



# Development Plan

## Hay River Airport Northwest Territories



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**Final Report**



## **Hay River Airport Development Plan**

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## **Preface**

The Hay River Airport Development Plan is not a commitment on the part of the Government of the Northwest Territories to expand/improve the airport infrastructure at the Hay River Airport. It will serve as a framework within which future project proposals will be scrutinized. Justification of these projects and programs, however, will be detailed in program documentation once sufficient growth is realized. Implementation of these projects will be subject to Government of the Northwest Territories priorities and the availability of funds.

## Executive Summary



Hay River is the second largest community in the Northwest Territories (NWT) having grown to a population of 3,685 by 1998. Originally constructed in 1942 by the US Corps of Engineers, the airport was upgraded by Transport Canada in 1966 to accommodate jet aircraft and transferred to the Government of the Northwest Territories (GNWT) in 1995. Hay River Airport provides an essential transportation link with southern Canada and other northern centres. Short range air services operate in support of tourism, forest fire management operations, community resupply for surrounding communities and limited mining and exploration. There is also some intermittent oil and gas exploration. Air transportation is considered integral to the ability of the Town to conduct corporate business.



In 1998, Hay River was the second highest visitor travel destination in the NWT, with 34% of the total traffic. However the preferred mode of transportation used to reach the South Mackenzie Region has undergone a complete reversal over the past 15 years due in part, to improvements made to the road system. In 1982 almost 70% of visitors travelled to the region by air. On average, 85% of visitors to the South Slave region in 1998 arrived by road. This is a key consideration in transportation infrastructure and facility development. More business travellers arrive by air (72% throughout the NWT), while 89% of pleasure travellers to the NWT arrive by road. Consequently the Hay River Airport caters predominantly to business travellers, and to commercial and government aviation.

The historical pattern of aircraft activity in Hay River can generally be attributed to the role of the Town as a barge terminus and to resource exploration activity. In the early to mid-1970's, the Hay River Airport experienced noticeable aviation growth as a result of resource interests in the Mackenzie Valley. The late 1970's slowdown in economic activity resulted in a corresponding decrease in aviation activity. The early 1980's saw high traffic levels but aircraft movement activity has traditionally fluctuated. At present, there are few new exploration or development ventures which would affect the airport infrastructure although the developing Cameron Hills Gas project may increase demand for airport activities and services.



Passenger traffic at Hay River Airport declined from approximately 30,000 enplaned/deplaned (E/D) passengers in 1977 and has fluctuated between 25,000 and 27,000 passengers in recent years. Current projections are that, barring any significant economic investment, passenger levels will return to the 30,000 level over the long term (20 year planning horizon) or may possibly reach the 32,000 E/D passenger level.

The existing air terminal building will be capable of handling this level of traffic at a relatively high level of service with some interior modifications. Based on existing airline traffic patterns, a peak design volume (PDV) of 43 passengers enplaned/deplaned is expected during the planning period. To be prudent however, and in anticipation of the possible return of larger aircraft, the PDV for the modified air terminal will be 47 passengers at a high level of comfort dropping down to an absolute maximum PDV of 110 passengers at the least acceptable level of operations. These levels approximately correspond to the use of Fokker F-28 and Boeing 737-200 size aircraft.



The Development Plan proposes a series of modifications to the air terminal building enabled, in large part, by the closure of NAV CANADA's Flight Service Station (FSS) in the building with a reduction in the associated resident technical equipment. The newly available space on the ground floor will allow the public waiting area to be expanded and reconfigured bringing passengers and visitors into closer visual contact with airside activities and offering a higher level of comfort to all. Check-in facilities will be expanded, airline operations will be centralized

and expanded. On the second floor, a new Community Aerodrome Radio Station (CARS) will be opened by the NAV CANADA to partially replace the services of the former FSS. Due to the age of the building, most mechanical systems will need to be upgraded in the short to medium term.



The current size of the apron is periodically inadequate and smaller than would be recommended by modern practice. Congestion sometimes requires enplaning or deplaning passengers to walk longer than ideal routes. To meet periodic apron congestion problems during peak seasons, the main apron will be expanded with additional parking created for aircraft of various sizes and performing differing roles. To facilitate this expansion, the new refuelling facilities will be relocated to a permanent location on the east side of the apron near the Air

Terminal Building, thereby also reducing the walking distance for passengers from the air terminal building to the parked aircraft. Apron expansion may be triggered by the introduction of larger aircraft, increased congestion during seasonal traffic peaks, or changes in airline schedules. Airline schedules and aircraft types may be expected to change in the short, medium, and long term as the domestic airline industry continues to be restructured and regional economic activity fluctuates.

From a high of 11,500 movements in 1983, aircraft traffic has declined steadily since then and currently appears to have stabilized at about 5,500 annual movements. In the absence of a major new economic initiative in the region this level of traffic is expected to gradually improve at the overall NWT rate of 1.1% per year to a level of 9,200 annual movements over the long term.



The existing runway and taxiway infrastructure is easily capable of handling this level of traffic and can in fact accommodate an annual traffic level of 82,000 movements and a peak hourly capacity of 30 movements under optimum conditions. The main runway requires significant annual maintenance due to poor natural drainage and discontinuous permafrost foundation conditions. Runway 13-31, Taxiways A and B, and the main Apron-1 will require re-paving in the short term.

To protect the interests of the airport in the distant future, land

has been reserved inside the existing airport boundary to permit construction of several taxiways in the future and to provide a small extension of 260 m to the existing 1,829 m Primary Runway 13/31. The gravel Crosswind Runway 04/22 continues to be utilized and is required in support of light aircraft operations. The Development Plan foresees its continued use, indefinitely.



Little if any demand currently exists for additional commercial land at the airport. However land demand is known to follow growth in aircraft and traffic movements at airports as well as local economic activity. Consequently the existing areas of commercial land have been rationalized, organized into parcels, and additional development lots planned. This will facilitate rapid and orderly development if and when commercial growth reappears.

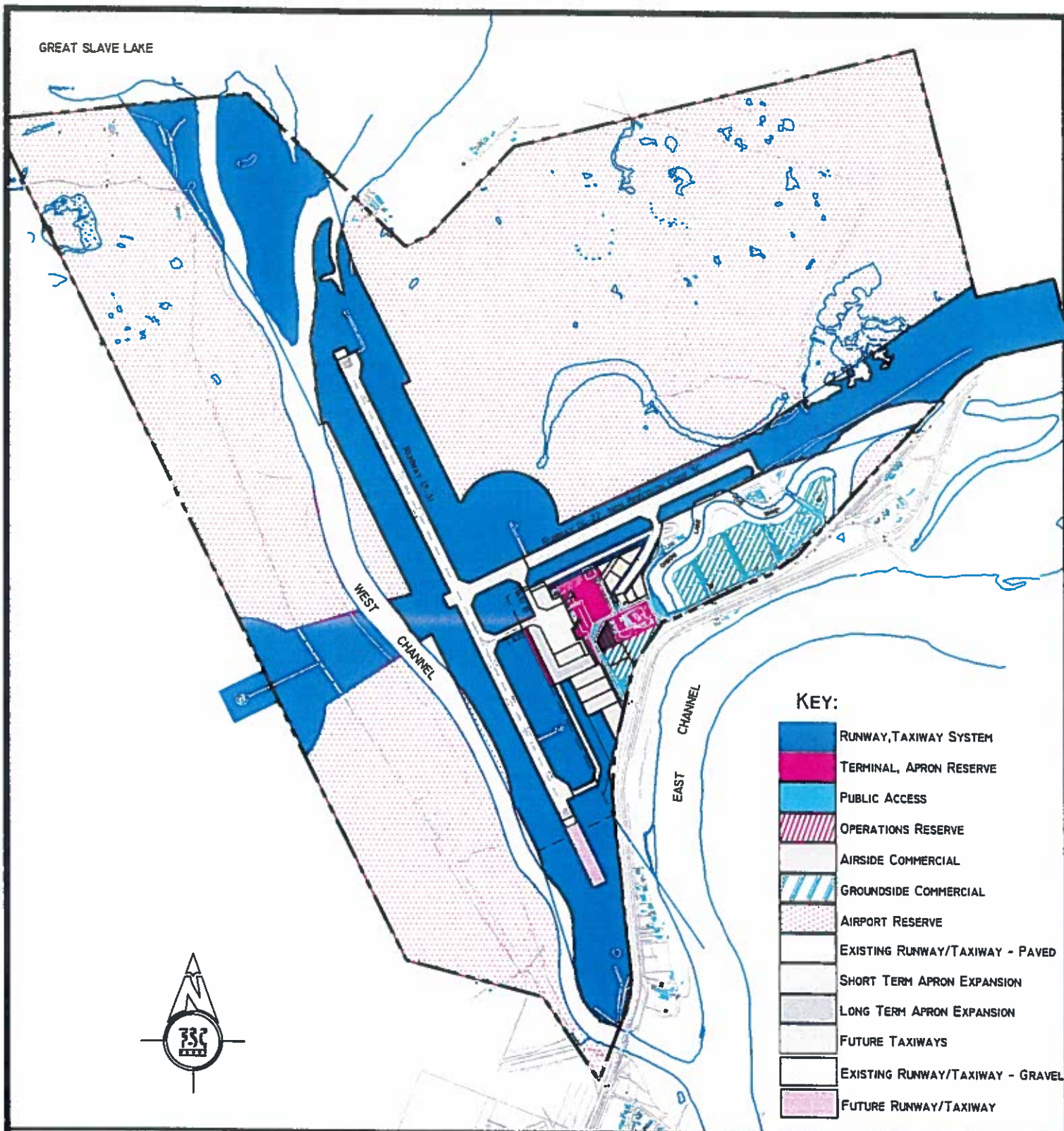
The current complement of electronic navigation and landing aids will continue to be supported at the airport and provision has been included in the Development Plan for a future Differential Global Positioning System (DGPS) site.



The airport access road will remain in its present location and improvements will be made to parking facilities thereby increasing the level of service offered to travellers. The airport sewage lagoon may be moved to a new, more suitable location during the planning period and a new Combined Operations Building may ultimately replace the existing Maintenance Garage. This new facility should also meet the requirements of pending Transport Canada regulations for providing upgraded Emergency Response Services (ERS).

Implementation of new airport investments will generally be undertaken in response to rising traffic levels and demand. Renovations and improvements to the air terminal building will however, be commenced upon the closure of the FSS which is currently planned to occur in June 2000.

Figure E-1 on the following page illustrates the Development and Land Use Plan for the airport.



## RECOMMENDED AIRPORT LAND USE AND DEVELOPMENT PLAN



DATE: March 20, 2000

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FIGURE NO.

### HAY RIVER AIRPORT DEVELOPMENT PLAN

E-1

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## **1.0 Introduction**

The 1999 Development Plan was commissioned by the Government of the Northwest Territories (GNWT) as the previous Master Plan prepared by Transport Canada in 1985 covered the 20 year period to 2005, and required updating.

This Development Plan was prepared using a phased approach which included: data assembly and review, detailed research and on-site verification, a stakeholder interview program followed by analysis and synthesis of the results and preparation of a draft report. This was reviewed by interested stakeholders, including Departmental Staff and the Project Steering Committee.

The Development Plan systematically examines the requirements of the catchment area which the airport serves. Changes in population, economic activity and government structures are reviewed and the concerns of the users and the community carefully considered.

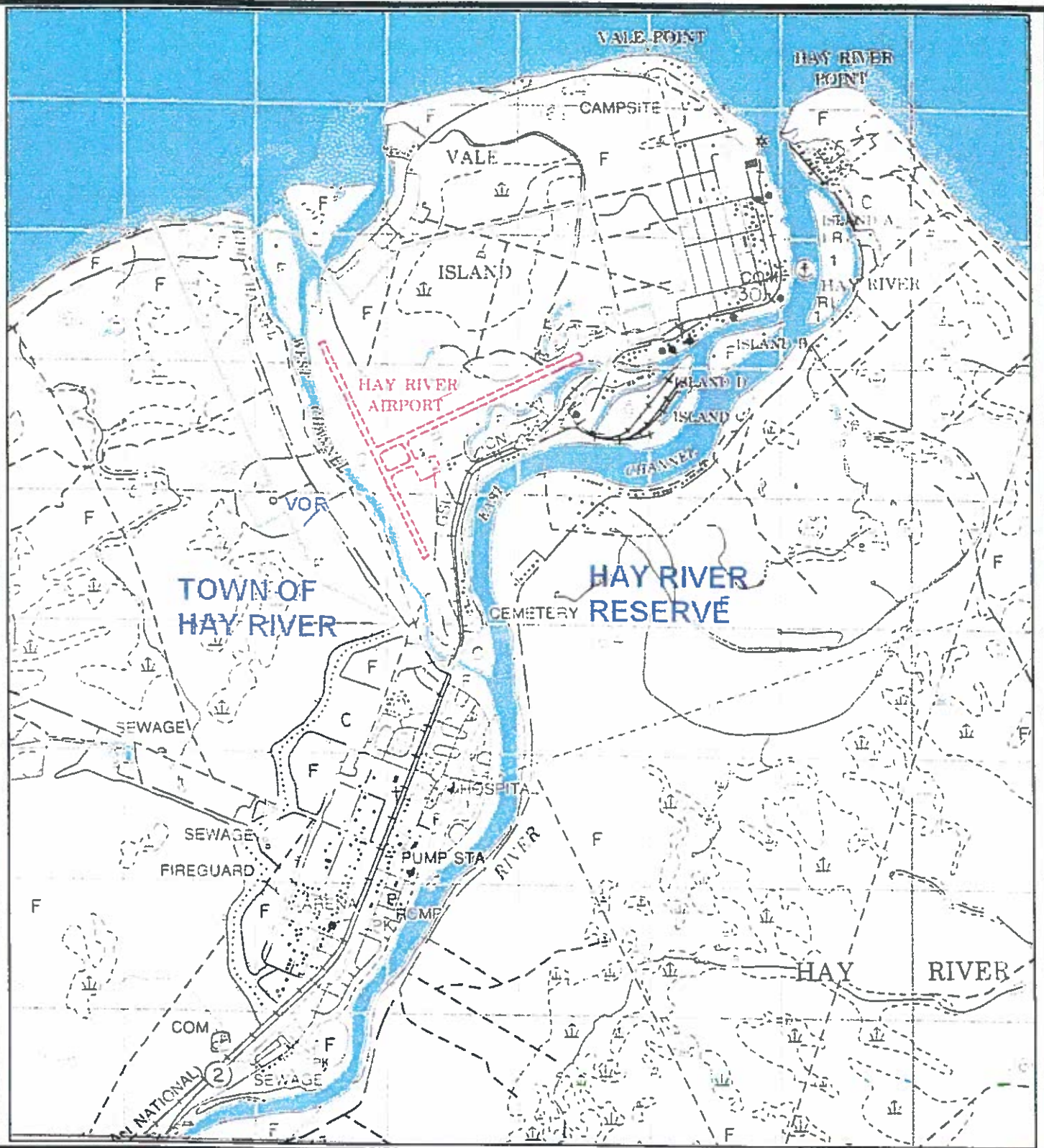
An airport profile is developed which describes the role, physical layout and zoning requirements necessary to perform the specified role. Aviation activity and forecast information was researched and the results presented and analysed in the Development Plan.

An inventory of all airport facilities and services was completed with current deficiencies and future requirements clearly identified.

A development concept was prepared to address the deficiencies and requirements on the basis of being the most effective over both the short and long term planning horizons.

A recommended land use plan was prepared based on the development plan.

Lastly the financial position of the airport was briefly examined in order to assess the impact of the recommended development plan on the long term financial position of the airport.



## Airport Location



Aviation Inc.



DATE: nov. 4/99

SCALE: nts

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FIGURE NO.

## HAY RIVER AIRPORT DEVELOPMENT PLAN

1-1

## 2.0 Catchment Area Profile

### 2.1 Geographic Context

The Hay River Airport is located at latitude 60°51' N, longitude 115°44' W and at an elevation of 165 metres above sea level (ASL). It is approximately 1,117 road kilometres north of Edmonton, Alberta, and is located on Vale Island at the mouth of the Hay River on Great Slave Lake. The airport property is situated within the Town limits, approximately 4 kilometres northeast of the town centre. The airport location in relation to the Town of Hay River and Hay River Dene Reserve is shown in Figure 1-1.

The first permanent settlement in the area occurred in the mid 1800's with the establishment of a Hudson's Bay Company trading post and a Roman Catholic mission on the east side of the Hay River. This is the current site of the Hay River Dene Reserve. The original town site, first occupied in 1939, was founded on Vale Island. Since the early 1960's, the Town's development has occurred on the adjacent mainland due primarily to the flooding that was experienced on Vale Island in the 1950's and 1960's.

The following summary of the airport setting outlines the growth of the Town. Future development opportunities are discussed as they relate to natural growth, tourism, resource development, and services. Population forecasts are made for the next twenty years and existing development plans are discussed and summarized.

The Town of Hay River has grown from an isolated trading post to an estimated population of 3,685 in 1998. Hay River is the second largest community in the NWT. The 1998 population estimate for the Hay River Dene Reserve is an additional 274 persons (NWT Bureau of Statistics). Transportation has played a key role in the development and growth of the Town. Some of the transportation milestones are summarized below:

- 1942 US Corps of Engineers constructs air strip on Vale Island as part of the staging process for the construction of the Canol pipeline
- 1948 Mackenzie Highway reached Hay River from Alberta
- 1964-66 Great Slave Lake Railway constructed to Hay River and the Pine Point mine
- 1966 Hay River Airport upgraded to accommodate jet aircraft

Due to its central location and transportation linkages, Hay River is considered a key business and service centre in the South Slave Region of the NWT. This region includes the communities of Hay River Dene Reserve, Enterprise, Kakisa, Fort Providence, Fort Resolution and Fort Smith. The combined population of these communities in 1996 was 7,711.

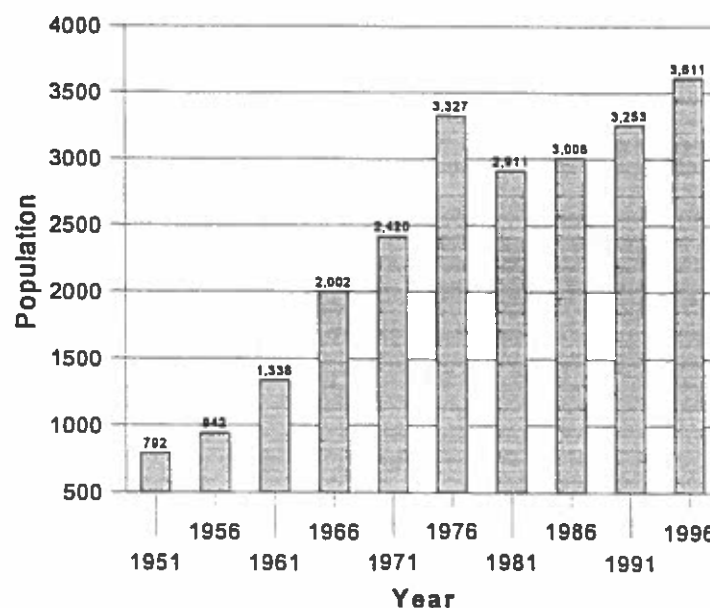
The historical population summary is presented below for the years 1951 to 1996. It illustrates the rapid growth of the Town in response to major periods of development. For example, the Town grew in population from 1,338 in 1961 to over 2,000 just five years later, largely as a result of northern resupply being shifted from Fort Mc Murray to Hay River with the construction of the Great Slave Lake Railway. Also, the proposed Mackenzie Valley Gas Pipeline of the mid 1970's had a profound effect upon the Town's growth. Within the span of three years, 1971 to 1974, the Town grew by nearly 1,100 people. Between the period 1974 to 1981, the Town decreased in population from 3,540 to 2,911 when the decision was made to not build the pipeline. Since 1981, the Town

has experienced steady growth reaching a population of 3,611 in 1996. The Town continues to be the centre of navigation for the Mackenzie River barge system.

The *Town of Hay River General Plan, Bylaw No. 1514 (General Plan, 1994)* and the *Zoning and Building Bylaw No. 1515 (Zoning and Building Bylaw)*, dated July, 1994, document the annual rate of population growth from 1981 to 1991 as ranging between 1.6% and 2.0% per annum.

The *General Plan (1994)* states that "it is reasonable to assume that Hay River can look forward to a period of slow steady growth" (Section 3.1, Development Prospects and Scenarios). The reasons provided include its strategic location relative to road, rail, water and air transport systems, and its function as the retail and service centre for the South Slave region.

**Figure 2-1**  
**Historical Population Growth for Hay River**  
**1951 to 1996**



Source: NWT Bureau of Statistics

The population of Hay River was 3,611 persons at the time of the 1996 Census, an 11.0% increase from the 1991 count of 3,253. The corresponding change in occupied private dwellings saw an increase from 1,118 dwellings in 1991 to 1,224 in 1996, representing a 9.5% increase. Both indicators were comparable to the NWT average where the population of the NWT increased by 9.0% over the 1991 to 1996 period. The corresponding change in occupied private dwellings saw an increase of 11.7% (NWT Bureau of Statistics).

The Hay River Dene Reserve experienced 19.4% and 17.7% growth for the 1981 to 1991, and 1991 to 1996 Census periods, respectively. The population of the Hay River Dene Reserve was 253 persons at the time of the 1996 Census, an increase from the 1991 count of 216. The corresponding change in occupied private dwellings saw an increase from 58 dwellings in 1991 to 70 in 1996, representing a 20.7% increase. The Hay River Dene Reserve growth significantly

exceeded the growth of both the Town and the NWT. In comparison, the growth rate for Canada for the same period was 5.7%.

The comparison of 1991 and 1996 in population figures, is as follows:

**Census Population Comparison  
1991 and 1996**

|                          | 1991<br>Census | 1996<br>Census | Percent<br>Change |
|--------------------------|----------------|----------------|-------------------|
| <b>NWT</b>               | 36,405         | 39,672         | 9.0 %             |
| <b>Nunavut</b>           | 21,244         | 24,730         | 16.4 %            |
| <b>Hay River</b>         | 3,253          | 3,611          | 11.0 %            |
| <b>Hay River Reserve</b> | 215            | 253            | 17.7 %            |

Source: NWT Bureau of Statistics

## 2.2 Population Growth

Population estimates and forecasts prepared by the NWT Bureau of Statistics for the Town of Hay River and the Hay River Dene Reserve are presented below.

**Population Estimates and Projections for Hay River and Hay River Reserve  
1996 to 2018**

|                   | 1996                 | 1997         | 1998         | 2003         | 2008         | 2013         | 2018         |
|-------------------|----------------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                   | Historical Estimates |              |              | Projections  |              |              |              |
| Hay River         | 3,813                | 3,730        | 3,685        | 3,721        | 3,750        | 3,797        | 3,825        |
| Hay River Reserve | 265                  | 267          | 274          | 284          | 288          | 301          | 311          |
| <b>Total</b>      | <b>4,078</b>         | <b>3,997</b> | <b>3,959</b> | <b>4,005</b> | <b>4,038</b> | <b>4,098</b> | <b>4,136</b> |

**Notes:**

- NWT Bureau of Statistics, Community Profiles, April, 1999.
- Population estimates differ from Census counts as they account for individuals not covered by the census. The 1996 Census figures are adjusted.
- NWT Bureau of Statistics population projections incorporate assumptions regarding fertility, mortality and migration patterns. These assumptions are reflective of historical patterns, as well as recent trends observed for the NWT.

In comparison, the *General Plan (1994)* identifies a 20 year planning horizon population projection to the year 2013, based on the previous ten years' rate of growth. The projected population for the year 2013 is between 4,630 and 5,076. This suggests a faster rate of growth as projected by the Bureau, but there is little indication that the historic rate of growth, particularly during the 1986 to 1996 period will continue.

A number of factors and circumstances can affect the rate of growth in the community. Factors such as new or expanded resource based projects within the region, decentralization of government or the expansion of the agricultural or forestry sector, could accelerate the growth rate. Alternatively, with public sector downsizing and if Hay River's pivotal role in the transport system is diminished, the pace of growth may decline.

## **2.3 Activity and Outlook**

### **2.3.1 Political - Territorial**

The Northwest Territories divided into two territories, Nunavut and the new Northwest Territories, on April 1, 1999. Given the importance of the public sector to the NWT and to Hay River, the impact of division and other government initiatives such as decentralization and the Community Transfer Initiative, which transfers resources and authority for programs to the communities, will have both short and long term impacts on the economy.

The GNWT receives almost 70% of its revenue from the federal government; revenues which have been reduced by more than \$160 million in the past three years.

The airport is located in the electoral boundaries of Hay River North. There are two territorial ridings in the Hay River area; Hay River North and Hay River South. The most recent territorial election occurred in December, 1999, wherein the MLA elected for Hay River North is Mr. Paul Delorey and Ms. Jane Groenewegen was elected to Hay River South.

### **2.3.2 Political - Local**

The Town of Hay River was first incorporated in 1956 and it achieved Town status on June 16, 1963. It is one of only six tax-based communities in the NWT. The present municipal boundaries of Hay River extend approximately 28 km south on Highway #2, abutting the boundary of the community of Enterprise. The west and north boundaries are formed by the south shore of Great Slave Lake, to the west side of the mouth of the Hay River.

The Hay River Dene Reserve was the first and to this point the only reserve in the NWT and is located on the east shore of the Hay River. As previously shown, the 1998 population of the Reserve was estimated at 274, which represents only a portion of the almost 400 registered Band members.

### **2.3.3 Economic - Territorial**

Much of the infrastructure in the NWT, including the Mackenzie Highway, the railway, and numerous power dams and airfields are a result of mineral production activity. Yet the lack of infrastructure is also a key deterrent to the viable development of other sectors such as the oil and gas industry. Another deterrent is the delay in the settlement of Aboriginal land claims in the South Mackenzie Region.

The discovery of diamonds north of Yellowknife, oil and gas deposits in the Mackenzie Valley and Beaufort Sea, and mineral extraction throughout the NWT, will affect the territorial economy of the future. The new initiatives in the diamond and oil and gas sectors will help offset the effects of the

mine closures that have taken place, including the closure of the Pine Point mine in the late 1980's. The mineral and oil and gas sectors have played a significant role in the economy of the north. New petroleum exploration in Cameron Hills and any future pipeline development in the Mackenzie Valley are not anticipated to have a significant impact on Hay River, and in particular, the airport facilities.

*Visitors to the Western Arctic - A Profile*, is a document prepared by the GNWT Department of Resources, Wildlife and Economic Development (RWED), in October, 1997, and is the most recent summary report of visitor surveys and marketing reports. Two studies that are currently being completed that include more up-to-date tourism statistics and projections are the '1998 NWT Visitor Exit Survey' and the 'Hay River Tourism Strategy'. Preliminary figures from both reports are provided where available. The limitations to the data contained in the GNWT Profile report are twofold: firstly, the statistics only include those identified through the regional Visitor Centres and secondly, the statistics only represent data collected during the summer period. The Exit Survey captured only non-resident visitors and surveys were administered in six communities at airports, visitor information centres, museums, campgrounds, hotels, as well as ferry and roadside locations between May and September.

Non-resident visitors to the Western Arctic (NWT), which includes the South Mackenzie and the Inuvik areas, are divided into vacation travellers and business travellers. Hay River is located in the South Mackenzie Region. The following table summarizes the non-resident visits to the Western Arctic between 1994 and 1996, and includes both highway and fly-in traffic.

**Non-Resident Visit Estimates to the Western Arctic  
1994 to 1996**

| Period        | Leisure |        |        | Business |        |        | Aggregate |        |        |
|---------------|---------|--------|--------|----------|--------|--------|-----------|--------|--------|
|               | 1994    | 1995   | 1996   | 1994     | 1995   | 1996   | 1994      | 1995   | 1996   |
| May-September | 31,512  | 37,420 | 33,943 | 11,698   | 14,236 | 17,597 | 43,210    | 51,656 | 51,540 |
| October-April | 3,311   | 3,693  | 3,538  | 7,161    | 8,392  | 11,563 | 9,472     | 11,085 | 14,050 |
| Total         | 34,823  | 41,113 | 37,481 | 18,859   | 22,628 | 29,160 | 53,682    | 63,741 | 65,590 |

Source: 'Visitors to the Western Arctic - A Profile', GNWT, RWED, October, 1997

There was an 18% increase in vacation travel in 1995, followed by an 8% decline in 1996, while those travelling for business have steadily increased in the same period. More visitors travelled to the South Mackenzie Region for leisure purposes than for business. For instance, in 1996, 75% of visitors travelled for leisure purposes versus 25% for business.

Other relevant statistics, include:

- ➔ the estimated number of visitors to Hay River (from various sources), between May and September, 1998, were:

|             |                 |
|-------------|-----------------|
| air travel  | 1,070           |
| road travel | 8,300 - 9,200   |
| total       | 9,370 - 10,270; |

- ➔ in 1998, Hay River was the second highest destination in the NWT, at 34% of the total traffic. The celebrations of the 50<sup>th</sup> Anniversary of the Mackenzie Highway in 1998 is considered to have had an impact on visitor numbers;
- ➔ the preferred mode of transportation used to reach the South Mackenzie Region has undergone a complete reversal over the past 15 years due, in part, to improvements made to the highways in the South Mackenzie. In 1982, almost 70% of visitors travelled to the region by air. By 1996, 90% of vacation travellers were arriving by road. (personal communication with RWED representative, Hay River). This is a key consideration in transportation infrastructure and facility development;
- ➔ on average, 85% of visitors to the South Slave region in 1998 arrived by road. More business travellers arrive by air (overall NWT figure of 72%), while 89% of the pleasure travellers to the NWT, arrived by road;
- ➔ the primary purpose for travel to the South Slave region, is for pleasure (60%). 33% of travel is to visit friends or relatives (33%). Business makes up 7% of the travel to the region;
- ➔ average length of stay in the South Slave region is 7.9 days and the average expenditures (not including travel costs to the NWT or package tours) is some \$968;
- ➔ overall, the dominant age group (34%) of visitors to the South Mackenzie is '60 and over', with (26%) in the '45-59' age group, and (28%) in the '25-44' age group. These figures reflect the age distribution of visitors from Canada and the US, but for foreign visitors, the greatest numbers (56%) of visitors are in the '25-44' age group;
- ➔ almost one third of the visitors to the South Slave region earn more than \$60,000 annually and 60% earn over \$40,000 annually;

#### **2.3.4 Economic - Local**

The Hay River economy can be viewed from a number of sectors including natural growth, tourism, industry, and natural resources. During this study, no one sector was identified as undergoing a period of growth or significant decline.

Labour Force Activity statistics for Hay River from the 1996 Census show a labour force employment rate of 70.4% and an unemployment rate of 12.5%. This compares with labour force employment in the NWT and Canada at 68.2% and 58.9%, and unemployment levels at 11.7% and 10.1%, respectively. During the winter of 1999 there was total labour force of 2,156 persons in Hay River. A total of 1,957 persons were employed, resulting in an employment rate of 73.4% and an unemployment rate of 9.2%. This is an improvement over the situation in 1996.

The Hay River Dene Reserve had a total labour force of 109 persons during the winter of 1999. A total of 73 persons were employed, resulting in an employment rate of 36.5% and unemployment rate of 33.0%. These indicators were less favourable compared to 1996 when the employment rate was 50.0% and unemployment stood at 23.8%.

Labour Force Employment statistics, by industry, are broken down as follows: 'Goods Producing Industries', 15.2%; 'Retail and Wholesale Trade', 19.2%; 'Government, Education and Health',

31.2%; 'Other Services', 34.4%. The primary employers in the Town include the Northern Transportation Company Limited (NTCL), the Canadian Coast Guard, and the GNWT.

The Mackenzie Highway Corridor stretches north 120 km from the 60<sup>th</sup> parallel at the Alberta/NWT border to the Town of Hay River and 1998 saw the 50<sup>th</sup> Anniversary of the Mackenzie Highway. There are located along this corridor, a number of well developed natural and man-made tourism features. Preliminary findings from the Hay River Tourism Strategy indicate that while the community continues to develop its product base, the focus for the next three years should be to attract the short haul road traffic market. The 'rubber tire' traffic is likely the most promising potential source of future tourism growth. The report indicates that it is reasonable to assume projected tourist levels of some 5,000 annually.

Fishing is a viable industry in Hay River with 36 licensed operators and an annual quota of more than 3 million pounds of fish. Whitefish, lake trout, pike and walleye are the primary species caught in Great Slave Lake. The product is marketed through the Freshwater Fish Marketing Corporation.

Other renewable resource industries in Hay River include, logging and milling operations in the forestry industry, market gardening, eggs and poultry, as well as an abattoir. This facility commenced operations in 1996 for the processing of hogs to service the meat demands of NWT residents. This is considered a major public infrastructure investment that provides opportunities for other livestock production. Constraints to the development of more extensive agricultural production are in the areas of infrastructure and the settlement of land claims. Manufacturing facilities for furniture and housing construction materials, are recent additions to the Hay River economy.

Marine freight costs are estimated to be 10 - 25% of the cost of air freighting. Still, in 1999, Mackenzie River cargo was below 100,000 tons for the first time since the early 1960's. This is attributed to economic slowdowns in the commodity markets. The sailing season is generally from early June to late September. In 1999, NTCL signed a three-year fuel supply and delivery agreement with the GNWT, Government of Nunavut, and the NWT Power Corporation, which provides stability for the company and the community. With anticipated development in the Beaufort Sea region, the shipment of goods by barge may again increase.

The cost of shipping freight by rail is less expensive than by road and the volumes that can be carried are considerably greater. Changes are not currently foreseen with respect to types of rail freight or volume.

Prior to the closure of Pine Point Mine in the late 1980's, the Town was a significant supply point for the mine operations. The transportation industry, rail in particular, experienced a significant decline in activity with the closure. Since then, there have been other changes to the mining sector which have also affected the transportation industry. There is no known new base metal potential in the immediate vicinity of Hay River which could affect the transportation network. Issues, such as unsettled land claims and poor road infrastructure, constrain Hay River's potential as a staging area for mineral resource development and/or processing.

At present, there are no proposals being considered which would affect the airport infrastructure, i.e., the 'Ice Diamonds' proposal. This proposal was conditionally approved by the GNWT for a diamond cutting and polishing facility to be located in Hay River. It was not supported by BHP which is the first diamond mine in Canada. The proposed siting of this facility was not on or near airport lands. As well, BHP has indicated that it is more cost effective to truck freight to Yellowknife and then ship it by Hercules aircraft stationed in Yellowknife, to the Ekati mine site. This routing

is more cost effective than shipping goods from outside the NWT to Hay River and flying an empty Hercules to Hay River for transshipment.

The demand for housing in Hay River and Yellowknife may slightly increase due to the potential relocation of southern employees of both the existing Ekati diamond mine and the proposed Diavik diamond mine. Housing and land prices in Hay River are lower than in Yellowknife.

A local real estate representative confirmed that there is no known demand for additional residential, commercial or industrial land at this time and that the community has sufficient supply to meet the anticipated growth rate. At the time that the *General Plan (1994)* was completed, there was no vacant commercial land available. The Town of Hay River purchased land sufficient for approximately 15 lots in the town centre. A number have been developed and approximately 10 commercial lots are still available for development. There are approximately 20 lots available in a newly planned residential subdivision and future residential land has been identified. Currently, there is no known demand for industrial or commercial land adjacent to the airport.

## **2.4 Transportation Systems**

### **2.4.1 Air**

The Hay River Airport provides an essential transportation link with southern Canada and other northern centres. Short range air services operate in support of tourism, forest fire management operations, community resupply for surrounding communities and limited mining and exploration. Air transportation is considered integral to the ability of the Town to conduct corporate business. It does not rely on air transport to the same extent as other northern communities due to its other well developed surface and marine transportation systems, but it is considered key to moving people, and some goods to the smaller centres. The airport serves as an alternate landing site for Yellowknife bound traffic.

Air service in the NWT has followed a pattern similar to that in the south. Increased competition and affiliations have allowed regional carriers to offer more efficient service. The result has been that most residents enjoy increased access to airline networks, improved service and a relatively wider selection of fares.

The historical pattern of aircraft activity in Hay River can generally be attributed to the role of the Town as a barge terminus and to resource exploration activity. In the early to mid-70's, the airport experienced noticeable aviation activity growth as a result of resource interests in the Mackenzie Valley. The late 70's slowdown in economic activity resulted in a corresponding decrease in aviation activity. Since then, aircraft movement activity has fluctuated significantly.

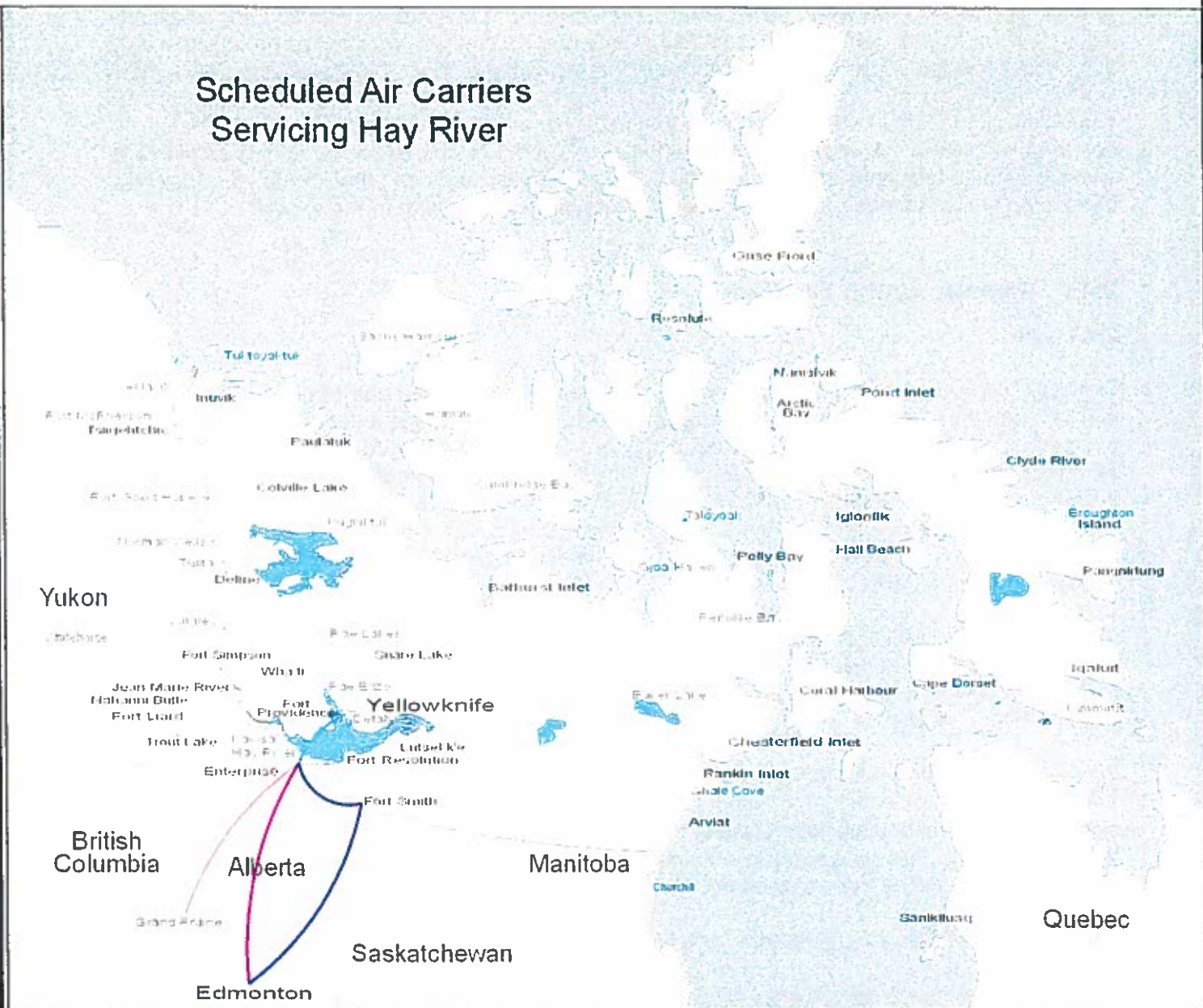
The airport serves as a major staging point for forest fire management operations.

A private water aerodrome, owned by Carter Air Service, is located on Vale Island at 60°51'N, 115°46'W at the mouth of the Hay River. The water aerodrome operates seasonally between mid June and late October. Commercial operators, including First Air and Air Tindi, use the base in a limited capacity for business and tourism charters. Also, approximately two private operators of single-engine float planes use the main channel.

The air routes from Hay River, are shown in Figure 2-2.

| ROUTE                                                                             | CARRIER(S) SERVING ROUTE                  |
|-----------------------------------------------------------------------------------|-------------------------------------------|
|  | CANADIAN, BUFFALO, NORTHWESTERN AIR LEASE |
|  | CANADIAN                                  |
|  | CANADIAN, NORTHWESTERN AIR LEASE          |
|  | NORTHWESTERN AIR LEASE                    |

## Scheduled Air Carriers Serving Hay River



## SCHEDULE AIR CARRIERS SERVING HAY RIVER



DATE: March 20, 2000

SCALE: NTS

FILE: FG\_2-2DWG

FIGURE NO.

HAY RIVER AIRPORT DEVELOPMENT PLAN

2-2

## 2.4.2 Road

Public transportation infrastructure, such as highways, airports and docks continue to be some of the largest investments funded by the GNWT. In total, there are 2,200 kilometres of public all-weather roads and 1,300 kilometres of winter roads in the NWT.

Hay River has the distinction of being the first major community in the NWT to be linked by road year-round. An all-weather road from Grimshaw, Alberta was completed in 1948. The community is strategically located on the Mackenzie Highway to points south, east, west and north:

South (Hwy #1 and #2): All-weather, paved surface from Edmonton, Alberta

- Hay River to NWT/Alberta border = 115 km
- NWT/Alberta border to Edmonton, Alberta = 990 km

West (Hwy #2 and #7): Chipseal/gravel surfacing

- Hay River to Enterprise = 35 km
- Enterprise to Wrigley (terminus of highway) = 607 km
- Enterprise to NWT/BC border = 583 km
- NWT/BC border to Watson Lake, British Columbia = 718 km

East (Hwy #5 and #6): Chipseal/gravel surfacing

- Hay River to Fort Resolution = 154 km
- Hay River to Fort Smith = 269 km

North (Hwy #3 and #4): Paved/gravel surfacing

- Hay River to Yellowknife (terminus of highway) = 480 km

Major new investments, identified by the GNWT, include:

- Mackenzie Highway #3 and #4 upgrading to improve safety and reduce operating costs; and
- Mackenzie Highway extension between Wrigley and Tsiigehtchic to improve community access, tourism and resource access along the Mackenzie Mountains.

Other potential longer term GNWT initiatives to extend the all-weather roadway network, include:

- a highway into the Slave geological province;
- a highway between Inuvik and Tuktoyaktuk; and
- a highway between Yellowknife and Rankin Inlet.

## 2.4.3 Marine

The marine transportation network throughout the north is more extensive than the highway system. In the Western Arctic, for example, fuel, building supplies, industrial equipment and other goods are shipped by rail and road to Hay River from southern Canada, where it is then shipped by barge to communities throughout the Western Arctic via the Mackenzie River.

Marine shipping in the Western Arctic is primarily through the Northern Transportation Company Ltd. (NTCL) which located its head office and principal marine facilities of coastal tug and barge fleet in Hay River in 1959. Syncrolifts (20 ton overhead cranes) and maintenance facilities were added in the 1970's, creating terminal and storage areas of over 70 hectares. With highway and road connections, NTCL has helped to establish Hay River as a transportation hub.

#### **2.4.4 Rail**

The Hay River railhead is the most northern in Canada. The rail line connects with the CN Rail line in Alberta. The railway was constructed in 1964 to service the Pine Point mine, which is 84 km from Hay River. A branch line to Hay River terminates at the NTCL terminal on Vale Island.

The rail link from Smith, Alberta to Hay River is owned and operated by RailAmerica a American firm that purchased the line from RailLink in July, 1999. The length of line is approximately 1,030 km. The company owns and operates the track and employs between 8 and 10 people in Hay River.

The predominant freight that is shipped north is fuel from Alberta. A limited amount of road salt is also shipped. Materials that are shipped south include lumber to High Level, Alberta, for processing as well as a small amount of scrap metal. It is estimated that between 3,000 to 4,000 rail cars ship freight on a yearly basis at 100 ton per car (volume of fuel not known). During the peak period October to April rail traffic is three trains per week (upwards of 60 cars per train). During slower periods, the traffic is reduced to two trains per week.

### **2.5 Government Jurisdictions**

#### **2.5.1 Federal Government**

In 1990, the responsibility for a majority of airports was devolved from Transport Canada to the territorial government, along with the necessary base funding. The devolution of the remaining nine public Class A airports in the Northwest Territories, including the Hay River Airport, was completed between Transport Canada and the GNWT Department of Transportation, in July, 1995.

#### **2.5.2 Government of the Northwest Territories**

The GNWT Department of Transportation is fully responsible for the upgrading, rehabilitation, and operation and maintenance of all public airports in the Northwest Territories as an integrated system.

The transfer of responsibility from the federal government to the GNWT for forest management and fire management was completed in April, 1987. The GNWT Forest Fire Management Tanker Base is located on a lease parcel at the airport. The Base facility operations are seasonal from May to September and employ between 12 and 17 people.

### 2.5.3 Town of Hay River

The municipal government of Hay River has the authority to coordinate and manage growth and land use within the municipal boundaries. Existing and future development is regulated through various bylaws, including the Town of Hay River *General Plan Bylaw No. 1514* and the *Zoning and Building Bylaw No. 1515*. These documents updated the 1987 General Plan and Zoning Bylaw documents and include the Hay River Corridor which was annexed to the Town in 1992, effectively doubling the area extent of the municipality.

The *Zoning and Building Bylaw* facilitates the orderly development and use of town lands through the designation of land use zones and regulations. Section 2.6 expands on the specific land use zones affecting the Hay River Airport. The Town is advised by the Airport Manager of proposed significant changes within the airport environs.

The *General Plan (1994)*, identifies policies which provide specific direction for future development within all land use classes. Policies that affect the Hay River Airport, specifically, include:

#### 4.8 Transportation

1. The Town shall protect its transportation resources in recognition of their important role in the Town's economy.
2. The Town shall endeavour to improve pedestrian access from Vale Island to the New Town through the implementation of the open space and trail corridor plan mentioned in Policy 4.4.8.

More specifically, the Town will work with the Department of Highways of the Government of the Northwest Territories to provide safe use of the bridge by vehicles, cyclists and pedestrians by a walkway along the side of the bridge.

4. The float plane base, on the main channel of the Hay River, has been designated on the *Land Use Concept* for its continued use.
6. The Town shall protect the airport by prohibiting development which could adversely affect the safe and efficient operation of the airport.

## 2.6 Municipal Zoning

### 2.6.1 Existing Vicinity Zoning

The Town of Hay River has had a long history of municipal planning. The most significant of the earlier plans was the 1964 Town Plan which created a new town site upstream, and on the opposite bank of the Hay River. This was prompted by the major flooding of Vale Island in the spring break-up of 1963. A new plan was created in 1975 with particular emphasis on the harbour and associated industrial lands on Vale Island, including the airport. The proposed 1970's Mackenzie Valley Gas Pipeline provided the catalyst to take an in-depth look at the potential impacts on population, land use, and services in Hay River due to the anticipated pipeline construction. The most significant decision made at that time was to zone the residential development in Old Town and the West Channel Village near the airport as 'non-conforming' by showing them as industrial use. Ultimately, the major expansion of transportation facilities on Vale Island predicted in the mid-to-late 1970's was not realized. During the past twenty years there has been a return to former policies for development on Vale Island.

The *General Plan (1994)* has been amended to eliminate the West Channel Village and Old Town as 'non-conforming' use. In fact the area designated as residential has been expanded to include several former 'non-conforming' residential properties. Other 'non-conforming' residential in the Vale Island industrial areas will be encouraged to relocate. Further residential development on Vale Island would be limited to the infill of existing subdivided properties. Expansion of residential lands in the Old Town would need to be re-evaluated when the plan is reviewed.

A modest expansion south in the West Channel Village has been proposed in the *General Plan (1994)*. It is proposed to remain as an unserved community and be subject to less restrictive standards for storage as it relates to the fishing industry.

A long term goal of the *General Plan (1994)* is to create public access along the shore of Great Slave Lake in the West Channel Village through a freeze on the sale of Town-owned lots and the acquisition of properties. The core of Old Town is to be protected and enhanced for residential uses by strict enforcement of the flood risk area regulations.

An area designated as 'H - Holding' on the northwest end of Vale Island, will be subject to negotiations with the West Point First Nation. It is recommended that public access be maintained along the shore of Great Slave Lake within this area.

The residential zones designated for Vale Island in proximity to the airport, are primarily single family detached dwellings, on varying lot sizes (R1A, R1B, R1C). A special residential designation exists for the West Channel Village (R3) which recognizes the lack of services, the potential for flooding and the residential 'character'.

Section 4 of the *Zoning and Building Bylaw No. 1515* identifies the general regulations as they affect the airport and vicinity. It states:

**4.5 Airport Vicinity**

1. When a proposed development occurs within the vicinity of the Hay River Airport, the development shall conform to the Hay River Airport Zoning Regulations passed pursuant to the Aeronautics Act by Order-in-Council numbered P.C. 1976-1123 and filed in the Land Titles Office on January 24, 1977 Day Book No. 17510. Amended August 20, 1981.

Commercial zoning designations include; 'C2 - Highway/Service Commercial', 'C3 - Mixed Use Commercial', and 'C4 - Convenience Commercial' (associated with residential areas).

There is no industrial land use on Vale Island. Much of the area adjacent to the Old Town is zoned 'T - Transportation'. This zone designates areas for the transportation industry and related uses. Small 'I - Institutional' zones exist throughout Vale Island, as do 'P - Parks and Open Space' zones. The predominance of land adjacent to the airport lands is zoned 'RR - Rural Reserve'. A small parcel is zoned 'U - Utility District' for utility services and facilities.

## **2.6.2 Airport Environs Zoning**

Pursuant to the *General Plan Bylaw No. 1514* and the *Zoning and Building Bylaw No. 1515*, the land within the airport boundary is regulated by three land use zones. The largest area of land is zoned 'T - Transportation'. A parcel of land west of Runway 04/22, is zoned 'RR - Rural Resource'. A narrow parcel that parallels the West Channel on the south side and a small parcel on the east side of the West Channel north of Runway 13/31 is zoned 'P - Parks and Open Space'. The Vicinity Land Use Zoning is shown in Figure 2-3.

The general purpose, permitted uses and discretionary uses for the three zones as identified in the *Zoning and Building Bylaw No. 1515*, are listed below.

## **'T' - Transportation District**

### General Purpose

To provide a Zone that designates areas for the transportation industry and transportation related uses, particularly because of their location relative to airports, railways, highways, the Hay River and Great Slave Lake.

### Permitted Uses

- Air Freight Terminals
- Aircraft Repair Establishments
- Aircraft Sales/Rentals
- Aviation Schools
- Aerial Survey Services and other similar uses
- Receiving and Distribution Facilities
- Air plane Hangars
- Water Transportation Services
- Servicing and Repair Establishment accessory to above uses
- Railway Yards and freight Terminals
- Buildings and uses accessory to the above

### Discretionary Uses

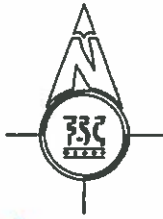
- Aircraft and Aircraft Parts Manufacturing
- Aviation Research and Testing Labs
- Public Utility Structures
- Cold Storage Lockers
- Workshops
- Wholesale or Retail of Electrical and Plumbing Equipment and Supplies
- Industrial Vehicles, Automobiles, Recreational, Construction and Farm Equipment Sales, Rentals and Service Establishments
- Manufactured Home and Trailer Construction
- Servicing and Repair Establishments
- Storage and/or sale of Building Materials, Lumber or Machinery
- Manufacturing, Processing, Packaging or Assembly of Goods or Materials
- Manufacturing and Processing of Chemical Products
- Manufacturing and Processing of Agricultural Products
- Commercial Ventures directly related to Industrial or Manufacturing Activities
- The Storage and Handling of Dangerous Goods
- Sewage Treatment and Disposal Plants
- Residential Facilities for transient workers ancillary to permitted or discretionary uses
- Trucking Terminals and other Allied uses
- Warehousing/Storage Facilities
- Caretaker Units
- Local Utility Services and Installations
- Buildings and uses accessory to the above

## **'RR' - Rural Resource**

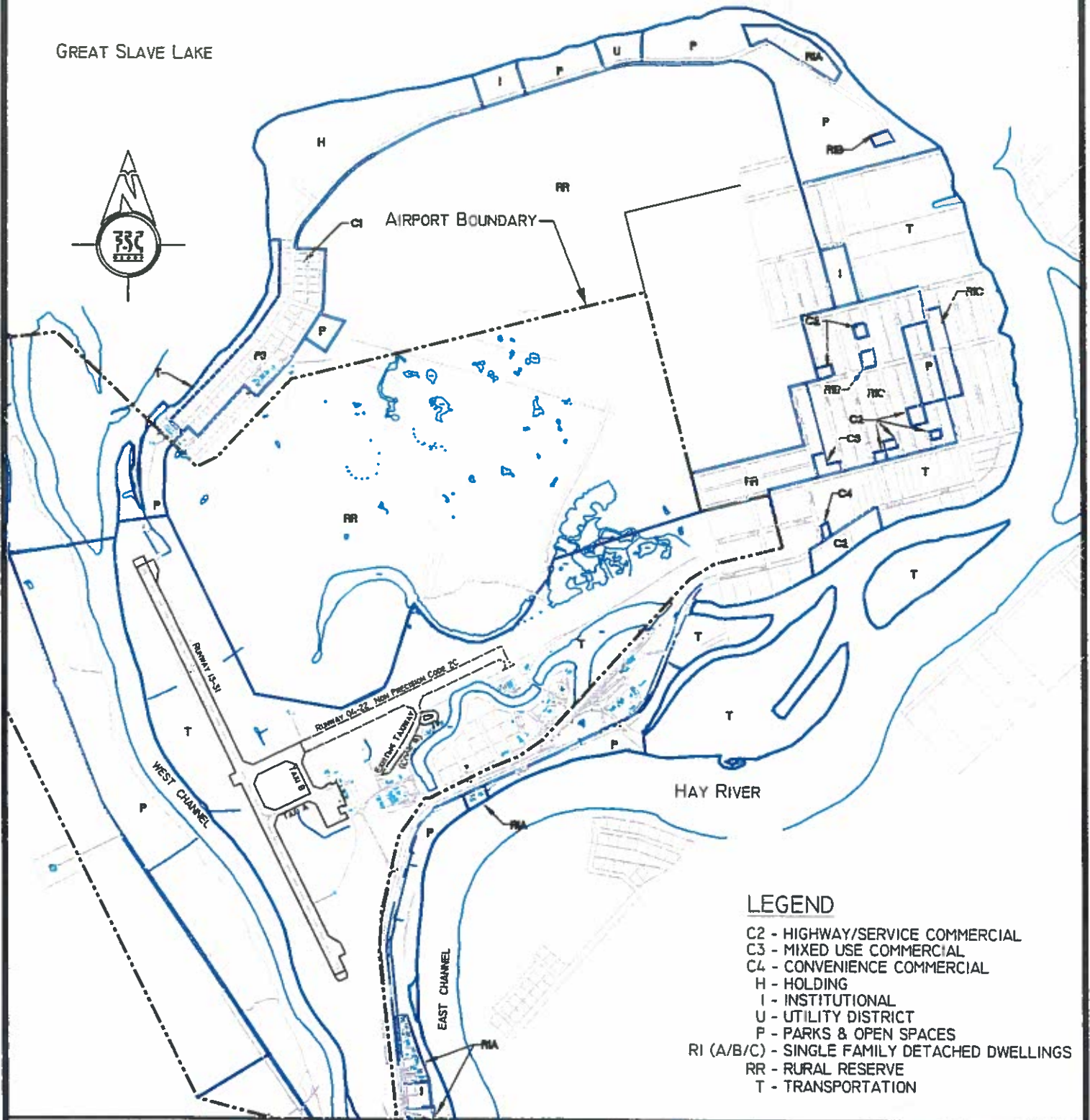
### General Purpose

To establish a zone for a variety of resource development purposes, of which agriculture shall be a significant use. It is the intent of this zone to prevent premature or scattered subdivision. The

GREAT SLAVE LAKE



AIRPORT BOUNDARY



### LEGEND

- C2 - HIGHWAY/SERVICE COMMERCIAL
- C3 - MIXED USE COMMERCIAL
- C4 - CONVENIENCE COMMERCIAL
- H - HOLDING
- I - INSTITUTIONAL
- U - UTILITY DISTRICT
- P - PARKS & OPEN SPACES
- RI (A/B/C) - SINGLE FAMILY DETACHED DWELLINGS
- RR - RURAL RESERVE
- T - TRANSPORTATION

## VICINITY LAND USE ZONING



DATE: March 20, 2000

SCALE: NTS

FILE: Fig\_2-3.dwg

FIGURE NO.

## HAY RIVER AIRPORT DEVELOPMENT PLAN

2-3

Rural Resource zone shall include all lands within the jurisdiction of this bylaw not otherwise designated on the Hay River Zoning Map.

#### Permitted Uses

- Agricultural Uses such as:
  - animal and poultry raising;
  - dairy farming;
  - field crops;
  - grazing; and
  - other similar uses customarily carried out in agriculture.
- One Single Family Housing Unit or Mobile Home per lot
- A commercial scale port operation on the area of land that lies south of the centre line of Territorial Highway No. 2 and north of the ordinary high water mark of the Hay River, between kilometre marker 18.93 and kilometre marker 20.90 of Territorial Highway No. 2, containing 121 hectares, more or less
- Buildings and uses accessory to the above

#### Discretionary Uses

- Public Parks
- Natural Resources Development
- Community recreation Services and Facilities
- Minor Impact Utility services
- Commercial Greenhouses and Plant Nurseries
- Market Gardening
- Apiaries
- Tree Nurseries
- Fish Farms
- Sod Farms
- Mushroom Farms
- Tourist Lodges
- Home Occupations
- Intensive Livestock Operations
- Small Animal Breeding and Boarding Establishments
- Storage on leased land as permitted by council
- Additional Dwelling Units or Mobile Homes as per demonstrated need
- Installations for Scientific Research
- Temporary camps where provision is made for the provision of water, waste disposal, transportation and other services
- Trapping and commercial fishing
- Sanitary landfill and other municipal or public utilities
- Quarries
- Timber Harvesting
- Those uses which, in the opinion of the Development Officer are similar to the permitted or discretionary uses, and which conform to the general purpose and intent of this zone
- Local Utility Services
- Buildings and uses accessory to the above

## **'P' - Parks and Open Space**

### **General Purpose**

To establish an area of private and public land for active and passive recreational uses and landscaped buffers, and to preserve natural areas and parkland along the river, creeks and ravines and other designated areas for active and passive recreational uses and environment protection.

### **Permitted Uses**

- Public Parks
- Open Reserve areas for Environmental Protection
- Buildings and uses accessory to the above

### **Discretionary Uses**

- Tourist Campsites and other facilities intended for the tourist industry
- Tourist Lodges
- Golf Course
- Archery Ranges
- Arena and Curling Rinks
- Cemeteries
- Gun Clubs
- Marinas
- Restaurants and Refreshment Facilities
- Riding Stables
- Ski and Toboggan Runs
- Swimming and Wading Pools
- Local Utility Services
- Those uses which, in the opinion of the Development Officer, are similar to the permitted or discretionary uses, and which conform to the general purpose and intent of the Zone
- Buildings and uses accessory to the above

## **2.7 Community Concerns**

### **2.7.1 Airport Physical Development**

The *General Plan (1994)* identifies a number of constraints and opportunities of existing development which will affect the direction of future development. The following is indicated:

- 3.3.1 a) The Airport constrains development in two ways. First, the Zoning Plan for the Airport places certain restrictions on development to protect approaches and navigational devices from incompatible land use. Second, the ownership of land by the airport authority precludes it from being developed.

The most significant effect is that the lands along the west bank of the West Channel are precluded from development. These lands are particularly suitable for development as they are well drained and possess river frontage.

At the time of the airport devolution, major fuel suppliers withdrew from the airport due to low volumes of traffic and potential environmental liabilities. This meant that aviation fuel was not easily available for itinerant aircraft. To encourage traffic growth in 1999, The Town of Hay River purchased new fixed tanks and Bassett Petroleum Distributors has been contracted to operate fuel

supply. This fuel service commenced in August, 1999. A concern of this new system was that the rate of fuel delivery was considered inadequate for larger aircraft such as B-737, although none currently serve the airport. Higher capacity fuel filters which deliver 450 litres per minute have recently been installed to alleviate this concern.

To protect the Hay River Airport and its associated site, registered zoning was put in place by Transport Canada.

The integrity of the airport services is dependant upon the protection of Obstacle Limitation Surfaces (OLS) and the Instrument Landing System (ILS). It is considered necessary and beneficial for the Town and the air industry to maintain the airport's capability as an alternate landing site. An issue that could have affected this capability and created considerable community concern at the time, relates to the recent enforcement of height restrictions of man made structures (e.g., light standards, etc.) and trees which penetrated the approach slope to Runway 31.

A concern that will affect the ILS in the short term is the new bridge construction in 99/00. The temporary closure of the precision approach ILS and the use of non-precision approach aids instead may potentially reduce airport availability under very poor conditions for six months. During construction there will be times when large overhead cranes are utilized. These cranes will likely affect the function of the ILS. The construction contract requires the contractor to receive approval from the airport manager prior to the use of any equipment that might affect the operation of the Hay River airport.

With respect to the new Emergency Response System requirements, there may be development and cost implications for the existing facilities at the airport. No equipment, facilities or crew currently exist. The fire truck was transferred to the Town for a nominal sum in 1995. The airport is reliant upon volunteer crews and equipment from the Town.

It is noteworthy that the CN rail line crosses both of the access roads to the airport and both of these roads can be blocked by the same (sufficiently long) train. Emergency and medivac services may experience delays if rail traffic increases. During a recent emergency exercise emergency vehicles attempting to evacuate the airport were temporarily blocked by a train.

### **2.7.2 Airport Commercial Development**

Interviews with commercial tenants at the airport have indicated that expansion of tenant lands is not required at this time. Should growth occur, the lack of serviced lots with airside access will become an issue. It is the desire of the tenants to maintain current traffic levels.

### **2.7.3 Non-Aviation Development**

The Owner of Courtesy Cabs raised a concern related to the allocated cab parking stall at the Air Terminal Building. The parking was moved from the front of the Air Terminal Building where it was considered to be more convenient for passengers. This parking stall is now located at the side of the building where passenger visibility and access are poor.

The GNWT Department of Resources, Wildlife and Economic Development considers there to be insufficient information available to incoming tourists at the Hay River Airport. The installation of

wall mounted tourism and operator information displays in the Air Terminal Building would assist incoming passengers.

#### 2.7.4 Land Use

An issue regarding the inappropriate use of airport lands by snowmobilers which compromised safety and security at the airport, is considered to be resolved as a result of discussions between the Airport Manager, the Snowmobile Club, the Town and interested residents. A new trail with signs will be completed in time for the 99/00 snowmobile season. Trespassers are known to traverse the crosswind Runway 04/22 at The Snye. The primary traffic is access between Old Town and New Town.

The *General Plan (1994)* and the Hay River Recreation Master Plan identifies the lands west of the West Channel as 'Parks/Open Space'. These lands are within the airport boundary. The Master Plan identifies an existing ball field and the clearing of land for two future ball fields in the southwest corner of the airport lands. The study has also identified future recreational development which could include a campground, soccer pitch, and BMX track. This area is also one of two identified for the construction of a recreation complex which, in the first phase, would be a stand alone arena. The Town has conducted initial discussions regarding residential development along the West Channel. Both physical height restrictions for the runways and electronic zoning restrictions affect the lands under consideration.<sup>1</sup> Building locations, orientation, configuration and materials will require specialized study in this area if development were to proceed.

The NDB site located 8 km (5 mi) from the threshold of Runway 31 at Sandy Creek on Aboriginal land. NAV CANADA is considering relocating and/or decommissioning this navigational aid due to the proposed lease costs. This may have an impact on smaller aircraft using the airport if alternate navigation aids are not available.

#### 2.7.5 Noise

No significant noise related issues have been identified by the community, except to a very limited extent from the perspective of the Hay River Dene Reserve. The infrequent over flight traffic noise is generally considered a minor problem.

The extent of aircraft noise within the Hay River area is shown on Figure 2-4 Noise Exposure Forecast presents the Noise Exposure Forecast contours developed by Transport Canada in 1985 for the Hay River Airport. It suggests that the existing residential community on Vale Island, located northeast of Runway 04/22, is impacted by airport noise. The Town has noted minor complaints from residents in this area, especially regarding water bomber take-off and landing on Runway 04/22. The forest fire management operations are a seasonal activity from May to September.

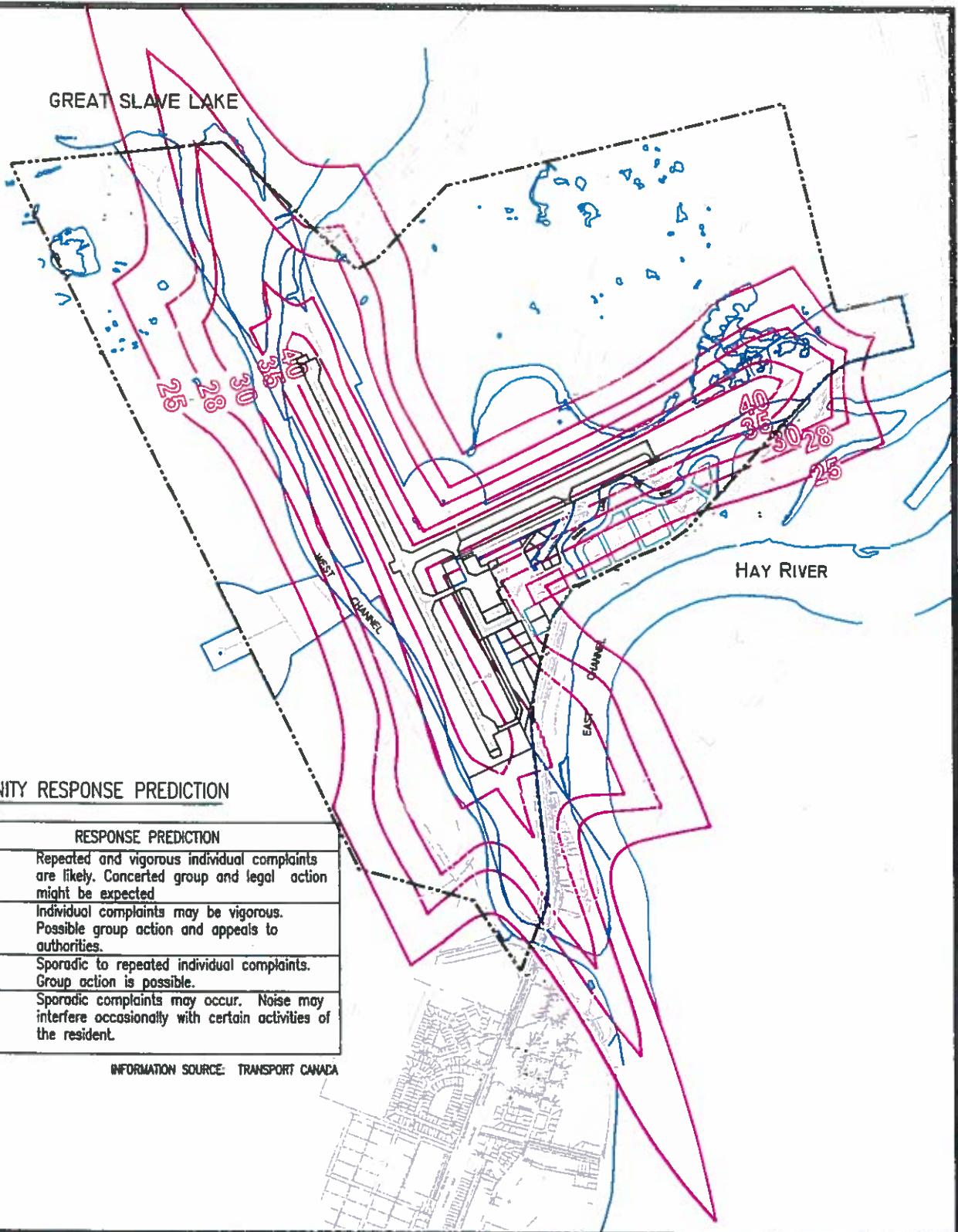
The *General Plan (1994)* shows that the north end of the Town is designated for future open space activity, thereby ensuring minimal social impact on residents of New Town. However, the existing West Channel Village on Vale Island (Old Town) remains a residential component of Hay River, and will therefore continue to be impacted by Runway 04/22 aircraft activity.

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<sup>1</sup> Even small structures such as baseball field backstops can have an adverse affect on some electronic navigational equipment. See Figure 3-4 for Electronic Zoning.



GREAT SLAVE LAKE



### COMMUNITY RESPONSE PREDICTION

| RESPONSE AREA | RESPONSE PREDICTION                                                                                        |
|---------------|------------------------------------------------------------------------------------------------------------|
| Over 40 NEF   | Repeated and vigorous individual complaints are likely. Concerted group and legal action might be expected |
| 35 - 40 NEF   | Individual complaints may be vigorous. Possible group action and appeals to authorities.                   |
| 30 - 35 NEF   | Sporadic to repeated individual complaints. Group action is possible.                                      |
| Below 30 NEF  | Sporadic complaints may occur. Noise may interfere occasionally with certain activities of the resident.   |

INFORMATION SOURCE: TRANSPORT CANADA

## NOISE EXPOSURE FORECAST, HAY RIVER



DATE: March 20, 2000

SCALE: NTB

FILE: Fig\_2-4.dwg

FIGURE NO.

## HAY RIVER AIRPORT DEVELOPMENT PLAN

2-4

## 2.7.6 Governance

The Hay River Airport is considered a stand-alone facility owned and operated by the GNWT within the Town's municipal boundaries. Airport management involves other jurisdictions or agencies on an issue-by-issue basis. A recent example is the proposed renovation of the Air Terminal Building. The Town, airlines and airport tenants have been consulted as part of the development planning process.

There are a number of significant constraints to physical expansion of the airport. The airport is constrained due to its location on Vale Island and the proximity of adjacent development. As well, flooding would be an issue. The Hay River Dene Reserve boundaries are fixed and cannot be encroached. Unsettled land claims in the vicinity of the municipality will also impact the positioning of structures and aids beyond the airport boundaries.

## 2.7.7 List of Interviewees

The following individuals were contacted during preparation of the Hay River Airport Development Plan. In conjunction with those listed below, many governmental employees were queried and their input has been incorporated into this Development Plan.

### List of Interviewees

| Name and Position                      | Organization                           |
|----------------------------------------|----------------------------------------|
| Michael King, General Manager          | Canadian North/Air Norterra            |
| Gary Reid, Hay River Manager           | Canadian North/Air Norterra            |
| Joe McBryan, President                 | Buffalo Airways                        |
| Cathy McBryan, Hay River Manager       | Buffalo Airways                        |
| Stephen Nourse, Manager of Development | First Air                              |
| Norm Case, Hay River Manager           | First Air                              |
| Larry Buckmaster                       | L&A (Landa) Aviation                   |
| Jean Carter                            | Carter Airways                         |
| Bill Lukan                             | Remote Helicopters                     |
| Tammy Powder                           | Budget Rent-a-Car                      |
| Verna Wozinca                          | Cabin Fever                            |
| Ken Day, Manager                       | DGS Astro Paving                       |
| Graham Nichols, External Affairs       | BHP Diamonds Inc., Vancouver           |
| Doug Willy, Vice President             | Diavik Diamond Mines Inc., Yellowknife |
| Cindy Lau                              | Northland Utilities                    |
| Charlie Scarborough, SAO               | Town of Hay River, Hay River           |
| Norma L'Heureux, Owner                 | Courtesy Cabs, Hay River               |

| <b>Name and Position</b>                        | <b>Organization</b>                               |
|-------------------------------------------------|---------------------------------------------------|
| Danette Jaeb, Partner                           | The North Group, Yellowknife                      |
| Jeanette Hinz, Agent                            | Conrad Realty Ltd., Hay River                     |
| Bill McComb, Senior Manager of Operations       | RailAmerica, Smith, Alberta                       |
| Dana Cross, President                           | Hay River Metis Nation/Hay River Metis Dev. Corp. |
| Diane Tourangeau, Sub-Chief                     | Hay River Dene Band, Hay River Dene Reserve       |
| Edith Norn, Medical Transportation Clerk        | Hay River Dene Band, Hay River Dene Reserve       |
| Mike Morrill, Director, Community Health Svcs.  | Town of Hay River, Hay River                      |
| Ron Cook, Recreation Coordinator                | Town of Hay River, Hay River                      |
| Rachel Yee, Lands                               | Town of Hay River, Hay River                      |
| Donna Lee Demarcke, Councillor/Snowmobiler      | Town of Hay River, Hay River                      |
| Dean McMeekin, Councillor/Snowmobiler           | Town of Hay River, Hay River                      |
| Duane Morgan, President                         | Hay River Chamber of Commerce, Hay River          |
| Mike Vaydik, Executive Director                 | NWT Chamber of Mines, Yellowknife                 |
| Debbie Mead, Policy Advisor                     | NWT Association of Municipalities, Yellowknife    |
| Colleen Bruce, Executive Director               | NWT Arctic Tourism, Yellowknife                   |
| Brian Auge, Researcher                          | Northern Manufacturers Association, Yellowknife   |
| Jane Groenewegan, MLA                           | Hay River                                         |
| Otto Epp, Airport Manager                       | GNWT, Department of Transportation, Hay River     |
| Bob Bies, Manager, Diamond Business Dev.        | GNWT, RWED, Diamond Projects, Yellowknife         |
| Eric Yaxley, Coordinator, Parks & Tourism Plan. | GNWT, RWED, Tourism, Yellowknife                  |
| Doug Matthews, Director                         | GNWT, RWED, Minerals, Oil and Gas, Yellowknife    |
| Larry Adamson, Regional Superintendent          | GNWT, RWED, North Slave Region, Yellowknife       |
| Mike Magean, Business Loans Officer             | GNWT, RWED, Hay River                             |
| Tom Colosimo, Regional Facilities Manager       | GNWT, RWED, Hay River                             |
| William Mawdsley, Forest Management Services    | GNWT, RWED, Fort Smith                            |

## **3.0 Airport Profile**

### **3.1 Role**

The Airport Role Statement is the fundamental starting point in determining future activity at the airport and ultimately, facility land requirements and the planning of airport development.

The role of the Hay River Airport is to serve:

- 1) as a point of entry to the transcontinental air system through links with Edmonton; and to the northern air system through links with Yellowknife;
- 2) as an inter-change point for domestic service to outlying communities;
- 3) as a point of service for aircraft operators providing scheduled passenger, cargo and mail service;
- 4) as a seasonal base for charter operators serving other communities in the Northwest Territories;
- 5) as a base for private aircraft owners and operators;
- 6) as a base for helicopter operators;
- 7) as a transfer point for air medivac operations;
- 8) as a base for aerial forest firefighting operations;
- 9) as a seasonal base of operation for specialty services including recreational flying, aerial inspection, reconnaissance, aerial surveys, and aerial photography;
- 10) as a periodic base for exploration and resource development activities;
- 11) as an alternate airport to YZF (Yellowknife).

Some of the individual roles fulfilled by the Hay River Airport are illustrated in Figure 3-1 on the following page.

### **3.2 Designation**

Hay River Airport was designated as an Arctic 'A' airport upon transfer from Transport Canada. The airport is classified as a Community Airport under the three tier airport classification system used in the Runway Issues Study 1998; the two higher classifications being Regional Hub and Gateway Hub.

**Figure 3-1 Role of Hay River Airport**



... as a point of entry to the intercontinental air system through Edmonton



... as a seasonal base for charter operators serving other communities in the Northwest Territories



... as a transfer point for air medevac operations



... as a base for helicopter operations



... as a point of entry to the northern air system through Yellowknife



...as a base for aerial forest fire fighting



... as a base for private aircraft owners and operators

### **3.3 Land Ownership**

Formerly owned by Transport Canada, ownership of the airport was transferred to the Government of the Northwest Territories on July 1, 1995.

### **3.4 Layout and Physical Constraints**

#### **3.4.1 Location**

The Hay River Airport is located within the urban limits of the Town of Hay River, NWT. The airport property is approximately 200 ha of land on Vale Island. The Town of Hay River sits on the south shore of Great Slave Lake on the mouth of the Hay River, at 60°51'N latitude and 115°44'W longitude. The Town is 200 km south-west of Yellowknife by air and 134 km from the Alberta border via the Mackenzie Highway.

The airport includes two runways, in an approximate orthogonal 'T' configuration, with the principal public facilities located near the intersection of the runways. Figure 3-2 illustrates the location and layout of the airport site, related physical constraints and areas of development.

The airport location is constrained: to the north by Great Slave Lake; to the west by the West Channel of the Hay River; to the east by the old town area of Hay River; and to the south by Highway 2, the RaiLink Railway, and the East Channel of the Hay River.

#### **3.4.2 Geomorphology**

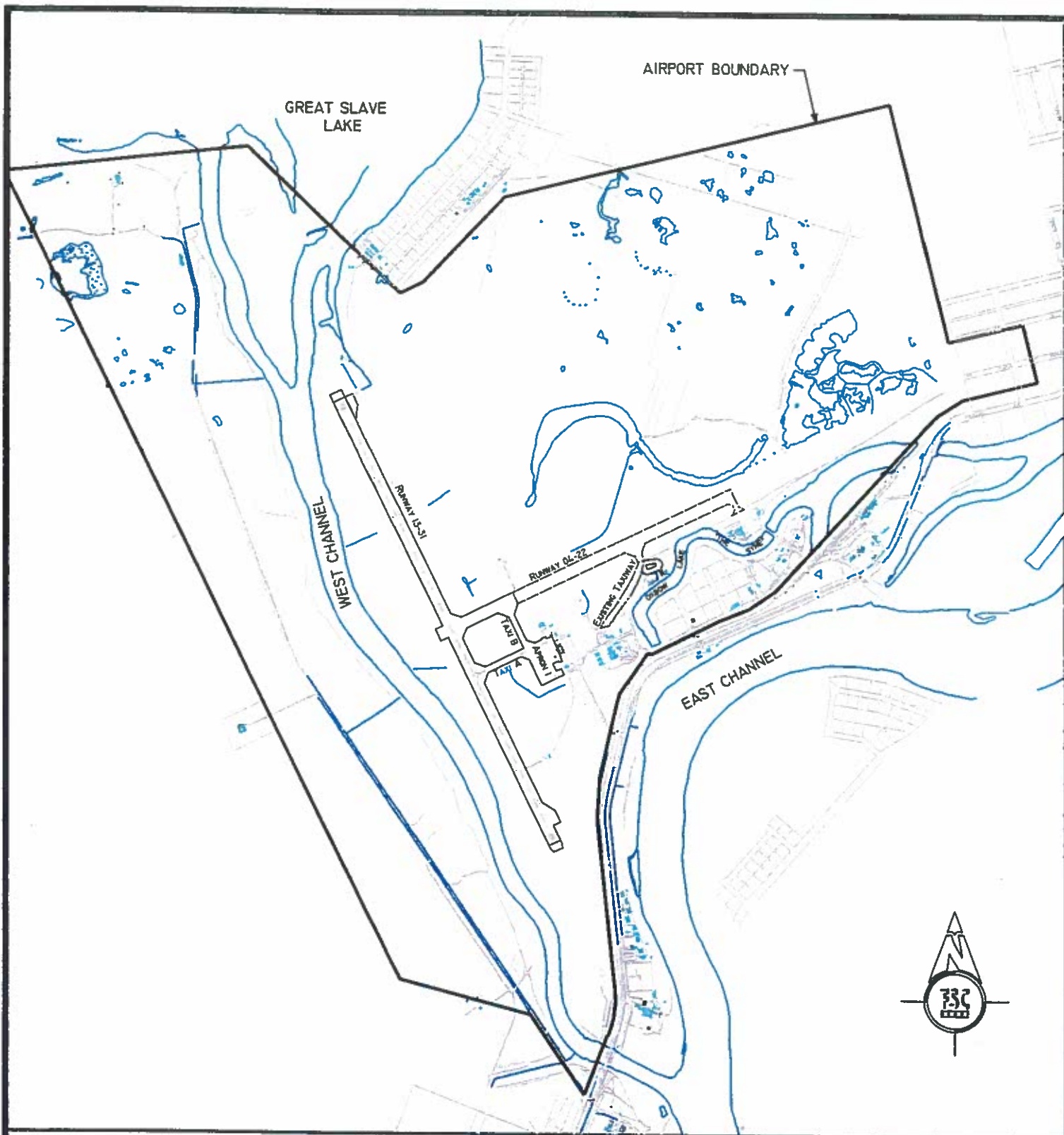
Vale Island is a deltaic feature formed where the Hay River branches into the East Channel and West Channel near the confluence with the Great Slave Lake. The island averages 3 metres or less above the water level and is susceptible to flooding. During spring runoff, the Hay River is subject to ice-jam flooding. As a result, Vale Island is periodically flooded, usually every 10 to 20 years. Ancient water courses on the island become active channels during floods.

Surface materials at the airport are sand, silts and clays; predominately brunisols, with some cryosols, both derived from alluvial parent materials. Gleysols are common in poorly drained areas. Clays underlay ancient oxbow lakes. Raised beach deposits are common running parallel to the current shoreline of Great Slave Lake and occurring east and west of the Hay River valley. The surface organic material has a maximum thickness of 0.6 m.

Two test holes near the present sewage lagoon consisted of, by mass, 13% sand, 59% silt, and 28% clay. A second test hole contained 40% sand, 38% silt and 22% clay. Soil staining and rust was observed at 1 metre depth. Underlying bedrock consists of a shale, limestone, and dolomite located more than 30 metres below the surface. A hard till can be found at depths of 5.5 - 8.5 m.

#### **3.4.3 Permafrost**

Hay River is within the discontinuous permafrost zone. Permafrost is sporadic and may range from 0 - 9 m in thickness depending on organic cover and location. Although discontinuous permafrost exists, frost action is not a problem on the higher, well-drained land where the new areas of settlement are situated.



## AIRPORT LAYOUT



DATE: March 20, 2000

SCALE: NTS

FILE: Fig\_3-2.dwg

FIGURE NO.

## HAY RIVER AIRPORT DEVELOPMENT PLAN

3-2

At the airport, discontinuous permafrost is located at approximately 2.5 metres depth in uncovered areas, and may be shallower if overlain with peat or muskeg.

#### **3.4.4 Hydrogeology**

The Hay River Region is described as a series of local aquifers, contained in sand units within the Quaternary sequence, enclosed by aquitards formed by clay and till units. Generally, regional groundwater flows toward the Hay River. At Vale Island, the shallow (1-2 metre) watertable and groundwater flow is influenced by the changing levels of Great Slave Lake.

At the airport, clay and silt deposits exhibit low hydraulic conductivity estimated at  $2 \times 10^{-6}$  cm/year. The percolation rate in a test hole near the sewage lagoon was 50 mm/hour.

#### **3.4.5 Vegetation**

The surrounding Boreal Forest is heavily treed. Jackpine, poplar, black spruce, tamarack, and willow are common. Muskeg and swamp are indicative of low-lying land.

### **3.5 Aerodrome Standards and Zoning**

The planning of airport lands for development requires compliance with international and national physical standards for aerodrome activities and construction. Developments must also be compatible with a variety of electronic transmissions occurring on or near the airport and which are critical to the safety of aircraft operations. The various types of airport zoning for the Hay River Airport are identified in the following sections.

#### **3.5.1 Physical Zoning**

Physical Zoning refers to the Obstacle Limitation Zoning defining airspace around the airport which must be maintained free of obstacles or the maximum height to which structures may be permitted. The zoning criteria are described in Transport Canada document TP 312E and the AOM and relate to the runway type designation and dimensions.

Figure 3-3 illustrates the physical zoning requirements of TP 312E as applied to Hay River Airport using Wavionics WASP surface planning software.

Key observations resulting from this analysis include the following:

- ➔ The West Channel partially encroaches on the Runway 13/31 Strip at two locations. This was a long-standing condition existing under ownership of the airport by Transport Canada and has not seemed to present operational difficulties;
- ➔ Grading limits stipulated in TP312E are violated in the Runway 13/31 Strip at the north end of the airport. This condition also existed during Transport Canada's ownership of the airport and this variance has not apparently proved significant;

- ➔ The inner edge of Runway 31 commences at the paved threshold due to a 1.2 m obstacle penetration of the OLS allowed by two registered zoning exemptions, namely the roof of a house and several hydro poles, which violate the surface. The Airport Operations Manual indicates that these are approved deviations.

This is an unusual solution to an obstruction issue since moving the approach surface will permit additional obstructions to occur in the future thereby incrementally reducing the overall level of safety afforded to landing aircraft. Both Figure 3-3 and the existing Registered Zoning Regulations reflect the common, and more conservative procedure for assessing OLS surface requirements. Any obstacles found on an approach surface may, after aeronautical review, be granted exemptions on an individual basis and may be required to be lighted.

- ➔ The Buffalo Airways hangar has been previously identified by Transport Canada as penetrating the transitional zoning for Runway 04/22 by approximately 3.5 m.



### 3.5.2 Electronic Zoning

Electronic Zoning is designed to protect the integrity of the electronic systems of the airport. The zoning criteria are described in Transport Canada document TP1247E Land Use in the Vicinity of Airports.

Electronic navigation systems located **within** the boundary of Hay River Airport include:

- ➔ Instrument Landing System (ILS) including Localizer (LOC) and Glide Path (GP);
- ➔ Back-up VHF transmitter and receiver equipment used for air-ground communications;
- ➔ VHF Direction Finding (VHF/DF) equipment located east of the runway intersection;
- ➔ VHF Omni-range and Distance Measuring Equipment (VOR/DME) located west of runway 13/31 and on the extended centreline of Runway 04/22.

Electronic navigation systems located **outside** the boundary of Hay River Airport include:

- ➔ Primary VHF receiver equipment used for air-ground communications; and
- ➔ Non-Directional Beacon (NDB) including main VHF transmitters.

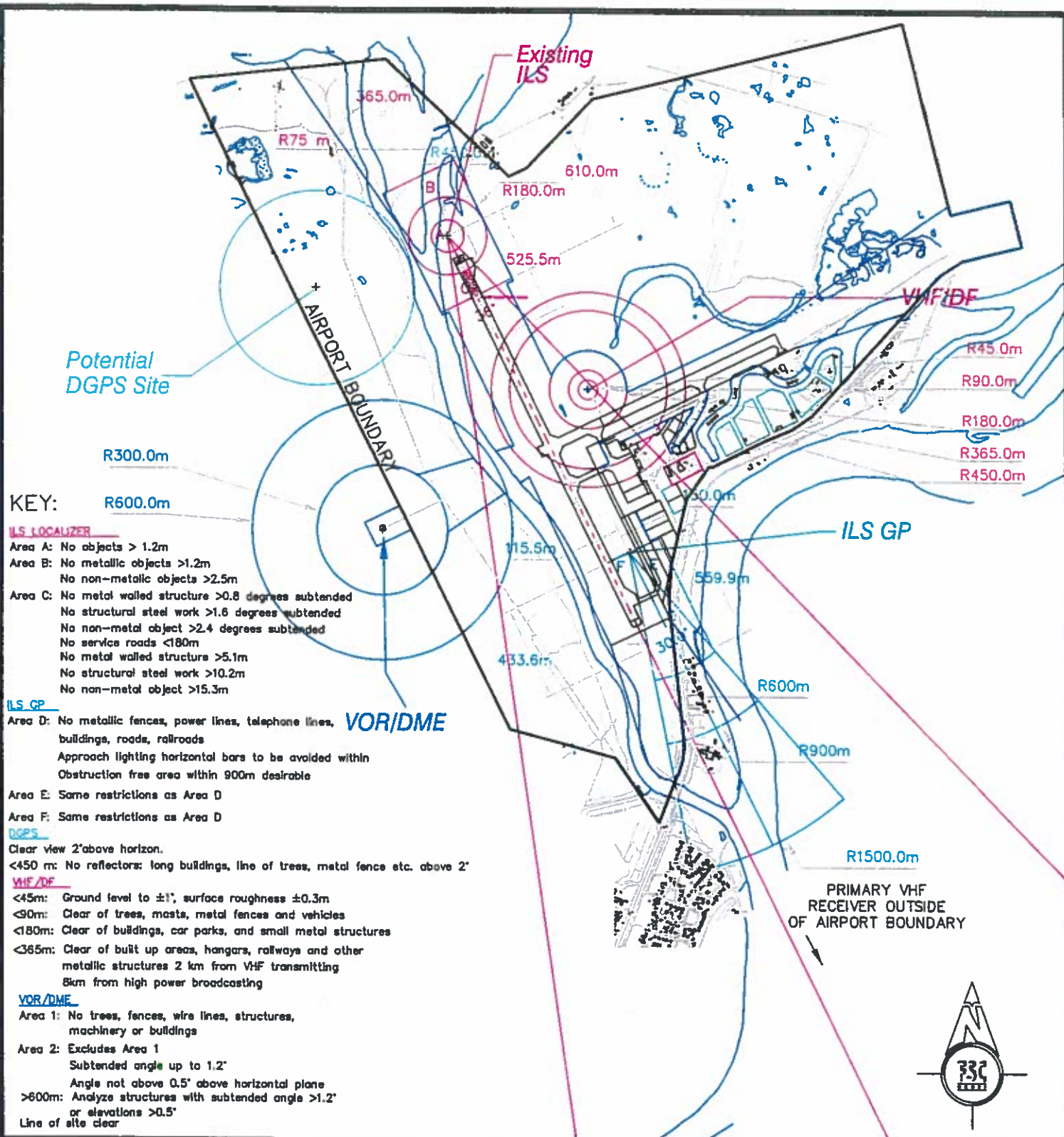
On the following, page Figure 3-4 illustrates the electronic zoning requirements stipulated by TP1247E which are necessary for protecting the integrity of the airport's electronic systems from interference or disruption as applied to the Hay River Airport navigation aids.

Key observations resulting from this analysis include the following:

- ➔ The ILS localizer is located significantly closer to the end of Runway 31 than is normally desired due to the location of the west channel beyond the end of the runway. This has resulted in excess sensitivity of the near field monitors which are extremely close to the antenna array.
- ➔ The ILS localizer will affect development west of the West channel potentially influencing building size, orientation, alignment, and types of materials used in construction.
- ➔ The ILS glide path location may potentially limit the future alignment, design and operational use of a parallel taxiway serving the threshold of Runway 31. Several alternative configurations will require specialist study to determine the optimum trade-off between operational benefits and any resulting restrictions. The nearby railway line and bridge require special calibration of the electronic equipment. The glide path location also limits the depth of airside commercial lots available beside the main airport access road.

### 3.5.3 Off-Airport Land Use Zoning

The Physical Zoning referenced above is not complete without protecting off-airport land requirements. Therefore the zoning plans usually include: a) Zoning Regulations for Obstacle Limitation Surfaces (OLS) including an Outer Surface consisting of a circular plane with a 4,000 metre radius (approximately 13,100 ft) from the Airport Reference Point; and b) A Noise Exposure



## ELECTRONIC ZONING



DATE: March 20, 2000

SCALE: NT8

FILE: Fig\_3-4.dwg

FIGURE NO.

## HAY RIVER AIRPORT DEVELOPMENT PLAN

3-4

Forecast (NEF) to facilitate land use compatibility by providing guidance to the local land use authority for development in the vicinity of the airport within the Noise Cone.

Zoning Regulations respecting the Hay River Airport were made by the Governor in Council and became effective May 11, 1976. The plans and descriptions are available at the Land Titles Office for the Northwest Territories Land Registration District at Yellowknife.

The Zoning Regulations require update for several reasons:

- ➔ the Runway 31 Localizer has been relocated onto Vale Island;
- ➔ current standards now utilize metric units of measure which will result in minor changes to the existing plans;
- ➔ not all current obstacles relating to the approach to Runway 31 are shown; and
- ➔ the location of the inner approach surface edge to Runway 31 does not coincide with the most recent amendment to the Airport Operations Manual.

Federal Zoning Regulations apply in addition to Municipal zoning by-laws. The *Zoning and Building Bylaw No. 1515* for the Town of Hay River defines permitted use of land surrounding the airport. Under the by-law, the airport itself is zoned as T-Transportation as described and illustrated in Chapter 2 and Figure 2-3. It is important to note that all relevant zoning regulations and by-laws must be adhered to in concert and that no single regulation or by-law necessarily overrides or negates any other applicable rule. Proposed future land use must comply with all Zoning Regulations and be acceptable to the airport owner.

#### **3.5.4 Noise Exposure Forecast**

Noise Exposure Forecast (NEF) contours can be developed for existing and forecasted aircraft activity. Contours of equal NEF index values (measured in effective perceived noise decibels - EPNdB) in the vicinity of an airport are the accepted means of portraying exposure to aircraft noise. The shape and extent of these contours depend upon the types of aircraft involved, their weight and speed, flight paths used, proximity to the ground, weather conditions, the time of day and number of operations performed by each aircraft type.

Over the years, guidelines have been developed that predict the probable community response to various aircraft associated noise levels. Transport Canada (document TP 1247) and the Canada Mortgage & Housing Corporation (CMHC) provide guidelines concerning different types of land uses and construction in the vicinity of airports to accommodate potential noise concerns.

Noise Exposure Forecast (NEF) contours for Hay River Airport were prepared in 1986 and were based on the prevailing traffic level and aircraft fleet mix at that time. Noise exposure contours are based on the busiest (peak) months of the year to illustrate the maximum effect of aircraft noise. Peak aircraft activity occurs during the summer at Hay River. The analysis assumed continued operation of Runway 13/31 as the main runway.

The NEF contours prepared by Transport Canada are shown in Figure 2-4. The expected community response is given in the table included in Figure 2-4. The figure shows that little if any noise disturbance will be created for the community.

Current demand projections support the initial conclusion that noise levels are not likely to increase significantly. Almost all larger aircraft operations fall into the itinerant movement category at Hay River Airport and these movements have remained close to, or below the 1986 levels used in the noise exposure forecasts. Consequently the noise exposure forecast prepared in 1986 remains generally valid.

The present traffic levels and aircraft mix have not posed a significant noise problem to the community. Since aircraft noise is not currently an issue at the airport, a noise abatement plan is not required.

## 4.0 Aviation Activity and Forecasts

The Hay River Airport experienced noticeable aviation activity growth during the early to mid-1970's owing to transportation and resource-related interest in the Mackenzie Valley Region. However, the slowdown in this regional and local economic activity during the later 1970's resulted in a corresponding decrease in annual passenger enplanements and deplanements.

Aircraft movement activity has fluctuated significantly during the past 25 years although the overall trend has been noted to have declined significantly over a period of 10 years. The pattern of aircraft activity can generally be attributed to the role of Hay River as a barge terminus, the closure of the Pine Point mine, and to Mackenzie Valley resource and exploration activity. In the past Transport Canada has noted a relationship between General Aviation traffic and Northern Transportation Company Ltd. barge activity originating from their Hay River base.

The 1998 "*Study on Runway Issues in the Northwest Territories*" by VISTAS included data on historical and projected traffic and passenger statistics for Hay River. Those projections included high, medium and low growth rates which were used for this study. Even the most optimistic study projections for Hay River show low growth rates in total enplaned and deplaned (E/D) passenger activity, and aircraft movements to the year 2017.

A series of recent Aviation Forecasts to the year 2020 for Hay River were also prepared for the GNWT by Mr. Geoffrey Horner of Transport Canada. These also reflect very low growth forecasts and, when compared to the VISTAS forecasts, and site consultations, validate use of the medium growth rates for the 1999 Development Plan.

Oil and gas development activity is increasing in the Mackenzie Valley, Beaufort Delta, and the Ft. Liard areas of the NWT. It is possible that this increase activity will affect the traffic at the Hay River airport.

### 4.1 Passengers

Passenger statistics are customarily expressed as a summation of enplaned and deplaned passengers at an airport. Passenger statistics dating back several decades have shown a relatively flat trend in the number of enplaned/deplaned passengers at Hay River and future forecasts have some degree of uncertainty due to unknown future exploration and development activity in the area. Passenger traffic depends not only on the population and economic growth of Hay River, but also on activity in the entire Northwest Territories.

The number of passengers enplaning and deplaning at the Hay River Airport is closely related to the state of the economy. The main market segments are local residents, business and government travellers, and tourists/visitors.

Average income and size of population drive the local resident market segment. This market is expected to grow (or shrink) at the same rate as population unless airfares go down considerably. Business and government travel will depend on the level of economic activity in the Northwest Territories. This is likely to increase modestly in the medium term as the territory pulls out of the recent recession and oil and gas exploration increases.

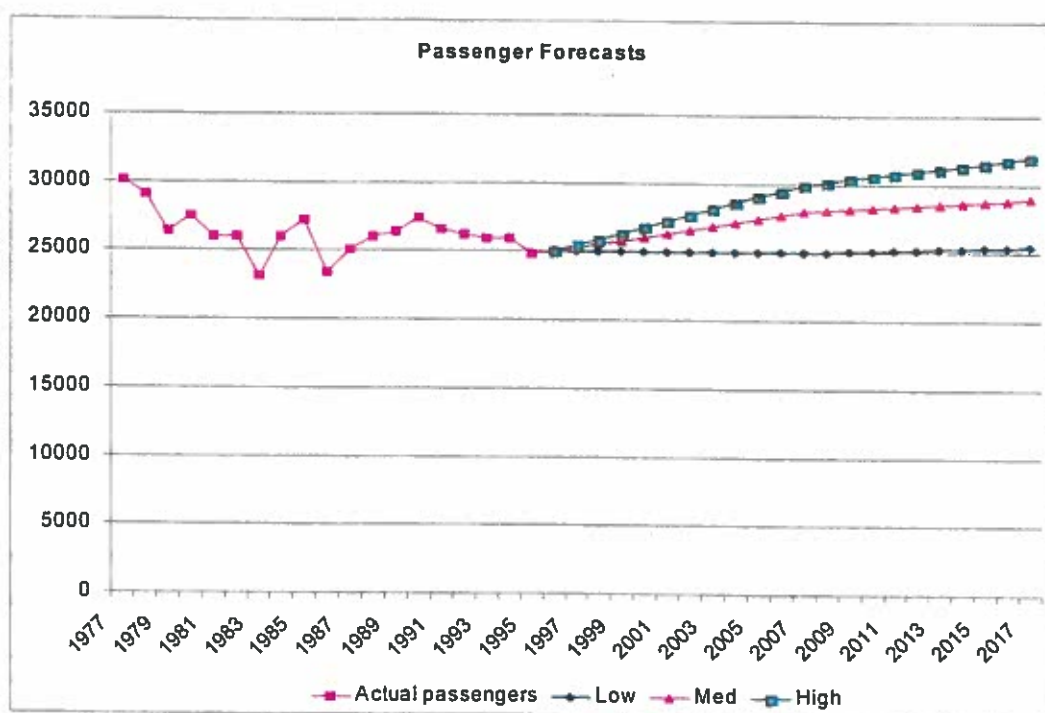
#### 4.1.1 Annual Passenger Growth

The table below and Figure 4-1 below show both the Transport Canada (TC) and VISTAS forecasts for passenger traffic at Hay River Airport.

**E/D Passenger Growth Projections  
Hay River Airport**

| Year | Scenario | VISTAS Annual<br>Passengers | TC Annual<br>Passengers |
|------|----------|-----------------------------|-------------------------|
| 1994 | Actual   | 25 950                      |                         |
| 1995 | Actual   | 24 860                      |                         |
| 1996 | Actual   | 25 012                      |                         |
| 2005 |          |                             | 27 000                  |
| 2007 | Low      | 25 000                      |                         |
|      | Medium   | 28 000                      |                         |
|      | High     | 30 000                      |                         |
| 2010 |          |                             | 28 000                  |
| 2015 |          |                             | 29 100                  |
| 2017 | Low      | 25 500                      |                         |
|      | Medium   | 29 000                      |                         |
|      | High     | 32 000                      |                         |
| 2020 |          |                             | 30 200                  |

**Figure 4-1 Enplaned/Deplaned Passengers, Historical and Forecast**



#### 4.1.2 Peak Hour Passengers

Hay River Airport is used as a distribution point for regional and local services. Consequently the air terminal experiences periods of brief, concentrated aircraft and passenger activity, followed by periods of lower activity levels.

The space requirements, layout and processing capabilities of an Air Terminal Building depend on:

- the annual number of passengers using the facility;
- the travel characteristics of the passengers;  
(ie: origin, destination, or connecting; domestic, trans-border, or international, etc.); and
- the number of peak hour passengers using the facility.

Specific space programming and design requirements for Air Terminal Buildings are influenced to a great extent by the number of passengers using the facilities in a given length of time, usually in a one hour period. Several techniques may be used for determining the PPHP figure to be used in design.

- The American Federal Aviation Administration has in the past suggested using the maximum peak hour number of E/D passengers which occurs on an average of 150 to 200 times per year, or 2 to 3 times a week.
- Canadian methodology has sometimes selected a Peak Planning Hour Passenger (PPHP) factor which represents a peak hour occurring on the 90% busiest day of the 90% busiest month in the year.

- ➔ For assessing facilities requirements within a given day, Transport Canada more recently adopted the Peak Design Volume (PDV) methodology which considers a sliding ½ hour passenger period. This has often been found to be about 85% of the PPHP factor.

The PDV methodology is used for the assessment of the Hay River air terminal since it reflects the relatively short time that travellers and well wishers spend at this small airport. Transport Canada prepared forecasts of peak passenger traffic which are presented in table below.

**Peak Passenger Activity and Forecasts  
Hay River Airport**

| Year | PPHP          | PDV           |
|------|---------------|---------------|
| 1981 | 65            | 55            |
| 1982 | 69            | 59            |
| 1983 | 56            | 48            |
| 1984 | not available | not available |
| 1985 | 42            | 36            |
| 1986 | not available | not available |
| 1987 | not available | not available |
| 1988 | 49            | 42            |
| 1989 | not available | not available |
| 1990 | 45            | 38            |
| 1991 | 12            | 12            |
| 1992 | 14            | 14            |
| 1993 | 26            | 23            |
| 1994 | 28            | 24            |
| 1995 | 28            | 24            |
| 1996 | 32            | 27            |
| 2005 | 35            | 30            |
| 2010 | 45            | 38            |
| 2015 | 50            | 43            |
| 2020 | 50            | 43            |

The air carrier service patterns and equipment options, most likely to serve Hay River within the planning horizon, are described in Section 4.4 Design Aircraft. The preceding PPHP and PDV forecasts are consistent with the regional aircraft sizes likely to serve Hay River, especially under the low to medium growth scenarios. Should a high growth scenario be experienced, the PPHP and PDV could be higher than shown.

## **4.2 Cargo**

Air cargo landed or transshipped at Hay River is handled exclusively by commercial air carriers and processed through commercial facilities by airlines, shippers or expeditors. Since public facilities are not involved, and since the air cargo industry is highly competitive, accurate estimates of cargo volumes are difficult to determine in the public realm. Individual companies are well aware of the tonnages uplifted, the type, origin and destination of the freight, and the percentage market share which they each enjoy.

The historical air cargo tonnages passing through Hay River listed in *A Study on Runway Issues in the Northwest Territories* in 1998 undoubtedly exclude a significant portion of the market not reported by the industry and are therefore unreliable as a basis for future projections.

The impact of potential air cargo growth on Hay River Airport will therefore be limited to possible demand for commercial land and facilities by the air carriers should cargo volumes grow to exceed the capacity of the existing commercial facilities and processing procedures. Allowance for airside commercial land with apron and groundside road access suitable for air cargo operations is included in the Development Plan.

## **4.3 Aircraft Movements**

### **4.3.1 Annual Movements**

Aviation activity was summarized in the recently completed report *A Study on Runway Issues in the Northwest Territories* completed in 1998 by VISTAS. The relevant figures for Hay River have been extracted and are included in the following table and graph. Actual movement statistics for 1997 and 1998 are included in the graph for comparison to the VISTAS projections made on the basis of pre-1997 statistics.

Aircraft movement statistics at the Hay River Airport have been categorized as Itinerant and Local flights in the previously mentioned VISTAS Study for traffic forecasting. The actual and forecast/projection figures shown in the following table and Figure 4-2 indicate Itinerant will continue to represent the most prominent aircraft activity at the airport. These flights include scheduled commercial movements and other third level charter operators plus private and government flights.

Aircraft movement growth does not reflect recent experiences, but does suggest increased airport facility demands resulting from regional and local economic growth should that regional growth occur.

Seasonal non-scheduled traffic continues to be significant, especially when the ice bridge/ferry services on Highway #3 are inactive in the Spring and Fall.

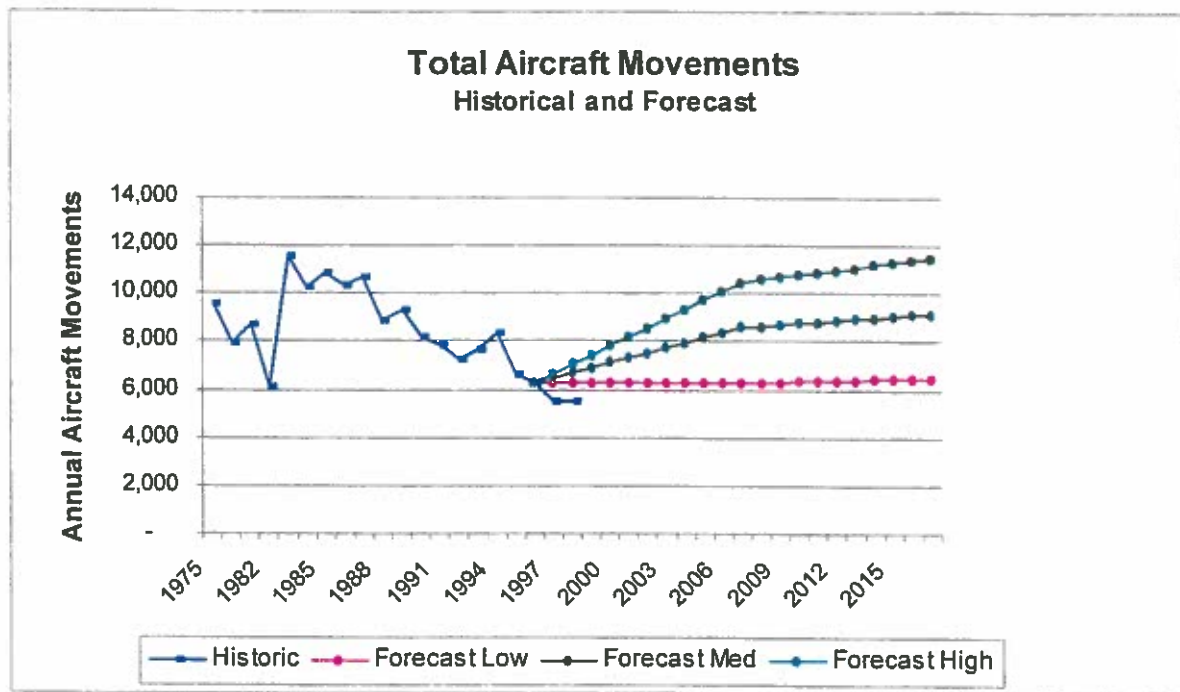
The following table summarizes the projections for aircraft movements in Hay River.

**Aircraft Movements, Historical and Projections  
Hay River Airport**

| Year | Scenario | VISTAS Annual Movements | TC Annual Movements |
|------|----------|-------------------------|---------------------|
| 1994 | Actual   | 8 382                   |                     |
| 1995 | Actual   | 6 691                   |                     |
| 1996 | Actual   | 6 293                   |                     |
| 1997 | Actual   | 5 489                   |                     |
| 1998 | Actual   | 5 546                   |                     |
| 2005 |          |                         | 6 800               |
| 2007 | Low      | 6 300                   |                     |
|      | Medium   | 8 600                   |                     |
|      | High     | 10 500                  |                     |
| 2010 |          |                         | 7 000               |
| 2015 |          |                         | 7 300               |
| 2017 | Low      | 6 500                   |                     |
|      | Medium   | 9 200                   |                     |
|      | High     | 11 500                  |                     |
| 2020 |          |                         | 7 600               |

Figure 4-2 shows the various aviation traffic levels forecast for Hay River Airport up to the year 2020 with historical traffic levels since 1981.

**Figure 4-2 Aircraft Movements**



Over the medium and long term a difference in growth expectations becomes evident between the TC forecast (0.75% per annum) and the VISTAS forecast (1.1% per annum). Viewed in a historical context, the Transport Canada forecast appears conservative and assumes that there will be no new developments of significance affecting Hay River for the next 20 years. The VISTAS forecasts appears more optimistic and is consistent with the overall growth expected throughout the Northwest territories over the long term. Based on these considerations, the 'medium' growth forecast is used in the Hay River Airport Development Plan.

Following good estimating practices, the medium growth projections are based on the most recent 10 years of data which provide a reasonable basis for extrapolation.

#### **4.3.2 Traffic Characteristics**

The role of Hay River Airport is reflected by the characteristics of air traffic in the most recent statistical reporting period, namely 1998. A review of selected statistics presented in Figure 4-3 on the following page highlights the following traffic characteristics:

- ➔ The vast majority of traffic, almost 99% was itinerant (aircraft having had either an origin or destination at another airport).
- ➔ Only approximately 1% of traffic was local to Hay River Airport (having both departed from and returned to Hay River without landing elsewhere).

- ➔ By far the largest type of operation was Air Carrier (commercial operators) which accounted for 86% of all traffic.
- ➔ Private operations amounted to 7% of total movements which include private company operations, ferry flights, recreational flying and other specialty activities.
- ➔ Helicopter activity is seasonal at Hay River Airport and rotary wing activity amounted to only 126 movements or 2% of total aircraft movements in 1998.
- ➔ Approximately 57% of aircraft movements use turbine or jet powered aircraft and by extension require Jet A type fuel.
- ➔ IFR traffic amounts to 48% of all movements and VFR traffic 52%.

Although definitive statistics are not available, the ratio of traffic distribution by runway has been estimated using a sample provided by FSS personnel to be 90% for Runway 13/31, 8.7% for Runway 04/22 and 1.3% for helicopter operations using neither runway.

#### **4.3.3 Airside Capacity**

Two measures are commonly used to define airfield capacity, Practical Annual Capacity (PANCAP) and Practical Hourly Capacity (PHOCAP). These measures are calculated using aircraft movement time and delay factors and consider various runway and taxiway configurations. Transport Canada has previously estimated the PANCAP to be 82,000 movements per year and the PHOCAP 30.33 movements per hour for the current configuration of Runway 13/31. Due to the low annual number of forecast aircraft movements (9,200), the annual capacity and the number of runways, airside capacity will not become an issue within the planning horizon. The hourly capacity of the airport is not currently constrained by the physical layout of the taxiways, but rather by the area control procedures in use for air traffic, and hence PHOCAP assessment is not appropriate.

Hay River Airport does not have air traffic control service, but rather a flight advisory service provided by a Flight Service Station (FSS). This will be replaced by a NAV CANADA Community Aerodrome Radio Services and the GNWT will be the general contractor.

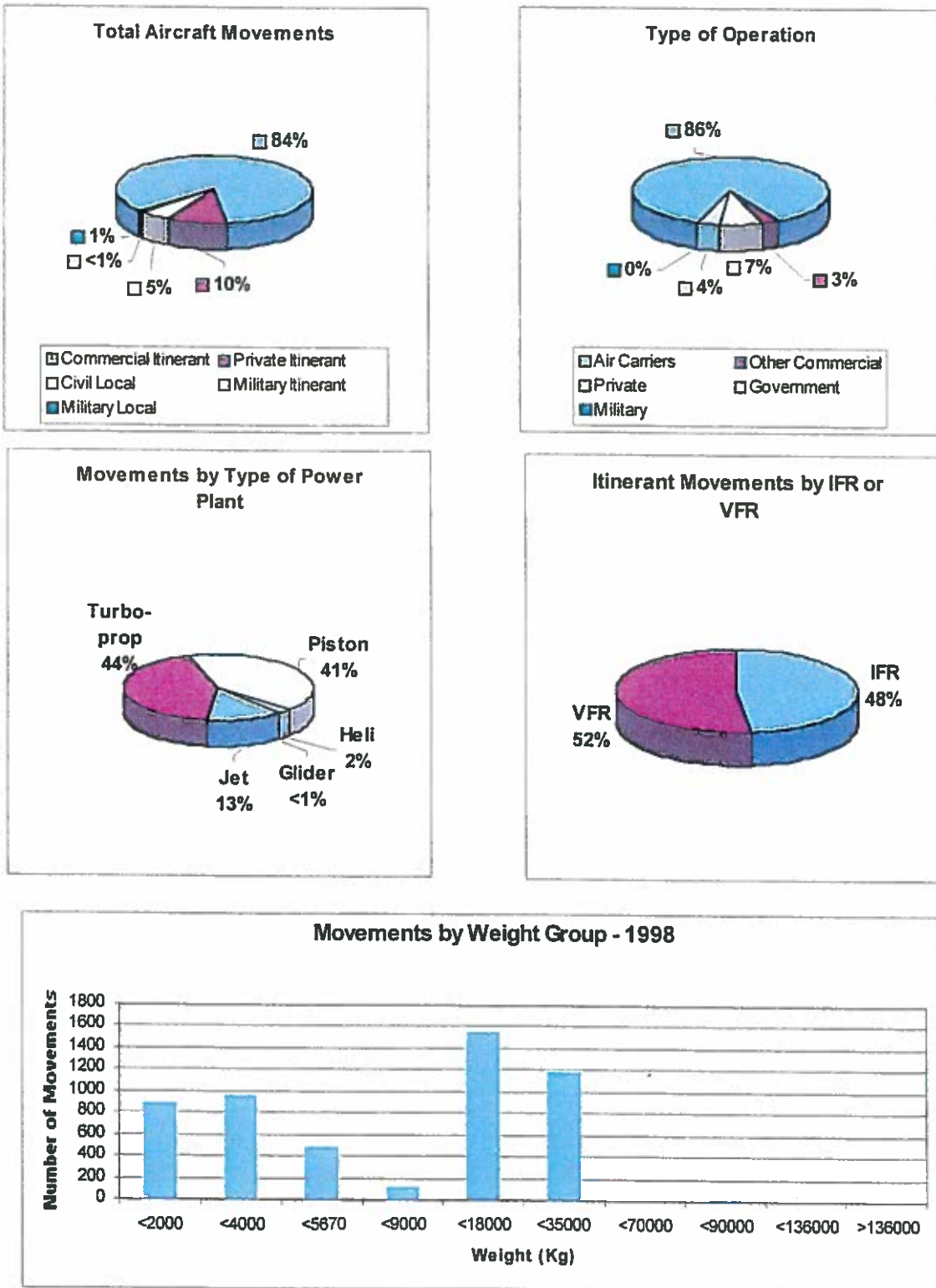
An aerodrome control zone does not exist and radar surveillance is not available for purposes of air traffic control. Approaches are controlled remotely from the Edmonton Area Control Centre (ACC) of NAV CANADA.

Due to the lack of surveillance, procedural control techniques must be used to direct Instrument Flight Rules (IFR) traffic arriving and departing from Hay River. Only one aircraft at a time is permitted to enter the approach and landing phase, or the takeoff and departure procedures phase of flight. The time allowed is based on a number of factors including the time to perform flight portions, take-off/landing and runway positioning activities.

Statistics on hourly runway movement activity are not available for Hay River. Few delays have been noted throughout most of the year. Occasional delays may occur due to seasonal traffic surges, such as when road traffic to Yellowknife is interrupted, or during major forest fire activity.

The new and/or relocated control structure(s) currently being planned for Yellowknife is (are) not expected to affect airside capacity at Hay River.

**Figure 4-3 Air Traffic Characteristics**



#### 4.3.4 Meteorological Conditions

Hay River receives an average of 34.0 cm of precipitation per year, of which 18.4 cm is rainfall and 165 cm is snowfall. Precipitation exceeds evaporation.

July mean high temperature and mean low temperature are 20.7°C and 10.8°C. January mean high and mean low temperatures are -21.0°C and -30.5°C. Winds are generally from the north-west and annually average 12.1 km/h. The date of spring break-up averages June 10<sup>th</sup> and freeze-up is usually at the beginning of November.

Based on Transport Canada Aerodrome Standards (TP312E), analysis in the 1985 Master Plan of Hay River meteorological data for the period from 1971 to 1981 indicated that the dual runway system is required, specifically for aircraft of under 1800 kg. This analysis was based on the data shown in the following table.

**Runway 13/31 Wind Analysis  
Hay River Airport**

| Crosswind<br>Limitation | Runway 13/31 Usability |        |         |
|-------------------------|------------------------|--------|---------|
|                         | All weather            | VFR    | All IFR |
| Max. 10 Knots           | 91.37%                 | 91.61% | 87.63%  |
| Max. 15 Knots           | 98.26%                 | 98.33% | 97.47%  |
| Max. 20 Knots           | 99.60%                 | 99.63% | 99.69%  |

Transport Canada standards require that airport runway availability of at least 95% be available with crosswind components not greater than: 20 knots for jet aircraft; 15 knots for turbo-prop and piston aircraft over 1800 kg and 10 knots for aircraft with a mass less than 1800 kg. The preceding chart demonstrates that Runway 13/31 does not meet the 10 knot availability standard.

A sample of traffic during the period from February 2, 1999 to April 21, 1999 shows that the Crosswind Runway 04/22 was used for 8.6% of the total traffic. This is normally a period of low utilization of the crosswind runway. Even so, this winter/spring utilization level supports the 1985 calculations as still relevant, and the ongoing need for the dual runway system. Further justification for maintaining Runway 04/22 comes from noting that this runway is used by a relative preponderance of light aircraft, and is frequently used as a taxiway. In that Runway 04/22 is a gravel runway maintenance of this runway consists primarily of snow removal and periodic grading.

## 4.4 Design Aircraft

### 4.4.1 Background

All airports are designed to permit regular operation of aircraft up to and including a specific size known as the "design" aircraft, or the "critical aircraft." The three most significant operational parameters necessary for airport planning and design are the design aircraft's runway length, pavement loading, and manoeuvring characteristics. Sometimes each of the three critical planning parameters may be dictated by a different design aircraft.

The design aircraft for Hay River has been listed as the B-737 in the 1985 Master Plan. A *Study on Runway Issues in the Northwest Territories* completed in 1998 listed the critical aircraft as the Gulfstream G-1. The appropriate design aircraft for the long term planning horizon requires careful consideration due to a number of new conditions and emerging trends in air services in general and air service in the NWT in particular. The largest aircraft currently serving Hay River on a regular basis is the Fokker F-28.

#### **4.4.2 Current Scheduled Services**

Currently, the largest airline serving the NWT is First Air, which operates a fleet of three (3) B-727-100, three (3) B-727-200 and three (3) B-737-200 aircraft. The airline serves Hay River with HS-748 service at this time, having recently retired the G-1 from fleet service. Based on prevailing market conditions, the HS-748 is operating with considerable spare capacity. Although fleet rationalization plans have not been finalized, the airline might consider acquiring newer generation regional size aircraft in the future which might potentially serve Hay River.

Canadian North currently operates (2) two B-737-200 and a smaller F-28 aircraft in the north, with the latter aircraft serving Hay River. Expansion during the summer of 1999 introduced a third B-737-200 to the fleet first in an all passenger configuration for the 1999 summer, then in a combi configuration at the end of October, 1999. The continued use of the F-28 to serve Hay River will depend on market economics, service patterns, and the continued availability of the aircraft on lease from Canadian Regional Airlines. The airline has, in the past, considered various alternate service patterns which might include a stop at Hay River for north-south B-737 services but has not proceeded with these plans.

The results of airline restructuring are currently unknown, however both Canadian North and First Air are currently providing, and will likely continue to provide service to Hay River with regional size jet, or turbo-prop aircraft in the future. Buffalo Airways and Northwestern Air Lease provide regional scheduled and charter passenger and cargo air service in and around Hay River.

#### **4.4.3 Future Scheduled Services**

Hay River functions as point of service for regional and local service. As a result it will most likely be served by smaller turbine-powered aircraft which are economical on shorter sector lengths. Aircraft such as the HS-748, DHC-6 and Beech 99 may in time be replaced by ATR-42/72, DHC-8, B-1900C/D, and SF-340 types for example. Some new technology aircraft may not be sufficiently robust for economical use in sustained northern operations however. Older aircraft types are expected to continue playing a role, most likely with small, or start-up air carriers.

Long term north-south trunk service by the airlines of the future will likely include third generation jet or turboprop powered aircraft ranging in size from 100 passenger A-319/A320 series and B-737-500 series aircraft, down to 50 seat regional aircraft such as the Bombardier CRJ Regional Jet and DHC-8-400 whose high cruise speed and low noise may allow it to compete with jets. The type of aircraft used will depend on market demand, the airline operating the service, and the availability of appropriate equipment. The use of combi aircraft on these routes may decline in the future for three reasons:

- ➔ the weak demand for south-north air cargo service to Yellowknife due to good surface transportation;

- the aging of current combi aircraft and the lack of a viable replacement on the used aircraft market;
- the superior operating economics of regional jet and turboprop aircraft.

Whether trunk services will stop at Hay River en-route to the north or south in the future is not known. It would be prudent however to maintain the current technical capability of the airport to permit operations by larger aircraft in the future. The technical capability is also important when considering YHY as an alternate to YZF.

#### **4.4.4 Non-scheduled Services**

Buffalo Airways provides a variety of charter services from Hay River Airport including fire patrol, water bombing, aerial reconnaissance, exploration and development support operations and resupply to communities on the north side of Great Slave Lake when road access is interrupted due to discontinuous operation of the ferry and/or ice bridge across the Mackenzie River at Ft. Providence. Other carriers may position aircraft at Hay River in response to the needs of their clients. Non-scheduled services may use a variety of aircraft including: DC-4, CL-215, DHC-6 Twin Otter, King Air, Beech 99, HS-748, C-47 and DC-3 types. Numerous small aircraft types may also use the airport as well as helicopters. Due to size and frequency of operations, none of the foregoing types of aircraft are appropriate as the design aircraft.

#### **4.4.5 Recommended Design Aircraft**

Based on the preceding analysis and aircraft operational requirements continued use of the B-737 is recommended as the design aircraft for Hay River Airport for the medium and long term.

For purposes of short term planning of air terminal facilities, the 55 seat F-28 is recommended as the critical aircraft. By considering the older F-28 aircraft, both the 50 seat Dash-8-300 and CRJ Regional Jet could also be accommodated.

## ***5.0 Airport Facilities, Deficiencies and Requirements***

### **5.1 Runway, Taxiway and Apron System**

#### **5.1.1 General**

One of the most critical issues at the airport involves the geotechnical condition of airside lands, and related pavement surface condition problems. Alternative pavement surface improvement options involving major airside modifications, or complete relocation of the airport have been rejected in the past due to the distance to a possible alternate site from the town, and the costs/benefits of undertaking such a major project. The analysis herein is based on the existing airside features at Hay River Airport.

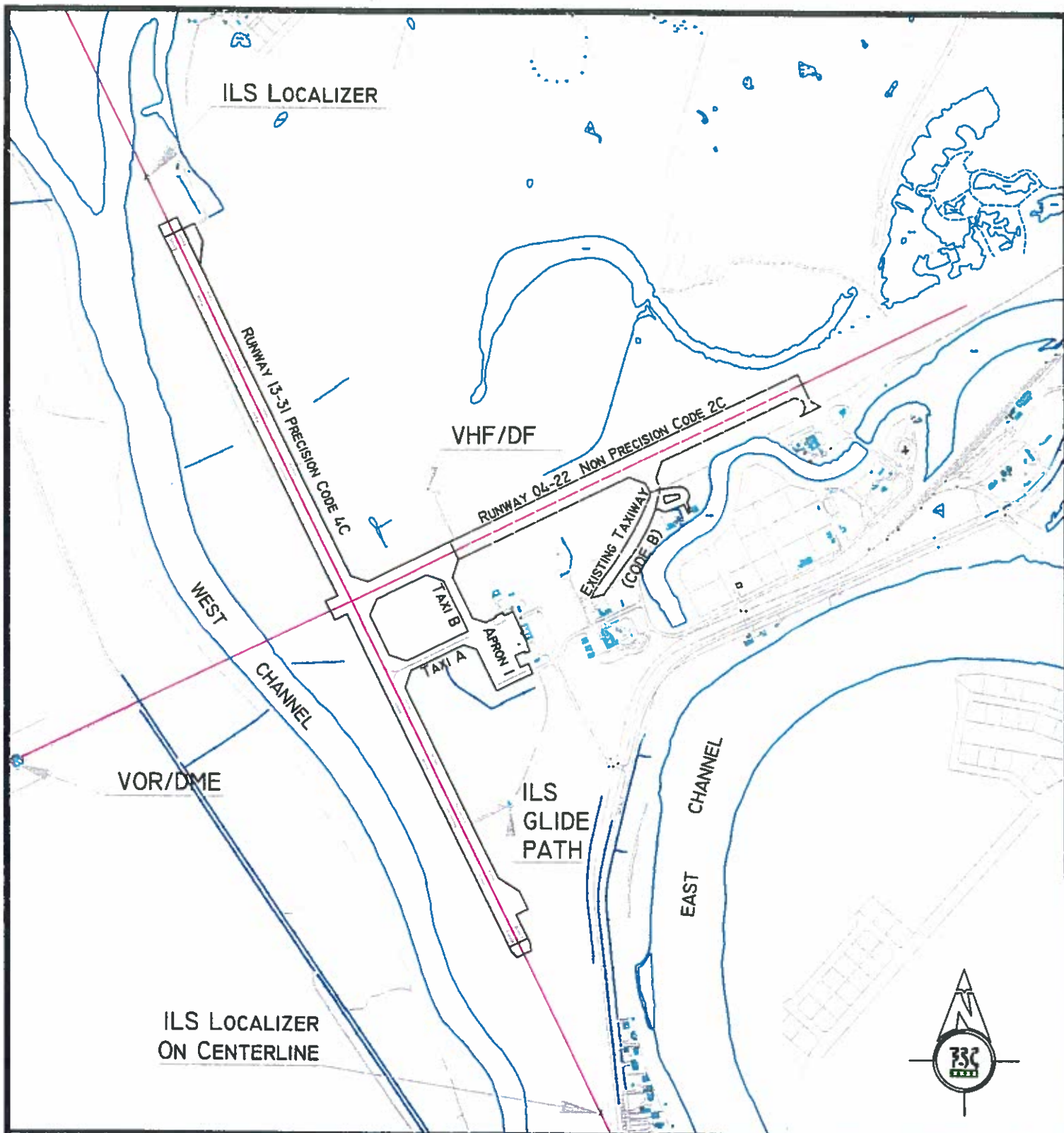
On the basis of information available, the paved areas were constructed using locally available granular fill, blasted rock and boulders placed in a non-uniform manner. The progressive degradation of the discontinuous permafrost under the paved areas and the non-uniformity of the fill has made significant pavement reconstruction and asphalt overlay necessary from time to time. At the present time most of the paved areas are stable with a limited number of localized exceptions.

In the future, continued careful yearly maintenance of the cracks in the pavement surface and timely correction of any appearance of pavement settlement as the result of further permafrost degradation should keep the pavement surfaces in a continuously good condition.

In addition to pavement surface maintenance, the surface drainage ditches and culverts should be kept in good operational condition, to assist rapid surface water run off and to minimize ponding thereby limiting any further degradation of the permafrost.

As demonstrated in Chapter 4, the capacity of the existing runway and taxiway system is more than adequate to meet the projected demand to the 20 year planning horizon.

Figure 5-1 on the following page presents an overall inventory of the runways, taxiways, apron and navigation systems at the airport. The subsequent charts detail the Airport and Runway Specifications, and summary Airfield Pavement Construction data.



## RUNWAY, TAXIWAY AND NAVIGATION AIDS INVENTORY



DATE: MARCH 20, 2000

SCALE: NTS

FILE: Fig\_5-1.dwg

FIGURE NO.

# HAY RIVER AIRPORT DEVELOPMENT PLAN

5-1

**Airport and Runway Specifications  
Hay River Airport**

| Runway                       |                         | 13                                      | 31                    | 4                                     | 22                    |
|------------------------------|-------------------------|-----------------------------------------|-----------------------|---------------------------------------|-----------------------|
| Lowest Landing Minima        |                         | 262 ft AGL<br>79.9 m                    | 200 ft AGL<br>61.0 m  | 517 ft AGL<br>157.6 m                 | 517 ft AGL<br>157.6 m |
| Lowest Authorized T-O Minima |                         | ½ NM Vis.                               | ½ NM Vis.             | ½ NM Vis.                             | ½ NM Vis.             |
| Magnetic Bearings            |                         | 128°                                    | 308°                  | 038°                                  | 218°                  |
| Runway Dimensions            |                         | 1828.8 m x 45.7 m<br>6000 ft x 150 ft   |                       | 1219.2 m x 45.7 m<br>4000 ft x 150 ft |                       |
| Runway Slope                 |                         | 0.2%                                    | -0.2%                 | -0.2%                                 | 0.2%                  |
| Runway Surface Type          |                         | Asphalt                                 |                       | 1000' Asphalt/3000' Gravel            |                       |
| Touchdown Zone Elevation     |                         | 538ft ASL<br>164.0 m                    | 543ft ASL<br>165.5 m  | -                                     | -                     |
| Threshold Elevation          |                         | 533 ft ASL<br>162.4 m                   | 543 ft ASL<br>165.5 m | 536 ft ASL<br>163.4 m                 | 531 ft ASL<br>161.9 m |
| Runway Strip                 | Dimensions              | 1950.7 m x 304.8 m<br>6400 ft x 1000 ft |                       | 1341 m x 91.5 m<br>4400 ft x 300 ft   |                       |
|                              | Surface Type            | Grass                                   |                       | Grass                                 |                       |
| Clearway                     | Dimensions              | 300 m<br>984 ft                         | 150 m<br>492 ft       | 300 m<br>984 ft                       | 150 m<br>492 ft       |
| Declared Distances           | TORA                    | 1828.8 m<br>6000 ft                     | 1828.8 m<br>6000 ft   | 1219.2 m<br>4000 ft                   | 1219.2 m<br>4000 ft   |
|                              | TODA                    | 2133.6 m<br>7000 ft                     | 2133.6 m<br>7000 ft   | 1524 m<br>5000 ft                     | 1341.1 m<br>4400 ft   |
|                              | ASDA                    | 1828.8 m<br>6000 ft                     | 1828.8 m<br>6000 ft   | 1219.2 m<br>4000 ft                   | 1219.2 m<br>4000 ft   |
|                              | LDA                     | 1828.8 m<br>6000 ft                     | 1828.8 m<br>6000 ft   | 1219.2 m<br>4000 ft                   | 1219.2 m<br>4000 ft   |
| Approach Surface             | Length of Inner Edge    | 300 m (1000 ft)                         | 300 m (1000 ft)       | 91.5 m (300 ft)                       | 91.5 m (300 ft)       |
|                              | Distance from Threshold | 60 m (200')                             | 60 m (200')           | 60 m (200')                           | 60 m (200')           |
|                              | Divergence              | 15%                                     | 15%                   | 10%                                   | 10%                   |
|                              | Length                  | 3,000 m                                 | 15,000 m              | 8,300 ft                              | 8,300 ft              |
|                              | Slope                   | 0.076389                                | 0.07638889            | 0.0625                                | 0.0625                |
| Transitional Surface Slope   |                         | 0.046528                                | 0.04652778            | 0.046528                              | 0.04652778            |
| Classification Code          |                         | 4C/NP                                   | 4C/P                  | 2C/NP                                 | 2C/NP                 |

Notes: 1) All lengths are in Feet. 2.) Source: Transport Canada approved Airport Operations Manual  
\* Reduced from 90 m to 75 m because of ditching



### 5.1.2 Runway

The airport includes two runways 13/31 and 04/22 as described in the table below.

**Runway Pavement  
Hay River Airport**

| Characteristics |                                         |                                       | Construction       |                                                                  |                                                                                            |
|-----------------|-----------------------------------------|---------------------------------------|--------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Runway          | Dimensions                              | Surface Type                          | Pavement Thickness | Base Thickness                                                   | Sub-Surface Base                                                                           |
| 13/31           | 1,828.8x45.7 m<br>(6,000 ft x 150 ft)   | hot mix asphalt                       | 179 mm             | 230 mm<br>crushed gravel                                         | 914 mm<br>compacted sand &<br>gravel                                                       |
| 04/22           | 1,219.2 x 45.7 m<br>(4,000 ft x 150 ft) | hot mix asphalt<br><br>crushed gravel | 139 mm<br><br>nil  | 152-230 mm<br>crushed gravel<br><br>329-456 mm<br>crushed gravel | 686-914 mm<br>compacted sand &<br>gravel<br><br>0-457-762 mm<br>compacted sand<br>& gravel |
|                 | 1,000 ft                                |                                       |                    |                                                                  |                                                                                            |
|                 | 3,000 ft                                |                                       |                    |                                                                  |                                                                                            |

#### Runway 13/31

The last Runway 13/31 overlay was completed in 1991 (50 mm hot mix asphalt concrete). In 1996 major areas of pavement settlement were corrected by partial surface reconstruction.

In 1997 the Runway Roughness was rated as "good", except for the local depressions noted above. Runway Surface Friction was also acceptable.

The 1999 Pavement Condition Survey states that the predominant distresses were longitudinal and transverse cracking with minor weathering/ravelling. Low severity block cracking was recorded in only one area. Several areas of pavement depression were noted up to 30 mm deep.

The Pavement Load Rating (PLR) for this runway is a conservative 9 (1.0 MPa). The pavement can accept any model of B-737 aircraft currently in operation, and there is a good likelihood that heavier aircraft might be accommodated subject to further study. The runway could be kept in good operational condition by a diligent yearly pavement and drainage maintenance program.

Depressions in the pavements should be eliminated by either hot mix asphaltic concrete levelling or local reconstruction of the crushed gravel base and hot mix asphaltic concrete surfacing to the proper grade. Sprinkling Portland Cement on the surface of freshly paved asphalt surfaces will help to reduce heat penetration into the pavement structure and would reduce the effect on the stability of the permafrost.<sup>2</sup> The next pavement overlay of 50 mm hot mix asphaltic concrete is

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<sup>2</sup> Based on the advice of Dr. G. Y. (Stephen) Sebastyan, P.Eng. of LPS Aviation Inc., 5/11/99

estimated to be required in the year 2005. The exact date of resurfacing should be determined on the basis of the actual rate of pavement deterioration.

### Runway 04/22

The most westerly 305 m (1,000 ft) of this runway is paved to facilitate large aircraft access to Apron I through Taxiway B. The most recent hot mix asphalt concrete pavement overlay was completed in 1988. The rest of the runway is gravel. In 1996-97 the centre 15 m (50 ft) of the gravel-strip was overlaid with 50 mm crushed gravel and the runway was graded.

This cross-wind runway is primarily required for small aircraft operations (aircraft under 1,800 kg) however larger water bomber aircraft use the runway during forest fire fighting operations. The paved portion of the runway is rated as PLR 9 (1.0 MPa)

Both the asphalt and the gravel portion of the runway require proper maintenance. Depending on the actual rate of pavement deterioration, an asphalt concrete overlay of the paved portion is scheduled for the Short Term. The gravel portion is graded as required.

This runway doubles as a taxiway to serve the eastern development lands. The cost of maintaining it as a runway over that of a taxiway is minimal and given the benefit it serves as a cross-wind and second runway it is recommended that it be maintained in its current status.

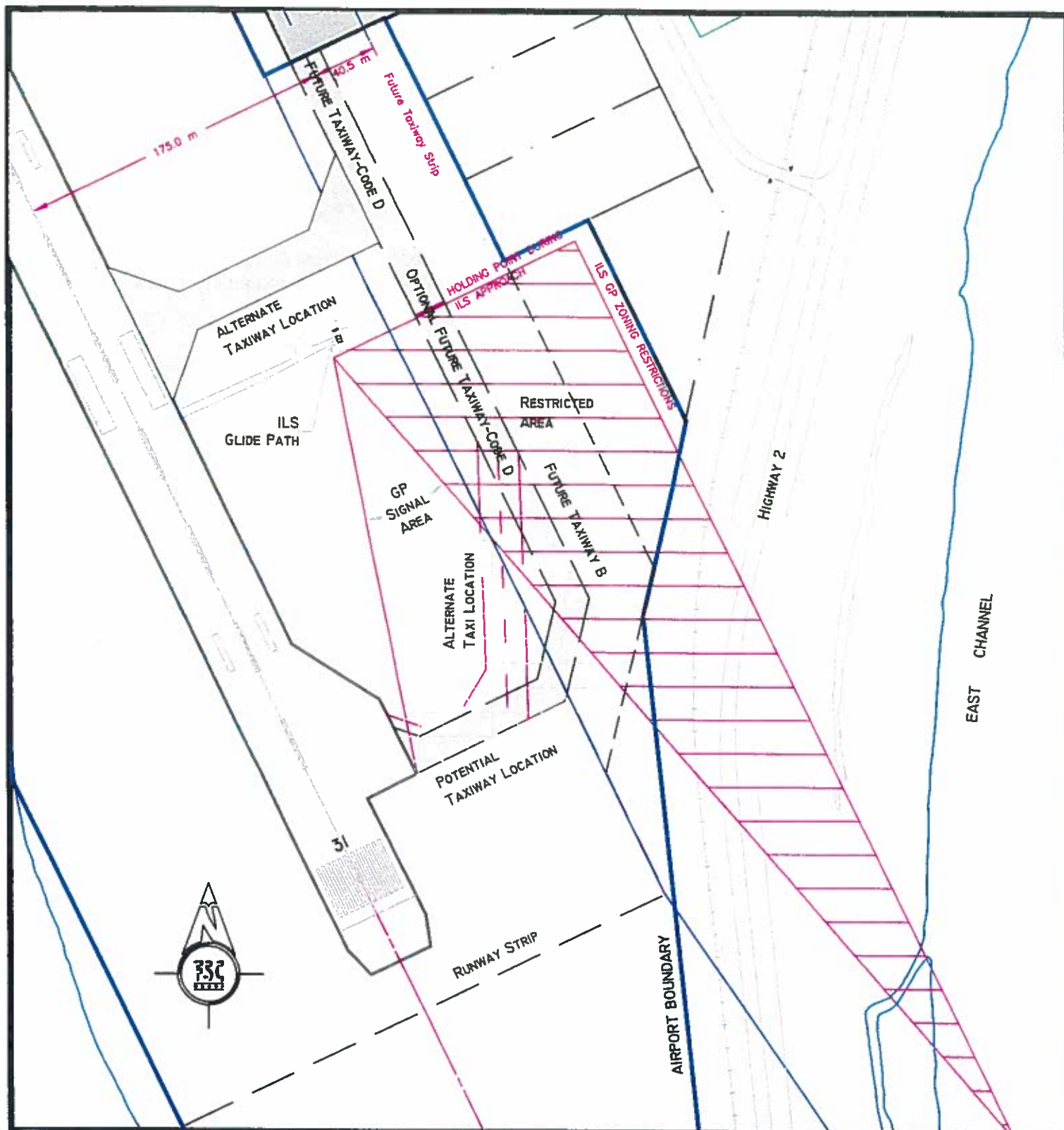
### 5.1.3 Taxiways

The existing Hay River Airport includes two designated taxiways, which are shown in Figure 5.1 and described as follows:

**Taxiway Pavement  
Hay River Airport**

| Characteristics |              |                 | Construction      |                       |                                |
|-----------------|--------------|-----------------|-------------------|-----------------------|--------------------------------|
| Designator      | Dimensions   | Surface Type    | Surface Thickness | Base Thickness        | Sub-Surface Base               |
| A               | 200 m x 23 m | hot mix asphalt | 229 mm            | 229 mm crushed gravel | 914 mm compacted sand & gravel |
| B               | 165 m x 23 m | hot mix asphalt | 139 mm            | 152 mm crushed gravel | 686 mm compacted sand & gravel |

Taxiway A was last overlaid in 1991 with 50 mm of hot mix asphalt concrete. Both taxiways have a PLR bearing strength of 9 (1.0 MPa), suitable for use by the B-737 type aircraft. The 1999 Pavement Condition Survey noted Taxiway A, which serves the primary Runway 13/31, is in good condition. It exhibits minor cracking, and minor settlement problems. Roughness is also rated as good. Taxiway A requires rehabilitation by the year 2005 or later, assuming proper and intensive pavement maintenance program.



## PARALLEL TAXIWAY ZONING RESTRICTIONS



DATE: March 20, 2000

SCALE: NTS

FILE: Fig\_5-2.dwg

FIGURE NO.

HAY RIVER AIRPORT DEVELOPMENT PLAN

5-2

Conversely, Taxiway B which serves the paved portion of the secondary Runway 04/22 has a fair condition rating. Cracking and settlement problems range from moderate to severe. Surface roughness is rated as fair. Depending on the actual rate of pavement deterioration an overlay of 50 mm hot mix asphalt concrete should be planned for Taxiway B in the Short Term.

Provision for the eventual construction of a taxiway from Apron 1 to Runway 31 will facilitate expansion of apron capacity, airside circulation, and runway capacity. This construction will require careful consideration of the glide path zoning restrictions as shown in Figure 5-2.

In addition it is prudent to reserve land for a future taxiway paralleling Runway 04/22 both to serve future commercial aviation lots and to increase the capacity of Runway 04/22 should this ever be required for peak seasonal operations.

#### **5.1.4 Apron**

Apron 1, associated with the Air Terminal Building, is the only designated apron at the Hay River Airport. It is an asphalt apron 170 m x 121 m in size, and includes markings, edge lighting and flood lighting.

Apron construction is similar to Runway 13/31 and Taxiway A comprising:

- 179 mm hot mix asphalt surface
- 230 mm crushed gravel base
- 914 mm compacted sand & gravel subbase

A small appendage off the northeast corner of the apron has a reduced pavement thickness and load carrying capacity. The origins of this appendage are unknown however it is reasonable to assume that: a) it was constructed after the 'main' apron was laid, and b) owing to its reduced load carrying capacity, was most likely intended to be used for light aircraft parking.

The 1999 Pavement Condition Survey notes the surface condition to be similar to Runway 13/31. Pavement maintenance and pavement overlay scheduling should be identical to the program for Runway 13/31.

The Pavement Load Rating of the Apron is the same as for Runway 13/31 namely a PLR 10.

The present apron size and characteristics are capable of accommodating simultaneously a maximum of two B-737 aircraft or a combination of smaller aircraft with parking and manoeuvring space. Apron congestion has only been noted during periods of peak seasonal activity. However, the provision of electrical plug-ins on the apron was noted as a short-term service requirement by both the airport users and the Town.

The recent location of fixed aircraft refuelling facilities on the southern edge of the apron obstructs apron use and expansion in this area. When refuelling is required by passenger aircraft passengers are required to walk a considerable distance across the apron from/to the Air Terminal Building for embarkation/disembarkation. The distance from the ATB apron passenger doors to the furthest corner of the apron is 140 m. With multiple aircraft on the apron, some enplaning/deplaning passengers may have to walk up to 70 m.

## APRON DEVELOPMENT



**DATE:** March 20, 2000

SCALE: NT8

FILE: Fig\_5-3.dwg

**KEY:**

**SHORT TERM**

**LONG TERM**



FIGURE NO.

# HAY RIVER AIRPORT DEVELOPMENT PLAN

5-3

To alleviate seasonal congestion and to accommodate any potential future growth, a short and long term apron expansion program is required. Figure 5-3 on the following page illustrates the capacity of the existing apron as well as the progressive expansion in response to operational requirements. The expansion program(s) should be followed based upon required demand.

## **5.2 Air Navigation Facilities**

### **5.2.1 Flight Service Station**

The Flight Service Station (FSS) at the Hay River Airport is presently located on the second floor of the Air Terminal Building in the southwest corner. This area contains 48.12 m<sup>2</sup> (520 ft<sup>2</sup>) of operations space not including assigned FSS storage or joint airport operations areas. Under the NAV CANADA Northern Services Review Implementation Project, the FSS at Hay River is in the process of conversion to an Airport Advisory Service (AAS) facility in December, 1999 and then further converted to a Community Airport Radio Station (CARS) in April 2000.

A CARS facility does not require unobstructed visibility of the airport surface and does not require as much floor space as a full FSS. NAV CANADA plans to carry out a minimal renovation of the FSS area to meet the CARS space requirements and to re-use, if possible, the existing console. These renovations should be co-ordinated with any planned Air Terminal Building renovations.

Support of the FSS and navigation aids equipment is carried out by the NAV CANADA maintenance organization based in Yellowknife. There are no permanent maintenance staff at Hay River. The maintenance workshop in the Air Terminal Building was staffed until recently but maintenance consolidation and FSS decommissioning efforts by NAV CANADA have changed the operational status of the site. This function currently occupies approximately 127 m<sup>2</sup>. The space occupied by NAV CANADA on the first floor of the Air Terminal Building has two purposes:

- ➔ housing operational and support equipment for the FSS; and
- ➔ as a workshop and spares storage for maintenance of navigation aids and FSS equipment.

As the FSS is converted to a CARS, the requirements for support equipment space will fall from 10 or 11 racks to only one rack, a space requirement that can be accommodated elsewhere. Workshop and spares storage space will still be required in support of the airport navigation aids but may be located elsewhere. The workshop should be relocated away from the current location on the first floor of the Air Terminal Building.

In the long term, all three functions (CARS, CARS support equipment and maintenance workshop) should be accommodated through reconfiguration of the space currently occupied by the FSS and possibly the FSS manager's office, if required.

### **5.2.2 Electronic Navigation and Landing Aids**

The navigation facilities at the Hay River Airport involve instrument or non-visual navigation and landing aids, and lighting and visual landing aids.

Non-visual navigation and landing aids include an Instrument Landing System (ILS) for Runway 31. This system comprises the Glide Path (GP) transmitter, and Localizer (LOC) transmitter as shown on the electronic zoning drawing, Figure 3-4.

A significant issue with respect to the Glide Path (GP) system has been the requirement to ensure that trees past the end of the runway within the GP zoning restricted area are prevented from exceeding the specified height. In the past tree cutting has met with considerable and unfavourable public comment. The large steel bridge beyond the end of Runway 13 and the railway line also present calibration problems for the GP system.

The ILS Localizer antenna array has been problematical at Hay River. At one time it was located on the island beyond the threshold of runway 13 but as the performance was badly affected by the intervening water, it was moved closer to the threshold. Its current location is, however, not in accordance with the standard specifications for positioning and as a result, it does not provide stable signals in the airspace as ground conditions change over the seasons. Adjustments have been made to reduce variability and while the effects appear promising discussions with NAV CANADA indicate that they are conducting a full assessment of the results. The Localizer antenna array is potentially vulnerable to flooding and ice conditions from the nearby West Channel that could disable the Instrument Landing System for an extended period (weeks or even months). However it should be noted that a recent flood inundation study appears to indicate that the equipment might possibly escape damage under the "design flood" condition used in the study.

A Non-Directional Beacon (NDB) is co-located with the airport Air Traffic Control (ATC) Very High Frequency (VHF) radio transmitters at a site 9.5 km (5.1 nautical miles) from the Runway 31 threshold. This site is off the airport property so it has no direct affect on airport planning. The VHF radio receivers are located at a second, off-airport site.

The airport is equipped with Very High Frequency Omni-Directional Range/Distance Measuring Equipment (VOR/DME) located to the west of Runway 04/22 as shown on Figure 3-4. This installation includes an older design antenna array with very new electronic equipment and is suitable for continuing operation for a number of years.

On the east side of the runway intersection is the VHF Direction Finder (VHF D-F) equipment site. This equipment will be decommissioned and removed when the FSS to CARS conversion is complete.

Airport planning should allow for the possible location of a Differential Global Positioning System (DGPS) at the airport. Siting would require a detailed technical evaluation with respect to satellite coverage and horizon screening. One potential site has been identified on Figure 3-4 for reference. Installation of DGPS could, in the future, remove the requirement for an ILS at Hay River for instrument approaches but at a significant cost to users for the installation of new avionics. To date, no DGPS precision approaches have been approved in Canada but development and testing work is proceeding. Any such change in airport equipment would be subject to the normal NAV CANADA Aeronautical Study Process.

The VOR/DME, the receivers, the transmitters and the NDB are supported by NAV CANADA emergency back-up power systems. The ILS (GP and LOC), the VHF-DF and the FSS equipment in the Air Terminal Building are supplied by the airport emergency power system.

### 5.2.3 Visual Landing Aids

The airport is equipped with the following lighting and visual landing equipment:

**Visual Landing Aids  
Hay River Airport**

| Type                             | Runway                                                    |                                     |    |    |
|----------------------------------|-----------------------------------------------------------|-------------------------------------|----|----|
|                                  | 13                                                        | 31                                  | 4  | 22 |
| Strobe Beacon                    | Located at North end of roof of the Air Terminal Building |                                     |    |    |
| PAPI                             | 4 units                                                   | -                                   | -  | -  |
| High Intensity Approach Lighting | -                                                         | AE<br>Non-standard<br>1,561 ft only | -  | -  |
| Edge Lighting                    | HI                                                        | HI                                  | ME | ME |
| Threshold Lighting               | TE                                                        | TE                                  | TE | TE |
| End Lighting                     | TE                                                        | TE                                  | TE | TE |

Edge lighting is also provided along Taxiways A and B. A lighted windsock is located at the threshold of Runways 13, 31 and 22. Finally, a Runway Visual Range (RVR) is sited near the Runway 31 threshold.

It should be noted that the HI (high intensity) approach and edge lighting are necessary to support the Category 1 instrument landing capability of Runway 31. The ME (medium intensity) edge lighting could support a non-precision instrument approach to Runway 04/22 although none is currently published in the Canada Air Pilot.

### 5.2.4 Aviation Meteorology

Airport meteorological services are located within the FSS general office space. This service provides weather observation and information services to pilots and the general public. Daytime observations during the week are carried out by the FSS staff. Visibility observations are taken from the Air Terminal Building roof, with weather equipment located in the MET area some 50 metres north of the Air Terminal Building.

A short term requirement of meteorological service at the Hay River Airport is protection of the existing MET area from encroachment by adjacent fuel tanks and storage sheds.

In the longer term, introduction of an Automated Weather Observation System (AWOS) is anticipated at Hay River Airport. This unmanned facility might be located in a more remote portion of the airfield thereby making land immediately north of the Air Terminal Building potentially available for Air Terminal Building or parking lot expansion.

## 5.3 Air Terminal Building

### 5.3.1 Assessment Methodology

The Systemized Terminal Expansion Standards (STEP) were devised by Transport Canada as a guide for the design and progressive expansion of small Air Terminal Buildings. The STEP system of progressive expansion was established on the basis of long-standing Canadian airport experience.

The standards are based on a Peak Design Volume (P.D.V.) of passengers using the building. The P.D.V. is determined through analysis of schedules, passenger loads and forecasts. It is the peak half-hour period passenger load for which the air carriers supply the most seats (arrival and departure).

Five levels of service are considered in the STEP standards as described below. A new air terminal is usually designed to deliver a Level of Service B for the first 5 years of operation. When service has deteriorated to less than the desired level, action by management is recommended.

**Levels of Service (LOS)  
STEP**

| Level | Quality      | Characteristics                                                                             |
|-------|--------------|---------------------------------------------------------------------------------------------|
| A     | Excellent    | condition of free flow, no delays; excellent level of comfort.                              |
| B     | High         | condition of stable flow; high level of comfort.                                            |
| C     | Good         | condition of stable flow, acceptable throughput; systems in balance.                        |
| D     | Adequate     | condition of unstable flow, delays for passengers; conditions acceptable for short periods. |
| E     | Unacceptable | unstable flow; conditions seriously limiting the capacity of the system                     |

Following the STEP methodology, 9 basic sizes of Air Terminal Buildings are classified in progressive order of P.D.V. processing capability. Each size of terminal is capable of processing a range of volumes depending on the desired Level of Service. For example, a STEP 4.0 terminal can process a P.D.V. of 47-55 at Level of Service B, or a PDV of 86-110 at Level of Service E. Each STEP size classification corresponds to a prescribed balance of functional services, amenities and building areas. These may be adjusted as required to meet specific local characteristics.

The following chart provides an overview of STEP terminal sizes.

**STEP Air Terminal Characteristics**

| Air Terminal Classification | Total Space Allocation (m <sup>2</sup> ) | Peak Design Volume (PDV)<br>(number of passengers) |                        |
|-----------------------------|------------------------------------------|----------------------------------------------------|------------------------|
|                             |                                          | Lower limit<br>LOS 'B'                             | Upper Limit<br>LOS 'E' |
| STEP 3                      | 314                                      | 26                                                 | 60                     |
| STEP 3.5                    | 424                                      | 34                                                 | 80                     |
| STEP 4                      | 628                                      | 47                                                 | 110                    |
| STEP 4.5                    | 841                                      | 64                                                 | 150                    |
| STEP 5                      | 1 289                                    | 84                                                 | 200                    |
| STEP 5.5                    | 1 623                                    | 109                                                | 260                    |
| STEP 6                      | 2 043                                    | 139                                                | 330                    |
| STEP 5.5X                   | 2 516                                    | 180                                                | 430                    |
| STEP 6X                     | 3 007                                    | 230                                                | 550                    |

### 5.3.2 Existing Air Terminal Building

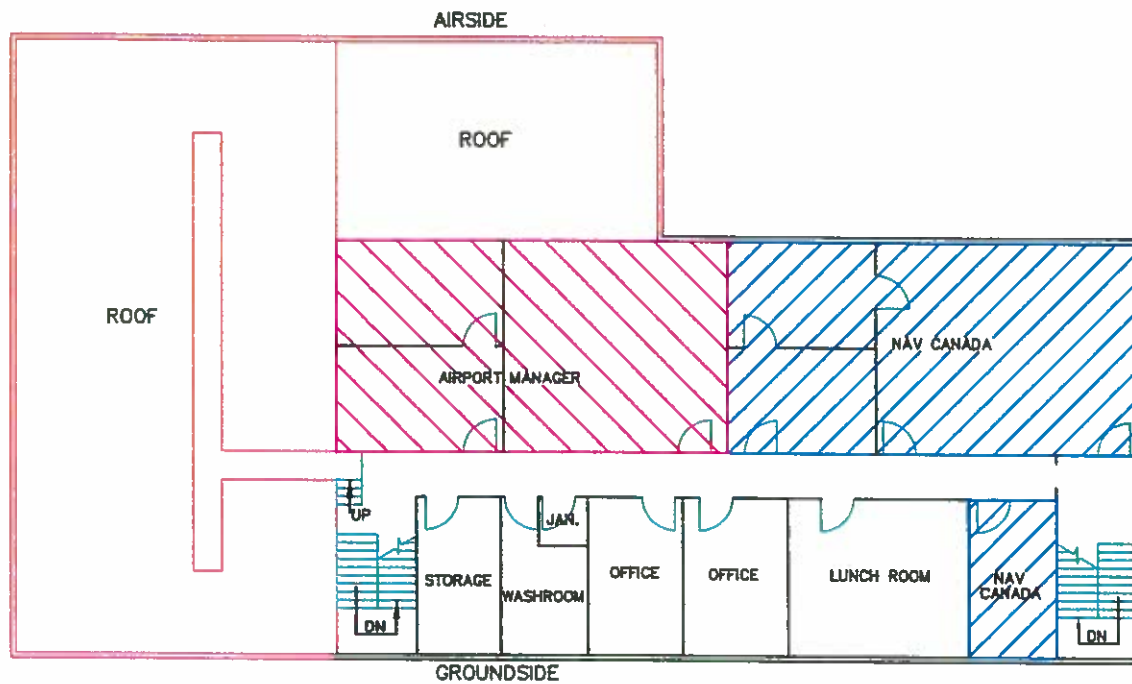
The Hay River Air Terminal Building opened in 1969 as part of the new Runway 13/31 construction program. It serves a number of airport functions which can be described as either passenger or aviation-related. Although the building is in good condition, a number of spatial inadequacies and internal design problems exist. The main floor of the building has a net area of 554 m<sup>2</sup>. The second floor is 310 m<sup>2</sup>. The distribution of the various use of the existing space is presented in the table on the following page.

Although the existing air terminal has a total area of 864 m<sup>2</sup>, approximately 66 m<sup>2</sup> on the main floor and at least 181 m<sup>2</sup> on the second floor are occupied by non-air terminal activities. The net area in use for air terminal related activities is therefore approximately 538 m<sup>2</sup>.

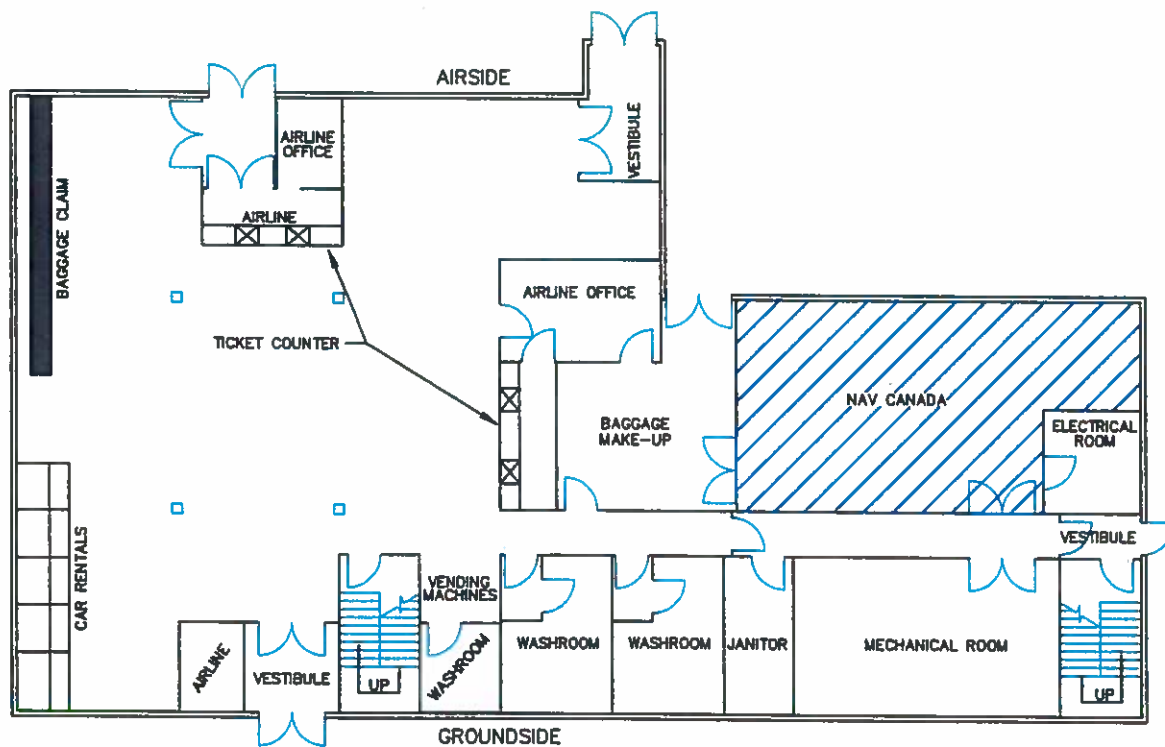
A STEP 3.5 terminal has a nominal area of 424 m<sup>2</sup> and a STEP 4.0 terminal has a nominal area of 628 m<sup>2</sup>.

On the basis of the analysis in Section 4.1.2, it is assumed that PDV at the Hay River Airport will be 43 for the planning period. Therefore in accordance with the STEP methodology the Air Terminal Building size and internal space and circulation arrangements should comply with at least a STEP 3.5 standard.

Given the uncertainty of future service patterns, and particularly the possibility of B-737 en route station operations at some time in the future, it appears prudent to maintain the STEP 4.0 capability already inherent in the existing building. This size will provide a B level of service at a PDV of 47



SECOND FLOOR & ROOF PLAN



FIRST FLOOR PLAN

## HAY RIVER ATB - EXISTING



DATE: March 20, 2000

SCALE: NTS

FILE: Fig\_5-4.dwg

FIGURE NO.

## HAY RIVER AIRPORT DEVELOPMENT PLAN

5-4

to the planning horizon, or an upper limit E level of service for a PDV of 110 as an absolute maximum.

The existing Air Terminal Building facility is therefore large enough to accommodate:

- a STEP 4.0 passenger processing operation
- a CARS facility, and
- a limited amount of workshop/support space for NAV CANADA.

### **Architectural Assessment of Building**

The building structure includes; steel pipe piles with concrete pile caps; a main floor concrete slab complete with internal concrete grade beams and perimeter grade beams placed above a heated crawlspace. The superstructure consists of steel columns and glulam beams, some interior load-bearing walls and steel pipe web trusses for the second floor and roof.

Exterior wood frame walls complete the structure.

The exterior walls are in good condition for a building of this age. Air/vapour barrier(s) and insulation systems at the exterior envelope and exterior windows were noted previously as deficiencies and should be considered worthy of upgrading. (Refer to the comprehensive evaluation report done by Public Works and Services, January, 1997, entitled *Building Technical Status Report, Air Terminal Building, Hay River, NWT*)

Utilizing the 1995 National Building Code, the building falls under Group A Division 2, Section 3.2.2.25 Up to 2 Storeys. This allows for either combustible or non-combustible construction with rated assemblies for Mechanical Service Spaces (Mechanical Room). Based on the 1995 NBC and an occupant load of 50 persons 1 (one) male water closet and 2 (two) female water closets are required. The current arrangement of washrooms exceeds this requirement. To satisfy the barrier free washroom requirements and provide additional concession space, we recommend the elimination of the unisex barrier free washroom and renovating the existing washrooms to provide barrier free access and barrier free stalls.

The interior finishes are in good condition with the exception of flooring. Carpeted areas in the stairways and vinyl floor tiles in the cargo room and offices should be replaced with resilient sheet flooring.

Further detailed studies of space assignments are required to fine-tune inefficient spatial arrangements or improvements required in the Public Areas and Airline operations of the building.

In summary, the Hay River Air Terminal Building is structurally solid, requires some minor maintenance, but can be operated indefinitely with regular maintenance. The building does not include a designated holdroom or security system. The Airport is a Class IV airport under the Multi-Level Security System and security arrangements for both the air carrier and airport are minimal.

The Airport Operations component of the building, on the second floor, includes the Flight Service Station and meteorological operations.

A more detailed description of these operational services at Hay River is provided in the Airport Operation Facilities section of this Development Plan.

### **Mechanical Systems**

The mechanical systems for the existing Hay River Air Terminal Building can be summarized as follows:

- Hydronic heating.
- Cool air constant volume ventilation.
- Split system AC cooling units.
- Water and sanitary from municipal mains.
- Fire hose and handheld fire extinguisher fire safety systems.
- Liquid propane gas from a local storage system.

The systems and equipment have been reasonably well maintained and are currently operational. Housekeeping is good and recent maintenance when required has been completed.

In general, however, the majority of the mechanical systems and equipment are at the end of their serviceable life and have exceeded the recommended ASHRAE TC1.8 median life cycle. The exception to the older equipment is the recently renovated heating plant that will have another 10 year expected life cycle. In addition certain aspects of the mechanical systems and equipment are in poor shape due to physical damage and lack of extended maintenance programs prior to takeover by the GNWT.

### **5.3.3 Operational Deficiencies**

The table on the following page summarizes the space available in the existing Terminal Building and compares this with the space requirement range for a STEP 4.0 standard. Analysing the table it is evident that the present Air Terminal Building is more than adequate in size to accommodate the expected air traffic for the long term, assuming that activities not directly related to passenger processing, including all air carrier's administration offices, will be removed from the ground floor and the internal arrangement of the ground floor space will be changed. The second floor of the Terminal Building can accommodate the Airport Manager, CARS/NAV CANADA, the air carrier's administrative offices, and other associated activities. In a perfect world most or all of these Second Floor offices would be located on the Ground Floor but the Ground Floor space is needed most by direct passenger and baggage activities with all administrative uses being shifted to the Second Floor.

The current building mechanical systems are functional in that they provide the space heating, sanitary services and nominal ventilation and cooling to the users. However, ventilation and cooling as well as heating control and functionality are poor which results in significant discomfort and reductions in the level of health and safety of the occupants. In addition there are code, operational and standards deficiencies in the mechanical systems all of which require immediate attention for either the continued short or long term use of the facility.

To maintain continued use of the facility the current codes and standards deficiencies should be corrected. However, typically, a building or structure may continue to exist despite certain code deficiencies, however upon the commencement of rehabilitative work to that same building or structure the most recent codes and standards become effective and must be adhered to. The

current code and standards deficiencies vary in scope from minor sanitary and heating upgrades to a need for a review into significantly retrofitting the ventilation and controls systems. Some of the more significant operational deficiencies should be corrected to improve occupant comfort levels.

For either the continued short or long term use of the facility there are code and standards deficiencies that may require upgrading. Further, most of the existing systems are at the end of their median life expectancy.

#### **5.3.4 Short Term Requirements**

Requirements which have been clearly identified include the following:

- Reconfigure and renovate Ground Floor areas to improve level of service and convenience for passengers, greeters and well-wishers;
- Install common user airline counters to provide improved level of service and opportunities for new airline entrants;
- Expand airline processing and baggage make-up areas;
- Expand baggage claim system to accommodate greater baggage capability;
- Relocate airline offices to the Second Floor as required;
- Develop CARS facility to replace FSS on Second Floor;
- Accommodate downsized NAV CANADA technical services requirements on the Second Floor;
- Provide additional office space, if available, for commercial lease;
- Upgrade mechanical systems to latest code requirements at the time of upgrade and comfort levels.

#### **5.3.5 Medium Term Requirements**

Medium term requirements cannot be readily identified due to the unknown growth rate and potential changes in airline service patterns. Two requirements may develop:

- Install security screening for a dedicated secure holdroom allowing service to other southern airports or to the sterile area of Edmonton International Airport for connecting traffic;
- Reconfigure public areas and increase concession space in response to new demands;
- Replace major mechanical systems.

#### **5.3.6 Long Term Requirements**

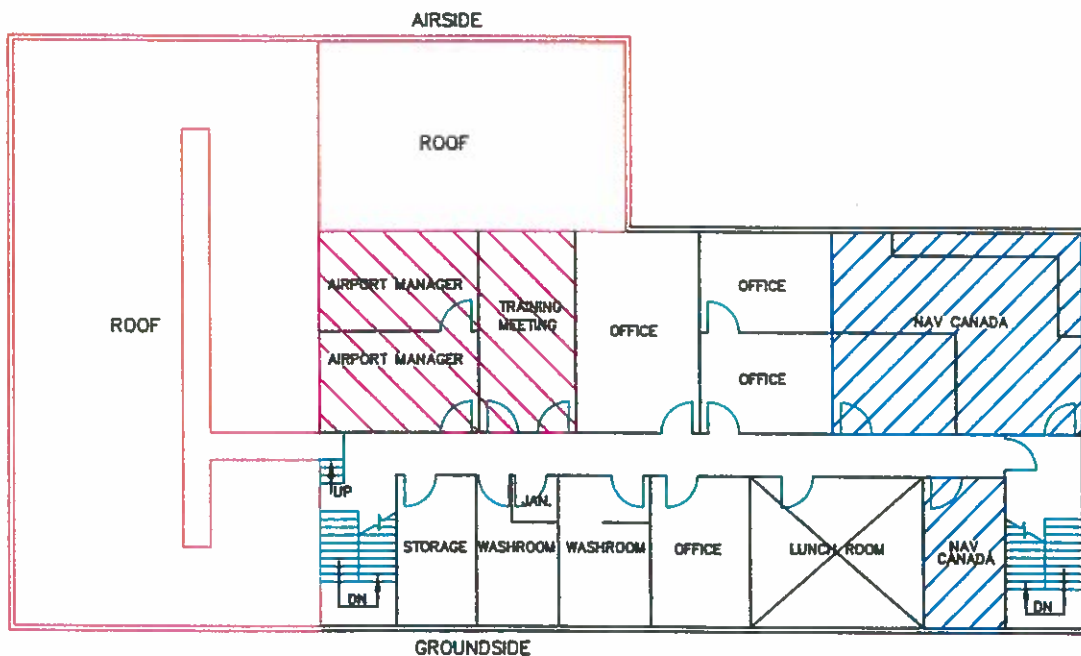
Long term requirements also cannot be easily foreseen but might include:

- Expand passenger processing, baggage claim, public waiting and baggage make-up areas;
- Reconfigure public areas and increase concession space in response to new demands.

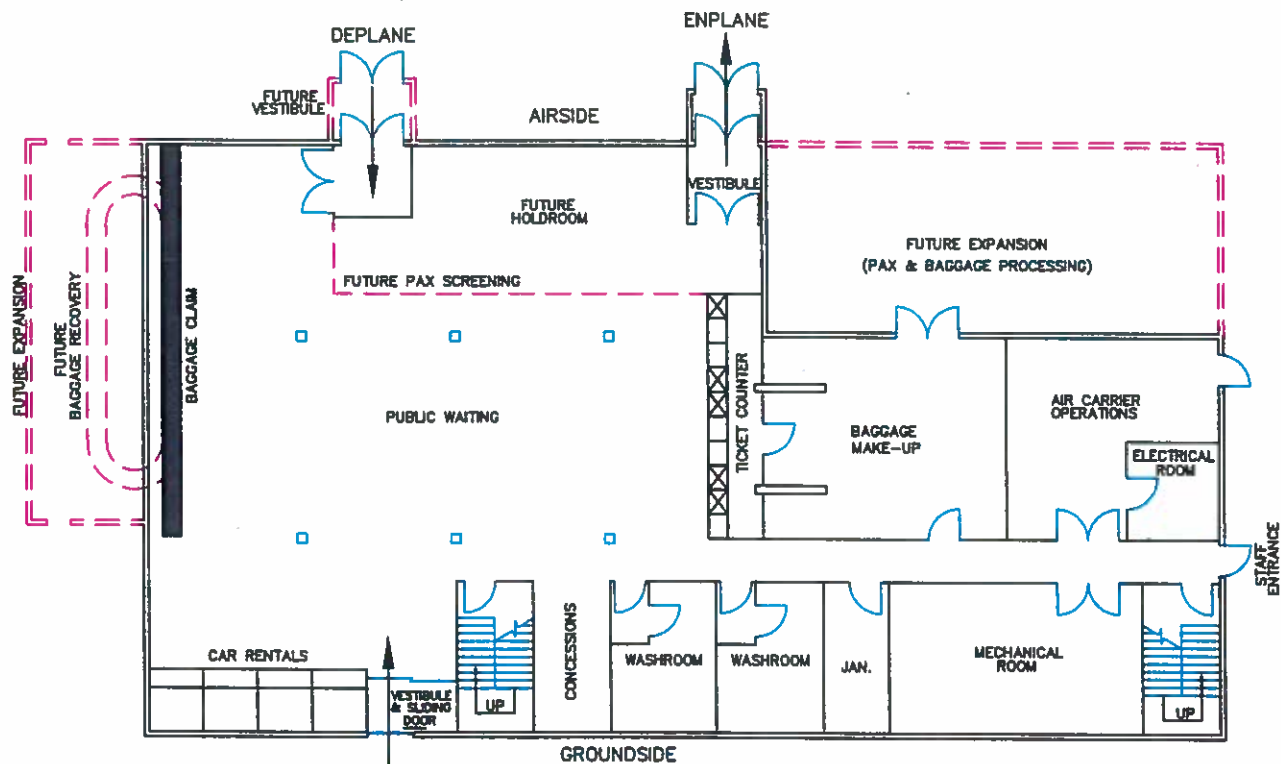
The proposed re-distribution of the internal spaces is shown in the following table. The proposed new Air Terminal Building lay-out is presented subsequently in Figure 5-5.

**Air Terminal Building Space Analysis  
Hay River Airport**

| Space Elements                              | Existing                       |                                            | STEP 4.0<br>(m <sup>2</sup> ) | Proposed                       |                                            |
|---------------------------------------------|--------------------------------|--------------------------------------------|-------------------------------|--------------------------------|--------------------------------------------|
|                                             | Gnd Floor<br>(m <sup>2</sup> ) | 2 <sup>nd</sup> Floor<br>(m <sup>2</sup> ) |                               | Gnd Floor<br>(m <sup>2</sup> ) | 2 <sup>nd</sup> Floor<br>(m <sup>2</sup> ) |
| <b>PUBLIC AREAS</b>                         | <b>229</b>                     |                                            | <b>199</b>                    | <b>188</b>                     |                                            |
| Ticketing                                   | 7.8                            |                                            | 14                            | 14                             |                                            |
| General Waiting                             | 192                            |                                            | 143                           | 142                            |                                            |
| Hold Room                                   | --                             |                                            | 32                            | 33                             |                                            |
| Baggage Claim Area                          | 22                             |                                            | --                            |                                |                                            |
| Baggage Claim Dev.                          | 7                              |                                            | 10                            | 7                              |                                            |
| <b>WASHROOMS</b>                            | <b>35</b>                      | <b>9</b>                                   | <b>35</b>                     | <b>35</b>                      | <b>9</b>                                   |
| <b>AIRLINE OPERATIONS AREA</b>              | <b>58</b>                      |                                            | <b>130</b>                    | <b>85</b>                      |                                            |
| <b>CONCESSIONS &amp; PASSENGER SERVICES</b> | <b>19</b>                      |                                            | <b>15</b>                     |                                |                                            |
| Telephone                                   | 0.5                            |                                            | 2                             | 2                              |                                            |
| Car Rentals                                 | 12                             |                                            | 8                             | 12                             |                                            |
| Vending Machines                            | 1                              |                                            | 5                             | 7                              |                                            |
| Gift Shop/News Stand                        | 5                              |                                            | --                            | --                             |                                            |
| <b>SECURITY</b>                             | <b>--</b>                      |                                            | <b>20</b>                     | <b>--</b>                      |                                            |
| <b>ADMINISTRATION</b>                       |                                | <b>98</b>                                  | <b>47</b>                     |                                | <b>41</b>                                  |
| APM's Office                                |                                | 15                                         | 15                            |                                | 15                                         |
| General Office                              |                                | 14                                         | 12                            |                                | --                                         |
| Coffee/Lunch Room                           |                                | 13                                         | --                            |                                | 13                                         |
| Training/Meeting Room                       |                                | 56                                         | 15                            |                                | 13                                         |
| ECC Allowance                               |                                |                                            | 5                             |                                |                                            |
| <b>LEASABLE OFFICE SPACE</b>                |                                |                                            |                               |                                | <b>98</b>                                  |
| <b>FSS+MET+TELECOM - CARS</b>               |                                | <b>96</b>                                  |                               |                                | <b>55</b>                                  |
| <b>BUILDING SERVICES</b>                    | <b>119</b>                     | <b>24</b>                                  | <b>45</b>                     | <b>119</b>                     | <b>24</b>                                  |
| <b>CIRCULATION &amp; STRUCTURE</b>          | <b>95</b>                      | <b>83</b>                                  | <b>137</b>                    | <b>41</b>                      | <b>83</b>                                  |
| <b>TOTAL</b>                                | <b>554</b>                     | <b>310</b>                                 | <b>628</b>                    | <b>554</b>                     | <b>310</b>                                 |



SECOND FLOOR & ROOF PLAN



FIRST FLOOR PLAN

# HAY RIVER ATB - RENOVATION AND DEVELOPMENT



DATE: March 21, 2000

SCALE: NTS

FILE: Fig\_5-5.dwg

FIGURE NO.

## HAY RIVER AIRPORT DEVELOPMENT PLAN

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## **5.4 Access Roads and Parking**

### **5.4.1 Access Road**

Primary road access to the Hay River Airport Terminal building is via a 350 m long access road that connects to NWT Highway #2 on Vale Island. A service road connects to the main access road at the ATB parking area. This service road runs northeast-southwest and serves the maintenance complex, existing General Aviation areas, and the Fire Bomber Base.

Secondary access is provided to the eastern commercial lands via a connection road that is located northeast on Highway #2 from the main airport access road location.

The Hay River Airport Terminal Building is approximately 4 km from Town Centre. Most of the local users of the airport rely on personal transportation to/from the airport. Itinerant travellers use either the rental car businesses in Hay River or rely on the taxi system. Both have facilities at the airport including direct telephone lines to attract business.

The primary access provides a direct route to the ATB and parking areas with an indirect route to the commercial and general aviation areas; the secondary access provides a direct route to the general aviation and commercial areas with an indirect route to the ATB. The roadway network on groundside primarily consists of undivided two-way roads. One way circulation is provided to the parking and terminal building.

A variety of controlled access points to airside are provided through secure gates about the airport perimeter. These other accesses are rarely used and only with permission and/or assistance of the Department of Transportation.

All groundside roadways are 6.0 metres wide. The roads are either paved with asphalt or chip sealed with asphaltic surface treatment.

The roads all include gravel shoulders except the roadway directly in front of the ATB which includes concrete curb, sidewalk and gutter constructed to an urban standard as defined by the Transportation Association of Canada (TAC).

A variety of airside roads/trails exist at the Hay River airport. These gravel surfaced roads are used primarily to access airside navigational equipment and provide emergency access to the runway system.

The only traffic controls presently in use at the airport are stop signs at the Highway/access road intersection, and railway crossing signs at the access road/RaiLink branch line crossing.

### **5.4.2 Terminal Frontage and Parking**

Parking at the terminal frontage of the ATB curb is not allowed at the Hay River airport other than for pickup/drop functions.

There is one formal parking lot adjacent to the ATB as detailed in Figure 5-6. This lot is divided into three distinct areas. The largest area is dedicated to meeters/greeters and travellers. It is located immediately in front of the main ATB doors. The second area is on the north side of that parking lot. This parking area is used primarily the airport services personnel such as employees

of the GNWT or NAV CANADA. The third parking area is on the south end of the ATB. This area is used by airline employees at the airport for their personal vehicles while on shift.

The overall parking lot is approximately 100 m x 45 m. The lot contains 20 designated public parking stalls, 8 employee stalls, 4 taxi stalls and 6 auto rental stalls.

The lot is uncontrolled and unregulated.

Approximately 12 of the employee, public, and agency parking stalls are electrified (energized) for cold weather users.

Airport staff report that the ATB parking lot adequately serves the general needs of the ATB except during periods when the Ft. Providence ferry (across the Mackenzie River) is not in operational. When the ferry is not operational the result is that some northbound highway travellers from either NWT communities south of the Great Slave Lake or from outside of the NWT who are bound for Yellowknife or beyond to leave their vehicles at the Hay River airport for extended periods while they fly from Hay River to their northern destination, often via Yellowknife.

This situation occurs principally in the spring as the Mackenzie River and Great Slave Lake break up and clear of ice. Ice breakup often lasts for up to two weeks.

Presently many vehicle owners park their vehicle on the grass area slightly northeast of the paved surface of the ATB parking area. Some leave their vehicles in the core of the parking lot, hindering the shorter term users.

Currently the main access road and parking facilities are generally adequate. A notable improvement to the level of service offered to passengers would be to develop a long term gravel parking area. Significantly increased passenger traffic and/or increased tenant activity will trigger the need for improvements to the access road and parking areas.

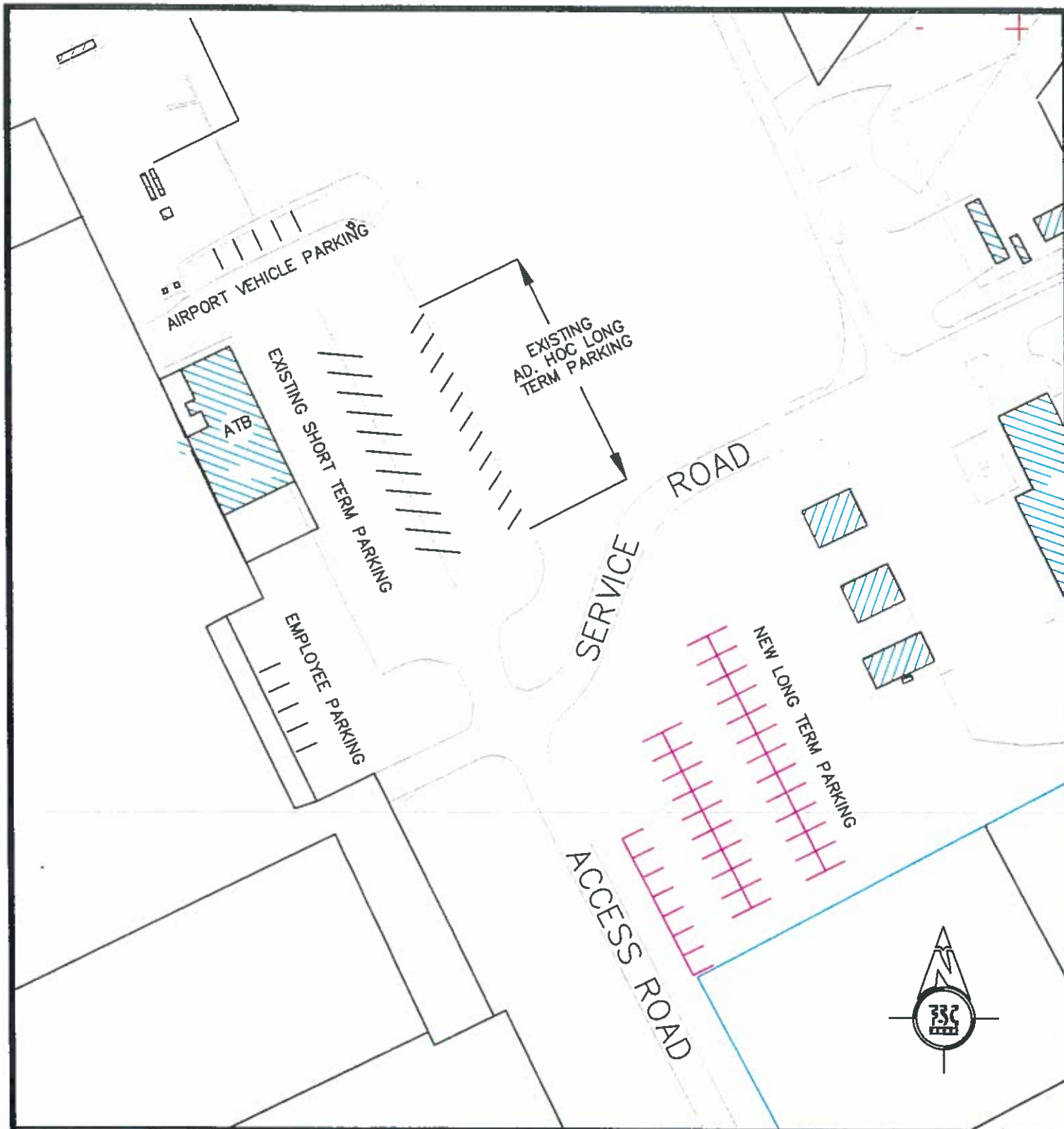
Lessees of airport lots each provide parking on their leased property for use by their staff and patrons. Parking on the airport roadway system is discouraged.

## **5.5 Utilities and Services**

Airport utilities include water, sewage and storm drainage systems which are illustrated in Figure 5-7 on the following page.

### **5.5.1 Water Supply**

Hay River's source for potable water is Great Slave Lake. The Town has two main systems for the water supply. The mainland system consists of an intake structure at the bank of Great Slave Lake, a pump house/treatment building, and a transmission water main to the town. The Vale Island intake and pumping system consists of an intake structure located north of the island in Great Slave Lake and a transmission line to the mainland system. The Town system includes a 4.5 ML concrete covered reservoir that is located in the south residential area.



## ACCESS ROAD / PARKING DEVELOPMENT



DATE: March 21, 2000

SCALE: NTS

FILE: Fig\_5-6.dwg

FIGURE NO.

HAY RIVER AIRPORT DEVELOPMENT PLAN

5-6

A 7 km transmission line serves Vale Island from the mainland distribution system. There are 28 water service connections to this pipeline on Vale Island. The Hay River Airport receives its water from a 150-mm service connection from this transmission line.

This single service serves the potable and fire water needs of the Air Terminal Building and maintenance garage. All other potable water users on the airport receive water via trucked delivery.

Non-potable water for users such as the GNWT Renewable Resources Wildlife Economic Development (RWED) air tanker base and various tenant vehicle washing requirements are satisfied by the surface water supply of the Snye and/or on-site wells.

Hay River's water supply is of good chemical quality for domestic use. Based on the chemical analysis the water is moderately hard, well buffered, and slightly alkaline. With respect to corrosivity, the calcium carbonate based indices indicate the water is moderately aggressive.

There are two main considerations regarding the water service at the airport. The first originates from a history of water main breaks on the service line prior to the airport metering point. Many of these breaks have occurred during the winter and have gone undetected for some time. As a result, the Town has requested that the service meter be moved closer to the airport boundary so that any water loss due to leakage or breaks on the airport property be recorded and billed accordingly. Timing of this relocation has not been established.

The second consideration involves future water supply within expanded General Aviation areas at the airport. Continued reliance on self-contained water supply in the form of storage tanks or wells for each airport user other than the terminal building and maintenance garage is recommended. The only exception to this on-site approach would be the possible provision of water line connections to future lots in the General Aircraft area. The poor geotechnical conditions on site which cause line breakage, and the low water demands of most General Aviation users do not support additional waterline expansion.

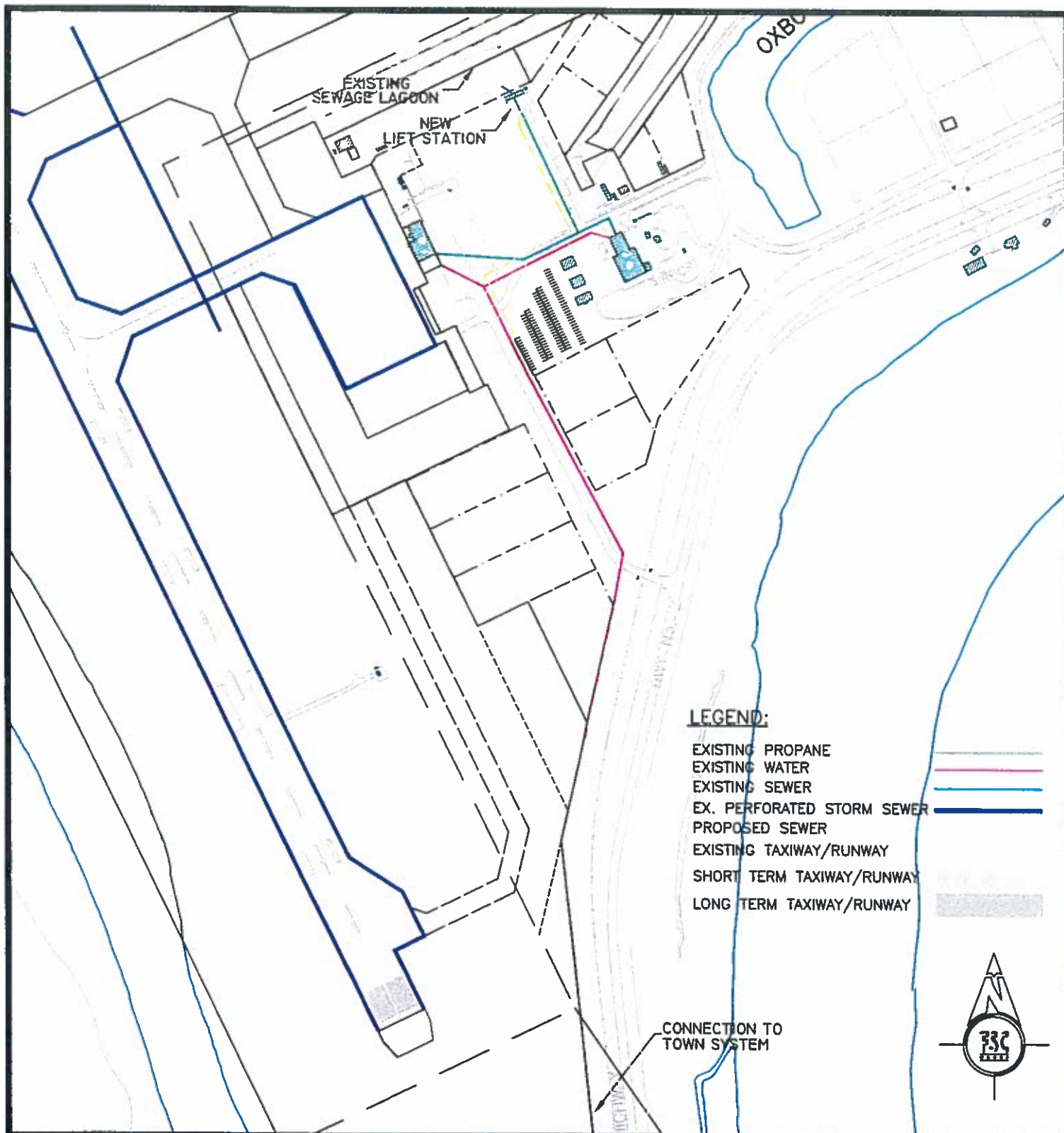
### **5.5.2 Sanitary Sewage**

The Town of Hay River sanitary sewage system presently includes a piped sewage system, connected to a system of lagoons. There is also a sewage pumpout service for those living on Vale Island.

The airport is presently served by its own piped gravity collection system. A 200 mm sewer line connects the terminal building and maintenance garage to a lift station, extended aeration package treatment plant and lagoon, all located approximately 110 metres northeast of the terminal building and south of Runway 04/22 as shown on Figure 5-7.

The airport sewage lagoon exfiltrates. This practice of disposal is approved by regulatory agencies for other NWT communities. Under present operation, there is a concern for sludge build-up in the lagoon that potentially reduces the capacity and could cause anaerobic conditions which result in unpleasant odours.

The lagoon sewage treatment method adequately serves the airport users and treats the sewage to acceptable levels. Piped connection to the Town of Hay River' municipal system would be extremely expensive and requiring a forced sewage delivery system from the airport, across the



## AIRPORT UTILITIES



DATE: March 21, 2000

SCALE: NTS

FILE: Fig\_5-7.dwg

FIGURE NO.

## HAY RIVER AIRPORT DEVELOPMENT PLAN

5-7

West Channel to the municipal system. The length of this piping would be in the order of 2 kilometres.

Lagoon operation and maintenance procedures, and sludge management practice, should be investigated and best practices followed. Raw sewage quality should be protected from contaminants and toxic influences.

Due to the poor geotechnical conditions of the airport lands and the high cost of serving, it is recommended that piped sewage services be extended to only those areas that are easily serviced from the existing buried sewage collection system. Any development lots beyond this system should be served by pump-out systems and on-site holding tanks.

While the lagoon system is recommended, the present location hinders future development. It is recommended that a new lagoon be constructed across Runway 04/22 from the existing location. Decommissioning of the existing site would be required prior to commercial redevelopment in the area.

### **5.5.3 Storm Water Drainage**

The airport is served by two storm drainage systems; a system of perforated pipes to handle subsurface drainage, and ditches for natural surface drainage of stormwater. The aircraft parking apron, taxiways and Runway 13/31 are served by pipe drains which were installed during initial construction. These systems are shown on Figure 5-7 and are located around the paved areas to carry subsurface water and storm drainage to the west channel and the oxbow in the centre of Vale Island via several outlets.

Elsewhere, surface drainage systems are generally in place. These require periodic improvement to mitigate runway subsidence problems caused, in part, by poor surface drainage conditions. Given the high water table, improvements to the systems are very difficult.

### **5.5.4 Flood Risk**

The Hay River Airport is surrounded by the Great Slave Lake to the north, the West Channel to the west, the Hay River to the south, and two oxbow channels within Vale Island to the east. The River and Channels are extremely susceptible to flooding during the spring ice breakup on the Hay River. Historically the entire Hay River area has faced substantial flooding, and this problem is expected to continue. In fact, the last flood which affected the airport was during the Spring, 1985. The result was closure of the airport for approximately 24 hours.

Flood Risk mapping of the Hay River area was completed in May, 1984, through a joint project involving Environment Canada, Indian and Northern Affairs Canada, and the Government of the Northwest Territories. This mapping, suggests that no operational areas of the airport are included within prime flood risk areas, which occur mainly along the channels and the Hay River. However, the 1985 flood which covered the north end of Runway 13/31 shows that this mapping is somewhat unreliable compared to natural occurrences which are impossible to predict.

In summary, the airport must continually be viewed as operating within a high risk, seasonal flooding area. No improvements short of complete airport relocation or reconstruction at higher grades will eliminate this fact. Therefore, all major capital expenditures at Hay River Airport must

include flood risk as a major evaluation and construction criteria. Fortunately, the main airport development areas proposed within this Development Plan represent a low relative flood damage risk.

## **5.6 Electrical and Communications**

### **5.6.1 Airfield**

In recent years various capital or repair projects on the airfield have resulted in most lighting transformers having pull pits installed as well as a steady increase in the amount of airfield lighting cable installed in poly tubing. This method of installation is typically a goal at airport sites in order to facilitate long-term maintenance of and alterations to the airfield circuits.

Because of problems experienced on Runway 04/22, there is currently a project planned to have all cabling routed in poly tubing.

Further, in 1995 the entire Field Electrical Centre (FEC) was completely replaced providing a modern system in good condition and with ample spare capacity to accommodate additional airfield loads.

### **5.6.2 Air Terminal**

Power services are brought to the Air Terminal Building from both a direct connection to the commercial power supply, and also from a second, independent, connection routed through the FEC. From a pad-mounted transformer 120/208 Volt secondary feed sources a 300 Amp main breaker in the Air Terminal Building electrical room.

The 300 Amp main breaker sources power to all normal power building loads when commercial power is being provided. The main breaker is part of a structure of integrated switchgear which includes the utility metering cabinet and the distribution section. The distribution section has five 100 Amp breakers feeding panels A through D as well as a transfer switch.

From the FEC a 347/600 V essential power feeder is run underground to the Air Terminal Building. This feeds a 100 Amp switch that supplies a 600/120/208 V, 45 kVA transformer which in turn provides a 120/208 V power source to the transfer switch. The 100 Amp manual transfer switch sub-feeds a 208 V panel (Y) via a 150 Amp enclosed breaker to carry all essential loads in the Air Terminal Building. Panel Y sub-feeds to two other panels (X & Z). Under normal circumstances the transfer switch is left in the emergency mode so as to allow all essential loads in the Air Terminal Building to be carried by the Interrupted Power Unit (IPU) when utility power fails without having to perform a manual transfer.

The one-year power demand records (from August, 1998 to August, 1999) show the building demand to be 30 kVA, excluding the essential loads which are metered at the FEC. Peak loading occurs in January and February most likely due to the building requiring full lighting loads at those times.

The personnel at the site have expressed an interest in having the entire Air Terminal Building carried by the FEC generator during utility power failures. Although there is sufficient capacity on the generator to accomplish this the fundamental philosophy behind the FEC is to ensure that all

essential airfield lighting, NAV CANADA equipment, and other related loads are powered during a commercial power interruption. Any additional loads connected to the FEC would require new cabling from the FEC and modifications to the Air Terminal Building distribution system.

### 5.6.3 Field Electric Centre (FEC)

Services are brought underground to the FEC from a pad mounted transformer owned by Northland Utilities. The transformer is wound for 347/600 Volt secondary voltages. A 347/600 Volt service is routed to a 3 Phase 300 Amp trip (400 Amp frame) main breaker in the FEC. The main breaker feeds a 400 Amp non-essential power bus. With the exception of one 15 kVA transformer feeding normal loads on a branch circuit panel and power factor correction capacitors, all other loads in the FEC distribution are essential and are carried by the Interruptible Power Unit (IPU).

The FEC includes a diesel-powered IPU manufactured by Onan. The manufacturer's placard indicates that this is a 250 kW unit while the as-built drawings show a 175 kW unit. This unit supplies emergency power to all essential loads in the airfield lighting system, the Air Terminal Building, sewage lift station, maintenance garage, Localizer, Glidepath system and the VHF/DF site. A one-year demand record (August, 1998 to August, 1999) shows a peak demand on the FEC of 77 kW. Typical monthly demands vary from 53 to 77 kW.

All constant current regulators for the airfield lighting circuits are located in the FEC. There are five 20 kW regulators (including one spare) plus three 7.5 kW regulators. The airfield circuits fed are as shown in the following table.

**Runway Lighting Circuits  
Hay River Airport**

| <b>Circuit Identification</b> | <b>Capacity</b> | <b>Construction</b> |
|-------------------------------|-----------------|---------------------|
| Spare                         | 20 kW           |                     |
| HIA 31                        | 20 kW           | 2 #8 5 kV           |
| HIA 31                        | 20 kW           | 2 #8 5 kV           |
| HIA 31                        | 20 kW           | 2 #8 5 kV           |
| Runway 13R/31                 | 20 kW           | 2 #8 5 kV           |
| AVASIS                        | 7.5 kW          | 2 #8 5 kV           |
| Taxis A&B                     | 7.5 kW          | 2 #8 5 kV           |
| Runway 04/22                  | 7.5 kW          | 2 #8 5 kV           |

There is also a 600 Volt feed from the regulator bus which supplies a 10 kVA 600/2400 Volt single phase transformer. From the 2400 Volt side of this transformer a 5 kV cable is run to a step-down transformer (2400/120/240 V) in the airfield, which supplies the Low Intensity Approach lighting.

The FEC was replaced in 1995 and all systems are in good condition with spare capacity. The IPU has capacity for significant additional or expanded airfield lighting circuits.

#### 5.6.4 Supply and Distribution

The supply of commercial power to the Air Terminal Building, the FEC and the maintenance garage is provided by Northland Utilities and is of adequate size for the existing loads with some spare capacity. The primary cabling makes the transition from overhead to underground in the Air Terminal Building parking lot and connects to both the Air Terminal Building and FEC transformers. It continues overhead to serve the maintenance garage and commercial operations which share the same road. Existing conditions are:

##### Electrical Services Hay River Airport

| Location              | Transformer | Demand |
|-----------------------|-------------|--------|
| Air Terminal Building | 150 kVA     | 30 kVA |
| FEC                   | 150 kVA     | 77 kVA |
| Maintenance Garage    | shared      | 20 kVA |

Northland Utilities is asking Arctic Airports to consider that they install underground cabling on the airport site where overhead power lines now exist. The intent is to improve the aesthetics and reliability due to the greater protection from lightning associated with underground power cabling however routine maintenance concerns are likely to take precedence. Further, there is a valid concern that underground wiring does not provide significantly greater protection from lightning strikes. Existing overhead wiring should remain.

#### 5.6.5 Telecommunications

Telecommunication services to the site are provided by the local utility (NorthwesTel). From the same pole where the power lines change from overhead to underground, the telephone service cabling also goes underground. The main site service cabling consists of two 100-pair copper cables with approximately 100 pairs currently in use.

The proposed renovation to the Air Terminal Building could easily be accommodated by the existing service cabling. However, as data transmission needs expand, there may be a future requirement for higher bandwidth services to the Air Terminal Building or other parts of the airport site, although NorthwesTel has no plans for altering the existing distribution lines which serve the airport site.

### 5.7 Aircraft Fuel Facilities

Branded fuel supply agencies withdrew from the airport at the time of transfer due to the low volumes sold and the cost of meeting current and future environmental requirements.

Several air carriers subsequently made interim arrangements for stand-by fuel tanker truck service to be available for their company's needs at the airport. However no service was available for itinerant aircraft.

The Town installed a fixed tank and dispensing system at the south end of the apron in the summer of 1999 and has contracted its operation to a local firm. Jet A and AVGAS is now available at the airport.

The location of the new fixed fuelling facilities impedes apron expansion to the south. Further, and prior to any apron expansion to the south, if these fuelling facilities were located elsewhere the area that they currently occupy could be used for the more convenient parking of aircraft for passenger operations using the Air Terminal Building. Relocation of the fuel facilities to the north or west sides of the apron is undesirable primarily because it would limit apron expansion in those directions. As such the new equipment should be relocated to the east side of the apron and closer to the Air Terminal Building.<sup>3</sup> This will improve apron capacity and passenger convenience with no reduction in overall safety. There is fuel contamination (of the soil) at the site proposed for the fuelling facilities relocation. Relocation of the existing equipment can not be completed until the proposed remediation program has been completed.

## **5.8 Access Control and Security**

Transport Canada classifies airport security under three levels: Schedule I (International) Airports, Schedule II (National) Airports, and Other Airports. Hay River Airport has been classified as an 'Other' airport. Security requirements take three forms:

- ➔ Legislated requirements in accordance with Aerodrome Security Regulations, and Aerodrome Security Measure;
- ➔ Policy recommendations of Transport Canada; and
- ➔ Good business practices.

### **5.8.1 Airfield**

Airfield security includes a 2 m high security fence adjacent to commonly used public areas, or water channels and obstacles. In more remote areas, the natural terrain serves to discourage casual entry to the airport. A continuous security barrier does not exist at this time, nor is such a continuous fence required by applicable regulations. Regulations notwithstanding, there does not appear to be an overriding need for a continuous fence.

Applicable regulations require that the apron areas are fenced-in (or otherwise barred) and such a fence barrier exists at the Hay River Airport.

### **5.8.2 Air Terminal**

The Air Terminal Building does not currently have passenger screening facilities. The facility is supervised and unauthorized airside access prevented by locked doors.

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<sup>3</sup> Attention is called to Table 4.3.2.1. of the 1995 National Fire Code which specifies minimum separation distances between a building and various tank sizes.

## **5.9 Emergency Response Services**

Transport Canada is currently reviewing requirements for Emergency Response Services (ERS) at Canadian airports. New regulations, which were originally scheduled for 1997, are expected to be finalized in the near future.

### **5.9.1 Current Services**

On-site aircraft firefighting was eliminated by Transport Canada before the airports were transferred to the Territorial Government. There are no on-site firefighting services currently and the Town's volunteer fire service will respond as required to airport emergencies. ICAO standards only apply to NAS airports (the 28 largest in the country) and do not apply to the Hay River Airport.

### **5.9.2 Current Facilities**

The Firehall equipment and facilities at the Hay River Airport were located in the maintenance garage approximately 250 m (820 ft) southeast of the Air Terminal Building. The original facility still exists but is no longer used for as a firehall. The CFR training area on-site has been decommissioned and is being remediated by Transport Canada. The Town of Hay River is responsible for all structural fire fighting on the airport.

### **5.9.3 Evolving Requirements**

Transport Canada is expected to issue new ERS regulations in the future. The proposed standard, CAR 308, will apply to Hay River. If these regulations are implemented in their proposed format, preliminary studies find that there may be an initial capital cost of \$724,00 for equipment and an annual operating cost of \$190,000. However, as these new ERS regulations have not actually been enacted as of the writing of this plan, caution must be given to their interpretation. In fact, these equipment and annual operating costs may actually decrease.

Transport Canada and user groups are reviewing the proposed regulations concerning ERS capabilities and the final rules are unknown at this time. Draft regulations are based on the number of daily aircraft movements and type of operations. To date, the following definitions have been drafted and Hay River Airport appears to fall under a Category B Airport:

## New Draft ERS Regulations for Airports

| Airport Category | Criteria                                                 | ERS Requirement                                                                                                                                                            |
|------------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A                | Air taxis, OR<br>< 8 commuter aircraft/day               | → Alerting system to community-based fire service, AND<br>→ On-site fire extinguishers                                                                                     |
| B                | 8 or more commuter aircraft/day, OR<br>< 8 airliners/day | → Alerting system to community-based fire service, AND<br>→ On-site trained emergency responder, vehicles and equipment, OR<br>→ community fire response within 10 minutes |
| C                | 8 or more airliners per day                              | → Trained emergency personnel<br>→ Vehicles and extinguishing agents on site<br>→ Communications and alerting system<br>→ 3-minute response capability                     |

| Operations - Definitions | Criteria                                                  |
|--------------------------|-----------------------------------------------------------|
| Air Taxis                | Aircraft authorized to carry fewer than 10 passengers     |
| Commuter Aircraft        | Aircraft authorized to carry between 10 and 19 passengers |
| Airliners                | Aircraft authorized to carry 20 passengers or more.       |

Source: Wings Magazine, Issue 3, 1999

## 5.10 Airport Maintenance

### 5.10.1 Services and Equipment

Maintenance of the airport is completed by airport staff and equipment. Maintenance requirements include but are not limited to the following tasks:

- Snow clearing
- Grass cutting
- Fence maintenance
- Maintenance of water and sewer systems
- Maintenance of the airfield electrical and the Field Electrical Centre
- Pavement management on airside and groundside
- General building maintenance
- Airfield electrical maintenance
- Vehicle and equipment maintenance

Airport maintenance equipment owned by GNWT includes:

- A variety of pickup trucks, stake trucks, service trucks, vans, trailers and tandem trucks
- Dump/Plow trucks
- Snow blowers
- Truck-mounted and removable plow blades
- Sweepers and wobbly wheeled rollers
- Line painting equipment
- Tractor
- Loaders
- Rotary lawn mowers attachments
- Truck mounted crane/manlift
- Sanding equipment
- Plow blades
- Trencher
- Tar/machine
- Various equipment such as generators, welders, trimmers, chain saws, and misc. support equipment

For a more detailed list of current maintenance equipment, refer to Table 5-1

Maintenance schedules have been established for some elements of the airport facilities for which the government is responsible for operations and maintenance. These schedules are maintained on a regular basis and updated as the general maintenance is completed.

### **5.10.2 Facilities**

The Hay River Airport facility includes a Maintenance Garage that was constructed in approximately 1969. The building is a pre-engineered steel structure of two distinct sections. The total floor area is approximately 760 m<sup>2</sup> which includes a 4 bay vehicle garage with overhead doors for each bay and an office section. The garage is 540 m<sup>2</sup> and the office is 220 m<sup>2</sup>.

### **5.10.3 Deficiencies and Requirements**

Snow removal equipment comprises the largest dictating factor for both size and critical operation with respect to the maintenance facilities at this airport. The present inventory of maintenance equipment at the Hay River airport is adequate to meet current aircraft movement scheduling.

A cursory site visit and documentation of the Maintenance Garage/Office indicates that it is in a typical condition for a building of this service type and age.

The structure and foundation of the building appeared to be solid. There is evidence around the perimeter of the building of settlement of the grade. As a result, drainage is not performing adequately and water is entering the crawlspace.

The metal cladding and insulation package are nearing the end of their life cycle. Air and vapour barriers are discontinuous and are therefore contributing to excessive heating costs. Signs of deterioration are present in the interior and exterior finishes.

The mechanical and electrical systems are aging and do not meet the current Canadian building code standards.

The GNWT Department of Public Works and Services completed a technical evaluation of this building in 1998 on behalf of the Department of Transportation. That particular study was completed to assess the physical condition of the building and determine the suitability of the building for renovations. The evaluation did not consider the functional or programming aspects of the facility.

The study found the garage/office to be generally in satisfactory condition but with a number of Building Code conflicts. Specific deficiencies include worn finishes aging doors and windows and damaged exterior cladding. 1995 National Building Code conflicts include inadequate fresh air supply and lack of fire separations. Building electrical systems include deficient lighting levels and wiring in excess of 25 years service life, and may require partial or complete retrofitting.

The Technical Status Evaluation noted that hydrocarbon contamination was evident in the crawlspace and at the exterior of the building. It also noted that there is a possibility that asbestos containing materials were used in the insulation of the heating lines. The report recommends further study of these two environmental aspects of the facility.

The overhead doors marginally serve the mobile equipment. Extra care is required by the operators to manoeuvre the equipment in and out of the garage. Future building improvements should consider enlarging at least one of the doors to ensure adequate clearance for the larger equipment.

A detailed feasibility study, including a space requirements program, for a combined use facility should be undertaken prior to finalizing the medium term airport support facilities strategy.

**Table 5-1: Equipment Inventory  
Hay River Airport**

| DOT    | AMMS    | Description     | Year | Manufacturer    | Model        | Cost       | Licence | Comments                |
|--------|---------|-----------------|------|-----------------|--------------|------------|---------|-------------------------|
| 12-503 | 85-9215 | Trailer         | 1992 | Craig           | Custom D3    |            | T15026  |                         |
| 15-506 | 56-7205 | Dump truck      | 1972 | Ford            | LT8000       |            | G3720   |                         |
| 16-526 | 56-8505 | Dump/plow truck | 1985 | International   | 5070         |            | G3707   |                         |
| 17-515 | 55-8215 | Dump/plow truck | 1982 | International   | S2500        |            | G3708   |                         |
| 18-615 | 3-3015  | Pickup truck    | 1993 | Ford            | F250         |            | G3718   |                         |
| 18-624 | 53-3016 | Pickup truck    | 1993 | Ford            | F250         |            | G3709   |                         |
| 18-827 | 54-9108 | Service truck   | 1992 | Ford            | F450         |            | G3716   |                         |
| 18-529 | 54-9208 | Stake truck     | 1992 | Ford            | F350         |            | G3711   |                         |
| 18-513 | 53-9113 | Pickup truck    | 1991 | Ford            | F150         | \$ 15,545  | G1616   |                         |
| 19-519 | 53-1099 | Minivan         | 1991 | Ford            | Aerostar     |            | G3717   |                         |
| 21-307 | 82-7805 | Wheel loader    | 1978 | John Deere      | JD554B       |            |         |                         |
| 21-310 | 62-9601 | Wheel loader    | 1996 | Case            | 721B1        | \$ 148,039 | G4153   | C/w snow bucket         |
| 23-516 | 66-7805 | Grader          | 1978 | John Deere      | JD670        |            | G3710   |                         |
| 24-503 | 83-6802 | Crawler/tractor | 1966 | International   | TD15         |            |         |                         |
| 26-545 | 72-6801 | Packer w/ wheel | 1968 | Bros            | R-67         |            |         |                         |
| 30-861 | 69-9302 | Tar machine     | 1993 | Marathon        | UCMK 200     |            |         |                         |
| 30-862 | 72-7407 | Line painter    | 1974 | Traffic Line    | City Line 30 |            |         | Surplus from Ft Simpson |
| 30-873 | 729702  | Line Painter    | 1997 | Precision       | P100         | \$ 52,410  | 52410   |                         |
| 52-905 | 61-9153 | Trencher        | 1991 | Case            | T400         |            |         |                         |
| 52-908 | 61-8008 | GP tractor      | 1980 | Massey Ferguson | MS265        |            | G3705   | Surplus                 |
| 52-909 | 67-7101 | Sweeper         | 1971 | Sicard          | SW314G11     |            |         | Surplus                 |

| DOT     | AMMS    | Description      | Year | Manufacturer | Model        | Cost       | Licence | Comments                                          |
|---------|---------|------------------|------|--------------|--------------|------------|---------|---------------------------------------------------|
| 52-912  | 67-9301 | Sweeper          | 1993 | Vohl         | PV112C       |            | G3719   |                                                   |
| 52-915  | 73-0880 | Rotary mower     | 1973 | Ullston      | 760          |            |         |                                                   |
| 62-917  | 73-8605 | Rotary mower     | 1973 | Terrain King | TIOV-15      |            |         |                                                   |
| 52-919  | 73-9130 | Mower            | 1991 | Ford         | CM222        |            |         |                                                   |
| 52-921  | 73-9131 | Mower attachment | 1991 | Ford         | 72"          |            |         |                                                   |
| 52-931  | 61-7901 | GP tractor       | 1979 | John Deere   | JD401C       |            | G4274   | Transfer to Hay River A/P                         |
| 52-931  | 61-7910 | Tractor          | 1979 | John Deere   | JD410C       |            |         | Surplus from Ft. Simpson                          |
| 52-961  | 67-9801 | Sweeper          | 1998 | SMI          | SW3240       | \$ 148,625 |         |                                                   |
| 53-127  | 60-9201 | Snowblower       | 1992 | SMI          | 5450         | \$ 219,960 | G3252   |                                                   |
| 53-874  | 71-6835 | Plow blade       | 1968 | Frink        | 440Sk        |            | G3722   | One way                                           |
| 53-876  | 71-7117 | Plow blade       | 1974 | Frink        | 4219PWK      |            |         | Reversible, 19 ft                                 |
| 53-878  | 71-7511 | Plow blade       | 1975 | Frink        | 4219PWK      |            |         | Reversible, 19 ft                                 |
| 53-880  | 71-7912 | Plow blade       | 1978 | Frink        | 4219PWK      |            |         | Ramp hog                                          |
| 53-882  | 71-8215 | Plow blade       | 1982 | Frink        | 4213PWK      |            |         | Reversible, 13 ft                                 |
| 53-928  | 71-9702 | Dozer blade      | 1997 | Weidco       |              |            |         | Reversible, attachment for Case 721B wheel loader |
| 53-943  | 71-9616 | Ramp plow        | 1996 | Weidco       | 240          | \$ 10,988  |         |                                                   |
| 53-944  | 71-9617 | Snow bucket      | 1996 | Weidco       | 6 cubic yard |            |         |                                                   |
| 54-500  | 71-8332 | Tailgate sander  | 1983 | Iberia       | 94-85        |            |         |                                                   |
| 54-515  | 70-9601 | Spreader         |      |              |              | \$ 4,555   |         |                                                   |
| Misc Eq | 71-9238 | Crane/Manlift    | 1992 |              |              |            |         | Mounted on 18-527                                 |

## **5.11 Airport Environment**

### **5.11.1 Overview**

The 1985 Master Plan prepared by Transport Canada identified three major environmental conditions affecting the airport.

- ➔ Geotechnical conditions represent the most significant environmental issue which has, and will continue to affect construction, development and use of this facility.
- ➔ The airport is located on an island which also includes a number of water channels within the airport boundary. The environmental impact of airport activity on these natural water systems must be considered in future development.
- ➔ The airport is situated in close proximity to an existing residential and industrial development area on Vale Island. Off-site social impacts of airport operations must be considered.

In 1994/95 Transport Canada contracted an Environmental Baseline Study for the Hay River Airport.

### **5.11.2 Environmental Concerns**

Current areas of concern for sites, operators and tenants on the airport property are listed in the accompanying tables. Other concerns are identified below. Figure 5-8 illustrates several environmental issues.

#### **Wildlife**

The artificial large expanse of open area created by the airport attracts a variety of birds which, prior to the airport's construction, would have traditionally passed over the area. Although there have been isolated incidences with wildlife, they have not been significant, and the airport is said to have increased diversity of habitat in the region. The Hay River, which surrounds the airport, supports fish species, notably some jackfish. The Department of Fisheries and Oceans advises that there is also a run of pickerel in the Spring and a run of whitefish in the Fall.

#### **Aircraft De-icing**

Aircraft de-icing is undertaken primarily by Canadian North using Type 1 fluid and approximately 200-300 litres per application on a designed area on the apron. Buffalo Airways and First Air use a small hand sprayer for leading edge of the wing applications. Volumes and practices require investigation to determine potential effects and collection/remediation alternatives.

#### **Runway Ice**

Urea is used on the runways for de-icing. Sand application and surface sweeping also take place. Management practices require investigation and a sampling program undertaken to determine potential effects on water quality.

## **Stormwater Drainage**

The airport has two drainage systems: a) a system of perforated pipe for subsurface drainage to service the aircraft parking apron, taxiways and Runway 13/31; and b) ditches to carry storm drainage to the west channel and oxbow in the centre of Vale Island. The subsurface drainage system is apparently functional however the settlement problems that are occurring on the surface of Runway 13/31 are suspected to be water related.

Stormwater drainage should be investigated to determine volumes, frequency and distribution of flows, and water quality to determine potential for downstream effects. Stormwater infrastructure should be investigated to determine adequacy, condition, and life expectancy.

## **Sewage**

The current sewage lagoon exfiltrates following a theoretical hydraulic retention of greater than one year. There is no groundwater mounding under the lagoon. The lagoon exceeds a 500 m setback from the Great Slave Lake. There is no potable groundwater source in the area. There has been no reported concern for groundwater contamination to this time. This practice of sewage disposal is approved by regulatory agencies for other NWT communities. It is unlikely that a separate water board licence would be required for such a facility located within a municipal boundary as has been previously suggested. Notwithstanding, the airport would still be subject to municipal by-laws, municipal effluent guidelines, public health regulations and all other environmental regulations.

Under present operation, however, there is a concern for sludge build-up in the lagoon. Sludge intruding into the upper layers of the lagoon reduces capacity, could cause anaerobic conditions and contributes to unpleasant odours. Anaerobic conditions could reduce treatment efficiency. Excessive vegetative growth beside the berm also contributes to anaerobic conditions and should be cut and removed frequently. Further, the sludge could reduce the exfiltration rate of the lagoon, causing the lagoon to overflow as discharge volumes increase.

Concern is held for disposal of toxic contaminants into the lagoon. Such a practice could disrupt treatment, allow contaminant discharge to the environment and/or contaminate the sludge above current guidelines for disposal and/or abandonment in place. It should be noted that the sludge may already be contaminated. Lagoon operation and maintenance procedures, and sludge management practice, should be investigated and the best practices followed. Raw sewage quality should be protected from contaminants and toxic influences. The sludge should be monitored to prevent contaminant build up from restricting disposal options. If the NWT Water Board finds the sludge to be of acceptable quality, it could be land farmed with fuel contaminated solid to enhance the C:N:P ratio required for bioremediation.

Any residence, inhabited building or establishment where food is stored and/or served must be located outside a 450 metre setback from the sewage lagoon as required by the General Sanitation Regulations of the Public Health Act. The Chief Medical Health Officer may grant a variance for non-compliant existing lagoons to permit the existing conditions, however, it has not been the practice to permit additional development within a 450 metre setback even if a variance exists. Any attempts to enlarge this sewage lagoon to accommodate additional development will likely not be approved by the Chief Medical Health Officer.

Replacing the sewage lagoon with a on-site enclosed mechanical facility will reduce setback requirements to 90 metres.

## **Solid Waste Management**

Although solid waste is collected by a contractor for disposal at the Town's municipal facility, waste minimization activities, segregation at the source and recycling opportunities should be investigated.

## **Waste Petroleum Oil Lubricants (POL)**

Waste Petroleum Oil and Lubricants (POL) should be investigated to consider waste minimization activities, and recycling/reuse opportunities.

### **5.11.3 Environmental Constraints to Development**

Aircraft noise is currently not a significant issue.

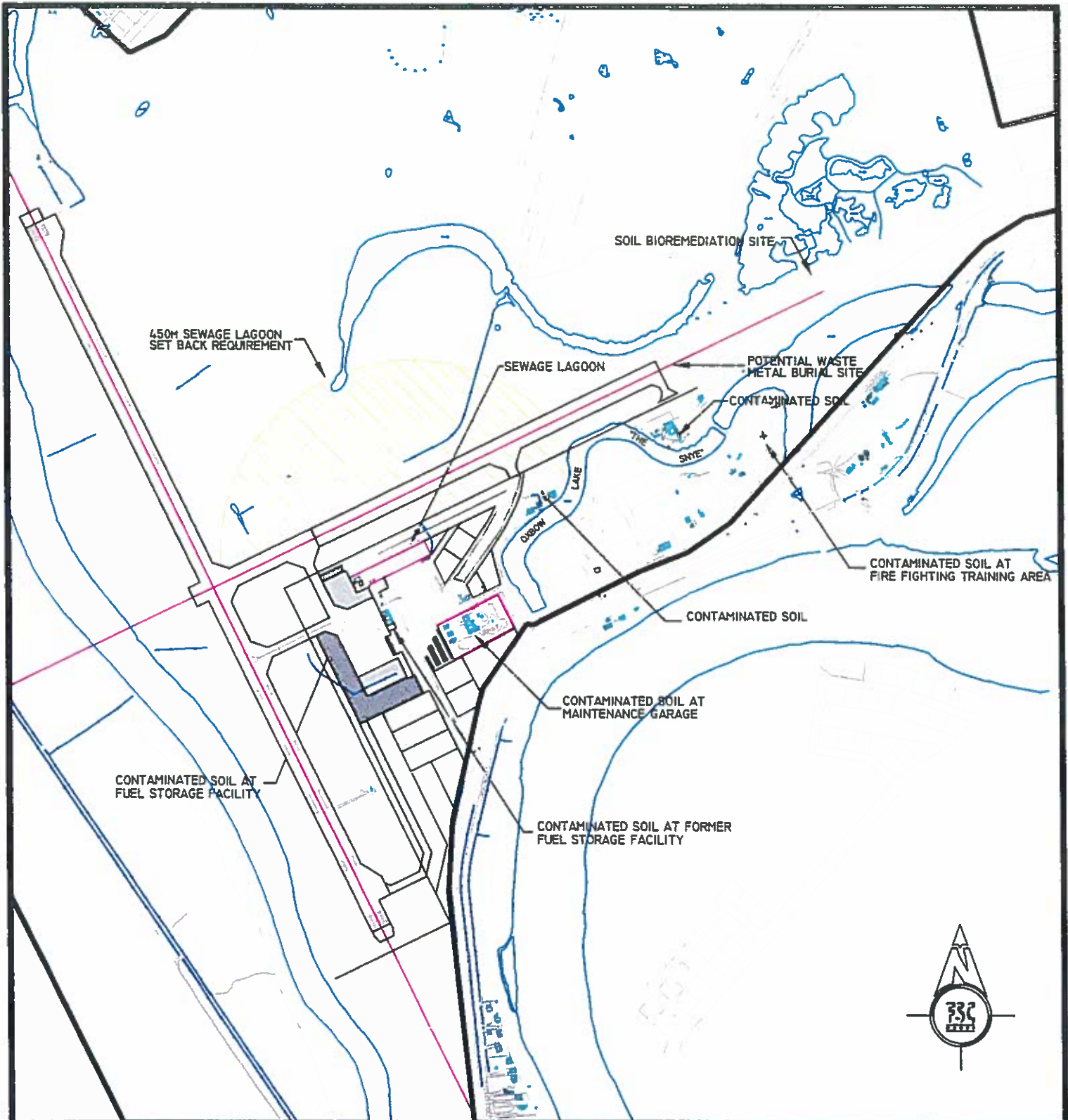
The sewage lagoon setback requirements will impact on development within the setback. Existing studies on the capacity of the existing sewage lagoon are cursory in nature and a detailed study of the sewage lagoon would be required before recommendations on development could be fully developed. However, it is known that the existing volume of the lagoon appears adequate to service the current needs of the airport, understanding that ongoing monitoring and maintenance will be required. In the absence of a comprehensive sewage lagoon study it is reasonable to conclude that future development of the Hay River Airport may be constrained unless an alternate facility is developed.

A potential waste metal disposal site at beyond the threshold of Runway 22 may prevent lengthening of this runway should this ever become a requirement.

Contaminated soil at many locations will constrain development.

Numerous National Fire Code, WHMIS, and environmental code violations are associated with hazardous materials management throughout the entire property, and by operators and tenants.

The identified present environmental conditions are catalogued within this report for a variety of airport tenants. For issues of privacy, the tenants are not specifically identified.



## ENVIRONMENTAL ISSUES



DATE: March 21, 2000

SCALE: NTS

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FIGURE NO.

# HAY RIVER AIRPORT DEVELOPMENT PLAN

# 5-8

**Figure 5-9 Environmental Issues**



Geotechnical conditions represent the most significant environmental issue. The airport is located on an island which includes a number of water channels within the airport boundary. The environmental impact on these natural water systems must be considered in future development. The airport is situated in close proximity to an existing residential and industrial development area. The shallow (1-2 metre) water table and groundwater flow is influenced by the changing levels of Great Slave Lake. Discontinuous permafrost is located at approximately 2.5 metres depth and may be shallower.



The sewage lagoon cannot support development



Stressed vegetation at the GNWT Renewable Resources site



Bioremediation of soils beyond the end of Runway 04-22



Waste product drums without secondary containment

## Identified Present Environmental Conditions

### Tenant A

| Issue                           | Previous Recommendation(s) to deal with the situation                                           | October 1999 Condition                             | Remarks/Plans                                                        |
|---------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------|
| Fire Fighter Training Area      | Conduct subsurface soil investigation to delineate the area of remaining contamination          | Continuing to turn top meter in place              | Continue monitoring                                                  |
|                                 | Conduct sampling program of monitoring wells to determine presence of groundwater contamination | Wells dry in 1999                                  | GNWT to continue monitoring                                          |
|                                 | Develop a more aggressive remediation strategy if programs indicate                             | not required at this time                          | To be determined                                                     |
| Bulk Storage Tanks              | Continue to remove free hydrocarbons from well Hay-07. Monitor remaining wells                  | On going passive skimmer                           | Continue                                                             |
|                                 | Remove and dispose all AST's                                                                    | Remains                                            | To be addressed                                                      |
| Sewage Lagoon                   | Upgrade to secondary treatment                                                                  | Remains                                            | Economic Decision                                                    |
| Maintenance Garage              | Clean up contaminated soil in crawlspace                                                        | Remains                                            | To be addressed                                                      |
| PCB Storage                     | Obtain water licence                                                                            | Remains                                            | May not be required. 4 barrels suspected of containing PCB's removed |
|                                 | Decommission former PCB storage trailers                                                        | Complete                                           |                                                                      |
| PCB Contamination               | Dispose light ballasts in storage                                                               | Completed                                          |                                                                      |
|                                 | Test FEC building for PCB's                                                                     | Leased to Buffalo Air                              | Nothing in building when leased.                                     |
| Hazardous Materials Solid Waste | Provide central storage                                                                         | Remains                                            | To be addressed                                                      |
|                                 | Clean up steel and rubble dump site                                                             | Remains - used as 'bone yard' for salvage material | Nothing new is placed in this site.                                  |
|                                 | Investigate potential buried metal at Runway 04/22 east                                         | Remains                                            | To be addressed                                                      |
|                                 | Investigate transformers in solid waste site                                                    | Remains                                            | To be addressed                                                      |

**Tenant B**

| Issue                          | Previous Recommendation(s) to deal with the situation                                     | Present Condition              | Remarks/Plans                                              |
|--------------------------------|-------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------|
| Underground Fuel Storage Tanks | Collect monitoring well data twice yearly and forward results to airport manager          | Nutrient injection and monitor | Results following summer 2000 will determine future course |
|                                | Provide soil and groundwater analysis and a decommissioning report for all tank removals  | Complete                       |                                                            |
|                                | Submit a remedial action plan that includes the clean-up of the site to CCME C/I criteria | Plan submitted                 | 1999 Implementation                                        |

**Tenant C**

| Issue | Previous Recommendation(s) to deal with the situation                 | Present Condition | Remarks/Plans   |
|-------|-----------------------------------------------------------------------|-------------------|-----------------|
| POL   | Provide secondary containment labeling for all POL per NFC and WHMIS. | Remains           | To be addressed |
|       | Investigate sources of stressed vegetation                            | Remains           | To be addressed |
|       | Clean up spills of oil and other hazardous materials                  | Remains           | To be addressed |
|       | File an emergency response plan                                       | Remains           | To be addressed |

**Tenant D**

| Issue                            | Previous Recommendation(s) to deal with the situation                 | Present Condition | Remarks/Plans   |
|----------------------------------|-----------------------------------------------------------------------|-------------------|-----------------|
| POL                              | Provide secondary containment for POL storage drums on site           | Remains           | To be addressed |
|                                  | Label storage drums as per NFC and WHMIS                              | Remains           | To be addressed |
|                                  | Clean up spills of hazardous materials                                | Remains           | To be addressed |
|                                  | Remove POL from derelict vehicles                                     | Remains           | To be addressed |
|                                  | Provide spill containment trays during outdoor maintenance as per NFC | Remains           | To be addressed |
| Hazardous Materials Bulk Storage | Dispose waste batteries                                               | Complete          |                 |
|                                  | Upgrade AST's to meet NFC                                             | Remains           | To be addressed |

**Tenant E**

| Issue            | Previous Recommendation(s) to deal with the situation      | Present Condition                                                             | Remarks/Plans    |
|------------------|------------------------------------------------------------|-------------------------------------------------------------------------------|------------------|
| POL              | Provide secondary containment for on-site drums as per NFC | Not Required                                                                  |                  |
| Bulk Storage     | Provide secondary containment as per NFC                   | Not Required                                                                  |                  |
| Maintenance Yard | Monitor Groundwater well Hay-05 annually                   | Monitoring well may have been destroyed/covered by newly constructed building | To be determined |

**Tenant F**

| Issue              | Previous Recommendation(s) to deal with the situation | Present Condition | Remarks/Plans   |
|--------------------|-------------------------------------------------------|-------------------|-----------------|
| Bulk Storage Tanks | Decommission redundant AST as per NFC                 | Remains           | To be addressed |

**Tenant G**

| Issue               | Previous Recommendation(s) to deal with the situation                                 | Present Condition | Remarks/Plans   |
|---------------------|---------------------------------------------------------------------------------------|-------------------|-----------------|
| Hazardous Materials | Leak test tank                                                                        | Remains           | To be addressed |
| Bulk Fuel Tanks     | Overfill protection and spill containment around fill line to be installed as per NFC | Remains           | To be addressed |

**Tenant H**

| Issue | Previous Recommendation(s) to deal with the situation               | Present Condition | Remarks/Plans   |
|-------|---------------------------------------------------------------------|-------------------|-----------------|
| POL   | Provide secondary containment and label waste product drums per NFC | Remains           | To be addressed |
|       | Old batteries require disposal                                      | Remains           | To be addressed |

**Tenant I**

| Issue        | Previous Recommendation(s) to deal with the situation                     | Present Condition | Remarks/Plans    |
|--------------|---------------------------------------------------------------------------|-------------------|------------------|
| UST's        | Collect monitoring well data bi-annually.                                 | Unknown           | To be determined |
| Bulk Storage | Provide soil water data and decommissioning report for all tank removals. | Complete          |                  |
|              | Submit remedial action plan for spills.                                   | Unknown           | To be determined |
|              | Investigate status of soil and remove any contaminated soil.              | Remains           | To be addressed  |

**Tenant J**

| Issue | Previous Recommendation(s) to deal with the situation               | Present Condition | Remarks/Plans   |
|-------|---------------------------------------------------------------------|-------------------|-----------------|
| POL   | Provide secondary containment and label all drums per NFC and WHMIS | Remains           | To be addressed |

## 6.0 Commercial Facilities and Requirements

### 6.1 Current Activities and Inventory

Commercial development at the Hay River Airport is currently restricted to the area immediately south of Runway 02/22 and extending to the airport boundary which follows the curve of the Hay River. Airport land to the north of Runway 02/22 is covered in dense forest and bogs and unsuitable for development.

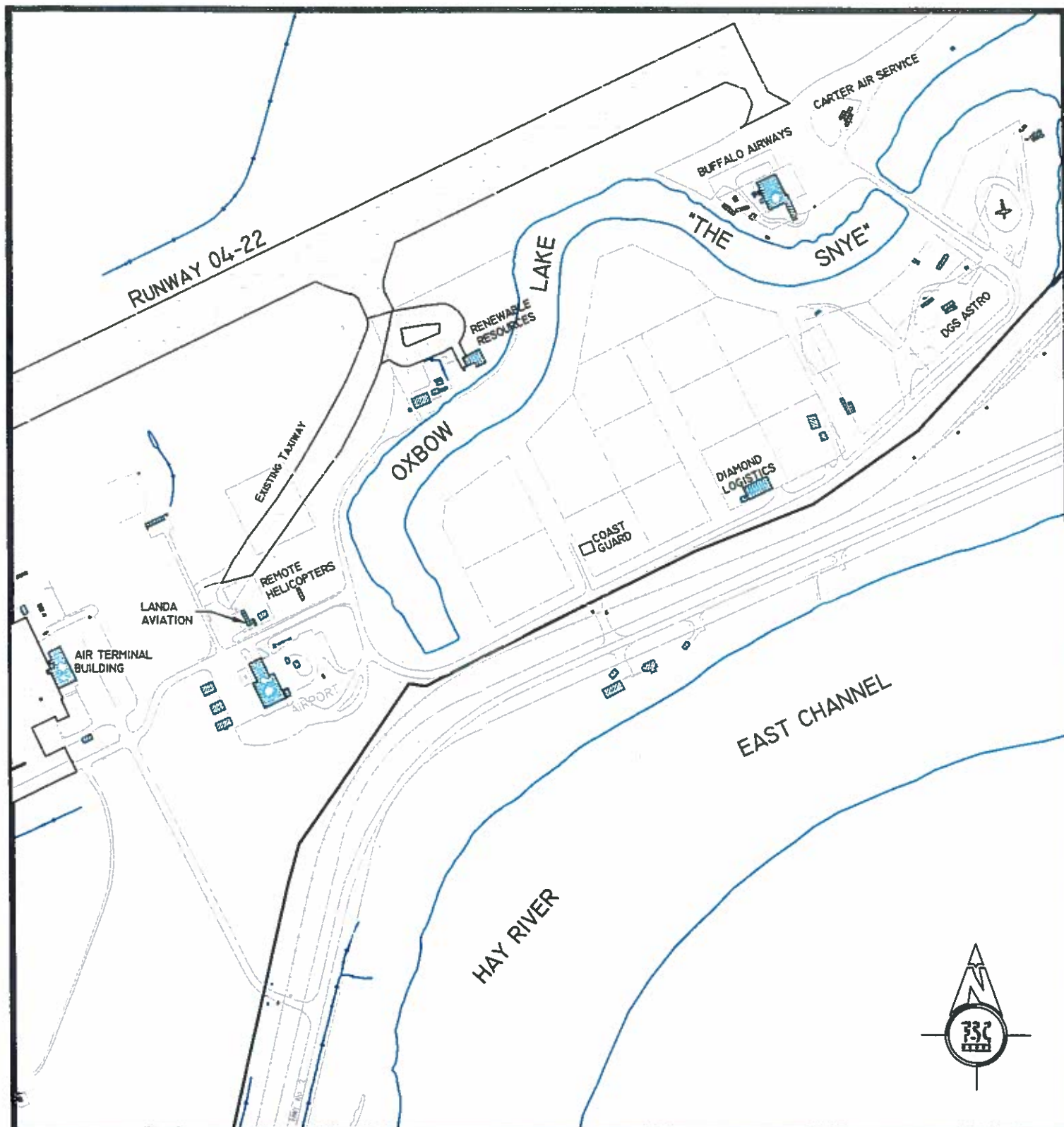
The 1986 Land Use Plan designated both airside and groundside commercial lots with ample space available for aviation and non-aviation development. As airside access is currently limited, the Land Use Plan recommended building a taxiway and stub taxi to the east of Runway 13/31 and south of the Air Terminal Building to provide airside access to general aviation tenants.

A total of 5.07 ha of land and 100 m<sup>2</sup> of Air Terminal Building space is currently under lease. Current airport leases are listed in the following table and illustrated in Figure 6-1.

**Airport Leases  
Hay River Airport**

| Tenant Name                  | Description                 | Status    | Expiry     | Space m <sup>2</sup> |
|------------------------------|-----------------------------|-----------|------------|----------------------|
| <b>Land Leases</b>           |                             |           |            |                      |
| Buffalo Airways              | Aircraft Parking & Storage  | overhold  | Dec 31/95  | 2,850.3              |
| Buffalo Airways              | Hangar                      | overhold  | Mar 31/96  | 1,984.2              |
| L&A (Landa) Aviation         | Land Lease                  | overhold  | Apr 30/98  | 1,393.5              |
| Renewable Resources          | Land Lease                  | overhold  | Mar 31/97  | 11,330.8             |
| Canadian Coast Guard         | Land Lease                  | active    | Mar 31/05  | 1,493.0              |
| Town of Hay River            | Land Lease                  | active    | Mar 31/41  | 6,411.4              |
| Town of Hay River            | Land Lease                  | overhold  | May 31/97  | 12,256.7             |
| Buffalo Airways              | Building for Ground Equip.  |           | Dec 31/97  | 38.0                 |
| Shell Canada Product         | Land Lease - Refuelling     | expired   | no renewal |                      |
| Town of Hay River            | Earthen Flood Control Berm  | active    | Jul 24/16  | 3,300.0              |
| DGS Astro Paving Ltd.        | Storage/Oper. Asphalt Plant |           | Aug 22/97  | 8,250.0              |
| Remote Helicopters           | Land Heli-Base              |           | Dec 31/98  | 1,393.5              |
| Carter Air Service Ltd.      | Aircraft Parking (1 stall)  | active    | May 31/00  |                      |
| Town of Hay River            | Fuel Facilities             | active    |            |                      |
| Diamond Logistics            | Land Lease                  | in-active |            |                      |
| <b>Sub-Total Land Leases</b> |                             |           |            | <b>50,701.4</b>      |

| Tenant Name                            | Description                               | Status   | Expiry    | Space m <sup>2</sup> |
|----------------------------------------|-------------------------------------------|----------|-----------|----------------------|
| <b>Air Terminal Building Leases</b>    |                                           |          |           |                      |
| First Air                              | office space - 2nd floor                  | current  |           | 16.0                 |
| Air Norterra o/a Canadian North        | ATB Office/Ticket                         | overhold | Oct 25/97 | 50.2                 |
| Air Norterra c/a Canadian North        | ATB Car Parking Stalls(2)                 | expired  | Oct 25/97 |                      |
| Air Norterra c/a Canadian North        | ATB Microphone Outlet                     | expired  | Oct 25/97 |                      |
| Town of Hay River                      | Water Distribution Line                   | active   | Apr 1/41  |                      |
| Canadian National Railways             | Power Distribution Line                   | renewal  | pleasure  |                      |
| Northwestel Inc.                       | 900 Pair Cable                            | renewal  | Jun 30/03 |                      |
| Northwestel Inc.                       | Air Terminal Building Pay Phones          |          | Dec 31/97 |                      |
| Budget Rent-a-Car                      | ATB Vehicle Rental                        | active   | Apr 30/00 | 2.3                  |
| Ptarmigan Inn Hotel                    | Air Terminal Building Ad Material         | active   | Mar 14/00 |                      |
| Conrad Real Estate & Appraisals Ltd.   | Air Terminal Building Ad Material Display |          | Mar 31/98 |                      |
| Northern Stores                        | Air Terminal Building Ad Sign             |          | Feb 03/95 |                      |
| The Back Eddy                          | Air Terminal Building Ad Sign             |          | Feb 12/98 |                      |
| Cabin Fever                            | ATB Vending Machines (3)                  |          | Apr 30/98 |                      |
| Dept. Resources, Wildlife & Econ. Dev. | Air Terminal Building Display Case        | expired  | Oct 31/96 |                      |
| Norterra                               | ATB Parking Stall #8                      | overhold | Sep 30/97 |                      |
| Norma L'heureux Courtesy Cabs          | ATB Taxi Cab Station                      |          | Sep 30/97 |                      |
| Norma L'heureux Courtesy Cabs          | ATB Direct Phone Line                     |          | Sep 30/97 |                      |
| First Air                              | ATB Office/Ticket/Industrial              |          | Dec 31/97 | 21.2                 |
| Greenway Realty                        | ATB Direct Phone Line                     |          | Apr 30/98 |                      |
| Greenway Realty                        | Air Terminal Building Ad Signs (2)        |          | May 31/98 |                      |
| Buffalo Airways                        | ATB Ticket Counter                        | active   | Dec 31/98 | 6.5                  |
| Buffalo Airways                        | FEC T66 Building                          |          | Jun 30/98 | 3.8                  |
| Icon Office Solutions                  | Ad Sign                                   | active   | Dec 31/99 |                      |
| Icon Office Solutions                  | Car Plug-in                               |          | Jan 1/00  |                      |
| ARCAN Construction                     | Ad Sign                                   |          | Dec 31/99 |                      |
| <b>Sub-Total Air Terminal Building</b> |                                           |          |           | <b>100.0</b>         |
| <b>Utilities</b>                       |                                           |          |           |                      |
| Northland Utilities                    | Elect. Distribution System                | active   | Nov 30/07 |                      |
| Northland Utilities                    | Power Distribution Line                   | active   | Apr 30/94 |                      |
| <b>Sub-Total Utilities</b>             |                                           |          |           | <b>0.0</b>           |



## EXISTING COMMERCIAL FACILITIES



DATE: March 21, 2000

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FIGURE NO.

# HAY RIVER AIRPORT DEVELOPMENT PLAN

# 6-1

## **6.2 Air Cargo**

There are no dedicated air cargo facilities active at the Hay River Airport at this time. Canadian North and First Air offer both air and ground courier service utilizing over-the-counter services in the Air Terminal Building. Buffalo Airways provides a "Food Mail" service under contract to Canada Post. Although the Buffalo Airways facility is currently used in part, as a ground cargo shipment warehouse, the facility can also support air cargo operations when required.

Hay River is somewhat unique in terms of multi-modal transportation facilities and boasts year-round highway access to Alberta. Six trucking firms offer services to points north and south. Greyhound Bus Lines provides daily service to points south and Arctic Frontier offers service to Yellowknife. With the addition of the RailLink route to Edmonton, there is little demand for an extensive air cargo operations at Hay River Airport except during periods when the road link to Yellowknife is closed.

Provision for at least one airside commercial land lot suitable for air cargo should be included in the Development Plan as a contingency.

## **6.3 Aircraft Maintenance**

There are no aircraft maintenance services for itinerant aircraft at the Hay River Airport. Neither of the two larger scheduled airlines overnight aircraft at the site and the charter operators carry-out their own maintenance.

Little demand appears to exist for third party maintenance services due to the low number of resident aircraft based year-round at the airport and the proximity of Yellowknife as both a major nearby aircraft base, and source of third party maintenance services.

Demand for aircraft maintenance services is unlikely to grow significantly unless local exploration and development were to increase substantially and more aircraft became resident at the airport.

Provision for at least one airside commercial land lot suitable for aircraft maintenance services should be included in the Development Plan as a contingency.

## **6.4 General Aviation**

General Aviation is defined as civil aviation activities operated by individuals, organizations, and businesses providing the following services:

- ➔ Public charter aircraft operations;
- ➔ Public scheduled service to local airports not served by the mainline scheduled airline;
- ➔ Private charter operations serving the regional air transportation requirements of companies, organizations, and government departments;
- ➔ Military operations;
- ➔ Private aircraft operations for business or personal use;
- ➔ Flight training;
- ➔ Public and private helicopter operations;
- ➔ Cargo transportation;
- ➔ Support activities for the above including;
- ➔ repair, sale and inspection of aircraft and associated support material,

- ➔ supply of fuel and oil,
- ➔ storage of cargo, parts and equipment,
- ➔ private office and hangar space for General Aviation and cargo operators,
- ➔ Medivac services.

The current General Aviation activities at Hay River Airport shows that only a portion of these services are currently located at the airport.

General aviation activity at Hay River Airport is low and has declined progressively in recent years. Only 15.5% of the 5,208 total itinerant aircraft movements recorded in 1998 were General Aviation while General Aviation held a 19.2% share of the traffic in 1994.

General Aviation operations include:

- ➔ Buffalo Airways offers year-round non-scheduled fixed-wing charter services;
- ➔ Carter Air Service offers year-round non-scheduled fixed-wing charter services;
- ➔ Remote Helicopters provides summer charter services, primarily to the renewable resources sector and to the governments;
- ➔ The GNWT Department of Resources, Wildlife and Economic Development (RWED) operates a seasonal forest fire attack base at the airport;
- ➔ L&A (Landa) Aviation terminated its operation at the end of October, 1999;
- ➔ No pilot training operations currently operate at the airport;
- ➔ A limited number of small aircraft belonging to recreational flyers are stored at the airport in winter.

Provisions to accommodate a wider range of General Aviation activity in the future must be considered in the future airport land use plan to accommodate growth if and when it occurs.

General Aviation and industry land is decentralized leading to access and servicing problems.

Provision for several airside commercial lots suitable for General Aviation type activities (FBO, Flight training, etc) should be included in the Development Plan fronting on the Runway 13/31 operational area.

## **6.5 Aviation Commercial Land**

### **6.5.1 Existing Deficiencies**

The existing layout of lots is inadequate for users requiring direct airside access. The subdivided area is generally suitable for helicopter operations and industrial purposes. Fixed wing operators must rely on using Runway 04/22, which is gravel, for access to airside areas which has been noted by Transport Canada in the past to be inappropriate due to the availability of land fronting on Runway 13/31, which is a paved runway

At present, there is limited direct airside access. Both Buffalo Airways and Carter Air Service have operations near the threshold of Runway 22. Buffalo Airways is located off a gravel taxiway extending at right angles from the threshold, whereas Carter Air Services has access to the airside via a gravel road. Buffalo Airways also maintains an aircraft parking space adjacent to the Air Terminal Building apron.

Remote Helicopters maintains a facility to the east of the air terminal area. Access is provided to the Air Terminal Building apron by means of a paved road that extends around the back of the airport maintenance and firehall building. The GNWT RWED facility is located immediately to the south of Runway 04/22 and connected to it by a short, unclassified taxiway. The lot is accessed from groundside by a long private road across a portion of the airport's secure area.

As noted in Section 5.5, provision of utilities and services to the existing sites is extremely limited. Extension of the services is likely not warranted.

The 1986 Land Use Plan recommended building a parallel taxi leading from the south end of the Air Terminal Building apron to threshold of Runway 31 with a stub taxi extending east at right angles to provide airside access to existing lots located to the south of the Air Terminal Building area. Among other issues, this solution required the relocation of the Airport Access Road easterly and construction of a new intersection with Highway #2.

### **6.5.2 Requirements**

Demand for aviation commercial land is flat at this time however growth in demand has often been found to follow the growth rate for in annual aircraft movements. Consequently, for planning purposes a growth rate of 1.1% is projected for aviation commercial land. This amounts to only about 500 m<sup>2</sup> per year, or a 0.25 ha lot every 5 years based on the total commercial land leased including groundside/industrial classifications and land occupied by the Town of Hay River. Even using this gross rental area a total demand of only 1.0 ha might therefore be required over the long term (20 year) planning horizon. This appears low and unable to accommodate an upswing in the local Hay River or South Slave Region economy.

Consequently a larger inventory of aviation land has been identified in the Development Plan totalling 15.7 ha which should be developed in an orderly progression only as demand materializes. This provision ensures that, should an economic upturn take place, orderly development will ensue.

Since the demand for land is low, but the requirement to offer more attractive commercial land is high, development of land south of the Air Terminal Building is again recommended in the short to medium term but in a simpler, and more economical configuration than proposed by Transport Canada. These lots will potentially also have access to future utility services.

## **6.6 Non-Aviation Commercial Land**

Non-aviation commercial land includes land classified as groundside/industrial in the recent land rent appraisal prepared for GNWT, Arctic Airports Division. These lands do not have airside access and are therefore of interest to aviation support users, helicopter operators, or non-aviation companies.

### **6.6.1 Existing Deficiencies**

A total of 18 large lots are available to the south of Runway 04/22, with access to the airport service road.

At present, there is only one non-aviation, commercial tenant at the Hay River Airport. DGS Astro Paving maintains an asphalt plant and equipment storage facility in a designated Groundside /Industrial area to the south and east of Runway 04/22. The owner has indicated that there is no requirement to be located in the vicinity of the airport.

The Canadian Coast Guard also maintains a site in the area for the storage of equipment used to service marine navigation aids. Rent is not paid for this site as other services are provided to GNWT in lieu of rent payments.

As noted in Section 5.5 provision of utilities and services to the existing sites is also extremely limited, namely power only.

### **6.5.2 Requirements**

Demand for leased industrial land in Hay River is extremely low since other competitive lands are available which can be purchased. Commercial operations usually prefer to purchase land due to the higher degree of control, lower financing costs and potential for capital gain which accrue to the benefit of the purchaser.

The most important feature of the airport's groundside/industrial land parcels in attracting a non-aviation users are their proximity to the RailLink railway line. To a specialized business, this could be of significant interest and potential benefit. The probability of finding a tenant under current economic conditions is extremely low however.

Due to the surplus inventory already available, no additional groundside/industrial land is projected to be required to the long term planning horizon.

## **6.7 Commercial Development Strategy**

### **6.7.1 Land Parcels**

The Hay River Dene Reserve is projected to experience a 1% annual growth into the long term. The Town of Hay River's population, after decreasing somewhat recently, is expected to return to mid-1990's levels into the long term. Population can fluctuate with the level of activity experienced by various local resource based-industries however there are no major initiatives foreseen in the short term that will result in above average growth. Furthermore, due to the presence of alternative transportation services, the demand for aviation services has diminished over the past 15 to 20 years. Consequently, the demand for commercial land at the airport is static and may grow at only 1.1% over the long term. Provision for future growth is none-the-less prudent, and will be inexpensive to implement.

Regarding Airport Reserve Land (see Figure E-1), it should be noted that this Development Plan does not restrict the safe placement of as yet unplanned and/or unforeseen navigational aids. Placement of any such structures or facilities should be at the discretion of the airport owner.

The Development Plan includes the following new or reconfigured land parcels and conceptual lot layouts which provide a more than adequate supply of both airside and groundside/industrial land until well beyond the planning horizon.

The table below presents a summary of the land parcels including the aggregate area, number of lots, location, maximum development height and status (compared to the existing commercial lot layout). Since the final, surveyed lot lines are not consistently known and may change when surveyed or leased, the maximum development height is based on the shortest distance between the edge of each land parcel and the governing runway strip edge. The maximum height indicated is a guide for initial marketing purposes only, and detailed assessment of each proposed lot should be made prior to actual development.

#### **Commercial Land Parcels Hay River Airport**

| Parcel | Area (ha) | Number of Lots | Location   | Maximum Allowable Activity/Bldg. Height | Status       |
|--------|-----------|----------------|------------|-----------------------------------------|--------------|
| A      | 24.3      | 4              | Airside    | 9 m                                     | reconfigured |
| B      | 16.5      | 3              | Groundside | 30 m                                    | new          |
| C      | 3         | 4              | Airside    | 6 m                                     | reconfigured |
| D      | 4.4       | 3              | Airside    | 6 m                                     | reconfigured |
| E      | 12.4      | 1              | Airside    | varies<br>(from strip edge)             | existing     |
| F      | 85.4      | 14             | Groundside | 6 m                                     | existing     |
| G      | 6.8       | 2              | Groundside | 14 m                                    | existing     |
| H      | 3.9       | 1              | Airside    | varies<br>(from strip edge)             | existing     |

The total area of commercial land available is 156.7 ha including 43.6 ha of airside land and 113.1 ha of groundside/industrial land.

The recommended use for each parcel is shown in the table

#### **Recommended Land Parcel Use Hay River Airport**

| Parcel | Location   | Recommended Use                         |
|--------|------------|-----------------------------------------|
| A      | Airside    | larger aviation operations              |
| B      | Groundside | aviation and airport support activities |
| C      | Airside    | smaller aviation operations             |
| D      | Airside    | smaller aviation operations             |
| E      | Airside    | GNWT/RWED                               |

|   |            |                                  |
|---|------------|----------------------------------|
| F | Groundside | non-aviation and industrial      |
| G | Groundside | non-aviation and industrial      |
| H | Airside    | aviation commercial/recreational |

### 6.7.2 Short Term

None of the tenants that were interviewed anticipated expansion of their operations over the short term. All tenants seemed satisfied with the current services and facilities and with their general location on the airport. No new tenants are anticipated in the short term.

At present, only 10 to 15% of available commercial land on the airport is occupied and although airside access is limited this is not expected to become immediately problematic. Any new operators are likely to be accommodated within existing facilities.

In an attempt to attract aviation land tenants, and to prepare for a possible period of economic growth, it is recommended that the Parcel A, south of the Air Terminal Building, be surveyed and sub-divided as a marketing initiative to attract larger operators to the airport.

The GNWT changed the market rents at the airport in 1999. The overall impact was an increase in rates since the last assessment in 1994.

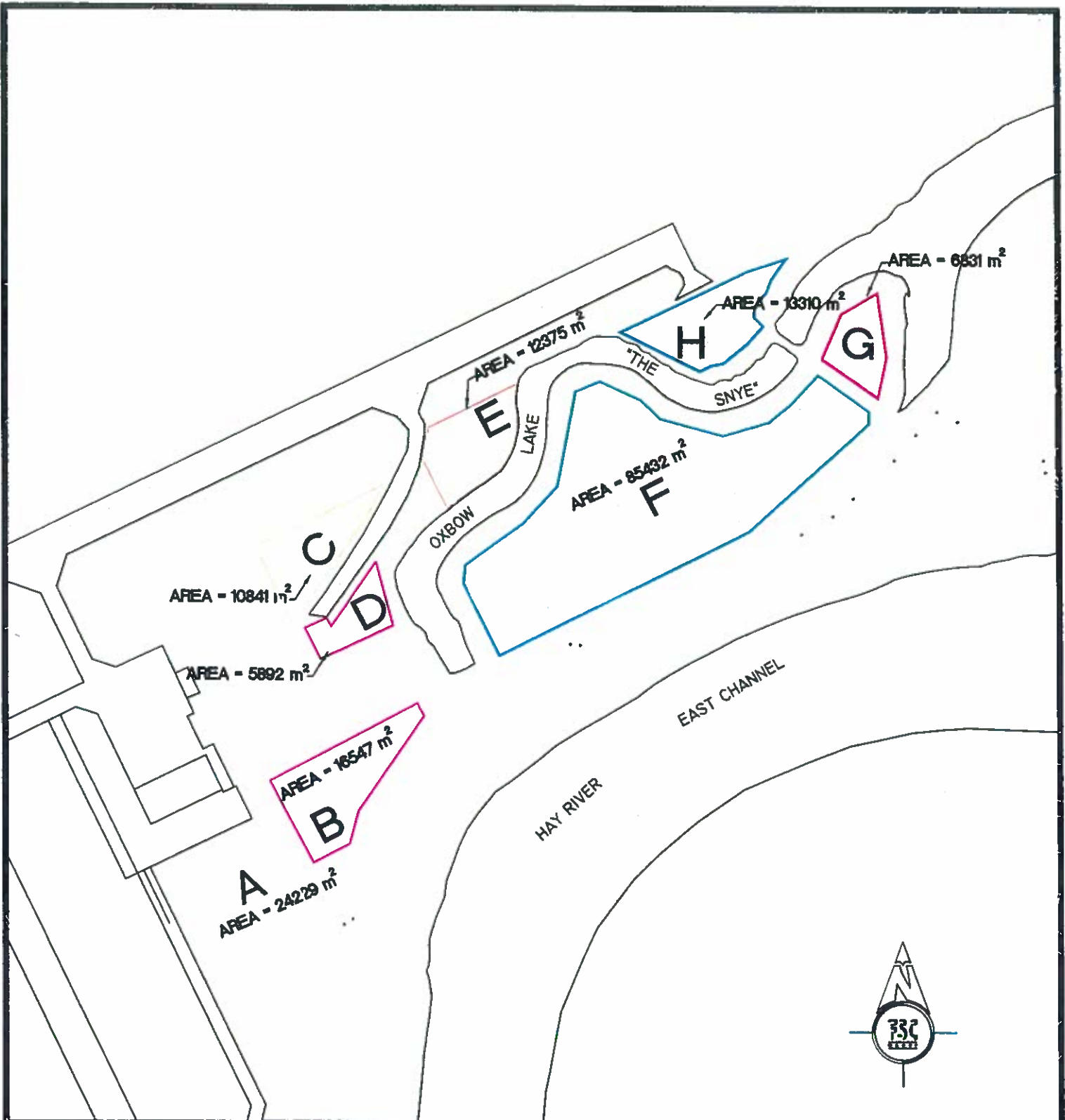
A demand for industrial land in and around the Town of Hay River has not been identified.

Although the recommended use of land within each parcel identified in Section 6.7.1 is preferred, the airport owner should be open to any and all potential interest in leasing airport lands for any alternative use which is not incompatible with airport operations.

### 6.7.3 Medium and Long Term

The 1986 Land Use Plan provided a fairly sophisticated assignment of land using a hierarchical approach. However, the subsequent decline in local economic activity and resultant decrease in air traffic has curtailed demand for airport land. In the absence of any significant anticipated economic growth, it is expected that the existing land parcels will be adequate to meet demands for the planning period.

In an attempt to attract new aviation land tenants in the medium and long term, and to allow for a possible period of economic growth, it is recommended that Parcel C south of Runway 04/22 be progressively surveyed and sub-divided as the market develops for smaller aircraft operations users.



## COMMERCIAL LAND PARCELS



DATE: March 21, 2000

SCALE: NTS

FILE: Fig\_6-2.dwg

FIGURE NO.

# HAY RIVER AIRPORT DEVELOPMENT PLAN

6-2

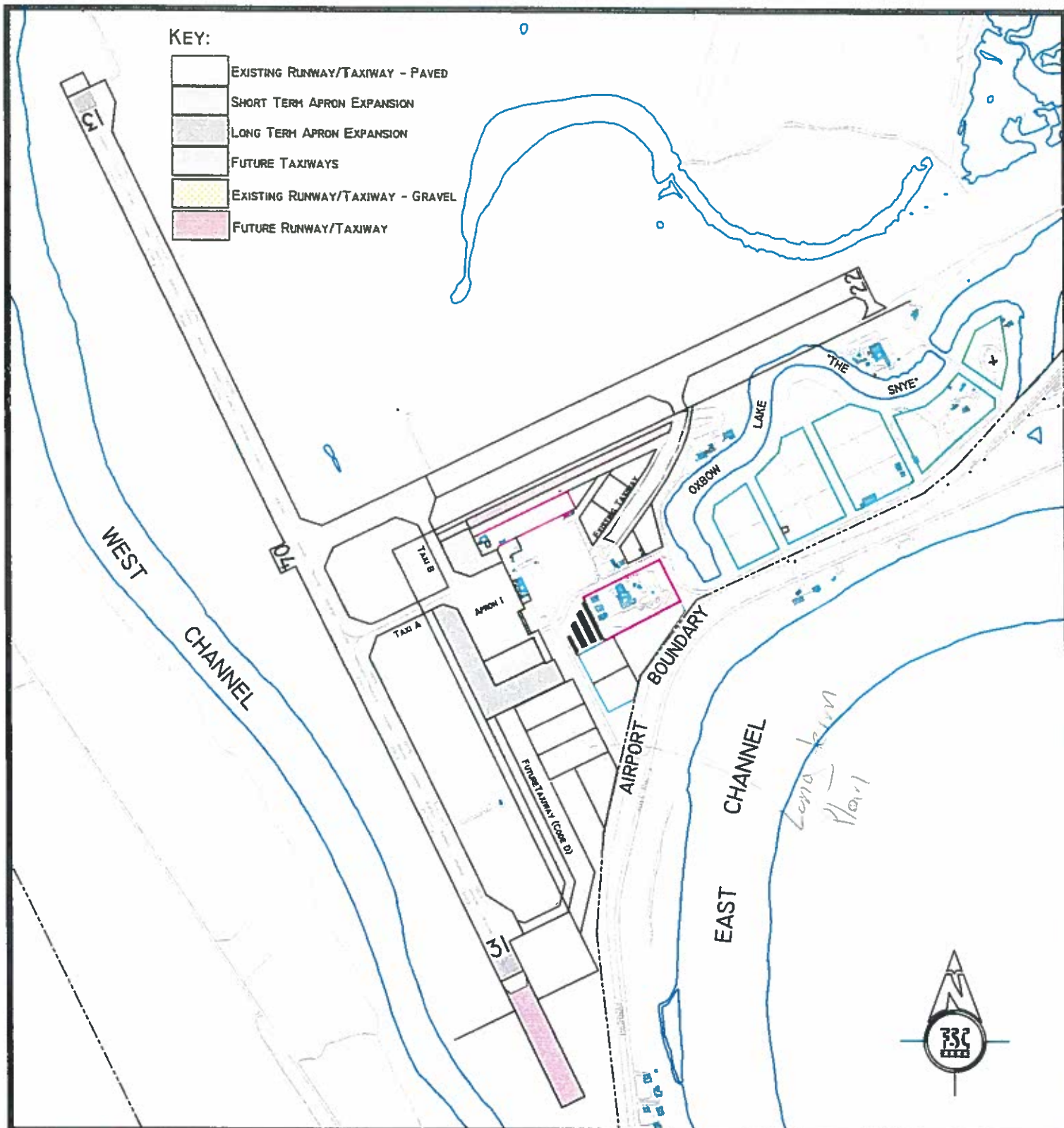
## **7.0 Development Concept**

An airport development concept has been prepared to meet current airside, air terminal and groundside deficiencies and future requirements at Hay River Airport. This concept is outlined below and illustrated in Figure 7-1.

### **7.1 Airside**

The ultimate airside development concept sets aside sufficient land to accommodate growth well beyond the long term (20 year) planning horizon. Key elements of the concept include the following:

- ➔ a parallel taxiway extending from Apron 1 to the threshold of Runway 31; this will be triggered by sufficient increases in air traffic;
- ➔ a parallel taxiway extending from Apron 1 to the east airside commercial area and serving Runway 04/22, this would require the relocation/remediation of the existing sewage lagoon; this will be triggered by sufficient commercial development;
- ➔ two stage expansion of Apron 1; this will be triggered by the need to minimize the distance enplaning and deplaning passengers must walk in conjunction with aircraft manoeuvrability constraints inherent with the current apron size and layout;
- ➔ 260 m reserve for extension of Runway 13; this will be triggered by sufficient increases in air traffic;
- ➔ protection for all existing visual and electronic aids to navigation and landing; this will be triggered by evolving requirements to ensure that these aids are consistently operable;
- ➔ initial site selection for a Differential Global Positioning System (DGPS) installation.



## DEVELOPMENT CONCEPT



DATE: March 21, 2000

SCALE: NTS

FILE: Fig\_7-1.dwg

FIGURE NO.

## HAY RIVER AIRPORT DEVELOPMENT PLAN

7-1

## 7.2 Air Terminal

The development concept for the Air Terminal Building, previously illustrated in Figure 5-5, includes the following key elements:

- ➔ expansion of the public waiting area; this will be triggered by the ongoing need to efficiently accommodate the flying public;
- ➔ airline check-in counters to be flexible for use by the anticipated changing airlines; this is triggered in the near short term in an effort to increase efficiencies;
- ➔ provision for the ultimate expansion of airline check-in and baggage make-up areas;
- ➔ expansion of airline check-in and baggage make-up areas;
- ➔ provision for the ultimate expansion of baggage claim facilities;
- ➔ expansion of baggage claim facilities; the trigger for this is somewhat tied to the expansion of the public waiting area, see above;
- ➔ new air cargo office with dedicated entry; triggered by sufficient increases in cargo activity;
- ➔ increased office lease space on the second floor;
- ➔ conversion of the FSS to a CARS facility; triggered by NAV CANADA's initiative to proceed with this conversion.

## 7.3 Groundside

The development concept for the groundside includes the following key elements:

- ➔ development of short and long term parking areas; this is triggered in the short term in the face of the current periodic 'lot full' occurrences;
- ➔ development of a service road to new lots in the east airside commercial area; triggered by a concurrent increase in the demand for un/under-used commercial lots;
- ➔ relocation of the sewage lagoon; to be triggered prior to the current lagoon reaching capacity;
- ➔ replacement of the maintenance garage with a combined services building (maintenance and firehall); to be triggered by the most recent governing regulations, when available;
- ➔ rationalization of existing airside commercial lots and development of additional lots; to be triggered prior to expressions of interest to lease further commercial sites;
- ➔ development of additional groundside/industrial lots; to be triggered prior to expressions of interest to lease further commercial sites.

## **8.0 Recommended Land Use Plan**

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The recommended Land Use Plan is presented on the following page as Figure 8-1.

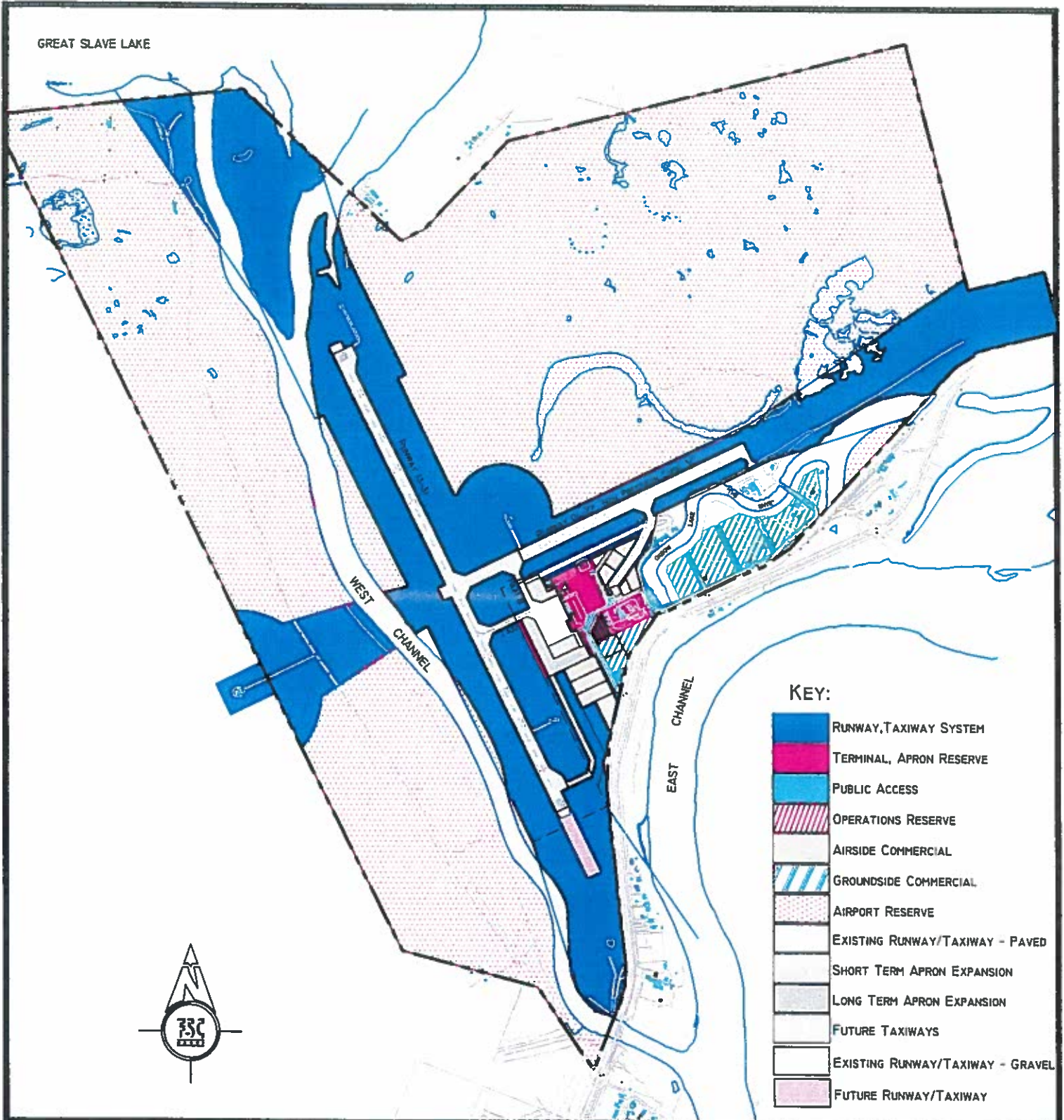
The Plan provides a comprehensive update to the original plan presented in the 1985 Master Plan prepared by Transport Canada.

Significant changes from Transport Canada's earlier plan include the following items:

- ➔ The Runway, Taxiway System zone has been enlarged to accommodate ILS localizer restrictions at the threshold of Runway 13.
- ➔ The Runway, Taxiway System zone south of Runway 04/22 has been enlarged to include a taxiway reserve serving both the runway and future airside commercial lots.
- ➔ The Restricted Development land use classification has been eliminated since most lands outside the Runway, Taxiway System zone are subject to various restrictions.
- ➔ The Terminal, Apron Reserve has been altered in size.
- ➔ The Operations Reserve north of the Air Terminal Building has been reconfigured.
- ➔ The Airside Commercial, Leased Property (Commercial) and Groundside Commercial classifications have been restructured as Airside Commercial and Groundside/Industrial classifications.
- ➔ Airside Commercial land parcels have been reconfigured.
- ➔ A new Groundside/Industrial zone has been established east of the existing Airport Access Road.
- ➔ Public Access corridors have been redefined.
- ➔ A substantial area of Airport Reserve land, which is not required for airport operations, has been identified for compatible use at the discretion of the airport owner.

The land use plan is based on metric units of measurement with respect to airport physical and electronic zoning restrictions. The current Registered Zoning for Hay River Airport is based on imperial units.

GREAT SLAVE LAKE



## RECOMMENDED LAND USE PLAN



DATE: March 20, 2000

SCALE: NTS

FILE: Fig\_8-1.dwg

FIGURE NO.

## HAY RIVER AIRPORT DEVELOPMENT PLAN

8-1

## **9.0 Implementation Plan**

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### **9.1 Short Term**

The recommended Short Term Development Program addresses outstanding deficiencies and meets projected activity levels for the next 5 years. All investments and development will be driven by actual needs as they occur, and by increases in demand.

The short term program should be initiated as required and should include the elements listed in the chart entitled Short Term Development Program. This chart includes: the requirement; a list of all projects forming part of the program; and, their estimated costs. The costs are Class 'C' estimates and are presented in 1999 dollars.

### **9.2 Medium Term**

The recommended Medium Term Development Program addresses evolving airport requirements and growth over 10 years. All investments and development will be driven by actual increases in demand.

Elements of the medium term program which should be initiated as required over the next 10 years are identified in the chart entitled Medium Term Development Program. This chart is similar to the Short Term Development Program chart . The costs are Class 'C' estimates and are presented are in 1999 dollars.

### **9.3 Long Term**

The recommended Long Term Development Program addresses evolving airport requirements and sustained growth over 20 years. All investments and development will be driven by actual increases in demand.

Elements of the long term program which should be initiated as required over the next 20 years are identified in the chart entitled Long Term Development Program. This chart is similar to the Short Term Development program chart . The costs are Class 'C' estimates and are presented are in 1999 dollars.

**Short Term Development Program  
Hay River Airport**

| Req't                | Program                                                                                     | Trigger                                                                                                  | Cost                    |
|----------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------|
| Airside              | Apron 1 is too small, expand Apron 1                                                        | The need to accommo-<br>date seasonal traffic<br>and to minimize pas-<br>senger activity on the<br>apron | \$ 350,000              |
|                      | Replace cabling on Runway 04/22                                                             | Cable breakages                                                                                          | \$ 15,000               |
|                      | Fuel tanks are poorly located, relocate to<br>east edge of Apron 1 by ATB                   | Expansion of Apron 1                                                                                     | \$ 75,000               |
|                      | Runway 13/31 is excessively rough, repair<br>areas of settlement                            | Annually required                                                                                        | \$ 100,000              |
|                      | Insecure perimeter areas, install/upgrade<br>security fencing as required                   | Before a genuine risk to<br>security is identified                                                       | \$ 150,000              |
|                      | Subtotal                                                                                    |                                                                                                          | \$ 690,000              |
| ATB                  | Passenger congestion, reconfigure and<br>renovate Ground Floor areas                        | The conversion of FSS<br>to CARS                                                                         | \$ 480,000              |
|                      | Airline counter inefficiencies, install<br>common-user airline counters                     | The ATB<br>reconfiguration                                                                               | \$ 20,000               |
|                      | Baggage belt too short, expand baggage<br>claim area                                        | The ATB<br>reconfiguration                                                                               | \$ 20,000               |
|                      | Substandard mechanical systems, upgrade<br>selected systems                                 | The ATB<br>reconfiguration                                                                               | \$ 240, 000             |
|                      | CARS facility required, develop CARS to<br>replace closed FSS                               | The conversion of FSS<br>to CARS                                                                         | \$ 65,000               |
|                      | Subtotal                                                                                    |                                                                                                          | \$ 825,000              |
| Groundside           | Inadequate long term parking, develop long<br>term parking                                  | The need to accommo-<br>date seasonal traffic                                                            | \$ 75,000               |
|                      | Inadequate short term parking and curb<br>lane, develop and realign                         | The need to minimize<br>any passenger frustra-<br>tion                                                   | \$ 100,000              |
|                      | Lack of marketable commercial land, pre-<br>pare a survey of commercial development<br>lots | The need to be ahead<br>of any future develop-<br>ment proposals                                         | \$ 50,000               |
|                      | ERS systems do not meet the most likely to<br>be proposed regulations, upgrade              | The requirement to sat-<br>isfy governing regula-<br>tions                                               | \$ 50,000<br>study only |
|                      | Subtotal                                                                                    |                                                                                                          | \$ 275,000              |
| Total Estimated Cost |                                                                                             |                                                                                                          | \$ 1,790,000            |

**Medium Term Development Program  
Hay River Airport**

| Req't                | Program                                                                                                              | Trigger                                                | Cost         |
|----------------------|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|--------------|
| Airside              | Poor pavement condition on Runway 13/31, overlay Runway 13/31                                                        | Part of normal, periodic, upkeep and quality assurance | \$ 2,500,000 |
|                      | Increase airside capacity and access to commercial lots, construct taxiway from Apron 1 to threshold of Runway 13/31 | Unacceptable delays or major commercial investment     | \$ 400,000   |
|                      | Runway 13/31 is excessively rough, repair areas of settlement                                                        | Annually as required                                   | \$ 100,000   |
|                      | Subtotal                                                                                                             |                                                        | \$ 3,000,000 |
| ATB                  | Insecure passenger boarding, install security screening for secure holdroom                                          | Before a genuine risk to security is identified        | \$ 52,000    |
|                      | Reverse decline in level of service to passengers, reconfigure public areas and increase concession space            | The need to keep the flying passenger comfortable      | \$ 78,000    |
|                      | Subtotal                                                                                                             |                                                        | \$ 130,000   |
| Groundside           | Environmental issues regarding sewage lagoon, decommission lagoon and connect to Town's sewage system                | Before the current lagoon reaches capacity             | \$ 1,100,000 |
|                      | Poor access to commercial lots, improve access                                                                       | Increased commercial activity                          | \$ 75,000    |
|                      | MET site abandoned, convert MET site to a parking lot                                                                | Installation of AWOS                                   | \$ 80,000    |
|                      | Subtotal                                                                                                             |                                                        | \$ 1,255,000 |
| Total Estimated Cost |                                                                                                                      |                                                        | \$ 4,385,000 |

**Long Term Development Program  
Hay River Airport**

| Req't                | Program                                                                                                                      | Trigger                                                | Cost         |
|----------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|--------------|
| Airside              | Solve Runway 04/22 congestion and poor access to commercial lot, construct a taxiway from Apron 1 to Forestry Base           | High usage of RWY 04/22 and/or demand for airside lots | \$ 245,000   |
|                      | Runway 13/31 is excessively rough, repair areas of settlement                                                                | Annually as required                                   | \$ 100,000   |
|                      | Apron 1 is too small, expand Apron 1                                                                                         | Increased apron demand from air carriers               | \$ 800,000   |
|                      | Subtotal                                                                                                                     |                                                        | \$ 1,145,000 |
| ATB                  | Passenger congestion and flight delays, expand passenger processing, baggage claim, public waiting and baggage make-up areas | The need to keep the flying passenger comfortable      | \$ 345,000   |
|                      | Substandard mechanical systems, upgrade building mechanical systems                                                          |                                                        | \$ 50,000    |
|                      | Subtotal                                                                                                                     |                                                        | \$ 395,000   |
| Groundside           | Poor pavement condition on groundside roads and parking areas, overlay asphalt in these areas                                | Part of normal, periodic, upkeep and quality assurance | \$ 225,000   |
|                      | Subtotal                                                                                                                     |                                                        | \$ 225,000   |
| Total Estimated Cost |                                                                                                                              |                                                        | \$ 1,765,000 |

***The total estimated cost of Short, Medium and Long Term Development Programs is \$ 7,940,000.***

## 10.0 Financial Viability Assessment

The Hay River Airport has always operated at a deficit. In fiscal year 1998/99, total revenues amounted to \$67,028 whereas O&M expenses totaled \$816,304 for an operating deficit of \$749,276.00.

### 10.1 Current Operating Costs

In fiscal year 1998/99, the majority (74%) of the airport's O&M expenses were attributed to salary costs including a one-time salary accrual charge. Of the non-salary costs, the two largest expenditure items were materials and supplies, and utilities.

A breakdown of the airport's operating expenses for the last 4 years of operation since the transfer to the Government of the Northwest Territories (1995/96 to 1998/99) is shown below and illustrated in Figure 10-1.

**Hay River Airport  
Statement of O&M Expenses**

| <b>Cost Category</b>                         | <b>1995/96</b>   | <b>1996/97</b>   | <b>1997/98</b>   | <b>1998/99</b>   |
|----------------------------------------------|------------------|------------------|------------------|------------------|
| Other O&M Expenses - Airport Manager         | \$25,033         | \$52,017         | \$46,264         | \$43,474         |
| (Propane, Diesel, Gasoline)                  |                  |                  |                  |                  |
| Salaries & Wages                             | 584,340          | 587,263          | 496,108          | 515,917          |
| Materials & Supplies                         | 251,569          | 208,605          | 154,394          | 172,890          |
| Total O&M Expenses                           | 860,941          | 847,885          | 696,765          | 732,281          |
| Adjustments                                  | (2,370)          |                  | (969)            | 84,023           |
| <b>Total O&amp;M Expenses - Adjusted</b>     | <b>\$858,572</b> | <b>\$847,885</b> | <b>\$695,796</b> | <b>\$816,304</b> |
| Notes - Adjustments                          |                  |                  |                  |                  |
| 1995/96 - credit from HQ                     |                  |                  |                  |                  |
| 1997/98 - NAV CANADA recovery                |                  |                  |                  |                  |
| 1998/99 - MDO Salary Accrual from July, 1995 |                  |                  |                  |                  |

## 10.2 Current Revenues

Of the total revenues received by the airport in 1998/99, 46% was derived from concessions and space rentals, 18% from the rental of land, 21% was attributed to aircraft fees, and 15% was NAV CANADA recoveries. A breakdown of airport revenue by source, for the last four years of operation, is provided in the table below and illustrated in Figure 10-2.

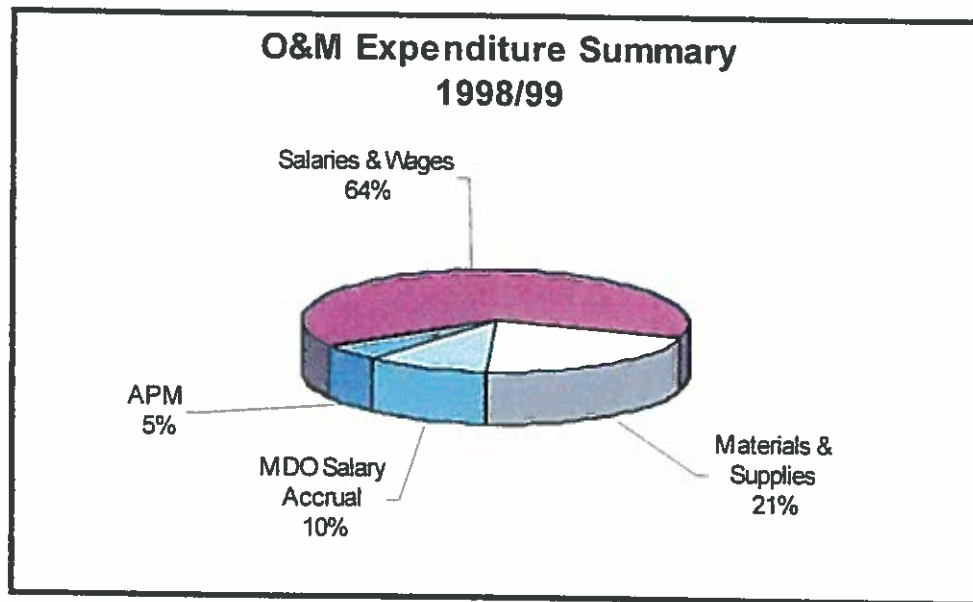
**Hay River Airport  
Statement of Revenue**

| Revenue Category                                     | 1995/96         | 1996/97         | 1997/98         | 1998/99         | 1999/00*        |
|------------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Landing & Other Fees                                 | \$19,730        | \$18,619        | \$16,559        | \$16,456        | \$16,456        |
| Rental Land                                          | 6,923           | 12,316          | 12,845          | 14,086          | 10,028          |
| Lease/Rental Revenue*                                | 28,285          | 20,503          | 26,012          | 28,115          | 24,374          |
| Concessions                                          | 13,658          | 8,316           | 4,980           | 8,181           | 9,110           |
| Miscellaneous Revenue                                | 1,192           | 500             |                 | 190             | 0               |
| <b>Total Revenues</b>                                | <b>\$69,787</b> | <b>\$60,254</b> | <b>\$60,396</b> | <b>\$67,028</b> | <b>\$59,969</b> |
| Adjustment                                           |                 | (8)             | (2)             |                 |                 |
| <b>Total (Adjusted)</b>                              |                 | <b>\$60,246</b> | <b>\$60,645</b> |                 |                 |
| NAV CANADA Recovery                                  |                 |                 |                 | 11,921          | 11,921          |
| <b>Total including NAV CANADA</b>                    |                 |                 |                 | <b>\$78,949</b> | <b>\$71,890</b> |
| * Estimated Revenue based on known leases & licences |                 |                 |                 |                 |                 |

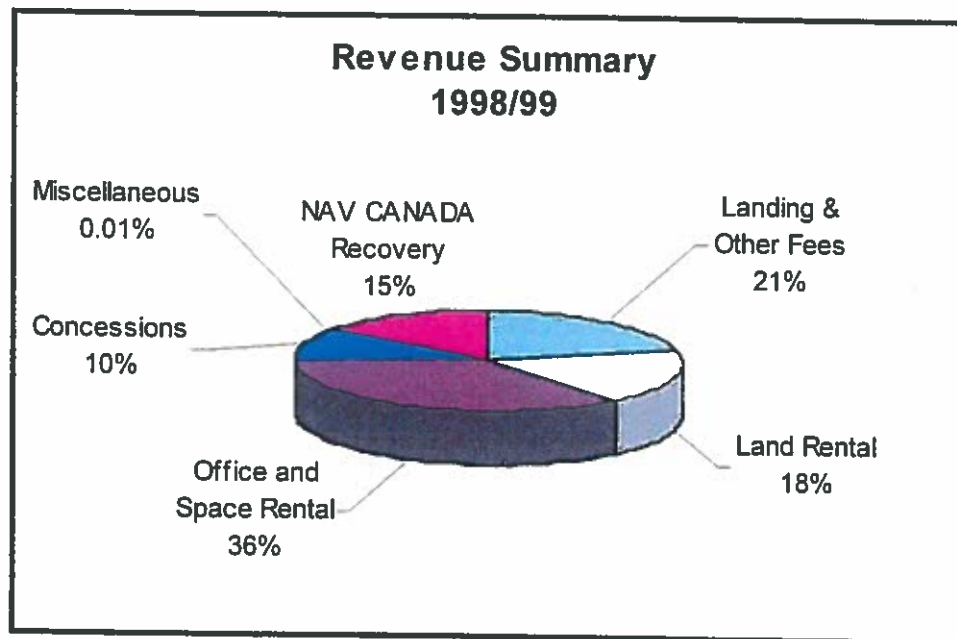
Revenue from land leases at the airport amounted to \$14,085.54 in 1998/99. Rental revenue increased significantly in 1996/97. Since that time however revenues have only increased moderately. One of the General Aviation operators, L&A (Landa) Aviation, chose not to renew the lease at the end of October, 1999 which will result in an annual decrease in revenues of \$1,038.

Office and Space rentals account for the single largest source of revenue for the Hay River Airport. The most significant tenants in the Air Terminal Building are: a) the scheduled airlines, Canadian North and First Air, b) Buffalo Airways which operates a scheduled and charter service, and c) NAV CANADA. When NAV CANADA and the airport administration both fell under Transport Canada, NAV CANADA space was offered in exchange for the provision of FSS and navigation aids services. NAV CANADA also pays O & M cost recoveries to the GNWT. After the departure from Transport Canada, NAV CANADA's policy has been to regularize all space lease arrangements so in 1997/98 a NAV CANADA's recoverable revenue item appears in the table. The next step by NAV CANADA will be to significantly reduce their floor space requirements and thereby decrease the recovery amount through closure of the FSS.

**Figure 10-1 O&M Expenditure Summary**



**Figure 10-2 Revenue Summary**



Revenues from concessions have decreased significantly over the past four years due, in large part, to the closure of the Shell and Esso fuel facilities in 1996 when the storage tanks exceeded their economic life. An agreement was signed in 1999 with the Town of Hay River to provide a re-fuelling service, however, no land rent is anticipated for several years.

Revenues from aircraft fees include landing fees and aircraft parking fees. General Terminal (GT) fees have never been charged at the Hay River Airport. Prior to 1994, Transport Canada's policy for charging GT fees applied only to Class I airports where carriers made use of Passenger Terminal Buildings. The 1994 National Airports Policy extended the application of GT fees to all airports south of latitude 60° but with an exemption for aircraft with less than 10 seats.

Revenues derived from aircraft charges have declined slightly in the past few years, reflecting the shift from major to regional carriers and the accompanying switch to smaller aircraft types.

In spite of the significant transfer to regional carriers, the numbers of enplaned/deplaned passengers have remained relatively stable. Unless there is a major up-swing in the local economy, passenger growth is not expected to exceed an average annual growth rate of 0.75% in the medium term.

Total revenues at the Hay River Airport declined sharply between 1995/96 and 1996/97, then increased in 1998/99 to previous levels. As the large majority of airport revenues is derived from the rental of land and Air Terminal Building space, the factor that appears to drive revenue generation at the present time is the demand for facilities by aviation operators, rather than actual numbers of passengers. It is recognized, however, that as traffic increases a point will be reached where capacity will become constrained and new facilities are warranted.

With the planned departure of the NAV CANADA FSS in April 2000, an additional 38 m<sup>2</sup> of office space will be made available to the airlines serving Hay River. Further, new space will be made available for baggage make-up and cargo operations and additional ticket counters. It is anticipated that the existing airlines collectively will take over the space vacated by NAV CANADA. This should result in an increase in Air Terminal Building revenue as the current rental rates are higher than that applied to the NAV CANADA lease.

Very little revenue is generated from discretionary spending on the part of passengers. The owner of the former gift shop, who is also the current owner of the vending machines, indicated that a large portion of her customers are airport employees rather than travellers. If tourism expands at Hay River, there may be opportunities for more retail outlets at the airport, but as long as business travel comprises the majority of trips to and from Hay River, there does not appear to be much scope to increase retail revenues. The planned refurbishment of the Air Terminal Building may provide new opportunities for retail operations, however none is currently anticipated.

The GNWT Commissioner's Airport Land Regulations were put into place in 1997 and the department has been setting up the legal framework for a leasing program since that time. New rates have been set for land and Air Terminal Building space rentals and the target to complete negotiations on the new rates is prior to April 1, 2000. The introduction of the new rates, as proposed, will double land and building space rent. There has been no attempt to incorporate these proposed rental rates into the forecast of commercial revenues.

### 10.3 Projected Capital Costs

The estimated capital costs contemplated in this Development Plan approximate **\$ 7.925 million**. If projects qualify for the Airports Capital Assistance Program (ACAP) then **up to 95%** of qualified costs could be recovered from Transport Canada. The purposes for which ACAP funding can be used include: safety, asset protection and operating cost reduction. Based on the current level of passenger activity, the possible contribution available could cover all but 5% of the eligible costs.

### 10.4 Projected Operating Costs

Operating and maintenance costs generally do not increase as air traffic increases. Only substantial changes in airport activity are likely to result in an increased demand for maintenance and support, or for additional airport personnel.

Expansion of airport facilities or significant changes in airport operations will, however, affect operating costs. Major capital expenditures usually include an associated, on-going maintenance component that will be added to the O&M base.

As there are currently no plans to increase the number or size of airport facilities or operations, O&M costs are not expected to change significantly. The refurbishment of the Air Terminal Building will not increase the amount of space and, accordingly, no increases in maintenance costs are forecast.

#### 10.4.1 Airport Operations

It has been assumed that total O&M costs will increase with inflation only. However, should Transport Canada impose a new regulation requiring improved Aircraft Emergency Intervention (firefighting) services, an additional annual cost of \$190,000 will result. A summary of projected operating costs, including salary and non-salary items, is provided in the following table.

**O&M Expenditure Forecast  
Hay River Airport**

| Cost Category        | (1998/99 Constant \$'s) |                     |                     |                     |
|----------------------|-------------------------|---------------------|---------------------|---------------------|
|                      | 1998/99                 | 2002                | 2010                | 2020                |
|                      |                         |                     |                     |                     |
| Salary               | \$515,917               | \$515,917           | \$515,917           | \$515,917           |
| Non-salary           | 216,364                 | 216,364             | 216,364             | 216,364             |
| AEIS                 |                         | 190,000             | 190,000             | 190,000             |
|                      |                         |                     |                     |                     |
| <b>Total O&amp;M</b> | <b>\$732,280.81</b>     | <b>\$922,280.81</b> | <b>\$922,280.81</b> | <b>\$922,280.81</b> |

## 10.4.2 E.R.S. Services

The Hay River Airport currently does not have on-site Emergency Response Services (ERS) but fire fighting is available from the local volunteer fire department. The airport ERS personnel and equipment were disbanded as a result of the 1994 National Airports Policy.

Should the proposed Transport Canada Regulation, CAR 308, be imposed, there would be a requirement to hire fire fighters and purchase required equipment. The estimated start-up cost is \$724,000 with an annual operating cost of \$190,000 representing a 26% increase in annual operating costs. The ability to recover this cost through increases in user fees is severely constrained by the low traffic volumes.

## 10.5 Projected Revenues

Airport revenue projections are dependent on the type of activity that generates the demand for the particular service. Consequently, Air Terminal Building concessions, such as car rentals, taxis, gift shops and restaurants, are normally linked to passenger traffic. Similarly, revenue from fuel concessions is directly affected by airline activity. Leases for office and shop rentals and for airport land are more often based on a unit cost and are affected by inflation and local market demand.

Revenue projections have been based on passenger numbers and aircraft movements as well as known changes in facilities. Revenue information obtained from the airport was summarized by activity. Therefore, individual leases and licenses for concessions and space rentals have been grouped by category and the total amount has been projected by the appropriate indicator. It is important to note that the existing land leases do not contain automatic inflation increases, although most of the longer term leases include a five year review period at which time an adjustment for inflation can be negotiated.

A summary of projected revenues, by major category, is provided below.

Revenue Forecast  
Hay River Airport

| Revenue Category             | (1998/99 Constant \$'s) |                 |                 |                 |
|------------------------------|-------------------------|-----------------|-----------------|-----------------|
|                              | 1998/99                 | 1999/2000       | 2010            | 2020            |
|                              |                         |                 |                 |                 |
| Landing & Other Airline Fees | \$16,456                | \$16,456        | \$17,946        | \$18,603        |
| Land Rental                  | 10,028                  | 10,028          | 10,028          | 10,028          |
| Concessions & Space Rental   | 33,485                  | 46,293          | 46,303          | 46,367          |
| NAV CANADA Recoveries        | 11,921                  | 3,000           | 3,000           | 3,000           |
|                              |                         |                 |                 |                 |
| <b>Total</b>                 | <b>\$71,890</b>         | <b>\$75,777</b> | <b>\$77,277</b> | <b>\$77,998</b> |

Rates and fees charged at the Hay River Airport are prescribed by the GNWT and generally follow the practices in place at the time of transfer from the federal government. Land rentals are based on full market value, determined by an appraisal at the commencement of the agreement. Rental of non-aviation land is also based on full market value but calculated on a unit cost basis. Federal legislation requires that rent reviews are to occur every 5 years.

Office and shop space rentals are based on amortized capital costs plus on-going O&M expenditures and are reviewed annually.

Change to market rates was determined and implemented in 1999. The overall impact was an increase in rates since the last reassessment of 1994.

Airport maintenance charges, which are based on an analysis of airport maintenance costs of common user areas/facilities and land use and averaged over a five year period, are now included in rental rates and are not expected to increase with the proposed rental rates.

Air Terminal Building concession rates vary according to activity and generally include a minimum guarantee or a percentage of gross revenues or both. Substantial leases, such as those for car rentals, are publicly tendered.

Landing fees are based on aircraft weight and classified as either domestic or international. Fees are not applied to state aircraft, aircraft in distress, aircraft participating in search and rescue operations or providing emergency medical transportation.

## **10.6 Sensitivity Analyses**

With such a significant operating deficit and relatively stagnant forecast traffic levels, the ability of the airport to achieve operating viability is doubtful. The Hay River Airport is currently recovering less than 10% of it's total operating costs. The total revenue per passenger generated in 1998/99 was approximately \$6.00. To recover even the operating costs would require an increase to \$65.00 per passenger which, for a small airport, would be extremely difficult to achieve.

As alternatives to air transportation have improved in the recent past, the demand for air travel has become very inelastic and will not tolerate substantial increases in costs. By way of an example, whereas 10 years ago a typical family of four would have had to fly to larger centres such as Edmonton for vacations, shopping, etc., improvements to the highway systems have made it more economical for the discretionary traveller to drive to a wide variety of destinations.

Business travel will continue to be the mainstay of scheduled airline service and seasonal tourist, exploration and government travel will support the charter air services. If the economic situation improves locally, this non-discretionary class of travel is expected to increase accordingly. However, significant increases in activity are not anticipated in the short to medium terms.

There is considerable land available at the airport for rent for non-aviation purposes, although it has not been determined that a demand for airport land exists. If marketed effectively, however, this resource has potential to increase revenues significantly with minimal operating costs.

Ultimately, unless there is a significant increase in activity in the local economy, most likely in the natural resources sector, the demand for aviation services will remain relatively unchanged over the forecast period.





