estimated capital cost of \$65,000.

Typical Pavement Conditions on Taxi B



1.1.5. Taxi C

The existing Taxi C pavements appear to be nearing their 20 year life expectancy, and were observed to have a general condition rating of 6, or fair to good.

The main pavement defects observed were:

- Transverse cracking of minor extent and minor severity,
- Longitudinal cracking of minor extent and minor severity, and
- Ravelling of moderate extent and moderate severity.

Due to the extent and severity of deficiencies observed, it is recommended that the pavements be rehabilitated via asphalt overlay. It is estimated that this rehabilitation method would provide an acceptable level of service for a period of 7 years.

It is recommended that the Taxi C pavements be rehabilitated in 2018 at an estimated capital cost of \$61,000.

Typical Pavement Conditions on Taxi C



1.1.6. Taxi D (Abandoned)

The existing Taxi D pavements appear to be nearing their 20 year life expectancy, and were observed to have a general condition rating of 5, or fair.

The main pavement defects observed were:

- Transverse cracking of minor extent and minor severity,
- Longitudinal cracking of major extent and moderate severity, and
- Ravelling of moderate extent and moderate severity.

Due to the extent and severity of deficiencies observed, it is recommended that the pavements be rehabilitated via milling and paving, with localized repairs to major cracks. It is estimated that this rehabilitation method would provide an acceptable level of service for a period of 10 years.

Should the Airport decide to return Taxi D to service, it is recommended that the Taxi D pavements be rehabilitated in 2016 at an estimated capital cost of \$63,000.

Typical Pavement Conditions on Taxi D



1.1.7. Taxilane System

The existing taxilane system servicing the private hangars north of Taxi C were recently constructed between 2008 and 2012 and were observed to be in good to very good condition.

Rehabilitation of the taxilane system is not anticipated within the 20 year planning period.

Typical Pavement Conditions on Taxilane System



1.1.8. Apron I

The existing Apron I pavements appear to be nearing their 20 year life expectancy, and were observed to have a general condition rating of 5, or fair.

The main pavement defects observed were:

- Transverse cracking of minor extent and minor severity,
- Longitudinal cracking of major extent and moderate severity, and
- Ravelling of moderate extent and moderate severity.

Due to the extent and severity of deficiencies observed, it is recommended that the pavements be rehabilitated via milling and paving, with localized repairs to major cracks. It is estimated that this rehabilitation method would provide an acceptable level of service for a period of 10 years.

It is recommended that the Apron I pavements be rehabilitated in 2016 at an estimated capital cost of \$131,000.

Typical Pavement Conditions on Apron I



1.1.9. Apron II (Abandoned)

The existing Apron II pavements appear to be nearing their 20 year life expectancy, and were observed to have a general condition rating of 5, or fair.

The main pavement defects observed were:

- Transverse cracking of minor extent and minor severity,
- Longitudinal cracking of major extent and moderate severity, and
- Ravelling of moderate extent and moderate severity.

Due to the extent and severity of deficiencies observed, it is recommended that the pavements be rehabilitated via milling and paving, with localized repairs to major cracks. It is estimated that this rehabilitation method would provide an acceptable level of service for a period of 10 years.

Typical Pavement Conditions on Apron II



Should the Airport decide to return Apron II to service, it is recommended that the Apron II pavements be rehabilitated in 2016 at an estimated capital cost of \$135,000.

1.2. Airfield Drainage

1.2.1. Airfield Ditches

In general, the site drains to the west via drainage ditches on each side of Runway 13-31.

The drainage ditches were observed to be flowing freely with no major obstructions noted.

It is recommended that the Airport allocate \$5,000 every 5 years for ditch maintenance and cleaning.

1.2.2. Airfield Culverts

As with the airfield ditches, the airfield culverts were observed to be flowing freely with no major obstructions noted.

It is recommended that the Airport allocate \$5,000 every 5 years for culvert maintenance and cleaning.

1.2.3. Airfield Subsurface Drainage System

Subsurface drainage of the airfield pavements is by way of drainage tiles parallel to airfield pavements.

At the time of inspection, the subdrainage system outlets were observed to be draining freely with no obstructions noted or reported.

It is recommended that the Airport allocate \$5,000 every 5 years for subdrain maintenance and flushing.



1.3. **Fencing**

1.3.1. **Perimeter / Security Fencing**

The existing perimeter fencing consists of 1.2m high page-wire fencing with wooden posts. While the existing fencing clearly denotes the property boundary, it should be noted that the existing fencing does not comply with Transport Canada guidelines for wildlife or security fencing.

The existing security fencing at the Apron I area consists of 1.2m high chain link fencing with steel posts. While the existing fencing clearly denotes the airside / landside boundary, it should be noted that the existing fencing does not comply with Transport Canada guidelines for security fencing.

It is recommended that security fencing be installed around the entire Airport perimeter similar to the attached Ontario Provincial Standard Details (OPSD) 972.102 and 972.101 attached.

It is recommended that 650m of upgraded fencing be installed at the Apron area and along Highway 21 in 2013, at an estimated capital cost of \$56,000. Due to anticipated budget constraints, it is recommended that the remaining 4,200m of upgraded fencing be installed over the following five (5) years at an estimated yearly capital cost of \$90,000.



1.4. **Surface Traffic Pavements**

1.4.1. **Entrance Road**

Access to the Airport Site is via the two-lane entrance road from Highway 21.

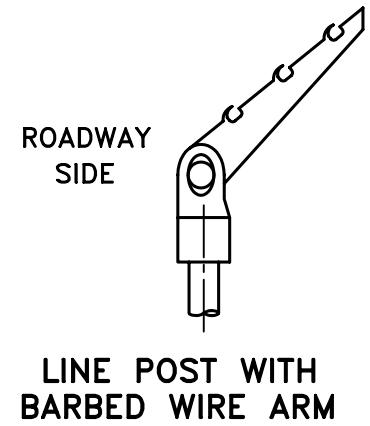
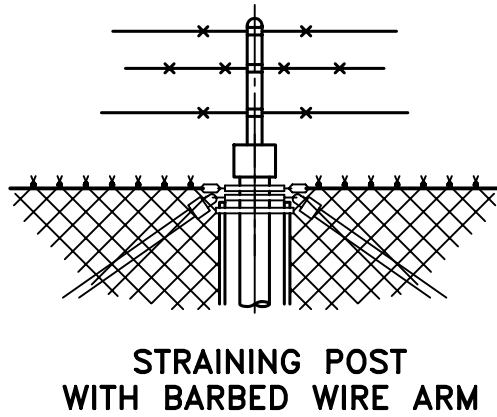
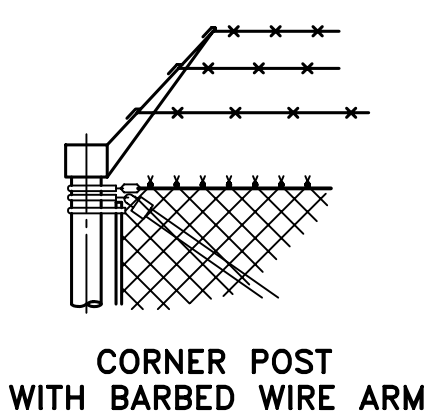
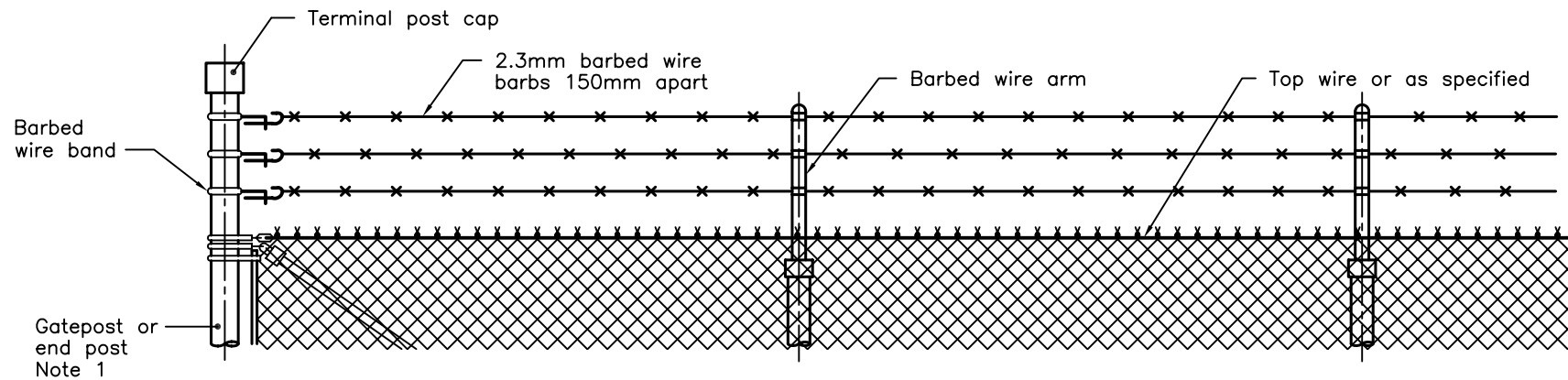
The existing pavements appear to be in good condition, and were observed to have a general condition rating of 7.

The main pavement defects observed were:

- Transverse cracking of minor extent and minor severity,
- Longitudinal cracking of minor extent and minor severity, and
- Ravelling of moderate extent and moderate severity.

Due to the extent and severity of deficiencies observed, it is recommended that the pavements be rehabilitated via asphalt overlay. It is estimated that this rehabilitation method would provide an acceptable level of service for a period of 7 years.

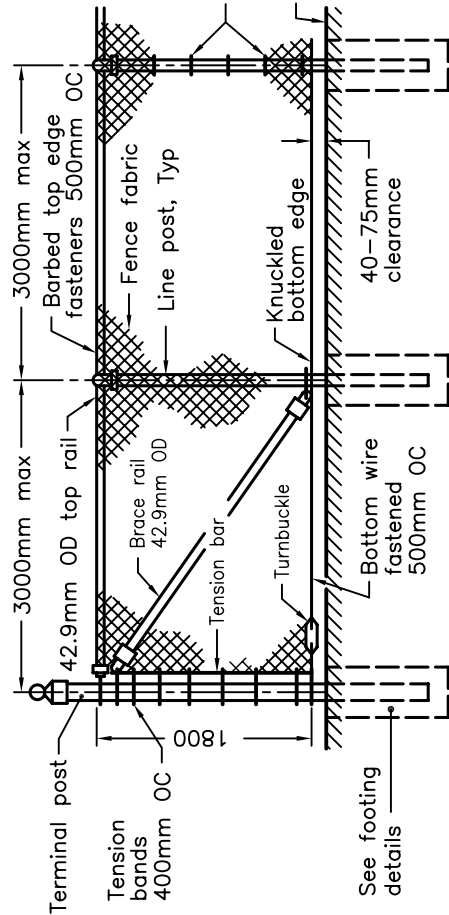
It is recommended that the Entrance Road pavements be rehabilitated in 2019 at an estimated capital cost of \$27,000.



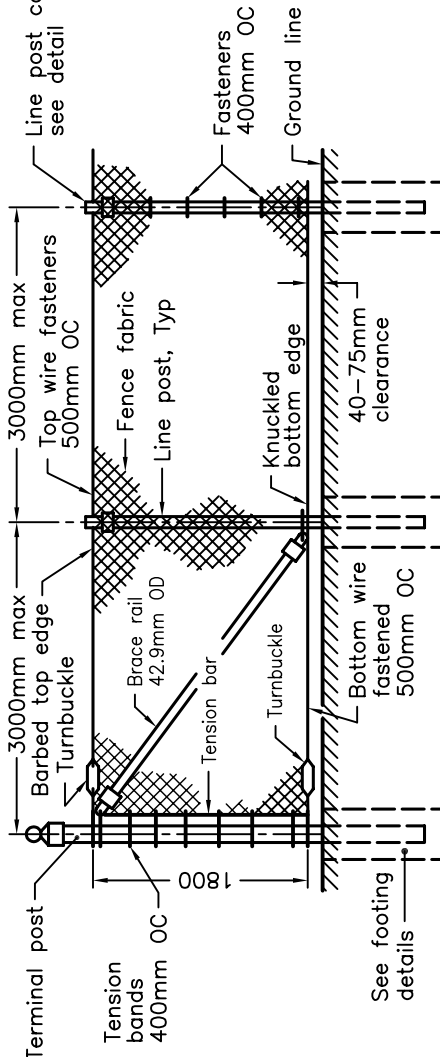
NOTES:

- 1 Terminal post shall be lengthened when barbed wire is specified, except when barbed wire arms are used.
- A Installation as viewed from the roadway.
- B All dimensions are in millimetres unless otherwise shown.

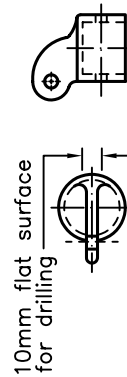
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2005	Rev 1	
FENCE, CHAIN-LINK COMPONENT - BARBED WIRE	-----		
OPSD - 972.101			



CHAIN-LINK FENCE WITH TOP RAIL



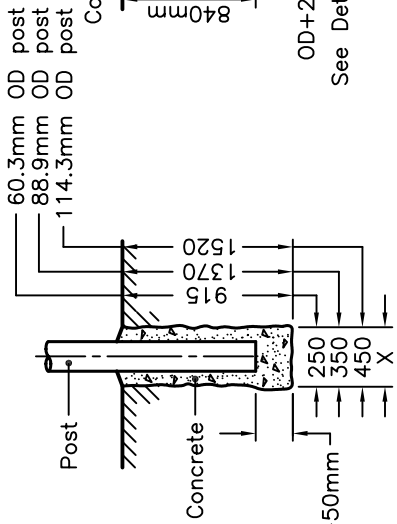
CHAIN-LINK FENCE WITH TOP WIRE



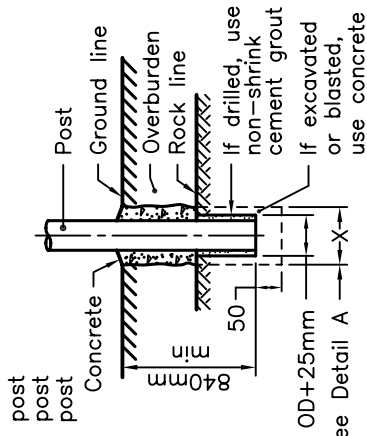
**62mm ID LINE POST CAP
DETAIL**

NOTE:

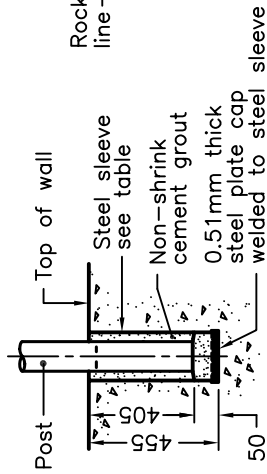
- A Fence as viewed from the roadway.
- B All dimensions are in millimetres unless otherwise shown.



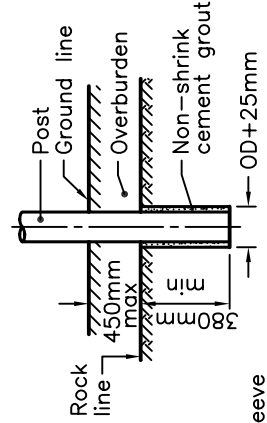
**DETAIL A
FOOTING IN EARTH**



**DETAIL B
FOOTING IN SHALE, LOOSE
OR FRIABLE ROCK, OR SOLID
ROCK WITH MORE THAN 450mm
OVERBURDEN**



**DETAIL C
FOOTING IN
RETAINING WALL**



**DETAIL D
FOOTING IN SOLID ROCK
LESS THAN 450mm
OVERBURDEN**

POST DETAILS TABLE

Post Type	OD	Post Length		Sleeves OD
		Standard Retaining Walls m	m	
Line post	60.3	2.6	2.0	88.9
Terminal post	88.9	2.9	2.3	114.3

ONTARIO PROVINCIAL STANDARD DRAWING

**FENCE, CHAIN-LINK
INSTALLATION - ROADWAY**

Nov 2005 Rev 1



OPSD - 972.130

1.4.2. Car Park

Car parking is provided north of Apron I and east of the ATB. By observation, the existing Car Park is sufficient for the Airport's current needs.

The existing pavements appear to be in good condition, and were observed to have a general condition rating of 7.

The main pavement defects observed were:

- Transverse cracking of minor extent and minor severity,
- Longitudinal cracking of minor extent and minor severity, and
- Ravelling of moderate extent and moderate severity.



Due to the extent and severity of deficiencies observed, it is recommended that the pavements be rehabilitated via asphalt overlay. It is estimated that this rehabilitation method would provide an acceptable level of service for a period of 7 years.

It is recommended that the Car Park pavements be rehabilitated in 2019 at an estimated capital cost of \$26,000.

1.4.3. Hangar Access Road

The existing gravel surfaced Hangar Access Road provides access from the Car Park area to the private hangars west of the ATB.

It is recommended that the Hangar Access Road be paved in 2014 at an estimated capital cost of \$45,000.



2. **AIRPORT BUILDINGS**

2.1. **Air Terminal Building (ATB)**

Conditions not assessed as part of infrastructure assessment.

2.2. **Municipal Hangar**

Conditions not assessed as part of infrastructure assessment.

2.3. **Airport House**

Conditions not assessed as part of infrastructure assessment.

3. **AIRPORT UTILITIES**

3.1. **Electrical**

3.1.1. **Airport Visual Aids**

3.1.1.1. **Edge Lighting**

The existing edgelifighting systems for runways and taxiways have been reported to be installed in 1992 to 1994 and are approaching their anticipated lifespan of 20 years. Maintenance requirements are reported to be increasing yearly for all edgelifighting systems.

It is recommended that the existing edgelifighting systems be replaced in 2015 for an estimated capital cost of \$476,000.



It is our understanding that the Airport is in possession of new airfield guidance signs. We recommend that these guidance signs be installed as part of the airfield lighting replacement project. The cost for this work has been included in the estimated capital cost for the airfield lighting project.

3.1.1.2. **Airport Lighting Regulators**

The airfield edgelifighting system is serviced by two (2) 7.5kW regulators which are reported to be installed at the same time as the edgelifighting systems.

While there are no problems reported with the regulators, it is recommended that they be replaced in conjunction with the edgelifighting systems in 2015 for an estimated capital cost of \$15,000.



3.1.1.3. Abbreviated Precision Approach Path Indicators (APAPI)

As Runway 13-31 length of 1,245m (4085ft) is a Code 3 Runway per TP312 Section 1.1.3, it is recommended that the existing Abbreviated Precision Approach Path Indicator (APAPI) systems be replaced with standard 4 bar PAPI systems along with the airfield lighting project in 2015. Replacement of the existing APAPI with PAPI systems would ensure compliance with TP312 Section 5.3.6.5(a).

The estimated capital cost for the installation of PAPI for Runway 13 and Runway 31 is \$55,000.

It is also recommended that the existing APAPI be salvaged and installed on Runway 05-23. It is anticipated that this work would also be completed in 2015 at an estimated capital cost of \$15,000.

3.1.1.4. Power Distribution

The Airport is supplied by electrical power from Ontario Hydro service along Highway 21. Incoming power is fed from Ontario Hydro lines at 600V 3-phase to the Municipal Hangar and transformed and distributed from there to the load centres on the Airport. The Airport's electrical service is understood to be adequate for the needs of the airport at its present levels of development.

Replacement of the power distribution system is not anticipated within the 20 year planning period.

3.1.1.5. Emergency Power Supply System

The existing emergency power distribution system is a 120V / 400A, 3 phase generator installed in 2007 along the north wall of the Municipal Hangar.

Replacement of the emergency power distribution system is not anticipated within the 20 year planning period.



3.2. Mechanical

3.2.1. Heat Generating Systems

There is no gas service to the Airport Site. The Municipal Hangar and Airport House are serviced by electric heat systems. The ATB is serviced by a combination of a propane furnace and electrical heating. There are currently no problems reported with the existing heating systems.

Conditions not assessed as part of this infrastructure assessment.

3.2.2. Cold Generating Systems

Conditions not assessed as part of this infrastructure assessment.



3.2.3. Fuel Storage and Handling System

The Airport's aviation fuel storage facilities are located east of the ATB immediately south of the public parking lot. The facility is comprised of two (2) above ground fuel tanks connected to a self-serve card lock dispensing system. A single 15,000 Litre (3,963 Gal) 100 Low Lead fuel tank and a single 10,000 Litre (2,642 Gal) Jet A1 fuel tank is provided. Issues with the systems pumping capacity and serviceability have been raised. As a part of the strategic planning process recommendations have been put forth to resolve these issues. Efforts are presently underway to address system deficiencies.

Conditions not assessed as part of this infrastructure assessment.

3.3. Municipal Systems

3.3.1. Water Distribution & Treatment Systems

There are no municipal water services to the Airport site. Water for the site is obtained from a well to the west of the Airport House. The well was drilled in 1981 to a depth of 79m and is reported to provide a flow of 20 gallons/minute.

The water treatment system consists of a series of in-line filters and UV treatment and is located in the crawl space of the Airport House.

While there are currently no problems reported regarding the water treatment and distribution systems, it is recommended that \$2,500 be allocated to the water treatment and distribution systems on a bi-annual basis.



It is also recommended that \$10,000 be allocated to replace the water distribution and treatment systems once within the 20 year planning period.

3.3.2. Sewage Collection & Treatment Systems

There are no municipal sewage collection or disposal systems in the area. Sewage disposal is via three (3) separate septic systems.

The septic system and tile bed for the ATB is located immediately south of the building.

The septic system and tile bed for the Municipal Hangar is located at the extreme east end of the property.

The septic system and tile bed for the Airport House is located immediately east of the building.

All systems are reported to be able to accommodate present levels of demand. Any further expansion of facilities would require additional capacity to be added to the existing system.

There are no reported problems with the three (3) septic systems, and the septic tanks are pumped regularly. It is recommended that \$6,000 be allocated to the septic systems on an annual basis.

Replacement of the septic systems is not anticipated within the 20 year planning period.

3.3.3. Communications

Communications for the site are currently via copper lines owned by Bruce Telecom.

Any expansions or upgrades to the communications system would be a function of future facility expansion, and as such have not been included as a separate capital cost for this report.

4. SUMMARY

As shown on the attached Existing Facilities 20 Year Capital Plan, the estimated capital costs for the Kincardine Municipal Airport over the next 20 years is \$5,289,500 in today's dollars.

Estimated capital costs for the next 5 years are summarized below.

ITEM	FACILITY	YEAR					TOTAL
		2013	2014	2015	2016	2017	
1.1.1	Runway 13-31		\$1,002,000				\$1,002,000
1.1.2	Runway 05-23				\$340,000		\$340,000
1.1.3	Taxi A						\$0
1.1.4	Taxi B				\$65,000		\$65,000
1.1.5	Taxi C						\$0
1.1.6	Taxi D				\$63,000		\$63,000
1.1.7	Taxilane System						\$0
1.1.8	Apron I				\$131,000		\$131,000
1.1.9	Apron II (Abandoned)				\$135,000		\$135,000
1.2.1	Airfield Ditches	\$5,000					\$5,000
1.2.2	Airfield Culverts	\$5,000					\$5,000
1.2.3	Airfield Subsurface Drainage System	\$5,000					\$5,000
1.3.1	Perimeter / Security Fencing	\$56,000	\$90,000	\$90,000	\$90,000	\$90,000	\$416,000
1.4.1	Entrance Road						\$0
1.4.2	Car Park						\$0
1.4.3	Hangar Access Road		\$45,000				\$45,000
3.1.1.1	Edge Lighting			\$476,000			\$476,000
3.1.1.2	Airport Lighting Regulators			\$15,000			\$15,000
3.1.1.3a	PAPI Installation			\$55,000			\$55,000
3.1.1.3b	APAPI Relocation			\$15,000			\$15,000
3.3.1	Water Distribution & Treatment	\$2,500		\$2,500		\$2,500	\$7,500
3.3.2	Sewage Collection & Treatment	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$30,000
TOTAL		\$79,500	\$1,143,000	\$659,500	\$830,000	\$98,500	\$2,810,500

**KINCARDINE MUNICIPAL AIRPORT
EXISTING FACILITIES 20 YEAR CAPITAL PLAN**

ITEM	FACILITY	Area	Length	Rate	YEAR																		TOTAL		
					2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		2031	2032
1.0	AIRPORT SURFACE STRUCTURES																								
1.1	Airfield Pavements																								
1.1.1	Runway 13-31	28635	1245	\$35.00		\$1,002,000									\$1,002,000									\$2,004,000	
1.1.2	Runway 05-23	9700	636	\$35.00			\$340,000									\$340,000								\$680,000	
1.1.3	Taxi A	1920	70	\$30.00					\$58,000						\$58,000								\$58,000	\$174,000	
1.1.4	Taxi B	1870	170	\$35.00			\$65,000									\$65,000								\$130,000	
1.1.5	Taxi C	2040	170	\$30.00					\$61,000						\$61,000								\$61,000	\$183,000	
1.1.6	Taxi D (Abandoned)	1810	95	\$35.00			\$63,000									\$63,000								\$126,000	
1.1.7	Taxilane System				<<< NO REHABILITATION WITHIN PLANNING PERIOD >>>																		\$0		
1.1.8	Apron I	3738		\$35.00			\$131,000									\$131,000								\$262,000	
1.1.9	Apron II (Abandoned)	3850		\$35.00			\$135,000									\$135,000								\$270,000	
1.2	Airfield Drainage																								
1.2.1	Airfield Ditches				\$5,000				\$5,000					\$5,000						\$5,000				\$20,000	
1.2.2	Airfield Culverts				\$5,000				\$5,000					\$5,000						\$5,000				\$20,000	
1.2.3	Airfield Subsurface Drainage System				\$5,000				\$5,000					\$5,000						\$5,000				\$20,000	
1.3	Fencing																								
1.3.1	Perimeter / Security Fencing				\$56,000	\$90,000	\$90,000	\$90,000	\$90,000	\$90,000														\$506,000	
1.4	Surface Traffic Pavements																								
1.4.1	Entrance Road	885		\$30.00							\$27,000					\$27,000								\$54,000	
1.4.2	Car Park	864		\$30.00							\$26,000					\$26,000								\$52,000	
1.4.3	Hangar Access Road	1800		\$25.00		\$45,000								\$45,000										\$90,000	
	Sub-Total Section 1.0				\$71,000	\$1,137,000	\$90,000	\$824,000	\$90,000	\$224,000	\$53,000	\$0	\$0	\$0	\$15,000	\$1,047,000	\$119,000	\$787,000	\$0	\$15,000	\$0	\$0	\$0	\$119,000	\$4,591,000
3.0	AIRPORT UTILITIES																								
3.1	Electrical																								
3.1.1	Airport Visual Aids																							\$0	
3.1.1.1	Edge Lighting		2505	\$190.00			\$476,000																	\$476,000	
3.1.1.2	Airport Lighting Regulators						\$15,000																	\$15,000	
3.1.1.3a	PAPI Installation						\$55,000																	\$55,000	
3.1.1.3b	APAPI Relocation						\$15,000																		
3.1.2	Power Distribution				<<< NO REHABILITATION WITHIN PLANNING PERIOD >>>																		\$0		
3.1.3	Emergency Power Supply System				<<< NO REHABILITATION WITHIN PLANNING PERIOD >>>																		\$0		
3.3	Municipal Systems																								
3.3.1	Water Distribution & Treatment				\$2,500		\$2,500		\$2,500		\$2,500		\$2,500		\$10,000		\$2,500		\$2,500		\$2,500		\$2,500	\$32,500	
3.3.2	Sewage Collection & Treatment				\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$120,000	
	Sub-Total Section 3.0				\$8,500	\$6,000	\$569,500	\$6,000	\$8,500	\$6,000	\$8,500	\$6,000	\$8,500	\$6,000	\$16,000	\$6,000	\$8,500	\$6,000	\$8,500	\$6,000	\$8,500	\$6,000	\$8,500	\$698,500	
	TOTAL				\$79,500	\$1,143,000	\$659,500	\$830,000	\$98,500	\$230,000	\$61,500	\$6,000	\$8,500	\$6,000	\$31,000	\$1,053,000	\$127,500	\$793,000	\$8,500	\$21,000	\$8,500	\$6,000	\$8,500	\$125,000	\$5,289,500

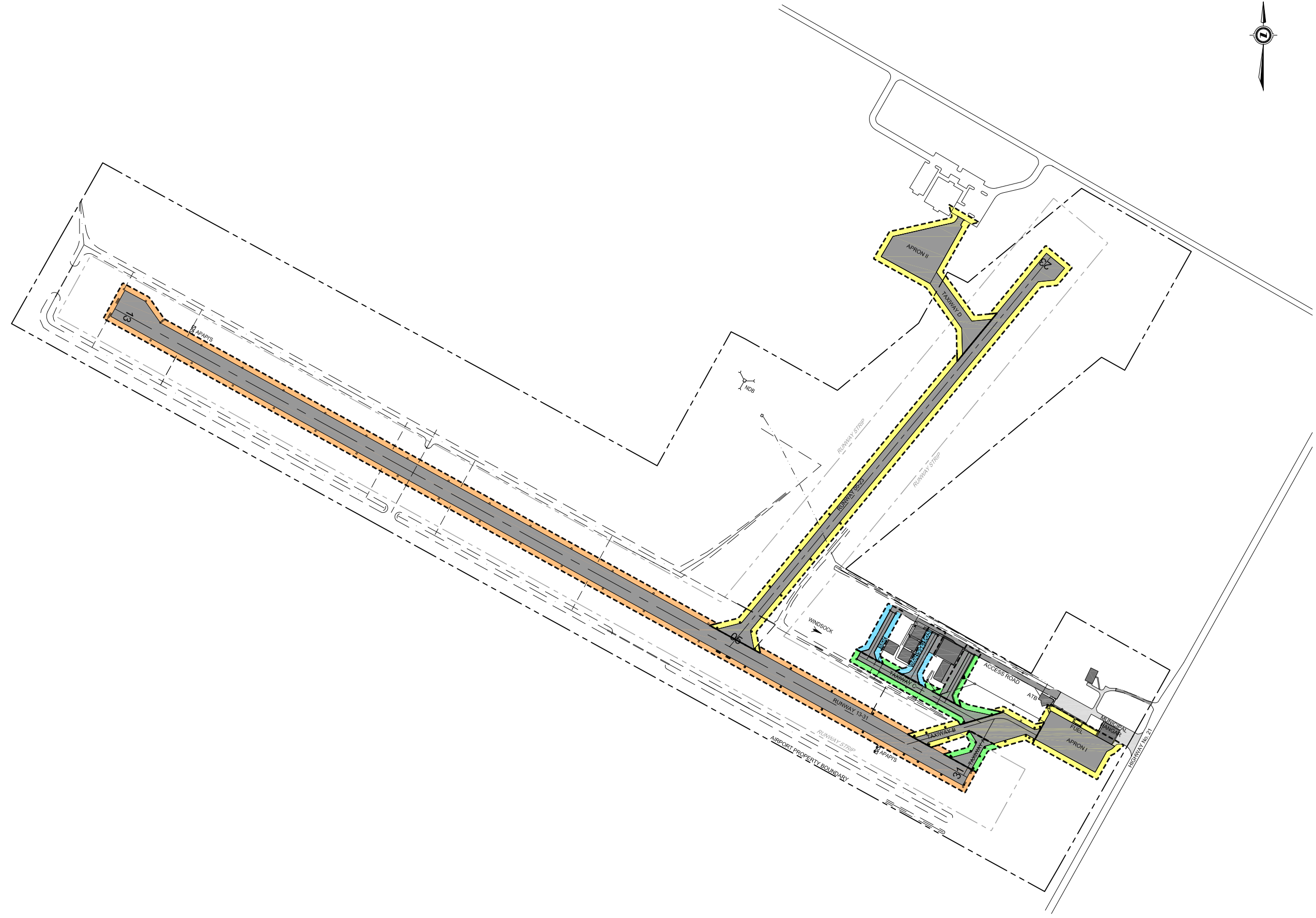
NOTES:
 1. Values shown in 2013 Canadian Dollars
 2. The estimate of construction costs is provided for budgetary purposes only. This is not to be interpreted as a guarantee by GENIVAR Inc. of the actual project cost. The final cost of the project will be determined by the tendering and construction phases.
 3. These prices do not include H.S.T.

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- Notes
1. SITE PLAN GENERATED FROM THE GENERAL AVIATION DEVELOPMENT AS-BUILT INFORMATION DATED MAY 16, 2007.
 2. ADDITIONAL INFORMATION DERIVED FROM TOPOGRAPHICAL SURVEY COMPLETED BY GENIVAR INC. OCTOBER 2011.
 3. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION UNLESS NOTED/REVISED "ISSUED FOR CONSTRUCTION."
 4. ALL UNITS IN METRES UNLESS OTHERWISE SPECIFIED.

LEGEND

	PROPERTY BOUNDARY
	EXISTING CENTRELINE
	EXISTING WINDSOCK
	EXISTING AIRSIDE PAVEMENT SCR = 8 TO 10 (EXCELLENT)
	EXISTING AIRSIDE PAVEMENT SCR = 6 TO 8 (GOOD)
	EXISTING AIRSIDE PAVEMENT SCR = 4 TO 6 (FAIR)
	EXISTING AIRSIDE PAVEMENT SCR = 2 TO 4 (POOR)
	EXISTING AIRSIDE PAVEMENT SCR = 0 TO 2 (VERY POOR)
	EXISTING AIRSIDE PAVEMENT
	EXISTING LANDSIDE PAVEMENT
	EXISTING CONCRETE
	EXISTING GRAVEL ROAD
	EXISTING BUILDING



Revision

No.	Description	By	Appd.	Date
0	ISSUED FOR CLIENT REVIEW	CT	JH	2013.05.14

Seals



Client/Project
MUNICIPALITY OF KINCARDINE
 KINCARDINE MUNICIPAL AIRPORT
 STRATEGIC PLAN
 Municipality of Kincardine, Ontario

Title
**EXISTING PAVEMENT CONDITIONS
 SITE PLAN**

Project No. 00703	Scale 1:5000	Dwn by. JV
Drawing No. SP	Revision 0	

Appendix B

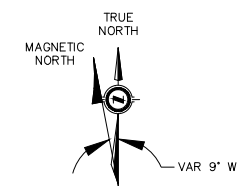
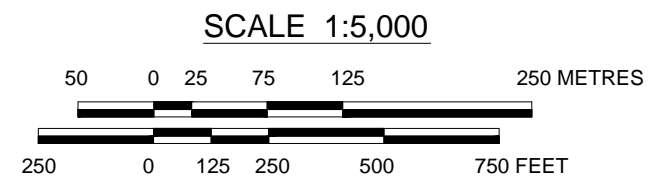
Existing Conditions Plan



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LEGEND

- AIRPORT LANDS (PROPERTY BOUNDARY)
- MUNICIPAL LANDS
- EXISTING BUILDING
- EXISTING AIRSIDE PAVEMENT (ASPHALT)
- EXISTING AIRSIDE PAVEMENT (CONCRETE)
- EXISTING LANDSIDE PAVEMENT (ASPHALT)
- EXISTING LANDSIDE PAVEMENT (GRAVEL)
- PROJECTED RUNWAY CENTRELINE
- EXISTING DITCHES
- TOPOGRAPHIC CONTOURS
- OLS - RUNWAY STRIP



Client **MUNICIPALITY OF KINCARDINE**
 Kincardine, Ontario

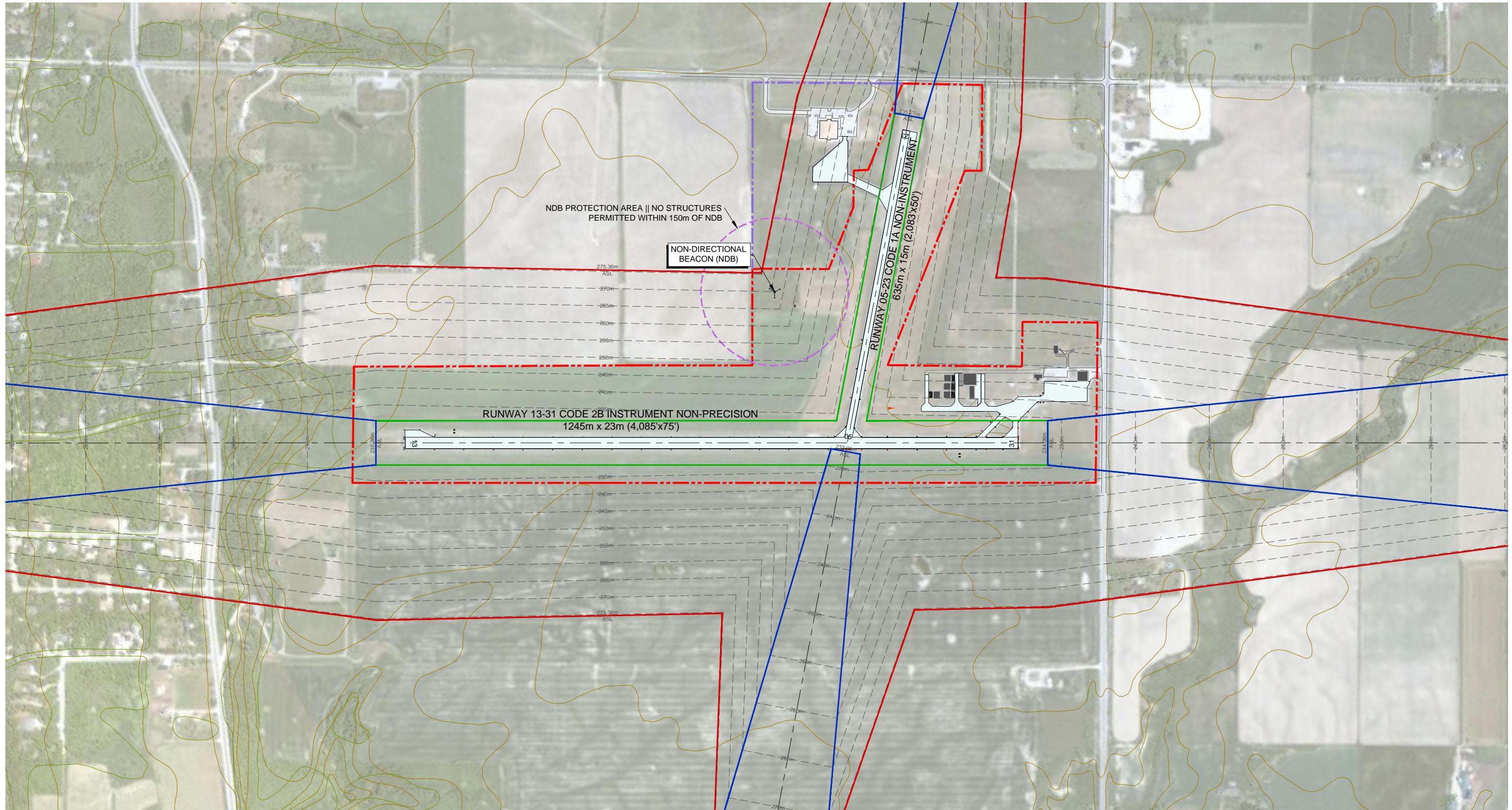
Project **KINCARDINE MUNICIPAL AIRPORT (CNS7)**
2013 AIRPORT STRATEGIC PLAN

Figure No. **SK-1**

Title **EXISTING CONDITIONS PLAN**

Appendix C

Existing Aeronautical Zoning

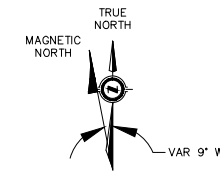
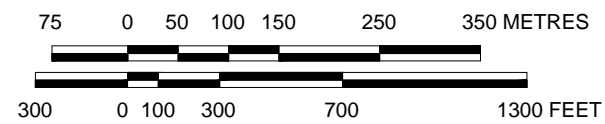


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LEGEND

- | | | | |
|--|--------------------------------------|--|-----------------------------------|
| | AIRPORT LANDS (PROPERTY BOUNDARY) | | OLS - RUNWAY STRIP |
| | MUNICIPAL LANDS | | OLS - APPROACH SURFACE |
| | EXISTING BUILDING | | OLS - TRANSITIONAL SURFACE |
| | EXISTING AIRSIDE PAVEMENT (ASPHALT) | | OLS - ELEVATION CONTOUR (m ASL) |
| | EXISTING AIRSIDE PAVEMENT (CONCRETE) | | EZ - NON-DIRECTIONAL BEACON (NDB) |
| | EXISTING LANDSIDE PAVEMENT (ASPHALT) | | |
| | EXISTING LANDSIDE PAVEMENT (GRAVEL) | | |
| | PROJECTED RUNWAY CENTRELINE | | |
| | EXISTING DITCHES | | |
| | TOPOGRAPHIC CONTOURS | | |

SCALE 1:7,500



Client **MUNICIPALITY OF KINCARDINE**
Kincardine, Ontario

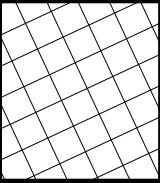
Project **KINCARDINE MUNICIPAL AIRPORT (CNS7)
2013 AIRPORT STRATEGIC PLAN**

Figure No. **SK-2**

Title **EXISTING AERONAUTICAL ZONING**

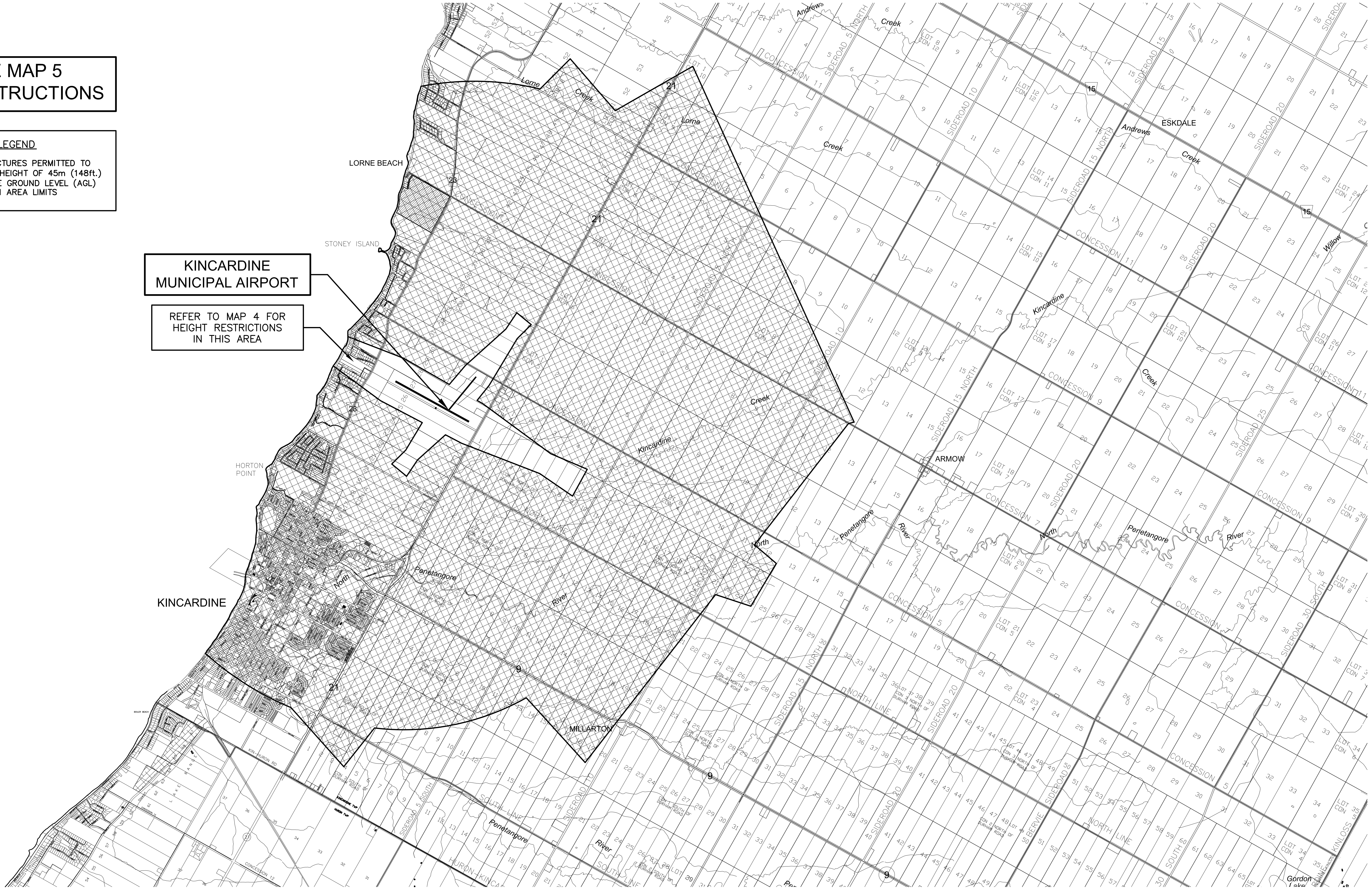
**SEE MAP 5
FOR INSTRUCTIONS**

LEGEND

 STRUCTURES PERMITTED TO MAX. HEIGHT OF 45m (148ft.) ABOVE GROUND LEVEL (AGL) WITHIN AREA LIMITS

KINCARDINE MUNICIPAL AIRPORT

REFER TO MAP 4 FOR HEIGHT RESTRICTIONS IN THIS AREA



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ORIGINAL SHEET - ARCH 0
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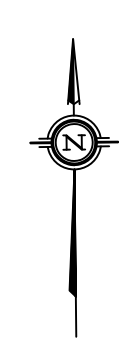
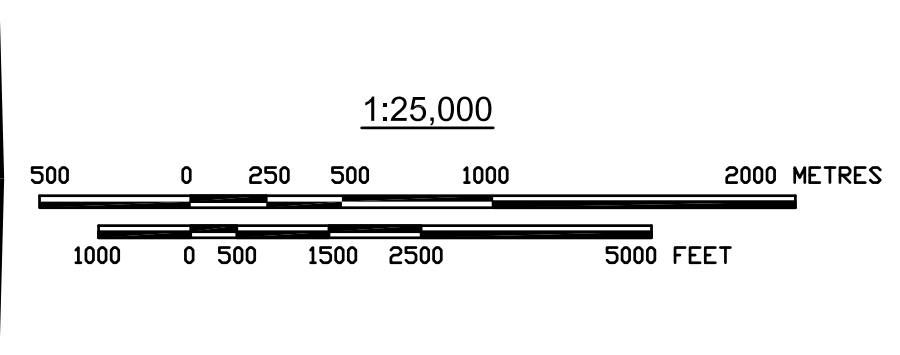
- Notes
1. THESE MAPS ACCOUNT FOR CURRENT AIRFIELD CONDITIONS AND PROTECT FOR EXISTING AND FUTURE INSTRUMENT APPROACH PROCEDURES AT KINCARDINE AIRPORT.
 2. RUNWAY 05-23 (CODE 1 NON-INSTRUMENT) 634m IN LENGTH.
 3. RUNWAY 13-31 (CODE 2 NON-PRECISION) 1245m IN LENGTH.
 4. AIRPORT OBSTACLE LIMITATION SURFACES AS PER TP312, 4th EDITION.
 5. INSTRUMENT APPROACH PROCEDURE DESIGN STANDARDS AS PER TP308.



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Revision No.	Description	By	Appd.	Date
0	FIRST SUBMISSION FOR COMMITTEE REVIEW	JJH	BGS	2008.03.10
1	FINAL REPORT	JJH	BGS	2008.04.21
2	BOUNDARY AND HEIGHT LIMITS REVISED TO ACCOMMODATE EXISTING 45m ZONING BY-LAW CONSTRAINT	JJH	BGS	2009.03.16
3	MAP MODIFICATIONS / COUNTY PLANNING	JJH	BGS	2010.03.29

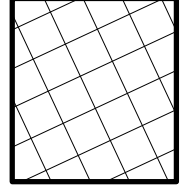
Client/Project: **MUNICIPALITY OF KINCARDINE**
KINCARDINE AIRPORT (CNS7)
Kincardine, Ontario

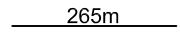
**MAP 3 OF 5
EXISTING AND FUTURE AIRPORT ACCESSIBILITY
PROTECTION AREAS (NDB/DME INSTRUMENT
APPROACHES - ALL RUNWAYS)**

Designed by: JJH/BGS/MDA	Scale: 1:25000
Dwn by: JJH	Reviewed by: BGS
Revision: 3	Drawing No.: C3
Project No.: 00695	

**SEE MAP 5
FOR INSTRUCTIONS**

LEGEND

 REFER TO MAP 3 OR 3A FOR ADDITIONAL HEIGHT CONSTRAINTS IN THIS AREA

 AIRPORT OBSTACLE LIMITATION CONTOURS SHOWN IN HEIGHT ABOVE SEA LEVEL (ASL)

265m



**KINCARDINE
MUNICIPAL AIRPORT**

KINCARDINE

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ORIGINAL SHEET - A1
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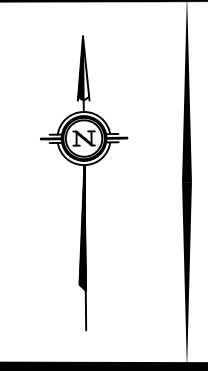
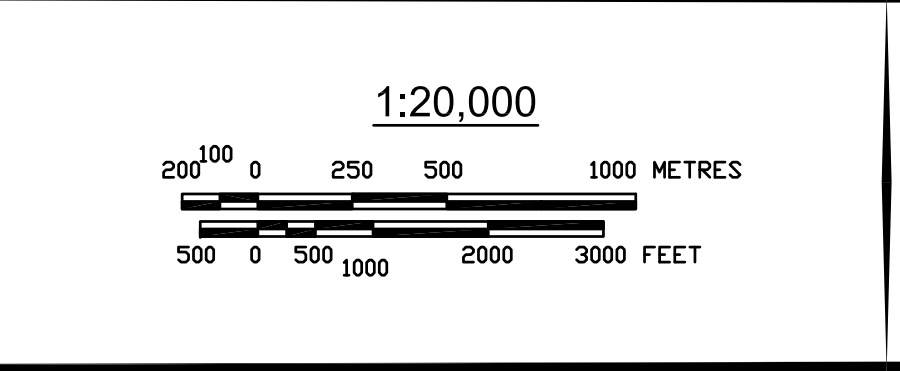
- Notes**
1. THESE MAPS ACCOUNT FOR CURRENT AIRFIELD CONDITIONS AND PROTECT FOR EXISTING AND FUTURE INSTRUMENT APPROACH PROCEDURES AT KINCARDINE AIRPORT.
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 3. RUNWAY 13-31 (CODE 2 NON-PRECISION) 1245m IN LENGTH.
 4. AIRPORT OBSTACLE LIMITATION SURFACES AS PER TP312, 4th EDITION.
 5. INSTRUMENT APPROACH PROCEDURE DESIGN STANDARDS AS PER TP308.



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PORT ELGIN TEL: 519-663-1100 FAX: 519-663-1101



Revision No.	Description	By	Appd.	Date
0	FIRST SUBMISSION FOR COMMITTEE REVIEW	JJH	BGS	2008.03.10
1	FINAL REPORT	JJH	BGS	2008.04.21
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3	MAP MODIFICATIONS / COUNTY PLANNING	JJH	BGS	2010.03.29

Client/Project

MUNICIPALITY OF KINCARDINE

KINCARDINE AIRPORT (CNS7)

Kincardine, Ontario

**MAP 4 OF 5
EXISTING AND FUTURE TRANSPORT CANADA
CERTIFICATION AIRPORT PROTECTION AREAS
MAXIMUM HEIGHT CONTROL CONTOURS/AREAS**

Designed by:	JJH/BGS/MDA	Scale:	1:20000
Dwn by:	JJH	Reviewed by:	BGS
Revision:	3	Drawing No.:	C4
		Project No.:	00695

Appendix D

Existing Airport Fees

Airport Fuel & Fees

The Kincardine Municipal Airport offers both Jet A fuel and 100 Low Lead fuel from our self serve fuelling system, available 24 hours a day. The system accepts both credit card and debit. For up to date fuel prices please see the "Airport Fuel Prices" link or call the airport directly at 519-396-4454.

Fees are subject to all applicable taxes.

Landing Fee – commercial aircraft 3,000 kg & over	\$65.25
Tie Down Fee (Standard)	\$44.75 per month
Pavement Tie Down Fee (Standard)	\$56.75 per month
Airport Meeting room Facilities	\$43.78 Full Day \$22.15 Half Day
Office Rent	\$65.41 per month
Land Lease for Hangar Developments	.31 per square foot

For more information about leasing Municipal land for a new hangar development please contact the Clerks Department at the Municipality of Kincardine 519-396-3468. Our Airport Service Provider would be pleased to show you potential locations for hangar developments.

Appendix E

Runway Length Analysis

Runway Length Requirement Calculations (Planning Level Analysis)
Kincardine Municipal Airport (CNS7)
Airport Strategic Plan

A. Summary of Runway Length Calculations Factors and Actual Conditions
(Based on ICAO Aerodrome Design Manual - Part 1)

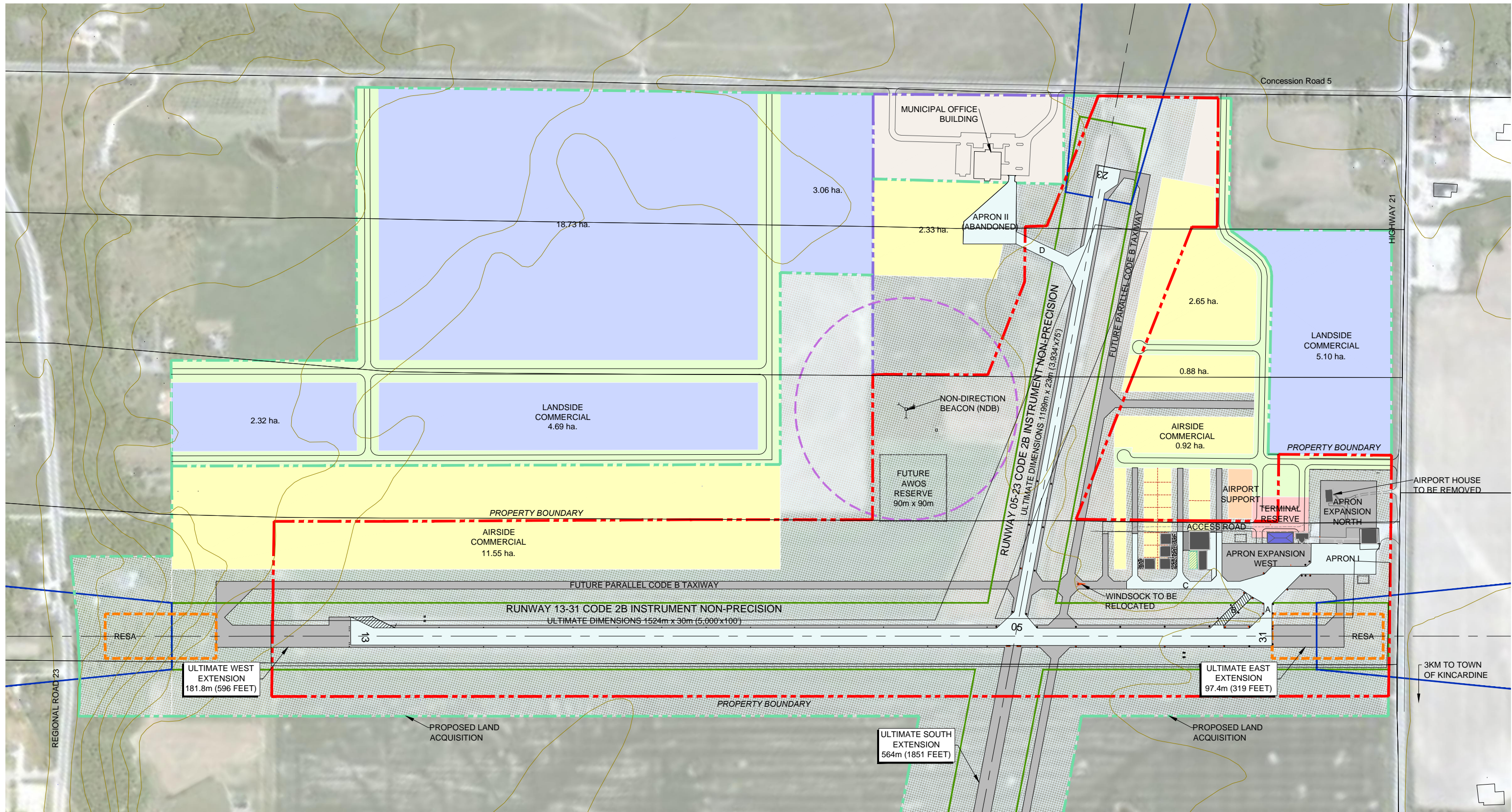
Airport Elevation Correction Factor	0.02% /m (7% per 300m)	
Airport Reference Temperature Correction	1% /deg C	
Runway Slope Correction Factor	10% /% of runway slope	← For Runway Lengths > 900m
Runway 13/31 (Length)	1,245 metres	4,085 Feet
Airport Elevation (ASL)	235 metres	772 ASL
Airport Standard Temp at Elevation	13.5 deg C	(Calculated)
Airport Reference Temperature	24.9 deg C	(TP 312E 3rd Edition) Goderich
Runway Slope	0.29 %	(Average)
Elevation Correction Factor	5.49%	(Calculated)
Ref. Temp Correction Factor	11.37%	(Calculated)
Runway Slope Correction Factor	2.90%	(Calculated)

B. Runway Takeoff and Landing Length Calculations (ft.)

Aircraft Make/Model	STD Atmosphere		Adjusted for Airport Elevation		Adjusted for Airport Elevation and Temp.		Adjusted for Airport Elevation, Temp., and Runway Slope	
	Takeoff length (ft.)	Landing Length (ft.)	Takeoff length (ft.)	Landing Length (ft.) (Bare and Dry)	Takeoff length (ft.)	Landing Length (ft.)	Takeoff length (ft.)	Landing Length (ft.)
Raytheon / Beech King Air C90GT	2,392	2,355	2,523	2,484	2,810	NA	2,892	NA
Raytheon / Beech King Air B200	2,579	2,845	2,721	3,001	3,030	NA	3,118	NA
Cessna 550 Citation II	2,990	2,270	3,154	2,395	3,513	NA	3,615	NA
Cessna Citation Mustang	3,110	2,390	3,281	2,521	3,654	NA	3,760	NA
Cessna 560 Citation V Ultra	3,180	--	3,355	--	3,736	NA	3,844	NA
Raytheon / Beech King Air 350	3,300	2,390	3,481	2,521	3,877	NA	3,989	NA
Piaggio P180 Avanti II	3,350	3,065	3,534	3,233	3,936	NA	4,050	NA
Empresa (Embraer) Phenom 100	3,400	3,000	3,587	3,165	3,994	NA	4,110	NA
Cessna 560 Citation Encore	3,560	2,865	3,755	3,022	4,182	NA	4,304	NA
Cessna 560 Citation Excel	3,590	3,180	3,787	3,355	4,218	NA	4,340	NA
Cessna Citation XLS	3,590	3,180	3,787	3,355	4,218	NA	4,340	NA
Cessna 550 Citation Bravo	3,600	3,180	3,798	3,355	4,229	NA	4,352	NA
Cessna Citation Sovereign	3,640	2,650	3,840	2,795	4,276	NA	4,400	NA
Empresa (Embraer) Phenom 300	3,700	2,920	3,903	3,080	4,347	NA	4,473	NA
Raytheon / Beech 1900D Airliner	3,813	2,380	4,022	2,511	4,480	NA	4,610	NA
Fairchild Metro III	4,300	2,400	4,536	2,532	5,052	NA	5,198	NA
Dassault Falcon 10	4,500	--	4,747	--	5,287	NA	5,440	NA
Cessna 650 Citation VII	4,850	3,220	5,116	3,397	5,698	NA	5,863	NA
Hawker 900 XP	4,965	2,344	5,238	2,473	5,833	NA	6,002	NA
Hawker 800 XP	5,030	2,344	5,306	2,473	5,909	NA	6,081	NA
Cessna 650 Citation III/VI	5,150	2,900	5,433	3,059	6,050	NA	6,226	NA
Dassault Falcon 900 ED	5,215	2,375	5,501	2,505	6,127	NA	6,304	NA
Bombardier Learjet 60	5,360	3,420	5,654	3,608	6,297	NA	6,480	NA
Dassault Falcon 2000	5,440	2,560	5,739	2,701	6,391	NA	6,576	NA

Appendix F

Land Use and Development Plans

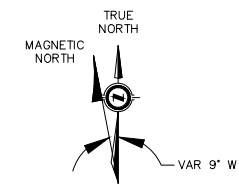
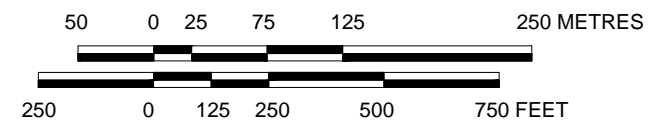


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LEGEND

	AIRPORT LANDS (PROPERTY BOUNDARY)		FUTURE AIRSIDE PAVEMENT
	MUNICIPAL LANDS		FUTURE LANDSIDE PAVEMENT
	PROPOSED LAND ACQUISITION		FUTURE AIR TERMINAL BUILDING (ATB)
	EXISTING BUILDING		RUNWAY END SAFETY AREA (RESA)
	EXISTING AIRSIDE PAVEMENT (ASPHALT)		AIRSIDE RESERVE
	EXISTING AIRSIDE PAVEMENT (CONCRETE)		AIRSIDE COMMERCIAL
	EXISTING LANDSIDE PAVEMENT (ASPHALT)		LANDSIDE COMMERCIAL
	EXISTING LANDSIDE PAVEMENT (GRAVEL)		TERMINAL RESERVE
	PROJECTED RUNWAY CENTRELINE		TRANSPORTATION RESERVE
	OLS - RUNWAY STRIP		AIRPORT SUPPORT
	OLS - APPROACH SURFACE		AIRPORT RESERVE

SCALE 1:5,000

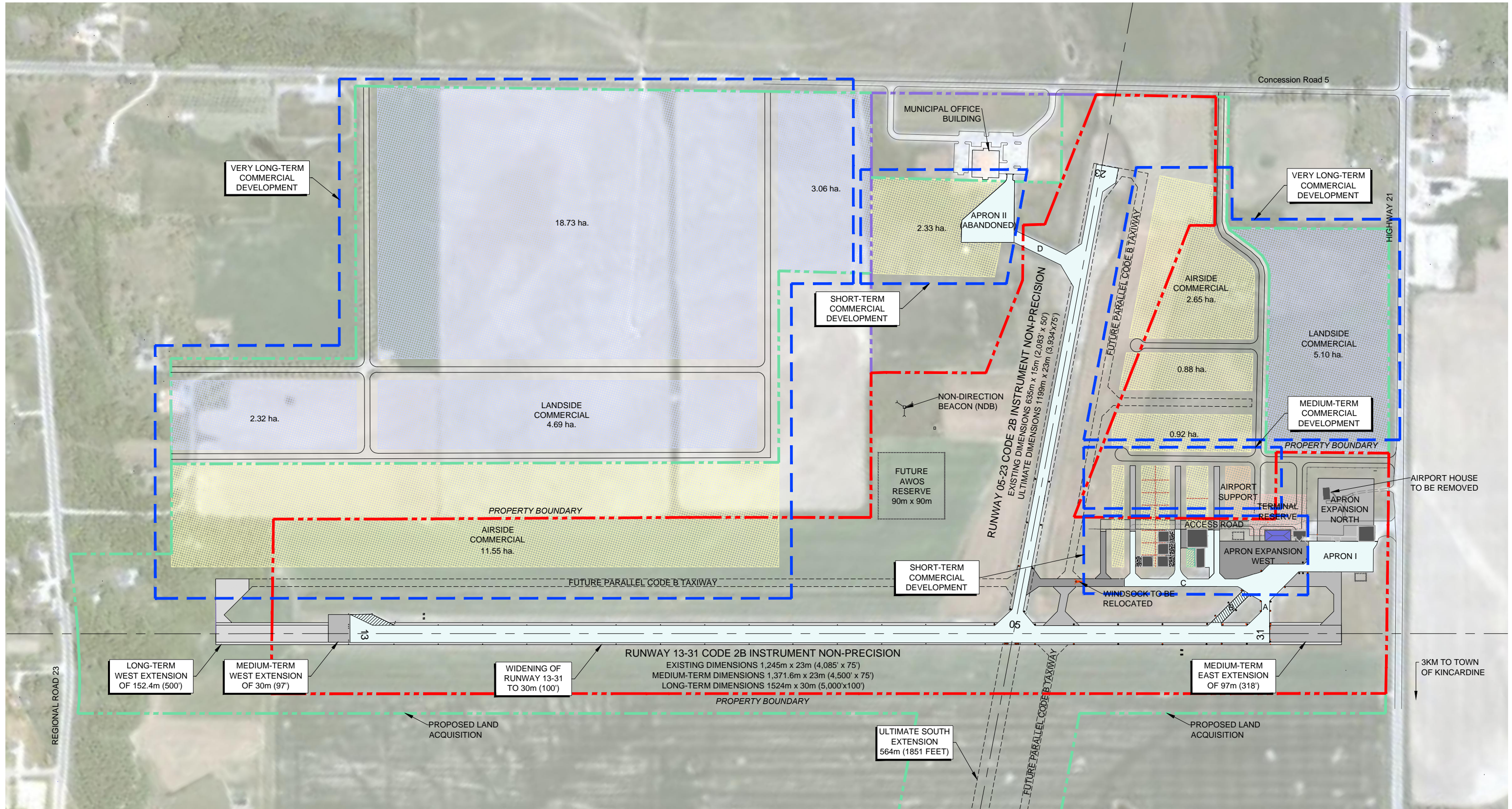


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 2013 AIRPORT STRATEGIC PLAN

Figure No. SK-3

Title LAND USE AND DEVELOPMENT PLAN
 OPTION 1



GENIVAR

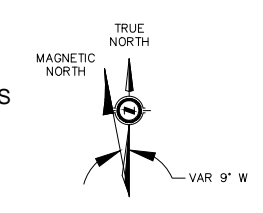
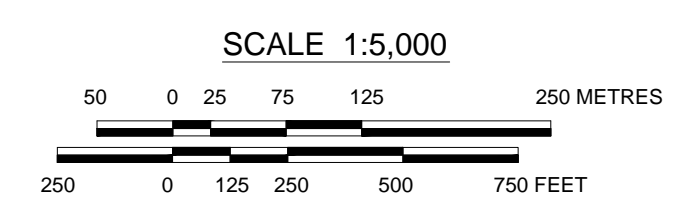
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	MUNICIPAL LANDS		AIRSIDE PAVEMENT - MEDIUM-TERM
	PROPOSED LAND ACQUISITION		AIRSIDE PAVEMENT - LONG-TERM
	EXISTING BUILDING		AIRSIDE PAVEMENT - VERY LONG-TERM
	EXISTING AIRSIDE PAVEMENT (ASPHALT)		PAVEMENT REMOVALS
	EXISTING AIRSIDE PAVEMENT (CONCRETE)		FUTURE LANDSIDE PAVEMENT
	EXISTING LANDSIDE PAVEMENT (ASPHALT)		AIRSIDE COMMERCIAL
	EXISTING LANDSIDE PAVEMENT (GRAVEL)		LANDSIDE COMMERCIAL
	PROJECTED RUNWAY CENTRELINE		TERMINAL RESERVE
	FUTURE AIR TERMINAL BUILDING (ATB)		AIRPORT SUPPORT

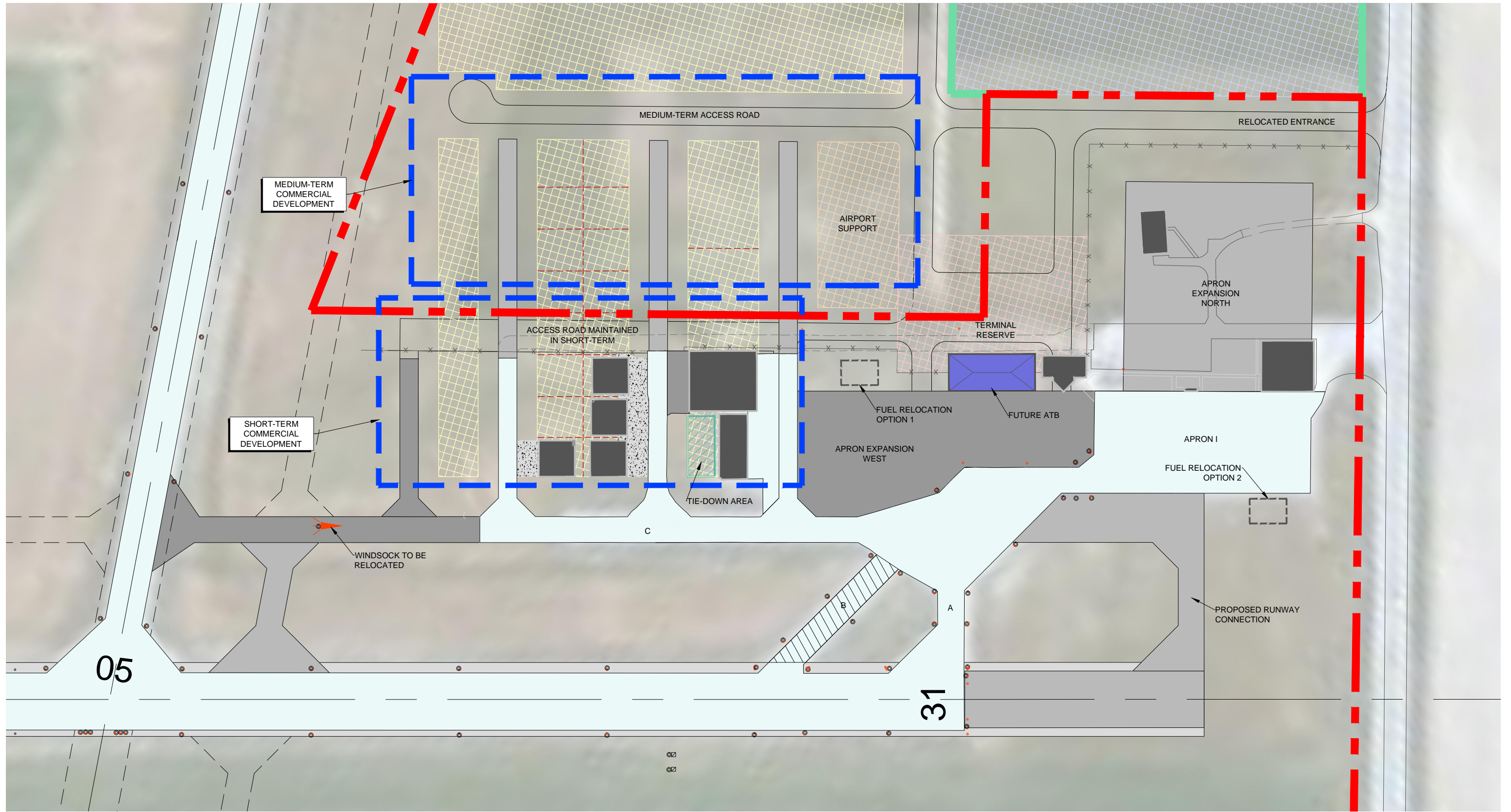


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2013 AIRPORT STRATEGIC PLAN**

Figure No. **SK-4**

Title **DEVELOPMENT PHASING PLAN
OPTION 1**

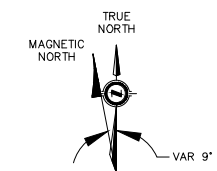
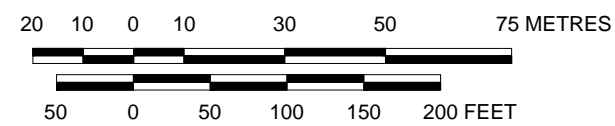


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	MUNICIPAL LANDS		AIRSIDE PAVEMENT - MEDIUM-TERM
	PROPOSED LAND ACQUISITION		AIRSIDE PAVEMENT - LONG-TERM
	EXISTING BUILDING		AIRSIDE PAVEMENT - VERY LONG-TERM
	EXISTING AIRSIDE PAVEMENT (ASPHALT)		PAVEMENT REMOVALS
	EXISTING AIRSIDE PAVEMENT (CONCRETE)		FUTURE LANDSIDE PAVEMENT
	EXISTING LANDSIDE PAVEMENT (ASPHALT)		AIRSIDE COMMERCIAL
	EXISTING LANDSIDE PAVEMENT (GRAVEL)		LANDSIDE COMMERCIAL
	PROJECTED RUNWAY CENTRELINE		TERMINAL RESERVE
	FUTURE AIR TERMINAL BUILDING (ATB)		AIRPORT SUPPORT

SCALE 1:1,500

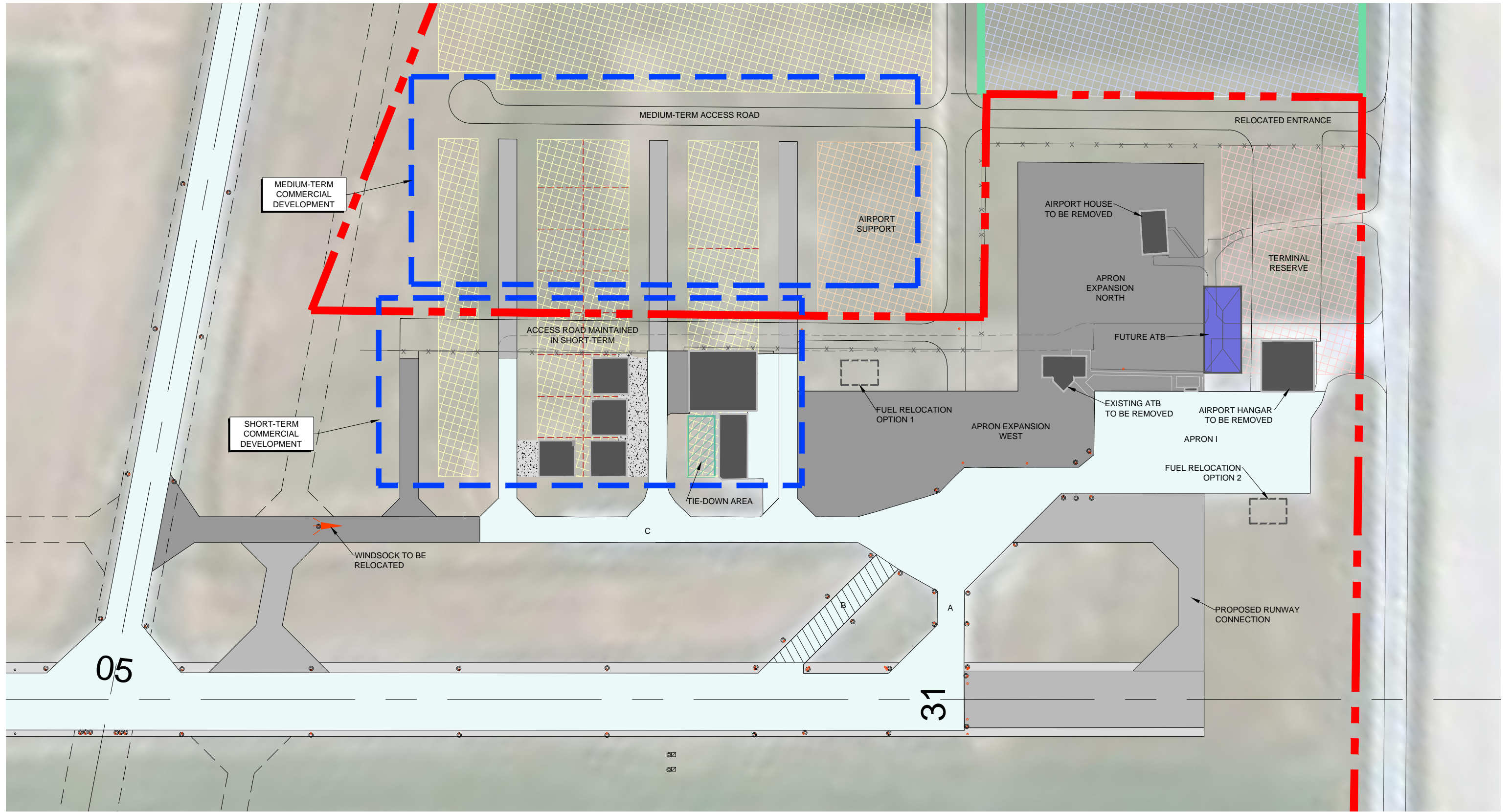


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 2013 AIRPORT STRATEGIC PLAN

Figure No. SK-6

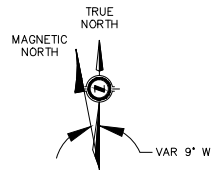
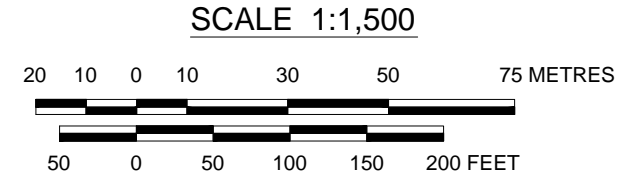
Title TERMINAL AREA PLAN
 DEVELOPMENT OPTION 1



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	MUNICIPAL LANDS		AIRSIDE PAVEMENT - MEDIUM-TERM
	PROPOSED LAND ACQUISITION		AIRSIDE PAVEMENT - LONG-TERM
	EXISTING BUILDING		AIRSIDE PAVEMENT - VERY LONG-TERM
	EXISTING AIRSIDE PAVEMENT (ASPHALT)		PAVEMENT REMOVALS
	EXISTING AIRSIDE PAVEMENT (CONCRETE)		FUTURE LANDSIDE PAVEMENT
	EXISTING LANDSIDE PAVEMENT (ASPHALT)		AIRSIDE COMMERCIAL
	EXISTING LANDSIDE PAVEMENT (GRAVEL)		LANDSIDE COMMERCIAL
	PROJECTED RUNWAY CENTRELINE		TERMINAL RESERVE
	FUTURE AIR TERMINAL BUILDING (ATB)		AIRPORT SUPPORT

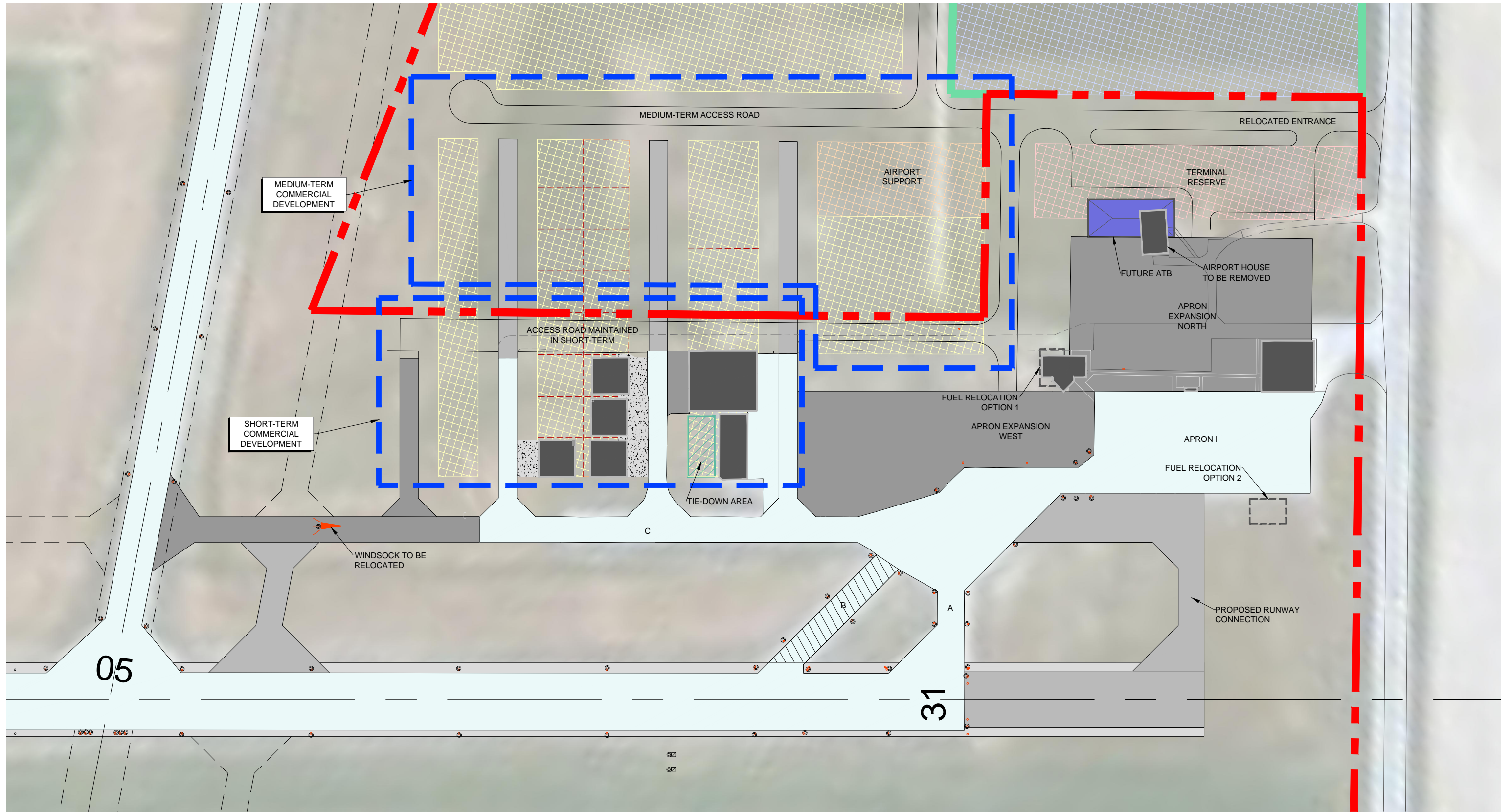


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2013 AIRPORT STRATEGIC PLAN

Figure No. **SK-7**

Title **TERMINAL AREA PLAN**
DEVELOPMENT OPTION 2

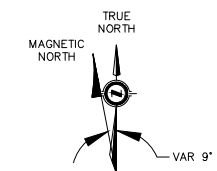
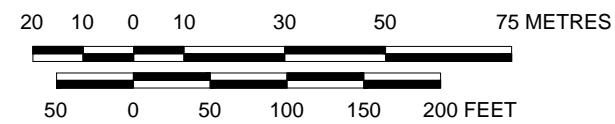


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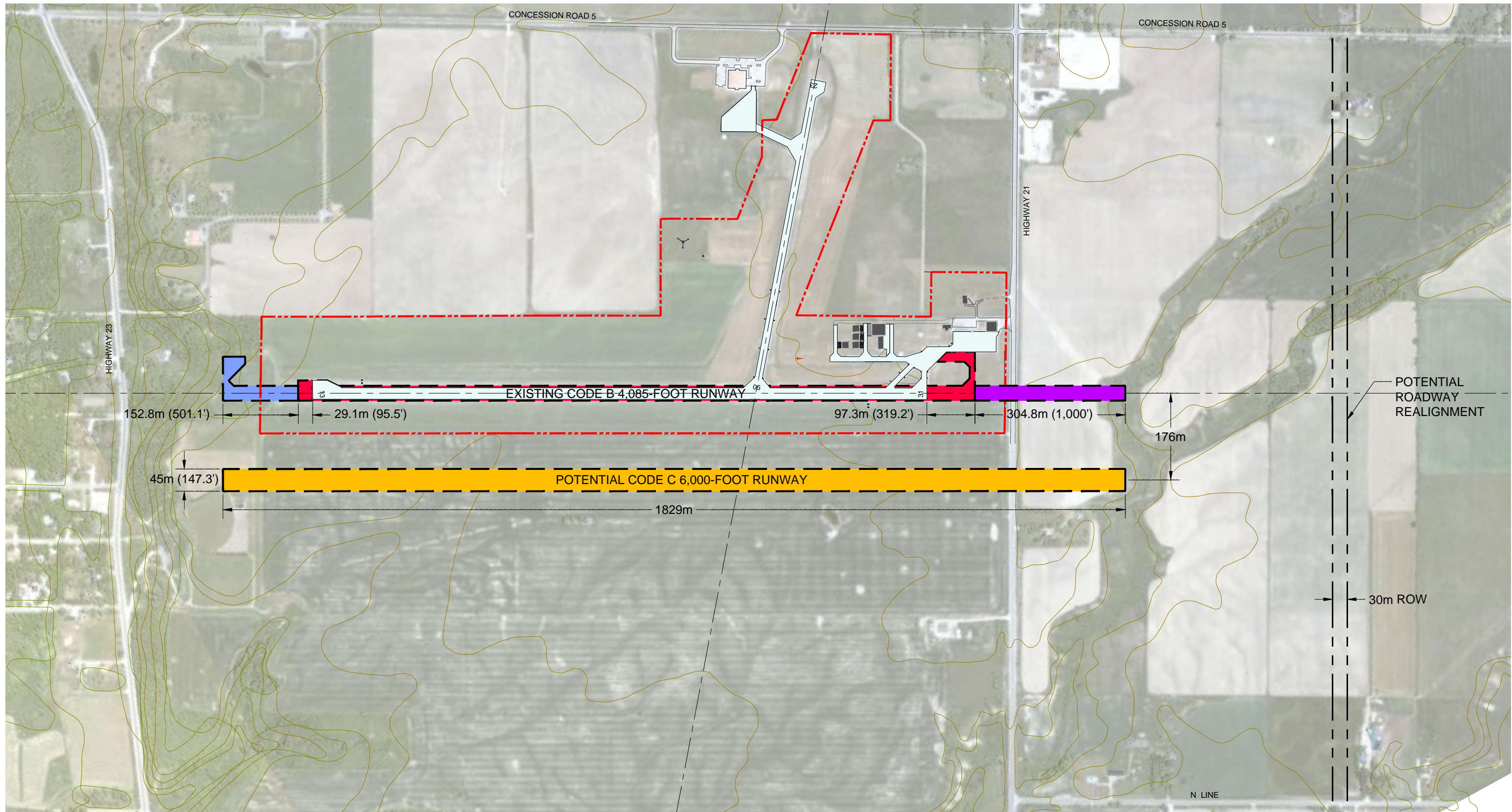
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	MUNICIPAL LANDS		AIRSIDE PAVEMENT - MEDIUM-TERM
	PROPOSED LAND ACQUISITION		AIRSIDE PAVEMENT - LONG-TERM
	EXISTING BUILDING		AIRSIDE PAVEMENT - VERY LONG-TERM
	EXISTING AIRSIDE PAVEMENT (ASPHALT)		PAVEMENT REMOVALS
	EXISTING AIRSIDE PAVEMENT (CONCRETE)		FUTURE LANDSIDE PAVEMENT
	EXISTING LANDSIDE PAVEMENT (ASPHALT)		AIRSIDE COMMERCIAL
	EXISTING LANDSIDE PAVEMENT (GRAVEL)		LANDSIDE COMMERCIAL
	PROJECTED RUNWAY CENTRELINE		TERMINAL RESERVE
	FUTURE AIR TERMINAL BUILDING (ATB)		AIRPORT SUPPORT

SCALE 1:1,500



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 2013 AIRPORT STRATEGIC PLAN
 Figure No. SK-8
 Title TERMINAL AREA PLAN
 DEVELOPMENT OPTION 3

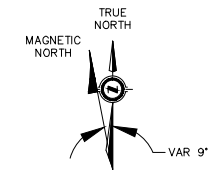
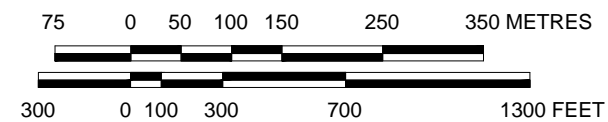


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LEGEND

- AIRPORT LANDS (PROPERTY BOUNDARY)
- PROJECTED RUNWAY CENTRELINE
- TOPOGRAPHIC CONTOURS
- EXISTING RUNWAY SYSTEM
- SCENARIO 1 - RUNWAY 13-31 EXTENSION TO 1,371.6m (4,500')
- SCENARIO 2 - RUNWAY 13-31 EXTENSION TO 1,524m (5,000')
- SCENARIO 3 - RUNWAY 13-31 EXTENSION TO 1,828.8m (6,000')
- SCENARIO 4 - RUNWAY 13-31 RELOCATION SOUTH

SCALE 1:7,500



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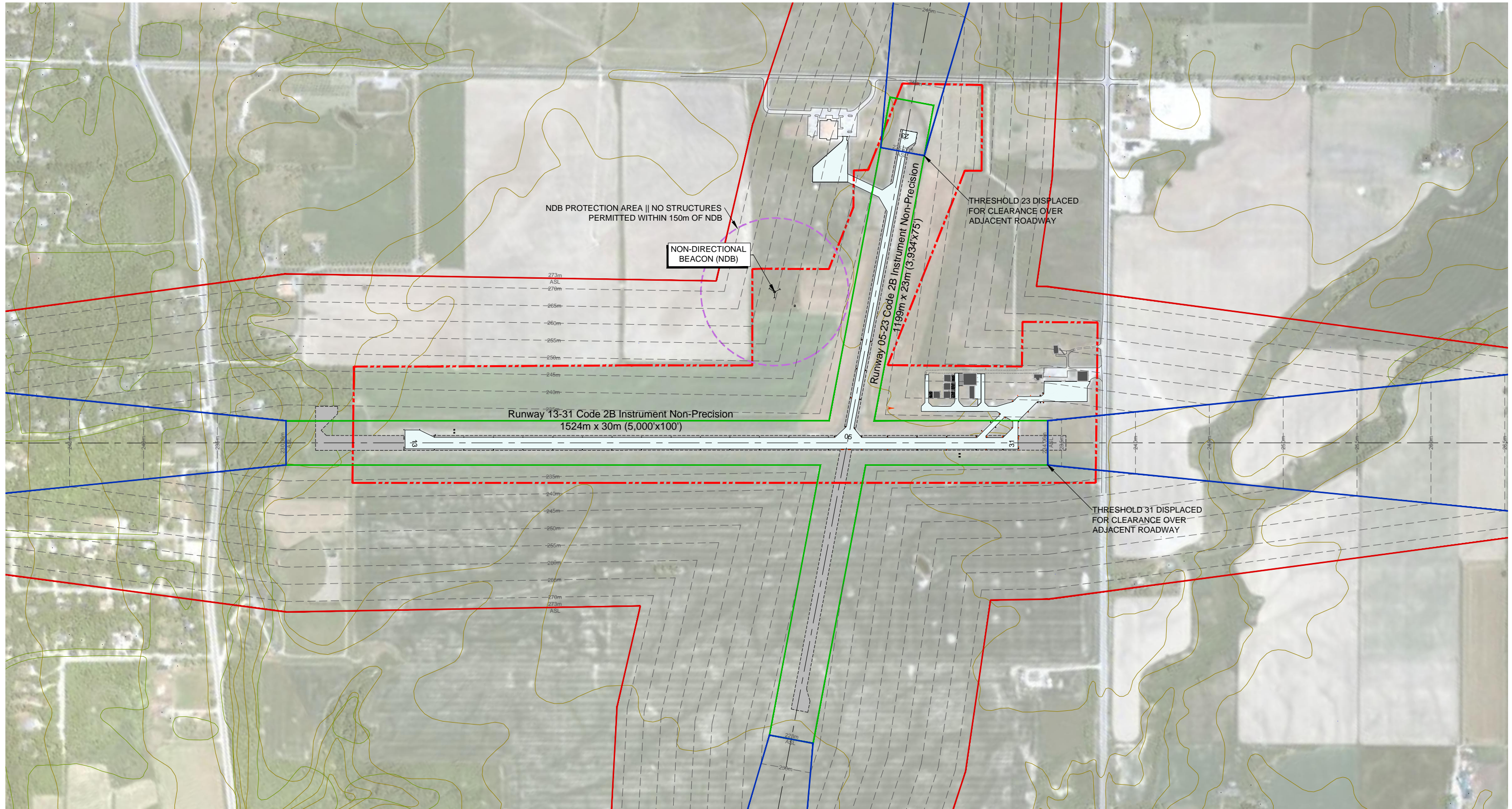
Project **KINCARDINE MUNICIPAL AIRPORT (CNS7)
 2013 AIRPORT STRATEGIC PLAN**

Figure No. **SK-9**

Title **RUNWAY EXTENSION SCENARIOS**

Appendix G

Future Aeronautical Zoning

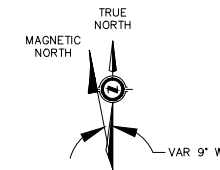
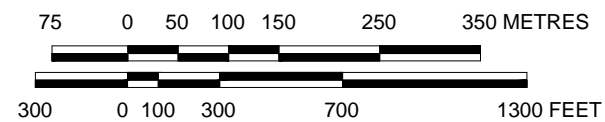


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LEGEND

- | | | | |
|--|--------------------------------------|--|-----------------------------------|
| | AIRPORT LANDS (PROPERTY BOUNDARY) | | OLS - RUNWAY STRIP |
| | MUNICIPAL LANDS | | OLS - APPROACH SURFACE |
| | EXISTING BUILDING | | OLS - TRANSITIONAL SURFACE |
| | EXISTING AIRSIDE PAVEMENT (ASPHALT) | | OLS - ELEVATION CONTOUR (m ASL) |
| | EXISTING AIRSIDE PAVEMENT (CONCRETE) | | EZ - NON-DIRECTIONAL BEACON (NDB) |
| | FUTURE AIRSIDE PAVEMENT | | |
| | EXISTING LANDSIDE PAVEMENT (ASPHALT) | | |
| | EXISTING LANDSIDE PAVEMENT (GRAVEL) | | |
| | PROJECTED RUNWAY CENTRELIN | | |
| | EXISTING DITCHES | | |
| | TOPOGRAPHIC CONTOURS | | |

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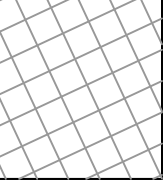
Project **KINCARDINE MUNICIPAL AIRPORT (CNS7)
2013 AIRPORT STRATEGIC PLAN**


Figure No. **SK- 5**

Title **FUTURE AERONAUTICAL ZONING**


SEE MAP 5
FOR INSTRUCTIONS

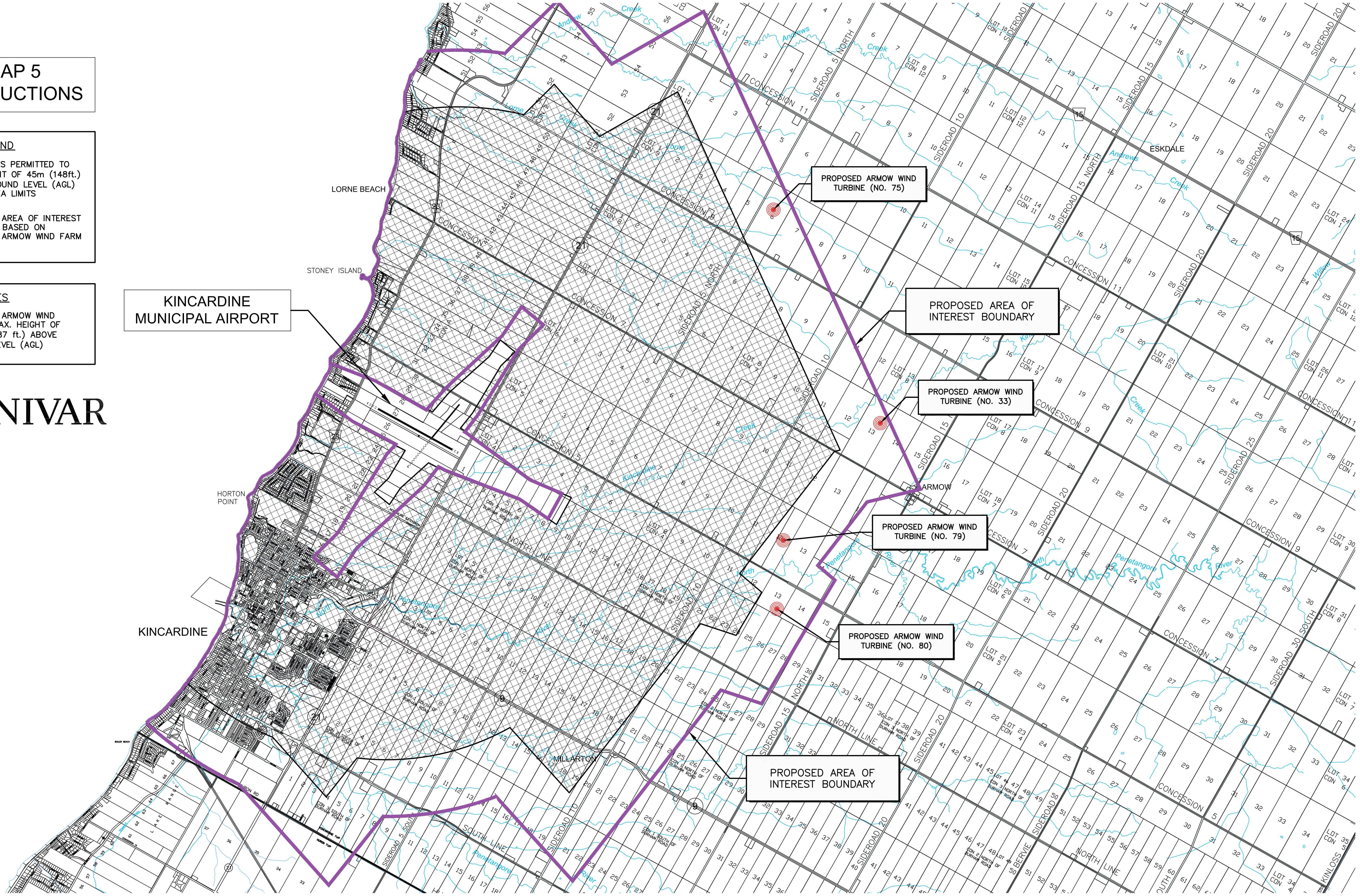
LEGEND

 STRUCTURES PERMITTED TO MAX. HEIGHT OF 45m (148ft.) ABOVE GROUND LEVEL (AGL) WITHIN AREA LIMITS

 PROPOSED AREA OF INTEREST BOUNDARY BASED ON PROPOSED ARMOW WIND FARM PROJECT.

NOTES

 PROPOSED ARMOW WIND TURBINE MAX. HEIGHT OF 148.5m (487 ft.) ABOVE GROUND LEVEL (AGL)



KINCARDINE MUNICIPAL AIRPORT

PROPOSED ARMOW WIND TURBINE (NO. 75)

PROPOSED AREA OF INTEREST BOUNDARY

PROPOSED ARMOW WIND TURBINE (NO. 33)

PROPOSED ARMOW WIND TURBINE (NO. 79)

PROPOSED ARMOW WIND TURBINE (NO. 80)

PROPOSED AREA OF INTEREST BOUNDARY

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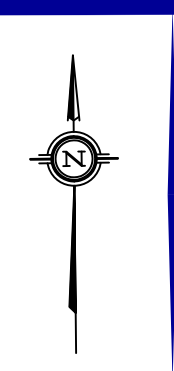
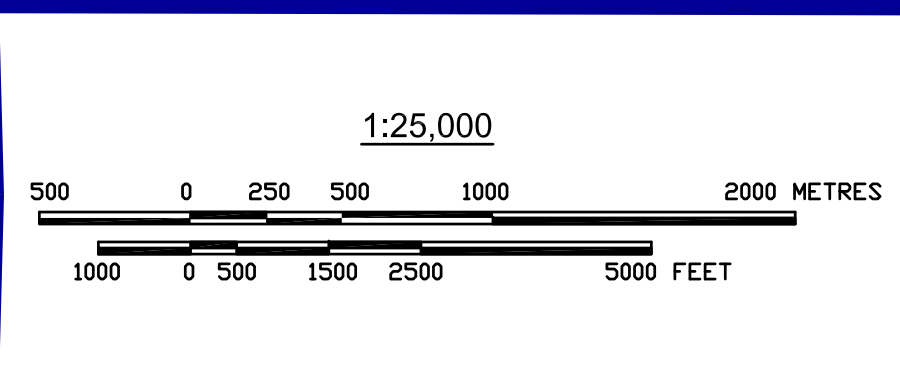
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ORIGINAL SHEET - A1
T:\Airports\Kincardine Airport\00695 AVPM\dwg\00695 Kincardine Accessibility Protection Areas (Map 3 Rev 2).dwg
2009 October 08, 8:39 a.m.

- Notes
- REFER TO REPORT PREPARED BY PSMI, APRIL 21, 2008.
 - THESE MAPS ACCOUNT FOR THE LONG-TERM AIRPORT MASTER PLAN, RUNWAY LAYOUTS TO CODE 2, INSTRUMENT NON-PRECISION STANDARDS WITH RUNWAY 05-23 AT 1199m IN LENGTH AND RUNWAY 13-31 AT 1524m IN LENGTH.
 - AIRPORT OBSTACLE LIMITATION AND INSTRUMENT APPROACH PROCEDURE DESIGN STANDARDS AS PER TP308.



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FAC: (613) 232-2244 FAC: (905) 879-8847 FAC: (905) 444-1133 FAC: (919) 394-4333
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Revision	Description	By	Appd.	Date
0	FIRST SUBMISSION FOR COMMITTEE REVIEW	JJH	BGS	2008.03.10
1	FINAL REPORT	JJH	BGS	2008.04.21
2	BOUNDARY AND HEIGHT LIMITS REVISED TO ACCOMMODATE EXISTING 45m ZONING BY-LAW CONSTRAINT	JJH	BGS	2009.03.16
3	MAP MODIFICATIONS / COUNTY PLANNING	JJH	BGS	2010.03.29
4	MAP MODIFICATIONS / AREA OF INTEREST	JJH	JPL	2013.02.12

Client/Project

MUNICIPALITY OF KINCARDINE
KINCARDINE AIRPORT (CNS7)
Kincardine, Ontario

MAP 3 OF 5
EXISTING AND FUTURE AIRPORT ACCESSIBILITY PROTECTION AREAS (NDB/DME INSTRUMENT APPROACHES - ALL RUNWAYS)

Designed by: JJH/BGS/MDA Scale: 1:25000
Drawn by: JJH Reviewed by: BGS Project No.:
Revision: 4 Drawing No.: C3 Project No.: 00695

Appendix H

Capital Cost Estimates



Kincardine Municipal Airport
Airfield Development Option 1

Preliminary Project Cost Estimate (Class D)
Airfield Development Cost Summary

ID No.	Description	Area (m ²)	Cost (\$/m ²)	Total Cost
1A	Apron NW Expansion	4,730	\$120.00	\$567,600.00
1B	Taxi C NW Extension I	1,580	\$160.00	\$252,800.00
1C	Taxilane West Construction	540	\$160.00	\$86,400.00
1D	Access Road North Construction I	3,070	\$80.00	\$245,600.00
2A	Apron NE Expansion	6,830	\$120.00	\$819,600.00
2B	Runway 13-31 SE Extension	2,240	\$150.00	\$336,000.00
2C	Threshold 13 Extension and Turn Pad Expansion	1,140	\$150.00	\$171,000.00
2D	Threshold 31 Taxi C NE Extension and Taxi D Construction	2,130	\$160.00	\$340,800.00
2E	Runway 05-23 Partial Parallel Taxi E Construction	1,040	\$160.00	\$166,400.00
2F	GA Taxilane Extensions	1,960	\$160.00	\$313,600.00
2G	Access Road North Construction II	5,380	\$80.00	\$430,400.00
3B	Runway 13-31 NW Extension	3,510	\$150.00	\$526,500.00
3C	Runway 13-31 Widening	9,500	\$150.00	\$1,425,000.00
3D	Threshold 13 Holding Bay Construction	1,800	\$160.00	\$288,000.00
4A	Runway 05-23 SW Extension	8,060	\$150.00	\$1,209,000.00
4B	Runway 05-23 Widening	9,250	\$150.00	\$1,387,500.00
4C	Taxi E North Extension	6,400	\$160.00	\$1,024,000.00
4D	Taxi E South Extension	6,390	\$160.00	\$1,022,400.00
4E	Taxi C NW Extension II	11,000	\$160.00	\$1,760,000.00
4F	Taxilane North Construction	2,310	\$160.00	\$369,600.00
4G	Access Road North Construction III	5,390	\$80.00	\$431,200.00
4H	Access Road West Construction	19,650	\$80.00	\$1,572,000.00
Total Airfield Development Cost Estimate (Excluding 13% HST)		113,900		\$14,745,400.00

Notes:

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- These prices do not include H.S.T.



**Kincardine Municipal Airport
Airfield Development Option 1
Preliminary Project Cost Estimate (Class D)
Summary**

Item	Description		Runway (\$/m ²)	Taxiway (\$/m ²)	Apron (\$/m ²)
1.0	General Construction Items		\$1.57	\$1.72	\$9.00
2.0	Civil Works		\$111.44	\$111.86	\$83.18
3.0	Electrical Works		\$7.51	\$13.40	\$4.10
	Sub-Total Construction Costs		\$120.52	\$126.98	\$96.28
4.0	Project Soft Costs		\$30.13	\$31.74	\$24.07
	Total Preliminary Project Cost Estimate (Excluding 13% HST)		\$150.65	\$158.72	\$120.35
1.0	General Construction Items	Unit	Runway	Taxiway	Apron
1.1	Mobilization/Demobilization/Bonding/Insurance/Etc.	LS	\$0.35	\$0.38	\$2.00
1.2	Utility Locates	LS	\$0.17	\$0.19	\$1.00
1.3	Managing Construction Sequencing/Plan of Construction Operations	LS	\$0.17	\$0.19	\$1.00
1.4	Airport Escort/Security Provisions	Allow.	\$0.17	\$0.19	\$1.00
1.5	Construction Layout and Quantity Measurement	LS	\$0.17	\$0.19	\$1.00
1.6	Quality Control Testing	LS	\$0.35	\$0.38	\$2.00
1.7	As-Built Survey and Closeout Documentation	LS	\$0.17	\$0.19	\$1.00
	Total Section 1.0		\$1.57	\$1.72	\$9.00
2.0	Civil Works	Unit	Runway (\$/m²)	Taxiway (\$/m²)	Apron (\$/m²)
2.1	Topsoil Stripping (200mm +/-) Including Onsite Stockpiling	m ³	\$7.75	\$4.72	\$4.10
2.2	Common Excavation	m ³	\$2.38	\$2.60	\$2.27
2.3	Imported Fill (+/- 1m)	m ³	\$24.46	\$11.16	\$9.76
2.4	Supply and Place Granular Subbase Compacted to 98% MPmdd.	tonnes	\$15.18	\$15.18	\$15.17
2.5	Supply and Place Granular Base Compacted to 100% MPmdd.	tonnes	\$8.15	\$8.15	\$8.12
2.6	Supply and Place HL2 Levelling Course c/w Tack Coat (Provisional)	tonnes	\$2.32	\$2.31	\$2.42
2.7	Supply and Place Hot Mix Asphalt Compacted to 97% Marshall Density c/w Tack Coat	tonnes	\$25.56	\$25.55	\$25.65
2.8	Supply and Install 200 mm dia. Perforated Polyethylene Subdrain c/w Filter Sock, Trenching, Dewatering, Bedding, Backfill and Compaction	lm	\$10.72	\$23.06	\$7.48
2.9	Supply and Install Catch Basins Including New Frame and Grate, Excavation, Dewatering, Bedding, Backfill, Compaction and Connections	each	\$7.33	\$15.49	\$6.00
2.10	Pavement Line Markings	m ²	\$1.19	\$0.60	\$0.88
2.11	Restoration with 100mm Topsoil and Mechanical Seeding	m ²	\$6.41	\$3.04	\$1.32
	Total Section 2.0		\$111.44	\$111.86	\$83.18
3.0	Electrical Works	Unit	Runway (\$/m²)	Taxiway (\$/m²)	Apron (\$/m²)
3.1	Supply, Install and Connect Edgelight c/w Transformer, Connectors and Accessories, Including Excavation and Backfilling	each	\$1.81	\$3.97	\$1.04
3.2	Supply and Install 50mm Polypipe c/w 2x ASLC and Counterpoise c/w Trenching	lm	\$4.38	\$9.43	\$3.06
3.3	Remove and relocate existing APAPs	LS	\$0.52	\$0.00	\$0.00
3.4	Remove and Relocate Existing Threshold Lights c/w Pullpits, Isolating Transformers, Secondary Cable, Ground and Other Connections	LS	\$0.44	\$0.00	\$0.00
3.5	Remove and Relocate Existing Windcone	LS	\$0.35	\$0.00	\$0.00
	Total Section 3.0		\$7.51	\$13.40	\$4.10

Notes:

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**Kincardine Municipal Airport
Airfield Development Option 1
Preliminary Project Cost Estimate (Class D)
Runway**

Item	Description				Total (per Square Metre)
1.0	General Construction Items				\$1.57
2.0	Civil Works				\$111.44
3.0	Electrical Works				\$7.51
Sub-Total Construction Costs					\$120.52
4.0	Project Soft Costs	25%			\$30.13
Total Preliminary Project Cost Estimate (Excluding 13% HST)					\$150.65
1.0	General Construction Items	Quantity	Unit	Unit Price	Total (per Square Metre)
1.1	Mobilization/Demobilization/Bonding/Insurance/Etc.	1	LS	\$10,000.00	\$0.35
1.2	Utility Locates	1	LS	\$5,000.00	\$0.17
1.3	Managing Construction Sequencing/Plan of Construction Operations	1	LS	\$5,000.00	\$0.17
1.4	Airport Escort/Security Provisions	1	Allow.	\$5,000.00	\$0.17
1.5	Construction Layout and Quantity Measurement	1	LS	\$5,000.00	\$0.17
1.6	Quality Control Testing	1	LS	\$10,000.00	\$0.35
1.7	As-Built Survey and Closeout Documentation	1	LS	\$5,000.00	\$0.17
Total Section 1.0					\$1.57
2.0	Civil Works	Quantity	Unit	Unit Price	Total (per Square Metre)
2.1	Topsoil Stripping (200mm +/-) Including Onsite Stockpiling	24,650	m ³	\$9.00	\$7.75
2.2	Common Excavation	9,730	m ³	\$7.00	\$2.38
2.3	Imported Fill (+/- 1m)	70,030	m ³	\$10.00	\$24.46
2.4	Supply and Place Granular Subbase Compacted to 98% MPmdd.	36,220	tonnes	\$12.00	\$15.18
2.5	Supply and Place Granular Base Compacted to 100% MPmdd.	16,660	tonnes	\$14.00	\$8.15
2.6	Supply and Place HL2 Levelling Course c/w Tack Coat (Provisional)	550	tonnes	\$121.00	\$2.32
2.7	Supply and Place Hot Mix Asphalt Compacted to 97% Marshall Density c/w Tack Coat	6,050	tonnes	\$121.00	\$25.56
2.8	Supply and Install 200 mm dia. Perforated Polyethylene Subdrain c/w Filter Sock, Trenching, Dewatering, Bedding, Backfill and Compaction	2,790	lm	\$110.00	\$10.72
2.9	Supply and Install Catch Basins Including New Frame and Grate, Excavation, Dewatering, Bedding, Backfill, Compaction and Connections	28	each	\$7,500.00	\$7.33
2.10	Pavement Line Markings	2,000	m ²	\$17.00	\$1.19
2.11	Restoration with 100mm Topsoil and Mechanical Seeding	91,760	m ²	\$2.00	\$6.41
Total Section 2.0					\$111.44
3.0	Electrical Works	Quantity	Unit	Unit Price	Total (per Square Metre)
3.1	Supply, Install and Connect Edgelight c/w Transformer, Connectors and Accessories, Including Excavation and Backfilling	42	each	\$1,250.00	\$1.81
3.2	Supply and Install 50mm Polypipe c/w 2x ASLC and Counterpoise c/w Trenching	2,790	lm	\$45.00	\$4.38
3.3	Remove and relocate existing APAPIs	1	LS	\$15,000.00	\$0.52
3.4	Remove and Relocate Existing Threshold Lights c/w Pullpits, Isolating Transformers, Secondary Cable, Ground and Other Connections	1	LS	\$12,500.00	\$0.44
3.5	Remove and Relocate Existing Windcone	1	LS	\$10,000.00	\$0.35
Total Section 3.0					\$7.51
Notes:					
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2. These prices do not include H.S.T.					



**Kincardine Municipal Airport
Airfield Development Option 1
Preliminary Project Cost Estimate (Class D)
Taxiway**

Item	Description				Total (per Square Metre)
1.0	General Construction Items				\$1.72
2.0	Civil Works				\$111.86
3.0	Electrical Works				\$13.40
Sub-Total Construction Costs					\$126.98
4.0	Project Soft Costs	25%			\$31.74
Total Preliminary Project Cost Estimate (Excluding 13% HST)					\$158.72
1.0	General Construction Items	Quantity	Unit	Unit Price	Total (per Square Metre)
1.1	Mobilization/Demobilization/Bonding/Insurance/Etc.	1	LS	\$5,000.00	\$0.38
1.2	Utility Locates	1	LS	\$2,500.00	\$0.19
1.3	Managing Construction Sequencing/Plan of Construction Operations	1	LS	\$2,500.00	\$0.19
1.4	Airport Escort/Security Provisions	1	Allow.	\$2,500.00	\$0.19
1.5	Construction Layout and Quantity Measurement	1	LS	\$2,500.00	\$0.19
1.6	Quality Control Testing	1	LS	\$5,000.00	\$0.38
1.7	As-Built Survey and Closeout Documentation	1	LS	\$2,500.00	\$0.19
Total Section 1.0					\$1.72
2.0	Civil Works	Quantity	Unit	Unit Price	Total (per Square Metre)
2.1	Topsoil Stripping (200mm +/-) Including Onsite Stockpiling	6,850	m ³	\$9.00	\$4.72
2.2	Common Excavation	4,860	m ³	\$7.00	\$2.60
2.3	Imported Fill (+/- 1m)	14,590	m ³	\$10.00	\$11.16
2.4	Supply and Place Granular Subbase Compacted to 98% MPmdd.	16,540	tonnes	\$12.00	\$15.18
2.5	Supply and Place Granular Base Compacted to 100% MPmdd.	7,610	tonnes	\$14.00	\$8.15
2.6	Supply and Place HL2 Levelling Course c/w Tack Coat (Provisional)	250	tonnes	\$121.00	\$2.31
2.7	Supply and Place Hot Mix Asphalt Compacted to 97% Marshall Density c/w Tack Coat	2,760	tonnes	\$121.00	\$25.55
2.8	Supply and Install 200 mm dia. Perforated Polyethylene Subdrain c/w Filter Sock, Trenching, Dewatering, Bedding, Backfill and Compaction	2,740	lm	\$110.00	\$23.06
2.9	Supply and Install Catch Basins Including New Frame and Grate, Excavation, Dewatering, Bedding, Backfill, Compaction and Connections	27	each	\$7,500.00	\$15.49
2.10	Pavement Line Markings	460	m ²	\$17.00	\$0.60
2.11	Restoration with 100mm Topsoil and Mechanical Seeding	19,860	m ²	\$2.00	\$3.04
Total Section 2.0					\$111.86
3.0	Electrical Works	Quantity	Unit	Unit Price	Total (per Square Metre)
3.1	Supply, Install and Connect Edgelight c/w Transformer, Connectors and Accessories, Including Excavation and Backfilling	42	each	\$1,250.00	\$3.97
3.2	Supply and Install 50mm Polypipe c/w 2x ASLC and Counterpoise c/w Trenching	2,740	lm	\$45.00	\$9.43
Total Section 3.0					\$13.40

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**Kincardine Municipal Airport
Airfield Development Option 1
Preliminary Project Cost Estimate (Class D)
Apron**

Item	Description	Total (per Square Metre)
1.0	General Construction Items	\$9.00
2.0	Civil Works	\$83.18
3.0	Electrical Works	\$4.10
Sub-Total Construction Costs		\$96.28
4.0	Project Soft Costs	25% \$24.07

Total Preliminary Project Cost Estimate (Excluding 13% HST)

\$120.35

1.0	General Construction Items	Quantity	Unit	Unit Price	Total (per Square Metre)
1.1	Mobilization/Demobilization/Bonding/Insurance/Etc.	1	LS	\$5,000.00	\$2.00
1.2	Utility Locates	1	LS	\$2,500.00	\$1.00
1.3	Managing Construction Sequencing/Plan of Construction Operations	1	LS	\$2,500.00	\$1.00
1.4	Airport Escort/Security Provisions	1	Allow.	\$2,500.00	\$1.00
1.5	Construction Layout and Quantity Measurement	1	LS	\$2,500.00	\$1.00
1.6	Quality Control Testing	1	LS	\$5,000.00	\$2.00
1.7	As-Built Survey and Closeout Documentation	1	LS	\$2,500.00	\$1.00
Total Section 1.0					\$9.00
2.0	Civil Works	Quantity	Unit	Unit Price	Total (per Square Metre)
2.1	Topsoil Stripping (200mm +/-) Including Onsite Stockpiling	1,140	m ³	\$9.00	\$4.10
2.2	Common Excavation	810	m ³	\$7.00	\$2.27
2.3	Imported Fill (+/- 1m)	2,440	m ³	\$10.00	\$9.76
2.4	Supply and Place Granular Subbase Compacted to 98% MPmdd.	3,160	tonnes	\$12.00	\$15.17
2.5	Supply and Place Granular Base Compacted to 100% MPmdd.	1,450	tonnes	\$14.00	\$8.12
2.6	Supply and Place HL2 Levelling Course c/w Tack Coat (Provisional)	50	tonnes	\$121.00	\$2.42
2.7	Supply and Place Hot Mix Asphalt Compacted to 97% Marshall Density c/w Tack Coat	530	tonnes	\$121.00	\$25.65
2.8	Supply and Install 200 mm dia. Perforated Polyethylene Subdrain c/w Filter Sock, Trenching, Dewatering, Bedding, Backfill and Compaction	170	lm	\$110.00	\$7.48
2.9	Supply and Install Catch Basins Including New Frame and Grate, Excavation, Dewatering, Bedding, Backfill, Compaction and Connections	2	each	\$7,500.00	\$6.00
2.10	Pavement Line Markings	130	m ²	\$17.00	\$0.88
2.11	Restoration with 100mm Topsoil and Mechanical Seeding	1,650	m ²	\$2.00	\$1.32
Total Section 2.0					\$83.18
3.0	Electrical Works	Quantity	Unit	Unit Price	Total (per Square Metre)
3.1	Supply, Install and Connect Edgelight c/w Transformer, Connectors and Accessories, Including Excavation and Backfilling	2	each	\$1,250.00	\$1.04
3.2	Supply and Install 50mm Polypipe c/w 2x ASLC and Counterpoise c/w Trenching	170	lm	\$45.00	\$3.06
Total Section 3.0					\$4.10

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**Kincardine Municipal Airport
Airfield Development Option 1
Preliminary Project Cost Estimate (Class D)
Access Road**

Item	Description	Total (per Square Metre)
1.0	General Construction Items	\$15.00
2.0	Civil Works	\$47.05
3.0	Electrical Works	\$0.00
Sub-Total Construction Costs		\$62.05
4.0	Project Soft Costs	25% \$15.51
Total Preliminary Project Cost Estimate (Excluding 13% HST)		\$77.57

1.0	General Construction Items	Quantity	Unit	Unit Price	Total (per Square Metre)
1.1	Mobilization/Demobilization/Bonding/Insurance/Etc.	1	LS	\$2,500.00	\$3.33
1.2	Utility Locates	1	LS	\$1,250.00	\$1.67
1.3	Managing Construction Sequencing/Plan of Construction Operations	1	LS	\$1,250.00	\$1.67
1.4	Airport Escort/Security Provisions	1	Allow.	\$1,250.00	\$1.67
1.5	Construction Layout and Quantity Measurement	1	LS	\$1,250.00	\$1.67
1.6	Quality Control Testing	1	LS	\$2,500.00	\$3.33
1.7	As-Built Survey and Closeout Documentation	1	LS	\$1,250.00	\$1.67
Total Section 1.0					\$15.00

2.0	Civil Works	Quantity	Unit	Unit Price	Total (per Square Metre)
2.1	Topsoil Stripping (200mm +/-) Including Onsite Stockpiling	440	m ³	\$9.00	\$5.28
2.2	Common Excavation	300	m ³	\$7.00	\$2.80
2.3	Imported Fill (+/- 1m)	630	m ³	\$10.00	\$8.40
2.4	Supply and Place Granular Subbase Compacted to 98% MPmdd.	380	tonnes	\$12.00	\$6.08
2.5	Supply and Place Granular Base Compacted to 100% MPmdd.	190	tonnes	\$14.00	\$3.55
2.6	Supply and Place HL2 Levelling Course c/w Tack Coat (Provisional)	0	tonnes	\$121.00	\$0.00
2.7	Supply and Place Hot Mix Asphalt Compacted to 97% Marshall Density c/w Tack Coat	100	tonnes	\$121.00	\$16.13
2.8	Supply and Install 200 mm dia. Perforated Polyethylene Subdrain c/w Filter Sock, Trenching, Dewatering, Bedding, Backfill and Compaction	0	lm	\$110.00	\$0.00
2.9	Supply and Install Catch Basins Including New Frame and Grate, Excavation, Dewatering, Bedding, Backfill, Compaction and Connections	0	each	\$7,500.00	\$0.00
2.10	Pavement Line Markings	50	m ²	\$17.00	\$1.13
2.11	Restoration with 100mm Topsoil and Mechanical Seeding	1,380	m ²	\$2.00	\$3.68
Total Section 2.0					\$47.05

3.0	Electrical Works	Quantity	Unit	Unit Price	Total (per Square Metre)
3.1	Supply, Install and Connect Edgelight c/w Transformer, Connectors and Accessories, Including Excavation and Backfilling	0	each	\$1,250.00	\$0.00
3.2	Supply and Install 50mm Polypipe c/w 2x ASLC and Counterpoise c/w Trenching	0	lm	\$45.00	\$0.00
Total Section 3.0					\$0.00

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- Notes
1. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION UNLESS NOTED/REVISED "ISSUED FOR CONSTRUCTION."
 2. ALL UNITS IN METRES UNLESS OTHERWISE SPECIFIED.
 3. AIRFIELD DEVELOPMENT PHASING PLAN EXCLUDES AIRFIELD REDEVELOPMENT COSTS.

LEGEND

	AIRPORT BOUNDARY
	FUTURE AIRPORT BOUNDARY
	EXISTING CENTRELINE
	EXISTING RUNWAY STRIP
	PROPOSED FENCE
	EXISTING PAVEMENT
	EXISTING CONCRETE
	EXISTING BUILDING
	FUTURE BUILDING
	SHORT-TERM PAVEMENTS (ASPHALT)
	MEDIUM-TERM PAVEMENTS (ASPHALT)
	LONG-TERM PAVEMENTS (ASPHALT)
	VERY LONG-TERM PAVEMENTS (ASPHALT)
	COMMERCIAL AIRSIDE DEVELOPMENT
	COMMERCIAL LANDSIDE DEVELOPMENT

Revision

No.	Description	By	Appd.	Date
0	FIRST DRAFT	JV	CT	2013.02.15

Seals

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Client/Project
MUNICIPALITY OF KINCARDINE
KINCARDINE MUNICIPAL AIRPORT (CNS7)
AIRPORT STRATEGIC PLAN
 Municipality of Kincardine, Ontario

Title
AIRFIELD DEVELOPMENT
PHASING PLAN
CAPITAL COST ESTIMATES
FOR AIRFIELD EXPANSION

Project No. 00703 Scale 1:2500 Dwn by: JV
 Drawing No. SP1 Revision 0

CAPITAL COST ESTIMATES FOR AIRFIELD EXPANSION

ID No.	COLOUR	DESCRIPTION	AREA (m ²)	COST (\$/m ²)	TOTAL COST
1A		APRON NW EXPANSION	4,730	\$120	\$567,600
1B		TAXI C NW EXTENSION I	1,580	\$160	\$252,800
1C		TAXILANE WEST CONSTRUCTION	540	\$160	\$86,400
1D		ACCESS ROAD NORTH CONSTRUCTION	3,070	\$80	\$245,600
2A		APRON NE EXPANSION	6,830	\$120	\$819,600
2B		RUNWAY 13-31 SE EXTENSION	2,240	\$150	\$336,000
2C		THRESHOLD 13 EXTENSION AND TURN PAD EXPANSION	1,140	\$150	\$171,000
2D		THRESHOLD 31 TAXI C NE EXTENSION AND TAXI D CONSTRUCTION	2,130	\$160	\$340,800
2E		RUNWAY 05-23 PARTIAL PARALLEL TAXI E CONSTRUCTION	1,040	\$160	\$166,400
2F		GA TAXILANE EXTENSIONS	1,960	\$160	\$313,600
2G		ACCESS ROAD NORTH CONSTRUCTION II	5,380	\$80	\$430,400
3A		RUNWAY 13-31 NW EXTENSION	3,510	\$150	\$526,500
3B		RUNWAY 13-31 WIDENING	9,500	\$150	\$1,425,000
3C		THRESHOLD 13 HOLDING BAY CONSTRUCTION	1,800	\$160	\$288,000
4A		RUNWAY 05-23 SW EXTENSION	8,060	\$150	\$1,209,000
4B		RUNWAY 05-23 WIDENING	9,250	\$150	\$1,387,500
4C		TAXI E NORTH EXTENSION	6,400	\$160	\$1,024,000
4D		TAXI E SOUTH EXTENSION	6,390	\$160	\$1,022,400
4E		TAXI C NW EXTENSION II	11,000	\$160	\$1,760,000
4F		TAXILANE NORTH CONSTRUCTION	2,310	\$160	\$369,600
4G		ACCESS ROAD NORTH CONSTRUCTION III	5,390	\$80	\$431,200
4H		ACCESS ROAD WEST CONSTRUCTION	19,650	\$80	\$1,572,000
TOTAL			113,900		\$14,745,400