MASTER PLAN

AUGUST 2017

Prepared for

THE CITY OF KENAI

By:

Aries Consultants Ltd.

Wince-Corthell-Bryson

KENAI MUNICIPAL AIRPORT MASTER PLAN
FINAL REPORT

Prepared for

CITY OF KENAI

The preparation of this document was financed in part through a planning grant from the Federal Aviation Administration as provided under Section 505 of the Airport and Airway Improvement Act of 1982, as amended. The contents do not necessarily reflect the official view or policy of the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate laws.

Prepared by

WINCE-CORTHELL-BRYSON

ARIES CONSULTANTS LTD.

Prepared August 2017

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CITY OF KENAI

RESOLUTION NO. 2017-51

A RESOLUTION OF THE COUNCIL OF THE CITY OF KENAI, ALASKA, ACCEPTING AND ADOPTING THE 2017 AIRPORT MASTER PLAN UPDATE.

WHEREAS, the Federal Aviation Administration (FAA) requires as part of the terms and conditions of its grant support that the City formally adopt a master plan; and,

WHEREAS, in July 2010, the FAA approved and offered to the City a grant agreement to "Conduct Airport Master Plan"; and,

WHEREAS, the master plan consultants, Wince-Corthell-Bryson, prepared a new master plan for the Kenai Municipal Airport; and,

WHEREAS, the Kenai Airport Commission, under KMC 21.20.010, shall develop, adopt, alter or revise, subject to approval by the City Council, a master plan for the airport development; and

WHEREAS, the Kenai Airport Commission unanimously recommended City Council approve the 2017 Airport Master Plan at the regularly scheduled meeting of July 13, 2017 meeting; and,

WHEREAS, the Kenai City Council concurs with the recommendations of the master plan.

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF KENAI, ALASKA:

Section 1. That the 2017 Kenai Municipal Airport Master Plan is hereby adopted by the City of Kenai.

PASSED BY THE COUNCIL OF THE CITY OF KENAI, ALASKA, this 2nd day of August, 2017.

BRIAN GABRIEL SR., MAYOR

ATTEST:

Jamie Heinz, Acting City Clerk

Chapter 1

EXECUTIVE SUMMARY

1.1 INTRODUCTION

The Kenai Municipal Airport (also referred to as the "Airport" throughout this report) is geographically located in the northwest portion of the City of Kenai on approximately 1,481 acres of land at an elevation of 99 feet above mean sea level. The location of the City with respect to other Alaska communities and the Airport within the community are illustrated on Figure 1-1.

The Airport is owned and operated by the City of Kenai. An Airport Commission serves as an advisory board to the City for airport and aviation-related issues.

The Kenai Municipal Airport is included in the Federal Aviation Administration's (FAA) *National Plan of Integrated Airport Systems* (NPIAS). The NPIAS defines the role and future development of public-use airports throughout the United States. The Airport is classified as a Commercial Service-Primary Airport in the FAA's overall national system of airports. Commercial Service airports are defined as those airports having 2,500 or more annual passenger enplanements. Primary Airports are defined as those Commercial Service airports having 10,000 or more annual passenger enplanements. The designated role of the Airport is to serve short-haul air carrier routes of less than 500 miles.

The Kenai Municipal Airport is included in the *Alaska Aviation System Plan* (AASP) prepared for the State of Alaska, Department of Transportation and Public Facilities. The AASP classifies the Airport as one of 28 Regional Airports in the State. A Regional Airport serves as a transportation and economic hub to more than one community.

The general objective of the Airport Master Plan is to provide a long-range plan to guide development of the Airport. This will maintain the Airport as a valued transportation facility for the City of Kenai and those parts of the surrounding Kenai Peninsula Borough for which the Airport is the most convenient aviation facility.

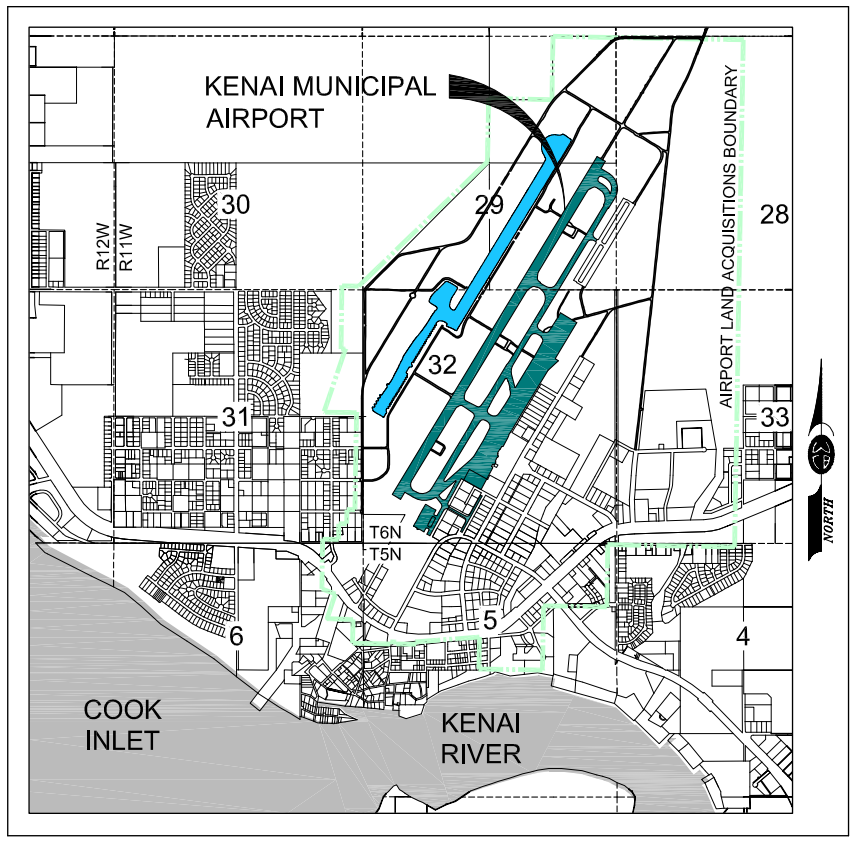
The Airport Master Plan was prepared in three phases. The Phase 1 Report documented the Aviation Activity Forecasts, Existing Airport Conditions and Airport Sustainability Practices. Passenger Terminal Building Existing Conditions Surveys, including architectural, structural, mechanical and electrical inspections were documented in Appendix A. A description of the Aeronautical Survey and Airport Geographic Information System Mapping required for the new Airport Layout Plan drawings, prepared in Phase 3, was presented in Appendix B.

The Phase 2 Report documented the Airport Facility Requirements, Alternative Airport Development Concepts and Environmental Overview.

The Phase 3 Report documented the Recommended Airport Master Plan, Facilities Implementation Plan and Financial Feasibility Analysis. The new Airport Layout Plan drawings were submitted separately to the City and FAA.

The Phase Reports have been combined into this Airport Master Plan Report.

The City Council unanimously accepted and adopted the 2030 Airport Master Plan at their August 2, 2017 City Council meeting (See Resolution No. 2017-51)



VICINITY MAP

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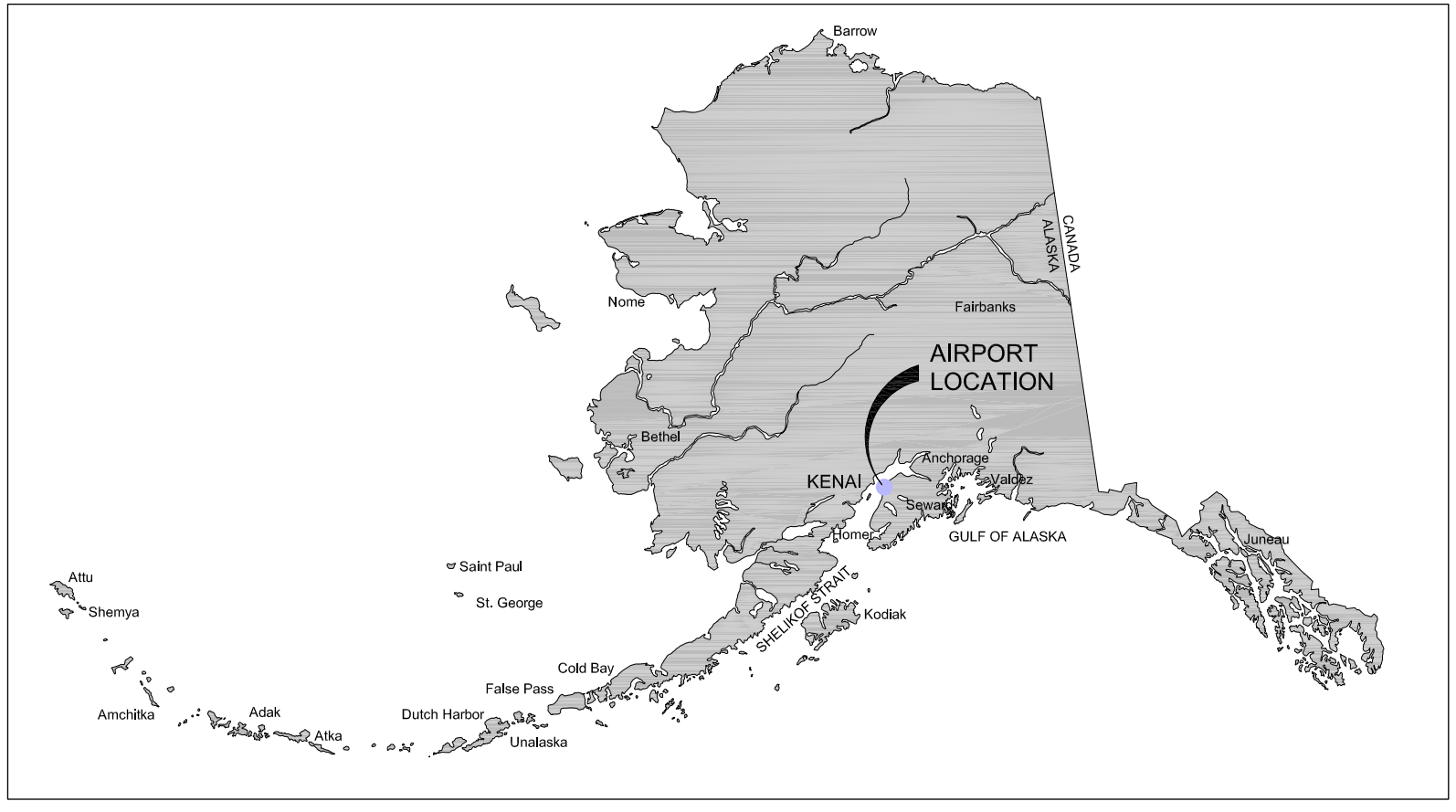


LOCATION MAP

WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN LOCATION AND VICINITY MAP	FIGURE 1-1
DRAWN BY: V.C. DRAWING: LOCATIONMAP CHECKED BY: C.M. DATE: Oct 03,2017		

Municipal Airport

Since the Airport Master Plan was initiated in 2010, several events relevant to the Airport Master Plan have occurred as noted below.

In 2012, under the FAA Modernization and Reform Act (FMRA) an Airport Recycling, Reuse and Waste Reduction Plan is now required as part of an Airport Master Plan.

In 2013, the tree obstructions on Airport and City-owned property were removed.

In 2013, the City updated the 2003 Comprehensive Plan.

In 2015, FAA issued updated *FAA Order 1050.1F, Environmental Impacts: Policy and Procedures*.

In 2013 The FAA issued a new Airport Layout Plan Checklist with significant additional requirements.

In 2015, the State of Alaska notified the City that the State DOT&PF will be unable to continue providing a 3.125 percent matching share grant to local sponsors for FAA Airport Improvement Program grants.

In 2015, the FAA redesignated the runways from 1-19 to 2-20. However, the runway designations were not repainted until 2017.

In 2016, the City updated the 2003 Comprehensive Plan again.

In 2016, the City updated the zoning within the Airport Reserve Boundary.

In 2016, Taxiways F, G and H and the general aviation tiedown apron and the float plane basin overflow weir projects were completed.

The Phase Reports incorporated the implications of these events after they occurred as noted in the text.

1.2 FINDINGS AND RECOMMENDATIONS

The principal findings and recommendations of the study are presented below.

1.2.1 Aviation Activity Forecasts

The aviation activity forecasts, based on the high enplaned passenger forecasts, are summarized below.

The Kenai Peninsula Borough is forecast to increase from a population of 55,712 in 2010 to an estimated 66,700 in 2030, an average annual increase of 0.9 percent.

The Air Service Area is forecast to increase from a population of 35,191 in 2010 to an estimated 42,000 in 2030, an average annual increase of 0.9 percent and continue to account for about 63 percent of the total population of the Kenai Peninsula Borough.

Passengers are forecast to increase at an average annual growth rate of 1.6 percent from 97,041 enplaned passengers in 2011 to 131,600 enplaned passengers in 2030.

Annual aircraft departures by the scheduled commuter air carriers are forecast to increase from approximately 9,000 operations in 2011 to 10,200 operations by 2030.

The total volume of cargo and mail currently reported at the Airport is forecast to increase from 1,384 tons in 2011 to 1,575 tons by 2030. The reported air cargo does not include the transportation of bulk fuel to outlying areas or the annual fish haul activities. An estimated 7,500 tons of bulk fuel were flown out of the Airport and an estimated 200 tons of fish were flown into the Airport in 2011.

Total aircraft operations, on a 24-hour basis, are forecast to increase from about 45,894

operations in 2011 to 55,500 operations in 2030.

Air carrier operations are forecast to remain at about 1,100 operations.

Commuter/air taxi operations are forecast to increase from about 28,219 operations in 2011 to 34,000 operations by 2030. These operations include scheduled and nonscheduled passenger and air cargo aircraft and helicopters.

General aviation operations are forecast to increase from 13,115 operations in 2011 to 16,800 operations by 2030. Itinerant operations are forecast to increase from 6,550 operations in 2011 to 8,400 operations by 2030. Local operations are forecast to increase from 6,565 operations in 2011 to 8,400 operations by 2030 and to continue to account for about 50 percent of total general aviation operations.

The water runway is forecast to accommodate an estimated 1,300 operations (about 7 percent of the general aviation aircraft operations) by 2030.

The gravel runway is forecast to accommodate an estimated 500 operations (about 3 percent of the general aviation aircraft operations) by 2030.

Military operations accounted for 3,589 operations in 2011 and are forecast to remain at a level of 3,600 annual military operations.

Annual aircraft instrument operations are forecast to increase from about 10,800 operations in 2011 to 13,000 operations by 2030.

Based aircraft are forecast to increase from 85 aircraft in 2011 to 95 aircraft by 2030. Single-engine aircraft are forecast to increase from 76 aircraft in 2011 to 82 aircraft by 2030, multiengine propeller aircraft are forecast to increase from six aircraft to eight aircraft and helicopters are forecast to increase from three helicopters to five helicopters.

Peak month enplaned passengers are forecast to increase from 11,090 passengers in 2011 to 15,800 passengers by 2030. Daily enplaned passengers during the peak month are forecast to increase from 360 passengers in 2011 to 500 passengers by 2030. Peak hour enplaned passengers are forecast to increase from 54 passengers in 2011 to 75 passengers by 2030.

Peak hour aircraft operations are forecast to increase from 21 operations in 2011 to 28 operations by 2030.

FAA accepted the forecasts on February 26, 2013 for proceeding with the airport master planning activities and formally approved the forecasts on January 13, 2016.

1.2.2 Airport Property

Acquire an additional 12.6 acres of land to the southwest of Runway 2L-20R for future airport development and protection.

Acquire additional avigation easements over approximately 3.75 acres north of the Kenai Spur Highway.

Acquire 80 acres northwest of the Airport for future airport purposes.

1.2.3 Airfield

Retain Runway 2L-20R as a 7,855 –foot runway with a width of 150 feet to handle commuter aircraft, business jet and other large aircraft expected to use the Airport. The Runway 2L threshold is retained to provide only 7,575 feet for landing on runway 2L and 20R. a full-length parallel taxiway for Runway 2L-20R is retained at

600 feet to the east with one additional entry/exit taxiway.

Retain Runway 2R-20L (gravel runway) at 2,000 feet long and 60 feet wide.

Retain Runway 2W-20W (water runway) at 4,600 feet long and 252 feet wide. A separate 150-wide water taxi channel is planned west of the water runway.

Reserve space, at least 500 feet west of Runway 2W-20W centerline, for a potential relocated gravel runway 2,400 feet long by 60 feet wide on the west side of the Airport.

Rehabilitate Runway 2L-20R, taxiways, terminal aircraft parking apron and general aviation tiedown apron pavement based on the Pavement Maintenance Management Plan.

Retain the present loading and unloading helipads near the passenger terminal and Airport Operations Facility. Provide new loading and unloading helipads west of the FAA Air Traffic Control Tower.

Implement the Float Plan Basin Level Control Weir replacement and General Aviation Area Storm Drain Sedimentation/Oil/Water Separator Drainage Improvements.

1.2.4 Airspace and Navigational Aids

Enhance the capabilities of the Airport with a nonprecision instrument flight rules (IFR) approach procedure to Runway 2L with lower minimums than presently exist. FAA has indicated that, if all the obstruction penetrations, both on and off the Airport, were mitigated, the minimums could be further reduced.

Do not recommend reducing the visibility minimums to less than ¾ mile for Runway 2L as this would require larger runway protection zone, land acquisition and medium intensity approach lights.

Retain a 2,500-foot long precision instrument runway protection zone for Runway 20L and a 1,700-foot long nonprecision instrument runway protection zone for Runway 2L.

Recommend the City acquire in fee title, or enforce, the avigation easements within the runway protection zone for Runway 2L that extend outside the Airport property line.

Recommend the City continue to work with affected private property owners to mitigate the remaining off-Airport tree obstructions.

Retain visual runway protection zones, 1,000-feet long, for Runways 2W-20W and 2R-20L.

Recommend that the Building Restriction Line on the east side of the airfield, north of the passenger terminal, be moved to the west edge of the existing lease lot lines. Also move the lease lot lines 100 feet west to create additional space for lease lot development.

1.2.5 Passenger Terminal

Retain the commuter aircraft parking apron to accommodate up to six commuter-type aircraft positions for DeHavilland DHC-8 and Cessna 208 Caravan type aircraft through 2030 without impacting the itinerant aircraft parking to the south.

Retain the aircraft parking apron and Taxiway J, adjacent to the passenger terminal building, to accommodate the commuter aircraft parking positions and allow up to C-130 aircraft to taxi along the west side of the apron.

Reserve beyond 2030, or if air traffic grows faster than forecast, additional aircraft

parking apron space to the north. The helipad and large itinerant general aviation spaces in this area would have to be relocated. Long-term expansion should also allow for expanding the aircraft parking apron to the west.

Preserve the existing 25,000-square foot passenger terminal building which is generally adequate to accommodate the forecast 2030 demand.

Modify and reassign some terminal building space, as necessary, to provide additional space for improved passenger handling services and increased passenger volumes including departure lounge/waiting area, passenger security screening, passenger ticketing and check-in, airline operations and baggage handling depending upon the number of air carriers, size of aircraft, security requirements and associated facilities.

Provide an Airport Administration area addition.

Modify and improve terminal building to address deferred maintenance and Code issues, including installing a new roof, rehabilitating the sprinkler system and implementing recent energy audit recommendations.

1.2.6 Air Cargo and Mail

Continue to accommodate some air cargo as belly cargo on passenger aircraft handled through the passenger terminal building.

Retain (and expand) the apron area for the air cargo refueling, bulk fuel and supplies, air carrier diversions, fire suppression, fish haul, military and larger cargo aircraft to the north of the FAA Air Traffic Control Tower.

1.2.7 General Aviation

Retain the commercial aviation/fixed base operator lease facilities southeast of Runway 2L-20R. About 3 acres to the south of the passenger terminal vehicular parking lot are provided for additional commercial aviation/fixed base operator facilities. There are vacant lease lots of about 1 acre in General Aviation Apron No. 1 and about 1.8 acres in the F.B.O. Subdivision available.

Provide about 3.6 acres for future commercial aviation/fixed base oerator and other aviation-related activities north of the State of Alaska Department of Natural Resources, Division of Forestry, facility.

Reserve an additional 41 acres along an extension of Willow Street to the north for future aviation-related and/or aviation compatible development beyond 2030.

Reserve space for lease lots along the west side of the float plane basin.

Provide tiedown spaces for over 100 based aircraft in either the present City general aviation tiedown area or in the existing lease lots in this area. There is also space for Civil Air Patrol-owned based aircraft on their own facility at the south end of the Airport.

Provide space for at least 20 itinerant aircraft that is needed through 2030. The existing itinerant aircraft tiedown area provides 15 to 30 spaces depending on the mix of aircraft.

Recommend that hangars be consolidated in a few general areas on the Airport in the long term. One is the present area southeast of the passenger terminal area. The other is a new area east of the float plane basin water taxiway that would be developed on an as-required basis for T-hangars, executive or conventional hangars.

Provide space for additional aircraft slips on the west side of the old float pond with access from Float Plane Road.

Retain an aircraft parking area alongside the gravel Runway 2R-20L for use by taildragger aircraft with oversized tundra tires.

Locate additional helipads for parking helicopters at the north end of the City General Aviation aircraft parking apron. Another helipad parking area is also provided near the FAA Air Traffic Control Tower.

1.2.8 Airport Access and Parking

Retain the existing access roadways off Willow Street into the terminal area which are adequate to serve the passenger terminal, cargo and general aviation activity on the east side of the Airport through 2030. A future extension of Willow Street to the north is planned for future development beyond 2030.

Reconfigure the curbside roadway in front of the passenger terminal.

Modify the public vehicular parking lot to handle different types of paid parking ranging from an honor system to a fully-enclosed parking lot. Space is reserved for another 50 spaces south of the existing rental car parking lot and an additional 70 space paved parking lot east of Willow Street.

Relocate, or upgrade, the access road into the gravel runway, which tilizes an existing maintenance road entrance from Willow Street, when the aircraft parking apron and lease lots are extended to the north.

Extend/realign the maintenance/perimeter roadway inside the north and west sides of the Airport property line.

1.2.9 Airport Support

Retain the Airport Operations Facility which is adequate for present needs. The Aircraft Rescue and Fire Fighting facility satisfies the required response time.

Retain the FAA Air Traffic Control Tower and FAA Flight Service Station in their present locations.

Reserve space for an aircraft wash pad on the City general aviation tiedown area.

Extend and modify the utility systems on the east side of the Airport, which are well established, in the future consistent with the development recommended.

Implement water and sewer improvements for commercial aviation development on the southwest side.

Realign the Airport fencing as additional airport improvements are implemented.

Retain the Alaska Regional Fire Training Center along Marathon Road.

Retain the City of Kenai reserve water tank and adjacent camping area south of the float plane facility. The nonaviation uses on the east side of General Aviation Apron No. 1 are also retained.

Expand the cemetery to the west, if required, on City-owned property within the Airport Boundary.

1.2.10 Facilities Implementation Plan

Implement a three-phase Capital Improvement Program for the recommended Airport Master Plan. Phase I (through 2020) projects, which are considered the highest priority items to be implemented as soon as practicable, are estimated to cost $16.7 million.

Finance the City's financial obligation which is estimated to be $1.6 million on the basis of current eligibility criteria and funding participation from the FAA Airport Improvement Program. This includes over $0.7 million for the Passenger Terminal rehabilitation and $0.2 million for the Alaska Regional Fire Training Center upgrade.

Develop and maintain a three to five year Airport Capital Improvement Program that effectively prioritizes projects consistent with the needs of the Airport and effectively utilizes the Airport's FAA Airport Improvement Program entitlement funds and keeps the Airport in a position to take advantage of available FAA discretionary funding for high National Priority Rating scoring projects.

Schedule Phases II and III projects to be consistent with the financial resources of the City.

1.2.11 Financial Feasibility Analysis

Recognize that, historically, the combined Airport Land Sale Permanent Fund and the Airport Fund have provided average annual revenues of $2.9 million over the past five-year period. Based on the four-year forecast of operating revenues and expenses, an estimated $508,000 will be available on an annual basis to fund implementation of the Phase I Capital Improvement Program.

Fund the City share of the capital improvement requirements totaling $1.6 million, together with an estimated receipt of $15.2 million in FAA Airport Improvement Program entitlement funds, to fund the City's share of Phase I Capital Improvement Program projects.

Chapter 2

AVIATION ACTIVITY FORECASTS

2.1 INTRODUCTION

The aviation activity forecasts presented in this chapter were developed based on processes and guidance presented in Federal Aviation Administration (FAA) Advisory Circular 150/5070-6B *Airport Master Plans*; FAA 2001 *Forecasting Aviation Activity by Airport;* and the Transportation Research Board 2007 *Airport Aviation Activity Forecasting*.

Forecasts of future levels of aviation activity form the basis for effective decisions for future airport planning and development in determining the need for new or expanded facilities. Forecasts of aviation activity should be realistic and based upon the latest available data to provide adequate justification for future planning and development.

This chapter defines the air service area of the Kenai Municipal Airport and the historical air traffic activity at the Airport including commercial airline service, air cargo and mail activity, general aviation activity and aircraft operations. The forecasts of aviation activity through 2030 are presented and the methodologies used to develop future levels of aviation activity are also presented.

2.2 AIR SERVICE AREA

The geographic area served by an airport is designated as the air service area. Typically, the air service area includes a densely-populated urban area (such as a city and its environs) within a larger, less-densely populated area that is usually defined (or limited) by the existence of other airports.

The air service area can seldom be precisely identified in terms of political boundaries. Therefore, usually a city, borough or political region (such as a Standard Metropolitan Statistical Area) is selected to represent the air service area because relevant population and economic data are readily available for such areas. Furthermore, trends in aviation activity typically correspond closely with general growth trends in the major economic regions containing the main concentration of population served by a given airport.

Available population and socioeconomic information provided by the Kenai Peninsula Borough Economic Development District, Inc. are presented. The Kenai Peninsula Borough encompasses a total of 25,600 square miles which includes the Kenai Peninsula, Cook Inlet and portions of sparsely populated areas to the west of the Inlet. Because of the size, distance and population centers, the Borough is often divided into four geographic locations with the Central Kenai Peninsula, the industrial and business heart of the Borough, containing the largest cities of Kenai and Soldotna.

The Kenai Municipal Airport serves the City of Kenai and those surrounding communities for which it is the most convenient airport. Since the majority of the people served by the Airport reside in the Cities of Kenai and Soldotna, the Central Kenai Peninsula was designated as the Air Service Area.

Population data for the Air Service Area includes the communities of Clam Gulch,

Cohoe, Funny River, Kalifornsky, Kasilof, Nikiski, Ridgeway, Salamatof and Sterling. Table 2-1 presents the historical and forecast population data for the Kenai Peninsula Borough and the Air Service Area. Population forecasts for the Borough were prepared by the State of Alaska Department of Labor and Workforce Development. The population of the Air Service Area (Central Kenai Peninsula) was interpolated to account for 63 percent of the total population of the Kenai Peninsula Borough.

Table 2-1
Historical and Forecast Population, Central Kenai Peninsula

Year	Kenai Peninsula Borough	Air Service Area
Historical		
2000	49,691	30,904
2001	50,190	31,201
2002	50,879	31,753
2003	51,743	33,536
2004	51,616	32,528
2005	51,735	32,741
2006	52,025	32,938
2007	52,904	33,618
2008	53,669	34,115
2009	53,578	34,908
2010	55,712	35,191
Forecast		
2015	59,073	37,200
2020	62,174	39,200
2025	64,761	40,800
2030	66,700	42,000

Sources:
Alaska Department of Labor and Workforce Development
Population of Alaska by Labor Market Area and Borough/Census Area 2000-2010
Alaska Region and Borough/Census Area Population Projections 2010-2035
Projections for Air Service Area interpolated to account for 63 percent of total Kenai Peninsula Borough.

The Borough's economic activity is centered around government, oil and gas production and refining, visitor industry and fishing according to the Kenai Peninsula Borough Economic Development District. The Kenai-Soldotna area accounts for about 67 percent of the Borough's total employment and wages tend to be higher in this area than the average for the Borough due to the oil and gas industry activities in the Kenai and Nikiski areas. Government, health care and retail account for about 47 percent of the area employment while other employment is accounted for in a broad range of jobs with no dominant industry thus allowing the area to be more resilient to declines in any one industry. Almost all of the natural resources jobs in the Kenai-Soldotna area are in the oil and gas industry that has exhibited potential significant new oil and gas discoveries in the Kenai area. Based on the Draft 2012 *Imagine Kenai 2030 – Comprehensive Plan Update*, the City of Kenai continues to expand its role as a regional commercial center with new box stores opening including Home Depot and Walmart Supercenter and the Aspen Extended Stay Suites, businesses that will generate revenues for the City.

Based on the 2003 *City of Kenai Comprehensive Plan* and the Draft 2012 *Imagine Kenai 2030 – Comprehensive Plan Update*, slower economic and population growth is changing the make-up of Kenai's population. There are more long-term residents, fewer newcomers and less of a population turnover. Over time these trends indicate a steadily aging population of more seniors, fewer increases in school enrollments, a shift in housing demand mix and a shift in local priorities for public facilities and services to meet the changing needs of the changing population. The City is expected to continue its role as a center for commerce, and its location and services

provide opportunities for growth as a center for the visitor industry.

The City of Kenai is the center for providing services and supplies for oil and natural gas drilling and exploration. Tesoro Alaska's oil refining operations are located in North Kenai. Buccaneer Energy recently announced the start of natural gas production from its Kenai Loop No. 1 well that has included the construction of a pipeline and the facilities necessary to drill, produce and transport a substantial amount of natural gas. Based on information presented at the recent Industry Outlook Forum sponsored by the Kenai Peninsula Economic Development District and the Kenai Peninsula Chapter of the Alliance, presentations by other major oil and gas companies indicate proposed increases in oil and gas exploration in the Kenai and Cook Inlet areas in the near-term. The Nikiski liquefied natural gas (LNG) plant that had been a mainstay of the Kenai Peninsula for over 40 years was slated for closure in 2010 but the plant has been maintained and Conoco Phillips expects to resume exports of natural gas in 2012.

Corporate business aircraft using the Airport include those from Walmart, GCI, Fred Meyer, Marathon Oil, Caribou Industries, Office Max, Mid America Energy, Harrah's Entertainment, Shell Oil, Tesoro and Home Depot, although these trips are infrequent. With the recent closure of the Agrium Fertilizer Plant in Nikiski, the Agrium jet is no longer at the Airport. The closure of big box stores, e.g., Kmart and Lowe's has also affected corporate aviation activity as their corporate jets no longer come into the Airport.

The Borough is known for its scenic beauty and outdoor recreation that attracts visitors throughout the year with summer being the main tourist season. Tourism was down in 2010 with an estimated 2,900 fewer cruise ship passengers compared with 2009. Sport fishing on the renowned Kenai River is a popular tourist destination. Based on discussions with airport management, there are fewer business jets that come in during the fishing season for the Kenai River Classic, an annual fundraising event for the Kenai River Sportfishing Association, than there have been in earlier years.

Commercial fishing and seafood processing have been a mainstay of the area economy. Although the industry experienced declining harvests, weak markets, depressed product prices and seasonal labor shortages over the past 20 years, the industry has been relatively stable over the most recent five-year period based on information from the Alaska Department of Fish and Game. Fishing processing employment accounted for 52 percent of the Borough's manufacturing jobs in 2010. The volume of fish hauled through the Airport decreased in recent years in part because of lower local processing capacity. In addition, the change from canning to flash freezing which allows fish processing on and off shore, has contributed to the diminished need to haul fish to on-shore canneries over the years. The fishing industry is cyclical in nature, and although plans exist to expand fish processing operations in the Kenai area, fish and fish hauls are not expected to return to previous higher levels any time soon according to information published by the Alaska Department of Fish and Game.

2.3 AVIATION ACTIVITY TRENDS

Aviation demand is created by the activity of air carrier, commuter/air taxi, general aviation and military air traffic and may be stated in terms of scheduled passenger service, aircraft operations, based aircraft

demand and related components. In turn, the air traffic activity at the Kenai Municipal Airport relates directly to the population and economy of the area. In addition, the aviation demand at the Airport relates to aviation trends and forecasts on the national, State and local levels, the facilities and services provided at the Airport and the aviation facilities and services provided at other airports in the area.

2.3.1 National Aviation Trends

The FAA follows aviation trends on the national level and publishes their aerospace forecasts on an annual basis. According to the latest *Aerospace Forecast Fiscal Years 2011-2031*, air carriers have responded to major setbacks that have led to reduced passenger demand for air travel. These setbacks have included the terrorist attacks of September 11, 2001, escalating fuel costs and a global recession. In an effort to lower operating costs and minimize financial losses, air carriers eliminated unprofitable routes after 9/11 and over 30 airports across the Country lost all passenger service. The air carriers reduced the number of flights serving certain markets, grounded older, less fuel efficient aircraft and unbundled services originally included in the total ticket price and initiated fees to include these services, e.g., fees for checked bags, preferred aircraft seats and meals. A number of the major commercial carriers consolidated their operations in an effort to reduce labor costs. FAA predicts that, because of a greater increase in air travel over the past two years than originally expected, the commercial air carrier market will continue to grow over the long term.

The FAA measures general aviation demand by several factors including the number of new aircraft delivered in a calendar year. The numbers of aircraft delivered in 2010, the latest year available, decreased for the third consecutive year with increases shown only in the multiengine category. Generally, general aviation aircraft operations at contract and combined FAA-contract towers have exhibited a decade long decrease in the numbers of aircraft operations. The economic downturns have dampened the near-term prospects for the general aviation industry buts looks more favorable in the long-term outlook.

2.3.2 State Aviation Trends

According to the *Alaska Aviation System Plan,* aviation activity forecast projections are similar to the FAA forecasts and, despite the recent disruptions in the State from high fuel costs and the economic recession, long-term aviation demand in the State is expected to resume growth in all categories including passengers, cargo and aircraft operations. The demand will be uneven, however, with higher growth rates in the more urbanized areas and less growth in the rural areas.

2.4 PASSENGER ACTIVITY

Scheduled passenger service is provided from Kenai Municipal Airport to Ted Stevens Anchorage International Airport, located 160 miles northeast of the City of Kenai by road and 60 miles by air. The only other airport on the Kenai Peninsula providing scheduled passenger service to Anchorage is the Homer Airport located 90 miles southwest of the City of Kenai.

Historically, the Airport has been served with commuter passenger aircraft. ERA (now RAVN) Alaska (Alaska Airlines Commuter Service) provides daily scheduled service to Anchorage with the de Havilland DHC-8 37-passenger aircraft and Beech 1900 19-passenger aircraft. Grant Aviation provides daily scheduled service to Anchorage with nine-passenger Cessna 208 Caravan and Beech King Air aircraft. Kenai Aviation provides nonscheduled air taxi passenger service with Piper PA-31 Navajo and Beech D50C type aircraft. In addition there are also numerous other air taxis providing nonscheduled / charter passenger service to and from the Airport with Beech King Air 200, Piper PA-31 Navajo and the Pilatus PC-12 type aircraft. These air taxi nonscheduled/charter passengers account for approximately 4 percent of the total annual reported passengers.

2.4.1 Historical Enplaned Passengers

Table 2-2 presents the annual enplaned passengers at the Airport from 2000 through 2011. Although the Airport experienced fluctuations in enplaned passenger levels in the 2000s, the average number of enplaned passengers totaled 92,400 passengers annually from 2000 through 2011.

During the early 2000s enplaned passenger activity at the Airport decreased which can be attributed in part to the September 11, 2001 (9/11) terrorist attacks and rising fuel prices that affected the aviation industry nationwide during that time period. The 9/11 events decreased the overall passenger propensity to travel by air. In addition, personnel layoffs on the North Slope decreased the number of residents commuting to the North Slope by air.

Table 2-2
Historical Enplaned Passengers

Year	Enplaned Passengers	Percent Change from Previous Year
2000	100,965	-1.51
2001	106,673	+5.65
2002	91,588	-14.14
2003	84,426	-7.82
2004	85,439	+1.20
2005	87,924	+2.91
2006	93,246	+6.05
2007	94,720	+0.16
2008	96,565	+1.95
2009	82,277	-14.80
2010	86,857	+5.57
2011	97,041	+11.73

Sources:
FAA Air Carrier Activity Information System and City of Kenai Airport Management Records

The rise in fuel prices increased airline ticket fares and made the Sterling Highway an attractive alternative to air travel to Anchorage, particularly for family groups.

While these factors continue to affect passenger activity, enplaned passengers have generally increased during the later 2000s. Based on discussions with the air carriers, flying is more convenient and faster

than driving to Anchorage, particularly for one-day business travel, doctor's appointments, crew changes and fishing during the summer months. These factors have contributed to the general increase in passenger activity over the past several years. The decreases in passenger activity during the early 2000s and the increases in passenger activity during the later 2000s essentially represent a no-growth trend over the eleven-year period.

2.4.2 Forecast Enplaned Passengers

The following general assumptions were used in the preparation of the aviation demand forecasts.

- No policies that would constrain aviation activity will be imposed on the Airport by any governmental entity.
- The national economy will continue to have a sustained low to moderate growth level;
- Aircraft operating costs, particularly fuel, will not increase at an extraordinary rate over time, although there may be periodic spikes due to unforeseen events;
- The population data presented earlier are satisfactory for purposes of aviation activity forecasting.
- The existing nine-passenger up to 37-passenger type aircraft will continue to be used for commuter passenger service. Larger commuter aircraft will be used more frequently as the number of enplaned passengers increases, and the passenger load factors will increase.

Discussions with persons knowledgeable of the Airport and the Kenai-Soldotna area provided valuable information on the profile of Kenai-Soldotna air travelers. Discussions were held with the airline station managers at the Airport, representatives of the tourism and business activities in the area, airport operators, travel agencies and airport management representatives.

The primary reasons cited for the lower number of passenger enplanements following 9/11 has been the overall economy and the increases in airline fares to pay for the rising costs for fuel. People tend to conserve limited discretionary fund spending and seek alternatives when travel is necessary. For instance, when more than one family member is traveling outside of Alaska, it is more economical to use their own vehicle or rent a vehicle one way to Anchorage and rent a vehicle one way from Anchorage. Another reason for the reduced air travel is that changes in airline activity in the lower 48 states have significantly impacted travel schedules in and out of Alaska. The consolidation of major airlines has reduced the number of flights and seats available, not only out of Anchorage, but also out of Seattle to connections elsewhere making airline reservations more difficult to make.

People indicated that a number of air travelers are reluctant to fly in the smaller commuter aircraft (i.e., the nine-passenger Cessna 208 Caravan and, to a certain extent, the 19-passenger Beech 1900) while the 37-passenger de Havilland DHC-8 type aircraft

are acceptable to the majority of air travelers and are often a requirement when making airline reservations. Some people are concerned about taking flights and the airlines not being able to accommodate their baggage on the same flight. The frequency of service to Ted Stevens Anchorage International Airport is often cited as an attraction over the alternative mode of surface transportation.

Discussions with airline representatives indicate that Kenai is expected to continue to be an important commuter market served by up to 37-passenger type aircraft. The Kenai air traveler will continue to be provided with a short 25 to 35-minute flight to Ted Stevens Anchorage International Airport, which in turn provides the air traveler with access to scheduled air carrier and commuter flights to their desired destination or connecting service to other communities in Alaska, the United States and any destination worldwide.

Based on FAA guidance for preparing aviation demand forecasts, several approaches were considered in developing forecasts of enplaned passengers at the Kenai Municipal Airport and are presented in the following sections.

2.4.2.1 Population Based Forecast

Trends in aviation activity typically correspond closely with general growth trends in the major economic regions containing the main concentration of population served by a given airport as noted earlier. Passenger enplanements and population totals in the air service area for the past 10 years were analyzed to determine if a correlation existed between the two sets of statistics. Table 2-3 presents a summary

Table 2-3
Forecast Enplaned Passengers per Capita

Year	Enplaned Passengers	Population of Air Service Area	Enplanements per Capita
Historical			
2000	100,965	30,904	3.27
2001	106,673	31,201	3.42
2002	91,588	31,753	2.88
2003	84,426	33,536	2.52
2004	85,439	32,528	2.63
2005	87,924	32,741	2.69
2006	93,246	32,938	2.83
2007	94,720	33,618	2.82
2008	96,565	34,115	2.83
2009	82,277	34,903	2.36
2010	86,857	35,191	2.47
2011	97,041	35,200*	2.76
Forecast			
2015	104,200	37.200	2.8
2020	109,800	39,200	2.8
2025	114,200	40,800	2.8
2030	117,600	42,000	2.8

* = Estimated
Source: Tables 2-1 and 2-2

of historical passenger enplanements, population and the resulting enplanements per capita.

The analysis determined that passenger enplanements per capita decreased from 3.3 percent prior to 9/11. After 9/11, the passenger enplanements have fluctuated between 2.4 and 2.9 enplanements per capita. Passenger enplanements were forecast by applying the average of 2.8 enplanements per capita (between 2000 and 2011) to the forecast population for the air service area. Based on this analysis of enplaned passengers in relation to population in the air service area, the forecast increased to 104,200 enplaned passengers in 2015; 109,800 enplaned passengers in 2020; 114,200 enplaned passengers in 2025; and to 117,600 enplaned passengers by 2030, an average annual increase of 1.0 percent over the 19-year forecast period, as shown in Table 2-3.

2.4.2.2 Linear Regression/Trend Extrapolation Forecast

Based on FAA guidance for preparing aviation demand forecasts, the results of statistical techniques such as linear regression/trend analysis and extrapolation, are recommended to include the results, or eliminate the results, from further consideration. A time series, or linear regression, is used to establish a straight line that best fits historical data and forecasts a straight line into the future. The assumption is made that the same factors that have influenced the historical data will continue to influence future data. Although this is a rather broad assumption, the linear regression provides a benchmark for comparing results of other analyses. Although future passenger enplanements may fluctuate above and below the trend line as in the past, the trend line could be used as a guideline so that planning can respond to short-term fluctuations.

Several regression analyses were prepared to establish forecast enplaned passengers for the Airport. A regression was prepared using the 100,965 enplaned passengers in 2000 as the base year through the 97,041 enplaned passengers in 2011. The linear regression produced a correlation coefficient of -0.311 which is unacceptable for forecasting purposes and indicated a gradual decrease in enplaned passengers at the Airport to 76,700 enplaned passengers by 2030. A linear regression was also analyzed using passenger enplanements from 1981 through the 97,041 enplaned passengers in 2011 to include the higher enplaned passenger levels during the 1990s. This regression produced a correlation coefficient of -0.177 which is also considered unacceptable for forecasting purposes although the gradual decrease in enplaned passengers was slowed to 90,503 enplanements by 2030. Other regression projections were prepared that produced similar results and no other regression projections were considered.

2.4.2.3 Market Share Analysis Forecast

A market share analysis was prepared that included a historical review of enplaned passengers at the Airport as a percentage share of historical enplaned passengers for total enplaned passengers Statewide and for the Ted Stevens Anchorage International Airport.

Enplaned passenger data for the Kenai Municipal Airport were compared with the Statewide total enplaned passengers from the FAA Air Carrier Activity Information System (ACAIS) data base, excluding enplaned passengers for the Ted Stevens

Anchorage International and Fairbanks International Airports, as forecast passenger activity for these two airports were not included in the 2011 *Alaska Aviation System Plan*. The market share analysis for the Kenai Municipal Airport was then applied to forecast enplaned passengers in the 2011 *Alaska Aviation System Plan* and the Ted Stevens Anchorage International Airport *2008 Master Plan Study Report*. Table 2-4 presents the results of the market share analysis.

Between 2001 and 2010, the Airport's share of the total State air passenger market remained relatively stable accounting for an average between about 5 and 6 percent of the total enplanements. Between 2000 and 2010, the Airport's share of enplaned passengers compared to the Ted Stevens Anchorage International Airport also remained relatively stable accounting for an average of about 4 percent of the total.

According to the 2008 *Master Plan Study Report* prepared for the Ted Stevens Anchorage International Airport, the forecast of aviation activity was based on economic and airline projections in 2006 and was considered technically valid by the FAA.

Table 2-4
Forecast Enplaned Passengers Market Share Analysis

Year	Statewide Passenger Enplanements	Kenai Percentage Share of the State Market	Kenai Enplanements as a percent of the State Market	Ted Stevens International Airport Passenger Enplanements	Kenai Percentage Share of the TSIA Market	Kenai Enplanements as a percent of the TSIA Market
Historical						
2000	n.a.	n.a.	100,965	2,503,138	0.0403	100,965
2001	1,780,060	0.0599	106,673	2,419,261	0.0440	106,673
2002	1,637,700	0.0559	91,588	2,388,563	0.0383	91,588
2003	1,796,923	0.0469	84,426	2,246,683	0.0375	84,426
2004	1,867,894	0.0457	85,439	2,439,969	0.0350	85,439
2005	1,869,543	0.0470	87,924	2,430,081	0.0361	87,924
2006	1,905,091	0.0489	93,246	2,367,390	0.0393	93,246
2007	1,971,903	0.0480	94,720	2,617,764	0.0361	94,720
2008	1,946,860	0.0496	96,565	2,599,313	0.0371	96,565
2009	1,709,048	0.0481	82,277	2,282,666	0.0360	82,277
2010	1,796,184	0.0483	86,857	2,342,310	0.0370	86,857
Forecast						
2015	1,889,767	0.048	91,300	2,727,623	0.037	100,900
2020	2,046,574	0.048	98,800	2,889,578	0.037	106,900
2025	2,226,439	0.048	107,500	3,051,091	0.037	112,900
2030	2,355,602	0.048	113,100	3,558,000	0.037	131,600

n.a. = not available
Sources: FAA Air Carrier Activity Information System (ACAIS);
Ted Stevens Anchorage International Airport *2008 Master Plan Study Report*
Alaska Aviation System Plan, Final Forecasts, June 2011

However, the forecasts did not consider the rise in crude oil prices and major economic events in 2007 and 2008 that dramatically changed, and continue to affect, the aviation industry and concluded that future demand levels may not materialize as soon as originally projected. Therefore, the forecast enplaned passengers for the Kenai Municipal Airport, based on the assumption that forecast passengers would continue to account for about 4 percent of the forecast enplaned passengers for the Ted Stevens Anchorage International Airport, could be considered high based on the FAA determination that future demand levels may not materialize as soon as originally projected.

2.4.3 Summary of Enplaned Passenger Forecasts

High, medium and low enplaned passenger forecasts were developed for the Kenai Municipal Airport based on the results of the forecasting methodologies discussed in the previous sections. The low, medium and high forecasts of enplaned passengers are presented in Table 2-5 and illustrated on Figure 2-1.

The low forecasts assume the Kenai Municipal Airport will continue to accommodate about 5 percent of the total passenger enplanements in the State of Alaska, excluding the Ted Stevens Anchorage International and Fairbanks International Airports. The State's aviation forecasts were prepared in June 2011 and they account for the economic factors that continue to affect aviation in the State outside of the two major metropolitan areas of Anchorage and Fairbanks. On this basis 113,100 enplaned passengers are forecast by 2030.

The medium forecasts are based on the number of passenger enplanements per capita based on the population of the Central Region of the Kenai Peninsula Borough presented in Section 2.3.2.1. Because the enplanements per capita have fluctuated on an annual basis, an average of 2.8 percent of the total population for the Central Region of the Borough was applied to ascertain a forecast of 117,600 enplaned passengers by 2030, an average annual increase of 1.0 percent over the 19-year forecast period.

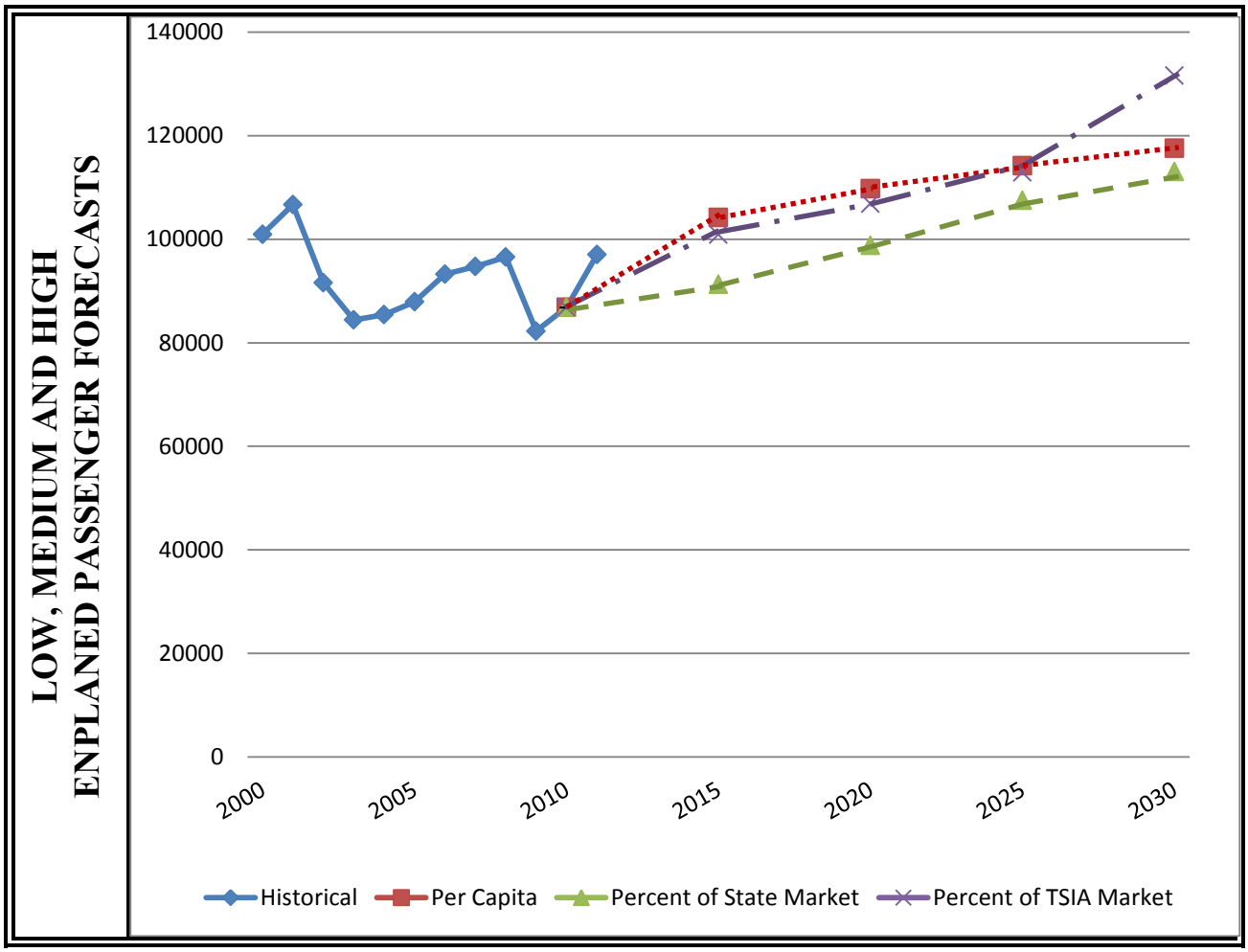
The high forecasts are based on the Kenai Municipal Airport continuing to accommodate about 4 percent of the total passenger enplanements at the Ted Stevens Anchorage International Airport and would reach 131,600 enplaned passengers by 2030, an average annual increase of 1.6 percent over the 19-year forecast period.

Table 2-5
Low, Medium and High Enplaned Passenger Forecasts

Year	Low Forecast	Medium Forecast	High Forecast
2011	97,041	97,041	97,041
Forecast			
2015	91,300	104,200	100,900
2020	98,800	109,800	106,900
2025	107,500	114,200	112,900
2030	113,100	117,600	131,600

Source: Aries Consultants Ltd.

Figure 2-1
Low, Medium and High Enplaned Passenger Forecasts



2.4.4 Comparison of Enplaned Passenger Forecasts

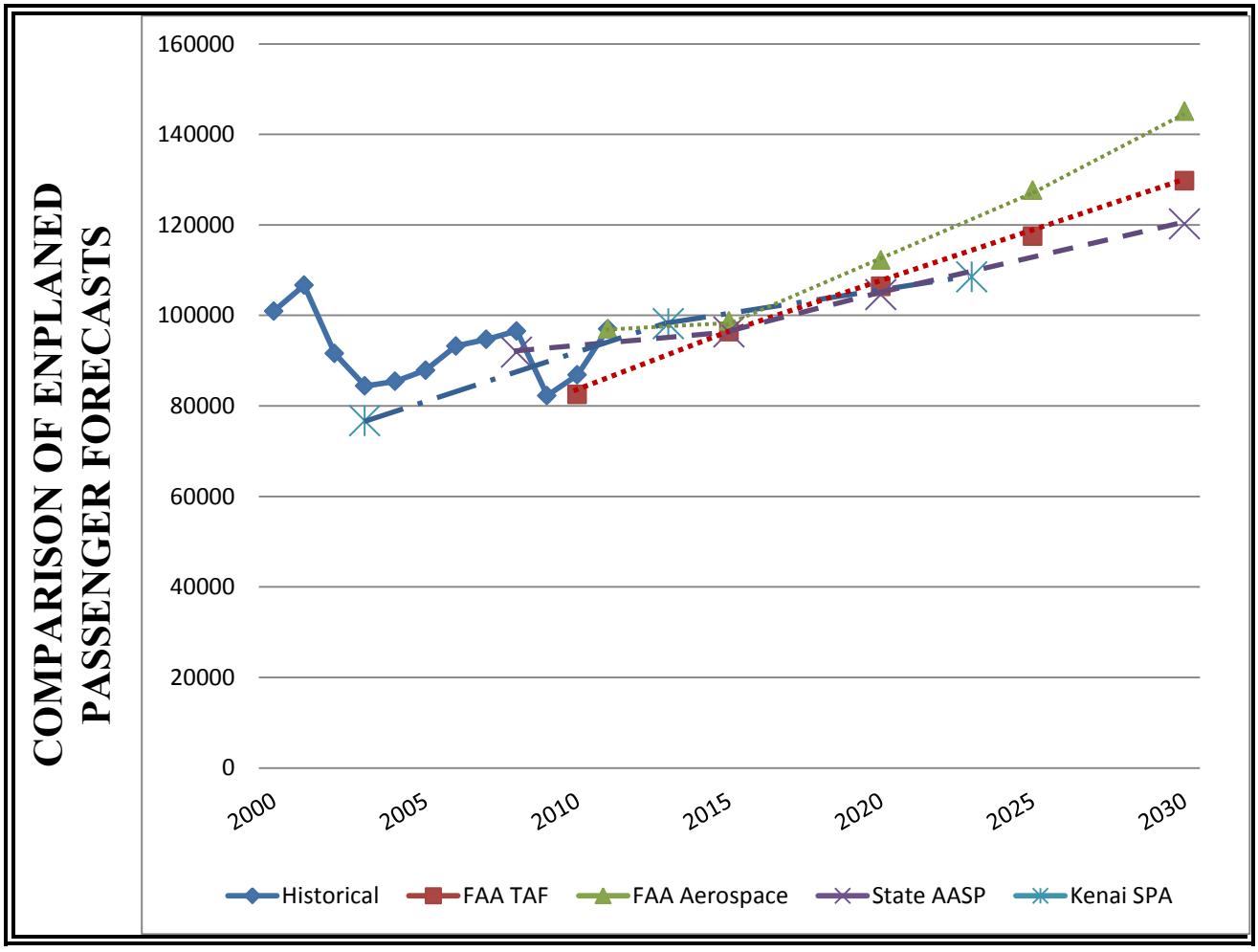
The results of the alternative methods for preparing forecasts of enplaned passenger activity for the Kenai Municipal Airport were reviewed with other recent activity forecasts on the national, state and local levels. The following forecasts, presented in Table 2-6, and illustrated on Figure 2-2, were reviewed.

- FAA *Terminal Area Forecasts 2011-2040*
- FAA *Aerospace Forecast, Fiscal Years 2011-2031*
- State of Alaska, *Alaska Aviation System Plan*, 2011
- *Kenai Municipal Airport Supplemental Planning Assessment*, 2005

Table 2-6
Comparison of Enplaned Passenger Forecasts

Year	FAA TAF	FAA Aerospace	State AASP	Kenai SPA
Historical				
Base Year Shown	(2010) 82,560	(2010) 86,857	(2008) 91,911	(2003) 76,729
2011	97,041	97,041	97,041	97,041
Forecast				
2013				98,200
2015	96,395	98,751	96,372	
2020	106,430	112,274	104,569	
2023				108,500
2025	117,509	127,648		
2030	129,735	145,128	120,246	

Figure 2-2
Comparison of Enplaned Passenger Forecasts



It should be noted that the available enplaned passenger forecasts were prepared at different points in time based on enplaned passengers for the historical years shown. These forecasts of enplaned passengers reflected data and assumptions that were considered valid at the time the different aviation activity forecasts were prepared.

FAA's *Terminal Area Forecasts* (TAF) are prepared for over 3,300 airports that are included in the FAA's *National Plan of Integrated Airport Systems* (NPIAS). The TAF is designed to assist the FAA in meeting its planning, budgeting and staffing requirements. In addition, state and aviation planners use the TAF as the basis for planning airport improvements. The latest enplaned passenger forecasts for the Kenai Municipal Airport are included in the *Terminal Area Forecasts 2011-2040* report and forecast 129,735 enplaned passengers for the Airport in 2030, an average annual increase of 2.3 percent over the 20-year forecast period from 2010 to 2030.

The *Aerospace Forecast, Fiscal Years 2011-2031* is the latest annual forecast of the FAA. The forecasts are prepared annually based on national trends in the aviation industry and a variety of economic assumptions and include various segments of the aviation industry. The 2011 baseline forecast domestic enplaned passengers to increase 2.6 annually through 2031. Based on 86,857 enplaned passengers in 2010, applying this growth rate would result in a forecast of 145,128 passenger enplanements by 2030, an average annual increase of 2.6 percent over the 20-year forecast period from 2010 to 2030.

The *Alaska Aviation System Plan* forecasts were published in June 2011 and are based on a consistent set of assumptions and approach for the State system of airports. A total of 120,246 enplaned passengers by 2030 were forecast for the Kenai Municipal Airport, an average annual increase of 1.2 percent over the 22-year forecast period from 2008 to 2030, as part of the State's Plan.

Enplaned passenger forecasts were prepared for the 2005 *Kenai Municipal Airport Supplemental Planning Assessment.* The forecasts projected 108,500 enplaned passengers in 2023. The 2005 Plan did not account for the full effects of the economic downturn following the events of 9/11 and increased fuel prices as the forecasts were based on 2003 as the most recent data.

2.5 AIR CARGO AND MAIL

Table 2-7 presents the available historical air cargo and mail at the Kenai Municipal Airport as reported to the U.S. Department of Transportation, Bureau of Transportation Statistics (USDOT). Air cargo and mail are generally carried either as belly cargo on passenger aircraft or on small cargo aircraft providing small package service (e.g., Cessna 208 Caravan, Beech 1900, de Havilland DHC-8, Saab 340). A small amount of reported cargo is carried on larger Boeing B-737, Lockheed L-100/L-382, McDonnell Douglas DC-6 and Curtiss-Wright C-46 cargo aircraft. However, several cargo operators do not report their data to the USDOT, including the bulk fuel and fish haul data.

Small package service is provided by Federal Express (using Empire Airlines Cessna 208 Caravan aircraft). TransNorthern (using Beech 99, Swearingen

Metro and McDonnell Douglas DC-3 aircraft), and sometimes Desert Air (using McDonnell Douglas DC-3 aircraft), are feeders for United Parcel Service (UPS). RAVN Alaska and Grant Aviation provide air cargo service primarily using their passenger aircraft.

Table 2-7
Historical and Forecast Air Cargo and Mail

Year	CARGO		AIR MAIL		TOTAL	
	Enplaned (tons)	**Deplaned** (tons)	**Enplaned** (tons)	**Deplaned** (tons)	**Enplaned** (tons)	**Deplaned** (tons)
Historical						
2002	210	466	123	114	333	580
2003	702	2,057	89	84	791	2,141
2004	791	2,569	30	17	821	2,586
2005	832	2,007	11	15	843	2,022
2006	739	1,741	6	17	745	1,758
2007	798	1,648	2	16	800	1,664
2008	887	1,282	20	31	907	1,313
2009	689	773	5	14	694	787
2010	675	692	7	12	682	704
Forecast						
2015	685	700	7	12	692	712
2020	710	730	8	13	718	743
2025	740	760	9	14	749	774
2030	765	785	10	15	775	800

Source: 2002-2010. U.S. Department of Transportation, Bureau of Transportation Statistics

Everts Air Fuel transports bulk fuel to outlying areas in the Region using McDonnell Douglas DC-6 and Curtiss-Wright C-46 aircraft. Everts Air Cargo also provides air cargo, propane and grocery services with their McDonnell Douglas DC-6 and Embraer-120 aircraft. Alaska Central Express carries freight using Beech 1900 aircraft. Air Supply Alaska provides air cargo services with Beech 18 aircraft. Lynden uses Lockheed L-100/L-382 air cargo aircraft for cargo service to the Airport.

Some fish from outlying areas on the west coast of Alaska are airlifted to the Kenai Municipal Airport for transfer to the fish processing plants in the City of Kenai. At present, McDonnell Douglas DC-6 and Boeing B-737-100 type aircraft are used for the fish haul by Universal Airlines and

Northern Air Cargo, respectively. This activity has declined in recent years.

According to USDOT, some air mail is carried in and out of Kenai by Alaska Central Express using Beech 1900 aircraft, RAVN Alaska and Grant Aviation using their passenger aircraft, Peninsula Airways using Saab 340 aircraft and Northern Air Cargo using Boeing B-737-200 aircraft.

The total volume of cargo and mail handled at the Kenai Municipal Airport that is reported to the USDOT is small, averaging 790 tons annually of enplaned cargo and mail and 1,620 tons annually of deplaned cargo and mail from 2003 to 2010. Enplaned cargo and mail tonnage remained relatively constant between 700 tons and 900 tons between 2003 and 2010. However, deplaned cargo and mail tonnage decreased in volume from an estimated 2,586 tons in 2004 to 692 tons in 2010. Deplaned cargo and mail have historically accounted for an average of 70 percent of the total cargo and mail reported for the Airport over the nine-year period except for the past two years. It should be noted that the reported air cargo data does not include the transportation of fuel to outlying areas or the annual fish haul activities. The deplaned cargo and mail volumes have declined in recent years because of a reduction in small packages and fish haul. Some of this can be attributed to improved ground transportation. In addition, based on data reported to the USDOT, it appears that some reported enplaned and deplaned cargo data may be duplicated. An estimated 290 tons of enplaned cargo and 240 tons of deplaned cargo appear to be duplicated in the USDOT statistics on an annual basis in the past five years.

In the absence of reliable historical data, the air cargo and mail volumes have been forecast to increase in proportion to the population forecast for the Kenai air service area or less than one percent annually. Therefore, air cargo and mail, exclusive of bulk fuel and fish haul, are forecast to total 1,404 tons in 2015; 1,461 tons in 2020; 1,523 tons in 2025; and 1,575 tons by 2030.

Based on the aircraft landing reports submitted to the City and discussions with airport management and fuel shipper, an additional estimated 7,500 tons of bulk fuel are enplaned on an annual basis and not reported to the USDOT. This bulk fuel is flown to communities and businesses in the Region. These volumes of estimated enplaned fuel are assumed to continue in the future, but will depend on actual community and business demand. In addition, an estimated 150 to 200 tons of fish are flown into the Airport, significantly less than it used to be, and it is expected that these volumes will continue to decline in the future based on discussions with a fish processor.

The annual air cargo and mail volumes were forecast to increase at an average annual rate of 1.8 percent in the recently-completed *Alaska Aviation System Plan*, to 2,123 tons in 2015, 2,334 tons in 2020 and 3,834 tons in 2030. The annual air cargo and mail were forecast to increase from a total of 3,209 tons in 2003 to 6,353 tons by 2023 in the 2005 *Kenai Municipal Airport Supplemental Planning Analysis*.

2.6 GENERAL AVIATION ACTIVITY

General aviation is defined as all civil aviation not classified as air carrier, commuter/air taxi or military. It includes a multitude of diverse and growing uses of aircraft, ranging from flying for enjoyment and the transportation of personnel or cargo

by business firms and individuals in privately-owned aircraft, to highly-specialized uses such as pipeline patrol, aerial advertising and agricultural application operations. It includes agricultural, industrial and business / corporate aviation; using an aircraft for flight training; the aviation of Federal, State and local governments; and miscellaneous other aviation uses.

The following presents a review and analysis of historical general aviation activity at the Kenai Municipal Airport and includes the historical growth of general aviation aircraft on the national, State and local levels.

2.6.1 Based Aircraft

The number of aircraft based at an airport is a function of many factors, including the number of active aircraft registered in the airport's air service area, aircraft registered elsewhere, but used in the area, aircraft of parties visiting the area for several days or longer and the existence and location of other airports in the area that accommodate general aviation aircraft and activities. Based aircraft are those aircraft that are hangared or on tiedowns at the Kenai Municipal Airport or belong to one of the individual leaseholders. Several sources were reviewed to identify the number and types of based aircraft at the Airport.

The number of based aircraft at the Kenai Municipal Airport decreased from 101 aircraft in the early 2000s to 78 aircraft in 2004 and increased to 85 aircraft in 2008 according to the FAA *Terminal Area Forecasts.* According to the FAA 5010-1, *Airport Master Record,* last inspected in December 2009, there were 85 aircraft based at the Airport with 75 aircraft (88 percent) single-engine aircraft and 10 aircraft (12 percent percent) multiengine aircraft.

The City only has detailed information on aircraft based on City tiedowns. This information does not include the aircraft that are either on tiedowns or in hangars on private lease lots. Based on discussions with airport management, there are about 85 aircraft based at the Airport including about 76 single-engine aircraft, six multiengine aircraft and three helicopters. This includes about nine aircraft that park over by the float pond in the summer and two aircraft that tiedown on the gravel apron by the gravel runway.

Based on information provided by the Kenai Peninsula Borough Tax Assessor's office, there were 61 aircraft registered at the Airport in September 2011. Of the 61 registered aircraft, 55 (90 percent) were single-engine aircraft and six (10 percent) were multiengine aircraft. Of the 61 aircraft registered at the Airport, 55 (90 percent) were registered to individuals with addresses in the Airport's air service area. Generally, tax assessors' data include about 70 to 80 percent of the number of aircraft actually based at an individual airport as aircraft may be elsewhere when the tax assessor conducts the surveys at individual airports.

Forecasts of based aircraft are presented in Table 2-8. The growth rate of an average annual increase of 0.6 percent for the Kenai Peninsula Borough forecast in the *Alaska*

Aviation System Plan appears reasonable to apply to the Kenai Municipal Airport. Based on this assumption, based aircraft are forecast to increase from 85 aircraft in 2011; to 87 aircraft in 2015; to 90 aircraft in 2020; to 92 aircraft in 2025; and to 95 aircraft by 2030. This is a comparable rate of growth to that forecast for the population of the Kenai Air Service area.

Table 2-8
Forecast Based Aircraft

Year	Single Engine	Multiengine Propeller	Business Jet	Helicopters	Float Planes	Tundra Tire	Total
Historical							
2011	66	6	0	3	8	2	85
Forecast							
2015	67	6	0	3	9	2	87
2020	68	7	0	4	9	2	90
2025	69	7	0	4	10	2	92
2030	70	8	0	5	10	2	95

Source: Aries Consultants Ltd.

Forecasts of growth in based aircraft activity are presented below in Table 2-9 on the national, State and local levels. On the national level, the *Aerospace Forecast, Fiscal Years 2011-2031* is the latest annual forecast of the FAA. The forecasts are prepared annually based on national trends in the general aviation industry based on a variety of economic assumptions nationwide. The FAA forecasts the active general aviation and air taxi aircraft fleet to increase 0.9 percent annually through 2031. Single-engine aircraft are forecast to increase at less than 0.3 percent annually, and multiengine aircraft are forecast to decrease by -0.9 percent annually.

The *Alaska Aviation System Plan* forecasts were published in June 2011 and are based on a consistent set of assumptions and approach for the State system of airports. Total based aircraft were forecast to account for 0.02 percent of the U.S. Active Aircraft Fleet accounting for 7,271 aircraft in 2030. Total based aircraft on the Kenai Peninsula were forecast to increase from 314 aircraft in 2008 to 356 aircraft by 2030, an average annual increase of 0.6 percent. However, total based aircraft for the Kenai Municipal Airport were forecast to increase from 85 aircraft in 2008 to 93 aircraft by 2030, an average annual rate of 0.4 percent through 2030.

FAA's *Terminal Area Forecasts* (TAF) forecast based aircraft at the Kenai Municipal Airport to increase from 85 aircraft in 2011 to 86 aircraft by 2012 and remain at 86 aircraft through 2030. The 2005 *Kenai Municipal Airport Supplemental Planning Assessment* forecast the number of based aircraft to increase from 101 aircraft in 2003 to 122 aircraft by 2023.

2.6.2 Aircraft Fleet Mix

The forecast aircraft fleet mix is presented earlier in Table 2-8. The forecast increases

Table 2-9
Comparison of Forecast Based Aircraft

Year	Single-engine Aircraft	Multiengine Aircraft	Helicopters	Business Jets	Float Planes	Tundra Tires	Total
Historical							
2011	75	10	0	0	0	0	85
FAA Forecast[a]							
2015	--	--	--	--	--	--	86
2020	--	--	--	--	--	--	86
2030	--	--	--	--	--	--	86
State Forecast							
2015	77	11	0	0	0	0	88
2020	78	11	0	0	0	0	89
2030	82	11	0	0	0	0	93
SPA							
2013	83	22	7	1	0	0	112
2023	87	27	7	1	0	0	122

a. Mix of aircraft are not included

in based aircraft are primarily in the multiengine propeller and helicopter aircraft while single-engine aircraft, (paved, float and tundra tire) are forecast to increase at a slower rate from 76 based aircraft in 2011 to 82 aircraft by 2030 and decrease as a percent of the total based aircraft from 89 percent in 2011 to 86 aircraft percent by 2030. Some of the float plane and tundra tire aircraft may also operate on the paved runway depending upon the season. Multiengine propeller aircraft are forecast to increase from six aircraft in 2011 to eight aircraft by 2030 and increase as a percent of the total based aircraft from 7 percent in 2011 to 8 percent by 2030. Helicopters are forecast to increase from three helicopters in 2011 to five helicopters by 2030 and increase as a percent of the total based aircraft from 4 percent in 2011 to 5 percent by 2030.

2.7 AIRCRAFT OPERATIONS

Historical aircraft operations at the Kenai Municipal Airport from 2000 through 2011 are presented in Table 2-10. The aircraft operations are described in four categories: air carrier, commuter/air taxi, general aviation, and military. In addition, aircraft operations are counted as itinerant operations or local operations. These categories are used by the FAA to record and report aircraft operations at airports in the United States.

Total aircraft operations at the Kenai Municipal Airport have fluctuated over the 11-year historical period from a high of 69,058 operations in 2000 and a low of 40,178 operations in 2009 and increasing to 41,894 operations in 2011 based on FAA air traffic control tower records. The tower operates between 6:00 a.m. and 10:00 p.m. on a year-round basis. Based on published scheduled flights, commuter/air taxi operations are believed to be understated by an estimated 4,000 operations in 2011. These 4,000 aircraft operations occur between 10:00 p.m. and 6:00 a.m. from May through September and between 9:00 p.m.

Table 2-10
Historical Aircraft Operations

	Itinerant					Local			
Year	Air Carrier	Commuter/ Air Taxi	General Aviation	Military	Total Itinerant	General Aviation	Military	Total Local	Total Operations
2000	544	24,034	15,283	1,587	41,448	21,262	6,348	27,610	69,058
2001	386	20,541	12,427	1,491	34,845	14,422	5,634	20,056	54,901
2002	444	15,474	11,379	1,178	28,475	14,015	4,872	18,887	47,362
2003	972	16,371	13,013	975	31,331	19,560	5,584	25,144	56,475
2004	783	17,411	11,046	622	29,862	16,776	6,520	23,296	53,158
2005	656	19,708	11,142	467	31,973	15,472	6,380	21,852	53,825
2006	687	22,643	9,549	466	33,345	3,060	4,614	17,674	51,019
2007	1,427	21,303	7,912	363	31,004	9,216	3,628	12,844	43,848
2008	1,324	23,922	6,910	498	32,654	8,470	4,492	12,962	45,616
2009	1,045	23,263	6,429	327	31,064	6,316	2,798	9,114	40,178
2010	862	22,744	6,310	306	30,222	6,716	3,359	10,075	40,297
2011	971	24,219	6,550	389	32,129	6,565	3,200	9,765	41,894

Source: FAA Air Traffic Control Tower

and 7:00 a.m. from October through April and are not included in the FAA air traffic control tower counts as the tower is closed during those hours.

2.7.1 Air Carrier

The FAA air traffic control tower at the Airport includes those operations by aircraft capable of accommodating 60 or more passengers in the air carrier category. These operations include the nonscheduled operations of the cargo, fuel and fish haul flights using Boeing B-737 and McDonnell Douglas DC-6 type aircraft. The occasional operations of airline flights diverted from Ted Stevens Anchorage International Airport due to inclement weather conditions are also included in this category.

Historically, the air carrier aircraft operations have accounted for the smallest share of civil aircraft operations, totaling 971 operations in 2011, or about two percent of total aircraft operations. Based on information provided by Airport management, air carrier operations have decreased in recent years from a high of 1,427 operations in 2007 to 971 operations in 2011 due in part to the reduced fish haul permits issued by the City. There are also some night time operations.

Air carrier operations are forecast to remain at about 1,100 operations, and although these types of operations may fluctuate in numbers depending on cargo, fuel, fish hauls and other unknown factors, e.g., number of flights that may be diverted from Anchorage. These types of operations are not expected to increase significantly over the forecast period.

Forecasts of annual air carrier operations were compared with FAA's *Terminal Area Forecasts.* According to FAA annual air carrier operations are forecast to remain at 848 operations through 2030.

2.7.2 Commuter/Air Taxi

Air taxi aircraft operations include the scheduled operations of commuter airlines and the unscheduled operations of "for hire"

air taxis. For clarity, the term "commuter/air taxi" is used in this chapter, instead of the FAA term "air taxi."

The majority of the operations in the commuter/air taxi category are accounted for by the commuter airlines serving the Kenai Municipal Airport (RAVN Alaska and Grant Aviation) and the operations of the contract cargo carriers (e.g., Federal Express / Empire Airlines, UPS / TransNorthern) using small aircraft. The scheduled and unscheduled operations of

those operators providing passenger charter and cargo flights are also included (e.g., Kenai Aviation and Alaska Central Express).

The commuter/air taxi operations also include larger aircraft such as the Everts Curtiss-Wright C-46 and Lynden Lockheed L-100/L-382 aircraft. The helicopter activities providing offshore platform support, forest fire fighting and aerial surveys are also included in this category.

Based on FAA air traffic control tower records, commuter/air taxi operations peaked with 24,219 operations in 2011 after decreasing to a total of 15,474 operations in 2002. Of these, scheduled commuter air carrier operations totaled an estimated 14,000 operations. The unscheduled operations providing passenger and cargo flights accounted for about 6,000 commuter/air taxi operations in 2011. Helicopter air taxi operations totaled an estimated 4,000 operations in 2011.

Scheduled commuter/air taxi operations are understated by an estimated 4,000 operations in 2011 as mentioned previously and are estimated to total about 18,000 operations in 2011 on a 24-hour basis. Therefore the total commuter/air taxi aircraft operations are estimated to be about 28,200 aircraft operations in 2011 compared to the 24,219 aircraft operations that occurred during the FAA air traffic control tower hours of operation from 6:00 a.m. to 10:00 p.m. in the summer months and from 7:00 a.m. to 9:00 p.m. from October through April.

Commuter/air taxi aircraft operations are forecast to increase from a total of about 28,200 operations in 2011 to 29,400 operations by 2015; to 30,800 operations by 2020; to 32,400 operations by 2025; and to 34,000 operations by 2030. These forecasts are of total commuter/air taxi aircraft operations and not just for the hours when the FAA air traffic control tower is open.

Forecasts of annual commuter/air taxi aircraft operations were compared with the FAA *Terminal Area Forecasts*. According to FAA, forecast commuter/air taxi aircraft operations are forecast to increase from 23,793 operations in 2011 to 25,221 operations in 2015; to 27,125 operations in 2020; to 29,175 operations in 2025; and to 31,373 operations by 2030. It should be noted that these forecasts are based only on historical FAA data for when the FAA air traffic control tower is open.

The AASP forecast commercial service operations to decline from 25,246 operations in 2008 to 23,202 operations in 2015, and then increase to 24,222 operations in 2020 and 25,670 operations in 2030.

The 2005 *Kenai Municipal Airport Supplemental Planning Assessment* forecast annual airline (commuter) operations to

increase from 9,788 operations in 2003 to 11,386 operations in 2013 and decrease to 11,338 operations in 2023.

2.7.3 General Aviation

General aviation operations include all civil aircraft operations not classified as air carrier or commuter/air taxi. General aviation operations have declined from 36,545 operations in 2000 to 13,215 operations in 2011. General aviation operations have fluctuated between 12,609 operations in 2006 and 17,128 operations in 2007 in recent years.

The estimated 1,000 operations on the Water Runway and 400 operations on the Gravel Runway, discussed later, are included in the total general aviation operations and are estimated to account for about 10 percent of the general aviation aircraft operations.

Operations per based aircraft are a useful guide to estimate the number and types of general aviation aircraft operations. Operations per based aircraft include the number of operations by visiting itinerant aircraft as well as those based at the Airport. The numbers also include training operations. Operations per based aircraft have been gradually increasing in recent years and totaled 155 operations per based aircraft in 2011. Operations per based aircraft are forecast to increase from an estimated 155 annual operations in 2011 to 160 annual operations in 2015; to 165 annual operations in 2020; to 170 annual operations in 2025; and to 175 annual operations by 2030 reflecting a greater utilization of existing aircraft and the increased percent of multiengine aircraft and helicopters in the aircraft fleet mix.

General aviation operations are forecast to increase from 13,115 operations in 2011 to 14,000 operations by 2015; to 14,800 operations by 2020; to 15,600 operations by 2025; and to 16,600 operations by 2030. Based on recent experience, and without a locally-based flight training school, it is estimated that itinerant and local operations will both account for about 50 percent of the general aviation operations in the future.

Forecasts of general aviation aircraft operations were compared with the FAA *Terminal Area Forecasts*. According to FAA, general aviation operations are forecast to increase from 13,634 operations in 2011 to 13,656 operations in 2015; to 13,794 operations in 2020; to 13,934 operations in 2025; and to 14,074 operations by 2030. According to FAA itinerant aircraft operations are forecast to decrease from 51 percent in 2011 to about 50 percent of the total general aviation operations by 2030 while local operations are forecast to increase from 49 percent in 2011 to about 50 percent of total general aviation operations by 2030.

The AASP forecast general aviation operations to change from 15,380 operations in 2008 to 15,206 operations in 2015 to 15,920 operations in 2020 and to 18,285 operations in 2030.

The 2005 *Kenai Municipal Airport Supplemental Planning Assessment* forecast general aviation operations to increase from 40,130 operations in 2003 to 43,904 operations in 2013 and to 48,216 operations in 2023.

2.7.3.1 Itinerant Operations

Itinerant general aviation operations are performed by aircraft that fly into or out of the airspace controlled by the FAA air traffic control tower at the Airport. Itinerant operations are performed by aircraft that

take off at one airport and land at another airport, or the reverse. They include the operations of aircraft based at the Airport and flights of other aircraft carrying persons to and from Kenai on business or pleasure. These include operations by business jets (Gulfstream IV and V, Falcon 50 and 900 and Cessna Citation) and turboprop aircraft. They also include the Convair 580 and de Havilland Beaver aircraft fighting forest fires for the Alaska Department of Natural Resources, Division of Forestry. Itinerant general aviation aircraft operations declined from a high of 15,283 operations in 2000 to 6,550 operations by 2011. Itinerant operations have accounted for an estimated 50 percent of total general aviation operations in recent years.

2.7.3.2 Local Operations

Local general aviation operations are performed by aircraft that remain in airspace controlled by the FAA air traffic control tower at the Airport and include aircraft operating in the local traffic pattern and aircraft departing for, or arriving from, local practice areas. Local general aviation operations declined from a high of 21,262 operations in 2000 to 6,565 operations by 2011 in large part because there is no longer a flying school at the Airport. Local operations include those by aircraft based at the Airport as well as those from other airports who use the Kenai Municipal Airport for training activity.

2.7.3.3 Water Runway

Based on discussions with FAA air traffic control tower personnel, airport management and others knowledgeable of the aircraft operations on the water Runway 1W-19W, are estimated to be about 1,000 operations on an annual basis in recent years as shown in Table 2-11. There are numerous lakes in the Kenai-Soldotna area, and many float plane operators prefer to dock and fuel their aircraft at private homes which front the lakes.

Aircraft operations on the water runway are forecast to increase at the same rate as other general aviation activity to a total of 1,300 operations by 2030.

2.7.3.4 Gravel Runway

Based on discussions with FAA air traffic control tower personnel, airport management and others knowledgeable of the airport, there are an estimated 400 annual operations on the gravel Runway 1R-19L during the summer months and a few in the winter months. Based on discussions with airport management, the gravel runway is underutilized because of its remote location from other airport facilities and services.

Aircraft operations on the gravel runway are forecast to increase at the same rate as other general aviation activity to a total of 500 operations by 2030.

2.7.4 Military

Military operations at the Airport have fluctuated between 3,000 and 8,000 operations annually between 2000 and 2011 and accounted for 3,589 operations in 2011.

Table 2-11
Float Plane Basin Activity

Month	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
April	4	0	0	0	0	0	2	0	2	0	0	0
May	49	109	118	66	0	99	114	99	86	94	0	75
June	135	170	190	118	72	151	317	161	158	223	313	210
July	162	228	242	242	178	265	327	428	259	345	243	283
August	124	192	278	192	221	251	238	342	287	233	0	307
September	86	83	146	119	173	136	227	134	215	153	0	202
October	56	20	68	48	30	51	100	0	63	47	0	0
Total	702	802	1,042	785	674	953	1,325	1,164	1,070	1,095	556	1,077

Source: FAA Air Traffic Control Tower

Military operations include the fixed-wing aircraft and helicopter activity performed by a variety of military units and the U.S. Coast Guard. Fixed-wing aircraft are primarily C-130s with some C-17, Shorts Sherpa, Cessna Citation and Beech Super King Air aircraft. There are also some HH-60 helicopter operations.

Military aircraft operations are forecast to remain at about 3,600 annual operations through 2030.

Forecasts of annual military aircraft operations were compared with the FAA *Terminal Area Forecasts*. According to FAA, military aircraft operations are forecast to remain at 3,367 annual operations through 2030. The AASP forecasts military aircraft operations to remain at 4,990 operations through 2030.

2.7.5 Aircraft Instrument Operations

Historical aircraft instrument operations at the Kenai Municipal Airport, while the FAA air traffic control tower is open, are presented in Table 2-12. Instrument operations include aircraft take-offs and landings while on an instrument flight clearance as well as instrument approaches and other IFR aircraft activity handled by the FAA air traffic control tower at the Airport.

Instrument operations increased to a high of 10,081 operations in 2008 (the peak year for air carrier and commuter/air taxi aircraft operations) and decreased to 9,295 operations by 2011. Aircraft instrument operations have fluctuated between about 9,000 and 10,000 operations since 2006.

Aircraft instrument operations at the Airport, on a 24-hour basis, are forecast to increase in the same proportion as commuter/air taxi operations (the primary generator of instrument operations at the Airport) to 11,300 operations in 2015; to 11,800 operations in 2020; to 12,400 operations in 2025; and to 13,000 operations in 2030.

Table 2-12
Historical Annual Aircraft Instrument Operations

Year	Air Carrier	Commuter/ Air Taxi	General Aviation	Military	Total
2000	41	5,303	836	244	6,424
2001	37	6,414	776	303	7,530
2002	148	5,690	778	311	6,927
2003	399	5,473	1,001	275	7,148
2004	364	5,446	988	228	7,026
2005	141	6,113	669	159	7,082
2006	271	8,075	671	166	9,183
2007	370	8,171	526	84	9,151
2008	392	8,989	563	137	10,081
2009	249	8,007	469	126	8,851
2010	231	8,563	409	110	9,313
2011	236	8,549	378	132	9,295

Source: FAA Air Traffic Activity System

2.8 SUMMARY OF AVIATION ACTIVITY FORECASTS

The aviation activity forecasts, based on the high enplaned passenger forecasts, are summarized in Table 2-13.

2.9 PEAK PERIOD AVIATION ACTIVITY

Key forecasts that affect airfield and passenger terminal planning are those indicating the levels of activity during the peak period of the average day of the peak month. The peak period aviation activity forecasts are intended for use in the demand-capacity analysis and in determining requirements for future airport facilities. This section presents forecasts of peak period activity for enplaned passengers and aircraft operations.

2.9.1 Enplaned Passengers

Monthly passenger enplanements at the Kenai Municipal Airport are presented in Table 2-14 from 2000 through 2011. The peak month for passenger enplanements at the Airport has been July for each of the 11-year historical period.

Based on historical passenger activity at the Airport, about 12 percent of the annual passengers enplane at the Airport during the peak month. This data indicates that about 360 passengers enplaned daily during the peak month in 2011. This trend is forecast to continue with total peak month enplanements reaching a level of 12,100 passengers in 2015; to 12,800 passengers in 2020; to 13,500 passengers in 2025; and to 15,800 passengers by 2030. The total daily peak month enplanement passengers are forecast to increase to 375 passengers in 2015; to 400 passengers in 2020; to 420 passengers in 2025; and to 500 passengers by 2030 as shown in Table 2-15.

Table 2-13
Summary of Aviation Activity Forecasts

	Base Year	Forecast			
	2011	2015	2020	2025	2030
ANNUAL ENPLANED PASSENGERS	97,041	100,900	106,900	112,900	131,600
ANNUAL SCHEDULED AIRCRAFT DEPARTURES[a]	9,000	9,200	9,400	9,600	10,200
AIR CARGO AND MAIL (tons)	1,384	1,404	1,461	1,523	1,575
AIRCRAFT OPERATIONS[a]					
Air Carrier	971	1,100	1,100	1,100	1,100
Commuter/Air Taxi	28,219	29,400	30,800	32,400	34,000
General Aviation					
Itinerant	6,550	7,000	7,400	7,800	8,400
Local	6,565	7,000	7,400	7,800	8,400
Total General Aviation Operations	13,115	14,000	14,800	15,600	16,800
Military	3,589	3,600	3,600	3,600	3,600
TOTAL AIRCRAFT OPERATIONS	45,894	48,100	50,300	52,700	55,500
ANNUAL INSTRUMENT OPERATIONS[a]	10,800	11,300	11,800	12,400	13,000
AVIATION BASED AIRCRAFT					
Single-engine	76	78	79	81	82
Multiengine-propeller	6	6	7	7	8
Multiengine-jet	0	0	0	0	0
Helicopter	3	3	4	4	5
TOTAL BASED AIRCRAFT	85	87	90	92	95

a. Base Year and Forecast aircraft operations are for 24 hours rather than just for FAA air traffic control tower hours of operation

Source: Aries Consultants Ltd..

Table 2-14
Monthly Enplaned Passengers

Month	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
January	7,859	8,300	7,829	6,454	6,326	6,338	6,751	7,679	8,015	7,146	6,392	6,939
February	7,815	7,137	7,046	5,602	5,922	5,756	6,658	6,717	7,329	6,287	6,086	6,846
March	7,657	8,216	7,371	5,280	5,993	6,440	7,104	6,929	7,196	6,357	6,926	7,373
April	6,409	7,058	6,902	6,367	5,618	5,844	6,455	6,469	7,391	6,081	6,510	6,788
May	7,531	8,143	6,880	5,848	5,700	6,289	7,481	7,414	7,990	6,859	6,676	7,157
June	9,086	9,044	6,740	5,988	6,869	7,095	7,892	7,879	8,418	7,170	7,207	7,945
July	12,736	12,093	9,979	9,445	10,654	11,210	11,775	11,927	11,718	10,002	10,562	11,090
August	11,049	10,807	8,644	7,674	8,945	9,574	9,782	10,608	10,697	9,505	10,009	10,801
September	8,994	6,334	6,684	6,435	6,838	7,276	7,744	7,918	8,255	7,625	7,553	8,314
October	8,464	7,582	6,309	6,120	6,489	7,205	7,459	8,230	8,257	7,078	7,798	8,447
November	7,612	7,345	6,023	5,820	6,245	7,236	7,417	7,670	7,099	6,848	7,503	7,726
December	7,968	7,494	6,249	6,688	6,410	7,009	7,645	7,006	7,519	6,376	6,585	7,615
TOTALS	103,180	99,553	86,656	77,721	82,009	87,272	94,163	94,446	99,884	87,334	89,897	97,041

Source: City of Kenai Airport Management Records

Table 2-15
Peak Period Aviation Activity

	2011	2015	2020	2025	2030
Total annual enplaned passengers	97,041	100,900	106,900	112,900	131,600
Peak month enplaned passengers	11,090	12,100	12,800	13,500	15,800
Daily enplaned passengers (ADPM)	360	375	400	420	500
Peak hour enplaned passengers (ADPM)	54	56	60	63	75
Peak hour aircraft operations (ADPM)	21	24	25	26	28

ADPM = Average Day, Peak Month
Source: Aries Consultants Ltd.

Based on the scheduled passenger flight departures, it is estimated that the peak hour accommodated about 15 percent of passengers in 2011 and is estimated to remain at 15 percent through 2030. This indicates the peak hour passengers will increase from 54 passengers in 2011 to 56 passengers in 2015; to 60 passengers in 2020; to 63 passengers in 2025; and to 75 passengers by 2030.

2.9.2 Aircraft Operations

Based on FAA air traffic control tower records, about 12 percent of annual aircraft operations occur in the peak month (typically July). Peak hour operations are estimated to be 15 percent of the average day in the peak month during the hours the FAA air traffic control tower is open. Based on this analysis, peak hour aircraft operations will increase from 21 operations in 2011 to 24 operations in 2015; to 25 operations in 2020; to 26 operations in 2025; and to 28 operations by 2030 as shown in Table 2-15.

2.10 AIRPORT REFERENCE CODE AND DESIGN AIRCRAFT

The FAA definition of the critical aircraft for an airport is used to determine runway requirements for the highest-performing aircraft that accounts for at least 500 annual operations. The largest civil aircraft currently using the Airport and expected to use the Airport in the future, with at least 500 annual operations, are as follows:

Aircraft	FAA Airport Reference Code
▪ McDonnell Douglas DC-6	B-III
▪ Curtiss-Wright C-46	B-III
▪ de Havilland DHC-8	B-III
▪ Beech 1900	B-II

In addition, the military Lockheed L-100/C-130 generates over 500 annual operations and this aircraft is classified in FAA Airport Reference Code C-IV.

Chapter 3

EXISTING AIRPORT CONDITIONS

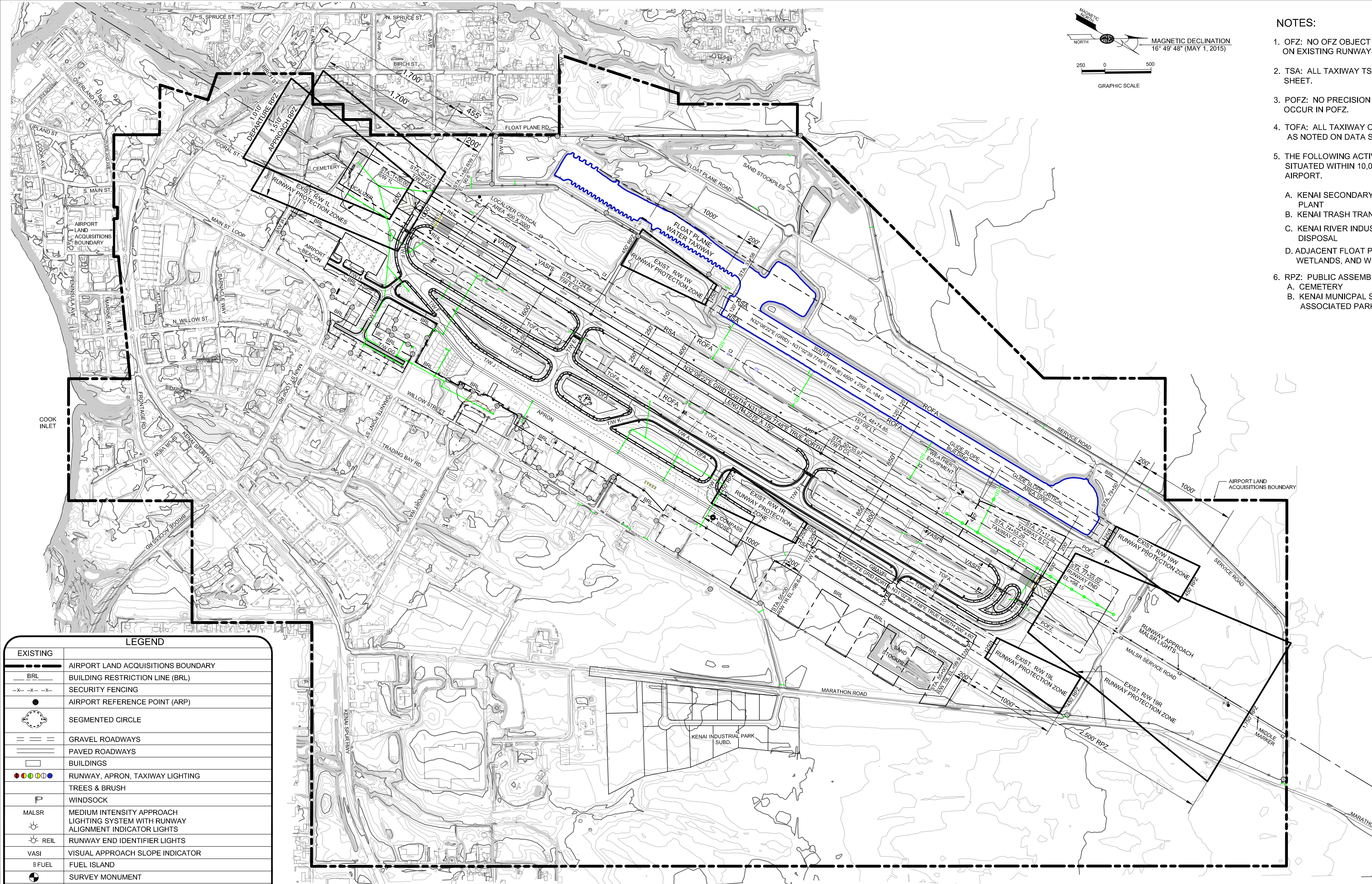
3.1 INTRODUCTION

This chapter presents the existing facilities and conditions at the Airport that are important in the master planning process including the airfield, airspace and navigational aids, passenger terminal, air cargo and mail, general aviation, airport access and parking, airport support, other building areas, and land use and zoning. The existing airport facilities are illustrated on Figure 3-1 and Figure 3-2 and listed in Table 3-1.

3.2 AIRPORT PROPERTY

The original Kenai Municipal Airport boundary, as shown on Figure 3-1, encompassed approximately 1,940 acres within the central portion of the Kenai City Limits containing the Airport, a large portion of the City's central business district, and undeveloped land to the north (See later Figure 3-9). The Airport Reference Point is situated at latitude 60° 34' 29.76" north and longitude 151° 14' 41.81" west with an Airport elevation of 100 feet above mean sea level.

Approximately 1,700 acres were quitclaimed to the City of Kenai by the United States Government in 1963. The additional 240 acres have been acquired from the State of Alaska and private land owners since that time. Approximately 484 acres have been released by the Federal Aviation Administration (FAA) for lease/sale purposes. The released property is to the east and south of the Airport and contains the majority of the City's central business district. Land to the west and north contains the airport float plane facility, airport navigational aids and undeveloped wetlands.



LEGEND

EXISTING	
	AIRPORT LAND ACQUISITIONS BOUNDARY
BRL	BUILDING RESTRICTION LINE (BRL)
—x— —x— —x—	SECURITY FENCING
●	AIRPORT REFERENCE POINT (ARP)
	SEGMENTED CIRCLE
	GRAVEL ROADWAYS
	PAVED ROADWAYS
	BUILDINGS
	RUNWAY, APRON, TAXIWAY LIGHTING
	TREES & BRUSH
	WINDSOCK
MALSR	MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS
REIL	RUNWAY END IDENTIFIER LIGHTS
VASI	VISUAL APPROACH SLOPE INDICATOR
FUEL	FUEL ISLAND
	SURVEY MONUMENT
80	GROUND CONTOUR (2' INTERVAL)
	RUNWAY PROTECTION ZONE

NOTES:

1. OFZ: NO OFZ OBJECT PENETRATIONS OCCUR ON EXISTING RUNWAYS.
2. TSA: ALL TAXIWAY TSA AS NOTED ON DATA SHEET.
3. POFZ: NO PRECISION OBJECT PENETRATIONS OCCUR IN POFZ.
4. TOFA: ALL TAXIWAY OBJECT PENETRATIONS AS NOTED ON DATA SHEET.
5. THE FOLLOWING ACTIVITIES ARE SITUATED WITHIN 10,000 FEET OF THE AIRPORT.
   - A. KENAI SECONDARY TREATMENT SEWAGE PLANT
   - B. KENAI TRASH TRANSFER SITE
   - C. KENAI RIVER INDUSTRIAL FISH WASTE DISPOSAL
   - D. ADJACENT FLOAT PLANE FACILITY, WETLANDS, AND WILDLIFE AREAS.
6. RPZ: PUBLIC ASSEMBLY AREAS WITHIN RPZ.
   - A. CEMETERY
   - B. KENAI MUNICPAL SOFTBALL FIELD AND ASSOCIATED PARKING.

WINCE-CORTHELL-BRYSON
ARIES CONSULTANTS LTD.

DRAWN BY: V.C. DRAWING: EXISTINGAIRPORTFACILITIES
CHECKED BY: C.M. DATE: Oct 03,2017

KENAI MUNICIPAL AIRPORT
MASTER PLAN
EXISTING AIRPORT FACILITIES

FIGURE 3-1

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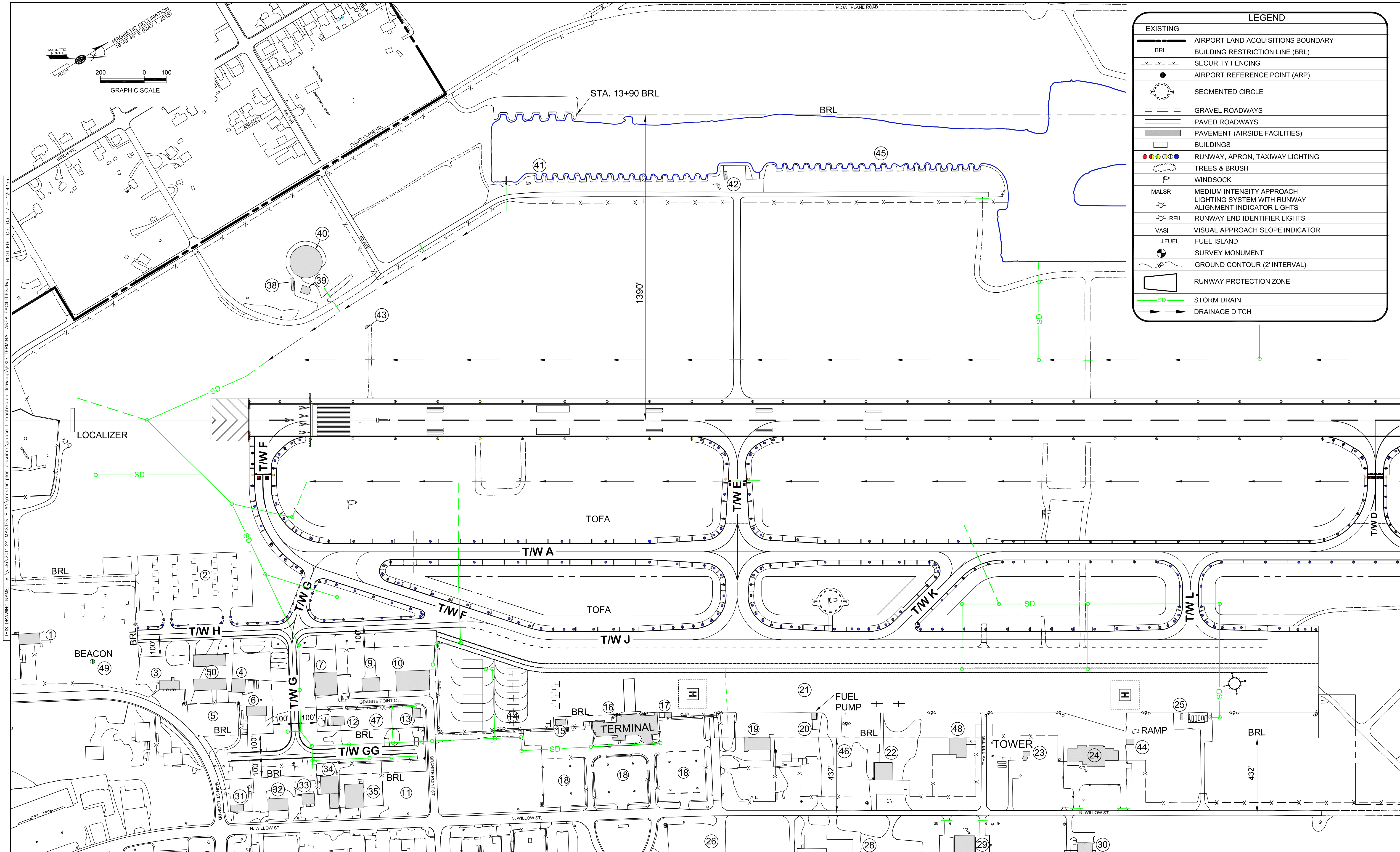
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EXISTING
AIRPORT LAND ACQUISITIONS BOUNDARY
BUILDING RESTRICTION LINE (BRL)
SECURITY FENCING
AIRPORT REFERENCE POINT (ARP)
SEGMENTED CIRCLE
GRAVEL ROADWAYS
PAVED ROADWAYS
PAVEMENT (AIRSIDE FACILITIES)
BUILDINGS
RUNWAY, APRON, TAXIWAY LIGHTING
TREES & BRUSH
WINDSOCK
MALSR
MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS
REIL
RUNWAY END IDENTIFIER LIGHTS
VASI
VISUAL APPROACH SLOPE INDICATOR
FUEL
FUEL ISLAND
SURVEY MONUMENT
GROUND CONTOUR (2' INTERVAL)
RUNWAY PROTECTION ZONE
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STORM DRAIN
DRAINAGE DITCH
MAGNETIC DECLINATION 16°49' 48" E (MAY 1, 2015)
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NORTH
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0
100
GRAPHIC SCALE
STA. 13+90 BRL
BRL
1390'
LOCALIZER
BEACON
TERMINAL
TOWER
RAMP
FUEL PUMP
TOFA
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T/W D
T/W E
T/W F
T/W G
T/W GG
T/W H
T/W J
T/W K
T/W L
100'
432'
SD
FLOAT PLANE ROAD
FLOAT PLANE RD
BIRCH ST
4th AVE
N. WILLOW ST.
GRANITE POINT ST.
GRANITE POINT CT.
MAIN ST LOOP RD.
GEE BEE AVE
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WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN EXISTING TERMINAL AREA FACILITIES	FIGURE 3-2
DRAWN BY: V.C. CHECKED BY: C.M.	DRAWING: EXISTINGAIRPORTFACILITIES DATE: Oct 03,2017	

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Table 3-1
Airport Facilities

Facility Number	Subdivision	Lot/Block	Leaseholder/Owner	Facility
1	1967 Unit A-3		Civil Air Patrol	Civil Air Patrol
2	Undesignated Tracts		Airport	Long-term Small Aircraft Tiedowns
3	General Aviation Apron	Lot 1A, Block 1	Kenai Aviation Services, Inc.	Air Cargo Building
4	General Aviation Apron	Lot 3, Block 1	SOAR International Ministries	Hangar
5	General Aviation Apron	Lot 1A, Block 3	Kenai Aviation Services, Inc.	Air Charter Service
6	General Aviation Apron	Lot 2, Block 3	SOAR International Ministries	Hangar
7	General Aviation Apron	Lot 1A, Block 2	SOAR International Ministries	Air Cargo Building
8	Not Used			
9	General Aviation Apron	Lot 2, Block 2	Kenai Aviation Leasing Co. LLC	Hangar
10	General Aviation Apron	Lot 3, Block 2	Schilling Rentals LLC	Hangar and Aircraft Parking
11	General Aviation Apron	Lot 9A, Block 5		Gravel Pad
12	General Aviation Apron	Lot 1A, Block 4	Schilling Rentals LLC	Hangar
13	General Aviation Apron	Lot 3, Block 4	Russell Winger	Aircraft Maintenance Building
14	Undesignated Tracts		Airport	Itinerant Aircraft Parking
15	Undesignated Tracts		Airport	Emergency Generator Building
16	Undesignated Tracts		Airport	Terminal Passenger Handling
17	Undesignated Tracts		Airport	Inside Vehicle Parking
18	Undesignated Tracts		Airport	Vehicle Parking
19	F.B.O. Subdivision	Lots 1A and 2A1, Block 1	Dan Pitts	Air Cargo Building
20	F.B.O. Subdivision	Lots 3A1 and 4, Block 1	Crowley Marine Services Inc.	Fueling
21	Apron		Crowley Marine Services Inc.	Short-term Large Aircraft Parking
22	F.B.O. Subdivision	Lot 7A, Block 1	Loroc LLC	Air Cargo Building
23	FBO Subdivision No. 7	Lot 2	Federal Aviation Administration	Air Traffic Control Tower
24	F.B.O. Subdivision No. 7	Lot 3	Airport	Airport Operations Facility
25	F.B.O. Subdivision No. 7	Lot 4, Block 1	Alaska Division of Forestry	Forest Fire Suppression
26	FBO Subdivision No.5	Tract B		Overflow Parking
27	F.B.O. Subdivision	Tract A	City of Kenai	City of Kenai Maintenance
28	Not Used			
29	F.B.O. Subdivision No. 5	Lot 7A-1, Block 2	Federal Aviation Administration	FAA Flight Service Station
30	F.B.O. Subdivision No. 6	Lot 2	City of Kenai	Animal Control Building
31	General Aviation Apron	Lot 1, Block 5	Kenai Aviation Leasing Co. LLC	Charter Service
32	General Aviation Apron	Lots 2 and 3, Block 5	Kenai Fabric Center Inc.	Commercial Business
33	General Aviation Apron	Lot 4, Block 5	C. R. Baldwin	Professional Office
34	General Aviation Apron	Lot 5, Block 5	Arctic Barnabas Ministries	Charter Service
35	General Aviation Apron	Lots 6 and 7, Block 5	Jacqueline Swanson	Office/Warehouse/Equipment Storage
36	Fidalgo Commercial Center	Tract A	City of Kenai	Main Fire Station and Police

Table 3-1
Airport Facilities (continued)

Facility Number	Subdivision	Lot/Block	Leaseholder/Owner	Facility
37	Fidalgo Commercial Center	Tract A	City of Kenai	Kenai City Hall
38	Undesignated Tracts		City of Kenai	Emergency Power Van
39	Undesignated Tracts		City of Kenai	Water Pump House
40	Undesignated Tracts		City of Kenai	Water Reservoir Tank
41	Undesignated Tracts		Airport	Itinerant Float Aircraft Registration
42	Undesignated Tracts		Airport	Fuel Tank – 4,000 Gallons
43	Undesignated Tracts		Federal Aviation Administration	REIL Building
44	F.B.O. Subdivision	Lot 3	Airport	Urea Storage Building
45			Airport	Based Float Plane Aircraft Slips
46	F.B.O. Subdivision	Lots 5 and 6	Airport	Gravel Pad
47	General Aviation Apron	Lot 2, Block 4	Kenai Aviation Leasing Co. LLC	Small Aircraft Tiedown
48	F.B.O. Subdivision No. 9	Lot 11A	Kenai Hangar	Hangar
49	1967 Unit A-3		City of Kenai/Airport	Airport Beacon

Source: City of Kenai

Airport facilities presented in this chapter are limited to the Airport Reserve Boundary. These facilities include the properties generally used for aviation or aviation-related functions and are located within the Airport Reserve Boundary as shown on Figure 3-1. The area is generally bordered by Float Plane Road to the west, First Avenue and Main Street Loop to the south, Willow Street and Marathon Road to the east and the Airport property line to the north.

3.3 AIRFIELD

The airfield consists of three runways, one asphalt-paved Runway 1L-19R, one gravel Runway 1R-19L, one water Runway 1W-19W, two helipads, various taxiways and a water taxi channel associated with the water runway. The runways, taxiways, aircraft parking aprons, pavement conditions, water runway, taxi channel, water slips, and drainage conditions, and runway markings, lighting and navigational aids of the Airport are described in this section.

3.3.1 Runways and Taxiways

The orientation, physical dimensions and effective gradient of the runways and water runway are as follows:

Runway	Orientation	Physical Dimensions (feet)	Effective Gradient (%)
1L-19R	North-south	7,855 by 150	0.10
1R-19L	North-south	2,000 by 60	0.08
1W-19W	North-south	4,600 by 252	0.00

The FAA has accepted declared distances for Runway 1L-19R as follows:

Declared Distance	Runway 1L	Runway 19R
TORA	7,855 feet	7,855 feet
TODA	7,855 feet	7,855 feet
ASDA	7,855 feet	7,575 feet
LDA	7,575 feet	7,575 feet

The take off run available (TORA) and take off distance available (TODA) for Runway 19R will be reduced to 6,495 feet until the tree obstructions discussed later are removed. The accelerate stop distance available (ASDA) and landing distance

available (LDA) are not affected by the trees.

Runway 1L-19R is asphalt paved, grooved, in good condition, painted with precision instrument runway markings and equipped with high intensity runway lights (HIRL).

There is a 280-foot displaced landing threshold on Runway 1L. Runway 19R is equipped with an instrument landing system (ILS) and a medium intensity approach lighting system with runway alignment indicator lights (MALSR). Both ends of Runway 1L-19R have visual approach slope indicators (VASI-4) installed. There are runway end identifier lights (REIL) at the end of Runway 1L. The runway orientation is north 31 degrees, 03 minutes, 12 seconds east, true.

Runway 1R-19L is a gravel runway at 850 feet to the east of, and near the north end of, Runway 1L-19R. The runway surface is in good condition. There are no runway markings, visual aids or runway edge lights. There are plastic cones alongside the runway and taxiways. The runway orientation is the same as Runway 1L-19R. A 100-foot wide gravel apron, adjacent to the runway provides a parallel taxiway, aircraft tiedowns and vehicle parking.

Runway 1W-19W is a water channel at 850 feet to the west of Runway 1L-19R that is connected to a seaplane base, by a water taxiway channel that has water slips, a ramp up to a gravel apron for seasonal conversion from floats to skis or wheels, and other facilities. There are no water runway edge lights or visual landing aids, however, unlit distance to go signs are provided along the east side of the water runway.

There are two loading and unloading helipads, one just north of the passenger terminal and one just west of the Airport Operations Facility.

There are full-length parallel taxiways for both Runways 1L-19R and 1R-19L. There is one entry/exit taxiway at the south end of Runway 1L (Taxiway F), one at approximately 2,500 feet from the end of Runway 1L (Taxiway E), one at approximately 5,000 feet from the end of Runway 1L (Taxiway D), and two at the north end of Runway 19R (Taxiways C and B).

Taxiways E, D, C and B connect to Taxiway A. Taxiways F, E, K and L lead into Taxiway J and the main aircraft parking apron. Taxiways K and L serve the aviation uses at the northeast end of the aircraft parking apron. The taxiways have medium intensity taxiway lights (MITL). All of these taxiways are 75 feet wide, asphalt surfaced and in fair to good condition.

Taxiways M, N and P serve the gravel Runway 1R-19L. Taxiway M is 50 feet wide and Taxiways N and P are both 25 feet wide.

Taxiways H, G, and GG serve the aviation users at the southeast end of the Airport. Taxiway G, from Taxiway A to Taxiway H, and Taxiway H are 45 feet wide and the remainder of Taxiways G and GG are both 36 feet wide and in fair condition.

It should be noted that portions of the terminal aircraft parking apron, Taxiways G, H and all of Taxiway GG are not visible from the FAA air traffic control tower.

A recently reconstructed and expanded 4,000 foot by 300 foot wide aircraft parking apron is situated between Taxiway J and the landside terminal area providing transient aircraft parking at the south end, commuter/air taxi aircraft operations area for the passenger terminal in the center and based and transient aircraft parking apron to the north. A 500 foot by 250 foot apron is situated alongside Taxiway H and is used for long term aircraft tiedown spaces.

3.3.2 Pavement Strength

According to the latest Federal Aviation Administration (FAA) Form 5010-1 *Airport Master Record,* last inspected on December 5, 2011, Runway 1L-19R is of asphalt construction, grooved, and considered by the FAA to be in good condition. Runway 1R-19L is of gravel construction and in good condition. The current estimated runway pavement strengths, by aircraft landing gear configurations, according to the latest FAA approved Airport Layout Plan are as follows:

Aircraft Maximum Gross Weight (pounds)

Runway	Single-wheel	Dual-wheel	Dual-tandem
1L-19R	75,000	150,000	250,000
1R-19L	≤12,500	≤12,500	n.a.

n.a.= not applicable

Nondestructive load-deflection tests were performed on all pavement features at the Kenai Municipal Airport in June 1995. The purpose of the tests was to assess the bearing capacity and condition of the various pavements on the Airport as well as to provide the basis for recommended pavement overlays and/or reconstruction recommended in the 1997 Airport Master Plan. Since 1997 the north and south end of the parallel Taxiway A has been constructed, Runway 1L-19R has been extended 255 feet to the north and overlaid and the terminal aircraft parking apron has been reconstructed and expanded.

FAA Advisory Circular (AC) 150/5335-5B, *Standardized Method of Reporting Airport Pavement Strength,* provides updated guidance and design software for evaluating existing pavement section performance under known and /or projected aircraft fleet mix annual operations. This Advisory Circular provides for establishing, and reporting, the standardized International Civil Aviation Organization (ICAO) airport runway(s), taxiway(s) and apron pavement strength. The standardized reporting method, known as the Aircraft Classification Number – Pavement Classification Number (ACN-PCN) is defined as follows:

> *The ACN is a number that expresses the relative effect of an aircraft, at a given weight, tire pressure, and landing gear geometry on a defined pavement section with a specified sub grade strength. The PCN is a number that expresses the load*

carrying capacity of a defined pavement section for unrestricted operations. This methodology is structured so a pavement section with a particular PCN value can support any aircraft that has an ACN value equal to or less than the pavements PCN value. Aircraft maximum load can then be determined by direct ratio utilizing the aircraft ACN and the pavement PCN.

Utilizing the procedures and software described above, the ACN and PCN values for the three aircraft landing gear configurations listed on the current airport layout plan for the runway, taxiways and terminal apron are presented in Table 3-2. At this time we are using the program's Generic Aircraft Database and assuming the minimum 1,200 aircraft operations per year. The highest PCN value for all aircraft evaluated, over each section, is the value reported. The aircraft using the Airport do not cause a problem with the pavement.

Table 3-2
Aircraft Landing Gear Configuration

	AIRCRAFT LANDING GEAR CONFIGURATION					
	75S		150D		250DT (2D)	
	ACN	PCN	ACN	PCN	ACN	PCN
RUNWAY 1L-19R	27	38	37	59	34	46
TAXIWAYS						
B	27	33	37	48	34	40
C	27	38	37	59	34	46
D	27	26	37	34	34	32
E	27	33	37	48	34	40
F	27	26	37	34	34	32
A						
F to K	27	33	37	48	34	40
K to D	27	26	37	34	34	32
D to B	27	38	37	59	34	46
J	27	26	37	34	34	32
K	27	26	37	34	34	32
L	27	26	37	34	34	32
H, G, GG	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
TERMINAL APRON	27	26	37	34	34	32

n.a. = not applicable, only small aircraft < 12,500 pounds.
Source: Wince-Corthell-Bryson

Following the FAA approval of the Aviation Activity Forecasts and aircraft fleet mix in Chapter 2, the procedure was rerun and the Airport's new PCN values are reported on the new Airport Layout Plan and on the updated FAA *Form 5010-1 Airport Master Record.*

3.3.3 Pavement Conditions

The State of Alaska Department of Transportation and Public Facilities (ADOT&PF) completed an Airport Pavement Condition Inspection Report in September 2009. The inspection and report provides a numerical condition rating according to the US Army Corps of

Engineers Pavement Condition Index (PCI) methods as described in FAA AC 150/5380-6B, *Guidelines and Procedures for Maintenance of Airport Pavements*.

This method provides a value of 100 for new pavements with deductions for measured deterioration down to a value of 0 for failed pavement. Guidelines for determination of recommended corrective action on aging pavement are as follows.

Runways	Taxiway/Aprons	Corrective Action
100-70	100-60	Preventative Maintenance
69-40	59-40	Maintenance/Rehab
39-0	39-0	Reconstruction

The PCI values from the 2009 inspection of the Airport's pavements are shown on Figure 3-3. The reported values show the general aviation area, and Taxiways G, H and GG are due for reconstruction. Taxiway F and Taxiway A, between Taxiways K and C, are due for rehabilitation.

3.3.4 Runway Safety Areas

The runway safety area (RSA) for Runway 1L-19R, for the most part, meets FAA dimensional design criteria with a width of 500 feet and extending 1,000 feet beyond both runway ends. There are a few grading deficiencies along the outside edges that the City has, and will continue to work on, with other projects. The RSA for Runway 1R-19L fully meets FAA design criteria with a width of 120 feet and extending 240 feet beyond both runway ends.

3.3.5 Drainage

The general direction of storm water surface runoff on the Airport is southwesterly toward the mouth of the Kenai River and Cook Inlet. The wetlands to the north of the airfield collect and store significant water from spring breakup and seasonal rainfall, slowly releasing it to subsurface groundwater flow and drainages through and around the Airport. Drainage in the Airport area is typically collected through a combination of underground pipes and drainage ditches.

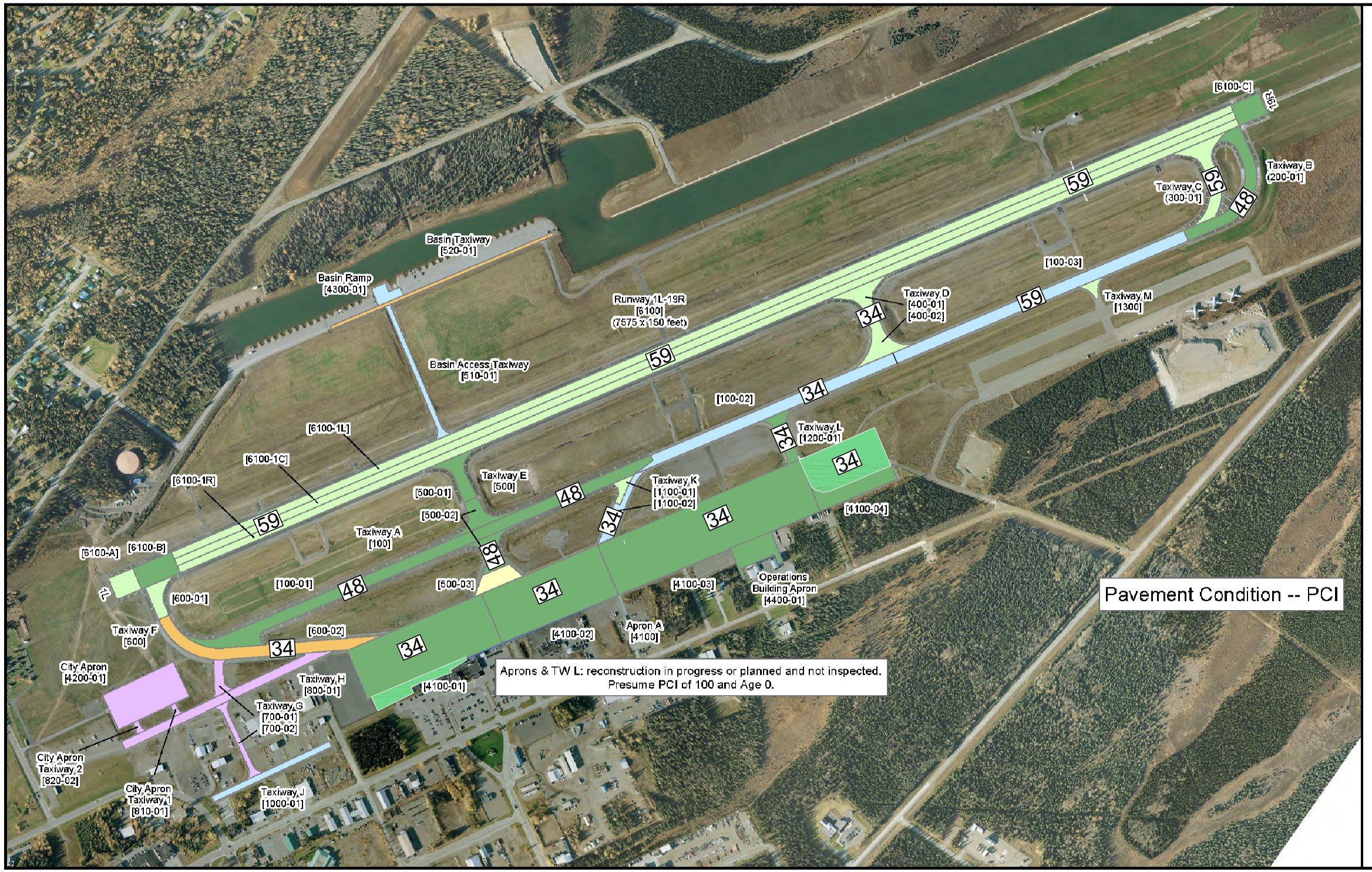
Drainage west of the runway is collected by a combination of ditches and piping that discharge into the existing water runway and taxiway basin system at four locations providing extended retention for good sedimentation. The basin level is controlled by an overflow drop inlet that discharges into a natural drainage gully at the south end of the Airport. The overflow is protected from floating pollutants and debris with a steel baffle surrounding it.

Drainage east of the runway is primarily collected by a combination of ditches and underground piping. They connect by pipe to the same natural drainage gully utilized by the float plane basin overflow.

Storm water treatment consists of oil/water separators on storm drain systems serving the central and north apron and at the Float Plane Basin overflow weir. Additional sedimentation and filtration is achieved through the well vegetated drainage ditches on the Airport and natural drainages downstream.

At the present time there are no provisions in place for collecting deicing fluids.

Storm drains with catch basins are located in all streets with curbs and gutters. Poor drainage exists in the vicinity of Willow Street north of the FAA air traffic control tower. A substantial amount of standing water is commonly observed in the ditches in this area up gradient from the Ryan's Creek drainage swale.



Kenai Municipal Airport

Airport Code: ENA
Site Number: 50410.*A

2009 Pavement Inspection Results

Map Compiled June 2007 by Central Region Materials, AK DOT&PF

Pavement Condition Index (PCI)

Target PCI Range for Runways: 70 to 100
Target PCI Range for Taxiways and Aprons: 60 to 100

PCI Values	General Pavement Recommendations
85 - 100	Do Nothing or Preventative Maintenance
70 - 84	Preventative Maintenance
60 - 69	Corrective Maintenance
55 - 59	Rehabilitate
40 - 54	Rehabilitate
25 - 39	Reconstruct
10 - 24	Reconstruct
0 - 9	Reconstruct

Pavement Surface Age

- 0 - 4 years
- 5 - 9 years
- 10 - 14 years
- 15 - 19 years
- 20 - 24 years
- 25 - 29 years
- >30 years

[ ] Branch-Section Identifier

Aerial Image: Oct 2007 Crazy Mountain Joint Ventures

0 250 500 1,000
Feet

[#] Pavement Classification Number
AC 150/5335-5b

WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD. Map Compiled June 2007 by Central Region Materials, AK DOT&PF	KENAI MUNICIPAL AIRPORT MASTER PLAN 2009 PAVEMENT INSPECTION RESULTS	FIGURE 3-3
DRAWN BY: V.C. DRAWING: 09PAVEMENTINSPECTION CHECKED BY: C.M. DATE: Oct 03,2017		

A comprehensive airport drainage study was completed in 1988 addressing drainage within the Airport boundaries. Development since that time has more or less followed the recommendations developed in the study and continues to guide current planning.

3.4 AIRSPACE AND NAVIGATIONAL AIDS

Airspace and air navigation considerations include airspace and air traffic control, approach areas and obstructions, runway protection zones, and navigational and landing aids. Meteorological conditions are also presented.

3.4.1 Airspace and Air Traffic Control

Figure 3-4 shows the airspace use in the vicinity of the Kenai Municipal Airport in relation to the major navigational aids, low altitude airways, instrument flight rules (IFR) approaches and other airports in the area. The Soldotna Municipal Airport is located approximately 8.5 nautical miles (NM) to the south east of the Kenai Municipal Airport. In addition, there are several other airstrips and lakes in the area around the Kenai Municipal Airport, used primarily by small, privately owned aircraft (e.g., Carty's, Gaede, Island Lake and Mackeys Lakes.)

There are several navigational aids that provide the basis of the low altitude airway structure in the area. The nearest, shown on Figure 3-4, are the Kenai VOR/DME, the Anchorage (TED) VOR/DME and the Homer VOR/DME. A VOR is a very high frequency omnidirectional radio range and DME is distance measuring equipment.

The above navigational aids are presented below with the approximate distance in nautical miles (NM) and general direction from the Airport.

Name	Location Relative to Kenai Municipal Airport	
Kenai VOR/DME	3	NM northeast
Anchorage (TED) VOR/DME	49	NM northeast
Homer VOR/DME	52	NM south-southeast

The Anchorage VOR/DME has recently been relocated to the east, and the radials of airways emanating from the Anchorage VOR/DME have all changed. This change is reflected on Figure 3-4. The call sign has also changed from ANC to TED.

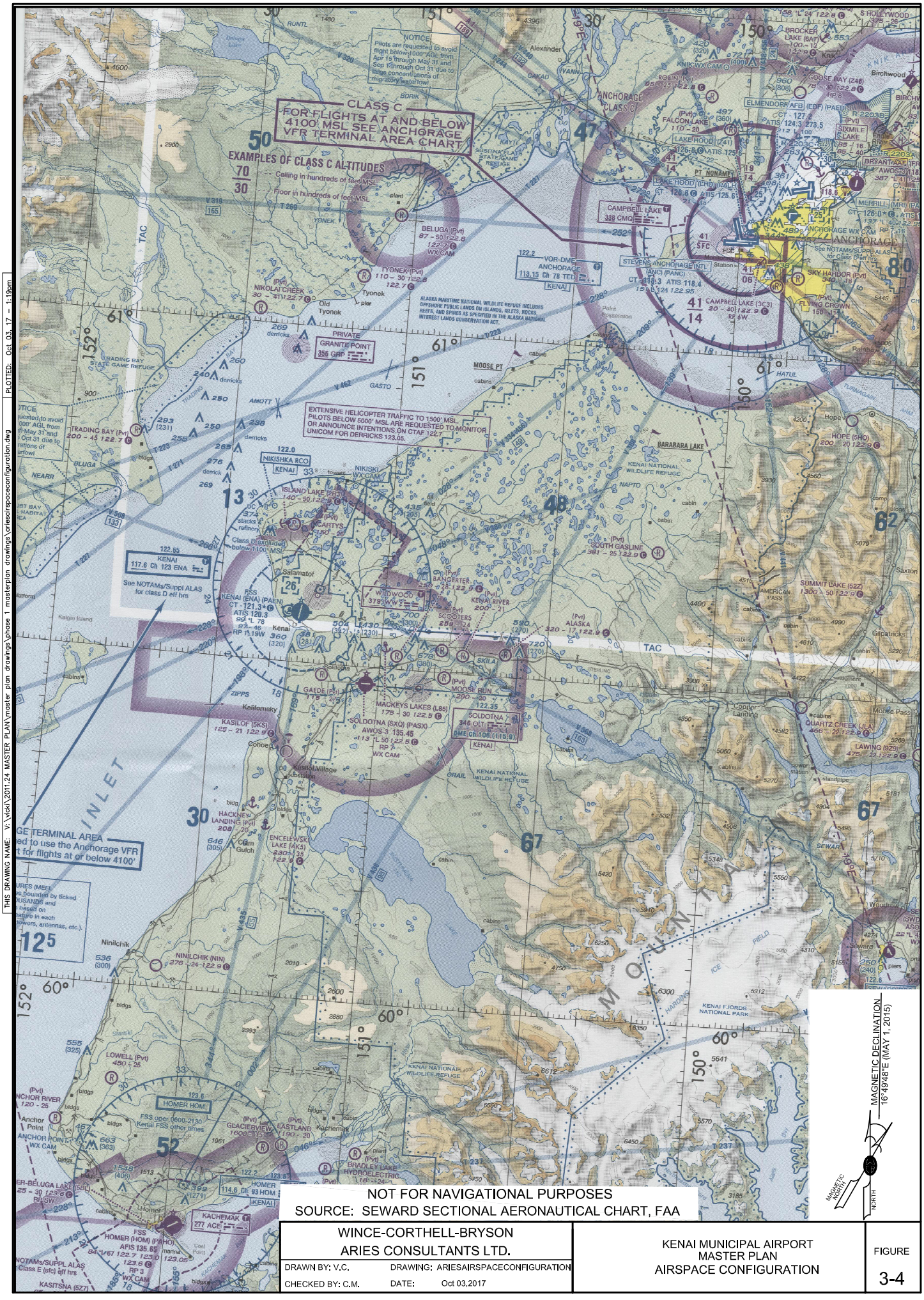
The Soldotna non-directional radio beacon (NDB/DME) is located approximately 4.5 NM east of the Soldotna Municipal Airport and is primarily a navigation aid for the Soldotna Municipal Airport. However, it is also used to identify navigational fixes along the low altitude airway system near the general area of both the Kenai and Soldotna Municipal Airports including fixes associated with IFR approach procedures to both airports.

The Wildwood NDB, adjacent to the south side of the Kenai VOR/DME, has recently been decommissioned by the FAA.

3.4.1.1 Published IFR Procedures

There is a precision approach, an instrument landing system (ILS), to Runway 19R. The ILS has IFR minimums of 200 feet above the runway with ½ mile visibility.

The closest navigational aid, the Kenai VOR/DME, also serves as the basis for two nonprecision approaches to runways at the Airport. These are the VOR/DME approach to Runway 1L and the VOR approach to Runway 19R. (FAA has been considering cancelling the VOR approach to Runway 19R but it is still available.)



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WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.		KENAI MUNICIPAL AIRPORT MASTER PLAN AIRSPACE CONFIGURATION	FIGURE 3-4
DRAWN BY: V.C.	DRAWING: ARIESAIRSPACECONFIGURATION		
CHECKED BY: C.M.	DATE: Oct 03,2017		

There are two global positioning system (GPS) approaches. They are RNAV (GPS) to Runway 1L and RNAV (GPS) approach to Runway 19R. (RNAV approaches rely on aircraft area navigation equipment.)

Three IFR procedures (LPV, LNAV/VNAV and LNAV) of a new class of GPS/WAAS (Wide Area Augmentation System) are now available at the Airport for properly equipped aircraft. While the LPV (localizer performance with vertical guidance) and LNAV/VNAV (lateral navigation/vertical navigation) procedures provide vertical guidance, they do not meet the strict requirements of the International Civil Aviation Organization (ICAO), so all three are technically considered nonprecision approaches. The LPV and LNAV/VNAV IFR minimums vary from approximately 200 feet above the runway with ½ mile visibility to approximately 300 feet above the runway with 1 mile visibility.

The LPV procedure has been approved to take advantage of the high accuracy guidance and increased integrity provided by WAAS. The minimums for the LPV procedure are now as low as 200 feet above the runway with 1/2 mile visibility where ground conditions, including obstructions, permit. The LPV minimums for Runway 19R are the same as for the ILS to Runway 19R. However, the minimums are higher for Runway 1L due to the trees off the south end of Runway 1L.

The nonprecision IFR minimums vary from approximately 480 feet above the runway with 1 mile visibility to approximately 600 feet above the runway with 2 miles visibility, depending on the procedure and the approach category of aircraft flying the procedure.

3.4.1.2 Air Traffic Control

Air traffic control (ATC) facilities that serve the Kenai Municipal Airport are the Anchorage Air Route Traffic Control Center (ARTCC) and the Kenai Air Traffic Control Tower (ATCT). The ARTCC, commonly known as Center, provides ATC for en route IFR aircraft, and for approach and departure IFR aircraft. When open, the ATCT provides ATC for aircraft operating within the Class D airspace surrounding the Kenai Municipal Airport. The Class D airspace is effective from the surface of the ground up to 2,500 feet above the Airport elevation, or 2,600 feet MSL, within a radius of 5 nautical miles of the Airport. There is a Class E airspace surface area extension to the northeast to provide controlled airspace for instrument approaches. When the ATCT is closed the Class D airspace reverts to Class E airspace. When the ATCT is closed pilots should use the common traffic advisory frequency (CTAF) of 121.3 to broadcast location and intentions in accordance with FAA AC 90-42F, *Traffic Advisory Practices at Airports Without Operating Control Towers*.

3.4.1.3 Airspace Usage

The use of airspace in the Kenai terminal area airspace is influenced by mountainous terrain. The terrain keeps minimum en route altitudes (MEA) relatively high over the mountainous areas. Mountain peaks rise to over 5,000 feet mean sea level (MSL) within 35 NM southeast of the Airport, and over

6,000 feet MSL to the west-northwest of the Airport. MEAs on V508, one of the low altitude airways that pass over the Airport, are 9,000 feet MSL at 18 NM to the southeast and 12,000 feet MSL at 28 NM to the west-northwest of the Kenai VOR/DME. Additionally, mountain peaks rise to approximately 7,000 feet within 45 NM to the west/northwest of the Airport. Within 65 NM to the southwest and 45 NM to the west/southwest of the Airport peaks rise to over 10,000 feet MSL. These peaks affect the MEAs on V508, V462 and V456. The MEA on V462 is 14,000 feet MSL at 28 NM and on V456 is 13,000 feet MSL at 44 NM from the Kenai VOR/DME.

New GPS/WAAS airways, requiring GPS enhanced by WAAS, are being established in Alaska, including three airways that pass near Kenai. These airways are denoted by the letter T preceding the airway number. The T227 passes through the Amott Intersection, located at 16 nautical miles north-northwest of Kenai, and continues in a southwesterly direction. The T223 originates at the Anchorage VOR/DME, overlying the V462 airway, passing through the Amott Intersection and continues in a southwesterly direction. The T271 originates at the Amott Intersection and also continues in a southwesterly direction between T227 and T223.

The significance of these emerging new airways is the enhanced accuracy allowing lower minimum en route altitudes by avoiding some mountainous terrain. More of these GPS/WAAS airways can be expected in the future.

The Kenai terminal area airspace serves a wide range of civil and military aircraft operations, both instrument flight rules (IFR) and visual flight rules (VFR). The main difference between IFR and VFR is that the pilot maintains spatial orientation by reference to instruments for IFR operations and by visual reference to the earth's surface for VFR operations. VFR activity requires good visibility whereas IFR activity can be accomplished in poor visibility.

Meteorological conditions that permit flight under VFR rules are prescribed in the Federal Aviation Regulations (FAR) Part 91, *General Operating and Flight Rules*, Paragraph 155, *Basic VFR Weather Minimums,* in terms of visibility and distance from clouds.

3.4.1.4 IFR Operations

The Kenai Municipal Airport is within the Anchorage ARTCC, commonly known as Center. Centers may delegate airspace to local air traffic control (ATC) facilities for IFR approach and departure control. However, Anchorage ARTCC has retained Approach/Departure control for Kenai Municipal Airport.

As IFR aircraft near the Kenai terminal area airspace, Anchorage Center clears them to descend from en route altitudes and transfers control to an approach controller within the Center who has the responsibility for controlling aircraft from this point to the final approach course to the runway of intended landing while maintaining prescribed separation from other aircraft. As aircraft near the final approach course, they are instructed to descend further and cleared for the approach. At this time, or shortly after, the pilots are instructed to contact Kenai ATCT, commonly known as Kenai Tower or to contact the Kenai Flight Service Station (FSS) when the ATCT is closed.

The three IFR procedures to and from the Soldotna Municipal Airport interact to a limited degree with IFR procedures at the Kenai Municipal Airport but do not seriously affect the capacity for either existing or forecast air traffic demand. However, when wind is basically from the northeast and IFR approaches are to Runway 1L at Kenai Municipal and to Runway 7 at Soldotna Municipal, the Kenai approaches are designed to pass over the Soldotna approaches by at least 1,000 feet, the minimum required vertical separation.

For any IFR departures from these airports, pilots must be in contact with the Anchorage Center Approach/Department Control or the Kenai Air Traffic Control Tower when in Class D airspace. Only Kenai and Soldotna Municipal Airports have IFR approach procedures and pilots are in contact with the Anchorage Center Approach Control until released shortly prior to landing.

3.4.1.5 VFR Operations

Unlike IFR flights, VFR flights in the Kenai terminal area airspace are not controlled by the air traffic control system except in the Class D airspace surrounding the Kenai Municipal Airport. All airports contribute to VFR traffic and the airports in the general area around the Kenai Municipal Airport, mentioned earlier in Section 3.4.1, do present some concern to aviation activity in the area. However, there is a floor of Class E controlled airspace at 700 feet above ground level surrounding both airports. This means that pilots operating under VFR rules must maintain visibility and clearance from clouds in accordance with FAR Part 91, Paragraph 155, as stated earlier in Section 3.4.1.3.

For any VFR aircraft within the Class D airspace surrounding the Kenai Municipal Airport, pilots also must be in contact with the Kenai Air Traffic Control Tower.

The Kenai Municipal Airport underlies a relatively busy northeast-southwest VFR flyway to and from the Ted Stevens Anchorage International Airport. For some of the traffic using this northeast-southwest VFR flyway Kenai Municipal Airport is the origin or destination airport. During the summer months, there is significant VFR traffic through the local airspace consisting of small aircraft (e.g., de Havilland DHC-2 Beaver and de Havilland DHC-3 Otter) flying east-west, primarily from Mackey Lakes and Longmere Lake.

Airport traffic patterns related to the main runway and water runway are separated by having Runway 1L-19R traffic to the east and the water Runway 1W-19W traffic to the west of the Airport. To accomplish this, right turn rectangular traffic patterns have been established for Runways 1L and 19W. Whereas, Runways 19R and 1W have standard left turn rectangular traffic patterns. The traffic pattern altitudes are established at 1,000 feet mean sea level (MSL) (900 feet above ground level [AGL]) for propeller aircraft and at 1,600 feet MSL (1,500 feet AGL) for turbine aircraft for Runway 1L-19R and at 800 feet MSL (700 feet AGL) for the Water Runway 1W-19W. Gravel Runway 1R-19L has left turn traffic patterns at both ends. General operating rules have been established for helicopters to avoid interactions with fixed wing aircraft. When within 3 NM of the Airport, helicopters remain below 600 feet MSL (500 feet AGL).

3.4.2 Approach/Departure Areas and Obstructions

Both the FAA approved Airport Layout Plan and the Aeronautical Data Sheet (for the Kenai Municipal Airport Obstruction Chart),

published by the National Geodetic Survey, were reviewed to identify obstructions as defined by Federal Aviation Regulations (FAR) Part 77, *Safe, Efficient Use and Preservation of the Navigable Airspace*. FAR Part 77 establishes imaginary surfaces, related to airports and their runways, which are used to identify obstructions.

The FAR Part 77 approach surface slopes, compared with existing obstacle/obstruction controlled approach slopes and other information relative to the controlling obstacle/obstructions as listed on the FAA *Form 5010-1 Airport Master Record*, are shown in Table 3-3.

Table 3-3
Approach Surfaces

				Controlling Obstacle/Obstruction Location from Runway Threshold, Related to Extended Runway Centerline		
Runway Number	**Runway Elevation (feet)**	**FAR Part 77 Slope**	**Actual Slope**	**Type**	**Height Above Threshold (feet)**	**Location**
1L	91	34:1	9:1[a)]	Trees[b)]	48	625 feet from end of runway and 490 feet to the west of the extended runway centerline
19R	98	50:1	50:1	None		
1R	99	20:1	20:1	None		
19L	100	20:1	20:1	None		
1W	84	20:1	20:1	None		
19W	84	20:1	20:1	None		

NOTE: a) The 9 to 1 slope is associated with the end of the primary surface for Runway 1L. A 14 to 1 slope is related to the displaced landing threshold on Runway 1L.
b) Trees on Airport and City property have since been removed.
Source: FAA *Form 5010-1 Airport Master Record*, December 5,2011

In addition to the approach surface slopes defined in FAR Part 77, the departure surfaces for designated runways defined in FAA Order 8260.3C, *United States Standard for Terminal Instrument Procedures* (TERPS) were also reviewed. The 40 to 1 departure surface for instrument runways is penetrated by about 2,600 trees to the south of Runway 19R departures. Some of the trees penetrate the 40 to 1 departure surface by as much as 40 feet. The City and FAA are in the process of mitigating this problem that includes trees both on and off airport property. For Runway 1L instrument departures to the north, there are no penetrations of the 40 to 1 departure surface.

All of the existing building restriction lines (BRL) meet FAA design standards and have no penetrations except for the area west of the end of Runway 1L. A water tank, water pump house, and emergency power van are within 750 feet of the centerline of Runway 1L-19R. The water tank access ladder, extending upward to 116.5 feet MSL, penetrates the 7 to 1 transitional surface slope for FAR Part 77 by 2 feet and is lit with a red obstruction light.

3.4.3 Runway Protection Zones

Runway protection zone dimensions are no longer based on FAR Part 77 approach surface dimensions. The dimensions are now established in the FAA AC 150/5300-13A, *Airport Design*, for each individual runway, by approach visibility minimum for, and by category of aircraft that the individual runway will serve.

The type of existing runway protection zone and dimensions established for each runway approach end are presented in Table 3-4.

Table 3-4
Runway Protection Zones

Runway	Protection Zone	Length in Feet	Inner Width in Feet	Outer Width in Feet
1L	Departure	1,700	500	1,010
19R	Departure	1,700	500	1,010
1L	Nonprecision Approach	1,700	1,000	1,510
19R	Precision Approach	2,500	1,000	1,750
1W	Visual Approach	1,000	500	700
19W	Visual Approach	1,000	500	700
1R	Visual Approach	1,000	250	450
19L	Visual Approach	1,000	250	450

Source: Wince-Corthell-Bryson

A small portion of the RPZ for Runway 1L is outside the Airport property. The RPZ for Runway 19R is entirely within the property line to the north. The RPZs for the water runway and gravel runway are entirely within the Airport property.

3.4.4 Navigational and Landing Aids

Runway 19R has a Category I Instrument Landing System (ILS) with a 200-foot above-ground level (AGL) decision height (DH) and minimum visibility of 1/2 mile.

There is a medium intensity approach lighting system with runway alignment indicator lights (MALSR) for Runway 19R.

Both Runways 1L and 19R have visual approach slope indicators (VASI-4) with a visual glide angle of 3.0 degrees. Runway 1L has runway end identifier lights (REIL). Runway 1L-19R is equipped with high intensity runway lights (HIRL). Neither the water Runway 1W-19W nor gravel Runway 1R-19L have permanently installed runway edge lights.

There is a VOR/DME, with automatic weather broadcasts, located 2.4 NM to the northeast of the Runway 19R threshold. This VOR/DME serves as the basis for IFR approaches to both Runways 1L and 19R. The DME also serves to identify fixes for the ILS approach and also as the basis for the DME arcs leading to the ILS and VOR final approach courses.

There is an Airport rotating beacon located approximately 1,500 feet southeast of the Runway 1L threshold. There is a lighted wind indicator and segmented circle with traffic pattern indicators on the east side of Runway 1L-19R, at approximately 500 feet northeast of Taxiway E. There are wind socks near each end of Runway 1L-19R. There is also a wind indicator on the east side of the water runway near the north end.

3.4.5 Meteorological Conditions

Kenai's climate is transitional between continental and maritime influences, and is characterized by cool summers and cold winters. Based on climatic data collected at the Kenai Municipal Airport between 1996 and 2008, as reported by the Western Regional Climate Center, the annual mean temperature at Kenai is 36 degrees Fahrenheit (F). The highest temperature was 84°F in June 2004 and the lowest temperature was -37°F in February 1999. On the average, January is the coldest month, with a mean temperature of 15°F, and mean daily maximum and minimum temperatures of 23°F and 7°F, respectively. Mean monthly temperatures are below freezing from November to March, and the average frost-free period is from June through August. The mean monthly temperature in July is 56°F, with an average range from a minimum of 49°F to a maximum of 64°F.

Most precipitation in Kenai occurs from July through October, whereas March and February are the driest months. The maximum mean monthly precipitation of 3.4 inches occurs in September, and the minimum, 0.5 inches, in March. The highest recorded daily precipitation event of 1.9 inches occurred in December 1999, probably as snow. Annual average precipitation totals 17.4 inches, including snowfall.

Typically, snow falls during every month except May, June, July, August and September. Maximum snowfall is in December, averaging 13.1 inches, followed by January and February, with 10.7 and 11.0 inches, respectively. In Kenai, snow accumulates to depths as great as 53.0 inches in January 1949. There is an automated surface observing system (ASOS) on the Airport but it does not report snowfall. Because Kenai's winter temperatures are cold, much of the snowfall remains on the ground until the spring thaw.

Prevailing winds are from the north and northeast in the winter and from the south to southwest in the summer. The average annual wind speed is 6.6 knots, with calms 15 percent of the time. Based on wind data collected at the Airport between 1998 and 2008, the crosswind coverage for the runway orientation is 98.5 percent for 10.5 knot crosswinds, 99.4 percent for 13 knot crosswinds, 99.9 percent for 16.0 knot crosswinds and 100.0 percent for 20 knot crosswinds.

Daylight at Kenai's latitude (60° north) fluctuates according to the season. In May, June and July, there are up to 24 hours of light and twilight, while in November, December and January there are only 9 to 11 hours of light and twilight.

3.5 PASSENGER TERMINAL

The passenger terminal facilities at the Kenai Municipal Airport include the aircraft parking apron and passenger terminal building. The passenger terminal building is illustrated on Figure 3-5.

3.5.1 Aircraft Parking Apron

The terminal area aircraft parking apron measures approximately 4,000 feet by 200 feet. There is space for up to six commuter aircraft (depending upon the type of aircraft) at the passenger terminal on approximately 500 feet by 200 feet of the aircraft parking apron. The portion that is adjacent to this area, and south of the terminal building, is approximately 600 feet by 300 feet and is used for transient aircraft parking. This transient aircraft parking contains six small aircraft tiedowns and nine parking spaces for larger charter and private aircraft with wingspans up 79 feet. A helicopter parking pad is located north of the terminal building on the aircraft parking apron. Further to the north, there is aircraft parking apron for based and transient aircraft and another helicopter parking pad. There is an apron service road along the west side of the aircraft parking apron located between the apron and Taxiway J.

3.5.2 Passenger Terminal Building

The passenger terminal building is located about 1,300 feet east of Runway 1L-19R and about 300 feet west of Willow Street. It is about 2,000 feet south of the midpoint between the ends of Runway 1L-19R. The terminal building is a two-story facility approximately 300 feet long and 90 feet wide encompassing about 25,000 square feet. The terminal building has four passenger doorways, three for passenger enplanements and one for passenger deplanements. The building serves several purposes with space for airline ticket/check-in counter and related airline functions, passenger lounge/waiting area, baggage claim area, restaurant, lounge, public restrooms, car rental facilities, gift shop and airport management. Scheduled commuter service is provided to and from Anchorage by RAVN Alaska using de Havilland DHC-8 and Beech 1900 aircraft and by Grant Aviation using Cessna 208 Caravan and Beech King Air aircraft.

ORIGINAL SHEAR WALLS REMOVED DURING SUBSEQUENT RENOVATIONS, TYP.

WOMEN 161
MEN 160
HALL 159
SOLARIUM 155
RESTAURANT 154
SUB-WAITING 146
STORAGE 158
KITCHEN 157
PREP AREA 156
ENTRY 153
ARCTIC ENTRY 152
TENANT 7 145
ELEV 144
STAIR 1 138
HALL 147
ELEV. EQUIP. 143
JANITOR 151
STORAGE 150
DISPLAY CASE
SUB-LOBBY 149
TENANT 6 148
ELEC. 142
MECH. 141
MEN 140
WOMEN 139
OH4
OH3
BAGGAGE BREAKDOWN AREA 129
BAGGAGE CLAIM 130
ARRIVAL HALLWAY 128
ARCTIC ENTRY 127
ARCTIC ENTRY 123
PASSENGER HOLDROOM 125
ARCTIC ENTRY 122
WAITING 126
DEPARTURE HALLWAY 124
OH2
ELEC/COMM PANELS
ARCTIC ENTRY 121
BAGGAGE MAKEUP AREA 118
ADMIN. 120
ARCTIC ENTRY 119
OH1
RAVN 117
BAGGAGE CONVEYOR
RAVN 116
OFFICE 115
VACANT 114
GRANT 113
GRANT 112
ADMIN. 111
TICKET COUNTER 5 110
TICKET COUNTER 4 109
TICKET COUNTER 3 108
TICKET COUNTER 2 107
TICKET COUNTER 1 106
1966 TERMINAL
1983 ADDITION
LOBBY 102
TENANT 5 135
TENANT 4 134 VAC.
TENANT 3 133
TENANT 2 132 VAC.
TENANT 1 131
1983 ADDITION
1966 TERMINAL
ARCTIC FOYER 137
STAIR 2 136
ARCTIC FOYER 101
JANITOR 105
MEN 103
WOMEN 104
HEATED SIDEWALK
2ND FLOOR LOUNGE 204
BAR 203
ELEV 211
HALL 210
STAIR 1 209
RR 207
RR 206
STOCK 205
STORAGE 208
HALL 202
STAIR 2 201

SCALE: 1"=20'

WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN TERMINAL BUILDING FLOOR PLAN	FIGURE 3-5
DRAWN BY: V.C. DRAWING: TERMINALFLOORPLAN CHECKED BY: C.M. DATE: Oct 03,2017		

3.5.3 Existing Conditions Surveys

Architectural, Structural, Mechanical and Electrical inspections were conducted to evaluate the overall condition of the terminal building and its electrical and mechanical systems as well as to provide an overview of the facilities conformance with current building codes. The following summaries are based on a review of Record Drawings provided by the City and non-intrusive inspections of facility equipment, controls, materials, interior and exterior finishes, as well as interviews with terminal tenants and Airport staff.

The evolution of the passenger terminal building, beginning in 1966 and followed by additions and renovations in 1983, 1988, and 2004 was assumed to be constructed in conformance with the current codes at those times. Several maintenance and equipment replacement projects have occurred over the life of the terminal but documentation on those projects is not reasonably available.

Items noted as "not in compliance with current Building Codes" do not necessarily imply a "Code Violation" exists but rather an observation of current Code status and a notice of possible additional requirements that the City Building Officials may require with future additions or renovations.

Code issues with "Life Safety" considerations and potential liability for the City were noted and reported for consideration.

The surveys provide insight into the terminal's existing conditions and serve as a basis for the next phase of the Airport Master Plan when facility requirements and alternatives will be explored. This will be followed by the development of a prioritized Capital Improvement Plan over the next 20-year planning period.

Full survey reports are included in Appendix A.

3.5.3.1 Architectural

Terminal Building History – The original southeast 190 feet by 60 foot section of the terminal building was constructed and dedicated in 1966. The building was renovated and expanded to the west and north with a small addition on the south end in 1983. In 1988 the upper level and south end of the building were remodeled to establish the lounge and restaurant. Therefore, the original terminal is 46 years old and the addition is 29 years old at the time of this report. In 2004 the curbside sidewalk, as well as the north and south entries, were reconstructed addressing American with Disabilities Act (ADA) requirements and adding sidewalk heating, canopies, storm drain collection and revised vehicular parking and traffic patterns.

Construction Assemblies – Refer to the complete Architectural and Structural reports in Appendix A.

Code Data – The record drawings for the original terminal building do not specify any code data. However, the record drawings for the 1983 addition show that the governing code at the time was the 1979 Uniform Building Code.

The 1983 building addition is designated as Occupancy Group A3, Construction Type VN, and was revised to A3/B2-VN in 1988. However, it is not clear what Code was in affect at that time.

The main public areas appear to meet current codes in terms of occupancy and exiting considerations.

Several areas were noted as not in compliance with current codes, including the sprinkler system over the lounge stairways, the front entries and canopies, as well as the elevator control room and possibly elevator shaft.

The rear exits out of the lounge and restaurant areas also do not comply with current codes with respect to guardrail and handrail heights and partially blocked fire exits. Non-code compliant conditions were also noted with the Mechanical and Electrical systems.

Specific information concerning these code compliance conditions can be reviewed in the Architectural and Engineers' reports in Appendix A.

Public Spaces – The existing public areas for passenger waiting, baggage claim and ticketing areas appear to be of adequate size and capacity for the current airport activity.

The terminal building lacks a secure area so that when air carrier jets are diverted from Anchorage and land in Kenai the passengers can deplane and then re-board the aircraft.

The restaurant space appears small for the number of customers served as evidenced by inadequate pantry and storage area resulting in supplies blocking the fire exit. In addition, the restaurant restroom facilities are closed to the public and one of the restrooms is used for storage.

The lounge on the upper level is in good condition and seems to be adequately sized.

The car rental lease space appear adequate but are underutilized.

The smokers' area outside the terminal building main entry is less than the required 20 feet from the entrance and does not provide adequate shelter for smokers.

Private Spaces – Airport administrative personnel spaces are dispersed and mixed with the baggage makeup area. The public reception office, as well as the conference room, is located in unused airline space which could be a problem if a potential airline tenant requested space.

The airport manager's office is small and, with the conference room, is isolated from the public access space by the baggage makeup area resulting in environmental conflicts including, noise, temperature, ventilation and air quality.

There are no restroom or break room facilities and no secure warm or cold storage space for held and lost baggage. The storage and stock facilities for both the airport and the airlines is limited.

Interior finishes in all areas were noted to be in fair to good condition with a few areas noted as being in poor condition. Refer to the Architectural report in Appendix A.

Building Exterior – The building exterior finish is a high quality steel siding and is generally in good condition with the exception of the baggage overhead doors where the siding has been damaged. Other exterior deficiencies are related to general

maintenance items such as weather stripping scuppers and minor damage to siding.

The roof system consists of a built up asphalt and tapered rigid insulation system over a metal deck. The roofing membrane has outlived its useful life expectancy, is leaking and is in need of replacement.

Americans with Disabilities Act Compliance – Most public spaces comply with the Americans with Disabilities Act (ADA). However, in some cases, exit door operating devices appear to be in need of repair and are not compliant. The public bathrooms at the second floor lounge do not meet the ADA for a number of reasons. The drinking fountains do not meet ADA height requirements. Private spaces in the terminal building are generally not ADA compliant.

3.5.3.2 Structural

The original building was constructed in 1966 with a steel frame system with lateral loads resisted by wood framed walls sheathed with 1/2-inch plywood. The 1983 additions were constructed similar to the original building however the perimeter lateral load resisting walls were constructed with 2x10 wood studs. Both projects appear to have been designed in accordance with the code in place at the time.

In reviewing the 1988 plans, it appears that numerous shear walls both along the perimeter and in the interior of the building were removed as part of the remodel. It appears a moment resisting frame was added to account for the removal of the shear wall along the perimeter, however, there is no indication that any new shear walls or other lateral force resisting systems were installed to replace the interior sheer walls. The 1988 plans that were provided by the City for review were not sealed by a structural engineer.

Since the original structure and the subsequent additions were designed and constructed, the building codes have undergone major revisions. These revisions have included modifications to the way that roof design live loads (snow loads) are calculated as well as how wind and seismic forces are calculated. The end result is that structures designed to meet the current building codes are required to resist larger live loads than what the terminal building was designed for. To meet current code requirements, lateral load resisting systems are required to resist seismic forces that are on the order of 50 percent greater than what the original building was designed for.

Due to the age of the terminal building, the numerous modifications made to the terminal building over the years, and the revisions made to the building code, it is recommended that the entire building be analyzed with regards to its structural stability if future modifications and/or additions are proposed for the terminal building.

3.5.3.3 Mechanical

Site utilities, plumbing and heating systems, ventilation, fire protection and control systems were inspected and terminal building maintenance staff, as well as terminal tenants were interviewed.

The systems, as a whole, have been well maintained and were found to be in fair condition. However, due to age, some systems are reaching the end of their serviceable life and all are lacking in more efficient modern technology and system redundancy.

Operation and maintenance deficiencies were reported and observed with the terminal sewer service, systems monitoring and control, building ventilation and heating.

Mechanical Code issues, limited to non-intrusive inspection, found some system features are not in compliance with current code including combustion air intakes, mechanical and electrical equipment clearances, area ventilation, kitchen equipment, the fire sprinkler system and domestic water connection.

Refer to the full Mechanical Inspection Report in Appendix A for more detailed information on the mechanical systems.

3.5.3.4 Electrical

Site utility service and standby power, distribution, fire alarm systems, public address and security systems, as well as terminal and parking area lighting were inspected and terminal building maintenance staff interviewed.

Equipment and controls were found to be in fair to good condition with the exception of a separate 6-meter load center assembly that is only serving the vehicular parking lot lighting system. This assembly is severely corroded and appears to be moving around from frost heave.

Peak electrical demand, as reported by Homer Electric Association (HEA), is far below that which is available through both HEA power service and the Airport's standby generator system. There is also ample telephone service available from the 300 pair service feeding the terminal.

The standby generator system response time was tested and found to be in compliance with both the National Electric Code and FAA response criteria.

Photometric lighting measurements found both indoor and outdoor lighting acceptable.

Electrical code issues, limited to non-intrusive inspection, found items not in compliance with current codes in several areas including the generator building, the electrical distribution center room 142, outdoor receptacles and vehicular parking area lighting as well as required equipment and panel signage and load schedules.

Refer to the full Electrical Inspection Report in Appendix A for more detailed information on the electrical systems.

3.6 AIR CARGO AND MAIL

Federal Express subleases space from Loroc LLC in the 6,400 square foot building and loads and unloads cargo on the 12,000 square feet of aircraft parking apron that FedEx leases adjacent to the Loroc LLC building. UPS leases a 3,600 square foot building from Kenai Aviation Services Inc. (d/b/a Aviation Services) at the south end of the Airport and park their aircraft on Taxiway H to load and unload cargo.

Dan Pitts has a 6,000 square foot cargo building used by RAVN Alaska and Everts. Everts uses part of the 35,000 square foot nonexclusive aircraft parking apron area in front of Crowley Marine Services to load cargo. Everts has a special use permit for 12,000 square feet at the north end of the

aircraft parking apron for refueling their aircraft and loading bulk fuel through the fence by Alaska Oil Sales.

3.7 GENERAL AVIATION

General aviation and other aviation facilities at the Kenai Municipal Airport are generally located in two areas – the General Aviation Apron Subdivision No. 1 to the south of the passenger terminal building and the F.B.O. Subdivision located to the north of the passenger terminal building. There are also City and Civil Air Patrol facilities south of the terminal area and there are float plane facilities on the west side of the Airport.

3.7.1 Commercial and Noncommercial Aviation

General Aviation Apron Subdivision No. 1 on the southeast side of the Airport has lots that are leased to several general aviation users.

- Kenai Aviation Leasing Company LLC leases three lots and provides air charter, aircraft maintenance and repairs, hangar and tiedowns, and aircraft-related enterprises.

- Russell Winger has a building for aircraft maintenance.

- Schilling Rentals has a lot with a hangar. Schilling Rentals also has a hangar for air freight and aircraft parking on the apron.

- SOAR International Ministries has two hangars and a cargo-office building for their charter services and aircraft storage and maintenance.

- Air Supply Alaska subleases Building 4 from SOAR for their charter operations and aircraft maintenance.

- Peninsula Aero Technology provides avionics sales and service in the SOAR Building 7.

- Arctic Barnabas Ministries has a hangar for the charter services they provide with their aircraft.

- Two lots are available for lease in this area.

The F.B.O. Subdivision, north of the passenger terminal, has several lease lots for general aviation and other aviation uses.

- Crowley Marine Services leases two lots and 35,000 square feet of a nonexclusive portion of the aircraft parking apron for their fueling operations at the Airport.

- Loroc LLC provides facilities for Federal Express and FAA Airway Facilities field maintenance facilities on two lease lots.

- Kenai Hangar built a new hangar and has leased it to Cougar Helicopters.

- Dan Pitts has a freight building.

- Five lots are available for lease in this area.

The State of Alaska, Department of Natural Resources, Division of Forestry, leases a lot north of the air traffic control tower for their fire fighting activities, including storage of retardant material. They have 9,600, 8,000 and 7,500-gallon tanks for retardant for the contract aircraft for fire fighting. In the summer, they also use a 10,000-gallon water tank and 5,000-gallon semi-tank trailer. They contract with private operators using Convair 580 and de Havilland Buffalo aircraft to fight fires.

3.7.2 Aircraft Parking

The Airport maintains 40 long-term tiedown spaces, of which ten have electricity, on a 130,000 square foot apron to the southwest of General Aviation Apron Subdivision No. 1 alongside Taxiway H. The Airport also provides 15 itinerant tiedown spaces at the south end of the main aircraft parking apron and north of General Aviation Apron No. 1. There is also space for itinerant aircraft parking on the aircraft apron north of the passenger terminal aircraft parking apron and west of the F.B.O. Subdivision. Both based and itinerant aircraft tiedowns are available adjacent to the gravel runway.

A 5-1/2-acre tract on the southwest side of General Aviation Apron Subdivision No. 1 is used by the Civil Airport Patrol (CAP). While the City holds title to this tract, the federal government (U.S. Army Corps of Engineers) controls the use and occupancy of this parcel. The CAP has a hangar for storage of their own aircraft, as well as a gravel aircraft parking apron.

The float plane basin has 25 long-term tiedown slips, 10 slips reserved for itinerant aircraft and five slips reserved for commercial activity. Aircraft with up to a 48-foot wing span can be accommodated in the tiedown slips, and aircraft with up to a 65-foot wing span can be accommodated in the commercial slips. A transition ramp and paved apron is available for aircraft owners to convert aircraft from floats to skis or wheels on a seasonal basis. An aircraft registration building, pay telephones and restrooms are–available at the south end of the float plane basin. There is also a 24-hour credit card refueling system.

3.8 AIRPORT ACCESS AND PARKING

This section describes the Airport access roads, and vehicle parking facilities, leading to and within the Airport Reserve Boundary area.

3.8.1 Access Roads

From the west, primary access to the terminal area is along Main Street Loop and Willow Street. Traffic from the south uses the Kenai River Bridge Access Road to Main Street Loop and then Willow Street. Traffic from the east travels along Airport Way to the terminal area. Access to airport businesses on the east side is provided along Main Street Loop, Willow Street and Granite Point Court.

There are traffic signals at the intersections of Airport Way, Main Street Loop Road, Willow Street and the Bridge Access Road with the Kenai Spur Highway.

Access to the float plane basin on the west side of the Airport is from First Avenue near the cemetery, then north along Float Plane Road to the Fourth Avenue gate.

3.8.2 Vehicle Parking Facilities

The passenger terminal vehicular parking area currently provides about 460 public, rental car, lounge/restaurant, and employee parking spaces as illustrated on Figure 3-6. It is divided into several different areas by a one-way terminal access loop road which serves passenger loading and unloading areas in front of the terminal building. The northern section is designated for reserved long-term parking with 154 spaces and employee parking with 21 spaces. The center section is designated as short-term parking with 84 spaces. The southern section provides 134 spaces for rental cars, 53 parking spaces for the restaurant and lounge and 14 spaces for terminal building employees.

There are seven spaces along the passenger terminal building curbside for passenger loading and unloading. Due to the short turn-around time of the commuter aircraft, this area becomes congested with vehicle and pedestrian crossing traffic at times.

There are also three taxi spaces and two load/unload spaces on the east side of the curbside with taxi queuing spaces adjacent to long-term parking.

The long-term parking area is over utilized occasionally and overflows to the gravel parking area on the east side of Willow Street which can accommodate 50 to 75 vehicles. Short-term parking, in front of the terminal building, provides ample parking spaces. However, the current layout creates drainage problems due to the required snow plowing and removal patterns. With the recent reduction in car rental agencies in the terminal building, the south parking area is underutilized at this time.

The Airport provides a vehicular parking area off Main Street Loop that Kenai Aviation Services Co. pays for parking permits for use by their customers.

There are also vehicular parking spaces for customers and employees at the various lease lots.

3.9 AIRPORT SUPPORT

This section describes the facilities serving Airport Administration, Airport Maintenance, aircraft rescue and fire fighting, Federal Aviation Administration, fuel, utilities and fencing.

3.9.1 Airport Administration

The Airport administration offices are located on the ground floor of the passenger terminal building on the north side of the ticketing/check-in area and northwest of the baggage makeup area.

DRAWING NAME: V:\Vicki\2011.24 MASTER PLAN\master plan drawings\phase 1 masterplan drawings\EXISTINGTERMINALPARKINGAREA.DWG PLOTTED: Oct 03, 17 – 1:26pm

TERMINAL EMPLOYEE PARKING (14)

CONCESSION PARKING

CONCESSION PARKING

LOUNGE/RESTURANT PARKING (23)

LOUNGE/RESTURANT PARKING (16)

TERMINAL

RESERVED FOR: ADMINISTRATIVE ASSISTANT

TERMINAL EMPLOYEE PARKING (21)

RESERVED FOR: CITY OF KENAI

RESERVED FOR: AIRPORT MANAGER

RESERVED

PERMIT PARKING (12)

PERMIT PARKING (14)

TWO DAY MAX. PARKING

15' WALK

2 HOUR FREE PARKING

30' DRIVE LANE

2 HOUR FREE PARKING

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

30' DRIVE LANE

30' DRIVE LANE

30' DRIVE LANE

34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18

35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51

27' DRIVE LANE

27' DRIVE LANE

OVERSIZED VEHICLES

OVERSIZED VEHICLES

CONCESSION PARKING

RESERVED FOR: DEPARTMENT OF PUBLIC SAFETY (2) @ 9'

PERMIT PARKING (10)

52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72

73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93

94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114

115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135

136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156

157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177

178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198

WILLOW STREET

NORTH

20 0 20 40

GRAPHIC SCALE FEET

OVERFLOW PARKING

WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN EXISTING TERMINAL VEHICULAR PARKING PLAN	FIGURE 3-6
DRAWN BY: V.C. DRAWING: TERMINALPARKING AREA		
CHECKED BY: C.M. DATE: Oct 03,2017		

3.9.2 Airport Maintenance

Airport maintenance and snow removal is carried out by airport maintenance employees, supplemented by City of Kenai Public Works employees, when required.

Maintenance equipment designated for airport use is housed in the 19,600 square foot Airport Operations Facility north of the FAA Air Traffic Control Tower and includes the following maintenance and snow removal equipment (SRE):

- 2012 1021F Case Loader
- 2010 Caterpillar 14M Motor Grader
- 2006 Ford F-250 4 by 4
- 2004 New Holland Tractor Mower
- 2002 Ford F-250 4 by 4
- 2003 GMC C-8500 End Dump with Henderson Sander
- 2002 Case 521D Loader
- 2000 Sweepster Broom
- 1998 Dodge Durango SUV
- 1996 Oshkosh P2546-4 Plow and Sander
- 1994 Caterpillar 966 Loader
- 1993 Oshkosh Snow Thrower
- 1985 Kulman Sand Screen
- 1983 Oshkosh Snow Thrower

3.9.3 Aircraft Rescue and Fire Fighting

FAR Part 139, *Certification of Airports*, requires the Airport to operate under Class I, aircraft rescue and fire fighting (ARFF) Index A of these requirements as the Airport is served by scheduled air carrier aircraft with 31 or more passenger seats. The index is based on the length of air carrier aircraft serving the Airport and the number of average daily departures. Index A is the minimum requirement and includes aircraft less than 90 feet in length.

The Kenai Municipal Airport Operations Facility maintains a 24-hour fire station on the Airport north of the ATCT with two ARFF vehicles. The station location allows for a minimum of one required airport rescue and firefighting vehicle to reach the midpoint of Runway 1L-19R within three minutes from the time of an alarm and begin application of foam, dry chemical or halon as required by FAR Part 139. Additional City firefighting vehicles and apparatus are capable of meeting the four-minute response time requirement.

Airport emergency response is carried out by the City of Kenai Fire Department and Police Department as part of their City-wide duties. Emergency equipment specifically designated for Airport use only is housed in the Kenai Municipal Airport Operations Facility ARFF/SRE warm storage building and includes:

- 2010 Six-wheel Drive Oshkosh Truck Model T-3000
- 1982 Four-wheel Drive Oshkosh Truck Model T-1500
- 1995 E-One Pumper/Tanker with 3,000-gallon water tank
- 1982 E-One Triple Combination Pumper with 2,000-gallon water tank

Other City fire equipment available for emergency situations includes the following:

- 1,500 gallons per minute (gpm) Engine, 500 gallons of water, foam capabilities/40 gallons aqueous film forming foam (AFFF), extrication equipment and high pressure air bags

- 1,500 gpm Engine, 2,000 gallons of water, foam capabilities/5 gallons AFFF foam1,250 gpm Tender, 3,000 gallons water foam
- 1,500 gpm 95-foot Tower, 200 gallons water, foam capabilities/50 gallons AFFF foam, extrication equipment
- Crew Cab Forestry Brush Truck, 300 gallons water
- Two 4 by 4 Utility Trucks
- 4 by 4 Utility Jeep
- Two advanced life support (ALS) Ambulances fully-equipped

Rescue Boats Available include:

- 18-foot Rigid Hull Inflatable Rescue Boat
- 18-foot Aluminum Skiff

In addition, the City of Kenai has entered into Mutual Aid Agreements with the Central Emergency Services and the Nikiski Fire Service Area Fire Department for mutual fire protection and emergency medical services.

3.9.4 Federal Aviation Administration

The Federal Aviation Administration has three facilities at the Airport including the air traffic control tower, a field maintenance facility for the FAA-owned navigational equipment and a Flight Service Station. The FAA contract-operated air traffic control tower is located just south of the Airport Operations Facility. The Flight Service Station is located east of Willow Street across from the air traffic control tower.

The VOR is located north of the Airport along gravel-surfaced Marathon Road. This site is accessible by either Willow Street or the Kenai Spur Highway, from just east of Airport Way, to Marathon Road.

3.9.5 Fuel

Fuel storage is provided in several locations on the Airport.

Crowley Marine Services has two 12,000-gallon double-walled underground tanks for Jet A and 100 low lead fuel. There is also one above-ground Jet A 5,000-gallon tank and two 3,000-gallon 100 low lead tanks. In addition, there are two 6,000-gallon 100 low lead and one 6,000-gallon Jet A trailer mounted tanks. There are also an above-ground 6,000-gallon diesel tank and a 5,000-gallon multi-fuel tanker truck. A 24-hour credit card system is also available for aircraft refueling.

A 24-hour credit card system provides fueling services at the float plane basin facility from a 4,000 gallon above-ground fuel tank.

Kenai Aviation has one 4,000-gallon above-ground fuel tank for providing fuel to their own aircraft.

Air Supply Alaska has mobile 4,000 and 2,000-gallon trucks for providing fuel to their own aircraft.

The Civil Air Patrol has an above-ground 1,000-gallon fuel tank for fueling their own aircraft.

SOAR International Ministries and Artic Barnabas Ministries also have fuel tanks for refueling their own aircraft.

Alaska Oil Sales refuels Everts aircraft on the Airport, at the north end of the aircraft parking apron, with highway tanker trucks but operate through-the-fence from an off-Airport location.

The generator building has an above-ground double walled 500-gallon diesel tank for the standby generators.

3.9.6 Utilities

All developed airport properties are currently served with community water and sewer provided by the City of Kenai and by electric, telephone and natural gas utilities. Electricity is provided by the Homer Electric Association. Telephone service is provided by Alaska Communications Systems and natural gas is provided by Enstar Natural Gas. A 300-kilowatt backup generator system for airfield lighting and the terminal building is housed in a building immediately south of the terminal building. Underground telephone and electricity is available to all properties.

The Willow Street extension area, beyond the north end of the aircraft parking apron, is not presently served by any utilities except for electrical service for the controlled access gate to the north apron and gravel runway.

The float plane facility is served with electricity and telephone service and natural gas is available nearby.

There are good fire flows available in the general aviation area. However, fire flows to the terminal building and to the north along Willow Street are limited to 1,500 gpm due to an old 6-inch pipe segment in Airport Way and Willow Street and the dead end 8-inch water line in Willow Street.

3.9.7 Fencing

Not all of the Airport property is fenced. The perimeter/security fencing securing the aircraft movement area generally follows Marathon Road and Willow Street south to the passenger terminal area and through General Aviation Apron No. 1 to Main Street Loop. It then extends west along First Avenue and around the cemetery to Second Avenue, then north along Float Plane Road along the Airport property line. The fencing then runs north and west of the maintenance/service road to the Airport property line. It then crosses north of the float plane basin and around the runway protection zone for Runway 19R east to Marathon Road. There are controlled access gates at several locations along the fencing.

About 15,000 feet of fencing was replaced in 2007 from the Float Plane Basin Road/Fourth Avenue intersection around the west, north and east sides of the Airport to the north end of Willow Street. The remaining fence is suffering from post jacking, brush and tree intrusion and in, some locations, damage from snow removal operations.

3.10 OTHER BUILDING AREAS

The City of Kenai has a three-million gallon reserve water tank on the west side of the Airport just south of the float plane basin facility. Space has been reserved in this area for six overnight camping areas adjacent to the float plane transient parking area.

A cemetery is located on the southwest side of the Airport, just north of First Avenue, on a City-owned parcel that was provided for in the original land transfers.

In the southern part of the Airport, south of Runway 1L-19R and First Street, there are City recreational facilities, vehicular parking and two lease lots used for van storage. There are several commercial establishments along Kenai Spur Highway including stores, offices, car wash and restaurant.

The City of Kenai Animal Control Facility is located north of the FAA Flight Service Station on the east side of Willow Street. The City of Kenai Public Works maintenance shop area is located off Airport Way and just east of Willow Street.

The Alaska Regional Fire Training Center, which was built in 1997, is on property that is under the Management Authority of the City's General Fund. The property is 9.29 acres and was originally part of a larger parcel known as Baron Park Subdivision, which was approximately 40 acres in size. According to the City, in 1991, via Ordinance No. 1413-91, the City's General Fund paid to transfer Management Authority of the 40-acre parcel from the City's Airport Fund. In March 1997, a subdivision of the 40-acre parcel was completed which created the subject 9.29-acre parcel and a 30-acre parcel. The Alaska Regional Fire Training Center was constructed utilizing FAA Airport Improvement Program funding, including both entitlement and discretionary funding from the Airport and has been managed by the Airport with all liabilities and revenues generated by its use going to the benefit of the Airport Fund.

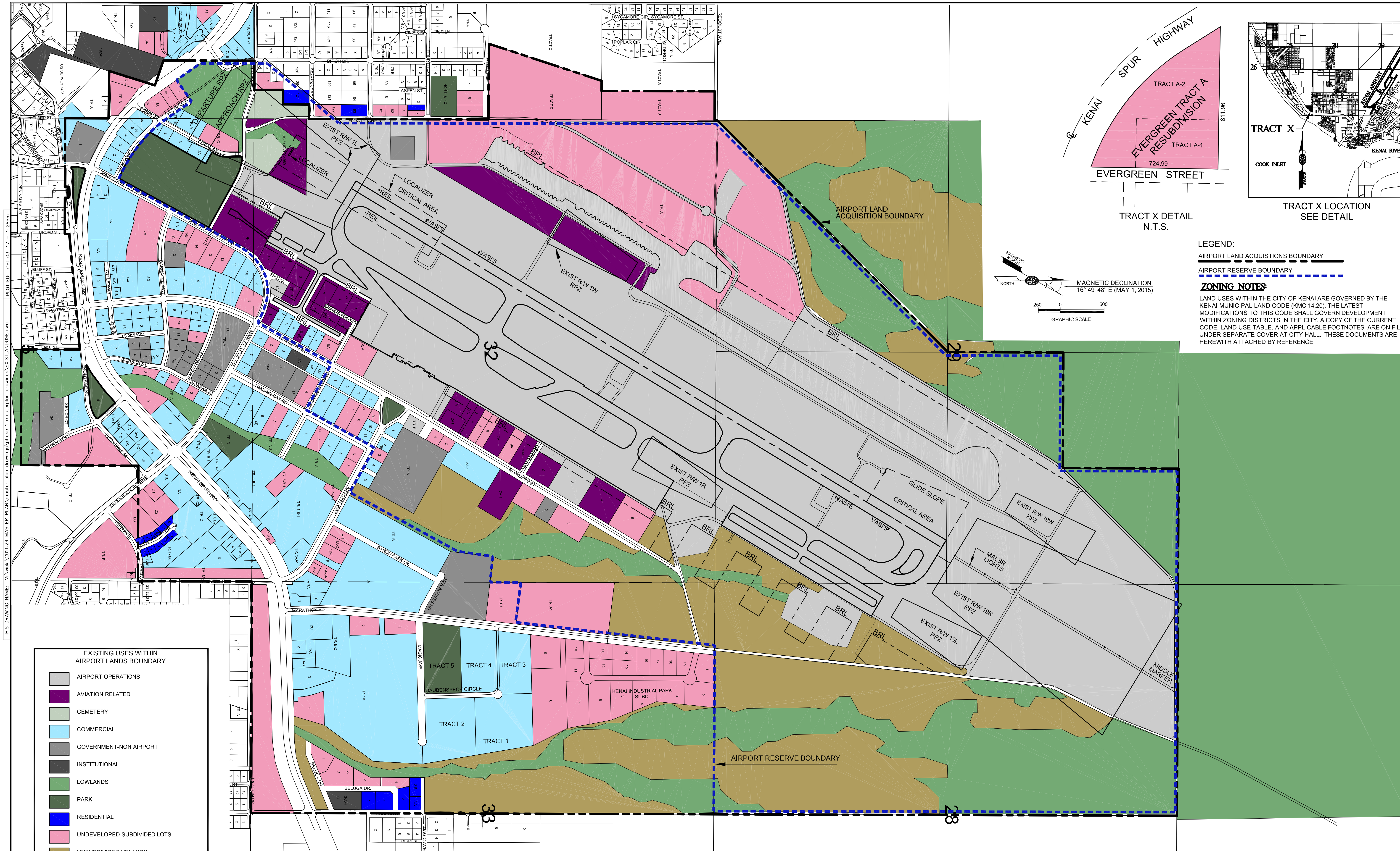
3.11 LAND USE AND ZONING

Existing land uses within the Airport Land Acquisitions Boundary, as of 2012, are illustrated on Figure 3-7. The airfield and passenger terminal area are designated as Airport Operations uses. The General Aviation Apron Subdivision No. 1 area, west of Taxiway GG and the F.B.O. Subdivision, west of Willow Street are designated primarily as Aviation Related uses with some Undeveloped Subdivided Lots. The land east of the old float plane basin is designated as Aviation Related uses. The land south, west and north of the old float plane basin is designated as Undeveloped Subdivided Lots. The lands east of Taxiway GG and west of Willow Street are currently a mix of Aviation Related, Commercial and Undeveloped Subdivided Lots uses. The lands west of Main Street Loop, south of First Avenue and north of the Kenai Spur Highway, are a mix of Park, Commercial, Undeveloped Subdivided Lots and Lowlands uses.

The north end of the Airport, outside the maintenance/service road, is either Lowlands or Unsubdivided Uplands. The land on the east side of the Airport, within the Airport Reserve Boundary, is primarily Unsubdivided Uplands and Lowlands with some Commercial, Undeveloped Subdivided Lots and Governmental Non-Airport uses.

Existing zoning districts, established by ordinance, within the Airport lands boundary, as of 2012, are illustrated on Figure 3-8. Most of the land within the Airport Reserve Boundary is currently zoned for Conservation (C) which is not compatible with airport use and future development. This includes the airfield (Runways 1L-19R and 1R-19L and most of the Water Runway 1W-19W), the passenger terminal building and aircraft parking aprons. The Conservation designation, which was applied to the Airport many years ago, has come to be viewed as an environmental conservation zone by some people over the years. This view contradicts the current use of the land for airport and aircraft operations areas and may restrict development of adjacent land within the Airport Reserve Boundary for aviation uses.

The float plane aircraft and vehicular parking area, part of the Water Runway 1W-19W, and land to the west are zoned Light Industrial (IL).



LEGEND:

AIRPORT LAND ACQUISTIONS BOUNDARY

AIRPORT RESERVE BOUNDARY

ZONING NOTES:

LAND USES WITHIN THE CITY OF KENAI ARE GOVERNED BY THE KENAI MUNICIPAL LAND CODE (KMC 14.20). THE LATEST MODIFICATIONS TO THIS CODE SHALL GOVERN DEVELOPMENT WITHIN ZONING DISTRICTS IN THE CITY. A COPY OF THE CURRENT CODE, LAND USE TABLE, AND APPLICABLE FOOTNOTES ARE ON FILE UNDER SEPARATE COVER AT CITY HALL. THESE DOCUMENTS ARE HEREWITH ATTACHED BY REFERENCE.

WINCE-CORTHELL-BRYSON
ARIES CONSULTANTS LTD.

DRAWN BY: V.C. DRAWING: EXISTLANDUSE
CHECKED BY: C.M. DATE: Oct 03,2017

KENAI MUNICIPAL AIRPORT
MASTER PLAN
EXISTING LAND USE

FIGURE 3-7

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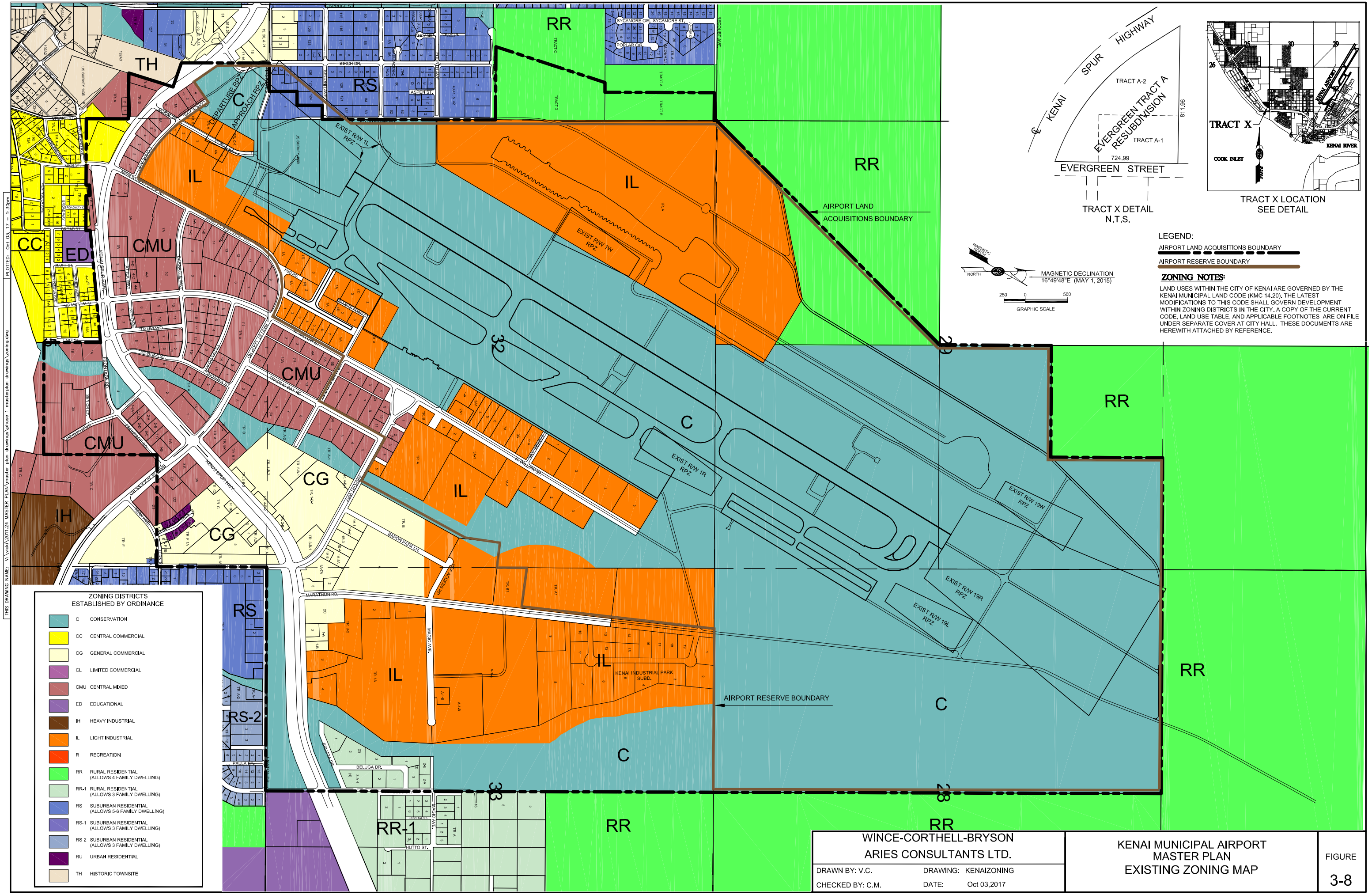

LEGEND:

AIRPORT LAND ACQUISITIONS BOUNDARY

AIRPORT RESERVE BOUNDARY

ZONING NOTES:

LAND USES WITHIN THE CITY OF KENAI ARE GOVERNED BY THE KENAI MUNICIPAL LAND CODE (KMC 14.20). THE LATEST MODIFICATIONS TO THIS CODE SHALL GOVERN DEVELOPMENT WITHIN ZONING DISTRICTS IN THE CITY. A COPY OF THE CURRENT CODE, LAND USE TABLE, AND APPLICABLE FOOTNOTES ARE ON FILE UNDER SEPARATE COVER AT CITY HALL. THESE DOCUMENTS ARE HEREWITH ATTACHED BY REFERENCE.

ZONING DISTRICTS
ESTABLISHED BY ORDINANCE

C	CONSERVATION
CC	CENTRAL COMMERCIAL
CG	GENERAL COMMERCIAL
CL	LIMITED COMMERCIAL
CMU	CENTRAL MIXED
ED	EDUCATIONAL
IH	HEAVY INDUSTRIAL
IL	LIGHT INDUSTRIAL
R	RECREATION
RR	RURAL RESIDENTIAL (ALLOWS 4 FAMILY DWELLING)
RR-1	RURAL RESIDENTIAL (ALLOWS 3 FAMILY DWELLING)
RS	SUBURBAN RESIDENTIAL (ALLOWS 5-6 FAMILY DWELLING)
RS-1	SUBURBAN RESIDENTIAL (ALLOWS 3 FAMILY DWELLING)
RS-2	SUBURBAN RESIDENTIAL (ALLOWS 3 FAMILY DWELLING)
RU	URBAN RESIDENTIAL
TH	HISTORIC TOWNSITE

WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN EXISTING ZONING MAP	FIGURE 3-8
DRAWN BY: V.C. DRAWING: KENAIZONING		
CHECKED BY: C.M. DATE: Oct 03,2017		

The General Aviation Apron and F.B.O. Subdivision are zoned Light Industrial (IL). Airport land along the Kenai Spur Highway is zoned Central Mixed (CMU). Some Airport property on the west side of the Airport, west of Float Plane Road, is zoned Rural Residential (RR). Some land north of First Avenue, within the Airport property and within the Runway 1L runway protection zone, is zoned Suburban Residential (RS).

The land ownership within, and adjacent to, the Kenai Municipal Airport is shown on Figure 3-9. Portions of the original 1,700 acres that were quitclaimed to the City of Kenai by the United States Government in 1963 are now owned by the City (Municipal), Kenai Peninsula Borough, State of Alaska or Federal governments. Other parcels are now privately-owned.

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MAGNETIC DECLINATION
16°49'48"E (MAY 1, 2015)

250 0 500
GRAPHIC SCALE

AIRPORT RESERVE BOUNDARY

AIRPORT LAND ACQUISITIONS BOUNDARY

AIRPORT RESERVE BOUNDARY
AIRPORT LAND ACQUISITIONS BOUNDARY

LAND OWNERSHIP
- KENAI MUNICIPAL AIRPORT
- MUNICIPAL
- BOROUGH
- STATE
- FEDERAL
- PRIVATE
- NATIVE
- NATIVE ALLOTMENT

WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN LAND OWNERSHIP	FIGURE 3-9
DRAWN BY: V.C. DRAWING: LAND OWNERSHIP CHECKED BY: C.M. DATE: Oct 03,2017		

Chapter 4

AIRPORT SUSTAINABILITY

4.1 INTRODUCTION

This chapter describes current airport sustainability practices at the Kenai Municipal Airport. Suggested future sustainability practices at the Airport are also identified. An Airport Recycling, Reuse and Waste Reduction Plan is also included.

Airport sustainability encompasses a wide range of practices applicable to the planning, design, building and operating of airport facilities. There are three core principles – protecting the environment, maintaining high and stable levels of economic growth and social progress that recognizes the needs of all stakeholders. The benefits of airport sustainability planning include reduced energy consumption, reduced environmental impacts (e.g., noise and air quality), reduced hazardous and solid waste generation, reduced greenhouse gas emissions, improved water quality, improved community relations and cost savings.

4.2 CITY/AIRPORT SUSTAINABILITY POLICY/MISSION STATEMENT

According to the draft 2013 Imagine Kenai 2030--Comprehensive Plan Update, one of the goals is to provide adequate public improvements and services in Kenai. One objective is to consider additional City activities and services. One of the strategies to achieve this objective is to promote recycling at City facilities and in the community.

4.3 SUSTAINABILITY CATEGORIES AT THE AIRPORT

Sustainability categories at the Airport involve socioeconomic, airport facilities and procedures, environmental resources and financial considerations.

These include administrative, storm water management, water efficiency, ground transportation, landscape and exterior design, energy efficiency and atmosphere, indoor environmental quality, facility operations, materials and resources and construction practices.

4.4 BASELINE INVENTORY AND ASSESSMENT OF SUSTAINABILITY CATEGORIES

A baseline inventory, or assessment, of each definable sustainability category at the Airport has been conducted and is presented below. In addition, when data are available for a specific category (e.g., electrical use and natural gas) this information is presented later in this section. Relevant data from the terminal building surveys and Siemens Energy Audit Report for the terminal building are included in this section.

4.4.1 Administrative

Policies, Procedures and Plans

- City/Airport follows the terms of the land transfer from the federal government. In addition, the City/Airport has formally established investment strategies and goals for the Airport and hired an investment firm to manage it.

- City receives and utilizes grants for energy-related improvements, e.g., light emitting diode (LED) street lighting and energy upgrades in buildings.
- City operates under a Master Server where all administrative staff have access to records, documents, data, etc.
- Airport and operators have approved Spill Prevention Countermeasure and Control Plans and Hazardous Waste Control Plans in place for fuel tanks and products.
- City has a Tobacco Smoke Ordinance in place.
- Airport uses ultra-low sulfur diesel (ULSD) fuel in all Airport equipment together with a regular maintenance program.

Community Outreach

The City/Airport are actively involved in community partnering and community outreach programs. These take place in several formats including:

- City Council meetings and workshops on Airport projects or items of interest or concern to the community.
- Airport Commission monthly meetings.
- Airport meetings in accordance with national and state requirements, e.g., public information meetings on Airport Master Plan and Environmental Assessment documents.
- Community outreach by Airport website, letter, mailings, press releases and advertisements, group and individual meetings on specific projects or items of concern.
- Airport has established voluntary noise abatement procedures to promote a good neighbor policy between users of the Airport and the residents of the City.
- City/Airport jointly sponsor Kenai Peninsula Annual Air Fair with the City of Soldotna for the community to visit the Airport to promote aviation safety and Military Appreciation Day and meet with Airport management, Airport tenants and users and offer Airport tours.
- City/Airport actively works with local conservation groups to implement restoration projects for airport improvements, e.g., the Kenai Watershed Forum.
- Airport actively works with other City departments, Kenai Peninsula Borough and Federal Aviation Administration (FAA) to prevent incompatible land uses and zoning from adversely impacting aircraft and airport operations.
- Airport works with Native American organizations to inform them of proposed airport projects.
- City/Airport accepts court-ordered community service patrons.
- City/Airport works with High School Job Shadow Programs.
- Airport participated in Caring for the Kenai Program “Airport Bird Control” 2010 trail period.

Human Resources

- City/Airport promotes employee sustainability education and training, including maintenance, operations, health and safety, personnel relations and provides tuition reimbursement.
- Employees subject to the Federal Motor Carrier Safety Administration (FMCSA) and City's Drug and Alcohol Testing Program.

4.4.2 Storm Water Management

Erosion and Sedimentation Controls

City/Airport implements and uses several Soil Erosion and Sedimentation Controls and Stormwater Best Management Practices (BMPs) including:

- Approved Airport and Operator Stormwater Pollution Prevention Plans (SWPPP)
- Sedimentation structures, ditches and the Float Plane Basin
- Maintained vegetation and rip rap outfalls for soil stabilization
- Oil/water separators
- Icing sand removal in the Spring

Stormwater Management, Rate and Quality
City/Airport implements and uses:
- Detention ponds, e.g., Float Plane Basin and by the Terminal Building
- Vegetated drainage ditches alongside of Runway 1L-19R
- Natural drainage to Cook Inlet to the south

Stormwater Management, Treatment
City/Airport implements Best Management Practices (BMPs) including:
- Sedimentation
- Oil/water separators

Deicing Facilities/Operations
- Airport operators use their own deicing systems without collection and treatment.

Stormwater Pollution Prevention Plan (SWPPP)
- City/Airport has developed and implemented a SWPPP
- Airport tenants have developed and implemented individual SWPPPs

4.4.3 Water Efficiency

Water Management Plan
- City Water Department operates a Class A Municipal system that is regulated by the Alaska Department of Environmental Conservation (ADEC).
- City Water Department is responsible for management of water source, storage and supply.
- City would first restrict water use by limiting City Parks and Recreation irrigation of landscaping throughout the City. Then the City would restrict contractors from obtaining water for construction use.

Innovative Wastewater Technologies
- City Sewer Department has increased the use of newer technology, i.e., variable speed motor control systems as well as upgraded monitoring and control equipment.

Water Use Reduction
- City Maintenance Department has increased use of newer technology, i.e., variable speed motor control systems as well as upgraded monitoring and control equipment.
- City Maintenance Department conducts distribution system leakage testing.
- Airport water supply and distribution is metered as well as for commercial users.

4.4.4 Ground Transportation

Public Transportation Access
- Local tourist services utilize bus/van pickup and drop off for passengers at the Airport

Alternative Fuel Vehicles
- RAVN Alaska uses propane baggage tugs and forklifts

Reduced Vehicle Idling Plan
- Airport and tenant staff shutdown/turn off ground service equipment (GSE) and other vehicles when not in use.

- City/Airport requires no construction vehicle idling longer than 20 minutes and when over 20 degrees.

Parking Capacity
- Preferred parking is provided for handicapped drivers near the terminal.
- Vehicle pay parking machine is provided at departure entrance to enhance revenue collection.

4.4.5 Landscape and Exterior Design

Landscape and Exterior Design to Reduce Heat Islands, Non Roof
- Current use of sustainable airside and landside landscape guidelines include perennial planting.
- Mow cuttings are left for mulching.
- Where practical, disturbed soils are planted and mowed to keep vegetation low.

Light Pollution Reduction
- Low level lighting is used to mitigate light pollution.

4.4.6 Energy Efficiency and Atmosphere

Systems Commissioning
- Airport has installed LED aircraft parking apron flood lighting.
- City has initiated a LED street lighting program.
- Light bulb upgrades planned for terminal building in near future.

Minimum Energy Performance
- City/Airport has recent data on baseline energy consumption (See Section 4.5).

Optimize Energy Performance
- Airport utilizes movement detectors, LED signs, energy upgrades, existing glazing and window systems, after-hours energy reduction when nonessential lights are turned off, to reduce energy consumption.
- The 2012 Energy Audit Report recommended the replacement of the lighting in the passenger terminal lobby.

Measurement and Verification
- Metering equipment is installed on electricity and gas distribution systems.

4.4.7 Indoor Environmental Quality

Minimum Indoor Air Quality Performance
- Potential Indoor Air Quality (IAQ) problems (ventilation deficiencies) have been identified in the recent mechanical survey of the Terminal Building.

Environmental Tobacco Smoke Control
- Smoking is prohibited in all areas of the passenger terminal and airport operations facility and away from the building entries.
- Designated smoking area is limited to outside the passenger terminal departure door under a canopy in partially enclosed area.

Carbon Dioxide Monitoring
- Airport has carbon dioxide (CO2) monitoring systems or sensors installed in the airport operations facility and City maintenance buildings but not yet in the passenger terminal.

Ventilation Effectiveness
- Recent mechanical survey noted ventilation deficiencies in the passenger terminal.

Indoor Chemical and Pollutant Source Control
- Airport has separate exhaust and plumbing systems.

- Airport uses nontoxic cleaning supplies, non-absorptive flooring and walls, materials that resist mold, etc.

Controllability of Systems
- Recent mechanical/electrical surveys noted the system controls in the passenger terminal are in fair to good condition although dated.

Thermal Comfort
- Airport uses thermally-efficient glass and thermal controls.

4.4.8 Facility Operations

Maintenance Equipment
- Airport performs vehicle and equipment maintenance to avoid adverse impacts (e.g., to stormwater system).
- Airport uses environmentally-friendly cleaning products.

Operations and Maintenance Program
- Airport maintains Operation and Maintenance Manuals provided for new equipment installations on projects.
- Airport has Operator Training Programs.
- Airport has developed Maintenance Plan with 200-hour maintenance schedule and daily inspections of equipment by operators when in use.

Brownfield and Contaminated Site Prevention/Redevelopment

City/Airport has implementation procedures and practices to prevent environmental contamination or to remediate/encapsulate site contamination including:
- Approved SWPPP and Hazardous Waste Control plans in place
- Ongoing remediation project in the terminal area
- Instituted solid and fluid waste containment methods and disposal protocols that are included in SWPPP and Hazardous Waste Control plans.

Exterior Air Quality
- City/Airport requires contractors to provide and implement SWPPP Best Management Practices such as water down loose materials and exposed earth during construction, prohibits the use of chemical soil stabilizers, requires spray down of truck wheel wells and use of rumble strips before exiting the site, regular street sweeping, installation of temporary fencing, dust palliatives or penetration asphalt on haul roads, hydro seed or fast growing vegetation on disturbed areas, silt separation fencing and other soil stabilization features as required.
- City/Airport prohibits the burning of landscape waste on the Airport.
- City/Airport utilizes the nearby Beacon Occupational Health and Safety Services Inc. training facility to conduct firefighting training exercises .

Noise and Acoustical Quality
- Airport has developed voluntary noise abatement procedures to minimize the impact of aircraft operations and aircraft noise on residential areas around the Airport and to promote a good neighbor policy between the users of the Airport and the residents of Kenai. The procedures are posted on the Airport website and at other locations on the Airport as well as in pilot and official aviation publications.
- Airport has a 24-hour noise response hotline whereby people can call and report what they believe to be noisy aircraft. Airport responds to each individual complaint after contacting the FAA Air Traffic Control Tower and/or FAA Flight Service Station to get

information on the aircraft and aircraft operator.

Vegetation and Wildlife Management

- City/Airport has developed and implemented a Wildlife Hazard Control Plan and recently worked with the U.S. Department of Agriculture and FAA to update the Plan.
- City/Airport uses nontoxic wildlife control methods.
- City/Airport participated in Airport Bird Control trial.
- City/Airport utilizes other methods to control wildlife when the safety of the pilots and passengers and airport users and employees may be at risk.

4.4.9 Materials and Resources

Waste Reduction

- Airport uses waste oil from equipment burned for building heat.

Office Waste Reduction

- City/Airport encourages paperless electronic submittals to minimize the use of printed materials.

Storage and Collection of Recyclables

- Airport recycles gas and oil filters, waste gasoline, motor oil, antifreeze, scrap metal, tires, electrical wiring, electronics, deicing fluid, hazardous materials, etc.
- Airport recycles batteries, light bulbs, toner cartridges, electronics, etc.

Structure and Building Reuse

Airport reuses airfield pavement and other building materials such as:

- Topsoil and sand from excavation are utilized on the projects.
- Old asphalt is ground up and recycled back into projects as sub base material.
- Salvaged materials such as signs, pipe, lights, etc. are stored and sold at auction for reuse in the area.

4.4.10 Construction Practices

Construction Scheduling and Sequencing

- City/Airport requires contractors to schedule construction work on the Airport between the hours of 7:00 a.m. and 7:00 p.m. (or 8:00 a.m. to 6:00 p.m. near residential areas) to minimize noise, vibration and other impacts on airport neighbors. Exceptions are made for on-airport related projects that do not require traffic to and from the Airport, e.g., sometimes when paving due to the longer hours of daylight.
- City/Airport requires contractors to minimize the time that bare ground is exposed to prevent erosion and air quality impacts.
- City/Airport requires contractors to minimize impacts to airport operation areas and aircraft operations.

Construction Waste Management

- City/Airport requires balanced earthwork to reduce off site hauling, potential reuse of topsoil, recycle waste, reuse project waste on future projects, on site storage of excavated material for future reuse, hazardous waste management plan, etc.

Recycled Content

- City/Airport has recycled content requirements.

Certified Wood

- City/Airport requires all building materials to be certified.

Wood Preservatives

- City/Airport has restrictions on use of certain wood preservatives as regulated by other agencies

Salvaged Materials and Resources

- City/Airport stores salvaged material and auctions off from time to time for reuse.

Construction Vehicle Emissions Reduction

- Airport uses ultra-low sulphur diesel (ULSD) vehicles.

Reduced Construction Vehicle Idling Plan

- City/Airport requires no construction vehicle idling longer than 20 minutes and when over 20 degrees

Construction Noise and Acoustical Quality

- City/Airport requires mufflers on all construction equipment.
- City/Airport has established a speed limit of 15 mph on the Airport to minimize noise and dust and accident potential.
- City/Airport requires contractors to schedule construction work on the Airport between the hours of 7:00 a.m. and 7:00 p.m. (or 8:00 a.m. to 6:00 p.m. near residential areas) to minimize noise, vibration and other impacts on airport neighbors.
- City/Airport establishing tree buffer parallel to Float Plane Road to minimize noise and visual impacts on airport neighbors.

Construction Equipment Maintenance

- City/Airport burns recycled oil as heating fuel.
- City/Airport requires contractors to contain and clean all chemical spills and dispose of clean up supplies properly.

Dust Control

- City/Airport applies BMPs for dust control.
- City/Airport requires soil stockpiles or areas under construction be covered during rainfall, high wind, and at night, if necessary.
- City/Airport requires haulers to cover truck beds, if necessary.
- City/Airport developed and implemented a construction dust control plan.
- City/Airport requires contractors to utilize non-potable water for dust control.

Construction Lighting

- City/Airport limits construction at night to minimize lighting impacts to neighbors and improve safety.
- City/Airport requests construction lighting to be focused toward earth to minimize night-sky pollution and pilot interference.

Minimize Site Disturbance During Construction

- City/Airport makes sure contractors and workers are aware of potential environmental and socially sensitive areas.

Construction Traffic Control

- City/Airport implements traffic control plan for each project.

Reduce Potable Water Use During Construction

- City/Airport requires use of nonpotable water or gray water whenever practical and feasible.

Construction Health and Safety

- City/Airport requires contractor to develop and implement a site-specific health and safety plan.

4.5 BASELINE ENERGY DATA

Data on 2009 and 2010 natural gas and electric consumption in the passenger terminal building were included in the *May 2012 Energy Audit Report* prepared for the City by Siemens and Central Alaska Engineering Company. The passenger terminal building was one of several City buildings that were audited. Proposed energy efficiency measures were also proposed in the Energy Audit. The only cost-effective energy efficient measure recommended was the replacement of the lighting in the passenger terminal lobby.

4.5.1 Electrical Consumption

Electrical consumption in the passenger terminal building amounted to 709,320 Kilowatt hours (KWh) in 2009 and 712,440 KWh in 2010. The annual energy use intensity (EUI) was 192.6 kBtu per square foot in 2009 and 192.2 kBtu per square foot in 2010. The annual electrical consumption peaked in both January 2009 and January 2010 (See Figure 4-1 from the Energy Audit Report). The lowest annual electric consumption demand was in August 2009 and June 2010. The primary electrical consumption uses were for lighting and space heating. The annual predicted electrical energy cost was $93,650.

4.5.2 Natural Gas Consumption

Natural gas consumption in the passenger terminal amounted to 50,254 therms in 2009 and 50,139 therms in 2010. The annual energy use intensity (EUI) was 192.6 kBtu per square foot in 2009 and 192.2 kBtu per square foot in 2010. The annual natural gas consumption peaked in February 2009 and January 2010. The lowest natural gas consumption occurred in August 2009 and August 2010 (See Figure 4-2 from the Energy Audit Report). The primary natural gas consumption was for spacing heating with a much smaller amount used for domestic hot water heating. The annual predicted natural gas energy cost was $35,530.

4.6 AIRPORT RECYCLING, REUSE AND WASTE REDUCTION PLAN

According to FAA Order 5100.38D *Airport Improvement Program Handbook* on Airport Improvement Program (AIP) grant eligibility, airport recycling, reuse and waste reduction plans, including the cost of a waste audit, are eligible under the FAA Modernization and Reform Act (FMRA) of 2012 (Public Law 112-95). According to Section 132 (b) of FMRA, the purpose of the recycling plan is to develop a plan for recycling and minimizing the generation of airport solid waste, consistent with applicable state and local recycling laws.

There is a need to audit solid waste from Airport-owned and occupied buildings and Airport provided public use areas. At the Kenai Municipal Airport, this would include airfield (runways and taxiways), aircraft parking aprons, Airport Passenger Terminal Area and Airport Operations Facility.

Recycling refers to any program, practice or opportunity to reduce the amount of waste disposal in a landfill. This includes the recycling, reuse and reduction of municipal solid waste (MSW) and other materials that could be legally disposed of in a 42 U.S.C. 6941-6949a landfill or equivalent State-permitted facility. This includes construction and demolition (C&D) debris, organic compostable materials, such as food

Appendix C – REAL Utility Data

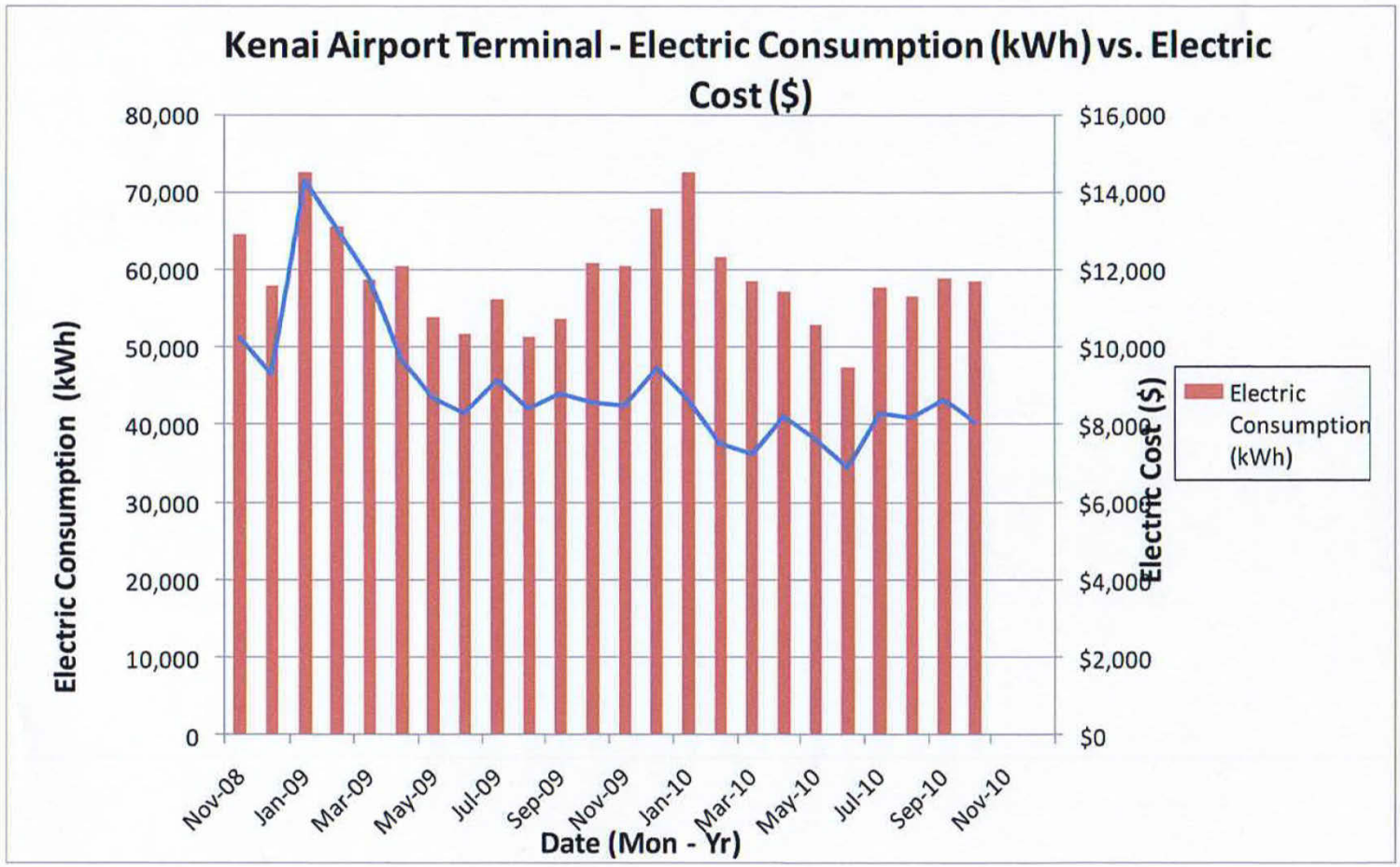

FIGURE 4-1

Appendix C – REAL Utility Data

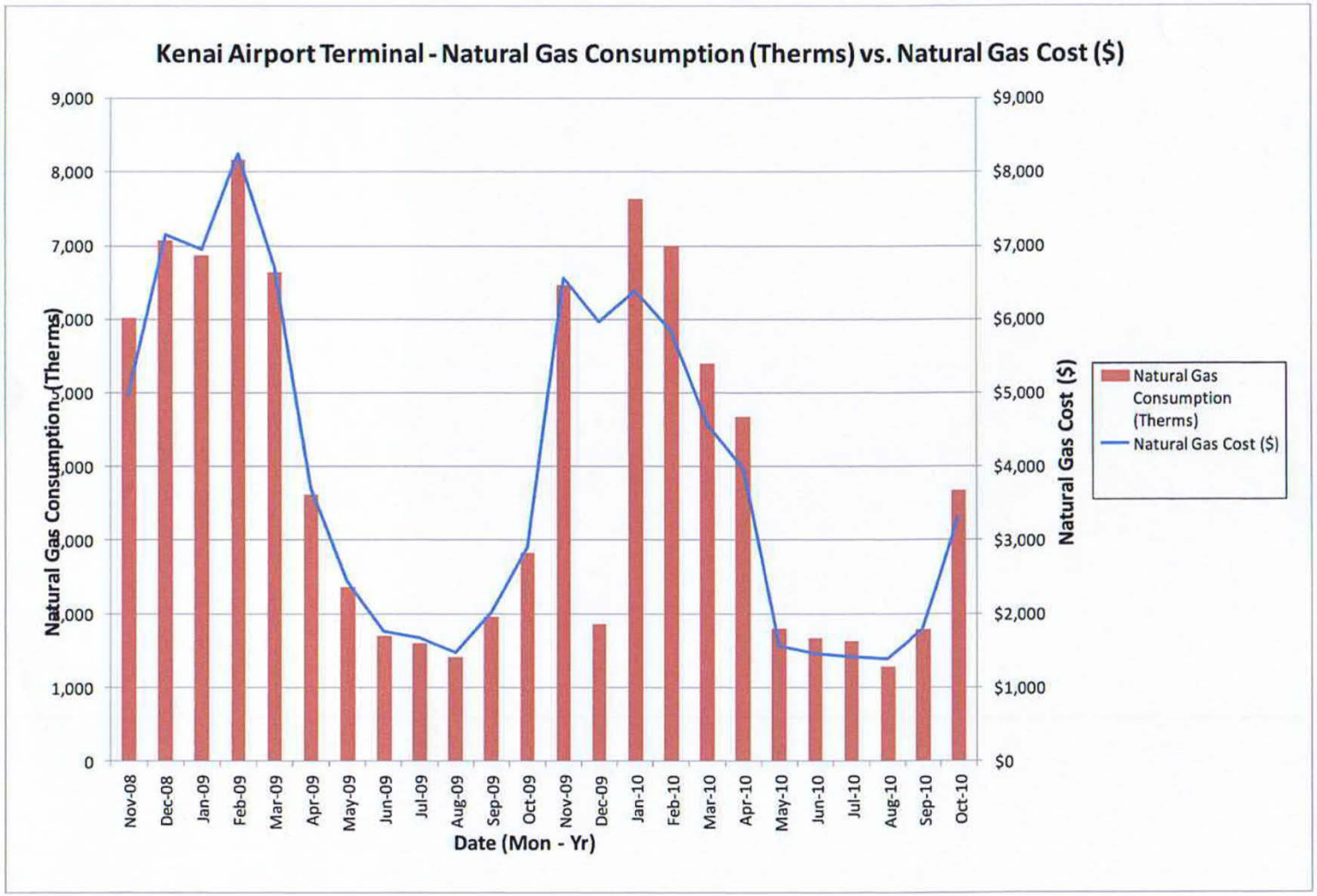

FIGURE 4-2

and yard waste, and deplaned waste. This does not include other types of solid waste such as hazardous waste, universal waste (i.e., batteries, fluorescent bulbs, electronics, etc.) or industrial waste.

According to the September 30, 2014 FAA Program Guidance Letter (PGL), *Guidance on Airport Recycling, Reuse and Waste Reduction,* this applies to:

a) Municipal Solid Waste (MSW) at airports, including, but not limited to, aluminum and steel, glass bottles and containers, plastic bottles and containers, packaging, bags, paper products and cardboard.

b) Construction and Demolition (C&D) at airports including any non-hazardous solid waste that results from land clearing, excavation or construction, demoltion, renovation, or repair of structures, roads and utilities. This includes, but is not limited to, concrete, wood, metals, soil, bricks and masonry material, asphalt, rock, stone, gravel, sand, roofing materials, drywall, carpet, plastic, pipe, rocks, earthwork, land-clearing debris, cardboard, and salvaged building components. Some C&D debris may require special handling and may be subject to special requirements, e.g., tar-impregnated roofing materials and asbestos-containing building materials.

c) Compostables at airports which are sometimes referred to as green waste and food waste. Green waste consists of tree, shrub and grass clippings, leaves, weeds, small branches, seeds, pods and similar debris generated by landscape maintenance. Food waste is food that is not consumed, or is generated during food preparation activities and discarded.

d) Deplaned waste at airports is MSW that is removed from passenger aircraft. These materials include bottles and cans, newspaper and mixed paper, plastic cups and utensils, food waste, food-soiled paper, magazines, unconsumed or surplus food and paper towels.

The Airport recycling, reuse and waste reduction plan includes the review and documentation of each of the following five elements listed in Section 133 of the FMRA.

- The feasibility of solid waste recycling at the Airport.
- Minimizing the generation of solid waste at the Airport.
- Operation and maintenance requirements.
- Review of waste management contracts, and
- The potential for cost savings or the generation of revenue.

The Airport recycling, reuse and waste reduction plan includes the following sections.

4.6.1 Facility Description and Background

Information on the number of based aircraft, aircraft operations, air taxis and other operators who serve the Airport, and available passenger and cargo data are presented earlier in Chapter 2. Information on the Airport location, general aviation classification, governance and facility layout and description are presented earlier in Chapters 1 and 3.

The existing recycling program responsibilities at the Airport include several components as follows:

- The City/Airport has direct control of waste management on the airfield (runways, taxiways and non-leased aircraft parking aprons), Airport Operations Facility and the Airport Passenger Terminal and other none leased property within the fenced and secured area of the Airport.

- The City/Airport has no direct control of waste management on tenant-leased spaces and buildings (hangars, apron areas, offices and vehicular parking) and waste generated on aircraft using their facilities other than good housekeeping provisions in the lease agreements and the Airports current Surface Water Pollution Prevention Plan and City Code Title 9; *Garbage and other Refuse*.

The Airport's current waste management program is part of the Kenai Peninsula Borough-wide waste management program. The program is covered by the following State/City/Kenai Peninsula Borough ordinances, requirements, permits, etc. The Central Peninsula Landfill (CPL) is required by the State of Alaska Department of Environmental Conservation (ADEC) regulations to have multiple permits including ADEC Solid Waste Disposal Permit (SW1A006-16), ADEC Solid Waste RD&D Permit (SWRDD002-14) and ADEC Alaska Pollutant Discharge Elimination System Multi-Sector General Permit (AKR050000-11-AAC-110). The Airport does have a paper recycling program at the Passenger Terminal and at the Airport Operations Facility.

The State of Alaska Department of Environmental Conservation (ADEC) encourages solid waste source reduction and recycling under *Alaska Statute, Chapter 46.06, Recycling and Reduction of Litter*, but has no restrictive regulations. Waste management practices at the Airport follow City *Code of Ordinances Title 9; Garbage and Other Refuse.*

Solid waste at the Passenger Terminal and Airport Operations Facility is collected by the Alaska Waste haulage company on a bi-weekly basis and disposed of at the Kenai Peninsula Borough Central Peninsula Landfill. This is a public and commercial disposal site located at Mile 98.5 on the Sterling Highway, about 12 miles away, and operated by the Kenai Peninsula Borough Solid Waste Department. Commercial haulers and the public deposit solid waste at the landfill.

The Borough's current recycling program is based on voluntary public participation and diverts as much material as possible from the landfill. The recyclables are baled and placed in a staging location for transport to market. The Kenai Peninsula Borough contracts with JCM to haul the recyclable bales to West Rock (formerly Rock Tenn) in Anchorage and the Kenai Peninsula Borough is paid for the recyclables received. Scrap metal (e.g., copper, iron and junk vehicles) is stored on site and a local scrap and salvage company periodically collects and hauls it away for marketing.

Because it is not practicable, or cost effective, to transport glass for recycling, and because there is a beneficial use locally, the Central Peninsula Landfill has utilized the glass collected for Central Peninsula Landfill road projects as a subbase and drainage material.

Additionally, construction and demolition (C&D), landscaping and wood (L&W), scrap metal and other materials not requiring burial are managed in other areas of the landfill site. Asbestos requires special

Kenai Peninsula Borough permitting and is only accepted at the Central Peninsula Landfill where it is buried in a separate cell.

Hazardous waste, e.g., fluorescent bulbs, lead acid and household batteries, used oil and latex paint, refrigerators and freezers, are accepted at the landfill. The Kenai Peninsula Borough hazardous waste management contractor ships the hazardous waste out of Alaska for management.

The estimated annual tonnage at the landfill is 48,000 tons to 58,000 tons. In fiscal year 2014, only 719 tons were recycled primarily cardboard, mixed paper, newspaper and aluminum. In 2014, the Kenai Peninsula Borough received a total of about $34,000 for recycled materials and in 2015 about $40,000 according to the Kenai Peninsula Borough.

Fees are only charged for commercial/business waste. Private individuals are not charged any fees except for waste requiring special handling, e.g., household appliances, junk vehicles, asbestos, tires, construction/demolition/land clearing debris, etc.

The infrastructure in place on the Airport that supports airport recycling only includes facilities to collect and transport paper waste products to the landfill. At present solid waste is collected in dumpsters located at the Airport Passenger Terminal, once a week, and at the Airport Operations Facility every other week. Additional dumpsters are provided when there is construction activity. At present there is no solid waste recycling, reuse and waste reduction program, with the exception of paper products, at the Airport.

In the past, Airport construction projects have stockpiled useable topsoil and sand from the Float Plane Basin expansions for use on future airport development projects. Asphalt rehabilitation projects also pulverize existing asphalts for use as crushed asphalt base courses for rehabilitation, reconstruction and new construction of pavement surfaces on the Airport.

Off-airport infrastructure includes accessible off-site recycling facilities at the Central Peninsula Landfill disposal site on the Sterling Highway and at Peninsula Scrap and Salvage located at mile post 18 on Kalifornsky Beach Road and about 5 miles from the Airport. Commodity markets for the reuse of some paper, cardboard, plastics, aluminum, metals, organic material, wood and other MSW exist in the Kenai and Anchorage areas and some is shipped out of Alaska as noted earlier.

4.6.2 Waste Audit

A waste audit has not been conducted to identify and document the source, composition and baseline quantity of MSW waste streams generated at the Airport. It is recommended that the City submit an application to FAA for an Airport Improvement Program grant to conduct a waste audit in accordance with FAA Order 5100.38D, *Airport Improvement Program Handbook*. The waste audit would include the following:

- The annual quantity and composition of MSW and C&D debris generated.
- The sources and activities that generate waste.
- The generators (owners and facilities/areas) of the various waste streams.

The Airport Operations Facility houses snow removal equipment, grass mowers and aircraft rescue and firefighting trucks. The

City performs minor maintenance at this facility such as washing vehicles, replacing chains and cutting edges on snow removal equipment. Mechanical maintenance is performed at the City Maintenance Facility located off Marathon Road. At present there is one solid waste dumpster at the Airport Operations Facility that is emptied every other week by Alaska Waste. The waste consists of office type waste, e.g., mixed paper and cardboard, kitchen waste, plastics (bottles/containers) and office cleaning materials. The waste is collected regularly by Alaska Waste and is deposited at the Central Peninsula Landfill.

Detailed maintenance, such as oil changes, takes place offsite at the large City Maintenance Facility located off Marathon Road. All waste oil generated at the Airport Operations Facility is taken to the City Maintenance Facility and is recycled in a *Blackgold* waste oil burner. All other hazardous materials associated with oil changes, lubrication, anti freezes and solvents are first put through an onsite incinerator and then into dumpsters and taken taken to the landfill. Scrap metal is collected and stored at the City Maintenance Facility and is recycled locally on an as-needed basis at Peninsula Scrap and Salvage.

4.6.3 Feasibility of Solid Waste Recycling at the Airport

A solid waste recycling program has not been established at the Airport with the exception of paper products.

There is a small local market for some recyclable commodities as noted earlier. However, logistical considerations (e.g., high transportation and labor costs) affect how some solid waste is handled and the associated feasibility. For example, some types of solid waste have to be hauled to Anchorage and others are shipped out of Alaska for recycling.

There are voluntary measures the Airport could adopt to improve the existing waste management and sustainability practices that other airports have successfully adopted, including:

- Implement a recycling program at the Airport Operations Facility that promotes proper separation and disposal of waste material.
- Coordinate with airport leaseholders and tenants to implement recycling at their facilities.
- Require sorting of recyclables on airport construction projects

Opportunities for solid waste recycling Airport-wide include developing and implementing a recycling program. Through their current contract with Alaska Waste, the City could extend current services to include separation of recyclable office materials such as mixed paper, cardboard, newspapers, and plastics from Airport leaseholders and tenants as well as other City facilities. Solid waste recycling options are also available through the following.

Scrap metal recycling is available, should the Airport or leaseholders demolish any existing structures involving large amounts of metal. The scrap metal recycling center is located at the Central Peninsula Landfill. Glass recycling and hazardous waste disposal, for airport users are also available at the Central Peninsula Landfill as noted earlier.

Recycling of earthwork and asphalt pavement materials should continue as well

the screening of Airport winter sand from stockpiled sand on the Airport.

4.6.4 Operation and Maintenance Requirements

There are currently no operation and maintenance requirements for waste handling and recycling responsibilities for solid waste at the Airport.

4.6.5 Review of Waste Management Contracts

At present all solid waste removal at the Airport is contracted to Alaska Waste to transfer all solid waste to the Central Peninsula Landfill located about 12 miles from the Airport. Alaska Waste is an optional use utility company regulated by the State of Alaska and does not have a contract with the City. At present the Airport pays $383 per month for weekly service at the Airport Terminal Building and $88 per month at the Airport Operations Facility. This cost is funded out of the Airport Fund. The current contract neither encourages, or impedes, the use of environmentally-preferred products by the Airport or Airport tenants and leaseholders.

4.6.6 Potential for Cost Savings or Generation of Revenue

There is limited potential for cost savings or revenue generation from implementing a recycling program at the City's airport facilities because of the low volume and value of solid waste and other recycling material that is generated. There is minimal revenue generated from recycling versus the high transportation and labor costs as noted earlier. Also, the use of the landfill is free for individual users. There are some charges for businesses.

4.6.7 Plan to Minimize Solid Waste Generation

The Airport has already initiated some recycling measures to minimize solid waste generation. These include the following:

- The Airport has limited recycled content requirements.
- The Airport reuses airfield pavement and other building materials such as topsoil and sand from excavations which are utilized on projects, old asphalt which is ground up and recycled back into projects as subbase material.
- The Airport salvages materials (e.g., signs, pipes, lights) which are stored and sold at auction for reuse in the area.
- The Airport recycles waste gasoline, motor oil, scrap metal, tires, electrical wiring, electronics, deicing fluids, hazardous materials, batteries, light bulbs, and toner cartridges, electronics, through the locally available disposal sites mentioned earlier.

There is no formal recycling program at the Airport through Alaska Waste. The cost of implementing a formal program with Alaska Waste would not justify a program with the waste hauler. The City/Airport could however establish an informal voluntary recycling program that includes office and shop waste reduction for the Passenger Terminal and Airport Operations Facility and work with the Airport Advisory Commission and airport tenants and leaseholders to develop a voluntary program to include the private leaseholders, hangars, offices and other facilities. This could include the following:

- Place recycling containers and additional solid waste dumpsters in strategic locations on the Airport.

- Document the Airport's program to recycle mixed paper, newspaper, cardboard, plastic bottles and cups and aluminum cans at a minimum.
- Establish objectives and develop targets to reduce the amount of waste being disposed of in the landfill.
- Add any required capital improvements to the Airport Master Plan Capital Improvement Program.
- Identify best management practices to address any conflicts with existing plans and programs, e.g., storm water pollution prevention plan.
- Identify how recycling will be implemented as part of new development projects.
- Discuss how the Airport will track and report on the recommendations to improve recycling performance.
- Identify constraints to improving recycling that are outside the Airport's control that could change in the future.
- Work to expand current Kenai Peninsula Borough community recycling events to include the Airport.
- Consider any program enhancements in the future.

Chapter 5

AIRPORT FACILITY REQUIREMENTS

5.1 INTRODUCTION

The major elements of the Airport, which were described in Chapter 3, Existing Airport Facilities, must be analyzed individually and balanced in relation to one another as part of the airport master planning process. These major elements are:

- Airport Property
- Airfield
- Airspace and Navigational Aids
- Passenger Terminal
- Air Cargo and Mail
- General Aviation
- Airport Access and Parking
- Airport Support
- Other Building Areas
- Land Use and Zoning

The existing, and presently planned, facilities must be evaluated and their capability to satisfy forecast aviation demand throughout the planning period (as set forth in Chapter 2) must be determined. From these evaluations, the requirements for any additional facilities and improvements can be established. These requirements will in turn provide the basis for the recommended Airport Master Plan.

A summary of the major requirements for facilities and improvements at the Airport through the year 2030 and when they should be in place is presented in Table 5-1. Existing facilities are also listed for purposes of comparison.

5.2 AIRPORT PROPERTY

Requirements for any land acquisition, or avigation easements, recommended for both airport protection (including runway protection zones, approach and departure areas and buffer areas) and development will be discussed in the alternatives in Chapter 6. Ideally, all land within the runway protection zones and land requiring control of obstructions should be owned by the Airport.

From a physical planning standpoint, the important consideration is to reserve sufficient land now (before the surrounding land is further developed) for the development of airport facilities capable of accommodating possible long-range air traffic requirements associated with potential demand. In addition to the requirements described in this chapter, the airport master planning process should properly provide for the reservation of sufficient land to accommodate facilities that may be required beyond the year 2030.

The purpose is to preserve the long-range development potential of the Airport, thereby guaranteeing the longevity of the Airport beyond the current planning period.

5.3 AIRFIELD

The following analyses of airfield requirements cover airport classification, airfield dimensions, runway and taxiway dimensions, airfield pavement, airfield capacity and relocation of the existing gravel runway.

Table 5-1
Existing Facilities and Future Requirements (2012-2030)

	Existing 2012	2015	2020	2025	2030
AIRFIELD					
Runway 1L-19R					
Length (feet)	7,855	7,855	7,855	7,855	8,000
Width (feet)	150	150	150	150	150
Pavement Strength (pounds)					
Single-wheel aircraft (S)	75,000	75,000	75,000	75,000	75,000
Dual-wheel aircraft (D)	150,000	150,000	150,000	150,000	150,000
Dual-tandem-wheel aircraft (2D)	250,000	250,000	250,000	250,000	250,000
Pavement Strength (PCN) Runway	59	59	59	59	59
Pavement Strength (PCN) Taxiways	48	48	48	48	48
Pavement Strength (PCN) Aprons	34	34	34	34	34
Runway 1W-19W (Waterlane)					
Length (feet)	4,600	4,600	4,600	4,600	5,000
Width (feet)	252	252	252	252	500
Runway 1R-19L (Gravel)					
Length (feet)	2,000	2,000	2,000	2,000	2,400
Width (feet)	60	60	60	60	60
Gravel Strength (pounds)					
Single-wheel aircraft	<12,500	<12,500	<12,500	<12,500	<12,500
General Aviation Areas	<12,500	<12,500	<12,500	<12,500	<12,500
PASSENGER TERMINAL					
Commuter aircraft apron positions	4	4	4	4	4
Terminal building (square feet)	25,000	25,000	25,000	25,000	25,000
GENERAL AVIATION					
Based aircraft tiedowns	100	100	100	100	100
Itinerant aircraft spaces - large aircraft	9	9	10	11	12
Itinerant aircraft spaces - small aircraft	6	6	7	8	8
Hangar spaces	15	25	35	40	50
Float pond slips	40	40	40	40	40
AIRCRAFT ACCESS AND PARKING					
Access road lanes (one-way)	2	2	2	2	2
Terminal area parking spaces					
Public	291	300	320	340	400
Employee	35	35	40	40	50
Rental	134	60	60	60	60

Source: Wince-Corthell-Bryson and Aries Consultants Ltd.

5.3.1 Airport Classification

According to Federal Aviation Administration (FAA) planning criteria, the Kenai Municipal Airport service level is classified as a Commercial Service-Primary Airport in the *National Plan of Integrated Airport Systems* with an airport role of serving short-haul air carrier routes of less than 500 miles. Commercial Service airports are defined as those airports having 2,500 or more annual enplanements. Primary Airports are defined as having 10,000 or more annual passenger enplanements.

5.3.2 Airfield Dimensions

Airfield dimensions are determined by several factors, including airport classification, type, weight, approach speed and wingspan of the most demanding aircraft. Generally, speaking, no one aircraft can be expected to be the most demanding in all of these factors. Aircraft that may be the determinant for runway length may not be the most demanding aircraft for considerations of lateral separations of the runways, taxiways and taxilanes. Further, facilities used exclusively by small general aviation aircraft may have different dimensional requirements than those facilities used by larger aircraft.

5.3.2.1 Runway Design Code and Airport Reference Code

FAA Advisory Circular (AC) 150/5300-13A, *Airport Design*, establishes a runway design code (RDC) to provide information needed to determine certain design standards that apply to a specific runway at a particular airport. The RDC has three components. The first is depicted by a letter referring to the "aircraft approach category" (AAC) in terms of approach speed. The second is a roman numeral referring to the "airplane design group" (ADG) in terms of wingspan or tail height whichever is the most restrictive. The third relates to the lowest visibility minimums approved for the specific runway.

The first two components represent the airport reference code (ARC) that signifies the airport's highest RDC.

The majority of the aircraft expected to use the Airport on a regular basis are commuter air carrier aircraft such as the de Havilland DHC-8, Beechcraft 1900C/D, Cessna 208 Caravan, Beech King Air and small general aviation aircraft of 12,500 pounds or less. The largest of these aircraft (de Havilland DHC-8) are listed under an RDC of B-III.

The Kenai Municipal Airport also serves larger aircraft such as the Boeing B-737, McDonnell Douglas DC-6, Curtiss-Wright C-46 and Lockheed L-100/L-382, especially for shipping fuel and supplies and during the fish haul season. There are over 500 annual aircraft operations by McDonnell Douglas DC-6 aircraft which are listed under RDC B-III. Some business jets listed in RDC groups ranging from C-I to D-II use, and are expected to use, the Airport on an occasional basis.

Importantly, C-130 aircraft operated by the U.S. Air Force, U.S. Coast Guard, and the Alaska Air National Guard use the Airport on a regular basis with over 500 annual aircraft operations. This activity justifies an RDC classification of C-IV for the main Runway 1L-19R. The existing main Runway 1L-19R lateral clearance dimensions meet RDC C-IV criteria and most of the taxiway dimensions, with the exception of the paved shoulder widths along Taxiway A, from Taxiway K to

Taxiway C, already meet the criteria for design Group IV and should be retained.

Therefore, on the basis of this analysis and discussions with persons knowledgeable of the Airport, the RDC for the Kenai Municipal Airport should continue to be C-IV. For those runways and taxiways to be used exclusively by small general aviation aircraft of 12,500 pounds or less, an RDC of B-II could be used.

According to FAA AC 150/5300-13A, the runway design code (RDC) also includes the approach visibility minimums of a particular runway as expressed by the runway visual range (RVR) values in feet. For Runway 1L-19R the RVR is 2,400 feet (i.e., lower than ¾ mile but not lower than ½ mile). For Runways 1W-19W and 1R-19L the RVR value is VIS (i.e., runways with visual approach use only).

5.3.2.2 Runway Length

FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides design standards and guidelines for determining recommended runway length. For airplanes of 60,000 pounds or less, curves are provided for families of airplanes. The FAA has derived these curves with data from FAA approved aircraft flight manuals and assumed loading conditions.

For existing and future air carrier and commuter air carrier aircraft expected to use Kenai Municipal Airport, the approximate runway length requirements, with maximum takeoff weights (MTOW), are as follows:

Air Carrier/Commuter Aircraft	Runway Length (feet)	MTOW (pounds)
Boeing B-737-400	6,500	140,000
McDonnell Douglas DC-6	6,500	107,000
Curtiss-Wright C-46	5,000	48,000
De Havilland DHC-8	4,500	41,000
Beechcraft 1900D	3,800	17,200
Beech King Air 90/B100	2,700	10,100
Cessna 208 Caravan	2,500	8,800
Piper PA-31 Navajo	2,500	6,200

For aircraft between 12,500 pounds and 60,000 pounds maximum gross takeoff weight, including business jet and turbojet aircraft expected to use the Airport, FAA AC 150/5325-4B has recommended runway length curves for 75 percent and 100 percent of the fleet at 60 and 90 percent useful load.

Useful load consists of passengers and baggage, cargo, and useful fuel. For Kenai Municipal Airport, the recommended runway lengths corrected for elevation (100 feet msl), temperature (64 degrees F) and runway gradient (0.10 percent) are as follows:

Percent of Fleet	Percent of Useful Load	Runway Length (feet)
75	60	4,700
75	90	5,800
100	60	5,100
100	90	7,300

This indicates that 100 percent of the fleet at 90 percent useful load can be accommodated with the existing runway length of 7,855 feet. Operations above 90 percent useful load require a significant increase in runway length and are considered not to be cost effective.

For aircraft over 60,000 pounds maximum takeoff weight, the FAA AC 150/5325-4B does not provide information on runway length for individual aircraft. However, it does include reference to manufacturers websites whose Airport Planning Manuals, for specific aircraft, can be downloaded. Some aircraft over 60,000 pounds use the Airport on an occasional basis, including charter flights, weather diversions from Anchorage and cargo, fish and fuel haul flights. According to the appropriate Airport Planning Manuals, the existing runway length is basically adequate for these operations. However, it may be prudent to consider preserving the capability to extend Runway 1L-19R to accommodate future operational advantages, e.g., designation as an air carrier alternate airport. For example, an 8,000-foot runway could be required for air carriers to designate the Airport as an alternate for up to Boeing B-747 aircraft.

According to FAA AC 150/5325-4B, the required runway length to accommodate 100 percent of small airplanes (12,500 pounds or less maximum gross takeoff weight, i.e., Beech King Air 90/B100, Piper PA 42-100) at the Kenai Municipal Airport is 3,500 feet and for small airplanes having 10 passenger seats or more (i.e., Beech Super King Air 200) is 4,000 feet. These runway lengths are corrected for elevation (100 feet msl) and temperature (75°F) at Kenai.

For aircraft that use the gravel Runway 1R-19L, the existing length of 2,000 feet has been basically satisfactory. However, according to FAA AC 150/5325-4B, the required runway length to accommodate 75 percent of small airplanes at the Airport is 2,400 feet. The existing width meets the minimum required runway width of 60 feet.

Therefore, on the basis of this analysis and discussions regarding the types of aircraft that are expected to use the runways at the Airport, the following runway lengths and widths are required:

Runway 1L-19R. The existing 7,855-foot long and 150-foot wide Runway 1L-19R is adequate to accommodate expected future aircraft use. However, the capability of an extension and/or relocation to a length of 8,000 feet should be preserved.

Runway 1R-19L. The existing 2,000-foot long and 60-foot wide parallel gravel runway is adequate to accommodate approximately 70 percent of the small general aviation aircraft fleet (i.e., RDC A-I/B-I). However, the capability of an extension and/or relocation to 2,400 feet should be preserved. A future relocated gravel runway should be at least 700 feet centerline-to-centerline from Runway 1L-19R and 500 feet from Runway 1W-19R.

5.3.2.3 Seaplane Facilities

The FAA Alaskan Region, in a joint effort with the FAA Northwest Mountain Region and Transport Canada Pacific Region, has published a manual entitled *Seaplane Facilities* as an aid in planning, designing and constructing facilities to accommodate seaplanes. This manual contains, among other pertinent information, physical dimensional criteria to be used where a RDC for land based operations is not appropriate for water based operations. These dimensional criteria should be used for the water runway and seaplane basing facilities.

For water runways, *Seaplane Facilities* provides a table of recommended minimum dimensions for a waterlane. The minimum recommended length for any waterlane is 3,500 feet. However, when correcting for mean temperature of the hottest month in accordance with the correction factors given in the manual, the recommended minimum length is 3,800 feet. The length of the existing water Runway 1W-19W is 4,600 feet. (NOTE: The early version of the FAA Alaskan Region *Seaplane Facilities Manual* included a 5,000-foot length for extensive commercial operations. However, this length is not included in the FAA AC 150/5395-1, *Seaplane Bases*.)

The publication *Seaplane Facilities* recommends a minimum width of 400 feet, whereas the existing width is only 252 feet. The recommended minimum width for a taxi channel is 125 feet with a preferred width of 150 feet. A minimum radius of 150 feet is recommended for turning basins. However, the manual states a larger area is preferred.

In a separate effort, the FAA Washington Headquarters published FAA AC 150/5395-1, *Seaplane Bases*, in 1994 to provide guidance in planning, designing, and constructing seaplane base facilities. According to FAA AC 150/5395-1, a water operating area at least 2,500 feet long by 200 feet wide is recommended, accommodating a sea lane of 2,500 feet length and 100 feet width with a 200-foot diameter turning basin at each end. No correction factor for temperature is offered. However, the advisory circular says the length of the operating area needs to be increased by 7 percent per 1,000 feet of elevation above sea level to compensate for density altitude. The recommended minimum width for a taxiway channel is 125 feet with 150 feet or larger being more desirable. A minimum radius of 200 feet is recommended for any turning basin.

The takeoff run for a given aircraft can be considerably more on water than for the same aircraft on land. Depending on configuration of the flotation gear and other factors, the increase in the water takeoff run can be as much as twice the land takeoff run. The land takeoff run for the types of aircraft expected to use the water runway can vary from as short as 600 feet to at least 2,000 feet.

Runway 1W-19W. The existing 4,600-foot long and 252-foot wide water Runway 1W-19W is generally adequate to accommodate expected future aircraft use. However, the capability of an extension to 5,000 feet should be preserved. Consideration should be given to widening the water runway to the west, ideally, up to 500 feet to provide for a parallel water taxi channel. Other considerations include the waterway excavations provide onsite borrow for other improvements at a significant cost savings as well as the mitigation of environmental issues associated with trucking in borrow material.

5.3.2.4 Airfield Capacity

The FAA technique for estimating airfield capacity (FAA AC 150/5060-5, *Airport Capacity and Delay*) was used to compute hourly capacity and annual service volumes for both the existing airfield and potential improvements evaluated as part of this study.

The hourly capacity of the airfield is defined as a measure of the maximum number of aircraft operations (landings and takeoffs) that can be accommodated on the airfield in an hour. This definition contains no assumptions regarding "acceptable" levels of

delay to aircraft; it expresses the maximum physical capability of an airfield or any one of its components under a set of specified conditions.

The hourly capacity of the airfield depends on a number of conditions including ceiling and visibility, runway use, aircraft mix, percent arrivals, percent touch-and-go, and exit taxiway locations. These conditions were analyzed on the basis of available operations data, meteorological records, and conversations with FAA Air Traffic Control Tower and Airport management personnel.

The analysis indicates that the hourly capacity of the existing main Runway 1L-19R is about 78 aircraft operations during visual flight rule (VFR) conditions and 27 aircraft operations during instrument flight rule (IFR) conditions. The peak hour operations are forecast to increase from 21 aircraft operations in 2011 to 28 aircraft operations by the year 2030.

To analyze the potential future capacity of Runway 1L-19R, one additional exit taxiway, between Taxiway E and Taxiway D (an extension of Taxiway L), was assumed. With this assumption, airfield VFR capacity is estimated to be about 93 aircraft operations per hour. At such a time as a full radar environment is provided the IFR capacity is estimated to be about 59 aircraft operations per hour. Therefore, the existing runway, with taxiway improvements, is capable of accommodating the forecast peak hour demand of 28 aircraft operations through the year 2030. The 28 aircraft operations represent 30 percent of the future capacity of 93 VFR aircraft operations per hour.

Annual service volume (ASV) is a reasonable estimate of an airport's annual capacity in terms of aircraft operations that may be used as a reference in airport planning. The ASV is the annual volume of aircraft operations beyond which the average delay to each aircraft increases rapidly with relatively small increases in aircraft operations (and beyond which the levels of service on the airfield deteriorate).

The ASV of existing Runway 1L-19R, with a full-length parallel taxiway and not considering the gravel runway or the water runway, is about 230,000 aircraft operations. By comparison, according to the forecasts presented in Table 2-8, air traffic is expected to reach a level of 55,400 aircraft operations by the year 2030 and this is only 24 percent of capacity.

Part of the air traffic demand requires a water runway, and another part of the demand is for aircraft with tundra tires requiring a gravel runway. If the 4 to 5 percent of total aircraft operations conducted on the gravel runway and water runway are removed from the forecast, then the aircraft operations as a percent of capacity is about 23 percent by 2030. At 60 percent of capacity the FAA recommends planning for new facilities to accommodate demand. Therefore, the existing Runway 1L-19R will provide adequate capacity to accommodate the forecast demand throughout the year 2030 planning period.

5.3.2.5 Taxiways

The existing taxiway system is basically adequate for the forecast demand.

Any consideration for future extension or relocation of Runway 1L-19R should include extension of the parallel taxiway at the same 600 feet centerline-to-centerline separation. Any new taxiways should be 75 feet wide.

Any consideration for future extension or relocation of gravel Runway 1R-19L should include extension of the parallel taxiway at the same 240 feet centerline-to-centerline separation. Any new taxiways for future extension or relocation of Runway 1R-19L should be 35 feet wide.

A water taxi channel should be planned west of the water Runway 1W-19W as noted earlier and at least 125 feet wide. The water runway and water taxi channel could be identified by marker buoys.

5.3.2.6 Other Airfield Dimensions

Applicable runway design and separation standards for RDC C-IV, B-III, A-III, B-II and A-I/B-I at Kenai Municipal Airport are shown in Table 5-2. All FAA runway clearance and dimensional standards for RDC C-IV are currently met for Runway 1L-19R. However Taxiway A has only 12 to 14-foot paved shoulders between Taxiways D and K rather than the recommended 25-foot wide shoulders.

Table 5-2
Runway Dimensional and Separation Standards

ITEM	RUNWAY DESIGN CODE (RDC)			
	C-IV	B-III/A-III	B-II	A-I/B-I
Runway width	150 feet	100 feet	75 feet	60 feet
Runway Shoulder width	25 feet	20 feet	10 feet	10 feet
Runway Blast Pad width	200 feet	140 feet	95 feet	80 feet
Runway Blast Pad length	200 feet	200 feet	150 feet	60 feet
Runway Safety Area width	500 feet	300 feet	150 feet	120 feet
Runway Safety Area and Object Free Area length beyond each runway end	1,000 feet	600 feet	300 feet	240 feet
Obstacle Free Zone width	400 feet	400 feet	250 feet	250 feet
Object Free Area width	800 feet	800 feet	500 feet	250 feet
Runway Centerline to Taxiway Centerline	400 feet	300 feet	240 feet	150 feet
Runway Centerline to Aircraft Parking Area	500 feet	400 feet	250 feet	125 feet
Runway Centerline to Property/Building Restriction Line	750 feet	495 feet	495 feet	370 feet

Source: FAA Advisory Circular 150/5300-13A, *Airport Design*

The BRL is recommended to be at least 750 feet from the runway centerline of the main Runway 1L-19R, 370 feet from the centerline of the gravel Runway 1R-19L and 495 feet from the centerline of the water Runway 1W-19W or 50 feet beyond the edge of the waterway, whichever is further. The location and future length of the gravel runway and the water runway are critical elements for determination of the BRL beyond the area where the minimum dimension of 750 feet for the main Runway 1L-19R governs.

The recommended minimum aircraft parking limit line is 500 feet from the centerline of the main Runway 1L-19R, 125 feet from the centerline of the gravel

Runway 1R-19L, and 250 feet from the centerline of the water Runway 1W-19W.

Applicable taxiway design and separation standards for RDC C-IV, B-III, A-III, B-II and A-I/B-I aircraft at Kenai Municipal Airport are shown in Table 5-3. The FAA design criteria require that taxiway safety areas 171 feet wide be provided for RDC C-IV or taxiway design group (TDG) 5 aircraft, as appropriate, such as the C-130. Not all taxiway object free area standards are met at the present time. At the present time the taxiway object free areas are deficient along Taxiway G and Taxiway GG.

Table 5-3
Taxiway Dimensional and Separation Standards

	RUNWAY DESIGN CODE (RDC)			
ITEM	**C-IV**	**B-III/A-III**	**B-II**	**A-I/B-I**
Taxiway Safety Area width	171 feet	118 feet	79 feet	49 feet
Taxiway Object Free Area width	259 feet	186 feet	131 feet	89 feet
Taxiway Centerline to Parallel Taxiway Centerline	215 feet	152 feet	105 feet	69 feet
Taxiway Centerline to Fixed or Movable Object	129.5 feet	93 feet	65.5 feet	44.5 feet
Taxilane Centerline to Fixed or Movable Object	112.5 feet	81 feet	57.5 feet	39.5 feet
Taxiway Wing Tip Clearance	44 feet	34 feet	26 feet	20 feet

Source: FAA Advisory Circular 150/5300-13A, *Airport Design*

FAA AC 150/5300-13A provides for using an airplane design group (ADG) for taxiways/taxilanes where undercarriage dimensions are not a factor. However, where undercarriage is a factor, a taxiway design group (TDG) system based on the overall main gear width (MGW) and the cockpit to main gear (CMG) distance is established. Applicable taxiway design groups are shown in Table 5-4.

The ADG is based on wingspan and tail height, but not undercarriage dimensions. The TDG includes the ADG and undercarriage dimensions. The FAA identifies seven different combinations of main gear width (MGW) and cockpit to main gear (CMG) distance and illustrates them in graphic form in FAA AC 150/5300-13A.

Table 5-4
Taxiway Design Group

	BASED ON TAXIWAY DESIGN GROUP (TDG)			
ITEM	**5**	**3**	**2**	**1**
Taxiway width	75 feet	50 feet	35 feet	25 feet
Taxiway Edge Safety margin[1]	15 feet	10 feet	7.5 feet	5 feet
Taxiway Shoulder width	25 feet	20 feet	10 feet	10 feet
Taxiway/Taxilane Centerline to Parallel Taxiway/Taxilane Centerline	240 feet	160 feet	69 feet	69 feet

1. The taxiway edge safety margin is the minimum acceptable distance between the outside of the airplane wheels and pavement edge.

Source: FAA Advisory Circular 150/5300-13A, *Airport Design*

5.3.3 Pavement Strength

The pavement strength is expressed as a calculated Pavement Classification Number (PCN) as discussed in Chapter 3. Aircraft with published Aircraft Classification Numbers (ACN) less than or equal to the pavement PCN may operate unrestricted. Aircraft with an ACN higher than the pavement PCN would be required to reduce their maximum load to the percentage calculated by dividing the pavement PCN by the aircraft ACN.

The calculated PCN for Runway 1L-19R, and all the associated taxiways, presented in Chapter 3, will accommodate all current and forecast design aircraft operations through the year 2030.

Taxiways F and A, between Taxiways D and K, are below the average taxiway PCN value of 48, however, they are due for rehabilitation and/or reconstruction in the near future which will increase their pavement strength to that, or more than, of the rest of the taxiway system. Taxiway J and the Terminal Apron have the lowest PCN (34) accommodating all current and forecast design aircraft and they will increase in strength with future overlays as well.

A few larger and heavier aircraft that frequent the Airport, or have requested operations information in the past, are controlled by the Airport Manager's office and will continue to be limited according to their ACN values. They include the C-17, Boeing B-737-400 and McDonnell Douglas MD-83. Examples of typical larger aircraft frequenting Kenai Municipal Airport and requesting apron operations are listed as follows:

Aircraft	ACN	PCN	Maximum Load
Boeing B-737-200	31	34	Unrestricted
Lockheed L-100/L-382	29	34	Unrestricted
Boeing B-737-400	38	34	89%
McDonnell Douglas MD-83	42	34	81%
C-17	43	34	79%

Therefore, the calculated airfield pavement strengths that are available for unlimited aircraft operations, by the ACN – PCN comparison are as follows:

Pavement Section	Pavement Classification Number (PCN)
Runway 1L-19R	59
Taxiways	
A, B, C and E	48
D	34
F, J, K and L	34
Terminal Apron	34
Taxiways G, H, GG and M	N/A (Small Aircraft <12,500 lbs.)
Runway 1R-19L	N/A (Small Aircraft <12,500 lbs.)

The next pavement overlay or reconstruction will bring the PCN up to 48 for Taxiways D, F, J, K and L and also the terminal apron.

Comparable airfield pavement strengths, by aircraft landing gear configuration and runway, are as follows:

Runway	Aircraft Maximum Gross Weight (pounds)		
	Single Wheel(S)	Dual Wheel(D)	Dual Tandem (2D)
1L-19R	75,000	150,000	250,000
1R-19L	12,500	12,500	N/A

5.3.4 Pavement Conditions

Runway 1L-19R, Taxiway A, from Taxiway F to Taxiway K, as well as Taxiways B, C and J, and the Terminal Apron have been rehabilitated and/or reconstructed within the past few years. These pavement sections are in good condition and with regular maintenance should not require rehabilitation within the planning period.

Taxiways F, G and H as well as the long term tiedown apron, are the oldest pavements on the Airport. These pavement sections are in fair to poor condition with excessive cracking, and differential frost heaving occurring along their edges and, in the case of Taxiway G, across its full section between Taxiways H and GG. These pavements should be reconstructed within the planning period.

Taxiways K, L and A, from Taxiway C to Taxiway K, are in fair condition with moderate cracking, some frost heaving along the shoulders, inadequate shoulder width, and they have the last section of the old airfield lighting system remaining on the Airport. These pavement sections should be reconstructed within the planning period.

5.3.5 Drainage

The general direction of the surface runoff on the Airport is southwesterly toward Cook Inlet. The area to the north of the Airport is low lying and is subject to standing water several times during the year.

In 1992, an Airport Drainage Study was completed for the City. This study made both specific and long-term recommendations regarding surface drainage in the Airport area. As part of the Airport Drainage Study, four major drainage systems were identified to serve the study area. They are:

- West Runway Drainage
- East Runway-Taxiway and Apron Drainage
- Passenger Terminal Area Drainage
- Ryan Creek Drainage

West Runway Drainage. The West Runway drainage collects its runoff at the north end in a series of inlet structures, and discharges to the float plane basin. The remainder of the west drainage area is graded to a ditched system, where runoff is collected and also discharged to the float plane basin. The basin provides good sedimentation and significant storage of storm water for higher duration storms and spring breakup. The area south of the float plane basin is routed by surface drainage and collected into the float plane basin discharge system and released to Cemetery Creek. This drainage has been completed over the past 20 years and will accommodate airport expansion to the west.

East Runway-Taxiway and Apron Drainage. The East Runway-Taxiway and Apron drainage ditch collects and conveys runoff from the area east of the Runway 1L-19R centerline to the existing and any future apron and taxiway expansions. An inlet and pipe system collects water at concentration points along the apron centerline and discharges to the runway ditch.

The general aviation area drainage is collected into the taxiway ditch inlet and pipe systems or is drained to the fronting streets. These pipe systems drain, untreated, to the existing west runway storm drain system near the southerly end of the runway area and discharge to Cemetery Creek.

At the time that Taxiways G and H are reconstructed the storm drain system should be retrofitted with sedimentation and oil/water separation systems.

Passenger Terminal Area Drainage. The general aviation storm drain system was extended to the north end of the passenger terminal and collects all the runoff immediately in and around the passenger terminal. The vehicular parking areas surface drain to a small inlet and pipe system and/or to Willow Street and this is routed to the sedimentation basin near the passenger terminal prior to discharge to Ryan Creek.

The drainage is good in and around the passenger terminal area. However, the reconfiguration of the vehicular parking layout some years ago creates drainage problems during winter Chinooks and breakup due to the required direction of plowing and resulting snow and ice buildup.

At the time the parking lots are reconstructed the parking layout should be reconfigured to its original layout or the drainage patterns changed to accommodate the current plowing direction.

Ryan Creek Drainage. A small portion of the apron drainage, near the passenger terminal, is collected and discharges to a sediment pond at the north end of the passenger terminal area and eventually discharges to Ryan Creek to the east.

The lease lots between the Terminal Apron and Willow Street drain to Willow Street for the most part where the drainage is poor and in need of routing to Ryan Creek as recommended in the 1992 drainage plan.

The Ryan Creek Drainage will provide drainage improvements to serve the area between the Terminal Apron and Marathon Road and north of Airport Way to the north airport boundary. The 1992 drainage plan for this area recommended collector drainages to serve both the Willow Street extension problem areas and future apron extensions to the north.

5.4 AIRSPACE AND NAVIGATIONAL AIDS

Airspace and air navigational considerations include airspace and air traffic control, approach and departure areas and obstructions, runway protection zones, and navigational and landing aids.

5.4.1 Airspace and Air Traffic Control

Existing airspace procedures and air traffic control (ATC) facilities provide for a safe, orderly, and expeditious flow of traffic. Airspace and ATC considerations do not limit the capacity of aviation activity in the Kenai area, and they are not expected to limit capacity in the future given the existing and forecast aviation demand. However,

some interactions do exist between IFR operations at Kenai Municipal and Soldotna Municipal Airports, particularly when northerly operations at Kenai and easterly operations at Soldotna are in progress. Fortunately, the incidence of this combination is relatively infrequent and ATC procedures and strategies can reduce the impact on capacity.

The airfield capacity analysis for the existing conditions assumed a non-radar environment, whereas for the future conditions a radar environment was assumed to be in place. The installation of radar can improve both VFR and IFR capacities. At the present time, approach and departure control is provided by Anchorage Air Route Traffic Control Center (ARTCC), commonly known as Center.

5.4.2 Approach/Departure Areas and Obstructions

Runway 1L-19R. The controlling obstructions that determine IFR minimums to nonprecision instrument approaches to Runway 1L are two antennas located approximately 300 feet from the physical end of the runway measured along the extended centerline. One is 3,400 feet to the northwest of the runway centerline and the other is 2,000 feet to the southeast of the runway centerline. The effect of these antennas is to increase the minimum descent altitude (MDA) for the very high frequency omnidirectional radio range/distance measuring equipment (VOR/DME) and some global positioning system (GPS) approaches to Runway 1L, because they are within the area that must be considered for obstacle clearance by the FAA when designing IFR procedures. A VOR is a very high frequency omnidirectional range and DME is distance measuring equipment. However, the localizer performance with vertical guidance (LPV) and lateral navigation/vertical navigation (LNAV/VNAV) global positioning system/wide area augmentation system (GPS/WAAS) approach procedures are not affected because the antennas are outside the area considered for obstacle clearance.

The existing FAR Part 77 34:1 approach surface slope to Runway 1L was penetrated by numerous trees within 800 feet to 2,000 feet of the end of the runway and along both sides of the extended runway centerline. (*The trees on Airport and City property were removed in 2013 but not those on private property*.) Relocating or displacing the runway threshold to avoid any penetrations of trees would require a relocation or displacement of approximately 1,200 feet to the north and would not alleviate the problem of the antennas as the controlling obstructions to the existing VOR/DME or GPS nonprecision instrument approaches. The existing 280-foot displaced threshold does not relieve the problem of the penetrating trees.

It is desirable to protect an Federal Aviation Regulations (FAR) Part 77 50:1 approach surface with the potential for future lower minimums for a localizer performance with vertical guidance (LPV) approach to Runway 1L. With the advent of GPS, new terminology and published LPV approaches, the area to be considered for obstacle clearance is reduced to an area similar to that for an instrument landing system (ILS). Such a reduced obstacle clearance area would exclude the antennas that presently dictate the high minimums for the existing VOR/DME or GPS instrument approaches. Because of the potential for lower IFR minimums to the LPV approach, e.g., (200 feet above the runway and ½-mile visibility) it is recommended that all of the trees penetrating an FAR Part 77 50:1 approach

surface related to the LPV approach to the Runway 1L displaced threshold be removed. This would preserve the potential for a lower minimums LPV approach to Runway 1L. Preservation of an FAR Part 77 50:1 approach slope to accommodate visibility minimums of less than 3/4 of a mile would include all of the existing penetrating trees, even with the 280 feet displaced threshold, and many more trees.

If an approach lighting system was installed on Runway 1L, the visibility minimums for the LPV approach could be reduced to 1/2 mile with a medium intensity approach lighting system with sequenced flashers (MALSF) and to 3/8 mile with a medium intensity approach lighting system with runway alignment indicator lights (MALSR) and 200 feet descent altitude (DA) above the runway. This assumes all the 34 to 1 penetrations were mitigated or removed.

The minimums for the existing LPV instrument approach procedure to Runway 1L are as low as 300 feet above the runway with 3/4 mile visibility. It is estimated that these weather conditions occur about 1.8 percent of the time at the Airport for winds from all directions and about 0.8 percent of the time when winds would suggest the use of Runway 1L assuming no tailwind. For precision instrument runway minimums of 200 feet above the runway with 1/2 mile visibility, it is estimated these conditions occur about 1.1 percent of the time at the Airport and about 0.5 percent of the time when wind conditions suggest the use of Runway 1L assuming no tailwind. Therefore, the Airport could be used an additional estimated 0.3 percent of the time with instrument minimums of 200 feet above the runway and 1/2 mile visibility to Runway 1L assuming no tailwind.

The FAR Part 77 50:1 existing approach surface slope to Runway 19R is free of obstructions. However, any extension or relocation of Runway 19R to the north would involve property acquisition and consideration of five power poles along Marathon Road. The poles are located at approximately 1,800 feet to 2,400 feet from the end of the runway near the eastern boundary of the existing runway protection zone.

The existing FAA Order 8260.3C *United States Standard for Terminal Instrument Procedures* (TERPS) 40:1 departure surface slope for Runway 19R is penetrated by numerous trees within 750 feet of the south end of the runway and along both sides of the runway centerline. Relocating Runway 1L-19R to avoid any penetration of the trees would require a runway relocation of at least 1,600 feet to the north. However, this would only temporarily alleviate the problem as the trees continue to grow.

The trees on Airport and City property that penetrate the TERPS 40 to 1 departure surface and FAR Part 77 approach 7 to 1 transitional surface were removed in 2013 as noted earlier. The City is working with private property owners along the west side of the Airport to access property and obtain additional avigation easements for removal of the remaining trees within the TERPS 40 to 1 departure surface and the FAR Part 77 approach 7 to 1 transitional surface. The trees off-airport will remain as obstructions until they are removed.

Runway 1W-19W. The existing FAR Part 77 20:1 approach slope to water Runway 1W-19W is penetrated by an earth obstruction at the north end.

Runway 1R-19L. The existing FAR Part 77 20:1 approach slopes to gravel Runway 1R-19L are not penetrated by any obstructions.

Terminal Area. Portions of the terminal area transient aircraft parking apron, Taxiways G, H and all of Taxiway GG are not visible from the FAA Air Traffic Control Tower. Due to the layout of General Aviation Apron No. 1, it may not be possible to change this. However, consideration should be given to removal of any visual obstructions where practical.

5.4.3 Runway Protection Zones

Ideally, all of the runway protection zones (RPZ) should be owned in fee title by the Airport. Alternatively, avigation easements with sufficient interest to allow entry and removal of obstructions for both approach and departure RPZs to comply with both FAR Part 77 and TERPS criteria, may be acceptable to meet FAA grant assurance obligations. At the present time avigation easements have been obtained from property owners of eight lots within the area of the RPZ that are outside of the existing airport boundary.

The following summarizes the RPZ visibilities and dimensions discussed below:

Visibility Runway Approaches	Aircraft to be Served	Length in Feet	Inner Width in Feet	Outer Width in Feet
Not lower than 1 mile	A/B-I, II Small	1,000	250	450
Not lower than 1 mile	A/B-I, II	1,000	500	700
Not lower than 1 mile	C and D	1,700	500	1,010
Not lower than ¾ mile	All	1,700	1,000	1,510
Lower than ¾ mile	All	2,500	1,000	1,750
Runway Departures	C-III, IV	1,700	500	1,010
Runway Departures	A/B-II, III	1,000	500	700

The approach RPZs start 200 feet beyond the physical ends of the existing paved Runway 19R, water Runway 1W-19W and gravel Runway 1R-19L. The approach RPZ for Runway 1L starts 200 feet outward from the displaced threshold. The Runway 1L-19R departure RPZs start 200 feet beyond the physical ends of Runway 1L-19R. However, the FAR Part 77 approach surfaces for non-paved runways such as the gravel Runway 1R-19L and water Runway 1W-19W, start at the end of the runway.

The existing approach and departure runway protection zones (RPZs) are generally adequate in size for forecast activity through the planning period to the year 2030. However, as noted above, the trees within the approach surface area are also within the RPZ for Runway 1L and those on Airport or City property have been removed as discussed earlier. Additionally, a larger 2,500-foot long RPZ to accommodate approaches with visibilities less than 3/4 of a mile, will be considered for Runway 1L during the evaluation of alternatives. This larger size runway protection zone will, if applied to the existing runway threshold, encompass some land uses that are considered incompatible within the

controlled activity area of the RPZ (e.g. single family residential, trailer park, car wash, stores and offices). A displaced or relocated threshold of another 600 feet to the north for Runway 1L that avoids some, if not all, of this area will also be addressed and evaluated in the alternatives.

A 2,500-foot long RPZ to accommodate instrument approaches with visibilities less than 3/4 of a mile has been established for Runway 1R and should be retained. If Runway 1R is extended or relocated to the north, the relocated runway protection zone would include up to five power poles along Marathon Road as noted earlier. The runway protection zone would also extend outside the existing airport boundary if Runway 1R is extended or relocated to the north and land acquisition or an avigation easement would be required.

A 1,700-foot long runway protection zone to accommodate visibilities not less than 3/4 of a mile has been established for Runway 1L and should be retained at a minimum. However, it would be considered prudent planning to establish a 2,500-foot long RPZ for Runway 1L to protect the potential for future approaches with visibilities of less than 3/4 of a mile.

The land within the existing airport boundary around the southern end of Runway 1L does not include all of the RPZ. If the RPZ is to be enlarged to accommodate IFR approaches with visibilities of less than 3/4 of a mile then 13 lots, or portions of lots, within an area of about 16 acres will be outside of the existing airport boundary assuming the current physical end of Runway 1L is retained.

RPZs for small A-II/B-II aircraft have been established for both ends of Runway 1W-19W and should be retained.

RPZs for small A-I/B-I aircraft (less than 12,500 pounds) have been established for both ends of the gravel Runway 1R-19L and should be retained if the runway is relocated.

5.4.4 Navigational and Landing Aids

With some modifications and upgrades, as noted below, existing navigational and landing aids are adequate through the planning period to the year 2030. Additional high intensity runway lights will be required for any extension or relocation of existing Runway 1L-19R and additional medium intensity taxiway lights will be required for any new taxiways. Any consideration for runway edge lights for the water runway or gravel runway should take into consideration the expected limited frequency of use during nighttime hours.

The City should request the FAA to evaluate the potential of reducing the landing minimums for the localizer performance with vertical guidance (LPV) approach to Runway 1L at such a time as all obstructions are removed and incompatible land uses are avoided or else by either increasing the displaced threshold or relocating the runway to the north. Installation of a MALSF or MALSR would be required on Runway 1L to reduce the landing minimums for the LPV approach to the maximum extent feasible. Depending upon the ultimate runway length selected and runway location, it may be necessary to relocate certain existing navigational aids (e.g., ILS glide slope and localizer, MALSR and VASI-4) for Runway 1L-19R.

The existing VASI-4s would have to be relocated with any further displacement of the Runway 1L landing threshold or future extension/relocation of Runway 1L-19R to the north. At such time consideration should be given to replacing the VASI-4s with an

upgraded system such as a precision approach path indicator (PAPI).

Any consideration for installation of precision approach path indicators (PAPI), or other general visual glide slope indicators (GVGI), on Runway 1R-19L should take into consideration the expected limited frequency of use during nighttime hours.

5.5 PASSENGER TERMINAL

The passenger terminal includes the aircraft parking apron and passenger terminal building.

5.5.1 Aircraft Parking Apron

The number of aircraft parking positions needed at an airport depends on the number of peak hour operations, the gate use policy of the airport, and the time required to unload and load each aircraft. The amount of time an aircraft spends in a parking position depends on the type of aircraft, the number of deplaning and enplaning passengers, the amount of baggage and cargo, and fueling and routine services required.

The area available for the passenger terminal aircraft parking apron is about 500 feet by 220 feet, comprising approximately 110,000 square feet. At the present time there is space for up to six commuter aircraft, depending upon the type of aircraft.

Based on the aviation demand forecasts presented in Chapter 2, Aviation Activity Forecasts, up to four commuter air carrier aircraft parking positions are required through the forecast period. Based on the anticipated mix of aircraft, space for two deHavilland DHC-8/Beechcraft 1900D sized aircraft and two Beechcraft 1900D/Cessna 208 Caravan/Beech King Air sized aircraft parking positions should be provided. These parking positions should continue to be sized for power-in/power-out aircraft operations. These would require an aircraft parking apron area of approximately 100,000 square feet. This includes adequate space between parked aircraft for taxiing, maneuvering and clearance.

5.5.2 Passenger Terminal Building

The passenger terminal requirements will depend on the type of air carrier service to be provided at Kenai Municipal Airport. For the purpose of this study, it is expected that the Airport will continue to be served by scheduled commuter air carrier airlines.

The gross terminal building space requirements for the year 2030 were analyzed on the basis of the air traffic forecasts and accepted planning criteria for terminal development at airports of comparable size, including FAA AC 150/5360-9, *Planning and Design of Airport Terminal Facilities at Nonhub Locations* and the Airport Cooperative Research Program Report 25, *Airport Passenger Terminal Planning and Design*. The major terminal building functional areas are evaluated in the following paragraphs.

Although there is adequate space for ticketing, check-in and operations, several issues were identified during the existing facilities surveys for consideration during the facilities requirements and alternatives analyses as listed below:

- Mitigate environmental conflicts in baggage makeup and Airport Administration areas
  - Reduce heat loss from baggage tug overhead doors
  - Provide ventilation
  - Reduce noise

- Provide for warm and cold baggage storage space
- Provide for consolidated Airport Administration space
- Provide protection of electrical and communication panels
- Rehabilitate fire sprinkler system
- Provide space for expanding mechanical and electrical rooms
- Provide visual information system for the hearing impaired
- Reroof terminal building
- Install terminal area energy upgrades
- Expand secure passenger gate area
- Provide airline equipment shelter space
- Provide for safe and adequate maneuvering of baggage tugs in and out of the baggage makeup area
  - Vehicle, pedestrian and baggage tug line-of-sight at north end
  - Wider overhead doors and/or good jamb protection
- Provide wireless computer service and kiosks
- Designate pet release and exercise area
- Provide outdoor enclosed smoking area

5.5.2.1 Airline Ticketing, Check-in and Operations

The currently available ticket counter is about 65 feet in length compared to an estimated 30 feet of ticket counter required to accommodate forecast demand through 2030. The queuing and circulation space within the existing ticket/check-in lobby is 30 feet in depth, which allows adequate space for passenger circulation.

Approximately 2,900 square feet of space is now available for airline offices and operations and outbound baggage makeup behind the ticket counter, compared to an estimated 2,400 square feet required to accommodate the 2030 forecast level of passengers.

5.5.2.2 Baggage Claim

There is a 1,200-square foot baggage claim area and a 1,000-square foot baggage breakdown area at the center of the terminal with a 25-foot oval baggage claim device. Part of this area is railed off for passenger queuing space. The present baggage claim area will be adequate to handle the forecast passenger levels through 2030.

5.5.2.3 Departure Gate and Public Circulation

There is one passenger departure gate in the terminal building with an area of 900 square feet to the south of the ticketing/check-in area and can accommodate about 70 passengers. This area should be adequate to handle the forecast passenger levels. The area could be expanded to the east towards the lobby area by up to 20 feet to accommodate diverted aircraft and passenger waiting to provide an area of 1,400 square feet for up to 120 passengers and, if required, one passenger security screening station that would be adequate to handle the forecast demand.

The present public waiting and lobby areas (3,200 square feet) are located adjacent to the departure gate and baggage claim areas and east of the ticketing/check-in area and are adequate to handle the forecast passenger levels through 2030.

5.5.2.4 Concessions

The ground floor restaurant and support facilities include about 2,000 square feet of space. Consideration should be given to expanding the restaurant area to provide separate space for groups, e.g., for meetings.

The second floor lounge and support facilities include about 1,000 square feet of space. In addition, the former gift shop (now real estate office), arcade and display areas include more than 1,400 square feet of space. These concession areas are generally adequate to accommodate current and forecast passenger levels through the year 2030.

There are five tenant spaces located along the east side of the terminal building in the baggage claim area. However, there are presently only two rental car booths in use, other users (real estate office) and two vacant booths in this area of 700 square feet. The rental car booths have 12 to 15-foot counters and are 10 feet in depth, and are adequate to accommodate forecast passenger levels. Until the vacant spaces are requested, they could be rented for business kiosks, wireless computer access, art displays or other rental uses.

At present, there is a total of over 5,000 square feet available for use by various concessions. This amount of concession space is adequate for the various concessions (food and beverage, rental car and other uses) to serve the forecast passenger levels, except for the restaurant needs noted earlier.

5.5.2.5 Airport and Building Services

An area of over 2,000 square feet in the terminal is currently used for airport and building services including airport management offices, restrooms, building mechanical and electrical systems, and storage rooms. This area is generally adequate to accommodate the 2030 requirements for these services. However, there is a separation of the space used for airport administration functions and this space is inefficiently located in the terminal building. In addition, there is a need for additional utility room space to address code issues identified in the terminal building surveys. A fenced pet release/exercise area is also needed near the passenger terminal for passengers traveling with pets.

5.5.2.6 Summary

The total passenger terminal building space of 25,000 square feet appears adequate to accommodate the demand forecast through 2030. However, some remodeling and reassignment of existing spaces, as well as minor expansion, may be required for a more efficient operation and to facilitate the improvements and amenities noted above.

These building space estimates provide the basis for evaluating a long-range plan for the passenger terminal to accommodate future requirements. The important consideration is that the terminal building plan provide sufficient flexibility to permit adjustment to specific space requests of terminal users, depending on the level and type of services to be provided.

5.6 AIR CARGO AND MAIL

The low volumes of air cargo forecast (except for bulk fuel shipments) indicates that cargo will continue to be accommodated primarily either as belly cargo on passenger aircraft or on small aircraft providing small package services from other locations on the Airport as currently occurs.

At present the small package/air cargo service operations are located in several areas on the Airport. Consideration should be given to consolidating small package/air cargo and freight forwarders, including cargo buildings, aircraft parking apron, and truck and vehicular parking areas in one area on the Airport, preferably in the area north

of the passenger terminal. Either of the buildings located in this area could be expanded within existing lease lots to handle future air cargo requirements. There are also several vacant lease lots in this F.B.O. Subdivision area that could be developed.

There is currently up to 560,000 square feet of aircraft parking apron space in use or available north of the helipad that is north of the passenger terminal except for 80,000 square feet in front of the Airport Operations Facility building. Some of this aircraft parking apron space is leased by the adjacent lease lot holders and not available for other users. Consolidation of the air cargo activities would also minimize the distance traveled by service vehicles and trucks, either on the apron between the passenger and cargo terminals and aircraft parking positions, or, by exiting the Airport to Willow Street, on the road to the existing cargo facilities at the south end of the Airport.

Other large all-cargo McDonnell Douglas DC-6, Curtiss-Wright C-46 and Lockheed C-130 type aircraft use the apron area north of the FAA Air Traffic Control Tower for refueling, loading bulk fuel and supplies for outlying areas, for transferring fish from aircraft to surface transportation to nearby canneries, fire suppression, air carrier diversions and for military aircraft at different times of the year. These apron areas are permitted, in 15,000 square foot spaces, to accommodate the fish haul and other activity, and the City would like to continue to use this area for these and other activities.

Additional apron space will be required as currently vacant and new lease lots are developed north of the passenger terminal in order to provide new or replacement aircraft parking apron and to provide airfield and aircraft parking apron access to vacant and new lease lots as they are developed.

Seasonal parking for large aircraft is also currently provided on the gravel apron area north of the paved apron and Taxiway L. However, this area would not be available if additional apron and leasehold improvements are developed in this area in the future. Therefore, apron space will be required to replace the seasonal parking.

5.7 GENERAL AVIATION

General aviation includes those aviation facilities not required for air carrier or commuter/air taxi activities.

5.7.1 Commercial and Noncommercial Aviation

Commercial aviation activities are defined as those which provide aviation products and services for the benefit of the general public. Several commercial aviation/fixed base operators provide a range of general aviation services at the Airport including hangars and tiedowns, maintenance and fueling. Currently there is no flight instruction offered at the Airport. In addition, there are several noncommercial aviation leaseholds (leaseholders which provide for the basing and servicing of the aircraft of an individual, private organization, or corporation solely for its own benefit and not for the public) on the Airport.

Based on discussions with the City, there appears to be little demand or requirement for commercial aviation expansion at this time. However, sufficient area should be provided for future expansion as well as for potential new operators. There are currently two lease lots totaling about 2 acres available for lease on General Aviation

Apron No. 1 and No. 5. A portion of the area designated as General Aviation Apron No. 2, between Granite Point Street, Willow Street and the transient aircraft parking apron, totaling about 5 acres, is also available for lease.

Additional lots totaling about 3 acres are available for lease in the F.B.O. Subdivision along Willow Street north of the passenger terminal and south of the FAA Air Traffic Control Tower. The lots have aircraft parking apron access and are sized to provide adequate vehicular parking space for employees and patrons. Water, sewer and other utility services are provided to these areas. However, the lease lots available in the F.B.O. Subdivision have a 100-foot to 150-foot frontage along the aircraft parking apron which could be considered marginal for some types of uses and aircraft. One additional lot, approximately 4 acres with 400 feet of apron frontage, is currently available north of the Airport Operations Facility and State of Alaska, Department of National Resources, Division of Forestry lease lot. Flexibility should be maintained in leasing these areas as the actual need and types of uses become known (e.g. cargo or general aviation).

The City has received requests for lease lots, and hangar space, adjacent to the float plane basin. A near-term and long-term development plan for the float plane basin has been developed by the City.

5.7.2 Aircraft Parking and Storage

On the basis of the general aviation forecasts presented in Chapter 2, it is estimated space will be required for about 100 based aircraft by the year 2030. At present most of the general aviation aircraft are parked on tiedowns as there are limited hangar spaces available. Existing hangars are on individual lease lots and are used primarily for the storage and maintenance of the leaseholders' own aircraft. In the future it would be desirable to provide space for development of public-use storage hangars (either conventional or T-hangars) at the Airport.

The City maintains 40 permanent long-term tiedown spaces on a 130,000 square foot apron to the southwest of General Aviation Apron No. 1. An estimated additional 60 tiedown spaces are available on individual lease lots. Therefore, sufficient tiedown spaces are currently available to serve the aircraft basing demand through the forecast period particularly if some based aircraft are able to relocate to hangars in the future.

There are limited hangar facilities at the Airport and no public-use hangars are available for lease. There has been an increasing demand for hangar space at airports in recent years. Actual demand for hangar space could vary depending on such factors as availability, cost, City policy towards providing such facilities, and who develops the hangars (City or private). For purposes of this analysis it is assumed that up to 50 percent of the total based aircraft (50) could be accommodated in T-hangars or conventional hangars on the Airport. It is expected that up to 15 aircraft will continue to be accommodated in hangars on individual lease lots. By 2030, to accommodate up to 35 additional aircraft in individual hangars would require approximately 5 acres of land. A 3-acre area adjacent to, and east of, the float plane parking area has been designed and programmed for up to 23 individual hangar lots. (Recently, 12 T-hangar units have been developed on the General Aviation Apron.)

In addition to the based aircraft demand, space should be provided for up to 20

transient aircraft parking spaces. Transient aircraft parking will be required at several locations on the Airport. It is estimated that an additional five aircraft parking spaces will be required to supplement the existing 15-space itinerant tiedown apron at the south end of the passenger terminal apron. This apron is used for smaller propeller and business jet aircraft, and the requirement for additional tiedown spaces, including busjets, is particularly important during peak periods in the summer months.

Medevac aircraft and helicopters operate from the aircraft parking apron in front of the Airport Operations Facility.

There are 10 aircraft parking slips reserved for itinerant aircraft at the float pond facility that appear to be adequate for future float pond facilities. The 30 based aircraft parking slips at the float pond facility also appear to be adequate for the forecast period. Additional slips could be provided to the west of the float plane taxi channel (old float pond) or west of the new water runway to the north.

Aircraft parking spaces should continue to be provided alongside the existing or relocated gravel runway for those aircraft with oversized tires and tail draggers that use the gravel runway.

5.7.3 Helicopters

At present helicopters land and take off on Runway 1L-19R or near the intersection of Taxiways G and H and hover taxi to the two loading and unloading helipads marked on the aircraft parking apron north of the passenger terminal or elsewhere on the Airport including the SOAR International Ministries lease lot south of the passenger terminal. The helipad by the Airport Operations Facility is used for medevac operations.

In the future, helicopters may require alternate areas to land and on take off from, and also to park on, that are sufficiently protected from aircraft blast and conveniently located to other airport facilities. According to FAA AC 150/5390-2C, *Heliport Design*, for general aviation helicopters, this includes a touchdown and lift off area (TLOF) that can operate independent of the fixed-wing aircraft activity on the runways and in the surrounding airspace. The minimum length and width of the TLOF area would be the rotor diameter (RD) of the design helicopter. For example, for a Bell Jet Ranger the RD would be 37 feet. A final approach and take off area (FATO) containing the TLOF would have a minimum dimension of 1.5 times the overall length of the design helicopter. A safety area (not less than 20 feet) would also be required outside the FATO. A 280-foot heliport protection zone would also need to be provided around the FATO area. The VFR approach/departure surface would slope upward at 8 to 1 for a distance of 4,000 feet and a transitional surface would extend outward at 2 to 1. These dimensions would have to be shown on the Airport Layout Plan and approved by FAA.

Space should be provided near any new TLOF area for helicopter parking facilities with 50-foot spacing (1-1/3 RD) between helipads and 74-foot helicopter taxi route (2RD for a Bell Jet Ranger) to minimize the amount of hover taxiing required for taxi through parking positions. The helicopter parking positions should be located to provide at least 1/3 RD, and a minimum of 10 feet, between the main rotor circle and any object, building, safety area or other parking position and 1/3 RD from the edge

of the taxi route width. The size of the parking position should be no less than the RD of the largest helicopter to be accommodated.

5.8 AIRPORT ACCESS AND PARKING

This section describes the Airport public access roads, vehicle parking facilities and on-airport service road requirements.

5.8.1 Access Roads

It is assumed that vehicular traffic volumes will increase approximately in proportion to forecast air traffic activity.

The primary airport access roads, Airport Way, Main Street Loop and Willow Street, are adequate to handle the forecast Airport traffic volumes. An extension of Willow Street will be required to serve any new development at the north end of the Airport. The access road off Float Plane Road at Fourth Avenue on the west side of the Airport is adequate to serve the float pond facility.

Based on discussions with Airport management, the curbside roadway in front of the passenger terminal building is congested at times. In addition, as forecast traffic increases in the future, vehicles may be double parked at the curbside making it difficult for traffic to exit the terminal area using the two lanes available. At present there is one no parking lane providing eight to nine spaces for loading/unloading passengers along the curbside on the west side. A center lane is provided for traffic circulation and there is one taxi parking lane providing three spaces along the east side of the roadway.

Additional public loading/unloading parking will be required during the planning period and alternatives may include reconfiguration of the terminal curbside frontage lanes with parking lot reconfigurations.

5.8.2 Vehicle Parking Facilities

There are currently 460 vehicular parking spaces available in the passenger terminal area. Based on the forecasts there will be an estimated requirement for a total of 510 parking spaces in the passenger terminal area through the 2030 planning period to accommodate public, employee and rental car parking.

In the passenger terminal area, public parking space requirements are forecast to increase from 291 spaces to approximately 400 spaces by 2030 to accommodate both short-term and long-term parking requirements. Up to 60 spaces should be provided in the passenger terminal area for ready and return rental cars. Space for up to 50 employee vehicles in the passenger terminal area should also be provided by 2030.

The long-term parking lot is full at peak times during holiday periods. Additional overflow long-term parking space in the terminal area is provided east of Willow Street and north of Airport Way. The short-term and rental car parking lots are currently operating at less than capacity. The long-term and employee parking lot, north of the passenger terminal, operates close to capacity. Alternatives will consider reassignment/layout of existing parking areas as well as any required expansion. Consideration should also be given to installing electrical plug-ins at the long-term parking spaces.

Sufficient area should be provided for vehicular parking at the general aviation areas. On the basis of one parking space for two based aircraft, a total of 50 parking spaces are required near tiedown and hangar areas.

Vehicular parking spaces should also continue to be provided within each fixed base operator/commercial aviation lease lot (as a condition of the lease) for use by visitors and employees.

5.8.3 Airport Service Roads

At present there is an airfield/apron service road east of Taxiway J and along the west side of the aircraft parking apron. It extends north from the general aviation itinerant aircraft parking apron to the north end of the apron near Taxiway L. Several airport operators have commented that it does not adequately serve the aviation activities at the south end of the Airport causing some airport vehicular traffic to use City streets. Potential improvements and/or realignment of the apron service road will be addressed in the alternatives.

There is a maintenance/perimeter road within the boundary of the airport property. A rescue and firefighting road is required to access the runway safety areas and runway protection zones. This is provided at the north end of the Airport and connects to the maintenance/perimeter road as well as a paved access road across the airfield from the Airport Operations Facility to the float plane basin. At the south end of the Airport, a service road extends from the long-term aircraft tiedown access road to connect to the existing road by the localizer.

5.9 AIRPORT SUPPORT

Airport support facilities include the requirements of Airport Administration, Airport maintenance, aircraft rescue and fire fighting, Federal Aviation Administration, fuel storage and dispensing, aircraft wash pad, deicing station, utilities and fencing.

5.9.1 Airport Administration

The Airport administration office is located on the ground floor of the passenger terminal building. The need for consolidation and/or additional space is discussed earlier in this chapter.

5.9.2 Airport Maintenance

Maintenance materials, equipment and shop space designated for airport maintenance use is housed in 10,000 square feet of the 19,600 square foot Airport Operations Facility located directly north of the FAA Air Traffic Control Tower. The facility is located on a 3.6-acre lot, with 400 feet of apron frontage, and also houses the aircraft rescue and fire fighting equipment.

There is heated storage area in the Airport Operations Facility for approximately 150 cubic yards of sand and 60 tons of urea for pavement sanding and deicing providing adequate storage of materials through the planning period.

About 1,500 cubic yards of sand and 25 tons of urea are used annually requiring the stockpiling of about 1,500 cubic yards of sand each year. The sand is presently being screened on site and stockpiled on the north end of the apron however this will require another location when the adjacent lease lot is developed.

5.9.3 Aircraft Rescue and Fire Fighting

Emergency aircraft rescue and fire fighting (ARFF) equipment specifically designated only for Airport use are housed in 3,000 square feet of the Airport Operations Facility. ARFF equipment should be centrally located on the Airport to meet the three-minute response time (from time of the alarm) to the midpoint of the farthest runway serving air carrier aircraft or reach any other specified point of comparable distance on the aircraft movement area which is available to air carriers, and begin dispensing firefighting agents. The ARFF facility should have direct access to the terminal area apron without crossing the active runway; direct access to the runways, taxiways, and aircraft parking areas; maximum visibility of all aircraft movement areas, and the ability to expand the facility. The Airport Operations Facility, north of the FAA air traffic control tower, satisfies these requirements as noted above.

5.9.4 Federal Aviation Administration

The Federal Aviation Administration (FAA) has three facilities at the Airport including the Air Traffic Control Tower, the Flight Service Station, and a field maintenance facility for the FAA-owned navigational equipment. These facilities are adequately sized to carry out their functions through the 2030 planning period.

5.9.5 Fuel

Fuel storage is provided in several locations on the Airport by several operators as described in Chapter 3. Based on the existing fueling capacity, and the number of tenants providing for their own fueling requirements, additional fuel storage will not be required.

5.9.6 Aircraft Wash Pad and Deicing Station

There is no aircraft wash pad (pollution abatement facility) facility at the Airport. Space should be provided on the Airport for an aircraft wash pad (pollution abatement facility), at least 60 feet by 60 feet, with appropriate water and drainage systems to serve future needs. The wash pad could be designed to function as a deicing station in the winter.

RAVN Alaska and Grant Aviation deice their aircraft just outside their respective apron parking areas in front of the passenger terminal. Everts, FedEx, and UPS deice their own aircraft on the terminal apron. The deicing fluids drain off the apron to the airport storm drain systems that eventually discharge to Ryan Creek and the Kenai River. At present general aviation aircraft deicing is done by aircraft owners on their lease lots. Deicing in the general aviation area is, for the most part, runoff to unpaved areas and soaks into the ground.

According to EPA -821-F-12-002, *Effluent Guidelines for Airport Deicing Discharges*, dated April 2012, deicing fluid discharges to receiving waters create an excessively high ammonia content and chemical oxygen demand in the water that is harmful to aquatic life forms. EPA is developing regulations for the collection and treatment of those fluids prior to discharge.

According to these EPA Guidelines, "New airports with 10,000 annual departures located in cold climate zones are required to collect 60 percent of aircraft deicing fluids after deicing. Airports that discharge the collected deicing fluids directly to waters of the United States must meet numeric discharge requirements for chemical oxygen demand. The rule does not establish

uniform, national requirements for aircraft deicing discharges at existing airports, however, such requirements will continue to be established in general permits, or in individual permits on a site-specific, best professional judgment basis."

It should also be noted that all airports with 1,000 or more annual jet aircraft departures (nonpropeller) will be required to discontinue the use of urea containing pavement deicers or meet numeric effluent limitations for ammonia. While this requirement does not affect Kenai at this time it may in the future.

An area should be reserved for a centralized deicing facility, with appropriate environmental controls. (See FAA AC 150/5300-14B, *Design Aircraft Deicing Facilities*). In addition the Airport should begin a storm drainage discharge monitoring program to document effluent quality for future permit consideration.

5.9.7 Utilities

Water, sewer, telephone, natural gas and electric service are provided to all lease lots adjacent to Willow Street north of the terminal area. Any new development to the north and east can be supplied with an extension of this infrastructure.

Water system modeling, based on fire flow tests and system parameters, provided by the City Fire Department and Water utility, indicate that the existing fire flow available to the ends of Willow Street and Marathon Road are limited. Table 5-5 provides the modeled fire flows available to the existing and future ends of Willow Street and Marathon Road at current operating and fire flow pressures, with and without the two water mains looped.

Table 5-5
Fire Flows

Fire Flow Location	Condition	Pressure Range			
		50 PSI Static to 20 PSI Residual		80 PSI Static to 20 PSI Residual	
		Fire Flow at Average Demand (GPM)	Fire Flow at Max Day Demand (GPM)	Fire Flow at Average Demand (GPM)	Fire Flow at Max Day Demand (GPM)
North End Marathon Road Extension and Industrial Park	Not looped	798	683	1,123	994
	With first loop	1,318	1,039	1,811	1,526
	With second loop	1,420	1,109	1,944	1,627
North End of Willow Street	Not looped	761	665	1,092	987
	With first loop	1,106	896	1,537	1,319
	With second loop	1,428	1,115	1,955	1,637
Marathon Road and Willow Street Extended to Connection	Looped	1,285	1,044	1,829	1,591

Source: Wince-Corthell-Bryson

The modeling was performed under a winter average demand of 625 gallons per minute (GPM) and a maximum demand of 1,562 GPM. Average summer time demands would further stress the system and reduce available fire flows.

The Willow Street water main is restricted by six inch pipe segments in Willow Street and a portion of Airport Way. Both Willow Street and Marathon Road fire flows are further restricted by being dead end lines.

Fire flows can be quite demanding particularly for the passenger terminal, freight terminals, aircraft hangars and other industrial/commercial facilities such as those planned along Willow Street and Marathon Road and the City water utility should consider improvements to increase available flow to those areas.

Any development planned to the north, along Willow Street and Marathon Road, should at least include street cross links and/or utility easements for efficient development of the property and looping the water mains to increase fire flows.

Water and sewer should be extended to the terminal area off the Granite Point Street mains to increase fire flow to the terminal area and provide deeper sewer service to alleviate the freezing problems experienced at the passenger terminal in the past.

Future development to the west of Runway 1L-19R and adjacent to the float plane facility will be served by the municipal water and sewer systems presently installed near the south end of the float plane facility.

5.9.8 Fencing

The perimeter/security fencing may require relocation or realignment to accommodate future airport development and land acquisition. Improvements will be required around the north end of the Airport for any extension or relocation of Runway 1L-19R to the north and to enclose any future relocation or realignment of the maintenance/perimeter road around the north and west sides of the Airport. Modifications to the fencing will also be required in the terminal area on the east side of the Airport as additional lease lots and other facilities are developed.

Segments of the fencing around the south end of the Airport are difficult to maintain and in some areas have been damaged by snow removal operations and will require some replacement over the planning period.

5.10 OTHER BUILDING AREAS

The cemetery, three million gallon reserve water tank and the six overnight camping areas are located on the southwest side of the Airport. It is assumed the City will continue to lease lots for nonaviation uses that are within the Airport boundary and are not required for future aviation-related facilities and services.

5.11 LAND USE AND ZONING

The 1963 Quitclaim Deed for the Airport states that “the land, buildings, structures, improvements…..shall be used for public airport purposes for the use and benefit of the public.” Airport lands are identified on the Airport Master Plan and Airport Layout Plan (ALP). Title 21 of the Kenai Municipal Code provides guidance for lease, sale and use of airport-owned properties to ensure there is an adequate supply of land to support operation of the Airport and to reduce incompatible uses in the airport proper. The Conservation (C) zoning of much of the Airport lands, especially within

the Airport Reserve Boundary, does not support this requirement and is not consistent with airport uses. In addition, a portion of the Airport, on the northwest side and west of Float Plane Road, is zoned as Rural Residential (RR). On the southwest side, land on the Airport and within the Runway 1L runway protection zone, is zoned as Suburban Residential (RS).

The City should consider rezoning these lands to an industrial zone within the Airport Reserve Boundary and, as appropriate, elsewhere to provide for development to the highest and best uses for the Airport, including support for airport-related uses, for revenue-generating leases, for other private development or for public improvements. (*The City updated the Airport Zoning in 2016 as discussed later in Chapter 8.*)

The City should also consider changes to the City Leasing Code to better promote and market airport lands.

Chapter 6

DEVELOPMENT CONCEPTS

6.1 INTRODUCTION

Development concepts to accommodate the major airport facility requirements are described in this chapter. The development concepts are based on the aviation demand forecasts, presented in Chapter 2, and the additional facilities required to accommodate the anticipated demand, described in Chapter 5. Of the major airport elements discussed in Chapter 5, this chapter identifies the Airport's primary elements and associated secondary elements that are necessary to accommodate the aviation demand forecasts, retain and attract aviation users as well as comply with the various Federal Aviation Administration (FAA) regulations, requirements, advisory circulars and grant assurances.

This chapter also includes a preliminary financial analysis which identifies potential funding sources associated with each development concept identified in Chapter 6. After the City selects the preferred long-range airport master plan development concept, which may include components from any or all of the development concepts presented in Chapter 6, then a 5, 10 and 20-year Phased Capital Improvement Program will be prepared and documented later in Chapter 9 and the financial analysis will be completed and documented later in Chapter 10.

6.1.1 Development Concepts

Primary elements, based on FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, and the types and levels of aviation activity at the Kenai Municipal Airport, include:

- Airside (airfield, airspace and navigational aids and land acquisition)
- Passenger Terminal
- Air Cargo and Mail
- General Aviation

Secondary elements that support the primary elements include:

- Airport Access and Vehicular Parking
- Airport Support

The development concepts are described in terms of their impact on the primary airport functional elements – airside (airfield, land acquisition, airspace and navigational aids), passenger terminal, air cargo and mail and general aviation facilities, and secondary airport elements – airport access and vehicular parking and airport support. The inclusion of individual projects in the development concept does not necessarily imply that the projects are recommended or that they should be implemented in the near future. The primary purpose is to facilitate the selection of a long-term development concept for the Airport Master Plan.

It should be noted that some development concepts, particularly for the airside, have been developed in response to specific questions or issues that have been raised by the City and others. For the airside, these include whether to preserve the capability for a future precision instrument approach procedure to Runway 1L, relocating/extending Runway 1L-19R to the north to avoid tree obstructions, and relocation or abandonment of the gravel Runway 1R-19L and the associated land

acquisition and airspace and navigational aid requirements. For the passenger terminal, these include improvements to the existing passenger terminal building or future relocation of the passenger terminal to the north if Runway 1L-19R is relocated/extended to the north. Also, preserving space for future development of air cargo and general aviation facilities (commercial and noncommercial aviation, hangars and tiedowns, float plane facilities and helicopters) to the northeast and northwest.

Development concepts for the secondary airport elements – access and vehicular parking and airport support, are developed to support the primary airport elements as required in each concept.

The potential environmental impacts associated with each development concept are presented. Preliminary financial analyses, including cost considerations, and potential funding from FAA, State, City and private sources, are also presented for each development concept.

Individual project and land use recommendations, and the phasing of airport improvements over time, will be developed later in the study. In some cases, the projects will not be required within the 20-year time period of this study. In these cases the objective will be to reserve appropriate land areas, consistent with the long-term development concept selected by the City, so that future development is not precluded.

The airport master planning process is essentially an iterative decision-making process, and each development concept involves tradeoffs among the various elements. The selected airport master plan concept may well involve features from the different development concepts described in this chapter.

This chapter presents four development concepts for the potential future development of the Kenai Municipal Airport. After review and consideration of the different elements of the development concepts through a cooperative interaction by the City, FAA, stakeholders and other interested parties, and a public involvement process, an airport master plan will be developed combining those elements preferred by the City into a long-range development plan for the Airport.

The process has been adapted to the needs of the Airport, as stated in FAA AC 150/5370-6B, *Airport Master Plans*, and as described in the scope of work.

The Technical Advisory Committee (TAC) has developed a projects evaluation matrix to assist in screening the potential projects using several criteria related to airport needs, operations, safety, environmental and financial considerations. The intent of the evaluation matrix is to provide a supporting quantitative value to assist stakeholders in evaluating which projects may be selected for inclusion in the airport master plan as well as their respective priority for implementation over the 20 year planning period.

The review process included several meetings of the TAC to discuss the development concepts. The development concepts were also forwarded to FAA for review and input. The development concepts were presented and discussed at a public meeting of the Kenai Airport Commission. The City selected the primary and secondary elements to be included in the long-range Airport Master Plan documented

later in Chapter 8. The selected primary and secondary elements were presented and discussed at a public meeting of the Kenai Airport Commission.

6.1.2 Primary Funding Sources

In addition to the airport needs, operations, safety and environmental considerations that affect airport planning, programming and implementation of development projects the Airport Sponsor also needs to take into consideration its fiscal capabilities to implement those projects being considered. The following discussion presents the primary funding sources, as well as other funding sources, that are available for the Airport to consider utilizing.

The FAA Reform and Modernization Act of 2012 provides a multi-year program for funding under the Airport Improvement Program (AIP) through fiscal year 2015. The FAA AIP participation rate for the Kenai Municipal Airport is based on the size and statutory classification of the Airport as a Small or Nonhub Commercial Service Airport. The Airport is eligible for nonhub airport entitlement grants based on the number of annual passenger boardings. Historically, the Airport entitlement grants have averaged about $1.1 million on an annual basis. The AIP provides 93.75 percent of the cost of the eligible project, and the City is responsible for the remaining 6.25 percent. As FAA can only fund public use areas of the Terminal, or the public use percentage of joint use areas, some of the terminal building projects may only be eligible for 50 percent of FAA AIP funding.

Up until 2015 the State provided 50 percent (or 3.125 percent) of the City's 6.25 percent match for FAA Airport Improvement Program grants to airports in the State that are not owned and operated by the State. However, the State notified the City of Kenai on October 26, 2015 that, due to the State's fiscal reality, beginning October 1, 2015, the State DOT&PF will be unable to continue providing a matching share to local sponsors such as the Kenai Municipal Airport.

The estimated cost tables included in this chapter were prepared prior to the State's October 26, 2015 notification and show, in addition to the estimated project costs, the FAA share, the State and City shares, as well as the available funding based on the 93.75/ 3.125/3.125 percent split discussed earlier.

After the Airport has utilized all of its entitlement grant sources the Airport can compete with other airports for FAA discretionary grant funds that are prioritized by the FAA using the National Priority Rating System with the highest priority placed on projects that enhance safety, security, system capacity and environmental concerns. The future availability of FAA AIP discretionary grants is uncertain, and the Airport would have to compete successfully when prioritized with the needs of other airports in the State.

The use of discretionary funds as a funding source for any capital improvement projects may not be realistic at this time as the actual projects included in the Airport's Capital Improvement Program, to be developed in the next phase of the Airport Master Plan, would require discussion with FAA representatives as to their prioritization and the availability of discretionary funding.

The City of Kenai is not eligible to collect Passenger Facility Charges (PFC) at the Kenai Municipal Airport.

Based on information provided by the City, the net operating revenues from the Airport

Operations Fund that could be used for future airport improvements have been estimated at about $200,000 to $250,000 on an annual basis as a result of user fees, including leases, rents and special use permits. It is also the City's policy to maintain a fund balance of about $4 million. Positive and negative variances from the $4 million fund balance could increase or decrease the annual amount available to fund airport improvements.

Annually, FAA AIP funding of about $1.1 million, State Legislative Grants totaling 3.125 percent of the total FAA AIP project cost and the estimated $200,000 to $250,000 net operating revenues of the Airport are assumed to continue at the existing levels. Those projects eligible for FAA AIP funding are presented in Tables 6-2, 6-3, 6-4 and 6-5 for the development concepts.

The primary funding sources for a 20-year capital improvement program include the FAA AIP, State Legislative Grants and the net operating revenues of the Airport. It is assumed that these sources of funds will continue to be available at their current level of about $1.4 million annually and $28 million over a 20-year planning period.

It should be noted that over the 20-year planning period it is likely that unexpected and undefined expenditures, such as airport maintenance equipment replacement and reconstruction of airport infrastructure, as well as projects that arise due to changing facility requirements will become necessary.

City historical records indicate that about $200,000 per year has been expended for unexpected and undefined expenditures. In addition, some projects such as pavement and airfield marking maintenance or obstruction removal, are required by FAA grant assurances to be programmed and implemented regardless of the results of the screening process. These projects are estimated to average $250,000 per year. Therefore the available funding, less the undefined and yearly maintenance type projects, is about $950,000 per year.

Projects that exceed the projected $1.4 annual available funding level will require phasing or the saving (rollover) of yearly FAA grant entitlements and matching funds that the Airport may receive up to a maximum of four years, or about $3.8 million. Projects that exceed that amount would require other funding sources or be implemented over a longer period of time.

The use of the remaining City net operating revenues will be analyzed in the next phase of the study when the long-range airport master plan development concept has been selected by the City and the phased capital improvement program and financial feasibility analysis are prepared. The phased capital improvement program and financial feasibility analysis will assume the State DOT&PF no longer provides a matching funding share to the City.

6.1.3 Other Funding Sources

There are several other potential sources for financing airport and airport support projects either as stand alone or in combination that may be available to the City.

6.1.3.1 Airport Funds

The City maintains two accounting funds for the Airport, including the Airport Land System Special Revenue Fund and the Airport Land Sales Permanent Fund, both of which have limitations and restrictions on the use of the funds. Use of these funds for specific development projects, that support and develop the Airport, will be analyzed in the next phase of the study when the long-

range airport master plan development concept has been selected by the City and the financial feasibility analysis is prepared.

6.1.3.2 Bonds

Municipal financing (City of Kenai) is complex as a number of financial instruments could be available to the City for financing capital development projects. The most common and widely accepted bond financing for airport development projects is through general airport revenue bonds (GARB) supported solely by the net revenues generated through operation of the Airport (an estimated $200,000 to $250,000 annually).

Other alternative financing that might be considered by the City are general obligation bonds that are backed by the full faith and credit of the City and supported by the City's ability to levy taxes. The issuance of general obligation bonds would be subject to the bonding capacity available to the City, approval by the City's voters and prioritized with other committed municipal projects that may not be supported by revenue sources.

A combination of these bonds would be expected to be paid back through revenue generated by the Airport or could be backed by the full faith and credit of the City.

Bond Sales have not been a preferred method of financing Kenai's projects over the years and with the funding sources available and the nature of the projects under consideration, are not a recommended source for these projects unless some development opportunity can provide an effective benefit to cost return to the City.

6.1.3.3 Other Grant Sources

Several of the projects requiring other sources of funding are considered secondary elements for Airport Access and Airport Support and include recommended water/sewer utility improvements to the terminal and developing the Airport land, north, along and in between Willow Street and Marathon Road. Street improvements for accessing landlocked property between Willow Street and Marathon Road and improving traffic circulation in the area are also presented for consideration.

These projects, with the exception of those serving the terminal which would not be fully FAA grant eligible, pending FAA review, would require other sources of funding. These could include the State of Alaska Department of Commerce, Community and Economic Development; State of Alaska Department of Environmental Conservation; and the US Environmental Protection Agency. Grant funding from these sources varies from 50 percent, to 70 percent and up to 100 percent of the project cost depending on the grant source, monies available and the presentation and justification for the individual projects.

These other funding sources have been used for Municipal projects in the past including the recent Kenai Industrial Park, City Streets, water reservoirs and pipelines in the City of Kenai.

The projects, under consideration, support and enhance the City's long-term comprehensive planning efforts and should be coordinated and prioritized along with other City infrastructure projects.

6.1.3.4 Other Funding Sources

Funding the lease lot development is estimated to cost $1.6 to $2.2 million and would be the responsibility of the City. However, an annual rate of return of these funds over a period of time could be recognized through lease agreements with individual airport tenants. The expansion of the restaurant and the airlines equipment shelter in the terminal building would be the responsibility of the restaurant owner/lessee and the airlines, respectively.

6.1.4 Summary

The City should identify the long-range airport master plan development concept, including the following key primary decisions, in order to complete the long-range financial analysis.

- Which of the four concepts presented for Runway 1L-19R and associated land acquisition does the City want to protect in the long term;
- Does the City want to retain Gravel Runway 1R-19L in the present location, relocate to the west side of the float plane basin or close;
- Does the City want to preserve the capability to widen and extend the Water Runway 1W-19W both for increased aviation use and as a future source of onsite material to reduce construction costs;
- What are the locations and areas of land the City wants to reserve for future aviation-related activities (lease lots, aircraft parking apron, hangars, etc.)
- Are there other options for the use of the Terminal Building and Terminal Area

The Airport development concepts identified in Chapter 6 provide for total project costs ranging from $30 million for all the projects in Development Concept One, presented in Table 6-2, to $44 million for all the projects in Development Concept Three presented in Table 6-4. Development Concept Four was formulated in response to several issues that have been raised. However, due to the costs to implement ($77 million), environmental concerns and property acquisition requirements, some of the major components of Development Concept Four, e.g., relocating Runway 1L-19R to the north, land acquisition to the north and relocating the passenger terminal, would be eliminated from further consideration.

Projects identified as being eligible for FAA AIP grants total an estimated $21 million for Development Concept One, $28.5 million for Development Concept Two, and $34.6 million for Development Concept Three. An estimated $6.6 million in other sources of funds will be required to implement all of the projects in Development Concept One, and $7.5 million for all of the projects in Development Concepts Two and Three.

Funding sources are available should the City elect to implement any of the individual projects included in Development Concepts One, Two or Three, and some of the individual projects in Development Concept Four, under certain scenarios. However, it should be noted that the sources of future revenues may change. For example, as passenger enplanements and other aviation and nonaviation activities continue to increase, Airport revenues should continue to increase. However, depending on the FAA reauthorization of the AIP in 2015, the Airport's entitlements could increase or decrease.

Once the City has selected the long-range airport master plan concept, which may include components from any or all of the development concepts, then a financial feasibility analysis will be prepared. The financial feasibility analysis will identify FAA eligible grant sources as well as other available funding sources.

6.2 DEVELOPMENT CONCEPT ONE

Development Concept One retains the existing Runway 1L-19R thresholds with the existing nonprecision approach to Runway 1L. The water Runway 1W-19R is retained as is. The gravel Runway 1R-19L is retained east of Runway 1L-19R. The Airport Reserve Boundary would be shifted northwest from the intersection of Trading Bay Street and Granite Point Street and north from the Kenai Spur Highway to Cohoe Avenue.

Currently planned improvements are included at the Float Plane Basin facility as well as the addition of new lease lot and apron extension 400 feet to the north. Scheduled pavement maintenance, rehabilitation and reconstruction are included as well as other airport and terminal area improvements.

The principal features of this concept are illustrated on Figures 6-1 and 6-2 described below.

6.2.1 Airside

The airside includes land acquisition, airfield and airspace and navigational aids.

6.2.1.1 Land Acquisition

Ideally, all land within the runway protection zones and land requiring control of obstructions should be owned and controlled by the Airport. All land within the existing nonprecision runway protection zone for Runway 1L is currently owned or covered by avigation easements. An additional 5.6 acres (6.5 lots) of land are impacted for tree removal for Runway 19R instrument departures (See Table 6-1). The City should also consider acquiring the remaining land (6 lots of 3.8 acres) along the west side of Float Plane Road as a buffer area to minimize noise, visual, light and weather emissions and impacts. This concept does not require the acquisition of any land at the north end of the Airport.

6.2.1.2 Airfield

Runway 1L-19R. The displaced Runway 1L landing threshold is retained to provide only 7,575 feet for landings on Runways 1L and 19R and up to 7,855 feet for departures on Runways 1L and 19R.

Existing taxiways are retained to serve the runway and terminal area.

Runway 1W-19W. The water runway is retained at a length of 4,600 feet and width of 252 feet.

Runway 1R-19L. The gravel runway is retained at a length of 2,000 feet and width of 60 feet at the north end of the Airport.

6.2.1.3 Airspace and Navigational Aids

There is a precision approach using an instrument landing system (ILS) and a stand-alone global positioning system (GPS) precision approach procedure for Runway 19R. There is a GPS nonprecision approach procedure for Runway 1L. These approach procedures are retained.

The instrument landing system (ILS) glide slope and localizer, medium intensity approach lighting system with runway alignment indicator lights (MALSR), runway threshold lights and visual approach slope indicators (VASI-4) will not have to be relocated for Runway 1L-19R.

DEVELOPMENT CONCEPT ONE

LAND ACQUISITION

AIRPORT RESERVE BOUNDARY

R/W DEPARTURE PROTECTION ZONE

BUFFER ZONE

R/W APPROACH PROTECTION ZONE

R/W 1L

FLOAT PLANE BASIN PHASE ONE

WASH PAD

HELICOPTER TIEDOWNS

DEICING PAD

AIRPORT LAND ACQUISITIONS BOUNDARY

TRADING BAY

WILLOW STREET

400'

R/W 19 R

UTILITY/ROAD LINKS

MARATHON ROAD

KENAI INDUSTRIAL PARK SUBD.

R/W PROTECTION ZONE

OWNER: ALASKA MENTAL HEALTH TRUST AUTHORITY

OWNER: BLM

MAGNETIC DECLINATION 16°49'48"E (MAY 1, 2015)

250 0 500

GRAPHIC SCALE

AIRPORT LAND ACQUISITIONS BOUNDARY

AIRPORT RESERVE BOUNDARY

LEGEND

- LAND/EASEMENT ACQUISITION
- CONCEPT ONE
- PAVEMENT MAINTENANCE
- AVAILABLE LEASE LOTS

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WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD. DRAWN BY: V.C. DRAWING: ALT ONE RW1LPRECISIONAPPROACH CHECKED BY: C.M. DATE: Oct 03,2017	KENAI MUNICIPAL AIRPORT MASTER PLAN DEVELOPMENT CONCEPT ONE EXISTING R/W 1L WITH NON PRECISION APPROACH	FIGURE 6-1

DEVELOPMENT CONCEPT ONE

MAGNETIC DECLINATION
16°49'48"E (MAY 1, 2015)

250 0 500
GRAPHIC SCALE

EXISTING AIRPORT RESERVE BOUNDARY
AIRPORT LAND ACQUISITIONS BOUNDARY

LAND OWNERSHIP
- KENAI MUNICIPAL AIRPORT
- MUNICIPAL
- BOROUGH
- STATE
- FEDERAL
- PRIVATE
- NATIVE
- NATIVE ALLOTMENT
- AVAILABLE LEASE LOTS

LAND ACQUISITION
AIRPORT RESERVE BOUNDARY
R/W DEPARTURE PROTECTION ZONE
BUFFER ZONE
R/W APPROACH PROTECTION ZONE
WASH PAD
R/W 1L
HELICOPTER TIEDOWNS
DEICING PAD
TRADING BAY
AIRPORT LAND ACQUISITION BOUNDARY
WILLOW STREET
400'
R/W 19 R
UTILITY/ROAD LINKS
MARATHON ROAD
KENAI INDUSTRIAL PARK SUBD.
R/W PROTECTION ZONE
OWNER: ALASKA MENTAL HEALTH TRUST AUTHORITY
OWNER: BLM

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WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN	FIGURE
DRAWN BY: V.C. DRAWING: ALT ONE LAND OWNERSHIP CHECKED BY: C.M. DATE: Oct 03,2017	DEVELOPMENT CONCEPT ONE LAND OWNERSHIP MAP	6-2

Table 6-1
Land Acquisitions and Avigation Easements to South

	EXISTING	DEVELOPMENT CONCEPT ONE	DEVELOPMENT CONCEPT TWO	DEVELOPMENT CONCEPT THREE	DEVELOPMENT CONCEPT FOUR
Land within RPZ	8 Lots 6.3 Acres	8 Lots 6.3 Acres	13 Lots 15.6 Acres	11 Lots 10.9 Acres	1 Lot 1.25 Acres
Land with Avigation Easements [1]	7.5 Lots	7.5 Lots	10.5 Lots	7.5 Lots	7.5 Lots
Add land for Tree Obstructions	6.5 Lots [2] 5.6 Acres	6.5 Lots 5.6 Acres	8.5 Lots [2] 8.2 Acres	13.5 Lots [2] 10.6 Acres	5 Lots 5.0 Acres
Add land for Buffer Area	-0- -0-	6 Lots 3.8 Acres	6 Lots 3.8 Acres	4 Lots 2.5 Acres	4 Lots 2.5 Acres
TOTAL LOTS [3]	14.5 Lots	20 Lots	27.5 Lots	28.5 Lots	10 Lots
TOTAL ACRES	11.9 Acres	15.7 Acres	27.6 Acres	24.0 Acres	8.75 Acres

1. Current Avigation Easements on 8 Lots
2. 0.5 Lot Requirement is North 1/2 of Lot 122 (Bradley)
3. Total land acquisition needed for runway protection zone and tree obstruction maintenance control

Source: Wince-Corthell-Bryson

Lights are not provided for the water runway and gravel runway.

The tree obstructions to the existing Runway 1L approach surface and Runway 19R departure surface on Airport and City property have been removed to provide the required 34:1 approach and 40:1 departure surfaces, respectively. The City will continue to work with affected private property owners to mitigate the remaining off-airport obstructions.

Retaining the existing nonprecision instrument 1,700-foot long runway protection zone for Runway 1L means that the trailer park, car wash, retail stores and office space along Kenai Spur Highway are outside the runway protection zone.

6.2.2 Passenger Terminal

The passenger terminal complex is retained in its present location.

Approximately 110,000 square feet (500 feet by 220 feet) is required for the commuter air carrier aircraft parking apron to handle a mix of deHavilland DHC-8, Beechcraft 1900 and Cessna 208 Caravan type aircraft. The aircraft parking apron and Taxiway J, adjacent to the passenger terminal building, are retained to provide for the aircraft parking and for RDG C-IV aircraft to use Taxiway J. The apron service road is retained on the west side of the apron.

The overall passenger terminal building space (25,000 square feet) is adequate to handle the forecast demand through the year 2030. Modifications and some reassignment of space may be necessary to provide improved passenger handling services, accommodate increased passenger volumes, and any additional air carriers that may serve the Airport in the future. The modifications and improvements needed to address deferred maintenance, remodeling to accommodate airport management and tenant requests for space and amenities, as well as Code issues, include the following and are illustrated on Figure 6-3.

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EMPLOYEE RESTROOM

1983 ADDITION

1966 TERMINAL

CONVERT RESTROOM TO OFFICE

EXPAND RESTAURANT 400 SF +/-

VISUAL PAGER

RESTORE SHEAR WALLS

WIRELESS KIOSKS

HOT AIR CURTAINS OVER DOORS

WIRELESS KIOSKS

EXPANDED PASSENGER HOLDROOM CAPACITY 90

VISUAL PAGER

VISUAL PAGER

OVERHEAD SECURITY CURTAINS

HOT AIR CURTAINS OVER DOORS TYP.

ISOLATED AIRPORT ADMINISTRATION AREA

WARM & COLD STORAGE

CONFERENCE

EXISTING 30 X 24' GARAGE

POLE BARN STYLE COVERED PARKING 20' X 20' BAYS ONLY TWO BAYS SHOWN

ATTACHED GARAGE AND STORAGE

RELOCATED SECURITY FENCE

ELECTRICAL/ MECHANICAL EXPANSION

PET RELEASE AREA

SMOKING SHELTER

WIRELESS KIOSKS

HEATED SIDEWALK

BUS

BUS

RENTAL CAR QUEUE AREA

WALKWAY OR SIDEWALK

TAXI SHELTER

N REF
1"=30' HALF SIZE

WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN TERMINAL BUILDING FLOOR PLAN REMODEL IMPROVEMENTS
DRAWN BY: V.C. DRAWING: TERMINALBUILDINGFLOORPLAN CHECKED BY: C.M. DATE: Oct 13,2017	FIGURE 6-3

- Baggage and Administration Areas
  - Separation of areas
  - Hot air curtains over baggage tug doors
  - Warm and cold storage space
  - Attached vehicle garage
  - Separate open airline equipment shelter to park deicing equipment, passenger stairs, etc.
- Stand-alone wireless computer system with remote kiosks
- Visual paging and information for hearing impaired at three to four locations (including one upstairs in the lounge)
- Expanded secure passenger holdroom area
- Restaurant expansion
- Mechanical/Electrical room expansion area
- Pet release area
- Outdoor taxi and smoker shelters

Other more significant items include:

- Install new roof
- Rehabilitate sprinkler system
- Implement recommendations from recent energy audit

6.2.3 Air Cargo and Mail

The existing air cargo facilities are retained in their present locations. However, in the long term, the area north of the passenger terminal and south of the FAA Air Traffic Control Tower (ATCT) is proposed for air cargo/small package-related lease lots. The existing air cargo facilities in this area are underutilized and can be expanded to handle future needs. There are also three vacant lease lots in this area.

Additional apron space is available north of the FAA ATCT to accommodate large cargo aircraft (e.g., McDonnell Douglas DC-6, Lockheed L-100/L-382) The apron in this area provides a 200-foot wide apron and a 75-foot wide taxiway to meet RDG C-IV design criteria as for the passenger terminal apron. This provides about 300,000 square feet of apron. However, the 400 feet of apron in front of the Airport Operations Facility is not available for aircraft parking with the exception of the helipad that is used for medevacs. Therefore, only 220,000 square feet of apron is available north of the FAA ATCT. The taxiway centerline in this area is presently 37.5 feet from the west edge to increase the amount of aircraft parking space available.

For this concept one additional lease lot is added at the north end together with a 400-foot extension of the apron along its frontage.

6.2.4 General Aviation

Existing general aviation facilities are retained and expanded primarily in the southern part of the Airport, especially for small aircraft. There are two lease lots currently available on the General Aviation Apron No. 1 and No. 5 and a portion of General Aviation Apron No. 2. The existing itinerant aircraft parking apron has recently been expanded to the south by approximately 100,000 square feet to accommodate itinerant business jet and small general aviation aircraft demand. Additional aircraft parking apron, primarily for other large aircraft, is provided north of Taxiway E. The apron area available north of the passenger terminal provides about 240,000 square feet of apron space for large itinerant general aviation and small package cargo aircraft.

The current commercial aviation operators, Civil Air Patrol and private long-term tiedown users remain in the area south of the passenger terminal. These operators have

not indicated any need for expansion of the areas they lease.

A 3.7-acre area north of the Airport Operations Facility, between the aircraft parking apron and Willow Street, is reserved for future commercial aviation development and other airport-related land uses. This area is considered an unallocated reserve for aviation-related uses, with the specific uses to be determined in the future, depending on the nature of the demand for such lease lots. It is recommended, when this area is actually developed for lease lots, that each lot be developed so that there is both adequate airfield access to the west as well as roadway access to the east in order to maximize the usefulness and attractiveness of this area to potential commercial aviation developers.

The existing three remaining vacant lease lots, south of the FAA ATCT, are only 100 to 150 feet along the apron and wider apron frontage should be considered in the future to increase their effectiveness. Alternatively, stub taxiways from the apron and access roads from Willow Street could be provided to more effectively develop this 400-foot deep area. The 3.3 acre area south of the passenger terminal vehicular parking lots could also be developed as a future lease lot as illustrated on Figure 6-4.

A new taxiway will connect the south end of Runway 1L-19R to the float plane basin and the proposed hangar development on the east side of the float plane basin water taxi channel.

Space for float plane slips and lease lots is currently provided on the east side of the water taxi channel. With the availability of the card lock refueling system, the water taxi channel will continue to be used for aircraft parking and refueling. Space is reserved for lease lots along the northwest shoreline for commercial aviation operators to provide facilities and services for float plane operators. (However, this would require construction of new access and water revetments and is shown later on Development Concepts Two and Three.) An area near the center of the water taxi channel provides a ramp for amphibian aircraft and for converting aircraft from wheels to floats and is close to the limited access taxiway connecting the float pond to the rest of the airfield.

Winter ice borings show that the water level remains at the existing operating level providing ice support for maintaining a winter ski runway. Considering the security and amenities provided this facility could be available for winter use.

New helicopter parking for based or transient helicopters is provided at the north end of the City aircraft parking apron.

6.2.5 Airport Access and Parking

On the east side of the Airport, Willow Street and the utilities are extended to the north by 600 feet and the access road off Willow Street, serving the gravel runway facility, is realigned.

Consideration should be given to adding one lane on the east side of the curbside roadway, across from the passenger terminal, in the future as activity increases. This will improve safety and the flow of traffic along the terminal curbside roadway during peak periods.

The terminal access roadway, parking and area lighting are reconstructed within the planning period. Additional vehicular parking space are not required in the passenger terminal area. Up to 510 spaces

AIRCRAFT WASHPAD

TRANSIENT HELICOPTER TIEDOWNS

DEICING PAD

TOFA

T/W A

T/W G

T/W F

T/W H

T/W J

TOFA

MAGNETIC DECLINATION 16°49'48"E (MAY 1, 2015)

MAGNETIC NORTH

TRUE NORTH

100 0 50

GRAPHIC SCALE

SITE DEVELOPMENT

WATER/SEWER, SITE DEVELOPMENT, AND LEASE LOTS

NEW GATE

GRANITE POINT CT.

BRL

T/W GG

FUTURE LEASE LOT

GRANITE POINT ST.

MAIN ST. LOOP RD

N. WILLOW ST.

TERMINAL

SS

W

SD

TAXI LANE

LOT 5 & 6 FBO

PARKING LOT EXPANSION

ACCESS AND PARKING LOT REHABILITATION

OVERFLOW PARKING LOT

CONSTRUCTION AREA

LAYDOWN

FLAGPOLE

FLAG

TRADING BAY RD.

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WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN DEVELOPMENT CONCEPT ONE TERMINAL AREA REDEVELOPMENT
DRAWN BY: V.C. DRAWING: TERMINAL AREA CHECKED BY: C.M. DATE: Oct 03,2017	FIGURE 6-4

are required by 2030. There are currently 460 spaces near the passenger terminal and an additional 70 parking spaces are provided east of the present parking lot across Willow Street. It may be necessary to redesignate the public, employee and rental vehicle parking spaces in the future.

Vehicular parking spaces should be provided within each fixed base operator (FBO)/commercial aviation lease plot for visitors and employees.

6.2.6 Airport Support

All lease lots adjacent to Willow Street are already supplied with water and sewer stubouts as well as underground gas, telephone and electricity utilities. Slips along the water taxi channel as well as the planned taxi lanes and lease lots to the east are served with telephone and electricity. Future development at the float plane basin facility can be served by all utility systems near the south end of the facility.

An aircraft wash pad is planned on the west side of the City's based aircraft parking apron at the south end of the Airport.

Space for an aircraft deicing facility is reserved across from the passenger terminal apron between Taxiways A and J.

Land lease and sales provide an important source of support for airport operations. Existing lease lots established along Airport Way, Willow Street and Marathon Road have resulted in approximately 34 acres being almost land locked. When considering the planned and proposed extensions of Willow Street and Marathon Road, and the reduced fire flows that will be available, the City should consider providing cross linking streets and utilities to provide more flexibility for development and at the same time strengthen the water service and fire flows to these areas.

6.2.7 Environmental Impacts

There are compatible land use impacts with private parcels in the Runway 1L runway protection zone and approach surface area, as well as Runway 19R departure surface, along Float Plane Road.

No noise berm or fence is proposed along the east side of Float Plane Road to minimize noise and visual impacts after removal of the on-airport tree obstructions.

6.2.8 Preliminary Financial Analysis

The estimated project costs included for Development Concept One, including those projects not eligible for FAA grant funding, are presented in Table 6-2. The total cost is estimated to be $29 million if all the projects are implemented. Of the total $29 million, it is estimated that $21 million of the total project costs are FAA Airport Improvement Program (AIP) grant eligible. About $697,000 would be required from State Legislative grants, and about $761,000 would be required from the City. An additional $6.6 million would be required from other funding sources. The FAA AIP projects listed are within the funding capabilities discussed earlier in Section 6.1.2, Primary Funding Sources.

Table 6-2
DEVELOPMENT CONCEPT ONE ESTIMATED COSTS

-	PROJECT	COST OF EACH PROJECT	CONCEPT ONE PROJECT COSTS	SOURCE FOR FAA-FUNDED PROJECTS			OTHER FUNDING SOURCES
				FAA @ 93.75%	STATE @ 3.125%	CITY @ 3.125%	
	AIRSIDE						
1	RETAIN R/W 1L-19R NON PRECISION	0.00	0.00				
2	RETAIN R/W 1L-19R PRECISION	3,500,000.00					
3	DISPLACE RUNWAY 1L (600 FEET)	3,650,000.00					
4	RELOCATE R/W 1L-19R 1900' PRECISION	22,250,000.00					
5	RETAIN OR ABANDON GRAVEL R/W	0.00	0.00				
6	RELOCATE GRAVEL RUNWAY	4,600,000.00					
7	EXTEND WATER R/W	1,500,000.00					
8	WIDEN WATER R/W	1,500,000.00					
9	FLOAT PLANE BASIN "PHASE ONE"	2,600,000.00	2,600,000.00	2,437,500.00	81,250.00	81,250.00	
10	FLOAT PLANE BASIN "PHASE TWO"/ REVETMENT	1,000,000.00					
11	T/W's H-G-GG APRON REHAB	1,000,000.00	1,000,000.00	937,500.00	31,250.00	31,250.00	
12	T/W A, T/W K TO T/W C	3,100,000.00	3,100,000.00	2,906,250.00	96,875.00	96,875.00	
13	AIRFIELD PAINT / CRACK SEAL	250,000/ YR	5,000,000.00	4,687,500.00	156,250.00	156,250.00	
	LAND ACQUISITION (KPB TAX ROLL)						
14	FOR RUNWAY PROTECTION ZONES						
15	FOR OBSTRUCTION CONTROL		103,000.00	96,562.50	3,218.75	3,218.75	
16	FOR BUFFER ALONG FLOAT PLANE ROAD		287,400.00	269,437.50	8,981.25	8,981.25	
17	CONSTRUCT EARTH BUFFER	655,500.00	655,500.00	614,500.00	20,500.00	20,500.00	
18	CONSTRUCT FENCE BUFFER	900,000.00					
	SUB TOTAL		12,745,900.00	11,949,250.00	398,325.00	398,325.00	0.00
	TERMINAL BUILDING						
	EXISTING TERMINAL IMPROVEMENTS						
19	RE-ROOF TERMINAL AREA BUILDINGS	400,000.00	400,000.00	375,000.00	12,500.00	12,500.00	
20	SPRINKLER SYSTEM REHABILITATION	100,000.00	100,000.00	93,750.00	3,125.00	3,125.00	
21	ISOLATE ADMINISTRATION AREA	17,000.00	17,000.00	7,968.75	265.63	8,765.63	
22	WIRELESS KIOSKS	15,000.00	15,000.00	14,062.50	468.75	468.75	
23	VISUAL INFORMATION SYSTEM	60,000.00	60,000.00	56,250.00	1,875.00	1,875.00	
24	ATTACHED GARAGE WITH DEMO OF EXISTING	114,500.00	114,500.00	107,343.75	3,578.13	3,578.13	
25	WARM AND COLD SECURE STORAGE	15,000.00	15,000.00	14,062.50	468.75	468.75	
26	PET RELEASE AREA	5,000.00	5,000.00	4,687.50	156.25	156.25	
27	MECH/ELECT ROOM EXPANSION AND REHAB	111,000.00	111,000.00	52,031.25	1,734.38	57,234.38	
28	EXPAND RESTAURANT 400 sq. ft.	18,000.00	18,000.00				18,000.00
29	NEW OVERHEAD DOORS WITH HOT AIR CURTAINS	87,000.00	87,000.00	81,562.50	2,718.75	2,718.75	
30	TERMINAL BUILDING ENERGY UPGRADES	160,000.00	160,000.00	150,000.00	5,000.00	5,000.00	
31	TAXI AND SMOKER SHELTERS	20,000 each	40,000.00	37,500.00	1,250.00	1,250.00	
32	AIRLINES EQUIPMENT SHELTER	65,000.00	65,000.00				65,000.00
33	EXPAND SECURE PASSENGER GATE AREA	25,000.00	25,000.00	23,437.50	781.25	781.25	
34	**CONSTRUCT NEW TERMINAL 25,000 SF**	12,200,000.00					
	SUB TOTAL		1,232,500.00	1,017,656.25	33,921.89	97,921.89	83,000.00
	CARGO, MAIL AND GENERAL AVIATION						
35	**APRON EXPANSION FOR LEASE LOTS**	3,300 per foot					
35.1	CONCEPT ONE 400'	1,320,000.00	1,320,000.00	1,237,500.00	41,250.00	41,250.00	
35.2	CONCEPT TWO 1000'	3,300,000.00					
35.3	CONCEPT TWO AND THREE 1000'	3,300,000.00					
35.4	CONCEPT TWO, THREE & FOUR 1000'	3,300,000.00					
36	**WILLOW STREET EXTENSION (ROAD/UTILITIES**	780 per foot					
36.1	CONCEPT ONE 600'	468,000.00	468,000.00				468,000.00
36.2	CONCEPT TWO 1000'	780,000.00					
36.3	CONCEPT TWO AND THREE 1000'	780,000.00					
36.4	CONCEPT FOUR 4,166 ln. ft.	3,249,480.00					
37	**LEASE LOT DEVELOPMENT TO SUBBASE**	170,000 / AC					
37.1	CONCEPT ONE 1000' ALONG APRON 9.4 AC	1,600,000.00	1,600,000.00				1,600,000.00
37.2	CONCEPT TWO 12.9 AC	2,200,000.00					
37.3	CONCEPT TWO AND THREE 12.9 AC	2,200,000.00					
37.4	CONCEPT TWO, THREE & FOUR 12.9 AC	2,200,000.00					
38	WATER / SEWER GRANITE PT. TO WILLOW ST.	228,000.00	228,000.00				228,000.00
39	TAXILANE EXTENSION	350,000.00	350,000.00	328,125.00	10,937.50	10,937.50	
40	CONVERT EXISTING TERMINAL AREA	1,500,000.00					
41	AIRCRAFT WASH PAD	45,000.00	45,000.00	42,187.50	1,406.25	1,406.25	
42	AIRCRAFT DEICING PAD	1,200,000.00	1,200,000.00	1,125,000.00	37,500.00	37,500.00	
	SUB TOTAL		5,211,000.00	2,732,812.50	91,093.75	91,093.75	2,296,000.00
	AIRPORT ACCESS AND PARKING						
43	ACCESS AND PARKING REHAB	1,100,000.00	1,100,000.00	1,031,250.00	34,375.00	34,375.00	
44	PARKING EXPANSION	450,000.00	450,000.00	421,875.00	14,062.50	14,062.50	
	SUB TOTAL		1,550,000.00	1,453,125.00	48,437.50	48,437.50	0.00
	AIRPORT SUPPORT						
	CROSS CONNECTS (ROADS & UTILITIES)	740 / FT					
45	ROAD LOOP ONE (MARATHON-WILLOW)	900,000.00	900,000.00				900,000.00
46	ROAD LOOP TWO (MARATHON-WILLOW)	450,000.00	450,000.00				450,000.00
47	TRADING BAY EXTENSION (RD & UTILITIES)	2,200,000.00	2,200,000.00				2,200,000.00
48	BARANOFF EXTENSION (RD & UTILITIES)	700,000.00	700,000.00				700,000.00
	SUB TOTAL		4,250,000.00	0.00	0.00	0.00	4,250,000.00
	UNIDENTIFIED PROJECTS	200,000/YR	4,000,000.00	3,750,000.00	125,000.00	125,000.00	
	TOTAL CONCEPT ONE PROJECT COSTS		28,989,400.00	20,902,843.75	696,778.14	760,778.14	6,629,000.00
	AVAILABLE FUNDING			22,000,000.00	733,000.00	733,000.00	TO BE DETERMINED

SOURCE: Wince-Corthell-Bryson

6.3 DEVELOPMENT CONCEPT TWO

Development Concept Two retains the existing Runway 1L-19R thresholds but with a precision instrument approach to Runway 1L. The water Runway 1W-19R is retained as is with potential for phased development along the west side. The gravel Runway 1R-19L, east of Runway 1L-19R, is abandoned and the area reserved for apron and lease lot expansion. Two additional lease lots are added at the north end for this concept with a 1,000 foot extension of the apron (with the potential for an additional four lots and 1,500-foot apron extension to the north to Marathon Road). The Airport Reserve Boundary would remain along the Kenai Spur Highway except along Cohoe Avenue.

Currently planned projects, scheduled pavement maintenance, rehabilitation and reconstruction as well as other airfield and terminal area improvements included in Development Concept One are also included.

The principal features of this concept are illustrated on Figures 6-5 and 6-6 and described below.

6.3.1 Airside

The airside includes land acquisition, airfield and airspace and navigational aids.

6.3.1.1 Land Acquisition

This concept requires the acquisition, or avigation easements, of about 15.6 acres (13 lots) of land at the south end of the Airport required for a 2,500-foot long precision instrument runway protection zone for the existing Runway 1L displaced threshold. An additional 8.2 acres (8.5 lots) of land are required for acquisition or avigation easement for tree removal for the 50:1 approach and 40:1 departure surfaces for Runways 1L and 19R, respectively (See Table 6-1). Another 3.8 acres (6 lots) could be acquired to provide a buffer zone along Float Plane Road as noted in Development Concept One. This concept does not require the acquisition of any land at the north end of the Airport.

6.3.1.2 Airfield

Runway 1L-19R. The displaced Runway 1L landing threshold is retained to provide only 7,575 feet for landings on Runways 1L and 19R and up to 7,855 feet for departures on Runways 1L and 19R.

Existing taxiways are retained to serve the runway and terminal area.

Runway 1W-19W. The water runway is retained at a length of 4,600 feet and width of 252 feet.

Runway 1R-19L. The gravel runway (2,000 feet by 60 feet) is abandoned at the north end of the Airport.

6.3.1.3 Airspace and Navigational Aids

A new precision instrument approach procedure using stand-alone global positioning system (GPS) will be developed for Runway 1L with minimums of 200 feet and 1/2 mile visibility. (This procedure has already been developed for Runway 19R). A medium-intensity approach lighting system with runway alignment indicator lights (MALSR) will be installed on Runway 1L. New generation technology may reduce the existing minimums in the future and if the existing tree obstructions at the south end are removed.

DEVELOPMENT CONCEPT TWO

LAND ACQUISITION

R/W DEPARTURE PROTECTION ZONE

AIRPORT RESERVE BOUNDARY

ISOLATION BERM

BUFFER ZONE

R/W APPROACH PROTECTION ZONE

AIRPORT LAND ACQUISITION BOUNDARY

OWNER: ALASKA MENTAL HEALTH TRUST AUTHORITY

OWNER: BLM

R/W 1L

R/W 19 R

FLOAT PLANE BASIN PHASE ONE

HELICOPTER TIEDOWNS

DEICING PAD

WASH PAD

TRADING BAY

WILLOW STREET

MARATHON ROAD

UTILITY/ROAD LINKS

KENAI INDUSTRIAL PARK SUBD.

NEAR

LONG

TAXILANE

TERM

DEVELOPMENT

1000'

MAGNETIC DECLINATION 16°49'48"E (MAY 1, 2015)

GRAPHIC SCALE 250 0 500

AIRPORT RESERVE BOUNDARY

AIRPORT LAND ACQUISITIONS BOUNDARY

LEGEND

- LAND/EASEMENT ACQUISITION
- CONCEPT ONE
- CONCEPT TWO
- PAVEMENT MAINTENANCE
- AVAILABLE LEASE LOTS

PLOTTED: Oct 03, 17 - 2:03pm

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WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN DEVELOPMENT CONCEPT TWO RW IL PRECISION APPROACH TO EXISTING THRESHOLD	FIGURE 6-5
DRAWN BY: V.C. DRAWING: ALT TWO RW1LPRECISIONAPPROACH		
CHECKED BY: C.M. DATE: Oct 03,2017		

DEVELOPMENT CONCEPT TWO

LAND ACQUISITION

R/W DEPARTURE PROTECTION ZONE

AIRPORT RESERVE BOUNDARY

ISOLATION BERM

BUFFER ZONE

R/W 1L

WASH PAD

HELICOPTER TIEDOWNS

DEICING PAD

NEAR TERM DEVELOPMENT

LONG TERM DEVELOPMENT

TAXILANE

TAXILANE

R/W APPROACH PROTECTION ZONE

AIRPORT LAND ACQUISITION BOUNDARY

HELICOPTER TIEDOWNS

WASH PAD

WILLOW STREET

1000'

DEICING PAD

R/W 19 R

UTILITY/ROAD LINKS

MARATHON ROAD

KENAI INDUSTRIAL PARK SUBD.

OWNER: ALASKA MENTAL HEALTH TRUST AUTHORITY

OWNER: BLM

MAGNETIC DECLINATION
16°49'48"E (MAY 1, 2015)

250 0 500
GRAPHIC SCALE

AIRPORT RESERVE BOUNDARY

AIRPORT LAND ACQUISITIONS BOUNDARY

LAND OWNERSHIP

- KENAI MUNICIPAL AIRPORT
- MUNICIPAL
- BOROUGH
- STATE
- FEDERAL
- PRIVATE
- NATIVE
- NATIVE ALLOTMENT
- AVAILABLE LEASE LOTS

PLOTTED: Oct 03, 17 - 2:06pm

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WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN	FIGURE
DRAWN BY: V.C. DRAWING: ALT TWO RPZ LANDUSE CHECKED BY: C.M. DATE: Oct 03,2017	DEVELOPMENT CONCEPT TWO LAND OWNERSHIP MAP	6-6

The instrument landing system (ILS) glide slope and localizer, MALSR, runway threshold lights and visual approach slope indicators (VASI-4) will not have to be relocated for Runway 1L-19R.

Lights are not provided for the water runway.

The tree obstructions to the existing Runway 1L approach surface and Runway 19R departure surface, and trees within the runway protection zone, on Airport and City property have been removed to provide the currently required 34:1 approach and 40:1 departure surfaces, respectively. However, a 50:1 approach surface is required for the Runway 1L precision approach and this would require the removal of additional tree obstructions outside the Airport property than for Development Concept One. An additional 12.4 acres are required for the runway protection zone and tree obstructions compared to Development Concept One.

The precision instrument 2,500-foot long runway protection zone required for Runway 1L means that a portion of the trailer park, car wash, retail stores and office space along Kenai Spur Highway are inside the runway protection zone.

6.3.2 Passenger Terminal

The passenger terminal complex development is the same as for Development Concept One.

6.3.3 Air Cargo and Mail

The air cargo development is generally the same as for Development Concept One. However, for this concept three additional lease lots are added at the north end together with a 1,000 foot extension of the apron along its frontage.

6.3.4 General Aviation

The general aviation development is generally the same as for Development Concept One.

A 26-acre area north of the Airport Operations Facility, between the aircraft parking apron and extended Willow Street, is reserved for future commercial aviation development and other airport-related land uses. This area is considered an unallocated reserve for aviation-related uses, with the specific uses to be determined in the future, depending on the nature of the demand for such lease lots.

The lease lot layout on Figures 6-5 and 6-6 illustrate the current one lot deep lease layout between the aircraft parking apron and Willow Street. The 3.3 acre area south of the passenger terminal vehicular parking lots could also be developed as a future lease lot as illustrated earlier on Figure 6-4.

A new taxiway will connect the south end of Runway 1L-19R to the float plane basin and the proposed hangar development on the east side of the float plane basin water taxi channel.

Space is reserved for lease lots along the northwest shoreline of the float plane basin for commercial aviation operators to provide facilities and services for float plane operators. This would require construction of access and water revetments which can be constructed from the south end as demand dictates as illustrated on Figures 6-5 and 6-6.

New helicopter parking for based and transient helicopters is provided on the City General Aviation Apron.

6.3.5 Airport Access and Parking

The Airport access and parking improvements are generally the same as for Alternate One except as noted below.

On the east side of the Airport, Willow Street and the utilities are extended to the north by 1,100 feet and cross linked over to Marathon Road and the northerly intersection of the future industrial park.

6.3.6 Airport Support

The Airport support improvements are the same as for Alternate One except as noted below.

An aircraft wash pad is planned on the west side of the City's based aircraft parking apron at the south end of the Airport (or adjacent to the FAA ATCT as an alternative).

Space for an aircraft deicing facility is reserved across from the passenger terminal apron between Taxiways A and J (or near Taxiway D as an alternative).

6.3.7 Environmental Impacts

There are compatible land use impacts with private parcels in the Runway 1L runway protection zone and approach surface area, as well as the Runway 19R departure surface, along Float Plane Road and Kenai Spur Highway.

A noise berm is constructed along the east side of Float Plane Road to minimize noise and visual impacts after removal of the on-airport tree obstructions.

The precision instrument 2,500-foot long runway protection zone required for Runway 1L means that a portion of the trailer park, car wash, retail stores and office space along Kenai Spur Highway are inside the runway protection zone.

6.3.8 Preliminary Financial Analysis

The estimated project costs included for Development Concept Two, including those projects not eligible for FAA grant funding, are presented in Table 6-3. The total cost is estimated to be $38 million if all the projects are implemented. Of the total $38 million, it is estimated that $28.5 million of the total project costs are FAA Airport Improvement Program (AIP) grant eligible. About $951,000 would be required from State Legislative grants, and about $1.0 million would be required from the City. An additional $7.5 million would be required from other funding sources.

It should be noted that the FAA AIP projects listed would exceed the total funding capabilities discussed in Section 6.1.2, Primary Funding Sources, if all the projects were included in the long-range master plan concept selected by the City.

This would be largely due to the addition of the Runway 1L precision instrument approach system capability, float plane facility expansion, land acquisition and additional apron expansion.

Table 6-3

DEVELOPMENT CONCEPT TWO ESTIMATED COSTS

	PROJECT	COST OF EACH PROJECT	CONCEPT TWO PROJECT COSTS	SOURCE FOR FAA-FUNDED PROJECTS			OTHER FUNDING SOURCES
				FAA @ 93.75%	STATE @ 3.125%	CITY @ 3.125%	
	AIRSIDE						
1	RETAIN R/W 1L-19R NON PRECISION	0.00					
2	RETAIN R/W 1L-19R PRECISION	3,500,000.00	3,500,000.00	3,281,250.00	109,375.00	109,375.00	
3	DISPLACE RUNWAY 1L (600 FEET)	3,650,000.00					
4	RELOCATE R/W 1L-19R 1900' PRECISION	22,250,000.00					
5	RETAIN OR ABANDON GRAVEL R/W	0.00					
6	RELOCATE GRAVEL RUNWAY	4,600,000.00					
7	EXTEND WATER R/W	1,500,000.00					
8	WIDEN WATER R/W	1,500,000.00					
9	FLOAT PLANE BASIN "PHASE ONE"	2,600,000.00	2,600,000.00	2,437,500.00	81,250.00	81,250.00	
10	FLOAT PLANE BASIN "PHASE TWO"/ REVETMENT	1,000,000.00	1,000,000.00	937,500.00	31,250.00	31,250.00	
11	T/W's H-G-GG APRON REHAB	1,000,000.00	1,000,000.00	937,500.00	31,250.00	31,250.00	
12	T/W A, T/W K TO T/W C	3,100,000.00	3,100,000.00	2,906,250.00	96,875.00	96,875.00	
13	AIRFIELD PAINT / CRACK SEAL	250,000/ YR	5,000,000.00	4,687,500.00	156,250.00	156,250.00	
	LAND ACQUISITION (KPB TAX ROLL)						
14	FOR RUNWAY PROTECTION ZONES		634,000.00	594,375.00	19,812.50	19,812.50	
15	FOR OBSTRUCTION CONTROL		1,349,180.00	1,264,856.25	42,161.88	42,161.88	
16	FOR BUFFER ALONG FLOAT PLANE ROAD		59,300.00	55,593.75	1,853.13	1,853.13	
17	CONSTRUCT EARTH BUFFER	655,500.00	655,500.00	614,531.25	20,484.38	20,484.38	
18	CONSTRUCT FENCE BUFFER	900,000.00					
	SUB TOTAL		18,897,980.00	17,716,856.25	590,561.88	590,561.88	0.00
	TERMINAL BUILDING						
	EXISTING TERMINAL IMPROVEMENTS						
19	RE-ROOF TERMINAL AREA BUILDINGS	400,000.00	400,000.00	375,000.00	12,500.00	12,500.00	
20	SPRINKLER SYSTEM REHABILITATION	100,000.00	100,000.00	93,750.00	3,125.00	3,125.00	
21	ISOLATE ADMINISTRATION AREA	17,000.00	17,000.00	7,968.75	265.63	8,765.63	
22	WIRELESS KIOSKS	15,000.00	15,000.00	14,062.50	468.75	468.75	
23	VISUAL INFORMATION SYSTEM	60,000.00	60,000.00	56,250.00	1,875.00	1,875.00	
24	ATTACHED GARAGE WITH DEMO OF EXISTING	114,500.00	114,500.00	107,343.75	3,578.13	3,578.13	
25	WARM AND COLD SECURE STORAGE	15,000.00	15,000.00	14,062.50	468.75	468.75	
26	PET RELEASE AREA	5,000.00	5,000.00	4,687.50	156.25	156.25	
27	MECH/ELECT ROOM EXPANSION AND REHAB	111,000.00	111,000.00	52,031.00	1,734.38	57,234.38	
28	EXPAND RESTAURANT 400 sq. ft.	18,000.00	18,000.00				18,000.00
29	NEW OVERHEAD DOORS WITH HOT AIR CURTAINS	87,000.00	87,000.00	81,562.50	2,718.75	2,718.75	
30	TERMINAL BUILDING ENERGY UPGRADES	160,000.00	160,000.00	150,000.00	5,000.00	5,000.00	
31	TAXI AND SMOKER SHELTERS	20,000 each	40,000.00	37,500.00	1,250.00	1,250.00	
32	AIRLINES EQUIPMENT SHELTER	65,000.00	65,000.00				65,000.00
33	EXPAND SECURE PASSENGER GATE AREA	25,000.00	25,000.00	23,437.50	781.25	781.25	
34	**CONSTRUCT NEW TERMINAL 25,000 SF**	12,200,000.00					
	SUB TOTAL		1,232,500.00	1,017,656.00	33,921.89	97,921.89	83,000.00
	CARGO, MAIL AND GENERAL AVIATION						
35	**APRON EXPANSION FOR LEASE LOTS**	3,300 per foot					
35.1	CONCEPT ONE 400'	1,320,000.00					
35.2	CONCEPT TWO 1000'	3,300,000.00	3,300,000.00	3,093,750.00	103,125.00	103,125.00	
35.3	CONCEPT TWO AND THREE 1000'	3,300,000.00					
35.4	CONCEPT TWO, THREE & FOUR 1000'	3,300,000.00					
36	**WILLOW STREET EXTENSION (ROAD/UTILITIES**	780 per foot					
36.1	CONCEPT ONE 600'	468,000.00					
36.2	CONCEPT TWO 1000'	780,000.00	780,000.00				780,000.00
36.3	CONCEPT TWO AND THREE 1000'	780,000.00					
36.4	CONCEPT FOUR 4,166 ln. ft.	3,249,480.00					
37	**LEASE LOT DEVELOPMENT TO SUBBASE**	170,000 / AC					
37.1	1000' ALONG APRON 9.4 AC	1,600,000.00					
37.2	CONCEPT TWO 12.9 AC	2,200,000.00	2,200,000.00				2,200,000.00
37.3	CONCEPT TWO AND THREE 12.9 AC	2,200,000.00					
37.4	CONCEPT TWO, THREE & FOUR 12.9 AC	2,200,000.00					
38	WATER / SEWER GRANITE PT. TO WILLOW ST.	228,000.00	228,000.00				228,000.00
39	TAXILANE EXTENSION	350,000.00	350,000.00	328,125.00	10,937.50	10,937.50	
40	CONVERT EXISTING TERMINAL AREA	1,500,000.00					
41	AIRCRAFT WASH PAD	45,000.00	45,000.00	42,187.50	1,406.25	1,406.25	
42	AIRCRAFT DEICING PAD	1,200,000.00	1,200,000.00	1,125,000.00	37,500.00	37,500.00	
	SUB TOTAL		8,103,000.00	4,589,062.50	152,968.75	152,968.75	3,208,000.00
	AIRPORT ACCESS AND PARKING						
43	ACCESS AND PARKING REHAB	1,100,000.00	1,100,000.00	1,031,250.00	34,375.00	34,375.00	
44	PARKING EXPANSION	450,000.00	450,000.00	421,875.00	14,062.50	14,062.50	
	SUB TOTAL		1,550,000.00	1,453,125.00	48,437.50	48,437.50	0.00
	AIRPORT SUPPORT						
	CROSS CONNECTS (ROADS & UTILITIES)	740 / FT					
45	ROAD LOOP ONE (MARATHON-WILLOW)	900,000.00	900,000.00				900,000.00
46	ROAD LOOP TWO (MARATHON-WILLOW)	450,000.00	450,000.00				450,000.00
47	TRADING BAY EXTENSION (RD & UTILITIES)	2,200,000.00	2,200,000.00				2,200,000.00
48	BARANOFF EXTENSION (RD & UTILITIES)	700,000.00	700,000.00				700,000.00
	SUB TOTAL		4,250,000.00	0.00	0.00	0.00	4,250,000.00
	UNIDENTIFIED PROJECTS	200,000/YR	4,000,000.00	3,750,000.00	125,000.00	125,000.00	
	TOTAL CONCEPT TWO PROJECT COSTS		38,033,480.00	28,526,699.75	950,890.01	1,014,890.01	7,541,000.00
	AVAILABLE FUNDING			22,000,000.00	733,333.00	733,333.00	TO BE DETERMINED

SOURCE: Wince-Corthell-Bryson

6.4 DEVELOPMENT CONCEPT THREE

Development Concept Three includes an additional 600-foot displacement of Runway 1L to the north, a widening of the water runway, and a new relocated gravel runway west of Runway 1W-19W. The Airport Reserve Boundary is moved to north of the Kenai Spur Highway.

Currently planned improvements, as well as those provided in Development Concepts One and Two, are also included in this concept. No further development of the terminal area, apron or lease lots is provided to the north. However, the lease lot reserve area is subdivided differently providing smaller lots with taxi lane and street access between the apron and Willow Street. This subdivision layout could provide more flexibility for serving both cargo and other commercial aviation operators.

The principal features of this development concept are illustrated on Figures 6-7 and 6-8 and described below.

6.4.1 Airside

The airside includes land acquisition, airfield and airspace and navigational aids.

6.4.1.1 Land Acquisition

This concept requires the acquisition, or avigation easements, of about 10.9 acres (11 lots) of land at the southwest end of the Airport required for a 2,500-foot long precision instrument runway protection zone for the new Runway 1L displaced threshold. This private land is north of the Kenai Spur Highway. An additional 10.6 acres (13.5 lots) are required for acquisition or avigation easements for tree removal for the 50:1 approach and 40:1 departure surfaces for Runways 1L and 19R, respectively (See Table 6-1). Another 2.5 acres (4 lots) could be acquired to provide a buffer area along the west side of Float Plane Road. No property acquisitions are required to the north of the Airport.

6.4.1.2 Airfield

Runway 1L-19R. The Runway 1L threshold is displaced an additional 600 feet to the north to allow for a 2,500-foot precision instrument runway protection zone to the south for Runway 1L. This provides only 6,975 feet for landing on Runway 1L and 7,575 feet for landing on Runway 19R. This provides up to 7,855 feet for takeoffs on both Runways 1L and 19R.

Existing taxiways are retained to serve the runway and terminal area.

Runway 1W-19W. The water runway is widened to 500 feet at the surface. A separate 150-foot wide parallel water taxi channel is provided on the west side. In this concept the water lane is widened only to the west. Therefore the water runway centerline is retained.

Runway 1R-19L. A new gravel runway (2,400 feet by 60 feet) is provided west of Runway 1W-19W. (Alternative locations for the gravel runway that were considered and eliminated included south of Runway 1W-19W and between Runway 1L-19R and Taxiway A.) The present gravel runway to the east of Runway 1L-19R is abandoned.

DEVELOPMENT CONCEPT THREE

LAND ACQUISITION

R/W DEPARTURE PROTECTION ZONE

AIRPORT RESERVE BOUNDARY

SCREEN FENCING

BUFFER ZONE

R/W APPROACH PROTECTION ZONE

AIRPORT LAND ACQUISITION BOUNDARY

WASH PAD

R/W 1L

FLOAT PLANE BASIN PHASE ONE

HELICOPTER TIEDOWNS

RELOCATE VASI'S

DEICING PAD

TRADING BAY

WILLOW STREET

MARATHON ROAD

UTILITY/ROAD LINKS

KENAI INDUSTRIAL PARK SUBD.

NEAR

LONG

TAXILANE

TERM

DEVELOPMENT

RPZ

GRAVEL RUNWAY

500'

ROAD

R/W 19 R

1000'

OWNER: ALASKA MENTAL HEALTH TRUST AUTHORITY

OWNER: BLM

MAGNETIC DECLINATION 16°49'48"E (MAY 1, 2015)

250 0 500

GRAPHIC SCALE

AIRPORT RESERVE BOUNDARY

AIRPORT LAND ACQUISITIONS BOUNDARY

LEGEND

- LAND/EASEMENT ACQUISITION
- CONCEPT ONE
- CONCEPT TWO
- CONCEPT THREE
- PAVEMENT MAINTENANCE
- AVAILABLE LEASE LOTS

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WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN DEVELOPMENT CONCEPT THREE RW IL PRECISION APPROACH WITH 600' THRESHOLD DISPLACED	FIGURE 6-7
DRAWN BY: V.C. DRAWING: ALT TWO RW1LPRECISIONAPPROACH		
CHECKED BY: C.M. DATE: Oct 03,2017		

DEVELOPMENT CONCEPT THREE

LAND ACQUISITION

R/W DEPARTURE PROTECTION ZONE

AIRPORT RESERVE BOUNDARY

SCREEN FENCING

BUFFER ZONE

R/W 1L

WASH PAD

HELICOPTER TIEDOWNS

R/W APPROACH PROTECTION ZONE

RELOCATE VASI'S

DEICING PAD

NEAR

LONG

TAXILANE

TERM

DEVELOPMENT

RPZ

GRAVEL RUNWAY

500'

ROAD

AIRPORT LAND ACQUISITION BOUNDARY

WILLOW STREET

UTILITY/ROAD LINKS

MARATHON ROAD

KENAI INDUSTRIAL PARK SUBD.

R/W 19 R

OWNER: ALASKA MENTAL HEALTH TRUST AUTHORITY

OWNER: BLM

MAGNETIC NORTH

NORTH

MAGNETIC DECLINATION 16°49'48"E (MAY 1, 2015)

250 0 500

GRAPHIC SCALE

AIRPORT RESERVE BOUNDARY

AIRPORT LAND ACQUISITIONS BOUNDARY

LAND OWNERSHIP

- KENAI MUNICIPAL AIRPORT
- MUNICIPAL
- BOROUGH
- STATE
- FEDERAL
- PRIVATE
- NATIVE
- NATIVE ALLOTMENT
- AVAILABLE LEASE LOTS

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WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN	FIGURE
DRAWN BY: V.C. DRAWING: ALT TWO RPZ LANDUSE	DEVELOPMENT CONCEPT THREE LAND OWNERSHIP MAP	6-8
CHECKED BY: C.M. DATE: Oct 03,2017		

6.4.1.3 Airspace and Navigational Aids

A new precision instrument approach procedure using stand-alone global positioning system (GPS) will be developed for Runway 1L with minimums of 200 feet and 1/2 mile visibility. A MALSR will be installed on Runway 1L. New generation technology may reduce the existing minimums in the future and if the existing tree obstructions at the south end are removed.

The ILS glide slope and localizer, MALSR, runway threshold lights and VASI-4 will not have to be relocated for Runway 19R. The runway threshold lights and VASI-4 will have to be relocated for Runway 1L. Alternatively, the VASI-4s will be replaced with precision approach path indicators (PAPIs).

Lights are not provided for the water runway and new gravel runway.

The tree obstructions to the existing Runway 1L approach surface and Runway 19R departure surface, and trees within the runway protection zone, on Airport and City property have been removed to provide the currently required 34:1 approach and 40:1 departure surfaces. However, a 50:1 approach surface is required for the Runway 1L precision approach and this would require the removal of more tree obstructions (10.6 acres), outside the Airport property, than for Development Concept One (5.6 acres) and Development Concept Two (8.2 acres).

Displacing the Runway 1L threshold by an additional 600 feet to the north results in the trailer park, south of the Kenai Spur Highway, being outside the precision instrument 2,500-foot long runway protection zone. The car wash, retail stores and office space north of the Kenai Spur Highway will also be outside the runway protection zone.

The new gravel runway is planned with visual runway protection zones and 20:1 approach surfaces at both ends of the runway.

6.4.2 Passenger Terminal

The passenger terminal complex development is the same as for Development Concepts One and Two.

6.4.3 Air Cargo and Mail

The proposed air cargo facilities are generally the same as for Development Concepts One and Two with four additional lease lots and a 1,100-foot extension of the aircraft parking apron space provided north of the Airport Operations Facility for future cargo use.

6.4.4 General Aviation

The general aviation facilities are generally the same as for Development Concepts One and Two. A 26-acre area north of the Airport Operations Facility, between the aircraft parking apron and extended Willow Street, is reserved for future commercial aviation development and other Airport-related land uses.

The lease lot layout on Figures 6-7 and 6-8 provides for two lots deep between the aircraft parking apron and Willow Street with taxiway access from the aircraft parking apron and vehicular access from Willow Street to each lot. The lease lot reserve area north of the Airport Operations Facility is reconfigured to provide smaller lots (200 feet by 200 feet) with taxi lane and street access between the apron and Willow

Street. This configuration provides more flexibility for development and mixed use of cargo and commercial aviation operators.

A new taxiway will connect the south end of Runway 1L-19R to the float plane basin and the proposed hangar development on the east side of the float plane basin water taxi channel.

Space is reserved for lease lots along the northwest shoreline of the float plane basin for commercial aviation operators to provide facilities and services for float plane operators. This would require construction of access and water revetments which can be constructed from the south end as demand dictates as illustrated on Figures 6-7 and 6-8.

New helicopter parking for based and transient helicopters is located adjacent to the FAA ATCT rather than on the City General Aviation apron as in Development Concepts One and Two, to minimize the amount of hover taxiing required and to be close to access to Willow Street.

6.4.5 Airport Access and Parking

The Airport access and parking improvements are generally the same as for Development Concepts One and Two except as noted below.

On the east side of the Airport, Willow Street and it's utilities are extended to the north by 1,600 feet and cross linked over to Marathon Road and the northerly intersection of the future industrial park.

6.4.6 Airport Support

The airport support facilities are generally the same as for Development Concepts One and Two except as noted below.

An aircraft wash pad is planned on the west side of the City's based aircraft parking apron at the south end of the Airport (or adjacent to the FAA ATCT as an alternative site).

Space for an aircraft deicing facility is reserved across from the terminal between Taxiways A and J (or near Taxiway D as an alternative site).

6.4.7 Environmental Impacts

There are compatible land use impacts with private parcels in the Runway 1L runway protection zone and 50 to 1 approach surface along Float Plane Road.

A screen fence is to be built along the east side of Float Plane Road to minimize noise and visual impacts after removal of the on-airport tree obstructions.

There will be increased overflights of the residential neighborhood west of the Airport with the new gravel runway location.

There are potential wetland impacts in the area of the new gravel runway and realigned maintenance/perimeter road and fence on the northwest side of the Airport.

The wetlands east of the existing gravel runway were addressed and mitigated in the 2005 Environmental Assessment.

6.4.8 Preliminary Financial Analysis

The estimated project costs included for Development Concept Three, including those projects not eligible for FAA grant funding, are presented in Table 6-4. The total cost is estimated to be $44.5 million if all the projects are implemented. Of the total $44.5 million, it is estimated that $34.6

Table 6-4
DEVELOPMENT CONCEPT THREE ESTIMATED COSTS

	PROJECT	COST OF EACH PROJECT	CONCEPT THREE PROJECT COSTS	SOURCE FOR FAA-FUNDED PROJECTS			OTHER FUNDING SOURCES
				FAA @ 93.75%	STATE @ 3.125%	CITY @ 3.125%	
	AIRSIDE						
1	RETAIN R/W 1L-19R NON PRECISION	0.00					
2	RETAIN R/W 1L-19R PRECISION	3,500,000.00					
3	DISPLACE RUNWAY 1L (600 FEET)	3,650,000.00	3,650,000.00	3,421,875.00	114,062.50	114,062.50	
4	RELOCATE R/W 1L-19R 1900' PRECISION	22,250,000.00					
5	RETAIN OR ABANDON GRAVEL R/W	0.00					
6	RELOCATE GRAVEL RUNWAY	4,600,000.00	4,600,000.00	4,312,500.00	143,750.00	143,750.00	
7	EXTEND WATER R/W	1,500,000.00					
8	WIDEN WATER R/W	1,500,000.00	1,500,000.00	1,406,250.00	46,875.00	46,875.00	
9	FLOAT PLANE BASIN "PHASE ONE"	2,600,000.00	2,600,000.00	2,437,500.00	81,250.00	81,250.00	
10	FLOAT PLANE BASIN "PHASE TWO"/ REVETMENT	1,000,000.00	2,000,000.00	1,875,000.00	62,500.00	62,500.00	
11	T/W's H-G-GG APRON REHAB	1,000,000.00	1,000,000.00	937,500.00	31,250.00	31,250.00	
12	T/W A, T/W K TO T/W C	3,100,000.00	3,100,000.00	2,906,250.00	96,875.00	96,875.00	
13	AIRFIELD PAINT / CRACK SEAL	250,000/ YR	5,000,000.00	4,687,500.00	156,250.00	156,250.00	
	LAND ACQUISITION (KPB TAX ROLL)						
14	FOR RUNWAY PROTECTION ZONES		304,300.00	285,281.25	9,509.38	9,509.38	
15	FOR OBSTRUCTION CONTROL		688,900.00	645,843.75	21,528.13	21,528.13	
16	FOR BUFFER ALONG FLOAT PLANE ROAD		59,300.00	55,593.75	1,853.13	1,853.13	
17	CONSTRUCT EARTH BUFFER	655,500.00		0.00	0.00	0.00	
18	CONSTRUCT FENCE BUFFER	900,000.00	900,000.00	843,750.00	28,125.00	28,125.00	
	SUB TOTAL		25,402,500.00	23,814,843.75	793,828.13	793,828.13	0.00
	TERMINAL BUILDING						
	EXISTING TERMINAL IMPROVEMENTS						
19	RE-ROOF TERMINAL AREA BUILDINGS	400,000.00	400,000.00	375,000.00	12,500.00	12,500.00	
20	SPRINKLER SYSTEM REHABILITATION	100,000.00	100,000.00	93,750.00	3,125.00	3,125.00	
21	ISOLATE ADMINISTRATION AREA	17,000.00	17,000.00	7,968.75	265.63	8,765.63	
22	WIRELESS KIOSKS	15,000.00	15,000.00	14,062.50	468.75	468.75	
23	VISUAL INFORMATION SYSTEM	60,000.00	60,000.00	56,250.00	1,875.00	1,875.00	
24	ATTACHED GARAGE WITH DEMO OF EXISTING	114,500.00	114,500.00	107,343.75	3,578.13	3,578.13	
25	WARM AND COLD SECURE STORAGE	15,000.00	15,000.00	14,062.50	468.75	468.75	
26	PET RELEASE AREA	5,000.00	5,000.00	4,687.50	156.25	156.25	
27	MECH/ELECT ROOM EXPANSION AND REHAB	111,000.00	111,000.00	52,031.25	1,734.38	57,234.38	
28	EXPAND RESTAURANT 400 sq. ft.	18,000.00	18,000.00				18,000.00
29	NEW OVERHEAD DOORS WITH HOT AIR CURTAINS	87,000.00	87,000.00	81,562.50	2,718.75	2,718.75	
30	TERMINAL BUILDING ENERGY UPGRADES	160,000.00	160,000.00	150,000.00	5,000.00	5,000.00	
31	TAXI AND SMOKER SHELTERS	20,000 each	40,000.00	37,500.00	1,250.00	1,250.00	
32	AIRLINES EQUIPMENT SHELTER	65,000.00	65,000.00				65,000.00
33	EXPAND SECURE PASSENGER GATE AREA	25,000.00	25,000.00	23,437.50	781.25	781.25	
34	**CONSTRUCT NEW TERMINAL 25,000 SF**	12,200,000.00					
	SUB TOTAL		1,232,500.00	1,017,656.25	33,921.89	97,921.89	83,000.00
	CARGO, MAIL AND GENERAL AVIATION						
35	**APRON EXPANSION FOR LEASE LOTS**	3,300 per foot					
35.1	CONCEPT ONE 400'	1,320,000.00					
35.2	CONCEPT TWO 1000'	3,300,000.00					
35.3	CONCEPT TWO AND THREE 1000'	3,300,000.00	3,300,000.00	3,093,750.00	103,125.00	103,125.00	
35.4	CONCEPT TWO, THREE & FOUR 1000'	3,300,000.00					
36	**WILLOW STREET EXTENSION (ROAD/UTILITIES**	780 per foot					
36.1	CONCEPT ONE 600'	468,000.00					
36.2	CONCEPT TWO 1000'	780,000.00					
36.3	CONCEPT TWO AND THREE 1000'	780,000.00	780,000.00				780,000.00
36.4	CONCEPT FOUR 4,166 ln. ft.	3,249,480.00					
37	**LEASE LOT DEVELOPMENT TO SUBBASE**	170,000 / AC					
37.1	1000' ALONG APRON 9.4 AC	1,600,000.00					
37.2	CONCEPT TWO 12.9 AC	2,200,000.00					
37.3	CONCEPT TWO AND THREE 12.9 AC	2,200,000.00	2,200,000.00				2,200,000.00
37.4	CONCEPT TWO, THREE & FOUR 12.9 AC	2,200,000.00					
38	WATER / SEWER GRANITE PT. TO WILLOW ST.	228,000.00	228,000.00				228,000.00
39	TAXILANE EXTENSION	350,000.00	350,000.00	328,125.00	10,937.50	10,937.50	
40	CONVERT EXISTING TERMINAL AREA	1,500,000.00					
41	AIRCRAFT WASH PAD	45,000.00	45,000.00	42,187.50	1,406.25	1,406.25	
42	AIRCRAFT DEICING PAD	1,200,000.00	1,200,000.00	1,125,000.00	37,500.00	37,500.00	
	SUB TOTAL		8,103,000.00	4,589,062.50	152,968.75	152,968.75	3,208,000.00
	AIRPORT ACCESS AND PARKING						
43	ACCESS AND PARKING REHAB	1,100,000.00	1,100,000.00	1,031,250.00	34,375.00	34,375.00	
44	PARKING EXPANSION	450,000.00	450,000.00	421,875.00	14,062.50	14,062.50	
	SUB TOTAL		1,550,000.00	1,453,125.00	48,437.50	48,437.50	0.00
	AIRPORT SUPPORT						
	CROSS CONNECTS (ROADS & UTILITIES)	740 / FT					
45	ROAD LOOP ONE (MARATHON-WILLOW)	900,000.00	900,000.00				900,000.00
46	ROAD LOOP TWO (MARATHON-WILLOW)	450,000.00	450,000.00				450,000.00
47	TRADING BAY EXTENSION (RD & UTILITIES)	2,200,000.00	2,200,000.00				2,200,000.00
48	BARANOFF EXTENSION (RD & UTILITIES)	700,000.00	700,000.00				700,000.00
	SUB TOTAL		4,250,000.00	0.00	0.00	0.00	4,250,000.00
	UNIDENTIFIED PROJECTS	200,000/YR	4,000,000.00	3,750,000.00	125,000.00	125,000.00	
	TOTAL CONCEPT THREE PROJECT COSTS		44,538,000.00	34,624,687.50	1,154,156.26	1,218,156.26	7,541,000.00
	AVAILABLE FUNDING			22,000,000.00	733,000.00	733,333.00	TO BE DETERMINED

SOURCE: Wince-Corthell-Bryson

million of the total project costs are FAA Airport Improvement Program (AIP) grant eligible. About $1.2 million would be required from State Legislative grants, and about $1.2 million would be required from the City. An additional $7.5 million would be required from other funding sources.

It should be noted that the FAA AIP projects listed would exceed the total funding capabilities discussed in Section 6.1.2, Primary Funding Sources, if all the projects were included in the long-range master plan concept selected by the City.

This would be largely due to the inclusion of the Runway 1L precision instrument approach system capability, the relocation of the gravel runway over on the west side, float plane facility expansion and land acquisition.

6.5 DEVELOPMENT CONCEPT FOUR

Development Concept Four includes long-range (beyond 2030) and other considerations that could be combined with elements of Development Concepts One, Two and Three in developing the Airport Master Plan. This concept includes a longer 1,900-foot relocation of Runway 1L-19R to the north, an extension of the water Runway 1W-19W and a new gravel runway at 700 feet, centerline-to-centerline, west of Runway 1W-19W with space to the west for lease lot development.

A new passenger terminal area is established at midfield of the relocated Runway 1L-19R and the existing passenger terminal area is converted to commercial aviation/general aviation use.

Marathon Road is relocated to the east with the extension of Willow Street to the north and additional lease lot area is made available.

Currently planned improvements, as well as those provided in Development Concepts One, Two and Three, are also included in this concept.

The principal features of this concept are illustrated on Figures 6-9 and 6-10 and described below.

6.5.1 Airside

The airside includes land acquisition, airfield and airspace and navigational aids.

6.5.1.1 Land Acquisition

This concept requires the acquisition, or avigation easement, of 1.25 acres (1 lot) of land at the southwest end of the Airport required for a 2,500-foot precision instrument runway protection zone for relocated Runway 1L. The private land is north of the Kenai Spur Highway. An additional 5 acres (5 lots) of land are required for tree removal for the 50:1 approach and 40:1 departure procedures for relocated Runways 1L and 19R, respectively, along Float Plane Road (See Table 6-1). Another 2.5 acres (4 lots) could be acquired to complete a buffer area along the west side of Float Plane Road.

The 1,900-foot relocation of Runway 1L-19R to the north locates the new Runway 1L threshold at Taxiway E and removes all incompatible land uses to the south with the exception of one lot on Float Plane Road. All existing tree obstructions are avoided with the exception of 5 acres (5 lots) along Float Plane Road, between Second and Fourth Avenues. (Note: an additional runway relocation of about 1,000 feet to the north would be required to avoid all tree obstructions to the south for the Runways 1L and 19R approach and departure surfaces, respectively.)

This concept requires the acquisition of approximately 80 acres of private land, 40 acres from the Kenai Native Association, and 120 acres from the Bureau of Land Management for the relocation of Runway 1L-19R and its runway protection zone and for the new gravel runway and supporting facilities.

6.5.1.2 Airfield

Runway 1L-19R. The Runway 1L-19R thresholds are relocated 1,900 feet to the north for a length of 7,855 feet. This provides 7,855 feet for takeoffs and landings on both Runways 1L and 19R.

DEVELOPMENT CONCEPT FOUR

MAGNETIC DECLINATION 16°49'48"E (MAY 1, 2015)

250 0 500

GRAPHIC SCALE

AIRPORT RESERVE BOUNDARY

AIRPORT LAND ACQUISITIONS BOUNDARY

LEGEND

- LAND/EASEMENT ACQUISITION
- CONCEPT ONE
- CONCEPT TWO
- CONCEPT THREE
- CONCEPT FOUR
- PAVEMENT MAINTENANCE
- AVAILABLE LEASE LOTS

AIRPORT RESERVE BOUNDARY

LAND ACQUISITION

R/W APPROACH PROTECTION ZONE

R/W DEPARTURE PROTECTION ZONE

BUFFER ZONE

ACRES TO BE ACQUIRED

OWNER: LAVERNE FOWLER

80 ACRES

KENAI NATIVE ASSOCIATION

APRON AND LEASE LOTS

ROAD

40 ACRES

OWNER: ALASKA MENTAL HEALTH TRUST AUTHORITY

AIRPORT LAND ACQUISITION BOUNDARY

WASH PAD

HELICOPTER TIEDOWNS

DEICING PAD

R/W 1L

4 PAPI'S

COMMERCIAL GENERAL AVIATION

MID FIELD TAXIWAYS

NEAR

LONG

TAXILANE

TERM

DEVELOPMENT

RPZ

GRAVEL RUNWAY

500'

RELOCATE MID FIELD TAXIWAY

WILLOW STREET

TERMINAL RESERVE

1000'

RELOCATE GLIDE SLOPE

400'

MARATHON ROAD

UTILITY/ROAD LINKS

KENAI INDUSTRIAL PARK SUBD.

R/W 19 R

120 ACRES TO BE ACQUIRED

OWNER: BLM

NAVAIDS

R/W PROTECTION ZONE

WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN DEVELOPMENT CONCEPT FOUR RW IL PRECISION APPROACH WITH RUNWAY RELOCATED 1900'	FIGURE 6-9
DRAWN BY: V.C. DRAWING: ALT TWO RW1LPRECISIONAPPROACH		
CHECKED BY: C.M. DATE: Oct 03,2017		

PLOTTED: Oct 03, 17 – 2:16pm

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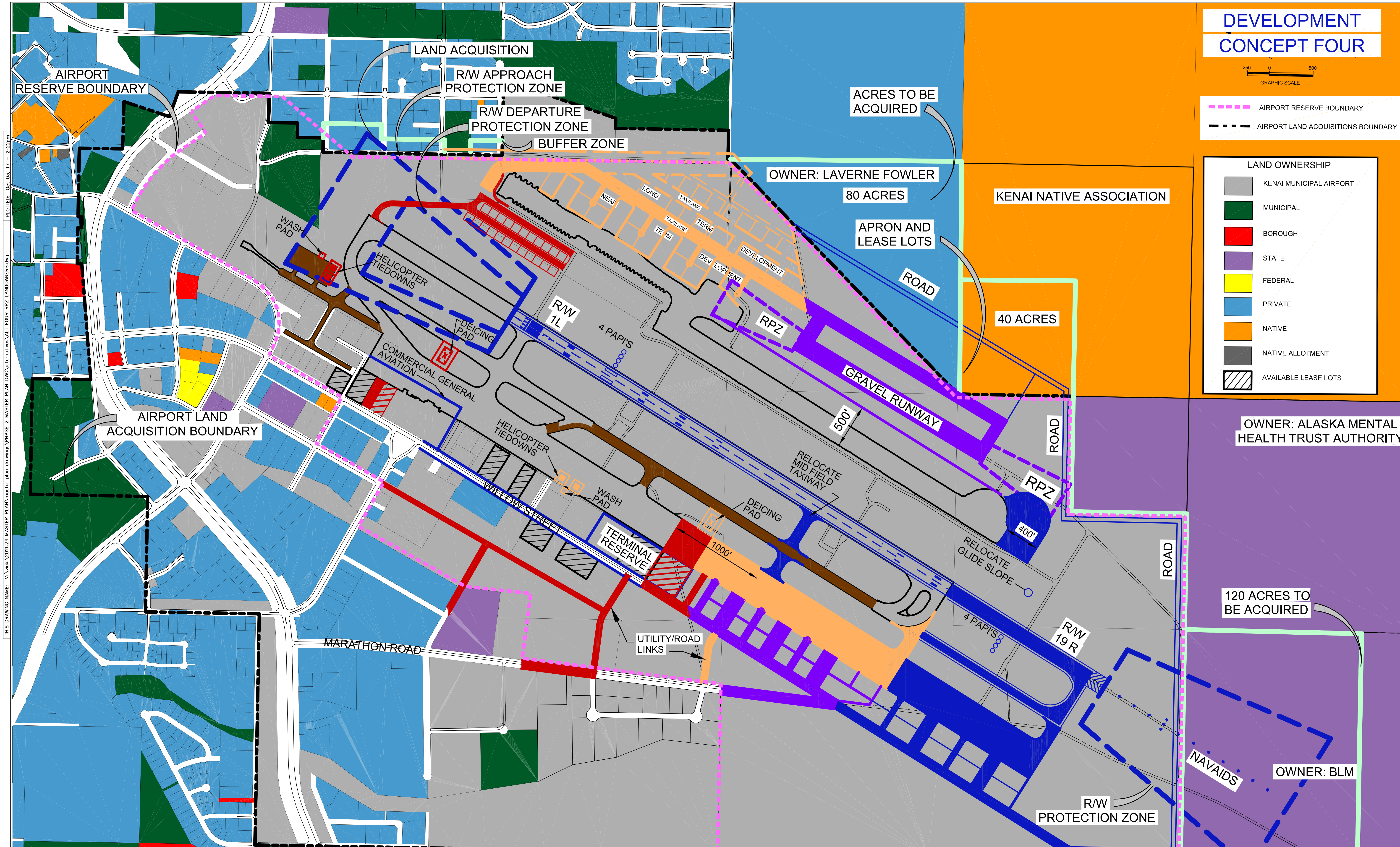

DEVELOPMENT
CONCEPT FOUR
250 0 500
GRAPHIC SCALE
AIRPORT RESERVE BOUNDARY
AIRPORT LAND ACQUISITIONS BOUNDARY
LAND OWNERSHIP
KENAI MUNICIPAL AIRPORT
MUNICIPAL
BOROUGH
STATE
FEDERAL
PRIVATE
NATIVE
NATIVE ALLOTMENT
AVAILABLE LEASE LOTS
AIRPORT RESERVE BOUNDARY
LAND ACQUISITION
R/W APPROACH PROTECTION ZONE
R/W DEPARTURE PROTECTION ZONE
BUFFER ZONE
ACRES TO BE ACQUIRED
OWNER: LAVERNE FOWLER
80 ACRES
APRON AND LEASE LOTS
KENAI NATIVE ASSOCIATION
40 ACRES
ROAD
RPZ
GRAVEL RUNWAY
500'
RPZ
400'
OWNER: ALASKA MENTAL HEALTH TRUST AUTHORITY
120 ACRES TO BE ACQUIRED
OWNER: BLM
NAVAIDS
R/W PROTECTION ZONE
R/W 19 R
4 PAPI'S
RELOCATE GLIDE SLOPE
RELOCATE MID FIELD TAXIWAY
DEICING PAD
1000'
TERMINAL RESERVE
UTILITY/ROAD LINKS
MARATHON ROAD
WILLOW STREET
WASH PAD
HELICOPTER TIEDOWNS
COMMERCIAL GENERAL AVIATION
DEICING PAD
R/W 1L
4 PAPI'S
WASH PAD
HELICOPTER TIEDOWNS
AIRPORT LAND ACQUISITION BOUNDARY
LONG
TAXILANE
TERM
NEAR
TE RM
DEVELOPMENT
DEV LOPMENT

WINCE-CORTHELL-BRYSON
ARIES CONSULTANTS LTD.

DRAWN BY: V.C. DRAWING: ALT TWO RPZ LANDUSE
CHECKED BY: C.M. DATE: Oct 03,2017

KENAI MUNICIPAL AIRPORT
MASTER PLAN

DEVELOPMENT CONCEPT FOUR
LAND OWNERSHIP MAP

FIGURE
6-10

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Taxiway A is retained at the present 600-foot centerline-to-centerline separation and is extended to the north to serve the new north end of Runway 1L-19R. A new exit taxiway is provided at the north end of the runway. Taxiway E becomes the new entry/exit taxiway for the new south end of Runway 1L-19R.

Runway 1W-19W. The water runway is lengthened to the north to 5,000 feet at the surface. A 300-foot radius turning basin is provided at the north end of the water runway. A separate 150-foot wide parallel taxi channel is provided on the west side. In this concept the water lane is widened only to the west as in Development Concept Three.

Runway 1R-19L. A new gravel runway (2,400 feet by 60 feet) is provided at the north end of the Airport at 700 feet centerline-to-centerline separation west of Runway 1W-19W. The present gravel runway to the east of Runway 1L-19R is abandoned.

6.5.1.3 Airspace and Navigational Aids

A new precision instrument approach procedure using stand-alone global positioning system (GPS) will be developed for Runway 1L with minimums of 200 feet and 1/2 mile visibility. A MALSR will be installed on Runway 1L. New generation technology may reduce the existing minimums in the future and if the existing tree obstructions at the south end are removed.

The ILS glide slope and localizer, MALSR, runway threshold lights and VASI-4s will have to be relocated at both ends of the runway for the relocation of Runway 1L-19R. Alternatively, the VASI-4s will be replaced with PAPIs.

Lights are not provided for the water runway and the new gravel runway.

Even with the 1,900-foot runway relocation to the north and the removal of the tree obstructions on Airport and City property, another 5 acres (5 lots) will be required for acquisition or avigation easements for tree maintenance to protect the navigable airspace.

The water Runway 1W-19W extension to the north is planned with a visual runway protection zone and 20:1 approach surface.

The new gravel runway is planned with visual runway protection zones and 20:1 approach surfaces at both ends of the runway.

6.5.2 Passenger Terminal

The passenger terminal complex is relocated to a new location north of the Airport Operations Facility. The new passenger terminal would be more centrally located with respect to the airfield if Runway 1L-19R is relocated by 1,900 feet to the north.

Approximately 160,000 square feet (700 feet by 230 feet) is required for the commuter air carrier aircraft parking apron to handle up to six deHavilland DHC-8 type aircraft. The aircraft parking apron and Taxiway A, adjacent to the new passenger terminal building will provide for the aircraft parking and for RDG C-IV aircraft to use Taxiway A. The apron service road is retained to the west between the new passenger terminal apron and Taxiway A.

While the existing overall passenger terminal building space (25,000 square feet) is adequate to handle the forecast demand through the year 2030, space is reserved for long-range expansion of the new passenger terminal building.

A conceptual layout for the relocated passenger terminal, aircraft parking apron and vehicular parking is shown on Figure 6-11.

Potential future uses of the existing passenger terminal/aircraft parking apron/vehicular parking areas and facilities could include additional commercial aviation lease lots and general aviation facilities.

6.5.3 Air Cargo and Mail

The proposed air cargo facilities are generally the same as for Development Concepts One, Two and Three with additional lease lot and aircraft parking apron provided to the north of the Airport Operations Facility and alongside the current gravel runway facility for future cargo use.

6.5.4 General Aviation

The general aviation facilities are generally the same as for Development Concepts One, Two and Three. A 36 acre area (not including the new passenger terminal area) north of the Airport Operations Facility, between the aircraft parking apron and extended Willow Street, is reserved for future commercial aviation development and other Airport-related land uses.

An additional 20 acres of land would be reserved for lease lot development between the apron and Willow Street. The lease lot layout on Figures 6-9 and 6-10 provides for two lots deep (200 feet by 200 feet) between the aircraft parking apron and vehicular access from Willow Street to each lot. In addition, this would preserve the capability for future aviation development, with airfield access, for the area east of existing Marathon Road and the Airport Reserve Boundary.

Additional space for future commercial aviation development (e.g., cargo, general aviation) is reserved to the east by relocating Marathon Road to the east along the Airport Reserve Boundary.

Space is provided for 30 hangars north of the Airport Operations Facility rather than at the south end of the Airport. Vacant Lots in General Aviation Apron No. 1 are also reserved for future general aviation use.

Space for lease lot development is provided to the west of the new gravel runway and parallel taxiway.

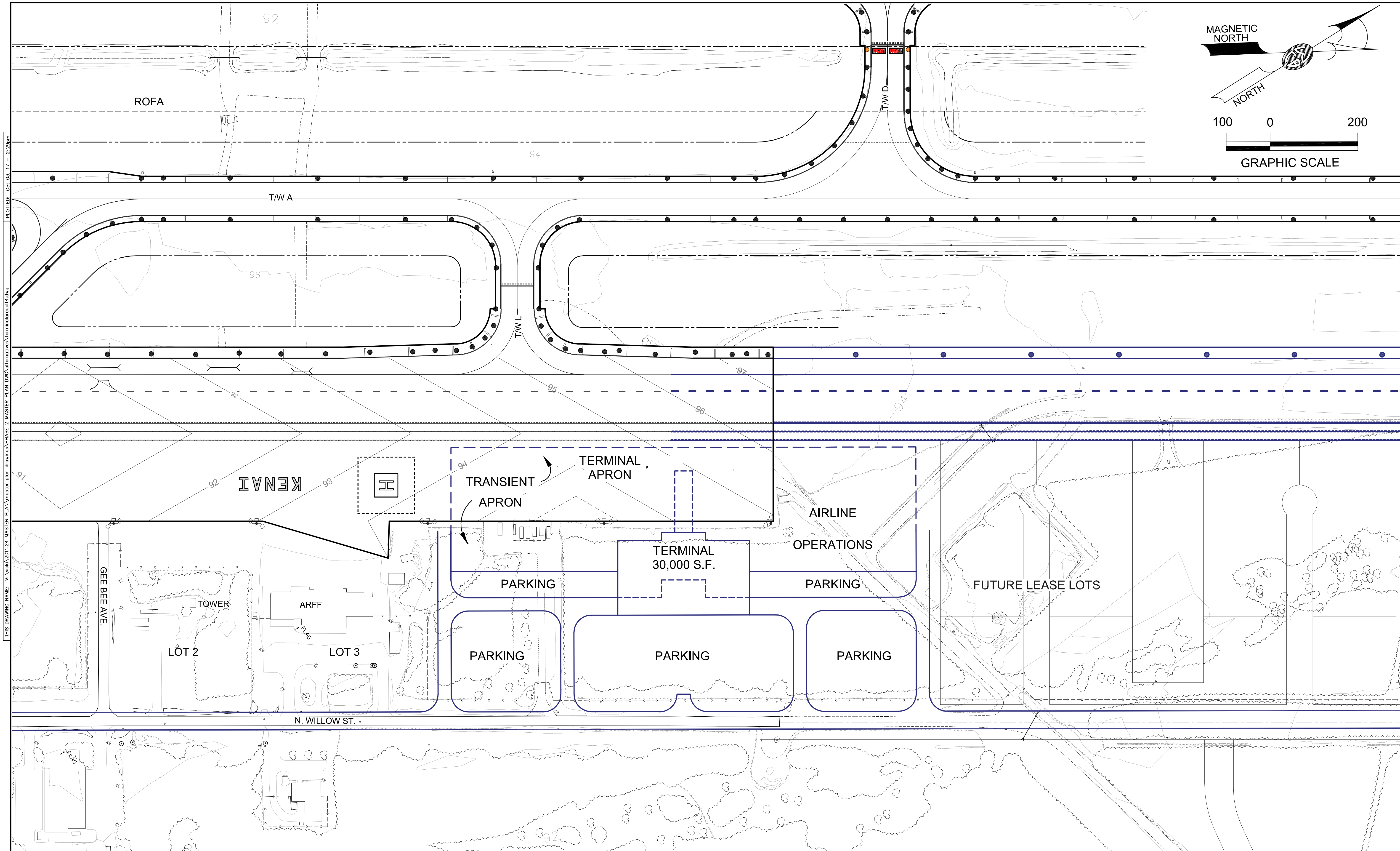
In the long term additional space for float plane slips and lease lots are provided west of the old float plane basin. This would require construction of access and water revetments which can be constructed from the south end as demand dictates as illustrated on Figures 6-9 and 6-10.

6.5.5 Airport Access and Parking

Willow Street is extended north, across existing Marathon Road, to the future relocated north end of Runway 1L-19R and Marathon Road is relocated to the east to serve additional commercial aviation lease lots and apron areas. (The section of Willow Street from Airport Way to the new passenger terminal location would be FAA grant eligible for reconstruction as the primary airport access road.)

The aircraft parking apron and Willow Street would be extended to the north, with the runway relocation, requiring the relocation of approximately 6,000 feet of Marathon Road to the east.

A new curbside roadway is provided adjacent to the new passenger terminal. A one-way road would encircle a new



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KENAI MUNICIPAL AIRPORT
MASTER PLAN

DEVELOPMENT CONCEPT FOUR
NEW TERMINAL AREA

FIGURE
6-11

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vehicular parking lot. Parking on the east side of the curbside roadway across from the new passenger terminal will be eliminated to improve the flow of traffic along the new terminal curbside roadway. A covered arrival and departure area in front of the new passenger terminal is shown because of the ice buildup that occurs at the existing passenger terminal.

On the east side of the Airport, Willow Street and its utilities are extended to the north by 1,600 feet and cross linked over to Marathon Road at the intersection of the roads.

New parking spaces for public, employee and rental car parking are provided with approximately 700 spaces adjacent to the new passenger terminal.

6.5.6 Airport Support

The airport support facilities are generally the same as for Development Concepts One, Two and Three. New support facilities and utilities would be required for the new passenger terminal facility.

An aircraft wash pad is planned on the west side of the City's based aircraft parking apron at the south end of the Airport (or adjacent to the FAA ATCT as an alternative site).

Space for an aircraft deicing facility is reserved near Taxiway D as the runway is relocated to the north in this concept.

Approximately 10,000 feet of service road and security fence would have to be relocated on the north and west sides of the Airport.

6.5.7 Environmental Impacts

There are compatible land use impacts with private parcels in the Runway 1L runway protection zone along Float Plane Road. This concept requires acquisition of native, private and government land to the north and west. This area is designated as Parks/Recreation and Open Space land to the north in the Comprehensive Plan and is zoned Conservation.

There will be increased overflights of the residential neighborhood west of the Airport with the new gravel runway location.

There are potential wetlands impacts in the area of the new gravel runway and supporting aircraft parking apron and lease lots and realigned maintenance/perimeter road and fence on the northwest side of the Airport. The wetlands east of the existing gravel runway were addressed and mitigated in the 2005 Environmental Assessment.

The Airport perimeter fence would be moved to the northwest towards the Caribou area north of the Airport.

A noise berm or screen fence will be built along the east side of Float Plane Road to minimize noise and visual impacts after removal of the on-airport tree obstructions.

6.5.8 Preliminary Financial Analysis

The estimated project costs included for Development Concept Four, including those projects not eligible for FAA grant funding, are presented in Table 6-5. The total cost is estimated to be $77.3 million if all the projects are implemented. Of the total $77.3 million, it is estimated that $61.7 million of the total project costs are FAA Airport

Table 6-5
DEVELOPMENT CONCEPT FOUR ESTIMATED COSTS

	PROJECT	COST OF EACH PROJECT	CONCEPT FOUR PROJECT COSTS	SOURCE FOR FAA-FUNDED PROJECTS			OTHER FUNDING SOURCES
				FAA @ 93.75%	STATE @ 3.125%	CITY @ 3.125%	
	AIRSIDE						
1	RETAIN R/W 1L-19R NON PRECISION	0.00					
2	RETAIN R/W 1L-19R PRECISION	3,500,000.00					
3	DISPLACE RUNWAY 1L (600 FEET)	3,650,000.00					
4	RELOCATE R/W 1L-19R 1900' PRECISION	22,250,000.00	22,500,000.00	21,093,750.00	703,125.00	703,125.00	
5	RETAIN OR ABANDON GRAVEL R/W	0.00					
6	RELOCATE GRAVEL RUNWAY	4,600,000.00	4,600,000.00	4,312,500.00	143,750.00	143,750.00	
7	EXTEND WATER R/W	1,500,000.00	1,500,000.00	1,406,250.00	46,875.00	46,875.00	
8	WIDEN WATER R/W	1,500,000.00	1,500,000.00	1,406,250.00	46,875.00	46,875.00	
9	FLOAT PLANE BASIN "PHASE ONE"	2,600,000.00	2,600,000.00	2,437,500.00	81,250.00	81,250.00	
10	FLOAT PLANE BASIN "PHASE TWO"/ REVETMENT	1,000,000.00	2,000,000.00	1,875,000.00	62,500.00	62,500.00	
11	T/W's H-G-GG APRON REHAB	1,000,000.00	1,000,000.00	937,500.00	31,250.00	31,250.00	
12	T/W A, T/W K TO T/W C	3,100,000.00	3,100,000.00	2,906,250.00	96,875.00	96,875.00	
13	AIRFIELD PAINT / CRACK SEAL	250,000/ YR	5,000,000.00	4,687,500.00	156,250.00	156,250.00	
	LAND ACQUISITION (KPB TAX ROLL)						
14	FOR RUNWAY PROTECTION ZONES		296,780.00	278,231.25	9,274.38	9,274.38	
15	FOR OBSTRUCTION CONTROL		165,300.00	154,968.75	5,165.63	5,165.63	
16	FOR BUFFER ALONG FLOAT PLANE ROAD		26,300.00	24,656.25	821.88	821.88	
17	CONSTRUCT EARTH BUFFER	655,500.00					
18	CONSTRUCT FENCE BUFFER	900,000.00					
	SUB TOTAL		44,288,380.00	41,520,356.25	1,384,011.88	1,384,011.88	0.00
	TERMINAL BUILDING						
	EXISTING TERMINAL IMPROVEMENTS						
19	RE-ROOF TERMINAL AREA BUILDINGS	400,000.00					
20	SPRINKLER SYSTEM REHABILITATION	100,000.00					
21	ISOLATE ADMINISTRATION AREA	17,000.00					
22	WIRELESS KIOSKS	15,000.00					
23	VISUAL INFORMATION SYSTEM	60,000.00					
24	ATTACHED GARAGE WITH DEMO OF EXISTING	114,500.00					
25	WARM AND COLD SECURE STORAGE	15,000.00					
26	PET RELEASE AREA	5,000.00					
27	MECH/ELECT ROOM EXPANSION AND REHAB	111,000.00					
28	EXPAND RESTAURANT 400 sq. ft.	18,000.00					
29	NEW OVERHEAD DOORS WITH HOT AIR CURTAINS	87,000.00					
30	TERMINAL BUILDING ENERGY UPGRADES	160,000.00					
31	TAXI AND SMOKER SHELTERS	20,000 each					
32	AIRLINES EQUIPMENT SHELTER	65,000.00					
33	EXPAND SECURE PASSENGER GATE AREA	25,000.00					
34	**CONSTRUCT NEW TERMINAL 25,000 SF**	13,000,000.00	13,000,000.00	12,187,500.00	406,250.00	406,250.00	
	SUB TOTAL		13,000,000.00	12,187,500.00	406,250.00	406,250.00	0.00
	CARGO, MAIL AND GENERAL AVIATION						
35	**APRON EXPANSION FOR LEASE LOTS**	3,300 per foot					
35.1	CONCEPT ONE 400'	1,320,000.00					
35.2	CONCEPT TWO 1000'	3,300,000.00					
35.3	CONCEPT TWO AND THREE 1000'	3,300,000.00					
35.4	CONCEPT TWO, THRRE & FOUR 1000'	3,300,000.00	3,300,000.00	3,093,750.00	103,125.00	103,125.00	
36	**WILLOW STREET EXTENSION (ROAD/UTILITIES)**	780 per foot					
36.1	CONCEPT ONE 600'	468,000.00					
36.2	CONCEPT TWO 1000'	780,000.00					
36.3	CONCEPT TWO AND THREE 1000'	780,000.00					
36.4	CONCEPT FOUR 4,166 ln. ft.	3,249,480.00	3,249,480.00				3,249,480.00
37	**LEASE LOT DEVELOPMENT TO SUBBASE**	170,000 / AC					
37.1	1000' ALONG APRON 9.4 AC	1,600,000.00					
37.2	CONCEPT TWO 12.9 AC	2,200,000.00					
37.3	CONCEPT THREE 12.9 AC	2,200,000.00					
37.4	CONCEPT TWO, THREE & FOUR 12.9 AC	2,200,000.00	2,200,000.00				2,200,000.00
38	WATER / SEWER GRANITE PT. TO WILLOW ST.	228,000.00	228,000.00				228,000.00
39	TAXILANE EXTENSION	350,000.00					--
40	CONVERT EXISTING TERMINAL AREA	1,500,000.00	1,500,000.00				1,500,000.00
41	AIRCRAFT WASH PAD	45,000.00	45,000.00	42,187.50	1,406.25	1,406.25	
42	AIRCRAFT DEICING PAD	1,200,000.00	1,200,000.00	1,125,000.00	37,500.00	37,500.00	
	SUB TOTAL		11,722,480.00	4,260,937.50	142,031.25	142,031.25	7,177,480.00
	AIRPORT ACCESS AND PARKING						
43	ACCESS AND PARKING REHAB	1,100,000.00					
44	PARKING EXPANSION	450,000.00					
	SUB TOTAL		0.00	0.00	0.00	0.00	0.00
	AIRPORT SUPPORT						
	CROSS CONNECTS (ROADS & UTILITIES)	740 / FT					
45	ROAD LOOP ONE (MARATHON-WILLOW)	900,000.00	900,000.00				900,000.00
46	ROAD LOOP TWO (MARATHON-WILLOW)	450,000.00	450,000.00				450,000.00
47	TRADING BAY EXTENSION (RD & UTILITIES)	2,200,000.00	2,200,000.00				2,200,000.00
48	BARANOFF EXTENSION (RD & UTILITIES)	700,000.00	700,000.00				700,000.00
	SUB TOTAL		4,250,000.00	0.00	0.00	0.00	4,250,000.00
	UNIDENTIFIED PROJECTS	200,000/YR	4,000,000.00	3,750,000.00	125,000.00	125,000.00	
	TOTAL CONCEPT FOUR PROJECT COSTS		77,260,860.00	61,718,793.75	2,057,293.13	2,057,293.13	11,427,480.00
	AVAILABLE FUNDING			22,000,000.00	733,333.00	733,333.00	TO BE DETERMINED

SOURCE: Wince-Corthell-Bryson

Improvement Program (AIP) grant eligible, if justified. About $2.1 million will be required from State Legislative grants, and about $2.1 million will be required from the City. An additional $11.4 million would be required from other funding sources.

It should be noted that the FAA AIP projects listed would far exceed the funding capabilities discussed in Section 6.1.2, Primary Funding Sources, if all the projects were included in the long-range master plan concept selected by the City.

This would be largely due to the relocation of Runway 1L-19R to the north and the associated precision instrument approach systems, relocation of the gravel runway to the west side, float plane facility expansion, land acquisition and the relocation and construction of a new terminal facility.

Chapter 7

ENVIRONMENTAL OVERVIEW

7.1 INTRODUCTION

This chapter presents a general overview of existing environmental conditions that affect or may affect future airport development. Topics included are based upon environmental impact categories identified in FAA Order 1050.1E, *Environmental Impacts: Policy and Procedures*, and FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*. (*It should be noted that the new standards/categories, published in the July 2015 FAA Order 1050.1F, will apply to the design and construction of recommended projects.*)

This environmental overview is based on previous environmental analyses of the Airport to the maximum extent possible updated as necessary through internet research of on-line data bases. Recent previous environmental analyses include: *Kenai Municipal Airport Proposed Improvement Projects Environmental Assessment* completed in January 2006; *Float Plane Basin Facility Improvement Projects 2011-2015 Supplemental Environmental Assessment* completed in August 2010; and *Kenai Municipal Airport Obstruction Tree Removal Projects Environmental Assessment* completed in March 2012. No additional field surveys were conducted for the Airport Master Plan Update. Relevant information included elsewhere in this report has also been included, or cited.

7.2 AIR QUALITY

The Federal Clean Air Act (CAA), as amended, requires the U.S. Environmental Protection Agency (USEPA) to identify National Ambient Air Quality Standards (NAAQS) protective of public health and welfare. Currently, USEPA has established national standards for the following criteria air pollutants:

- Ozone (O_3) – referred to as "1997 8-Hr Ozone"
- Carbon Monoxide (CO)
- Nitrogen Dioxide (NO_2)
- Sulfur Dioxide (SO_2)
- Respirable Particulate Matter – referred to as 2006 PM-2.5, 1997 PM-2.5 and PM-10
- Lead (Pb)

Based on information in USEPA's "Green Book", last updated January 30, 2015, the City of Kenai is either in attainment, or unclassified, for all criteria air pollutants defined by NAAQS.

The CAA, as amended, also requires that federal transportation projects conform with the approved state or federal air quality implementation plans (today referred to as SIPs or FIPs, respectively) and that a "conformity review" is needed to provide this assurance. Since conformity rules are only applicable in non-attainment and maintenance areas, conformity reviews should not be required for projects at the Kenai Municipal Airport unless the City or region is subsequently cited as a non-attainment or maintenance area.

The Kenai Municipal Airport is classified as a "Commercial Service" airport. The aviation demand forecasts for the Airport, as

discussed earlier in Chapter 2, indicate that a total of 131,600 enplaned passengers and 55,400 aircraft operations may need to be accommodated at the Airport by 2035. These levels of passengers and aircraft operations are well below the levels (1.3 million passengers and 180,000 general aviation operations) at which a detailed air quality analysis is required under FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions,* and guidance found in FAA's report number FAA-AEE-97-03, *Air Quality Procedures for Civilian Airports and Air Force Bases*.

7.3 COASTAL RESOURCES

Federal activities involving or affecting coastal resources are governed by the Coastal Barriers Resources Act (CBRA), the Coastal Zone Management Act (CZMA) and Executive Order (E.O.) 13089, Coral Reef Protection. The CBRA is focused on the Atlantic and Gulf coasts and Great Lakes and is not applicable to Alaska. The Kenai Municipal Airport is not located near any coral reefs so E.O. 13089 is also not applicable.

The Coastal Zone Management Act created both a National Coastal Zone Management Program (CZMP) and the National Estuarine Research Reserve System. Under the latter program the State of Alaska established the Kachemak Bay National Estuarine Research Reserve which is located in waters at the mouth of Kachemak Bay on the southwest side of the Kenai Peninsula. The Reserve is not affected by any proposed actions at the Kenai Municipal Airport.

Within the National Coastal Zone Management Program a state-based grant program was established to identify, preserve, protect, develop, and where possible, restore or enhance, coastal zone resources. The State of Alaska initially participated in this program and through the Alaska Coastal Management Program (ACMP) implemented provisions of the Coastal Zone Management Act with federal approval. On July 1, 2011, a sunset provision in the Alaska legislation supporting the ACMP was triggered and the program ceased to operate. The Kenai Peninsula Borough participated in the State's program and developed a Borough-wide plan that met State and federal objectives. Elements of the Borough's CZMP that provided policy direction to Borough and local agencies have been incorporated in local planning and zoning documents either specifically or by reference and remain a relevant set of planning and policy guidelines.

Prior to inception of the sunset provision the Kenai Municipal Airport was subject to the ACMP protections because the Borough established that all lands under 1,000 feet mean sea level (MSL) in elevation, as well as waters seaward to the three mile limit of state jurisdiction were subject to ACMP policies. The Kenai Municipal Airport is at an elevation of 100 feet above MSL. To the extent the Kenai Peninsula Borough continues to apply ACMP protections in local planning, projects proposed at the Airport may be subjected to Borough review. Those elements of the Borough's CZMP policies that require State reviews or permits are no longer relevant, unless these actions are governed by other legislation.

Since the State of Alaska is no longer participating in the National Coastal Zone Management Program, there are no specific federal environmental laws other than those noted above that pertain specifically to the coastal zone. Any resources that lie within the coastal zone that may be affected by

federal environmental laws are discussed among the other topics in this chapter.

7.4 COMPATIBLE LAND USE

From the federal perspective, compatibility of existing and planned land uses in the vicinity of an airport is usually associated with the extent of the airport's noise impacts. Noise issues are specifically addressed later in Section 7.15, Noise. However from a state-level or local-level perspective, driven in part by FAA funding requirements to protect the navigable airspace around public airports, land use compatibility may incorporate additional issues such as safety on the ground and height controls in addition to noise.

The height of objects in areas surrounding the Airport is an environmental issue from the perspective of trees or manmade objects protruding into the protected airspace defined by Federal Aviation Regulations Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace* and FAA Order 8260.3C, *United States Standard for Terminal Instrument Procedures* (TERPS). City codes also address airport and airspace issues. This issue was discussed earlier in Chapter 3, Existing Airport Facilities, in which it was noted that the City has various avigation easements recorded on a number of private properties adjacent to the Airport and is in the process of obtaining several additional easements.

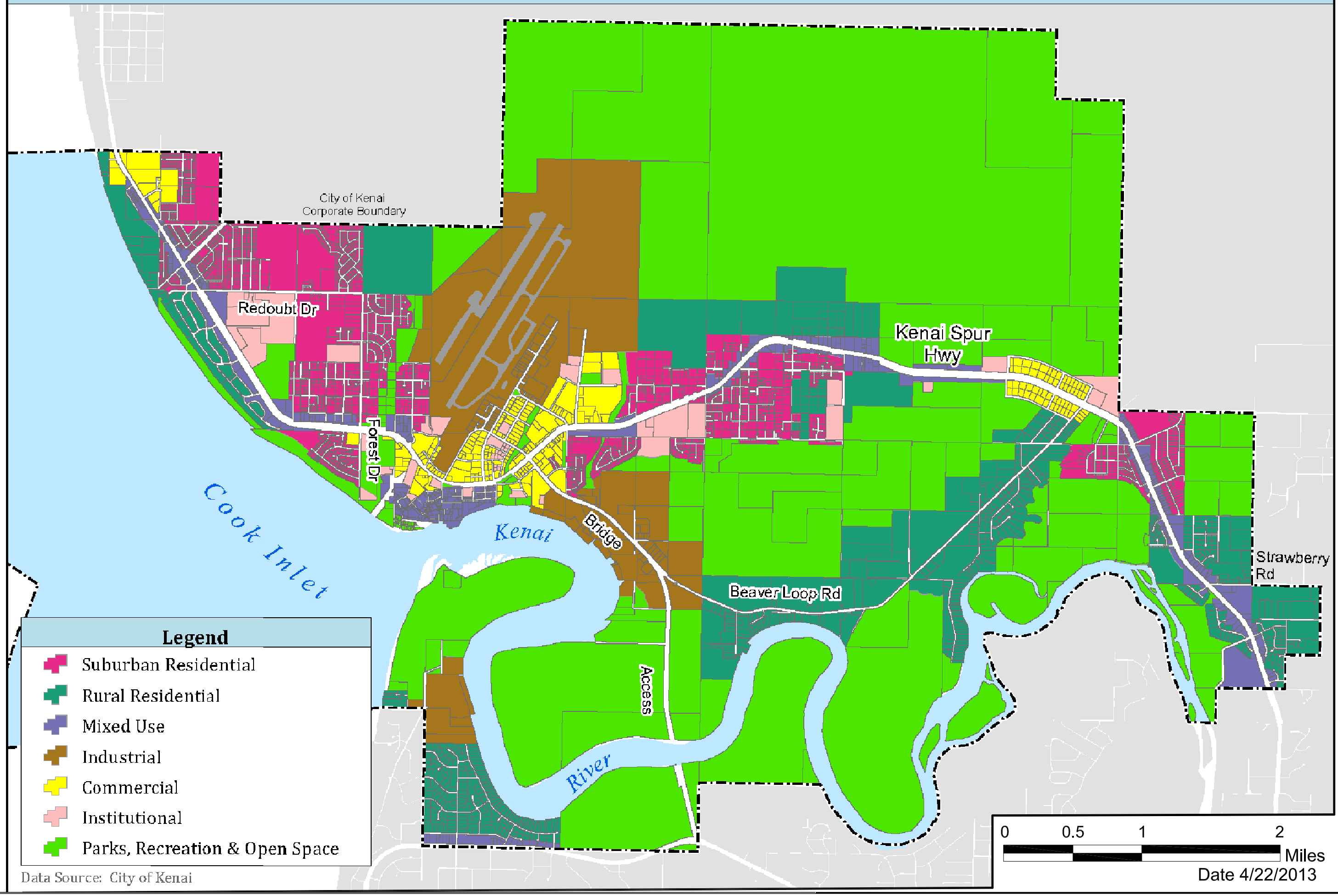
Other characteristics of land use compatibility have been addressed indirectly by the City of Kenai in the 2003 *City of Kenai Comprehensive Plan* (as amended through 2011) and Zoning Ordinance. Land use classifications in the vicinity of the Airport, as of 2013, are illustrated on Figure 7-1, (referred to as Map 7 Future Land Use Plan-2012 by the City of Kenai). While suburban type residential development is located in close proximity to the western side of the Airport the majority of land use types in the vicinity area are commercial and industrial with scattered institutional uses. As noted later in Section 7.15, Noise, existing and future aircraft noise levels affecting this residential area are below the federal standard of 65 dB average day/night noise level (DNL). The City's 2003 Comprehensive Plan envisions the continuation of these existing patterns in the vicinity area so existing land use compatibility is expected to be preserved. Zoning in the vicinity of the Airport, as amended through 2011, generally reflects the City's 2003 Comprehensive Plan as shown on Figure 7-2, (referred to as City of Kenai Zoning April 2014).

Most of the land within the Airport Reserve Boundary, as of April 2014, is zoned as "Conservation," as shown earlier on Figure 3-8, a district that is usually applied to publicly-owned lands which should be preserved primarily as open areas and as watersheds and wildlife reserves. The Airport and related uses have been included in this zone to allow for the reservation of aircraft approach zones. The Conservation (C) designation is not compatible with airport use and aircraft operations and future airport development. Other parts of the Airport, within the Airport Reserve Boundary, are zoned Light Industrial (IL), Rural Residential (RR), Suburban Residential (RS) and Central Mixed (CMU). The need to change the Airport zoning is being addressed in the Airport Master Plan as well as in the City's update of the 2003 Comprehensive Plan.

The zoning ordinance generally permits structures, including freestanding communications towers, to be up to thirty-

Map 7. Future Land Use Plan

2012



Data Source: City of Kenai

Date 4/22/2013

FIGURE
7-1

City of Kenai Zoning
April 2014

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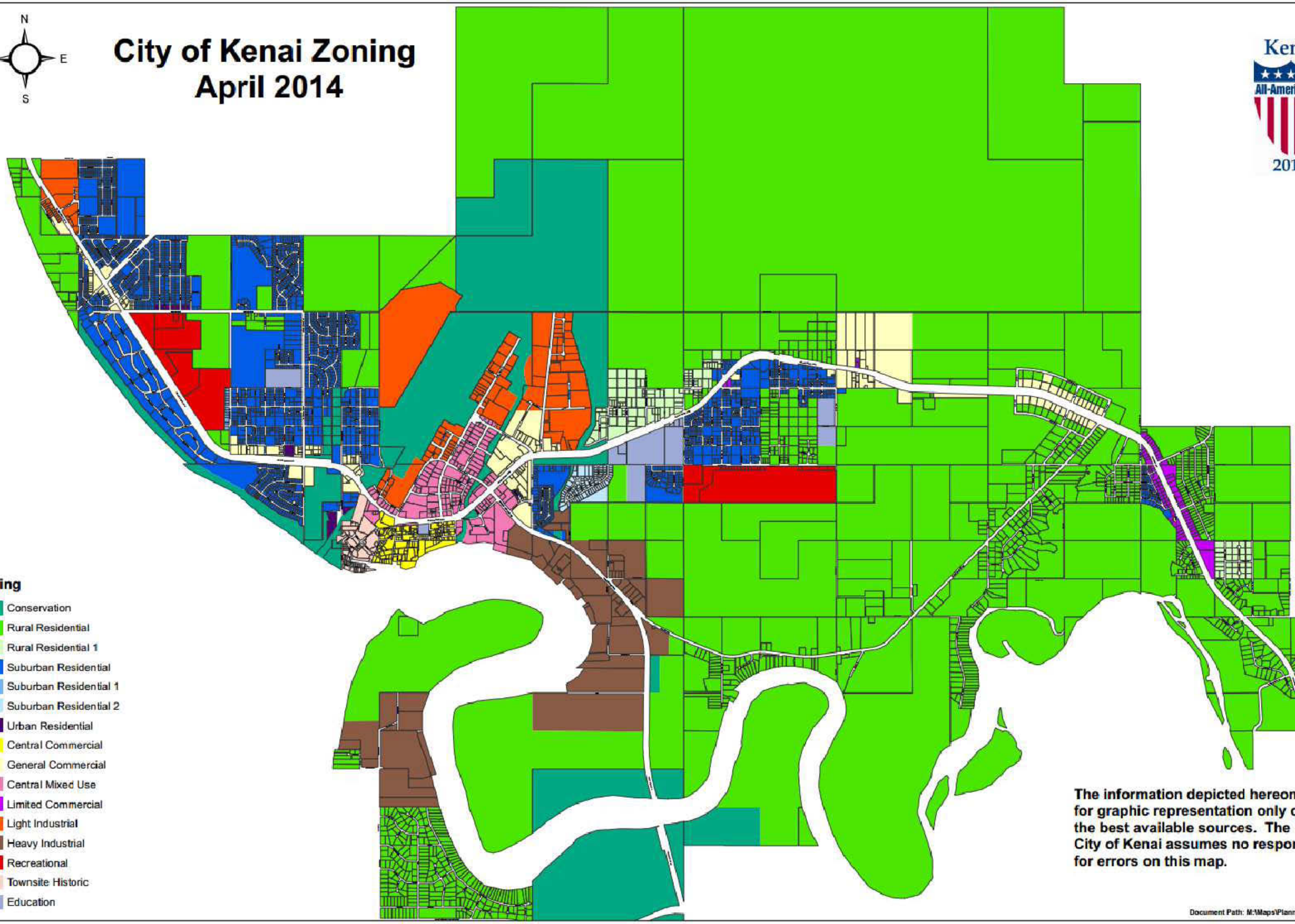
Kenai All-America City 2011



Zoning

- Conservation
- Rural Residential
- Rural Residential 1
- Suburban Residential
- Suburban Residential 1
- Suburban Residential 2
- Urban Residential
- Central Commercial
- General Commercial
- Central Mixed Use
- Limited Commercial
- Light Industrial
- Heavy Industrial
- Recreational
- Townsite Historic
- Education

The information depicted hereon is for graphic representation only of the best available sources. The City of Kenai assumes no responsibility for errors on this map.

Date: 4/24/2014

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FIGURE
7-2

five feet (35'). Heights exceeding thirty-five feet (35') typically require a variance.

The 2003 Comprehensive Plan shows the entire airport property, within the Airport Reserve Boundary, as future industrial land use and zoning. The 2003 Comprehensive Plan recommends rezoning airport lands within the Airport Reserve Boundary to zoning consistent with the Airport Master Plan and Airport Layout Plan and rezoning lands outside the Airport Reserve Boundary to meet the mandate of the 1963 Airport deed. (*The Comprehensive Plan was updated in 2016 and the zoning within the Airport Reserve Boundary was also updated in 2016.*)

7.5 CONSTRUCTION IMPACTS

Construction impacts will depend upon the specific project being considered. At this time no specific projects have been identified. However, the projects included in the Airport Master Plan are similar in nature and magnitude to projects implemented over the previous master planning period.

Major construction activities associated with various improvement projects are likely to include:

- Clearing and grubbing
- Stockpiling of materials
- Disposal of frost susceptible soils
- Placement of sand and gravel fill
- Paving of various airfield, aircraft parking apron and road improvements.

Construction impacts are expected to be of short duration, typically occurring during the summer-schedule work day. Construction activities will include the use of heavy equipment and machinery to excavate and move earth and construct the various structures.

Previous environmental analyses of construction projects at Kenai Municipal Airport have addressed:

- Air Quality – airborne dust (PM-2.5 and PM-10) potentially affecting air quality
- Construction Equipment – including equipment noise, traffic, refueling and storage of petroleum products
- Street and Highway Traffic – additional highway traffic from workers, as well as from equipment and material hauling
- Water Quality - soil erosion potentially affecting water quality including stream bank protection and avoidance of spawning habitats in Cemetery Creek and requirements of National Pollutant Discharge Elimination System (NPDES). See discussion under Section 7.18, "Water Quality"
- Wetland Protection - See discussion under Section 7.19, "Wetlands"

To the extent possible, the City of Kenai employs best management practices to reduce the influences of these various construction impacts.

7.6 DEPARTMENT OF TRANSPORTATION ACT SECTION 4(f)

The Department of Transportation (DOT) Act, Section 4(f), which is codified and renumbered as Section 303c of 49 U.S.C., provides that the Secretary of Transportation will not generally approve any program or project that requires the use of any publicly-owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land from an historic site of national, state, or

local significance unless there is no prudent and feasible alternative to using that land, and that all possible planning to minimize harm has been completed.

None of the Airport properties are considered to be a public park, recreation area, wildlife and waterfowl refuge or historic site of national, State, or local significance and therefore are not affected by the provisions of Department of Transportation Act Section 4(f). There is a cemetery located within the Airport Reserve Boundary that is owned by the City of Kenai.

7.7 FARMLANDS

The Farmland Protection Policy Act (FPPA) regulates Federal actions with the potential to convert farmland to non-agricultural uses. There are no protected farmlands in the vicinity of the Kenai Municipal Airport.

7.8 FISH, WILDLIFE AND PLANTS

Fish – The Alaska Department of Fish and Game publication Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes – Southcentral Region (Special Publication 04-05), indicates that Cemetery Creek which drains a large portion of the airfield southward to the Kenai River is considered an anadromous fish water body (ID number 244-30-10010-2001-3004). Based on mapping of the anadromous streams prepared as part of the wetlands functional assessment completed in February 2005, the anadromous portion of the stream draining the airfield ends in a small wetland area located just north of First Avenue and thus does not extend into any active areas of the Airport.

Wildlife – A variety of birds and other animals exist throughout the Kenai area. The surrounding area is home to many types of wildlife, including moose, bears, sheep, goats, wolves, coyotes and caribou. Portions of the Kenai National Wildlife Refuge are located northeast of the Airport. The Kenai River Flats, located about 2.5 miles southeast of Runway 1L-19R, provides important food sources in the form of aquatic vegetation and invertebrates for migrating waterfowl in the spring. For example, Snow geese, Canada geese, mallard, and pintail arrive during spring migration in April. The Kenai River itself is another wildlife attractant because of the annual salmon runs. Commercial seafood processors, near the mouth of the Kenai River, provide a food source for gull populations when all fish waste is pumped into the river. Dip-netters, who leave salmon carcasses scattered along the beach also contribute to the available food sources.

A summary of the species observed at the Kenai Municipal Airport is presented in Table 7-1. The information in Table 7-1 was developed by the U.S. Department of Agriculture (USDA) during a one-year Wildlife Hazards Assessment conducted at the Airport in order to continue compliance with the Airport's FAR Part 139 *Certification of Airports*. An initial study was conducted between February 2001 and January 2002. The second study was conducted between October 2011 and November 2012 and the data are presented in Table 7-1.

In the most recent Wildlife Hazards Assessment, the USDA noted information available in FAA's Wildlife Strike Database that indicated that between 1990 and 2010, 737 wildlife strikes were reported in Alaska.

Table 7-1

SPECIES OBSERVED AT KENAI MUNICIPAL AIRPORT
Wildlife Hazards Assessment 2011-2012 [1]

Common Name	Scientific Name
Corvids	
Common Raven	*Corvus corax*
Black-billed Magpie	*Pica pica*
Northwestern Crow	*Corvus caurinus*
Dabblers	
American Green-winged Teal	*Anas crecca*
American Wigeon	*Anas Americana*
Mallard	*Anas platyrhynchos*
Northern pintail	*Anas acuta*
Northern shoveler	*Anas clypeata*
Divers	
Barrows Goldeneye	*Bucephala islandica*
Bufflehead	*Bucephala albeola*
Canvasback	*Aythya valisineria*
Common Goldeneye	*Bucephala clangula*
Common Loon	*Gavia immer*
Common Merganser	*Mergus merganser*
Greater Scaup	*Aythya marila*
Horned Grebe	*Podiceps auritus*
Pacific Loon	*Gavia pacifica*
Red-breasted Merganser	*Mergus serrator*
Ring-necked Duck	*Aythya collaris*
Red-necked Grebe	*Podiceps grisegena*
Red-throated Loon	*Gavia stellate*
Geese and Swans	
Canada Goose	*Branta Canadensis*
Greater White-fronted Goose	*Anser albifrons*
Snow Goose	*Chen caerulescens*
Trumpeter Swan	*Cygnus buccinators*
Gulls and Terns	
Arctic Tern	*Sterna paradisaea*
Bonaparte Gull	*Larus Philadelphia*
Glaucous-winged Gull	*Larus glaucescens*
Herring Gull	*Larus argentatus*
Mew Gull	*Mew gull*

Table 7-1 - continued

Mammals	
Brown Bear	*Ursus horribilus*
Caribou	*Rangifer granti*
Coyote	*Canis latrans*
Dog	*Canis familiarus*
Meadow Vole	*Microtus pennsylvanicus*
Moose	*Alces alces*
Muskrat	*Ondatra zibethicus*
Porcupine	*Erethizon dorsatum*
Red-backed Vole	*Myodes rutilus*
Snowshoe Hare	*Lepus americanus*
Raptors	
American Kestrel	*Falco sparverius*
Bald Eagle	*Haliaeetus leucocephalus*
Merlin	*Falco columbarius*
Northern Goshawk	*Accipiter gentilis*
Northern Harrier	*Circus cyaneus*
Peregrine Falcon	*Falco peregrinus*
Red-tailed Hawk	*Buteo jamaicensis*
Sandhill Cranes	
Sandhill Crane	*Grus Canadensis*
Shorebirds	
American Golden-Plover	*Pluvialis dominica*
American Pipit	*Anthus rubescens*
Dunlin	*Calidris alpine*
Greater Yellow Legs	*Tringa melanoleuca*
Short-billed Dowitcher	*Limnodromus griseus*
Semipalmated Plover	*Charadrius semipalmatus*
Spotted Sandpiper	*Actitus macularia*
Whimbrel	*Numenius phaeopus*
Songbirds	
American Robin	*Turdus migratorius*
Gray Jay	*Cyanocitta stelleri*
Savannah Sparrow	*Passerculus sandwichensis*
White-crowned Sparrow	*Zonotrichia leucophrys*
Swallows	
Bank Swallow	*Riparia riparia*
Cliff Swallow	*Petrochelidon pyrrhonota*

Source: *Wildlife Hazard Assessment, Kenai Municipal Airport*, U.S. Department of Agriculture Wildlife Services Program, March 2013

Of those reported, 95.4 percent involved birds, 4.4 percent terrestrial mammals, and 0.1 percent bats. During this same period 18 wildlife strikes were reported at Kenai noted that at the national level, FAA studies suggest that wildlife strike information is significantly under-reported.

The risk to aviation from wildlife varies throughout the year. The USDA noted that wildlife risk for all guilds at the Airport is relatively low during winter months (October to March), but Spring migration (April) brings a substantial increase in risk, followed by a short lull during nesting season. Fall migration (August) raises the risk level to its highest level. Not surprisingly, hazardous wildlife showed a preference for water bodies on the Airport, with particular emphasis on the float plane runway and water taxi area on the west side of the Airport. Temporary standing water in areas under the approach to Runway 19R also provides waterfowl with loafing and escape cover.

In addition to providing a detailed summary of species observed at the Airport these wildlife hazard assessments provide the basis for a Wildlife Hazards Management Plan, last updated by FAA in August 2011. The Wildlife Hazards Management Plan outlines completed and on-going habitat management projects at the Airport. The types of projects considered include mowing of tall grasses, spraying for insect species that provide food sources for birds, proper refuse containment, removal of aquatic vegetation, elimination of areas with temporary standing water, removal of perching areas and, when necessary, depredation of specific birds or animals that pose an immediate or impending hazard to aviation. According to the USDA, the Airport possesses all necessary Federal and State permits to manage wildlife Municipal Airport. Of the 18 reported wildlife strikes, 38.8 percent involved gulls, but only two strikes were reported as causing any damage. However, it should be hazards. Non-lethal harassment is performed by authorized subpermittees using pyrotechnics (screamers, bangers and cracker shells), blanks and vehicles. Lethal reinforcement using a shotgun with non-toxic shot and an air rifle is authorized for Canada geese, ducks, sandhill cranes, gulls, common ravens and all deleterious exotic wildlife (starlings, house sparrows, pigeons, raccoons, rats, mice, gerbils, other murid rodents and Belgian hares) on airport property. The existing permits also allow nest removal/destruction of shorebirds and lethal removal of shorebirds and coyotes (via trapping and firearms).

According to the most recent USDA report, all wildlife species recorded during the 2011–2012 Wildlife Hazards Assessment are protected by federal and/or state regulations. Migratory bird species are protected under the federal Migratory Bird Treaty Act of 1918, which extends to species present year-round, such as common raven who are also protected as migratory species under this act. Bald eagle and golden eagles are further protected by the Bald and Golden Eagle Protection Act of 1940. A specific permit is required for hazing all eagles. In addition, under the Endangered Species Act of 1973 all wildlife species at risk of becoming extinct (discussed further in Section 7.9 below) are protected.

Plants – A Preliminary Jurisdictional Determination and Wetland Functional Assessment was completed in July 1996, and subsequently updated and amended in February 2005. Soils within the Airport boundary are generally considered to be upland with variations of wetland inclusions,

although in some limited areas there are wetlands with upland inclusions. These partially hydric soils support spruce and birch trees and in wetter places willows. The forest understory includes native berry and shrub species, with a limited groundcover of low-lying herbaceous plants. See additional discussion in Section 7.19, Wetlands.

7.9 THREATENED OR ENDANGERED SPECIES

Under the Endangered Species Act (ESA), as amended, the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) are responsible for maintaining lists of species that meet the definition of threatened or endangered as defined in the ESA legislation. The NMFS is responsible for maintaining the endangered species list for marine species and managing those species once they are listed. The USFWS is responsible for maintaining the endangered species list for terrestrial and freshwater species and managing those species once they are listed.

Table 7-2 provides a current listing of federal and State of Alaska endangered, threatened and candidate species. None of the aviation activities or construction activities at the Airport are likely to affect any of the listed marine species. Few, if any, of the terrestrial species are found within the vicinity of Kenai and the Cook Inlet region. The 2001-2002 Wildlife Hazards Assessment, as well as the 2011-2012 Wildlife Hazards Assessment, did not specifically identified any endangered, threatened or candidate species in the Airport vicinity. However, future projects at the Airport must consider the ongoing evolution of the endangered or threatened species listings.

If endangered, threatened and candidate species were found to be potentially affected by aviation or construction activities at the Airport, Section 7 of the Endangered Species Act (ESA), as amended, applies to Federal agency actions and sets forth requirements for consultation to determine if the proposed action "may affect" an endangered or threatened species. If an action "may affect" a threatened or endangered species, then Section 7(a)(2) requires FAA consultations with the USFWS or the NMFS, as appropriate, to ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of any Federally listed endangered or threatened species or result in the destruction or adverse modification of critical habitat.

7.10 FLOODPLAINS AND NAVIGABILITY

Based on Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) the Airport and surrounding areas are not subject to coastal or Kenai River flooding. The source of this information is FIRM map titled Kenai Peninsula Borough, Alaska, Community Panel Number 020012-2030, dated May 19, 1981.

7.11 HAZARDOUS MATERIALS, POLLUTION PREVENTION AND SOLID WASTE

Two statutes of most importance to any proposed actions to construct and operate airport facilities and navigational aids are the Resource Conservation and Recovery Act (RCRA) (as amended by the Federal Facilities Compliance Act of 1992) and the Comprehensive Environmental Response, Compensation, and Liability Act

Table 7-2

ENDANGERED, THREATENED AND CANDIDATE SPECIES IN ALASKA [1]

Common Name	Scientific Name	Responsible Agency
ENDANGERED		
Short-tailed albatross	*Phoebastria albatrus*	USFWS and ADF&G
Aleutian shield fern	*Polystichum aleuticum*	USFWS
Eskimo curlew	*Numenius borealis*	USFWS and ADF&G
Blue Whale	*Balaenoptera musculus*	NMFS and ADF&G
Bowhead Whale	*Balaena mysticetus*	NMFS
Cook Inlet Beluga Whale	*Delphinapterus leucas*	NMFS
Fin Whale	*Balaenoptera physalus*	NMFS
Humpback Whale	*Megaptera novaeangliae*	NMFS and ADF&G
Leatherback Sea Turtle	*Dermochelys coriacea*	NMFS
North Pacific Right Whale	*Eubalaena japonica*	NMFS and ADF&G
Sei Whale	*Balaenoptera borealis*	NMFS
Sperm Whale	*Physeter microcephalus*	NMFS
Steller Sea Lion west of 144º	*Eumetopias jubatus*	NMFS
Western North Pacific Gray Whale	*Eschrichtius robustus*	NMFS
THREATENED		
Steller's eider	*Polysticta stelleri*	USFWS
Spectacled eider	*Somateria fischeri*	USFWS
Northern sea otter SW AK	*Enhydra lutris kenyoni*	USFWS
Polar bear	*Ursus maritimus*	USFWS
Green Sea Turtle	*Chelonia mydas*	NMFS
Loggerhead Sea Turtle	*Caretta caretta*	NMFS
Olive Ridley Sea Turtle	*Lepidochelys olivacea*	NMFS
Steller Sea Lion east of 144º	*Eumetopias jubatus*	NMFS
Bearded Seal	*Erignathus barbatus*	NMFS
Ringed Seal	*Pusa hispida*	NMFS
Wood bison	*Bison bison athabascae*	USFWS
CANDIDATE		
Yellow-billed loon	*Gavia adamsii*	USFWS
Pacific walrus	*Odobenus rosmarus divergens*	USFWS
Harbor Seals in Iliamna Lake	*Phoca vitulina*	NMFS
Pacific Herring SE AK	*Clupea pallasii*	NMFS
Black-footed Albatross	*Phoebastria nigripes*	NMFS

NOTES: 1) Within each category species are organized by responsible agency with U.S. Fish and Wildlife Service (USFWS) representing terrestrial and freshwater species and National Marine Fisheries Service (NMFS) next representing marine species. Alaska listed "endangered" species are represented by the Alaska Department of Fish and Game (ADF&G). Fish species that may occur in Alaskan waters during the marine phase of their life cycles are excluded.

SOURCES: U.S. Fish and Wildlife Service, Alaska Region, as of February 25, 2014
National Marine Fisheries Service, Alaska Region, as of April 2014
Alaska Department of Fish and Game, as of March 31, 2015

(CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA or Superfund) and the Community Environmental Response and cleanup of any release of a hazardous substance (excluding petroleum) into the environment.

The Alaska Department of Environmental Conservation (ADEC), Division of Spill Prevention and Response maintains information about the location and status of sites that are considered to be contaminated. This information is maintained in their Contaminated Sites Program (CSP) and Leaking Underground Storage Tanks (LUST) databases. Table 7-3 provides a summary of two contaminated sites listed as "Active" in the vicinity of Kenai Municipal Airport. Although Table 7-3 identifies the original hazard, remedial actions have been occurring at both sites over many years as chronicled in the ADEC records. These sites are located within the Airport Reserve Boundary but these contaminated areas have not significantly affected Airport projects.

With respect to on-airport hazardous materials spills, the Airport and its various operators have approved a Spill Prevention Countermeasure and Control Plan and a Hazardous Waste Control Plan for fuel tanks and products.

Solid waste facilities are available through the Kenai Peninsula Borough's Central Peninsula Landfill (CPL) located at mile 98.5 on the Sterling Highway and about 2.5 miles south of the City of Soldotna. This is a Class I Landfill that serves all municipalities and unincorporated communities located on the Kenai Peninsula road system. Hazardous wastes, such as used motor oils, paint, batteries, and antifreeze are collected at CPL but are transported to Anchorage or outside Alaska Facilitation Act of 1992. RCRA governs the generation, treatment, storage, and disposal of hazardous wastes. CERCLA provides for consultation with natural resources trustees for final disposal. Recycling in the Kenai Peninsula Borough is a voluntary program. Collection containers are set up at CPL to collect plastics, aluminum cans, glass, corrugated cardboard, mixed paper, newspaper, and plastic bags. The Borough bales the recyclables (except glass and scrap metal) at CPL and after transport to Anchorage receives income from selling them.

The CPL receives municipal solid waste (MSW), construction/demolition and land clearing waste, wastewater treatment plant sludges, asbestos, junk vehicles, etc. The CPL has sufficient capacity to service the area for about 30 to 50 years. The CPL also has an extensive recycling program.

7.12 HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL AND CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966, as amended, requires that projects be evaluated for their effects on properties on or eligible for inclusion in the National Register of Historic Places. Section 106 requires consultation with the State Historic Preservation Officer (SHPO) and/or Tribal Historic Preservation Officer (THPO) if there is a potential adverse effect to listed or eligible historic properties.

The area surrounding the City of Kenai is part of the ancestral territory of the Dena'ina speaking Athabascan Indian tribe. When Russian fur traders arrived in 1741 there was a thriving Indian village on the high bluff overlooking Cook Inlet near the mouth of

Table 7-3

SUMMARY OF CONTAMINATED SITES LISTED AS "ACTIVE" VICINITY OF KENAI MUNICIPAL AIRPORT

Descriptor	Data
Site Name	City of Kenai Maintenance Yard
Location	332 Airport Way
Hazard ID	2075
Hazard Description	Off-site migration of petroleum hydrocarbons was found on the adjoining property to the south from the Kenai Maintenance Yard. The extent of the contaminant migration hasn't been determined. DRO, GRO, RRO, BTEX, VOCs, and SVOCs contamination has been confirmed both on site and migrating off site. DRO, GRO, toluene, xylene and one SVOC contamination of the adjacent Ryan Creek water and sediments have been determined, further confirming off site migration of the contamination. Low level PCB contamination has been found in on-site soils.
LUST Site	No
Site Name	Kenai Airport Fuel Service
Location	409 Willow Street
Hazard ID	23460
Hazard Description	On October 18 and 19, 1993 three 10,000 gallon jet aviation fuel, aviation gasoline and 100 low lead gasoline, and one 1,000 gallon regular unleaded gasoline underground storage tanks were removed. Free product was observed on the groundwater during tank removals, and approximately 600 gallons of free product was skimmed off the water surface into a pumper truck. The groundwater is approximately 6.5 to 7 feet below ground level. Levels of 1.2 dichloroethane in two of the test pits also exceeded the maximum contaminant levels of 0.005 ppm. Levels of extractable petroleum hydrocarbons in soil exceed the allowable levels. June 1999, 220 cubic yards of contaminated soil is transported to a temporary soil burning facility on K Beach Rd, then thermally remediated. May 2004, conditionally approved Remedial Action Work Plan #2R(Revised).
LUST Site	Yes

Notes: Abbreviations have the following meanings:

- BTEX - Benzene, Toluene, Ethylbenzene and Xylene, all considered as GRO.
- DRO - Diesel Range Organics: Diesel fuels and its by-products.
- GRO - Gasoline Range Organics: Gasoline fuels and its by-products.
- PCB - Polychlorinated Biphenyl: A broad family of man-made organic chemicals known as chlorinated hydrocarbons.
- RRO - Residual Range Organics: A common acronym for heavy fuel products such as Bunker C fuel or asphalt.
- SVOC - Semi Volatile Organic Compound An organic compound with a boiling point higher than water that may vaporize when exposed to temperatures above room temperature.
- VOC - Volatile Organic Compound: An organic compound that evaporates (volatilizes) readily at room temperature.

Source: Cleanup Chronology Reports found in the Contaminated Sites Database, Alaska Department of Environmental Conservation, Division of Spill Prevention and Response. As of August 31, 2015.

the Kenai River. The Russians built Fort St. Nicholas at Kenai in 1791 as an outpost. Over time the Russian Orthodox religion took root and Kenai's oldest buildings are Orthodox-related, including: a log rectory built about 1886; the Church of the Holy Assumption of the Virgin Mary (1895); and the nearby log chapel (1906).

Based on a search of the National Register Information System operated by the National Park Service, U.S. Department of the Interior, only two historic properties are found in the City of Kenai vicinity, neither of which is affected by the Airport or its activities:

- Buildings and sites associated with the Church of the Holy Assumption of the Virgin Mary. It is the oldest standing Orthodox church in Alaska and is considered the principal and most enduring representative of Russian culture in southcentral Alaska from 1841 to the present.

- Victor Holm Cabin. This is a 13 foot by 15 foot hewed log cabin with dovetailed corners, built on a simple plan and demonstrates the method of construction of log homes in this area during the period prior to the Alaska gold rushes.

The Alaska SHPO has previously determined that the Kenai River valley has a very high potential for prehistoric village sites, although the likelihood of finding such sites in already disturbed areas is considerably reduced. Based on previous surveys for prehistoric, historic, archeological, or paleontological resources in the Airport vicinity, and previous consultations with SHPO for specific Airport related projects, no Airport properties and no private properties in the airport vicinity are included or considered to be eligible for inclusion in the National Register of Historic Places. Consultations with SHPO will be required for future Airport development, particularly in previously undisturbed areas.

Past environmental studies have not found any significant resources. However, a charcoal-making site was discovered during a recent clearing project that was investigated and the results provided to SHPO.

7.13 LIGHT EMISSIONS AND VISUAL IMPACTS

This impact category addresses the extent to which Airport lighting potentially affects persons in the vicinity area. This impact category also addresses the extent to which the aesthetic values of Airport projects may create visual impacts.

Historically, the extensive tree cover throughout the Airport has limited the potential for adverse impacts in this category. However, continued development of the Airport has gradually reduced the tree cover and this trend is expected to continue as the airport master plan is further developed. Mitigation measures considered previously have included the selective placement of new trees, earth berms and screened fencing where the potential for light or visual impacts may exist.

Proposed changes to the Airport may slightly increase the overall light emissions at the Airport, particularly added apron and lease lot lighting. Potential impacts can be reduced to insignificant levels through the use of downward facing lights which avoid casing additional light into the night sky. Since adjacent development is mostly industrial in nature no impacts are expected from proposed lighting improvements. The

City/Airport limits construction at night and utilizes downward-focused lighting to further minimize lighting impacts to its neighbors.

7.14 NATURAL RESOURCES AND ENERGY SUPPLY

Executive Order (E.O.) 13123, *Greening the Government Through Efficient Energy Management*, encourages each federal agency to expand the use of renewable energy within its facilities and in its activities. E.O. 13123 also requires each federal agency to reduce petroleum use, total energy use and water consumption. FAA policy encourages development of facilities that exemplify the highest standards of design including principals of sustainability. A discussion of sustainability measures implemented or proposed at the Kenai Municipal Airport is presented in Chapter 4. Historically, natural resource consumption and changes to energy demands have not resulted in any significant impacts to natural resources and available energy supplies.

The materials to be used in various improvement projects include sand, gravel, cement, steel, asphalt, gasoline and oil and electricity, together with various coatings, glues and manufactured fabrics. Certain asphalt materials would be recycled. None of these materials proposed to be used are considered to be scarce or in extreme short supply. Consequently, no impacts are expected under this topic.

7.15 NOISE

This impact category addresses the potential for adverse effects from aircraft noise. The FAA has established aircraft noise compatibility criteria to determine when different land use types are considered to be adversely impacted. The FAA has determined that the cumulative noise energy exposure of individuals to noise resulting from aviation activities must be established in terms of the yearly day/night average sound level (referred to as the Day/Night Level or DNL). Residential land uses are considered to be significantly affected by aircraft noise at levels of 65 dB DNL or above. A significant noise impact would occur if analysis shows that the proposed action will cause noise sensitive areas to experience an increase of 1.5 dB DNL or more above the 65 dB DNL noise exposure level when compared to existing conditions.

Aircraft noise exposure maps were prepared for existing and future aircraft operations using the FAA's Integrated Noise Model (INM). The INM model produces noise exposure maps which depict the locations of the different DNL contours. To develop each noise exposure map, the INM utilizes the number of aircraft operations by aircraft types, airfield configuration, aircraft flight tracks, runway use, and established or expected flight procedures together with standard data regarding the noise characteristics of each aircraft type in different stages of flight. While some of these characteristics are unique to each airport, aircraft characteristics and performance are built into the model in order to increase consistency and compatibility.

The noise exposure map representing 2011 existing conditions is presented on Figure 7-3. This data is based on the current configuration of the airfield, as described in Chapter 3 and current aircraft operations, as described in Chapter 2. The 65 dB DNL contour is almost entirely within the Airport Reserve Boundary except for a small portion that extends over open lowlands to the north.

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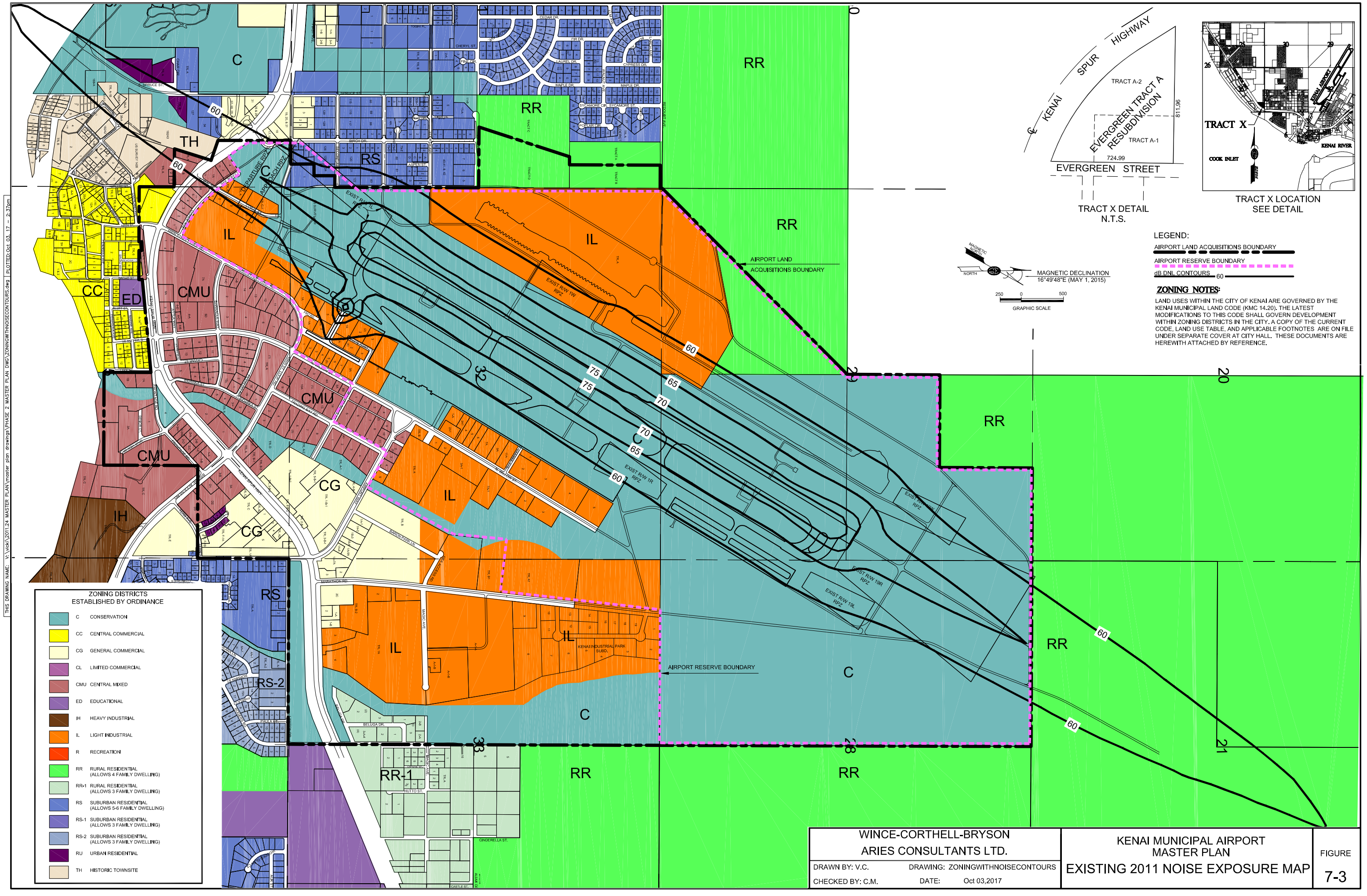

TRACT X DETAIL
N.T.S.

TRACT X LOCATION
SEE DETAIL

LEGEND:

AIRPORT LAND ACQUISITIONS BOUNDARY

AIRPORT RESERVE BOUNDARY

dB DNL CONTOURS 60

ZONING NOTES:

LAND USES WITHIN THE CITY OF KENAI ARE GOVERNED BY THE KENAI MUNICIPAL LAND CODE (KMC 14.20). THE LATEST MODIFICATIONS TO THIS CODE SHALL GOVERN DEVELOPMENT WITHIN ZONING DISTRICTS IN THE CITY. A COPY OF THE CURRENT CODE, LAND USE TABLE, AND APPLICABLE FOOTNOTES ARE ON FILE UNDER SEPARATE COVER AT CITY HALL. THESE DOCUMENTS ARE HEREWITH ATTACHED BY REFERENCE.

ZONING DISTRICTS
ESTABLISHED BY ORDINANCE

C	CONSERVATION
CC	CENTRAL COMMERCIAL
CG	GENERAL COMMERCIAL
CL	LIMITED COMMERCIAL
CMU	CENTRAL MIXED
ED	EDUCATIONAL
IH	HEAVY INDUSTRIAL
IL	LIGHT INDUSTRIAL
R	RECREATION
RR	RURAL RESIDENTIAL (ALLOWS 4 FAMILY DWELLING)
RR-1	RURAL RESIDENTIAL (ALLOWS 3 FAMILY DWELLING)
RS	SUBURBAN RESIDENTIAL (ALLOWS 5-6 FAMILY DWELLING)
RS-1	SUBURBAN RESIDENTIAL (ALLOWS 3 FAMILY DWELLING)
RS-2	SUBURBAN RESIDENTIAL (ALLOWS 3 FAMILY DWELLING)
RU	URBAN RESIDENTIAL
TH	HISTORIC TOWNSITE

WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN	FIGURE
DRAWN BY: V.C. DRAWING: ZONINGWITHNOISECONTOURS CHECKED BY: C.M. DATE: Oct 03,2017	EXISTING 2011 NOISE EXPOSURE MAP	7-3

The 60 dB DNL noise exposure contour extends north of the Airport Reserve Boundary over open lowlands and to the South to the Kenai River and Cook Inlet. The 60 dB DNL noise exposure contour overlays some residential areas west of Float Plane Road from Third Avenue to First Avenue and Birch Street. The 60 dB DNL extends south over commercial development along the Kenai Spur Highway between Birch Street and Coral Street and further south over multifamily, commercial, Church of the Holy Assumption of the Virgin Mary Orthodox Church and new Dena'ina Clinic in Old Town.

The noise exposure map representing 2030 future conditions is presented on Figure 7-4. (*Figure 7-4 shows the updated zoning adopted by the City in 2016.*) This data is based on the future configuration of the airfield, as described in Chapter 8, and future aviation activity as described in Chapter 2. Although aircraft operations are forecast to increase about 18 percent between now and 2030, the aircraft noise contours are little changed. From an aircraft noise impact perspective there is virtually no change in the areas impacted by future aircraft operations at the Kenai Municipal Airport. The primary reason for this is the expectation that some of the older and noisier aircraft currently operating at the Airport will be replaced over time by newer and less noisy aircraft. In addition, as noted in Chapter 2, the future aircraft operations levels do not reflect any potential increase in commercial passenger jet aircraft.

Based on forecast aviation activity and INM modeling, no noise sensitive areas are expected to experience an increase of 1.5 dB DNL or more above the 65 dB DNL noise exposure level when 2030 activities are compared to existing conditions. Therefore, no long-term noise issues are expected to be created as a result of the proposed Airport Master Plan changes.

7.16 SECONDARY (INDUCED) IMPACTS

Major development projects have the potential to induce secondary impacts such as increased public service demands, changes in business and economic activity, or high employment requirements. Historically, most Airport projects have been of a size or character that avoids such secondary impacts. The capital improvements, discussed in Chapter 9, are proposed to be implemented incrementally over a 20-year period and individually are unlikely to produce any significant secondary impacts. However, since projects may be combined each proposed improvement will need to be evaluated on its own merits at the time of development.

7.17 SOCIOECONOMIC IMPACTS, ENVIRONMENTAL JUSTICE AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

The analysis of environmental justice determines whether or not minority and low income populations are disproportionately and adversely affected by a proposed action. In the 2006 *Kenai Municipal Airport Final Environmental Assessment, Proposed Improvement Projects*, a comparison was made of race, age and gender characteristics of the population within the Airport influence area as compared to the total City population. The Airport influence area was defined to include the census areas surrounding the Airport and those census areas under the approach and departure routes. The information collected was based on 2000 Census data. Data from the 2010

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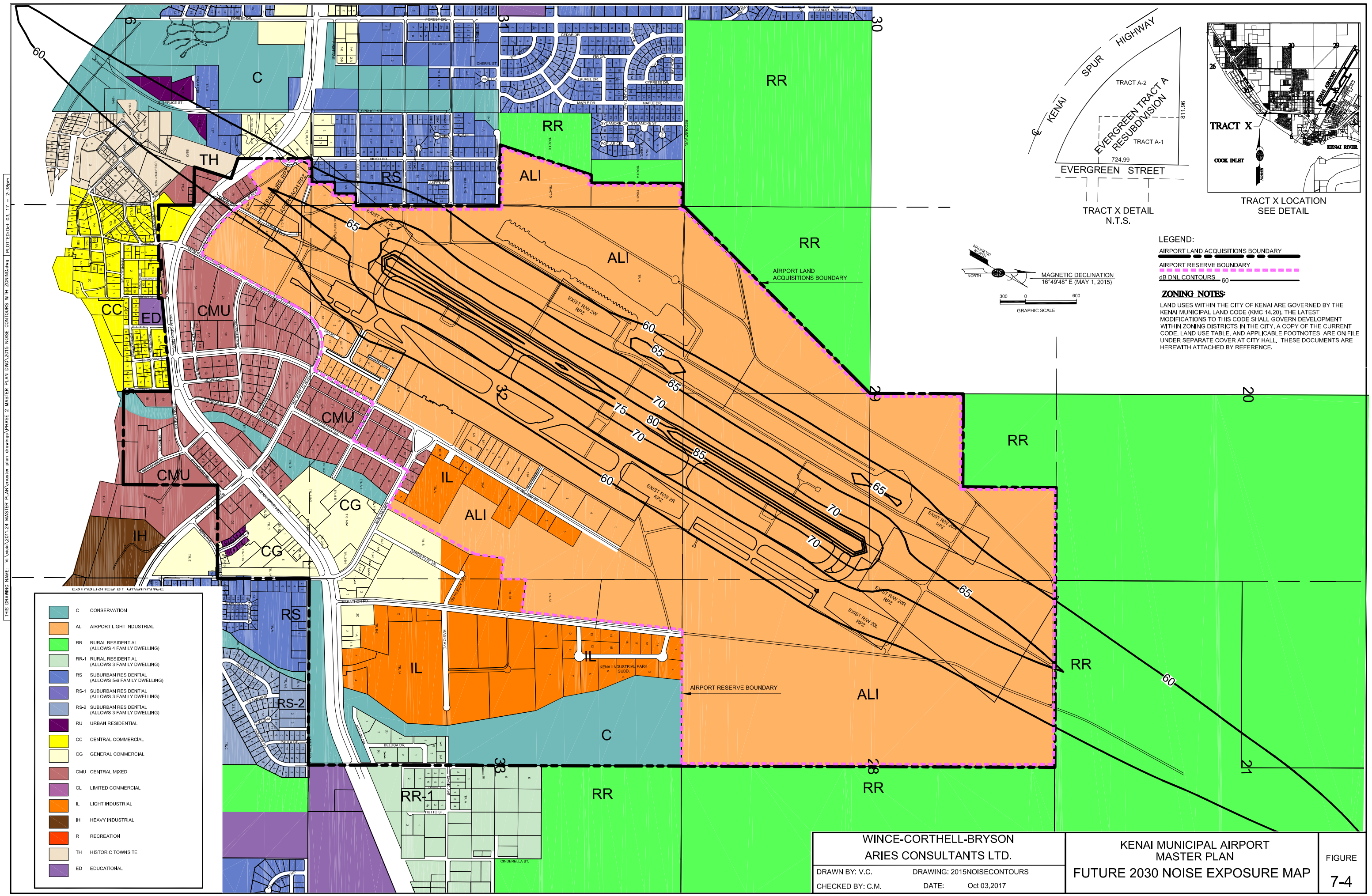


ESTABLISHED BY ORDINANCE

C	CONSERVATION
ALI	AIRPORT LIGHT INDUSTRIAL
RR	RURAL RESIDENTIAL (ALLOWS 4 FAMILY DWELLING)
RR-1	RURAL RESIDENTIAL (ALLOWS 3 FAMILY DWELLING)
RS	SUBURBAN RESIDENTIAL (ALLOWS 5-6 FAMILY DWELLING)
RS-1	SUBURBAN RESIDENTIAL (ALLOWS 3 FAMILY DWELLING)
RS-2	SUBURBAN RESIDENTIAL (ALLOWS 3 FAMILY DWELLING)
RU	URBAN RESIDENTIAL
CC	CENTRAL COMMERCIAL
CG	GENERAL COMMERCIAL
CMU	CENTRAL MIXED
CL	LIMITED COMMERCIAL
IL	LIGHT INDUSTRIAL
IH	HEAVY INDUSTRIAL
R	RECREATION
TH	HISTORIC TOWNSITE
ED	EDUCATIONAL

LEGEND:

AIRPORT LAND ACQUISITIONS BOUNDARY

AIRPORT RESERVE BOUNDARY

dB DNL CONTOURS 60

ZONING NOTES:

LAND USES WITHIN THE CITY OF KENAI ARE GOVERNED BY THE KENAI MUNICIPAL LAND CODE (KMC 14.20). THE LATEST MODIFICATIONS TO THIS CODE SHALL GOVERN DEVELOPMENT WITHIN ZONING DISTRICTS IN THE CITY. A COPY OF THE CURRENT CODE, LAND USE TABLE, AND APPLICABLE FOOTNOTES ARE ON FILE UNDER SEPARATE COVER AT CITY HALL. THESE DOCUMENTS ARE HEREWITH ATTACHED BY REFERENCE.

WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN	FIGURE
DRAWN BY: V.C. DRAWING: 2015NOISECONTOURS	FUTURE 2030 NOISE EXPOSURE MAP	7-4
CHECKED BY: C.M. DATE: Oct 03,2017		

U.S. Census is not yet available at a refined enough level to update this earlier evaluation. Available 2010 census data suggests the City of Kenai grew only about 2.3 percent between 2000 and 2010.

The differences that were noted in the 2006 environmental justice analysis ranged from 2 to 3 percent across race, age and gender. Due to the small population in the Airport influence area these differences could be explained by one or two households. The conclusion was that low income and minority populations in the Airport influence area were essentially similar to those throughout the Kenai City area.

Another element of this subject category is to determine if any proposed project poses environmental health risks and/or safety risks that could disproportionately and adversely affect children due to substances or products that a child is likely to come in contact with or ingest, such as drinking water, recreational waters, soil, or products they might be exposed to. While the airside of the Airport inherently imposes various safety risks due to the nature of the activities that occur there, the area is fenced and unaccompanied or unsupervised children are unlikely to be found there. On the landside of the Airport the drinking water meets local standards and access to other products such as fuels, oils and other hazardous substances are typically controlled or supervised by the various tenants. There are no long-term adverse impacts associated with the Airport (such as aircraft noise, water quality, contaminated soils or air quality) that might affect children over the course of their development. At this time, this assessment leads to a conclusion that children are unlikely to be adversely affected by proposed Airport development.

Other socioeconomic impacts, such as those associated with the relocation of housing or businesses or changes in traffic patterns as a result of proposed changes to the Airport development plan, are not relevant since none of the proposed projects require such actions.

7.18 WATER QUALITY

Water quality is an area-wide issue influenced by actions of the City of Kenai, the Kenai Peninsula Borough and others. Water quality Borough-wide varies markedly. Many rivers carry high sediment loads and ground water in some areas is highly mineralized (iron and some manganese). Human activities also contribute to water degradation or contamination.

Water quality at the Airport is affected by contaminants in stormwater runoff from runways, taxiways, aircraft parking aprons and vehicular parking areas which may include oil and grease residues, tire particles, plant and animal debris (i.e., leaves, dust and animal feces), and general litter. The drainage system within the Airport is largely made up of naturally vegetated drainage ditches coupled with storm drains. Runoff is directed southward to a stream known locally as Cemetery Creek, a portion of which, as noted earlier, is considered an anadromous fish water body. Runway 1W-19W also drains south to Cemetery Creek through a drop-inlet weir that maintains the water runway elevation. A portion of the aircraft parking apron and vehicular parking lot run off drains to an oil/water sedimentation detention pond and then to Ryan Creek. The naturally vegetated drainage ditches provide excellent filtering capacity to reduce the impacts of known

contaminants to less than significant levels. None of the streams in the Airport vicinity are identified on the most recent (2010) U.S. Environmental Protection Agency (USEPA) List of Impaired Waters.

The Airport has been in compliance with the National Pollutant Discharge Elimination System (NPDES). The Alaska Department of Environmental Conservation (ADEC) is the permitting agency for Alaska and the Airport has been operating under the Alaska Construction General Permit (ACGP) No. AKR 100000 dated July 2009. The ACGP expired in September 2013 but the Airport remained in compliance awaiting the new ACGP No. AKR 060000 which was issued February 2015 and became effective April 1, 2015.

New Surface Water Pollution Prevention Plans (SWPPP) and Notices of Intent (NOIs) were required to be submitted within 120 days for individual plans and within 180 days for comprehensive umbrella plans. The City of Kenai has submitted a comprehensive SWPPP covering itself and its affected tenants. The tracking number for the SWPPP is ADEC No. AKR 06AA09.

Proposed improvements at the Airport include an aircraft wash pad and a deicing facility. These facilities will require special attention with respect to water quality because they cannot be connected to any existing septic systems and under FAA standards require a special pollution containment control system to manage the effluents. As noted earlier in Section 5.8.6, Aircraft Wash Pad and Deicing Station, aircraft are currently washed or deiced on various aircraft apron parking areas and the effluent flows into vegetated and/or permeable airport ditch drainage ways or the airport storm drain systems that eventually discharge to the Kenai River. With respect to the future aircraft wash pad, the design typically includes a degreasing facility to separate out the oils and other residues removed during aircraft washing. Users of the aircraft wash pad facility will be required to use approved biodegrable detergents. With respect to a future aircraft deicing facility, deicing fluids can be harmful to aquatic life forms due to an excessively high ammonia content and chemical oxygen demand. There is an expectation that in the future deicer fluids will need to meet numeric effluent limitations for ammonia. To address these various water quality issues the aircraft wash pad and deicing facility are expected to eventually be connected to the City's waste water treatment plant. The impacts will be reduced by use of oil/water separators and detention filtration tanks prior to discharge from the Airport. The construction of each facility is expected to require ADEC review and approval to construct and operate as well as amendments to the Airport SWPPP.

7.19 WETLANDS

The Rivers and Harbors Act of 1899 and the Clean Water Act, together with Executive Order 11990 and Order DOT 5660.1A address development activities in wetlands. For regulatory purposes wetlands are defined as those areas that are inundated or saturated by surface and ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include "muskegs", swamps, marshes, bogs, and similar areas. If any proposed improvement projects require the discharge of dredged or fill material into the waters of the United States, including wetlands, Section 404 of the Clean Water Act (33 U.S.C. 1344, hereinafter referred to as Section 404) authorizes the

Secretary of the Army, acting through the Chief of Engineers (U.S. Army Corps of Engineers - USACOE), to issue permits to control such discharges.

The primary source of information regarding wetlands at the Kenai Municipal Airport is found in a Jurisdictional Determination and Wetland Functional Assessment completed in July 1996 that was updated and amended in February 2005 to include the entire Airport. (See *Preliminary Jurisdictional Determination and Wetland Functional Assessment, February 2005*, prepared as part of the *Kenai Municipal Airport, Final Environmental Assessment, Proposed Improvement Projects* in January 2006.) Soils information for the Airport is also available from the Natural Resources Conservation Service (NRCS) and through graphic information systems (GIS) features found on the Kenai Peninsula Borough web site.

The functional assessment studies identified wetland areas that were considered to be protected and the relative significance of them as wetland resources. The wetlands and biological resources within the Airport were identified using several different functional assessment rating systems including Hydrogeomorphic (HGM), Buell, and Magee classifications. The findings of the Jurisdictional Determination and Wetland Functional Assessment were agreed to by the U.S. Army Corps of Engineers on October 17, 2005.

7.20 WILD AND SCENIC RIVERS

The Wild and Scenic Rivers Act, as amended, describes those river segments designated or eligible to be included in the Wild and Scenic Rivers System. Based upon a search of the National Park Service's Wild and Scenic Rivers System many Alaskan rivers are listed as wild and scenic, however the Kenai River is not listed. There are no other designated rivers nor any study rivers located in the immediate vicinity of the Airport.

Chapter 8

RECOMMENDED AIRPORT MASTER PLAN

8.1 INTRODUCTION

The recommended long-range Airport Master Plan (the Plan) for the Kenai Municipal Airport is illustrated on Figure 8-1. The Terminal Area and Access Plan is illustrated on Figure 8-2. The Plan integrates long-term airfield and terminal area requirements with current and forecast aviation needs and airport access and parking needs. It represents a guide for airport development through the year 2030 planning period and indicates possible development beyond the year 2030 for which land should be reserved at this time.

The long-range 2030 Airport Master Plan development concept was selected by the City. Several Airport development concepts were formulated and evaluated for review prior to development of the long-range 2030 Airport Master Plan concept presented on Figure 8-1. Four alternative concepts were prepared and reviewed with the City Technical Advisory Committee (TAC) and Airport Commission at a public meeting on May 14, 2015. The alternative development concepts are described and illustrated in Chapter 6.

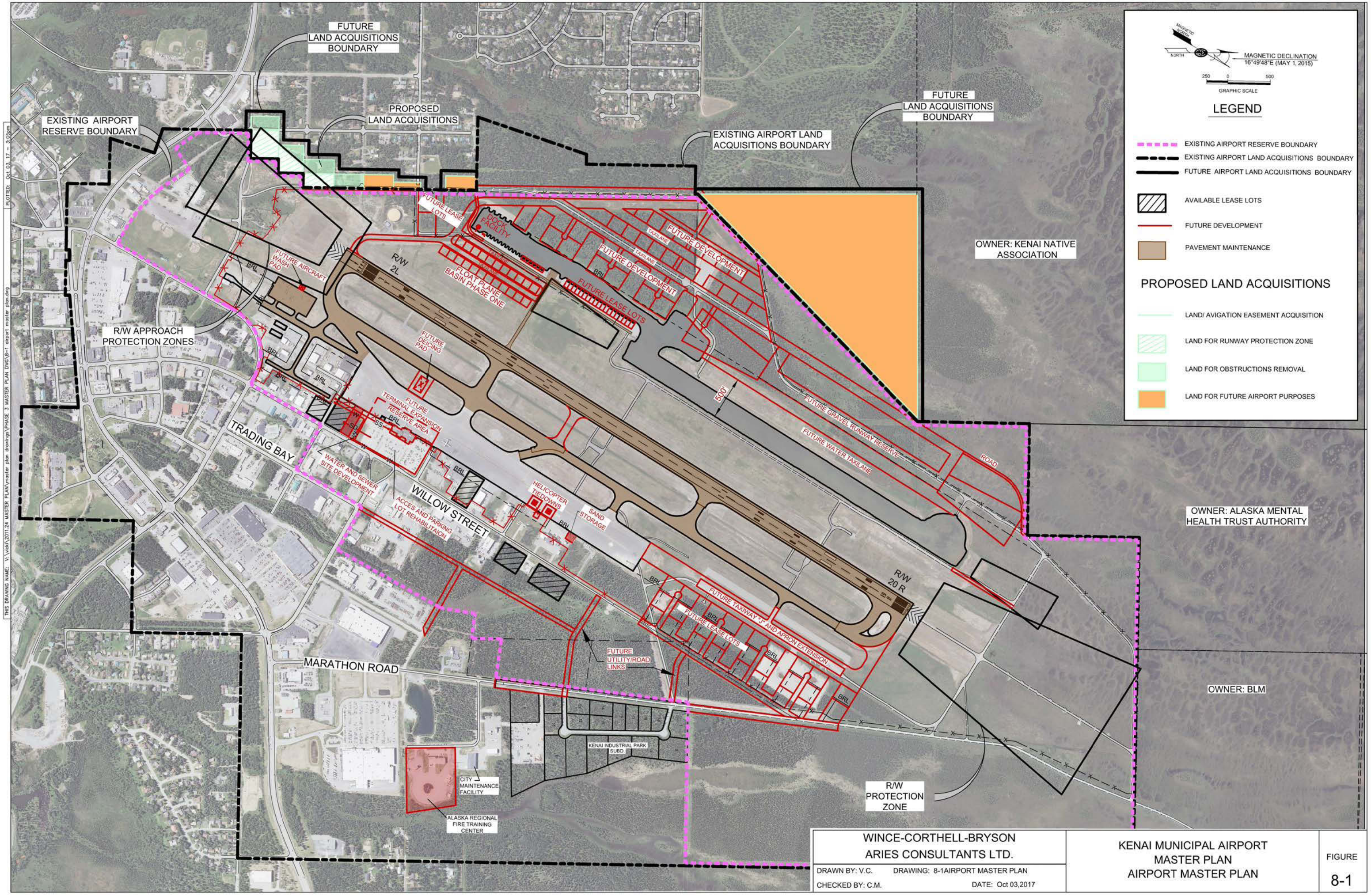
Based on comments received at the May 14, 2015 meeting a draft Airport Master Plan was prepared for review by the City TAC and Airport Commission at their June 11, 2015 public meeting. A revised draft Airport Master Plan, reflecting additional comments from the City TAC and Airport Commission at their June 11, 2015 and July 9, 2015 public meetings and Airport Commission January 13, 2016 meeting was prepared.

The recommended Airport Master Plan, reflecting additional comments from the City TAC, was presented to the Airport Commission at their July 17, 2017 public meeting. The Airport Commission unanimously recommended that the City Council approve the 2030 Airport Master Plan.

The proposed Alaska Liquid Natural Gas (LNG) Facility project could potentially impact the Kenai Municipal Airport. However, at this time, the potential impacts on airport facilities and operations are not known. Depending upon the type and level of aviation activity associated with the LNG project, there could be impacts on the passenger terminal building, aircraft parking apron, cargo facilities, vehicular access and parking. In addition, there could be financial and economic and environmental impacts on the Airport and the City that would need to be addressed.

The primary functional areas of the Plan, as illustrated on Figure 8-1, are:

- Airport Property
- Airfield
- Airspace and Navigational Aids
- Passenger Terminal
- Air Cargo and Mail
- General Aviation
- Airport Access and Parking
- Airport Support
- Other Building Areas
- Airport Land Use and Zoning



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WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN AIRPORT MASTER PLAN	FIGURE 8-1
DRAWN BY: V.C. DRAWING: 8-1AIRPORT MASTER PLAN		
CHECKED BY: C.M. DATE: Oct 03,2017		

FUTURE AIRCRAFT WASHPAD

FUTURE DEICING PAD

TOFA

T/W A

MAGNETIC DECLINATION 16° 49' 48" E (MAY 1, 2015)

100 0 50

GRAPHIC SCALE

WATER/SEWER, SITE DEVELOPMENT, AND LEASE LOTS

T/W F

T/W G

T/W H

T/W J

FUTURE TERMINAL EXPANSION RESERVE AREA

TERMINAL ADDITION

SITE DEVELOPMENT

NEW GATE

COVERED PARKING

BRL

GRANITE POINT CT.

SS

W

T/W GG

TERMINAL

TAXI LANE

SD

E

FUTURE LEASE LOT

GRANITE POINT ST.

LOT 5 & 6 FBO

MAIN ST. LOOP RD

N. WILLOW ST.

PARKING LOT EXPANSION

ACCESS AND PARKING LOT REHABILITATION

OVERFLOW PARKING LOT

PLAYGROUND

CONSTRUCTION AREA

TRADING BAY RD.

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WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD. DRAWN BY: V.C. DRAWING: TERMINAL AREA CHECKED BY: C.M. DATE: Oct 03,2017	KENAI MUNICIPAL AIRPORT MASTER PLAN TERMINAL AREA AND ACCESS PLAN	FIGURE 8-2

General adherence to land use allocations and circulation patterns, as shown on Figure 8-1, will ensure that continuing development of the Airport may take place in an orderly manner within the framework of long-range potential development.

From a physical planning standpoint, the important consideration is to reserve sufficient land now (before the surrounding land is further developed) for the development of airport facilities capable of accommodating possible long-range air traffic requirements associated with potential demand. Future community development can then be guided by the long-range air traffic potential so that, should the forecast demand become a reality, the Airport will be protected from encroachment by incompatible land uses, and the surrounding community will be protected from airport operations. On the other hand, actual physical facilities should be constructed only as the demand arises.

In addition to the Airport development described in this Chapter, the master planning process should properly provide for the reservation of sufficient land to accommodate facilities that may be required beyond the year 2030. The purpose is to preserve the long-range development potential of the Airport, thereby guaranteeing the longevity of the Airport beyond the current planning period.

There are several reasons for planning in this manner. If air traffic demand increases more rapidly than is forecast in this report, facilities beyond those recommended herein through the year 2030 may be needed. Conversely, if air traffic demand increases more slowly than is forecast, the construction of facilities may be deferred until the demand develops.

The primary purpose of the Terminal Area and Access Plan, as illustrated on Figure 8-2, is to ensure that the necessary land area will be reserved for future passenger terminal, air cargo, general aviation, and other facility expansion requirements. In addition, the Terminal Area and Access Plan, like the Airport Master Plan, should be sufficiently flexible to permit expansion of individual elements as exact requirements are determined without affecting the overall terminal area concept. Specific tenant and user space requests will be necessary to establish precise dimensions and design requirements for the terminal area and related facilities.

The basic elements of the Plan are described below.

8.2 AIRPORT PROPERTY

An additional 12.6 acres of privately-owned land is recommended for acquisition by the City outside the present Airport property line for future airport development and protection. The land ownership around the Airport is shown earlier on Figure 3-9. The land recommended for acquisition, shown on Figure 8-1, is at the southwest end of the existing Airport property boundary line and is to include land for the Runway 2L runway protection zone (5.75 acres), obstruction removal (3.75 acres) and future airport purposes (3.1 acres). The City already has avigation easements on 4.75 acres (7 lots) that are within the runway protection zone.

Ideally, the City should acquire all land within the runway protection zone for Runway 2L. However, if this is not feasible, or not pursued by the City, additional avigation easements should be acquired and zoning controls established that are compatible with airport and aircraft operations. This involves an area of

approximately 3.75 acres north of the Kenai Spur Highway. The portion of the runway protection zone that is outside the Airport property line, north of First Avenue, is already covered by avigation easements.

The City Council has recently authorized negotiations for acquisition of the 80-acre triangular parcel northwest of Tract IX on the Airport for future airport purposes.

8.3 AIRFIELD

The recommended airfield configuration, illustrated on Figure 8-1, retains two existing runways (2L-20R and 2W-20W), with widening of the water runway, and area reserved for future relocation of the gravel Runway 2R-20L to the west side of the Airport. An additional entry/exit taxiway for Runway 2L-20R, to provide adequate capacity to handle the forecast air traffic demand as well as encourage the proper use of the touchdown zone on Runway 2L, is also provided for in the Plan. The Plan also provides a separate water taxi channel for Runway 2W-20W.

The runways were redesignated by the Federal Aviation Administration (FAA) as Runways 2L-20R, 2W-20W and 2R-20L in December 2015 because of changes in the magnetic declination. This will require repainting and marking of the runways and new airfield signs in 2017.

8.3.1 Runway 2L-20R

This runway is retained as a 7,855-foot runway with a width of 150 feet to handle commuter aircraft, business jet and other large aircraft expected to use the Airport during the planning period. The Runway 2L landing threshold is retained in its present location to provide only 7,575 feet for landings on Runways 2L and 20R. Blast pads 200 feet long and 200 feet wide and holding aprons are retained at, or near, each end of the runway.

Runway safety areas, extending 1,000 feet beyond the physical ends of Runway 2L-20R and 500 feet wide, are retained.

The paved runway shoulders are retained at 25 feet wide for Runway Design Code (RDC) C-III and C-IV (e.g., B-737 and C-130) aircraft.

A full-length parallel taxiway for Runway 2L-20R, with one additional entry/exit taxiway, is retained to the east at 600 feet centerline-to-centerline spacing. The new entry/exit taxiway is planned to be 75 feet in width and located between Taxiways D and E. Medium intensity taxiway lighting should be installed along the new entry/exit taxiway.

8.3.2 Runway 2R-20L

The gravel Runway 2R-20L is retained at 2,000 feet long and 60 feet wide, with a centerline-to-centerline separation from Runway 2L-20R of 860 feet. The runway safety area consists of the same gravel surface with a width of 120 feet, centered on the runway centerline, and extending 240 feet beyond both ends of the runway.

Eventually, it may be necessary to relocate the gravel runway to the west side of the Airport if the lease lots and aircraft parking apron are extended to the north along Willow Street. An area is reserved at least 500 feet west of the water Runway 2W-20W centerline for a potential relocated gravel runway 2,400 feet by 60 feet on the west side of the Airport.

8.3.3 Runway 2W-20W

The water runway is planned to be retained at a length of 4,600 feet and width of 252 feet with a centerline-to-centerline separation from Runway 2L-20R of 850 feet. A 50-foot clear area free of obstacles is provided along the outside edges of the water runway and around the exterior edge of the turning basins. Ultimately, a separate 150-foot wide parallel water taxi channel is provided to the west of the water runway. The water runway and parallel water taxi channel could be identified by marker buoys.

8.3.4 Pavement Strength

Based on the pavement analyses summarized earlier in Chapters 3 and 5, all existing pavement sections satisfy the strength requirements for the current design aircraft utilizing the Airport. Pavement age and condition, however, will require scheduled pavement rehabilitation projects through the planning period.

Historically the airport pavement sections have been well maintained providing about 25 to 30 years of good service life. The following presents the most recent paving year followed by the year pavement rehabilitation can be expected to be required or should have been required.

Pavement Section	Year Paved	Rehabilitation Year
Runway 2L-20R	2008	2033
Taxiway B	2008	2033
Taxiway C	2008	2033
Taxiway D	1997	2022
Taxiway L	1997	2022
Taxiway E	2008	2033
Taxiway F	1989	2016
Taxiway A		
F to K	2006	2031
K to C	1997	2022
Taxiways H and G	1990	2016
Taxiway GG	1990	2019
General Aviation		
Tiedown Apron	1984	2016
Taxiway J	2010	2035
Terminal Apron	2010	2035
Float Plane Basin Area	1989	2014

The Terminal Apron and Taxiway J may require overlaying sooner if heavier aircraft, such as Boeing 737-400 and larger, begin using the Airport on a regular basis.

8.3.5 Helicopters

At present helicopters land and take off on Runway 2L-20R, or near the intersection of Taxiways G and H, and hover taxi to the two loading and unloading helipads marked on

the aircraft parking apron or to other areas on the Airport. In the future, no specific touch down and lift off area (TLOF) that can operate independent of the fixed-wing aircraft activity on the runways and in the surrounding airspace, in accordance with FAA AC 150/5390-2C, *Heliport Design*, is recommended, or provided for, in the Plan. Otherwise a heliport would have to be designated and shown on the Airport Layout Plan and approved by the FAA. Take offs and landings at the intersection of Taxiways G and H should be discouraged by the Air Traffic Control Tower.

8.3.6 Taxiways

The Plan provides for a new 75-foot wide entry/exit taxiway near the center of Runway 2L-20R between Taxiways D and E.

The paved shoulders on Taxiway A, between Taxiways C and K are planned to be widened from 12 to 14 feet to the recommended 25-foot wide shoulders.

A new 75-foot wide Taxiway S will connect the south end of Runway 2L-20R to the float plane basin and the proposed hangar development on the east side of the float plane basin water taxi channel.

Taxiway safety areas 171 feet wide, centered on the taxiway, should be provided for the taxiways serving Runway 2L-20R for RDC C-IV aircraft such as the C-130.

Taxiway G, between Taxiways F and H, and Taxiway H will be upgraded to Airplane Design Group II (ADG-II). Taxiway G, east of Taxiway H and Taxiway GG, will remain ADG-I. All of these taxiways will be restricted to small aircraft 12,500 pounds and less.

8.3.7 Drainage

The Airport is fairly well drained with only a few minor projects recommended to address Float Plane Basin drainage control, mitigate migratory bird surface water attractants and provide for storm water treatment. The proposed projects are as follows:

- Float Plane Basin Level Control Weir replacement
- General Aviation Area Storm Drain Sedimentation/Oil/Water Separator

The following recommended projects are minor maintenance type projects and can be completed with other airport projects or by City Airport and Street maintenance crews:

- Extend and improve drainage across the northerly east-west airfield service road
- Re-establish drainage along Willow Street north of the passenger terminal

8.4 AIRSPACE AND NAVIGATIONAL AIDS

Airspace and navigational aid considerations in the Plan are airspace and air traffic control, approach/departure areas and obstructions, runway protection zones, and navigational and landing aids.

8.4.1 Airspace and Air Traffic Control

Existing airspace procedures and air traffic control (ATC) facilities provide for a safe, orderly and expeditious flow of traffic. A nonprecision Instrument Flight Rules (IFR) approach procedure to Runway 2L, with lower minimums than presently exist to Runway 2L, would enhance the capabilities

of the Airport. The existing localizer performance with vertical guidance (LPV) minimums to Runway 2L are 300 feet minimum descent altitude (MDA) and ¾ mile visibility. There are times when tailwinds are too high for aircraft to land on Runway 20R and the weather is below 300 feet and ¾ mile. A nonprecision approach to Runway 2L with lower minimums would allow the Airport to remain open longer during these times with weather probably as low as 200-foot ceiling and 1/2 mile visibility.

The FAA has re-evaluated the Runway 2L nonprecision approach minimums now that the on-Airport tree obstructions have been removed and has not lowered the 300 feet and ¾ mile minimums. FAA has indicated that, if all the obstruction penetrations, both on and off the Airport, were mitigated, then the LPV minimums could be further reduced to 200 feet descent altitude (DA) and ¾ mile visibility. If all the 34 to 1 penetrations were mitigated, FAA has indicated that the visibility minimums could be reduced to ½ mile with a medium intensity approach lighting system with sequenced flashers (MALSF) and to 3/8 mile with a medium intensity approach lighting system with runway alignment indicator lights (MALSR). This would increase the amount of time the Airport is open by about 0.5 percent of the time, or 40 hours a year.

It should be noted that if the visibility minimums were ever reduced to less than ¾ mile, then a larger 2,500 foot by 1,000 foot by 1,750 foot runway protection zone would be required for Runway 2L approaches.

8.4.2 Approach/Departure Areas and Obstructions

It is recommended that the City acquire in fee title, or enforce the avigation easements, within the portion of the runway protection zone (RPZ) for Runway 2L, that extends outside the existing Airport property line. The City already has avigation easements over these properties. It is also recommended that the City acquire in fee title or acquire avigation easements over additional privately-owned lots to the west and north of the RPZ for airspace obstruction control.

The Plan provides for approach and departure slope surface ratios as shown below:

Runway	Approach Slope Surface Ratio	Departure Slope Surface Ratio
2L	34:1	40:1
20R	50:1	40:1
2R	20:1	
20L	20:1	
2W	20:1	
20W	20:1	

The tree obstructions to the existing Runway 2L approach surface and Runway 20R departure surface on Airport and City property have been removed to provide the required 34 to 1 approach and 40 to 1 departure surfaces, respectively. The City will continue to work with affected private property owners to mitigate the remaining off-Airport tree obstructions.

The Kenai Municipal Code Title 11, *Harbor and Harbor Facilities*, Chapter 11.20.370 *Aircraft Operations Protected*, does not fully address airspace requirements for any new construction in the vicinity of the Airport. The City needs to update the Airport-related restrictions in the Kenai Municipal Code to include the FAA Order 8260.3, *United States Standard for Terminal Instrument Procedures* (TERPS) 40 to 1 instrument departure surface and reference FAA Form 7460-1, *Notice of Proposed Construction or Alteration*. The City also

needs to update the title of FAR Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*.

No obstacles penetrate the 20:1 approach slope surfaces shown on the Plan for Runway 2R-20L. The earth embankment at the northeast end of the water Runway 2W-20W penetrates the 20:1 approach surface slope and should be flattened.

All of the existing building restriction lines (BRL) meet the recommended FAA design standards and have no penetrations except for the ladder on the City water reservoir which is lighted and will remain. It is recommended that the BRL on the east side of the airfield, north of the passenger terminal, be moved to the west to the edge of the existing lease lot lines and 1,334 feet from the Runway 2L-20R centerline. In addition, moving the lease lot lines to 1,234 feet from the Runway 2L-20R centerline would create additional space for lease lot development.

8.4.3 Runway Protection Zones

A 2,500-foot long precision instrument runway protection zone exists for Runway 20R and should be retained. A 1,700-foot long nonprecision runway protection zone exists for Runway 2L and should be retained. This results in the trailer park, south of the Kenai Spur Highway and the car wash, retail stores and office space north of the Kenai Spur Highway being outside the recommended 1,700-foot long runway protection zone.

Visual runway protection zones exist for each end of Runway 2W-20W and Runway 2R-20L and are retained. Visual runway protection zones should be provided for each end of Runway 2R-20L if the gravel runway is relocated to the west side of the Airport.

Runway	Protection Zone	Length in Feet	Inner Width in Feet	Outer Width in Feet
2L	Departure	1,700	500	1,010
20R	Departure	1,700	500	1,010
2L	Nonprecision Approach	1,700	1,000	1,510
20R	Precision Approach	2,500	1,000	1,750
2W	Visual Approach	1,000	500	700
20W	Visual Approach	1,000	500	700
2R	Visual Approach	1,000	250	450
20L	Visual Approach	1,000	250	450

8.4.4 Navigational and Landing Aids

Additional navigational landing aids are provided for in the Plan.

The capability of installing a medium intensity approach lighting system with runway alignment indicator lights (MALSR), or with sequenced flashers (MALSF), for Runway 2L is not required for a nonprecision approach with lower minimums to Runway 2L in the future as noted earlier and would also require a larger runway protection zone.

At some time in the future it may be necessary to upgrade and replace the VASI-4 on Runways 2L and 20R to PAPI-4.

Medium intensity taxiway lights are planned for all new paved taxiways.

Marker buoys are recommended to identify the water runway and a future parallel water taxi channel.

Eventually medium intensity runway lighting could be provided for both the water runway and the gravel runway strip. However, these lights should not be installed until the volume of aircraft operations expected to use these facilities after dark warrants the expenditure of installation and operations and maintenance funds.

8.5 PASSENGER TERMINAL

The passenger terminal complex includes the aircraft parking apron and passenger terminal building and is illustrated on Figures 8-1 and 8-2. Based on the aviation demand forecasts presented in Chapter 2, it is expected that the Airport will be served by commuter airlines using DeHavilland DHC-8, Beech 1900 and Cessna Caravan type aircraft in the future. It is essential that the aircraft parking apron and terminal building plans be flexible and capable of development to satisfy future needs.

In the long term, it is recommended that space to the south, west and north of the existing passenger terminal building be reserved for future expansion.

Considering the potential for substantial impacts on the passenger terminal, security, cargo, aircraft parking apron space, access and vehicular parking, as a result of the proposed LNG facility it is recommended that, in the long term, approximately 40,000 square feet be reserved for future terminal expansion and that the apron be expanded west to parallel Taxiway A. This recommendation will retain the existing passenger terminal in its current configuration for providing service during construction, allow for power-in and power-out aircraft operation and required separation from the larger parked and taxiing aircraft across the apron and retain existing vehicular parking and space for expansion.

It is also recommended that, when more information is available as to the potential airport requirements generated by the LNG Facility, a Terminal Area Study be completed to better determine the actual needs for passenger terminal and cargo operations, aircraft parking apron, and access and vehicular parking.

8.5.1 Aircraft Parking Apron

The commuter aircraft parking apron, as shown on Figure 8-2, can accommodate up to six power-in/power-out commuter-type aircraft parking positions (700 feet by 300 feet) for DeHavilland DHC-8, Beech 1900 and Cessna Caravan type aircraft through 2030 without impacting the itinerant aircraft parking to the south.

The aircraft parking apron assumes the use of power-in/power-out aircraft parking procedures with aircraft parked parallel to the face of the terminal building. The Plan will accommodate other positioning of the design aircraft (such as for nose-in/push-back procedures or other aircraft parking angles) within the aircraft parking apron dimensions.

Beyond 2030, or if air traffic grows faster than forecast, additional apron space would be needed to the north and this area is currently used for a helipad and large itinerant general aviation spaces as illustrated on Figures 8-1 and 8-2. These spaces would have to be relocated elsewhere on the Airport if the commuter aircraft parking apron is expanded.

The aircraft parking apron and Taxiway J, adjacent to the passenger terminal building, can accommodate the commuter aircraft parking positions and allow RDC C-IV e.g., C-130 and similar aircraft to taxi along the west side of the apron. The apron vehicle service lane and movement area boundary line is retained between Taxiway J and the aircraft parking apron area.

As mentioned earlier, long-term expansion should allow for expanding the aircraft parking apron to the west to the parallel Taxiway A.

8.5.2 Passenger Terminal Building

The passenger terminal building plan is illustrated on Figure 8-3. Passengers using commuter aircraft would continue to enplane and deplane at ground level. Based on the forecasts presented in Chapter 2, the existing passenger terminal building of approximately 25,000 square feet is generally adequate to accommodate the forecast 2030 demand. The size of the building will depend on the number of airlines, size of aircraft, security requirements, and associated facilities to be accommodated through the 2030 planning period. The building generally provides adequate space for passenger ticketing and check-in, baggage handling, airline offices, departure and waiting lounges, concessions (restaurant/lounge, rental cars), restrooms as well as maintenance and circulation. Space is reserved to the south, west and north for any long-term expansion needs.

Some modifications and reassignment of space may be necessary to provide additional space for improved passenger handling services, accommodate increased passenger volumes, passenger ticketing and check-in, airline operations and baggage handling depending upon the number of air carriers serving the Airport. Depending upon the size of aircraft being used and type of air carrier service provided, the existing departure lounge/waiting area could be enlarged to the west to provide a secured departure lounge. Some remodeling to accommodate the then current security requirements (e.g., passenger security screening and enclosed passenger departure lounge) may be necessary. The baggage claim area is adequate to accommodate forecast demand. New airdam rollup doors are proposed for baggage makeup and breakdown areas. An Airport Administration area addition, to separate baggage makeup and Airport Administration areas, is proposed.

The modifications and improvements needed to address deferred maintenance, remodeling to accommodate airport management and tenant requests for space and amenities, as well as Code issues, include the following and are illustrated on Figure 8-3.

Significant items include:

- Install new roof
- Rehabilitate sprinkler system
- Implement recommendations from recent energy audit

Other items include:

- Baggage and Administration Areas
  - Separation of Administration and baggage areas. (The relocation of the Administration Areas to be determined in a future Terminal Area Planning Project)
  - New overhead doors with hot air curtains over baggage tug doors
  - Warm and cold secure storage space
  - Attached vehicle garage
  - Separate open airline equipment shelter to park deicing equipment, passenger stairs, etc.

FUTURE TERMINAL EXPANSION RESERVE AREA

EMPLOYEE RESTROOM

1983 ADDITION

1966 TERMINAL

CONVERT RESTROOM TO OFFICE

SOLARIUM 155

RESTORE SHEAR WALLS

WIRELESS KIOSKS

VISUAL PAGER

SUB-WAITING 146

TENANT 7 145

STORAGE 158

KITCHEN 157

PREP AREA 156

ARCTIC ENTRY 152

ENTRY 153

HALL 147

VENDING

JANITOR 151

SUB-LOBBY

STORAGE 150

149

ELECTRICAL/ MECHANICAL EXPANSION

ELEC. 142

MECH. 141

MEN 140

WOMEN 139

ELEV. EQUIP. 143

ELEV. 144

STAIR 1 138

PET RELEASE AREA

OH4

HOT AIR CURTAINS OVER DOORS

OH3

BAGGAGE BREAKDOWN AREA 129

BAGGAGE CLAIM 130

ARRIVAL HALLWAY 128

127 ARCTIC ENTRY

123 ARCTIC ENTRY

EXPANDED PASSENGER HOLDROOM CAPACITY 90

VISUAL PAGER 125

VISUAL PAGER

OVERHEAD SECURITY CURTAINS

DEPARTURE HALLWAY 124

ARCTIC ENTRY 122

OH2

ELEC/COMM PANELS

ARCTIC ENTRY 121

HOT AIR CURTAINS OVER DOORS TYP.

OH1

WARM & COLD STORAGE

AREA 118

RAVN 117

RAVN 116

OFFICE 115

VACANT 114

GRANT 113

GRANT 112

BAGGAGE CONVEYOR

TICKET COUNTER 5 110

TICKET COUNTER 4 109

TICKET COUNTER 3 108

TICKET COUNTER 2 107

TICKET COUNTER 1 106

ADMIN. 111

ADMIN. 120

CONFERENCE

119

ISOLATED AIRPORT ADMINISTRATION AREA

EXISTING 30 X 24' GARAGE

POLE BARN STYLE COVERED PARKING 20' X 20' BAYS ONLY TWO BAYS SHOWN

TERMINAL ADDITION

RELOCATED SECURITY FENCE

1966 TERMINAL

1983 ADDITION

LOBBY 102

TENANT 5 135

TENANT 4 134 VAC.

TENANT 3 133

TENANT 2 132 VAC.

TENANT 1 131

ARCTIC FOYER 137

STAIR 2 136

WIRELESS KIOSKS

JANITOR 105

MEN 103

WOMEN 104

ARCTIC FOYER 101

HEATED SIDEWALK

BUS

BUS

TAXI

TAXI

TAXI

RENTAL CAR QUEUE AREA

WALKWAY OR SIDEWALK

SMOKING SHELTER

TAXI SHELTER

N REF
1"=30' HALF SIZE

THIS DRAWING NAME: V:\ Vicki\2011.24 MASTER PLAN\master plan drawings\PHASE 3 MASTER PLAN DWG\8-3 TERMINALBUILDINGFLOORPLAN.dwg PLOTTED: Oct 03, 17 - 3:10pm

WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN PASSENGER TERMINAL BUILDING PLAN	FIGURE 8-3
DRAWN BY: V.C. DRAWING: TERMINALBUILDINGFLOORPLAN CHECKED BY: C.M. DATE: Oct 03,2017		

- Stand-alone wireless computer system with remote kiosks
- Visual paging and information system for hearing impaired at three to four locations (including one upstairs in the lounge)
- Mechanical/Electrical room expansion area and rehabilitation
- Pet release area
- Outdoor taxi and smoker shelters
- Utility improvements

Once more information regarding the proposed LNG Facility is known, the future expansion of the Terminal Building to accommodate more passengers, TSA security requirements, etc. can be determined and planned for.

8.6 AIR CARGO AND MAIL

In the future, some air cargo would continue to be accommodated as belly cargo on passenger aircraft. Therefore, the Plan provides for the handling of some cargo through the passenger terminal building.

A 300,000 square-foot apron area, north of the Air Traffic Control Tower, based on the current BRL and lease lot locations, is retained for activities including air cargo, refueling, bulk fuel and supplies, air carrier diversions, fire suppression, fish haul, military and larger cargo aircraft to minimize the interaction between large and small aircraft to the greatest extent possible, including taxiing and parking interactions. However, the 80,000 square foot apron area in front of the Airport Operations Facility is only available for medevacs. Another 60,000 square feet is needed for helicopter tiedowns by the Air Traffic Control Tower. Therefore, about 160,000 square feet of apron is available for the larger aircraft parking.

FAA has recently determined that aircraft parking apron areas, fronting lease lots, will no longer be eligible for FAA Airport Improvement Program grant funds due to the exclusive use of the apron areas for accessing the lease lots. Therefore, the Plan recommends consideration of relocating the lease lot lines and the building restriction line to the west to provide an additional 200 feet of lease lot depth between Willow Street and the airfield for additional aircraft parking and development. This would apply to the lease lots north of the passenger terminal. Moving the existing lease lot lines, south of the air traffic control tower, to the west would eliminate the existing large aircraft parking apron areas. This would also require replatting of the existing lease lots and lease revisions including the adjustment of aircraft parking revenues between the leaseholders and the Airport. This should be considered in future planning.

8.7 GENERAL AVIATION

This section describes recommendations for commercial and noncommercial aviation, aircraft parking and storage and helicopter facilities.

8.7.1 Commercial and Noncommercial Aviation

Commercial aviation activities are defined as those which provide aviation products and services for the benefit of the general public. Several commercial aviation/fixed base operators provide a range of air taxi and general aviation services at the Airport including air taxi passenger and cargo services, hangars and tiedowns, maintenance and fueling. Currently there is no flight instruction offered at the Airport. In addition, there are several noncommercial

aviation leaseholds (leaseholders which provide for the basing and servicing of the aircraft of an individual, private organization, or corporation solely for its own benefit and not for the public) on the Airport.

The Plan retains the commercial aviation/fixed base operator lease facilities to the southeast of Runway 2L-20R. The Plan provides about 3 acres to the south of the passenger terminal vehicular parking lot for additional commercial aviation/fixed base operator facilities. There is also a vacant lease lot of about 1 acre in General Aviation Apron No. 1 south of the passenger terminal. One lot in the General Aviation Apron has recently been developed to provide 12 hangar units. There are also about 1.8 acres of vacant lease lots in the F.B.O. Subdivision, north of the passenger terminal, available for commercial aviation uses.

The Plan could also provide about 3.6 acres that would be the last subdivided lease lot for commercial aviation/fixed base operator and other aviation-related activities north of the State of Alaska, Department of Natural Resources, Division of Forestry facility to accommodate future demand.

The two existing available lease lots, south of the Air Traffic Control Tower, are only 100 feet wide along the apron and wider apron frontage, or combining the two adjacent lots, should be considered in the future to increase their effectiveness and financial feasibility. Alternatively, stub taxiways from the aircraft parking apron and access roads from Willow Street could be provided to more effectively develop the 400-foot deep lease lot areas north of the passenger terminal.

The current commercial aviation operators, Civil Air Patrol and private long-term tiedown users would remain in the area south of the passenger terminal. These operators have not indicated any need for expansion of the areas they lease.

For the long term beyond 2030, additional space of about 41 acres is also reserved along an extension of Willow Street to the north for future aviation-related and/or aviation compatible development if and when required. This area is considered an unallocated reserve for aviation-related uses, with the specific uses to be determined in the future, depending on the nature of the demand for such lease lots. It is recommended, when this area is actually developed for lease lots, that each lot be developed so that there is both adequate airfield access to the west as well as roadway access to the east in order to maximize the usefulness and attractiveness of this area to potential commercial aviation developers. This area will have ready access to the airfield as well as access off the Willow Street extension. The development of this area in the future will require the relocation, or closing, of the gravel Runway 2L-20R and associated taxiways and aircraft parking apron area.

Space is reserved for lease lots along the west shoreline of the float plane basin for commercial aviation operators to provide facilities and services for float plane operators. Vehicular access to this area would be from Float Plane Road and through the gate onto the existing portion of the Maintenance Road on the west side of the Airport. Development in this area will minimize potential aircraft/vehicular interactions as illustrated on Figure 8-1. This would require construction of access roads and water revetments which could be constructed from the south end as demand

warrants as illustrated on Figure 8-1. This area would be connected to the airfield and facilities on the east side of the Airport by an extension of proposed Taxiway S from the south end of Runway 2L-20R and around the south end of the Float Plane Basin.

8.7.2 Aircraft Parking and Storage

The Plan provides tiedown spaces for over 100 based aircraft. These spaces are already provided in either the present general aviation long-term tiedown area to the southeast of Runway 2L-20R or on the existing lease lots in this area.

The small taxiways and aircraft tiedown project, completed in 2016, established a taxi lane along the east side of the long term tiedown apron and, with the required object free area, reduced the available tiedown spaces from 40 aircraft to 35 aircraft.

There is also space for Civil Air Patrol (CAP)-owned based aircraft on the CAP facility at the south end of the Airport.

Apron space is needed for at least 20 itinerant aircraft through 2030. The existing itinerant aircraft tiedown area, south of the passenger terminal aircraft parking apron, provides 15 spaces, (for four large business jets, five small business jets or small aircraft and six small aircraft tiedowns). If there are no business jets present, then 15 more small aircraft could be accommodated.

Based on the requirements, presented in Chapter 5, up to 50 hangar spaces (T-hangars, executive or conventional hangars) are needed by 2030. It is recommended that hangars be consolidated in a few general areas on the Airport in the long term. One is the present area south of the passenger terminal area and another would be east of the float plane basin water taxi lane that would be developed on an as-required basis. A new Taxiway S will connect the south end of Runway 2L-20R to the float plane basin and the proposed 23 lease lot hangar development. A 12-unit hangar development project has recently been developed east of Taxiway H.

The parallel Taxiway A, at 600 feet centerline-to-centerline east of Runway 2L-20R, and the location of the gravel Runway 2R-20L, at 860 feet, centerline-to-centerline east of Runway 2L-20R, reduces the width of a future aircraft parking apron extension near the gravel runway from 400 feet to 200 feet. This will preclude use of this future aircraft parking apron area by large RDC Group IV aircraft (e.g. C-130) unless the gravel runway is relocated or closed. However, based on the aviation activity forecasts in Chapter 2, this should not be an issue before 2030.

An aircraft parking area is retained alongside the gravel Runway 2R-20L for use by taildragger aircraft with oversized tundra tires/skis. This area is accessed through an existing gate along Willow Street. Ultimately, if and when the adjacent area is required for development of additional aviation activities (aircraft parking apron, lease lots, etc.), then it may be necessary to relocate the gravel runway and associated aircraft parking area to the west side of the Airport as illustrated on Figure 8-1.

Space is reserved on the east shoreline of the float plane basin for mini-lease lots for individual float plane aircraft owners. Space is also reserved for a future Operations and Pilot Building on the east side of the float plane basin.

An area near the center of the water taxi channel provides a ramp for amphibian aircraft and for converting aircraft from wheels to floats and is close to the existing limited access taxiway connecting the float pond to the rest of the airfield.

Winter ice borings, taken at mid-winter, show that the water level remains at the existing operating level providing ice support for maintaining a winter ski runway. Considering the security and amenities provided, this facility would be available for winter use. It is an option if the City chooses to implement it with potential demand.

8.7.3 Helicopters

The present loading and unloading helicopter parking positions north of the passenger terminal and by the Airport Operations Facility, used for medivac operations, are retained. New helipads for helicopter parking are provided for in the Plan west of the Air Traffic Control Tower and east of Taxiway J to service the northeast portion of the Airport. Additional helipads for parking helicopters are provided near the Air Traffic Control Tower to minimize the amount of hover taxiing required and to be close to Willow Street access. The dimensions and markings for different types of helicopter parking positions are presented in FAA AC 150/5390-2C, *Heliport Design*, Paragraph 214, Helicopter Parking. In addition, it is assumed that helicopters would be parked on the operator lease lots. Helicopters may hover taxi on taxiways to tiedowns and lease lots but in congested areas, e.g., taxilanes, may need to be trailered to parking positions.

8.8 AIRPORT ACCESS AND PARKING

This section describes recommended airport access, vehicle parking and service road improvements.

8.8.1 Access Roads

The existing access roadways off Willow Street into the terminal area are adequate to serve the passenger terminal, cargo and general aviation activity on the east side of the Airport through 2030. A future extension of Willow Street to the north will serve additional airport development beyond 2030 as required.

The access road to the gravel runway utilizes an existing maintenance road entrance from Willow Street. This access road will require relocation, or upgrading, when the aircraft parking apron and the lease lots are extended to the north and a new airport access road from Willow Street is proposed to eventually serve this area as shown on Figure 8-1.

The curbside roadway in front of the passenger terminal building is congested at times and it is recommended that the roadway be reconfigured as illustrated on Figure 8-3. Consideration should be given to adding one lane on the east side of the curbside roadway, across from the passenger terminal, as activity increases in the future. This will improve safety and the flow of traffic along the terminal curbside roadway, especially during peak periods. The Plan provides additional vehicular parking for arriving and departure passengers as well as an additional lane for drive through passenger drop off.

8.8.2 Vehicle Parking Facilities

At least another 50 spaces are needed to accommodate the forecast 2030 demand for public, employee and rental car parking. The public parking lot can be modified to handle different types of paid parking ranging from an honor system to a fully enclosed parking lot. Space is reserved for another 50 spaces south of the existing rental car parking lot and an additional 70-space paved parking lot east of Willow Street, if the demand grows faster than forecast, and for overflow peak period parking.

The terminal access roadway, vehicular parking and area lighting should be reconstructed within the planning period. It is recommended to reorient and redesignate the public, employee and rental car vehicle parking spaces in the future as illustrated on Figures 8-2 and 8-3.

Consideration should be given to installing electrical plug-ins with the new lighting system at the long-term parking spaces if found to be financially feasible and supportable by an increase in the parking fees. Some of the rental car spaces already have electrical plug-ins.

The actual number of parking spaces required for general aviation users will be based on the City's policy of whether or not to allow aircraft owners and pilots to park on the tiedown areas. At present, the long-term aircraft tiedown owners and pilots are provided a paved parking area adjacent to the aircraft parking apron. The only vehicle parking allowed on a lease lot within the Airport security fence is for employees or someone with an "operational need." Airport tenants are required to provide secure parking for all others. In addition, a total of 50 parking spaces are required near based aircraft tiedown and hangar areas. It is recommended that airport tenants should continue to be required to provide adequate parking for their employees and visitors within their respective lease lots as a condition of their lease.

8.8.3 Airport Service Roads

The Plan provides for an extended realigned/maintenance/perimeter roadway inside the north and west sides of the Airport property line if and when that area is developed.

8.9 AIRPORT SUPPORT

Airport support includes the facilities for Airport Administration, Airport maintenance, aircraft rescue and fire fighting, Federal Aviation Administration, fuel storage and dispensing, aircraft wash pad, deicing station, utilities and fencing.

8.9.1 Airport Administration

The Airport administration offices in the passenger terminal building are planned to be relocated to a second floor location as illustrated on Figure 8-3.

8.9.2 Airport Maintenance

The Airport Operations Facility is adequate for its present needs.

Airport lighting and signage material is currently stored in connex cargo containers at the Airport Operations Facility.

Currently the Airport screens sand from the sand stockpile and stores it on the north end of the aircraft parking apron. Due to a recent lease lot request for this location, the sand is now stockpiled off the apron on a temporary prepared soil pad with

inconvenient access. The Plan provides for a new sand storage facility located immediately north of the Airport Operations Facility and within the existing City parcel of land.

The existing Airport sand stockpile area will require relocation when the north end of the aircraft parking is extended to the north and future lease lots are developed. The proposed new site is located north of the existing sand stockpile on the west side of the float plane basin. Both stockpiles, as they are utilized, should be designed for future reclamation to lease lot sand subgrade elevations. In the interim the existing sand stock piles will continue to provide airfield construction material.

The Plan provides for a shared Airport Maintenance and Float Plane Basin user facility, at the south end of the Float Plane Basin, to provide space for boat, oil booms and hazardous waste cleanup materials storage as well as pilot and passenger waiting space and restrooms.

8.9.3 Aircraft Rescue and Fire Fighting

The Aircraft Rescue and Fire Fighting (ARFF) facility location, in the Airport Operations Facility, satisfies the required response time for ARFF equipment. A fire lane is already established from the ARFF facility onto and across the airfield to the float plane basin.

8.9.4 Federal Aviation Administration

The Air Traffic Control Tower (ATCT), Flight Service Station, and the field maintenance facility are retained in their present locations.

8.9.5 Fuel

The existing fuel storage facilities are retained on the east side of the Airport and also adjacent to the float plane water taxiway on the west side of the Airport.

8.9.6 Aircraft Wash Pad and Deicing Station

Space is reserved on the west side of long-term aircraft tiedown apron, at the south end of the Airport, for at least a 60-foot by 60-foot aircraft wash pad (pollution abatement facility) with appropriate water and drainage systems to serve future needs and comply with current standards.

In addition, a 300-foot by 300-foot deicing station, with appropriate environmental controls, for commuter air carrier and other aircraft is proposed west of the passenger terminal and Taxiway J and east of Taxiway A to provide a centralized deicing facility. This location should be reserved if and when a deicing station is required in the future.

8.9.7 Utilities

The utility systems on the east side of the Airport are well established and some extensions and modifications will be needed in the future consistent with the development of the taxiways, passenger terminal, air cargo, general aviation and commercial aviation areas recommended in the Plan. All lease lots adjacent to Willow Street are already supplied with water and sewer stubouts as well as underground telephone and electricity. Natural gas currently serves as far north as the Airport Operations Facility. The water, sewer, and other utility systems will need to be extended to the north as part of any extension of Willow Street to serve additional lease lots to the north.

The utility and support systems needed to develop the southwest side of the Airport, west of Runway 2L-20R and adjacent to the float plane facility for commercial aviation development are municipal water, which is available at the City water reservoir and Float Plane Basin Access Road, and municipal sewer which is available near the intersection of Float Plane Basin Road and Fourth Avenue. Natural gas is available from the City water reservoir site and telephone and electric service is already provided to this area.

The City water systems serving Willow Street, from the Passenger Terminal north, and Marathon Road, north of Magic Avenue, are restricted dead end lines providing fire flows that are less than that typically required for industrial type development as discussed earlier in Chapter 5. The Airport and City Water and Sewer Department should consider improvements to increase available fire flows to any planned development along Willow Street and Marathon Road.

Any development planned to the north, along Willow Street and Marathon Road, should at least include street cross links and/or utility easements for efficient development of the property and looping the water mains to increase fire flows.

Water and sewer should be extended to the terminal area off the Granite Point Street mains to increase fire flow to the terminal area and provide deeper sewer service to alleviate the freezing problems experienced at the passenger terminal in the past.

8.9.8 Fencing

The airport fencing will need to be realigned as additional airport improvements, such as additional lease lots and other facilities, are implemented on the east side of the Airport. The fencing will also need to be realigned along the west airport boundary to accommodate any future land acquisition.

Segments of the fencing around the south end of the Airport are difficult to maintain and have been damaged and will require some replacement during the planning period.

8.10 OTHER BUILDING AREAS

The City of Kenai's three million gallon reserve water tank and adjacent camping area are retained just south of the float plane facility.

The cemetery, located just north of First Street, is City-owned and will be expanded to the west if required on City-owned property within the Airport Property Boundary.

The FAA Flight Service Station and City of Kenai Animal Control Facility are located on Willow Street.

The Alaska Regional Fire Training Center is located and retained on Marathon Road. The Center needs major maintenance and the fire training equipment is obsolete and needs replacing.

The City is in the process of relocating the street, water and sewer maintenance departments to the new facility on Marathon Road thereby making the present facility on Airport Way available for leasing opportunities.

It is assumed the City will continue current leases for airport-compatible uses that are within the Airport Reserve Boundary.

There is approximately 30 acres of airport reserve land between Willow Street and Marathon Road that is land-locked by existing lease lots and with no access. Street extensions and cross links are recommended to access this property and provide for looping of the City water utility to increase fire flow in this area. Future development may be limited by technical and environmental constraints due to the drainage through the area.

8.11 AIRPORT LAND USE PLAN

This section describes the Airport Land Use Plan and proposed changes to the Airport Reserve Boundary and airport land use and zoning designations on the Airport property.

The goals, objectives and strategies of the City for the future role and development of the Airport have also been updated.

8.11.1 Airport Land Use Plan

The Airport Land Use Plan, illustrated on Figure 8-4, is intended to guide the future lease, sale and use of Airport lands. The long-range Airport Land Use Plan reflects the future development recommended in the Airport Master Plan shown on Figure 8-1 as well as the Kenai Municipal Code and City of Kenai Comprehensive Plan. In some instances, such as the development of additional commercial aviation areas to the northeast along Willow Street and the expansion and possible relocation of some general aviation activity to the west side of the Airport, the Plan reflects a significant potential growth that will take a long time to implement and for which land should be reserved.

Actual physical facilities would only be constructed as the demand arises and to be compatible with the financial resources and capabilities of the Airport at the time of implementation.

The Airport Land Use Plan has been developed to identify the highest and best uses of Airport land that are in compliance with FAA grant assurances, regulations, standards and guidelines as described throughout the report.

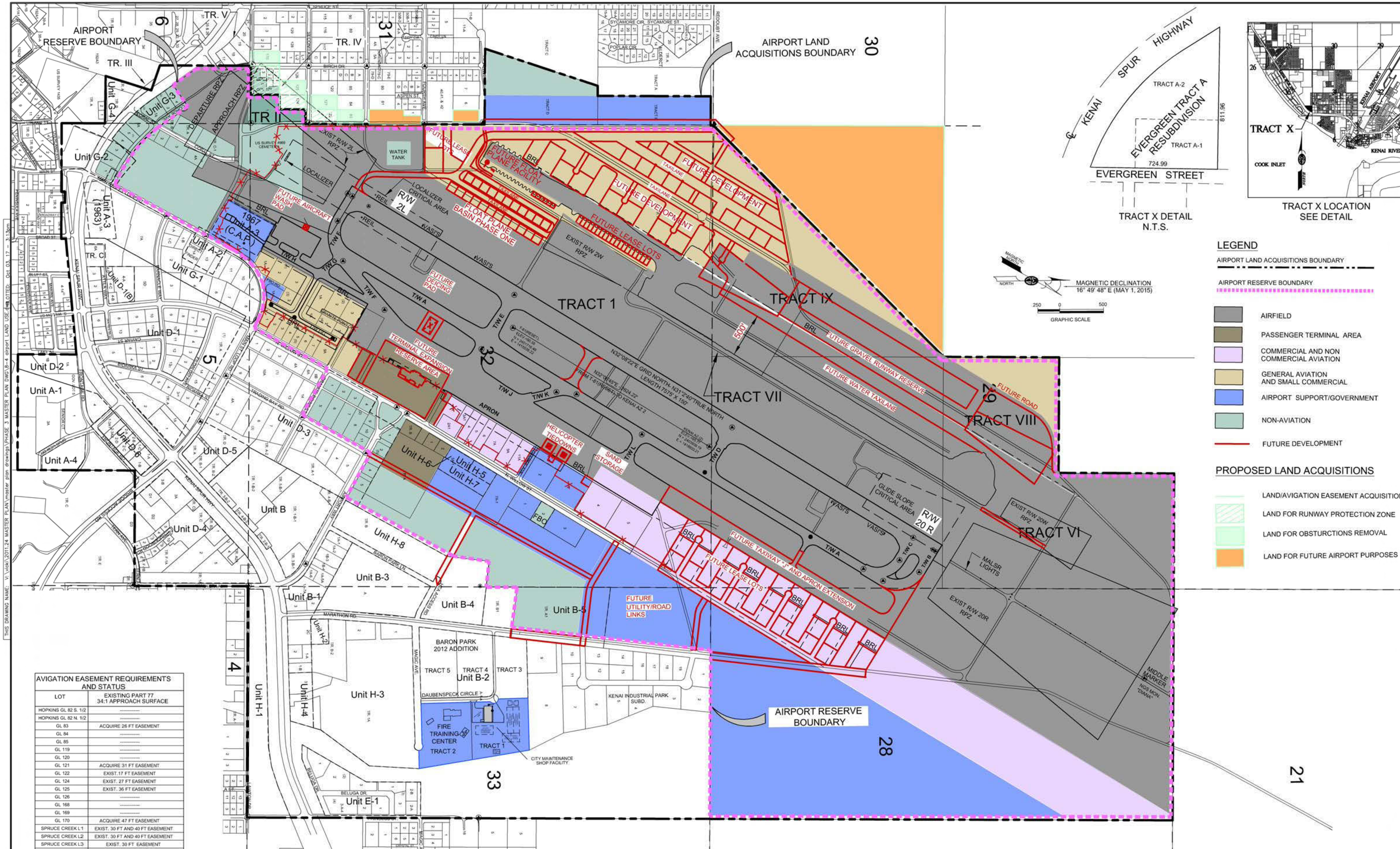
8.11.1.1 Airport Land Use Definitions

The following land use definitions have been updated to correspond to the land use areas shown on Figure 8-4.

Airport Land Acquisitions Boundary. This boundary reflects the original airport boundary and any lands that have subsequently been added to the Airport. Many parcels within this boundary have been sold by the City, and these properties are no longer technically part of the Airport property. However, for simplicity and because of the large amount of roads, rights-of-ways and easements between sold lots that are still owned by the City, this drawing continues to reflect the original Airport Property Boundary.

Airport Reserve Boundary. The Airport Reserve is defined in the Kenai Municipal Code (KMC Section 21.05.010, Airport Reserve) as follows:

(a) There is established an Airport Reserve for the development, expansion, maintenance, operation, protection, and perpetuation of the Kenai Municipal Airport. The boundaries of the Airport Reserve are established as shown on the map codified as KMC 21.05.020.


TRACT X LOCATION
SEE DETAIL
TRACT X
COOK INLET
KENAI RIVER
KENAI SPUR HIGHWAY
TRACT A-2
EVERGREEN TRACT A RESUBDIVISION
TRACT A-1
EVERGREEN STREET
TRACT X DETAIL
N.T.S.
MAGNETIC DECLINATION
16° 49' 48" E (MAY 1, 2015)
GRAPHIC SCALE
LEGEND
AIRPORT LAND ACQUISITIONS BOUNDARY
AIRPORT RESERVE BOUNDARY
AIRFIELD
PASSENGER TERMINAL AREA
COMMERCIAL AND NON COMMERCIAL AVIATION
GENERAL AVIATION AND SMALL COMMERCIAL
AIRPORT SUPPORT/GOVERNMENT
NON-AVIATION
FUTURE DEVELOPMENT
PROPOSED LAND ACQUISITIONS
LAND/AVIGATION EASEMENT ACQUISITION
LAND FOR RUNWAY PROTECTION ZONE
LAND FOR OBSTURCTIONS REMOVAL
LAND FOR FUTURE AIRPORT PURPOSES
AIRPORT LAND ACQUISITIONS BOUNDARY
AIRPORT RESERVE BOUNDARY
TRACT 1
TRACT VII
TRACT VIII
TRACT IX
TRACT VI
FUTURE DEVELOPMENT
FUTURE FLOAT PLANE FACILITY
FLOAT PLANE BASIN PHASE ONE
FUTURE LEASE LOTS
FUTURE GRAVEL RUNWAY RESERVE
FUTURE WATER TAXILANE
FUTURE ROAD
FUTURE TERMINAL EXPANSION RESERVE AREA
FUTURE DEICING PAD
FUTURE AIRCRAFT WASH PAD
HELICOPTER TIEDOWNS
SAND STORAGE
FUTURE TAXIWAY "J" AND APRON EXTENSION
FUTURE UTILITY/ROAD LINKS
R/W 2L
R/W 20 R
EXIST R/W 2W RPZ
EXIST R/W 2L RPZ
EXIST R/W 20W RPZ
EXIST R/W 20R RPZ
LOCALIZER CRITICAL AREA
GLIDE SLOPE CRITICAL AREA
MALSR LIGHTS
MIDDLE MARKER
WATER TANK
APRON
FBO
DEPARTURE RPZ
APPROACH RPZ
FIRE TRAINING CENTER
CITY MAINTENANCE SHOP FACILITY
BARON PARK 2012 ADDITION
KENAI INDUSTRIAL PARK SUBD.
Unit H-1
Unit H-3
Unit H-5
Unit H-6
Unit H-7
Unit H-8
Unit B
Unit B-2
Unit B-3
Unit B-4
Unit B-5
Unit D-1
Unit D-2
Unit D-3
Unit D-4
Unit D-5
Unit A-1
Unit A-2
Unit A-3 (1963)
Unit A-4
Unit G-1
Unit G-2
Unit G-3
Unit G-4
Unit E-1
TR. II
TR. III
TR. IV
TR. V
4
5
6
21
28
29
30
31
32
33

AVIGATION EASEMENT REQUIREMENTS AND STATUS	
LOT	EXISTING PART 77 34:1 APPROACH SURFACE
HOPKINS GL 82 S. 1/2	------------
HOPKINS GL 82 N. 1/2	------------
GL 83	ACQUIRE 26 FT EASEMENT
GL 84	------------
GL 85	------------
GL 119	------------
GL 120	------------
GL 121	ACQUIRE 31 FT EASEMENT
GL 122	EXIST.17 FT EASEMENT
GL 124	EXIST. 27 FT EASEMENT
GL 125	EXIST. 36 FT EASEMENT
GL 126	------------
GL 168	------------
GL 169	------------
GL 170	ACQUIRE 47 FT EASEMENT
SPRUCE CREEK L1	EXIST. 30 FT AND 40 FT EASEMENT
SPRUCE CREEK L2	EXIST. 30 FT AND 40 FT EASEMENT
SPRUCE CREEK L3	EXIST. 30 FT EASEMENT
SPRUCE CREEK L4	EXIST. 30 FT EASEMENT
SPRUCE CREEK L5	EXIST. 30 FT AND 40 FT EASEMENT

WINCE-CORTHELL-BRYSON
ARIES CONSULTANTS LTD.

DRAWN BY: V.C. DRAWING: LOCATIONMAP
CHECKED BY: C.M. DATE: Oct 03,2017

KENAI MUNICIPAL AIRPORT
MASTER PLAN
AIRPORT LAND USE PLAN

FIGURE
8-4

(b) No city-owned land within the Airport Reserve shall be sold or otherwise conveyed out of City ownership for any purpose, except as provided in a lease executed by the City before the effective date of the ordinance codified in this section.

The Airport Reserve definition could be further divided into property with direct airfield access (as defined under airfield below) and property without direct airfield access. Property with direct airfield access should be used for aviation-related and airport protection purposes. Properties without direct airfield access should be used for purposes consistent with FAA Grant Assurance 21, *Compatible Land Use*.

Airfield. Areas directly related to the landing, takeoff, taxiing and parking of aircraft and helicopters, including runways, helicopter touchdown and lift off (TLOF) areas, taxiways, runway protection zones, approach and departure surfaces, runway and taxiway safety areas, building and obstacle free zones, navigational aids and City-owned aircraft parking aprons.

Passenger Terminal. Areas containing the passenger terminal and public, rental car and employee parking associated with passenger terminal activities.

Commercial and Noncommercial Aviation. Areas used for aviation activities requiring airfield taxiway access such as air cargo facilities, hangars, aircraft parking aprons, corporate jet support facilities, fueling facilities, airline and air taxi hangar/office facilities, government and military aviation facilities and primarily for large aircraft (more than 12,500 pounds).

General Aviation and Small Commercial. Areas used by general aviation and commercial aviation activities using small aircraft (12,500 pounds or less), primarily by private aircraft owners, pilots and businesses requiring airfield taxiway access to the paved runway and/or operating from the gravel runway and floatplane basin and other businesses that provide services to them including hangars, non-City owned aircraft parking aprons, and aircraft maintenance and support facilities. Uses in these areas shall be restricted to aircraft meeting taxiway and taxilane pavement strength limitations and taxiway and taxilane object free area width standards defined in FAA Advisory Circular 150/5300-13A, *Airport Design,* for small aircraft (12,500 pounds or less).

Airport Support/Government. Areas used by government activities required for the operation and maintenance of the Airport and air navigation such as the FAA air traffic control tower, FAA flight service station, airport administration and maintenance facilities, aircraft rescue and fire fighting, airport storage areas, aircraft wash pad and deicing facilities, utilities and fencing. Areas used for facilities and functions which support the airfield, passenger terminal area, commercial and noncommercial aviation and general aviation─tenants and the traveling public such as rental car or other ground transportation maintenance areas, aviation-related offices and warehouses, aircraft parts suppliers or hotels/motels.

Future Development. Areas reserved for future long-term passenger terminal, commercial aviation, noncommercial aviation or other airport support/government development.

Nonaviation. Areas inside the Airport Reserve Boundary which may be developed for purposes unrelated to the Airport and

aviation activities providing they do not conflict with airport-related restrictions on height, noise, airport safety zones or hazardous wildlife attractants. These uses currently include and may not be limited to the cemetery, water tank and City recreational activities.

8.11.1.2 Airport Land Use Plan

The Airport Land Use Plan, illustrated on Figure 8-4, shows that a significant portion of the Airport is reserved for the Airfield and airfield protection uses encompassing the three runways and related approach and departure areas, (e.g., runway protection zones, approach and departure surfaces and safety areas) and associated taxiways. The Airfield also includes the aircraft parking apron along the east side of the Airfield and the City-owned general aviation aircraft parking apron.

The Passenger Terminal area includes the existing passenger terminal building and adjacent public, rental car and employee vehicular parking areas.

The Commercial and Noncommercial Aviation areas include the existing lease lots north of the passenger terminal. This area could be expanded by relocating the lease lot lines to the west as discussed earlier. The Commercial and Noncommercial Aviation area also includes the area reserved for future Commercial Aviation lease lots along an extended Willow Street to the north. The Plan for this future area reflects relocation of the lease lot lines and building restriction line to the west as shown on Figure 8-1.

The General Aviation and Small Commercial Aviation area is retained south of the existing Passenger Terminal area. Additional space is provided east of the float plane basin, and south of the water Runway 2W-20W, for additional small aircraft lease lots. In the long term, additional space is reserved for future development, west of the float plane basin and water Runway 2W-20W, of additional lease lots and facilities for users of the water runway and any future relocation of the gravel Runway 2R-20L and aircraft parking apron to the west side of the Airport.

The Airport Support/Government areas include the Airport Operations Facility, FAA air traffic control tower, FAA flight service station, future aircraft wash pad, deicing facility, float pond operations and pilot facility building, and new sand stockpile. The Airport Support/Government land uses also include the Alaska Regional Fire Training Center and the City Maintenance Facility east of Willow Street.

The Nonaviation land uses include the commercial development on the north side of the Kenai Spur Highway and South of Cohoe Avenue. Nonaviation land uses also include the cemetery, water tank, softball fields and animal control facility.

Any interim or existing uses that are not consistent with the long-range Airport Land Use Plan, illustrated on Figure 8-4, may be allowed to continue if the land is not currently needed for the land uses designated on the Airport Land Use Plan. However, before issuing a lease for an interim use, the City should determine when the land will be needed for future uses that confirm with the Airport Land Use Plan. The City's determination should be based on the airport land use plan, the airport master plan, airport capital improvement program and airport financing capabilities. The maximum term for an interim use lease would be the shorter of the term specified in the City's lease term guidelines for the

Airport or the amount of time remaining until the land will be needed for a conforming use. Some proposed interim uses may be subject to FAA approval.

Existing airport leaseholders should be notified of any proposed future land use or zoning change on the Airport affecting their leasehold interest.

Most of the recommended projects in the Facilities Implementation Plan, presented in Chapter 9, are for rehabilitation and maintenance projects to maintain the Airport as an economic asset to the City. This includes airfield rehabilitation projects and rehabilitation/upgrading of the passenger terminal building, access roads and vehicular parking lot. It also includes improvements to the perimeter security fencing and gates. Land acquisition/avigation easements are recommended for obstruction control to protect the instrument approach and departure procedures for aircraft and pilots using the Airport for air carrier, air taxi, general aviation and military aviation activity for the safety of persons in the air and on the ground.

The only major new development project included in the Facilities Implementation Plan is the Float Plane Basin Phase One project which will create an additional 23 hangar lease lots and generate additional revenue to the Airport. This project will provide additional hangar spaces for people to park their aircraft in rather than outside on aircraft parking aprons. There has been an increasing demand for hangar spaces at airports in recent years as people prefer to park and pay for their aircraft inside hangars rather than outside on aircraft parking tiedowns. There are limited hangar facilities available at the Airport and no public-use hangars are available for lease. This project will allow the Airport to attract, or maintain, aircraft owners who might otherwise use other airports to base their aircraft at. This project will have economic benefits to the Airport and City in terms of additional lease revenue that is generated. A rate of return analysis for the Float Plane Basin Phase One project is presented in Chapter 10.

The expansion of the vehicular parking lot, adjacent to the passenger terminal, will also generate additional revenue to the Airport.

The development of small lease lots along the east side of the float plane basin taxi waterlane also has the potential to generate additional revenue to the Airport.

8.11.2 Airport Reserve Boundary

Land within the Airport Reserve Boundary, shown on Figure 8-4, would not be sold and would be retained for long-term Airport-related development and protection. The Airport Reserve Boundary protects the existing and future airfield and associated runway protection and safety zones, the passenger terminal area, airfield accessible lease lots and lease areas adjacent to, but without direct access to, the airfield. Adoption of this revised Airport Reserve Boundary would ensure the City has the long-range capability to expand aviation development and support the economic development of the community. The purpose is to preserve the long-range development potential of the Airport, thereby guaranteeing the longevity of the Airport beyond the current planning period.

The recommended Airport Reserve Boundary encompasses a few strategically-located parcels of private land in the vicinity of the passenger terminal building. These parcels are primarily east of Willow Street and near the intersection with Airport Way.

These parcels are included with the provision that the parcels would become a part of the Airport Reserve Boundary only if they came into City ownership by gift, tax foreclosure, purchase or other means. Until ownership passes to the City, all such parcels would be treated in every way as if they were located outside the Airport Reserve Boundary.

Airport land outside the Airport Reserve Boundary could continue to be leased or sold for nonaviation purposes after a release of the Airport land is obtained from the FAA.

Several revisions are proposed to the existing Airport Reserve Boundary. On the east side of the Airport, it is recommended that the Airport Reserve Boundary be realigned to the west side of Marathon Road to exclude the Kenai Industrial Park as shown on Figure 8-4. On the south side of the Airport, it is recommended the Airport Reserve Boundary be relocated north of the existing commercial properties fronting the Kenai Spur Highway along Cohoe Avenue, and then south to the Kenai Spur Highway and then north along the Airport Land Acquisition Boundary. On the west side of the Airport, the Airport Reserve Boundary should encompass the existing airport property and Airport land east of Float Plane Road. At present there are no recommended changes to the Airport Reserve Boundary on the north side of the Airport. However, when the 80-acre triangular parcel to the north, and the runway protection zone, obstruction removal and future airport purposes areas to the southwest are acquired, they should be included within the Airport Reserve Boundary.

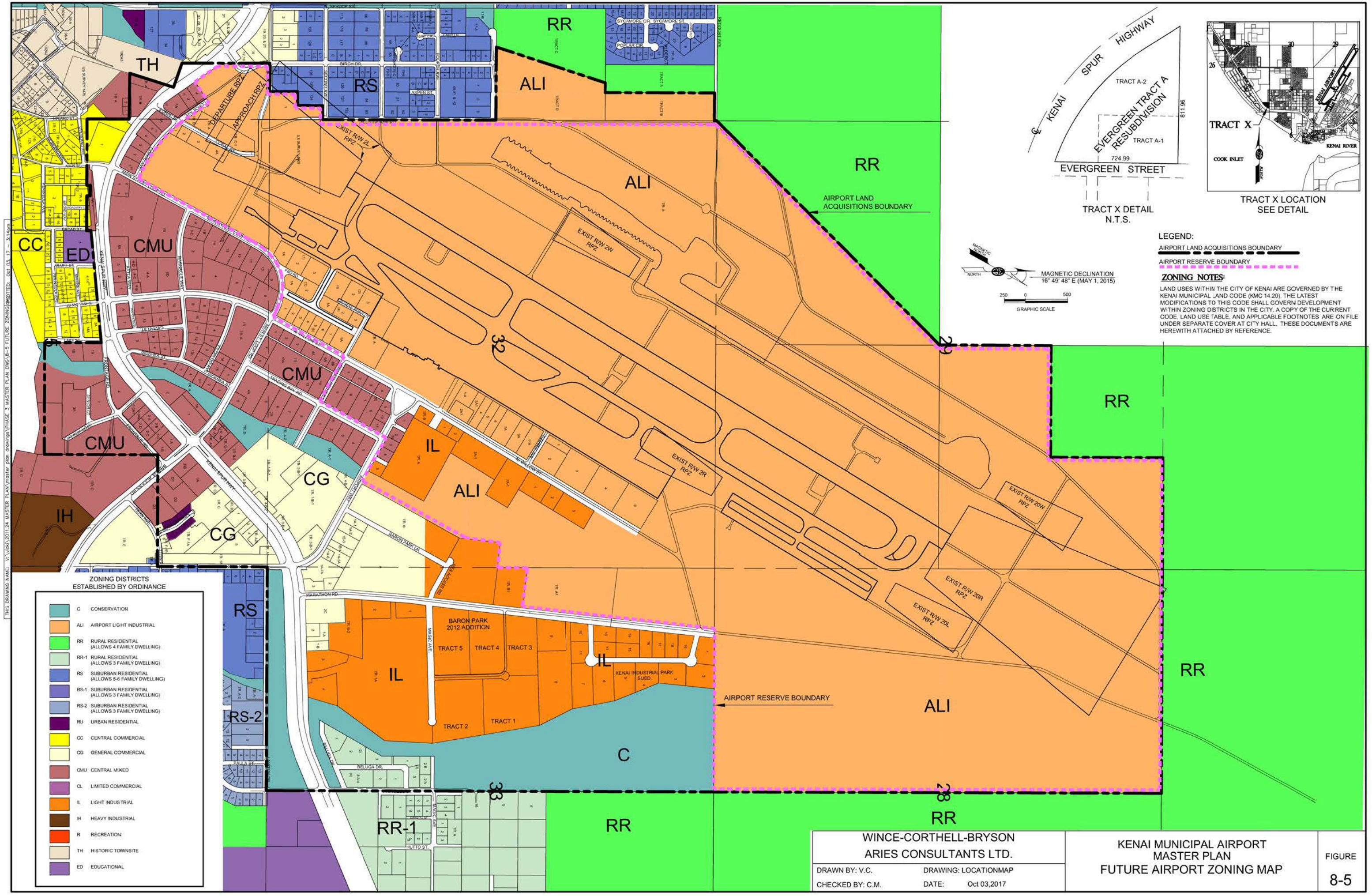
8.11.3 Airport Zoning

On May 18, 2016, the Council of the City of Kenai passed Ordinance Nos. 2884-2016 and 2885-2016. Ordinance No. 2884-2016 enacted Kenai Municipal Code (KMC) Section 14.20.065 – *Airport Light Industrial Zone* (ALI). The intent of the ALI Zone is to protect the vitality of the Kenai Municipal Airport as a significant resource to the community by encouraging compatible land use, densities and reducing hazards that may endanger the lives and property of the public and aviation users. Industrial and Commercial uses which are usually compatible with aviation users are permitted which have no nuisance effects upon surrounding property, or which may be controlled to prevent nuisance effects upon surrounding property. New residential uses are not permitted in this zone because it is intended that lots classified in the ALI Zone are reserved for aviation-related commercial and industrial uses.

Ordinance No. 2885-2016, amended the official Kenai Zoning map by rezoning 51 parcels owned by the City of Kenai, located within the Airport Reserve Boundary, as shown on Figure 8-5, from Conservation Zone (C), Rural Residential Zone (RR), Suburban Residential Zone (RS) and Light Industrial Zone (IL) to Airport Light Industrial Zone (ALI).

The Rural Residential (RR) area on the west side of the Airport is not an appropriate use within the Airport Boundary. Any additional land to be acquired west, or northeast, of Float Plane Road, for runway protection zone, obstruction removal and/or future airport purposes as shown on Figure 8-1, should be rezoned from either Rural Residential (RR) or Suburban Residential (RS) to Airport Light Industrial (ALI) if and when the land is acquired.

Initially, the proposed zoning change only affected City and/or Airport-owned land within the Airport Reserve Boundary.


TH
RS
RR
ALI
CC
ED
CMU
IH
CG
IL
RR-1
RS-2
C
KENAI SPUR HIGHWAY
DEPARTURE RPZ
APPROACH RPZ
EXIST R/W 2L RPZ
EXIST R/W 2W RPZ
EXIST R/W 2R RPZ
EXIST R/W 20W RPZ
EXIST R/W 20R RPZ
EXIST R/W 20L RPZ
AIRPORT LAND ACQUISITIONS BOUNDARY
AIRPORT RESERVE BOUNDARY
BARON PARK 2012 ADDITION
TRACT 1
TRACT 2
TRACT 3
TRACT 4
TRACT 5
KENAI INDUSTRIAL PARK SUBD.
32
33
28
TRACT A-1
TRACT A-2
EVERGREEN TRACT A RESUBDIVISION
724.99
811.96
EVERGREEN STREET
TRACT X DETAIL
N.T.S.
TRACT X
KENAI RIVER
COOK INLET
TRACT X LOCATION
SEE DETAIL
MAGNETIC DECLINATION
16° 49' 48" E (MAY 1, 2015)
GRAPHIC SCALE
250
0
500
LEGEND:
AIRPORT LAND ACQUISITIONS BOUNDARY
AIRPORT RESERVE BOUNDARY
ZONING NOTES:
LAND USES WITHIN THE CITY OF KENAI ARE GOVERNED BY THE KENAI MUNICIPAL ,AND CODE (KMC 14.20). THE LATEST MODIFICATIONS TO THIS CODE SHALL GOVERN DEVELOPMENT WITHIN ZONING DISTRICTS IN THE CITY. A COPY OF THE CURRENT CODE, LAND USE TABLE, AND APPLICABLE FOOTNOTES ARE ON FILE UNDER SEPARATE COVER AT CITY HALL. THESE DOCUMENTS ARE HEREWITH ATTACHED BY REFERENCE.
ZONING DISTRICTS
ESTABLISHED BY ORDINANCE
C CONSERVATION
ALI AIRPORT LIGHT INDUSTRIAL
RR RURAL RESIDENTIAL (ALLOWS 4 FAMILY DWELLING)
RR-1 RURAL RESIDENTIAL (ALLOWS 3 FAMILY DWELLING)
RS SUBURBAN RESIDENTIAL (ALLOWS 5-6 FAMILY DWELLING)
RS-1 SUBURBAN RESIDENTIAL (ALLOWS 3 FAMILY DWELLING)
RS-2 SUBURBAN RESIDENTIAL (ALLOWS 3 FAMILY DWELLING)
RU URBAN RESIDENTIAL
CC CENTRAL COMMERCIAL
CG GENERAL COMMERCIAL
CMU CENTRAL MIXED
CL LIMITED COMMERCIAL
IL LIGHT INDUSTRIAL
IH HEAVY INDUSTRIAL
R RECREATION
TH HISTORIC TOWNSITE
ED EDUCATIONAL
WINCE-CORTHELL-BRYSON
ARIES CONSULTANTS LTD.
DRAWN BY: V.C.
DRAWING: LOCATIONMAP
CHECKED BY: C.M.
DATE: Oct 03,2017
KENAI MUNICIPAL AIRPORT
MASTER PLAN
FUTURE AIRPORT ZONING MAP
FIGURE
8-5
THIS DRAWING NAME: k:\cad\2017-24_MASTER PLAN\master plan drawings\PHASE 3 MASTER PLAN DWG\8-5 FUTURE ZONING.dwg PLOTTED: Oct 03, 17 - 1:14pm

Rezoning of privately-owned parcels would be addressed later.

The land within the Airport Reserve Boundary has been rezoned as Airport Light Industrial (ALI), as illustrated on Figure 8-5, to include the airfield (Runways 2L-20R, 2R-20L and 2W-20W), runway protection zones, approach and departure areas, taxiways, passenger terminal area, aircraft parking aprons, hangars, lease lots and areas recommended for future development on both the east and west sides of the Airport.

The creation of KMC Section 14.20.065 added new development requirements which require that new uses be constructed in a manner which do not produce emission of dust, smoke, refuse matter, odor, gas fumes, noise, vibration or similar substances. The new KMC Section 14.20.065 also added development requirements which require that new uses not emit light or light glare which exceed the boundaries of the parcel on which it is placed. It goes on to say that all exterior lighting shall be positioned so that it is downcast and shielded.

New definitions related to Airport Land Uses have been added to KMC Section 14.20.320 *Definitions*, including "Necessary Aviation Facilities." These definitions also include an updated definition of "Airport" and "Airport Compatible Uses." The KMC Section 14.22.010 *Land Use Table* has been amended to add the ALI zone and designate uses as Principal Uses, Permitted Uses, Conditional Use, Secondary Use or Not Permitted. KMC Section 14.20.065 also includes references to the most recent FAR Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace* and FAA Order 8230.3 *United States Standard for Terminal Instrument Procedures*. It may be appropriate to include Airport and related uses for navigational aids in the Conservation Zone in the future.

Future Airport rezoning to ALI should include the Airport land, acquired in 2011, west of Float Plane Road and north of Fifth Court, as well as land recommended for acquisition along Float Plane Road in the Airport Master Plan when acquired by the City. The 80-acre triangular parcel northwest of Tract IX should also be rezoned to ALI when acquired by the City.

The cemetery and cemetery expansion area would be a permitted use within the ALI zone.

Aircraft operations are also referenced in KMC Title 11, *Harbor and Harbor Facilities*, Chapter 11.20 *Leasing of Tidelands*, Section 11.20.370 *Aircraft Operations Protected*. This section of the KMC needs to be updated to include reference to FAA Order 8260.3, *United States Standard for Terminal Instrument Procedures* (TERPS), as well as Federal Aviation Regulation Part 77, *Safe, Efficient Use and Preservation of the Navigable Airspace*, to make sure that both aircraft approach and departure operations are protected for the safety of persons on the ground and in the air. Reference should also be added to FAA Form 7460-1, *Notice of Proposed Construction or Alteration*, for anyone proposing the erection of any structure or an object, manmade or natural, which may be an airport obstruction in accordance with the standards established under FAR Part 77 and TERPS.

Reference to FAA Order 5190.6B, *FAA Airport Compliance Manual, Chapter 20, Compatible Land Use and Airspace Protection*, should also be included in the KMC.

If land acquisition is not pursued by the City in those areas recommended for acquisition on Figure 8-1, then the City should obtain (update) avigation easements over these affected properties to incorporate FAR Part 77 and TERPS obstruction standards. The existing City Clear Zone Easements should be updated to reflect the requirements of FAR Part 77 and TERPS.

FAA Grant Assurance 20, *Hazard Removal and Mitigation*, states "it (the Airport sponsor) will take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the Airport (including established minimum flight altitudes) will be adequately cleared and protected by removing, lowering, relocating, marking, or lighting or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards.

In addition, it should be noted that FAA Grant Assurance 21, *Compatible Land Use*, states that "it (the Airport sponsor) will take appropriate action, to the extent reasonable, including the adoption of zoning laws, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and take off of aircraft."

The KMC Section 14.20.065 also incorporates the guidelines in FAA Advisory Circular (AC)150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports*, concerning land use practices on or near airports that potentially attract hazardous wildlife. This includes waste disposal operations, water management facilities, wetlands, dredge spoil containment areas, agricultural activities, golf courses, landscaping and other land use considerations. The FAA recommends minimum separation criteria in FAA AC 150/5200-33B for these land use practices. The FAA encourages the operators of public-use airports, who become aware of proposed land use practice changes that may attract hazardous wildlife within 5 statute miles of their airports, to promptly notify FAA so FAA may determine if such changes present potential wildlife hazards to aircraft operations.

This rezoning would provide for development of the Airport to the highest and best uses for Airport and aviation-related uses, including support for aviation-related uses, for revenue-generating leases, for other private development and for public improvements and for other airport compatible uses.

The FAA requirements of FAR Part 77, TERPS, FAA Form 7460-1, and FAA AC 150/5200-33B, would also apply to the Kenai Peninsula Borough for any proposed structure or object, manmade or natural, which may be an airport obstruction outside the City of Kenai corporate boundary.

8.11.4 Comprehensive Plan

The *City of Kenai Comprehensive Plan, Imagine Kenai 2030*, was updated in July

2016 and adopted by the City Council on September 7, 2016. The Comprehensive Plan includes several components relative to the Kenai Municipal Airport. The Comprehensive Plan includes a new Airport Industrial (AI) land use classification as follows:

Airport Industrial is intended to support continued development at the Kenai Municipal Airport. It is intended for those lands reserved for the airport and its future expansion are included in this classification. Residential uses may be considered appropriate provided the residential use is associated with and secondary to the primary industrial use. *(Residential uses are included because there may be parcels in the future which get rezoned to ALI which are not owned by the City. It is possible that a private party may wish to rezone their parcel(s) which may have a residence on it to ALI. Part of the rezone would probably also include a Comprehensive Plan land use amendment to Airport Industrial as well. While the intention of the Airport Industrial land use designation is to apply it to parcels owned by the Airport, it is not out of the question that it could be applied to parcels outside of the Airport in the future.)*

The Airport Industrial lands are those lands reserved for the Kenai Municipal Airport and its future expansion, and tracts needed for present and future aviation-related uses and activities.

The Goals, Objectives and Action Items of the 2016 Comprehensive Plan include the following:

Goal 3 – Land Use: Develop land use strategies to implement a forward-looking approach to community growth and development.

Objective LU-16 – Support implementation of the City's Kenai Airport Master Plan Capital Improvements Program.

Goal 5 – Transportation: Provide transportation systems that are efficient and adequate to serve the regional needs of the community.

Objective T-1 – Support future development near or adjacent to the airport when such development is in alignment with the Kenai Municipal Airport's primary mission, "To be the commercial air transportation gateway to the Kenai Peninsula Borough and Cook Inlet".

Action Items – Support the Airport's marketing strategy to actively recruit development on Airport Industrial Park leases.

8.11.5 Goals, Objectives and Strategies

The most recent goals, objectives and strategies of the City for the future role and development of the Airport were included in the 2007 *Kenai Municipal Airport Supplemental Planning Assessment, Phase 2 Report, Airport Strategic Plan*. The goals and objectives for the Airport are generally still valid. Some of the strategies have not been implemented for a variety of reasons including economic, financial and political considerations. The objectives and strategies have been updated to reflect the Kenai Municipal Airport Master Plan.

Goals can be defined as a statement of the long-term results that the City expects to achieve at the Airport while objectives are specific accomplishments to be

achieved along the way to obtaining the long-term goals. Both the goals and the objectives must be in keeping with the Airport's mission and vision statements that were presented in the 2007 *Kenai Municipal Airport Supplemental Planning Assessment, Phase 2 Report, Airport Strategic Plan*. Strategies are the actual actions employed to achieve the Airport's various goals and objectives.

Goal: Retain and expand scheduled air passenger services at the Kenai Municipal Airport

Objectives

- Provide facilities and services to encourage scheduled air passenger operations on a 24-hour, seven days a week, basis.
- Maintain regular contact with the airlines and keep up-to-date on their short- and long-term plans and needs.
- Assure equity among airlines and avoid penalizing either current or potential airlines.
- Monitor and continue to meet all Department of Homeland Security mandates relative to scheduled air transportation that apply to the Airport.
- Create awareness in community of the importance of scheduled air passenger services and keep the community aware of services and opportunities at the Airport.
- Survey passengers periodically for pertinent information to assist in future marketing and facility planning efforts.
- Prepare and implement a marketing plan to promote use of the Airport by the traveling public and service providers.
- Implement passenger terminal improvements recommended in the 2030 Kenai Municipal Airport Master Plan subject to the availability of funding resources and current priorities.

Goal: Encourage and expand on air taxi and general aviation services at the Kenai Municipal Airport

Objectives

- Implement the recommendations of the 2030 Kenai Municipal Airport Master Plan for air taxi and general aviation services.
- Retain and expand the number of air taxi and general aviation aircraft utilizing the Airport.
- Encourage the development of air taxi and general aviation T-hangars and conventional hangars.
- Encourage a Fixed Base Operator (FBO) to service the needs of the air taxi and general aviation aircraft owners, pilots and passengers at the Airport.
- Consolidate lease lots and facilities for air taxi and general aviation users operating from the floatplane basin.
- Improve the existing water taxi lane to accommodate air taxi aircraft operations.
- Survey both air taxi and general aviation operators and passengers periodically for pertinent information to assist in future planning efforts.
- Market float plane basin facility for convenient access to the west side of Cook Inlet for fishing, hunting and sightseeing opportunities.

Goal: Establish Kenai Municipal Airport as a major air cargo center for the Kenai Peninsula Borough and West Cook Inlet

Objectives

- Encourage the expansion of the activity of existing air cargo carriers utilizing the Airport.
- Determine the need for a dedicated air cargo apron area and joint use air cargo building at the Airport.
- Maintain availability of air cargo space.
- Collect information from air carriers and air taxi operators on the weight and type of enplaned and deplaned air freight at the Airport.
- Provide space for short-term and long-term air cargo expansion.
- Survey the air cargo operators periodically for pertinent information to assist in future planning efforts.
- Consider utilizing the Airport, port and road system as an intermodal hub for cargo and freight to the Kenai Peninsula and southwestern Alaska.

Goal: Maintain the financial viability of the Kenai Municipal Airport

Objectives

- Implement the recommended Capital Improvement Program presented in the 2030 Kenai Municipal Airport Master Plan for short-term (2016-2020); intermediate-term (2021-2025); and long-term (2026-2030) development projects.
- Establish and maintain a regularly-updated FAA Airport Capital Improvement Plan (ACIP) for efficient planning, programming and implementing Airport maintenance and development projects.
- Lease land and facilities within the Airport boundary (both aviation and nonaviation use areas) at fair market value rates and limit the sale of land outside the Airport Reserve Boundary to preserve the future revenue-generating potential of the property.
- Enhance the opportunities for local economic development and improved employment opportunities consistent with local growth plans and policies.
- Implement the development of the Float Plane Basin Phase One Project.
- Negotiate a management agreement for operation of the Alaska Regional Fire Fighting Training Center.
- Establish a policy, by code, that provides a consistent and dependable guide for the lease and/or sale of airport lands outside the Airport Reserve Boundary.

Goal: Maintain and encourage a compatible environment for growth and development of the Kenai Municipal Airport

Objectives

- Adopt and implement a comprehensive land use plan that protects the Airport from encroachment by incompatible uses.
- Create an airport overlay zone based on airspace and noise exposure patterns and implement actions such as acquisition of avigation easements as needed.
- Acquire privately-owned land for runway protection zone, obstruction and future airport purposes as recommended in the 2030 Kenai Municipal Airport Master Plan.
- Acquire additional avigation easements and establish zoning controls if land not acquired.
- Maintain an airport reserve within which no lands will be sold and lands will be used for aviation-related and/or airport compatible purposes defined in the airport land use plan and airport layout plan.

- Update the Kenai Municipal Code (KMC) Zoning Ordinances that relate to the Airport and Airport operations.
- Rezone Airport lands within the Airport Reserve Boundary to Airport Light Industrial.
- Remove obstructions in accordance with FAA regulations and requirements.

Goal: Provide airport facilities and services that maximize safety, efficiency, convenience and opportunity for use

Objectives
- Continue to identify any airport capacity constraints.
- Identify land needed for future aviation growth.
- Provide space at the south, west and north ends of the Passenger Terminal for potential future passenger terminal area expansion.
- Consolidate wheeled air taxi and general aviation facilities on east side of the Airport.
- Maximize use of the remaining undeveloped land on the east side of the Airport.
- Reassess the continued need for the gravel runway. If required, relocate to the west side of the Airport.
- Provide cross link streets, if technically, financially and environmentally feasible, between North Willow Street and Marathon Road for access to property, traffic circulation and utility routes.
- Implement water utility improvements recommended to increase fire flow capability to the Terminal Area, North Willow Street and Marathon road.
- Consider providing basic water and sewer utility service to the float plane basin facility.
- Consider the reconstruction of North Willow Street beyond the Passenger Terminal.

Goal: Make the Kenai Municipal Airport an aesthetically pleasing gateway to the Kenai Peninsula

Objectives
- Plan for facilities that reflect community values and standards.
- Prepare and adopt airport development standards to ensure development of consistently high quality facilities.
- Provide for the aesthetic compatibility of land use between industrial, commercial and office uses.
- Provide attractive, convenient, and passenger-friendly terminal facilities.
- Implement modifications and improvements to the passenger terminal building needed to address deferred maintenance, remodeling for more efficient use of space and amenities and Code issues.
- Reconfigure the curbside roadway in front of the passenger terminal building.
- Modify public vehicle parking lot layout.
- Reserve space for additional vehicle parking south of rental car parking and also east of Willow Street.
- Reserve space for potential passenger terminal expansion.
- Rehabilitate the Terminal vehicle parking and lighting.
- Consider the rehabilitation of Willow Street from the Kenai Spur Highway to the Passenger Terminal.

Strategies

Strategies are the actual actions employed to satisfy specific objectives needed to achieve the Airport's various goals. The strategies comprise the plan for achieving where the City wants to go. The strategies presented in this section are essentially a systematic plan of action needed to accomplish the desired outcomes as defined by the goals stated previously. Most of the strategies in this section are the result of the findings and recommendations developed as part of the 2030 Kenai Municipal Airport Master Plan. Adopt the 2030 Kenai Municipal Airport Master Plan and its recommendations.

- Update the Airport Layout Plan

- Update the Future Airport Land Use Plan
  - -- Modify the Airport Land Use Plan to reflect the 2030 Airport Master Plan recommendations
  - -- Modify the Airport Reserve Boundary
  - -- Revise Land Use Definitions

- Airport Property
  - -- Acquire privately-owned land for runway protection zone, obstruction removal and future airport purposes.
  - -- Acquire additional avigation easements and establish zoning controls if land not acquired.

- Amend the Capital Improvement Program to include Phases I, II and III Recommendations of the 2030 Kenai Municipal Airport Master Plan.

- Regularly update the Airport Capital Improvement Plan (ACIP) to efficiently plan, program and implement airport maintenance and development projects.

- Airfield
  - -- Retain nonprecision approach procedures to Runway 2L and work with FAA to lower existing nonprecision approach minimums
  - -- Widen water Runway 2W-20W to provide parallel water taxi channel
  - -- Reserve area for future re-location of gravel Runway 2R-20L and aircraft parking apron to the west side of the Airport

- Passenger Terminal
  - -- Implement modifications and improvements needed to address deferred maintenance, remodeling for more efficient use of space and amenities and Code issues.
  - -- Reserve space for future passenger terminal expansion

- Air Cargo and Mail
  - -- Consolidate air cargo facilities north of passenger terminal
  - -- Retain large aircraft parking areas north of passenger terminal.
  - -- Reserve space for additional commercial aviation lease lots to the north along an extension of Willow Street.

- Air Taxi and General Aviation
  - -- Retain existing commercial aviation/fixed base operator facilities to the southeast.
  - -- Develop hangar lease lots east of the float plane water taxi lane on as-required basis.
  - -- Reserve space for additional commercial and noncommercial aviation lease lots to the north

along an extension of Willow Street.
  - -- Reserve space for lease lots along the west shoreline of the float plane basin for commercial aviation float plane operators as the demand warrants.
  - -- Provide additional helipads for helicopter parking near the Air Traffic Control Tower.
  - -- Relocate future Building Restriction Lines and lease lot lines to west at northeast end.
  - -- Consolidate some lease lots for more efficient and economic uses.
  - -- Reserve area on west side of Airport for future relocation of gravel runway and associated aircraft parking area.

- Airport Access and Parking
  - -- Reconfigure the curbside roadway in front of the passenger terminal building.
  - -- Modify public vehicle parking lot layout.
  - -- Reserve space for additional vehicle parking south of rental car parking and also east of Willow Street.
  - -- Extend Willow Street to the north, as required, to serve additional airport Development.
  - -- Consider reconstruction of North Willow Street and providing cross link streets over to Marathon Road.

- Airport Support
  - -- Expand Airport Administration offices in the passenger terminal
  - -- Provide new sand stockpile and storage area
  - -- Reserve space for aircraft wash pad.
  - -- Reserve space for deicing station
  - -- Extend utilities as needed to serve future airport development
  - -- Consider water improvements to increase available fire flows to any planned development along Willow Street and Marathon Road
  - -- Consider providing basic water and sewer utility service to the Float Plane Basin facility.
  - -- Add the recommended utility improvements to the City' Capital Improvement Program and begin applying for State Economic and Environmental Department Development Grants.

- Update Kenai Municipal Code (KMC) for Airport Zoning to include:
  - -- Rezone Airport lands within Airport Reserve Boundary to Airport Light Industrial (ALI). Initially only for City and Airport-owned lands.
  - -- Amend Land Use Table to designate uses in ALI zone
  - -- Amend KMC Conservation Zone
  - -- Update KMC to reference FAR Part 77, *United States Standard for Terminal Instrument Procedures* (TERPS) and other relevant documents to protect the safety of persons on the ground and in the air
  - -- Incorporate guidelines in FAA AC 150/5200-33B, *Hazardous Wildlife Attractants on or near Airports*

- Financial Analysis
  - -- Identify resources to fund the initial phase of the Capital Improvement Program.
  - -- Consider the financial impacts of State Legislative grants no longer being available to fund one-half of

the City's share of FAA Airport Improvement Program grants.

-- Ascertain total amount of monies that can be recovered by FAA Airport Improvement Program grant funds that can be reimbursed to the Other Building Areas cost center operating expenses.
-- Negotiate a management agreement for the operation of the Alaska Regional Fire Fighting Training Center.
-- Consider operating the water runway and float pond basin for ski-equipped aircraft in the winter to generate additional tiedown fees and fuel sales.
-- Initiate expansion of the vehicle parking lot and rehabilitation of the existing parking lot.
-- Prepare an updated Airport Lease Policy to provide a sound, consistent basis upon which the Airport can attract stable and financially responsible tenants to the Airport and can administer tenant leaseholds in a fair and uniform manner.

8.12 AIRPORT LAYOUT PLAN

The updated Airport Layout Plan drawings, based on the long-range 2030 Airport Master Plan Development concept, selected by the City, were submitted separately to the City and FAA.

Chapter 9

FACILITIES IMPLEMENTATION PLAN

9.1 INTRODUCTION

The Facilities Implementation Plan and Phased Capital Improvement Program for the Kenai Municipal Airport and the estimated costs of the airport improvements recommended as part of the Airport Master Plan, selected by the City and discussed in Chapter 8, are presented in this chapter.

9.2 PHASED CAPITAL IMPROVEMENT PROGRAM

A three-phase Capital Improvement Program has been developed to meet estimated short-range (Phase I, 2016 through 2020), intermediate-range (Phase II, 2021 through 2025), and long-range (Phase III, 2026 through 2030) airport requirements. The phasing of these improvements is illustrated on Figure 9-1, Airport Phasing Plan. Phasing of the program reflects the results of the planning and public involvement process, an assessment of the relative priorities of various proposed projects and the approximate timing of the anticipated requirements.

Phase I projects are considered to be the highest priority items and should be implemented as soon as practicable to meet the Phase I forecast requirements for facilities and to preserve the capability for future airport expansion. Phase II and III projects should be undertaken only as the actual needs are demonstrated by the demand for airport facilities and services and as financing arrangements are made. Additional facility improvements that may be required after 2030, and which space should be reserved for on the Airport Master Plan, are also included at the end of Table 9-1 presents the sources of funding for projects included in the Capital Improvement Program assuming FAA Airport Improvement Program grants will continue to be available at 93.75 percent for eligible projects.

It should be noted that, up until 2015 the State provided 50 percent (or 3.125 percent) of the City's 6.25 percent match for FAA Airport Improvement Program grants to airports in the State that are not owned and operated by the State. However, the State notified the City of Kenai on October 26, 2015 that, due to the State's fiscal reality, beginning October 1, 2015, the State DOT&PF will be unable to continue providing a matching share to local sponsors such as the Kenai Municipal Airport. It is possible that these funds could be made available sometime in the future when the State's fiscal situation improves. However, the Capital Improvement Program presented in Table 9-1 assumes that State DOT&PF matching share funds will not be available throughout the planning period.

An approximate planning cost estimate for each improvement for the recommended three-phase Capital Improvement Program is presented in Table 9-1. The phasing of these capital improvements is presented on Figure 9-1, Airport Phasing Plan. In addition to recommended new development projects, the Capital Improvement Program also includes rehabilitation and maintenance projects that will be required during the planning period in order to maintain the useful life of existing airport facilities. The following rehabilitation projects have been

FUTURE LAND ACQUISITIONS BOUNDARY

PROPOSED LAND ACQUISITIONS

EXISTING AIRPORT RESERVE BOUNDARY

EXISTING AIRPORT LAND ACQUISITIONS BOUNDARY

FUTURE LAND ACQUISITIONS BOUNDARY

OWNER: KENAI NATIVE ASSOCIATION

FUTURE LEASE LOTS

FUTURE FLOAT PLANE FACILITY

PILOT FACILITY

FUTURE DEVELOPMENT

TAXILANE

FUTURE AIRCRAFT WASH PAD

R/W 2L

FLOAT PLANE BASIN PHASE ONE

LEASE LOTS

R/W APPROACH PROTECTION ZONES

FUTURE DEICING PAD

BRL

500'

FUTURE GRAVEL RUNWAY RESERVE

TERMINAL EXPANSION RESERVE AREA

FUTURE WATER TAXILANE

ROAD

TRADING BAY

WATER AND SEWER SITE DEVELOPMENT

ACCES AND PARKING LOT REHABILITATION

WILLOW STREET

HELICOPTER TIEDOWNS

SAND STORAGE

OWNER: ALASKA MENTAL HEALTH TRUST AUTHORITY

R/W 20 R

FUTURE TAXIWAY "J" AND APRON EXTENSION

FUTURE LEASE LOTS

DRAINAGE IMPROVEMENTS

MARATHON ROAD

FUTURE UTILITY/ROAD LINKS

OWNER: BLM

KENAI INDUSTRIAL PARK SUBD.

CITY MAINTENANCE FACILITY

ALASKA REGIONAL FIRE TRAINING CENTER

R/W PROTECTION ZONE

MAGNETIC DECLINATION 16°49'48"E (MAY 1, 2015)

250 0 500

GRAPHIC SCALE

LEGEND

- EXISTING AIRPORT RESERVE BOUNDARY
- EXISTING AIRPORT LAND ACQUISITIONS BOUNDARY
- FUTURE AIRPORT LAND ACQUISITIONS BOUNDARY
- AVAILABLE LEASE LOTS
- PHASE ONE (2016 - 2020)
- PHASE TWO (2021 - 2025)
- PHASE THREE (2026-2030)
- FUTURE DEVELOPMENT (BEYOND PLANNING PERIOD)
- AIRPORT FENCE

PAVEMENT MAINTENANCE

- PHASE ONE PAVEMENT MAINTENANCE
- PHASE TWO PAVEMENT MAINTENANCE
- PHASE THREE PAVEMENT MAINTENANCE

PROPOSED LAND ACQUISITIONS

- LAND/AVIGATION EASEMENT ACQUISITION
- LAND FOR RUNWAY PROTECTION ZONE
- LAND FOR OBSTRUCTIONS REMOVAL
- LAND FOR FUTURE AIRPORT PURPOSES

WINCE-CORTHELL-BRYSON ARIES CONSULTANTS LTD.	KENAI MUNICIPAL AIRPORT MASTER PLAN AIRPORT PHASING PLAN	FIGURE 9-1
DRAWN BY: V.C. DRAWING: PHASINGPLAN		
CHECKED BY: C.M. DATE: Oct 03,2017		

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Table 9-1
CAPITAL IMPROVEMENT PROGRAM
Kenai Municipal Airport (2016-2030)

PHASE -- PROJECT	TOTAL PROJECT ($)	SOURCE FOR FAA-FUNDED PROJECTS ($)		OTHER CITY FUNDING ($)	FAA ACIP NPR[1]
		FAA @ 93.75%	CITY @ 6.25%		
PHASE I IMPROVEMENTS (2016-2020)					
Airside					
Float Plane Basin Overflow Weir (Completed 2017)	410,000	384,375	25,625		72.40
General Aviation Taxiways, Apron and Lighting (Completed 2017)	2,200,000	2,062,500	137,500		65.60
Float Plane Basin "Phase One" Taxiway S and Taxilanes	2,975,000	2,789,063	181,250	75,000	29.60
Taxiway GG Overlay	300,000	281,250	18,750		65.60
Airfield Paint/Crack Seal[2]	1,250,000	1,171,875	78,125		82.50
Snow Removal Equipment	1,200,000	1,125,000	75,000		46.80
Aircraft Rescue and Firefighting Vehicle	1,000,000	937,500	62,500		---
Miscellaneous Grading and Drainage Improvements	100,000	93,750	6,250		100.00
Terminal Building					
Security Camera System	300,000	281,250	18,750		80.50
Passenger Terminal Planning and Design	250,000	234,375	15,625		42.70
Passenger Terminal Rehabilitation[3]	3,450,000	2,760,000	215,625	474,375	42.70
Air Cargo/Mail and General Aviation					
Property Acquisition	58,000	54,375	3,625		---
Float Plane Basin Mini Lease Lots Surveys[4]	11,000			11,000	---
Other Building Areas					
Upgrade Alaska Regional Fire Training Center	3,200,000	3,000,000	187,500		---
TOTAL PHASE I IMPROVEMENTS (2016-2020)	**16,704,000**	**15,175,313**	**1,026,125**	**560,375**	**--**

Table 9-1 -- continued

PHASE -- PROJECT	TOTAL PROJECT ($)	SOURCE FOR FAA-FUNDED PROJECTS ($)		OTHER CITY FUNDING ($)	FAA ACIP NPR[1]
		FAA @ 93.75%	CITY @ 6.25%		
PHASE II IMPROVEMENTS (2021-2025)					
Airside					
Obstruction Tree Maintenance on Airport	55,000	51,563	3,438		92.50
Taxiway A from Taxiway K to Taxiway C and Taxiways D, K and I Rehabilitation/Safety Areas/Lighting	3,100,000	2,906,250	193,750		65.60
Snow Removal Equipment	1,000,000	937,500	62,500		46.80
Land for Runway Protection Zone and Obstruction Control	932,000	873,750	58,250		43.50
Sand Storage Building	826,000	774,375	51,625		32.10
Runway 2L-20R New Midfield Exit Taxiway	825,000	773,438	51,563		29.60
Obstruction Tree Removal Off Airport	110,000	103,125	6,875		92.50
Airfield Paint/Crackseal[2]	1,250,000	1,171,875	78,125		82.50
Terminal Area					
Access Roads and Parking Rehabilitation and Lighting[5]	1,212,000	303,000	909,000		---
Parking Lot Expansion[5]	496,000	124,000	372,000		---
Air Cargo/Mail and General Aviation					
Small Aircraft Washpad	50,000	46,875	3,125		
Float Plane Basin Operations and Pilot Facility	154,000	144,375	9,625		20.00
TOTAL PHASE II IMPROVEMENTS (2021-2025)	**10,010,000**	**8,018,875**	**1,787,125**		**---**
PHASE III IMPROVEMENTS (2026-2030)					
Airside					
Perimeter Security Fencing and Gates	550,000	515,625	34,375		80.50
Land for Obstruction Control	98,700	92,531	6,169		43.50
Land for Buffer Along Float Plane Road	106,600	99,938	6,663		38.10
Runway 2L-20R and Entrance/Exit Taxiways B, C, D, E and F Overlay	7,500,000	7,031,250	468,750		69.60
Taxiway A Overlay from Taxiway F to Taxiway K	875,000	820,313	54,688		65.60
Airfield Paint/Crack Seal[2]	1,250,000	1,171,875	78,125		82.50
Air Cargo/Mail and General Aviation					
Taxilane Extension	385,800	361,688	24,113		50.75
TOTAL PHASE III IMPROVEMENTS (2026-2030)	**10,766,100**	**10,093,219**	**672,881**		**---**
TOTAL ALL PHASES	**37,480,100**	**33,287,406**	**3,486,131**	**560,375**	**---**

Table 9-1 -- continued

PHASE -- PROJECT	TOTAL PROJECT ($)	SOURCE FOR FAA-FUNDED PROJECTS ($)		OTHER CITY FUNDING ($)	FAA ACIP NPR[1]
		FAA @ 93.75%	CITY @ 6.25%		
BEYOND 2030					
Airside					
Widen Water Runway	1,654,000	1,550,625	103,375		48.00
Terminal Apron and Taxiway J Overlay	5,500,000	5,156,250	343,750		63.60
Airfield Paint/Crack Seal[2]	1,250,000	1,171,875	78,125		82.50
Aircraft Deicing Facility	500,000	468,750	31,250		80.50
Aircraft Wash Pad	49,000	45,938	3,063		22.60
Terminal Building					
Airlines Equipment Shelter	72,000			72,000	---
Air Cargo/Mail and General Aviation					
Apron Taxiway Extension for Lease Lots (600 feet)[6]	990,000	928,125	61,875		---
Willow Street Extension (road/utilities) (600 feet)[6]	516,000	483,750	32,250		---
Lease Lot Development to Subbase (5 acres)[6]	937,000			937,000	---
TOTAL BEYOND 2030	**11,468,000**	**9,805,313**	**653,688**	**1,009,000**	**---**

NOTES:

1. FAA Airport Capital Improvement Program (ACIP) National Priority Rating (NPR) for Discretionary Funding.
2. Airfield paint and crack seal assumed to be $250,000 annually.
3. Terminal Building improvements assumed to be eligible for 50 to 80 percent FAA Airport Improvement Program funding except for attached new garage/storage building and restaurant expansion.
4. Float Plane Basin mini lease lot surveys are assumed to be 100 percent City funding.
5. Airport access and parking lot improvements assumed to be eligible for 25 percent FAA Airport Improvement Program funding.
6. Lease lot development to subbase assumed 100 percent City funded and associated Willow Street road and utilities and apron expansion are assumed eligible for 93.75 percent FAA Airport Improvement Program funding.

SOURCE: Wince-Corthell-Bryson and Aries Consultants Ltd.

scheduled into the long-term Airport Capital Improvement Program phases as follows:

- Phase I (2016-2020)
  -- Taxiways F, G, H, GG and general aviation tiedown apron, Float Plane Basin area
  -- Passenger Terminal Building
  -- Alaska Regional Fire Training Center

- Phase II (2021-2025)
  -- Taxiway A from Taxiway K to Taxiway C, and Taxiways D, K and L
  -- Access Roads and Parking Lot

- Phase III (2026-2030)
  -- Runway 2L-20R with Taxiways and Taxiway A from Taxiway F to Taxiway K

- Beyond 2030
  -- Terminal Apron, Taxiway J

The following projects are minor maintenance type projects and can be completed with other airport projects or by City Airport and Street maintenance crews.

- Extend and improve drainage across the northerly east-west airfield service road
- Re-establish drainage along Willow Street north of the Passenger Terminal

Total costs for all projects included in the three-phase Program are expressed in 2016 dollars. These costs would be incurred as follows:

Phase I (2016-2020)	$16,704,000
Phase II (2021-2025)	10,010,000
Phase III (2026-2030).....	10,766,100
TOTAL	$37,480,100

The cost of other projects identified in the Airport Master Plan, which are not expected to be required until after 2030, is $11,468,000.

9.3 CAPITAL IMPROVEMENT PROGRAM FUNDING SOURCES

The FAA Airport Improvement Program (AIP) typically provides 93.75 percent of the cost of an eligible project. As FAA can only fund public use areas of the terminal building, or the public use percentage of joint-use areas, some of the terminal building projects may only be eligible for 50 to 80 percent FAA funding. In addition, Airport access and parking lot improvements may only be eligible for 25 percent FAA funding. The isolation of the Airport administration area in the terminal building and the attached garage/storage area may require 100 percent funding by the City unless these facilities are being displaced by terminal tenant demand and remodeling.

The Capital Improvement Program in Table 9-1 indicates a total of $1,586,500 will be required from City sources for implementation of Phase I (2016-2020) development projects. The total includes the City's share for matching FAA Airport Improvement Program grants ($1,026,125) and projects that are not eligible for FAA funding ($560,375). The $1,586,500 equates to an annual requirement from the City of $317,300 to implement the initial phase of the Capital Improvement Program.

Of the total $1,586,500 required from City sources for implementation of the Phase I (2016-2020) development projects, $690,000 may be required for the passenger terminal rehabilitation project. The $896,500 balance equates to an annual City requirement of $179,300, which is a modest requirement to leverage more than $15,105,000 in FAA Airport Improvement Program funding over the initial Phase I (2016-2020) of the Capital Improvement Program.

9.4 FUNDING PHASE I OF THE CAPITAL IMPROVEMENT PROGRAM

The FAA Airport Improvement Program Entitlement funding is based on the size and statutory classification of the Airport as a Small or Nonhub Commercial Service Airport. The nonhub airport entitlement grants are based on the number of annual passenger boardings. The Airport entitlement grants have averaged about $1.1 million on an annual basis up until 2012. Based on recent information provided by FAA, an estimated $1.3 in entitlement grants should be available annually for Airport development projects in the future based on the past three years.

Development projects for the initial five-year phase total $16.7 million of which $15.1 million are eligible for FAA entitlement funding. Based on $1.3 annual entitlement grants and information provided by FAA, and an additional $3.5 million in entitlement grants that have been rolled over by the City (or not programmed and used in the year in which these funds became available), there will be approximately $10 million in FAA entitlement grants available to fund the initial five-year phase of the Capital Improvement Program. It should be noted that entitlement grants are relinquished following the fourth year of roll over.

The $3.5 million of roll over funds represent about $3.8 million in total development projects that could be programmed for funding. It should be noted, however, that the City's local matching share will now be about $300,000 as the State DOT&PF will no longer provide matching grant funds.

The Airport must use all of its annual entitlement grants for eligible projects prior to competing with other airports for FAA discretionary grant funds. Discretionary grant funds are prioritized by the FAA using the National Priority Rating (NPR) System with the highest priority placed on projects that enhance safety, security, system capacity and environmental concerns. Projects included in the Capital Improvement Program have been rated according to the NPR consistent with FAA goals and objectives. FAA NPR projects rated 60 or higher total $1 million in the initial five-year phase of the Capital Improvement Program as shown in Table 9-1. The Airport has not been eligible to apply for discretionary grant funding as, to date, there are $3.5 million in entitlement grants that have been rolled over since 2013.

Based on the initial five-years of development included in the Capital Improvement Program, it is recommended that the City prepare and maintain a five-year program for FAA Airport Capital Improvement Program (ACIP) projects to effectively utilize the City's entitlement funds and be in position to take advantage of discretionary funding for high-NPR scoring projects. The ACIP integrates the City projects with other projects in the FAA Alaskan Region for funding and considers the sources of funding expected of the City to fund the match for the FAA entitlement grants, excluding contributions from the State DOT&PF. There are several sources of funding available to the City for funding the City's matching share of FAA grants, as well as for those projects not eligibile for FAA grant funding, that are discussed earlier in Chapter 6.

9.5 FUNDING PHASES II, III AND BEYOND 2030 OF THE CAPITAL IMPROVEMENT PROGRAM

Beyond Phase I, it is assumed that development of the Airport will proceed according to the priorities proposed in the recommended Capital Improvement Program. It is also assumed that the implementation of Phase II and Phase III projects will be arranged to be compatible with the financing sources and capability of the City, as identified at the time of implementation, without regard to the technical requirements that may be demonstrated.

It should be recognized that the financial feasibility of projects in the later phases will be linked to the funding levels and participation rates of the FAA Airport Improvement Program, the continued programming of FAA-eligible development projects through the FAA Airport Capital Improvement Plan process, the overall management of the Airport in the short-term including periodic review by the City of its leasing policies and rates and charges policies and the provisions of existing leases and agreements in effect.

9.6 STATUS OF THE RECOMMENDED 2007 IMPLEMENTATION PLAN

The *2007 Kenai Municipal Airport Supplemental Planning Assessment—Phase 2 Report* recommended 50 specific actions to be implemented by the City for the Kenai Municipal Airport. Of the 50 recommendations, 45 were implemented, several with minor amendments. According to the November 30, 2010 memo from the City Manager to the City Council and Airport Commission, "*Five (5) of the consultant's recommendations were not adopted as they were determined to be impracticable or would have instituted management changes deemed to be not in the best interest of the Airport.*"

Table 9-2 presents the 2007 recommended actions and the status of implementation. Based on the November 30, 2010 memo from the City Manager to the City Council and Airport Commission, "*As all of the accepted recommendations have either been completed, or are on-going maintenance items, there will be no further status reports to the City Council or Airport Commission regarding the Kenai Municipal Airport Supplemental Planning Assessment.*"

Table 9-2

2007 IMPLEMENTATION PLAN

NO	RECOMMENDED ACTIONS	2015 STATUS
	Land Use Plan	
1	Adopt an ordinance to establish the Airport Reserve and prohibit sale of Airport lands within the Reserve	Complete
2	**Update the Airport Layout Plan to include:** ▪ Larger terminal area apron	Complete
3	▪ Larger terminal area	Complete
4	▪ Relocated Building Restriction Line and consolidated lease lots	Complete
5	▪ Northeast Airpark	Complete
6	▪ Relocated gravel strip	Complete
7	▪ Widen the floatplane waterlane and extend it to the north	Complete
8	▪ Airport Reserve and Land Use Plan	Complete
9	▪ Amend the Capital Improvement Program to include recommendations from the Phases 1 and 2 reports	Complete
10	▪ Request FAA release of Airport land outside the Airport Reserve	In Process
11	▪ Complete upgrades to the City's GIS for the Airport	Complete
	Property Management	
12	Terminate submittal of airport appraisals to the FAA for approval	Complete
13	Transition to a reconstituted Airport Commission with more direct authority over the Airport	Not recommended for implementation by City Administration
14	Adopt revised/updated Airport regulations	Complete
15	Obtain Borough exemption from platting requirements for Airport Reserve Lands	Not recommended for implementation by City Administration
16	**Prepare a New Chapter of the Kenai Municipal Code incorporating all ordinances relating to the Airport and including the following:** Establishing new method of setting and adjusting land rental rates based on Airport-wide appraisal conducted every five year	Complete
17	▪ Delete the fixed 6 percent capitalization rate	Complete
18	▪ Set new lease term guidelines	Complete
19	▪ Enabling incentives to encourage private development of Airport land	Case-by-case consideration
20	▪ Allowing the City to require lease applicants to provide a business plan and evidence of financial ability	Complete
21	▪ Projecting the City from environmental liability	Complete
22	▪ Modifying the rights of a mortgage and sublessee under a lease	Complete
23	▪ Updating insurance requirements	Complete
24	Adopt an "Airport" zoning classification to cover all Airport Reserve lands	Re-zone as required. Complete
25	Update the City's land lease form	Complete
26	Prepare a summary of Kenai Municipal Code provisions applicable to Airport tenants ("minimum standards")	Complete
27	Complete Airport-wide appraisal and implement new land rental rates	Complete
	Financial Plan	
	Financial Management Structure and Policy	

	Revise the Kenai Municipal Code (KMC) to include:	
28	▪ Eliminate unnecessary restrictions on use of Airport revenues and land sale proceeds	Complete
29	▪ Combine three existing Airport funds into a single Airport Enterprise Fund	Complete
30	▪ Less-restrictive investment policy for Airport cash balances	Complete
31	Consider adopting policies to lease rather than sell Airport land, and using a portion of Airport cash balances to develop revenue-producing capital investments	Not recommended for implementation by City Administration. Case-by-Case Consideration
	Terminal Leases	
32	Draft a new airline operating agreement and terminal building lease to reflect formula based rates and other common industry practices	Complete
33	Modify rental car concession agreements	Complete
34	Modify restaurant concession agreement	Complete
35	Modify lounge lease	Complete
36	Modify travel agency concession agreement	Complete
37	Modify advertising concession agreement	Month-to-month
38	Modify public parking lot fees	Complete
39	Establish direct and indirect cost centers within the Airport Enterprise Fund and implement cost accounting allocation procedures	Complete
40	Calculate formula-based airline land fees and terminal rent to be adjusted annually	Complete
41	Increase landing fees by ordinance	Complete
42	Negotiate airline operating agreement and terminal building lease and implement formula-based rate structure	Complete
43	Revise the aviation activity report to include aircraft landed weight	Complete
	Financial Plan	
44	Adopt the Financial Plan and acknowledge the necessity of improving Airport revenues/costs to mitigate the projected exhaustion of Airport cash balances in the long-term future	As amended. Complete
45	Finalize evaluation of airport costs allocation and airport revenues	Complete
	Strategic Plan	
46	Adopt the Strategic Plan	As amended. Complete
47	Form working group within the Airport Commission to track achievement of the Strategic Plan's goals and objectives. Set priorities.	Not recommended for implementation by City Administration.
48	Report to the Airport Commission on an ongoing basis with a list of resources and levels of efforts needed to satisfy the Strategic Plan's goals and objectives.	Annually
49	Assess attainment of the Strategic Plan's Goals and Objectives. Reassess Goals and Objectives.	Annually
50	Report to the City Council the status of the Implementation Plan**	Complete

SOURCES:

2007 Kenai Municipal Airport Supplemental Planning Assessment, Phase 2 Report, Appendix F, Implementation Plan and November 30, 2010 Memo from the City Manager to City Council and Airport Commission, Subject: *Kenai Municipal Airport Supplemental Planning Assessment, Status of Implementation.*

9.7 2030 AIRPORT MASTER PLAN RECOMMENDED ACTIONS

Recommendations to reflect the 2030 Airport Master Plan are presented in Table 9-3.

Table 9-3

2030 AIRPORT MASTER PLAN RECOMMENDED ACTIONS

	Adopt the Airport Master Plan
	Update Airport Land Use Plan
	▪ Modify the Land Use Plan to reflect the Airport Master Plan recommendations
	▪ Modify the Airport Reserve Boundary
	▪ Revise land use definitions
	Amend the Capital Improvement Program to include Phases I, II and III Recommendations
	Update Airport Layout Plan to reflect the Airport Master Plan
	Airport Property
	Acquire 12.6 acres of privately-owned land for runway protection zone, obstruction and buffer areas
	Acquire additional avigation easements and establish zoning controls if land not acquired
	Airfield
	Retain nonprecision approach procedures to Runway 2L and work with FAA to lower existing nonprecision approach minimums
	Provide additional entry/exit taxiway for Runway 2L-20R
	Widen water Runway 2W-20W to provide parallel water taxi channel
	Reserve area for future relocation of gravel Runway 2R-20L and aircraft parking apron to the west side of the Airport
	Upgrade and replace VASI-4 on Runway 2L-20R to PAPI-4
	Passenger Terminal
	Implement modifications and improvements needed to address deferred maintenance, remodeling for more efficient use of space and amenities and Code issues
	Reserve space for future passenger terminal expansion
	Air Cargo and Mail
	Consolidate air cargo facilities north of passenger terminal
	Retain large aircraft parking areas north of passenger terminal
	Air Taxi and General Aviation
	Retain existing commercial aviation/fixed base operator facilities to the southeast
	Develop hangar lease lots east of the float plane water taxi lane on as-required basis
	Reserve area north of Airport Operations Facility for future aviation-related lease lots
	Reserve space for lease lots along the west shoreline of the float plane basin for commercial aviation float plane operators as the demand warrants
	Reserve area on west side of Airport for future relocation of gravel runway and associated aircraft parking area
	Provide additional helipads for helicopter parking near the Air Traffic Control Tower
	Relocate future Building Restriction Lines and lease lot lines to west at northeast end
	Consolidate some lease lots
	Airport Access and Parking
	Reconfigure the curbside roadway in front of the passenger terminal building
	Modify public parking lot layout
	Reserve space for additional vehicle parking south of rental car parking and also east of Willow Street
	Extend Willow Street to the north, as required, to serve additional airport development

	Airport Support
	Expand Airport Administration offices in the passenger terminal
	Provide new sand stockpile and storage area
	Provide space for aircraft wash pad
	Reserve space for deicing station
	Extend utilities as needed to serve future airport development
	Consider water improvements to increase available fire flows to any planned development along Willow Street and Marathon Road
	Update Kenai Municipal Code (KMC) for Airport Zoning to include:
	Rezone Airport lands within Airport Reserve Boundary to Airport Light Industrial (ALI). Initially only for City and Airport-owned lands
	Amend Land Use Table to designate uses in ALI zone
	Amend KMC Conservation Zone
	Update KMC to reference FAR Part 77, TERPS and other relevant documents to protect the safety of persons on the ground and in the air
	Incorporate guidelines in FAA AC 150/5200-33B, *Hazardous Wildlife Attractants on or near Airports*
	Financial Analysis Recommendations
	Identify financial resources to implement the initial phase of the recommended Capital Improvement Program
	Establish and maintain a regularly-updated FAA Airport Capital Improvement Program
	Ascertain total amount of monies that can be recovered by FAA Airport Improvement Program grant funds that can be reimbursed to the Other Building Areas cost center operating expenses.
	Implement the development of the Float Plane Basin Phase One Project
	Negotiate a management agreement for operation of the Alaska Regional Fire Training Center
	Prepare an updated Airport Lease Policy to provide a sound, consistent basis upon which the Airport can attract stable and financially responsible tenants to the Airport and can administer tenant leaseholds in a fair and uniform manner.
	Initiate expansion of the vehicle parking lot and rehabilitation of the existing parking lot.

Chapter 10

FINANCIAL FEASIBILITY ANALYSIS

10.1 INTRODUCTION

This chapter describes the financial considerations of the Capital Improvement Program recommended for the Kenai Municipal Airport to meet estimated Phase I (2016-2020) capital improvement funding requirements as described in Chapter 9. Because of the uncertainties involved in forecasting financial data and precise implementation dates of capital improvement projects, detailed financial planning is usually limited to three to five years. Therefore, only the initial phase of the recommended Capital Improvement Program is discussed in detail. The financial implications of proceeding with the development plan beyond Phase I are discussed in general terms at the end of this chapter.

10.2 AIRPORT SPECIAL REVENUE FUND

The Airport Fund is a special revenue fund of the City of Kenai. Special revenue funds are established to finance particular activities and are created out of receipts of specific taxes or other designated revenues. Special revenue funds are authorized by statutory or charter provisions to pay for certain activities with some form of continuing revenues.

10.2.1 Operating Revenues

The Airport Fund accounts for operations of the Airport and revenues from leases of Airport-owned lands. The major sources of revenue to the Airport Fund are from other rents and leases, airline landing fees, vehicular parking fees, car rental commissions, and terminal rents and leases. The most significant source of operating revenue is from investment earnings from the Airport Land Sale Permanent Fund.

The Airport Land Sale Permanent Fund accounts for revenues from the sale of airport property over the years. Based on the grant deed for the Airport, the principal from sales of airport land will remain in the Airport Land Sale Permanent Fund while the interest on principal is considered a source of operating revenue and capital needs for the Airport.

10.2.2 Operating Expenses

Airport operating expenses are applied to cost centers within the Airport Fund depending on the physical areas of the Airport for which the expenses are incurred. Definitions of the cost centers were obtained from the *City of Kenai Annual Budget July 01,2015 – June 30, 2016.* The Airport Fund cost centers are charged directly for salary and benefits of personnel reporting to other departments in the City but working on Airport-related tasks. In other instances, the City's General Fund is reimbursed from the Airport Fund for services provided by other City departments performing Airport duties. Cost centers used to account for the Airport expenses are presented in the following paragraphs.

Terminal. The terminal includes the terminal building, employee and public parking lots, rental car services, utilities and maintenance. The City's Police and Fire Departments provide emergency services for the Airport. A contract security company provides supplemental patrol capability. Custodial services and snowplowing are provided by contract. The City's General Fund is reimbursed from Airport funds for services provided by other City departments performing Airport duties. In some instances, the Airport fund is charged directly for salary and benefits of personnel reporting to other departments but working on Airport-related tasks.

Airfield. The airfield includes the runways, taxiways, aircraft parking aprons, aircraft approach and departure areas, safety areas, security/perimeter fencing, infield maintenance areas, navigational aids, utilities, storm drainage and any other areas related to aircraft operations. An Airport Operations Supervisor is responsible for the day-to-day maintenance and operations of the Airport including daily inspections, overseeing contractors and interfacing with Airport tenants and users. The Airport Operations Supervisor also participates in snow removal and maintenance activities. In addition, there are two Airport Operation Specialists positions and two parttime operators shared with the City Roads and Streets Department from October to March. One of the Airport Operations specialists' time is split evenly between the Airfield and the Terminal cost centers.

Administration. The Airport Manager is responsible for FAA compliance, Airport development and the overall management and operation of the Airport. The Airport Manager receives secretarial support. An Administrative Assistant assists the Airport Manager with management of the City's Disadvantaged Business Enterprise (DBE) program and assists in the management of the Airport parking system including aircraft itinerant, long-term and floatplane tiedown areas, and employee parking; secures landing reports and collects parking and landing fees. Legal, finance, engineering, planning, public works, police and fire support are funded through the City's Central Administration budget. The administration area accounts for all management, planning and administrative expenses. This includes the costs of administrative personnel, supplies, equipment, offices, and other administrative functions that support the operation of the Airport.

Other Building and Areas. Other building areas include other land and buildings located on Airport property. Expenses for the Float Plane Basin, including the aircraft tiedown areas, fueling station, transient aircraft parking and camping spots are included in the other building areas as is the FAA Flight Service Station. One-third of an Administrative Assistant's time, who is responsible for the administration of the other lands and buildings, is charged to the Other Building and Areas cost center. The City Planner and Administrative Assistant III to the City Planner are responsible for the administration of airport lands under the direction of the City Manager; 25 percent of the City Planner and 10 percent of the Administrative Assistant III positions are charged directly to the Other Buildings and Areas budget.

Training Facility. The Alaska Regional Fire Training Center (Center) was designed to facilitate hands-on training of fire-reponse personnel in scenarios replicating actual emergencies involving aircraft and structural/industrial settings. The Center is operated by a third party under a Facility

Management Agreement with the City. The Facility Management Agreement is due for renegotiation but needed major maintenance and equipment obsolescence have slowed those negotiations. A new agreement could increase Airport Fund revenues but much uncertainty exists.

Central Administrative Expenses. Central administrative expenses are transferred out of the Airport Fund cost centers to reimburse for services provided by other departments in the City performing Airport duties. These expenses are incurred by legal, finance and other City Departments and are in addition to other City employees whose salaries and benefits are charged directly to the Airport Fund cost centers for working on Airport-related activities and tasks. The Central Administrative Expenses include the average salary of one police officer, Airport-specific training costs and 10 percent of the costs for the City Dispatch Center. Three firefighters are allocated to the Airport to cover 24-hour staffing.

10.3 FINANCIAL ANALYSIS

The financial analysis is initially presented as a statement of historical revenues and expenses from Fiscal Year Ending FY2011 to FY2015 based on information provided by the City of Kenai, Finance Department. Based on information provided by the City Finance Director, the numbers for FY2015 were not finalized at the time this report was prepared. The historical FY2011-FY2015 financial data presented has been prepared on the basis of information and assumptions set forth in the text. These rely on information and assumptions from the sources indicated without further verification of such data. FY2015-FY2016 data were obtained from the *City of Kenai, Alaska Annual Budget July 01, 2015–June 2016*.

10.3.1 Historical Operating Revenues and Expenses

The historical operating results of the Airport Special Revenue Fund that account for operations of the Airport and rental and lease of Airport-owned lands are presented in Table 10-1. The historical five-year revenues and expenses provide a basis for assessing the ability of the City to meet future requirements to fund the Capital Improvement Program from operating sources.

Operating revenues from Airport operations are combined by the City and account for total operating revenues as shown in Table 10-1. Operating revenues from Airport operations averaged $2.9 million, on an annual basis, from FY2011 through FY2016. About $1 million of the operating revenues are from interest on the principal of the Airport Land Sale Permanent Fund. Interest from the Airport Land Sale Permanent Fund increased at an average annual rate of 4.6 percent from FY2011 to FY2016. This source of revenue accounted for 38 percent of total operating revenues in FY2011 and is expected to account for 36 percent of total operating revenues in FY2016 as shown in Table 10-1.

Operating expenses for Airport operations are shown in Table 10-1 based on the cost centers discussed in Section 10.2.2. Operating expenses from Airport operations averaged $2.8 million, on an annual basis, from FY2011 through FY2016. About $1.3 million of the operating expenses are for salary and wages that increased at an average annual rate of 5.7 percent from FY2011 to FY2016. These expenses accounted for 55 percent of total operating expenses in FY2011 and are expected to account for 64 percent of total operating expenses in FY2016 as shown in Table 10-1.

Table 10-1

HISTORICAL AND FORECAST OPERATING REVENUES AND EXPENSES

Fiscal Year 2010-2011 -- Fiscal Year 2019-2020

	HISTORICAL					2016 BUDGET	FORECAST			
	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015[1]	2015-2016[2]	2016-2017	2017-2018	2018-2019	2019-2020
OPERATING REVENUES										
Training Facility[3]	138	119	1,253	2,487	1,612	Footnote[3]	Footnote[3]	Footnote[3]	Footnote[3]	Footnote[3]
Fuel Sales	18,754	21,506	12,491	11,748	9,300	15,000	15,500	16,000	16,500	17,000
Fuel Flowage Fees	38,448	80,376	60,123	30,350	30,894	30,000	30,000	31,000	31,000	32,000
Float Plane Fees	2,609	1,428	730	1,571	1,331	1,800	1,600	1,600	1,600	1,600
Tiedown Fees	10,274	12,489	10,452	10,430	7,602	--	--	--	--	--
Aircraft Parking Fees[4]	14,903	4,694	14,972	4,327	5,128	15,000	16,000	18,000	20,000	22,000
Apron Parking & Ground Support Equipment[4]	11,432	10,516	12,202	9,681	2,522	--	--	--	--	--
Penalties and Interest	13,331	18,316	10,865	7,275	5,092	5,500	5,700	5,900	6,100	6,300
Interest on Investments	22,986	13,296	(10,265)	27,402	--	31,079	32,000	33,500	34,000	34,500
Other Rents and Leases	527,921	591,423	689,466	733,532	709,298	792,607	858,000	930,000	1,011,000	1,094,000
Fish Haul Rents	4,458	836	--	--	--	--	--	--	--	--
Sales of Other Assets	56	60	824	4	2,505	--	--	--	--	--
Miscellaneous Revenue	47,428	28,813	20,377	13,057	33,650	16,000	17,000	18,000	19,000	20,000
Restitutions	--	--	--	--	1,142	--	--	--	--	--
Vending Fees	11	--	--	--	--	--	--	--	--	--
Auto Parking Fees	191,147	200,909	206,706	201,256	269,842	336,000	338,000	340,000	342,000	344,000
Car Rental Commissions	150,292	180,243	195,398	199,432	194,331	195,000	203,000	216,000	228,000	240,000
Advertising Commissions	3,538	3,534	3,956	5,552	4,852	5,500	5,600	5,700	5,800	5,900
Other Terminal Rents and Leases[5]	63,234	58,204	84,103	192,931	195,130	293,575	294,000	295,000	296,000	297,000
Airline Rents and Leases[5]	133,243	132,717	158,279	56,141	54,436	--	--	--	--	--
TSA Rents and Leases	282	--	--	--	--	--	--	--	--	--
Airline Landing Fees[6]	176,444	210,018	187,661	245,016	209,278	351,277	367,000	372,800	378,500	384,000
Nonairline Landing Fees[6]	123,560	147,992	121,911	111,669	145,124	--				
Transfers in Capital Projects	54,747	--	--	--		--	--	--	--	--
Land Sale Permanent Fund	999,976	1,011,485	1,031,773	1,094,473	1,135,313	1,171,705	1,210,000	1,248,000	1,289,000	1,330,000
TOTAL OPERATING REVENUES	**2,609,213**	**2,728,973**	**2,813,275**	**2,958,333**	**3,018,382**	**3,260,043**	**3,393,400**	**3,531,500**	**3,678,500**	**3,828,300**

Table 10-1 -- continued

	HISTORICAL					2016 BUDGET	FORECAST			
	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015[1]	2015-2016[2]	2016-2017	2017-2018	2018-2019	2019-2020
OPERATING EXPENSES										
TERMINAL										
Salaries and Wages	99,807	111,023	112,184	114,755	151,834	182,916	190,000	197,800	205,700	213,900
Office Supplies	25	229	214	244	91	500	500	500	500	500
Operating Supplies	17,811	17,970	20,665	21,769	20,270	31,700	32,300	32,800	33,500	34,200
Small Tools	1,040	4,285	3,533	8,814	2,372	3,000	3,000	3,000	3,000	3,000
Computer Software	56	0	0	0	0	400	--	--	--	--
Professional Services	250	0	2,390	605	4,610	1,500	1,500	1,500	1,500	1,500
Communications	4,336	4,988	4,830	1,212	541	4,890	5,000	5,000	5,000	5,000
Transportation	1,955	2,275	3,446	1,189	1,090	6,278	6,200	6,200	6,200	6,200
Advertising	1,249	229	360	980	929	1,500	1,500	1,500	1,500	1,500
Printing and Binding	471	132	150	329	266	435	400	400	400	400
Insurance	8,600	5,830	6,901	8,053	0	7,585	8,000	8,800	9,100	9,300
Utilities	120,516	132,526	134,778	129,916	128,908	156,904	161,000	164,500	168,400	172,500
Repair and Maintenance	191,306	197,012	178,115	225,311	141,989	169,520	176,000	183,000	191,000	196,000
Rentals	6,360	6,360	6,424	6,540	4,305	4,320	5,000	5,000	5,000	5,000
Miscellaneous/Contingency	1,349	376	706	456	1,034	10,700	10,000	10,000	10,000	10,000
Charges (to) from Other Departments	0	0	1,721	91	-143	--	--	--	--	--
Buildings	0	29,024	47,027	0	22,150	--	--	--	--	--
Improvement to OT Buildings	3,900	0	0	0	0	--	--	--	--	--
TERMINAL OPERATING EXPENSES	**459,030**	**512,259**	**523,444**	**520,264**	**480,246**	**582,148**	**600,400**	**620,000**	**640,800**	**659,000**
AIRFIELD										
Salaries and Wages	233,629	279,392	307,559	304,614	309,930	371,722	386,500	402,000	418,000	434,000
Office Supplies	408	492	405	485	254	500	500	500	500	500
Operating Supplies	138,876	157,961	156,322	122,391	121,432	150,000	152,000	153,000	154,000	155,000
Small Tools	9,275	27,417	20,582	14,821	16,984	8,625	10,000	12,000	13,000	14,000
Computer Software	19	0	0	0	818	1,034	--	--	--	--
Professional Services	260	3,411	8,051	3,749	17,278	41,800	10,000	10,000	10,000	10,000
Communications	13,404	11,781	7,851	10,087	11,125	9,245	10,000	10,500	11,000	11,500
Transportation	2,324	5,710	2,682	3,753	4,534	5,900	4,000	4,000	5,000	5,000
Advertising	176	172	600	435	418	500	500	500	500	500
Printing and Binding	764	495	120	628	388	1,135	500	500	500	500
Insurance	77,300	60,055	74,799	78,153	36,721	78,034	80,000	82,000	84,000	86,000
Utilities	135,189	150,894	145,228	148,941	143,160	173,319	177,500	181,700	186,000	190,500
Repair and Maintenance	71,518	54,722	52,364	56,318	33,008	44,175	50,000	52,000	54,000	56,000
Rentals	8,493	3,742	3,952	3,675	11,866	4,385	5,000	5,000	5,000	5,000
Books	153	0	54	122	0	--	--	--	--	--
Miscellaneous/Contingency	133	0	0	0		10,000	10,000	10,000	10,000	10,000
Charges (to) from Other Departments	0	0	0	-332	(143)	--	--	--	--	--
Improvements to OT Building	5,413	0	0	0	3,247	7,500	--	--	--	--
AIRFIELD OPERATING EXPENSES	**697,334**	**756,242**	**780,570**	**747,841**	**711,020**	**907,874**	**896,500**	**923,700**	**951,500**	**978,500**

Table 10-1 -- continued

	HISTORICAL					2016 BUDGET	FORECAST			
	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015[1]	2015-2016[2]	2016-2017	2017-2018	2018-2019	2019-2020
OPERATING EXPENSES -- continued										
ADMINISTRATION										
Salaries and Wages	179,054	193,973	203,483	212,438	211,589	221,947	231,700	242,000	252,400	263,500
Office Supplies	899	1,158	1,117	1,000	158	500	600	700	800	900
Operating Supplies	604	138	859	1,116	608	1,200	1,200	1,200	1,200	1,200
Small Tools	2,253	3,251	14,685	2,177	1,283	250	1,000	1,000	1,000	1,000
Computer Software	329	329	480	480	959	586	500	550	600	650
Professional Services	3,146	1,845	4,661	1,006	795	1,250	1,300	1,350	1,400	1,450
Communications	4,403	4,975	12,200	9,667	5,239	7,168	8,000	8,500	9,000	9,500
Transportation	4,786	11,027	4,893	4,365	4,213	8,715	9,000	9,500	10,000	10,500
Advertising	7,896	6,992	9,864	9,850	6,108	9,500	9,700	9,800	9,900	10,000
Printing and Binding	2,072	983	451	896	663	935	1,000	1,000	1,000	1,000
Insurance	2,200	1,366	1,470	1,819	0	1,739	1,800	1,850	1,900	1,950
Books	0	0	54	50	50	--	--	--	--	--
Dues and Publications	367	345	739	645	645	650	700	700	750	750
Miscellaneous/Contingency	806	894	1,580	934	757	10,650	10,000	10,000	10,000	10,000
Charges (to) from Other Departments	0	0	0	(1,567)	(1,501)	--	--	--	--	--
ADMINISTRATION OPERATING EXPENSES	**208,816**	**227,278**	**256,535**	**244,877**	**231,567**	**265,090**	**276,500**	**288,150**	**299,950**	**312,400**
OTHER BUILDING AREAS										
Salaries and Wages	71,943	78,794	91,150	70,464	63,744	73,394	76,000	79,000	82,000	85,000
Office Supplies	237	373	0	0	0	200	200	200	200	200
Operating Supplies	10,946	17,933	8,683	9,828	13,646	16,000	17,000	18,000	19,000	20,000
Small Tools	546	679	0	0	0	--	--	--	--	--
Professional Services	12,432	16,053	6,788	7,808	49,893	3,500	4,000	5,000	6,000	7,000
Communications	241	969	1,224	1,280	935	1,800	2,000	2,200	2,400	2,600
Transportation	0	0	46	0	0	--	--	--	--	--
Advertising	0	672	47	0	0	600	600	600	600	600
Printing and Binding	0	375	120	628	224	--	--	--	--	--
Utilities	3,633	3,792	2,796	7,554	6,390	19,035	21,000	22,000	23,000	24,000
Repair and Maintenance	12,336	10,821	7,369	3,949	4,721	5,000	6,000	7,000	8,000	9,000
Rentals	1,305	1,230	1,380	2,290	1,945	3,750	3,800	3,800	3,800	3,800
Miscellaneous	581	664	631	382	283	10,000	10,000	10,000	10,000	10,000
Land	103,000	0	0	0	0	--	--	--	--	--
Machinery and Equipment	19,307	0	0	0	0	--	--	--	--	--
Transfers Out	92,365	45,442	125,385	403,796	215,338	--	--	--	--	--
OTHER BULDING AREAS OPERATING EXPENSES	**328,871**	**177,797**	**245,618**	**507,977**	**357,119**	**133,279**	**140,600**	**147,800**	**155,000**	**162,200**
TRAINING FACILITY										
Professional Services	29,639	14,279	0	0	0	--	--	--	--	--
Communications	0	924	0	0	0	--	--	--	--	--
Utilities	18,351	17,778	26,959	16,345	16,843	23,536	--	--	--	--
Repair and Maintenance	15,493	8,392	15,021	12,782	11,853	13,290	--	--	--	--
TRAINING FACILITY OPERATING EXPENSES	**63,483**	**41,373**	**41,980**	**29,127**	**28,696**	**36,826**	Footnote[2]	Footnote[2]	Footnote[2]	Footnote[2]
TOTAL OPERATING EXPENSES	**1,757,534**	**1,714,949**	**1,848,147**	**2,050,087**	**1,808,648**	**1,925,217**	**1,914,000**	**1,979,650**	**2,047,250**	**2,112,100**

Table 10-1 -- continued

	HISTORICAL					2016 BUDGET	FORECAST			
	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015[1]	2015-2016[2]	2016-2017	2017-2018	2018-2019	2019-2020
TOTAL OPERATING REVENUES	2,609,213	2,728,973	2,813,275	2,958,333	3,018,382	3,260,043	3,393,400	3,531,500	3,678,500	3,828,300
TOTAL OPERATING EXPENSES	1,757,534	1,714,949	1,848,147	2,050,087	1,808,648	1,925,217	1,914,000	1,979,650	2,047,250	2,112,100
REVENUES OVER (UNDER) EXPENSES	**851,679**	**1,014,023**	**965,128**	**908,247**	**1,209,734**	**1,334,826**	**1,479,400**	**1,551,850**	**1,631,250**	**1,716,200**
CENTRAL ADMIN COSTS										
Terminal	58,100	63,500	58,500	73,800	73,900	68,700	70,100	72,100	74,000	76,100
Airfield	757,000	794,900	776,300	813,300	845,600	835,200	849,000	863,000	877,000	891,700
Administration	30,300	53,700	60,200	54,200	54,300	45,200	47,000	50,100	53,800	57,000
Other Building Areas	--	--	--	--	--	85,000	87,500	90,000	92,800	95,600
TOTAL CENTRAL ADMIN COSTS	**845,400**	**912,100**	**895,000**	**941,300**	**973,800**	**1,034,100**	**1,053,600**	**1,075,200**	**1,097,600**	**1,120,400**
TOTAL OPERATING REVENUES	2,609,213	2,728,973	2,813,275	2,958,333	3,018,382	3,260,043	3,393,400	3,531,500	3,678,500	3,828,300
TOTAL OPERATING EXPENSES	(1,757,534)	(1,714,949)	(1,848,147)	(2,050,087)	(1,808,648)	-1,925,217	1,914,000	1,979,650	2,047,250	2,112,100
TOTAL CENTRAL ADMIN COSTS	(845,400)	(912,100)	(895,000)	(941,300)	(973,800)	-1,034,100	1,053,600	1,075,200	1,097,600	1,120,400
TOTAL AVAILABLE FOR FUNDING CAPITAL EXPENDITURES	**6,279**	**101,923**	**70,128**	**(33,053)**	**235,934**	**300,726**	**425,800**	**476,650**	**533,650**	**595,800**

FOOTNOTES:

1. *The City of Kenai, Alaska Annual Budget July 01, 2015 -- June 30, 2016*
2. FY2014-2015 data were not finalized at the time of preparation of this report.
3. The lease for the Training Facility has expired. The City is negotiating a new lease agreement. It is assumed that there will be future revenues in this cost center.
4. Aircraft Parking Fees and Apron Parking and Ground Support Equipment were combined in the FY2015-FY2016 budget.
5. Other Terminal Rents and Leases and Airlines Rents and Leases were combined in the FY2015-FY2016 budget.
6. Airline Landing Fees and Nonairline Landing Fees were combined in FY2015-FY2016 budget.

SOURCES:

Historical--City of Kenai Finance Department
Forecast--Aries Consultants Ltd.

Operating expenses for the Terminal increased at an average annual rate of 0.9 percent from $459,030 in FY2011 to $480,246 in FY2015. Salaries and wages increased at an average annual rate of 8.6 percent and utility expenses increased at an average annual rate of 1.4 percent over the historical five-year period. Expenses for repair and maintenance decreased at an average annual rate of 6 percent over the same five-year period.

Operating expenses for the Airfield increased at an average annual rate of 0.4 percent from $697,334 in FY2011 to $711,020 in FY2015. Salaries and wages increased at an average annual rate of 5.8 percent and utility expenses increased at an average annual rate of 1.2 percent over the historical five-year period. Expenses for repair and maintenance decreased at an average annual rate of 17 percent over the same five-year period.

Operating expenses for Administration increased at an average annual rate of 2.1 percent from $208,816 in FY2011 to $231,567 FY2015. Salaries and wages increased at an average annual rate of 3.4 percent while other expenses had no significant increases or decreases over the historical five-year period.

Operating expenses for Other Building Areas increased at an average annual rate of 1.7 percent from $328,871 in FY2011 to $357,119 in FY2015. Expenses for professional services increased at an average annual 32 percent over the historical five-year period while salaries and wages decreased an average annual 3.4 percent over the same five-year period.

Operating expenses for the Alaska Regional Fire Training Center averaged $40,000 annually over the five-year historical period from FY2011 to FY2015. The Facility Management Agreement with Beacon Occuptional Heath & Safety Services required the City to negotiate a fair rental rate beginning in January 2014. This new rate has not yet been negotiated. It is expected that a new agreement will generate revenues to the Airport Fund from the Center and utilities and repair and maintenance expenses will no longer be the responsibility of the City.

Central Administrative Costs, averaging $900,000 annually, have been transferred out of the Terminal, Airfield, Administration and Other Building Areas costs centers primarily for salaries and wages of other City employees working on Airport-related tasks. The Central Administrative Costs include the average salary of one police officer, Airport-specific training costs and 10 percent of the costs for the City Dispatch Center. The salaries of three fire fighters are also included to cover 24-hour staffing of the Airport Aircraft Rescue and Fire Fighting facility. These expenses have increased an average annual rate of 2.9 percent over the historical five-year period from $845,000 in FY2011 to $973,000 in FY2015 and are expected to increase by an additional 6.2 percent in FY2016 based on the City of Kenai Annual Budget for FY2016.

The Airport Operating Fund, like all operating funds of the City, reimburses the City of Kenai for administrative services provided by the departments of the City's General Fund. Examples of administrative services include financial services such as payroll accounts payable, accounts receivable and investment management. Other examples of administrative services include governance by the City Council, legal services, land management services and general oversight by the City Manager's

office. Administrative services are allocated to the various departments and operating funds of the City using the modified direct expenditure method. In addition to administrative support, departments of the City's General Fund provide direct support services to the Airport. Other direct support services include public safety, property management, building maintenance, fleet maintenance and ground maintenance services. The allocation methods for each service differ but are designed and monitored to ensure the allocation charged is in proportion to the level of service provided.

10.3.2 Projected Revenues and Expenses

The projections of airport financial operations for the initial five-year Phase I development period are also presented in Table 10-1. The projections of operating revenues are based on the historical five years of financial data, the City's current budget, current levels of Airport Fees in accordance with the Kenai Municipal Code and projected aviation activity increases. They are also based on the assumption there will be no major changes or improvements in tenant/user rates and charges or lease policies except as noted. Specifically, the projections are based on the following general assumptions:

- All sources of income derived from airport users will be credited to the Airport Fund and will be used only for maintaining, operating and improving the Airport as required by Federal Grant Assurances.

- No major capital improvement projects will be undertaken during the five-year forecast period other than those included in the Capital Improvement Program.

- The projected dollars are based on 2016 dollar values.

- Overall aviation demand forecasts presented in Chapter 2 will be realized.

- The development of facilities recommended in this report will be implemented and managed to produce the maximum net revenue to the Airport funds consistent with providing reasonable levels of public facilities and services.

- All present leases and agreements will continue in force with no major changes in their financial provisions.

- The fair rental rate for the Facility Management Agreement for the Alaska Regional Fire Training Center will be renegotiated. The Airport Fund currently pays for repairs and maintenance items exceeding $1,500 and utilities. The future revenues and any expenses for the Alaska Regional Fire Training Center have not been included in the operating revenues and expenses.

- Landing fees of the commercial airline operators will increase as activity increases and the use of larger aircraft increases. (The fiscal year 2016 landing fees for the signatory aircraft are based on the certificated gross takeoff weight to the nearest 1,000 pounds x $1.60. Nonsignatory aircraft are based on the certificated gross takeoff weight to the nearest 1,000 pounds x $2.10.)

- Revenues from other sources are estimated to remain generally the same as in the five-year historical period.

- Rents and leases for the terminal building are estimated to remain generally the same over the forecast period with no major changes in the terminal facility.

- Commissions are revenues received as a result of the rental car concessionaire agreements. Commissions and vehicle parking fees are estimated to increase commensurate with increased passenger activity.

- Other revenue includes advertising in the terminal building and is estimated to remain the same over the forecast period.

- The projected operating expenses are generally expected to be commensurate with the five-year historical period from FY2011 through FY2015 with periodic adjustments to account for an average of 2.4 annual inflation rate.

- Salaries and wages are forecast to increase commensurate with the five-year historical period averaging about 4 percent annually.

- It is expected there will be increased utility costs to the Terminal Area cost center as the parking lot expansion occurs and new utilities come on line from Granite Point to Willow Street. These costs cannot be ascertained at this time.

- A variable of particular importance in a financial analysis for a program of this type is the level of user fees and rental rates upon which projections of operating revenues are based. Future user rates and charges based on existing agreements are assumed in the analysis except as noted.

10.4 SUMMARY OF THE FINANCIAL ANALYSIS

Based on the forecast revenues and expenses presented in Table 10-1, an estimated $2.3 million will be available beginning in FY2016 through FY2020 to fund the initial five-year phase of the Capital Improvement Program.

An estimated $1.6 million will be required from the Airport to fund the Phase I improvements presented earlier in Table 9-1, Capital Improvement Program. Based on the forecast revenues and expenses presented in Table 10-1, the Airport Fund will operate with sufficient revenues to fund Phase I of the Capital Improvement Program.

10.5 ALTERNATIVE METHODS OF FINANCING AIRPORT CAPITAL IMPROVEMENTS

There are a variety of sources from which potential financing for airport facilities may be obtained, including Federal Airport Improvement Program grant funds, State Legislative Grants, private financing, and in some instances, the sale of general obligation and/or revenue bonds. The major financial resources available to the City of Kenai, representing alternative means of financing airport development, are presented earlier in Chapter 6. Any of the alternative methods of financing or any combination of the methods presented, may be considered by the City.

10.6 REVENUE ENHANCEMENTS

About $880,000 was transferred out of the Other Building Areas cost center from FY2011 through FY2016. Based on information provided by the City Finance Director, some of these monies will be

eligible for FAA reimbursement through future Airport Improvement Program grants. The City should ascertain how much of these monies can be recovered by FAA grant funds that can then be reimbursed to operating expenses. Crediting these monies back to the Other Building Areas cost center could provide up to $880,000 to fund Phase I of the Capital Improvement Program.

As noted earlier, the City is renegotiating the Facility Management Agreement for the training activities at the Alaska Regional Fire Training Center. These renegotiations should yield new revenues to the Airport Fund in the future and eliminate the utility and maintenance and repair expenses for the Training Facility cost center. All revenues from the Training Facility will continue to go into the Airport Fund.

Development of the Float Plane Basin Phase One project, as well as the establishment of small lease lots along the water taxilane, recommended in the initial phase of the Capital Improvement Program will provide up to 48 lease lots. The cost to the Airport for the Phase One development is estimated to be about $181,250 to match FAA Airport Improvement Program grants. Another $75,000 will be required from the City to extend the electricity and natural gas services to the 23 lease lots to be developed in the Phase One project for a total estimated City requirement of $257,000.

10.6.1 Rate of Return

The Float Plane Basin Phase One project is the only major development project in the Phase I (2016-2020) of the Facilities Implementation Plan presented earlier in Table 9-1. The City will have to fund the City's 6.25 percent matching share of the FAA Airport Improvement Program funded project totaling $181,250. The extension of electricity and natural gas to service the 23 lease lots is estimated to cost an additional $75,000. Therefore, the total project costs are estimated to be $257,000 to be funded by the City. Based on the financial analysis, presented earlier in Chapter 10, there would not be a requirement for the City to borrow money to fund the project.

The assumptions used for development of this project are as follows:

- Float Plane Basin Phase One Development Costs $257,000
- Number of Lease Lots Available 23
- Square Footage of Lease Lots.....10,200
- Initial Lease Rate per Square Foot..$0.15
- Annual Lease Rate Increase..... 2.5%
- Two Lease Lots Occupied in Initial Year and One Additional Lot Added Each Year Thereafter

Table 10-2 presents the rate of return for the lease revenues over a 22-year period based on 2016 dollars. Based on 2016 dollars, the City's initial 2016 investment of $257,000 would be recovered through lease revenues in the fourteenth year following development with a rate of return of 130 percent over the 22-year period.

Table 10-2 also presents the lease revenues over a 22-year period based on the time value of money. The time value of money is based on the premise that the $257,000 available in 2016 is worth more than the same amount in the future due to its earning capacity. Based on the time value of money, the City's initial 2016 investment of $257,000 would be recovered through lease revenues in the nineteenth year following development with a rate of return of 66 percent over the 22-year period.

Table 10-2

RATE OF RETURN
FLOAT PLANE BASIN PHASE ONE DEVELOPMENT
Kenai Municipal Airport

Year	Lease Rate($)	Number of Lots Leased	2016 DOLLARS			TIME VALUE OF MONEY		
			Lease Revenues($)	Accumulative Lease Revenues($)	Breakeven($)[1]	Estimated Accumulative Time Value of Revenues($)[1]	Estimated Time Value of Investment $)[1]	Breakeven($)[1]
1	0.15	2	3,060	3060	-253,940	3,060	257,000	-253,940
2	0.15	3	4,590	7,650	-249,350	8,033	269,850	-261,817
3	0.16	4	6,528	14,178	-242,822	15,289	283,343	-268,054
4	0.16	5	8,160	22,338	-234,662	24,621	297,510	-272,889
5	0.17	6	10,404	32,742	-224,258	36,776	312,385	-275,609
6	0.17	7	12,138	44,880	-212,120	51,360	328,004	-276,644
7	0.17	8	13,872	58,752	-198,248	68,494	344,405	-275,911
8	0.18	9	16,524	75,276	-181,724	89,268	361,625	-272,357
9	0.18	10	18,360	93,636	-163,364	113,010	379,706	-266,696
10	0.19	11	21,318	114,954	-142,046	141,044	398,691	-257,647
11	0.19	12	23,256	138,210	-118,790	172,515	418,626	-246,111
12	0.20	13	26,520	164,730	-92,270	208,987	439,557	-230,570
13	0.20	14	28,560	193,290	-63,710	249,424	461,535	-212,111
14	0.20	15	30,600	223,890	-33,110	294,026	484,612	-190,586
15	0.21	16	34,272	258,162	1,162	344,712	508,842	-164,130
16	0.21	17	36,414	294,576	37,576	400,182	534,285	-134,103
17	0.22	18	40,392	334,968	77,968	462,603	560,999	-98,396
18	0.22	19	42,636	377,604	120,604	530,501	589,049	-58,548
19	0.23	20	46,920	424,524	167,524	606,292	618,501	-12,209
20	0.24	21	51,408	475,932	218,932	690,585	649,426	41,159
21	0.25	22	56,100	532,032	275,032	784,019	681,898	102,121
22	0.25	23	58,650	590,682	333,682	884,803	715,992	168,811

1. The time value of money does not include the effects of inflation.

Source: Aries Consultants Ltd.

The dollars to be invested in the Float Plane Basin Phase One Development total $3 million. FAA grants total $2,718,750 and City matching funds total $181,250 plus $75,000 for the extension of electricity and natural gas to the lease lots not eligible for FAA grant funding. The economic and financial benefits to the City include construction jobs in the short-term of initial development. In the longer-term, the development of the additional 23 lease lots for aviation and aviation-related activities would increase jobs on the Airport, fuel sales, use of other facilities and services on the Airport and generate increased property taxes.

10.6.2 Methodology for Determining Rates and Charges

It is generally desirable to classify each tenant on an airport by the type of privileges it is granted for use of the airport. Leases and agreements and other uses of the Kenai Municipal Airport should generally be classified according to the land uses and zoning designations on the Airport property. An updated Airport Lease Policy should be prepared to provide a sound, consistent basis upon which the Airport can attract stable and financially responsible tenants to the Airport and can administer tenant leaseholds in a fair and uniform manner. In this way, each existing and prospective tenant knows that he/she will be treated like all other tenants. It should be noted that a review of existing leases and agreements was eliminated from the Scope of Work by the City in March 2011.

The principal underlying the establishment of rates and charges is that each tenant on the Airport and each user of the airfield should pay an appropriate rate or fee for such tenancy or use. At a minimum, Airport use fees and facility rentals should be based on actual, fully-allocated costs of providing, operating, and maintaining the facilities occupied and used, including reasonable interest charges. With regard to the various users of the Airport, the following policies should apply:

Passenger Terminal Building

Currently, all tenants of the Passenger Terminal Building pay per square foot of space leased, except the vending machines. The lounge and rental car are the only commercial operators who pay a concession fee in addition to the per square foot of space leased.

All terminal building space occupants, except the food and beverage and any merchandising concessionaires, should pay standard rates per square foot per year for similar types of terminal building space exclusively leased. Differential rates for various types of space can be established based on the degree of public exposure and the extent and cost of building finish and services. This rate(s) is determined on the basis of actual, fully-allocated costs incurred by the City in providing, operating, and maintaining the terminal building.

In addition, all terminal building space occupants engaged in commercial operations (such as food/beverage, rental car, and advertising concessionaires) should pay a privilege fee (usually a percentage of gross receipts against a minimum annual guarantee). In no instance should the minimum annual guarantee be less than the cost of providing the space.

Airfield

Currently, the fiscal year 2016 landing fees for the signatory aircraft are based on the certificated maximum gross takeoff weight to the nearest 1,000 pounds x $1.60. Nonsignatory aircraft are based on the certificated maximum gross takeoff weight to the nearest 1,000 pounds x $2.10.

Landing fees are based on the certificated maximum gross takeoff weight. The Kenai Municipal Code Section 14.05.010, Landing Fees, General, exempts landing fees in the case of 1) an aircraft with a certificated maximum gross takeoff weight of less than 4,000 pounds; 2) military and federal government aircraft, as provided under Section 13.05.050; 3) all float planes, regardless of weight; 4) the landing of an aircraft solely for the purpose of testing the aircraft or its systems; and 5) the landing of an aircraft operated by an air carrier that serves the Airport when the landing is solely for the purpose of training flight crew personnel.

The fuel flowage fees are currently published in the City's fee schedule.

All users of the airfield should pay an airfield use fee regardless of any other space or ground rentals that they may be paying on the Airport.

For air carrier/commuter airline users, a specific landing fee should be negotiated on the basis of the certificated maximum gross takeoff weight operated at the Airport for each and every landing aircraft, regardless of whether the landings are extra sections, training flights, etc.

For general aviation aircraft users, in addition to landing fees for aircraft over 4,000 pounds certificated maximum gross takeoff weight, a use charge can most easily be obtained through a fuel flowage fee. Fuel flowage fees should be stated in terms of a percent of gallons delivered rather than cents per gallon sold. The Fee Schedule should remain flexible for change from time-to-time by City Ordinance, and any change would be applied consistently to all tenants at the same time.

Ground Rental Rates

In order to establish uniform ground rental rates in the future for various parcels of Airport property, the City should set basic ground rental rates for various types and locations of property on the Airport at current levels. Appraisals should be done at five-year intervals to provide a new rental basis on which to begin the next five-year term. In the interim five-year period, adjustments in property rates should be made according to a selected inflation index, e.g., Anchorage Consumer Price Index. The annual adjustments would apply to new leases and to all existing leases. An appraisal of all airport properties at five-year intervals, with inflation indexing during the intervening years, will minimize revenue losses to the City and excessive lease rates for the airport tenants.

It should be noted that airport appraisals should be made by specialized real estate appraisers qualified in appraising airport properties. The current ground rental rates for airport property should be determined through an appraisal of fair market value by an appraiser who is familiar with appraising airport properties and will take into consideration the current demand for aviation properties in the Kenai Peninsula area, the availability of competitive properties, and in particular trends in the aviation industry. In addition, appraisers who are familiar with appraising airport

properties recognize that there are restrictions on the use of the property in compliance with FAA requirements and other development standards as established by the City.

10.7 FINANCIAL CONSIDERATIONS OF THE PHASE II AND PHASE III CAPITAL IMPROVEMENT PROGRAM

Beyond Phase I, it is assumed that development of the Airport will proceed according to the priorities proposed in the recommended Airport Phasing Plan. It is also assumed that the implementation of Phase II (2021-2025) and Phase III (2026-2030) projects will be arranged to be compatible with the financing sources and capability of the City, as identified at the time of implementation, without regard to the requirements of the projects that may be demonstrated.

The City requirements to fund Phase II (2021-2026) of the Capital Improvement Program are estimated to be $1,787,000 if State Legislative grants are not made available. The City requirements to fund Phase III (2026-2030) of the Capital Improvement Program are estimated to be $673,000 if the State Legislative grants are not made available.

It should be recognized that the financial feasibility of projects in the later phases will be linked to the overall management of the Airport in the short-term, the provisions of existing leases and agreements in effect, funding levels and participation rates of Federal Airport Improvement Program grants and State Legislative grants, and periodic review by the City of its lease policies and rates and charges policies.

APPENDIX A

PASSENGER TERMINAL BUILDING EXISTING CONDITIONS SURVEYS

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Kenai Municipal Airport Terminal Existing Conditions Survey **Revised 5-23-2012**

1. Terminal Building History and General Statement

The original terminal building was constructed in 1966. In 1983 additions were added to both the north and south ends of the building. In 1988 a magor renovation of the south end and second floor of the terminal was completed. This would give the original terminal an age of 45 years and the addition an age of 28 years at the time of this report.

All construction done in compliance with code at the time of construction is considered code compliant until said building goes through a change in occupancy, change in exiting system or major renovation at which time the building, facility or space affected may be required to be brought into compliance with current building codes. These issues need to be reviewed with the building official having jurisdiction at the time of the remodel, addition or renovation work affecting the building.

It is generally assumed that the Kenai Municipal Airport was constructed to code at the time of construction. There may be conditions that were not constructed to code at the time of construction but this is difficult to determine with any certainty and the available records are incomplete. Other conditions may have deteriorated over time, been otherwise modified or be in need of repair and are therefore not currently code compliant.

Much of the information collected in this report concerning concealed assemblies and / or user group needs was gathered from airport personel and is believed to be accurate but should be verified.

2. Code Data

The record drawings for the original terminal building do not specify any code data. However, the record drawings for the 1983 addition show that the governing code at the time was the 1979 Uniform Building Code and the “Code Information” provided with these documents lists the project as an Occupancy group A-3. The main public areas appear to meet code in terms of occupancy and exiting considerations. The lounge on the upper level has a required exit stairway out the back that does not meet code for a number of reasons including guardrail heights, and non functional sprinkler system.

Stair handrails are required to be at a height between 34" and 38". The handrails in Stair 2 are at a height of 31". The stairs are reqired to have a clear width of 36"; Stair 1 has a clear width of only 34" between the handrails. Both stairs need a 42" high guard rail where there is no wall behind the handrail. Both stairs have horizontal intermediate guards that are spaced at six inches; the maximum spacing allowed for these guards is four inches.

There is a height clearance issue in Stair 2 and in Electrical Room 142.

Stair 2 and Hall 202 have sprinkler pipe located in the space but there are no sprinkler heads. Stair 1 does not have sprinkler protection at the intermediate landing and at the lower run of the stair. The Elevator Equipment Room 143 is not sprinkler protected.The Elevator Shaft was not inspected. There is a sprinkler head in Electrical Room 142 that is below the clearance height.

There are non code compliant conditions at the rear exit from the restaurant where a labeled exit passageway is blocked or restricted with storage of pantry type items for the kitchen.

Non code compliant conditions were observed in the Mechanical Room 141, see the Mechanical Report for details.

Non code compliant conditions were observed in the Electrical Room 142, see the Electrical Report for details.

3. Construction Assemblies and Building Systems

When the terminal building was originally built, it was predominantly 2x4 wood frame construction. The typical exterior wall assembly consisted of a stucco finish over plywood sheathing over 2x4 studs, with

fiberglass blanket insulation with aluminum facing over gypsum wall board. According to the original record drawings the roof was constructed with gravel over built-up roofing over 3" rigid insulation over metal decking. When the addition was built in 1983, the exterior walls were constructed with 2x10 studs while interior partition walls used 2x4 construction. The typical exterior wall assembly consisted of metal paneling over plywood sheathing, over 2x10 studs with 9 1/2" of fiberglass batt insulation over gypsum wall board. It appears that the entire roof was reinsulated and replaced when the 1983 addition was built. The current roof is constructed of built up roofing over tapered insulation over two (2) 3" layers of rigid insulation over a metal deck. The current roofing has outlived its useful life expectancy and is in need of replacement.

4. Exterior

The exterior wall finishes are in overall good condition. There are however some areas in need of repair and some damage can be found in similar areas around the building. For example, damage or discoloring can be found along the bottom of the metal paneling in many areas. Where there are overhead doors, there is commonly damage on either side. The soffit over the departure and arrival doors and over the entrance to Arctic Foyer 101 are both dirty and in need of cleaning. Generally speaking, the exterior doors are in overall good condition with the exception of the door leading into Hall 159 which is poor. The windows are also in overall good condition, although the weather stripping is beginning to come loose on a few. The energy rating and heat loss from the windows needs to be considered. The exterior stair and handrails are all in good condition.

Despite the generally good condition of the exterior, there are some locations that should be noted. The north wall on grid line 12 shows more damage than normal, with tears, dents, and discoloration from the left of the overhead door to about midway down the length of the wall. There is a gutter in poor condition over the coverered walkway along grid line 10. There was extensive ice accumulation from the scupper over the south wall of Arctic Foyer 137. Along grid line H, between Grid lines 2 and 4, there is a fire alarm with a large hole in the siding surrounding it. Also along this wall, there is a window in place of what was once a door, and the foundation is now exposed. To the left of this window, there is a rectangular section of siding that looks as though it was removed and then replaced. There is a tear in the siding to the right of the overhead door on grid line 4. The concrete outside of the Departure Hallways is badly cracked. the exterior doors in Arctic Foyer 137 are not wide enough and travellers with baggage bump them, knocking them off track.

The current roofing is generally in poor condition with the exception of the roof over the covered entry outside of Arctic Entry 152. Roof drainage is poor due to the insufficient slope of the roof and a significant amount of water was observed on the roof, pooled in several large areas. The membrane is bubbling in several locations. There is a broken vent cover above the Men's Restroom 103 and another above the Women's Restroom 161. A piece of flashing is mising from the wall outside the 2nd Floor Lounge 204. A large amount of pine needle debris was observed in the corner of the roof near Tenant 1, room number 131.

5. Interior

5 A. Main Level - Public Spaces

In the public spaces on the main level, the interior floor finishes consist of entry carpet that is generally in poor condition; area carpet that is generally in fair condition, although it is a little dated; tile that is generally in good condition; resilient flooring that is generally in good condition; and textured rubber flooring that is generally in fair condition.

The interior wall finishes consist of painted gypsum wall board that is generally in good condition; carpet (full height and wainscot depending on location) that is generally in fair condition; tile wainscot that is generally in good condition; rubber base that is generally in good condition; tile base that is generally in fair condition; and wood base that is generally in good condition.

The interior ceiling finishes consist of painted gypsum wall board that is generally in good condition; plaster that is generally in poor condition; and suspended linear metal that is generally in fair condition, although it is a little dated.

The exterior window and door finishes are generally in good condition with the following exceptions: the doors in Arctic Entries 121, 122, 123 and 127 are in poor condition, the doors in Arctic Foyer 137 are not operating properly, the retrofit window in Sub-Lobby 149 is in poor condition, the overhead glazing in Greenhouse 155 either has some small leaks or some condensation problems, and the door in Hall 159 is in poor condition.

The interior door finishes consist of glazed doors with aluminum frames and solid core wood doors. They are all generally in fair condition and many of the wood doors need to be refinished. The sliding glass door in Tenant 1, room number 131, is hard to open. The door into Tenant 6, room number 148, needs a kick plate. The interior window finishes are generally in good condition.

There are several places on the main level where wood trim has been used as a finish. All of the wood trim is generally in fair condition and needs to be refinished, especially in the areas where it is exposed to a large amount of ultraviolet rays. There are several display cases on the main level, some of which have aluminum framing and others that have wood framing. The wood frame display cases need to be refinished. The counters and casework in the restaurant, ticket counters and tenant counters are generally in poor condition. One of the walls in Prep Area 156 was not refinished during the last rerenovation of the space. The handrails along the Departure Hallway124 and the Arrival Hallway128 are loose. All of the restroom accessories are in good condition with the exception of Men's Restroom 160 where the restroom accessories in the toilet areas are in fair condition.

5 B. Main Level - Private Spaces

In the private spaces on the main level, the interior floor finishes consist of carpet that is generally in poor condition; exposed concrete floor that has typical cracks and oil stains; resilient flooring that is generally in poor condition; and tile that is generally in good condition.

The interior wall finishes consist of painted gypsum wall board that is generally in fair condition in the office spaces and poor condition in the utility spaces; fiberglass reinforced panels that are generally in good condition; tile wainscot that is generally in good condition; rubber base that is generally in poor condition; and resilient base that is generally in poor condition.

The interior ceiling finishes consist of painted gypsum wall board that is generally in fair condition in the office spaces and poor condition in the utility spaces; exposed structure with no finish that is generally in good condition; and suspended acoustical ceiling tiles that are generally in fair condition.

The exterior window and door finishes are generally in good condition with the following exceptions: the door in Arctic Entry 119 is starting to rust at the bottom, the overhead doors and man doors in the Baggage Makeup Area 118 and the Baggage Breakdown Area 129 are in poor condition and do not operate properly.

The interior window finishes are all generally in good condition. The interior door finishes are all generally in fair condition, many of them need to be refinished. The doors in Arctic Entry 119 and Storage 158 are frames only, the doors are missing.

The light switch for Janitor 105 is located behind the door, the door opens into the space which requires you to enter the room, shut the door and find the light switch in the dark. In Baggage Makeup Area 118 and the Baggage Breakdown Area 129 it appears that fluid from the forklifts is leaking and flowing into the floor drain; an oil/water seperator is required in this location. There is a walk-in refrigerator and a walk-in freezer in Storage 158 that are in fair condition.There are several places where wood trim has been used as a finish. All of the wood trim is generally in fair condition and needs to be refinished, especially in the areas where it is exposed to a large amount of ultraviolet rays. The casework is generally in poor condition.

5 C. Upper Level – Public and Private Spaces

On the upper level, the interior floor finishes consist of hardwood that is generally in good condition; carpet in the lounge that is generally in fair condition; carpet in utility spaces that is generally in poor condition; laminate that is generally in fair condition with small areas of water damage; tile that is generally in good condition; and textured rubber flooring that is generally in fair condition.

The interior wall finishes consist of painted gypsum wall board that is generally in fair condition and needs a fresh coat of paint; wood paneling that is generally in good condition; tile wainscot that is generally in good condition; carpet base that is generally in poor condition and is even missing in some locations; rubber base that is generally in fair condition; tile base that is generally in fair condition; and wood base that is generally in good condition.

The interior ceiling finishes consist of suspended linear metal that is generally in fair condition, although it is a little dated; painted gypsum wall board that is generally in fair condition and needs a fresh coat of paint.

The exterior window and door finishes are all brushed aluminum and are generally in good condition with the following exceptions: in Hall 202 one of the exterior window panes is cracked and a significant amount of water was observed between the two panes, in Hall 202 the overhead glazing has been covered with aluminum sheeting on the exterior and insulation is visible between the glazing and the aluminum sheeting and in Hall 202 two cracks were observed in the overhead glazing. The interior door finishes are generally in good condition with the following exceptions: in Stock Room 205 the door has been removed from the frame.

There are several places on the upper level where wood trim has been used as a finish. All of the wood trim is generally in fair condition and needs to be refinished, especially in the areas where it is exposed to a large amount of ultraviolet rays. Bar 203 has built-in casework that is in good condition; however, one of the built-in refrigerators needs a new door seal. There is a walk-in refrigerator in Stock Room 205 that is in good condition. All of the restroom accessories are in good condition.

6. Americans with Disabilities Act Compliance

6 A. Public Spaces

Most public spaces comply with the Americans with Disabilities Act. However, in some cases, exit door operating devices appear to be in need of repair and are not compliant. The Public bathrooms at the second floor lounge do not meet ADA for a number of reasons. To comply with the ADA, two drinking fountains are required, one with a maximum spout outlet height of 36" and the other with a spout outlet height between 38" and 43". The drinking fountains outside of Restrooms 103 and 104 have spout outlet heights of 25" and 34". The drinking fountains outside of Restrooms 139 and 140 have spout outlet heights of 26" and 35".

6 B. Private Spaces

Private spaces are typically not ADA compliant.

7. General Summary:

7 A. Public Spaces

The existing public areas for passenger waiting, baggage claim, and ticketing areas appear to be of adequate size and capacity for the current airport activity. The Airport does need a secure area so that when Boeing 737 or other jets are diverted from Anchorage and land in Kenai the passengers can deplane and then reboard the aircraft. The gates are not securable and it would be difficult to do so without bathrooms and other standard terminal amenities. The car rental lease space appears adequate for the function housedhowever are under utilized. The restaurant appears small for the number of customers servedas evidenced by the pantry and storage areas being completely inadequate. Storage for the kitchen is so inadequate that it has created a non code compliant condition with stored items blocking required exit passageways. In addition, the restaurant rest room facilities are closed to the public and one of the rest rooms is used for strorage. According to the Airport Manager, current and past tenants of the restaurant have repeatedly requested a meeting room where groups like Rotary Club could

come for lunch. The smokers' area outside the terminal building main entry is not the required 20 feet from the entrance and does not provide adequate shelter for smokers. The lounge on the upper level is in very good shape and seems to be adequately sized.

In an interview with the Airport Manager, we learned that there are additional tenant spaces that are desired to enhance the services offered at the Airport. These could include: Gift Shop, Book and Magazine Shop, Espresso Coffee Kiosk, Juice Bar, Pilots Lounge, Observation Deck, VIP room for travelling dignitaries, U.S. Coast Guard Office for temporary emergencies, and accommodations for family pets to be shipped.

7 B. Private Spaces

Administrative personnel space is lacking and needs to be integrated into the terminal building in a more effective manner. The airport manager's office is isolated from the rest of the building and can only be accessed through the baggage makeup area. Airport administration needs a conference room, large storage room, and a break room with a kitchenette. The Airport Manager's Office needs to expand to include a table with 3 chairs for meetings, a small library space, and a layout space for drawings and maps. Other non public spaces that are needed include storage rooms for baggage handlers, ticketing, check-in, and other personnel, storage for janitorial supplies and miscellaneous items such as lost bags. A refrigerated space is needed to store frozen product (fish) when shipping is delayed to prevent product from going bad. Airline personnel need a locker room for personal gear, and a break room with a kitchenette for food and coffee. Garage type storage is needed for airline equipment including (1) power car, (2) tugs, and (3 or 4) baggage carts. Finally, the storage and stock rooms for both the airport and the airlines are inadequate and need to be significantly increased in size.

7 C. Significant Non Code Compliant issues

The following items were noted during our site visit that appear to be out of compliance with current code and may very possibly present a liability to the city if not corrected (note: this list is in no way meant to be comprehensive, other non code compliant issues may very well exist):

1. The sprinkler system in the Upper Level Lounge exiting system at the rear “tunnel” exit system is in disrepair and has been capped off.
2. The guard rails at the stairs in this same exit system are only 32” high.
3. The back exit system from the Restaurant on the Main Level is blocked by stored restaurant supplies.
4. In this same general area there are locations in the ceiling and walls where the plastic vapor barrier is exposed.
5. The roof system in this same general area lacks adequate attic ventilation. Note, this item is not a life safety issue and as such does not present any immediate danger. It does however appear to either have been non code compliant at the time of construction or to have been modified at some point since original construction.
6. The back exit door from the Multipurpose Room lacks panic hardware.
7. The existing Commercial Kitchen has an oven and stove top with a residential style hood only.

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MEMORANDUM

TO: File

FROM: Mark Blanning

DATE: December 30, 2011

SUBJECT: Kenai Municipal Airport
Terminal Building

STRUCTURAL REVIEW

The existing terminal building for the Kenai Municipal Airport is located on the east side of the airport and is accessed on the land side of the airport by Willow Street. The original building was constructed in 1966 and consisted of a main level containing approximately 12,600 square feet and a second story containing approximately 1,400 square feet. The height of each story is approximately 13 feet. In 1983, a significant addition was constructed that increased the size of the main level by approximately 11,000 square feet. Subsequent minor additions have increased the size of the building by approximately 1,050 square feet to bring the total area of the building to approximately 26,050 square feet. A 1988 project remodeled a significant portion of the southern half of the building.

The original building was constructed with a steel frame system with tube steel columns varying in size from 3" x 3" to 5" x 5" and steel beams varying in size from W16x36 to W18x70. The columns are nominally spaced on a 30 foot grid pattern, with the exception of where they support the second story. The main beams run north to south along the east and west walls and down the center of the building and support parallel chord open web steel joists, 20" deep, that span east to west and are spaced at four feet intervals. The joists support a 1 ½" deep, 20 gauge metal roof deck.

Lateral loads are resisted by 2x4 wood framed walls sheathed with ½" plywood. The walls on the exterior of the building have plywood on the exterior only. There are several interior 2x4 framed walls (shear walls) with ½" sheathing on one or both sides that were also designed to resist lateral loads.

The foundation consists of a seven course nominal 8" x 8" x 16" reinforced concrete masonry unit (cmu) perimeter wall that bears on a reinforced 8" x 16" concrete footing. The floor is a 4" thick concrete slab-on-grade. Interior columns bear on isolated spread footings below slab grade.

According to the plans for the original building, the structure was designed to support a roof live load (snow load) of 40 p.s.f. and a roof dead load of 22 p.s.f. In addition, the lateral load resisting system was designed to resist seismic forces calculated for Seismic Zone 3, which at that time was the zone with the probability of having the largest seismic event.

The additions were constructed similar to the original building. Steel frame columns and beams, roof joists and decking, and the foundation are similar in size and layout to the original building. One difference in the construction is the perimeter lateral load resisting walls which were constructed with 2x10 wood studs. Similar to the original construction, they are sheathed with ½" plywood on the exterior and there are 2x4 wood framed interior walls (shear walls) with plywood on one or both sides that were also designed to resist lateral loads.

According to the plans for the 1983 addition, the addition was designed to support a roof live load (snow load) of 40 p.s.f. and a roof dead load of 32 p.s.f. The plans also indicate the lateral load resisting system was designed to resist wind loads of 20 p.s.f. and seismic forces calculated for Seismic Zone 4. At the time the addition was designed, Zone 4 was the zone with the probability of having the largest seismic event.

In reviewing the 1988 plans, it appears that numerous shear walls, both along the perimeter and in the interior of the building, were removed as part of the remodel. It appears a moment resisting frame was added to account for the removal of the shear wall along the perimeter, however, there is no indication that any new shear walls or other lateral force resisting systems were installed to replace the interior shear walls. The 1988 plans that were provided by the City for review were not sealed by a structural engineer.

Since the original structure and the subsequent additions were designed and constructed, the building codes have undergone major revisions. These revisions have included modifications to the way that roof design live loads (snow loads) are calculated as well as how wind and seismic forces are calculated. The end result is that structures designed to meet the current building codes are required to resist larger live loads than what the terminal building was designed for. As noted previously, the roof was designed to support a live load (snow load) of 40 p.s.f. To meet current code requirements, the roof would be designed for a minimum live load of 45 p.s.f. plus the effects of snow drifting. Lateral load resisting systems are required to resist seismic forces that are on the order of 50% larger than what the original building was designed for.

Due to the age of the building, the numerous modifications made to the building over the years, and the revisions made to the building code, if future modifications and/or additions are proposed for the terminal building, it is recommended that the entire building be analyzed with regards to its structural stability.

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Facilities Existing Conditions Report
Kenai Municipal Airport – Electrical

The following report is based on onsite inspections and observations, review of record drawings and interviews with utility companies and City Maintenance Personnel. Undocumented changes to planned installation were noted.

Service Entrance

- The Kenai Municipal Airport is served by Homer Electric Association. A 300 Kilowatts, (KVA) 120/208 volts, 3 phase WYE transformer provides electricity to the Airport terminal as well as the airfield lighting system.
- Service entrance equipment to the Generator Building consists of a 1200 A metering section and 1200 A main disconnect cabinet.
- Conduits leaving the building had been cut off flush with the cement floor. Bushings to protect conductors were not installed and conduits were not sealed per the current National Electric Code (NEC)
- Mandatory labeling of emergency systems, feed through circuits, equipment, nameplate data, etc. was non-existent. Panelboard schedules were outdated and illegible and are not in compliance with the current NEC
- Homer Electric Association has reported a peak demand in January 2011 of 139.14 Kilowatts,(KW) or 386.5 AMPS.
- Personnel doors are available for egress from the generator room which houses generators, service entrance equipment, distribution and transfer equipment. The regulator room had one exit to the outside. None of the egress doors were equipped with panic bars as required by current code
- A decommissioned 30KW constant current regulator is being maintained on site as a spare. It is oil cooled and reported to be free of Polychlorinated Biphenyls,(PCB's). All other distribution equipment is of the dry type and assumed to be free of hazardous material.

Standby Generator

- Two generators are available to provide backup electricity to the Airport. Diesel powered Volvo engines drive MQ Power generators. They are each 300KW, 120/208 volts, WYE.
- Both generators are circuited through an ASCO 7000 series transfer switch. Only one generator can be selected to assume a load at any given time. There are no provisions to parallel the generators and operate them simultaneously.
- A second ASCO 7000 series transfer switch is aligned with either the selected generator or the utility service. Upon failure of utility power one generator is started and assumes load after achieving acceptable voltage and cycle frequency.
- A test was conducted on January 3, 2012. The generator system responded in 8.5 seconds (Well within the 10 second limit required by NEC and the 15 seconds required by FAA for CAT I weather conditions.)
- The Kenai Municipal Airport deviates from the NEC characterization of an emergency system by providing power to loads not essential "for safety to human life". All terminal and airfield lighting loads are circuited through the main transfer switch.

- Signage identifying the presence of onsite alternate power supply was not in place as required by the current NEC
- It should be noted that peak demand required by the Airport is far below that which is available through normal power source (HEA 300KVA Transformer) or emergency generator (300KW).

Distribution

- Electrical distribution to the Airport terminal is via a 4 conduit duct bank system between the Generator Building and Electric Room 142. There are two main distribution panels. MDP2 was added during a 1982 renovation project.
- Extensive mechanical ductwork in Electric Room 142 encroaches on defined electrical working spaces. Dedicated electrical space above panel boards contain mechanical piping. Storage cabinets and boxes were located in electrical working spaces. Conduits are not adequately supported. Equipment labeling and schedules were outdated, missing or illegible, all of which does not comply with the current NEC

Fire Alarm Systems

- The generator/vault building is protected by a Kidde PEGAsys system. It includes heat detectors, photoelectric smoke detectors, pull stations, horn/strobes and alarm bell with strobe. The generator side of the building is protected by a gas disbursement system. There are three abort stations.
- The passenger terminal is protected by a notifier AFP-100 fire alarm system. The main control panel is located in Electric Room 142. Detectors, pull stations and horn/strobes are located throughout the terminal. One annunciator panel is located at the main entrance Arctic Foyer 101.

Telephone

- Telephone service to the Airport is provided by Alaska Communications Systems. A 300 pair copper #24 AWG cable enters the building at Electrical Room 142. There are two communication cabinets in the room with no labeling or circuit directories. The cabinets are almost inaccessible due to mechanical ductwork.
- The main cable continues through the building to a telephone terminal board located on the South wall of the Baggage Makeup area, Room 118. Being adjacent to an overhead door the equipment and terminations are subjected to the outdoor weather. There are no provisions to protect the equipment from physical (tug traffic) damage.
- Of the 300 pair of available lines 104 are currently in service.
- Fiber optic to serve the terminal is available approximately 1000’ away on the East side of Willow Street.

Public Address

- A paging system is available to tenants. It interfaces with tenants’ telephones at the telephone terminal board.

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CCTV

- An electronic surveillance system is in place with cameras located inside the terminal as well as throughout the Airport. The controller, recording equipment and monitor are located in a conference room (number 112). The system has recently failed.

Terminal Lighting

- Photometric readings were taken about the Airport terminal common areas and were found to be acceptable for the most part. The areas noted to be marginal were found where relamping had taken place and the replacement tubes were of a different color temperature.
- All florescent lamps observed were T8. Electronic ballasts are commonly used with T8 lamps and do not contain PCB's. Hazardous material is not expected to be found in the lighting system.
- Outdoor holiday lighting displays were plugged in to receptacles that were not ground-fault circuit-interruptor protected. They did not have code compliant weatherproof cover and are not in compliance with the current NEC
- Apron Lighting, new in 2009, consists of new state-of-the-art Light Emitting Diodes, (LEDs).

Parking Lot Lighting

- Apart from the terminal building electrical service there is a 6 gang multi-meter assembly. Five of the services are not in use. The one 100A single phase service being used is circuited through a lighting contractor and provides power to parking lot luminaries. Meter base and equipment enclosures are severely corroded.
- Field wiring was noted to be aluminum. It was insufficient size for the overcurrent protection provided and is not in compliance with the current NEC
- Photometric measurement found the light in the parking area to be acceptable.

Summary

The original terminal construction was in 1965. There have been four renovation/expansion projects since as well as periodic repairs and replacement of equipment and controls. Various tenants and their modifications have also come and gone. Due to the non- intrusive nature of this inspection it is likely that additional conditions may exist that are not in compliance with current or will be in compliance with future code revisions.

The National Electric Code is revised every three years with increased emphasis on personnel safety. A detailed comprehensive study of any of the above systems should precede any additions, renovations or modifications.

As noted above, Electrical and Telecommunication services are underutilized. Future development at this time is not expected to tax either service.

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Facilities Existing Conditions Report
Kenai Municipal Airport – Mechanical

The following report is based on onsite inspections and observations, review of record drawings and interviews with City Maintenance Personnel.

Site Utilities

- Domestic water is provided by a 2" line off of the water entry in the boiler room. The water entry appears to be in fair condition. There is no domestic water meter. This is not a code issue but may not meet local utility requirements.
- Natural Gas is provided by a meter located on the front of the building from a 3" low pressure gas line. Gas meter and piping appears to be in good condition.
- The terminal building sewer is connected to the City sewer system. The maintenance staff noted they have had sewer blockage problems in the past on the south side of the building but the date of the last occurrence was unknown. The current restaurant tenant (located on the south end of the terminal) state they have not had any problems in two and half years since they took over occupancy, and that the commercial kitchen grease interceptor is cleaned routinely.

Plumbing

- Domestic hot water is provided by a hot water generator that consists of a shell-and-tube heat exchanger of unknown capacity due to the nameplate being covered with insulation. Storage is provided by a State model PV 120 storage tank.
- The domestic hot water storage tank is located in the boiler room in close proximity to the combustion air intake, creating a potential freeze up condition.

Heating

- Most of the terminal building's heating needs are served from the building's boiler plant, which consists of two Burnham V906A cast iron boilers with 808,000 BTU/Hr. (MBH) output each. The boilers appear to be in good condition, but do not match modern technology with condensing boilers and modulating controls.
- System circulation is provided by four circulators for four branches and is directly coupled to the boilers. Each branch only has a single circulator so there is no redundancy in case of a circulator failure.
- The lower combustion air opening was blocked off with plywood. This was likely done to keep the domestic water piping from freezing due to the proximity of the hot water storage tank but is not in accordance with current code as the system does not provide the code minimum free area for combustion air.
- Relief valves on the boilers showed sign of minor leakage.
- Boiler room piping lacked thermometers and pressure gauges for easy system monitoring.
- Hydronic piping in the boiler appears to be in fair condition, with numerous breaks in the pipe insulation.
- The system circulators appear to reaching the end of their serviceable life.

- The snowmelt circulator pumps have had numerous failures according to the maintenance staff. The circulators were originally installed in 2004 with the snowmelt project.
- The hydronic heating system uses water as the heating medium. Cold water makeup with proper cross connection prevention is provided, but a filter/strainer or air separator are not provided on the system. All heating systems should have filter/strainers and an air separator to prolong the life of the heating equipment and piping.
- The snowmelt loop uses glycol for the heating medium. No automatic glycol make-up system was found, and the system was labeled for the type and percentage of glycol in the system.
- The dirt blowdown outlet of the air/dirt separator on the snowmelt glycol loop was piped to an expansion tank blocking the possibility of the blowing down any dirt in the separator.
- Heating distribution is provided by baseboard terminal units in common spaces, cabinet unit heaters in the arctic entries, and unit heaters in the Baggage Makeup space. Cabinet unit heaters appear to be serviceable but should have the air filters replaced. Baseboard in common spaces is damaged in numerous locations, and the baseboards in the toilet rooms are corroded.
- See controls section for more discussion on heating plant controls.
- The upstairs Lounge rear exit was notably cold during our inspection. The heating system for this was not functional.

Ventilation

- Mechanical ventilation is provided for the common and private spaces of the building by five roof-top units and one indoor unit located in the electrical room. Most units are gas-fired for tempering the supply air. The indoor unit suspended in the electrical room does not provide maintenance access to the Heating Ventilation and air Conditioning (HVAC) unit and encroaches on required electrical gear clearances, this is not in compliance with current code.
- Ventilation distribution is through galvanized steel sheetmetal ductwork. All ductwork and air inlets and outlets were dirty.
- Mechanical ventilation of the baggage makeup area is not provided. This is not in compliance with current codes.
- Commercial Kitchen ventilation consists of a Type 1 Commercial Kitchen Exhaust Hood (grease) with roof mounted upblast fan. The system appears to be in good shape. The commercial dishwasher was not provided with a Type II (Vapor) hood, and this is not in compliance with current code.
- One of the airline tenant spaces, formally a small office, is being used as a Conference Room, Break Room, Copy Room, and houses security equipment. Existing mechanical ventilation rates are not adequate for this occupancy type.

Controls

- For the most part, controls are electric/electronic analog controls.
- Maintenance staff stated that each boiler control occasionally stops working and must be manually reset in order to resume operation. Boilers are sequenced for lead/lag operation, so when one boiler failures, the other one does not become lead boiler.

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Fire Protection

- The building is served by a wet-type automatic sprinkler system; the sprinkler riser is located in the boiler room.
- The sprinkler riser, which is served by the same water entry that serves the domestic water, does not have any backflow protection. This is not in compliance with current codes.
- Room 105 houses a dry-type sprinkler riser that is inactive but is not identified as abandoned. This is not in compliance with current codes.

Summary

The original terminal was constructed in 1965 and under went three expansions or renovations during the 1980's. The snowmelt system was added in 2004. Therefore the majority of the mechanical and plumbing equipment is over 20 years old. As a whole the mechanical systems have been well maintained and the majority of the sub-systems are functional, but due to the vintage they could benefit from modern technologies and major renovations. Building, Mechanical, and Plumbing Codes are revised every three years, as well there has a been a transition from the Uniform Building and Mechanical Codes to the International Building and Mechanical Codes. Therefore not all code compliance issues were observed and documented. A detailed investigation and analysis of the above systems should precede any modifications.

APPENDIX B

AERONAUTICAL SURVEY AND AIRPORT GEOGRAPHIC INFORMATION SYSTEM MAPPING

Airport Surveying-GIS Program
Geodetic Control Plan
AC 150/5300-16A

Airport Name	State	Location Identifier
Kenai Municipal Airport	**Alaska**	**ENA**

Submitting Organization Information

Name: **Oakwood Survey & Mapping, LLC**		
Address Line 1: **PO Box 97**		
City: **Dayton**	State: **Ohio**	Zip Code: **45409**
Telephone Number: **(937) 674-1492**	Fax Number: **None**	
Contact Person Name: **Chad T. Snoke, PS**		
Contact Person Email Address **Chad@OakwoodSurveying.com**		
Estimated Start Date **June, 2013**	Estimated Completion Date **September, 2014**	

Identify method that will be used to establish accurate connection to the National Spatial Reference System

Project will use existing permanent Geodetic Control

1. Project Summary

This project is being performed in support of an Airport Master Plan update at Kenai Municipal Airport (ENA), in Kenai, Alaska. The work will be conducted to the standards of an Airport Layout Plan (ALP) of Table 2-1, in Advisory Circular (AC) 150/5300-18B. The work will be performed by the following team:

Team Member	Project Role
Kenai Municipal Airport	Sponsor
Wince-Corthell-Bryson Consulting Engineers	Consulting Airport Engineer
Crazy Mountains Joint Venture	Local Surveyor
Oakwood Survey & Mapping	Aeronautical Surveyor
Kappa Mapping	Photogrammetrists

The airport point of contact is:

Manager: MARY BONDURANT
305 N WILLOW SUITE 200
KENAI, AK 99611
Phone 907-283-7951

The airport is controlled with the following airport radio frequencies:

CHANNEL	FREQUENCY
RADIO	122.65 and 122.0
TOWER	121.3
GROUND CONTROL	121.9

While there is intervisibility between the two Secondary Airport Control Stations (SACS), the Primary Airport Control Station is located off of the airfield and is not intervisible with the SACS. There is no current construction planned. Obstruction tree removal is in the planning stage and scheduled for late summer thru early winter 2012.

2. Station Table Listing

ENA Airport has existing Primary Airport Control Stations (PACS) and Secondary Airport Control Stations (SACS). All work will be tied to the NSRS via the PACS and SACS.

TYPE	PID	DESIGNATION	LATITUDE	LONGITUDE	LAST RECOVERY
SAC	AC7794	KENAI AZ 2	60 34 27.74724	151 14 33.08174	2001 – NGS
SAC	AC7795	KENAI RESET	60 33 45.51060	151 15 29.31466	2001 – NGS
PAC	AA9520	KENAI USCG A	60 34 40.90857	151 13 42.25713	2002 – NGS
BM	TT0521	Z 80	60 34 02.15257	151 08 56.48907	1990 – USPSQD
BM	TT0532	G 81	60 34 09.89530	151 18 19.94447	1996 – NGS

Additional ties will be made to benchmarks in the airport vicinity. These stations will serve as verification of vertical adjustment accuracy for the photogrammetric control.

3. Station Reconnaissance Methodology

The PACS and SACS will be recovered utilizing the NGS Datasheet recovery notes and reference ties. If a station cannot be recovered via the reference ties, it will be staked out via RTK survey techniques, and the area will be inspected for evidence of the station. Control point 'KENAI RESET' (NGS PID AC7795) is believed to have been disturbed during recent construction activities. Physical evidence and survey measurement data will be obtained and evaluated during the control survey. If, after careful review of the data, it appears that this SACS control station has been disturbed, all of the data will be submitted to NGS for review and guidance on how they would like to proceed.

4. Airport Control Plot

5. Photographs Requirements
Digital photographs will be submitted per the requirements of AC-150/5300-16A, notably the following rules will be adhered to:

- For each mark recovered or described during the project, at least three digital photographs taken during daylight hours are required.
- The three photos will consist of a type 1 (close-up), type 2 (eye-level), and type 3 (horizontal).
- Photographs will be captioned as required by section 8.2.10.3 and 8.2.10.5.

6. Station Location Sketch and Visibility Diagrams
Oakwood Survey & Mapping will utilize the Station Location Sketch and Visibility Diagram forms as well as the GPS Observation log sheets while recovering and observing NGS control stations.

7. Station Descriptions
The station description and recovery ties will be verified for the recovered stations, and any changes will be reported via the NGS station recovery notes form found here:

http://www.ngs.noaa.gov/ngs-cgi-bin/recvy_entry_www.prl

8. GPS Observing Scheme
After recovering the PACS and SACS, Oakwood Survey & Mapping will conduct two independent GPS sessions, each 20 minutes or longer, between the existing stations. The collected data will be post-processed and adjusted while constraining to the PACS. The results of the network adjustment will be compared to published values in order to validate the relative positional accuracy of the SACS and identify any possible disturbance.

As required in AC-18B, Section 2.6.10.1.1, the computed distance from the PACS must agree within ±3 cm in distance, the difference in ellipsoidal height must agree to ±4 cm, and the difference in orthometric height must agree to ±5 cm.

Oakwood Survey & Mapping will contact the NGS for guidance in repositioning the SACS if a discrepancy is found that is greater than these tolerances

9. Project Vector Diagram

10. Proposed Instrumentation List

Oakwood Survey & Mapping will utilize the following instruments during this project:

Type	Manufacturer	Model
GPS Receiver	Trimble	5800 (3 units)
GPS Receiver	Trimble	5700 (1 units)
RTK Radio	Trimble	Trimmark III
Total Station	Trimble	5603 DR
Data Collector	Trimble	TSCe (3 units)
Rangefinder	Laser Technologies	TruePulse 360R

11. Data Processing Software

Oakwood Survey & Mapping will utilize the following software during this project:

Title	Manufacturer	Version
Geomatics Office	Trimble	6.3
Business Center	Trimble	2.6
Inverse 3D	NGS	2

12. Quality Assurance Methodology

Oakwood Survey & Mapping will utilize quality assurance forms and checklists throughout the project to document all observations, including instrument heights, observation times, and other metadata. Furthermore, all work will be completed by following the official FAA Station Table and Recon Checklist as well as internally developed quality control checklists. The paperwork will be scanned, included in the final report, and utilized during the data-validation task conducted as the final stage of the project.

Additionally, immediately after download, Oakwood field crews will perform data backup routines that preserve field data as collected. Oakwood crews will upload data via a cloud-backup data service to maintain a site-distinct backup as well as carry thumb drives to backup their local machine. The two combined backups will address both local and network system failures and will ensure data preservation in case of catastrophic system failure.

13. Data Format Requirements

As required by AC-16A, Oakwood Survey & Mapping will collect GPS data at 15-second epochs using a 15-degree elevation mask, then process the data at a 15-second interval. When tying to the NSRS, a NGS CORS station with a collection rate of 30-seconds will be used.

14. Other information

None

Airport Surveying-GIS Program
Imagery Plan
AC 150/5300-17C

Airport Name	State	Location Identifier
Kenai Municipal Airport	**Alaska**	**ENA**

Submitting Organization Information

Name: **Oakwood Survey & Mapping, LLC**		
Address Line 1: **PO Box 97**		
City: **Dayton**	State: **Ohio**	Zip Code: **45409**
Telephone Number: **(937) 674-1492**	Fax Number: **None**	
Contact Person Name: **Chad T. Snoke, PS**		
Contact Person Email Address **Chad@OakwoodSurveying.com**		
Estimated Start Date **June, 2013**	Estimated Completion Date **September, 2014**	

1. Project Summary

This project is being performed in support of an Airport Master Plan update at Kenai Municipal Airport (ENA), in Kenai, Alaska. The work will be conducted to the standards of an Airport Layout Plan (ALP) of Table 2-1 in Advisory Circular (AC) 150/5300-18B. The work will be performed by the following team:

Team Member	Project Role
Kenai Municipal Airport	Sponsor
Wince-Corthell-Bryson	Consulting Airport Engineer
Crazy Mountains Joint Venture	Local Surveyor
Oakwood Survey & Mapping	Aeronautical Surveyor
Kappa Mapping	Photogrammetrists

Per AC-150/5300-18B, aerial imagery is required to be collected. The imagery will be used to perform airport airspace analysis, inventory obstacles, perform topographic measurements and for other required tasks.

The Airport Airspace Analysis will be conducted utilizing the Vertically Guided Approach Surfaces (VGAS), as defined in AC-18B, Section 2.7.1.1, for runway 01L/19R. Runway critical points and profile data will be collected for SPHS runways at ENA. Additionally, Oakwood Survey & Mapping will collect data pursuant to Seaplane requirements in Section 5.11 for runway 01W/19W.

Runway	Length	Width	Type
01L/19R	7830ft	150ft	Runway
01R/19L	2000ft	60ft	Runway
01W/19W	4600ft	252ft	Waterway

2. Collection Methodology

The following specifications will be adhered to for imagery acquisition:

Imagery Scale: 1"=800'
Focal Ratio: f/5.6
Film Type: Color Agfa X-100 negative
Approximate Flying Height: 4,800 ft (AGL)
Number of Flight Lines: 10
Number of Photos: 148
Estimated Number of Stereo Models: 138
Forward Lap Percentage: 60%
Side Lap Percentage: 50%
Estimated Number of Photo Control Points: 17 Plus 5 GCP Check Points
Geo-referencing Method: Aero-triangulation with Airborne GPS

Aerial Photography Acquisition and Geo-Referencing

Color aerial photography with a nominal 800 ft./in. photo scale will be acquired with a calibrated 6” mapping camera. The USGS camera calibration will be less than three years old on the date of photography. The photo block will be composed of 10 flight lines with a total of 148 images using 60% forward lap and 50% side lap. Airborne GPS data will be collected during the flight. The airborne

GPS base station will be located near the airport to minimize the plane to base distances. The airborne GPS data will be post-processed to provide decimeter (or better) accuracy exposure center positions for use in the aerotriangulation phase. The negatives will be scanned with a photogrammetry grade scanner at a resolution of 12 or 12.5 microns.

The AT will be done with the Image Station Automatic Triangulation (ISAT) package. During this process, image coordinates of all pass, tie, control, and check points in the imagery are measured and a "least squares bundle adjustment" is performed. This process yields exterior orientation parameters for all imagery and three-dimensional object coordinates for all measured image points.

Obstruction Data Analysis

The obstruction data collected from the ground and photogrammetric surveys will be analyzed simultaneously in a 3D AutoCAD environment. The surfaces, points, lines, and polygons collected will be inserted into AutoCAD and inspected to calculate and attribute the penetrations of the OIS. The obstructions will be inserted in the final deliverable to the FAA. All obstructions will be provided to Oakwood Survey for future obstruction clearing plans. Obstructions will be analyzed and delivered based on the as-built runway positions.

Development of Ortho Photography - Requirements and Options

All orthoimagery will be developed using the specifications listed in AC-17B and the Federal Geographic Data Committee FGDC-STD-008-1999. Digital true-color orthoimages will be created from the following raw data sources: scanned aerial imagery, aerotriangulation results, and USGS DEMs.

Digital Elevation Models (DEM) are a necessary element to create digital orthophotographs. KAPPA will obtain USGS DEMs that cover the project area and use these in the orthorectification process.

These DEMS will be imported into our softcopy system and edge matching will be verified. In areas of gaps or overlaps, KAPPA will correct these areas so that comprehensive DEM covers the entire project area. In essence, we are providing quality control on the USGS DEM data.

The individual images will be orthorectified using SoftPlotter 4.1 orthorectification software. The orthorectification process will use a cubic convolution algorithm, which produces a quality orthophotograph. Images will be reviewed to select the

image that minimizes building leans and shadows. The raw scanned imagery will have a ground sample distance (GSD) of 0.38', and the orthorectified images will have a GSD of 0.5', both of which are well within the 10-30 cm stated by AC-17B. The orthorectified images will be mosaicked into a seamless composite using OrthoVista 4.5 software. Mosaicking will occur along sharp linear features where possible, and linear feathering will be used to blend the images. This software package also provides tools for radiometrically balancing of the images to ensure image consistency and enhancement across flight lines.

Once the images are color corrected and mosaicked, they will be tiled to a layout that has tile sizes of approximately 100 MB for untiled TIFF images. Orthoimages will be placed on an hard disk drive along with appropriate metadata to be sent to NGS and FAA.

3. Quality Control Procedures

The team assures data quality by utilizing both aerial photogrammetric data and ground-based survey measurements throughout the survey process. A percentage of photogrammetrically measured points, such as obstacles, planimetrics, and topographic features, will be also collected by surveyors as quality control checks. Horizontal and vertical positions of the identified objects will be compared against field notes and aerial imagery to ensure consistent data.

The team will employ data redundancy and independent measurements to verify data accuracy. The field survey and photogrammetric analysis will be conducted in independent stages. Both will be performed based on the PACS & SACS stations of the airport and will establish coordinates on features. Once both stages are complete, the survey and photogrammetric results will be compared. If discrepancies are identified, the data will be closely inspected to identify the source of the differences.

The team will utilize the 60% overlap areas in the imagery along each flight line to efficiently move through the photogrammetric data set to inspect for obstructions. When features possess a large amount of lean or are difficult to measure from single flight line imagery, the areas of the 50% side lap will be inspected for the same features to verify their penetration characteristics.

Evidence that will be provided

Oakwood Survey will utilize quality assurance forms and checklists throughout the project to document all observations, including instrument heights, observation times, and other metadata. Furthermore, all work will be completed by following the official FAA Station Table and Recon Checklist as well as internally developed quality control checklists. The paperwork will be scanned and included in the final report and utilized during the data validation task conducted at the final stage of the project.

Data Backup Methodology/Detail of Procedures to maintain original raw data
All data will be backed up daily via Kappa Mapping's daily backup system and will be archived on DVDs at project completion. Once the data is compiled and QC'd, it will not be changed unless deemed necessary through field or other appropriate checking. Any post-processing will begin with a copy of the QC'd data.

Additionally, immediately after download, Oakwood field crews will perform data backup routines that preserve field data as collected. Oakwood crews will upload data via a cloud-backup data service to maintain a site-distinct backup as well as carry thumb drives to backup their local machine. The two combined backups will address both local and network system failures and will ensure data preservation in case of catastrophic system failure.

File naming Conventions
The team will adhere to the file naming conventions and storage hierarchy required by AC-17C and 18B. The sample file structure from AC-17C figure 3-1 will be followed when submitting the AP Acquisition Report.

4. Equipment and Software Listing
In order to facilitate the digital map production processes, Kappa Mapping owns and maintains a wide range of hardware and software production equipment, including a collection of state-of-the-art systems specifically configured for softcopy vector collection and orthophoto production. These systems include high-capacity hard drives, network attached storage, 3D-displays, fast processors, and both 32-bit and 64-bit workstations.

Specifically, Kappa's software includes the following: KDMS (vector collection and translation), SoftPlotter (softcopy photogrammetry including orthophoto production), KDSP (digital stereoplotter), Cardinal Systems (softcopy

photogrammetry), AutoCAD, MicroStation, ARC/View, Aerotriangulation software (Albany, ISSBA), DeLorme's XMAP, Google Earth, Inpho's OrthoVista, Adobe Photoshop, TerraSolid's TerraScan Viewer and TerraModeler, etc.

Oakwood Surveying's software will include Trimble Geomatics Office (v1.63) and Business Center (v2.6) for GPS data processing and adjustment, as well as NGS Inverse3D for point comparisons.

5. Schedule

The project tasks are expected to take 6 to 9 months to complete and will commence with the FAA AGIS project initiation in late February 2013. Once the online project has been created, the Statement of Work, Geodetic Control Plan, Imagery Plan, and Survey and Quality Control Plan will be submitted for review. No surveying or mapping work will commence until the plans have been approved by the FAA and/or NGS and funding for this project has been secured. After approval of these plans by the FAA and NGS, all of the surveying and mapping data will be collected, processed, and submitted to the AGIS web portal for review.

Timing and scheduling is very important in the process due to the narrow window available in Alaska for capturing the aerial photography. Suitable photography must be free from atmospheric interference, with full foliage on the vegetation, and with the sun at its optimum angle. These conditions limit the available window of opportunity for aerial photographic data collection to just two or three months (June, July, and August) in Alaska.

The table below outlines key milestones in this project's schedule.

FROM	TO	TASK
2/20/2013	2/29/2013	Create an account on AGIS web portal and initiate a new project
3/1/2013	3/2/2013	Submit the Geodetic Control, Imagery, and Survey and Quality Control Plans to AGIS web portal
3/2/2013	4/15/2013	FAA review and approve Geodetic Control, Imagery, and Survey and Quality Control Plans
5/15/2013	6/15/2013	Ground Survey (Geodetic, Photogrammetric and Aeronautical surveys)
6/15/2013	7/15/2013	Acquire aerial photography
6/16/2013	9/16/2013	Data processing and Deliverable Development /

		final data submittal
9/16/2013	3/1/2014	FAA/NGS Data Review and Validation

6. Other Comments

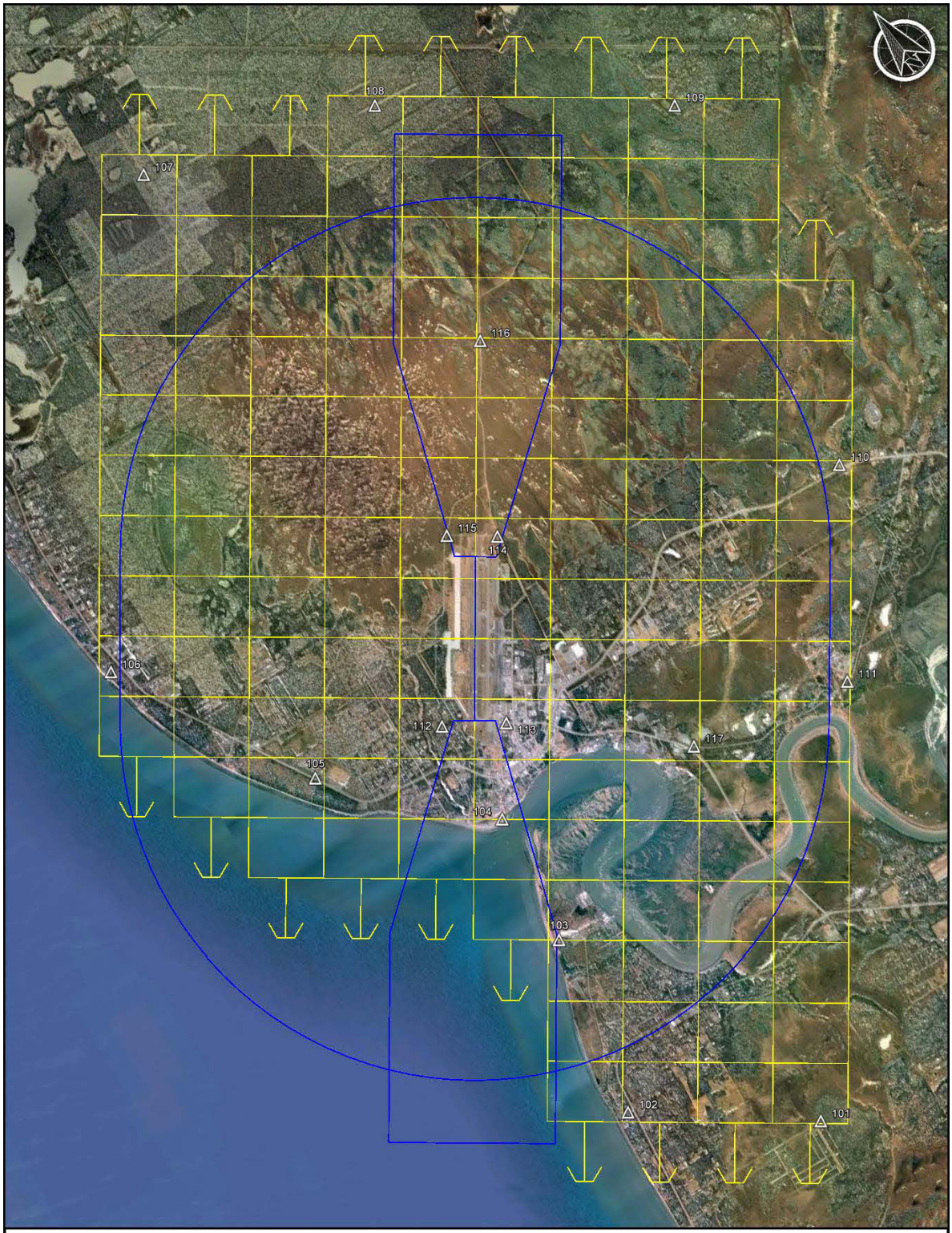
Attached is additional supporting information including:

1. Imagery Control Point Coordinates
2. Flight Layout
3. Camera Calibration Report

Preliminary Imagery Control Point Coordinates – Kenai Airport (ENA)

Airport Name: Kenai Airport (ENA)
Coordinate System: US State Plane Coordinate System
Zone: Alaska Zone 4
Horizontal Datum: NAD 83 (2007)
Vertical Datum: NAVD 88 (Geoid 09)
All coordinates are in US Survey Feet.

Station Name	Northing	Easting	Orthometric Ht.
101	2374904	1418050	14
102	2380115	1410413	7
103	2388827	1411925	7
104	2395171	1412652	4
105	2401546	1406069	22
106	2411015	1400413	19
107	2430406	1414306	45
108	2427392	1425457	34
109	2419856	1437656	30
110	2401091	1435329	18
111	2392075	1430204	11
112	2400461	1412538	23
113	2398980	1415249	21
114	2406782	1419580	16
115	2408092	1417539	25
116	2415193	1423827	26
117	2393304	1422308	9



17 Photo Control Points Targeted 8’ x 2’ x 8’ or Photo ID

Minimum of 5: Additional QC Check Points Evenly Distributed

10 Flight @ 1” = 800’ Color Agfx X-100 Neg. 60% F/L

148 EXP F/5.6 @ 1/500th Sec. Medium Density

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Reston, Virginia 20192

REPORT OF CALIBRATION
of Aerial Mapping Camera

December 29, 2009

Camera type:	Wild RC30*	**Camera serial no.:**	5259
Lens type:	Wild Universal Aviogon /4-S	**Lens serial no.:**	13334
Nominal focal Length:	153 mm	**Maximum aperture:**	f/4
		Test aperture:	f/4

Submitted by: GPS Aerial Services, Inc.
Anchorage, AK

Reference:

These measurements were made on Agfa glass plates, 0.19 inch thick, with spectroscopic emulsion type APX Panchromatic, developed in D-19 at 68° F for 3 minutes with continuous agitation. These photographic plates were exposed on a multicollimator camera calibrator using a white light source rated at approximately 5200K.

I. Calibrated Focal Length: 153.685 mm

II. Lens Distortion

Field angle:	7.5°	15°	22.7°	30°	35°	40°
Symmetric radial (μm)	-2	-4	-4	-3	-1	4
Decentering tangential (μm)	0	0	0	1	1	1

Symmetric radial distortion		Decentering distortion		Calibrated principal point	
K_0	= 0.1046E-03	P_1	= -0.1973E-07	x_p	= -0.001 mm
K_1	= -0.8395E-08	P_2	= -0.7818E-07	y_p	= 0.007 mm
K_2	= 0.6103E-14	P_3	= 0.0000		
K_3	= 0.0000	P_4	= 0.0000		
K_4	= 0.0000				

The values and parameters for Calibrated Focal Length (CFL), Symmetric Radial Distortion (K_0,K_1,K_2,K_3,K_4), Decentering Distortion (P_1,P_2,P_3,P_4), and Calibrated Principal Point [point of symmetry] (x_p,y_p) were determined through a least-squares Simultaneous Multiframe Analytical Calibration (SMAC) adjustment. The x and y-coordinate measurements utilized in the adjustment of the above parameters have a standard deviation (σ) of ±3 microns.

* Equipped with Forward Motion Compensation

III. Lens Resolving Power in cycles/mm

Area-weighted average resolution: 110

Field angle:	0°	7.5°	15°	22.7°	30°	35°	40°
Radial Lines	134	134	159	134	113	95	95
Tangential Lines	134	134	134	113	113	95	67

The resolving power is obtained by photographing a series of test bars and examining the resultant image with appropriate magnification to find the spatial frequency of the finest pattern in which the bars can be counted with reasonable confidence. The series of patterns has spatial frequencies from 5 to 268 cycles/mm in a geometric series having a ratio of the 4th root of 2. Radial lines are parallel to a radius from the center of the field, and tangential lines are perpendicular to a radius.

IV. Filter Parallelism

The two surfaces of the Wild 525 filter No. 7535 accompanying this camera are within 10 seconds of being parallel. This filter was used for the calibration.

V. Shutter Calibration

Indicated Time (sec)	Rise Time (μ sec)	Fall Time (μ sec)	½ Width Time (ms)	Nom. Speed (sec)	Efficiency (%)
1/125	691	701	9.21	1/110	95
1/250	364	356	4.90	1/210	95
1/500	186	181	2.44	1/430	95
1/1000	92	84	1.22	1/860	95

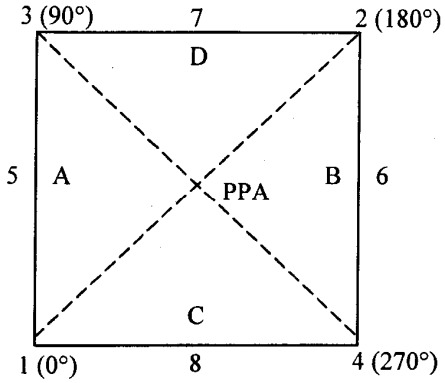
The effective exposure times were determined with the lens at aperature f/4. The method is considered accurate within 3 percent. The technique used is described in International Standard ISO 516:1999(E).

VI. Film Platen

The platen mounted in Wild drive unit No. 5259 does not depart from a true plane by more than 13 μm (0.0005 in).

This camera is equipped with a platen identification marker that will register "629" in the data strip area for each exposure.

VII. Principal Point and Fiducial Mark Coordinates



Positions of all points are referenced to the principal point of autocollimation (PPA) as origin. The diagram indicates the orientation of the reference points when the camera is viewed from the back, or a contact positive with the emulsion up. The data strip is to the left.

	X coordinate (mm)	Y coordinate (mm)
Indicated principal point, corner fiducials	0.005	0.002
Indicated principal point, midside fiducials	0.003	0.001
Principal point of autocollimation (PPA)	0.000	0.000
Calibrated principal point (point of symmetry)	-0.001	0.007
Fiducial Marks		
1	-105.998	-105.998
2	106.006	106.001
3	-105.992	106.003
4	106.003	-105.998
5	-112.000	0.003
6	112.011	0.000
7	0.007	112.002
8	-0.001	-112.003

VIII. Distances Between Fiducial marks

Corner fiducials (diagonals)	1-2:	299.816 mm	3-4:	299.811 mm
Lines joining these markers intersect at an angle of	90° 00' 00"			
Midside fiducials	5-6:	224.010 mm	7-8:	224.004 mm
Lines joining these markers intersect at an angle of	89° 59' 55"			
Corner fiducials (perimeter)	1-3:	212.001 mm	2-3:	211.999 mm
	1-4:	212.001 mm	2-4:	211.999 mm

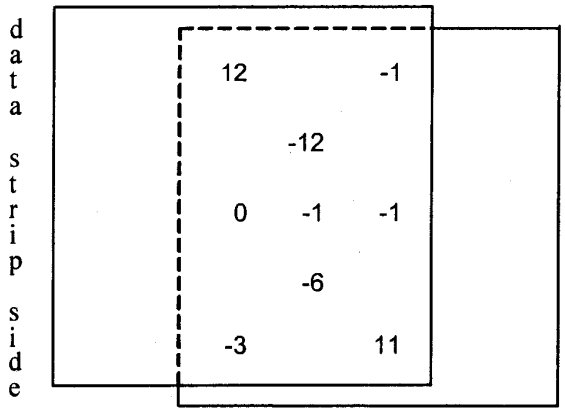
The Method of measuring these distances is considered accurate within 0.003 mm

Note: For GPS applications, the nominal entrance pupil distance from the focal plane is 277mm.

IX. Stereomodel Flatness

FMC Drive Unit No: 5259 **Base/Height ratio:** 0.6

Platen ID: 629 **Maximum angle of field tested:** 40 °



Stereomodel Test Point Array
(values in micrometers)

The values shown on the diagram are the average departures from flatness (at negative scale) for two computer-simulated stereo models. The values are based on comparator measurements on Agfa Avitone P3P copy film made from Kodak 2405 film exposures. These measurements are considered accurate to within 5 µm.

X. System Resolving Power on film in cycles/mm

Area-weighted average resolution: 52 **Film:** Type 2405

Field angle:	0°	7.5°	15°	22.7°	30°	35°	40°
Radial Lines	57	57	57	57	57	48	48
Tangential Lines	57	57	57	57	48	48	40

This aerial mapping camera calibration report supersedes the previously issued USGS Report No. OSL/3275, dated December 1, 2006.

Michael G. Benson
Remote Sensing Technologies Project Manager
Geography Discipline

Airport Surveying-GIS Program
Survey and Quality Control Plan for
AC 150/5300-18B

Airport Name	State	Location Identifier
Kenai Municipal Airport	**Alaska**	**ENA**

Submitting Organization Information

Name: **Oakwood Survey & Mapping, LLC**		
Address Line 1: **PO Box 97**		
City: **Dayton**	State: **Ohio**	Zip Code: **45409**
Telephone Number: **(937) 674-1492**	Fax Number: **None**	
Contact Person Name: **Chad T. Snoke, PS**		
Contact Person Email Address **Chad@OakwoodSurveying.com**		
Estimated Start Date **June, 2013**	Estimated Completion Date **September, 2014**	

1. Project Summary

This project is being performed in support of an Airport Master Plan update at Kenai Municipal Airport (ENA), in Kenai, Alaska. The work will be conducted to the standards of an Airport Layout Plan (ALP) of Table 2-1, in Advisory Circular (AC) 150/5300-18B. The work will be performed by the following team:

Team Member	Project Role
Kenai Municipal Airport	Sponsor
Wince-Corthell-Bryson	Consulting Airport Engineer
Crazy Mountains Joint Venture	Local Surveyor
Oakwood Survey & Mapping	Aeronautical Surveyor
Kappa Mapping	Photogrammetrists

The Airport Airspace Analysis will be conducted utilizing the Vertically Guided Approach Surfaces (VGAS), as defined in AC-18B, Section 2.7.1.1, for runway 01L/19R. Runway critical points and profile data will be collected for SPHS runways at ENA. Additionally, Oakwood Survey & Mapping will collect data pursuant to the Seaplane requirements in Section 5.11 for runway 01W/19W.

Runway	Length	Width	Type
01L/19R	7830ft	150ft	Runway
01R/19L	2000ft	60ft	Runway
01W/19W	4600ft	252ft	Waterway

Oakwood will also survey and document the navigation aids at ENA as required by AC-18B, section 5.10.

NAVAID Type	Runway	Latitude	Longitude
MALSR	19R	N/A	N/A
4 VASI ON LEFT	01L	N/A	N/A
4 VASI ON LEFT	19R	N/A	N/A
REIL	01L	N/A	N/A
LOC	19R	60-33-40.198N	151-15-38.760W
GLIDE SLOPE	19R	60-34-44.965N	151-14-28.874W
MM -	19R	60-35-16.994N	151-13-40.361W
OM - FREDE	19R	60-37-50.067N	151-10-32.740W
VOR/DME	KENAI - ENA, 2.89 miles away	60-36-52.933N	151-11-42.874W
NDB	WILDWOOD - IWW, 1.82 miles away	60-35-55.246N	151-12-40.329W

2. Field Survey Approach

Airport Interview Methodology

Prior to field deployment, survey crews will conduct interviews with critical airport staff to coordinate airfield activities and identify unique airfield requirements that may impact the project. Interviews will be conducted with the Airport Manager, Operations Manager, FAA Facilities Personnel, Air Traffic Control Tower Chief, and Airport Engineering. Survey crews will utilize the official FAA interview forms during the interview process.

Topics discussed will include: scheduling requirements, safety concerns and communication protocols to ensure that data collection has a minimal impact on air traffic and ground operations, background checks, and driver training requirements.

Geodetic Control Methodology

Survey crews will utilize existing Primary and Secondary Airport Control Stations (PACS & SACS) at ENA. No new permanent airport control stations will be established as part of this project. Survey crews will utilize the fast-static GPS technique to perform a geodetic control validation survey at the beginning of the project. Further details about the geodetic control validation methodology can be found in the submitted Geodetic Control Plan.

Additional Temporary Survey Marks (TSMs) may be established on the airfield during the aeronautical survey to aid in the measurement of Runway End Points, Navigational Aids, and Obstacles. TSM monumentation will consist of magnail or rebar driven into the ground with marking identification such as a washer or plastic cap.

Survey crews will document and provide digital photographs, sketches, and scans of the field book and log sheets supporting the geodetic control survey (including temporary points occupied) as outlined in AC-16A. Examples of Oakwood log sheets and other forms can be found as attachments to this work plan.

Photogrammetric Ground Control Methodology

Survey crews will utilize fast-static and RTK GPS methodologies to measure and establish photogrammetric ground control at ENA. Crews will erect GPS base stations over and tie all control to the existing PACS and SACS. The collected data will be post-processed and adjusted while constraining to the PACS and SACS.

Survey crews will also collect five Ground Control Points (GCPs) as required by AC-17C, Section 2.1.12. The GCPs will be similar to photogrammetric ground control stations, but their GPS data will be submitted to NGS Online Positioning User Service (OPUS) to determine point positions. These check points will not be used as part of georeferencing solution, but rather the results of the network adjustment will be compared to OPUS values in order to validate the quality of the static data adjustment and identify any possible discrepancy.

Station monumentation will consist of a cloth or painted target or suitable photo identifiable point, with a magnail or rebar driven at the center with marking identification such as a washer or plastic cap.

Survey crews will document and provide digital photographs, sketches, and scans of the field book and log sheets supporting the photogrammetric control survey (including GCPs) as outlined in AC-17C Section 3.1.5.D-2.

Runway End Survey Methodology

Survey crews will utilize fast-static GPS methodology to measure and establish runway critical points at ENA. Crews will erect GPS base stations over and tie all control to the existing PACS and SACS. The collected data will be post-processed and adjusted while constraining to the PACS and SACS. The survey of runway and stopway critical points will be collected in accordance with AC-18B section 2.6.10.2.1. and 5.4.26. Unmonumented critical points will be marked with a magnail and a washer set at pavement level. The Runway ends are already monumented with below grade monuments in ductile iron monument cases. Runway/Taxiway Intersections are marked with flush mounted brass caps.

Survey crews will document and provide digital photographs, sketches, and scans of the field book and log sheets supporting the runway survey (including displaced thresholds and stopways) as outlined in AC-18B.

Runway Profile Survey Methodology

Survey crews will utilize RTK GPS methodology to measure runway profile points at ENA. Crews will erect GPS base stations over and tie all control to the existing PACS. The measurements will be conducted utilizing 'continuous topo' mode and measured using a magnetic mount on the survey vehicle. Crews will measure the magnetic mount's height as the instrument height and drive the centerline twice (once each direction) to obtain 10 foot interval stationing measurements as required at certificated airports.

The collected data will be post-processed and adjusted while constraining to the PACS. The runway centerline profile points will not be monumented.

Crews will perform quality control measurements with fixed height survey rods along the runway to validate the accuracy of the vehicle mounted observations.

Survey crews will document and provide sketches and scans of the field book and log sheets supporting the runway profile survey as outlined in AC-18B. Examples of Oakwood log sheets and other forms can be found as attachments to this work plan.

Navigational Aid Survey Methodology

Survey crews will utilize a combination of RTK GPS and Total Station survey methodologies to measure Navigational Aid (NAVAID) points at ENA. The following

table outlines the NAVAIDs located at ENA and their corresponding survey method.

	Accuracy Requirements			
Equipment Type	**Horizontal**	**Orthometric**	**Ellispoidal**	**Measurement Method**
Approach Light System (ALS)	± 3 ft	± 5 ft	N/A	RTK
Visual Approach Slope Indicator	± 5 ft	± 10 ft	N/A	RTK
Runway End Identifier Lights	± 3 ft	± 5 ft	N/A	RTK
Localizer	± 1 ft	± .25 ft	N/A	Total Station
Glide Slope	± 1 ft	± 0.25 ft	± 0.20 ft	Total Station
Middle Marker	± 10 ft	± 20 ft	N/A	RTK
Outer Marker (OM)	± 10 ft	± 20 ft	N/A	RTK
VOR coupled with DME	± 10 ft	± 20 ft	N/A	Total Station
Non-Directional Beacon (NDB)	± 10 ft	± 20 ft	N/A	RTK

Crews will tie all points to the existing PACS and SACS. The collected data will be post-processed and adjusted while constraining to the PACS and SACS. The survey of NAVAID points will be performed in accordance with AC-18B section 5.10.

Station monumentation will consists of an etched cross, magnail with washer, wooden hub, or rebar set at the appropriate NAVAID survey point.

Survey crews will document and provide digital photographs, sketches, and scans of the field book and log sheets supporting the runway survey (including displaced thresholds and stopways) as outlined in AC-18B paragraphs 1.5.2 and 1.5.3.

Obstacle Survey Methodology

Survey crews will utilize a combination of RTK GPS, Total Station, and Laser Range Finder survey techniques to measure obstacles at ENA. Crews will establish temporary survey marks around the airport and turn horizontal and vertical angles to suspected obstacles. The crews will then measure the slope distance to the top of the obstacle using either EDM/prism or laser range finders and enter the distance into the survey data collection software. The three measurements, HA/VA/SD, will be used to compute the 3D position of the obstacle. The collected data will be post-processed and adjusted while constraining to the PACS and SACS. The survey of obstacle points will be collected in accordance with AC-18B section 5.5.2.

Survey crews will document and provide scans of the field book and log sheets supporting the obstacle survey as outlined in AC-18B.

Accuracy Requirements Runways Supporting Vertically Guided Operations				
		Vertical		
VGA Surface Type	Horizontal	Orthometric	Ellipsoid	AGL
Vertically Guided Primary Connection Surface (VGPCS)	± 20 ft	± 3 ft	± 3 ft	± 10 ft
Vertically Guided Protection Surface (VGPS)	± 20 ft	± 3 ft	± 3 ft	± 10 ft
Vertically Guided Approach Transition Surface (VGATS)	± 20 ft	± 3 ft	± 3 ft	± 10 ft
Vertically Guided Approach Surface (VGAS)	± 20 ft	± 3 ft	± 3 ft	± 10 ft
Vertically Guided Horizontal Surface (VGHS)	± 20 ft	± 10 ft	± 10 ft	± 10 ft
Vertically Guided Conical Surface (VGCS)	± 20 ft	± 10 ft	± 10 ft	± 10 ft

3. Geodetic Control Approach

Survey crews will utilize fast-static GPS methodologies to validate and measure existing Primary and Secondary Airport Control Stations (PACS & SACS) at ENA. Crews will conduct two independent GPS sessions, each 10 minutes or longer with a 5-second collection interval, between the PACS and each SACS. The collected data will be post-processed and adjusted while constraining to the PACS. The results of the network adjustment will be compared to published values in order to validate the relative positional accuracy of the SACS and identify any possible disturbance.

As required in AC-18B, Section 2.6.10.1.1, the computed distance from the PACS must agree within ±3 cm; the difference in ellipsoidal height must agree to ±4 cm; and the difference in orthometric height must agree to ±5 cm.

Oakwood Survey & Mapping will contact the NGS for guidance in repositioning the SACS if a discrepancy is found that is outside these tolerances.

4. Imagery Approach

Imagery will be collected as described in the submitted Imagery Plan.

The 800 scale imagery will be utilized for obstacle inventory, planimetric mapping and ortho photography development.

Map Accuracies as a Function of Photo/Map Scale				
Map Scale 1"= -ft	Photo Scale 1"= -ft	Min Contour Interval	Accuracy XY RMSE	Accuracy Z RMSE
100	800	2 ft	2 ft	1.32 ft

Common collected features and accuracy requirements are well within the accuracy capabilities for 800 scale aerial photography:

Data Layer	Horizontal Accuracy (ft)	Vertical Accuracy (ft)
Airfield Light	3	5
Fence	3	5
Landmark Segment	5	5
Marking Line/Area	2	3
Obstacle	20	3 or 10
Obstruction Area	20	3 or 10
Runway	3	5
Runway Blastpad	2	3
Runway Label	3	5

5. Existing Data Requirements

Existing data will be migrated to AC-18B requirements on case-by-case basis. At this time, we do not anticipate the need to migrate any existing data.

6. Data Processing Methodology

After the completion of each day's field work, survey crews will download, backup and process the day's observation data. Data collection notes, logsheets, and photos will be organized, scanned, and backed up to mitigate the chance of loss or accidental deletion.

- RAW observation data is downloaded into a folder created to hold only that day's data.
- The RAW data is processed and inspected for errors including Quality Assurance/Quality Control modules (loop closures, rod height checks, etc.)
- Data is inspected to verify that accuracies requirements have been met.
- Digital photos are downloaded and captioned, with point names, dates and direction requirements while the information is still current for the crew.
- Logsheets and sketches are organized, scanned and filed in the correct directory.
- All data is backed up via cloud-storage and USB thumb drive.

Nightly processing allows the crews to inspect the data while the observation is fresh in their memory and ensures the completeness and accuracy of the data. At the end of the project, the survey data will be reviewed and adjusted to ensure

statistical results meet required accuracy in accordance with the AC guidance.

7. Equipment Listing
Oakwood Survey & Mapping will utilize the following instruments during this project:

Type	Manufacturer	Model
GPS Receiver	Trimble	5800 (3 units)
GPS Receiver	Trimble	5700 (1 unit)
RTK Radio	Trimble	Trimmark III
Total Station	Trimble	5603 DR
Data Collector	Trimble	TSCe (3 units)
Rangefinder	Laser Technologies	TruePulse 360R

8. Quality Assurance Methodology
Oakwood intends to perform all necessary survey and mapping operations adhering to the industry standard methodologies to ensure the FAA is receiving a sound and accurate product meeting the requirements of the ACs. Quality control measures are taken in the field and office to ensure the required specifications and technical approach are followed throughout the survey.

The first step in the quality assurance is to equip survey crews with information needed to accurately complete the survey. All survey personnel will be deployed with copies of the survey scope, work and quality control plans, as well as copies of Advisory Circulars 150/5300-16A, 150/5300-17C and 150/5300-18B.

Crews will also utilize quality assurance forms and checklists throughout the project to document all observations, including instrument heights, observation times and other metadata. Furthermore, all work will be completed by following the official FAA Station Table and Recon Checklist as well as internally developed quality control checklists. The paperwork will be scanned and included in the final report and utilized during the data-validation task conducted as the final stage of the project.

During the field survey process, Oakwood will employ the following quality control

methodologies to ensure the FAA is receiving accurate data.

Standardized equipment
To minimize the potential for measurement errors, Oakwood crews utilize Trimble equipment on all aspects of the project. All GPS measurements will be performed using Trimble 5000 series receivers. All conventional survey measurements will be performed using Trimble 5600 series total stations. All prism offsets will be measured at -30mm. All GPS tripod measurements will be performed with a tripod or bipod height of 2 meters.

RTK initialization checks
Throughout the duration of the project, Oakwood survey crews will employ redundant RTK measurements with separate initializations to validate on-the-fly initializations. Crews will conduct multiple measurements established points, at different times using different satellite constellations.

15% duplicate checks
When establishing GPS control stations, such as photogrammetric control, Oakwood crews will randomly re-observe 15% of stations. Station re-observations will be performed by a separate crew member using different equipment. Discrepancies in the derived points will be inspected to identify the cause.

Range finder checks
At the beginning of all obstacle measurements where a rangefinder is used, Oakwood crews will first measure and document distances to known stations to test the accuracy of the rangefinder EDM. The standard Oakwood conventional observation log sheet has a place for documenting this measurement.

Independent Measurements
The team will employ data redundancy and independent measurements to verify data accuracy. The field survey and photogrammetric analysis will be conducted in independent stages. Both will be performed based on the PACS & SACS stations of the airport and will establish coordinates on features. Once both stages are complete, the survey and photogrammetric results will be compared. If discrepancies are identified, the data will be closely inspected to identify the source of the differences.

Data backup procedure
Immediately after download, Oakwood field crews will perform data backup

routines that preserve field data as collected. Oakwood crews will upload data via a cloud-backup data service to maintain a site-distinct backup as well as carry thumb drives to backup their local machine. The two combined backups will address both local and network system failures and will ensure data preservation in case of catastrophic system failure.

9. Data Format Requirements

In accordance with FAA delivery standards identified in AC-18B and outlined in Chapter 2, Section 2.6.6, Oakwood will compile the survey data for delivery to the FAA Airport-GIS system. Oakwood Survey will combine the field and office data using both Autodesk Civil 3D and ESRI ArcGIS Desktop software. The obstruction identification surfaces will be analyzed three-dimensionally and compared to the aerial and ground survey points and penetration values computed in Civil 3D. The attributes for the features will be applied in ArcGIS Desktop and the final dataset exported as AC-18B compliant shapefiles. The compliant ESRI shapefiles files will possess the required features and attributes and will be delivered in a *.zip file in accordance to the requirements found on the FAA Airport-GIS web portal.

Prior to uploading, Oakwood will validate the deliverable files by uploading to a test project on the FAA Airport-GIS website. The test project will perform automated validation checks for geometry, structure, and attributes and will provide quality control on the compliancy of uploaded data.

10. Other Information

Attached are additional supporting information including:

1. Sample GPS Log Sheet
2. Sample Conventional Log Sheet
3. Sample Station Recovery Log Sheet

Oakwood Surveying - Observation Log Sheet

Airport LID & State	Data File Name ☐ RTK File

Observer Full Name
Chad T. Snoke, PS

Observer email
Chad@OakwoodSurveying.com

Observer Phone

Sketch

Witness Ties

m / ft	N E S W	
m / ft	N E S W	
m / ft	N E S W	
m / ft	N E S W	

Setting Type ○ Concrete Mon. ○ Deep Rod ○ Fixed Mt. ○ Rebar

Monument Size

Stamping

Agency

Notes

Station Designation Station PID

Station Classification
○ FBN ○ CBN ○ BM ○ PACS ○ SACS ○ TSM
○ RWY ○ NAVAID ○ Photo Control ○ Other:

Latitude N ° ' "

E-Height m/ft

Longitude W ° ' "

Calendar Date / /

Julian Day

Session

Start Time utc local :

Stop Time :

Receiver
P/N
S/N

Antenna
P/N
S/N

Antenna Height m/ft

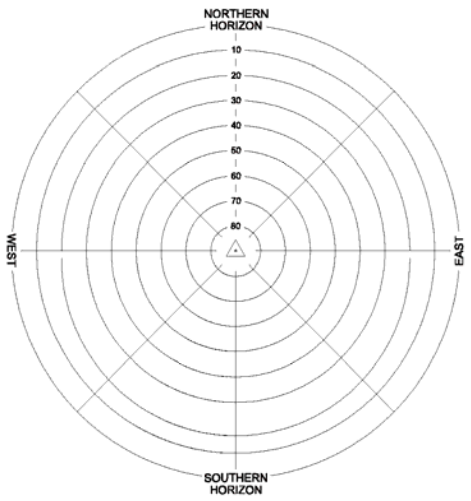
Epoch

Mask

Ant. Ht. Measured To
○ Bottom of Ant. Mt. ○ Other:

Ground Plane
○ Yes ○

Tripod Type
○ Fixed-Ht. ○ Bi-Pod ○ Slip-leg ○ Other



Oakwood Surveying - Observation Log Sheet

Station Designation	Height of Instrument	General location		Airport LID
Back Sight Designation	**Height of Back Sight**	**Data File**	**Calendar Date**	**Observer**
			/ /	

Total Station		Laser Range Finder	
S/N	P/N	S/N	P/N

Sheet

of

Oakwood Surveying - Station Recovery

Station Designation	PID	LID / Location	Date
			/ /

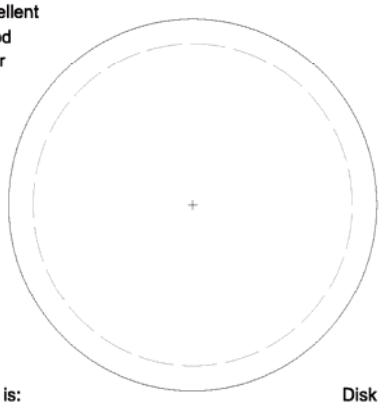
Observer	Organization

○ PACS ○ SACS ○ TACS ○ BM
○ FBN ○ CBN ○ Other _____

Sketch

Disk Detail ○ Photos Available

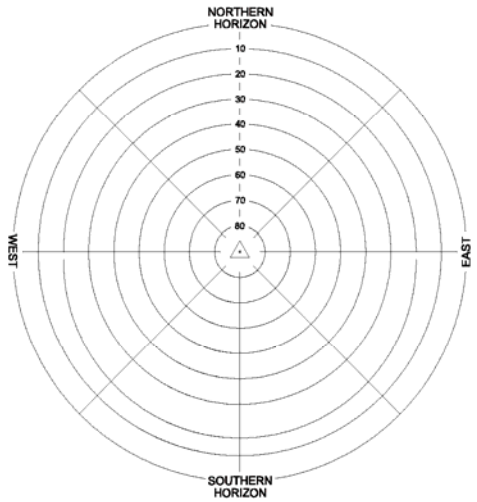
Monument is:
- ○ A. Most stable
- ○ B. Excellent
- ○ C. Good
- ○ D. Poor



Monument is:
- ○ Recessed ____cm
- ○ Flush with ground
- ○ Projecting ____cm

Disk is set:
- ○ in bedrock.
- ○ in concrete.
- ○ in structure.

Visibility Diagram ○ Photos Available



○ No Obstructions above 10°