Concrete, Washington

Municipal Airport

Airport Layout Plan Report

BUCHER, WILLIS & RATLIFF CORPORATION

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Executive Summary

The Concrete Municipal Airport is owned and operated by the Town of Concrete, Washington. The airport is located south of the town center, adjacent to the school facilities. The airport elevation is 267' above MSL and has an east-west configured asphalt runway that is 2,580' by 60'. Forty-four aircraft are based on the Concrete Municipal Airport. 43 are single engine, and 1 is a multi engine aircraft. The airport is not lighted, no instrument approaches have been published for the airport, and no navigation systems are available at the Concrete Municipal Airport. The total annual operations in 2006 and 2026 are forecast to be 5,000 and 6,042 respectively. On-site facilities consist of individual hangar buildings and an Airport Terminal Office building. The Airport Reference Code is A-I and the "critical aircraft" is the Beechcraft Bonanza.

The following list summarizes the recommendations found in the Airport Layout Plan report:

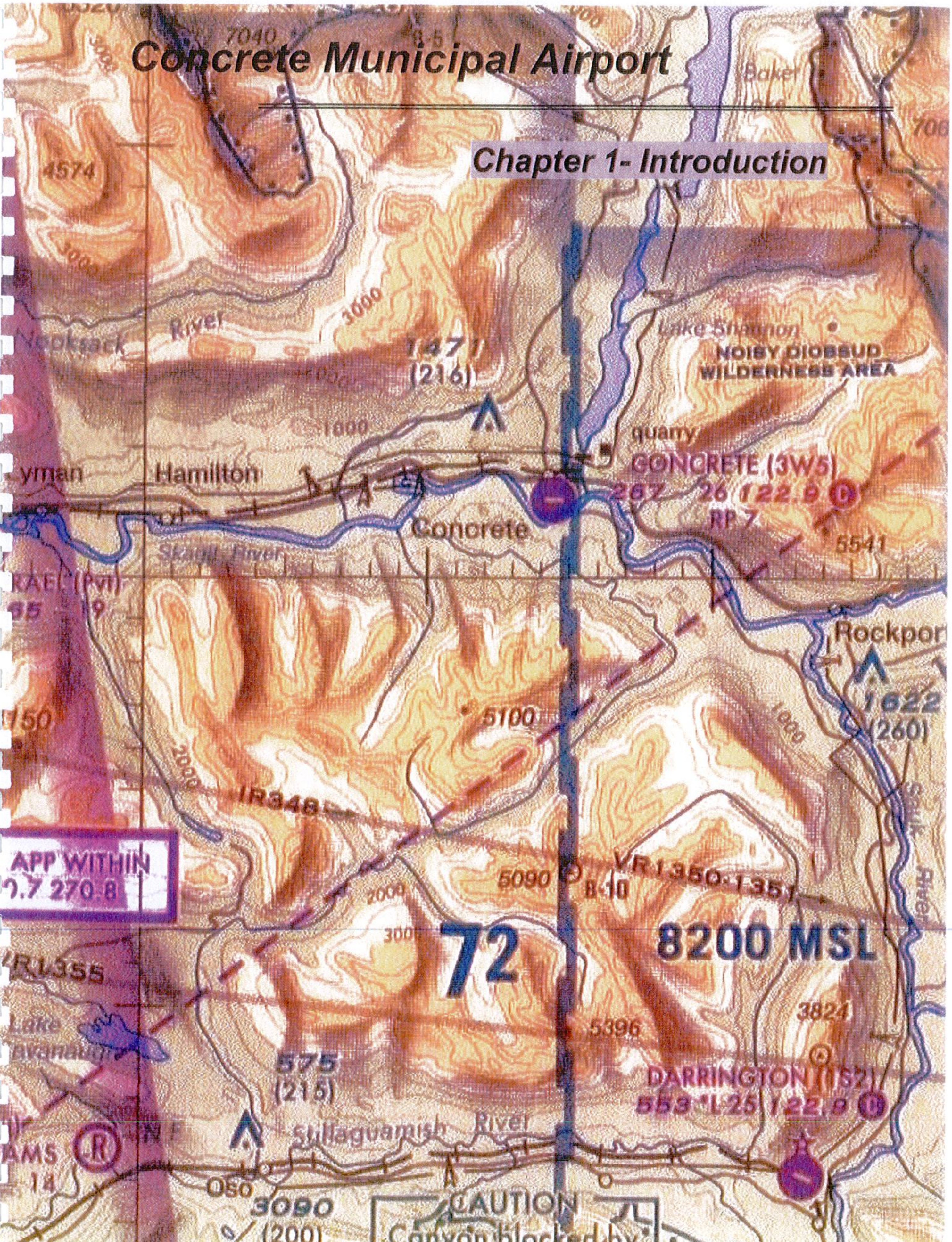
- Clear trees in vicinity of windsock and install additional windsocks north side of runway.
- Clear trees penetrating transitional surfaces, and in the primary surface. Institute management plan with civic organization to plan seasonal Christmas Tree harvest
- Clear and grub area of vegetation of bushes and shrubs that have grown in the OFA.
- Remove the trees that penetrate the 20:1 approach surfaces. Acquire Avigation easements to protect the approach ends of the runway.
- Change the runway designation to 9-27 and mark and stripe the runway according to the requirements identified in the FAA Advisory Circular No: 150/5340-1J STANDARDS FOR AIRPORT MARKINGS.
- Install a Rotating Beacon and Medium Intensity Runway Edge Lights (MIRLs)
- Shorten the east end of the runway 25 by 163' and the west end of the runway 7 by 35'. The resulting runway will have a published length of 2,350'
- Construct a full-length parallel taxiway.
- Install a Self-Fueling system with 100LL Aviation Fuel.
- Designate the property northwest of the field as airport property.

The future development of the airport as a vital component of the local, state and national transportation infrastructure requires the implementation of compatible land use controls. This ALP document recommends that the community manage airport compatible land use development through regulatory measures. The Concrete Planning Commission has developed the following Airport District Goals and Policies:

- Land Use Goals to encourage airport compatible land uses through regulatory measures.
- Economic Development Goals to ensure the airport remains a viable employment and economic engine.
- Two distinct development categories to ensure a regulatory means of facilitating airport compatible land uses.
    i. Permitted primary uses.
    ii. Uses requiring a permit.

Concrete Municipal Airport

Chapter 1- Introduction



Chapter 1

INTRODUCTION

The Town of Concrete, Washington initiated the preparation of this Airport Layout Plan Update and Narrative Report to assess the future role of the Concrete Municipal Airport, and to provide direction and guidance regarding short and long-range airport facility development. This layout plan narrative report will identify and address the existing facilities and the future needs at the Airport during the ultimate 20-year planning period, with emphasis on the short-term, 0-5 year timeframe.

An assessment of local airport requirements, along with consideration of airport capital improvement opportunities are major issues addressed as part of the Airport Layout Plan Update Program. Following a comprehensive review of design considerations, the study is intended to identify maintenance and improvement priorities to meet business, corporate, and general aviation demand service levels, safety and efficiency requirements in accordance with current Federal Aviation Administration (FAA) Advisory Circulars, and Washington State Department of Transportation (WSDOT) airport design standards.

STUDY OBJECTIVES

The Airport Layout Plan Narrative Report has been designed to provide an objective look at future airport needs, and to answer some basic questions about the Concrete Municipal Airport, including:

- *What is the Airport's near term and future role?*
- *What are the existing airport facilities, equipment, and operating conditions?*
- *What are the preferred airfield and terminal area development strategies and priorities?*
- *What are the proper setbacks, safety areas and pavement markings?*
- *What is the appropriate Land use/Zoning description for the airport?*

Overall, the airport study will provide the basis for an airport facility that is:

- *Safe, and within FAA design criteria;*
- *Economically viable;*
- *In concert with broad local, regional, state and national goals and programming plans.*

FIFURE 1.1

Concrete Airport Aerial Photograph

Planning Study Agreement

The Town of Concrete entered into an agreement with Bucher, Willis & Ratliff Corporation (BWR) for the preparation of the Airport Layout Plan and to complete an airport study for the Concrete Municipal Airport. The plan was funded through an airport planning grant from WsDOT Aviation Department.

Airport Study Phases and Documentation

Table 1.1, *Description of Airport Planning Program*, identifies each element and task included in the airport study. The study is being conducted in separate elements to allow participants the opportunity for input, to provide formal review and discussion of findings, and permit coordination with regard to development priorities.

Study Coordination

Overall, the development of the Airport Study is evidence that the Town of Concrete recognizes the importance of aviation in the inclusive concept of community and transportation planning.

When approved by the various local, regional and state agencies, the study represents the expressed intentions of all agencies regarding the location and extent of airport improvements. This permits more effective long-range programming and budgeting, reduces the review and approval periods, and provides for orderly and timely development.

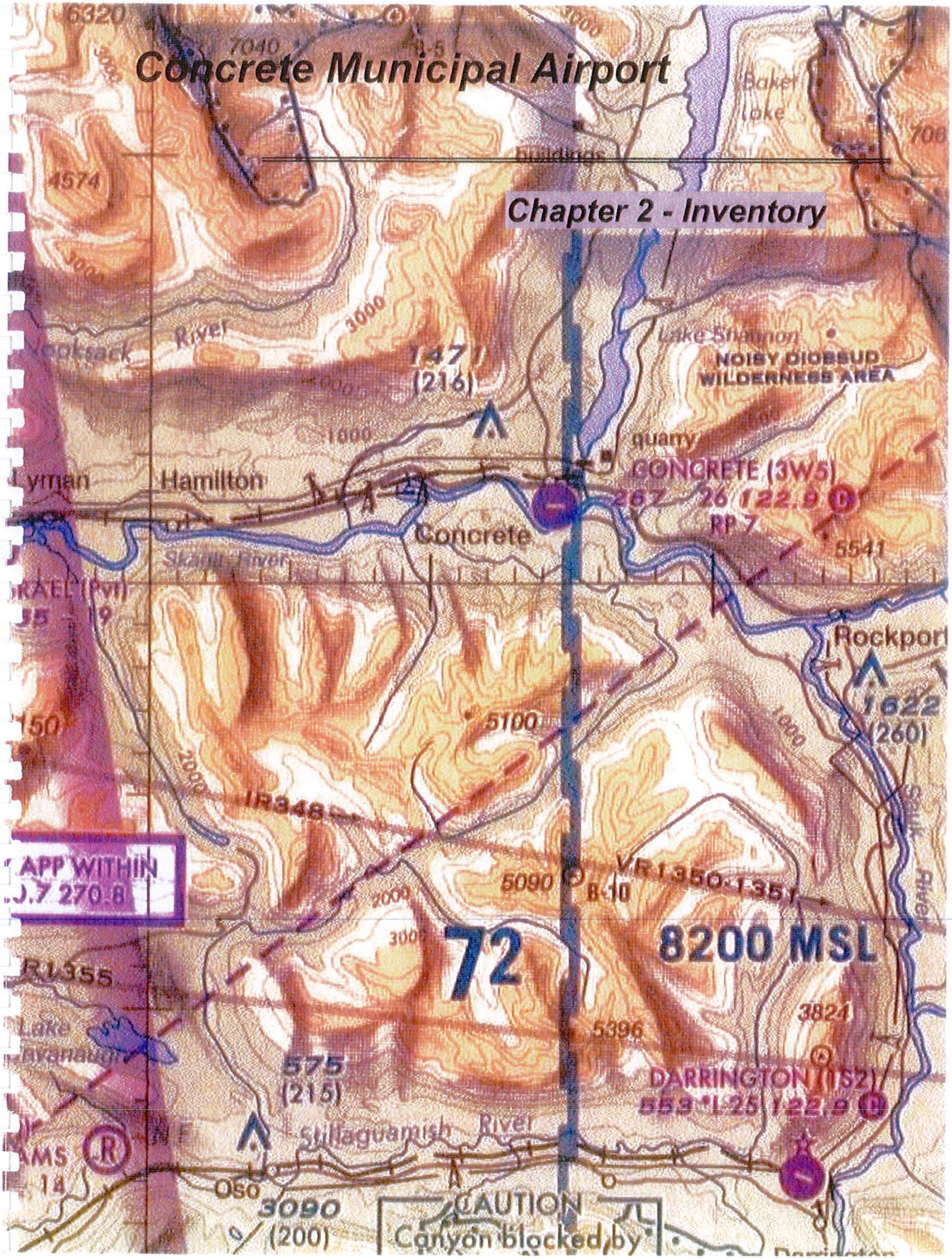
Table 1.1
DESCRIPTION OF AIRPORT PLANNING PROGRAM
Concrete Municipal Airport Study

ELEMENT 1 – AIRPORT INVENTORY Airport "Kick-Off" Meeting #1 ▪ Assemble Airport Review/Steering Committee ▪ Physical Airport Site Investigation ▪ Based Aircraft/Operational Activity/Aircraft Mix ▪ Review Airport Data/Ordinances/Agreements ▪ Interview Airport Users/Tenants/Business Users ▪ Regional Community Assessment/Growth Profile ▪ Airport Service Area/Surrounding Facilities ▪ Identify Existing Critical Aircraft ▪ Assessment of Fueling Facilities ▪	**ELEMENT 2 – AVIATION DEMAND FORECASTS** ▪ Forecast Future Based Aircraft and Operational Demand ▪ Determine Future Actual Instrument Operations ▪ Identify Activity by FAA Airport Design Categories ▪ Identify Fleet Mix/Future Critical Aircraft
ELEMENT 3 – FACILITY REQUIREMENTS ▪ Identification of Required Facilities by Phase ▪ Evaluation of Airfield and Terminal Area ▪ Alternatives Analysis Conceptual ALP ▪ Airport Access and Obstructions ▪ Land Ownership Planning Committee Meeting #2	**ELEMENT 4 – CAPITAL IMPROVEMENT PROGRAM** ▪ Schedule and Phasing of Improvement Projects ▪ Development Cost Estimates ▪ Multi-Year Airport Capital Improvement Program (CIP) ▪ Economic Significance/Impact of Airport ▪ Financial Plan/Funding Sources Planning Committee Meeting #3
ELEMENT 5 – AIRPORT PLANS ▪ Airport Layout Drawing ▪ Airport Airspace Drawing ▪ Runway Inner Approach Surface Drawings ▪ Terminal Area/Airport Access Plan Drawing ▪ Runway Centerline Profile Drawing ▪ Airport Property Map	**ELEMENT 6 – FINAL REPORT** ▪ Final Draft Report ▪ Town and WsDOT Final Review

▪ Major Study Task
Planning Advisory Committee (PAC) with the airport sponsor

Concrete Municipal Airport

Chapter 2 - Inventory



Chapter 2

EXISTING CONDITIONS INVENTORY

The inventory is a systematic and comprehensive data collection process that provides background information about the surrounding area and provides an understanding of past and present aviation factors. A physical site inspection was conducted in October, 2005 to assess the existing airport facilities. This chapter describes the existing conditions at the Concrete Municipal Airport based upon information gathered during the site inspection.

Airport History

Much of the airport's growth has occurred after the town assumed control of the facility from the county in the early 1990s. A pilot's lounge has been added, and new hangars have been built. The following July 26, 2007 Skagit Herald article provides an excellent representation of the Airport's historical development:

> Concrete - Pilot Ralph Prisel, 83, still laughs when he hears about tourists who stop at the local gas station and ask where the town's airport is located.
>
> When told they need to drive underneath the school to get there, they think it's an inside joke.
>
> Except it's not.
>
> For Prisel, such quirks are just part of the airport's many charms.
>
> Whether it's the picturesque setting in the Cascade Mountains, or the relative affordability of leasing hangar space there, the airport has a way with pilots.
>
> Prisel counts himself among a handful of residents who've moved to Concrete over the years, just to be closer to the airport.
>
> Few have worked harder than Prisel to convince others to leave the beaten path and take that peculiar drive beneath the school, which is built over the road leading to this unique airport.
>
> His biggest success in landing the airport on the map has been with the Concrete Old Fashioned Fly-In, which runs this Friday through Sunday.
>
> When he launched it in 1982, six airplanes showed up.

Entering its 26th year, the fly-in now regularly draws several thousand visitors and more than 200 airplanes here every summer.

The event has helped highlight the importance of the airport, which has long been critical to upriver logging, government work, fire fighting and search and rescue operations.

"It's a very important airport," said town Councilman Jack Mears, who sits on the town's airport committee. "The next airport is Winthrop. If anything happens on the west side of the mountains, this is it."

The Puget Sound Power and Light Co., which is now part of Puget Sound Energy, helped develop the original airstrip in the 1950s to fly in workers and equipment needed to construct and maintain hydroelectric projects in the region.

Jack Hoover, 84, was mayor at the time and remembers clearing stands of cottonwood and fir trees for the original airstrip.

Back then the airport featured a single hangar, he said, which was owned early on by state Sen. Lowell Peterson. The hangar is still in use today.

In ensuing decades, the airport was used by logging outfits, which flew in bunkhouses, trailers, fuel trucks and workers.

The airport has also become a hub for natural resources operations. Every year, geological survey workers, and wildlife counters use the airport as a hub for accessing more remote parts of the mountains.

The airport has also evolved into a critical staging ground for emergency operations.

Helicopters make regulars stops here when rescuing injured climbers, snowmobile riders and motorcyclists, as do family members awaiting news of rescue efforts.

During firefighting operations, the U.S. Forest Service leases the airport from the town and turns it into a central command center bustling with radios, computers, news crews, trucks and helicopters.

The airport has come a long way since Prisel moved here in 1981. At the time, the airstrip wasn't even paved.

Much of the airport's growth came after the town assumed control of the facility from the county in the early 1990s.

Since then, a pilot's lounge has been added, and new hangars have been built.

Today there are 40 or so airplanes stored at the airport in 20 hangars.

Mears said there are 13 people on a waiting list for hangar space, and plans are in place to clear space for an additional dozen hangars.

Prisel takes pride in the airport's progress, which is exactly what he hoped for when he launched the fly-in 25 years ago.

"I've watched airports all my life disappear," he said. "When I saw this one I thought, 'what can I do to save it.'"[1]

Economic Impacts

The state Aviation System Plan Forecast and Economic Analysis Study estimated that the Concrete Municipal Airport general aviation operations resulted in approximately 2,400 visitors arriving at the Airport in the year 2000. The total direct and indirect jobs and economic impacts in the community and region attributed to the airport in the year 2000 were shown to be: 22 jobs, $308,000 in total payroll, and $1.2 million in total sales. A copy of the Economic Analysis report for the Concrete Municipal Airport is included in Appendix D.

Current Airport Role

The Concrete Municipal Airport is designated as a General Utility Airport[2]. The Existing Conditions of the Concrete Municipal Airport is an unlighted, asphalt concrete runway 2,580 feet in length, and 60 feet in width. The Airport Reference Code (ARC) is designated A-I for small aircraft exclusively, and the runway is strength rated to handle aircraft weighing less than 12,500 pounds. The runway is not equipped with an instrument approach, runway lighting, rotating beacon or visual approach slope indicators. A centerfield taxiway connects the runway to the aircraft parking area located adjacent to the pilots lounge.

Airport Location and Access

Figure 2.1, Airport Service Area, provides a pictorial representation of the importance of the Airport to the state and the general aviation flying community. The airport is one of the last landing opportunities available for pilots flying eastward over the Cascade Mountain Range. The Lost River Resort Airport located 50.4 NM east of Concrete and

[1] Permission to reprint Skagit Valley Herald article provided by Josh Lintereur and Don Nelson.

[2] **General Utility Airport** – designed to serve small single and twin-piston aircraft under 12,500 pounds.

the Stehekin State Airport located 42.8 NM east of Concrete are the nearest airports east of the Cascade Mountains which exceed 12,000 feet in elevation above mean sea level.

Figure 2.2, Airport Location Map, and **Figure 2.3,** Airport Vicinity Map identify the location of the Concrete Municipal Airport. The Concrete Municipal Airport is located in Skagit County adjacent to Washington Highway 20, one mile south of the Town of Concrete. Airport access is provided from WA Highway 20 to South Superior Avenue, which traverses the northern border of the airport property.

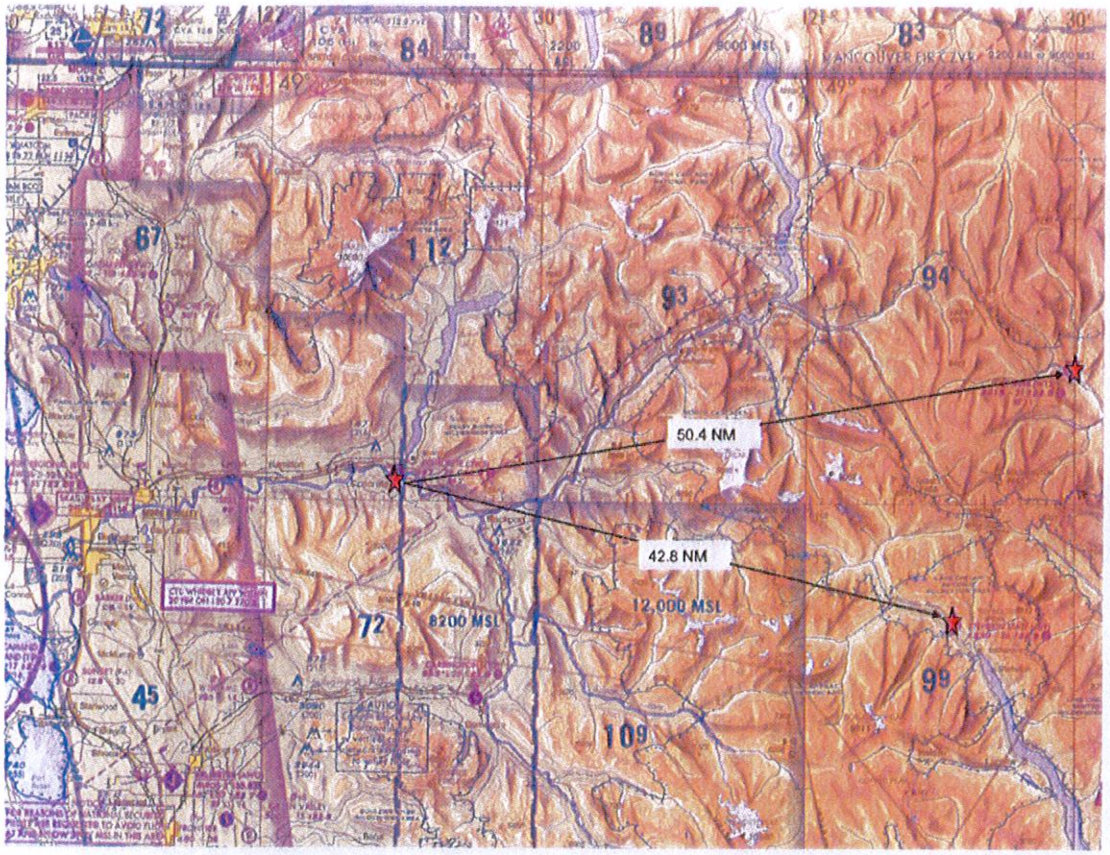
The Town of Concrete offers a window into the spectacular Cascade Mountain Range and remains today a rugged reminder of the pioneer spirit that settled the West. Concrete is situated partially on a hillside on the north bank of the upper Skagit River Valley, with elevations varying from 160 feet at the confluence of Baker and Skagit Rivers to approximately 600 feet in the northwest corner of the town. Concrete is nestled within mountain ridges ranging in elevation from 3000 to 4000 feet.

Climate and Weather

Concrete, Washington lies in a region with weather typical of the northwestern Washington climate. Daytime temperatures during the summer are high, but the humidity levels fluctuate due to constant, yet moderate, winds. The winter season is fairly cold and windy, but is accompanied by occasional to moderate snow accumulation.

The temperature ranges at the Concrete Municipal Airport lie between average winter lows of 30° - 33° F and mid-summer high temperatures of around 74 - 76° F. Annual precipitation is approximately 71.3 inches with 77 percent falling between the months of October and March.

Figure 2.1
AIRPORT SERVICE AREA
Concrete Municipal Airport Study



EXISTING AIRSIDE FACILITIES

The Concrete Municipal Airport consists of approximately 41 acres held in fee simple. The airport is located on a relatively small narrow tract of land with hangar and landside development on the northern side of the airport. The airport property is located on a bluff extending 200' beyond both ends of the 2,580' runway where the property contours drop off by more than 30' at the airport property line.

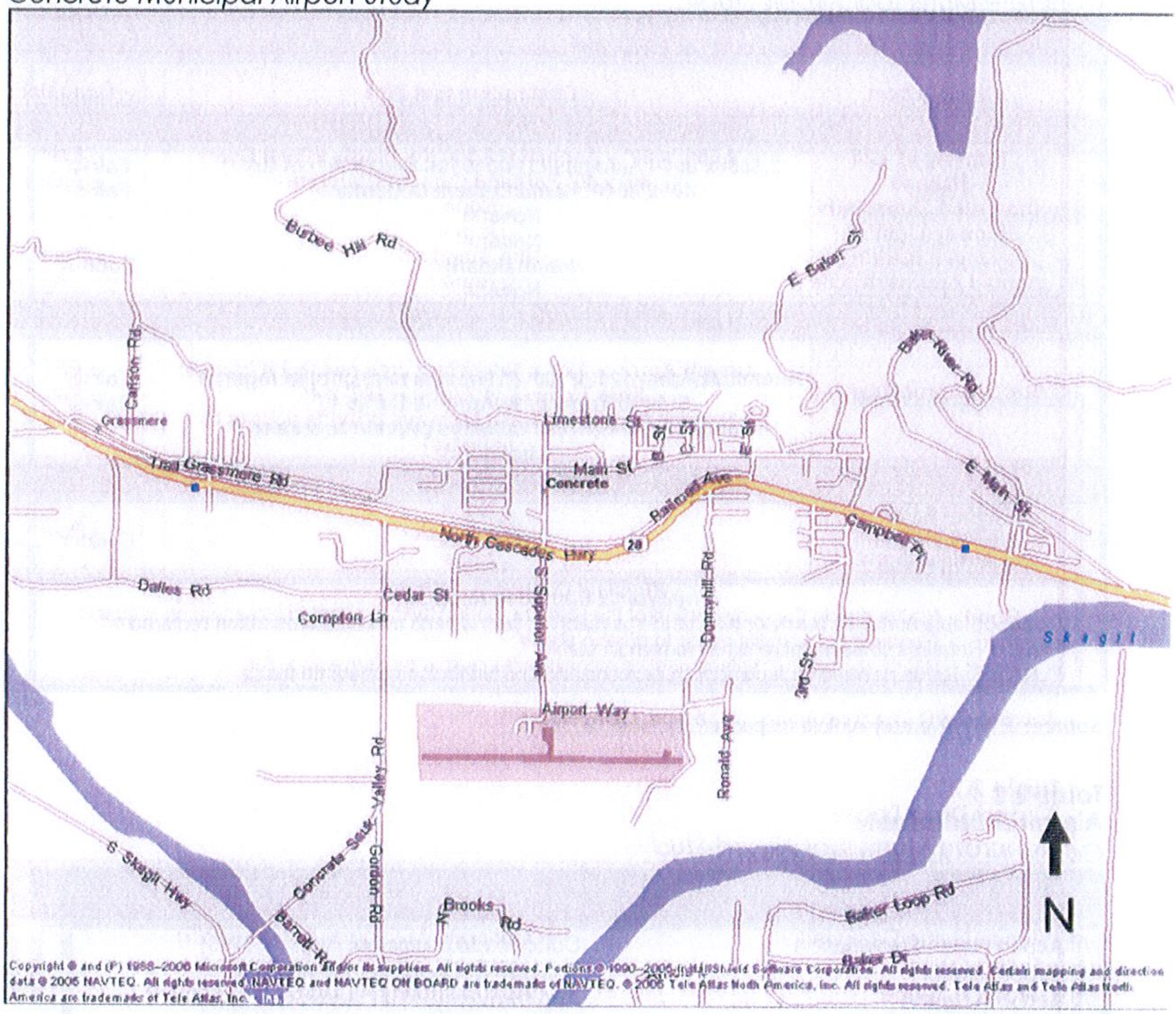
The Airport elevation is 267' above mean sea level (MSL). The topography surrounding the airport consists of downward sloping terrain to the east and west of the runway. The Concrete Elementary, Middle and High Schools are located on the property adjacent to and north of the airport. South of the airport is not developed and is being used for forest growth.

The existing runway layout is an east-west alignment with a true bearing of east 90.6635°. The runway pavements are in fair condition and the markings are in poor condition. **Table 2.1, Existing Facilities and Condition** identifies the facilities and equipment, with a corresponding assessment of physical conditions based on the airport inspection.

Figure 2.2
AIRPORT LOCATION MAP
Concrete Municipal Airport Study

Source: Microsoft Mappoint

Figure 2.3
AIRPORT VICINITY MAP
Concrete Municipal Airport Study



Source: Microsoft Mappoint

Table 2.1
Existing Facilities and Condition
Concrete Municipal Airport Study

Airfield Item	Description and Size	Condition
	Runway Facilities & Equipment	
Runway 07 - 25	**2,580' x 60' – Asphalt (12,500 lbs Single Wheel Gear)**	**Fair**
Helipad	**40' x 40' Portland Cement Concrete**	**Fair**
Displaced Thresholds	**None**	**-**
Runway Lighting	**None**	**-**
Pavement Markings	**Non Standard**	**Poor**
Lighted Approach Aids	**None**	**-**
	Taxiway Facilities & Equipment	
Aircraft Apron/Taxiway	**Aircraft Apron – 120' x 100' (West area near pilot lounge)** **Stub Taxiway to Apron – 180' x 40'** **Hangar Access – (Grass taxiways provide access to hangars)**	Fair Fair Fair
	Additional Airfield Items	
Rotating Beacon	**None**	-
Wind Indicator	**Wind sock**	Poor
Airfield Signs	**None**	-

Physical Condition Ratings:
Good: Stable during the early portion of the planning period, with no immediate attention required
Fair: Requires some initial repair to remain stable
Poor: Rates as needing replacement or reconstruction within the immediate future

Source: BWR Inventory Airfield Inspection, October, 2005.

Table 2.2
Airport Data Table
Concrete Municipal Airport Study

Airport Name/Designation	Concrete Municipal Airport (3W5)
Airport Owner	Town of Concrete, Washington
Airport Acreage	Approximately 41 Acres (fee simple)
Airport Reference Point	N 48° 31' 47.041" W 121° 45' 32.55"
Airport Elevation	267 feet Mean Sea Level (MSL)
Airport Traffic Pattern	Runway 07 Right TP at 1,267' MSL Runway 25 Left TP at 1,267' MSL

Runway and Taxiways

The Concrete Municipal Airport has one paved runway (7-25), oriented in an east-west configuration. Runway 7-25 is 2,580 feet long and 60 feet wide with a centerfield taxiway connecting the parking apron to the runway. The holding distance (centerline of runway to the hold line) for the primary runway is 125 feet. No paved taxiway access is available for the runway ends. Runways without complete parallel taxiways commonly have runway-end turnarounds for safety, convenience, and efficiency purposes. The turnarounds are designed to accommodate the largest category of aircraft and developed to provide an adequate separation holding distance from the runway centerline. While other aircraft are approaching or departing the runway, an aircraft waiting to depart or conducting aircraft run-up procedures within the turnaround area should have sufficient maneuvering space behind holding position lines. Aircraft turnaround and run-up areas are located on the north side of both the east and west runway ends. The dimensions for the turnarounds are 83' x 53' for Runway 07 and 85' x 50' for Runway 25. Donnyhill Road is an unpaved private road located within 100 feet of the end of Runway 25. In chapter 4, Airport Facility Requirements, this road is discussed in detail with respect to the FAA Part 77 surfaces and safety areas.

The runway is an asphalt concrete runway 2,580 feet in length, and 60 feet in width. It is strength rated to handle A-1 category small aircraft exclusively, weighing less than 12,500 pounds. The runway is not equipped with an instrument approach, runway lighting or visual approach slope indicators. Due to the contour of the property the airport is located upon, the airport does not have an appropriate Runway Safety Area (RSA) on either end of the runway.

Runway and Taxiway Markings

The Concrete Municipal Airport runway markings are non-standard with a fading yellow line depicting the centerline of the runway and "CONCRETE" painted on the centerline of the runway. **Figure 2.4, Existing Pavement Markings,** shows the existing runway markings at the Concrete Municipal Airport and **Figure 4.5, Ultimate Pavement Markings,** illustrates how an airport should be marked with Visual Runway Markings.[3]

Airport runway markings should be white and take precedence over other markings. If a pilot of an aircraft encounters white markings, he knows he is on a runway. Taxiways have centerline markings and runway holding positions markings whenever they intersect a runway. Taxiway markings are yellow. RUNWAY HOLDING POSITION MARKINGS identify the location on a runway or on a taxiway where a pilot is to stop

[3] See Page 4-19 in Facility Requirements chapter.

prior to proceeding onto a runway. WSDOT Aviation and the FAA emphasize the importance of Runway Holding Position Markings as a tool to prevent runway incursions.

The Concrete Municipal Airport's runway number designations are 07 – 25.

Figure 2.4
EXISTING PAVEMENT MARKINGS
Concrete Municipal Airport Study

AIRFIELD PAVEMENT CONDITION

Applied Pavement Technology, Inc. (APTech), with assistance from CH2M HILL and CivilTech Engineering, recently updated the Washington Airport Pavement Management System (APMS) for the Washington State Department of Transportation (WSDOT) Aviation. The principal objective for the APMS is to assess the relative condition of pavements for selected Washington airports in the Washington State Airport System Plan (WSASP). The APMS can be used as a tool to identify system needs, make programming decisions for funding, provide information for legislative decision making, and assist local jurisdictions with planning decisions.

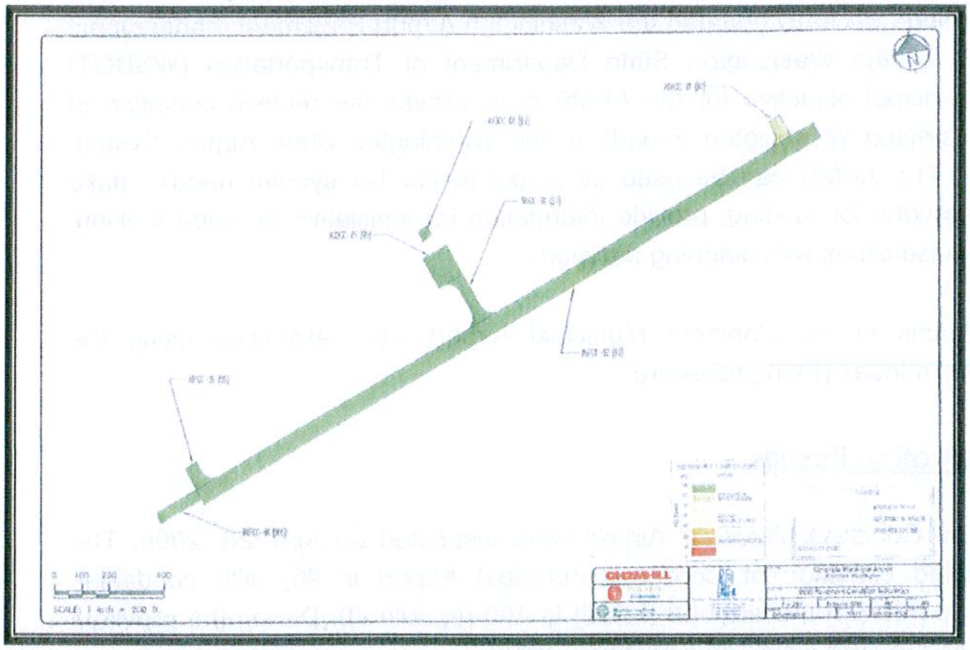
Pavement conditions at the Concrete Municipal Airport were assessed using the Pavement Condition Index (PCI) procedure.

Pavement Evaluation Results

The pavements at Concrete Municipal Airport were inspected on April 28, 2005. The 2005 area-weighted condition of Concrete Municipal Airport is 96, with conditions ranging from 81 to 100 (on a scale of 0 [failed] to 100 [excellent]). During the previous inspection in 1999, the area-weighted condition was 92.

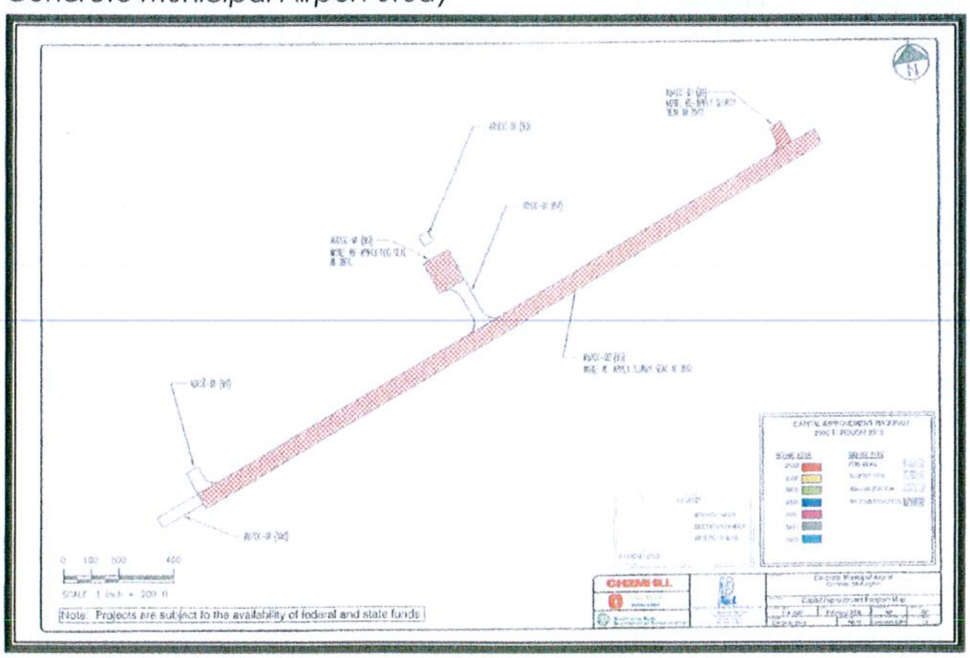
Figures 2.5 and **2.6** summarize the overall condition of the pavements at the Concrete Municipal Airport. A detailed copy of the WsDOT Aviation Division's Pavement Evaluation report is included in Appendix G.

Figure 2.5
CONDITION OF PAVEMENTS EVALUATED
Concrete Municipal Airport Study



Source: 2005 Pavement Maintenance Report – Applied Pavement Technology Inc

Figure 2.6
RECOMMENDED PAVEMENT REHABILITATION
Concrete Municipal Airport Study



Source: 2005 Pavement Maintenance Report – Applied Pavement Technology Inc.

Rotorcraft Facilities

The Concrete Municipal Airport has a designated helicopter landing area located on the north side of the Aircraft Parking Apron. The paved helicopter area is 40 feet by 40 feet and is unlighted and has faded markings. The helipad is restricted to use by Medivac operations and is not commonly used. According to the Airport Manager and users of the airport, helicopter pilots tend to land on the runway and taxi to the apron area for parking.

Agricultural Aircraft Facilities

The Concrete Municipal Airport does not have any designated agricultural (AG) aircraft loading areas or associated facilities.

Airport Lighting

Runway lighting systems increase the safety and utility of airports. The Concrete Municipal Airport does not currently have a rotating beacon or lighting on the runway or taxiway system.

AIRPORT REFERENCE CODE CLASSIFICATION

The FAA has established airport design criteria commensurate with an airport's role and Airport Reference Code (ARC) designation. This criterion provides minimum safety standards with respect to the performance characteristics represented by the airport's critical aircraft. This particular aircraft, as determined with respect to approach speed and wingspan, is within a design category of airplanes that conduct at least 500 itinerant operations (combination of landings and takeoffs) per year.

Critical Aircraft Design

The primary components of the "airfield" are those directly related to the arrival and departure of aircraft. These facilities are comprised of the runways, taxiways, navigational aids, and airport lighting and marking.

The development of airport facilities is based primarily upon the characteristics of the most demanding aircraft which are expected to use the airport. The most important characteristics are the approach speed and the wingspan of the "critical" group of aircraft expected to use the airport.

The FAA groups aircraft according to their performance and wingspan. The categories range from Approach Category A, for slower single-engine piston aircraft, to Approach

Category E for supersonic jet aircraft. The "critical" general aviation aircraft group forecast to use the Concrete Municipal Airport fall into Category A with approach speeds of less than 91 knots.

Along with the aircraft's approach speed, the airplane's wingspan is another principal characteristic which affects airport design standards. There are six Airplane Design Groups which range from Group I, for small aircraft with wingspans less than 49 feet, to Group VI for the largest air carrier and cargo aircraft. Civil aircraft now using Concrete Municipal fall generally into Design Group I (wingspan less than 49 feet). **The specific "critical" design aircraft group for the Concrete Municipal Airport is the FAA Airport Reference Code A-I, for Small Aircraft Exclusively.** The **"critical aircraft**" for the Concrete Municipal Airport is the Beechcraft Bonanza which is the largest airplane within a composite family of aircraft conducting at least 500 annual itinerant operations (combination of 250 takeoffs and landings) per year at the Airport.

Currently, 44 aircraft are based at the Airport and approximately 5,000 takeoff or landings occur annually. Through the year 2025, it is estimated that the based aircraft will increase to 58 aircraft and the total annual operational activity will rise to approximately 6,600.

Table 2.3, Critical Aircraft Information, provides information about the critical aircraft for the Concrete Municipal Airport. The critical aircraft is the largest airplane within a composite family of aircraft conducting at least 500 annual itinerant operations (combination of 250 takeoffs and landings) per year at the Airport. The critical aircraft is evaluated with respect to size, speed and weight, and is important for determining airport design, structural, and equipment needs for the airfield, and terminal area facilities.

As part of this airport layout plan update, users of the Concrete Municipal Airport were contacted to obtain information regarding their current and expected use of the facilities. Using the information gathered, it was determined that the Beechcraft Bonanza would be the representative critical aircraft for the airport given that it is the most demanding aircraft to exceed the 500 annual operations threshold required. Additionally, it has been determined that the future characteristics of the airport will remain the same as the existing conditions for the 20 year time horizon.

Table 2.3
Critical Aircraft Information – Existing Aircraft
Concrete Municipal Airport Study

Aircraft Type & ARC	Wing Span	Aircraft Length	Aircraft Height	Seating	Max. Gross Takeoff Weight	Approach Speed
Beechcraft Bonanza (F33) A-I	32.5'	25.5'	8.25'	6	3,400 lbs	70 knots

Note 1: Takeoff weight indicates maximum takeoff and ramp weight, respectively.
Note 2: There is one based twin engine aircraft at the airport. It is not flown regularly; therefore, it does not meet the criteria for the critical aircraft.

Source: BWR, Aircraft Performance File and Aviation Week & Space Technology *"2006 Aerospace Source Book".*

Beechcraft Bonanza

EXISTING LANDSIDE FACILITIES

Table 2.4, Existing Land Side Facilities, summarizes the major landside / terminal facilities and equipment, with a corresponding assessment of physical location of the facilities. The pilot lounge is owned and maintained by the Airport, the remaining buildings are individually owned structures on land leases at $0.09 per square foot until the year 2010 when the rates and charges for the Airport are scheduled to be reevaluated. Two individuals have through the fence agreements with the Airport. Four automobile parking spaces located outside of the fenced area are available for Airport visitors.

Table 2.4
Existing Landside Facilities
Concrete Municipal Airport Study

Terminal Item	Physical Characteristics	Utility Service Provider
Terminal Facilities	**Physical Characteristics/Comments**	**Location**
Airport Terminal Office	34'x40' Pilots lounge with restrooms, showers, meeting room, waiting room, and kitchen	Inside Pilot Lounge
Main Apron/ Tie downs	Contains 2 aircraft tie down spaces on the 1,340 S.Y. parking apron.	Adjacent Pilot Lounge
Aircraft Hangars Type/ Function	Includes 33 delineated sites, with 22 built out hangar sites and one pilot lounge. All of the hangars are conventional type hangars.	Hangar Area
Aviation Fuel Storage	No fuel storage or dispensing equipment is located on the airport.	Not Applicable
Auto Access/ Parking	Airport access is provided from WA Highway 20 to South Superior Avenue, which traverses the northern border of the airport property. Automobile parking is available near the entrance of the airport located outside the fenced area.	South Superior Avenue from WA Highway 20 to airport terminal area

Source: BWR, Airport Site Inspection, October, 2005.

Through the Fence Operations

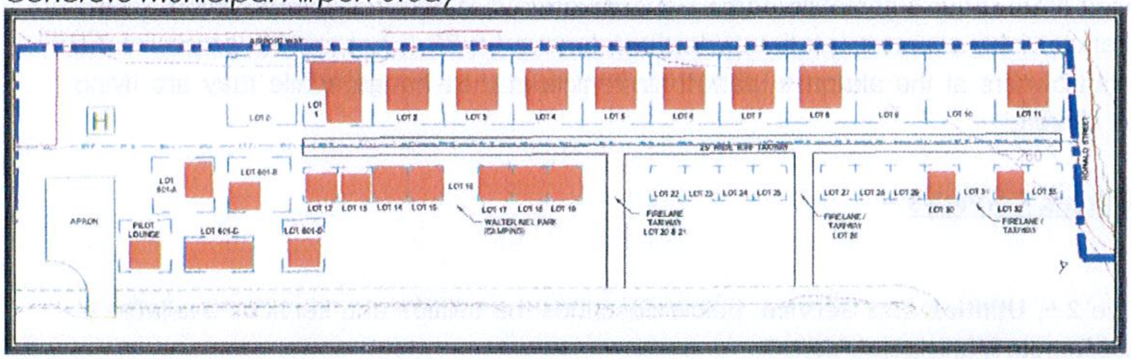
A Through the Fence operation occurs when property owners adjacent to the airport are granted access privileges to the airport for aeronautical purposes. Both the FAA and WsDOT Aviation strongly discourage the use of Through the Fence agreements because the highest airport revenues tend not to be realized by the sponsor of the airport. Typically, the sources of revenue at small general aviation airports are limited to hangar rental fees, tie down fees and fuel sales. When a Through the Fence Operation is permitted, the annual fees established in the agreements should be equal to or greater than the fair market value charged for an equivalent facility or service on the airport property.

Currently, two Through the Fence Operating arrangements exist at the Airport. These arrangements, as well as all of the hangar lease agreements are scheduled to be renegotiated in Fiscal Year 2010.

Buildings and Facilities

The Concrete Municipal Airport has 22 hangar building structures and one pilot lounge on the field. All of the hangars are used for aircraft storage and aeronautical use. **Figure 2.7** shows the hangar layout of existing hangars and sites available for development.

Figure 2.7
Hangar Building Area
Concrete Municipal Airport Study



Aircraft Tie-down Apron

The airport has a 120' x 100' apron located near the center of the airport adjacent to the Pilot Lounge. The apron is connected to the runway by a paved taxiway and contains 2 aircraft tie-down spaces on the 1,340 S.Y. parking apron.

AIRPORT SUPPORT FACILITIES

Airport services support general aviation airplanes, pilots and passengers operating single-engine and the occasional small twin-engine piston aircraft. No fixed base operator exists at the airport. Facility improvements and business incentives such as economic development grants would increase the appeal of the airport making it more attractive to establish a FBO at the Airport. Town employees and volunteers conduct routine upkeep of the airfield and airport facilities. Under the current arrangement, the Concrete Municipal Airport provides the following general aircraft support services:

- Aircraft storage and tie-downs
- Room for additional hangar development
- Pilot Lounge

Aircraft Fuel

Fuel does not currently exist at the Concrete Municipal Airport. The nearest airports for pilots to obtain fuel is the Arlington Municipal Airport, located 27 miles south west of Concrete or Skagit Regional Airport, located 27 miles west of Concrete.

Vehicle Parking

Automobile parking is available near the entrance of the airport located outside the fenced area. Four automobile parking spaces are available for airport visitors near the entrance of the airport located outside the fenced area. It is common practice for the aircraft owners at the airport to park their vehicle in their hangar while they are flying their aircraft.

Utilities & Services

Table 2.5, Utilities and Service, below describes the utilities and services available at the Concrete Municipal Airport.

Table 2.5
Utilities and Services
Concrete Municipal Airport Study

Item	Physical Characteristics	Utility Service Provider
Terminal Area Utilities	Electric Supply	Puget Sound Energy
	Natural Gas	Propane – NW Propane
	Water System	Concrete Municipal Water
	Telephone	Verizon Telephone Company
	Wastewater System	Septic & Municipal
	Trash/Waste Removal	Individual Hangar Owners
	Fire Protection Service	Concrete Volunteer Fire Dept.
	Police	Skagit County Sheriff
	Medical	Arrow Skagit Ambulance

Security

Portions of the airport have security fencing. The northern side of the airport has chain link fencing running the distance of the property to separate the school district property from the airport property. On the southern side of the airport, a wire fence is delineating the airport property.

NAVIGATIONAL AIDS AND EQUIPMENT

En-route Airspace System

The Concrete Municipal Airport is under the control of the Seattle Approach/Departure Control agreement with the Seattle ARTCC. Seattle is the controlling Flight Service Station (FSS) for the airport. The Common Traffic Advisory Frequency (CTAF) at Concrete Municipal for pilot communications is a radio operating on a frequency of 122.9 MHZ.

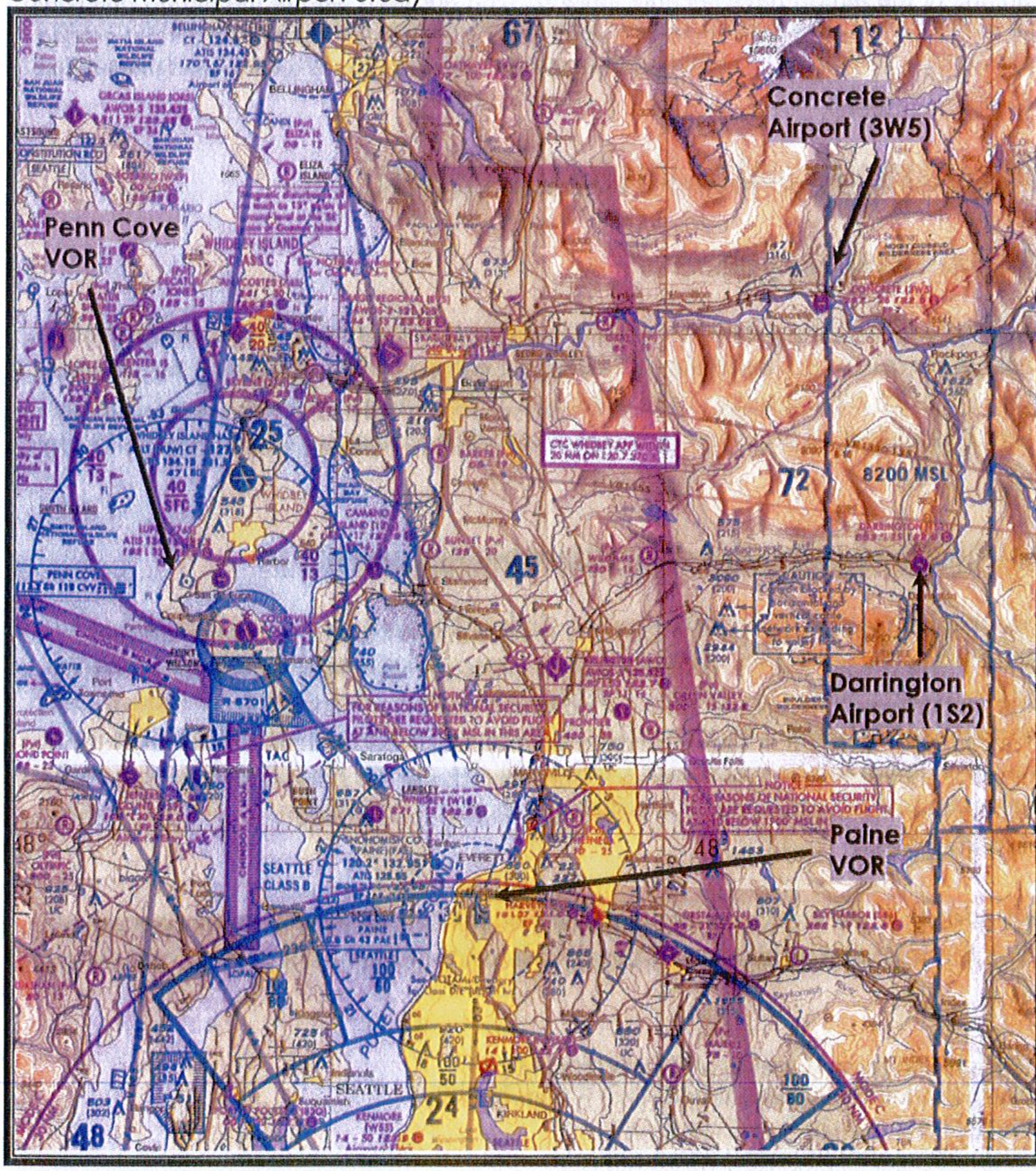
Airport Electronic Navigation and Instrument Approaches

Airport navigational aids (NAVAIDS) are equipment installed on or near the airport to provide pilots with electronic guidance and visual references to execute instrument approaches and landings during inclement weather conditions. **Figure 2.8, Aeronautical Sectional Chart**, illustrates the aeronautical system and NAVAIDS within the surrounding airport service area. Currently, there are no electronic ground based navigational aids available for instrument approach procedures to the Concrete Municipal Airport.

The following is a list of the surrounding airports with published instrument approach procedures and total distance from Concrete Municipal Airport (1S2) in nautical miles (NM):

- Arlington Municipal Airport (AWO) - 27 nm SW
- Bellingham International Airport (BLI) – 35 nm NW
- Skagit Regional (BVS) - 27 nm W
- Wes Lupien Airport (OKH) - 40 nm SW
- Whidbey Island NAS – Ault Field (NUW) - 37 nm W

Figure 2.8
Aeronautical Sectional Chart
Concrete Municipal Airport Study



Source: Seattle Sectional Aeronautical Chart

Automated Weather Observation System (AWOS)

The Concrete Municipal Airport does not have an Automated Weather Observation System (AWOS) weather reporting system currently available. The closest airports to Concrete with an AWOS radio frequency are the Arlington Municipal Airport (27 NM southwest of Concrete), Skagit Regional Airport (27 NM west of Concrete) and Oak Harbor / Wes Lupien (40 M west of Concrete).

Communications and Air Traffic Control

Without an Air Traffic Control Tower at the Concrete Municipal Airport, communications are completed over a Common Traffic Advisory radio Frequency (CTAF) of 122.9 MHZ by all aircraft in the airport vicinity. It is the individual aircraft operator's responsibility to maintain open communications and visual clearance with all other aircraft. The Concrete Municipal Airport falls within the Seattle ARTCC, which provides metering, separation, sequencing of all IFR aircraft and participating VFR aircraft. The controlling automated flight service station (AFSS) for the Concrete Municipal Airport and the surrounding airspace region is in Seattle, Washington. The AFSS can be reached by the pilot via remote communication over the Paine VOR frequency of 110.6 MHz, or by landline at 866-384-7323.

LAND USE PLANNING AND ZONING

Currently, the airport is zoned Public/Residential use. Due to the development at the airport and the needs of the community, the airport would benefit from the establishment of an Airport Zoning District. The Airport Zoning District would assist in controlling the height that structures can be built in the vicinity of the airport as well as controlling the type of development prohibited near the airport, i.e., single-family residential development or a new hospital. The future development of the airport as a vital component of the local, state and national transportation infrastructure requires the implementation of compatible land use controls. This Airport Layout Planning document recommends that the community manage compatible land use development for the airport through regulatory measures by adopting the Planning Commission's Airport Land Use District Goals and Policies.

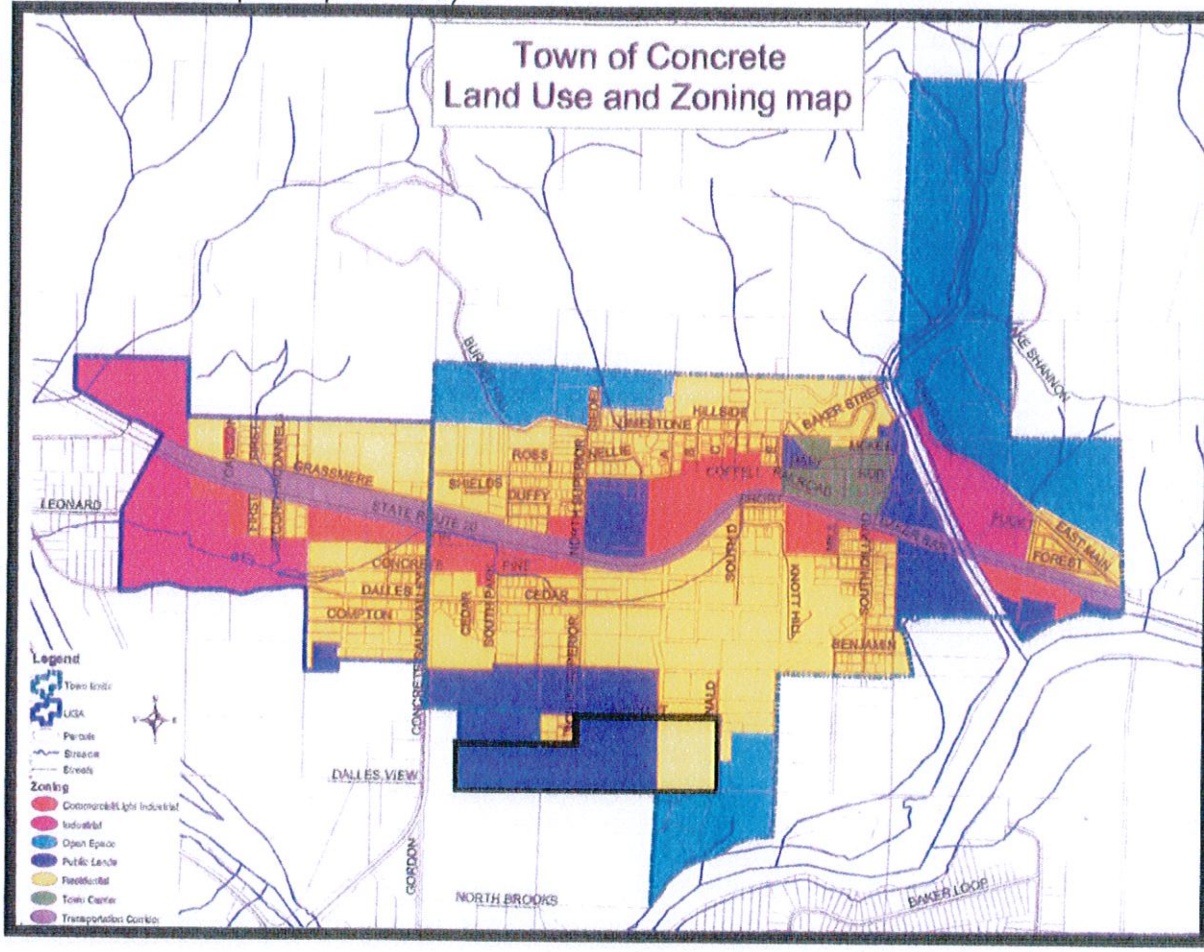
Existing land uses in the vicinity of the Concrete Municipal Airport include Public Land, Open Space, Residential, Commercial and Light Industrial. Areas South and East of the airport are forested mountains which could ultimately be developed. Areas approximately ½ mile west of the airport are residential with forest areas beyond that. Adjacent to the airport, to the north side is the local High School and athletic fields. The

Skagit River parallels the airport to the South and is considered/classified as "Wild & Scenic."

In 1996, the Washington State Legislature passed land use legislation (RCW 36.70.547, RCW 36.70A.510) that requires all cities and counties to adopt comprehensive plan goals, policies and regulations to discourage development of incompatible land uses adjacent to public use airports. Local jurisdictions are also required to consult with aviation interests, including WSDOT Aviation, when adopting comprehensive plan amendments. Communities must address airport land use compatibility as part of their scheduled GMA Updates, subject to the schedule designated by state law.

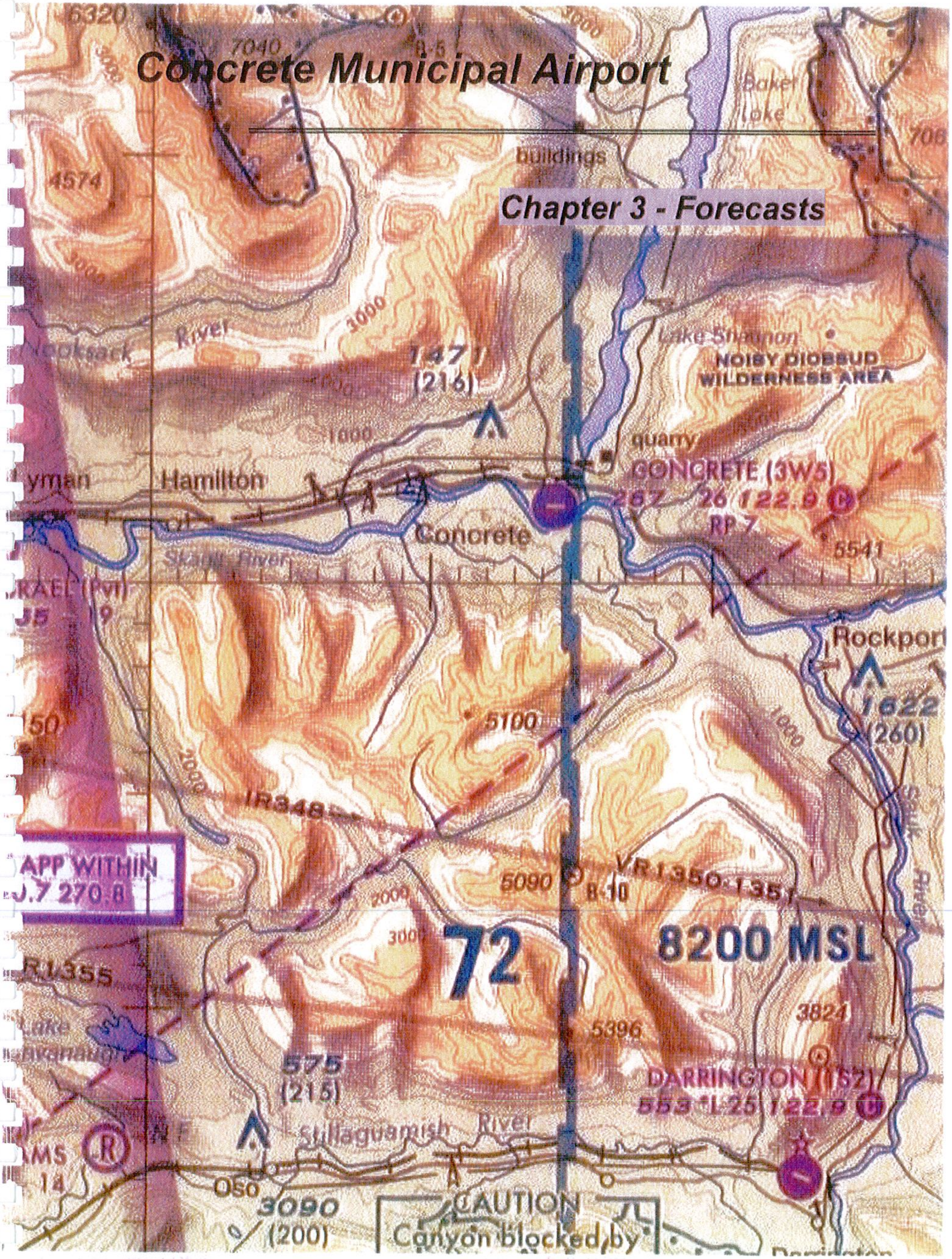
The Town of Concrete is currently in the process of updating their Comprehensive Plan. Appendix E, Proposed Land Use Goals and Policies identifies the Town of Concrete's draft comprehensive planning goals and policies for the municipal airport. The plan includes language that discourages the development of incompatible land uses adjacent to the airport as well as including additional policies relevant to the airport, such as the significance of the airport for economic development, education and recreation. The passage of the comprehensive plan will provide for a level protection against the development of facilities that are not compatible with the airport.

Figure 2.9
Land Use Zoning Map
Concrete Municipal Airport Study



Concrete Municipal Airport

Chapter 3 - Forecasts



Chapter 3

GENERAL AVIATION DEMAND FORECASTS

GENERAL AVIATION TRENDS

According to the FAA Aerospace Forecasts general aviation activity "is expected increase from relatively inexpensive twin-engine microjets, which may redefine "on-demand" air taxi service. In 2008, 100 microjets will join the fleet, with an annual growth of 400-500 per year through 2017. General aviation hours flown will also increase by 3.2 percent annually through 2017"[1]. As a whole, the nation's general aviation fleet is expected to grow in size, with future growth levels proportional with the existing aircraft types (single, multi-piston, turboprop, turbine-jet). The single-engine general aviation fleet is becoming more sophisticated, with a gradual increase in the fleet size, utilization, and pilot training. An increase in the business utilization of aircraft, combined with increasingly complex pilot and airspace regulations, has generally contributed to a more sophisticated pilot population flying more advanced and demanding aircraft. Likewise, the recent cost escalations associated with recreational flying, coupled with higher liability and taxes for those who own, rent, and operate general aviation airplanes, has contributed to an increase in business and itinerant aircraft operations relative to pilot training and recreational activity. This trend has resulted in a reduction in private pilots, and a leveling-off of single-engine, general aviation aircraft used for recreational purposes. However, the recently adopted sport pilot regulations are anticipated to stimulate activity in general aviation for small and light aircraft operators that would likely use or base their aircraft at the Concrete Municipal Airport.

AIRPORT FORECAST METHODOLOGY

Aviation demand forecasts are prepared to estimate future airport facility and equipment needs. The preferred forecasts are used to identify the type, extent, and timing of airport development, along with an estimate of the financial feasibility of airport development alternatives, and evaluating potential environmental effects.

[1] FAA Aerospace Forecasts FY 2006-2017

REGRESSION ANALYSIS

Regression analysis relies on projecting historic trends into the future. A regression equation based upon independent variables such as economic measures like income, population, and employment is used to predict the dependent variable, or in this case based aircraft. It is one of the fundamental techniques used to analyze and forecast aviation activity.

Share Analysis

Historical shares are calculated as a basis for projecting future shares. This approach is a "top-down" method of forecasting since forecasts of larger aggregates are used to derive forecasts for smaller areas (e.g., airports). A typical example where this may be appropriate is an airport's percentage share of national based aircraft. An airport might historically have a relatively constant 0.22 percentage share of U.S. domestic aircraft. Perhaps the share has shown little variation over the period being measured (e.g., ranged between 0.21 percent and 0.23 percent of the national total). Given no expected structural changes, the historic share is extrapolated over the 20 year planning period. Therefore, the historic share could be multiplied by the FAA's national domestic aircraft forecast to obtain the airport's based aircraft forecast.

Exponential Smoothing

Exponential smoothing is a statistical technique that is used in producing short-term forecasts. This technique produces a forecast based on a time series analysis of observations in which the most weight is given to the most recent observation and decreasing weights are given to earlier observations. This method would give more weight to the latest trends and conditions at the airport (e.g., a new flight training school at the airport).

Comparison with Other Airports

Comparison with other airports is a forecasting technique that compares the airport to be forecast with other airports of relative size and relevant characteristics. One particular use of this technique is in projecting airport operations growth after a major change such as the lengthening of the primary runway. In this case, analogy can be made to growth rates achieved at similar airports after they have lengthened their primary runway. It may also be appropriate to compare airport forecasts to statewide forecasts that are available, or established forecasts for other airports in the same region.

NATIONAL AVIATION TRENDS

According to the FAA Aerospace Forecast Fiscal Years 2006–2017 report, business use of general aviation aircraft will expand at a more rapid pace than that for personal/sport use. On the business and corporate side of general aviation the industry should benefit from a growing market for new microjets. Moreover, corporate safety and security concerns for corporate staff, combined with increased processing times at some airports have made corporate and on-demand charter flights appealing alternatives to traveling on commercial flights.[2]

"The general aviation fleet is forecast to increase at an average annual rate of 1.4 percent over the 12-year period, growing from an estimated 214,591 in 2005 to 252,775 aircraft in 2017. The turbine-powered fleet is expected to grow at an average of 4.0 percent a year over the 12-year period with the turbine jet fleet doubling in size by 2017."[3]

"These FAA projections indicate that microjets will begin to enter the active fleet in 2008 (100 aircraft) and grow by 400 to 500 aircraft a year, reaching 4,950 aircraft by 2017. The number of piston-powered aircraft is projected to increase from 193,098 in 2005 to 218,415 in 2017, an average increase of 1.0 percent yearly. The slow growth among single engine and multi-engine piston aircraft (0.3 and 0.1 percent respectively) is offset by a projected 6.7 percent average annual growth in piston rotorcraft."[4]

"Starting in 2005, a new category of aircraft was created: "light sport" aircraft. The FAA forecasts indicate that approximately 10,000 of these aircraft will be registered through 2011 and is projected to increase to 14,000 in 2017. The number of general aviation hours flown is forecast to increase by 3.2 percent annually through the forecast period. The increase is attributed to more business and corporate activity in addition to the increase in utilization rates for piston aircraft. Hours flown by turbine aircraft are forecast to increase 6.4 percent yearly over the forecast period, compared with 1.8 percent for piston-powered aircraft."[5]

PREVIOUS AIRPORT FORECASTS

The WSDOT Aviation Division's State Aviation System Plan - Forecast and Economic Analysis Study contains the forecasts for the Concrete Municipal Airport and are shown in Table 3.1. The methodology used was based on a forecast of registered aircraft in the

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2 FAA Aerospace Forecasts FY 2006-2017
3 ibid
4 ibid
5 ibid

state and a subsequent distribution of the forecasts to airports in each county. Aircraft operations were determined using a ratio of operations per based aircraft and includes a slight increase in the utilization rate over time into the future. The WSDOT Aviation Division forecast was being updated at the time this report was written.

Table 3.1
WSDOT Aviation Division Forecast
Concrete Municipal Airport Study

Year	2000	2005	2010	2015	2020
Based Aircraft	24	24	24	24	25
Operations	6,750	6,800	6,800	6,800	7,100

Source: WsDOT Aviation System Plan & Economic Analysis Study

Historical Population in Concrete

Although Concrete's rate of growth has fluctuated, population numbers have remained relatively stable over the last several years, with only small increases recognized in the estimates. Between 1980 and 1990, Concrete's population increased by 143 people, an average rate of 2.2% per year. Between 1990 and 1995 this growth trailed off, with the net addition of five new residents, resulting in an annual growth rate of only 0.1%.

Table 3.2
Town of Concrete Historical Population
Concrete Municipal Airport Study

	1995	2000	2001	2002	2003	2004	2005
Population	740	790 Census	790	790	780	785	815
Population Change		50	0	0	-10	5	30

Source: Concrete Long Range Plan

Skagit County Population

The county-wide population projections from the Washington Office of Financial Management (OFM) Based on the 2000 census data, Skagit County had a population of approximately 102,978 residents. The county has experienced an average annual rate of population growth of approximately 3.2% since 1990. This reflects a significant increase in the rate of growth during the decade of the 1980s, when Skagit County population increased at an average rate of 2.2% per year.

The projection of based aircraft at the Concrete Municipal Airport is shown in Table 3.3, Based Aircraft Forecast. The forecast are based upon regression analysis calculations utilizing population growth rates of the Town of Concrete and Skagit County, and the FAA growth rate detailed in the FAA Aerospace Forecasts FY 2006-2017 report.

Table 3.3
Based Aircraft Forecast
Concrete Municipal Airport Study

Year	2005	2010	2015	2020	2025
Town of Concrete Population[6]	44	44	44	45	45
Skagit County Population[7]	44	52	60	71	83
FAA Share Analysis[8]	44	47	51	54	58

[6] Based upon 0.10% growth rate.
[7] Based upon 3.20% growth rate.
[8] Based upon 1.40% growth rate.

PREFERRED BASED AIRCRAFT FORECAST

Taking into consideration the various growth rates based upon the local and county population growth rates and also considering the geographic constraints of the Airport, it was determined that the FAA Share Analysis methodology using the "FAA Growth" forecast should be selected as the preferred forecasting method. This forecast method assumes the FAA forecast reasonably represents the local demand for general aviation activity per type of aircraft.

Table 3.4, Preferred Based Aircraft Forecast, summarizes the forecasts of based aircraft prepared for the Concrete Municipal Airport throughout the 20-year planning period. These were prepared to provide a basis for airport development which is tied to actual airport activity and aircraft usage. For forecast purposes, total based aircraft are expected to increase gradually from 44 existing aircraft to approximately 58 aircraft by the end of the planning period.

Table 3.4
Preferred Based Aircraft Forecast
Concrete Municipal Airport Study

Year	Single-Engine Aircraft (A-I)	Multi-Engine Piston (A-I)	Helicopters	Total Based Aircraft
2005	43	1	0	44
2010	46	1	0	47
2015	50	1	0	51
2020	53	1	0	54
2025	57	1	0	58
Note: Forecasts have not been prepared for other aircraft such as ultra-lights, balloons, or sailplanes.				

Source: BWR, Forecast of Based Aircraft, October 2005.

AIRCRAFT OPERATIONS FORECAST

Table 3.5, Aircraft Operations Forecast, summarizes the forecast of annual aircraft operations at the Concrete Municipal Airport for each forecast phase. Based upon the Airport Master Record (FAA Form 5010), the annual activity at the Concrete Municipal Airport is 5,000 operations which correlates to a utilization rate in the vicinity of 114 operations per based aircraft. While the total based aircraft at the airport is expected to increase over the planning period, the operational forecast are based on the assumption that the aircraft utilization rate will remain constant through the planning period.

Furthermore, it is assumed that the operational relationship of (40%) local to (60%) itinerant operations will occur at the Concrete Municipal Airport throughout the 20-year planning period.

Table 3.5
Aircraft Operations Forecast
Concrete Municipal Airport Study

Year	Total Based Aircraft	Utilization Rate	Total Local Operations	Total Itinerant Operations	Total Operations
2005	44	114	2,006	3,010	**5,016**
2010	47	114	2,143	3,215	**5,358**
2015	51	114	2,326	3,488	**5,814**
2020	54	114	2,462	3,694	**6,156**
2025	58	114	2,645	3,967	**6,612**

Note 1: 2005 level of based aircraft, FAA 5010 Inspection Form data were utilized to generate aviation forecasts.
Note 2: Utilization Rate is Total Operations/Total Based Aircraft = Utilization Rate. Forecasts for itinerant and local traffic were calculated as follows:

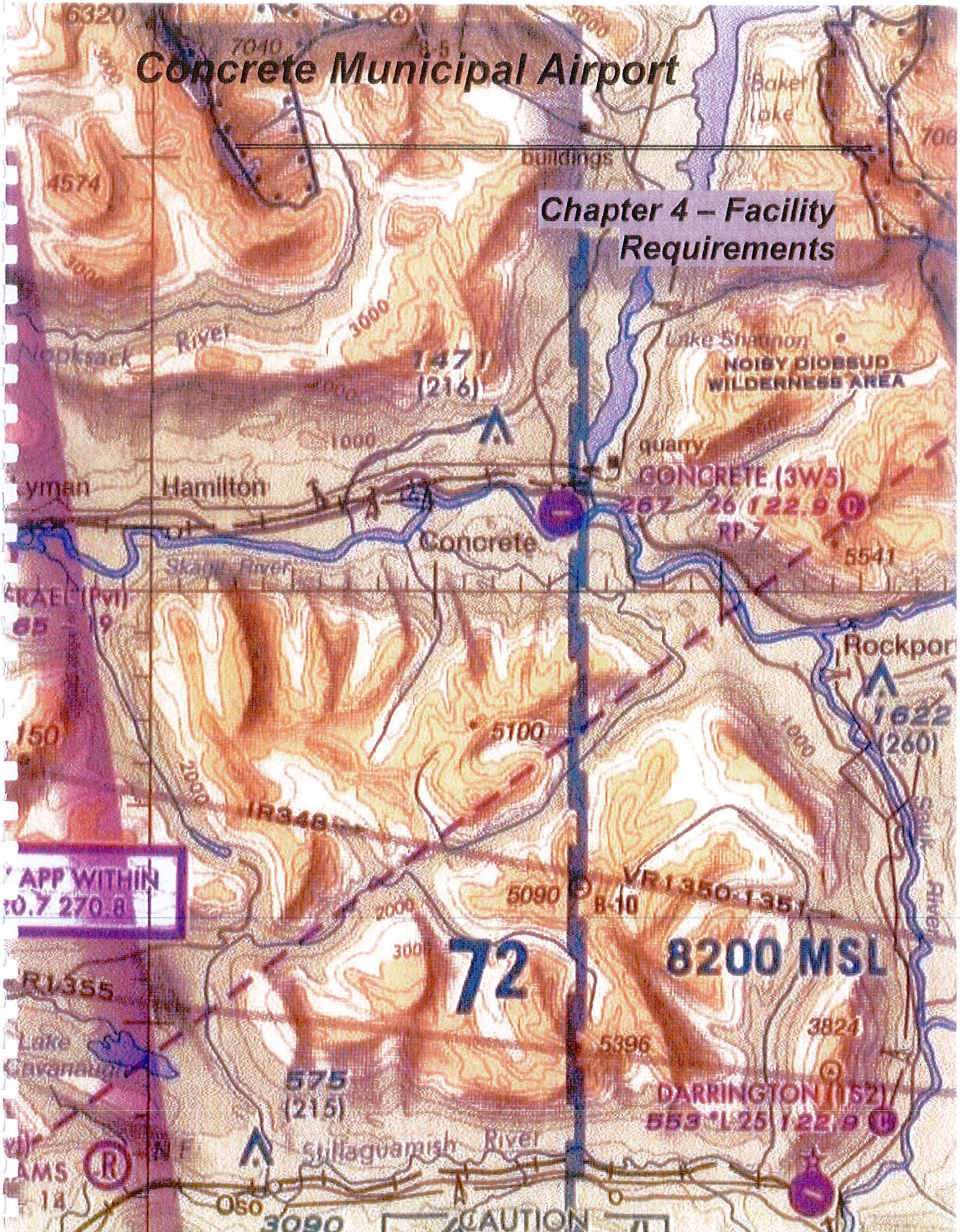
Source: BWR, Aircraft Operational Forecast, October 2005.

AIRPORT INSTRUMENT APPROACHES

Typically, instrument approaches permit flight operations during instrument meteorological conditions (IMC) and further increase airport access, capacity, and overall reliability and safety of the airport. Due to the mountainous terrain and geographical constraints of the airport location, the Concrete Municipal Airport does not have an instrument approach to the runway. Therefore, no instrument approach forecasts were accomplished for the Airport.

Concrete Municipal Airport

Chapter 4 – Facility Requirements



Chapter 4

AIRPORT FACILITY REQUIREMENTS

INTRODUCTION

This chapter identifies the long-range airfield and terminal area facility needs and is based upon the inventory and forecast findings illustrated in Chapters 2 and 3. The airport facility improvements have been identified based on the accumulation of inventory information and aviation demand forecast elements, and has been planned in accordance with FAA and WSDOT Aviation Division design standards and airspace criteria. It should be noted that identification of needed facilities does not constitute a "requirement" in terms of design standards; however, this provides an "option" for facility improvements to accommodate future aviation activity.

Airfield facility components include runways, taxiways, navigational aids, airfield marking/ signage and lighting. Terminal area facility components involve hangars, terminal building, aircraft parking apron, fuel quantity and dispensing units, public vehicle parking and airport access requirements.

Airport Reference Code (ARC) Classification

As discussed in Chapter 2, the Critical Aircraft for the Concrete Municipal Airport will be in the ARC A-I category throughout the 20-year planning period. The Airport Reference Code (ARC) for the Concrete Municipal Airport during each of the planning periods is shown in **Table 4.1, Existing and Ultimate Airport Reference Code.**

The FAA has established airport design criteria corresponding with an airport's role and ARC designation. This criterion provides minimum safety standards with respect to the performance characteristics represented by the airport's critical aircraft. This particular aircraft, as determined with respect to approach speed and wingspan, is within a design category of airplanes that conduct at least 500 itinerant operations (combination of landings and takeoffs) per year.

The following information in this chapter will focus on applying the FAA Design standards to the existing conditions of the Concrete Municipal Airport, and will include recommendations to improve the airport in order to bring it into compliance with the safety standards.

Table 4.1
EXISTING AND ULTIMATE AIRPORT REFERENCE CODE (ARC)
Concrete Municipal Airport Study

Runway	Existing ARC	Phase 1 ARC (0-5 Years)	Phase 2 ARC (6-10 Years)	Phase 3 ARC (11-20 Years)
Primary Runway	A-I	A-I	A-I	A-I
Crosswind Runway	N/A	N/A	N/A	N/A

Note 1: The most demanding (greatest) runway ARC per planning phase indicates the airport's ARC.

Note 2: Aircraft Approach Category groups have the following performance characteristics:
Aircraft Approach Category A = approach speed less than 91 knots.
Aircraft Approach Category B = approach speed of 91 knots or more, but less than 121 knots.

Airplane Design Groups are based on aircraft wingspans as follows:
Airplane Design Group I = wingspan up to but not including 49 feet.
Airplane Design Group II = wingspan of 49 feet up to but not including 79 feet.

Source: BWR, Designated Airport Reference Code (ARC) Forecast – July, 2006.

AIRFIELD SAFETY AREA REQUIREMENTS

Compliance with airport design standards is required to maintain a minimum level of operational safety. The major airport design elements, as follows, are established from FAA Advisory Circular 150/5300-13, Change #10, Airport Design and FAR Part 77, Objects Affecting Navigable Airspace, and should conform with FAA airport design criteria without a modification to the standards.

Runway Safety Area (RSA): The RSA is a two-dimensional area surrounding and extending beyond the runway and taxiway centerlines that the airport must own in "fee simple" title. The RSA for the Concrete Municipal Airport (ARC A-I and small aircraft exclusively) is 240' prior to the landing threshold, 240' beyond the runway end and 120' wide. This safety area is provided to reduce the risk of damage to airplanes in the event of undershoot, overshoot, or excursion from the runway. In addition, it must be cleared and free of objects except those required for air navigation and graded to prevent water accumulation, as consistent with local drainage requirements. Under dry conditions, the RSA must support an airplane without causing structural damage to the airplane or injury to the occupants. No object may be located in the safety area except those that need to be because of their function in airport operations (i.e. REIL or PAPI). In those cases, they must be constructed on frangible-mounted structures where practical.

As identified in Chapter 2, the airport runway is 2,580' x 60'. East of the Runway 25 end there is 77' of level surface prior to a steep drop off point. West of the Runway 07 end, there is 205' of level surface prior to a steep drop off point. In order to meet the RSA requirements of 240', the east end of Runway 25 will need to be shortened by 163' and the west end of Runway 07 will need to be shortened by 35'. Because adequate runway safety areas do not exist and because the physical property constraints prohibit the construction of adequate runway safety areas, it is recommended that declared distances be established as a short term solution until a capital improvement grant becomes available for the design, engineering and construction of relocated thresholds.

Declared distances are a means of obtaining a standard safety area by reducing the usable runway length. To provide a full 240' RSA on both ends of the runway, the following is recommended:

- Runway 25 threshold should be relocated 163 feet.
- Runway 07 threshold should be relocated 35 feet.

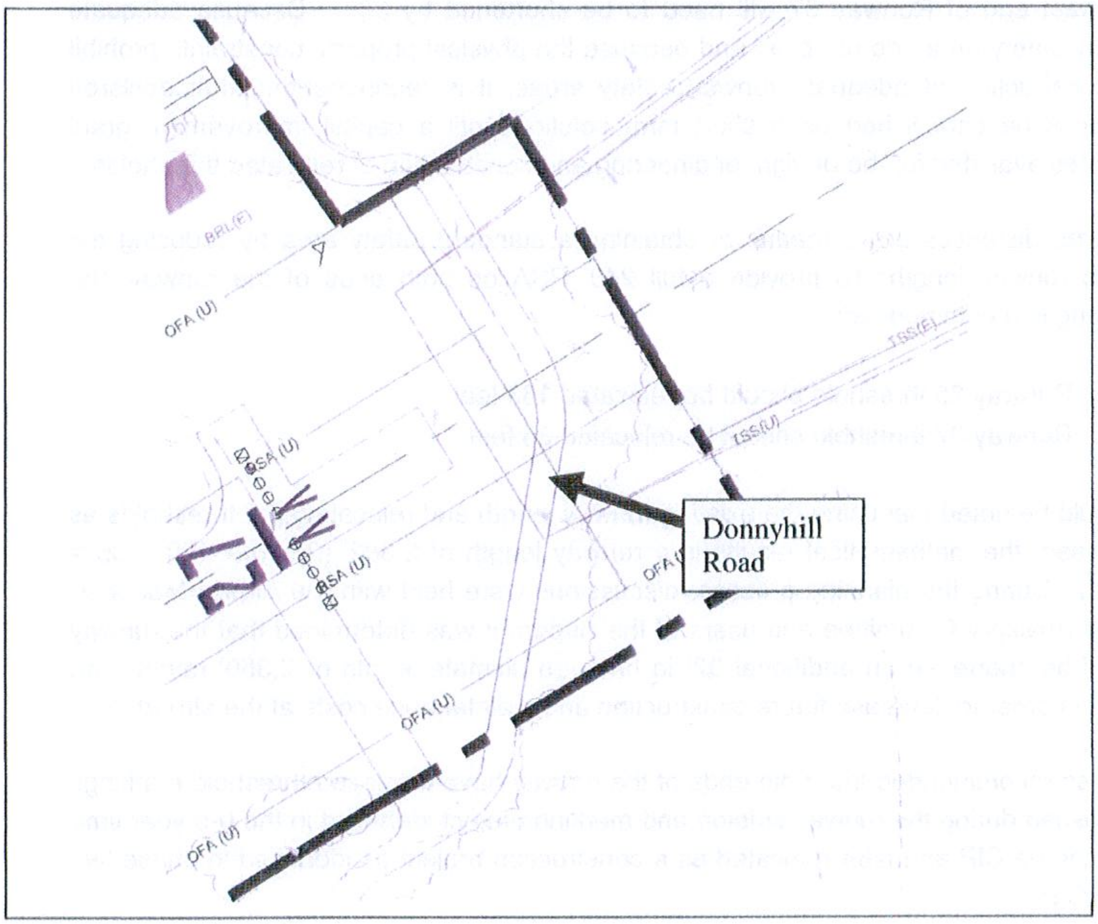
It should be noted that using the existing runway length and relocating the thresholds as discussed, the mathematical results is a runway length of 2,382' (2,580 – 163 – 35 = 2,382'). During the planning process, discussions were held with the Airport Manager, Airport Advisory Committee and users of the Airport, it was determined that the runway should be shortened an additional 32' to have an ultimate length of 2,350' rather than 2,382' in order to decrease future construction and maintenance costs at the airport. [1]

It is also recommended that both ends of the runway have displaced threshold markings established during the runway striping and marking project identified in the 0-5 year time frame of the CIP and later relocated as a construction project as identified in phase two of the CIP.

There is an unpaved private road (Donnyhill Road) located approximately 100 feet of the Runway 25 threshold, creating an obstruction (10' vehicles) to landing aircraft. The road also limits the clear dimensions for the runway safety area. By relocating the threshold by 163', Donnyhill Road no longer violates the RSA. Exhibit 4.1 shows the location of Donnyhill Road with respect to the eastern end of the runway.

1 Existing runway length of 2,580' shortened by 198' is 2,382' (2,580 – 163 – 35 = 2,382).

Figure 4.1
Donnyhill Road
Concrete Municipal Airport Study



Object Free Area (OFA): The Runway Object Free Area (OFA) is defined as a two dimensional ground area surrounding runways, taxiways, and taxi lanes which is clear of objects except for objects whose location is fixed by function to assist air navigation or ground maneuvering reasons. The OFA standard for Runway 7 - 25 is 250 feet wide (125' on each side of the runway centerline) and extends 240 feet beyond the runway end. The OFA is also infringed upon by Donnyhill Road located 100 feet off the Runway 25 extended centerline.

Similar to the discussions concerning the RSA described above, By relocating the threshold by 163', Donnyhill Road is no longer an obstruction to the OFA.

On the eastern area of the airport south of the runway, an area of vegetation of bushes and shrubs has grown to a level that they have become obstructions in the OFA. This area should be cleared and grubbed to remove the vegetation and to clear the OFA.

As shown on the Pavement Marking page of the ALP drawing set, the standard hold line location for a visual runway is 125' from the runway centerline. The remaining area of the OFA appears to be free of obstructions.

Obstacle Free Zone (OFZ): The OFZ is airspace above a surface centered on the runway centerline, and precludes taxiing and parked airplanes and object penetrations except for frangible post mounted NAVAIDs expressly located in the OFZ by function such as runway edge lights and runway threshold lights. Similar to the OFA, the OFZ is 250' wide (125' on each side of the runway centerline), however, the OFZ only extends 200' beyond each end of the runway.

The deficiencies noted in the OFA section above are similar for the OFZ. On the eastern area of the airport south of the runway, an area of vegetation of bushes and shrubs has grown to a level that they have become obstructions in the OFZ. This area should be cleared and grubbed to remove the vegetation and to clear the OFZ.

The remaining area of the OFZ appears to be free of obstructions.

Taxiway / Taxilane Safety Area: The taxiway system at the Concrete Municipal Airport consists of one connecting taxiway between the runway and the parking apron adjacent to the pilots lounge and a turf taxilane that runs east and west between the hangar buildings. The areas adjacent to the taxiway and taxilane are free of obstructions.

Taxiway / Taxilane Object Free Area: For taxiway systems under the Aircraft Design Group 1, the taxiway OFA width is 89' and the taxilane OFA is 79'. The existing hangars are located well outside the taxiway OFA.

Parked aircraft positioned near the existing or planned taxiway should be located with a minimum setback of at least 44.5 feet from the taxiway centerline and 39.5 feet from the taxilane centerline.

Building Restriction Line: A 251 foot Building Restriction Line (BRL) is recommended which would allow for an 18' tall building to be constructed without penetrating the 7:1 transitional surface. However, it should be noted that the contours of the airport property are the highest at the runway centerline, and decrease in the direction of the hangar buildings. This may be of interest to parties interested in building a structure greater than 18' near the BRL. Additionally, the BRL is intended to provide guidance in locating structures so that they do not penetrate the 7:1 transitional surface. Therefore a building less than 18' in height could be located closer to the runway than 251' and not penetrate the 7:1 transitional surface.

Currently, five structures have been built closer to the runway than 251'. Three are on airport property and two are off airport property. It is recommended that one structure (Lot 601-D) that penetrates the transitional surface by five feet have a roof top obstruction light installed[2]. Due to the fact that the airport is predominately a day time use only facility, the surface penetrations (if lighted) created by the structures are considered minor.

It is recommended that a BRL be established to prevent the construction of any structure that penetrates the transitional surface.

Runway Protection Zone (RPZ): The RPZ is a two-dimensional trapezoid area beginning 200 feet beyond the paved runway end, and extends along the runway centerline. The purpose of the RPZ is to enhance the protection of people and property on the ground, and to prevent obstructions potentially hazardous to aircraft. RPZ dimensions are determined by the type of aircraft expected to operate at the airport (small or large) and the type of approach planned for the runway ends (visual, precision, or non-precision).

The recommended visibility minimums for the runway ends are determined with respect to approach procedures, the ultimate runway ARC, airfield design standards, instrument meteorological wind conditions, and physical constraints (approach slope clearance) beyond the extended runway centerline. The FAA recommends that airports own the entire RPZ in "fee simple" title and that the RPZ be clear of any non-aeronautical structure or object that would interfere with the arrival and departure of aircraft. The RPZ dimensions at Concrete are based upon "small aircraft exclusively" with approach visibility minimums of visual and not lower than 1 – mile.

With the current configuration, the RPZs for both runway ends are beyond the airport property and are not controlled by the airport. There are no incompatible land uses in the runway 25 RPZ, and two residential structures are located in the runway 07 RPZ. It should be noted that the top of these structures are more than 70' lower than the runway elevation.

As discussed under the **Runway Safety Area (RSA)** section, it is recommended that declared distances be established as a short term solution until a capital improvement grant becomes available for the design, engineering and construction of relocated

[2] 601-D is a 14' hangar located 190' from centerline (190-125/7=9 structure allowed); i.e., 5' penetration.

thresholds. This short term runway markings should include the following displaced thresholds:

- Runway 25 threshold should be displaced 163 feet.
- Runway 07 threshold should be displaced 35 feet.

The use of declared distances also necessitates the establishment of two RPZs for each end of the runway, an approach RPZ and a departure RPZ. These are shown on the ALP drawing set.

Numerous fir trees, ranging in height from 30' to 40' located on both sides of the runway centerline; extend from 200' to 1000' from the primary surface. These trees have grown into obstructions in both the east and west RPZs at the Concrete Airport. Avigation easements should be acquired from the adjacent property owners to gain access for the trees to be topped or removed in order to protect the approach ends of the runways.

It is recommended that the Town ensure that avigation easements are in place for the property in the RPZs to protect the airport from incompatible land use development and to keep the RPZs free of obstructions. WsDOT Aviation should be consulted to assist with implementing local land use and zoning controls to prohibit the development of incompatible uses in the airport vicinity.

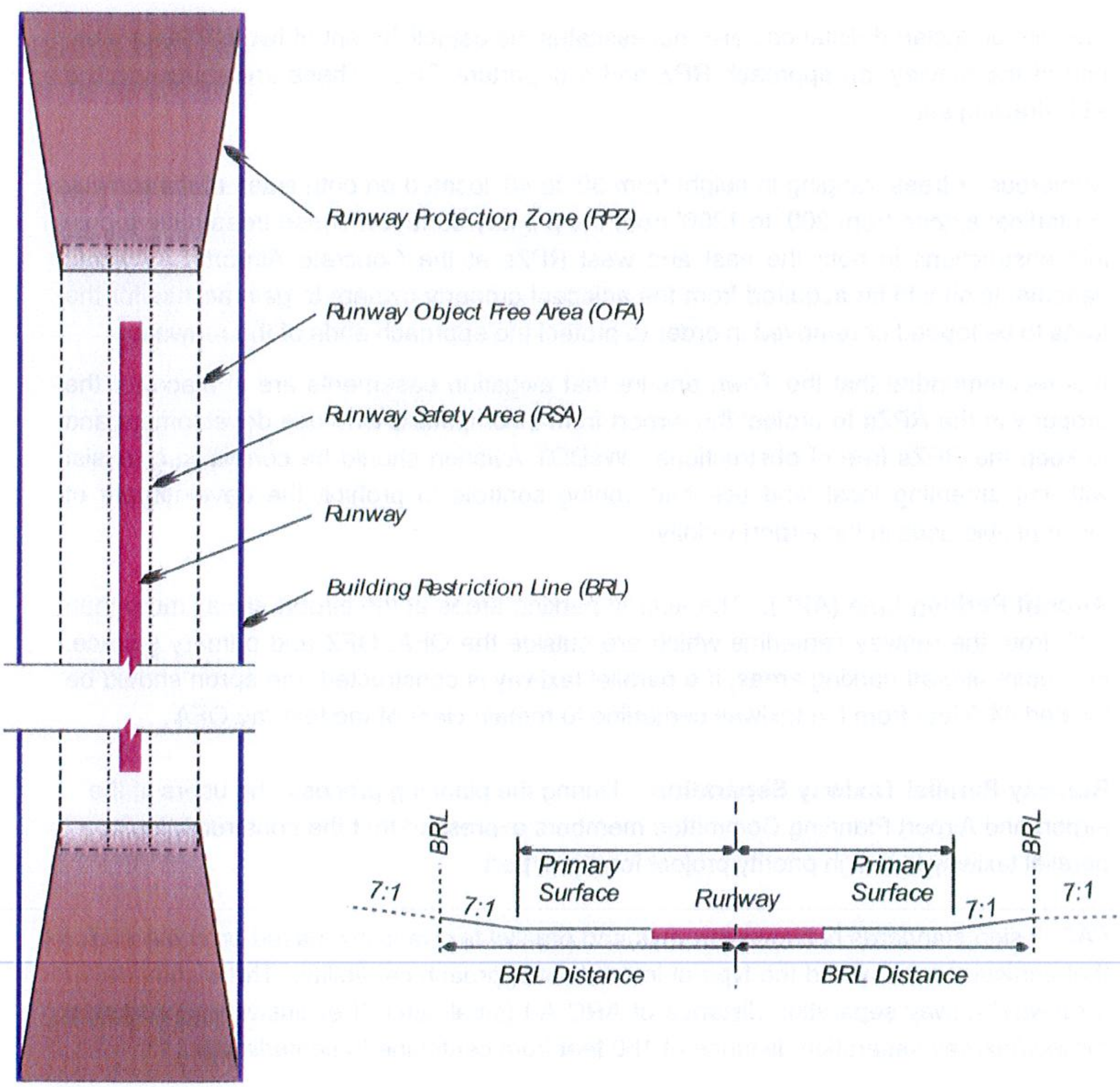
Aircraft Parking Line (APL): The aircraft parking areas at the airport are all more than 125' from the runway centerline which are outside the OFA, OFZ and primary surface. For future aircraft parking areas, if a parallel taxiway is constructed, the apron should be located 44.5 feet from the taxiway centerline to remain clear of the taxiway OFA.

Runway-Parallel Taxiway Separation: During the planning process, the users of the airport and Airport Planning Committee members expressed that the construction of a parallel taxiway is a high priority project for the airport.

FAA design standards between runways and parallel taxiways are based on the ARC for that particular runway and the type of instrument approach capability. The standards for a runway/taxiway separation distance of ARC A-I (small aircraft exclusively) specifies a runway/taxiway separation distance of 150 feet from centerline to centerline.

Figure 4.2 – Runway Safety Areas, on the following page gives a visual representation of the Airport Safety Areas.

Figure 4.2
RUNWAY SAFETY AREAS
Concrete Municipal Airport Study



Source: **FAA FAR Part 77, *Objects Affecting Navigable Airspace*.**

FAR PART 77 SURFACES

Airspace planning for airports in the United States is delineated under Federal Air Regulation (FAR) Part 77 – Objects Affecting Navigable Airspace. The BRL represents the boundary that separates the airside and landside facilities and identifies suitable building area locations based on airspace and visibility criteria. Figure 4.3 shows a visual representation of the FAA Part 77 surfaces.

Based on the geographic constraints of the airport, it is recommended that the airspace planning be based upon visual approaches to the existing runway. **Table 4.2** summarizes the FAR Part 77 standards with Concrete's runway and published approach.

Table 4.2
FAR PART 77 AIRSPACE SURFACES
Concrete Municipal Airport Study

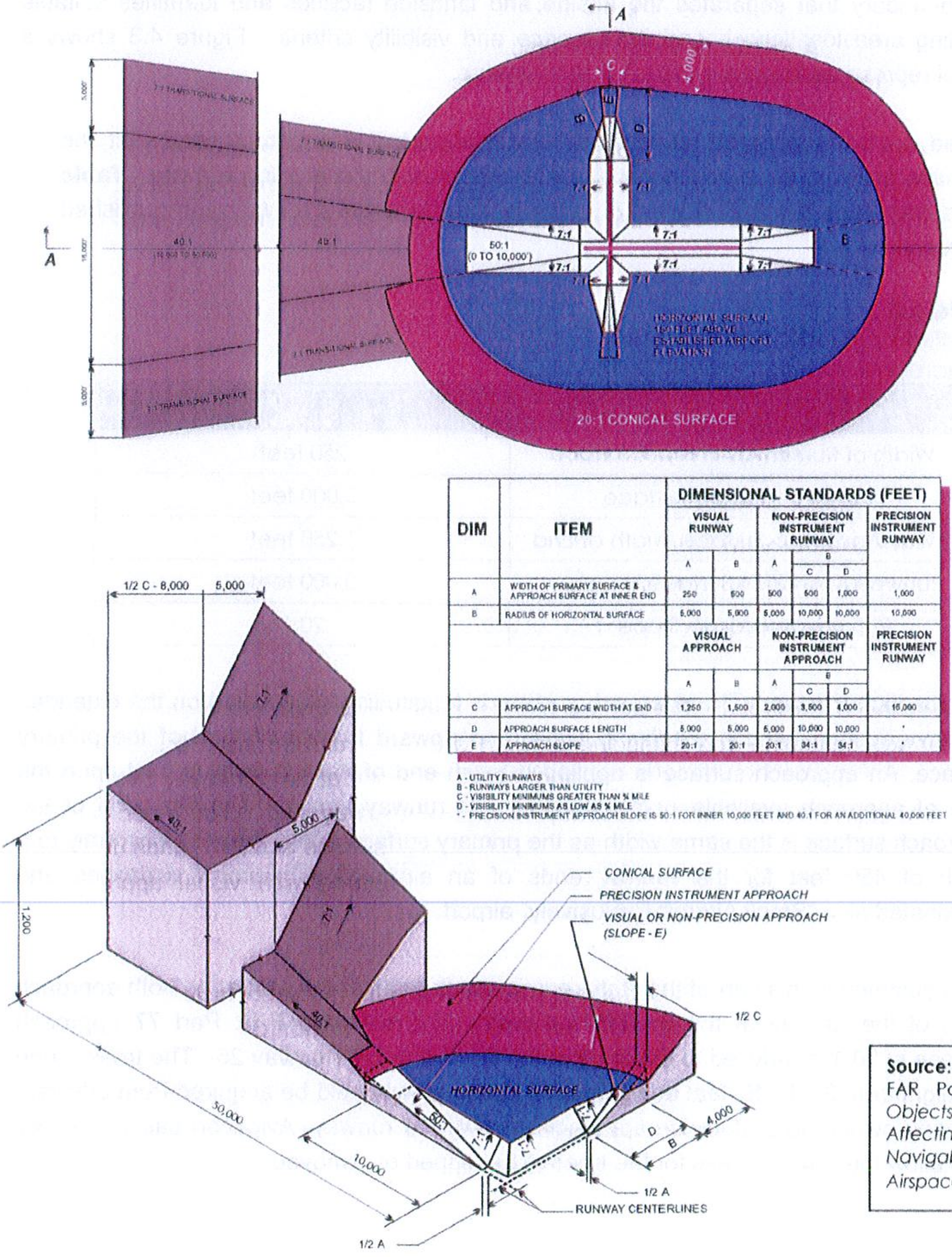
Item	Utility Visual
Width of Runway Primary Surface	250 feet
Radius of Horizontal Surface	5,000 feet
Runway Approach Surface Width at End	1,250 feet
Runway Approach Surface Length	5,000 feet
Runway Approach Slope	20:1

Approach Surfaces: The approach surface is longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of each runway based upon the type of approach available or planned for that runway end. The inner edge of the approach surface is the same width as the primary surface and it expands uniformly to a width of 450 feet for the runway ends of an airport with visual approaches and designated as a "Small Aircraft Exclusively" airport.

As is common in this part of the state, numerous fir trees are obstacles to both approach ends of the runway at the Concrete Airport. The standard FAR Part 77 approach surface of 20:1 is reduced to 6:1 for Runway 07 and 1:1 for runway 25. The trees range in height from 30' to 40' feet and avigation easements should be acquired from adjacent property owners to protect the approach ends of the runway. Avigation easements will also allow the Town Access for the trees to be topped or removed.

The helicopter landing area has one defined approach surface from the south that extends 4,000 feet from the paved surface at a slope of 8:1. There are no obstructions.

Figure 4.3
FAR PART 77 - IMAGINARY AIRPORT SURFACES
Concrete Municipal Airport Study



DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B: C	B: D	
A	WIDTH OF PRIMARY SURFACE & APPROACH SURFACE AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT RUNWAY
		A	B	A	B: C	B: D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN ¾ MILE
D - VISIBILITY MINIMUMS AS LOW AS ¾ MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET

Source: FAA FAR Part 77, *Objects Affecting Navigable Airspace.*

Primary Surface: The primary surface is longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond each end of that runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline. The width of a primary surface is 250 feet for utility runways having only visual approaches. The primary surface should be free of obstructions except those items that are fixed by function such as PAPIs, REILS and taxiway lights.

Similar to the runway safety area described above, east of the Runway 25 end there is 77' of level surface prior to a steep drop off point and west of the Runway 07 end, there is 205' of level surface prior to a steep drop off point. In order to meet the primary surface requirement of 200' beyond both runway ends, the work described above to establish an adequate RSA on both runway ends will also provide a primary surface that meets the requirements of the FAA and WsDOT Aviation.

The primary surface for the helicopter pad is defined by the flight operations area 40' wide surrounding the paved landing area. There are no obstructions to the area.

Transitional Surface: These surfaces extend outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the approach surfaces. Transitional surfaces for those portions of the precision approach surface which project through and beyond the limits of the conical surface and extend a distance of 5,000 feet measured horizontally from the edge of the approach surface and at right angles to the runway centerline.

On the South side of the runway, an area has been made available to a local civic organization to grow and harvest Christmas trees. Over the years the area has grown significantly, and many of the trees are too large to be used as Christmas trees. Several of the larger trees penetrate the Transitional surfaces, and should be removed. The remaining trees should be managed with a plan designed to maximize the Christmas tree harvest and to minimize the over growth of the trees. The local civic organization should be tasked to co-lead the implementation of this program with the airport sponsor.

Based on information obtained during airport inventory five structures and a chain link fence (20' ball-field back-drop fence) penetrate the Transitional Surface. Because these items penetrate the transitional surface, it is recommended that obstruction lighting be installed on the highest obstruction. Due to the fact that the airport is predominately a day time use only facility, the surface penetrations (if lighted) created by the structures are considered minor.

Horizontal Surface: The horizontal surface is a flat plane of airspace 150' above the elevation of the runway. The outer boundary of the horizontal surface is defined by two 5,500 foot radii extending from the runway ends. The outer points of the radii for each runway end are connected to form an oval which is then referred to as the horizontal surface. The elevation of the horizontal surface is determined by the elevation of the airport, plus 150' or 417' for the Concrete Municipal Airport. Sauk Mountain east of the airport has an elevation of 5,500' which penetrates the horizontal surface.

Conical Surface: The conical surface is the outer band of the Part 77 Airspace. It begins at the elevation of the horizontal surface and extends outward 4,000 feet at a slope of 20:1. The ceiling of the conical surface is 200' above the horizontal surface or 350' above the airport elevation. As with the horizontal surface, Sauk Mountain east of the airport at an elevation of 5,500' also penetrates the conical surface.

AIRSIDE REQUIREMENTS

Runway Length: FAA Advisory Circular 150/5325-4A, Runway Length Requirements, Computer Program Version 4.2, was used to determine the recommended runway length requirements for the Concrete Municipal Airport.

Table 4.3, Airport Runway Length Data, illustrates the runway design lengths as determined with respect to local conditions in order to achieve minimum safety levels. These conditions were considered as follows: **1**) the airport elevation for the Concrete Municipal Airport – 267.0 feet mean sea level; **2**) the average mean maximum daily temperature of 62.2°F for the hottest month (August); **3**) the effective runway gradient of .001° between runway ends; **4**) dry versus wet runway pavement (utility runway); and **5**) the corresponding critical aircraft family of airplanes forecast to use the runway.

Based on the FAA runway length model, a design length and width of 2,300' x 60' accommodates 75 percent of small airplanes under wet and slippery pavement conditions and 2,820' x 60' accommodates 95 percent of small airplanes under wet and slippery pavement conditions. Due to the geographical constraints of the airport's location, it is not feasible to construct a runway with sufficient length to accommodate 95 percent of small airplanes under wet and slippery pavement conditions. Moreover, because of the need to adhere to the **Airfield Safety Area Requirements** described in a preceding section of this chapter, the ultimate runway at Concrete, Washington will be 2,350' x 60' which only accommodates 75 percent of small airplanes under wet and slippery pavement conditions.

Pavement Strength: Pavements designed in accordance with the standards set forth in FAA AC 150/5320-6D are intended to provide a structural life of 20 years without major maintenance, provided that aviation demand is not significantly greater than forecast levels and routine maintenance activities are performed. Pavement strength is normally achieved through sufficient initial design and periodic overlays, and is maintained through routine crack seal, slurry seal maintenance and upkeep projects. At a minimum, the design pavement strength should accommodate the existing and future mix of aircraft expected to use the airport. The ultimate runway pavement strength of 12,500 lbs. is recommended.

Table 4.3
AIRPORT RUNWAY LENGTH DATA (FAA ADVISORY CIRCULAR 150/5325-4A)
Concrete Municipal Airport Study

Airport and Runway Data	Concrete Input
Airport elevation	267.0'
Mean daily maximum temperature of the hottest month	62.2° F
Maximum difference in runway centerline elevation	1.0'
Recommended Runway Length/Corresponding ARC	Length – Dry/Wet
Small airplanes with less than 10 passenger seats:	
75 percent of these small airplanes (ARC A-I)	2,300'
95 percent of these small airplanes (ARC A-I)	2,820'
Existing Runway Design/Corresponding ARC	*Design Length*
Runway (ARC A-I)	2,580'

Note 1: Wet & slippery apply to landing distance; runway end elevation applies to takeoff distance.
Note 2: "Useful load" – includes all usable fuel, passengers and cargo.

Source: AC 150/5325-4A (FAA Computer Model), *Runway Length Requirements for Airport Design.*

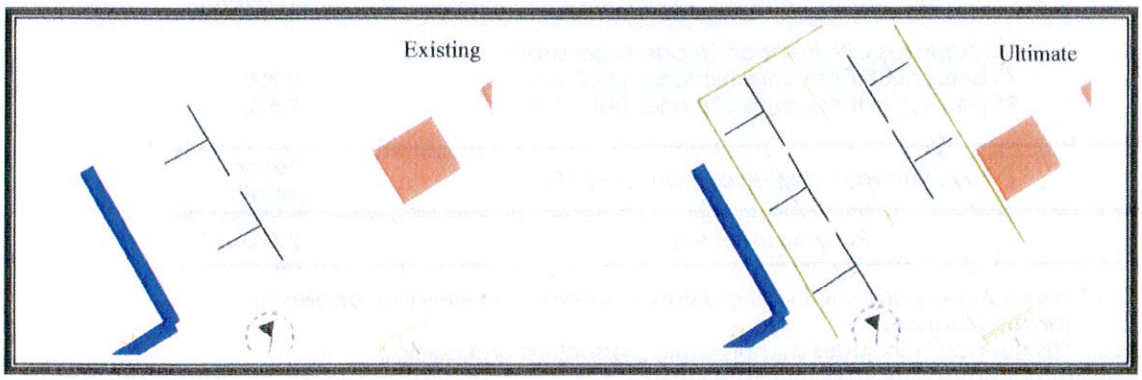
Airfield Capacity: The capacity of a general aviation airport with a single runway configuration has a range between 20 to 30 operations per hour during day time visual meteorological conditions (VFR). Based upon the projected aviation activity described in chapter 3 of this report, the existing facility will accommodate the forecast demand without much delay. However, as described below, the addition of a parallel taxiway for runway 07-25 is recommended as a safety related project to reduce the amount of time aircraft is currently required to spend on the runway. The addition of a parallel taxiway would also have the effect of doubling the runway capacity to approximately 60 operations per hour.

SECONDARY / CROSSWIND Runway Length Requirements

Crosswind runways are normally constructed to accommodate wind conditions and/or increase airfield capacity and safety. Based on wind coverage and geographic constraints, a crosswind runway is not feasible at the Concrete Municipal Airport.

Aircraft Tie-down Apron

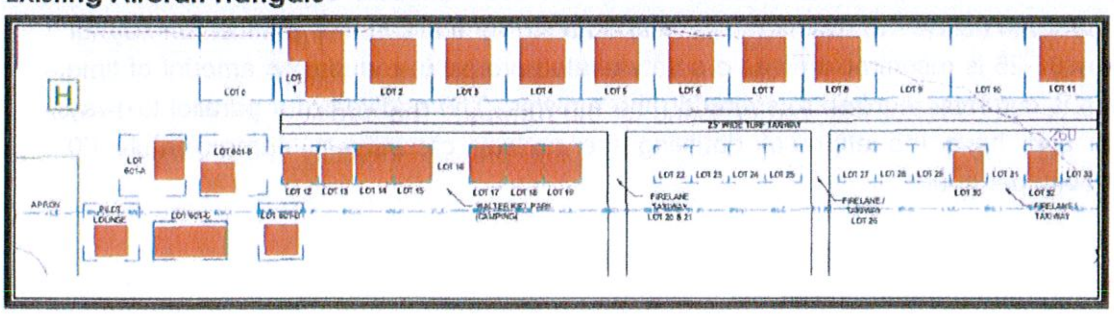
The airport has a 120' x 100' apron located near the center of the airport adjacent to the Pilot Lounge. The apron is connected to the runway by a paved taxiway and contains 2 aircraft tie-down spaces on the 1,340 S.Y. parking apron. The current tie-down area is sufficient to meet the current demand levels for transient aircraft parking. As future activity increases as projected in Chapter 3 (Aviation Forecast), three additional Tie-down spaces can be provided by reconfiguring the existing ramp area as shown below.



Aircraft Hangars

Currently, 23 existing hangar structures exist on the airport, and an additional 11 lots are available for hangar development.

Figure 4.4
Existing Aircraft Hangars



TAXIWAY SYSTEM

Taxiways are constructed primarily to facilitate aircraft movements to and from the runway system. Some taxiways are necessary simply to provide access between the aprons and runways, whereas other taxiways become necessary as activity increases at an airport to provide safe and efficient use of the airfield.

The FAA has established standards for taxiway width and runway/taxiway separation distances. Taxiway width is determined by the ADG of the most demanding aircraft to use the taxiway. According to FAA design standards, the minimum taxiway width for ADG I is 25 feet. This width applies to all taxiways serving the runway and corporate and FBO hangar areas serving large business aircraft. Design standards for the separation distances between runways and parallel taxiways are based primarily on the ARC for that particular runway and the type of instrument approach capability.

A full-length parallel taxiway is planned for the Runway 07-25. This taxiway is planned to extend along the north side of the runway to provide for future landside facilities developed in that area of the airport. Currently, the airport has a midfield taxiway connecting the Runway to the Apron Area. Aircraft must back taxi to the runway end for takeoff and also back taxi after landing to transverse to the parking apron or hangar area. A parallel taxiway would improve the capacity and safety characteristics of operations at the airport.

Based on FAA design standards (AC 5300-13 CHG 10) for Design Group I aircraft, the recommended taxiway would be required to be 25-feet wide. The minimum runway to taxiway separation distance for an ARC A-I, visual approach runway is 150 feet measured from runway centerline to taxiway centerline.

Taxiway Safety Standards: All entry taxiways must provide acceptable hold-short locations in compliance with threshold siting surface (TSS) and obstacle free zone (OFZ) criteria. All non-aeronautical objects must be located beyond the taxiway object free area (TOFA), which is a total of 89 feet wide (Design Group I) along the taxiway (44.5' on both sides of the centerline). Existing and planned taxiways are shown on the Airport Layout and Terminal Area Drawings per FAA airport design standards. The Taxiway Safety Area width is 49' (24.5' on both sides of the centerline). There are no obstructions to the taxiway safety areas.

Taxilane Requirements: Taxilanes provide access to airplane parking areas, fueling areas and hangars. Typically, taxilanes should provide for a minimum 15 feet of wing tip clearance on both sides of the aircraft wing. The taxilane object free area (TOFA) is 79 feet wide (Design Group I).[3] There are no obstructions to the taxilane safety areas.

Segmented Circle Marking System: A segmented circle is a 100-foot diameter circle with at least 18 segments constructed around the airport's wind direction indicator. The circle helps the visiting pilot to locate the wind indicator. It also serves as another visual identification of an airport. Segments are similar to those used to mark unpaved runways. Airports having nonstandard traffic patterns are able to convey this information with traffic pattern indicators located adjacent to the segmented circle. (See AC 150/5340-5B). The circle should be readily discernable from the air as well as the ground. The color(s) used should provide the best possible contrast with the surroundings. Aviation White is the recommended color for the Segmented Circle at Concrete.

The wind sock and segmented circle are located on the north side of the runway near the parking apron.

Aviation Fuel

Pilots at the Concrete Municipal Airport do not have the ability to purchase aviation fuel at the airport. The nearest airports for pilots to obtain fuel is the Arlington Municipal Airport 27 miles south west of Concrete or Skagit Regional Airport 27 miles west of Concrete. A self-fueling system should be installed that consists of an automatic dispenser for fixed wing aircraft that accepts major credit cards and debit cards. This will allow for seamless deposits into municipal bank accounts, provide accurate electronic read-out pump displays, and be programmed to accept fleet/loyalty card transactions. The installation of a 100 LL fuel system would be a benefit to the airport and provide revenue to the airport fund.

Security

Portions of the airport have security fencing. The northern side of the airport has chain link fencing running the distance of the property to separate the school district property from the airport property. On the southern side of the airport, a wire fence is delineating the airport property. Additional fencing is recommended with electronic gate controls for protection of the aircraft from potential theft and vandalism. The fencing will also improve the safety characteristics of the airport by preventing wildlife from gaining access to the airside area of the airport. It is recommended that one electronic controlled access gate be added to the north and south side of the airport.

[3] Critical Aircraft wingspan of 49' (49+15+15=79')

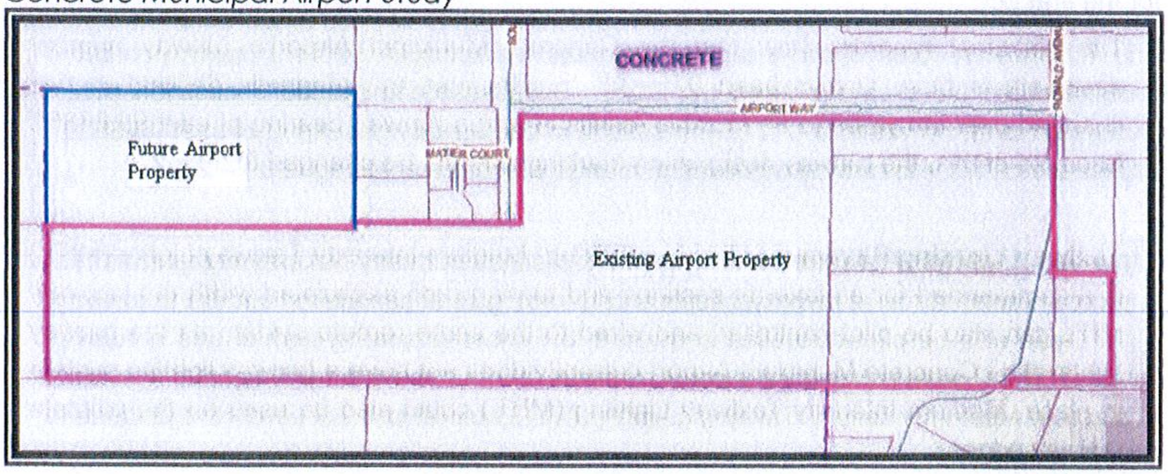
Vehicle Parking

Automobile parking is available near the entrance of the airport located outside the fenced area. The parking is adequate to meet the future needs of the airport. Four automobile parking spaces are available for airport visitors near the entrance of the airport located outside the fenced area. It is common practice for the aircraft owners at the airport to park their vehicle in their hangar while they are flying their aircraft. Because the demand for additional automobile parking spaces at the airport is low it is not recommended that additional parking spaces be constructed at the airport.

Land Acquisition

Land for future development of the airport north of the runway is reaching its capacity which is close to being completely built out. Adjacent land south of the runway should be considered to be acquired to support future aeronautical development at the airport. However, that may be a challenging prospect due to the fact that is currently owned by Native Americans. The parcels of land identified in **Figure 4.5**, shown as "Future Airport Property," is currently owned by the city and could be transferred to the airport at some point in the future to be used for aviation purposes.

Figure 4.5
Potential Land Transfer
Concrete Municipal Airport Study



AIRPORT LIGHTING AND MARKING REQUIREMENTS

Runway lighting systems increase the safety and utility of airports. Due to the relatively remote location of other airports east of the Cascade Mountain Range, a rotating beacon and runway lighting system at Concrete Municipal Airport would provide an additional airfield available in this mountainous area of the state with night-time operational capabilities. Airport lighting is used to help maximize the utility of the airport during day, night and adverse weather conditions. The recommended signage, marking and lighting systems for the Concrete Municipal Airport include:

Runway Lighting (MIRL): As mentioned in the chapter 2, the Concrete Municipal Airport is not lighted. To increase the safety characteristics of the airport, Pilot-controlled Medium Intensity Runway edge Lighting (MIRL) is recommended as the lighting system to define the lateral and longitudinal limits of the runway.

Pavement Markings: The runway pavement markings at the airport should follow the requirements as prescribed in FAA Advisory Circular 150/5340-1H, Standards for Airport Markings. The existing airport runway markings are non-standard with a fading yellow line depicting the centerline of the runway and "CONCRETE" painted on the centerline of the runway which should be removed. The runway centerline should be white and there should be a yellow aircraft hold line located on the taxiway to the runway. **Figure 4.6,** shows the existing markings and **Figure 4.7** shows an example of the ultimate pavement for the airport.

The historical records show that the Concrete Municipal Airport's runway number designations have always been 07 – 25. Because the magnetic declination has changed over the years to 3° 7'E, this results in a true runway bearing of east 90.6635°. Because of this, the runway designation markings should be changed to 09 – 27.

Taxiway Lighting/Pavement Marking (MITL): Medium Intensity Taxiway Lights (MITL) is recommended for all taxiway sections and turning radii associated width the taxiway. MITL can also be pilot-controlled and wired to the same remote system as the runway lights. The Concrete Municipal Airport currently does not have a taxiway lighting system in place. Medium Intensity Taxiway Lighting (MITL) could also be used on the ultimate taxiway edges.

Taxiway edge markers may used as a less expensive alternative. In addition, all paved taxiways should be painted with standard taxiway markings as prescribed in FAA Advisory Circular 150/5340-1H, Standards for Airport Markings.

Figure 4.6
EXISTING PAVEMENT MARKINGS
Concrete Municipal Airport Study

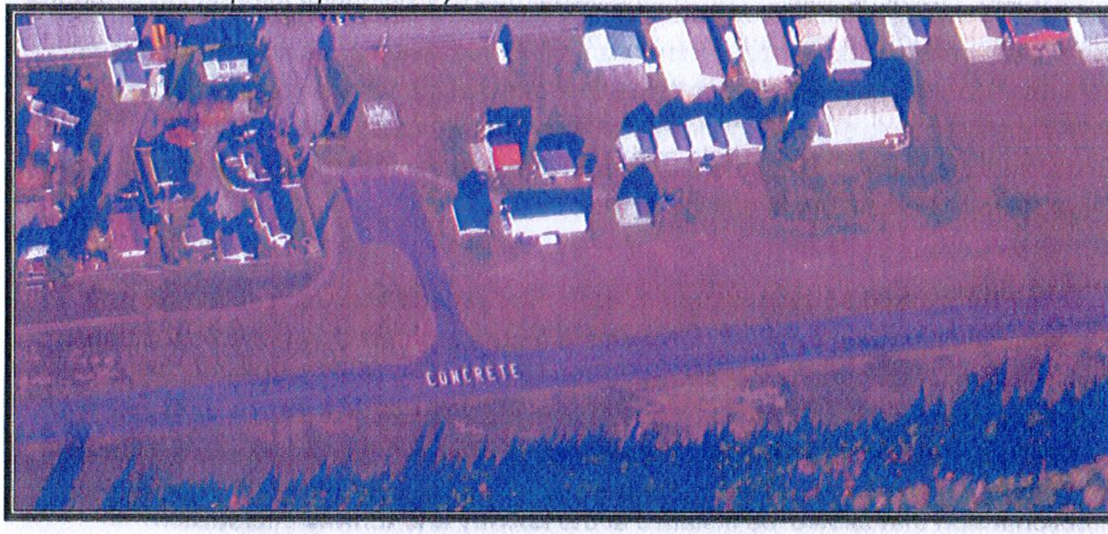
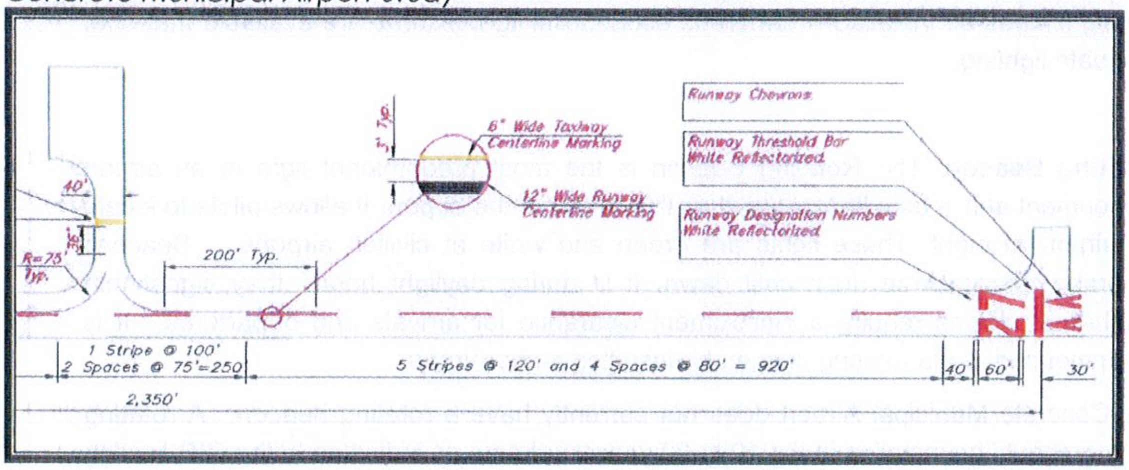


Figure 4.7
Standard FAA PAVEMENT MARKINGS
Concrete Municipal Airport Study



Precision Approach Path Indicators (PAPI): This lighting system emits a sequence of colored light beams providing continuous visual descent guidance information along the desired final approach descent path (normally at 3 degrees for 3 nautical miles during daytime, and up to 5 nautical miles at night) to the runway touchdown point. The system normally consists of two (PAPI-2) or four (PAPI-4) lamp housing units installed 600 to 800 feet from the runway threshold and offset 50 feet to the left of the runway edge. A PAPI -2 system is recommended at the airport.

Airport Signs: Standard airport signs provide runway and taxiway location, direction, and mandatory instructions for aircraft movement on the ground. A system of standard signs is recommended to indicate runway, taxiway and aircraft parking destinations. FAA Advisory Circular 150/5345-44F, Specifications for Taxiway and Runway Signs and FAA Advisory Circular 150/5340-18C, Standards for Airport Sign Systems, should be followed for proper implementation of airport signs. Phase one of the CIP includes one directional sign that should be installed at the taxiway and runway intersection.

Main Ramp Lighting: The existing apron/ramp area lighting is inadequate for illuminating the main aircraft parking and auto parking areas. It is recommended that lighting fixtures be installed. Numerous economical light fixtures are available that offer adequate lighting.

Rotating Beacon: The Rotating Beacon is the most predominant light in an airport environment and is usually located near the center of the airport. It allows pilots to locate the airport at night. These lights are green and white at civilian airports. Beacons generally operate from dusk until dawn. If lit during daylight hours, they signal that weather conditions require an instrument clearance for arrivals and departures. It is recommended that a rotating beacon be installed at the Airport

The Concrete Municipal Airport does not currently have a rotating beacon. A rotating beacon should be installed in the 10 to 20 year timeframe as indicated in the CIP section of this report.

Airspace & Instrument Approach Capabilities

At present, the Concrete Municipal Airport does not have any published instrument approaches, and due to the geographical constraints of the airport and mountainous terrain, it is unlikely that the FAA will publish an instrument approach to the airport.

Automated Weather Observing System (AWOS): AWOS is significant for non-towered airports to relay accurate and valuable weather information to pilots. The Concrete Municipal Airport does not have an Automated Weather Observation System (AWOS) weather reporting system currently available. The closest airports to Concrete with an AWOS radio frequency are the Arlington Municipal Airport (27 NM southwest of Concrete), Skagit Regional Airport (27 NM west of Concrete) and Oak Harbor / Wes Lupien (40 M west of Concrete). It is recommended that an AWOS be installed at the airport.

SUMMARY OF REQUIREMENTS AND DEFICIENCIES

Table 4.4 Airport Design Standard Summary shows the airfield design standards and existing conditions for ADG I small aircraft. **Table 4.5 Deficiencies & Corrective Actions** provides a summary of airport facility requirements to accommodate the level of activity projected for the Concrete Municipal Airport for each of the three planning phases spanning the 20-year planning period.

Table 4.4

Airport Design Standard Summary (Dimensions in feet)
Concrete Municipal Airport Study

Item	Runway 7/25 *Existing Conditions*	ADG I[1] (small aircraft exclusively)
Runway Length	2580	2300/2820[2]
Runway Width	60	60
Runway Shoulder Width	<10	10
Runway Safety Area Width	120	120
Runway Safety Area Lengthen (Beyond Rwy End)	205 & 70 [3]	240
Obstacle-Free Zone Width	250	250
Object Free Area Width	250	250
Object Free Area Length (Beyond Rwy End)	205 & 70 [3]	240
Primay Surface Width	250	250
Primary Surface Length (Beyond Rwy End)	205 & 70 [3]	200
Runway Protection Zone Length	1000 [3]	1,000
Runway Protection Zone Inner Width	250	250
Runway Protection Zone Outer Width	450	450
Runway Centerline to:		
Parallel Taxiway/Taxilane Centerline	N/A	150
Aircraft Parking Area	100	100
Building Restriction Line	180	251
Taxiway Width	N/A	25
Taxiway Shoulder Width	N/A	10
Taxiway Safety Area Width	N/A	49
Taxiway Object Free Area Width	N/A	89
Taxiway Centerline to Fixed/Movable Object	N/A	44.5
Taxilane Object Free Area Width	N/A	79
Taxilane Centerline to Fixed/Movable Object	N/A	39.5

1. Utility (visual) runways per FAR Part 77 dimensions. All RPZ and AC 150/5300-13 dimensions reflect visual runways.
2. Runway length required to accommodate 75% and 95 % of GA fleet weighing 12,500 lbs. or less.
3. Donnyhill Road located within 70' of Runway 25 end – impacts RSA, OFA and OFZ. A severe slope located 205' from the end of Runway 07 limits the existing RSA.
4. BRL for 18' building structure is located 251' from runway centerline.

Table 4.5

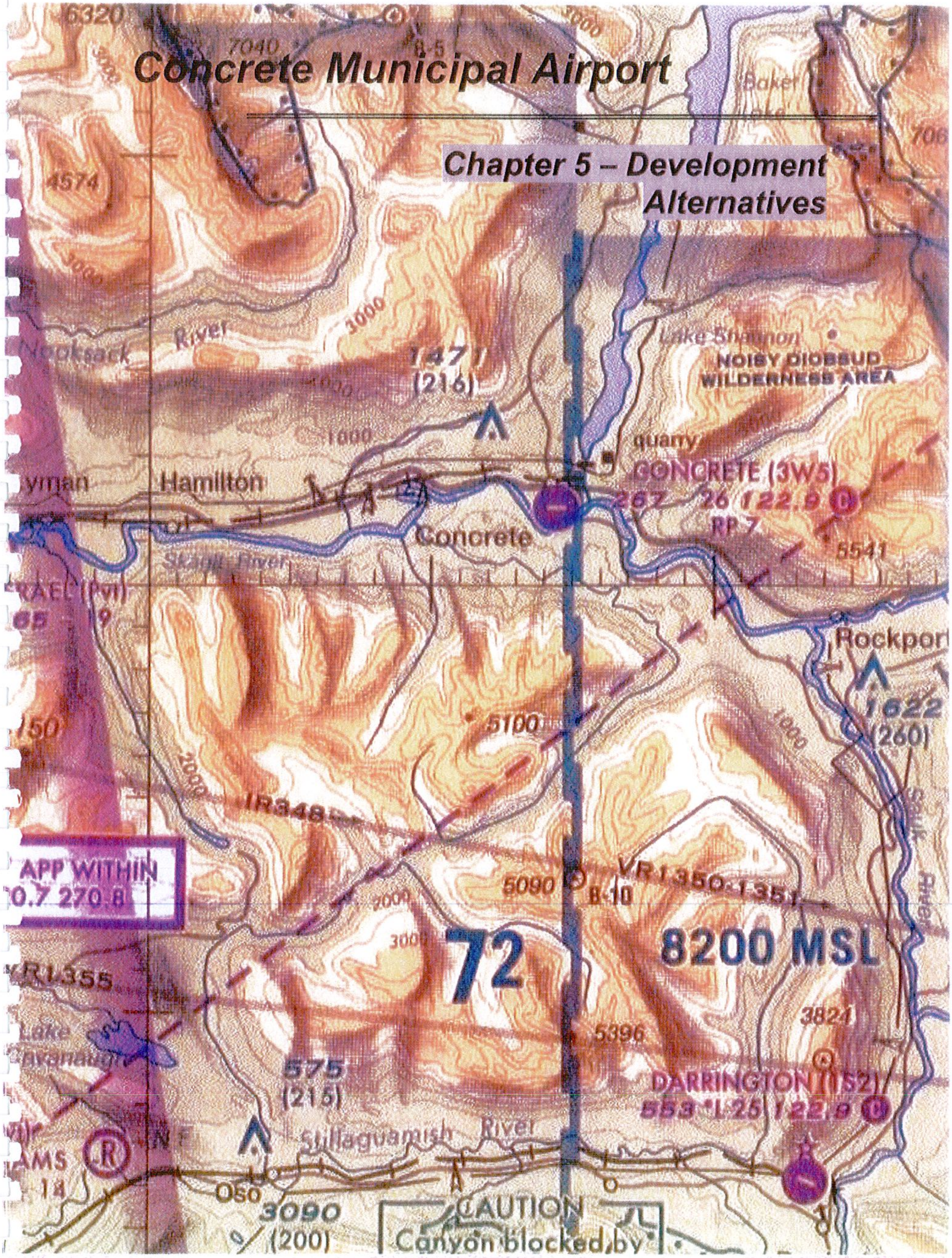
Deficiencies and Corrective Actions

Concrete Municipal Airport Study

Area of Concern	Noted Deficiency	Required Correction to Meet Standards
Runway Safety Areas	Adequate runway safety area does not exist on either runway end.	Shorten the east end of the runway 25 by 163' and the west end of the runway 7 by 35'. The resulting runway will have a published length of 2,350'
Object Free Area & Obstacle Free Zone	Donnyhill Road, Brush & Bushes penetrate OFA & OFZ; and hold line on taxiway and runup areas missing.	Shorten the east end of the runway 25 by 163' and the west end of the runway 7 by 35'. The resulting runway will have a published length of 2,350' Remove bushes and brush. Mark hold line 125' from runway centerline.
Building Restriction Line (BRL)	Five Structures penetrate the proposed BRL at 265'	Implement the proposed BRL and place obstruction lighting on controllong structure.
Pramp Lighting	Inadequate	Install lighting for auto parking and apron ramp.
Runway Protection Zone (RPZ)	Tree growth in both RPZ's and two structures in RW 07 RPZ.	Acquire Avigation easements from property owners to allow topping or cutting tree growth and implement zoning measures to prohibit structures from being built in RPZs.
Transitional Surfaces	Trees south of the runway, chain link fences north of the runway and five structures north of the runway (three on airport property & two off airport property) penetrate the transitional surfaces.	Remove / Top the trees and place obstruction light on controlling obstruction.
Runway Length	Design standards to accommodate 95% of Small Airplanes under Design Group A-1 aircraft is 2,820'	Geographic constraints of airport do not allow for constructing a runway of this length. Accomodating 75% of Small Airplanes under Design Group A-1 aircraft is 2,300' -- Ultimate length of runway will be 2,350'.
Parallel Taxiway	Parallel taxiway will increase safety and capacity at the airport.	Construct 25' wide, full length parallel taxiway north of runway centerline.
Segmented Circle	Existing windsock south of runway has been overgrown by tree growth.	Relocate windsock to north side of runway and install segmented circle. Install new windsocks at both runway ends.
Aviation Fuel	Aviation fuel is not available at the airport.	Install 100LL Self-Fueling fuel system with cardlock.
Landside Development	Existing land for future hangar development is reaching capacity.	Consider acquiring land south of the airport from Native American group and also consider converting land owned by Town that is currently a ball field to aviation use property.
Airport Lighting	The airport is an unlighted facility except for the helipad, which is only lit during emergency situatuions.	Install MIRLs, MITLs, PAPI-2s, and a Rotating Beacon.
Runway Markings	Non Standard Markings, Missing Taxiway Hold Lines, and outdated Designation Numbers.	Change the runway designation to 9-27 and mark and stripe the runway according to the requirements identified in the FAA Advisory Circular No: 150/5340-1J STANDARDS FOR AIRPORT MARKINGS.
Airport Signage	Airport Signage is Missing	Install runway directional signs at taxiway entrance to runway.
Security Fencing	Partial airport perimeter fencing	Construct perimeter fence with electronic gates.
Automated Weather	Unavailable	Install Automated Weather System

Concrete Municipal Airport

Chapter 5 – Development Alternatives



Chapter 5

DEVELOPMENT ALTERNATIVES

The alternatives chapter typically includes a set of alternative development concepts based on the facility requirements identified in the previous chapters. Most often the alternatives consider the various expansion possibilities for lengthening the runway and showing different locations or options on the airport property for hangar construction However, because the property located on a bluff and is geographical constrained on both the east and west ends of the airport, it is not feasible to consider lengthening the runway in either direction due to the limiting characteristics and steep slope of the ground contours. Moreover, the location of the airport with respect to the school district property to the north and the Native American owned property to the south preclude changing the runway alignment for future development purposes at this time.

The development items considered in this planning document focus on improvements designed to meet the safety standards required of the WSDOT Aviation Department.

As mentioned in the previous chapters, several deficiencies have been identified that need to be corrected in order for the airport to satisfy the FAA and WSDOT safety standards. The information below under AIRPORT DEVELOPMENT identifies a No Build Alternative and a Proposed Airside Development Alternative.

AIRPORT DEVELOPMENT

The no build alternative would result in no development taking place to correct any of the areas of the airport that have been described in the previous chapters that do not meet the safety standards of the FAA and WsDOT Aviation. The following deficient areas would not be addressed and would remain unchanged:

No Build Alternative

- Non-standard RSA & OFA
- Penetration of safety areas and transitional surfaces
- Non-standard runway markings and designation
- No parallel taxiway
- No additional rotating beacon of runway lighting system
- Non-standard approach surfaces
- No fuel system

Proposed Airside Development Alternative

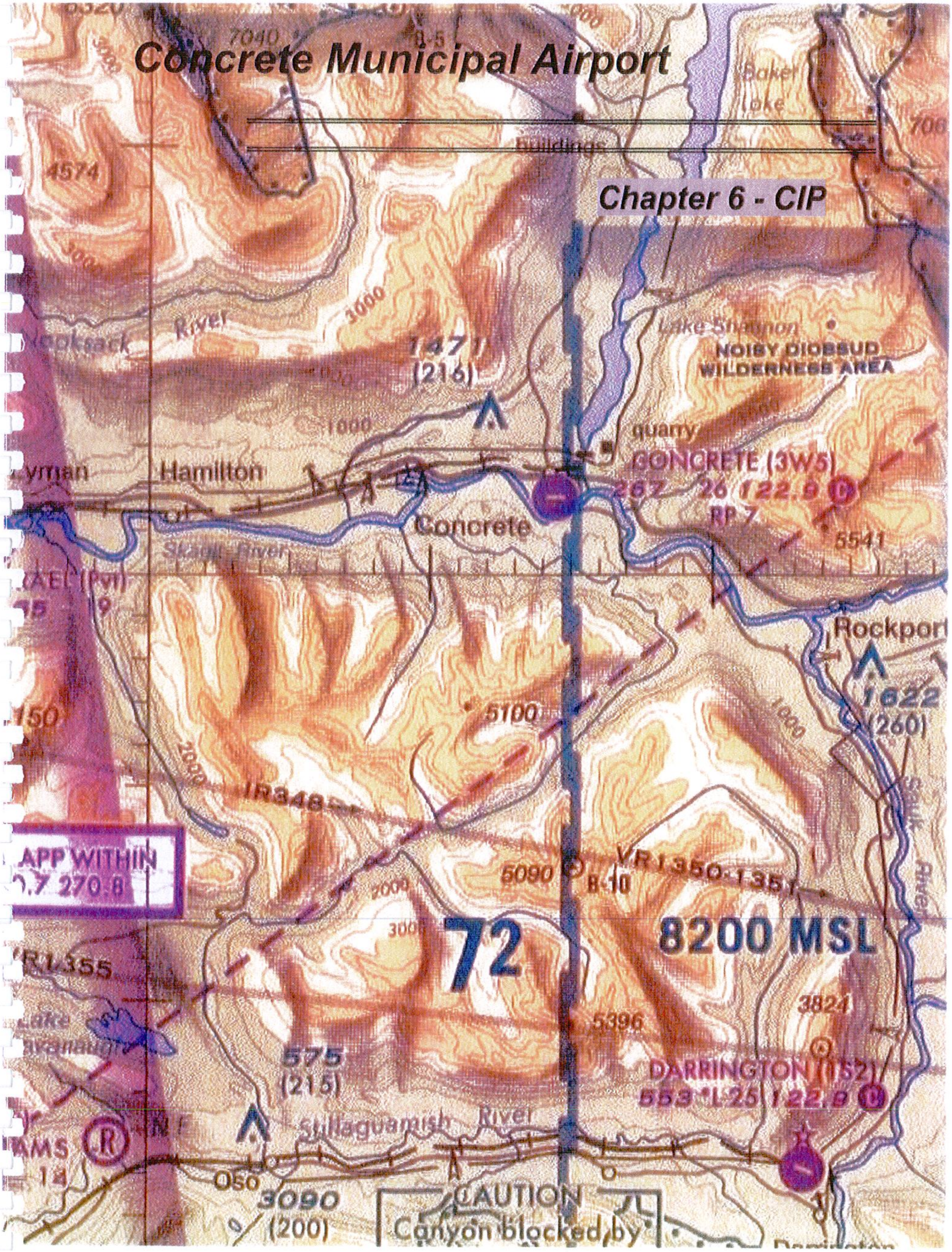
The proposed airside development for the airport is based upon the information provided in the previous chapters. The primary focus, of the projects identified, is intended to improve the safety characteristics of the airport by fixing the areas that are deficient and meeting the standards as prescribed by the FAA and WSDOT Aviation. The items below summarize the improvements needed at the airport over the next 20 year period:

- Shorten the east end of the runway 25 by 163' and the west end of the runway 7 by 35'. The resulting runway will have a published length of 2,350'
- Change the runway designation to 9-27 and mark and stripe the runway according to the requirements identified in the FAA Advisory Circular No: 150/5340-1J STANDARDS FOR AIRPORT MARKINGS.
- Construct partial parallel taxiway to Runway 25 end.
- Remove the trees that penetrate the 20:1 approach surfaces. Acquire Avigation easements to protect the approach ends of the runway.
- Install AWOS.
- Clear trees in vicinity of windsock and install additional windsocks north side of runway.
- Clear trees penetrating transitional surfaces, and in the primary surface. Institute management plan with civic organization to plan seasonal Christmas tree harvest.
- Clear and grub area of vegetation of bushes and shrubs that have grown in the OFA.
- Install a Rotating Beacon and Medium Intensity Runway Edge Lights (MIRLs)
- Construct a parallel taxiway.
- Install a Self-Fueling system with 100LL Aviation Fuel.
- Designate the property northwest of the field as airport property for future aeronautical development.
- Consider acquiring property south of the airport for future aviation development.
- Reconfigure existing apron to allow additional tie-down spaces.

The Airport Advisory Committee has selected to implement and improve the facilities at Concrete Municipal Airport. This development will increase safety at the airport and meet the FAA design standards for runway/parallel taxiway separation, runway safety and object free areas, and maintain clear approaches to the airport.

Concrete Municipal Airport

Chapter 6 - CIP



Chapter 6

CAPITAL IMPROVEMENT PROJECTS AIRPORT DEVELOPMENT PROGRAM

Through the evaluation of the facility requirements and the development of the airport layout plan, the improvements needed at Concrete Municipal Airport over the next 20-year period have been determined. The capital improvement plan provides the basis for planning the funding of these improvements. The planned phases of development are in the 5-, 10- and 20-year time frames.

CAPITAL IMPROVEMENT PROJECTS

The Capital Improvement Plan (CIP) develops both the timeline for the airport improvements and estimated costs for those improvements.

PROJECT COSTS

A list of improvements and costs over the next 20-years are included in Table 6-1 at the end of this chapter. All costs are estimated in 2006 dollars. Total project costs include construction, temporary flagging and signing, construction staking, testing, engineering, administration, and contingency, as applicable. Utilities including phone and power are not included in the new hangar projects, along with septic costs. No water service cost was added for the hangar developments.

FUNDING SOURCES

Funding for a CIP can come from several different sources, including the State of Washington, the Town of Concrete, and private sources. Each project listed in the CIP has been assigned a total cost, which is then assigned a percentage based on its funding source(s) eligibility.

STATE

The Washington State Department of Transportation also provides grants for projects eligible for State funding.

ESTIMATED DEVELOPMENT COSTS

Overall, ultimate airport development costs are an important consideration in the planning process. Traditionally, costs have tended to play a less significant and conclusive role when compared with other types of site selection factors, including land acquisition and the consequences of undetermined political influences.

In addition, future airport development would require a mix of eligible and non-eligible facilities and equipment as identified under the current state funding program. The possibility of state funds, as well as other private investment options, is also an unknown consideration with regard to future costs. The main non-eligible cost items include:

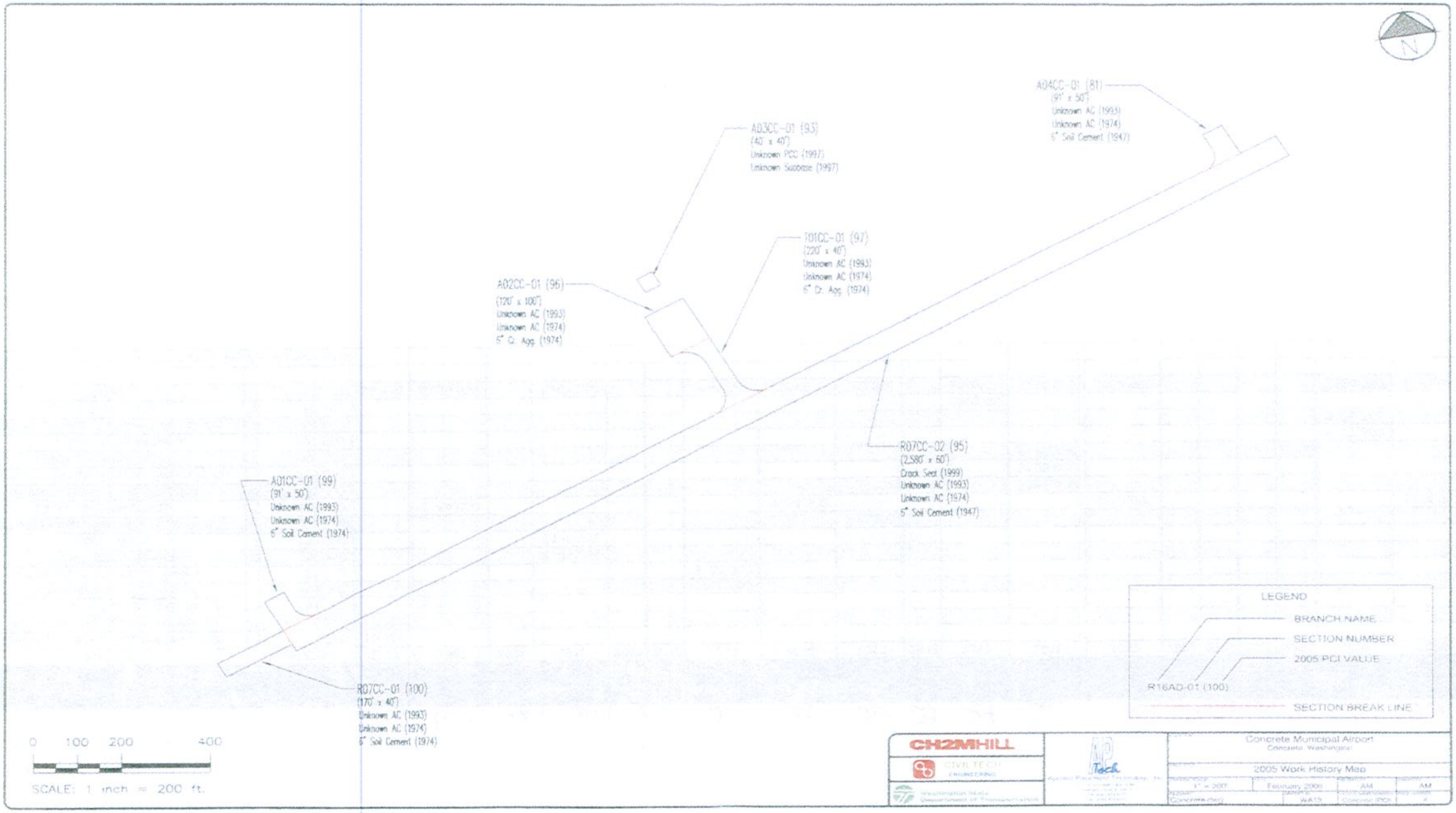
- Utility hookups (water and sanitary sewer)
- Hangar relocation and new hangar construction
- Airport access/entrance road improvements and road relocation/closure
- Power line extension/installation
- Water line reinforcement/extension/installation

Table 6.1
Capital Improvement Projects
Concrete Municipal Airport Study

Proposed Capital Improvement Projects
Concrete Municipal Airport

#	Project	Total Cost	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2025	2026	2027
			2014	2015	2016	2017	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
1 ✓	Relocate Wind Sock & Segmented Circle	$ 3,750	$3,750																			
2	Install WsDOT Security Camera	$ 5,000	$5,000																			
3	Tree Removal and Clearing/Grubbing	$ 51,500		$ 51,500																		
4	Install Security Fencing	$ 150,000							$150,000													
5	Install Electronic Acess Gates	$ 31,500							$ 31,500													
6	Install Rotating Beacon	$ 31,250				$ 31,250																
7	Install AWOS	$ 130,000				$130,000																
8	Shorten Primary Runway 07-25 (-230')	$ 92,500									$92,500											
9	Slurry Seal Pavements	$ 616,000		$154,000						$154,000					$154,000						$154,000	
10	Parallel Taxiway Construction	$ 151,600												$151,600								
11	Medium Intensity Runway Edge Lights	$ 105,000												$105,000								
12	PAPI System (2 box)	$ 40,000												$ 40,000								
13	Slurry Seal All Pavements	$ 127,500																		$127,500		
14	Medium Intensity Taxiway Edge Lights	$ 56,500																		$ 56,500		
15	100 LL Fuel System	$ 50,000											$50,000									
	TOTAL	$ 1,642,100	$8,750	$205,500		$161,250			$181,500	$154,000	$92,500		$50,000	$296,600	$154,000					$184,000	$154,000	

Note: All values include 25% contingency for survey, legal and engineering



A04CC-01 (81)
(91' x 50')
Unknown AC (1993)
Unknown AC (1974)
6" Soil Cement (1947)
A03CC-01 (93)
(40' x 40')
Unknown PCC (1997)
Unknown Subbase (1997)
T01CC-01 (97)
(220' x 40')
Unknown AC (1993)
Unknown AC (1974)
6" Cr. Agg. (1974)
A02CC-01 (96)
(120' x 100')
Unknown AC (1993)
Unknown AC (1974)
6" Cr. Agg. (1974)
R07CC-02 (95)
(2,580' x 60')
Crack Seal (1999)
Unknown AC (1993)
Unknown AC (1974)
6" Soil Cement (1947)
A01CC-01 (99)
(91' x 50')
Unknown AC (1993)
Unknown AC (1974)
6" Soil Cement (1974)
R07CC-01 (100)
(170' x 40')
Unknown AC (1993)
Unknown AC (1974)
6" Soil Cement (1974)
LEGEND
BRANCH NAME
SECTION NUMBER
2005 PCI VALUE
R16AD-01 (100)
SECTION BREAK LINE
0 100 200 400
SCALE: 1 inch = 200 ft.
CH2MHILL
Concrete Municipal Airport
Concrete, Washington
2005 Work History Map
February 2006

APPENDIX A
GLOSSARY AND ACRONYMS

GLOSSARY/ACRONYMS

TERMS:

Advisory Circular (AC): A series of external FAA publications consisting of all non-regulatory material of a policy, guidance, and informational nature.

Air Cargo: All commercial air express and air freight with the exception of air-mail and air parcel post.

Air Carrier: A commercial operator providing for the transport of passengers or property by aircraft for compensation or hire utilizing aircraft with greater than 30 seats and certificated in accordance with Federal Aviation Regulations (FAR) Parts 121 or 127.

Aircraft Mix: The numerical or percentage breakdown of aircraft into categories based on aircraft engine and weight.

Aircraft Operation: Any aircraft arrival or departure including touch-and-go operations.

Aircraft Type: A distinctive model of aircraft, as designated by the manufacturer.

Airline: A scheduled air carrier certificated by the Federal Aviation Administration under Part 121 of the Federal Aviation Regulations.

Airline Operations: Takeoffs and landings performed by aircraft operated by Part 121 or 127 airlines on scheduled and non-scheduled flights.

Airport: A landing area regularly used by aircraft for receiving or discharging passengers or cargo.

Airport Service Area: The geographic area that generates demand for aviation services at an airport.

Airport Surveillance Radar (ASR): A navigation instrument used to control air traffic within the immediate airport traffic areas.

Airspace: The area above the ground in which aircraft travel. It is divided into corridors, routes, and restricted zones for the control and safety of traffic.

Air Taxi: The transport of people or property for compensation or hire by a commercial operator (not an air carrier) in an aircraft having a maximum seating capacity of 30 or less and certified under Federal Aviation Regulations Part 135.

Ambient: The sum total of existing environmental conditions for any given impact category.

Ambient Air Quality: The existing quality of the air.

Aquatic: Growing or living in or upon water.

Approach Surface: An imaginary inclined surface longitudinally centered on the extended centerline of a runway, extending outward and upward from the runway. It has a shallower gradient than the corresponding glide slope.

Apron: An area on an airport designated for the parking, loading, fueling, or servicing of aircraft.

Aviation Easement: A form of limited property right purchase that establishes legal land-use control prohibiting incompatible development of areas required for airports or aviation-related purposes.

Based Aircraft: Aircraft stationed at the airport on a permanent basis.

Beacon: See rotating beacon.

Biotic Community: Recognizable assemblages of vegetation and wildlife organisms generally functioning as a unit.

Building Restriction Line (BRL): An imaginary line that identifies suitable building area locations on airports. The BRL is also dependent upon the Runway Visibility Zone (RVZ) and ATCT line-of-sight capabilities.

Capacity: The airport operating level, expressed as the number of aircraft movements that can occur at an airport over a specified time period.

Circling Approach: A descent used in an approved procedure to an airport for a circle to land maneuver.

Commercial Aviation: Aircraft activity licensed by state or federal authority to transport passengers and/or cargo on a scheduled or non-scheduled basis.

Community: A city, group of cities, or a Metropolitan Statistical Area receiving scheduled air service by a certificated route air carrier at an airport.

Commuter Airline: Commercial operators that operate aircraft with a maximum of 60 seats, and that provides scheduled service, or that carriers mail; commuters may be either air taxis or certified air carriers.

Condemnation: Proceedings under which a property interest may be forcibly acquired; government may condemn land through the power of eminent domain; an individual may apply inverse condemnation to obtain just compensation for a property interest taken by government without prior agreement.

Conical Surface: A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet and extending to a height of 350 feet above the airport elevation.

Critical Aircraft: The most demanding category or family of aircraft that performs 500 annual itinerant operations at an airport (Also referred to as the design aircraft).

Critical Habitat: An entire habitat or portion thereof, having any constituent element that is necessary to the normal needs or survival of an endangered or threatened species.

Decibel (dB): A unit of measurement used to describe sound pressure level. It is a dimensionless unit, which is commonly expressed as one-tenth of the logarithm of the ratio between two power levels, one of which is nominally a reference level. The human auditory response to a given increase in sound pressure is approximately proportional to the increase in sound pressure in comparison to the pressure already present.

Displaced Threshold: Actual touchdown point on specific runways designated due to obstructions that make it impossible to use the actual physical runway end.

Distance Measuring Equipment (DME): An airborne instrument that indicates the distance the aircraft is from a fixed point, usually a VOR station.

Draft Environmental Impact Statement: FAA's initial evaluation of the environmental impact of a proposed action when coordinated pursuant to Section 102(20Cc)) of NEPA is initiated.

Ecology: The science or study of the relationship between an organism and its environment.

Ecosystem: An ecological community together with its physical environment, considered as a unit.

Effective Runway Gradient: The maximum difference between runway centerline elevations divided by the runway length, expressed as a percentage.

Eminent Domain: Right of the government to take property from the owner, upon compensation, for public facilities or other purposes in the public interest.

Endangered Species: Those species in danger of extinction throughout all or a significant portion of their range.

Enplanement: A term applying to passengers and cargo which board a departing aircraft.

Enroute Airways: The route a flight follows from departure point to destination.

Express: Property transported under published air express tariffs.

Fauna: A collective term for the animal species present in an ecosystem.

Fixed Base Operator (FBO): A private enterprise engaged in services related to general aviation, such as fuel sales, aircraft maintenance, aircraft storage, aircraft rental and sales, flight instruction, and crop dusting.

Flora: A collective term for the plant species present in an ecosystem.

Floodplain: An area that would be inundated by storm-water runoff that occurs under a given recurrent frequency flood condition.

Fleet Mix: See Aircraft Mix.

Flight Service Station (FSS): FAA facility used for pilot briefings on weather, airports, altitudes, routes, and other flight planning data.

General Aviation (GA): All aviation activities except those performed by commercial air carrier or military.

General Aviation Aircraft: All civil aircraft except those owned by and classified as air carriers.

General Obligation Bond: A form of public indebtedness backed by the full faith and credit of the municipality or other appropriate public body.

Glide Slope (GS): Electronic vertical guidance provided the pilot while on the final approach to landing; usually an angle between two degrees and three degrees and intersecting the runway at the touch down area.

Global Positioning System (GPS): Satellite-based navigation capabilities utilizing a minimum of four (4) of 26 satellites orbiting the earth.

Horizontal Surface: A horizontal plane 150 feet above the established airport elevation, the perimeter of which is constructed by swinging arcs of specified radii from the center of each end of the primary surface of each runway and connecting the adjacent arcs by tangent lines.

IFR Conditions: Weather conditions below the minimum prescribed for flight under VFR.

Indirect Source: A facility, building, structure, or installation which attracts mobile air pollution source activity that results in emissions of a pollutant for which there is a national standard.

Instrument Landing System (ILS): A landing approach system that establishes a course and a descent path to align an aircraft with a runway for final approach.

Instrument Flight Rules (IFR): Rules that govern flight procedures when ceiling and visibility are below 1,000 feet and three miles respectively.

Instrument Approach: A landing approach using electronic aids and made without visual reference to the ground.

Itinerant Operations: Arrivals and departures of aircraft to or from an area greater than 20 miles from the airport. Itinerant operations may involve an aircraft based at the airport or an aircraft from another airport.

Local Area Augmentation System (LAAS): Intended to compliment Wide Area Augmentation System (WAAS) by meeting Category II/ III instrument approach requirements, as well as provide users with all weather surface navigation, surface navigation, and surface surveillance/ traffic management system capabilities.

Localizer (LOC): An electronic instrument that is part of an ILS and emits radio signals which provide the pilot with course guidance to the runway centerline.

Local Operations: Operations performed by aircraft that (1) operate in the local traffic pattern or within sight of the tower; (2) are known to be departing for or arriving from +/- light in local practice areas located within a 20 mile radius of the control tower; and (3) execute simulated instrument approaches or low passes at the airport.

Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR): A facility by which the pilot is provided visual reference t the instrument runway during transition from instrument to visual flight.

Microwave Landing System: An instrument landing system using VHF radio signals to guide the aircraft's approach instead of the VHF system still widely used. The microwave system provides for fewer ground reflections, takes up less space, and uses small aerials.

Minimum Descent Altitude (MDA): The lowest altitude, expressed in feet above MSL, to which descent is authorized on final approach or during circling-to-land maneuvering in execution of a standard instrument approach procedure where no electronic glide slope is provided.

Middle Marker (MM): An electronic beacon that indicates a position approximately 3,500 feet from the landing threshold.

Military Operations: An operation by military aircraft.

Missed Approach: A prescribed procedure to be followed by aircraft that cannot complete an attempted landing at an airport.

Nautical Mile: A measure of lineal distance equal to one minute of a great circle at the equator and is the length of one minute of latitude (6,076.1155 feet). To convert to statute miles, multiply by 1.150779.

NAVAID: Any navigational aids, such as PAPI, MALS, REIL, etc.

Noise Contour: A line connecting points of equal noise exposure.

Non-precision Approach Procedure: A standard instrument approach procedure in which no electronic glide slope is provided.

Non-scheduled Service: Revenue flights that are not operated in regular scheduled service such as charter flights and all non-revenue flights incident to such flights.

Object Free Area (OFA): An area on the ground centered on the runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft gound maneuvering purposes.

Obstacle Free Zone (OFZ): The OFZ is the airspace below 150 feet (45m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or departing from the runway, and for missed approaches.

Operation: Any airborne arrival or departure of an aircraft at or from an airport. "Touch-and-go" practice landings are considered as two operations.

Origination: The initial enplanement of any passengers and cargo; total originations include all enplanements except transfers and stop-overs.

Outer Marker (OM): An electronic beacon that indicates a position at which aircraft will intercept the ILS glide path.

Parts 25 and 121 Criteria: Those applicable portions of the Federal Aviation Regulations within which criteria for operational takeoff flight paths are defined.

Part 77: The applicable portions of Federal Aviation Regulations which define obstructions to air navigation.

Peak Hour: Represents that highest number of operations or passengers during the busiest hour of an average day of a peak month.

Precision Approach Path Indicator (PAPI): A lighting system providing for visual flight path, within the airport approach zone, so that an approaching pilot can establish a positive controlled descent (also VASI).

Precision Instrument: The term used to describe an approach using both horizontal and vertical guidance. This term also describes the runway with this type of approach and the markings on the runway.

Primary Runway: That runway which provides the best wind coverage, etc.; this runway receives the most usage at an airport.

Primary Surface: A surface longitudinally centered on a runway. When the runway has a hard surface, the primary surface extends 200 feet beyond each runway end; but when there is no hard surface, or planned hard surface, the primary surface ends at the end of the runway. The width of the primary surface of a runway will be that width prescribed in FAA Part 77 for the most precise existing or planned approach to that runway end.

Revenue Bonds: A form of public indebtedness backed by the revenue generated by the facility for which the debt was incurred.

Rotating Beacon: A visual NAVAID displaying flashes of white and/or colored light used to indicate the location of an airport.

Runway (RW): A defined area on an airport prepared for landing and takeoff of aircraft.

Runway Protection Zone (RPZ): An area off the runway end to enhance the protection of people and property on the ground.

Runway Safety Area: A defined surface surrounding the runway prepared or suitable for reducing the risk of damage o aircraft in the event of an overshoot, undershoot, or excursion from the runway.

Runway Visibility Zone (RVZ): An acceptable runway profile permits any two points five feet (1.5m) above the runway centerline to be mutually visible for the entire runway length. Hence, a clear line-of-sight between the ends of the of intersecting runways is recommended. Finally, the RVZ is an area formed by the imaginary lines connecting the two runways' visibility points.

Scheduled Service: Transport service performed by a commercial operator on a regular basis.

Segmented Circle: An airport aid identifying the traffic pattern direction.

Socioeconomic: Data pertaining to the population and economic characteristics of a region.

Special Use Airspace: Airspace of defined dimensions, within which flight of aircraft, while not wholly prohibited, is subject to restrictions or to hazards that may exist to non-participating aircraft.

Straight-In Approach: A descent in an approach procedure in which the final approach course alignment and descent gradient permits authorization of straight-in landing minimums.

Student Activity: Any aviation activity by student pilots.

Taxiway (TWY): A defined area on an airport prepared for the surface movement of aircraft to and from the runway.

Terminal Airspace: The controlled airspace normally associated with aircraft departure and arrival patterns to or from airports within a terminal control system.

Terminal Building: That building on an airport which is used in making the transition between surface and air transportation.

T-Hangar: A T-shaped aircraft storage building that provides economical shelter for a single aircraft.

Threshold: The beginning of that portion of the runway available for landing. In some instances the landing threshold may be displaced.

Tie Downs: An area on an airport specifically designed for the outdoor storage of aircraft.

Total Operations: The total of all operations (domestic and international) performed at an airport.

Touch-and-Go Operations: An aircraft operation for practice or testing purposes characterized by a landing touch down and then continuing takeoff without stopping.

Traffic Pattern: The flow of traffic that is prescribed for aircraft landing at, taxiing on, or taking off from an airport.

Transition Surface: An imaginary surface extending to the sides of the approach surface and inclined at a specified gradient 90 degrees to the extended centerline of the runway. Any object penetrating this surface would be an obstruction to air navigation.

Turnaround: A pavement area designed for turning around or holding aircraft at the end of a runway when a full parallel taxiway is not provided.

UNICOM: A ground radio communications station that provides pilots with pertinent airport information at specific airports.

Visual Approach Slope Indicator (VASI): A lighting system providing a visual flight path, within the airport approach zone, so that an approaching pilot can establish a more positive controlled descent (also PAPI).

Vector: A heading issued to an aircraft to provide navigational guidance by radar.

Visual Flight Rules (VFR): Rules under which aircraft are operated by visual reference to the ground, and fly on a "see and be seen" principle.

Very High Frequency Omni-Directional Range (VOR): Air navigation aid that provides bearing information to aircraft.

Wide Area Augmentation System (WAAS): Planned as a GPS augmentation by providing users with the use of GPS for all phases of flight from the en route environment to Category 1 precision instrument approaches. Thereby, providing more direct routing of aircraft, saving time, fuel, and money.

Wind Cone (Sock): Conical wind direction indicator.

Wind Coverage: Refers to orientation of runway in relationship to direction of prevailing winds (concerns usability of runway for takeoffs and landings).

Wind Rose: A diagram indicating the prevalence of winds from various directions, at a specific place.

Wind Tee: A visual device used to advise pilots about wind direction.

ACRONYM

AC:	Advisory Circular
ADF:	Automatic Direction Finder
AGL:	Above Ground Level
AIP:	Airport Improvement Program
ASR:	Airport Surveillance Radar
ALP:	Airport Layout Plan
ALS:	Approach Lighting System
ARFF:	Aircraft Rescue and Fire Fighting
ARTCC:	Air Route Traffic Control Center
ASDA:	Accelerate – Stop Distance Available
ASV:	Annual Service Volume
ATC:	Air Traffic Control
ATCT:	Air Traffic Control Tower
AWOS:	Automated Weather Observing System
BRL:	Building Restriction Line
BWR:	Bucher, Willis & Ratliff Corporation
CAT:	Category
CWY:	Clearway
dB:	Decibel
DME:	Distance Measuring Equipment
DNL:	Day/Night Average Sound Level
DOT:	Department of Transportation
FAA:	Federal Aviation Administration
FAR:	Federal Aviation Regulation
FIS:	Federal Inspection Service
FBO:	Fixed Base Operator
FSS:	Flight Service Station
FTZ:	Foreign Trade Zone
GA:	General Aviation
GPS:	Global Positioning System
GVGI:	Generic Visual Slope Indicator
GS:	Glide Slope
HIRL:	High Intensity Runway Lights
HUD:	U.S. Department of Housing and Urban Development
IFR:	Instrument Flight Rules
ILS:	Instrument Landing System
IMC:	Instrument Meteorological Conditions
INM:	Integrated Noise Model
KHz:	Kilohertz
LAAS:	Local Area Augmentation System
LDA:	Landing Distance Available
LIRL:	Low Intensity Runway Lights
LOC:	Localizer
MALSF:	Medium Intensity Approach Lighting System
MALSR:	Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MDA:	Minimum Descent Altitude
MHz:	Megahertz
MIRL:	Medium Intensity Runway Lights

MITL:	Medium Intensity Taxiway Lights
MM:	Middle Marker
MOA:	Military Operations Area
MSA:	Metropolitan Statistical Area
MSL:	Mean Sea Level
NAVAID:	Navigational Aid
NDB:	Non-directional Beacon
NOS:	National Ocean Survey
NPI:	Non-precision Instrument
NPIAS:	National Plan of Integrated Airport System
NWS:	National Weather Service
OAG:	Official Airline Guide
OC:	Obstruction Chart
OFA:	Object Free Area
OFZ:	Obstacle Free Zone
OM:	Outer Marker
OPBA:	Operations Per Based Aircraft
PAPI:	Precision Approach Path Indicators
PIR:	Precision Instrument
PLASI:	Pulsating Light Approach Slope Indicator
RAIL:	Runway Alignment Indicator Lights
REIL:	Runway End Identifier Lights
RNAV:	Area Navigation
RPZ:	Runway Protection Zone
RVR:	Runway Visibility Range
RVZ:	Runway Visibility Zone
RW:	Runway
SSALF:	Simplified Short Approach Light System with sequenced Flasher Lights
SSALR:	Simplified Short Approach Light System with RAIL
TACAN:	Tactical Air Navigation
TAP:	Terminal Area Plan
TCA:	Terminal Control Area
TERPS:	Terminal Instrument Procedures
TVOR:	Terminal Very High Frequency Omni Range
TW:	Taxiway
UHF:	Ultra-High Frequency
USGS:	United States Geological Survey
VASI:	Visual Approach Slope Indicator
VFR:	Very High Frequency
VMC:	Visual Meteorological Conditions
VOR:	VHF Omni-Directional Range
WAAS:	Wide Area Augmentation System

APPENDIX B
FAA AIRPORT DESIGN COMPUTER PROGRAM PRINTOUTS

AIRPORT DESIGN AIRPLANE AND AIRPORT DATA

Aircraft Approach Category A
Airplane Design Group I
Airplane wingspan.. 48.99 feet
Primary runway end approach visibility minimums are visual exclusively
Other runway end approach visibility minimums are visual exclusively
Airport elevation .... 264 feet

RUNWAY WIDTH AND CLEARANCE STANDARD DIMENSIONS

Airplane Group/ARC

Runway centerline to parallel runway centerline simultaneous operations when wake turbulence is not treated as a factor:

VFR operations with no intervening taxiway .... 700 feet
VFR operations with one intervening taxiway .... 700 feet
VFR operations with two intervening taxiways .... 700 feet
IFR approach and departure with approach to near threshold 2500 feet less 100 ft for each 500 ft of threshold stagger to a minimum of 1000 feet.

Runway centerline to parallel runway centerline simultaneous operations when wake turbulence is treated as a factor:

VFR operations .... 2500 feet
IFR departures .... 2500 feet
IFR approach and departure with approach to near threshold. . 2500 feet
IFR approach and departure with approach to far threshold 2500 feet plus 100 feet for each 500 feet of threshold stagger.
IFR approaches ....3400 feet

Runway centerline to parallel taxiway/taxilane centerline . 224.5 225 feet
Runway centerline to edge of aircraft parking .... 200.0 200 feet
Runway width .... 60 feet
Runway shoulder width .... 10 feet
Runway blast pad width .... 80 feet
Runway blast pad length ....100 feet
Runway safety area width .... 120 feet
Runway safety area length beyond each runway end or stopway end, whichever is greater .... 240 feet
Runway object free area width .... 400 feet

AIRPORT DESIGN AIRPLANE AND AIRPORT DATA

Runway object free area length beyond each runway end
or stopway end, whichever is greater . . . . 240 feet
Clearway width . . . . 500 feet
Stopway width . . . . 60 feet

Obstacle free zone (OFZ):

Runway OFZ width . . . . 400 feet
Runway OFZ length beyond each runway end . . . . 200 feet
Inner-approach OFZ width . . . . 400 feet
Inner-approach OFZ length beyond approach light system . . . . 200 feet
Inner-approach OFZ slope from 200 feet beyond threshold . . . 50:1
Inner-transitional OFZ slope 0:1

Runway protection zone at the primary runway end:

Width 200 feet from runway end . . . . 500 feet
Width 1200 feet from runway end . . . . 700 feet
Length . . . . 1000 feet

Runway protection zone at other runway end:

Width 200 feet from runway end . . . . 500 feet
Width 1200 feet from runway end . . . . 700 feet
Length . . . . 1000 feet

Departure runway protection zone:

Width 200 feet from the far end of TORA . . . . 500 feet
Width 1200 feet from the far end of TORA . . . . 700 feet
Length . . . . 1000 feet

Threshold surface at primary runway end:

Distance out from threshold to start of surface . . . . 0 feet
Width of surface at start of trapezoidal section . . . . 400 feet
Width of surface at end of trapezoidal section . . . . 1000 feet
Length of trapezoidal section . . . . 1500 feet
Length of rectangular section . . . . 8500 feet
Slope of surface 20:1

AIRPORT DESIGN AIRPLANE AND AIRPORT DATA

Threshold surface at other runway end:

Distance out from threshold to start of surface .... 0 feet
Width of surface at start of trapezoidal section .... 400 feet
Width of surface at end of trapezoidal section .... 1000 feet
Length of trapezoidal section .... 1500 feet
Length of rectangular section .... 8500 feet
Slope of surface 20:1

REFERENCE: AC 150/5300-13, Airport Design, including Changes 1 through 4.

APPENDIX C
ALP CHECKLIST

AIRPORT LAYOUT PLAN (ALP) CHECKLIST

Location: Concrete **Airport:** Concrete

Prepared By: CHR **Date:** 03/23/2006

Reviewed By: BCW **Date:** 11/15/2007

APPLICABLE FAA ADVISORY CIRCULARS:
Airport Master Plan, AC 150/5070-6A
Airport Design, AC 150/5300-13, Changes 1 through 8

CRITICAL AIRCRAFT:

Make: Beechcraft **Model:** Bonanza (F33)

Airport Reference Code (ARC): A-1 **Annual Operations:** 5,016

Desired Approach Minimums:

Runway End 7/25 Existing **Minimum** Visual

Runway End 9/27 Ultimate **Minimum** Visual

Runway End ____ **Minimum** ____

ALP COMPONENTS:	Required FAA	Required WSDOT	Included Yes	Included No	Remarks
I. Narrative Report	✓	✓	✦		
II. Airport Layout Drawing	✓	✓	✦		
III. Airport Airspace Drawing	✓	✓	✦		
IV. Inner App. Surface Drawing	✓	✓	✦		
V. Terminal Area Drawing	✓		✦		
VI. Land Use Drawing	✓	✓	✦		
VII. Airport Property Map	✓		✦		

I. NARRATIVE REPORT

DATE: November 21, 2007

MASTER PLAN ( ) No

ALP REPORT ( ) Narrative Report

	Required		Included		
	FAA	WSDOT	Yes	No	Remarks
FORECAST AVIATION DEMAND					
Current 5 yrs, 10 yrs, 20 yrs	✓	✓	✧		
Local Operations	✓				
Annual Itinerant Operations					
All Aircraft	✓				
Current Design Aircraft	✓	✓	✧		
Future Design Aircraft	✓	✓	✧		Current and Future Design Aircraft Remains the same
Total Annual Operations	✓	✓	✧		
Based Aircraft	✓	✓	✧		
Annual Instrument Approaches	✓				
Enplaned Passengers (Commercial Service Locations Only)	✓				
Design Aircraft (Current & Future)	✓	✓	✧		
STAGE DEVELOPMENT					
(Drawings, Schedule, Project Costs)	✓				
COORDINATION					
(Highways, Planning Agencies, etc.)	✓	✓	✧		

ADDITIONAL COMMENTS

II. AIRPORT LAYOUT PLAN DRAWING

DATE November 21, 2007

"An airport layout plan (ALP) is a graphic presentation to scale of existing and ultimate airport facilities, their location on the airport and the pertinent clearance and dimensional information required to show relationships with applicable standards."

NOTE: Use NAD 83 Datum for determining coordinates and indicate on ALP drawing

	Required		Included		
	FAA	WSDOT	Yes	No	Remarks
SHEET SIZE					
22" X 34" Recommended Size	✓	✓	✦		
SCALE					
1" = 200' to 1" = 600'	✓	✓	✦		
NORTH POINT	✓	✓	✦		
True & Magnetic Declination					
WIND ROSE					
Source & Time Period (latest 10	✓	(only if avail.)			
year period, using 36 points)					
Individual & Combined Coverage	✓				
10.5 Knots	✓				
13 Knots	✓				
16 Knots	✓				
20 Knots	✓				
AIRPORT REFERENCE POINT (ARP)					
Ultimate ONLY with lats and	✓	✓	✦		
longs to nearest second					
TOPOGRAPHIC INFORMATION					
Contours 2' to 10'	✓				
ELEVATIONS					
Runway Ends	✓	✓	✦		
(nearest 0.1 ft. exist & ult)	✓				
Runway Intersections	✓				
Runway High and Low Points	✓	✓	✦		
Roadways & Railroads at points	✓	✓	✦		
where they intersect *Approach Surface*					
Structures on Airport	✓	✓	✦		Terminal Drawing Included
(if no Terminal Drawing)					

II. ALP DRAWING (continued)

	Required		Included		
	FAA	WSDOT	Yes	No	Remarks
LINES					
ILS MLS Critical Areas	✓				
(GS & LOC)					
Building Restriction Lines (BRL)	✓	✓	✧		18' structure/ Building Height at
Building Height for BRL	✓	✓	✧		251' BRL from Runway CL
Property Lines (exist & ult)	✓	✓	✧		
Section Corners	✓	✓	✧		
Runway Visibility Zones	✓				
RUNWAY DETAILS					
Length and Width (exist & ult)	✓	✓	✧		
End Numbers	✓	✓	✧		
True Bearing (nearest .01 degree)	✓	✓	✧		
End Coordinates (nearest .01 sec)	✓	✓	✧		
Lighting Symbols	✓	✓	✧		
(threshold only, exist & ult)					
Clearways & Stopways Overruns	✓	✓	✧		
Safety Areas	✓	✓	✧		
TAXIWAY DETAILS					
Width	✓	✓	✧		
Clearance to Runway	✓	✓	✧		
Clearance to Aircraft Parking	✓	✓	✧		
Clearance to Objects	✓	✓	✧		
APRON					
Location & Size	✓	✓	✧		
Aircraft Parking	✓	✓	✧		
RWY PROTECTION ZONES					
Dimensions (exist & ult)	✓	✓	✧		Existing and Ultimate RPZs are off
Type of Ownership (Fee or Ease)	✓	✓	✧		airport property, No easements currently exist
APPROACHES					
App. Surface Slope & Type	✓	✓	✧		
(exist & ult)					

II. ALP DRAWING (continued)

	Required		Included		
	FAA	WSDOT	Yes	No	Remarks
TITLE & REVISION BLOCK	✓	✓	✦		
APPROVAL BLOCK	✓	✓	✦		Stan Allison requested WsDOT approval Block
(SPONSOR ONLY)					
AIRPORT DATA TABLE					
Airport Elevation (nearest 0.1 ft)	✓	✓	✦		
ARP Coordinates (nearest second)	✓	✓	✦		
Airport Electronic Aids	✓	✓			
(NDB/VOR/Beacon)		✓			NO existing NAVAIDS on the Airport
Mean Max Temp. (Hottest Month)	✓	✓			
Airport Reference Code (ARC)	✓	✓	✦		
BUILDING TABLE	✓	✓	✦		
(See ALP Guidance)					
LEGEND TABLE	✓	✓	✦		
RUNWAY DATA TABLE	✓	✓	✦		
(existing & ultimate)					
App. Category and Design Group	✓	✓	✦		
Runway (length/width)	✓	✓	✦		
Runway Lighting	✓	✓	✦		
(LIRL, MIRL, HIRL)					
Runway Marking (B, NP, or P)	✓	✓	✦		
Pavement Material	✓	✓	✦		
Pavement Design Strength	✓				
(exist & ult critical					
aircraft) (#lbs – S, D, DT, DDT)					
Runway Safety Area (length/width)	✓	✓	✦		
Object Free Area (length/width)	✓	✓	✦		
Obstacle Free Zone (length/width)	✓	✓	✦		
Taxiway Width	✓	✓	✦		Ultimate shown
Taxiway Lighting	✓	✓	✦		

II. ALP DRAWING (continued)

	Required		Included		
	FAA	WSDOT	Yes	No	Remarks
For each runway end (exist & ult)					
Approach Surface Slope	✓	✓	✧		
Electronic Aids (Localizer, Glide Slope, etc)	✓				
Visual Aids (REIL, VGSI, etc)	✓	✓	✧		NO existing Visual Aids on the Airport -- Ultimate included
Approach Visibility Minimums (V 1 mile, 3/4 mile, 1/2 mile, CAT II, or CAT III)	✓				
Touchdown Zone Elevation (TDZE) (highest runway elev. within first 3,000 ft)	✓				
Takeoff Run Available (TORA)	✓	✓	✧		
Takeoff Distance Available (TODA)	✓	✓	✧		
Accelerate Stop Distance Available	✓	✓	✧		
Landing Distance Available (LDA)	✓	✓	✧		

MODIFICATION TO AIRPORT DESIGN STANDARDS TABLE

Approval Date, Airspace Case No.	✓				
Standard Modified, Description					
If No Standard Modified, State "None Required"	✓				

OBSTACLE FREE ZONE (OFZ) OBJECT PENETRATIONS TABLE

If none, state "none."

THRESHOLD SITING SURFACE OBJECT PENETRATIONS TABLE

If none, state "none."

ADDITIONAL COMMENTS:

III. AIRPORT AIRSPACE DRAWING

	Required		Included		
	FAA	WSDOT	Yes	No	Remarks
PLAN VIEW					
USGS 7 1/2 Minute Quad	✓	✓	✦		
Runway Numbers (ultimate)	✓	✓	✦		
Part 77 Imaginary Surfaces	✓	✓	✦		
Elev. Contours (even 50' intervals on sloping surfaces)	✓	✓	✦		
Scale (1" = 2000'-5000')	✓	✓	✦		
Obstructions beyond RPZ	✓				
APPROACH PROFILES (Existing and Ultimate)					
Scale (1" = 1000' H, 1" = 100' V for Visual & Non-Precision Rwys)	✓	✓	✦		
Scale (1" = 2000' H, 1" = 200' V for IFR Runways) for a composite ground profile along ext. Rwy CL	✓				
Significant Objects	✓	✓	✦		
Top Elevation of Significant Objs	✓	✓	✦		
Part 77 Approach Slope Profile	✓	✓	✦		
OBSTRUCTION TABLE (BEYOND *INNER APPROACH SURFACE*)					
Obstruction Identification Number	✓	✓	✦		
Obstruction Elevation	✓	✓	✦		
Description of Obstruction	✓	✓	✦		
Amount of Penetration	✓	✓	✦		
Disposition of Obstruction	✓	✓	✦		

ADDITIONAL COMMENTS

IV. INNER PORTION OF THE APPROACH SURFACE DRAWING

	Required		Included		
	FAA	WSDOT	Yes	No	Remarks
PLAN VIEW (Existing & Ultimate)					
(out to 100' above rw elev for the approach slope)					
Scale (1" = 200')	✓	✓	✦		
Property Line	✓	✓	✦		Obstruction identified by A -C rather than identified by number
Obstructions Identified by Number	✓	✓	✦		
Clearance over Roads, RRs at CL & Edge of *Approach Surface* (Include Road/Railroad Elev.)	✓	✓	✦		
Runway End Number and Elev.	✓	✓	✦		
Ground Contours (light lines)	✓	✓	✦		
Runway Safety Area	✓	✓	✦		
Object Free Area	✓	✓	✦		
Runway Protection Zone (RPZ)	✓	✓	✦		
Prec. Object Free Area (POFA)	✓				
PROFILE VIEW					
Scale (1" = 200'H, 1" = 20'V)	✓	✓	✦		Terrain decreases on both ends of runway
Terrain Along Extended CL of Rwy (out to 100' above rw elev for approach slope)	✓	✓	✦		
Significant Objects	✓	✓	✦		
CrossSection of Roads & RRs	✓	✓	✦		
Obstructions Identified by Number	✓	✓	✦		Obstruction identified by A -C rather than identified by number
RUNWAY CENTERLINE PROFILE					
Scale (suff. to show line of sight req.)	✓	✓		✦	Maximum change in runway elevation is one foot. Line of sight in not a factor
Elev.s (sta. and elev at rwy ends &	✓	✓		✦	
at all points of grade change)	✓	✓		✦	
OBSTRUCTION TABLE					
Sep. Table for each *App. Surface*	✓	✓	✦		
Obstruction Identification Number	✓	✓	✦		Obstruction identified by A -C rather than identified by number
Obstruction Elevation	✓	✓	✦		
Description of Obstruction	✓	✓	✦		
Amount of Penetrations	✓	✓	✦		
Disposition of Obstruction	✓	✓	✦		

ADDITIONAL COMMENTS: ______________________________

V. TERMINAL AREA DRAWING

	Required		Included		
	FAA	WSDOT (optional)	Yes	No	Remarks
Scale (1" = 50' to 1" = 100')	✓		✦		
Property Line	✓		✦		
Bldg Restriction Line	✓		✦		
Apron	✓		✦		
T-Hangars	✓		✦		
Aircraft Parking	✓		✦		
Top Elevation of Structure	✓		✦		
Legend	✓		✦		
Building Identification Table	✓		✦		
Auto Parking Areas	✓		✦		
Entrance Road	✓		✦		

ADDITIONAL COMMENTS: ______________________________

VI. LAND USE DRAWING

NOTE: Use ALP as a base map

	Required		Included		
	FAA	WSDOT	Yes	No	Remarks
Legend	✓	✓	✦		
On-Airport Land Use (exist & ult)	✓	✓	✦		
Off-Airport Land Use (exist & ult)	✓	✓	✦		
to at least 65 DNL Contour	✓	✓	✦		
		(to within Part 77 Horiz. Surface)			
Crop Restriction Lines	✓	✓		✦	
Airport Property Lines (ult)	✓	✓	✦		
Zoning of adj. property to airport	✓	✓	✦		

ADDITIONAL COMMENTS: ______________________________

VII. AIRPORT PROPERTY MAP

NOTE: Use ALP as a base map

	Required		Included		
	FAA	WSDOT (optional)	Yes	No	Remarks
LEGEND	✓		✦		
DRAWING DETAILS					
Airport Features (exist & ult)	✓		✦		
Property Line (fee)	✓		✦		
Property Interest Areas (ease)	✓		✦		
Tract Boundary Line with ID #	✓		✦		
Type of Acquisition Indicated	✓			✦	
DATA TABLE					
Tract Identification Number	✓			✦	
Date of Acquisition	✓			✦	
Federal Aid Project Number	✓			✦	
Property Interest (fee or ease)	✓			✦	
Acreage	✓			✦	

ADDITIONAL COMMENTS

APPENDIX D
ECONOMIC IMPACTS

AIRPORT: Concrete Municipal (3W5)
ASSOCIATED CITY: Concrete
ARC: A-I
REGION: Northwest

AIRPORT DATE AND FACILITIES

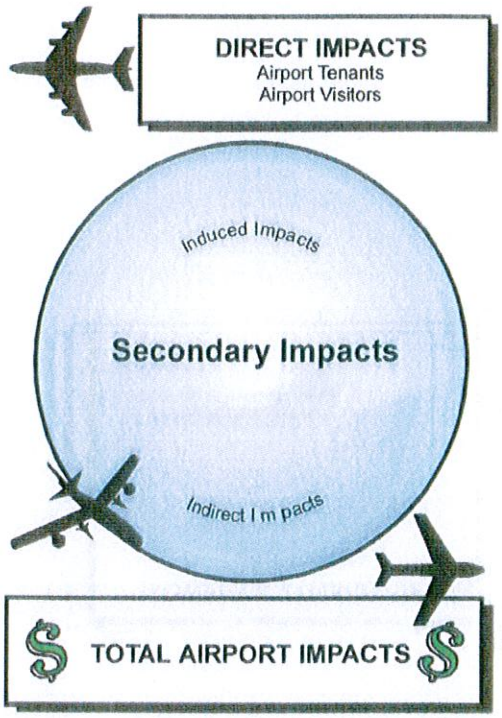
Concrete Municipal Airport is located in Skagit County adjacent to Washington Highway 20, one mile south of Concrete. There are 24 single-engine aircraft based at the Airport. The latest available data indicate that Concrete Municipal experienced approximately 6,750 annual operations. Runway 7-25 is the Airport's only runway. This runway is 2,580 feet long, 60 feet wide, and has an asphalt surface. Both runway ends have visual approaches. In addition to the runway, the Airport has a 40-foot by 40-foot helipad designated as "H1."

SKAGIT COUNTY, WASHINGTON

ECONOMIC IMPACTS

The economic impacts of Washington's airports were calculated using a methodology which has evolved over the past decade and is nationally recognized as the standard for conducting economic impact studies of airports. The methodology is consistent with analytical models used by the Federal Aviation Administration (FAA), and employs the use of direct survey information and an input/output model (IMPLAN) as developed by the U.S. Department of Commerce to determine multipliers specific to the state of Washington for "secondary" economic impacts.

Types of Economic Impact - This study identified and examined those aviation activities at the public use airports in Washington that created economic impacts. These impacts are generated in three ways: **1)** Direct, **2)** Indirect, and **3)** Induced Effects. Combined, the three impact types yield the total economic impacts of an airport, as described below:



DIRECT ECONOMIC IMPACTS

These economic impacts occur as a consequence of providing aviation services. These impacts usually occur at the airports, and comprise the financial expenditures by firms which carry passengers (air carrier, air charter or air taxi) or cargo; firms which serve the air carrier and general aviation functions (airport tenants); governmental agencies which support aviation; ground transport firms; and others. In every instance, the impacts include only expenditures where the recipient is located within each airport's service area. General aviation operations resulted in 2,400 visitors arriving at the Airport in 2000. The output resulting from general aviation operations was $889,260. These first-round expenditures were responsible for approximately 18 jobs and wages of $192,956.

INDIRECT ECONOMIC IMPACTS (Secondary Impact)

These economic impacts occur as a result of the use of aviation service. They include the regional expenditures made by air passengers who visit the region (at hotels, restaurants, ski facilities, etc.); expenditures by the region's residents associated with their use of aviation; and expenditures by firms having economic activity which is dependent on the airport. These indirect outputs accounted for output of $175,562 and two jobs with combined wages of $56,464.

INDUCED ECONOMIC IMPACTS (Secondary Impacts)

The "indirect" and "direct" impacts represent increases in regional final demand. Such increases do not represent total economic impact; there is also a "multiplier" effect. This multiplier effect comprises the local value of money as it circulates through the local economy and as individuals or firms associated with airport business buy goods and services in the local economy. Induced impacts accounted for output of $180,920 and two jobs with combined wages of $58,757. Each airport's total economic impact is the sum of the three types of impacts.

TOTAL ECONOMIC IMPACTS

The total economic impact across the state were quantified by adding together the direct, indirect and induced impacts for each airport, and interpreting, comparing, and presenting the results.

The output of the IMPLAN model enabled the presentation of total economic impacts by airport in terms of three economic impact measures: 1) jobs (employment); 2) earnings (payroll), and; 3) economic activity (output). Each of these was determined based on individual multipliers per industry categories. In each case, total impacts include the aviation sector itself, as well as the "multiplier effect" of the aviation sector. The impacts were estimated using Year 1998 data

All three indicators of economic impact are useful; however, the monetary measures should not be added together, as discussed below:

- **Jobs (Employment)** - The number of employees who are employed in the aviation industry, plus the aviation-oriented share of those that are employed in sectors that support the air passenger (hotels, restaurants, etc.) plus those employed in the industries included in the multiplier effect impacts. The number of jobs attributable to an industry is always greater than simply those in the industry itself, due to the "re-spending" of money. Total employment impact was approximately 22 jobs.

- **Labor Earnings (Payroll)** - The sum of the wages and salaries to all employed persons that the aviation industry pays, directly or indirectly, to deliver the output of final aviation demand. Earnings Impacts are always included in the Economic Activity totals, so they should not be summed with the Economic Activity impact. Earnings are a very conservative proxy for "value added." Earnings may be greater or less than the Direct and Use values depending on the industry type. Total earnings impact was $308,175.

- **Economic Activity (Sales Output)** - The value of the aviation final demand (aviation or airport service), plus the "multiplier" effect (the sum of all of the intermediate goods and services needed to produce the aviation final demand, plus the induced impacts of increased household consumption). Total economic activity equals the sum of intermediate demands, consumption demand, government demand, investment demand, and net export demand. Economic Activity is always larger than both the Direct and Use values because it includes the multiplier effect. Total economic activity impact was $1,245,741.

	Direct Impacts	+	Indirect Impacts	+	Induced Impacts	=	Total Impacts
Jobs (Employment)	Number of Jobs Supported		Number of Jobs Supported		Number of Jobs Supported		Total Number of Jobs Supported
	17.6		2.2		2.3		22.4
Labor Earnings (Payroll)	Annual Salary Supported		Annual Salary Supported		Annual Salary Supported		Total Annual Salary Supported
	$192,956		$56,464		$58,757		$308,175
Economics (Sales Output)	Contribution to Economy (Dollars)		Contribution to Economy (Dollars)		Contribution to Economy (Dollars)		Total Contribution to Economy (Dollars)
	$889,260		$175,562		$180,920		$1,245,741

SUMMARY

On an annual basis, Concrete Municipal Airport's tenants and its visitors in Skagit County, Washington contribute the following total annual economic benefit:

Jobs (Employment)	Labor Earnings (Payroll)	Economic Activity (Sales Output)
Total 22.4	Total $308,175	Total $1,245,741

APPENDIX E
GOALS AND POLICIES

Chassis	Pump	Fire equipment	Tank (gallons)
1968 Chevrolet	Hale 1000 gpm	Howe pumper	750
1988 Ford	Darley 1050 gpm	Darley pumper	1000
1986 Ford	n/a	Hose and ladder truck	0
1975 Chevrolet	n/a	Emergency vehicle	n/a

The Fire Chief would like to replace the nearly thirty year old Chevrolet. However, it needs to be replaced with a larger truck that would have the capacity to safely carry the firefighters needed [illegible] truck. If funds were made available, he would purchase equipment equivalent to a [illegible] Darley pumper with a 1000-1500 gallon tank.

Although individual sets of fire fighting gear do not meet the standards of cost to qualify as a capital project, equipment is normally replaced by purchasing in sufficient quantity to permit substantial cost savings. Nearly all the fire fighting gear was replaced in 1989. To do so again would cost an estimated $20,000-25,000. This should be done in the next six years to take advantage of the safety and serviceability improvements that have been made to fire fighting gear in recent years.

The fire department replaced its principal air compressor in 2001. It is used not only to fill [illegible] (through an intermediate air tank) but is also used by the [illegible] pack as well.

The department also houses the Upper Skagit Valley Water Rescue Unit's [illegible] boat with a 150 horsepower Johnson jet engine. The rescue unit is owned by the County and operated by a number of town volunteers, many of whom are also members of the police and fire departments.

The Fire Department recently applied for a grant through the FEMA in the amount of $[illegible] to fund a new pumper.

AIRPORT

The Concrete Municipal Airport is located south of the town center, adjacent to the school facilities. The main runway is 2600 feet long and 60 feet wide. Concrete accepts no federal funds for its airport and therefore does not have to meet federal requirements. In September of [illegible] the Town obtained a grant from the Aeronautics Division of the Washington Department of Transportation and used the funding for crack sealing/slurry of asphalt the runways and in [illegible] it was used to provide a security fence on the north side of the airport.

The airport does not have runway lighting and the Town plans to keep it that way. Town policy is to [illegible] discourage night flying in part because of the many mountains in the area. [illegible] because residents would not want the night noise from airplanes. The Town leases 50'x50' lots for $134.57 annually and 100'x100' lots for $538.29 annually plus the cost of insurance which is generally $163.33 annually and leasehold excise tax that is paid to the Department of Revenue. Pilots provide their own hangars.

The Town, with the help of Airside, an airport planning company, designed and constructed of an emergency medical service lighted helicopter facility at the airport. This heliport substantially improves access to major medical facilities in Seattle for citizens of, and visitors to, Concrete and the surrounding area. It also greatly improves the chances of survival for victims of vehicle accidents along Highway 20.

The Town recently paid $500 toward design of the heliport. Design and construction costs for the concrete landing pad (helipad) and the associated lighting were covered by a grant of $9,885 from the Aviation Division of the Washington Department of Transportation. Town staff and community volunteers worked under the supervision of Airside staff, built the concrete pad and installed the lighting for it. The value of the volunteer labor and materials is estimated at $2,500.

The Pilot's Lounge was completed in 2003 and is used for local and visiting pilots and is occasionally leased out to groups for meetings or events. The cost to construct the lounge was approximately $50,000 using mostly volunteer labor, donations, and a loan from the Town.

The Annual Concrete Old Fashioned Fly-In brings in pilots from mostly the west coast and Canada and generally range from 150 to 200 aircrafts. This event is weather dependent and is normally held in late spring, but may be moved to late July for improved weather conditions. The event lasts three days and brings in visitors to the Town.

The Town has an Airport Advisory Committee made up of pilots and those interested in the airport, and they make recommendations to the Town Council.

The Town is applying for a grant from the Washington Department of Transportation Aviation Division to fund the completion of an Airport Layout Plan which will study the needs of the airport, identify any problems in the development of the airport, propose a plan to meet the present and future needs of the airport, to be approved by the Town Council.

Airport Priority Projects

1. Complete all required striping and marking on the runway and adjacent ramps.

2. Add transient tie-downs in ramp area.

3. Move the windsock to a more visible location.

4. Construct a segmented circle around the windsock.

8. Construct a parallel taxiway to the north of the runway based on the Airport Layout Plan

GOALS AND POLICIES

Goal CF-1: Ensure consistency between the capital facilities plan and the other Comprehensive Plan elements.

Policy CF-1.1: Reassess the Comprehensive Plan to ensure that all of its elements continue to be coordinated and consistent, especially if capital facilities funding falls short of expectations.

Policy CF-1.2: Annually update the capital facilities plan, especially the financial section.

Goal CF-2: Continue the stated criteria for selecting and funding capital projects.

Policy CF-2.1: Meet all county, state and federal laws, regulations, and guidelines, particularly as they apply to public health and safety.

Policy CF-2.2: Meet capital facilities needs in the most cost-effective manner.

Policy CF-2.3: Invest in facilities which, if left unimproved, will cost more in the future or will require higher expenditures for operations and/or maintenance.

Goal CF-3: Meet long-held community values of financial responsibility and the expectations of flat revenues over the next few years.

Policy CF-3.1: Apply for grants and loans from state and federal agencies for expensive capital facilities rather than rely solely on local revenue sources.

Policy CF-3.2: Rely on local utility rates and other local sources of income for operations and maintenance costs.

Goal CF-4: All new development should be encouraged to locate where services are currently being provided so that expensive system extensions can be avoided.

Policy CF-4.1: The Town will attempt to avoid all "leapfrog" development and encourage "infill" development.

Policy CF-4.2: The Town will require that all new development pay its fair share of the costs to upgrade facilities that are impacted by the development.

Goal CF-5: System development charges should continue to be adjusted to meet the increasing costs of facilities required by new development.

APPENDIX F
THROUGH THE FENCE AGREEMENTS

ACCESS PERMIT

THIS AGREEMENT, made and entered into by and between the Town of Concrete, Washington and Marty and Tamera Glaser.

WHEREAS, Marty and Tamera Glaser own real estate abutting the south line of the Concrete Airport, and

WHEREAS, The Glaser's are constructing a private eight unit T-hanger on their real estate and will have tenants who will bring airplanes onto the Concrete Airport for the purpose of being able to use the Concrete Airport for take off and landing

NOW THEREFORE, the Town of Concrete does herewith grant permission to Marty and Tamera Glaser, and tenants to enter and egress the Concrete Airport at a point on the common boundary line between the Concrete Airport and Marty and Tamera Glaser's real estate. Said point to be marked, staked and a gate placed across the entry way which Marty and Tamera Glaser shall at all times keep locked and prohibit any other parties, other than themselves and tenants of their private 8-unit T-hanger, from using said entry way as ingress and egress.

Marty and Tamera Glaser, and tenants shall enter the Airport property only at the point where said egress is staked and shall use only the staked line across the airport property to the airport runway.

Marty and Tamera Glaser and their heirs, and tenants shall hold the airport harmless from any liability incurred by the Town of Concrete as a result of the operation of airplanes from their property to the airport runway Marty and Tamera Glaser, and tenants shall at all times comply with and observe the rules and regulations and the safety requirements of the FAA in the operation of airplanes.

In consideration of this Permit, Marty and Tamera Glaser shall pay the Town of Concrete $50.00 per year for each year that this permit is in effect Said amount to be paid on date of execution of this agreement and on each succeeding anniversary date while the Permit is in effect. The amount to be paid by Marty and Tamera Glaser shall be reviewed every five years

This agreement is for a period of 40 years.

DATED this ______ day of ______________, ________.

TOWN OF CONCRETE

By ____________________
Mayor

Approved by the Town Council
on the 8th day of October, 2007.

______________________ Marty Glaser

______________________ Tamera Glaser

PERMIT

THIS AGREEMENT, made and entered into by and between the Town of Concrete, Washington and Robert A. and Carolyn B. Fabrick.

WHEREAS, Robert A. and Carolyn B. Fabrick own real estate abutting the north line of the Concrete Airport, and

WHEREAS, The Fabricks have an airplane which they desires to house on their real estate at they residence and are desirous of being able to bring their airplane onto the Concrete Airport for the purpose of being able to use the Concrete Airport for take off and landing.

NOW THEREFORE, the Town of Concrete does herewith grant permission to the Fabricks to enter and egress the Concrete Airport at a point on the common boundary line between the Concrete Airport and the Fabricks real estate. Said point to be marked, staked and a gate placed across the entry way which the Fabricks shall at all times keep locked and prohibit any other parties, other than themselves, from using said entry way as ingress and egress to the airport property.

The Fabricks shall enter the airport property only at the point where said agrees is staked and shall use only the staked line across the airport property to the airport runway.

The Fabricks and their heirs shall hold the airport harmless from any liability incurred by the Town of Concrete as a result of the operation of the Fabricks airplane from their property to the airport runway. The Fabricks shall at all times comply with and observe the rules and regulations and the safety requirements of the FAA in the operation of the airplane.

In consideration this Permit, the Fabricks shall pay the Town of Concrete $50.00 per year for each year that this permit is in effect. Said amount to be paid on date of execution of this agreement and on each succeeding anniversary date while the Permit is in effect. The amount to be paid by the Fabricks shall be reviewed every five years.

This permission is not assignable.

This agreement is for a period of 40 years.

DATED this ____ day of October 2002.

TOWN OF CONCRETE

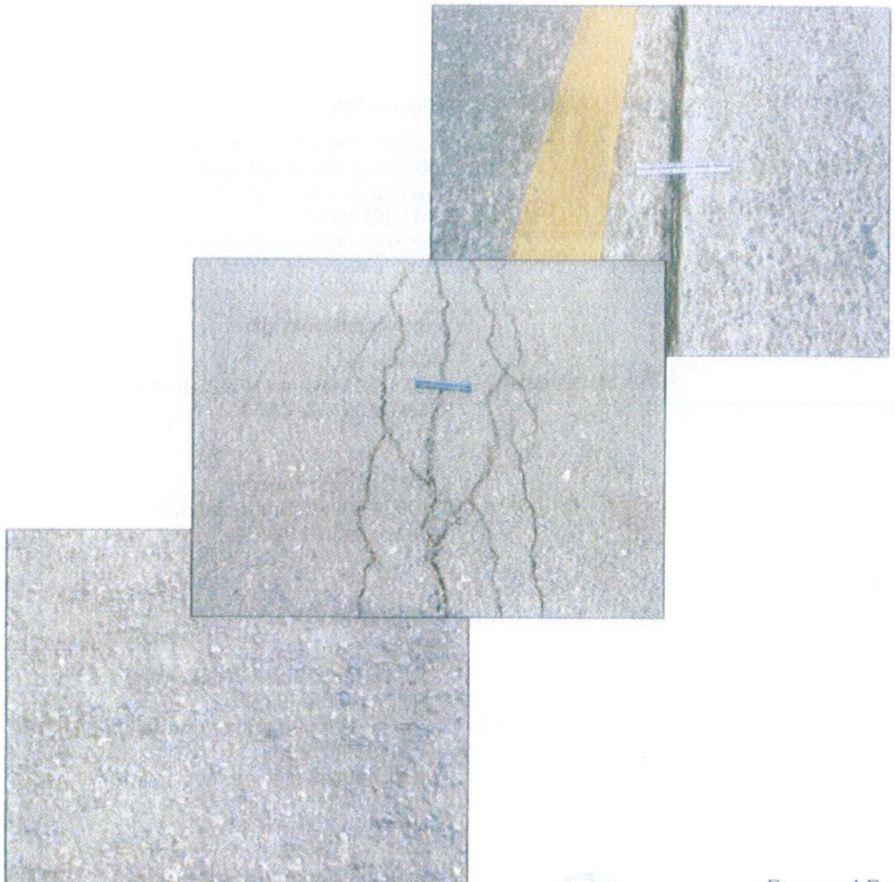
By ________
Mayor

Approved by the Town Council
This ___ day of October 2002

________________ ________________
Robert A. Fabrick Carolyn B. Fabrick

APPENDIX G
PAVEMENT EVALUATION REPORT

CONCRETE MUNICIPAL AIRPORT
2005 PAVEMENT MANAGEMENT REPORT



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CONCRETE MUNICIPAL AIRPORT
2005 PAVEMENT MANAGEMENT REPORT

Prepared By:

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www.wsdot.wa.gov/aviation

and

Federal Aviation Administration
Seattle Airports District Office
1601 Lind Avenue S.W., Suite 250
Renton, WA 98055

February 2006

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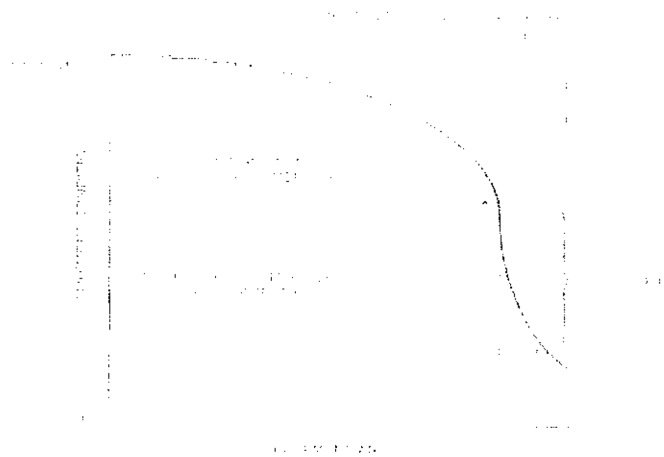


PAVEMENT INVENTORY

The first step in the pavement evaluation process was determining the extent of the pavement infrastructure at the Airport and its characteristics. To gather this information, CH2M HILL conducted a records review to determine when and how the Airport's pavements were constructed and subsequently rehabilitated.

The review concluded that approximately 193,207 square feet of runway, taxiway, and apron pavements exist at Concrete Municipal Airport, as shown in Figure 2. This figure also shows the average age of the pavements.

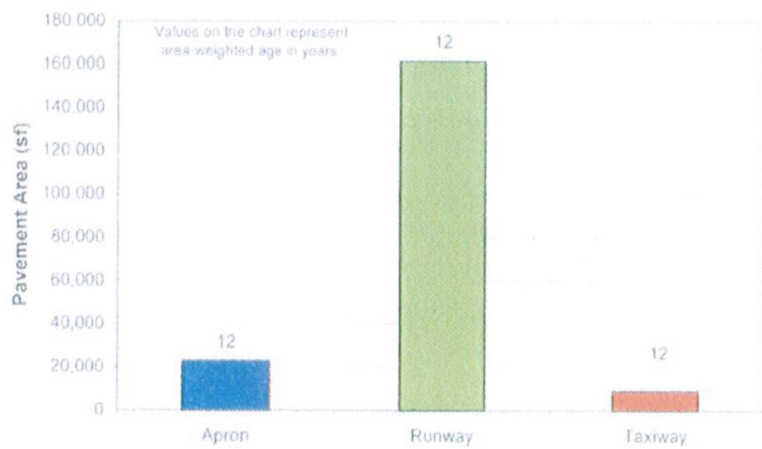


Figure 2. Concrete Municipal Airport pavement inventory.

Figure 3 presents the records review results in the form of a work history map. The Micro PAVER database (see the inside back cover of this report) contains detailed inventory information about the pavement system at the airport.

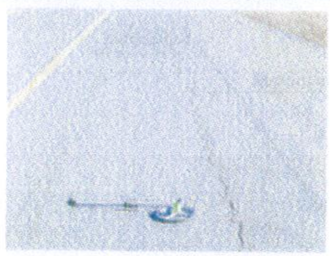
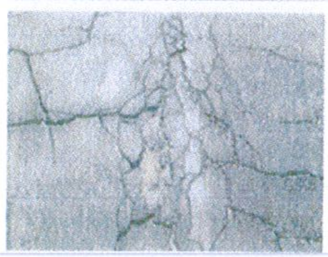
Using the records review information, the pavements were divided into branches, sections, and sample units in accordance with the FAA Advisory Circular (AC) 150/5380-6A and American Society for Testing and Materials (ASTM) Standard D5430. A branch is a part of the pavement system that serves a single function (i.e., runway, taxiway, or apron). A section is a portion of a branch with common characteristics (cross-section, age, traffic level, and overall condition). Sections are divided into sample units for the purpose of pavement inspection.

Figure 4 shows how the pavement network was divided into these units and it also shows the nomenclature used in the Micro PAVER pavement management database to identify the different pavement areas.

PAVEMENT EVALUATION

Pavement Evaluation Procedure

APTech inspected the pavements at Concrete Municipal Airport using the PCI procedure. This procedure is described in FAA AC 150/5380-6A, which is presented in Appendix A, and in ASTM Standard D5340. The PCI provides a numerical indication of overall pavement condition, as illustrated in Figure 5. The types and amounts of deterioration are used to calculate the PCI value of the section. The PCI ranges from 0 to 100, with 100 representing a pavement in excellent condition.

Representative Pavement Surface[1]	PCI
	100
	60
	5

[1]Photographs shown are not specific to the Airport

Figure 5. Visual representation of PCI scale

It should be noted that a PCI value is based on visual signs of pavement deterioration and does not provide a measure of structural capacity.

The types of distress identified during the PCI inspection provide insight into the cause of pavement deterioration. PCI distress types are characterized as load-related (such as alligator cracking on asphalt cement concrete [AC] pavements or corner breaks on portland cement concrete [PCC] pavements), climate/durability-related (such as weathering [climate-related on AC pavements] and D-cracking [durability-related on PCC pavements]), and other (distress types that cannot be attributed solely to load or climate/durability). Understanding the cause of distress helps in selecting a rehabilitation alternative that corrects the cause and thus eliminates its recurrence.

Appendix B identifies the distress types considered during a PCI inspection and the likely cause of each distress type.

Pavement Evaluation Results

The pavements at Concrete Municipal Airport were inspected on April 28, 2005. The 2005 area-weighted condition of Concrete Municipal Airport is 95, with conditions ranging from 81 to 100 (on a scale of 0 [failed] to 100 [excellent]). During the previous inspection in 1999, the area-weighted condition was 92.

Figures 6 and 7 summarize the overall condition of the pavements at the Concrete Municipal Airport. Figure 8 displays the condition of the pavements evaluated. Table 1 summarizes the results of the pavement evaluation. Appendix C presents photographs taken during the PCI inspection and Appendix D details the distresses observed during the visual survey.

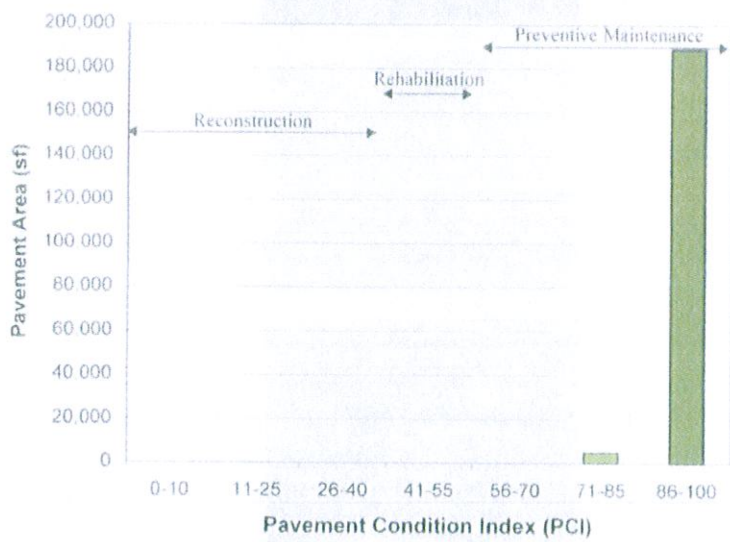


Figure 6. Concrete Municipal Airport overall condition

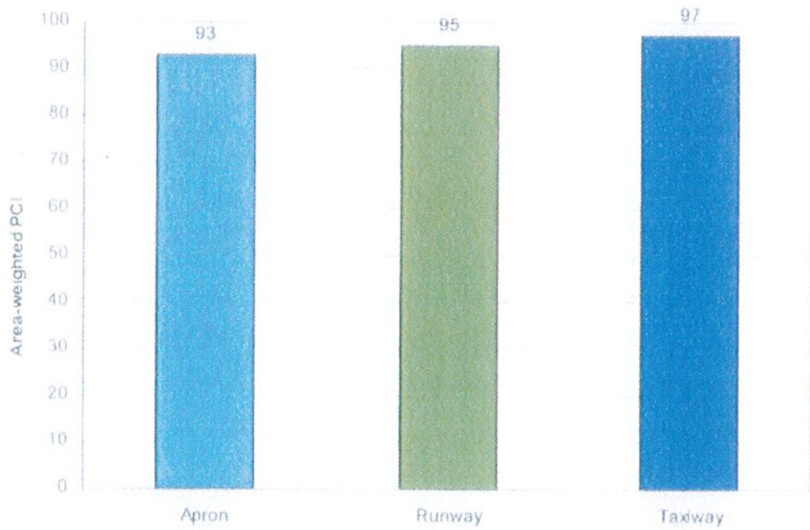


Figure 7. Concrete Municipal Airport area-weighted PCI by use.

Concrete Municipal Airport

Branch	Section	Surface Type	Section Area (sf)	LCD	2005 PCI	% Distress (Percent) Load	% Distress (Percent) Climate or Durability	Distress Types
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

[illegible]

[illegible]	Section	2017		2016		2015	
		PCI	Repair Level	PCI	Repair Level	PCI	Repair Level
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

PAVEMENT MAINTENANCE AND REHABILITATION PROGRAM

[illegible]

Analysis Parameters

Critical PCI Values

[illegible]

[illegible]

Surface Type	Load Classification	Runway	Taxiway	Apron
AC	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]
PCC	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]

Budget and Inflation Rate

[illegible]

Maintenance Policy and Unit Costs

[illegible]

[illegible]

[illegible]

Major Rehabilitation Unit Cost

[illegible]

Analysis Approach

[illegible]

[illegible]

Analysis Results

[illegible]

[illegible]

Because an unlimited budget was used in the analysis, it is probable that the pavement repair program will need to be adjusted to take into account economic and/or operational constraints. [illegible]

[illegible]

[illegible]	Branch	Section	Action		Estimated Cost
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
	[illegible]	[illegible]	[illegible]		[illegible]
	[illegible]	[illegible]	[illegible]		[illegible]
				Total	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
	[illegible]	[illegible]	[illegible]		[illegible]
				Total	$50,751
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
				Total	[illegible]

General Maintenance Recommendations

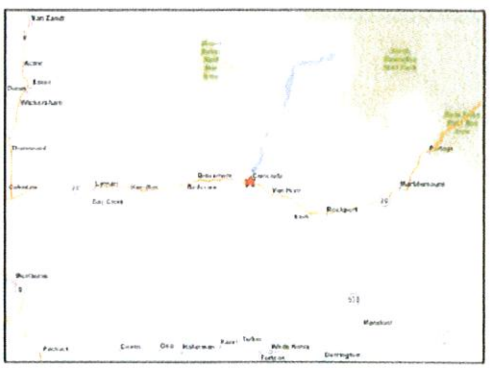
AIRPORT LAY

FOR T

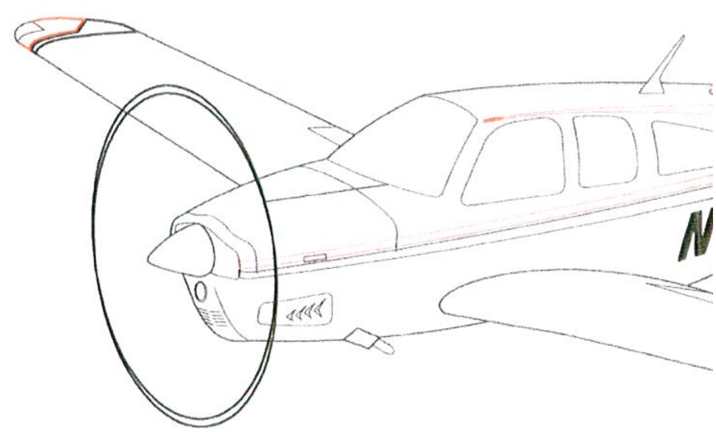
CONCRETE MUN

CONCRETE, W

LOCATION MAP



NOT TO SCALE



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3. AIRPORT AIRSPACE DRAWING
4. RUNWAY 7-25 INNER PORTION
5. RUNWAY 9-27 INNER PORTION
6. TERMINAL AREA DRAWING
7. AIRPORT LAND USE DRAWING
8. AIRPORT PROPERTY MAP

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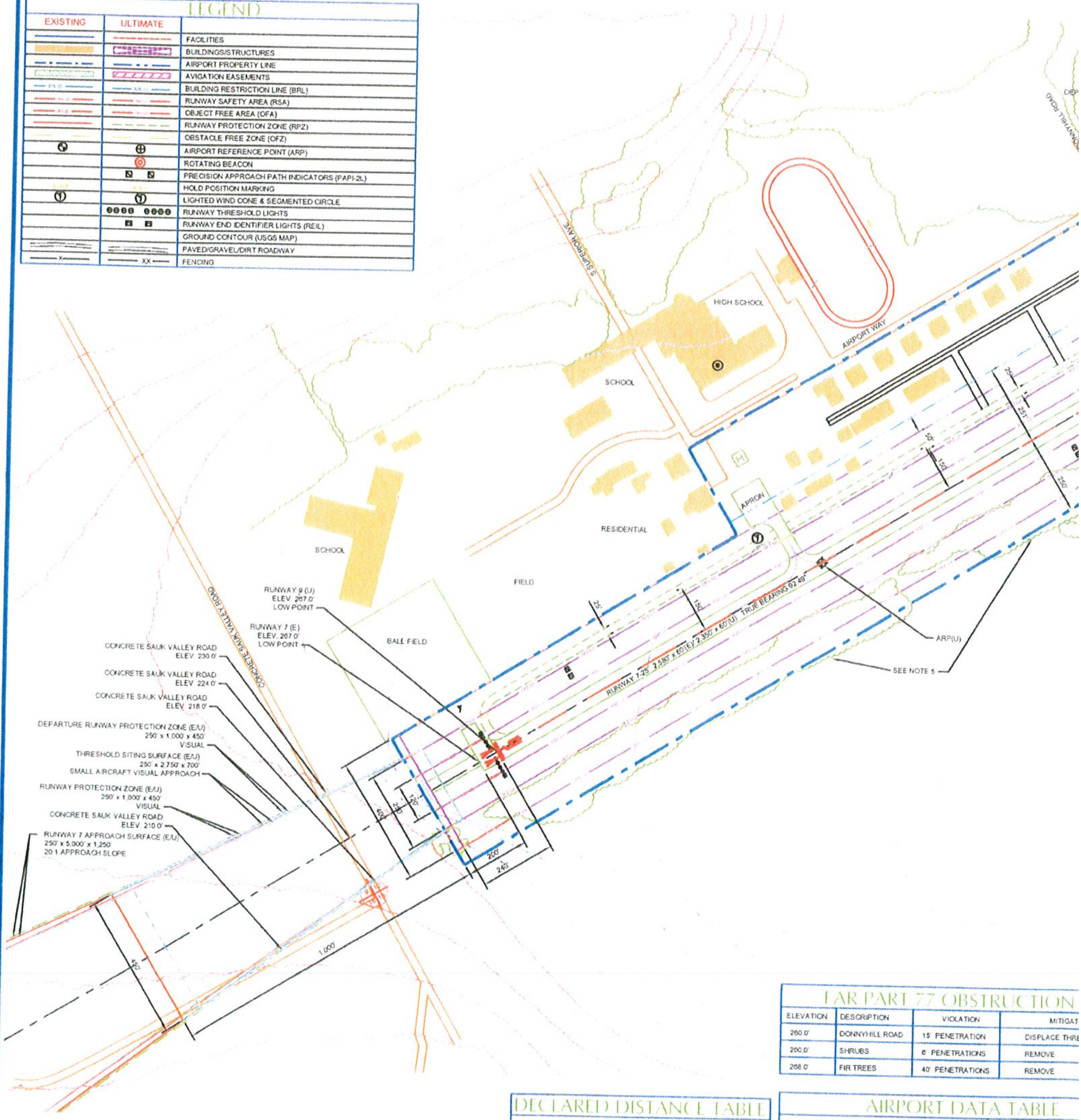
AIRPORT LAYOUT DRAWING

LEGEND

EXISTING	ULTIMATE	
		FACILITIES
		BUILDINGS/STRUCTURES
		AIRPORT PROPERTY LINE
		AVIGATION EASEMENTS
		BUILDING RESTRICTION LINE (BRL)
		RUNWAY SAFETY AREA (RSA)
		OBJECT FREE AREA (OFA)
		RUNWAY PROTECTION ZONE (RPZ)
		OBSTACLE FREE ZONE (OFZ)
		AIRPORT REFERENCE POINT (ARP)
		ROTATING BEACON
		PRECISION APPROACH PATH INDICATORS (PAPI-2L)
		HOLD POSITION MARKING
		LIGHTED WIND CONE & SEGMENTED CIRCLE
		RUNWAY THRESHOLD LIGHTS
		RUNWAY END IDENTIFIER LIGHTS (REIL)
		GROUND CONTOUR (USGS MAP)
		PAVED/GRAVEL/DIRT ROADWAY
X	XX	FENCING



FAR PART 77 OBSTRUCTION

ELEVATION	DESCRIPTION	VIOLATION	MITIGAT
260.0'	DONNYHILL ROAD	15' PENETRATION	DISPLACE THRE
200.0'	SHRUBS	6' PENETRATIONS	REMOVE
268.0'	FIR TREES	40' PENETRATIONS	REMOVE

DECLARED DISTANCE TABLE

RUNWAY	TORA	TODA	ASDA	LDA
EXISTING				
7	2,580'	2,580'	2,580'	2,580'
25	2,580'	2,580'	2,580'	2,580'
INTERMEDIATE				
RUNWAY	TORA	TODA	ASDA	LDA
9	2,580'	2,580'	2,580'	2,545'
27	2,580'	2,580'	2,580'	2,417'
ULTIMATE				
RUNWAY	TORA	TODA	ASDA	LDA
9	2,350'	2,350'	2,350'	2,350'
27	2,350'	2,350'	2,350'	2,350'

DECLARED DISTANCES IN ACCORDANCE WITH AC 150/5300-13, CHANGE #9.

AIRPORT DATA TABLE

		EXISTING
AIRPORT REFERENCE POINT COORDINATES (ARP)	NORTH LATITUDE	–
	WEST LONGITUDE	–
MEAN MAXIMUM TEMPERATURE OF HOTTEST MONTH		62.2° F
AIRPORT ELEVATION - MEAN SEA LEVEL (MSL)		268.0'
AIRPORT ELECTRONIC NAVIGATIONAL AIDS		NONE
AIRPORT REFERENCE CODE (ARC)		A-I
CRITICAL AIRCRAFT		F-33
NPIAS SERVICE ROLE		NON NPIAS

RUNWAY END COORDINA

RUNWAY END	LAT/LONG	EXISTING
RUNWAY 7 (E)/ 9 (U)	NORTH LATITUDE WEST LONGITUDE	N 48° 31' 47.56" W 121° 45' 50.95"
RUNWAY 25 (E)/ 27 (U)	NORTH LATITUDE WEST LONGITUDE	N 48° 31' 47.20" W 121°45' 10.26"

GENERAL NOTES

1. THERE ARE NO THRESHOLD SITING SURFACE (TSS) OBJECT PENETRATION FOR RUNWAY 7-25
2. RUNWAY NUMBERS WILL CHANGE FROM 7-25(E) TO 9-27(U) TO MEET WITH CURRENT MAGNETIC DECLINATION DURING PROJECT TO BRING RUNWAY MARKINGS UP TO STANDARD
3. 25' TURF TAXIWAY EXISTING / ULTIMATE
4. BUILDING RESTRICTION LINE (E/U) PROVIDES 18' STRUCTURE AND OBJECT CLEARANCE
5. FIR TREES 40+' AGL LINE THE FULL LENGTH OF THE RUNWAY ARE TO BE REMOVED
6. SHRUBS 6' AGL TO BE REMOVED

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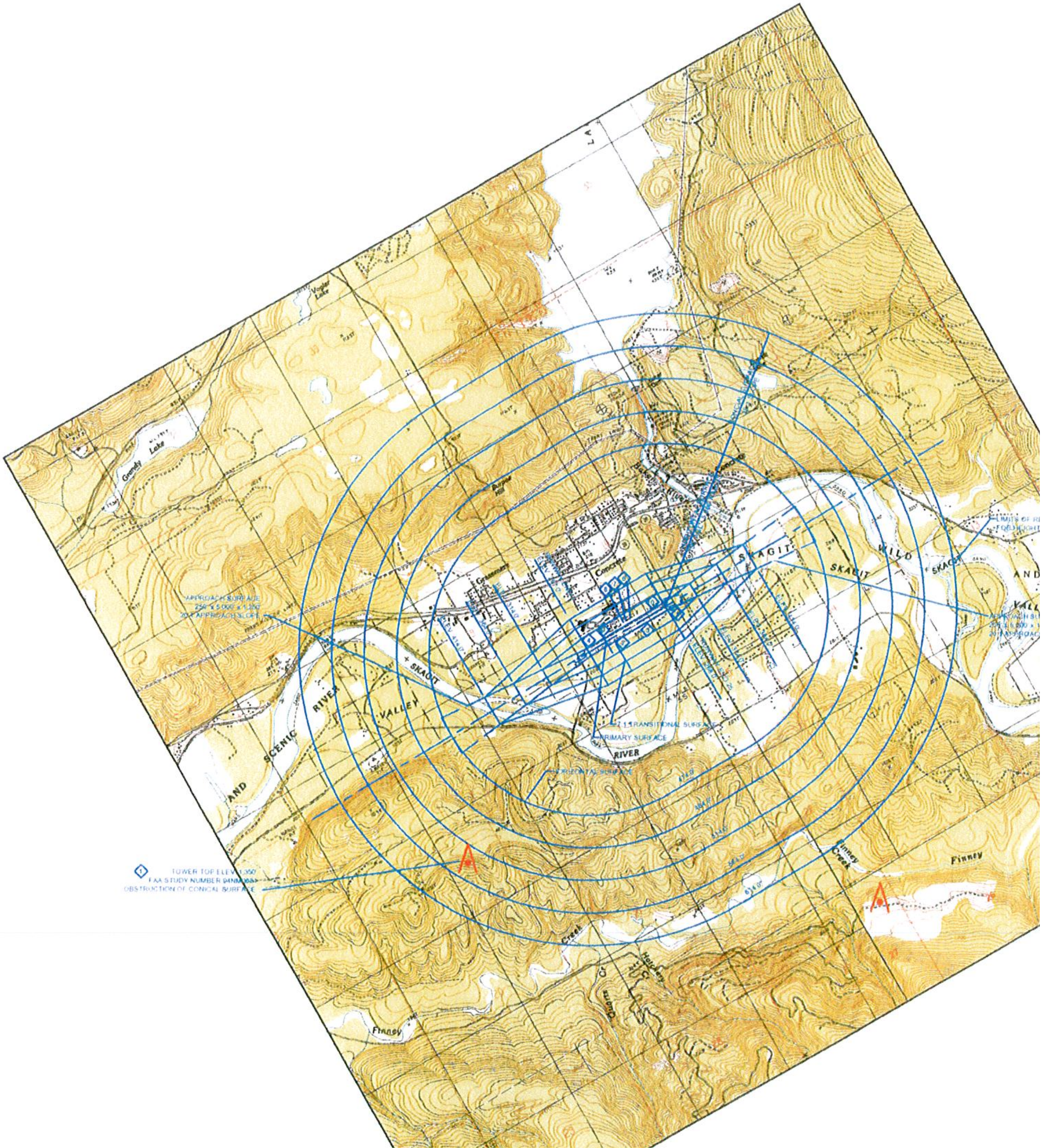
AIRPORT AIRSPACE DRAWING



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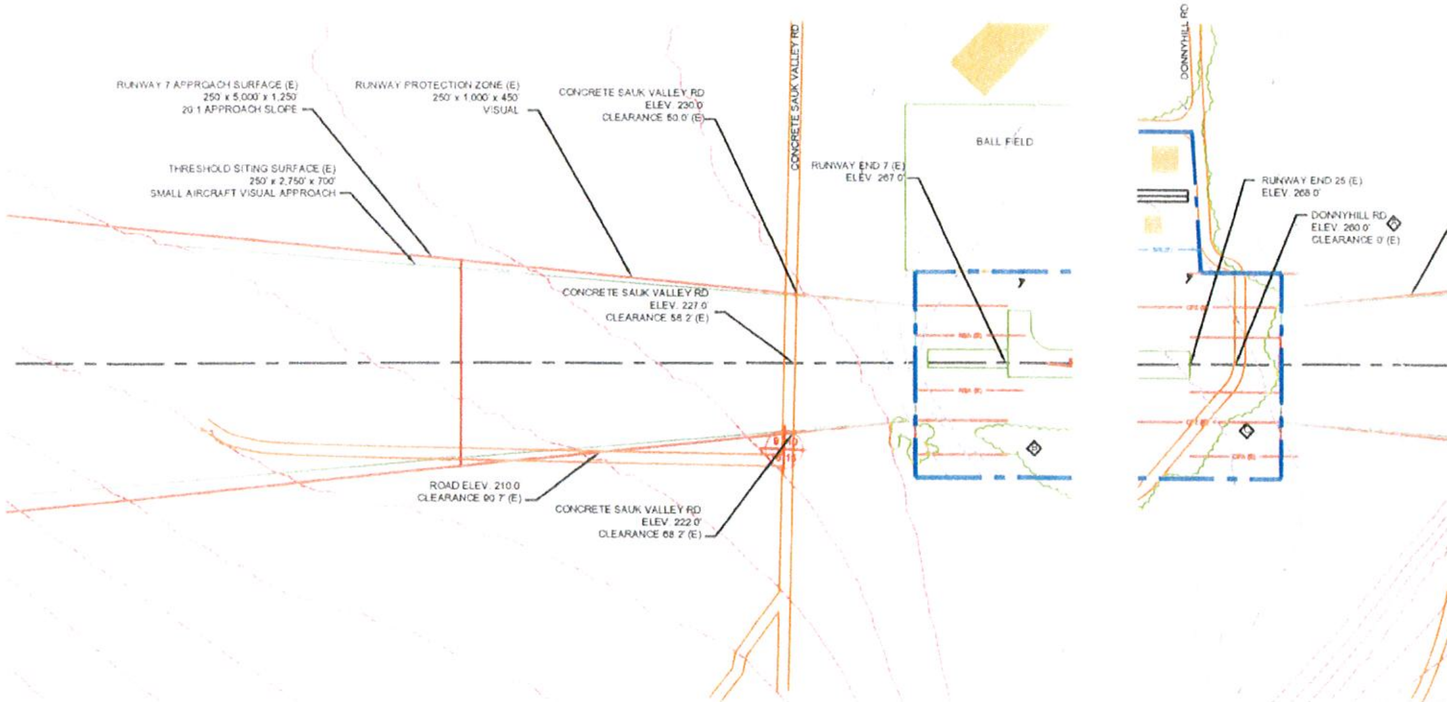
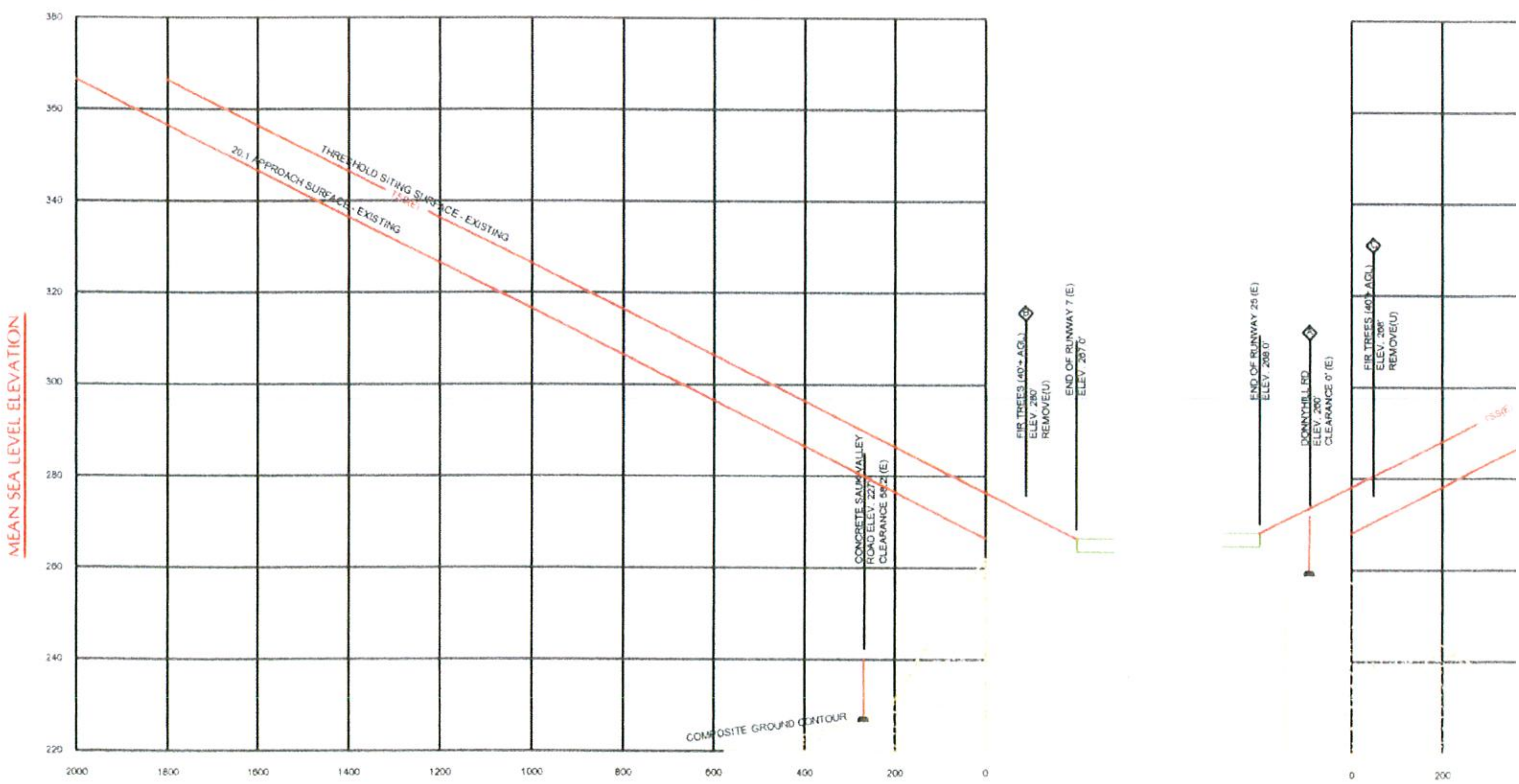
RUNWAY 7-25 INNER PORTION OF THE APPROACH SURFACE

RUNWAY 7 PLAN VIEW



RUNWAY 7 PROFILE VIEW



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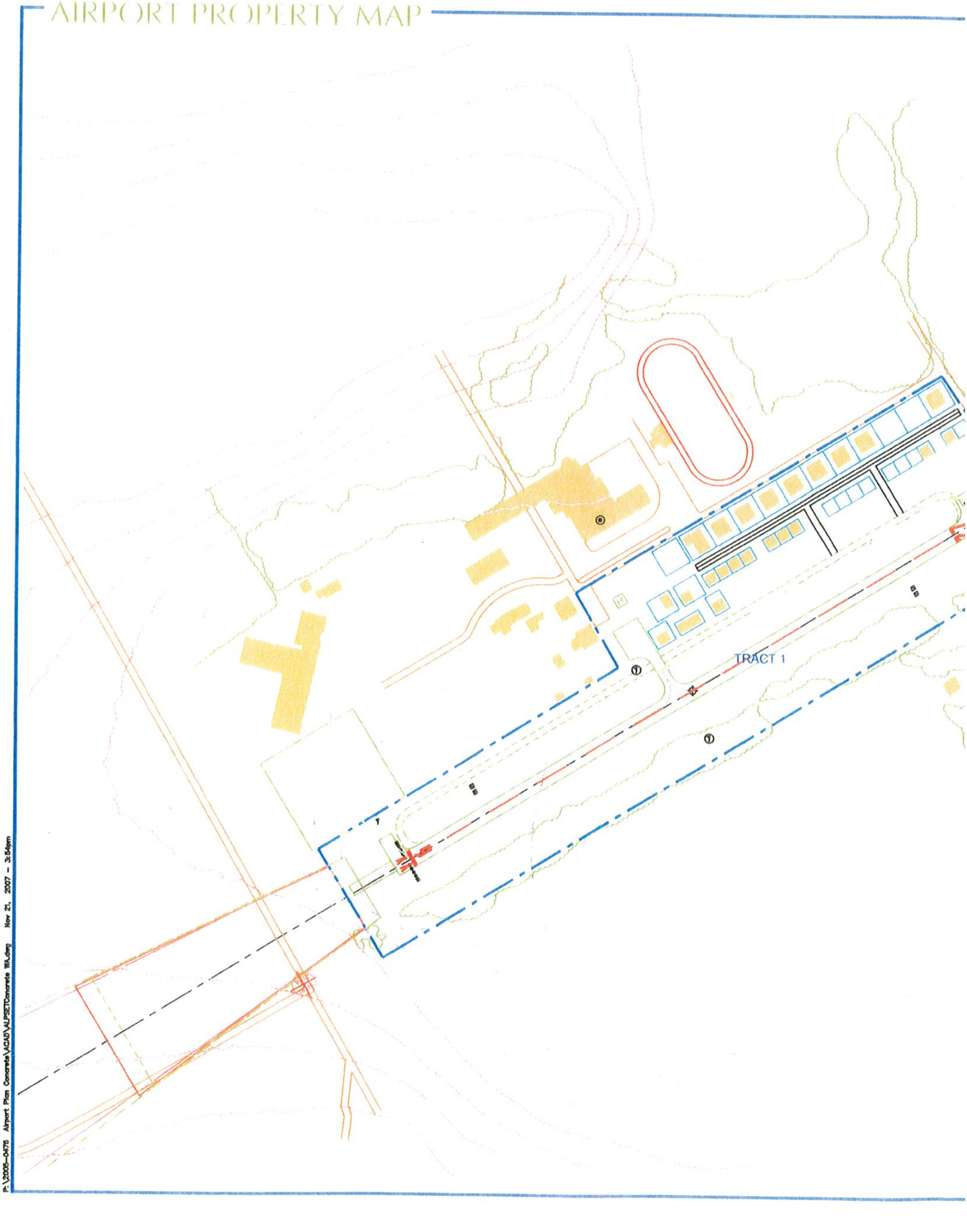
AIRPORT PROPERTY MAP



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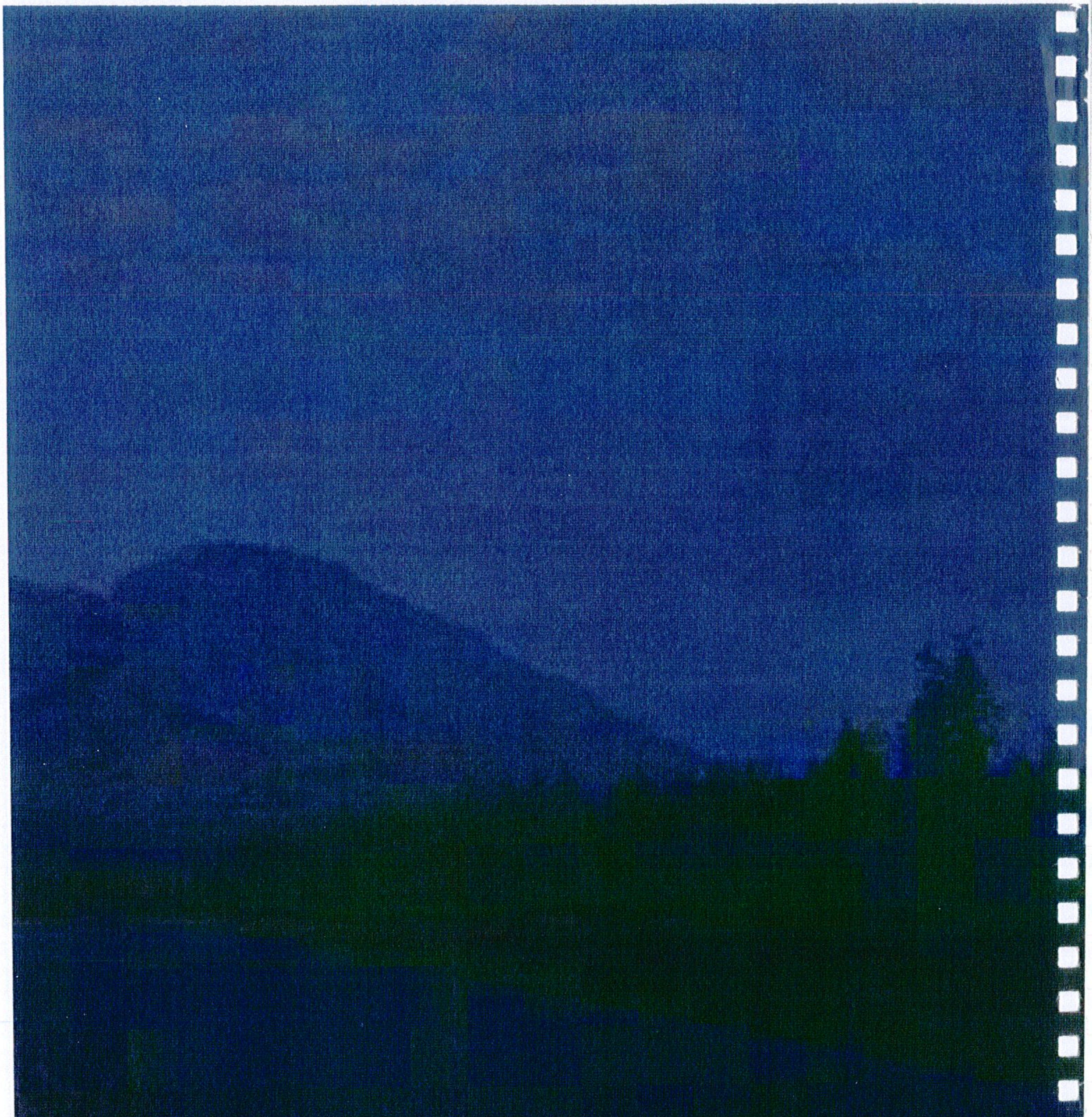

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