ANGOON AIRPORT RECONNAISSANCE STUDY

Prepared for:

Alaska Department of Transportation and Public Facilities
Southeast Region

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ANGOON AIRPORT RECONNAISSANCE STUDY

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Purpose and Need

The *Angoon Airport Reconnaissance Study's* purpose is to identify a preferred site for an airport at Angoon, Alaska. Angoon is located on Admiralty Island in Southeast Alaska. There are no roads to or from this community of 572 residents. Thus, Angoon is marine and aviation (seaplane) transportation dependent. Airport development will improve the safety and reliability of air travel and facilitate emergency medical travel. It will likely open new route systems for more convenient and frequent travel to and from Angoon, better meeting current travel needs and latent travel demand. Improved air travel will reduce the community's isolation, allow for greater economic and infrastructure development in an area with pressing development needs, and will provide improved access to the Admiralty Island National Monument.

Regional Economic and Population Trends

The Alaska Department of Labor estimates very slow population growth for the Southeast Alaska Region. Population forecasts for the Angoon area show an average annual population growth rate of about 1 percent between 2000 and 2025, resulting in a population of about 750 in 2025. Timber harvesting on federal land within the region has significantly decreased over the last decade due to political and environmental concerns. Similarly, timber processing in the region has slowed considerably. The mining and fishing industries fluctuate with market prices, and have encountered environmental and other obstacles that have dampened recent growth. Future trends for those industries are unclear, but strong growth is not expected. Growth in the visitor industry is expected to be strong, although it is not expected to replace economic earnings lost from the decline of the timber industry in Southeast Alaska.

Air Transportation Trends

Continued consolidation of Part 135 air carriers[1] in the region is expected due to high fuel and insurance costs, as well as the difficulty attracting and keeping qualified pilots. Recent movement toward faster, more convenient dayboat ferry service may dampen air traffic demand in the region. Changes in ferry service and access to airport facilities in Southern Southeast Alaska will lead to a reduction in seaplanes in the region, with more dependence on wheeled planes. Lastly, four communities in northern S.E. Alaska are without airports. These are Elfin Cove, Pelican, Tenakee and Angoon.

[1] **Part 135 Air Carrier** – Air taxi operators and commercial operators of small aircraft (less than 30 seats) regulated under 14 CFR Part 135.

Air Traffic Forecast

Air traffic within the region over the next 25 years is expected to increase slightly fueled by slow, steady population growth and the local reflection of national trends toward more travel by air. Regional economic growth is not expected to fuel additional air traffic. Development of an airport coupled with focused marketing could create increased visitation and air travel. The location of a runway at Angoon, near the geographic center of Southeast Alaska, and its traditionally better weather could potentially fuel increased air traffic to Angoon once the runway is completed. Convenient air connections to communities where Angoon residents wish to travel (such as Kake and Sitka) will also likely increase traffic. Additionally, development over time of the +700 privately owned residential homesite lots in the Angoon area will contribute to air traffic demand.

In total, while the air traffic on a new land-based runway at Angoon is expected to increase only moderately, several conditions in the region, and in Angoon itself, will contribute to greater air traffic growth. For these reasons, to ensure facilities are not undersized and to make efficient use of federal and state construction funding, a high-growth air traffic forecast is used to determine airport facility requirements.

Following is a summary of the air traffic forecast for the Angoon area, beginning with base year 1999, and continuing through 2026.

Air Traffic Forecast Summary

Activity	Base Year 1999	Est. Opening Year 2007	2011	2016	2026
Enplaned Passengers	*4,000*	*4,610*	*4,960*	*5,420*	*6,480*
Enplaned Air Cargo (total pounds)	*116,643*[(1)]	*126,880*	*132,340*	*139,490*	*154,970*
Annual Operations					
Air Carrier	*3,700*	*3,700*	*3,700*	*3,700*	*3,700*
Air Cargo	*500*	*500*	*500*	*500*	*500*
Emergency Medical	*100*	*100*	*100*	*100*	*100*
General Aviation	*500*	*500*	*500*	*550*	*600*
Total Annual Operations	*4,800*	*4,800*	*4,800*	*4,850*	4,900

(1) See Table 6, Page 33. This amount includes both freight and mail.

Source: URS Consultants

Critical Aircraft

The Critical Aircraft for the new Angoon Airport will be that used by the region's Part 135 air carriers. In the near and intermediate future this is expected to be a single engine aircraft with less than 6 seats such as the DeHavilland Beaver and the Cessna 206. The initial runway will have an Airport Reference Code (ARC) classification of A-I. As passenger demand increases, aircraft size and seating capacity will also increase. These future aircraft are expected to be the Cessna Caravan, DeHavilland Otter and the Piper Navajo with passenger potential up to ten seats. To accommodate these types of aircraft, (which weigh less than 12,500 pounds) the runway will have an ARC classification of B-II.

Facility Needs

Considering the forecasted increase in air traffic demand, and changes in critical aircraft, the Angoon airport will require the following facility infrastructure.

- Phase I at airport opening is expected in 2008.
- Phase II, ultimate requirements, are projected to be in place by 2017.

Angoon Airport Facility Requirements

Descriptor	Phase I Est. Opening Day 2008/2012	Phase II (Ultimate) 2017-2026
Airport Reference Code	A-I	B-II
Approach	Visual (20:1)	Precision (50:1)
Runway Width	60 feet	100 feet
Runway Safety Area Width	120 feet	300 feet
Object Free Area Width	400 feet	800 feet
Runway Length	3,300 feet	4,000 feet
Runway Safety Area Length	3,780 feet	5,200 feet
Object Free Area Length	3,780 feet	5,200 feet
Taxiway	Access	Full Parallel
Lighting	MIRL, MITL	HIRL, MITL
Navigational Aids	REIL, PAPI	GPS, WAAS, ODALS

Source: URS Consultants

Landside development will include a small terminal passenger holding facility with restrooms, a (small) vehicle parking lot, apron space and room for hangers, and possibly a maintenance and safety equipment storage facility. A camping facility for air travelers with restrooms, firepits, tables and gravel camping area could be added, but is not included with this study's cost. Utility requirements include a source of potable water, a septic system, and depending on the site location, a power generator for runway lights, navigational aids, and terminal building power (some of the study sites are on the current

electric grid). Landside and airside facilities are expected to include an area of not less than 200 acres of land.

With development of the airport, much of the air traffic into and out of Angoon will make use of that runway. However, use of the seaplane base is expected to continue due to the proximity of the base to downtown Angoon, due to the proliferation of seaplanes in the region, connections to other nearby airportless communities and because at times a water landing is favorable in adverse weather. Although no improvements or expansions of the seaplane facility are recommended, upkeep of the current facility is warranted.

Site Options

Several previous airport studies have been completed. An initial study was done by ADOT/PF in 1982, and amended in 1983. This was followed by a Kootznoowoo, Inc. funded study review in 1995. In those studies, seven sites were reviewed and ADOT/PF initially recommended a site that was later re-orientated, calling the site 5A (current study site 9). In general, Angoon residents felt this site limited growth potential and rejected it.

During an initial public open house by the study team (1/24/01), community members recommended the team should study the following sites:

- Site 1 – The un-named Channel Point Island E.N.E. of Angoon city center on the north side of Favorite Bay;
- Site 2 – The un-named island containing Sullivan Point which is located on the northeast side of Favorite Bay;
- Site 3 & 4 – sites on Admiralty Island on the easterly side of Favorite Bay, generally located within Admiralty National Monument on land that is not currently connected to Angoon's road system;
- Site 5 – a site located +/-3.7 miles, S.S.E. of Angoon off Chatham Straits beyond any current road access;
- Site 6 & 6A - sites located near the S.E. end of Angoon's current road system (Auk'Tah Lake Road) north of the community water supply, Auk'Tah Lake (runway orientation different with each site);
- Site 7 – a site within the center of Angoon's currently developed Peninsula that is generally between privately owned lands.
- Site 8 & 9 – sites that were ADOT/PF amended study sites 4B and 5B.

All but 8 & 9 were study areas recommended by Angoon residents. Sites 8 and 9 have been included in this work effort because of past recommendations and for relative cost comparisons.

Site Evaluation

Except for sites 1 and 2, each site was included in a detail engineering reconnaissance study, which included site development costs based on project mapping. Runway

orientation was based on available wind records analysis. Additional wind studies are on-going during the study period. The development costs included an environmental analysis, access analysis, land costs (as applicable), engineering design survey, and project construction administration inspection and inspection costs.

Sites 1 and 2 were eliminated due to access difficulty which included bridges which must allow for marine vessel navigation, as well as known wind orientation (Site 2).

Site Recommendation

Due to land areas required for community expansion and site orientation with what is currently felt to be the prevailing wind direction, sites 8, 9, 5, 6 and 7 were eliminated. Because of the probability of adverse wind shears, site 4 was eliminated. The remaining sites for final study are 3 and 6A.

Site 3 is recommended for advanced studies. In simplest terms, it allows for:

- Both future community and airport expansion;
- It is preferred by all present part 135 carriers;
- It has the least human impacts to Angoon;
- It has acceptable area environmental impacts;
- It has the best approach/departure alignment;
- It has the least obstructions;
- It has the least noise impacts to Angoon;
- It has the least visual impacts.

As an alternate to Site 3, Site 6A is also recommended for further review, but only as an alternate to the clearly superior site.

City of Angoon Resolution

On June 2, 2004, the City of Angoon approved this report and passed the following resolution:

CITY OF ANGOON • PHONE (907) 788-3653

P.O. BOX 189 • FAX (907) 788-3821
ANGOON, ALASKA 99820

Resolution # 04-08

A RESOLUTION OF THE ANGOON CITY COUNCIL ADOPTING THE STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES ANGOON AIRPORT RECONNAISANCE STUDY FOR THE ANGOON AIRPORT

WHEREAS: State of Alaska Department of Transportation and Public Facilities (ADOT&PF) has undertaken a study to determine the best site for a new airport to serve the City of Angoon; and

WHEREAS: ADOT&PF has completed a report recommending a preferred and alternate site for the airport; and

WHEREAS: development of an airport master plan based on the preferred site is the necessary next step in planning for the new airport; and

WHEREAS: the airport planning process has included active public participation; and

WHEREAS: due to an airport being built in Angoon, the community would like control of the area and economic opportunities; and

WHEREAS: the Angoon Airport Reconnaissance Study project is now complete and has been presented to the City Council for review and adoption.

NOW THEREFORE BE I T RESOLVED THAT; the Council for the City of Angoon regarding the Angoon Airport Reconnaissance Study dated April 2004 is adopted and ADOT&PF is encouraged to proceed with development of an airport master plan for the preferred site identified in the Reconnaissance Study Report.

BE IT FURTHER RESOLVED, that the airport master plan should include future expansion plans for the commercial airlines; ie., Alaska Airlines, Horizon Air

CERTIFICATION:

Passed and approved by a duly constituted quorum of the Angoon City Council, this 02 day of June, 2004.

FOR THE CITY OF ANGOON:

Walter Jack
HONORABLE WALTER JACK, SR., MAYOR

ATTEST: Francine J. Willis
FRANCINE j WILLIS, CITY CLERK

1.0 INTRODUCTION

1.1 Project Overview and Report Organization

Angoon, Alaska is a community located in Southeast Alaska about 60 miles southwest of Juneau and 50 miles northeast of Sitka (Figure 1). It is located on Admiralty Island, on a peninsula of land bordered by Chatham Strait to the west and Kootznahoo Inlet to the east. Angoon is primarily a Native Alaskan Tlingit community and the only permanent settlement on Admiralty Island in Southeast Alaska. Admiralty Island is also home to the Admiralty Island National Monument Kootznoowoo Wilderness, part of the Tongass National Forest.

Southeast Alaska is a narrow strip of land along the northwestern shore of North America between the Pacific Ocean/Gulf of Alaska and the Coastal Mountain Range, fronted by an archipelago (Alexander Archipelago) of islands. This terrain of mountains, islands and fjords does not support many miles of road. In fact, only a few communities in the region have road access to other communities, and the rest of the continent. Most transportation between communities in the region is either by air or by water. Consequently, many Southeast Alaska residents own and operate boats and aircraft. Alaska has the highest rate of aviation licenses per capita of any of the 50 states. Nearly 400 general aviation (GA) aircraft are based in the communities of Sitka (22) and Juneau (374), to the east and west of Angoon. Juneau is 59 air miles from Angoon; Sitka is only 43 air miles away.

The Alaska Department of Transportation and Public Facilities (DOT&PF) has commissioned this *Angoon Airport Reconnaissance Study* to investigate locations for an airport in the Angoon area. Air traffic to and from Angoon is currently restricted to small seaplane use. This study will assess Angoon airport needs, document local wind patterns, evaluate possible airport sites, and recommend an airport site for further study. The study has four parts:

- *Needs Assessment*,
- *Site Analysis*
- *Conclusions and Recommendations*
- *Mapping and Reconnaissance Development Plans*

Division One, the ***Needs Assessment,*** includes the project purpose and need, background information, the condition of current Angoon seaplane facilities, an air traffic forecast, and a review of the forecast facility needs for an Angoon airport.

Division Two, the ***Site Analysis,*** identifies possible airport sites, lists criteria for site evaluation, evaluates the possible sites and narrows airport sites down from ten to four, and estimates project costs.

Division Three, the ***Conclusions and Recommendations***, looks in more detail at reconnaissance level project costs, narrowing airport site options down to two areas (four possible sites) that merit further, advanced study. This division does conclude and recommend a primary and alternate site for final project studies.

Division Four, ***Mapping and Reconnaissance Level Development Plans***, contains project mapping and reconnaissance level site development plans with individual site quantities.

During periods the draft study was being reviewed by ADOT/PF and FAA personnel, wind studies continued. Due to both technical and project administrative reasons, wind studies did not begin until the summer 2002. Therefore, historic NOAA/NWS records were used in the engineering analysis study of sites and runway direction. The wind studies continued through the remainder of 2002 and 2003 with both equipment and remote access difficulties. The field studies ended in November 2003 with recent data basically agreeing with historic data.

After the ***Angoon Airport Reconnaissance Study*** is completed, it is reasonable to expect that environmental documentation and an Airport Master Plan will be prepared in 2004-2005, airport design work in 2005-2006, right-of-way and utility work during 2005-2007 (timing depends upon the site selected, complexity and availability of funding), and airport construction could take place between 2008 and 2010 at the earliest.

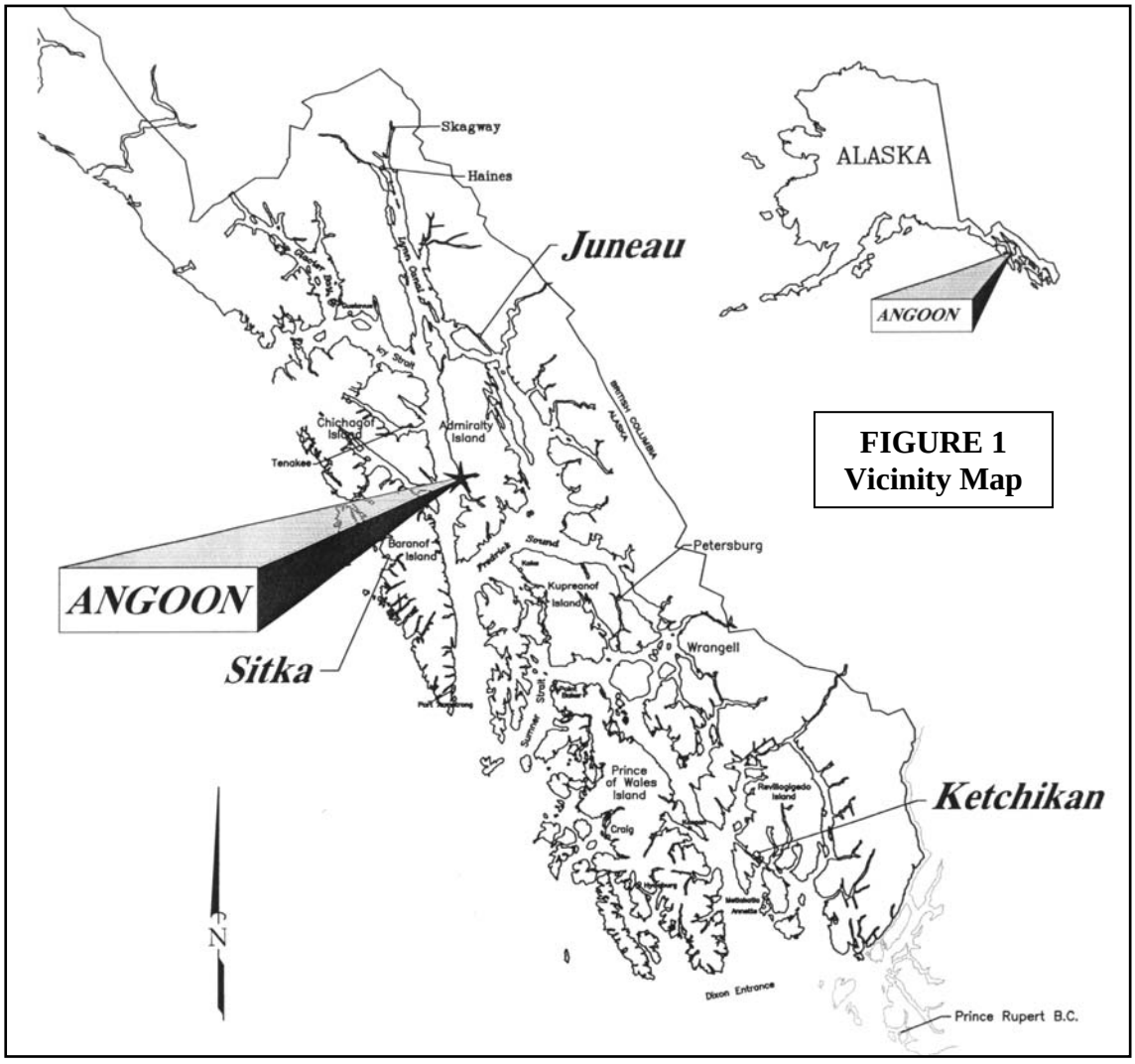


FIGURE 1
Vicinity Map

1.2 Public Outreach

Public outreach efforts completed as part of ***Angoon Airport Reconnaissance Study*** preparation included:

1) A public meeting held in Angoon on January 24, 2001 to explain the project to residents and solicit comments. A public meeting occurred in the evening and earlier that day, DOT&PF and the consulting team attended lunch at the Angoon Senior center to review the project and answer questions with Angoon elders and others gathered for lunch. Display ads for the meeting were posted in the Capital City weekly and Juneau Empire. Meeting flyers were posted in Angoon. A flyer was sent to agencies and the project mailing list.

V. Skagerberg makes point during 11/13/01 meeting.

2) Conducting an Angoon Residents' Travel Survey to better understand travel demand, preferences and needs (Appendix A).

3) Interviewing air carriers, charter operators, and businesses.

4) Distributing a project newsletter in March and July 2001, to report survey results and project status.

5) Issuing a draft *Needs Assessment* report in July 2001.

6) Holding a public meeting in Angoon on August 1, 2001 to review the draft (***Needs Assessment)*** and continue airport sites discussions. Display ads for the meeting were posted in the Capital City weekly and Juneau Empire. Meeting flyers were posted in Angoon. A flyer was sent to agencies and the project mailing list.

7) Distributing a ***project newsletter*** in early November 2001, that reported on the site analysis and recommendation to narrow possible airport sites down from ten to three.

8) Holding a public meeting in Angoon on November 13, 2001, to review the ***Site Analysis and Recommendations*** on possible airport sites. Display ads for the meeting were posted in the Capital City weekly and Juneau Empire. Meeting flyers were posted in Angoon. A flyer was sent to agencies and the project mailing list.

9) Answering agency and public questions about the project during winter 2001-02.

10) Issuance to ADOT/PF for review, a first "draft" of the ***Angoon Airport Reconnaissance Study Report*** in April 2002.

11) Issuance of a second draft ***Angoon Airport Reconnaissance Study Report*** in October 2002.

12) Issuance of a third draft ***Angoon Airport Reconnaissance Study Report*** in January 2003.

B. Sheinberg explains project to seniors on 1/24/01

1.3 Past Studies

Previous studies that considered Angoon transportation issues were examined. The following summarizes relevant findings and recommendations within those studies.

Airport Planning

Angoon Airport Reconnaissance Study, Alaska Department of Transportation and Public Facilities, August 1982 (revised February 1983).

ADOT&PF completed a "revised" *Angoon Airport Reconnaissance Study* in February 1983. A total of seven possible sites were studied at that time, all on Kootznoowoo Corporation land within the City of Angoon corporate boundary (Figure 2). At the conclusion of this study, the community generally preferred site 4a, not agreeing with ADOT&PF recommended site 5a (Table 1). Strong and mixed community reaction led ADOT&PF to take a position that a local vote supporting airport development would be needed for ADOT&PF to resume interest. No further work on airport development occurred by ADOT/PF.

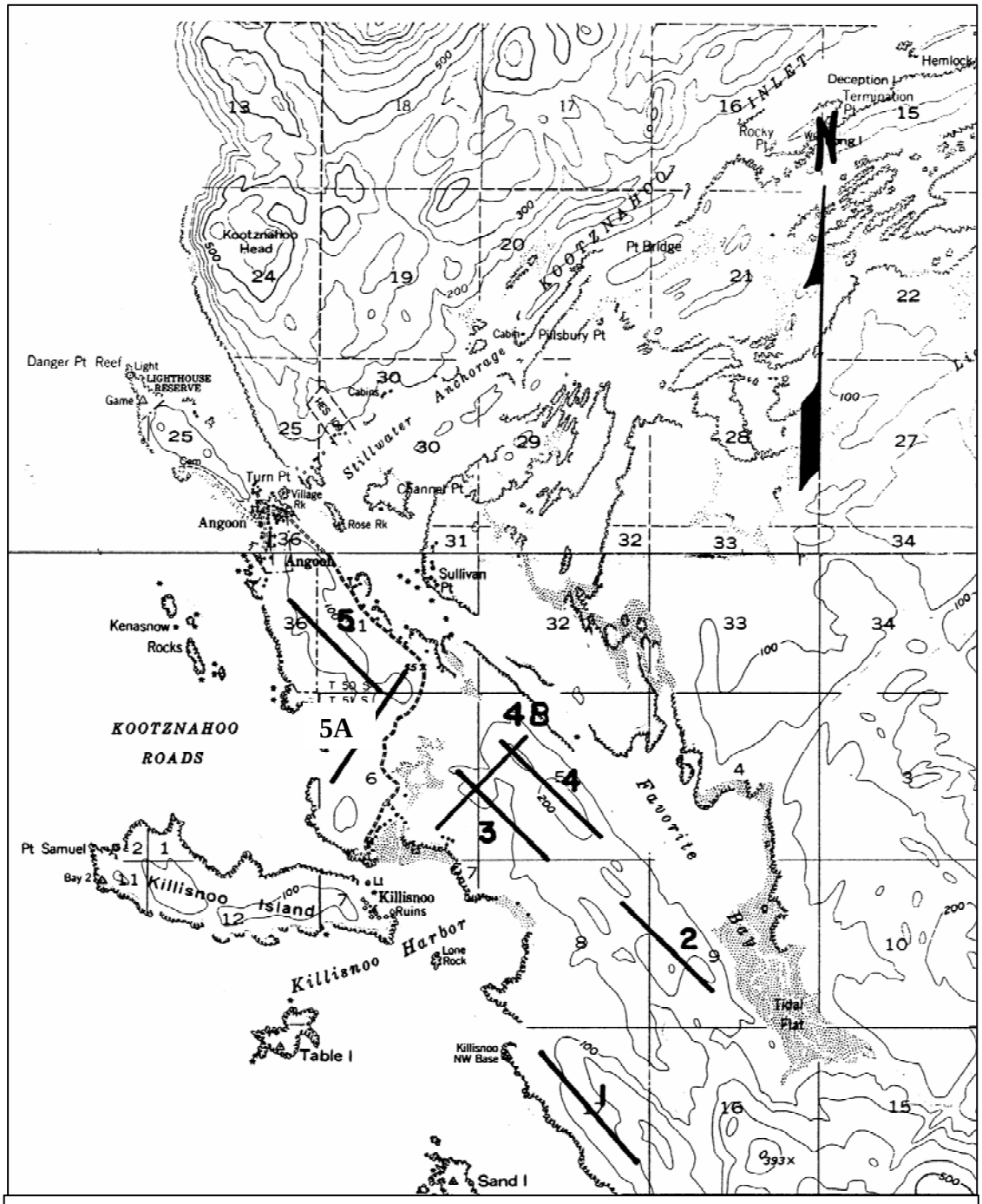


FIGURE 2
Sites studied in 1982/83 DOT&PF Airport Reconnaissance Study

Table 1
1983 DOT&PF Angoon Airport Reconnaissance Study
Site Recommendations

Site	Rationale for Dropping
1	A portion extends into USFS National Monument lands, obstructions to horizontal surfaces appear considerable, Oriented wrong to *apparent* prevailing winds (1) and road access increased costs.
2	Oriented wrong to *apparent prevailing winds*.
3	Lack of suitable "on site" material, adverse soil conditions, possible environmental impacts, possible obstruction to the approach and horizontal surfaces, Oriented wrong to *apparent prevailing winds*.
4	Oriented wrong to *apparent prevailing winds.*
4b	Twice as expensive to develop as site 5B. Community's preferred site.
5	Oriented wrong to *apparent prevailing winds*
5b	ADOT&PF recommended site. However community expresses deep concerns over conflicts with future land use and community expansion. ADOT&PF notes a need to address future growth and if needed, mitigate subsistence and land use concerns.

Source: Angoon Airport Reconnaissance Study, Alaska Dept. of Transportation and Public Facilities, February 1983.
(1) ADOT/PF first believed that the prevailing winds ran the direction of Favorite Bay (Seaplane landing area). This later proved incorrect by NOAA/NWS records and an independent ADOT/PF wind study.

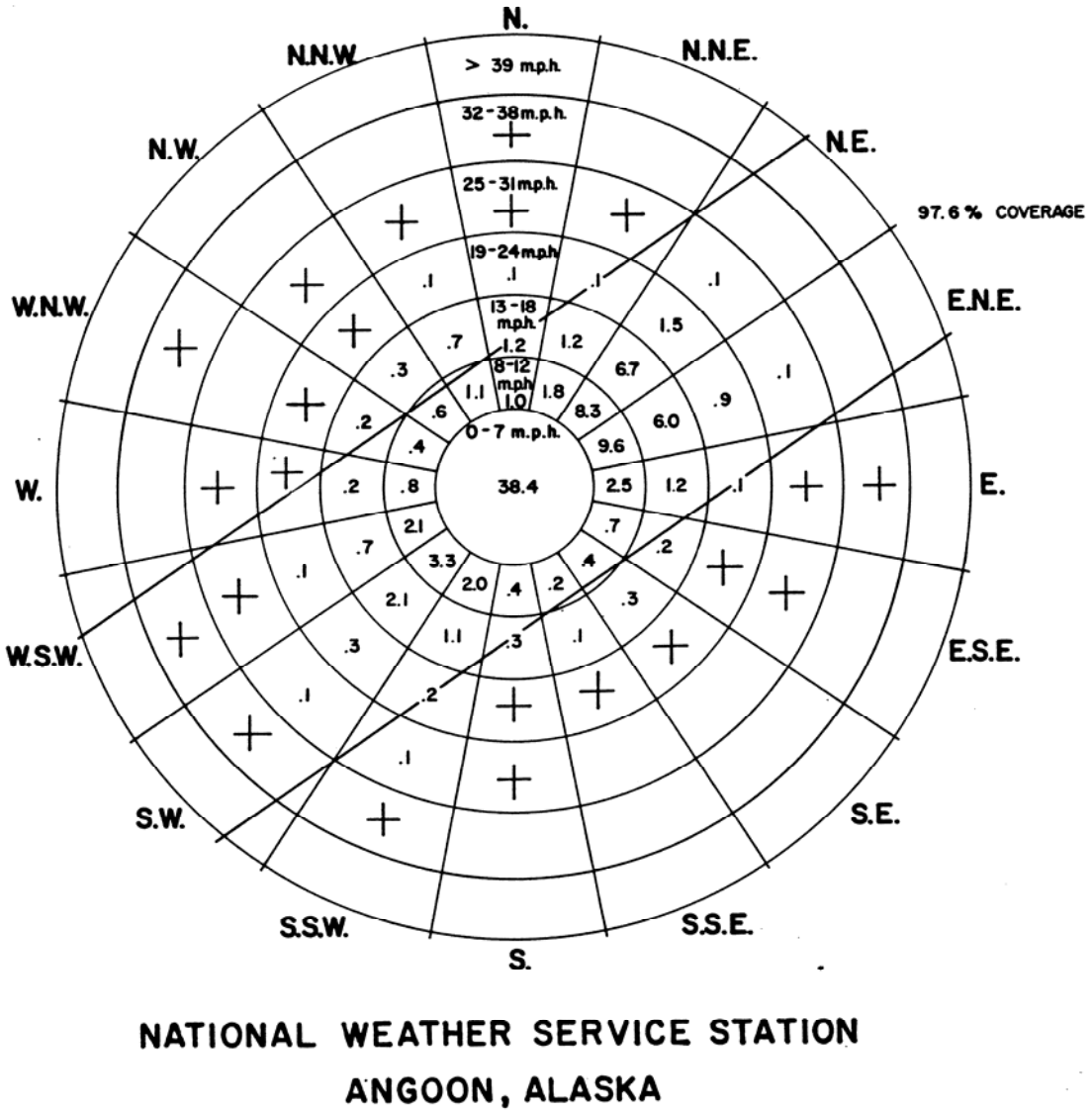
This study also analyzed local wind patterns. National Weather Service weather station generated wind speed and direction data from Angoon (Stn. No. 25310) over 10 years reveals a prevailing wind direction from northeast and southwest (Figure 3). To test a possible "terrain bias" based on weather station location, a Met Set 4 Wind recording station was installed by DOT&PF on top of the Alascom communication tower approximately one-half mile southeast of town. This recorder confirmed a prevailing northeast-southwest wind pattern. This wind direction, generally anomalous for Southeast Alaska, is likely attributable to "topographic funneling'. Wind data indicates a northeast-southwest runway orientation will accommodate winds 97.6% of the time.

Angoon Airport Feasibility Review, Airport Consulting Services of Alaska prepared for Kootznoowoo, Inc., January 1995.

In January 1995, Kootznoowoo Inc., contracted with Airport Consulting Services (ACS) to assess the feasibility of developing an airport in Angoon. In its *Angoon Airport Feasibility Review,* ACS concluded that DOT&PF would not pursue airport development without community concurrence on a site. Further:

(1) early coordination with the Angoon community and local pilots is needed;
(2) the community must vote to support airport development;
(3) an Environmental Impact Statement will *likely* be required to address impacts to wetlands, subsistence land uses, and other socioeconomic impacts resulting from airport development; and
(4) an evaluation of the compatibility of the proposed airport sites with land use plans will be required.

Figure 3
Angoon National Weather Station Wind Rose



Source: Angoon Airport Reconnaissance Study, Alaska Department of Transportation and Public Facilities, February 1993

Community Vote

During autumn 1998, Angoon municipal election voters passed a measure supporting development of a local land-based airport. Due to the Angoon community's support of airport development, DOT&PF began the current airport study.

Alaska Aviation System Plan Update, TRA-BV Airport Consulting for the Alaska Department of Transportation and Public Facilities, March 1996.

This plan does not address Angoon Airport in particular. It does state that as a community class airport, the Angoon seaplane base should be eligible for state and federal funding in competition with other community class airports. Although the air traffic forecast does not address the Angoon seaplane base in particular, it does show enplanements at all airports in the Southeast Region to have an average annual growth rate of 1.8 percent for the years 2000 to 2010.

Southeast Alaska Transportation Plan, KJS Associates for the Alaska Department of Transportation and Public Facilities, March 1999, and Addendum #1, February 2001.

The Southeast Alaska Transportation Plan (SATP) is Southeast Alaska's long-range transportation vision to guide investments for Alaska Marine Highway System (AMHS) travel to, from and within the region. In assessing region-wide transportation, the study noted no immediate priorities or requirements to serve with regard to air travel with one exception --- it specifically noted the interest of Angoon in having an airport. Completion of an airport reconnaissance study was recommended.

The study mainly addresses marine transportation needs. This study, and a subsequent related study of ferry service options in northern Southeast Alaska may recommend changes to ferry services to Angoon, which will impact demand, to some unknown extent, for air transportation to and from that community.

LAND USE AND COASTAL PLANNING

1980 Alaska National Interest Lands and Conservation Act (ANILCA)

There are three parts of ANILCA relevant to airport planning in Angoon.

- First, the Admiralty Island National Monument is established [§ 503(b)];
- Second, Kootznoowoo Inc. ownership of a 660 ft. wide swath of shoreline along Mitchell, Kanalku and Favorite Bays is established [§ 506(c)];
- Third, Title XI sets out rules for developing Transportation and Utility Systems in and across, and access into, Conservation System Units (such as Admiralty Island National Monument).

Section §1104 (g)(2) notes that when deciding whether to allow a transportation improvement on a Conservation System Unit, the federal agency(s) shall consider: (paraphrasing):

> *the need for and economic feasibility of the improvement; economically feasible and prudent alternatives; short and long-term social, economic and environmental impacts, impacts that would affect the purposes for which the federal unit was established; measures to avoid or minimize impacts; and the short and long term public values that might be adversely affected versus the short and long term public benefits.*

City of Angoon Land Use Plan, CH2MHill, December 1992

An airport is discussed as part of the Community Facilities section of the 1982 City of Angoon ***Land Use Plan***. The Plan notes airport location will influence the kind of development that can occur on adjacent lands. "All land uses must be carefully considered when deciding if and where to develop an airport (pg 16)."

City of Angoon-Angoon Coastal Management Plan, Mike Macy, May 25, 1990

The May 1990 ***Angoon Coastal Management Plan (Angoon CMP)*** reflects community uncertainty over airport development after the disagreement in the 1980's with DOT&PF over airport location. The Angoon CMP notes that while the community welcomes better access to neighboring communities, it is generally opposed to improvements such as airports that make Angoon's fish and wildlife resources more accessible to people from outside the community (pg.32).

Today, the Angoon community clearly wants an airport, but the sentiments from the 1990 Angoon CMP that airport location must carefully consider impacts to subsistence, and that after airport development the City will want to more aggressively manage land use activities though zoning and other local government tools, are still relevant. The 1990 Angoon CMP does endorse heliport development, noting that the City would like to establish a new heliport site, atop the hill south of City Hall and east of the health clinic with a new approach pattern from the south. It notes that the approach to the High School softball fields (used as a helipad now) from the north directly over the village creates anxiety for residents. In the Angoon CMP, under "Transportation", the issue statement is relevant as are two goals and objectives.

> **CMP ISSUE 8: TRANSPORATION**
> *Angoon's transportation facilities need improvements and expansion to accommodate even limited community growth.*
>
> *Goal 8.1: All transportation improvements should be planned, designed, constructed and maintained so as to minimize environmental impacts and erosion and maximize user convenience and safety.*

Objective 8.1.1: In planning, designing, constructing, and maintaining transportation facilities follow accepted standards and procedures.

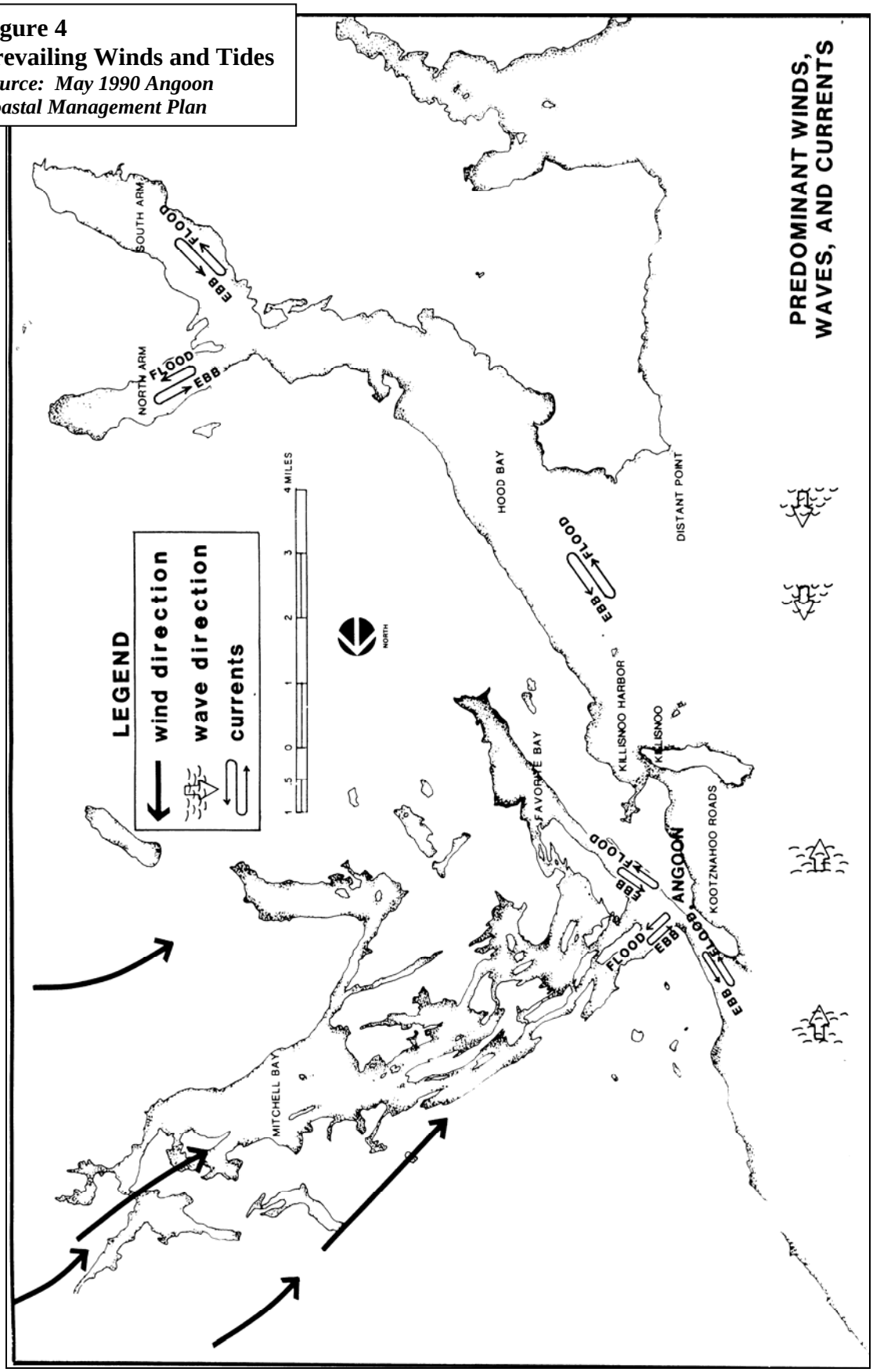
Goal 8.2: Air transportation facilities in Angoon should be maintained and improved to accommodate limited community growth.

Objective 8.2.1: Promote the development of a heliport near the health clinic with a safe, less intrusive approach and arterial road access.

There are no directly relevant enforceable policies in the transportation section, other than direction to avoid development on steep slopes and use best management practices when developing in muskegs, if such is necessary.

The May 1990 Angoon CMP also documents general wind and tidal data from the area. Figure 4 reproduces a figure from the Angoon CMP depicting the prevailing northeast-southwest wind direction (Figure 4).

Figure 4
Prevailing Winds and Tides
Source: May 1990 Angoon Coastal Management Plan



Draft 14(c)(3) Reconveyance Plan and Selections, Sheinberg Associates for Kootznoowoo Inc. and City of Angoon, October 1997

The draft 14c3 Plan reviewed what land might be needed for public purposes in Angoon over the next 25 years, so that land might be reconveyed from Kootznoowoo Inc. to the City of Angoon as part of the ANCSA 14c3 process. During public meetings and interviews, there was considerable interest in an "airstrip" and helipad. However, no 14(c)(3) reconveyance selection for an airport/helipad was identified due to land planning constraints.

When a "runway footprint" of 4,000 ft. x 100 ft.[1] is laid in various places in the Angoon area it becomes clear that there is no place on Kootznoowoo, Inc., land that is available for 14(c)(3) selection where an airstrip could realistically be developed because it would be too close to nearby homesites. If an airstrip was to be developed, many seem to favor USFS land between Favorite Bay and Kanalku Bay.

Tongass Land and Resource Management Plan (TLMP), U.S. Forest Service, 1997

Most of Admiralty Island is a federal Wilderness National Monument, including some possible airport sites on land immediately adjacent to the developed community and within City of Angoon corporate limits. Admiralty Island National Monument was designated to (pg 3-23, 1997 TLMP):

> *Admiralty Island, exclusive of the Mansfield Peninsula, was designated as a National Monument for the scientific purpose of preserving intact a unique coastal island ecosystem. The goal of the preservation was to assure continued opportunities for study of Admiralty Island's ecology and its notable cultural, historical and wildlife resources, within its relatively unspoiled natural ecosystem. Protection and study of Tlingit cultural resources, other historical resources, brown bear and bald eagle populations are specifically directed.*

Memorandum of Understanding between USDA Forest Service and Kootznoowoo Incorporated, signed August 2000

This MOU sets out a USFS-Kootznoowoo Inc. consultation process, and mutually recognizes the importance of subsistence and local hire with regard to actions within the 660 ft wide "corridor lands" along Mitchell, Kanalku and Favorite Bays. Several potential airport sites to be evaluated by the *2001 Angoon Airport Reconnaissance Study* cross these corridor lands.

[1] Andy Hughes and Mike McKinnon of DOT&PF attended the July 24, 1997, 14(c)(3) Committee meeting to discuss airport development. They noted that to accommodate small engine aircraft a 3,000' runway is needed; the state standard runway size is 3,300', for small twins like a Piper Navaho, a 3,500-3,800' long runway is needed; and for most small town airports (like Haines and Kake) a minimum 4,000' x 100' wide piece of land is needed. Also, 4,000' of available and appropriate land is needed to ensure future needs can be met. (This does not accommodate RSA, DFA, or RPZ. It is just for the runway footprint.)

Draft Angoon, Alaska Landfill Site Selection and Regional Disposal Options, City of Angoon and Alaska Native Tribal Health Consortium Project AN99-P40, March 2001

This study reviews options for solid waste disposal including two possible sites for a new landfill. To prevent wildlife and bird conflicts there must be a 5,000 ft separation between a landfill and an airport. Selection of a new landfill site could affect airport sites under review as part of this *2001 Angoon Airport Reconnaissance Study*. DOT&PF submitted a letter on June 1, 2000, to the Alaska Native Tribal Health Consortium noting this concern.

ECONOMIC DEVELOPMENT PLANNING

Angoon Overall Economic Development Plan, Sheinberg Associates for City of Angoon, April 1999

Building an airstrip and helipad is identified as one of Angoon's top economic development priorities (pg. 3 executive summary, pg. 43, pg. 57).

> **D-2 Build an Airstrip and Helipad in Angoon**
> Urge that DOTPF fund a reconnaissance airport siting design study in Angoon. The study should review alternative sites, traffic volumes, design aircraft, and costs and benefits. The study would conclude by listing the overall advantages and disadvantages of alternative airport locations.
>
> Angoon voters passed a measure supporting development of a local airstrip during the fall 1998 municipal election. When a "runway footprint" of 4,000' x 100' is laid in various places in the Angoon area it becomes clear that there is no place on Kootznoowoo Inc. land where an airstrip can realistically be developed because it would be too close to nearby homesites. If an airstrip was to be developed, many seem to favor USFS land between Favorite Bay and Kanalku Bay. Land for the airport could part of a package of developments that require use of USFS land or a land exchange, and be presented as a unified request to USFS/Congress/ Kootznoowoo. As for the road above, it should be noted that while ANILCA Title XI allows an airport, it will be a complex and lengthy process, including issuance of an EIS with a finding that it is in the overall public interest to build.
>
> A helicopter landing pad is also needed, particularly to support emergency medical needs. At this time infrequent helicopter landings generally occur on the softball field by the High School.

DIVISION I – NEEDS ASSESSMENT

2.0 PURPOSE AND NEED

The purpose of this ***Angoon Airport Reconnaissance Study*** is to identify a preferred site for an airport at Angoon, Alaska. Angoon, population 572, is the largest community in Southeast Alaska without direct airport access. Like many Southeast Alaska communities, there are no roads to or from Angoon, making it entirely dependent on air and marine service and facilities for transportation into and out of town. Regional barge service and State-run ferry service is limited, and the nearest community (Sitka) is 5 ½ hours away by ferry. Angoon has no hospital, and very little commerce, thus air travel is essential for health care and shopping, as well as educational, recreational, social and other community needs.

Angoon is currently served by a State-owned seaplane float that had 1,850 regularly scheduled flights, 2,543 enplaned passengers, 53,192 pounds of air cargo, and 63,451 pounds of mail in 1999. An estimated 600 additional charter air passengers also used the seaplane dock in 1999. No estimate is available for private seaplane use. There is no helipad, and helicopters currently land at the high school ballfield, near the ACS telephone site, along the shoreline and wherever it is possible.

An airport with a runway oriented northeast-southwest will enhance safety and reliability of air travel. There is a series of rocks about 2,000 to 3,000 feet to the west/northwest of the seaplane float in Favorite Bay which appear as rapids at low tide and can make seaplane landings hazardous. There is no (and can be no) landing light system in the waterway. Night landing with a seaplane is prohibited at this facility and is undesirable even in an emergency situation. Operations are confined to daylight hours during favorable weather conditions. When the prevailing wind direction is northeasterly (often in the fall, winter and early spring) the crosswind orientation of Favorite Bay makes landing impossible at times. A lighted airport that provides wheeled plane and helicopter access with appropriate navigational aid support will reduce risk and enhance air travel safety and reliability.

Angoon has no hospital, and only a limited clinic, with no doctor on staff. Medical emergencies generally require evacuation to a nearby community (such as Sitka or Juneau) with hospital facilities. Emergency medical evacuations are sometimes hampered by lack of reliable, lighted landing sites. A lighted airport will increase the reliability of emergency evacuation services. While this may not mean more flights per year, the community importance of reliable medical emergency service cannot be overstated.

A travel survey of Angoon residents conducted as part of this project indicated latent (unfulfilled) demand to travel. Travelers to and from Angoon reported an average of 3.5

times over the last year that they wanted to take an air trip but could not because of weather, high ticket prices, no seats left on the plane, and other reasons.

An airport with an initial runway of 3,300 feet[2] to serve Cessna Caravans, DeHavilland Otters, Piper Navajos and similar aircraft would improve service and access to Juneau and Sitka. An airport should mean more flights in and out of Angoon to more destinations, such as Sitka and Kake. Air carriers would most likely run north-south service making scheduled stops at several communities with airports along the way including Angoon.

Angoon airport development will assist the local economy. Angoon is an isolated community in need of better transportation access. Alaska Marine Highway ferries land at a State facility that is not connected to the power grid and has no heat or running water. There are no road connections to other communities, no helipad, and the seaplane dock facility is quite modest. The community has minimal services and groceries, very few retail shops, and counts on air and marine transportation services to bring in most of their goods.

An airport is also needed to help fulfill the mission of the Admiralty Island National Monument, as set out in the Alaska National Interest Land Conservation Act (ANILCA). ANILCA established Admiralty Island National Monument for the scientific purpose of preserving intact a unique coastal island ecosystem and to assure continued opportunities for study of Admiralty Island's ecology and its notable cultural, historical and wildlife resources, within its relatively unspoiled natural ecosystem. Protection and study of Tlingit cultural resources, other historical resources, brown bear and bald eagle populations are specifically directed. Reliable, modern and safe access to and from Admiralty Island must be available to assure that the Island's ecosystem, cultural, historical and wildlife resources are available to experience, observe and study. Further, an airport will help stimulate the Angoon economy by facilitating transport of residents, visitors, and goods. This is integral to long-term sustenance of the Tlingit culture and history as more economic opportunities and jobs for Angoon's young people are urgently needed to ensure long-term viability of the community and its vibrant culture.

More air service to more destinations could assist several economic sectors. Air shipments of fresh seafood products in an increasingly competitive market, and offer more travel choices for youth and adults to sports and cultural events. As the community, local businesses and Forest Service increase marketing the attractions of Angoon and Admiralty National Monument, more visitors can be expected. An airport with more frequent and reliable service will facilitate tourism opportunities such as sightseeing, flightseeing, community and wilderness touring, and other experiences that the community wishes to promote. Up to 500 annual flights for these purposes could be expected in the future.

[2] The State Department of Transportation and Public Facilities standard in 3,300 feet for a small aircraft runway.

If a self-service fueling facility was provided in Angoon, various carriers from Juneau, Wrangell, Petersburg, and Ketchikan would likely refuel there several times each season based upon the current economic conditions in Northern Southeast Alaska.

In summary, an airport in Angoon is needed to improve air travel safety, reliability and frequency; to provide for emergency medical needs; to better meet current travel needs and latent travel demand; to reduce the community's isolation; to stimulate the economy and provide opportunities for growth; and to provide improved access to the Admiralty Island National Monument.

3.0 SOCIOECONOMICS

This section reviews local and regional socioeconomics and forecasted trends. These can influence future demand for air travel. Likewise, airport development will improve Angoon's generally depressed socioeconomic conditions to the extent that increased air travel and related activity stimulates the local economy.

In 1990, approximately 22% of Angoon residents were living below the poverty level and about one-half of those over 18 were employed. Close to 60% of all employment is in the public-sector, with most employed in education

3.1 Population

The year 2000 Angoon population is 572, about 60 residents fewer than a decade earlier. Over 85% of Angoon residents are Alaskan natives, primarily Tlingit. Population growth has been slowing since the period from 1970 to 1980, when local population grew by 200 people. While overall population has slightly declined over the last decade, year-to-year population fluctuated from a high in 1991 of 665 to a low in 1997 of 570. (Table 2)

Population forecasts for Angoon suggest that by 2025 there could be up to 750 people in town. Six recent Angoon population forecasts that used different techniques show a population range from no growth over the next twenty-five years to a population of 800. The average of these projections yields a year 2025 forecast of 752 people (Table 3). (One forecast is not averaged because it is for the census area and can not be directly compared to the other forecasts. However, it is noteworthy that this census-wide forecast from the Alaska Department of Labor does forecast flat to slightly declining population for the Skagway-Hoonah-Angoon census area.)

Table 2
Angoon Population

YEAR	POP.
1940	375
1950	429
1960	400
1970	400
1980	575
1985	630
1990	638
1991	665
1992	636
1993	636
1994	610
1995	601
1996	605
1997	570
1998	586
1999	576
2000	572

Sources: Alaska Dept. of Labor U.S. Census

Table 3
Angoon Population Forecasts

	Population Forecast	Year	Source	Technique
1	800	2030	Angoon, Alaska Landfill Site Selection & Regional Disposal Options, draft report, March 2001. Alaska Native Tribal Health Consortium	1.1% annual growth rate
2	700-800	2020	Angoon Economic Development Plan, April 1999. Sheinberg Associates	Ave. annual growth of 1%, with range representing uncertainties of rural growth patterns
3	Census area: 3,140 to 3,687 (1998 pop for census area=3,664)	2018	Alaska Economic Trends, September 1998. Alaska Department of Labor projection for Skagway-Angoon-Hoonah census area 1998-2018	Cohort analysis for census area (note: not best technique for growth of a single place). Annual average change of -0.37 to -1.44 %
4	749	2025	Sheinberg Associates	Ave. annual growth of 1%
5	780	2025	Sheinberg Associates	Exponential trendline projection; R^2 =0.76
6	680	2025	Sheinberg Associates	Polynomial trendline projection; R^2 = 0.74
Average of projections 1,2,4,5,6 = 752. Forecast 3 is not used because it is for the census area and can not be directly compared to the other projections.				

3.2 Socioeconomic Indicators: Poverty, Income, Employment, and Education

To ensure there was not an undercount of Alaskan natives during the 2000 US Census, and to obtain the most reliable socioeconomic data, the Tlingit Haida Central Council and other Alaskan Native organization hired contractor Tribal Data Resources (TDR) to supplement the U.S. Census with procedurally rigorous, door-to-door interviews of Alaskan Natives. In a community like Angoon where over 80 percent of the population is at least part Alaskan Native, this TDR data provides very accurate and up-to-date socioeconomic information. TDR interviewed 483 persons over 18 in Angoon --- virtually the entire adult population.

The TDR data shows that in Angoon in 2000, 27% of households were living below the HUD poverty level and 61% were living below the HSS poverty level. Conditions have not improved much in a decade as 1990 census data showed a comparable 22% living below the poverty level. Compared to other Southeast Alaskan communities, this was the 6th highest percentage of people living below the poverty level in 1990. In 1990, the

Angoon median household income was $32,083, which ranked Angoon in the lower third for income of all communities in Southeast Alaska.

TDR 2000 data shows 51% of adult Angoon residents are unemployed and just 15% are employed full-time. Of those unemployed, only 1% state they have no desire to work and 44% report that they want to work but there is no work available in the area. The 1990 census found an unemployment rate of 35%, suggesting that employment opportunities over the last decade have declined.

The TDR study also reviewed the level of educational attainment, which is quite high in Angoon. About 26% of Angoon residents have attended college with 9% graduating, 10% have graduated from some type of vocational school training program, and 66% have graduated from high school.

3.3 Employment and Local Industry

Any review of Angoon employment and industry must begin with an acknowledgment of the importance of subsistence as a critical industry and part of the local lifestyle. The number of individuals and time spent in subsistence gathering and harvesting activities will not be captured in the traditional employment data presented below. Important resources are deer, salmon, bear, halibut, shellfish, geese, seaweed and berries.

Angoon employment data from 1997 (ADOL) shows approximately 180 employees (Table 3) in the community with close to 60% employed by the public sector in education and local government, and about 40% employed by the private sector and working in services, finance-insurance-real estate, and retail businesses. Larger private sector employers in Angoon include the Angoon Trading Company, Angoon Oil, Whalers Cove Lodge, and Angoon Market Center. There are also two small lumber mills in the area (one in Angoon, one Killisnoo). The total gross payroll coming into the community in 1997 from public and private employees was about $3.1 million dollars. [3]

[3] ADOL reports 182 employees and $3.9 million but interviews revealed that about 26 Chatham School District (CSD) employees with $0.7 million in payroll are CSD employees that live outside Angoon. (All CSD employment is reported as Angoon employment since this is the headquarters of CSD.)

Table 4
1997 Angoon Employment and Gross Wages
NOTE: this does NOT include any self-employed individuals

	No. Employees	Annual Wages
Total Wage & Salary Earners *(employed persons)*	**182 (**150**)**	**$ 3,969,430 (**$3,111,870**)**
Total Private Sector	**79**	**$1,872,757**
Manufacturing	0	n/d
Transportation	5	n/d
Retail Trade (no wholesale)	17	n/d
Finance, Insurance & Real Estate	29	n/d
Services & Misc.	28	n/d
Total Public Sector **	103	**$ 2,096,673**
Federal Government	2	$ 79,232
State Government.	4	$ 69,561
Education & Local Government**	97 (**71**)	$ 1,947,880 (**$1,239,113**)

Sources: Alaska Department of Labor, Research and Analysis Section, October 1998; Personnel Communication with Chatham School District employees Bill Borofka and Harriet Silva.

** ADOL data includes all Chatham School District employees and wages, even though some do not live or earn income in Angoon. Sheinberg interviews with Chatham Schools showed that of the District's $1.5 million dollar payroll, $791,233 of this is wages to Angoon residents; and of the only 60.5 total full-time equivalent employees, 34.5 live in Angoon. Data with asterisks (**) has subtracted the non-Angoon Chatham School District payroll and number of employees from the original ADOL data.

In 1997, $52,629 in sales tax was collected by the City of Angoon; at 2% taxation this suggests that about $2.6 million dollars worth of taxable goods and services were sold. In 1999, $42,728 in sales tax was collected, suggesting that about $2.1 million dollars worth of taxable goods and services were sold.

3.4 Development and Economic Trends

A review of likely development trends in Angoon and the region is considered to determine how this might affect future air traffic and travel demand. Interviews were conducted with nearly every Part 135 air carrier and helicopter company in Southeast Alaska as well as Part 121 air carriers, U.S. Coast Guard, U.S. Forest Service (USFS), wilderness tour operators, Native Corporations (especially those who have timber and fisheries operations), fish processors, health care providers (SEARHC), and Angoon businesses. In addition, the economy of Angoon and Southeast Alaska was reviewed.

Timber. USFS personnel support several regional charter aircraft operators (both fixed wing and helicopters). The Admiralty Island National Monument surrounding Angoon is managed by the USFS. Many Forest Service personnel now take the ferry to Angoon. Timber cutting operations and employment has declined significantly since the mid-1990's. The USFS is slowly beginning to allow timber harvest operations in the Tongass

National Forest after many months of shut-down in response to a judicial decision overturning the 1999 supplemental Tongass Land Management Plan (TLMP) Record of Decision. Further, the Bush Administration announced in early May 2003, that it intends to enact a USFS Roadless Initiative, although it is unclear exactly how this will be implemented in the Tongass. It is however, likely to mean fewer USFS personnel and timber harvest contractors flying within the region. Unless timber-cutting activities resume to previous levels, Forest Service traffic in the region will likely decrease over time.

3.4.1 Seafood Harvest and Processing. The City owns the Angoon Cold Storage, located near the ferry terminal. Equipment in the building is owned by the Angoon Community Association (ACA). ACA processed fish at the plant for one year in the mid-1990's, however, high operating costs due to the lack of a freshwater supply and electrical power led to plant closure. If water and power were extended to the area and the Cold Storage operation was brought back online at some time, today's markets point to operations such as specialty fish processing, mariculture processing, and sea products businesses. This could include items such as gift-packed smoked fish, restaurant packed fish, oysters, seaweed, shampoo and other products. The lack of use and maintenance of this facility is a major local concern.

At one time commercial fishing, primarily hand-trolling for king and coho salmon, was a major source of income (Table 5). Since IFQs were instituted though, fisheries in more remote areas like Angoon have suffered at the expense of areas closer to major transshipment centers (e.g. Juneau, Sitka). The decline from 1992 to 1998 reflects this trend. In 1999, a Juneau-based floating fish buyer started coming to Angoon to buy local fish. The result can be seen in the 1999 increase (after a half-dozen years of precipitous declines) in the number of pounds of fish caught and gross earnings for Angoon fisherman. Preliminary 2000 data though shows another decline.

Table 5
Angoon Commercial Fishing Data

YEAR	1992	1993	1994	1995	1996	1998	1999	2000
Total Angoon Residents Fishing	84	69	62	49	51	30	36	37
Total Pounds Caught	1,523,933	2,200,133	2,055,106	1,416,005	1,690,708	132,489	589,660	306,698
Total Estimated Gross Earnings	$1,006,785	$974,307	$1,370,852	$1,026,046	$926,479	$143,072	$340,687	$134,584
Source: Alaska Commercial Entry Commission								

Kake Tribal noted that more frequent and reliable air service may make flying troll caught fish from Angoon directly to Juneau or Kake to fillet for the fresh market feasible. However, even if this did occur, the volume would be small.

3.4.2. Mining: Mining in the region is generally dependent on world metal prices outside the control of Alaska. The northern tip of Admiralty Island is home to the Greens Creek Mine, one of the world richest zinc and silver mines with gold credits. Greens Creek is supplied from Juneau and elsewhere although they make a concerted effort to hire Angoon-based employees. Expansion of this mine is constrained due to its location adjacent to the Admiralty Island National Monument, and mining elsewhere on the Island is not likely. Estimated mine life is 10-15 years, although exploration tends to regularly increase expected mine life. The Angoon area is not currently a focus of other mineral exploration.

3.4.3. Tourism: The tourism industry is growing nationally at a phenomenal pace. In Alaska cruise ship visitation is up while a decline in independent tourism bucks national trends. Most attribute this decline to the significant decrease in state marketing dollars over the last five years. While the tourism sector continues to grow, a slowing national economy and high fuel prices may affect that growth. Also, tourists are not filling the airplane seats left open by the timber industry in areas like Angoon.

Tourism does play a major role in the Angoon economy. Whalers Cove, a lodge on Killisnoo Island, employs approximately 75 full and part-time employees seasonally (late May through mid-October). Of those, about 50 are reported to be local residents. The lodge has 40 rooms and typically offers three to seven day fishing packages, which include boats, guides, bait and tackle, meals and lectures. A three-day guided package costs about $2,400. In 1999, the Lodge broadened its offerings with a new 27-passenger vessel to offer sightseeing and more eco-tourism/adventure type of excursions. Associated with Whaler's Cove Lodge is Favorite Bay Inn in town, which has four rooms, reported to be booked every day in the summer and sporadically in the winter. Whaler's Cove reports that in FY 2000, Whalers Cove/Favorite Bay contributed about $53,000 in local taxes and paid about $534,000 in payroll. Lodge owners expect a 15 to 20 percent increase in those contributions in FY 2001. The new 12-room Favorite Bay Sportfishing Lodge opened in 2002 in town. The owners recently moved to Angoon (purchasing the Penney homestead) and have significant tourism marketing experience and hospitality /customer service know-how and training.

Angoon residents have expressed an interest in developing cultural and heritage tourism opportunities to complement existing lodges and guided fishing and wilderness/wildlife experiences. Local residents have successfully obtained licenses for chartering and own bed and breakfast operations. Residents have expressed interest in small business and customer service training to assist with development of a variety of tourism-related small businesses. Ideas include:

- Tours - leading cross Admiralty tours by Native guides, whale watching charters, leading photography and bear viewing tours, and guiding power boat/ canoe/kayak and sailing charters.
- Arts, Crafts, Wild Foods - establishing an Artisan program; owning gift shop(s), making and selling "Kootznoowoo Wilderness" food (forest, sea) and household products.

- Other - completing tribal house restorations, renovating and opening the local museum, and having a commercial salmon bake.

Whalers Cove does not anticipate much use of an airport as they generally charter seaplanes or private ferries directly to the lodge or the start of the tour. They bring 60% of their clients in from Juneau by chartered fast catamaran, the rest in charter seaplanes, which both land directly at the lodge, and generally do not use the existing seaplane float. The newest Lodge owners were not interviewed in this regard. One air carrier felt that an airport could be a catalyst for more lodges to be built.

Tourism traffic to the Angoon area would likely increase moderately if an airport is built. This is particularly true if more active marketing and attraction development by the Angoon community and businesses occurs. Those flights going directly to Angoon would likely use the airport.

3.4.4. Health Care. A new medical clinic for Angoon is being planned by the regional Native health care provider (SEARHC). It is slated for construction in 2003. Since many Angoon residents fly to Sitka and Juneau for medical services, the advent of the new clinic may result in less travel to those communities by Angoon residents. A land-based runway would be used for medivacs with both airplanes and helicopters.

3.4.5. Leisure Travel. Angoon residents typically travel for cultural activities, school activities and sports events. If an airport results in lower airfares, increased air travel for these activities may result. If direct or convenient connecting flights between Angoon and Kake and Sitka are available there will likely be moderate air traffic on that route as there is a lot of cultural exchange between those communities.

3.4.6. Local Development. In 1997, Kootznoowoo Corporation completed a homesite program under Section 1407 of the Alaska National Interest Land Conservation Act (ANILCA). About 630 homesites, each between 3/4 and 1.5 acres, were created within the City of Angoon. Deeds were issued to shareholders in March 1997. Development of homesite lots in the Angoon area will likely create demand for some air travel, but shipment of construction materials will mostly occur through marine transportation services.

Homesite development will cause the community to "spread out" over time, particularly after road and utility infrastructure is built to serve these areas. Many still live in cramped and crowded conditions. Avoiding negative noise and congestion impacts to these platted, privately-owned homesites that will eventually be residences is a significant factor in airport location.

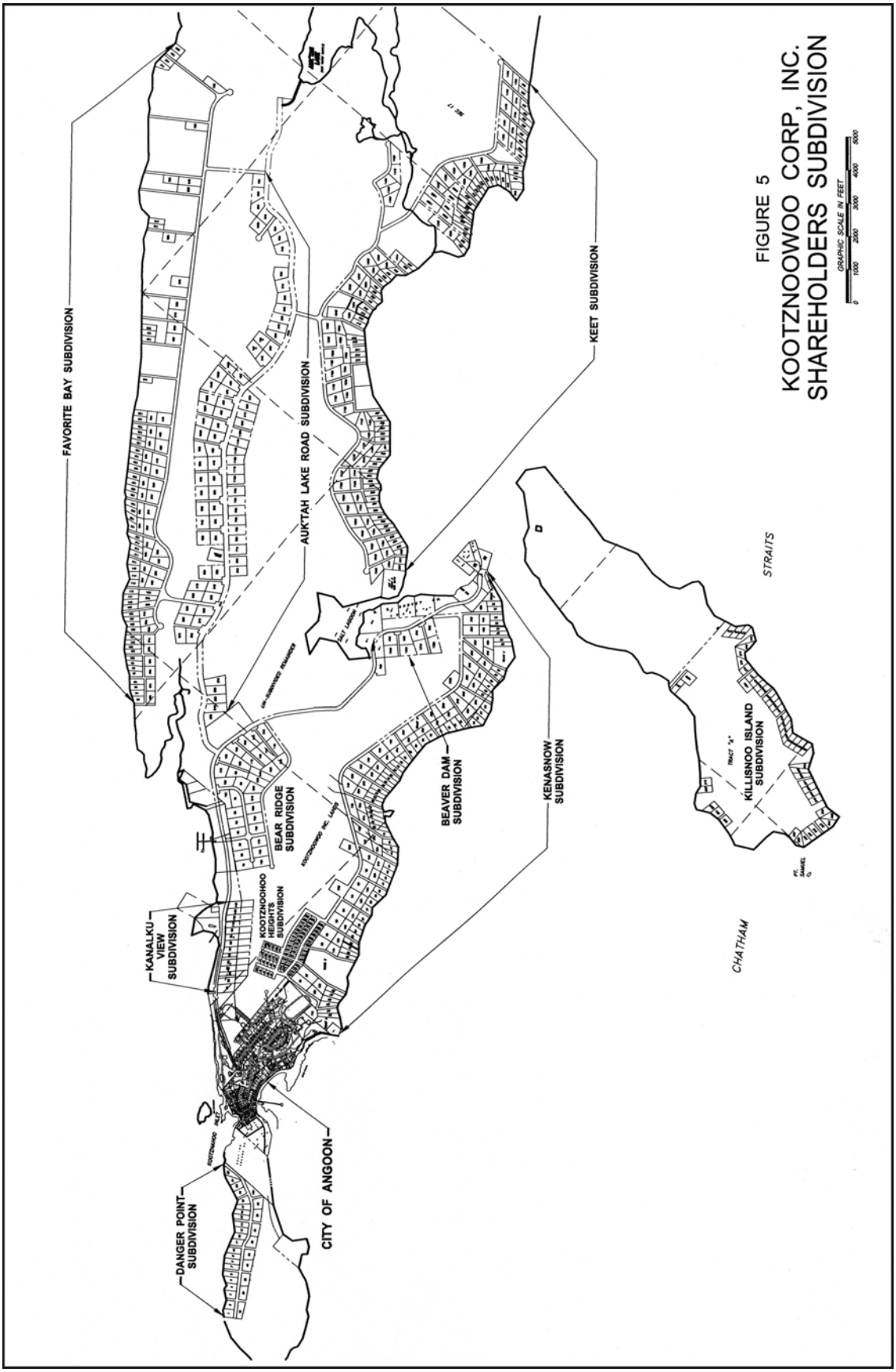


FIGURE 5
KOOTZNOOWOO CORP, INC.
SHAREHOLDERS SUBDIVISION
GRAPHIC SCALE IN FEET
0 1000 2000 3000 4000 5000
FAVORITE BAY SUBDIVISION
AUKTAH LAKE ROAD SUBDIVISION
KEET SUBDIVISION
KANALKU VIEW SUBDIVISION
KOOTZNOOHOO HEIGHTS SUBDIVISION
BEAR RIDGE SUBDIVISION
BEAVER DAM SUBDIVISION
KENASNOW SUBDIVISION
KILLISNOO ISLAND SUBDIVISION
DANGER POINT SUBDIVISION
CITY OF ANGOON
STRAITS
CHATHAM

In addition to "spreading-out," homesite development will mean more full and part-time residents from outside the community will move to Angoon over time, both Native and non-Native. Some shareholders who currently live outside of Angoon will build a second home, perhaps for the summer, in Angoon on their homesite. This could create a population boost, as well as more travel to and from Angoon, since only about 40% of Kootznoowoo Inc. shareholders currently live in Angoon. Angoon has a well-deserved reputation in Southeast Alaska for its beauty, lack of rain, abundance of sunshine, bountiful fish, and proximity to the Kootznoowoo Wilderness of the Admiralty Island National Monument. These and other factors will influence non-residents to come to the community to buy a parcel of land, build a home, and spend at least part of the year in Angoon.

3.4.7. Marine Transportation. The majority of Southeast Alaska is roadless. Marine transportation is the only practical alternative to air transportation for most communities in the region. The Alaska Marine Highway System provides public ferry service between Angoon and many communities in Southeast Alaska. In addition, charter passenger-only ferries are available from the private sector. Barge service is available for shipment of goods and equipment.

Alaska Outport, which provided marine freight service to rural Southeast Alaska communities including Angoon, went out of business during winter 2000, leaving a rural shipping void. Currently goods can be shipped to Angoon from Seattle by chartering a barge through Alaska Marine Lines, or from Juneau through Alaska Marine Lines (again on chartered barges), through Reliable Transfer who consolidates freight and ships it via the Alaska Marine Highway System ferries, or by contacting Angoon Trading Company locally. Angoon Trading Company accepts others' Angoon-bound (or exiting) freight on its routinely chartered barges from both Juneau and Seattle to supply its grocery and fuel businesses. Air service is only used infrequently to ship freight.

The State DOT&PF recently completed a Southeast Alaska Regional Transportation Plan (SATP) and is currently undertaking a study to examine possible ferry service options for Northern Southeast Alaska communities. If fast or other improved ferry service for Angoon is implemented, it is likely that even though fares may increase, travelers will use the ferry in lieu of flying to some extent. This could cut into Part 135 air carrier markets, possibly causing further consolidation and less capacity and frequency of service. A survey performed as part of the SATP indicates that improved ferry service will result in more travel via that mode in the region. Approximately 50% of the Angoon residents surveyed stated that they would travel on the ferry more frequently if better service were provided.

3.5 Air Services Trends

Consolidation of Part 135 air carriers in the region has occurred, and will continue to occur. In April 2001 Wings of Alaska bought Alaska Coastal/ Haines Air and consolidated operations. Those carriers with strength, markets and resources will likely be the survivors. Reasons for air carrier difficulties include:

- The slump in the economy (particularly the timber and fisheries industries) has resulted in decreased air travel demand, and the increase in tourism in the region has not been enough to fill the void.
- It is difficult to get and keep qualified pilots. Regulations require almost as many hours of experience to be a Part 135 pilot as they do to be a Part 121 (commercial jet) pilot. Since Part 121 pilots make more money, many Part 135 pilots will work only long enough to get the extra hours to qualify as a commercial pilot.
- Rates are increasing so fast that many Part 135 carriers are becoming unable to afford insurance. One Part 135 carrier reported that the insurance industry made $8 or $9 million in revenue in Alaska last year, and paid out $12.5 million in claims.
- Recently implemented dayboat ferry service in Lynn Canal has cut into the market of several air carriers.

Trends in the Part 135 air carrier industry in Southern Southeast Alaska could impact service to the north. Plans for dayboat ferry service between Prince of Wales Island and Ketchikan will decrease air traffic demand, especially for seaplanes. A planned hard link between Ketchikan and its airport on Gravina Island will also reduce the demand for seaplanes, as the hard link will make it more convenient to get to the airport and reduce the desire to land in downtown Ketchikan, which requires a seaplane. Thus a trend towards more wheeled planes in the region is likely.

One private company recently added a self-service fueling facility to the Hoonah Airport. If a self-service fueling facility was provided in Angoon, various air carriers (and private aircraft) from Juneau, Wrangell, Petersburg, and Ketchikan could each refuel there several times each season based upon the current economic conditions in Northern Southeast Alaska. If additional economic development occurred, or if timber-cutting operations started up again on Federal land and fuel were available at the new runway, increased helicopter traffic in and out of Angoon would be likely.

Although two Part 135 air carriers currently serve Angoon, local residents seem to have loyalty to one carrier, and the second picks up the overflow. Development of a land-based runway at Angoon will likely bring in competition from other regional air carriers. One carrier in particular flies scheduled service between Juneau and Kake in wheeled planes, and it would be logical for that carrier to stop in Angoon on the way, as it is between the two communities. Scheduled service between Juneau and Sitka with stops in Angoon is another possibility for similar reasons. Since Angoon's location is central in Northern Southeast, several routes structures that include a stop at Angoon become possible.

Although propeller jets do not currently operate commercially in Southeast Alaska, they have in the past and could again in the future. Alaska Airlines (the region's only Part 121 carrier) representatives stated that if the Essential Air Service subsidy disappears (which could occur in 10 to 15 years), they will still serve the region, but will serve it differently, possibly with smaller planes such as the DeHavilland Dash 8 series. Whether a scenario like this could include stops at Angoon is an open question.

3.6. Conclusion

Air traffic within the region over the next 20 years is expected to increase slightly fueled by slow, steady population growth and the general tendency toward more travel by air. Regional economic growth is not expected to fuel additional air traffic, with the exception of tourism. Increasing air carrier costs and plans for competing fast ferry transportation services in the region may dampen air travel demand.

In Angoon, an airport coupled with focused marketing could create increased visitation and air travel. As more people become aware of the Admiralty Island National Monument's ecology, cultural, historical and wildlife resources, visitation will also increase. The central location of an Angoon airport could also prove strategic within Northern Southeast Alaska and potentially fuel increased air traffic. Convenient air connections to communities where Angoon residents wish to travel (such as Kake and Sitka) will also likely increase traffic. In addition, development of the homesites in the Angoon area will contribute to air traffic demand.

While the air traffic at a new Angoon airport is expected to increase only moderately, several conditions discussed in this section in both the region and Angoon, could contribute to greater air traffic growth. For these reasons, to make efficient use of federal and state construction funding, and to ensure facilities are not undersized, the aviation forecast developed in Section 5 of this report should use the "high" air traffic growth forecast to determine airport facility requirements.

Traffic at the existing Angoon seaplane float is anticipated to decrease with development of an airport. Most of the air carriers in the region stated that they would prefer to use a runway. Seaplanes may still use the seaplane float if low fog or other conditions made landing on the runway problematic. In addition, charter float planes in transit to fishing lodges or other water-based landing facilities, could make moderate use of the existing float. However, the majority of the traffic into Angoon would use the new airport.

4.0 CURRENT FACILITIES – CONDITIONS AND SUFFICIENCY

Air transportation to and from Angoon is currently by seaplane to an unattended seaplane float or rotor wing aircraft to "informal" helipads. Angoon's seaplane float is located 2.1 miles east-southeast of the Favorite Bay entrance to Chatham Strait. Favorite Bay is approximately 10,000 ft. long by 900 ft. wide. The seaplane facility is at 57º29.98"N latitude - 134º 35.11"W Longitude *(FAA's Flight Information Publication: Alaska Supplement*). Aircraft land parallel the Bay in a northwest-southeast and southeast-northwest direction. Angoon's radio communication is with Sitka's Flight Service station at a frequency of 122.4.

At one time both the USFS and the A.C.S. facility (formerly RCA) had a heli-site, but both were redeveloped. Helicopters now generally land at the high school ball field or beach.

A series of rocks exist approximately 2,000 to 3,000 feet to the west/northwest, of the seaplane float. At low tide, that area appears as rapids. As a seaplane landing zone, there is not, and cannot be, any directional and/or landing light system. Night landing with a seaplane is prohibited at this facility and is undesirable even in an emergency situation. Generally, larger boats or vessels do not tie up to the seaplane float face, but smaller boats and skiffs are generally tied to the float sides.

Seaplane pilots interviewed noted that Favorite Bay is generally acceptable for landing in most late spring, summer and early fall winds. In other seasons of the year though, the prevailing wind direction is northeasterly making Favorite Bay's seaplane facility inaccessible at times.

4.1 Facilities Description

The seaplane facility consists of a pile secured channel shaped or reverse "C" shaped float, housing a small unheated waiting room and maintenance storage area. A covered, 8 ft. wide gangway ramp connects the float to a pile supported dock. The gangway is designed to slide with the rising and falling tides, which has an extreme of approximately 15 feet in Angoon. The dock services automobiles and pedestrians, separating them by timber curbing. The gangway does allow automobile access, and Wings of Alaska's A.T.V. or pushcarts are used to transport cargo and luggage.

Aerial photograph of Seaplane Float.

The present facility was constructed in the late 1980's-early 1990's. It replaced a seaplane float west of Angoon on Chatham Strait. That facility was subject to extreme south-southwesterly winds and wave action and was abandoned when the State DOT&PF constructed the new seaplane facility in Favorite Bay. The FAA "Alaska Supplement" advises pilots not to use the old dock.

Seaplane facilities consist of three parts: a land fixed, pile supported dock; a sliding gangway; and a seaplane float. Both the dock and float are supported and/or held in place by 16" galvanized pipe piles. The gangway is attached between the dock and the float on a slide system, which easily handles the extreme, 15-foot tidal range.

The dock's overall measurement is 200 ft. long x 16 ft. wide, accommodating one-lane traffic with a divided pedestrian path. At the east (water) end of the dock, there is an "L", which is a vehicle parking area. The "L" measures 48 ft. long x 24 ft. deep. This allows up to three cars parking with a minor turnaround.

The gangway is 100 ft. long x 8 ft. wide. It allows a 4x4 ATV with attached trailer access to the float for baggage handling purposes. The gangway is covered allowing passengers some protection from the weather.

The seaplane float is 160 ft. wide and 100 ft. deep, with the top and bottom "fingers" of the "C" measuring 40 ft. x 60 ft. The principal float face is 160 ft. x 40 ft, and five seaplanes can easily tie-up there. Float signage exists, but barely.

A gravel parking area is constructed in a crude cul-de-sac shape at the facilities uplands.

4.1.1 Maintenance: The dock is maintained by the City of Angoon through contract with DOT&PF. It is in good condition by Southeast Alaska standards. No timbers appear to be broken; bolting connections all seem secure with decking, planking and concrete surfacing are all in good condition. The non-slip carpet surface is exceptionally worn to non-existing in most places. Years of use without a non-skid surface leave some areas of the float in a "slick" condition. Tie ropes for seaplane securing are worn to gone.

Small unheated waiting area/maintenance building on seaplane float

Both the passenger storage waiting area and the maintenance storage area are in poor shape. Trash is formed in the storage area when various items are unclaimed.

4.2. Ferry Terminal

The Angoon ferry terminal is located 2.5 miles E.S.E. of the City center. The aerial photograph reflects the general docking, transfer bridge and parking facilities. The terminal is designed principally to serve the LaConte class of Alaska's Marine Vessels, but can also handle larger ferries.

The ferry generally serves Angoon two to three times per week in summer months and weekly during late fall, winter and early spring months.

The parking facility is inadequate for normal summer traffic.

Aerial View of Ferry Terminal.

Typical Ferry Parking.

4.3 Local Road System

Angoon has three classes of roadway systems. They consist of City streets; the (DOT/PF) ferry access roadway and Auk'Tah roadway.

4.3.1. Angoon Streets: Angoon streets are narrow and are a derivative of the original General Land Office (G.L.O.).

A survey of the village was conducted between 1920 and 1935. The platted streets are narrow, winding and rolling. Community expansion took place several times by the Tlingit Haida Regional Housing Authority (THRHA) preparing housing subdivisions for the area population. This expansion took place in 1975 and 1989 by this non-profit corporation.

City streets were improved by DOT/PF in 1995 by a community street and re-surfacing program. In general, the existing streets were graded, drainage, surface aggregate placed and paved with an asphalt cement. Street maintenance is accomplished by the City.

4.3.2. DOT/PF Roadway: From the developed city limit east, southeast, the road to the Marine Highway Ferry Terminal was constructed by the Alaska Department of Highways (presently DOT/PF) in and around 1968-72. The roadway varies in width from 24' to 28', including shoulders. As with the city streets, the roadway was resurfaced with drainage improvements and paved with asphaltic cement in 1995. Minor widening and ditching took place.

The roadway is maintained by the City of Angoon under a contract with DOT/PF.

4.3.3. City (B.I.A.) Roadway: From approximately 1.5 mile, as measured from the Angoon Post Office, Angoon's Auk'Tah Lake roadway "T" intersects with DOT's roadway and travels 4.0 miles in an easterly direction, terminating at Auk'Tah Lake. The roadway was constructed from 1987 to 1990 by the Bureau of Indian Affairs (B.I.A.). It is a 34' wide, gravel surfaced roadway meeting or exceeding current AASHTO Local Roadway Standards. Adjacent the roadway on its south side is the communities buried domestic water pipeline and an overhead electric system. The Right-of-Way (R.O.W.) is generally 100' wide. The land on both sides is owned by Kootznoowoo, Inc. and was subdivided in 1990-95 by Kootznoowoo, Inc. for their shareholders. The R.O.W.'s dedicated by the subdivision platting has not, to date, been developed by Kootznoowoo, Inc. the City of Angoon, or subdivision shareholders. Where possible, these R.O.W.'s are used for development planning of Airport sites 6 and 6A.

5.0 FUTURE AIR TRAFFIC DEMAND – AVIATION FORECAST

5.0.1 Terms Defined

When preparing forecasts of passenger activity for an airport, it is common practice to concentrate on passengers boarding aircraft and departing from the facility. These are commonly referred to as enplaned passengers or enplanements. The number of enplanements is then forecast to determine the future requirements for a wide range of airport facilities. Typically, the number of arriving (deplaning) passengers is assumed to equal departing (enplaning) passengers. Therefore, the total number of passengers moving through the airport is calculated as two times the number of enplaned passengers. An airport "operation" refers to aircraft landings or takeoffs. Thus, a typical flight has two operations --- once when landing in Angoon and the other when departing.

Other common references are to Part 135 and Part 121 air carriers. A Part 135 Air Carrier is an air taxi operators and commercial operators of small aircraft (less than 30 seats) regulated under 14 CFR Part 135. A Part 121 Air Carrier is a commercial operator of large aircraft (30 seats or more) regulated under 14 CFR Part 121.

Additional definitions may be found in the Glossary of Aviation Planning Terms, which is added as Appendix C to this report.

5.1 Introduction

The purpose of this chapter is to forecast activity for a new airport to serve the community of Angoon, Alaska. Preparing an aviation demand forecast is a key element in airport planning. The *Angoon Airport Reconnaissance Study-Needs Assessment's* forecast defines the future demand potential of the airport, based on the growth and socioeconomic characteristics of the service area and the state of the aviation industry, both regionally and nationally. The forecast will be used to:

- Determine the airport's service role.
- Determine the type of aircraft and size of airport facility.
- Develop a long-range airport development program.
- Evaluate the impacts that will result from airport growth and development.
- Assess the financial feasibility of the airport development proposal.

It is difficult to forecast annual fluctuations in specific airport activity categories, such as passengers or aircraft operations, because economic activity --- whether local, national, or international --- tends to be cyclical. However, when defining growth trends for extended periods of time, such as 5, 10, or 20-year periods, a forecast can approximate overall trends, even though actual growth will fluctuate above and below the trend line over the period covered. Capital improvement programs (CIP) and development plans must be flexible enough to allow response to these fluctuations rather than requiring adherence to

a strict schedule. Decisions to begin future development projects will be made as activity levels predicted by the trend lines are attained. This approach provides for a more realistic CIP and development plan, rather than one predicated on attaining certain activity levels in a specific calendar year.

Forecast development is described in detail in this chapter. For this study's purposes, data from 1999 are used as the base year for the forecast and it is estimated that the airport will open in the year 2007. The airport CIP and development program will cover a 25-year period beginning in 2002 and ending in 2026. It is assumed that during the period from 2002 to 2006, activities will be centered on obtaining airport funding and completing environmental documentation, design, and construction. Thus, a forecast out to 2026 provides a full 20-year CIP program for airport operation.

In this chapter, the Angoon Airport forecast is developed for:

(1) Air Carrier Service (Scheduled Part 135)
- Annual Enplaned Passengers
- Annual Operations

(2) Air Cargo
(3) Annual Operations for Emergency/Medical
(4) Annual Operations for Other
(5) Critical Aircraft Type

5.2 Historical Activity

Currently, Angoon receives scheduled service from two Federal Aviation Regulation (FAR) Part 135 air carriers. Wings of Alaska uses the Angoon seaplane facility and operates Cessna 206, DeHavilland Beaver or DeHavilland Otter seaplane aircraft, depending on the expected load. Their current winter schedule includes three daily flights to and from Juneau with occasional stops in Tenakee Springs, increasing to four flights daily in summer. Alaska Seaplane Services uses the Angoon seaplane facility for scheduled flights once per day to and from Juneau in Cessna 185 and DeHavilland Beaver seaplane aircraft. In addition to these scheduled flights, several regional FAR Part 135 carriers operate charter flights to Angoon from Juneau, Sitka, Kake and Tenakee Springs. U.S. Department of Transportation Air Carrier Activity reports for the years 1991 through 1999 show data for the recorded levels of enplaned passengers, air freight and mail (Table 6). The table combines data on recorded flights from Angoon to Juneau, Kake, Sitka and Tenakee Springs.

TABLE 6 – Historical Activity of Scheduled (Part 135) Carriers			
Year	**Enplaned Passengers**	**Freight (pounds)**	**Mail (pounds)**
1991	2,784	79,964	44,946
1992	2,388	76,461	45,141
1993	2,686	78,204	49,285
1994	3,449	71,863	69,654
1995	3,790	64,796	93,344
1996	3,383	80,619	103,690
1997	2,983	81,038	74,008
1998	2,952	73,617	71,047
1999	2,543	63,451	53,192

Source: United States Depart of Transportation Air Carrier Activity Reports

There is no pattern apparent from a review of the historical data. Passenger volumes range from a high of 3,790 enplaned passengers in 1995 to a low of 2,388 enplaned passengers in 1993. Anecdotal evidence suggests that variations in the number of passengers, and pounds of mail and cargo, correspond with fluctuations in design and construction activity of facilities in the community. The high volume years appear to be related to the construction of the road connecting the town with the water reservoir and the design and layout of the new subdivisions south of town. While it is not possible from the data to verify these assumptions, it is reasonable to assume that major construction projects would tend to generate significant additional traffic in a small community like Angoon. While the level of passengers recorded from 1991 through 1999 follows no discernable pattern, it does establish a good activity range from which to base future growth projections. These projections are discussed later.

In addition to these recorded levels of passenger and freight being enplaned at Angoon, the Federal Aviation Administration (FAA) has reported that the scheduled Part 135 air carriers made approximately 1,500 annual departures during 1998 and 1999. Records for other activity types are not available but it is known that during the summer months, several charter carriers operate on-demand service to the Angoon seaplane facility and other docks to transport clients to and from Whalers Cove and other fishing lodges and to other tourist and recreation destinations. Other reasons for the charter operations include emergency medical, deliveries of large, all-cargo orders, and sight-seeing/recreational flying. The FAA's *Terminal Area Forecast* (TAF) for years 1998 through 2015 estimates that these types of operations will continue to number approximately 1,500 per year in Angoon. However, TAF data is not considered very reliable for communities such as Angoon due to the lack of historical information for small airports.

5.3 Demand Forecasts

5.3.1. Forecast of Air Carrier Activity: To determine the size and characteristics of airport facilities needed at the Angoon Airport, the level of future annual enplaned passengers and airline operations is forecasted. Forecasts for peak activity can be deduced from these basic activity segments.

For this forecast, air carrier activity will be defined as any passenger, operation, or other activity by a scheduled Part 135 Carrier. Forecasts are derived through the following process and steps:

(1) Project future levels of passenger demand, by:

- Checking the validity of the projections using a series of population analyses
- Analyzing historical records to determine if any pattern exists linking passenger activity with any measurable independent variable such as population or development activity;
- Surveying Angoon residents to establish whether there is any unfulfilled demand for air travel at the current facility;
- Interviews with air carriers on historic and current use and patterns and likely trends;
- Projecting possible future scenarios based on available information;
- Review of the draft needs Assessment by air carriers (Wings of Alaska and L.A.B.); and
- Selecting the best projection to forecast future activity.

(2) Project future levels of Part 135 activity, by:

- Estimating the likely number of daily winter and summer flights given the possibility of new air routes and a new airport in the region;
- Examining possible future aircraft fleet to be used by the carriers in providing this service; and
- Using the passenger forecast to test the viability of the potential schedule.

After completing these steps to yield forecasts for enplaned passengers and air carrier operations, forecasts are developed air cargo, annual operations for emergency/medical, and other purposes. These forecasts are based on reasoned conjecture and information obtained by interview since recorded data is not available.

The forecasts presented herein reflect two additional basic factors. First, the number of base year 1999 enplaned passengers is derived from the recorded historical data (Table 6) and adjusted upward to account for unconstrained air travel demand levels as determined by the results from the Angoon resident survey, and other assumed conditions. This is explained in more detail in the next section of this chapter. Second, forecasts are developed to 2026. Assuming that the airport earliest opening is 2007, this provides a forecast of future activity for a twenty-year period beyond the estimated opening day. Thus, all forecast tables show (adjusted) base year 1999 data and data for 2007, the estimated facility-opening year. Additionally, forecasts are made for short-term horizon (2011), intermediate-term horizon (2016), and long-term horizon (2026).

5.3.2 Annual Enplaned Passengers:

Adjustments to Year 1999 Recorded Number of Enplaned Passengers

Historical data shows that the number of enplaned passenger at the Angoon seaplane facility for the past ten years has ranged between a low of 2,388 in 1992 and a high of 3,790 in 1995. However, a number of factors exist that appear to have suppressed community use of the airport, including:

- Reliability of service. The current seaplane facility is frequently subjected to poor weather conditions that lead to flight cancellations or delays. The result is that potential passengers either delay or cancel their trip, or use the Alaska State ferry service.
- Limited destination. All scheduled flights from Angoon currently go to Juneau where passengers must switch aircraft to continue on to other destinations, whether in Southeast Alaska or outside the region. This adds time and expense to the trip.
- Aircraft size. Because Angoon is served by four to ten seat seaplanes, some passengers are unable to secure seats on flights at the time they need to travel. In these cases they must either delay or cancel their trip or use the ferry service.
- Costs. Some individuals choose to use other forms of transportation or do not travel at all because the cost of service to and from Angoon is high.

To test this reasoning, the consultant team conducted a survey of Angoon residents 18 years of age and older. Surveys were mailed to all post office boxes and copies were available at central community locations. To ensure duplicate surveys were not received, residents were "checked-off" a list when they returned a completed survey. Angoon's current population is 572, with an estimated 390 people aged 18 or older. We received 103 completed surveys, yielding a response rate of about 25 percent. A copy of the survey instrument is provided in Appendix A. Survey responses are highlighted below and summarized on Tables 7 and 8.

- Not surprisingly, Juneau is the most popular destination as it is the only destination with scheduled air service.
- Of the 103 survey respondents, 96 (93%) stated that there had been times within the past year when they wanted to fly into or out of Angoon, but were unable to do so on a scheduled flight.
- Respondents who were unable to fly out of Angoon missed flying an average of 3.5 times during the past year.
- Angoon residents who were unable to fly out of town were trying to get to Juneau (89%), Sitka (56%) and other destinations (19%) for various reasons. *(Note: Percentages add up to more than 100% because one could choose more than one answer.)*
- Reasons for missed flights were led by weather (78%), high-ticket prices (57%) and fully booked flights (54%). *(Note: Percentages add up to more than 100% because one could choose more than one answer.)*
- Respondents who were unable to fly when they wanted to most frequently took the ferry as an alternative (85%). Their next option was to cancel the trip (52%), and

nearly 42% delayed the trip. *(Note: Percentages add up to more than 100% because one could choose more than one answer.)*

- Only about 17% of respondents stated that they chartered a plane when they could not get a scheduled flight.

Table 7 – Survey Results Reasons for Not Flying

Question	No.	Percent-age of Respon-dents
Completed Surveys	103	
Couldn't Fly	96	93%
How Many times (ave.)	3.5	
Where Trying to Fly		
Angoon to Juneau	85	89%
Angoon to Sitka	54	56%
Angoon to Other	18	19%
Juneau to Angoon	53	55%
Sitka to Angoon	27	28%
Other to Angoon	10	10%
Why Couldn't Fly		
Weather	75	78%
Ticket Price Too High	55	57%
No Seats Left on Plane	52	54%
Other	11	12%
What Did They Do		
Cancel Trip	50	52%
Delay Trip	40	42%
Charter a Plane	16	17%
Take the Ferry	82	85%
Other	2	2%

Note : Respondents were allowed to choose more than one answer, so percentages will add up to more than 100%

Table 8 – Survey Results: Desired Destinations

Trip Purpose	Juneau	Sitka	Other SE. AK.	Other Destina-tions
Shopping				
Number	92	36	4	14
Percent	89%	35%	4%	14%
Medical Reasons				
Number	55	75	4	11
Percent	53%	73%	4%	11%
Work or Business				
Number	43	26	10	7
Percent	42%	25%	10%	7%
School				
Number	9	3	3	5
Percent	9%	3%	3%	5%
Visiting Friends and Family				
Number	76	33	18	12
Percent	74%	32%	18%	12%
Vacation				
Number	36	12	9	13
Percent	35%	12%	9%	13%
Recreation or Events (Gold Medal, etc.)				
Number	56	6	3	3
Percent	54%	6%	3%	3%
Other				
Number	8	5	5	1
Percent	8%	5%	5%	1%

Source: Angoon resident travel survey, January/February, 2001. Southeast Strategies.

Table 8 shows the reasons why Angoon residents travel to various destinations. Juneau was the most popular destination for nearly every category. Sitka was the destination of choice for medical trips (72%). Since there are no scheduled flights to Sitka, Angoon residents traveling to the SEARHC hospital and clinics there must either take the ferry, charter a plane, or fly first to Juneau, and then to Sitka.

Use of Survey Results

Survey results shows that travelers to and from Angoon averaged 3.5 flights not taken for various reasons over the past year. Assuming that a new airport could offer service that was not subject to the same limitations as the existing facility, it would be safe to say that some of these trips would not have been cancelled. When calculating the Adjusted 1999 Base Year enplanement figures, the following assumptions were made regarding this unfulfilled or latent demand:

- New service at an airport may offer more air carrier choices, thus more seats available each day.
- A new airport would have a lighted runway and modern navigational aids (GPS approaches require visual aids such as PAPI, REIL and possibly ALS). Therefore, air service would be less likely to be canceled due to weather. With more reliable service, passengers would have a higher confidence in the airline and thus may be less likely to search for alternative travel choices.
- Price is a major determinant and those respondents who have stated that they use the ferry system instead of air travel due to price are assumed to continue with this choice. While wheel planes are less expensive to operate than float planes, this report does not assume that a new airport would reduce ticket prices as many factors influence private air carriers pricing decisions. If a new airport means more air service and more air carriers, then some additional deferred demand, based on price, may be realized.

This latent demand to travel was factored into the number of enplaned passengers for the 1999 base year as follows. First while the historical record (Table 6) does not have a traceable pattern, it did show that under current conditions enplaned passengers averaged 2,995 from 1991 through 1999. If the latent demand demonstrated in the survey is accurate, an additional 1,269 trips could be expected if conditions improve[4]. However, survey results are not strong enough to conclude this number with confidence, so an adjustment is used to reflect a lesser level of latent demand that would materialize with airport development. The adjustment calculates that one half of the flight cancellations indicated by the survey respondents could actually be expected. As a result, only 635 trips will be added to the total[5]. Additionally, a factor that accounts for passengers on chartered (unscheduled) flights is included. Actual numbers for chartered flights is unavailable. However, discussions with charter companies indicate that this number is estimated to be around 250 annual enplaned passengers. Finally,

[4] Ninety-three percent of surveyed adults could not make a trip. As a result, out of the estimated 390 adults in Angoon, 363 adults were not able to fly when they wanted to. Multiplying this by 3.5 missed trips will equal an estimated 1,269 additional trips per year.

[5] 1,269 trips divided by 2 equal 635 total trips.

the fact that state ferry fares are expected to increase and that air service is likely to be offered to Sitka and Kake after an airport is constructed is considered. Records show in years when there was direct service to Sitka, passenger use levels were higher. Together, these factors result in a projected 1999 base year demand number of an estimated 4,000 enplaned passengers. The following table shows a breakdown of these enplanement figures.

Table 9 – Calculation Breakdown: Adjusted 1999 Base Year Enplaned Passengers

Item	Enplaned Passengers
Average Scheduled Flights (1991 – 1999):	2,995
Estimated Chartered (unscheduled) Flights:	250
Estimated Latent Demand:	635
Additional demand due to direct Sitka and Kake service:	120
Total Adjusted 1999 Base Year:	**4,000**

Source: URS Consultants

Enplaned Passenger Forecast

This study uses a two-phase methodology for preparing the aviation demand forecast for enplaned passengers. First is the analytical phase, which involves applying statistical techniques to historical data to establish a basis for modeling future growth. Second, is a subjective phase that adds anecdotal information, experience, knowledge, and other nonmathematical valuation to the process. This combination of techniques is essential to the adoption of a final preferred forecast.

For the analytical phase, past trends in the aviation demand elements are extended into the future using a variety of techniques and assumptions. The products of these analyses are trend lines, which produce projections for specific time periods. A number of projections are developed since the most reliable approach to estimating demand is often obtained using more than one technique. Methodologies that are commonly employed include correlation and regression analyses, time series extrapolation (trend data), and market share analyses.

These three analytical techniques share a common shortcoming. They assume that relationships that existed in the past will continue unchanged into the future. Consequently, they do not allow for the effects of more aggressive marketing, increased service levels, or other changes that are independent of past indicators. Similarly, they do not permit the analysis of the impact of point-in-time activity increases followed by resumption of previous growth rates. To counter this weakness, the second phase of forecasting is a judgmental analysis. During this phase decisions are made regarding the growth projections resulting from the analytical analyses for each demand element. These decisions require that a number of intangible factors such as preference, policy, and objective changes be considered. The consultant team added these elements to the process using the experience at other airports, industry trends, knowledge of the aviation community, and results of the passenger, pilot and business surveys conducted as part of the planning process.

For this analysis we prepared projections based on growth factors experienced at other facilities or determined by others to be likely in the future. Specifically, the following were used to develop a low, medium and high Angoon aviation forecast.

- A trend line regression analysis was conducted using the recorded passenger levels shown in Table 6. Unfortunately the preliminary analyses showed that there was no trend identified by the historical activity levels. The resultant correlation coefficient was 0.125. In statistical analyses, a high correlation coefficient (1.0 being the highest possible) is seen as a sign that two variables are related in some fashion. The lower the correlation coefficient, the less reliable the factors are for making projections. In this case, 0.125 is extremely low and eliminated this method from being seriously considered as a forecast tool.
- The National Plan of Integrated Airport Systems (NPIAS) includes the Angoon seaplane facility. This FAA generated document projects that no growth can be expected at the facility over the next ten years. Although this is unlikely given the nature of air traffic growth registered in the region and the fact that a new airport is likely to produce increased activity, the no growth scenario should be considered in future planning and is included as the low-range forecast (in this case, no growth).
- In the late 1980's the State DOT&PF prepared a Statewide Aviation System Plan to allow the State to plan for the future of all airports under its jurisdiction in order to set funding priorities. That report established a growth rate of 0.8% per year for the Yakutat Airport. Yakutat is the community closest in size and character to Angoon for which projections were made. This projection is used to establish a moderate growth rate into the planning horizon.
- A high growth scenario was constructed using the 1.8% growth rate from the DOT&PF Statewide Aviation System Plan projection for the entire Southeast region. We assume that even though service levels vary from community to community, growth in air service tends to be complementary with improvements made to one airport being reflected in increased opportunity for others in the system.

Table 10 contains the year-by-year results of the demand forecast from base year 1999 to 2026 using a low growth rate in enplaned passengers of 0%, medium growth rate of 0.8% annually, and high growth rate of 1.8% annually; all numbers have been rounded to the nearest ten. Year 2026 projections range from 4,000 enplanements for the low growth scenario, to 4,960 for medium growth, and 6,480 passenger enplanements for the high growth scenario.

TABLE 10 – Forecast Of Enplaned Passengers						
Year	**Low Growth %**	**No. of enplaned passengers forecasted**	**Moderate Growth %**	**No. of enplaned passengers forecasted**	**High Growth %**	**No. of enplaned passengers forecasted**
Adjusted Base Year 1999		**4,000**		**4,000**		**4,000**
Estimated Opening Year 2007	**0.0%**	**4,000**	**0.8%**	**4,260**	**1.8%**	**4,610**
2011	0.0%	4,000	0.8%	4,400	1.8%	4,960
2016	0.0%	4,000	0.8%	4,580	1.8%	5,420
2026	0.0%	4,000	0.8%	4,960	1.8%	6,480

Source: URS Consultants

Since the methodologies used to determine growth rates by the studies above were not community based, the consultant team analyzed the forecast against community growth rates to validate the forecast. To accomplish this a series of market share analyses were conducted. These proceeded using the recorded enplaned passenger volumes for 1991 through 1999 compared with the population levels for those same years. Using several calculations, it was determined that the lowest ratio of enplaned passengers per Angoon resident was 3.76 in the year 1992. The highest ratio was in 1995 at 6.31 passengers per resident. Using these points as a base, the figures presented on Table 6 were generated. Three sets of numbers were developed as follows:

- Average Growth. This assumes that 1991 through 1999 were typical and that averaging passenger/population ratios for these nine years could derive a good activity indicator. A ratio of 4.92 enplanements per resident results.
- Low Growth. This used the low figure for 1992 as the basis for producing future activity levels. A ratio of 3.76 enplanements per resident results.
- High Growth. This projection assumes that the 1995 level could be sustained over the course of a 20-year period. A ratio of 6.31 enplanements per resident results.

To account for the latent demand discussed earlier in this chapter, a calculation was made that determined there was a ratio of 1.57 adjusted base year enplanements per actual enplanement. This ratio was included in the calculations for the average, low, and high growth forecasts.

Using these ratios, and applying them to the Year 2025 Angoon population forecast of 752 (see page 16), derives the enplaned passenger forecasts shown in Table 11; all numbers have been rounded to the nearest ten.

Table 11 – Forecasts of Enplaned Passengers Based on Population				
Year	**Angoon Population**	**Low Growth (3.76)**	**Average Growth (4.92)**	**High Growth (6.31)**
1991	665	2,784	2,784	2,784
1992	636	2,388	2,388	2,388
1993	636	2,686	2,686	2,686
1994	610	3,449	3,449	3,449
1995	601	3,383	3,383	3,383
1996	605	2,983	2,983	2,983
1997	570	2,952	2,952	2,952
1998	586	2,543	2,543	2,543
Adjusted Base Year 1999	**572**	**4,000**	**4,000**	**4,000**
Estimated Opening Year 2007	**619**	**3,660**	**4,790**	**6,150**
2011	**646**	**3,820**	**5,000**	**6,420**
2016	**680**	**4,020**	**5,270**	**6,750**
2025	**752**	**4,450**	**5,820**	**7,460**
2026	**759**	**4,490**	**5,870**	**7,530**

Source: URS Consultants

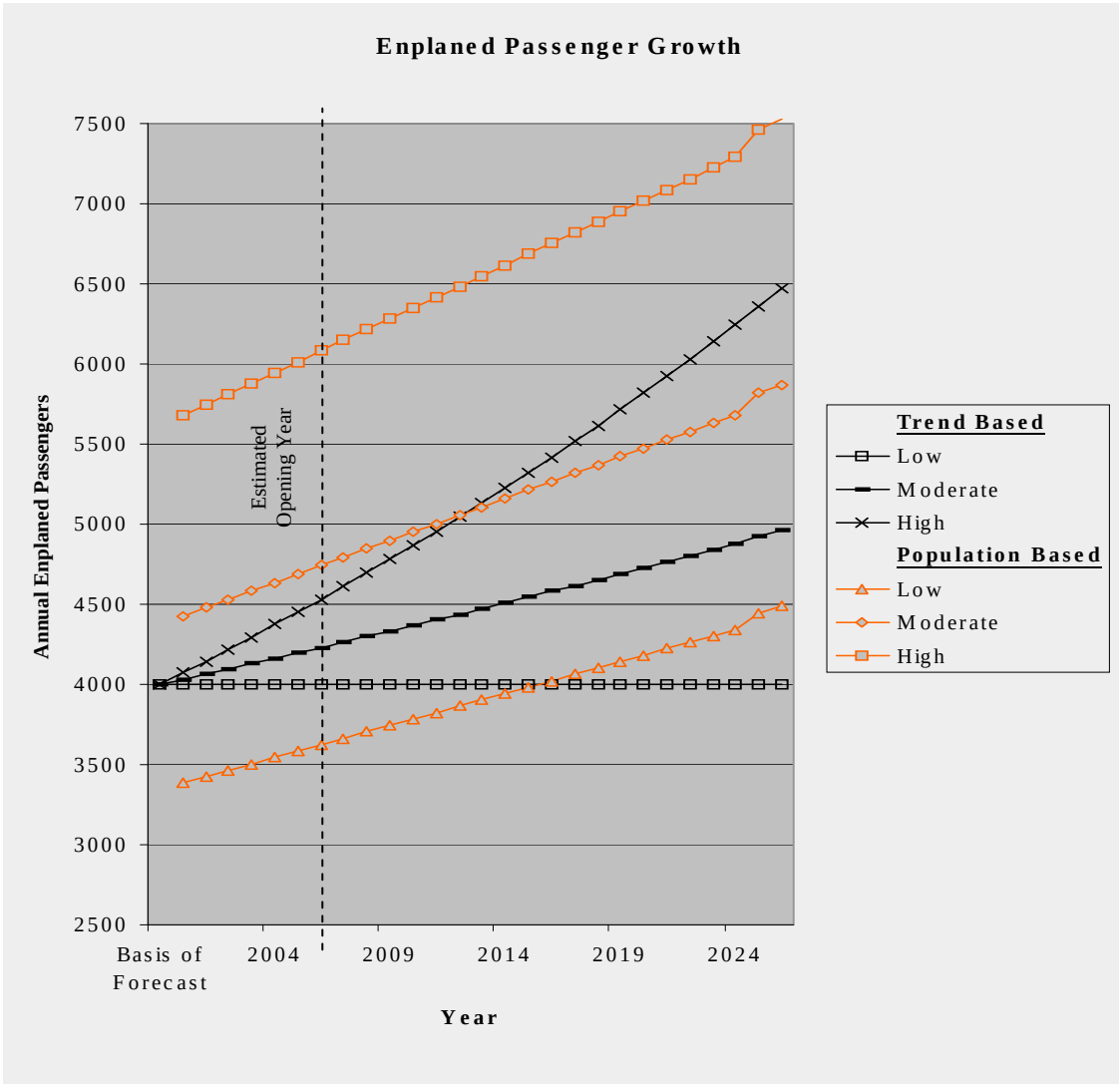
This approach yields a year 2026 enplaned passenger forecast ranging from 4,490 for low growth, 5,870 for average growth and 7,530 enplaned passengers under a high growth scenario.

Projection results as seen on Tables 10 and 11 yield a broad range of potential future passenger scenarios for Angoon. However, under any circumstances it is probable that the number of annual enplaned passengers will fall into the range of 4,490 to 7,530. The figure below shows this range graphically.

A high-growth scenario is recommended for Angoon airport development planning. For Angoon Airport development it is prudent to plan for the 7,530 passengers (high-growth trend-based forecast) for several reasons:

- Because air travel is increasingly the most reliable and convenient form of transportation available travelers choose it more and more frequently. Thus, it is reasonable to assume that air travel will increase beyond current levels.
- Because residential development at homesite lots over the next 5-25 years will increase travel demand.
- Because an airport coupled with focused marketing could create increased tourism related visitation and air travel.
- To make efficient use of federal and state construction funding.
- To ensure facilities are not undersized.

Figure 6 – Enplaned Passenger Growth



Source: URS Consultants

5.3.3 Annual Air Carrier Operations: Forecasting the number of air carrier operations expected at the Angoon airport helps define a number important airport planning factors. To produce this forecast, the historical number of enplaned passengers per airline departure is identified, and changes to this ratio are identified and applied to the forecast of enplaned passengers.

To determine the future of Part 135 air carrier service at Angoon it is important to assess the aircraft fleet being operated by the airlines. Current and future plans and assumptions for serving the community of Angoon are:

- Service to and from Angoon will continue to be supplied by Part 135 air carriers using four to ten passenger aircraft.
- Primary service will be to and from Juneau, but in the future service is also assumed to connect to Sitka and possibly Kake and Hoonah. This service is assumed to be "through service" with flights scheduled to travel from Juneau to Angoon and then on to one of the other destinations.
- The number of annual flights will be determined based on the schedules offered by the airlines. It is currently assumed that there will be two airlines, each offering a morning, mid-day and an evening flight during the winter season with four flights per day during summer months. The result will be about 3,700 annual operations (12 operations per day, six days per week, 52 weeks per year). (Note that it is common practice to calculate annual operations as less than daily times 365 days/year to allow for schedule variations, cancellations, and other factors.)
- In the short and intermediate term, service will continue to be supplied by single engine aircraft such as those used today (Cessna 185 and DeHavilland Beaver). The obvious difference will be that these aircraft will be wheeled or amphibian rather than float planes. As time passes and demand levels increase, the carriers will introduce twin engine aircraft with higher seating capacities. This move is not forecast to occur until the longer term (15+ years from estimated opening) when average occupancies on the smaller aircraft increase beyond 60 % of available capacity.

Given these plans and assumptions and the number of annual enplanements projected, it is unlikely that there will be much measurable growth in operations over the 20-year planning period. With plans and assumptions above, and use of the high-growth forecast of enplaned passengers, it is calculated that each departure will have the following loads.

Table 12 – Annual Air Carrier Operations

Year	Annual Enplanements	Annual Departures	Passengers/ Departure	Annual Operations
Adjusted Base Year 1999	4,000	1,850	2.2	3,700
Est. Opening Year 2007	4,610	1,850	2.5	3,700
2011	4,960	1,850	2.7	3,700
2016	5,420	1,850	2.9	3,700
2026	6,480	1,850	3.5	3,700

Source: URS Consultants

The passenger per air carrier departure numbers forecasted reinforce the notion that the airlines will serve several communities on each trip, although, given the size of the aircraft used, the enplaned passenger levels represent sufficient loads to justify service.

5.3.4. Air Cargo Activity: Air cargo carried to Angoon consists of mail and freight. Anecdotal evidence suggests that some all-cargo service does occur but is infrequent and unlikely to represent a substantial activity category in the future. Combined enplaned cargo and mail volume for 1999 was 116,643 pounds. The survey conducted as part of this study shows that there is very little market strictly for air cargo in Angoon. With adequate ferry and barge service, the majority of the community's goods will continue to be shipped by sea as this method is less expensive, and the majority of the freight is not time sensitive. Mail and cargo volumes will increase at approximately the same rate as the population of the community, however, resulting in approximately 1.1% growth per year and summarized in the Table 8, shown below.

Table 13 – Forecast Of Air Cargo

Year	Air Mail (pounds)	Freight (pounds)	Total Cargo (pounds)
Adjusted Base Year 1999	63,451	53,192	116,643
Estimated Opening Year 2007	69,020	57,860	126,880
2011	71,990	60,350	132,340
2016	75,880	63,610	139,490
2026	84,300	70,670	154,970

Source: URS Consultants

As is currently the case, the majority of the freight that must be flown in will continue to be done so by the scheduled Part 135 air carrier flights. Given the projected passenger loads, it is assumed that the increased number of flights per day will have sufficient capacity available for most of the demand. There will continue to be occasions when aircraft be chartered to bring in specific freight shipments. The presence of an airport will enhance this service by allowing for a wider variety of freighter aircraft, such as the Cessna Caravan and others.

While no data exists to make it possible to project the number of annual operations that will occur due to air cargo demand, it is assumed that they will be fewer than 500 per year throughout the study time frame.

5.3.5 Annual Operations – Emergency/Medical: One definite advantage of an airport for the community of Angoon is the increased reliability of emergency evacuation services. Presently the ability to evacuate individuals is constrained due to the lack of reliable, lighted, landing sites. Whether the emergency provider is using helicopters or fixed-wing aircraft, the presence of navigational aids and a lighted and maintained airport will increase accessibility to Angoon.

It is difficult to predict the number of operations that will occur for these medical and emergency search and rescue purposes since, by definition, these services are "on-demand." It is reasonable to assume, however, that they will number fewer than 100 per year.

The low level of activity in this category though, can not begin to state the level of importance of medical and fueling for search and rescue services is to the community and Southeast Alaska region.

5.3.6 Annual Operations – Other: At the present time there is a substantial level of charter service being used to access Angoon. This serves partly to supplement scheduled air carrier service and is operated by some of the same companies. The potential exists for other aircraft activity to develop with the establishment of an airport in Angoon. Among the possibilities are private General Aviation operations, fueling, sightseeing, and wilderness touring.

The private General Aviation activity potential is relatively high as the population (both year-round and seasonal) increases. However, even here it is doubtful that this will result in high activity levels. At best we would expect one or two pilots to use private aircraft resulting in fewer than 100 operations per year.

Conversations with the U.S. Coast Guard and helicopter operators indicate that occasional use of the new airport can be expected if fuel is available.

Sightseeing and other access services offer the potential for higher activity levels. As the nation's population discovers the Admiralty Island National Monument, it is expected that more travelers will visit and desire sightseeing and similar services. About 500 annual operations are envisioned for this category. Airport services to provide wilderness access to Admiralty Island National Monument are harder to envision since there are no wheeled aircraft landing areas. These services will continue to be provided by seaplanes, or by amphibian aircraft. It is expected that the majority of this potential will be fulfilled at the existing seaplane base.

5.3.7 Critical Aircraft: The Critical Aircraft selected for the airport reflects the operating requirements of the most demanding aircraft expected to generate 500 or more itinerant operations per year. The Critical Aircraft is used as the basis for comparing airport facilities against operating requirements of aircraft regularly using the facility. The Critical Aircraft helps to determine which FAA planning and design criteria should apply to the airport, as defined by the FAA's Airport Reference Code (ARC).

For Phase 1 of airport development (Estimated Opening Day in 2007 through 2017), the critical aircraft is the DeHavilland Beaver or the Cessna 206, both of which are classified as AI aircraft.

For Phase 2 of airport development (2017 to 2026), the critical aircraft is a passenger carrier with capacity for up to 12 passengers such as the DeHavilland Otter, Piper Navajo, or Cessna Caravan. The FAA's ARC definitions show that the DeHavilland Otter is classified as an AII

aircraft and the Navajo a BI. In this case there are two considerations. The approach speed of the Navajo suggests that it should be used in calculating runway length while the wider wingspan of the DeHavilland suggests that it should be used to determine the setback distances and separation criteria. Therefore, an ARC of BII is appropriate for Phase 2 of the new Angoon Airport. Under all conditions, the critical aircraft and projected use will be by aircraft with gross weights of less than 12,500 pounds.

5.4 Forecast Summary

The Angoon Aviation Forecast is summarized on Table 14. Beginning with an adjusted 1999 Base Year number of 4,000 enplaned passengers, a high-growth scenario forecasts that in the 2007 estimated airport opening year, there will be 4,610 enplaned passengers, and by 2026, some 5,400 enplaned passengers are expected at the Angoon Airport. The number of annual air carrier operations (flights) is assumed to remain constant over this time period. Thus, the number of passengers (and pounds of cargo) per departure is expected to slowly grow over time. It is expected that these conditions will result in Part 135 air carriers using scheduled, wheeled, aircraft flights to serve several communities (Juneau, Angoon, Sitka, Kake) on each trip. The typical aircraft used by the region's Part 135 carriers can justify this service.

Table 14 – Forecast Summary

Activity	Adjusted Base Year 1999	Est. Opening Year 2007	2011	2016	2026
Enplaned Passengers	*4,000*	*4,610*	*4,960*	*5,420*	*6,480*
Air Cargo (total pounds)	*34,353*	*37,370*	*38,977*	*41,082*	*45,641*
Annual Operations					
Air Carrier	*3,700*	*3,700*	*3,700*	*3,700*	*3,700*
Air Cargo	*500*	*500*	*500*	*500*	*500*
Emergency Medical	*100*	*100*	*100*	*100*	*100*
General Aviation	*500*	*500*	*500*	*550*	*600*
Total Annual Operations	*4,800*	*4,800*	*4,800*	*4,850*	4,900

Source: URS Consultants

6.0 FACILITY REQUIREMENTS

6.1 Introduction

This discussion analyzes requirements for the facilities needed to adequately serve the needs of the Angoon Airport. The assumptions used in analysis of facility requirements are as follows:

(1) Development will be a two-phase process. Phase 1 is for short-term development covering conditions from the 2007 airport estimated opening day through 2017. Phase 2 is for longer-term (ultimate) development of the site, from 2017 through 2026 and beyond.
(2) Any airport that is established in Angoon will be served with Federal Aviation Regulations (FAR) Part 135 air carrier operations. It has been assumed that these operators will use small passenger service aircraft such as the Cessna 206, DeHavilland Beaver, or similar on opening day eventually transitioning to aircraft with fewer than 10 passenger seats such as the Piper Navajo or DeHavilland Otter.
(3) Any airport developed on Angoon will ultimately be equipped with instrument approach capabilities with visibility minimums under ¾ mile on at least one approach using GPS technology.
(4) Given the presence of passenger activity, a small passenger terminal, parking apron and other landside amenities will be needed.

The resulting requirements represent a long-range view of the airport. They also are stated conservatively and are intended to represent a minimal facility that can operate safely, provide for the community's needs and meet all FAA Design Criteria. Although this analysis uses a time horizon to 20-years from estimated opening, it is relevant to consider a longer time frame. A conservative estimate of facility needs will consider facility growth 40 to 50 years beyond the estimated airport opening date to allow for continued safe and efficient use of the airport without large CIP expenditures.

Facility Size Considerations

Southeast Alaska is a narrow strip of land along the northwestern shore of North America between the Pacific Ocean/Gulf of Alaska and the Coastal Mountain Range, fronted by an archipelago (Alexander Archipelago) of islands. This terrain of mountains, islands and fjords does not support many miles of road. In fact, only a few communities in the region have road access to other communities, and the rest of the continent. Most transportation between communities in the region is either by air or by water. Consequently, many Southeast Alaska residents own and operate boats and aircraft. Alaska has the highest rate of aviation licenses per capita of any of the 50 states. Nearly 400 general aviation (GA) aircraft are based in the communities of Sitka (22) and Juneau (374), to the east and west of Angoon. Juneau is 59 air miles from Angoon; Sitka is only 43 air miles away.

With development of an airport at Angoon, it is likely that GA aircraft from surrounding communities will visit Angoon. Whether a day trip or an intended overnight visit, the potential volume of GA traffic will likely warrant ample apron and tie down space at the runway. Some conditions contributing to possible high volume of GA aircraft visitations to the Angoon airport are:

- Slow, but steady, development of 700-plus privately owned residential lots for Kootznoowoo, Inc. corporation shareholders.
- The continued development of the charter boat fleet for day and extended fishing and hunting trips.
- Day trippers often become grounded by weather and become overnight visitors.
- Angoon does not tax airplanes as personal property at this time. Commercial air carriers may wish to winter their planes at Angoon instead of other communities (such as Juneau and Sitka), which will tax those planes.

Even without an airport, the community of Angoon has supported an FBO in the past. With development of an airport, it is likely that one or more FBOs will build hangers/offices along side the runway. In addition, tour or other companies may wish to install hangers at the site for equipment storage or other purposes. Ample lease lot space is recommended to allow for future development at the airport site.

6.2 Airfield Requirements

6.2.1 Critical Aircraft: The initial step in the analysis is the determination of the airport's classification, known as the Airport Reference Code (ARC). The Federal Aviation Administration (FAA) has developed a set of guidelines, contained in FAA Advisory Circular 150/5300-13, *Airport Design*. The particular set of guidelines to follow is determined by the ARC, and the ARC is determined by identifying the most demanding aircraft, or group of aircraft, expected to regularly use the airport.

The Critical Aircraft selected for the airport reflects the operating requirements of the most demanding aircraft expected to generate 500 or more itinerant operations per year. The Critical Aircraft is used as the basis for comparing airport facilities against operating requirements of aircraft regularly using the facility. The Critical Aircraft helps to determine which FAA planning and design criteria should apply to the airport, as defined by the FAA's Airport Reference Code (ARC).

The FAA's ARC is a classification system developed to relate airport design criteria to the operational and physical characteristics of the airplanes expected to operate at the airport. The ARC is based on two key characteristics of the designated Critical Aircraft. The first characteristic, denoted in the ARC by a letter code, is the Aircraft Approach Category as determined by the aircraft's approach speed on landing. Generally, aircraft approach speed affects runway length, exit taxiway locations, and runway-related facilities. The ARC approach speed categories are as follows:

- Category A: Speed less than 91 knots;
- Category B: Speed 91 knots or more, but less than 121 knots;
- Category C: Speed 121 knots or more, but less than 141 knots;
- Category D: Speed 141 knots or more, but less than 166 knots; and
- Category E: Speed 166 knots or more.

The second ARC component, depicted by a Roman numeral, is the Airplane Design Group. The Airplane Design Group is determined by aircraft wingspan and determines dimensional standards for the layout of airport facilities such as separation criteria between runways and taxiways, taxilanes, buildings, or objects potentially hazardous to aircraft movement on the ground. The Airplane Design Group categories include:

- Design Group I: Wingspan up to but not including 49 feet;
- Design Group II: Wingspan 49 feet up to but not including 79 feet;
- Design Group III: Wingspan 79 feet up to but not including 118 feet;
- Design Group IV: Wingspan 118 feet up to but not including 171 feet;
- Design Group V: Wingspan 197 feet up to but not including 262 feet.

As stated in the opening paragraph, development will be a two-phase process. The critical aircraft in Phase 1 is the DeHavilland Beaver or the Cessna 206, both of which are classified as AI aircraft. As a result, the new Angoon Airport will have an ARC of AI during Phase I (Estimated Earliest Possible Opening in 2007 through 2017).

For Phase 2, the critical aircraft is a passenger carrier with less than 10-seat capacity but larger than those serving Phase 1, such as the DeHavilland Otter, Cessna Caravan, or the Piper Navajo. The FAA's ARC definitions show that the DeHavilland Otter is classified as an AII aircraft and the Navajo a BI. In this case there are two considerations. The approach speed of the Navajo suggests that it should be used in calculating runway length while the wider wingspan of the DeHavilland and Cessna suggests that it should be used to determine the setback distances and separation criteria. Therefore, an ARC of BII is appropriate for Phase 2 of the new Angoon Airport. Under all conditions, the critical aircraft and projected use will be by aircraft with gross weights of less than 12,500 pounds.

6.2.2 Runway Requirements: FAA AC 150/5325-4A, *Runway Length Requirements for Airport Design*, provides guidance for determining runway lengths. At Angoon where activity will be limited to aircraft weighing less than 12,500 pounds, the determination of required runway length is a function of the class of airplane having the most critical need. Other factors included in determining the required runway length, and the conditions applied to the calculations are as follows:

- Mean maximum temperature: 42° F
- Airport elevation estimated at 50 to 100 feet above mean sea level
- Stage length (aircraft trip length): 500 Miles[6]

[6] Although FAA recommends showing a minimum of 500 miles for stage length to any airport, a more typical and realistic stage length for trips to Angoon is 50 to 150 miles.

Table 15 shows the runway length required for the aircraft expected to use the airport over the next 20 years. The exhibit shows the longest and shortest calculated distances from the FAA's Runway Length Requirements computer model. The complete printout of results from this model is attached as Appendix B.

Table 15 – Runway Length Requirement

Percent of Aircraft Fleet Served	Length Requirement
75%	2,040 feet
95 %	2,550 feet
100 %	3,020 feet

Source: Information compiled by URS, lengths calculated by the FAA's Runway Length Requirements Computer Model.

The State of Alaska DOT&PF requires the minimum length of any runway be 3,300 feet. As a result, the initial runway for Angoon will be 3,300 feet in length. It is possible that a need to accommodate aircraft larger than the DeHavilland Otter will arise in the future. This is likely to be a DeHavilland Dash 8 or similar airplane requiring a runway length of approximately 4,000 feet.

6.2.3 Runway Design Standards: To further define the airport it is necessary to define the applicable FAA design standards, which are based on the following:

Phase 1
Critical aircraft weighing less than 12,500 pounds.
Approach visibility minimums for a visual runway not lower than ¾-statute mile.

Phase 2
Critical aircraft weighing less than 12,500 pounds.
Approach visibility minimums lower than ¾-statue mile.

Table 16 defines the FAA's Runway Design Standards for both Phase 1, an AI facility, and Phase 2, a BII facility.

Table 16 - Runway Design Standards		
DESCRIPTOR	**PHASE 1 - AI FACILITY DESIGN STANDARD**	**PHASE 2 - BII FACILITY DESIGN STANDARD***
Runway width	60 feet	100 feet
Runway shoulder width	10 feet	10 feet
Runway blast pad width	80 feet	120 feet
Runway blast pad length	100 feet	150 feet
Runway safety area (RSA) width	120 feet	300 feet
RSA length (beyond runway end)	240 feet	600 feet
Object free area (OFA) width	400 feet	800 feet
OFA length (beyond runway end)	240 feet	600 feet

Source: Information compiled by URS from guidance contained in FAA AC 150/5300-13, Airport Design
* Assumes a non-precision approach with less than ¾ mile minimum.

6.2.4 Runway Location and Orientation: When choosing a site for the new runway, the FAA FAR Part 77 guidelines state that following factors must be taken into consideration: wind, airspace availability, topography, environmental factors, and wildlife hazards. The orientation of a runway is primarily a function of wind velocity and direction, together with the ability of aircraft to operate under less than optimal crosswind conditions. As a general rule, the runway is oriented as closely as practical to the direction of the prevailing winds. Runway wind coverage is that percent of the time in which operations can safely occur with acceptable crosswinds. The FAA has set the desirable wind coverage for a runway at 95 percent. A wind analysis being conducted as part of this study will establish the optimum runway orientation for this facility.

6.2.5 Taxiways: It is assumed that the airport will be constructed to allow for the eventual addition of a full parallel taxiway system to facilitate runway and landside interface. However, the initial runway construction phase (Phase 1) will be limited to a simple access taxiway and activity levels will be light enough to allow for aircraft taxiing on the runway. Table 17 defines the design criteria for a taxiway system during each phase.

Table 17 - Taxiway Design Standards		
DESCRIPTOR	**PHASE 1 – AI FACILITY DESIGN STANDARD**	**PHASE 2 – BII FACILITY DESIGN STANDARD**
Runway centerline to taxiway centerline	NA	300 feet
Taxiway width	25 feet	35 feet
Taxiway edge safety margin	5 feet	7.5 feet
Taxiway shoulder width	10 feet	10 feet
Taxiway safety area width	49 feet	79 feet
Taxiway object free area width	89 feet	131 feet
Taxilane object free area width	79 feet	115 feet

Source: Information compiled by URS from guidance contained in FAA AC 150/5300-13, *Airport Design.*

Phase 2 for taxiway design has more critical design criteria. It is recommended to "overbuild" areas such as taxiway separation and maintain safety area, object free area and other critical set backs so Phase 1 design standards are the same as those of Phase 2. This will allow for a less expensive upgrade of the airport to a BII Facility.

6.2.6 Aprons and Tie-Downs: It is recommended that a terminal parking apron be constructed at Angoon Airport large enough for the parking of up to three Part 135 aircraft as well as three small transient aircraft tie-downs. The wingspan of the largest plane expected at the facility (the DeHavilland Otter) is 65 feet. Assuming a uniform separation of 25 feet wingtip to wingtip, a total frontage of 295 feet will be required for parking three planes simultaneously. The DeHavilland is also the longest aircraft (51 feet) assumed to service Angoon. A setback from the building restriction line of 25 feet will be used to accommodate the aircraft safety zone. As a result, a parking apron depth of 76 feet, or more is recommended.

Beyond the parking apron will be a taxilane for facilitating aircraft circulation between the taxiway and the apron. This will effectively add another 75 feet to the apron for a total paved surface depth of 151 feet.

In addition to the daily flight apron requirements, a tie-down area should be provided for three transient aircraft (assumed to be a Single Engine Piston (SEP) aircraft). It is likely that the area will be directly beside the other parking spots. The apron should also be extended to provide for access to two hangars. These additions give the apron width a total of 685 feet. The apron depth requirement will remain the same. Figure 6 provides details of this proposed apron.

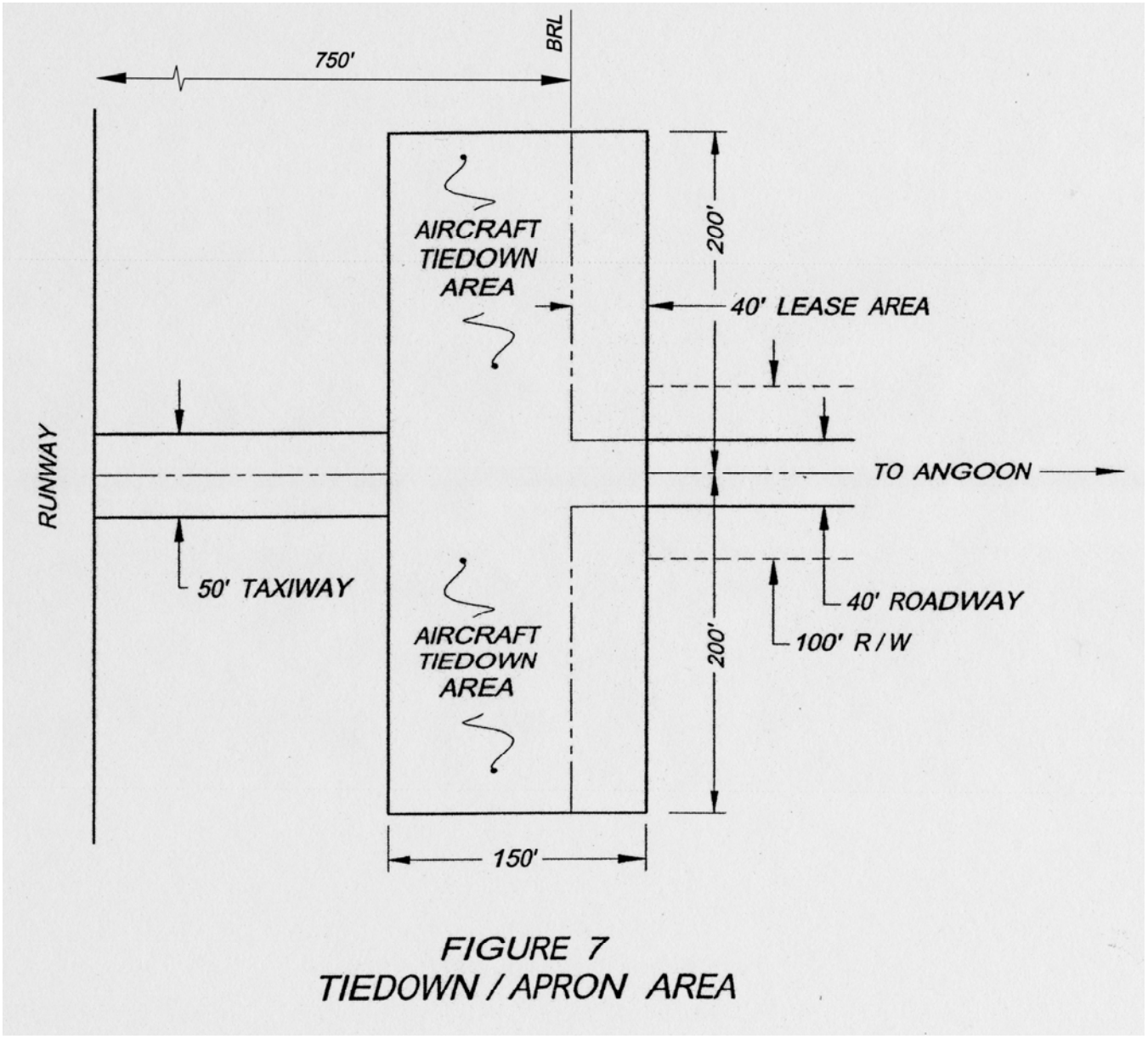


FIGURE 7
TIEDOWN / APRON AREA

To determine the parking apron setback from the runway, we need to take into consideration the height of aircraft tails and their influence upon FAR Part 77 Transitional Surfaces. The Primary Surface for the runway (based on Approach Category) will be 1,000 feet centered on the runway centerline for the ultimate configuration. From there, an upward slope at a ratio of 7:1 is applied to determine the transitional surface requirements. The DeHavilland Otter once again is used with its tail height of 19.5 feet. Using the 7:1 ratio, the transitional surface will clear the Otter's tail at a distance of 136.5 feet from the Primary Surface. Subtracting from this the taxilane requirements yields a setback of 561.5 feet from the runway centerline for the pavement edge. For practical purposes of other user aircraft, and to agree with other airports in the region, a building restriction line (BRL) of 750 feet is recommended.

6.2.7 Approach and Runway Protection Zones (RPZ's): The airport at Angoon will be developed to allow for an instrument approach to one runway end over the course of the next 20-years. The determination of which end receives the approach will be made based on analysis of wind and weather conditions as these data become available. The opposite end will maintain a visual approach. It is probable that any approach will be Global Positioning System (GPS) based but may rely on other emerging technologies. Currently, a GPS approach is classified as non-precision but is likely to be upgraded to that of a precision approach in the future. As a result, design criteria for precision approaches should be considered throughout the site analysis. The following table shows the requirements for Runway Approach and Protection Zones associated with both precision instrument and visual approaches.

Table 18 - Runway Approach and Protection Zones

Approach	Width at Runway End	Length	Width at Outer End	Area
Visual (20:1)	500 feet	1,000 feet	700 feet	13.770 acres
Precision (50:1)	1,000 feet	2,500 feet	1,750 feet	78.914 acres

Source: Information compiled by URS from guidance contained in FAA AC 150/5300-13, *Airport Design.*

To accommodate a visual approach, the airport's primary surface will need to be 500 feet wide. However, when the precision approach is incorporated, the airport's primary surface will need to be 1,000 feet adding lateral clearance requirements to the site layout.

6.2.8 Airport Lighting: Medium Intensity runway and taxiway lighting will be provided at the airport. Taxiway lights will be located along the sides of the apron and along the taxiway out to the runway. These lights are blue. Runway edge lights will be spaced every 200 feet down both sides of the runway. The lights are white with amber lights used on the last 2000 feet of the runway. Eight runway threshold lights will be used on each end of the runway. These lights are red when viewed from the runway and green when viewed from the approach side of the runway. The runway and taxiway lights will be powered from a lighting regulator (a complicated transformer). The lights will be fed from an underground cable in conduit in a loop that starts and ends at the regulator. The taxiway lights are mounted on a 24-inch deep, 12 inch diameter galvanized light base. The conduit is routed in and out of the side of the base at the bottom. Drainage conduits are routed out of a light base approximately every five

lights (every 1000'). The conduit is routed to daylight out of the embankment or into a ditch. This along with holes in the light bases provide drainage for any water that gets into the system, thus significantly reducing maintenance costs. The runway and taxiway lights will be controlled by a pilot controlled lighting (PCL) receiver. The pilots using the airports will turn the lights on and off by clicking their microphones on the airport common traffic advisory frequency established by the FAA. The mic clicks are received by the PCL receiver which provides a signal to a lighting control panel.

Airport signs will be located at the apron, at the intersection of the taxiway and runway, and along the runway every 1000'. The signs provide the pilots information about the airport. The signs along the runway indicate how many feet of runway is remaining. The signs at the runway/taxiway intersection indicate the numbers of the runway (one for each end). The sign at the apron indicates the direction to the runway, and it's numbers. These signs are required by the FAA for all airports. The signs will be powered from the taxiway/runway lighting circuit and come on with the lights.

A lighted wind cone will be provided on the airport. It will be powered by a 240-volt circuit that will be fed from the main distribution panel in the terminal building. A step down transformer and disconnect will be located next to the wind cone to convert the power to 120 volts for the wind cone. The wind cone will be controlled by a photocell to come on automatically at night. The wind cone will be mounted on a pole that is hinged in the middle, allowing the wind cone and its light bulbs to be maintained from the ground without using special equipment.

A beacon will be provided at the airport on a 50 to 70 foot tower depending upon the location. The beacon will also be fed from a 240-volt circuit in the same manner as the wind cone. The beacon will be controlled by a photocell also.

A control panel will be provided to control the runway/taxiway lighting, the wind cone, and the beacon. Normally they will be in automatic control as described above. However, if desired, they will be able to be manually controlled from the control panel for maintenance, testing, or in case of failure of the automatic controls.

6.2.9 Navigational Aids (NAVAIDS): In Phase 1, both approaches will be visual. To this end, only visual NAVAIDs such as Runway End Indicator Lights (REIL), which provide positive visual contact with the approach end of a runway, and the Precision Approach Path Indicator (PAPI) will be needed.

The PAPI is an approach path indicator system that provides the pilot with a visual indication of the plane's vertical position relative to the glide slope. It consists of four colored light units installed in a single row on the left side of the approach end of a runway. The aircraft is on slope if the two units nearest the runway show red and the two units furthest from the runway show white, too high if all units show white, and too low if all units show red. This

system has an effective visual range of about 5 miles during the day and up to 20 miles at night.

The PAPIs will be controlled by a Pilot Controlled Lighting Receiver (PCL). The PCL receiver will be mounted on the rack that holds the PAPI main controller. The receiver is activated by pilots clicking their microphones a prescribed number of times. A PCL receiver will be provided with each PAPI. Power for the PAPIs is described in Section *6.3.2 Utilities.*

The REILs will be controlled by the runway lighting circuit. A current transformer loop controller will be installed in the REIL base and the runway lighting circuit will be routed through the base. Whenever the runway lights are turned on, the REILs will automatically come on.

Phase 2 development will include the GPS-based approach. The GPS is a Department of Defense (DoD) developed, satellite-based radio navigation system. The system consists of three major segments: Space, Control, and User. The Space segment consists of a constellation of 24 satellites in circular orbits, the Control segment consists of monitoring stations, ground antennas, and a Master Control Station (MCS), and the User segment consists of antennas and receiver-processors that provide positioning, velocity, and precise timing to the user.

With the implementation of the Wide Area Augmentation System (WAAS) enhancement of GPS navigation, a higher quality approach can be obtained. The WAAS system was developed for the FAA for commercial aircraft precision approach landings. It consists of ground-based reference stations and two geo-stationary satellites broadcasting correction information to specialized GPS receivers. This augmented GPS signal corrects signal errors in the GPS system that can be caused by ionosphere disturbances, timing, and satellite orbit errors. The system covers both inland and offshore areas.

The WAAS augmented GPS system will require land-based visual aids such as Omnidirectional Approach Lighting Systems (ODALS) for final identification of, and approach to the airport. In upgrading to the GPS system, it is presumed there will be a change from medium to High Intensity Runway Lights (HIRL).

6.2.10 Helicopter Landing Areas: It is anticipated that the new airport will facilitate increased helicopter use. However, at this time no requirement for special helicopter landing facilities is foreseen. Under less than optimum weather conditions, the runway will be used for the Final Approach and Takeoff Area (FATO) and the taxiways and taxilane will be used as a taxi route to the parking apron where the transient spot will be used for parking. Under clear conditions, it is anticipated that a direct approach to the apron will be used.

6.2.11 Seaplane Facilities: Once the new airport enters service, much of the air activity will likely move to the new facilities. As a result, the existing seaplane facilities will provide only minimal service and should remain more than adequate for the needs of Angoon. To this end,

only minimal upgrades for this facility will be needed, such as a new non-skid surface. Continued maintenance of the facility is recommended.

6.2.12 Perimeter Fencing: A perimeter fence will be needed for wildlife control. The fence should be high enough to prevent wildlife from jumping over it. It should also include bear wire as an additional deterrent, as well as some method of securing the grounded edge of the fencing to keep bears from crawling under it. This combination should be sufficient in reducing possible runway incursions.

6.3 Landside Facilities

In addition to the airfield requirements that have been established, it is important to allow area for landside development. A conservative estimate is used to consider development needs 40 to 50 years beyond the estimated opening year. Landside facilities begin at the end of the apron. Landside facilities will only be installed as demand and funding allow.

6.3.1 Terminal Building: A terminal building will not be necessary due to the relatively low number of forecast emplaned passengers. If the carrier or the community desired to construct one, it would likely consist of a passenger waiting room, a small office, two small restrooms, maintenance closet and an electrical room. The total area of the building footprint should be no more than 2,500 square feet.

6.3.2 Utilities: Any building constructed at the airport will also require a potable water supply, a sewage and drainage system, electrical service, and telephone service. Connection to existing community of Angoon systems or on-site provisions will be needed to meet these requirements.

The single phase overhead electrical utility power line will be extended from the existing electrical distribution system to the airport location. A pad-mounted transformer will be located adjacent to the terminal building and a secondary service conduit routed from the transformer to the building. The electrical service will be 120/240 volt, single phase, and will feed a main distribution panel through a combination meter/disconnect located on the outside of the terminal building.

A telephone utility cable will be mounted on the overhead power line poles from the existing telephone utility system to the airport. A telephone service will be provided via an conduit down the last pole and routed underground to a Network Interface Device (NID) on the terminal building. The telephone receptacles in the building will be fed directly from the NID in conduit.

The main distribution panel will be located in the electrical room along with the equipment used to power and control the airport taxiway and runway lighting and other equipment around the airport including the beacon, lighted wind cone, REILs, PAPIs, and runway/taxiway signs. All airport equipment requiring power will be fed from the main distribution panel.

Section 6.2.8, *Airport Lighting*, describes how the taxiway/runway lighting, beacon, wind cone, and runway/taxiway signs are fed power.

The PAPI and REIL navigational aids described in Section 6.2.9, *NAVAIDS*, will be powered from a step up transformer located in the electrical room. The transformer will step up the voltage from 240V to 7200V. This power will then be routed underground through a cable in conduit to the PAPIs and REILs at each end of the runway. A step down transformer will be located adjacent to the PAPIs on each end that will step the power down to 120/240V. This power will feed the PAPIs and be routed underground down to the REILs. Underground vaults will be placed along the conduit route to allow the cable to be pulled into the conduit and to allow drainage. The vaults will not have floors and will also have drainpipes routed out of the sides at the bottom of the vault. The drainpipes will be daylighted out of the embankment or into a ditch.

Fluorescent lighting will be provided in the office, waiting area, restrooms, maintenance closet and electrical room. General use receptacles will also be provided in these spaces along with a telephone outlet in the office and waiting room. A Metal Halide exterior light will be provided over each exterior door. A streetlight will be provided on an adjacent power pole to provide lighting for the parking area.

6.3.3 Hangars: Space for two hangars will be provided to accommodate single- or twin-engine piston airplanes (whether based or transient) should demand for such arise. This will require a footprint of at least 1,250 square feet and should be located along the parking apron.

6.3.4 Fuel Storage: It is likely that one of the operators at the airport will decide to construct facilities for aviation fuel. These will be in aboveground storage tanks.

6.3.5 Automobile Parking: Ten automobile parking spaces (8x12) should be constructed at the airport to meet peak demand. An area of 1,700 square feet should meet this space requirement as well as provide circulation within.

6.3.6 Ground Access: A two-lane secondary roadway will meet all access needs between the parking lot and the closest existing road system. The estimated length and location of each site's roadway is shown for the final study sites. The recommended roadway typical section of improvement is shown on the site access plans, as is the profile and general drainage.

6.3.7 Fixed Base Operator (FBO) Areas: An aircraft operator might choose to establish a small aircraft fueling and service facility in Angoon once the land-based airport has opened. However, the City of Angoon will not gain direct airport revenue from lease facilities.

6.3.8 Cargo Support Areas: No major cargo support areas are needed for this airport. However, a small shed may be provided for weather protection while processing cargo as well as doubling as an equipment storage area. Most likely, this would be provided by a carrier.

6.3.9 Maintenance Buildings: It is assumed that all maintenance equipment and supplies (including a snowplow and supplies of sand and gravel) would be stored in a shed on site.

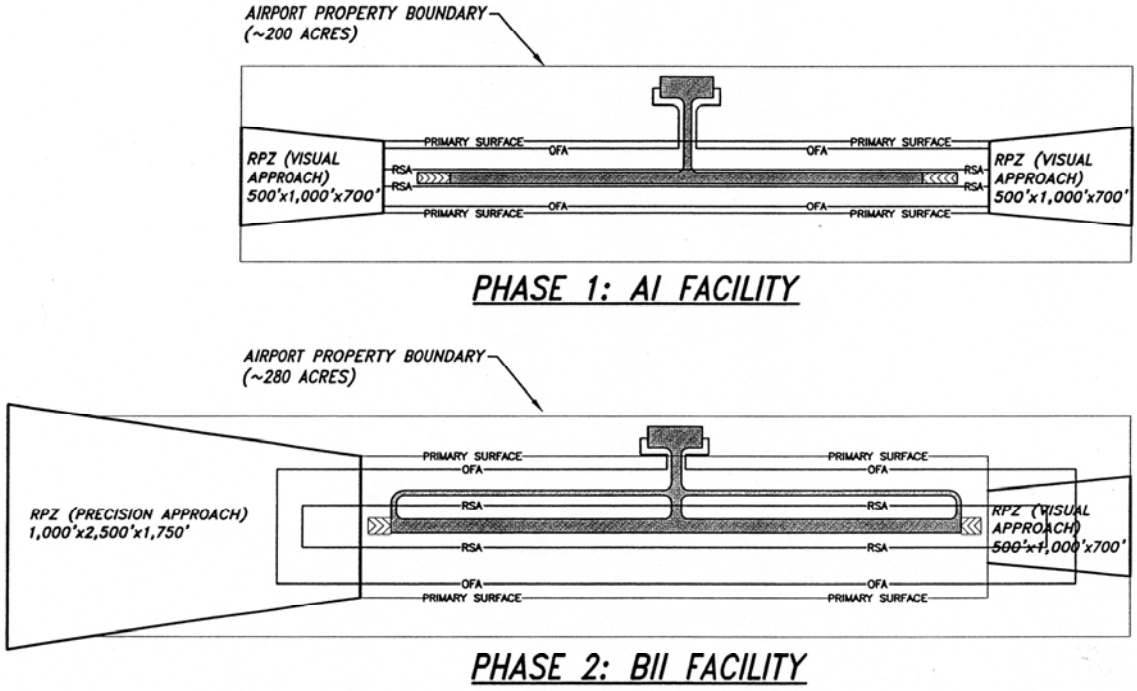
6.3.10 Air Rescue and Fire Fighting (ARFF): There are no ARFF requirements for small airports like that envisioned for Angoon. As growth occurs, a suitable airport site would be reserved for ARFF equipment, should the need arise.

6.3.11 Campground: A common activity at airports in locations similar to Angoon, is for pilots and passengers to camp underneath the wing of an aircraft. Some airports provide an area for this activity. These include rustic, gravel, or turf taxilanes and aircraft parking spots, fire pits, restrooms with showers, and other camping related facilities. Angoon should consider setting aside an area for this activity. This would be an inexpensive way to provide facilities as well as providing for possible increased transient and tourist air traffic.

6.4 Conceptual Template

Using the information set forth in this discussion, a prototypical facility layout was developed. Using this layout it can be deduced that a minimum of 200 acres of land will be needed to accommodate a new airport to serve Angoon. Figure 8 depicts the conceptual layout in two phases.

Figure 8 – Airport Template



DIVISION II – SITE ANALYSIS

7.0 AIRPORT SITES CONSIDERED

7.1 Past Sites

Outlined within the Executive Summary were the two previous DOT/PF studies. The 1982 study analyzed five sites presenting all to the community. After the community meeting presented strong concerns that selected sites were perpendicular to prevailing winds, additional wind studies were undertaken. Figure 2 and Table 19 reflects the initial study sites (1,2, 3, 4 and 5) and the brief summary of site rejection.

After further wind studies, a 1983 "revision" of the DOT/PF study was presented to the community. For access and cost reasons, DOT/PF preferred site 5A. The community preferred site 4A because it allowed growth. DOT/PF discontinued further advancement towards airport development until Angoon could agree that a community airport was needed. Such was expressed in a community positive vote during the fall 1998 municipal election.

The past and current study reports have the following sites in the same approximate location.

TABLE 19 – An Approximate Of This Study's Airport Sites Relative To The 1982/83 DOT/PF Study

THIS STUDY	1	2	3	4	5	6	6a	7	8	9
1982/83 STUDY	N/A	N/A	N/A	N/A	1	N/A	N/A	3 & 4	4a	5a

Two major differences between the 1982/83 and the current study are:

- Angoon has 3.25 (+) miles of additional road access to lands south-southeast of the communities landfill site.
- A 670-lot Kootznoowoo, Inc. shareholders residential subdivision was developed along the present road system and shorelines.

While the road development has opened available lands for further site considerations, the subdivision limits the availability of land.

7.2 Public Meeting

The DOT&PF and the R&M study team hosted a public meeting in Angoon on November 13, 2001 to:

a) review airport site evaluation work conducted over the last six months;
b) review our preliminary recommendation to eliminate six possible airport sites from further review; and
c) answer questions.

The team reviewed the site analysis and sequence of findings that led to narrowing possible airport sites down to two general areas (site 5/6/6A and site 3/4). We discussed the fact that instrumentation will be erected soon to gather wind direction and intensity data 24 hours a day, seven days a week, from (probably) the two general areas noted above for a period of at least six months. This will confirm the accuracy of earlier wind studies and the suitability (or unsuitability) of the various sites. It will also provide data to assist with airport runway layout and more detailed cost estimating that will occur with this study and as the Airport Master Plan/Environmental Documentation is prepared (2002-2004).

Barbara Sheinberg and Mark Morris listen to public participation on 11/13/01.

Residents were asked:

- Do you agree with the rationale to eliminate sites 1, 2, 5, 7, 8, and 9 from further consideration? (At the Nov. 13, public meeting in Angoon residents requested that site 5 remain a possible site in case wind patterns turn out different than expected and support this runway orientation.)

- If all other factors end up being about equal, do sites 6/6A and 3/4 both seem acceptable?

- At this time, does one of these areas (6/6A or 3/4) seem preferable? If so, what are your reasons or concerns?

- Provide any local knowledge about land use or environmental conditions, or other comments.

Residents had the following comments at the November 13, 2001, public meeting.

General

- Concern was expressed that recent wind data has not been gathered and analyzed. Residents want empirical, objective wind data and study. It was suggested that the State/team consider establishing an "observation protocol" and getting a resident to systematically assist with wind and fog observations as wind data is gathered.

- Residents have observed that there is more fog inland, less fog the closer you go to Chatham.

- It is important to clarify what Public Health's intentions are regarding the landfill. This could influence the airport location.

- If future wind study and analysis shows it is feasible, some find land use and planning advantages at site 5.

- The USFS wondered if it was too early to eliminate sites 8 and 9 from consideration. There was discussion about the rationale for eliminating these sites, based on multiple reasons: closeness to town, to already built homesites, to planned residential growth, for closeness to landfill, and for site 8 for conflicts with zoning and Angoon CMP designations for park and development of cultural site.

Sites 6, 6A

- If site 6 or 6A is selected, concern was expressed over people losing their homesites. A suggestion was made to poll each affected lot owner to determine their interests. A possible option is for Kootznoowoo to trade these lots and give shareholders a different lot. The DOT&PF Right-of-way staff noted that State would be very reluctant to "take" possession of lots if community was not in favor and if lot owners did not agree.

- It was suggested that a survey of residents and of students (future generation) about the sites would be beneficial. At the same time, landowners of homesites that might be affected could be surveyed.

- For sites 6 or 6A, electricity will be provided by city power lines that would be extended as needed. For sites 3 and 4, electricity is likely to be a generator, but power could eventually be extended along the access road if maintenance and operation costs for generators proved too expensive. A resident asked about putting a submerged power cable across the head of Favorite Bay to get to sites 3 or 4. This was considered, but a road would be needed to maintain the power line, and that would be very expensive to build under that scenario.

Sites 3, and 4

- The BIA may have road, *and especially* bridge, funding available. Residents noted that it is generally skiff traffic, not large fishing vessels that enter upper Favorite Bay. Those in attendance did not object to the concept of restricting large boat traffic in and out of Favorite Bay.

- Commercial development could not take place adjacent to airport land within the Monument.

- The USFS notes it is supportive of airport development and possible location on Monument, but warns that Title XI and land purchase/swap process would probably take two to five years. Residents are concerned with the extra time the Title XI process and land acquisition could take.

- Some noted that it would be a long drive to the airport at sites 3 or 4. This could especially be a concern during emergencies. Others noted that whether 5-6 miles is a "long" distance is relative. Some expressed an interest in having more of a road system to drive and "get out."

- There was discussion about how much air traffic there would be during the hunting season, and a concern that sites 3 and 4 may be too close to community subsistence resources, and that increased access (more flights by outsiders, a road) would put pressure on the resource. Other residents expressed an opinion that the access road to these sites would benefit their subsistence hunting.

  Related discussion was about the community's ability to restrict access, lease lots, etc. to residents only due to concern over increased hunting and fishing guides and visitation causing more pressure on local resources. However, a public facility built with public money on public land must be available to all on an equal basis – one cannot restrict who lots are leased to. It was noted that many communities in Southeast are dealing with outside pressure on their resources and visitation and figuring out what is the "right" mix/amount for their community. There are other tools (planning, zoning, permits, marketing, taxation, work on cooperative plans with USFS) to help Angoon control where activities happen, who owns them and who profits from them.

  Some residents commented that Angoon needs an airport for health and safety reasons --- Angoon will get hunters and fishers regardless --- not having an airport won't help that situation.

7.3 Current Study Sites 1 Through 9

As expressed in Division I, the current sites were derived from a public meeting held in Angoon on 1/24/01. Nine sites were recommended by the citizens. One site, site 6, was "shifted" to include site 6A, which now aligns with the known prevailing winds. The

following is a brief description of the nine sites community members felt a review and/or investigation should be considered.

Sites favored for final study by community members as expressed during public meeting were; 3, 4, 5, 6 and 6A. Because of wind orientation, site 5 was recommended to be dropped by the study teams and concurred with by the majority of those at the final public meeting

SITE 1: A 5,500-foot long by 1,000-foot wide island located 4,000 feet east, northeast of Angoon's City Center. No current access to the site exists. The site direction is NE/SW.

SITE 2: A 2,000-foot wide by 10,000-foot long island located 9,000 feet southeasterly from Angoon' City Center. The island is forested, lies NW to SE and is currently accessible by marine vessel only.

SITE 3: This site is located "mostly" within the Admiralty Island Monument and is approximately 3 miles S-SE of Angoon's City Center. The site is on the northeasterly side of Favorite Bay. The site is adjacent an unnamed lake. The site is not connected to the community's road system. The land is generally forested wetlands with isolated muskeg areas.

SITE 4: This site is 1.5 miles S-S.E. of site 3 and 4.8 miles S.-S.E. of Angoon's Community Center. The site is presently roadless, a forest wetlands that partly (safety area) must cover a small lake. It is located near the base of a hillside leading to a mountainside.

SITE 5: Site 5 is located 5 miles S.E. of Angoon's Community Center and the east side of Chatham Straits. The site is south of Auk'Tah Lake and does not have road access. The site runs in a NW-SE direction.

SITE 6 & 6A: Site 6 was selected by community members and 6A re-orients the site to the presently known prevailing winds. Both sites are at the end of the Auk'Tah Lake Road system. Both sides will require road re-location and the acquisitions of subdivided lots of the Kootznoowoo Corporation shareholders subdivision and un-developed lands owned by said corporation.

SITE 7: Site 7 is located in the approximate center of the Admiralty Island Peninsula that Angoon is located on. This site is 2.5 miles southeasterly from the community center and is located "between" subdivision lands, off of the road system and inland from Chatham Straits shoreline. The runway runs NW-SE and is common to sites 3-4 of the 1982/83 study. The terrain is rolling forested wetlands.

SITE 8: Site 8 is located E.S.E. of the ferry across roadway and is 2 miles south of the community center. The site is on rolling forested wetlands adjacent a salt chuck lake. The site is oriented north-south. It is "generally" common to site 4A, save the community desired orientation. This site is forested wetlands. It is also immediately east of Angoon's landfill which "may" be relocated.

SITE 9: Site 9 is south and west of Angoon's ferry access road and is common to site 5A of the 1983 DOT/PF study. The terrain is rolling, forested wetlands. Its extremes (outside lands) "take" subdivision lands. The site is located 1.2 miles south of the community center. All community infrastructure is available at this site, save wastewater.

8.0 AREA GEOLOGY/CLIMATE

8.1 Site Locations, Topography, Vegetation, Soils and Geology

Location

Angoon, Alaska is located on the west side of Admiralty Island, approximately 55 airmiles southwest of Juneau, and approximately 40 airmiles northeast of Sitka (See Regional Map, Figure 1, Division I).

The community of Angoon is situated at the northwest tip of a peninsula that is bounded on the northeast by Favorite Bay and Kootznahoo Inlet, and Chatham Straits to the southeast (See Location Map, Figure 2, Division I).

Topography and Vegetation

The area surrounding Angoon can be considered a relatively flat, gently rolling, muskeg terrain. The area is typified by stands of timber with dense underbrush and numerous open muskeg hollows. Drainage within the area is relatively poor.

The maximum elevation within the study area rarely exceeds 200 feet.

General Geology

The geology of the study area can be divided into two groups. The first being the geology of the soils found in the area, and the second the geology of the underlying bedrock.

Soils

The following soils information has been adopted from the United States Forest Service soil and Hydrologic Management Report for the Angoon area (see references) as well as other published reports.

Two basic types of soils are encountered with the study area.

Inorganic Soils

Generally, these soils are found on benches, moderate side slopes and in ravines. The vegetation on these soils is predominately stands of western Hemlock and Sitka Spruce. Typically, these soils consist of an organic mat of approximately 6 inches in depth, which is underlain by 1 to 5 feet of silty or sandy gravel. Beneath this gravelly soil is a layer of dense glacial till over bedrock. Bedrock is encountered in most cases between 2 to 4 feet, although isolated areas of deeper soil exist.

Billings and Bishop (1971) stated that the majority of the soils within their study area (as with most natural soils) have a tendency to have a "quick" nature to them (i.e. soil is stable in place, but once the soil has been disturbed, they loose certain engineering properties).

Peat

Three major types of peat exist within the study area. They are:

- Type 1 – (Kina and Kogish Peat)

These peats occur throughout the study area, as small isolated areas within other inorganic soil groups. The vegetation on these soils is predominately sparce Mountain Hemlock and stunted Alaska Cedar. Depth of these peats over inorganic soil or bedrock is between 5 to 10 feet.

The engineering properties of these peats include high consolidation, high moisture content, and relatively low strength properties.

Generally, the water table is at the ground surface.

- Type 2 – (Staney Peat)

These peats have very limited distribution within the study area. Only three isolated deposits have been identified by Billings and Bishop, and comprise less than 5% of the total area.

The vegetation on these soils is typically grasses void of trees.

Depth of these peats to inorganic soil or bedrock is in excess of 15 feet.

The engineering properties of this peat are very poor. The soil exhibits very low strength properties, high moisture content and high consolidation. The water table is generally at the ground surface, but during certain times of the year these areas may be flooded.

- Type 3 – (Kina and Maybeso Peats)

This particular soil has a wide distribution, and by far is the most common organic soil encountered within the study area.

Vegetation on these soils is typically scrub cedar and sparse western hemlock.

Depth to inorganic soil or bedrock varies between 2 to 10 feet.

The engineering properties of the Type 3 peats are similar to that of the Type 1 peats.

Bedrock

The rock that underlies the study area are the schists and marbles of the Gambier Bay Formation.

Schists and some lesser phyllites outcrop along the shore of Killisnoo Harbor, approximately 2 miles south of Angoon. Typically, the schists can vary between a chlorite-albite schist to a quartz-muscovite schist.

No outcrops of this particular rock type were examined during the field reconnaissance.

The most predominate rock type within the study area is a thin to thick bedded, medium gray, fine to medium grained marble. Exposures of this rock type along the west and southwest shore of Favorite Bay appear to be sheared. The marble generally strikes to the northwest and dips steeply to the northeast.

A grab sample was taken from a small road side cut, and tested at the Southeast Region's Materials Lab to determine the engineering properties of the rock. The results of this testing indicated that the material had a LA Abrasion loss of 26% (50% max) and Degradation Value of 47(40-45 Min.).

8.2 Climate

Angoon is located in the center-north portion of Alaska's Alexandra Archipelago.

The climate of Angoon, as with the majority of Southeast Alaska, is a moist maritime, with typically mild winters and cool summers.

A brief summary of pertinent climate information is listed below:

Mean Annual Temp:	+42°F
Coldest Month – January	+27°F
Warmest Month – July	+56°F
Temperature Range:	+21°F to 62°F
Average Annual Precipitation:	+44.8 inches
Mean Annual Snowfall:	63 inches

As can be seen by the above, the average annual precipitation for Angoon is one of the lowest in Southeast Alaska.

9.0 WIND STUDIES

9.1 Past

The most accurate wind records for Angoon are those of the NOAA/National Weather Service. Records were maintained by NOAA from (+/-) 1950 to 1982 through a system of volunteers, contract employees and automation.

Wind meter & solar panel with computer at Site 3.

M. Morris , P.E. downloads wind data at Site 3.

Initial wind observation for the previous 1982 DOT/PF study found Angoon's wind to align with Favorite Bay's NW/SE direction. This direction is the principal seaplane landing zone, which in all probability, greatly influenced the study. At the public presentation of the 1982 study, community members disagreed with these findings. DOT/PF listened and installed a project wind meter. These findings were presented in the 1983 "final" report. The new data generally agreed with NOAA/NWS wind data. The sum of both is expressed by Figure 3, Division 1.

9.2 This Study's Wind Data

This work has summarized NOAA/NWS wind records from previous to 1982 including some FAA and DOT/PF data to current time, as expressed in Figure 3, Division 1. In addition, after initial site analysis, it was decided in June 2002 to install wind recording gauges at two sites. They were installed near Site 3 and easterly of site 6A. Davis Weather Wizard III, units were placed in the top of 80' to 100' spruce trees in August 2002. At the supplier's specifications, the trees in which the units were placed were "guyed" to prevent unwanted movement, which could mislead direction results. Since that time, and except for some intermediate (unit) computer failures, the units have been recording wind speed/direction, temperature and rainfall since installation.

FAA required six months of continuous wind data collection. This data was to be compared with historic data collection to confirm early study runway alignments. Because of the site's remoteness, the Davis Weather Wizard III units were chosen. Solar electrical panels were installed at sites 3 and 6A. The reliability of the units internal computers, ample continuous sunlight, the freezing of Favorite Bay, cold temperatures and long periods of fog all entered into the data collections continual operations. For all of the above reasons, data was collected either partially, or totally for periods of six months in 2002 and seven months during 2003.

The resulting data reflected that for Site 3, the historic and new wind collection substantially agreed. Our runway alignment is with the prevailing winds. For Site 6A, the prevailing winds slightly favored the alignment of Site 6. This may be due to the influence of slight cross-winds within Favorite Bay.

The prevailing winds are Northeast-Southwest (NE-SW).

9.3 Topography and Wind Interaction & Effect

As known, topography can substantially affect wind. Such an effect will occur at Site 4 due to the hills and mountains to the east. For this reason, as well as local pilot(s) recommendations, site 3 was chosen over site 4 for continued wind direction and other analysis. The wind gauge for site 3 was installed E.S.E. of the south end of the site which also will aid the analysis of wind drafts caused by hill and mountainsides further to the east.

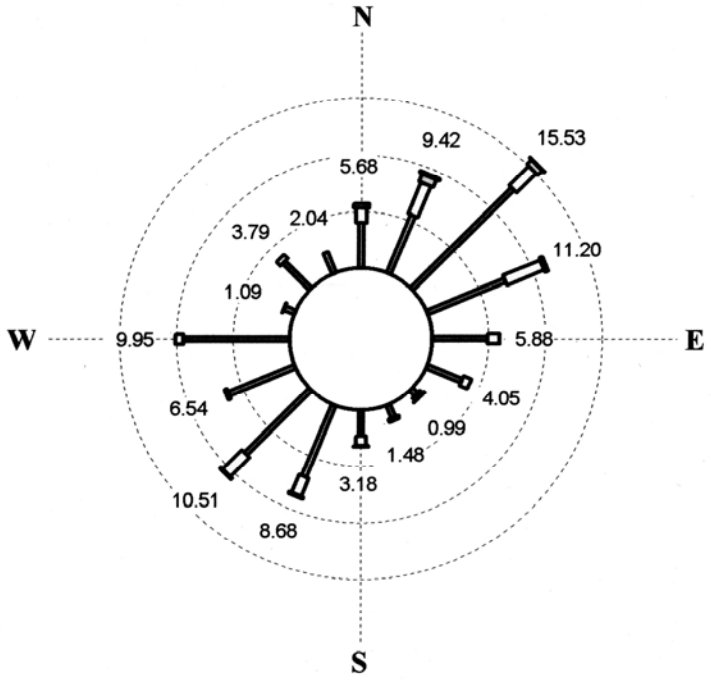
Site 6A is located in relatively flat to rolling terrain with a hill at its N.E. end. This hill will cause some minor (we believe) downdraft effects. The wind gauge at this site was again placed to the east of the north end of the site to account for these effects.

The following graphic presentations represent the wind rose summary for Wind Meter "Angoon One" (east of site 6A) and Wind Meter "Angoon Two" (west of site 3). Angoon Two is on the northeasterly side of Favorite Bay.

During both winters of 2002/2003 and 2003/2004, we experienced long periods of Favorite Bay to be iced over and not accessible by boat.

Angoon One Average Wind Speed Rose Diagram
Site Six/Six A - East Side / North End

Study Record Period Summary: Parts of 6/7/8/9/2002; 11/12/2002; 1/3/5/7/8/9/10/11/2003.



Calms excluded.
Rings drawn at 5% intervals.
Wind flow is FROM the directions shown.
No observations were missing.

PERCENT OCCURRENCE: Wind Speed (Miles Per Hour)
LOWER BOUND OF CATEGORY

DIR	0.1	3.5	6.9	11.5	18.4	24.2
N	4.00	1.32	0.36	0.00	0.00	0.00
NNE	5.55	3.00	0.71	0.15	0.00	0.00
NE	12.47	2.39	0.59	0.08	0.00	0.00
ENE	7.38	3.49	0.33	0.00	0.00	0.00
E	4.81	1.07	0.00	0.00	0.00	0.00
ESE	3.31	0.74	0.00	0.00	0.00	0.00
SE	0.64	0.31	0.05	0.00	0.00	0.00
SSE	1.20	0.28	0.00	0.00	0.00	0.00

TOTAL OBS = 6352 MISSING OBS = 0

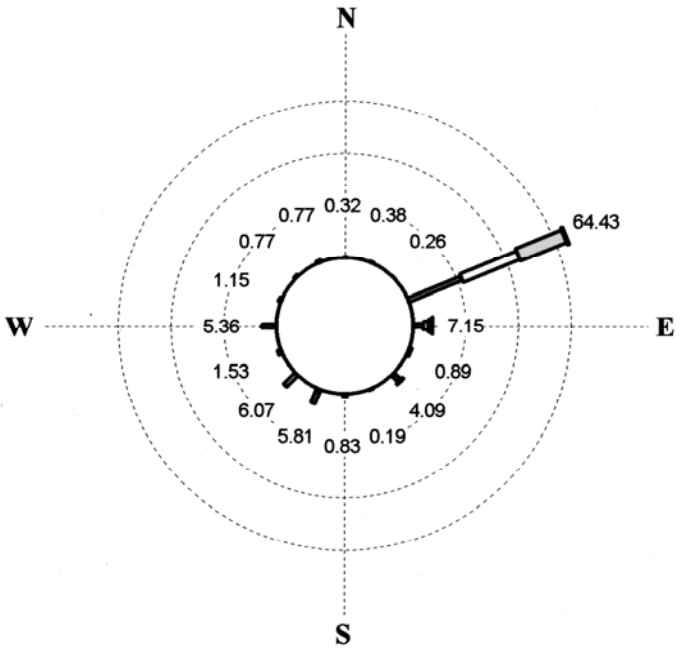
PERCENT OCCURRENCE: Wind Speed (Miles Per Hour)
LOWER BOUND OF CATEGORY

DIR	0.1	3.5	6.9	11.5	18.4	24.2
S	2.24	0.84	0.10	0.00	0.00	0.00
SSW	6.82	1.71	0.15	0.00	0.00	0.00
SW	7.99	2.34	0.18	0.00	0.00	0.00
WSW	6.29	0.25	0.00	0.00	0.00	0.00
W	9.29	0.66	0.00	0.00	0.00	0.00
WNW	1.04	0.05	0.00	0.00	0.00	0.00
NW	3.33	0.46	0.00	0.00	0.00	0.00
NNW	2.01	0.03	0.00	0.00	0.00	0.00

CALM OBS = 2423

Angoon Two Average Speed Wind Rose Diagram
Site Three - South End

Study Record Period Summary: Parts or all of 6/7/8/9/11/12/2002;
3/5/7/8/9/10/11/2003.



Calms excluded.
Rings drawn at 20% intervals.
Wind flow is FROM the directions shown.
No observations were missing.

PERCENT OCCURRENCE: Wind Speed (Miles Per Hour)
LOWER BOUND OF CATEGORY

DIR	0.1	3.5	6.9	11.5	18.4	24.2
N	0.32	0.00	0.00	0.00	0.00	0.00
NNE	0.38	0.00	0.00	0.00	0.00	0.00
NE	0.26	0.00	0.00	0.00	0.00	0.00
ENE	21.65	23.12	18.97	0.70	0.00	0.00
E	3.70	1.92	1.21	0.32	0.00	0.00
ESE	0.64	0.26	0.00	0.00	0.00	0.00
SE	3.51	0.57	0.00	0.00	0.00	0.00
SSE	0.13	0.06	0.00	0.00	0.00	0.00

TOTAL OBS = 6781 MISSING OBS = 0

PERCENT OCCURRENCE: Wind Speed (Miles Per Hour)
LOWER BOUND OF CATEGORY

DIR	0.1	3.5	6.9	11.5	18.4	24.2
S	0.83	0.00	0.00	0.00	0.00	0.00
SSW	5.81	0.00	0.00	0.00	0.00	0.00
SW	6.00	0.06	0.00	0.00	0.00	0.00
WSW	1.53	0.00	0.00	0.00	0.00	0.00
W	5.36	0.00	0.00	0.00	0.00	0.00
WNW	1.15	0.00	0.00	0.00	0.00	0.00
NW	0.77	0.00	0.00	0.00	0.00	0.00
NNW	0.77	0.00	0.00	0.00	0.00	0.00

CALM OBS = 5215

10.0 LAND OWNERSHIP AND USE

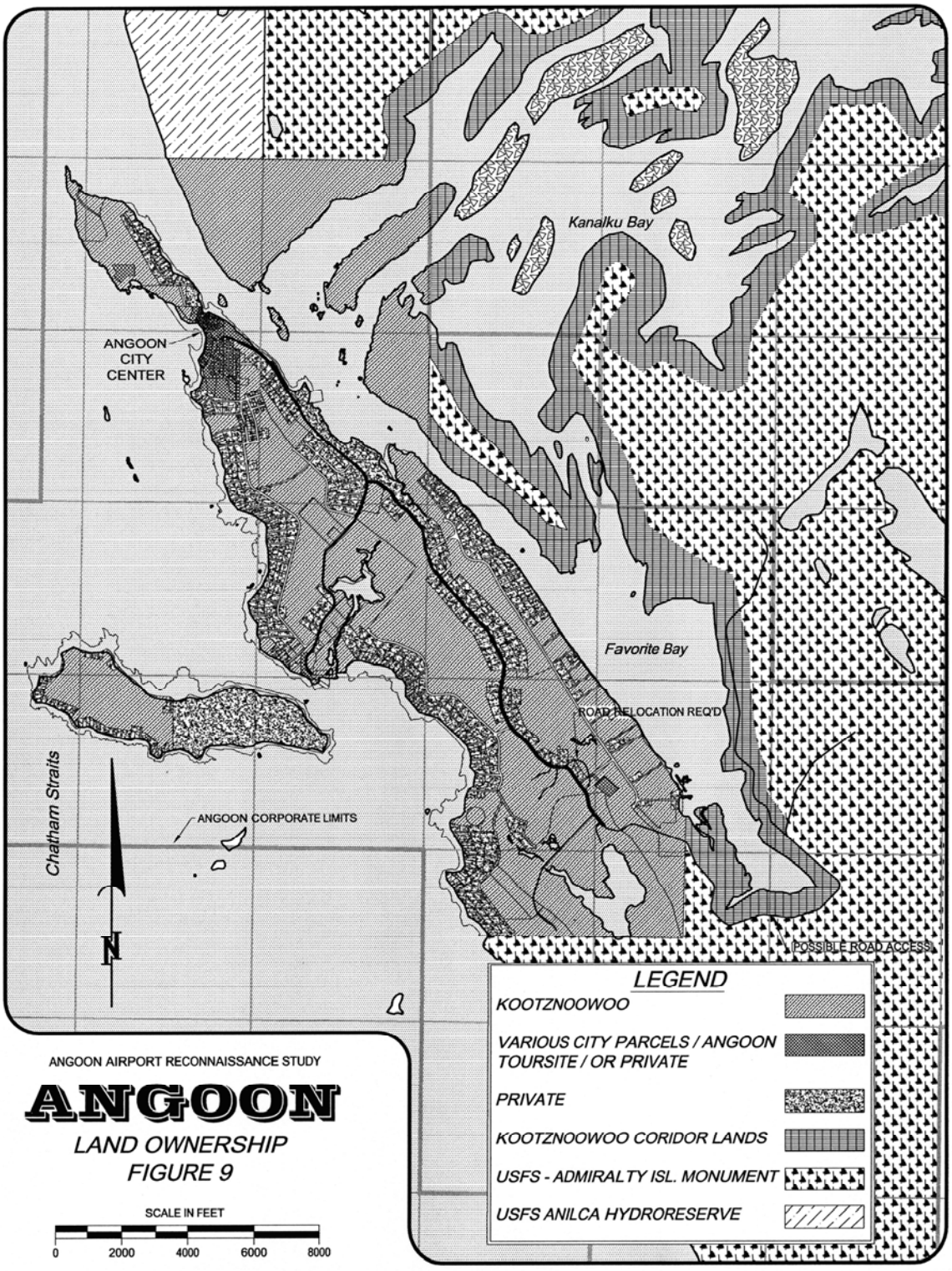
10.1 Land Ownership

Generalized land ownership is shown on Figure 9. There are three major landowners in the study area and many minor property owners.

The three major landowners are:

- The City of Angoon
- The U.S.D.A./Forest Service
- Kootznoowoo Corporation, Inc.

The minor landowners are the many shareholders of Kootznoowoo Corporation, Inc. They own tracts of land, generally 1.5 acres in size or smaller, in the general area of site 6, 6A, 7 and 8. The Forest Service and Kootznoowoo Corporation, Inc. own all of the land for sites 3 and 4, with the Forest Service being the larger landowner.


Kanalku Bay
ANGOON CITY CENTER
Favorite Bay
ROAD RELOCATION REQ'D
Chatham Straits
ANGOON CORPORATE LIMITS
N
POSSIBLE ROAD ACCESS
LEGEND
KOOTZNOOWOO
VARIOUS CITY PARCELS / ANGOON TOURSITE / OR PRIVATE
PRIVATE
KOOTZNOOWOO CORIDOR LANDS
USFS - ADMIRALTY ISL. MONUMENT
USFS ANILCA HYDRORESERVE
ANGOON AIRPORT RECONNAISSANCE STUDY
ANGOON
LAND OWNERSHIP
FIGURE 9
SCALE IN FEET
0
2000
4000
6000
8000

10.1.1 City of Angoon

The City of Angoon was incorporated as a fourth-class city in 1963, and reclassified as a second class city in 1972. Angoon is not part of an organized borough, although forming a borough is currently under study. City land ownership is not documented in one source. At a minimum, the City owns portions of the former Federal Townsite, approximately 37 (+) acres (U.S.S. No. 1567), the cemetery, land under City Hall, Angoon sewage and water treatment facilities, and the "BIA", Auk'Tah Road.

10.1.1.1 Corporate (City) Boundary

The City of Angoon's boundary is much larger than just the Angoon townsite (Figure 9). Within the City's boundary is land owned and managed by various private parties, Kootznoowoo Corporation, the City, Angoon Community Association, the State of Alaska, and the U.S. Forest Service (Admiralty Island National Monument).

10.1.2 Kootznoowoo Corporation Land

Land owned by Kootznoowoo Corporation, Inc. is shown by Figure 9. All airport sites are on land that is either entirely or partially owned by Kootznoowoo Corporation, Inc.

The Kootznoowoo (Village) Corporation was established in 1971 with the enactment of ANCSA. The Corporation currently serves approximately 860 shareholders, of which, about 37 percent are Angoon residents. Under ANCSA, Kootznoowoo is entitled to select 23,040 acres of surface estate from the federal government. The Tlingit of Angoon chose not to select land, or harvest timber in the Angoon area in order to protect their subsistence way of life. There were three village corporations and one regional corporation initially planning to select land under ANCSA and harvest timber in the area surrounding Angoon. The Angoon people felt that this logging activity would have negatively affected subsistence resources for generations to come. Consequently there was strong local support and much effort towards the designation of the Admiralty Island National Wilderness Monument. In addition, most of Kootznoowoo Corporation's land selections were made on Prince of Wales Island in southern Southeast Alaska, quite distant from Angoon.

Thus, in contrast to most village corporations, which have tens of thousands of acres of surface estate near their villages, Kootznoowoo Corporation only selected approximately 3,440 acres of surface land in the Angoon area.

In 1997, Kootznoowoo Corporation completed a homesite program under Section 1407 of the Alaska National Interest Land Conservation Act (ANILCA). Approximately 630 homesites, comprising about 663 acres, were created around the City of Angoon. Deeds were issued to shareholders in March 1997. The homesite program reduced the amount of surface estate the Corporation has in the Angoon area to approximately 2,778 acres (their original 3,440 ANCSA acres, minus the 663 acres used for homesites). The Corporation's land in the Angoon area will be further reduced as 14(c)1,2 and 3 reconveyances are deeded to the City of Angoon.

In addition to the above 2,778 acres, ANILCA [Section 506(c)] established a 660-foot wide corridor along all shore lands in Mitchell, Kanalku and Favorite Bays that Kootznoowoo owns (see section 10.2.6 of this report for more information). These "corridor lands" are also depicted on Figure 9.

10.1.3 Private Land

Most land parcels in the City of Angoon, and all the residential shareholder lots, are privately owned. Figure 9 generalizes land ownership in the city (townsite survey), and also depicts the privately owned residential homesite and other lots.

Airport development at sites 5, 6, 6A, 7, 8 and 9 will all require some type of land acquisition or purchase (few to many depending upon the site).

10.1.4 Tongass National Forest Land

Most of Admiralty Island is Federally owned and managed by the U.S.D.A. Forest Service, as part of the Tongass National Forest, ***Admiralty Island National Monument***. Federally owned and managed land is depicted on Figure 9. Most of airport sites 3, 4 and 5 are on federal land. The Forest Service has commented that it prefers to exchange or sell land, rather than subject it to long-term lease, if development such as an airport occurs.

10.2 Current and Planned Land Use

10.2.1 Land Use – General

Desired land uses and activities in Angoon are set out in the *Angoon Comprehensive Plan (1976)*, *City of Angoon Land Use Plan (1982)*, *Angoon Coastal Management Program (1990)*, and *Mitchell-Hood-Chaik-Whitewater Bays Area Meriting Special Attention (AMSA) Plan (1992).* Desired growth and land use set out in these documents is implemented through the City of Angoon's Zoning Regulations and Land Use Map (Angoon Municipal Code, Title 18) and through the enforceable policies of the Angoon Coastal Management Program and AMSA plans. Other important land use information is in the *Kootznoowoo/City of Angoon draft 14c(3) plan (1997)* and City of Angoon/Alaska Native Tribal Health Consortium *Landfill Site Selection & Regional Disposal Options document (2001).*

A review of Angoon planning documents reveals that there are inconsistencies between the City's zoning code and its zoning map. These probably originate from the time the code was updated and converted from Title 11 to Title 18, but no changes were made to the City's Zoning Map.

When all the planning documents are reviewed, some common themes emerge:

1) care to allocate land for residential use, a mix of residential, commercial, and rural residential uses;
2) subsistence harvest and gathering activities are important on and in most area lands and waters;
3) a waterfront overlay requires a 50-foot development setback along the shoreline from the mean high water line;

4) park and recreation uses are intended around the Salt Chuck;
5) commercial-light industrial uses are allowed at the ferry terminal area; and
6) a new or redeveloped landfill is a recognized need.

10.2.1.1 Airport Sites and Angoon's Land Code

An airport is discussed as part of the Community Facilities section of the 1982 City of Angoon Land Use Plan. The Plan notes that considerations for an airport include, "the possible impact on important subsistence areas and future growth areas [and that where the airport is located] will influence the kind of development that can occur on adjacent lands. All land uses must be carefully considered when deciding if and where to develop an airport (pg 16)."

Current land use in Angoon that must be considered as part of airport sites evaluation includes the proximity of the townsite to airport sites 8 and 9; the presence of residential development within 1,000-3,000 feet from airport sites 8 and 9; and only 1,000 feet, or less, separation between airport sites 8 and 9 and the current landfill.

10.2.2 Land Use – Landfill

The City of Angoon is evaluating alternatives for improving solid waste disposal operations. Concerns with the current 7.13 acre land fill site, operated since the 1960's, are that it is close to town, bears frequent the land fill, it is unsightly and highly visible to everyone, and is close to residential properties. The City and the Alaska Native Tribal Health Consortium identified six feasible alternatives in an August 2001 study, Landfill Site Selection & Regional Disposal Options.

Location of Angoon's landfill is a consideration in airport site selection. The U.S. Environmental Protection Agency, at 40 CFR Part 258.10(a), states that,

> "Owners or operators of new Municipal Solid Waste Landfill (MSWLF) units, existing MSWLF units, and lateral expansions that are located within 10,000 feet (3,048 meters) of any airport runway end used by turbojet aircraft or within 5,000 feet (1,524 meters) of any airport runway end used by only piston-type aircraft must demonstrate that the units are designed and operated so that the MSWLF unit does not pose a bird hazard to aircraft." (underlining added)

The Landfill Site Selection & Regional Disposal Options report notes (pg 6), "A transfer station or an incinerator may be allowed less than 5,000 ft away from an airstrip if appropriate bird control measures are provided."

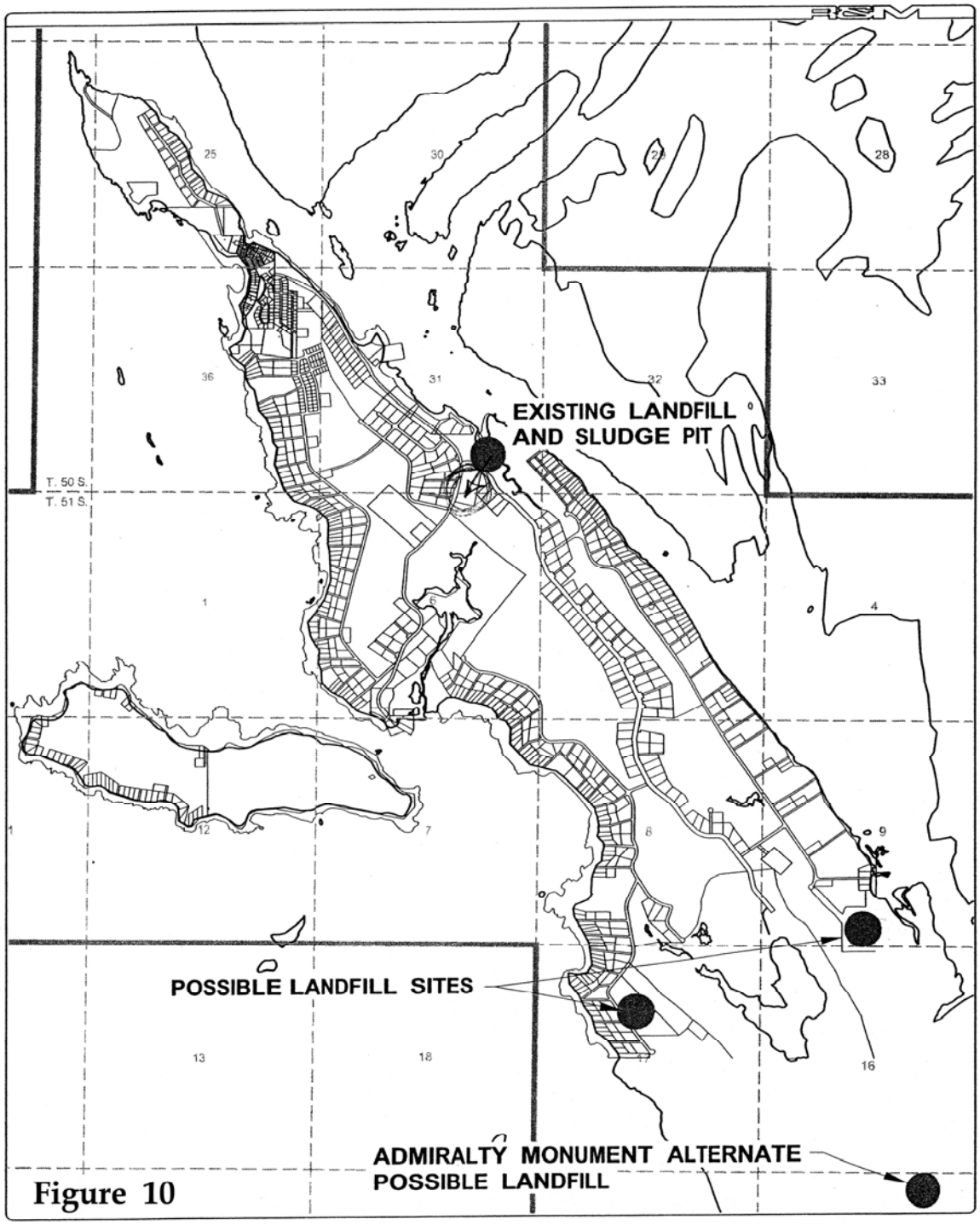
The feasible solid waste alternatives identified for Angoon, with a 5,000' radius drawn around each, are depicted in Figure 10. The sites, with associated construction and operating costs, are:

Table 20
Feasible Angoon Landfill Options

Option	Site	Construction Cost	Operating Cost	Within 5,000 feet of airport site
1	New Landfill at draft 14c3 selection No. 17	$1,150,000	$23.93/mo/home	6, 6A, 5
2	New Landfill at Admiralty Monument site	$1,475,000	$23.93/mo/home	5
3	Improved landfill at existing site	$610,000	$20.82/mo/home	8,9,7,2
4	Transfer station without a baler at existing site	$1,000,000	$64.79/mo/home	8,9,7,2
5	Transfer station with a baler at existing site	$1,510,000	$51.79/mo/home	8,9,7,2
6	Single stage incinerator at the existing site	Not reported		

Source: Landfill Site Selection & Regional Disposal Options, City of Angoon and Alaska Native Tribal Health Consortium, August 2001

The airport must either be further than 5,000 feet from the landfill or ensure an effective bird hazard control program is in place.



Alaska Native Health Consortium Proposed Landfill Sites

10.2.3 Land Use - Residential

Virtually all the privately-owned land (Figure 9) outside the townsite are residential lots, most of which were given by Kootznoowoo Corporation to its shareholders in 1997. The residential lots immediately adjacent developed roads are beginning to be developed. There is high interest in developing roads in dedicated Right-of-Ways (R/W) to provide access to other residential subdivisions. Portions of airport sites 6, 6A, 8, and 9 overlap with privately owned residential lots. Private lands within these sites will have to be acquired by DOT&PF to enable airport development.

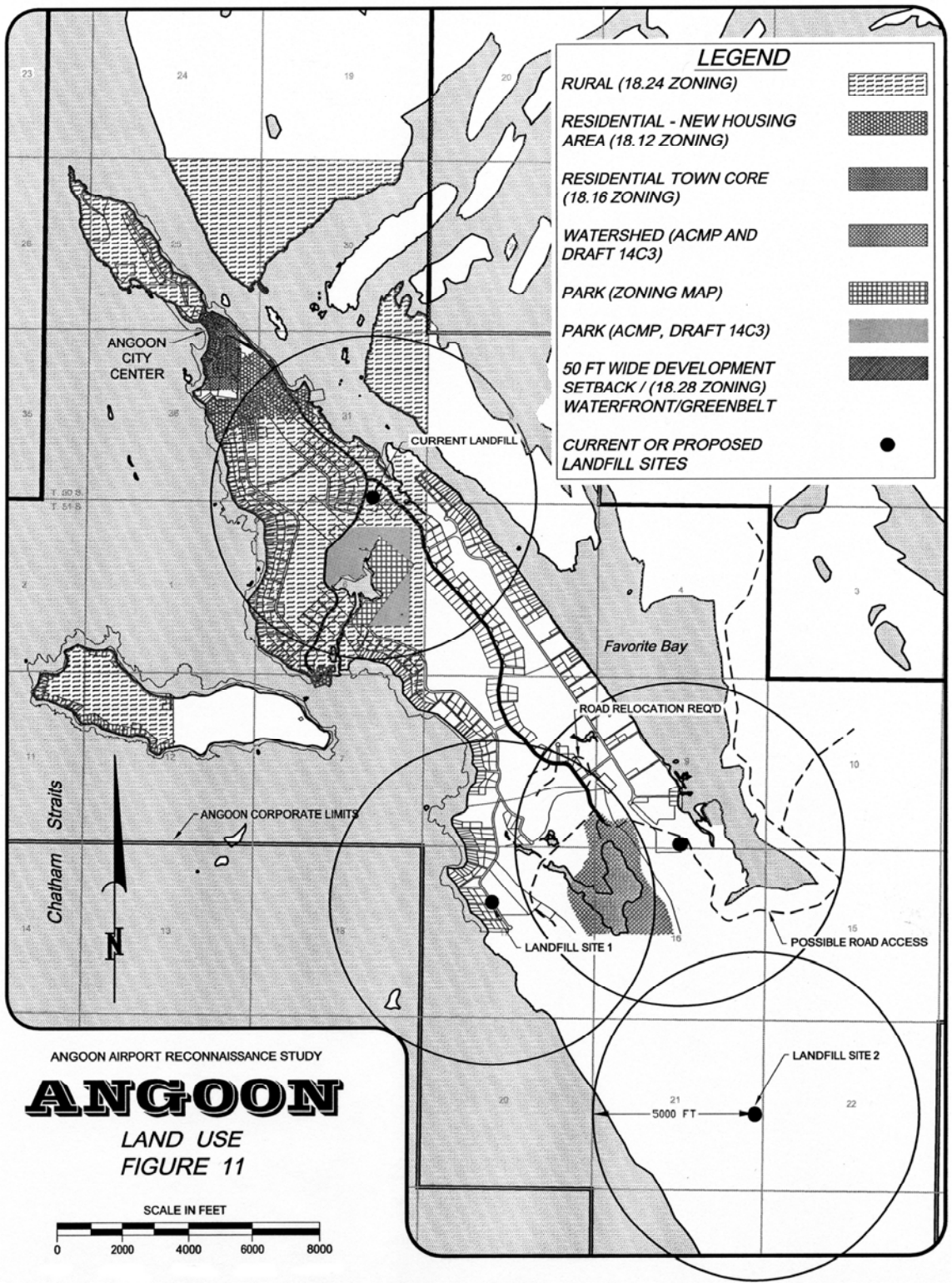
10.2.4 Zoning

Angoon zoning is codified at Angoon Municipal Code, Title 18. There are five zoning districts:

18.12 Residential Zone – New Housing Area (formerly 11.03.03)
18.16 Residential Zone – Town Core (formerly 11.03.04)
18.20 Residential Zone – Town Core – Historic District Preservation Overlay
18.24 Rural Zone (formerly 11.03.06)
18.28 Rural Zone – Waterfront Development Overlay (possibly related to former 11.03.10 or .07)

Only a small part of the land base within the Angoon Corporate boundary has been zoned (see Figure 9). Zoning only exists around airport sites 8 and 9. There is no zoning where airport sites 2, 3, 4, 5, 6, 6A, or 7 are located.

Airport Sites 8 and 9 are in areas zoned Rural, whose purpose is limited large lot residential development and subsistence use, in addition to related resource industry conditional uses. Permitted uses in the Rural Zoning District are single-family dwellings, subsistence, cemetery, helicopter landing area and firewood gathering. A variety of commercial and industrial uses may be conditionally allowed. An airport is not one of the stated uses that may be granted a conditional use. It is not clear from reviewing the code if one may apply for a conditional use that is not explicitly stated. Airport Site 8 is also in an area that the zoning map designates as a Park, although this is not reflected in the zoning code. The Angoon Coastal Management Plan also designates a Park in the same area (see next section).


LEGEND
RURAL (18.24 ZONING)
RESIDENTIAL - NEW HOUSING AREA (18.12 ZONING)
RESIDENTIAL TOWN CORE (18.16 ZONING)
WATERSHED (ACMP AND DRAFT 14C3)
PARK (ZONING MAP)
PARK (ACMP, DRAFT 14C3)
50 FT WIDE DEVELOPMENT SETBACK / (18.28 ZONING) WATERFRONT/GREENBELT
CURRENT OR PROPOSED LANDFILL SITES
ANGOON CITY CENTER
CURRENT LANDFILL
Favorite Bay
ROAD RELOCATION REQ'D
ANGOON CORPORATE LIMITS
Chatham Straits
N
LANDFILL SITE 1
POSSIBLE ROAD ACCESS
LANDFILL SITE 2
5000 FT
ANGOON AIRPORT RECONNAISSANCE STUDY
ANGOON
LAND USE
FIGURE 11
SCALE IN FEET
0
2000
4000
6000
8000

10.2.5 Angoon Coastal Management Program

Existing and future land use is depicted on Figure 14 in the Angoon Coastal Management Program (1990) and relevant portions are reproduced on Figure 11 here. Land use concepts on this map that are relevant to airport location decisions include:

- Residential or remote housing designations (now with subdivisions) at airport sites 5,6A and 6.
- A recreational rifle range designation at airport site 9.
- A park and cultural center designation at airport site 8.
- A spur road designated off the "BIA road," to provide access to this part of the peninsula, is designated to the area where airport sites 6 and 6A are located.
- A watershed designation near airport sites 5, 6A and 6.

The Angoon Coastal Management Program (CMP) policies have been adopted by Angoon and the State and federal governments. They are enforceable during local, State or federal government review of proposed development projects. Projects must be located, designed and operated in a manner that will ensure consistency with the Angoon CMP policies.

Section 1.3 of this report reviews Angoon CMP transportation goals. Other than direction to avoid development on steep slopes and use best management practices when developing in muskegs, if necessary, there are no directly relevant enforceable transportation policies.

10.2.6 draft 14(c) 3 Plan

The Alaska Native Claims Settlement Act (ANCSA) of 1971 established Native regional corporations (Sealaska Corporation) and village corporations (Kootznoowoo Corporation).

Under ANCSA, Kootznoowoo Corporation was entitled to select 23,040 acres of surface estate from the federal government. Section 14(c) of ANCSA requires all village corporations including Kootznoowoo, Inc., to reconvey certain lands they received under ANCSA. "Reconvey" means to pass title (ownership) on to others. There are four types of reconveyances required by ANCSA Section 14(c):

- Section 14(c)(1) requires reconveying land for homes, businesses and campsites that existed on or before December 18, 1971.
- Section 14(c)(2) requires reconveying land that was occupied on or before December 18, 1971 to non-profit organizations.
- Section 14(c) (3) requires reconveying land to cities for existing and future community land needs.
- Section 14(c)(4) requires giving land to the city or state for airports that existed on or before December 18, 1971. (This section is not relevant in Angoon.)

Section 14(c)(3) of ANCSA, with subsequent amendments in the Alaska National Interest Lands Conservation Act (ANILCA), provides for the transfer of 1,280 acres of land from Kootznoowoo Corporation to the City of Angoon, unless both parties agree in writing to a lesser amount, for the following purposes:

1. The remaining surface estate of the improved land on which the Native village is located;
2. As much additional land as is necessary for community expansion;
3. Appropriate rights-of-way for public use; and
4. Other foreseeable community needs.

In the 1990's several discussions and planning efforts were undertaken by the City of Angoon and Kootznoowoo Inc. to address reconveyances. A joint 1997 effort resulted in a draft 14c3 Plan that identified 20 parcels totaling 832 acres for 14c3 reconveyance. A final agreement was never signed by the City and Kootznoowoo to accept the recommendations in this plan. Since 1997, there have been periodic conversations about 14c3 reconveyances. Thus, while a fairly detailed community planning process resulted in the draft 14c3 plan and reconveyance selections, these areas and the land use for which they are selected can not be considered adopted land use designations by either the City or Corporation. At this point, they simply represent the product of a study that looked at future Angoon community needs and appropriate land for meeting those needs.

The draft 14c3 plan did not have a reconveyance selection for an airstrip. The draft 14c3 plan considered an airport site, and notes (pgs. 2 and 3):

> *During the public meetings and interviews there was considerable interest in an airstrip, but Alaska Department of Public Facilities and Transportation staff noted (July 1997 meeting) that a parcel of land that was a minimum of 3,000 to 4,000 feet long by 100 feet wide would be needed to accommodate an airstrip. When a "runway footprint" of 4,000 x 100 feet was laid over various places in the Angoon area, it seemed clear that there was no place on Kootznoowoo, Inc., land available for 14c3 selection where an airstrip could be developed because it would be too close to nearby homesites. If an airstrip is to be developed, many seem to favor USFS land between Favorite Bay and Kanalku Bay.*

The only airport sites that do not overlap with residential areas and privately owned lands are 1, 2, 3, 4 and 5. Airport development at sites 6, 6A, 7, 8 and 9 will require some type of acquisition of private lands (homesites).

Other possible conflicts with future land uses outlined in the draft 14c3 plan are:

- Airport site 7 conflicts with reconveyance selection 13, the Salt Lagoon uplands identified for park, open space, berry picking and a variety of recreation uses.
- Airport site 6, 6A could conflict with selection 18 for sewage treatment plant, and selection 17 for a city landfill.

10.2.7 ANILCA Title XI

There are four parts of the 1980 Alaska National Interest Lands and Conservation Act (ANILCA) relevant to airport planning in Angoon:

1. The Admiralty Island National Monument is established [§ 503(b)].

2. Kootznoowoo Inc. ownership of a 660 ft. wide corridor of shoreline along Mitchell, Kanalku and Favorite Bays is established [§ 506(c)].

3. In [§506(a)(3)(E)] states that, The Secretary of Agriculture shall consult and cooperate with Kootznoowoo, Incorporated, in the management of Mitchell, Kanalku, and Favorite Bays, and their immediate environs, and the Secretary is authorized to enter into such cooperative arrangements as may further the purposes of this Act and other provisions of law, concerning, but not limited to: permits for any structures and facilities, and the allocation of revenues therefrom; regulation of public uses; and management of the recreational and natural values of the area.

4. ANILCA Title XI sets out rules for developing Transportation and Utility Systems in and across, and access into, Conservation System Units (such as Admiralty Island National Monument). Title XI, Section §1104 (g)(2), notes that when deciding whether to allow a transportation improvement (such as an airport) on a Conservation System Unit, the federal agency(s) shall consider: (paraphrasing) the need for and economic feasibility of the improvement; economically feasible and prudent alternatives; short and long-term social, economic and environmental impacts, impacts that would affect the purposes for which the federal unit was established; measures to avoid or minimize impacts; and the short and long term public values that might be adversely affected versus the short and long term public benefits.

10.2.8 Joint Management Corridor Lands

As noted in section 10.2.6 above, ANILCA sets out consultation and cooperation between Kootznoowoo and the Secretary of Agriculture for management of Mitchell, Kanalku, and Favorite Bays, and their immediate environs. In August 2000, Kootznoowoo Corporation and the USDA/Forest Service Tongass National Forest signed Forest Service Agreement # 00MU-111005-104. This is to implement this section of ANILCA by establishing a Cooperative Management Area (CMA), and itemizing how these parties will consult and cooperate on actions within the CMA.

A portion of airport sites 3 and 4, and possibly site access, are on Favorite Bay "corridor lands."

Nothing within the agreement either prohibits or encourages airport development.

10.2.9 Tongass Land Management Plan

ANILCA, at Section 503(b), establishes the Admiralty Island National Monument.

> *There is hereby established within the Tongass National Forest, the Admiralty Island National Monument, containing approximately nine hundred and twenty-one thousand acres of public lands as generally depicted on a map entitled "Admiralty Island National Monument Proposed", dated July 1980.*

It is a federal Wilderness National Monument, designated in the Tongass Land Management Plan (pgs 3-23, 1997), to fulfill the following purposes.

> *Admiralty Island, exclusive of the Mansfield Peninsula, was designated as a National Monument for the scientific purpose of preserving intact a unique coastal island ecosystem. The goal of the preservation was to assure continued opportunities for study of Admiralty Island's ecology and its notable cultural, historical and wildlife resources, within its relatively unspoiled natural ecosystem. Protection and study of Tlingit cultural resources, other historical resources, brown bear and bald eagle populations are specifically directed.*

Portions, or all of airport sites 3, 4 and 5 are in the Admiralty Island National Monument.

As noted in section 10.2.7 above, Title XI of ANILCA specifically sets out procedures for consideration of utility and transportation improvements, such as an airport and road access, in and across conservation system units such as the Admiralty National Monument.

At this time, our understanding of the procedure to be followed if airport site 3 or 4 is chosen, is that either this Angoon Airport Reconnaissance Study, or the subsequent environmental documentation/Airport Master Plan, would be submitted to the Forest Service along with a cover memo from the Monument Ranger requesting review and approval, if possible, or listing additional information needs before an approval can be reached.

10.3 Effect on Airport Site Suitability

Land ownership and land use are reviewed in Sections 10.1 and 10.2. This section reports on the implications of land ownership and use on airport site suitability.

10.3.1 Land Ownership

Land ownership does not eliminate any airport sites from consideration.

Alaska's DOT&PF will want the entire airport site, and access to it, to be either on State land or on land for which the State has a long term lease.
Because no airport site is on State land, any site chosen would require the State to purchase land (or agree to a long term lease).

All the airport sites are on land that is either entirely, or partially, owned by Kootznoowoo Corporation, requiring acquisition. Portions of airport sites 5, 6, 6A, 7, 8 and 9 overlap with undeveloped, privately-owned land. Most of airport sites 3, 4 and 5 are on Forest Service land. For an airport, the Forest Service prefers to exchange or sell land, rather than subject it to long term lease. Forest Service comments have been supportive of airport development and its possible location on Forest Service land, but warn that the ANILCA Title XI and land purchase/swap process would probably take two to five years.

10.3.2 Current and Planned Land Use

Current and planned land use conflicts with airport development at sites 8 and 9. Both sites are proximate to the Angoon townsite, and within 1,000-5,000 feet of developing residential properties off the BIA Road. In addition, airport site 8 is in an area designated on the zoning map, the ACMP plan and the draft 14c3 plan as a community park, and site for a cultural center.

Development of the airport at site 5, 6 or 6A, would either eliminate consideration of Landfill Option 1 (draft 14c3 site No. 17) or require that an effective bird hazard control program be implemented. The current landfill is within a 1,000-1,500 feet of airport sites 8 and 9. Selection of Landfill Option 3 (improvements to the current landfill) would either eliminate consideration of airport sites 8 and 9, or require that an effective bird hazard control program be implemented.

Development of the airport at sites 3 or 4 would not create a conflict with any of the landfill options.

10.3.3 Conclusion

Eliminate airport sites 8 and 9 due to conflicts with current and planned land use land community growth.

11.0 SUBSISTENCE, CULTURAL, HISTORICAL USES

11.1 Documented Subsistence Use and Site

Within the Angoon area, subsistence hunting occurs for deer, birds and seal. Fish such as halibut, salmon, dolly varden, rockfish, crab, shrimp, clams and other marine invertebrates are also taken from Mitchell Bay, Favorite Bay and Chatham Strait. Intertidal areas are important for subsistence activities.

ADF&G's Division of Subsistence prepared a 1984 and 1987 baseline harvest study in Angoon as part of the Tongass Resource Use Cooperative Study (TRUCS). They prepared a study update in 1997. The following data is from the TRUCS data for 1987, with revised conversion factors to allow for comparisons with the latest available data.

Over 99% of Angoon household harvested subsistence resources in 1987. Resources most commonly harvested by Angoon residents are coho salmon, halibut, deer, chitons, berries and wood. Resources harvested in the greatest quantities (in terms of edible pounds) are chinook salmon, halibut, deer, seal, ducks, clams, dungeness crab, chitons, seaweed and kelp. Total 1987 harvest of edible resources was 127,202 lbs, or about 244 lbs per Angoon resident. Of this harvest, about 43% of the total weight was fish, 30% was deer, and marine invertebrates and mammals comprised about 23%.

TABLE 21
Deer Harvest by Angoon Residents In the Angoon Area

Year	Number Harvested	Percent of Total Harvest
1987	243	49%
1988	103	44%
1989	69	24%
1990	68	25%
Average	121	35%

Source: Subsistence Resource Use Patterns in Southeast Alaska: Summary of 30 Communities, Angoon, Alaska Department of Fish and Game, Subsistence Division, December 1997.

According to the TRUCS study, over 25% of Angoon households have used the Kootznoowoo inlet area and the coastline and Bay shores of western Admiralty Island to hunt for deer. Also, 10% to 25% of Angoon households have hunted deer in the uplands near Angoon and Kootznoowoo Inlet. Less than 10% of Angoon households hunted deer in upland areas more than 10 miles from Angoon, and in coastal areas more than 25 miles from Angoon. Information from Angoon residents in 1991 (upon review of the TRUCS maps) revealed that few Angoon residents hunt the interior or eastern side of Admiralty Island.

Salmon harvest takes place in Kootznoowoo Inlet, including Favorite Bay, and nearshore waters west of Admiralty Island, including Killisnoo Harbor. Marine invertebrates and marine mammals are also harvested in Kootznoowoo Inlet and Killisnoo Harbor.

Information from the current Angoon Coastal Management Plan indicates that Favorite Bay is used for subsistence harvest of dungeness crab and other marine invertebrates, but not necessarily the head of the Bay. Salmon troll and halibut fishing also occurs in Favorite Bay, but not at the head. Angoon residents subsistence fish for herring, and beach seine for salmon at the head of Favorite Bay. Seal, bird and deer hunting occurs along the eastern shore of the Bay. Killisnoo Bay is infrequently used to harvest seal, shellfish and other marine invertebrates. Seaweed and firewood may be gathered in these areas also. Birds are taken in Killisnoo Harbor, and in Favorite Bay, but not at the head of the Bay.

Residents of communities other than Angoon are more likely to use roaded areas for deer hunting. Angoon residents don't generally use the roaded areas to hunt deer because of this competition. Angoon residents tend to use boats to reach deer hunting areas, and often hunt deer inland when the weather is too rough to fish in Chatham Strait. If road access to the east side of Favorite Bay is developed, deer hunting along the road (probably by residents from communities other than Angoon), would likely displace those who now hunt in those areas via skiff. (Bob Schroeder, USFS Subsistence, January 2002; also, Subsistence Resource Use Patterns in Southeast Alaska: Summary of 30 Communities, Angoon, Alaska Department of Fish and Game, Subsistence Division, December 1997)

Data from the TRUCS maps for the Angoon area indicate the following subsistence use at potential airport sites:

- Site 1 – 15% to 25% of Angoon households use this area for subsistence hunting.
- Sites 3 and 4 – Road-enhanced access. 10% to 15% of Angoon household use these areas for deer hunting subsistence. Less than 25% of Angoon household subsistence hunt and fish at the shoreline of Favorite Bay in these areas.
- Sites 6 and 6A - 5% to 15% of Angoon household use these areas for subsistence deer hunting. Less than 25% of Angoon household subsistence hunt and fish the shoreline of Killisnoo Bay near these sites.
- Sites 8 and 9 – less than 25% of Angoon households use these areas for subsistence hunting.

During 1985 and 1986, the ADF&G Division of Subsistence research was compiled into a Technical Paper 159, entitled *Use of Fish and Wildlife by Residents of Angoon, Admiralty Island, Alaska (George, Gabriel D. and Robert G. Bosworth, 1988).* Two maps were produced, indicating specific areas generally used for subsistence harvest of fish and wildlife in the Angoon area. One map indicates areas for subsistence deer, seal and fur bearing animal harvest, and one shows harvest of birds, marine invertebrates (mostly crab), and salmon. Figure 12 (page 97) shows the areas indicated on those maps.

According to these maps, subsistence deer hunting occurred on the western shore of Favorite Bay near the eastern end of sites 6 and 6A before development of house lots and an access road. Seals were harvested on the northern shore of Killisnoo Bay, and the eastern shoreline of Favorite Bay near the western ends of sites 3 and 4 (especially site 4). Fur bearing animals were hunted closer to Angoon than the airport sites considered in this study.

Subsistence bird harvest occurred along the shoreline of Killisnoo Bay near the western end of sites 6 and 6A, and on the western shoreline of Favorite Bay near the eastern end of sites 6 and 6A. Marine invertebrate harvest (mostly dungeness crab) occurred along the western shore of Admiralty north and south of sites 6 and 6A, and on the eastern shore of Favorite Bay near the western end of site 3. Subsistence salmon harvest occurs in Chatham Strait offshore of sites 6 and 6A, as well as within Favorite Bay, especially at the head of the Bay (beach seine).

No official investigations of subsistence activities in these areas have been undertaken since the mid 1980s.

12.0 AIRPORT SITE EVALUATION

12.1 Past Sites and Pubic Meetings

As expressed in Division I, the 1982/83 study had five sites and two alternates reviewed (4A and 5A). The community favored site 4A because of future community expansion over site 5A. DOT/PF preferred site 5A due to cost.

Of the seven previous sites that were reviewed by DOT/PF in 1983/84, four are again reviewed by this study. Only past sites 1 and 3 were placed in the study by the public. During this study's initial (1/24/01) community meeting, the study team added past sites 4 and 5B for engineering comparison reasons. Table II-A equates the past and present sites.

None of the 1982/83 study sites have favorable recommendations by the study or community. The reasons are:

- Wind orientation (past sites 1, 2, 3, 4 and 5);
- Closeness to the community, limiting community expansion;
- Closeness to the existing community landfill.

Public Meeting: A total of three public meetings have been held beginning on January 24, 2001. Additional meetings were held on August 1, and November 13, 2001. Also, a series of project newsletters were used to inform state and local government representatives, air carriers and the general public.

A summary of the public meetings and newsletters is attached in Appendix D.

Team members and public review display maps - 8/1/01.

Study team members Sheinberg and Morris – 11/13/01

12.2 Sites 1 through 9 and Evaluation Matrix

The study sites have been summarized in the executive summary and Division II, Section 7.1 and 7.3. This data and the public meeting/air carriers input led the study team to prepare a project matrix of this airport sites. The matrix used three levels of evaluation to judge the study sites. These were:

- ***Level One Review*** (essential airport safety features). This included runway orientation; operational considerations and airport hazards.
- ***Level Two Review*** (key land use, cultural and subsistence considerations). This included land ownership; land use available area and permitting; future land use.
- ***Level Three Review*** (access and environmental concerns).

12.3 Site Evaluation Matrix

The suitability of airport sites based on past studies, area topography, winds, land ownership, land use, subsistence-cultural-historical uses, cost and environmental concerns has been evaluated in this report. These evaluations are summarized on the ***AIRPORT SITE EVALUATION – SUMMARY TABLE*** found on the following pages.

Concerns with airport safety and operations; proximity to the community, the existing landfill and historic and cultural sites; and conflicts with current and planned residential, park development and general community growth, eliminated all but four sites.

- Sites 2, 5 and 7 were eliminated because a runway cannot be oriented correctly to the apparent prevailing winds.

- Site 1 was eliminated due to presence of multiple historic sites.
- Sites 8 and 9 were eliminated due to closeness to town, landfill, current and future residential, subsistence, park and cultural center (zoning and Angoon CMP) uses.

The four airport sites that remain under consideration are 3 and 4 on the northeast side (across) Favorite Bay just within the Admiralty Island National Monument, and sites 6 and 6A just off the road and north of Auk Tah' Lake. The major differences between 6 and 6A were wind orientation and costs. Site 6 was selected by key citizens at our first public meeting. After reviewing known wind records, the site was re-orientated. This is the reason the study has continued with two airport layouts in the same relative location with different orientations. Wind records and current wind studies lead this study team to believe site 6A has the correct wind orientation.

12.4 Site Obstructions

Natural terrain presents site obstructions to some extent at all sites, with site 3 having the least. Site 3's departure to the south has high trees on the south shoreline of Favorite Channel. This was noted during the simulated approach/departure exercises conducted by Mr. Morris and Mr. Menzies as explained in Appendix E. Tree clearing will remove any airport obstructions at Site 3. All other sites will require both extensive earthwork and/or clearing to remove approach/departure obstructions.

13.0 AIRPORT SITES UNDER FINAL CONSIDERATION

The matrix explains the general reasons these sites remain under final study consideration.

13.1 Site 6 and 6A

The reason these sites continue is explained by the evaluation matrix and Section 12.3. The following aerial mosaics, with site orientation concepts, graphically reflects the sites and required existing roadway relocation needs. Please refer to Division 4 for engineering drawings of each site.

13.2 Site 3 and 4

These sites are on the north side of Favorite Bay and require new road construction either along the shoreline or on Admiralty Monument Lands. We attempted to locate road access within these private lands belonging to Kootznoowoo Corporation inland from the shoreline to preserve the shoreline for corporate land use. Where site topography would not permit development within this 600-foot corridor, we show access on Monument lands.

During all public meetings, citizens expressed the opinion that access to Site 3 should be by bridges across Favorite Channel, rather than a "long" road corridor. This is shown, but is largely infeasible as will be explained in Section 16.0, Project Costs.

The following aerial mosaic with site orientation concepts graphically reflect site 3 and 4 with road and road/bridge/cause way access. Please refer to Division 4 for plan-profile and cross-section engineering drawings.

14.0 ENVIRONMENTAL CONCERNS

This section is not meant to represent an environmental study or evaluation study. It simply brings attention to environmental concerns the study team has reviewed.

14.1 Forest

The forest is largely Hemlock and Spruce with alder and blueberry brush understory. All sites are forested with generally minor drainage concerns. The aerial mosaic shown in Section 13 generally reflects the forest. As viewed from the air, (or an aerial photograph), spruce species are identified from Hemlock by their "spindle" appearance.

14.2 Wetlands

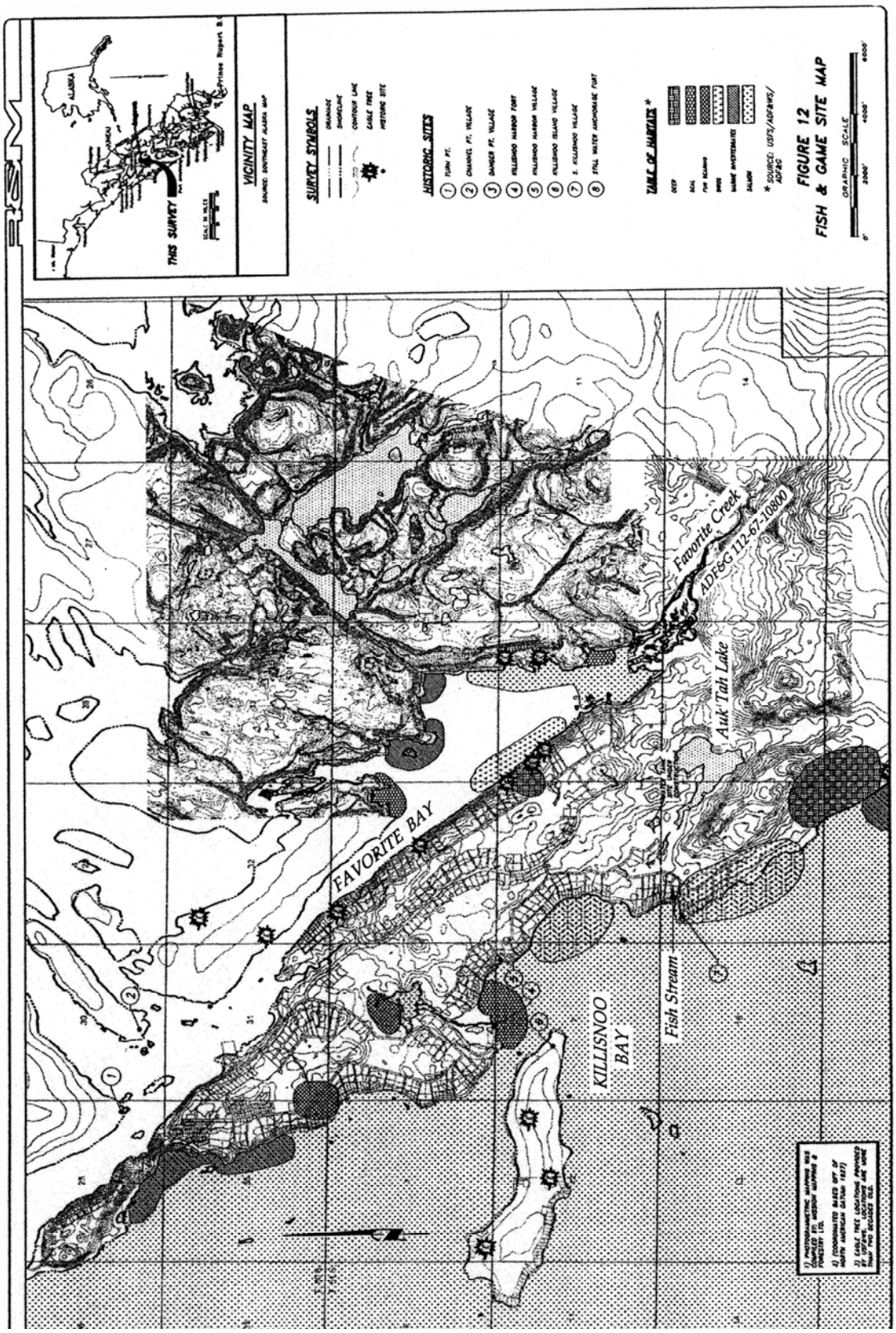
Open "muskeg" (large peat bodies) wetlands exist, to a minimum amount, at all the sites under final study review. All sites contain "forested wetlands". That is, where understory and the tree type reflect forested wetlands of southeastern Alaska as described by the U.S.A., C.O.E. Section 13's aerial mosaics reflect the "open" wetlands and to a great extent, the forested wetlands.

14.3 Anadromous Streams/Sensitive Fish Habitat

Limited Anadromous fish stream studies have been conducted by the Alaska Department of Fish and Game (ADF&G), Division of Habitat and Restoration, and the U.S. Forest Service (USFS). ADF&G has identified Favorite Creek as anadromous stream 112-67-10800 (refer to Figure 12). This creek found at the head of Favorite Bay, supports Coho, Chum and Pink salmon and Dolly Varden char. While this creek is not located at any potential airport site, it could be impacted by an access road to sites 3 and 4, east of Favorite Bay, particularly if the road crosses below the barrier falls of Favorite Creek. (Currently, the chosen road alignment is up-stream of these falls and a bridge crossing is part of the conceptual plan). ADF&G staff feel that a thorough survey of the area may reveal further anadromous streams.

USFS biologist have mapped anadromous fish habitat shown as the stippled pattern on Figure 12. The northeast end of potential airport Site 4 overlies a portion of a salmon-bearing lake.

Several streams are known or suspected to be anadromous, which were ont identified by ADF&G, or USFS. An example is a stream which flows from Auk'Tah Lake to Killisnoo Bay. This stream would be impacted by potential airport sites 6 and 6A. Construction of an airport at Site 6, or 6A must be accomplished so as to have the least impact possible to these drainages. Our concept plans and estimates reflect such. In addition, care was taken to avoid impacts to Auk'Tah Lake, which is Angoon's water source.


FAVORITE BAY
KILLISNOO BAY
Fish Stream
Auk Tah Lake
Favorite Creek
ADF&G 112-67-10800
THIS SURVEY
VICINITY MAP
SURVEY SYMBOLS
HISTORIC SITES
TABLE OF HABITATS *
* SOURCE: USFS/ADF&WS/ADF&G
FIGURE 12
FISH & GAME SITE MAP
GRAPHIC SCALE

14.4 Eagle Trees

Eagle nest trees were last mapped in the Angoon area in 1970 by the U.S. Fish and Wildlife Service 9USFW). Location of these trees is shown in Figure 12. The map shows an eagle nest tree 1500 feet northwest of potential airport Site 4. According to biologist Mike Jacobson (USFWS, Migratory Bird Management – Raptors Section), birds tend to keep nests in the same trees or in ones very close by. It is therefore likely that more recent eagle nests will be found in close proximity to those mapped in 1970. A current survey of eagle nest trees near the recommended airport sites is recommended during subsequent studies.

The USFWS recommends a 1,000-foot separation of eagle nest trees from operating facilities within the Admiralty Island National Monument. A 600-foot separation is "normal" for the USFWS/USFS. For an area that receives regular and repeated flights, USFW/USFS have recommended a ¼ mile separation.

14.5 Archeological and Historic Sites

In 1975, the Sealaska Corporation documented thousands of historic and archeological sites throughout Southeast Alaska, and presented them in a book entitled "Native Cemetery and Historic Sites of Southeast Alaska." Figure 13 shows archeological and historic sites within the Angoon area documented in this book. The mapped sites include:

1. Turn Point Village
2. Channel Point Village
3. Danger Point Village
4. Killisnoo Harbor Fort
5. Killisnoo Harbor Village
6. Killisnoo Island Village
7. South Killisnoo Village
8. Stillwater Anchorage Fort

Other sites which are not documented as to exact whereabouts, but could be located at or near potential airport sites include: Sullivan Point Favorite Bay Village; Kootznoowoo Roads Petroglyph; Angoon Favorite Bay Seasonal Village; Favorite Bay Village Site; and South of Angoon Burial Site. The "Angoon Coastal Management Plan" document shows additional historic sites in the area which are not named.

Site 1, the island across from Stillwater Anchorage, was eliminated because of three historic sites located on the island. These three sites include Channel Point Village on the Southwest part of the island. The only other mapped site close to potential airport sites is South Killisnoo Village, which is located on the southernmost point of Killisnoo Bay, just to the northwest of sites 6 and 6A.

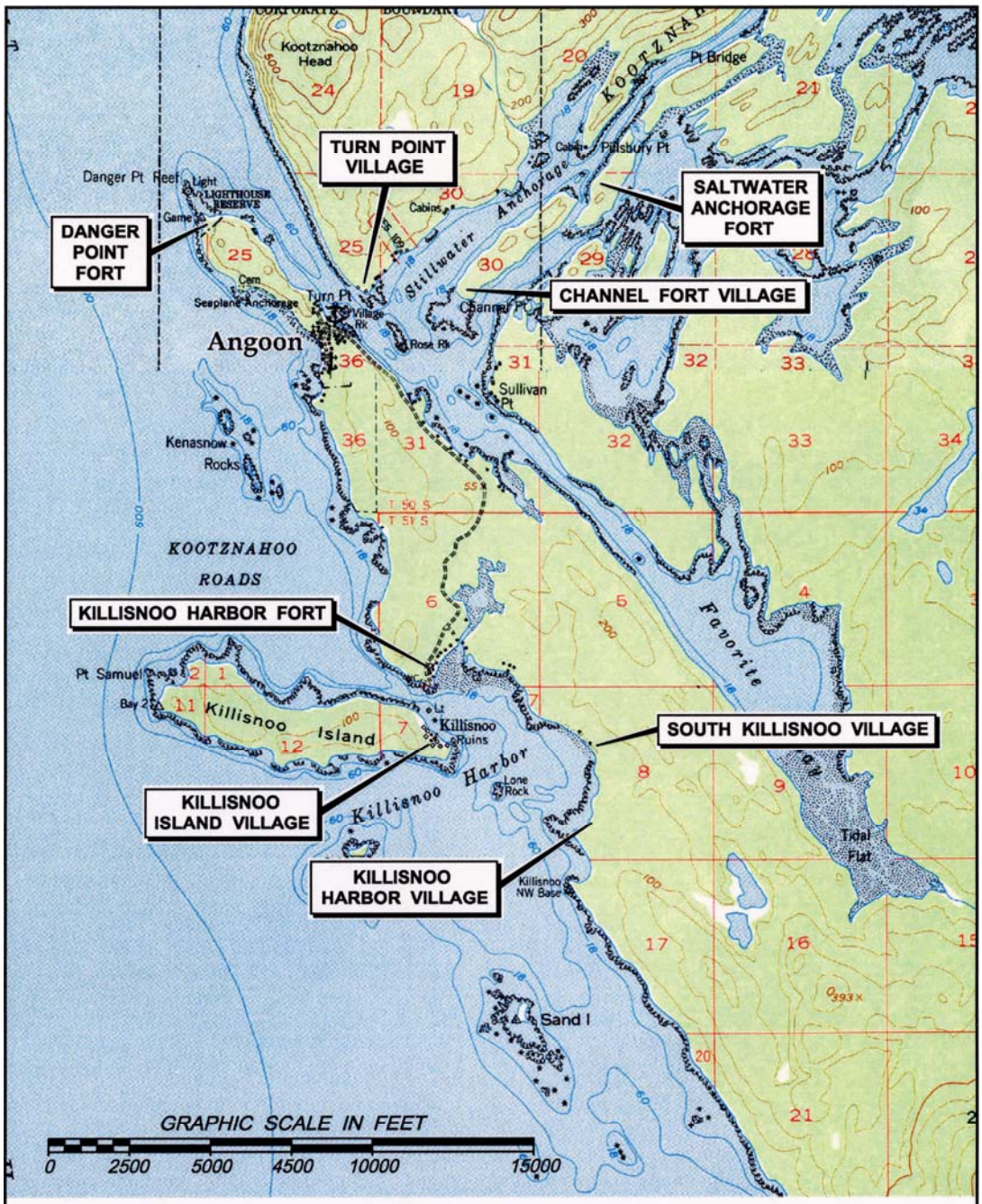


Figure 13

DOCUMENTED ARCHEOLOGICAL & HISTORIC SITES WITHIN THE ANGOON AREA

Source: SEALASKA CORPORATION "NATIVE CEMETERY & HISTORIC SITES"

14.6 Borrow Materials

There are no known deposits of sand and gravel in the general Angoon area or in the specific vicinities of potential airport sites 3, 4, 6 and 6A. Rock can be found at, or near all sites except for Site 3. Site 3 has little rock on site and transport from sources to the east will be required.

Wherever possible, rock quarries would be made along the access roads to sites 3 and 4 to reduce landscape scars and to preserve Admiralty Monument Lands.

15.0 RIGHT-OF-WAY

Right-of-Way access is required for all sites under final study consideration.

15.1 Sites 3 & 4

For these sites a new roadway and right-of-way must be constructed from the terminus of Auk'Tah Lake Road. The roadway Right-of-Way will be within Kootznoowoo, Inc. lands as much as alignment permits. We are recommending a 100-foot Right-of-Way.

15.2 Sites 6 & 6A

Access to the general areas of these sites is within the existing right-of-way of Auk'Tah Lake Road. Where the existing roadway intersects the airport layout, Auk'Tah Lake Road will have to be relocated. The re-alignment of Auk'Tah Lake Road is shown within the concept plans, largely utilizing the dedicated Right-of-Ways within Kootznoowoo, Inc.'s shareholder's subdivisions. Where this was not possible, we reflect the purchase of additional lands within the cost estimates.

16.0 PROJECT COSTS

Project cost go beyond the estimated construction costs as shown in Section 17.0. The costs that are included in the overall project costs include those as follows.

16.1 Reconnaissance Studies

Those costs expended in the preparation of this study and the administration activities associated with the study.

16.2 Environmental Documentation

This is the estimated cost to complete at a minimum, an environmental assessment for the preferred site and at a maximum, the estimated cost to conduct an environmental impact statement (E.I.S.) for the preferred and alternate site. We choose to use only the estimated cost for an E.I.S. at the preferred site.

16.3 Engineering Survey, Soils and Designs (civil and electrical)

The American Society of Civil Engineers Manual 45 was used to estimate these costs for each site as a percentage of the construction costs.

16.4 Right-of-Way Costs – Airport and Access

Land right-of-way acquisition costs for both the airport and airport access at each site. We used for a land cost basis, the average of six rural sites located in Sitka, Hoonah and Juneau as complied by a Sitka appraiser. Subdivision lot values were taken from real estate ads.

16.5 Construction Cost

The estimated construction costs are shown in Section 17 for both the airport and airport access.

DIVISION III – CONCLUSIONS AND RECOMMENDATIONS

17.0 RECONNAISSANCE LEVEL PROJECT COSTS

Throughout the project study, costs have been and remain a principal consideration. The cost estimates presented in the following section reflect this study's estimates of land acquisition, construction, engineering and environmental costs for each site. The estimates are limited to the accuracy of the Reconnaissance Level mapping for earthwork quantities.

The mapping was prepared specifically for this study by photogrammetric methods. It was produced form aerial photography taken in the spring 2000 from a flight altitude of 6,000 feet above average terrain height. This allowed a direct mapping horizontal scale of 1"=200' with a contour interval of 5 feet. Except for pre-paneled areas, no ground truthing of the resulting mapping was accomplished. The aerial photography was taken in the early spring with a low ceiling, cloud overcast day. For that reason, black and white film was used.

17.1 Airport Sites

Each of the four final study sites reflects its own project quantities based on the typical airport section shown in Division I, Section 6, Facilities Requirements. Special features exist for each of the sites, which have been included after study team members Mark Morris, P.E. and Malcolm A. Menzies, P.E., L.S. flew each site's approach/departure in a Cessna 180 aircraft.

These features include, but are not limited to:

- Sites 6 and 6A; protection for the community drinking water by special drainage cut-off trenches, berms and dikes;
- Site 6 and 6A; re-routing of the community's water reservoir access roadway to Right-of-Ways of Kootznoowoo's shareholders subdivision development;
- Sites 3 and 4; bridge construction at the south end of Favorite Bay to protect a fish stream;
- Sites 3 and 4; Clearing on the south side of Favorite Bay for approach/departure flight paths for safety reasons.

There are other items which appears in the project plan-profile and cross-section drawings.

In addition to the initial Reconnaissance Level Construction cost estimate based on an item quantity computations, the project costs for the airport include, but are not limited to:

- Environmental Assessment and/or Impact Studies;
- Site land and engineering surveys;
- Geotechnical investigation;
- Land acquisitions;

- Engineering Design Services (civil, environmental and electrical);
- Construction costs by estimated unit prices;
- Construction administration, inspection and testing;
- An estimating contingency.

The following are the estimated construction costs for each proposed airport site. Road access construction costs are provided in Section 17.2.

17.1.1 Airport Site 3 Construction Cost

BID SCHEDULE					
SITE NO. 3 - AIRPORT - NEW TEMPLATE - NEW MAPPING					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100		LS	MOB/DEMOB (5%)	207,671	$207,671
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	15,000	$15,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	25,000	$25,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	124,603	$124,603
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	15,000	$15,000
200f	75.0	AC	CLEARING AND GRUBBING	3,500	$262,500
200g	50	EA	SELECTED TREE REMOVAL	200	$10,000
300a	136,690	CY	UNCLASSIFIED EXCAVATION	8.00	$1,093,520
300b	105,555	CY	PEAT EXCAVATION	4.00	$422,220
330f	138,035	CY	EMBANKMENT	9.75	$1,345,841
350a	300	CY	RIPRAP, CLASS II	25	$7,500
400b	240	LF	24" CMP	55	$13,200
400d	240	LF	36" CMP	64.50	$15,480
440a	500	LF	CHAIN LINK FENCE	25	$12,500
440c	1	EA	DRIVE THRU SLIDE GATES	2,500	$2,500
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	51,380	CY	SUBBASE COURSE	15	$770,700
510a	54,075	TON	CRUSHED AGGREGATE BASE COURSE	16.50	$892,238
551a	1,000	SY	GEOTEXTILE FABRIC	5	$5,000
600a	34	TON	BITUMINOUS PRIME COAT	400	$13,600
660a	6,426	TON	ASPHALTIC CONCRETE	45	$289,170
660b	450	TON	ASPHALT CEMENT (7%)	300	$134,946
700	1	LS	TRAFFIC MARKING	15,000	$15,000
900a	1	ALL REQ	SEEDING	10,000	$10,000
701a	6	EA	SURVEY MONUMENTS WITH CASES	300	$1,800
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
1665	120	SF	PASSENGER WAITING FACILITY	125	$15,000
			SUBTOTAL		$5,743,989
	15%		CONTIG		$861,598
			TOTAL		**$6,605,587**

Estimated Electrical Costs for Site 3

Pay Item	Quantity		Unit Price		Amount
Runway Marker Light, L-862 (Each)	40	$	1,450.0	$	58,000
Runway Threshold Marker Light, L-862 (Each)	16	$	1,450.0	$	23,200
Taxiway Marker Light , L-861T (Each)	30	$	800.0	$	24,000
No. 8 Cable, L-824 (Lineal Foot)	10,250	$	2.6	$	26,650
2" Rigid Steel Conduit (Lineal Foot)	410	$	18.0	$	7,380
2" HDPE Conduit (Lineal Foot)	10,000	$	14.5	$	145,000
2" HDPE Conduit FAA (Lineal Foot)	4,500	$	14.5	$	65,250
No. 6 Ground Conductor(Lineal Foot)	10,300	$	0.9	$	9,270
3" HDPE Conduit (Lineal Foot)	100	$	15.8	$	1,580
15KV Cable, No. 2, Conc. Neut. EPR Cable	5,000	$	20.0	$	100,000
Type 3 Handhole (Each)	10	$	2,500.0	$	25,000
PAPI	2	$	50,000.0	$	100,000
Transformers w/ enclosures, disconects, etc.	3	$	5,000.0	$	15,000
Airport Sign, L-858 (Each)	4	$	4,200.0	$	16,800
2 no. 6 & 1 no. 10 Conductors (Lineal Foot)	1,500	$	2.1	$	3,150
Regulator Building	1	$	100,000.0	$	100,000
Electrical Panel & Main Disconnect, Lights, Wiring	1	$	50,000.0	$	50,000
Beacon	1	$	80,000.0	$	80,000
Windcone	2	$	5,000.0	$	10,000
REILS	2	$	15,000.0	$	30,000
Service	1	$	30,000.0	$	30,000
				$	-
			Sub Total	$	920,280
Utility Line Extension (5 Miles)	1	$	500,000.0	$	500,000
			Total	$	1,420,280
Contingency	15%			$	213,042
	Total electrical Site 3			**$**	**1,633,322**

17.1.2 - Airport Site 4 Construction Cost

BID SCHEDULE					
SITE NO. 4 - AIRPORT - NEW TEMPLATE - NEW MAPPING					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100		LS	MOB/DEMOB (5%)	474,805	$474,805
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	15,000	$15,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	25,000	$25,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	284,883	$284,883
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	15,000	$15,000
200f	80.0	AC	CLEARING AND GRUBBING	3,500	$280,000
200g	50	EA	SELECTED TREE REMOVAL	200	$10,000
300a	820,180	CY	UNCLASSIFIED EXCAVATION	5.50	$4,510,990
330f	268,850	CY	EMBANKMENT	9.00	$2,419,650
350a	500	CY	RIPRAP, CLASS II	25	$12,500
400b	360	LF	24" CMP	55	$19,800
400d	120	LF	36" CMP	64.50	$7,740
440a	500	LF	CHAIN LINK FENCE	25	$12,500
440c	1	EA	DRIVE THRU SLIDE GATES	2,500	$2,500
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	51,230	CY	SUBBASE COURSE	15	$768,450
510a	53,910	TON	CRUSHED AGGREGATE BASE COURSE	16.50	$889,515
551a	1,000	SY	GEOTEXTILE FABRIC	5	$5,000
600a	34	TON	BITUMINOUS PRIME COAT	400	$13,600
660a	6,410	TON	ASPHALTIC CONCRETE	45	$288,450
660b	449	TON	ASPHALT CEMENT (7%)	300	$134,610
700	1	LS	TRAFFIC MARKING	15,000	$15,000
900a	1	ALL REQ	SEEDING	10,000	$10,000
701a	6	EA	SURVEY MONUMENTS WITH CASES	300	$1,800
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
1665	120	SF	PASSENGER WAITING FACILITY	125	$15,000
			SUBTOTAL		$10,255,793
	15%		CONTIG		$1,538,369
			TOTAL		**$11,794,162**

Estimated Electrical Costs for Site 4

Pay Item	Quantity		Unit Price		Amount
Runway Marker Light, L-862 (Each)	40	$	1,450.0	$	58,000
Runway Threshold Marker Light, L-862 (Each)	16	$	1,450.0	$	23,200
Taxiway Marker Light , L-861T (Each)	30	$	800.0	$	24,000
No. 8 Cable, L-824 (Lineal Foot)	10,250	$	2.6	$	26,650
2" Rigid Steel Conduit (Lineal Foot)	410	$	18.0	$	7,380
2" HDPE Conduit (Lineal Foot)	10,000	$	14.5	$	145,000
2" HDPE Conduit FAA (Lineal Foot)	4,500	$	14.5	$	65,250
No. 6 Ground Conductor(Lineal Foot)	10,300	$	0.9	$	9,270
3" HDPE Conduit (Lineal Foot)	100	$	15.8	$	1,580
15KV Cable, No. 2, Conc. Neut. EPR Cable	5,000	$	20.0	$	100,000
Type 3 Handhole (Each)	10	$	2,500.0	$	25,000
PAPI	2	$	50,000.0	$	100,000
Transformers w/ enclosures, disconects, etc.	3	$	5,000.0	$	15,000
Airport Sign, L-858 (Each)	4	$	4,200.0	$	16,800
2 no. 6 & 1 no. 10 Conductors (Lineal Foot)	1,500	$	2.1	$	3,150
Regulator Building	1	$	100,000.0	$	100,000
Electrical Panel & Main Disconnect, Lights, Wiring	1	$	50,000.0	$	50,000
Beacon	1	$	80,000.0	$	80,000
Windcone	2	$	5,000.0	$	10,000
REILS	2	$	15,000.0	$	30,000
Service	1	$	30,000.0	$	30,000
				$	-
			Sub Total	$	920,280
Utility Line Extension (4 Miles)	1	$	400,000.0	$	400,000
			Total	$	1,320,280
Contingency	15%			$	198,042
	Total electrical Site 4			**$**	**1,518,322**

17.1.3 - Airport Site 5 Construction Cost

BID SCHEDULE					
SITE NO. 5 - AIRPORT - NEW TEMPLATE - NEW MAPPING					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100		LS	MOB/DEMOB (5%)	827,693	$827,693
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	15,000	$15,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	25,000	$25,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	325,538	$325,538
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	15,000	$15,000
200f	88.4	AC	CLEARING AND GRUBBING	3,500	$309,400
200g	50	EA	SELECTED TREE REMOVAL	200	$10,000
300a	1,690,078	CY	UNCLASSIFIED EXCAVATION	5.00	$8,450,390
330f	501,350	CY	EMBANKMENT	8.65	$4,336,678
350a	300	CY	RIPRAP, CLASS II	25	$7,500
400b	400	LF	30" CMP	55	$22,000
400d	600	LF	48" CMP	64.50	$38,700
440a	8,400	LF	CHAIN LINK FENCE	25	$210,000
440c	1	EA	DRIVE THRU SLIDE GATES	2,500	$2,500
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	53,648	CY	SUBBASE COURSE	15	$804,720
510a	56,495	TON	CRUSHED AGGREGATE BASE COURSE	16.50	$932,168
551a	1,000	SY	GEOTEXTILE FABRIC	5	$5,000
600a	34	TON	BITUMINOUS PRIME COAT	400	$13,600
660a	6,682	TON	ASPHALTIC CONCRETE	45	$300,690
660b	468	TON	ASPHALT CEMENT (7%)	300	$140,322
700	1	LS	TRAFFIC MARKING	15,000	$15,000
900a	1	ALL REQ	SEEDING	10,000	$10,000
701a	4	EA	SURVEY MONUMENTS WITH CASES	300	$1,200
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
1665	120	SF	PASSENGER WAITING FACILITY	125	$15,000
			ELEC.		$850,000
			SUBTOTAL		$17,707,098
	15%		CONTIG		$2,656,065
			TOTAL		**$20,363,163**

Estimated Electrical Costs for Site 5

Pay Item	Quantity		Unit Price		Amount
Runway Marker Light, L-862 (Each)	40	$	1,450.0	$	58,000
Runway Threshold Marker Light, L-862 (Each)	16	$	1,450.0	$	23,200
Taxiway Marker Light , L-861T (Each)	30	$	800.0	$	24,000
No. 8 Cable, L-824 (Lineal Foot)	10,250	$	2.6	$	26,650
2" Rigid Steel Conduit (Lineal Foot)	410	$	18.0	$	7,380
2" HDPE Conduit (Lineal Foot)	10,000	$	14.5	$	145,000
2" HDPE Conduit FAA (Lineal Foot)	4,500	$	14.5	$	65,250
No. 6 Ground Conductor(Lineal Foot)	10,300	$	0.9	$	9,270
3" HDPE Conduit (Lineal Foot)	100	$	15.8	$	1,580
15KV Cable, No. 2, Conc. Neut. EPR Cable	5,000	$	20.0	$	100,000
Type 3 Handhole (Each)	10	$	2,500.0	$	25,000
PAPI	2	$	50,000.0	$	100,000
Transformers w/ enclosures, disconects, etc.	3	$	5,000.0	$	15,000
Airport Sign, L-858 (Each)	4	$	4,200.0	$	16,800
2 no. 6 & 1 no. 10 Conductors (Lineal Foot)	1,500	$	2.1	$	3,150
Regulator Building	1	$	100,000.0	$	100,000
Electrical Panel & Main Disconnect, Lights, Wiring	1	$	50,000.0	$	50,000
Beacon	1	$	80,000.0	$	80,000
Windcone	2	$	5,000.0	$	10,000
REILS	2	$	15,000.0	$	30,000
Service	1	$	30,000.0	$	30,000
				$	-
			Sub Total	$	920,280
Utility Line Extension (1.5 Mile)	1	$	150,000.0	$	150,000
			Total	$	1,070,280
Contingency	15%			$	160,542
	Total electrical Site 5			**$**	**1,230,822**

17.1.4 - Airport Site 6 Construction Cost

BID SCHEDULE					
SITE NO. 6 - AIRPORT - NEW TEMPLATE - NEW MAPPING					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100	5%	LS	MOB/DEMOB	502,500	$502,500
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	15,000	$15,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	25,000	$25,000
121	3%	LS	CONSTR. SURVEY BY CONTRACTOR	301,500	$301,500
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	15,000	$15,000
200f	103	AC	CLEARING AND GRUBBING	3,500	$360,500
200g	50	EA	SELECTED TREE REMOVAL	200	$10,000
300a	614,825	CY	UNCLASSIFIED EXCAVATION	7.15	$4,395,999
330f	319,930	CY	EMBANKMENT	8.65	$2,767,395
350a	500	CY	RIPRAP, CLASS II	25	$12,500
400b	400	LF	30" CMP (5'@80)	55	$22,000
400d	480	LF	36" CMP (4@120')	64.50	$30,960
440a	8,800	LF	CHAIN LINK FENCE	25	$220,000
440c	1	EA	DRIVE THRU SLIDE GATES	2,500	$2,500
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	51,227	CY	SUBBASE COURSE	15	$768,405
510a	53,912	TON	CRUSHED AGGREGATE BASE COURSE	16.50	$889,548
551a	2,000	SY	GEOTEXTILE FABRIC	5	$10,000
600a	34	TON	BITUMINOUS PRIME COAT	400	$13,600
660a	6,410	TON	ASPHALTIC CONCRETE	45	$288,450
660b	449	TON	ASPHALT CEMENT (7%)	300	$134,610
700	1	LS	TRAFFIC MARKING	15,000	$15,000
900a	1	LS	SEEDING	10,000	$10,000
701a	6	EA	SURVEY MONUMENTS WITH CASES	300	$1,800
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
1665	120	SF	PASSENGER WAITING FACILITY	125	$15,000
			SUBTOTAL		$10,851,266
	15%		CONTIG		$1,627,690
			TOTAL		**$12,478,956**

Estimated Electrical Costs for Site 6

Pay Item	Quantity		Unit Price		Amount
Runway Marker Light, L-862 (Each)	40	$	1,450.0	$	58,000
Runway Threshold Marker Light, L-862 (Each)	16	$	1,450.0	$	23,200
Taxiway Marker Light , L-861T (Each)	30	$	800.0	$	24,000
No. 8 Cable, L-824 (Lineal Foot)	10,250	$	2.6	$	26,650
2" Rigid Steel Conduit (Lineal Foot)	410	$	18.0	$	7,380
2" HDPE Conduit (Lineal Foot)	10,000	$	14.5	$	145,000
2" HDPE Conduit FAA (Lineal Foot)	4,500	$	14.5	$	65,250
No. 6 Ground Conductor(Lineal Foot)	10,300	$	0.9	$	9,270
3" HDPE Conduit (Lineal Foot)	100	$	15.8	$	1,580
15KV Cable, No. 2, Conc. Neut. EPR Cable	5,000	$	20.0	$	100,000
Type 3 Handhole (Each)	10	$	2,500.0	$	25,000
PAPI	2	$	50,000.0	$	100,000
Transformers w/ enclosures, disconects, etc.	3	$	5,000.0	$	15,000
Airport Sign, L-858 (Each)	4	$	4,200.0	$	16,800
2 no. 6 & 1 no. 10 Conductors (Lineal Foot)	1,500	$	2.1	$	3,150
Regulator Building	1	$	100,000.0	$	100,000
Electrical Panel & Main Disconnect, Lights, Wiring	1	$	50,000.0	$	50,000
Beacon	1	$	80,000.0	$	80,000
Windcone	2	$	5,000.0	$	10,000
REILS	2	$	15,000.0	$	30,000
Service	1	$	30,000.0	$	30,000
				$	-
			Sub Total	$	920,280
Utility Line Extension (0.25 Mile)	1	$	25,000.0	$	25,000
			Total	$	945,280
Contingency	15%			$	141,792
	Total electrical Site 6			**$**	**1,087,072**

17.1.5 - Airport Site 6A Construction Cost

BID SCHEDULE					
SITE NO. 6A - AIRPORT - NEW TEMPLATE - NEW MAPPING					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100	5%	LS	MOB/DEMOB	1,081,432	$1,081,432
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	15,000	$15,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	25,000	$25,000
121	3%	LS	CONSTR. SURVEY BY CONTRACTOR	648,859	$648,859
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	15,000	$15,000
200f	82	AC	CLEARING AND GRUBBING	3,500	$287,000
200g	50	EA	SELECTED TREE REMOVAL	200	$10,000
300a	5,336,776	CY	UNCLASSIFIED EXCAVATION	3.25	$17,344,522
330f	299,416	CY	EMBANKMENT	5.00	$1,497,080
350a	300	CY	RIPRAP, CLASS II	25	$7,500
400b	400	LF	30" CMP (5'@80)	55	$22,000
400d	360	LF	36" CMP (3@120')	64.50	$23,220
440a	8,400	LF	CHAIN LINK FENCE	25	$210,000
440c	1	EA	DRIVE THRU SLIDE GATES	2,500	$2,500
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	51,227	CY	SUBBASE COURSE	15	$768,405
510a	53,912	TON	CRUSHED AGGREGATE BASE COURSE	16.50	$889,548
551a	2,000	SY	GEOTEXTILE FABRIC	5	$10,000
600a	34	TON	BITUMINOUS PRIME COAT	400	$13,600
660a	6,410	TON	ASPHALTIC CONCRETE	45	$288,450
660b	449	TON	ASPHALT CEMENT (7%)	300	$134,610
700	1	LS	TRAFFIC MARKING	15,000	$15,000
900a	1	LS	SEEDING	10,000	$10,000
701a	4	EA	SURVEY MONUMENTS WITH CASES	300	$1,200
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
1665	120	SF	PASSENGER WAITING FACILITY	125	$15,000
			SUBTOTAL		$23,358,926
	15%		CONTIG		$3,503,839
			TOTAL		**$26,862,765**

Estimated Electrical Costs for Site 6A

Pay Item	Quantity		Unit Price		Amount
Runway Marker Light, L-862 (Each)	40	$	1,450.0	$	58,000
Runway Threshold Marker Light, L-862 (Each)	16	$	1,450.0	$	23,200
Taxiway Marker Light , L-861T (Each)	30	$	800.0	$	24,000
No. 8 Cable, L-824 (Lineal Foot)	10,250	$	2.6	$	26,650
2" Rigid Steel Conduit (Lineal Foot)	410	$	18.0	$	7,380
2" HDPE Conduit (Lineal Foot)	10,000	$	14.5	$	145,000
2" HDPE Conduit FAA (Lineal Foot)	4,500	$	14.5	$	65,250
No. 6 Ground Conductor(Lineal Foot)	10,300	$	0.9	$	9,270
3" HDPE Conduit (Lineal Foot)	100	$	15.8	$	1,580
15KV Cable, No. 2, Conc. Neut. EPR Cable	5,000	$	20.0	$	100,000
Type 3 Handhole (Each)	10	$	2,500.0	$	25,000
PAPI	2	$	50,000.0	$	100,000
Transformers w/ enclosures, disconects, etc.	3	$	5,000.0	$	15,000
Airport Sign, L-858 (Each)	4	$	4,200.0	$	16,800
2 no. 6 & 1 no. 10 Conductors (Lineal Foot)	1,500	$	2.1	$	3,150
Regulator Building	1	$	100,000.0	$	100,000
Electrical Panel & Main Disconnect, Lights, Wiring	1	$	50,000.0	$	50,000
Beacon	1	$	80,000.0	$	80,000
Windcone	2	$	5,000.0	$	10,000
REILS	2	$	15,000.0	$	30,000
Service	1	$	30,000.0	$	30,000
				$	-
			Sub Total	$	920,280
Utility Line Extension (0.5 Mile) & Removal of extg.	1	$	100,000.0	$	100,000
			Total	$	1,020,280
Contingency	15%			$	153,042
	Total electrical Site 6A			**$**	**1,173,322**

17.1.6 - Airport Site 8 Construction Cost

BID SCHEDULE					
SITE NO. 8 - AIRPORT - NEW TEMPLATE - NEW MAPPING					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100	5%	LS	MOB/DEMOB (3%)	719,701	$719,701
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	15,000	$15,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	25,000	$25,000
121	3%	LS	CONSTR. SURVEY BY CONTRACTOR (2%)	479,800	$479,800
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	15,000	$15,000
200f	82	AC	CLEARING AND GRUBBING	3,500	$287,000
200g	50	EA	SELECTED TREE REMOVAL	200	$10,000
300a	5,165,750	CY	UNCLASSIFIED EXCAVATION	4.00	$20,663,000
330f	179,795	CY	EMBANKMENT	3.00	$539,385
350a	300	CY	RIPRAP, CLASS II	25	$7,500
400b	400	LF	30" CMP (5'@80)	55	$22,000
400d	360	LF	36" CMP (3@120')	64.50	$23,220
440a	8,400	LF	CHAIN LINK FENCE	25	$210,000
440c	1	EA	DRIVE THRU SLIDE GATES	2,500	$2,500
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	51,227	CY	SUBBASE COURSE	15	$768,405
510a	53,912	TON	CRUSHED AGGREGATE BASE COURSE	16.50	$889,548
551a	2,000	SY	GEOTEXTILE FABRIC	5	$10,000
600a	34	TON	BITUMINOUS PRIME COAT	400	$13,600
660a	6,410	TON	ASPHALTIC CONCRETE	45	$288,450
660b	449	TON	ASPHALT CEMENT (7%)	300	$134,610
700	1	LS	TRAFFIC MARKING	15,000	$15,000
900a	1	LS	SEEDING	10,000	$10,000
701a	6	EA	SURVEY MONUMENTS WITH CASES	300	$1,800
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
1665	120	SF	PASSENGER WAITING FACILITY	125	$15,000
			SUBTOTAL		$25,189,519
	15%		CONTIG		$3,778,428
			TOTAL		**$28,967,947**

Estimated Electrical Costs for Site 8

Pay Item	Quantity		Unit Price		Amount
Runway Marker Light, L-862 (Each)	40	$	1,450.0	$	58,000
Runway Threshold Marker Light, L-862 (Each)	16	$	1,450.0	$	23,200
Taxiway Marker Light , L-861T (Each)	30	$	800.0	$	24,000
No. 8 Cable, L-824 (Lineal Foot)	10,250	$	2.6	$	26,650
2" Rigid Steel Conduit (Lineal Foot)	410	$	18.0	$	7,380
2" HDPE Conduit (Lineal Foot)	10,000	$	14.5	$	145,000
2" HDPE Conduit FAA (Lineal Foot)	4,500	$	14.5	$	65,250
No. 6 Ground Conductor(Lineal Foot)	10,300	$	0.9	$	9,270
3" HDPE Conduit (Lineal Foot)	100	$	15.8	$	1,580
15KV Cable, No. 2, Conc. Neut. EPR Cable	5,000	$	20.0	$	100,000
Type 3 Handhole (Each)	10	$	2,500.0	$	25,000
PAPI	2	$	50,000.0	$	100,000
Transformers w/ enclosures, disconects, etc.	3	$	5,000.0	$	15,000
Airport Sign, L-858 (Each)	4	$	4,200.0	$	16,800
2 no. 6 & 1 no. 10 Conductors (Lineal Foot)	1,500	$	2.1	$	3,150
Regulator Building	1	$	100,000.0	$	100,000
Electrical Panel & Main Disconnect, Lights, Wiring	1	$	50,000.0	$	50,000
Beacon	1	$	80,000.0	$	80,000
Windcone	2	$	5,000.0	$	10,000
REILS	2	$	15,000.0	$	30,000
Service	1	$	30,000.0	$	30,000
				$	-
			Sub Total	$	920,280
Utility Line Extension (0.25 Mile)	1	$	25,000.0	$	25,000
			Total	$	945,280
Contingency	15%			$	141,792
	Total electrical Site 8			**$**	**1,087,072**

17.2. Airport Site Access

Each of the final airport sites considered have their own access constructions. Each airport site access route was estimated to the same accuracy limitations of the airport site it serves. As with the airport sites, the project's access estimate also includes all other airport and airport access cost centers. The road access for sites 3 and 4 is a continuation of Auk'Tah Lake Road and is located inland form the shoreline of Favorite Bay for previously explained reasons. Bridges are shown as constructed for fish stream crossing.

The public process brought to the study team's attention a Bureau of Indian Affairs (B.I.A.) program that has available funds for Alaska bridges. Public members requested that access from near the landfill, directly crossing Favorite Channel by bridge, be investigated. Public members felt that B.I.A. would fund the bridge approaches and bridges through this little used fund source.

Conversations were held with Robert (Bob) Martin, P.E., head of the Alaska B.I.A.'s Road Division. Mr. Martin did state that such funds are available, but with certain specific stipulations. These included, but are not limited to:

1. The project must benefit Alaskan Indian Tribe Members;
2. The bridge project must meet all navigation restrictions posed by the site and applicable agencies (U.S.C.G.; ADF&G; DOT/PF; USDA/FS; City of Angoon and the local Indian Corporation).
3. The project must be surveyed, geotechnically investigated and designed prior to B.I.A. accepting an application for project funding.
4. B.I.A. reserved the rights to fund all, part or none of the submitted application.

Because of these stipulations, a bridge access route to site 3, although estimated, was not accomplished to the same reconnaissance accuracy as other routes, or bridges. This is due, in part, to DOT/PF's policy not to design a project in "hope" of outside funding. Used for road costs were the guesstimated per mile cost of this study's estimated roads. Bridge costs used were the average, per foot costs for bridges in the Ketchikan Airport Access Study.

The following are the ***estimated*** project construction costs for each airport site's access.

17.2.1 - Site 3 Road Access Construction Cost

BID SCHEDULE					
SITE NO. 3 - AIRPORT ACCESS (+ SITE 4G-BOP TO EQUATION)					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100		LS	MOB/DEMOB (5%)	460,218	$460,218
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	5,000	$5,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	5,000	$5,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	276,131	$276,131
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	5,000	$5,000
200f	15.00	AC	CLEARING AND GRUBBING	10,000	$150,000
200g	10	EA	SELECTED TREE REMOVAL	400	$4,000
300a	141,750	CY	UNCLASSIFIED EXCAVATION	8.00	$1,134,000
300b	100,000	CY	PEAT EXCAVATION	4.00	$400,000
330f	129,350	CY	EMBANKMENT	13.00	$1,681,550
330g	1	ALL REQ	ACCESS - STA. 128 TO 10 (SITE 3)	303,662.00	$303,662
350a	100	CY	RIPRAP, CLASS II	35	$3,500
400a	4,000	LF	24" CMP	35	$140,000
400b	240	LF	30" CMP	55	$13,200
400c	100	LF	60" CMP	100	$10,000
400d	120	LF	48" CMP	64.50	$7,740
440a	80	LF	CHAIN LINK FENCE	25	$2,000
440c	1	EA	DRIVE THRU SLIDE GATES	2,500	$2,500
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	38,365	CY	SUBBASE COURSE	15	$575,475
510a	19,730	TON	CRUSHED AGGREGATE BASE COURSE	16.50	$325,545
551a	500	SY	GEOTEXTILE FABRIC	5	$2,500
600a	5	TON	BITUMINOUS PRIME COAT	400	$2,000
660a	4,665	TON	ASPHALTIC CONCRETE	45	$209,925
660b	327	TON	ASPHALT CEMENT (7%)	300	$97,965
700	1	LS	TRAFFIC MARKING	5,000	$5,000
900a	1	ALL REQ	SEEDING	5,000	$5,000
701a	28	EA	SURVEY MONUMENTS WITH CASES	300	$8,400
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
SITE 4 ACCESS	1	ALL REQ	ACCESS - STA. 102 TO 128 WITH BRIDGE	4,086,404	$4,086,404
			SUBTOTAL		$9,945,715
	15%		CONTIG		$1,491,857
			TOTAL		**$11,437,572**

17.2.2. – Alternate Site 3 Road Access Construction Cost

1.42 Mile Roadway…….. $2,530,520
1 each – 150 foot Bridge…….. $1,158,000
1 each – 225 foot Bridge…….. $1,737,000
1 each – 1,000-foot Bridge……. $8,480,000
15% Contingency……. $2,085,828
Grand Total……..$15,991,348

17.2.3 - Site 4 Road Access Construction Cost

BID SCHEDULE					
SITE NO. 4 - AIRPORT ACCESS - 4G					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100		LS	MOB/DEMOB (5% OF THIS ESTIMATE NOT SITE 4	259,778	$259,778
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	5,000	$5,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	5,000	$5,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	155,867	$155,867
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	5,000	$5,000
200f	22.00	AC	CLEARING AND GRUBBING	10,000	$220,000
200g	10	EA	SELECTED TREE REMOVAL	400	$4,000
300a	300,200	CY	UNCLASSIFIED EXCAVATION	6.50	$1,951,300
330f	111,267	CY	EMBANKMENT	9.25	$1,029,220
350a	500	CY	RIPRAP, CLASS II	35	$17,500
400a	1,200	LF	24" CMP	35	$42,000
400b	240	LF	30" CMP	55	$13,200
400d	120	LF	48" CMP	64.50	$7,740
440a	80	LF	CHAIN LINK FENCE	25	$2,000
440c	1	EA	DRIVE THRU SLIDE GATES	2,500	$2,500
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	56,675	CY	SUBBASE COURSE	15	$850,125
510a	29,140	TON	CRUSHED AGGREGATE BASE COURSE	16.50	$480,810
551a	500	SY	GEOTEXTILE FABRIC	5	$2,500
600a	5	TON	BITUMINOUS PRIME COAT	400	$2,000
660a	8,445	TON	ASPHALTIC CONCRETE	45	$380,025
660b	591	TON	ASPHALT CEMENT (7%)	300	$177,345
700	1	LS	TRAFFIC MARKING	5,000	$5,000
900a	1	ALL REQ	SEEDING	5,000	$5,000
701a	21	EA	SURVEY MONUMENTS WITH CASES	300	$6,300
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
901	16,000	SF	BRIDGE, SUPER AND SUB-STRUCTURE	193	$3,088,000
			SUBTOTAL		$8,741,210
	15%		CONTIG		$1,311,181
			TOTAL		**$10,052,391**

17.2.4 - Site 5 Road Access Construction Cost

BID SCHEDULE					
SITE NO. 5 - AIRPORT ACCESS - NEW TEMPLATE - NEW MAPPING					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100		LS	MOB/DEMOB (5%)	275,000	$275,000
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	5,000	$5,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	5,000	$5,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	165,000	$165,000
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	5,000	$5,000
200f	10.50	AC	CLEARING AND GRUBBING	10,000	$105,000
200g	10	EA	SELECTED TREE REMOVAL	400	$4,000
300a	508,880	CY	UNCLASSIFIED EXCAVATION	7.15	$3,638,492
330f	109,500	CY	EMBANKMENT	8	$876,000
350a	100	CY	RIPRAP, CLASS II	35	$3,500
400b	540	LF	30" CMP	55	$29,700
400d	160	LF	48" CMP	64.50	$10,320
440a	100	LF	CHAIN LINK FENCE	25	$2,500
440c	1	EA	DRIVE THRU SLIDE GATES	2,500	$2,500
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	24,068	CY	SUBBASE COURSE	15	$361,020
510a	12,134	TON	CRUSHED AGGREGATE BASE COURSE	16.50	$200,211
551a	1,000	SY	GEOTEXTILE FABRIC	5	$5,000
600a	5	TON	BITUMINOUS PRIME COAT	400	$2,000
660a	3,168	TON	ASPHALTIC CONCRETE	45	$142,560
660b	222	TON	ASPHALT CEMENT (7%)	300	$66,528
700	1	LS	TRAFFIC MARKING	5,000	$5,000
900a	1	ALL REQ	SEEDING	5,000	$5,000
701a	6	EA	SURVEY MONUMENTS WITH CASES	300	$1,800
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
			SUBTOTAL		$5,940,131
	15%		CONTIG		$891,020
			TOTAL		**$6,831,151**

17.2.5 - Site 6 Road Access Construction Cost

BID SCHEDULE					
SITE NO. 6 - AIRPORT ACCESS - NEW TEMPLATE - NEW MAPPING					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100		LS	MOB/DEMOB (5%)	13,560	$13,560
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	5,000	$5,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	5,000	$5,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	8,150	$8,150
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	5,000	$5,000
200f	1.00	AC	CLEARING AND GRUBBING	10,000	$10,000
200g	10	EA	SELECTED TREE REMOVAL	400	$4,000
300a	16,310	CY	UNCLASSIFIED EXCAVATION	7.15	$116,617
330f	50	CY	EMBANKMENT	8.00	$400
350a	100	CY	RIPRAP, CLASS II	35	$3,500
400b	240	LF	30" CMP	55	$13,200
400d	120	LF	48" CMP	64.50	$7,740
440a	80	LF	CHAIN LINK FENCE	25	$2,000
440c	1	EA	DRIVE THRU SLIDE GATES	2,500	$2,500
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	1,720	CY	SUBBASE COURSE	15	$25,800
510a	840	TON	CRUSHED AGGREGATE BASE COURSE	16.50	$13,860
551a	500	SY	GEOTEXTILE FABRIC	5	$2,500
600a	5	TON	BITUMINOUS PRIME COAT	400	$2,000
660a	255	TON	ASPHALTIC CONCRETE	45	$11,475
660b	18	TON	ASPHALT CEMENT (7%)	300	$5,355
700	1	LS	TRAFFIC MARKING	5,000	$5,000
900a	1	ALL REQ	SEEDING	5,000	$5,000
701a	4	EA	SURVEY MONUMENTS WITH CASES	300	$1,200
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
			SUBTOTAL		$292,857
	15%		CONTIG		$43,928
			TOTAL		**$336,785**
			AUK'TAH ROAD RE-CONSTRUCTION		
	0.38	MILE	RE-ALIGN (VERTICALLY) 2,000' OF AUK'TAH RD BASED ON PER MILE COST OF ALTERNATE 6A ROADWAY COST/MILE	$1,108,420	$421,200
	15%		CONTIG		$63,180
			TOTAL		**$484,380**

17.2.6.1 - Airport Site 6A Airport Access

BID SCHEDULE					
SITE NO. 6A - AIRPORT ACCESS					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100		LS	MOB/DEMOB (5%)	12,000	$12,000
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	5,000	$5,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	5,000	$5,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	7,140	$7,140
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	5,000	$5,000
200f	1.90	AC	CLEARING AND GRUBBING	10,000	$19,000
200g	10	EA	SELECTED TREE REMOVAL	400	$4,000
300a	9,160	CY	UNCLASSIFIED EXCAVATION	7.15	$65,494
330f	415	CY	EMBANKMENT	8.00	$3,320
350a	100	CY	RIPRAP, CLASS II	35	$3,500
400b	160	LF	30" CMP	55	$8,800
400d	120	LF	48" CMP	64.50	$7,740
440a	80	LF	CHAIN LINK FENCE	25	$2,000
440c	1	EA	DRIVE THRU SLIDE GATES	2,500	$2,500
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	2,065	CY	SUBBASE COURSE	15	$30,975
510a	960	TON	CRUSHED AGGREGATE BASE COURSE	16.50	$15,840
551a	350	SY	GEOTEXTILE FABRIC	5	$1,750
600a	5	TON	BITUMINOUS PRIME COAT	400	$2,000
660a	325	TON	ASPHALTIC CONCRETE	45	$14,625
660b	23	TON	ASPHALT CEMENT (7%)	300	$6,900
700	1	LS	TRAFFIC MARKING	5,000	$5,000
900a	1	ALL REQ	SEEDING	5,000	$5,000
701a	2	EA	SURVEY MONUMENTS WITH CASES	300	$600
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
			SUBTOTAL		$257,184
	15%		CONTIG		$38,578
			TOTAL		**$295,762**

17.2.6.2 - Site 6A Road Access Construction Cost

BID SCHEDULE					
SITE NO. 6A - RELOCATE EXISTING ROAD					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100		LS	MOB/DEMOB (5%)	20,400	$20,400
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	5,000	$5,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	5,000	$5,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	12,250	$12,250
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	5,000	$5,000
200f	4.50	AC	CLEARING AND GRUBBING	10,000	$45,000
200g	10	EA	SELECTED TREE REMOVAL	400	$4,000
300a	8,925	CY	UNCLASSIFIED EXCAVATION	7.15	$63,814
330f	1,295	CY	EMBANKMENT	8.00	$10,360
350a	100	CY	RIPRAP, CLASS II	35	$3,500
400b	240	LF	30" CMP	55	$13,200
400d	360	LF	36" CMP	64.50	$23,220
440a	560	LF	CHAIN LINK FENCE	25	$14,000
500b	5,060	CY	SUBBASE COURSE	15	$75,900
510a	2,350	TON	CRUSHED AGGREGATE BASE COURSE	16.50	$38,775
551a	800	SY	GEOTEXTILE FABRIC	5	$4,000
600a	5	TON	BITUMINOUS PRIME COAT	400	$2,000
660a	790	TON	ASPHALTIC CONCRETE	45	$35,550
660b	55	TON	ASPHALT CEMENT (7%)	300	$16,500
	3,630	SY	REMOVE ESXIST. A.C./PVM'T	6	$21,780
700	1	LS	TRAFFIC MARKING	5,000	$5,000
900a	1	ALL REQ	SEEDING	5,000	$5,000
701a	12	EA	SURVEY MONUMENTS WITH CASES	300	$3,600
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
			SUBTOTAL		$440,849
	15%		CONTIG		$66,127
			TOTAL		**$506,976**

17.2.7 - Site 8 Road Access Construction Cost

BID SCHEDULE					
SITE NO. 8 - AIRPORT ACCESS - NEW MAPPING					
ITEM NO.	APPROX. QUANT.		NAME OF PAY ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE DOLLARS	AMOUNT
G100		LS	MOB/DEMOB (5%)	6,165	$6,165
111a	1	LS	TEMP EROSION AND POLLUTION CONTROL	5,000	$5,000
111b	1	LS	EROSION AND POLLUTION CONTROL, ADMIN	3,000	$3,000
120	1	Contig. Sum	DBE ADJUSTMENT	5,000	$5,000
121	1	LS	CONSTR. SURVEY BY CONTRACTOR (3%)	3,700	$3,700
130	1	LS	ENGINEERS FIELD OFFICE AND LAB	5,000	$5,000
200f	0.50	AC	CLEARING AND GRUBBING	10,000	$5,000
200g	10	EA	SELECTED TREE REMOVAL	400	$4,000
300a	1,620	CY	UNCLASSIFIED EXCAVATION	7.15	$11,583
330f	200	CY	EMBANKMENT	8.00	$1,600
350a	100	CY	RIPRAP, CLASS II	35	$3,500
400b	160	LF	30" CMP	55	$8,800
400d	120	LF	48" CMP	64.50	$7,740
440a	80	LF	CHAIN LINK FENCE	25	$2,000
440c	1	EA	DRIVE THRU SLIDE GATES	2,500	$2,500
440e	1	EA	PEDESTRIAN GATE	1,000	$1,000
441	1	EA	GATE OPERATOR	15,000	$15,000
500b	691	CY	SUBBASE COURSE	15	$10,365
510a	337	TON	CRUSHED AGGREGATE BASE COURSE	16.50	$5,561
551a	350	SY	GEOTEXTILE FABRIC	5	$1,750
600a	5	TON	BITUMINOUS PRIME COAT	400	$2,000
660a	105	TON	ASPHALTIC CONCRETE	45	$4,725
660b	7	TON	ASPHALT CEMENT (7%)	300	$2,100
700	1	LS	TRAFFIC MARKING	5,000	$5,000
900a	1	ALL REQ	SEEDING	5,000	$5,000
701a	3	EA	SURVEY MONUMENTS WITH CASES	300	$900
702	1	ALL REQ	STANDARD SIGNS	5,000	$5,000
			SUBTOTAL		$132,989
	15%		CONTIG		$19,948
			TOTAL		**$152,937**
	4,200	FEET	AUK'TAH ROAD 4,200' ($1.781 M/MI) 5,280/MI		$1,417,090

18.0 RECOMMENDED AIRPORT SITE (and alternates)

Using previous site study information, public involvement information, City of Angoon concerns, local flight carriers input, engineering and environmental concerns, the study team is recommending a principal airport site and an alternate for final environmental and engineering analysis.

18.1 Recommended "Principal" Site

The recommended site is Airport Site 3 with its circumventing Favorite Bay Access. The environmental and other input reasons are shown in the Division III Site Matrix. The total estimated Project Costs, expressed in 2003 dollars is $24,946,629.

Because all access, land availability, environmental, engineering and cost studies are not complete, an alternate site is also recommended.

18.2 Alternate Airport Site

Site 4 is not recommended as an alternate, principally due to prevailing and cross winds which will be affected by the hillsides and mountains to the east. Site 6 is not recommended principally due to its "suspected" incorrect orientation to prevailing winds.

Site 6A is the alternate recommended site. Due to its community disturbances, limited community (and airport) expansion possibilities, as well as concern for community water quality, it can only be recommended as an alternate to the superior Site 3. The total estimated project cost for Site 6A is $36,462,189.

19.0 REMAINING WORK

19.1 Environmental Documentation

Further and specific studies are recommended at the principal site to determine that any and all environmental issues are known, addressed and mitigated, if necessary. The input would be included in a final Site Environmental Impact Statement.

19.2 P.S. & E Documentation

Because the reconnaissance study considered "many" sites, the plans, specifications and (other) engineering documentations developed for this report were from "limited" accuracy surveying and geotechnical data. Because of this, cost and other site considerations can only be described as reconnaissance (or preliminary) level. Therefore, actual "on-the-ground" surveys, soils and other related engineering efforts must be accomplished to better estimate the project costs and environmental concerns. In addition, plans, profile and cross-section studies will use this information to accurately determine the alignment and profile of both the airport site and its access. This information will enhance the project costing studies.

19.3 Final Studies

The final studies will include:

1. Wind orientation;
2. Environmental Impact Studies (E.I.S.);
3. An Engineering Design Study Report;
4. Contract Documents, including Plans (profiles), Specifications and other related Engineering Documentation.

20.0 ESTIMATED PROJECT TIME

As stated during the first public meeting, the study team, project DOT/PF staff and FAA representative estimated that this project time duration would be six to ten years after the acceptance of the project's Reconnaissance Study, site recommendation, and project funding availability. This places the project to begin construction between 2006 and 2010.

Construction is estimated to take no less than two years and no more than three.

21.0 PRESENT WORK

All cost estimates are made in 2002/2003 dollars. No projection to actual construction dates have been made.

DIVISION IV – MAPPING AND RECONNAISSANCE PLANS

The following project plans reflect this study's efforts for each of the sites studied.

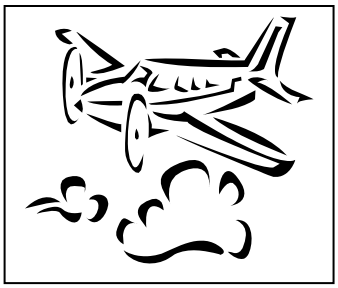
It also includes a site previously not considered (Site 8) in the final selection process, but conducted to determine costing of "closer in sites" (to Angoon City Center) with correct wind orientations to the community's previous (1983) study's recommendation. For all related reasons, this is shown for cost comparisons only as environmental and future community expansion (and impacts) demand that this site **not** be considered for further analysis.

22.0 AIPORT SITE AND ACCESS PROJECT COSTS AND MAPPING.

The following sheets reflect the plan-profile and cross-section drawings of all sites. Attached is a summary project cost table.

Appendix A

Angoon Residents' Travel Survey



Fill Out This Survey and Enter to Win Cash

Dear Angoon resident:

The Alaska Department of Transportation and Public Facilities (DOT&PF) is planning a land-based Angoon airport. DOT&PF and the R&M Engineering consulting team need YOUR help.

In order to aide runway design and find out future aviation service demand, we must learn about the travel patterns and needs of Angoon residents.

We need every Angoon resident 18 years or older to complete this survey. Your answers will be used for statistical purposes and are **confidential.**

These answers are important to us. When you turn in a completed survey to the following locations, **you can sign up to win a first prize of $50.00, or one of two second prizes of $25.00 each.** Only one entry per person 18 years or older.

Please fill this survey out now! When you are done, bring the finished form to the front desk of City Hall or the Angoon Community Association Office by Monday, February 12, and staff will sign you up for the drawing. More surveys are available at those places too.

Thank you. The more Angoon resident responses, the better the project will meet your needs.

If you want to talk to one of the DOT&PF consultant team about this survey, please call Linda Snow in Juneau (780-6106) or send her an email to ljsnow@ak.net.

Please answer all the questions with your best guess.

1. Have there been times in the past year (12 months) when you wanted to take a scheduled flight into or out of Angoon and couldn't? (CIRCLE ONE)

   YES NO

2. If YES, about how many times in the past year (12 months)? _____

3. If YES, where were you planning to fly? (CIRCLE ALL THAT APPLY)

   Angoon to Juneau Angoon to Sitka Angoon to Other (Where) _____

   Juneau to Angoon Sitka to Angoon Other to Angoon (Where)_____

4. If YES, which of the following were reasons you couldn't get in or out of Angoon by scheduled flight? (CIRCLE ALL THAT APPLY)

   Weather Ticket Price Too High No Seats Left on the Plane Other

5. If YES, for those times in the past year that you couldn't get in or out of Angoon by scheduled flight, what did you do? (CIRCLE ALL THAT APPLY)

   Cancel the Trip Delay the Trip Charter a Plane Take the Ferry

   Other (What) _____

6. Help us understand why you usually travel to the following places. Please mark an X in the box for all the reasons you travel to each destination.

Destination	Shopping	Medical Reasons	Work or Business	School	Visiting Friends or Family	Vacation	Recreation or Events (Gold Medal, Celebration)	Other
Juneau								
Sitka								
Other Southeast								
(say where):								
Other Destinations								
(say where):								

Thank you for your help! Bring the finished survey to the front desk of City Hall or the Angoon Community Association Office by Monday, February 12, and staff will sign you up for the drawing.

Appendix B

FAA's Runway Length Requirements Computer Model Results

FAA's Runway Length Requirements Computer Model Results

AIRPORT AND RUNWAY DATA

Airport elevation.....100 feet
Mean daily maximum temperature of the hottest month.....42.00 F.
Maximum difference in runway centerline elevation.....0 feet
Length of haul for airplanes of more than 60,000 pounds .....500 miles
Dry runways

RUNWAY LENGTHS RECOMMENDED FOR AIRPORT DESIGN

Small airplanes with approach speeds of less than 30 knots.....300 feet
Small airplanes with approach speeds of less than 50 knots.....810 feet
Small airplanes with less than 10 passenger seats
  75 percent of these small airplanes.....2040 feet
  95 percent of these small airplanes.....2550 feet
  100 percent of these small airplanes.....3020 feet
Small airplanes with 10 or more passenger seats.....3450 feet

Large airplanes of 60,000 pounds or less
  75 percent of these large airplanes at 60 percent useful load.....4560 feet
  75 percent of these large airplanes at 90 percent useful load.....5770 feet
  100 percent of these large airplanes at 60 percent useful load.....4560 feet
  100 percent of these large airplanes at 90 percent useful load.....5890 feet

Airplanes of more than 60,000 pounds.....Approximately 5050 feet

REFERENCE: Chapter 2 of AC 150/5325-4A, Runway Length Requirements for Airport Design, no Changes included.

Appendix C
Glossary of Aviation Planning Terms

Glossary of Aviation Planning Terms

ABBREVIATIONS

AC - Advisory Circular
ADF - Automatic Direction Finder
ADPM - Average Day of the Peak Month
AGL - Above Ground Level
AIP - Airport Improvement Program
ALP - Airport Layout Plan
ALS - Approach Lighting System
ALSF-1 - Approach Light System with Sequence Flasher Lights
ARC - Airport Reference Code
ARFF - Airport Rescue and Fire Fighting
ARP - Airport Reference Point
ARTCC - Air Route Traffic Control Center
ASDA - Accelerate-Stop Distance Available
ASV - Annual Service Volume
ATC - Air Traffic Control
ATCT - Air Traffic Control Tower
AVGAS - Aviation Gasoline
BRL - Building Restriction Line
CIP - Capital Improvement Program
CL - Centerline
DH - Decision Height
DME - Distance Measuring Equipment
DOT&PF - Department of Transportation and Public Facilities
EA - Environmental Assessment
EIS - Environmental Impact Statement
EP - Enplaned Passenger
EPA - The United States Environmental Protection Agency
FAA - Federal Aviation Administration
FAR - Federal Aviation Regulation
FATO - Final Approach and Takeoff Area
FBO - Fixed Based Operator
FSS - Flight Service Station
GA - General Aviation
GPS - Global Positioning System
HIRL - High Intensity Runway Lights
IFR - Instrument Flight Rules
ILS - Instrument Landing System
LDA - Landing Distance Available
LIRL - Low Intensity Runway Lights
MALS - Medium Intensity Approach Light System

MALSF - Medium Intensity Approach Light System with sequence flashing Lights
MALSR - Medium-Intensity Approach Lighting System with Runway Alignment Indicators
MGW - Maximum Gross Weight
MIRL - Medium Intensity Runway Lights
MITL - Medium Intensity Taxiway Lights
MSL - Mean Sea Level
NAVAID - Air Navigation Facility/Aid
NDB - Non-Directional Beacon
NPIAS - National Plan of Integrated Airport Systems
OAG - Official Airline Guide
ODALS - Omnidirectional Approach Lighting Systems
OFA - Object Free Area
OFZ - Obstacle Free Zone
PAPI - Precision Approach Path Indicator
PFC - Passenger Facility Charge
PIR - Precision Instrument Runway
RAIL - Runway Alignment Indicator Lights
REIL - Runway End Identifier Lights
RSA - Runway Safety Area
RPZ - Runway Protection Zone
RVR - Runway Visual Range
SEP - Single Engine Piston
TAF - FAA Terminal Area Forecasts
TODA - Take-Off Distance Available
TORA - Take-Off Run Available
UHF - Ultra High Frequency
VASI - Visual Approach Slope Indicator
VFR - Visual Flight Rules
VHF - Very High Frequency
WAAS - Wide Area Augmentation System

DEFINITIONS

Active Aircraft - Aircraft registered with the FAA and reported to have flown during the preceding calendar year.

Activity - Used in aviation to refer to any kind of movement, e.g., cargo flights, passenger flights, or passenger enplanements. Without clarification it has no particular meaning.

ADF - Automatic Direction Finder.

Advisory Circular (AC) - A series of Federal Aviation Administration (FAA) publications providing guidance and standards for the design, operation and performance of aircraft and airport facilities.

AGL - Above Ground Level.

Airport Improvement Program (AIP) - A congressionally mandated program through which the FAA provides funding assistance for the development and enhancement of airport facilities.

Air Cargo - Commercial freight, including express packages and mail, transported by passenger or all-cargo airlines.

Air Carrier - An airline providing scheduled air service for the commercial transport of passengers or cargo.

Air Navigation Facility (NAVAID) - Although generally referring to electronic radio wave transmitters (VOR, NDB, ILS), it also includes any structure or mechanism designed to guide or control aircraft involved in flight operations.

Air Route Traffic Control Center (ARTCC) - FAA-manned facility established to provide air traffic control services to aircraft operating in controlled airspace, en route between terminal areas. Although designed to handle aircraft operating under IFR conditions, some advisory services are provided to participating VFR aircraft when controller work loads permit.

Air Taxi - An air carrier certificated in accordance with FAR Part 135 and authorized to provide, on demand, public transportation of persons and property by aircraft. Air taxi operators generally operate small aircraft "for hire" for specific trips.

Aircraft Approach Category - A grouping of aircraft based on a speed of 1.3 times the stall speed in the landing configuration at maximum gross landing weight. The aircraft approach categories are:

Category A - Speed less than 91 knots;
Category B - Speed 91 knots or more but less than 121 knots;
Category C - Speed 121 knots or more but less than 141 knots;
Category D - Speed 141 knots or more but less than 166 knots; and,
Category E - Speed 166 knots or more.

Aircraft Gate Position - An aircraft operational stand close to the terminal building and related to a specific passenger-loading gate.

Aircraft Mix - The classification of aircraft into groups that are similar in size, noise, and operational characteristics.

Aircraft Operations - The airborne movement of aircraft. There are two types of operations: local and itinerant defined as follows:

1. Local Operations are performed by aircraft which:
   (a) Operate in the local traffic pattern or within sight of the airport;
   (b) Are known to be departing for or arriving from a local practice area.

2. Itinerant operations are all others.

Airfield - A defined area on land or water including any buildings, installations, and equipment intended to be used either wholly or in part for the arrival, departure or movement of aircraft.

Airplane Design Group - A grouping of airplanes based on wingspan. The groups are:

Group I:	Up to, but not including 49 feet
Group II:	49 feet up to, but not including 79 feet
Group III:	79 feet up to, but not including 118 feet
Group IV:	118 feet up to, but not including 171 feet
Group V:	171 feet up to, but not including 214 feet
Group VI:	214 feet up to, but not including 262 feet.

Airport Layout Plan (ALP) - An FAA required map of an airport depicting existing and proposed facilities and uses, with clearance and dimensional information showing compliance with applicable standards.

Airport Reference Code (ARC) - A coding system used to relate airport design criteria to the operational and physical characteristics of the airplanes intended to operate at the airport. It is a combination of the aircraft approach category and the airplane design group.

Airport Reference Point (ARP) - The location at which the designated latitude and longitude for an airport are measured.

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

Airport Traffic Area - Unless otherwise specifically designated that airspace with a horizontal radius of five statute miles from the geographic center of any airport at which a control tower is operating, extending from the surface up to but not including 3,000 feet above the surface.

Airside - That portion of the airport facility where aircraft movements take place, airline operations areas, and areas that directly serve the aircraft (taxiway, runway, maintenance, and fueling areas). Also called the airport operations area.

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 aircraft.

Alternate Airport - An alternate destination airport if flight to the original destination cannot be completed.

Annual Service Volume (ASV) - A reasonable estimate of an airport's annual capacity. It accounts for differences in runway use, aircraft mix, weather conditions, etc., that would be encountered over a year's time.

Approach End of Runway - The near end of the runway as viewed from the cockpit of a landing aircraft.

Approach Surface - An imaginary surface 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 the runway based upon the planned approach. The inner edge of the approach surface is the same width as the primary surface and expands uniformly depending upon the planned approach.

Approved Instrument Approach - Instrument approach meeting the design requirements, equipment specifications, and accuracies, as determined by periodic FAA flight checks, and which are approved for general use and publication by the FAA.

Apron - A defined area where aircraft are maneuvered and parked and where activities associated with the handling of flights can be carried out.

ARFF - Aircraft Rescue and Fire Fighting.

ATC - Air Traffic Control

ATCT - Air Traffic Control Tower.

AVGAS - Aviation gasoline. Fuel used in reciprocating (piston) aircraft engines. Avgas is manufactured in the following grades; 80/87, 100LL, 100/130, and 115/145.

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 an airport on an annual basis.

BRL - Building Restriction Line.

Capacity - (Throughput capacity). A measure of the maximum number of aircraft operations which can be accommodated on the airport component in an hour.

Capital Improvement Program (CIP) - A scheduled of planned projects and costs, often prepared and adopted by public agencies.

CAT I (one) - Category I Instrument Landing System which provides for approach to a height above touchdown of not less than 200 feet and with Runway Visual Range of not less than 1,800 feet.

CAT II (two) - Category II ILS approach procedure which provides for approach to a height above touchdown of not less than 100 feet and a RVR of not less than 1,200 feet.

CAT III (three) - Category III ILS approach which provides for an approach with no decision height and a RVR of not less than 700 feet.

Ceiling - The height above the ground of the base of the lowest layer of clouds or obscuring phenomena aloft that is reported as broken or overcast and not classified as scattered, thin, or partial. Ceiling figures in aviation weather reports may be determined as measured, estimated, or indefinite.

Charter - A nonscheduled flight offered by either a supplemental or certificated air carrier.

Circling Approach - An instrument approach procedure in which an aircraft executes the published instrument approach to one runway, the maneuvers visually to land on a different runway. Circling approaches are also used at airports that have published instrument approaches with a final approach course that is not aligned within 30 degrees of any runway.

Clear Zone - See Runway Protection Zone

Clearway - A clearway is an area available for the continuation of the take-off operation which is above a clearly defined area connected to and extending beyond the end of the runway. The area over which the clearway lies need not be suitable for stopping aircraft in the event of an aborted take-off. Clearways are applicable only in the take-off operations of turbine-engine aircraft.

Commuter Air Carrier - An air carrier certificated in accordance with FAR Part 135 which operates aircraft with a maximum of 60 seats, and provides at least five scheduled round trips per week between two or more points, or carries mail.

Commuter/Air Taxi Operations - Those arrivals and departures performed by air carriers certificated in accordance with FAR Part 135.

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 the government without prior agreement.

Conical Surface - An imaginary surface extending outward and upward from the periphery of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet.

Control Areas - These consist of the airspace designated as Federal Airways, additional Control Areas, and Control Area Extensions, but do not include the Continental Control Areas.

Control Tower - A central operations facility in the terminal air traffic control system consisting of a tower cab structure using air/ground communications and/or radar, visual signaling, and other devices to provide safe and expeditious movement of air traffic.

Control Zones - Areas of controlled airspace which extend upward from the surface and terminate at the base of the continental control area. Control zones that do not underlie the continental control area have no upper limit. A control zone may include one or more airports and is normally a circular area with a radius of five statute miles and any extensions necessary to include instrument departure and arrival paths.

Controlled Airspace - Airspace designated as continental control area, control area, control zone, or transition area within which some or all aircraft may be subject to air traffic control.

Critical Aircraft - The aircraft which controls one or more design items based on wingspan, approach speed and/or maximum certificated take off weight. The same aircraft may not be critical to all design items.

Crosswind - When used concerning wind conditions, the word means a wind not parallel to the runway or the path of an aircraft.

Decision Height (DH) - During a precision approach, the height (or altitude) at which a decision must be made to either continue the approach or execute a missed approach.

Declared Distances - The distances the airport owner declares available and suitable for satisfying an airplane's take-off distance, accelerated-stop distance, and landing distance requirements. The distances are:

- Take-off run available (TORA) - The runway length declared available and suitable for the ground run of an airplane taking off.
- Take-off distance available (TODA) - The TORA plus the length of any remaining runway and/or clearway (CWY) beyond the far end of the TORA.
- Accelerate-stop distance available (ASDA) - The runway plus stopway (SWY) length declared available and suitable for the acceleration and deceleration of an airplane aborting take-off.
- Landing distance available (LDA) - The runway length declared available and suitable for a landing airplane.

Design Hour - The design hour is an hour close to the peak but not the absolute peak, which is used for airport planning and design purposes. It is usually the peak hour of the average day of the peak month.

Displaced Threshold - Actual touchdown point on specific runways designated due to obstructions which 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.

DOT&PF - Department of Transportation and Public Facilities.

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.

Environmental Assessment (EA) - A report prepared under the National Environmental Policy Act (NEPA) analyzing the potential environmental impacts of a federally funded project.

Environmental Impact Statement (EIS) - A report prepared under NEPA fully analyzing the potential significant environmental impacts of a federally funded project.

EPA - The United States Environmental Protection Agency.

FAR Part 77 - Federal Aviation Regulations which establish standards for determining obstructions in navigable airspace.

Federal Aviation Administration (FAA) - A branch of the U.S. Department of Transportation responsible for the regulation of all civil aviation activities.

Fixed Base Operator (FBO) - An individual or company located at an airport providing commercial general aviation services.

Final Approach - The flight path of an aircraft which is inbound to the airport on an approved final instrument approach course, beginning at the point of interception of that course and extending to the airport or the point where circling for landing or missed approach is executed.

Fixed Wing - For the purposes of this report, any aircraft not considered rotorcraft.

Flight Plan - A description or outline of a planned flight which a pilot submits to the FAA, usually through a Flight Service Station.

Flight Service Station (FSS) - Air traffic facility operated by the FAA to provide flight service assistance such as pilot briefing, en route communications, search and rescue assistance and weather information.

General Aviation - All civil aviation operations other than scheduled air services and non-scheduled air transport operations for remuneration or hire.

Global Positioning System (GPS) - GPS uses a group of many satellites orbiting the earth to determine the position of users on or above the earth's surface. This system will provide at least non-precision approach capability to any airport having published instrument approach procedures.

HIRL - High Intensity Runway Lights.

Horizontal Surface - A horizontal plane 150 feet above the established airport elevation, the perimeter of which is constructed by swinging arcs with a radius of 5,000 feet for all runways designated as utility or general; and 10,000 feet for all other runways from the center of each end of the primary surface and connecting the adjacent arc by tangent lines.

Instrument Flight Rules (IFR) - These rules govern the procedures for conducting instrument flight. Pilots are required to follow these rules when operating in controlled airspace with visibility of less than three miles and/or ceiling lower than 1,000 feet.

Instrument Landing System (ILS) - ILS is designed to provide an exact approach path for alignment and descent of aircraft. Generally consists of a localizer, glide slope, outer marker, middle marker, and approach lights. This type of precision instrument system is being replaced by Microwave Landing Systems (MLS).

Instrument Runway - A runway equipped with electronic and visual navigation aids for which a precision or non-precision approach procedure having straight-in landing minimums has been approved.
Itinerant Operation - All aircraft operations at an airport other than local.

Landing Area - That part of the movement area intended for the landing and takeoff of aircraft.

LDN - Day-night sound levels; a method of measuring noise exposure.

Local Operation - Aircraft operation in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport.

LIRL - Low Intensity Runway Lights.

Mean Sea Level (MSL) - Elevation above Mean Sea Level.

Medium-Intensity Approach Lighting (MALSR) -This system includes runway alignment indicator lights. An airport lighting facility which provides visual guidance to landing aircraft.

Minimums - Weather condition requirements established for a particular operation or type of operation.

MIRL - Medium-Intensity Runway Lights.

MITL – Medium Intensity Taxiway Lights.

Movement Area - The runways, taxiways and other areas of the airport used for taxiing, takeoff and landing of aircraft, exclusive of loading ramps and parking areas.

Navigational Aid (NAVAID) - Any visual or electronic device airborne or on the surface which provides point to point guidance information or position data to aircraft in flight.

Non-Directional Beacon (NDB) - Transmits a signal on which a pilot may "home" using equipment installed in the aircraft.

Non-Precision Instrument Approach - An instrument approach procedure with only horizontal guidance or area-type navigational guidance for straight-in approaches.
Object Free Area (OFA) - A two-dimensional ground area surrounding runways, taxiways, and taxilanes which is clear of objects except those whose location is fixed by function.

Object Free Zone (OFZ) - The airspace defined by the runway OFZ and, as appropriate, the inner-approach OFZ and the inner-transitional OFZ, which is clear of object penetrations other than frangible NAVAIDs.

- Runway OFZ - The airspace above a surface centered runway centerline.
- Inner-approach OFZ - The airspace above a surface centered on the extended runway centerline. It applies to runways with an approach lighting system.
- Inner-transitional OFZ - The airspace above the surfaces located on the outer edges of the runway OFZ and the inner-approach OFZ. It applies to precision instrument runways.

Obstruction - An object that penetrates an imaginary surface described in FAR Part 77.

Omnidirectional Approach Lighting System (ODALS) - ODALS consists of seven omnidirectional flashing lights located in the approach area of a nonprecision runway.

Part 135 Air Carrier – Commuter and On-Demand operations. Airplanes having a passenger seating configuration of not more than 30 seats excluding any required crewmember seat.

Part 121 Air Carrier – Domestic, Flag, and Supplemental operations. Airplanes having a passenger seating configuration of more than 30 seats, excluding any required crewmember seat, or payload capacity of more than 7,500 pounds.

Peak Factor - The factor applied to the annual operations to determine the peak hour activity.

PIR - Precision Instrument Runway.

Precision Approach Path Indicator (PAPI) - Provides visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity focused light beams.

Precision Instrument Approach - An instrument approach procedure in which electronic vertical and horizontal guidance is provided, e.g. ILS and MLS.

Primary Surface - A surface longitudinally centered on the runway, extending 200 feet beyond each end of the runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline.

Rotorcraft (e.g. Helicopter) - A heavier-than-air aircraft supported in flight by the reactions of the air on one or more power-driven rotors on substantially vertical axis.

Runway End Identifier Lights (REIL) - These lights aid in early identification of the approach end of the runway.

Runway Protection Zone (RPZ) - The ground area under the approach surface which extends from the primary surface to a point where the approach surface is fifty feet above the ground. This was formerly known as the clear zone.

Runway Safety Area (RSA) - A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

Segmented Circle - A system of visual indicators designed to provide traffic pattern information at airports without operating control towers.

Touch and Go Operation - Practice flight performed by a landing touch down and continuous take off without stopping or exiting the runway.

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

VASI - Visual Approach Slope Indicator. See definition of PAPI.

Visual Flight Rules (VFR) - Flight rules by which aircraft are operated by visual reference to the ground. Weather conditions for flying under these rules must include a ceiling greater than 1,000 feet, three-mile visibility, and standard cloud clearance.

Wide Area Augmentation System (WAAS) – WAAS uses ground stations and several satellites orbiting the earth to augment the GPS signal and provide more accurate position information. This system will provide precision approach capability to any airport having published instrument approach procedures.

Wind Coverage - Wind coverage is the percent of time for which aeronautical operations are considered safe due to acceptable crosswind components.

Wind Rose - A scaled graphical presentation of wind information.

Appendix D
Public Meeting and News Letter Summary

January 24, 2001 Public Meeting

The Alaska DOT&PF and the R&M Engineering consulting team hosted a public meeting in Angoon, on January 24, 2001, at the Angoon Community Services building to discuss the Angoon Airport Reconnaissance Study. That meeting was in the evening from 7:00 pm to about 9:30 pm. Earlier that day, DOT&PF and the consulting team attended lunch at the Angoon Senior center and had an opportunity to review the project and answer questions with Angoon elders and others gathered for lunch.

Frank and thoughtful discussion occurred after both the Angoon Senior Center lunch and the evening public meeting. Comments and discussion at the January 24 meetings included the following:

Airport Need Several points were raised to demonstrate resident's need for an airport.

Airport Jobs Local hire during construction and airport operation is desired.

Community Support There was strong positive support for airport development by those attending the Angoon Senior Center discussion and at the public meeting.

Airport Location Several concerns and questions regarding the implications for a location on USFS land were raised. The reality of hard choices during the site selection between how close to the community the airport is, development costs, time required to develop, ease of land acquisition and permitting, and impact to homesites was discussed.
The City/Kootznoowoo/ACA Alliance and residents will need time to consider the criteria and the evaluation so that there is unity, not polarization, within the community.
The need to select a location that will serve today and future airport needs was noted.
Concerns that the airport location not impact the ability to develop and live on homesites, nor impact subsistence resources and harvest - particularly in Mitchell Bay, was noted.

Process Questions about the process and criteria for selecting an airport location were discussed. Concern was raised over the influence of outside environmental groups on a possible location on USFS land.

August 1, 2001 Public meeting

The Alaska DOT&PF and the R&M Engineering consulting team hosted a public meeting in Angoon, on August 1, 2001, at the Angoon Community Services building to discuss the draft Needs Assessment for the Angoon Airport Reconnaissance Study. The meeting was in the evening from 7:00 pm to about 9:30 pm.

The team gave a general project overview and then focused on a review of the draft Needs Assessment. This included discussion of the project's purpose and need statement, the aviation forecast (a power point presentation with an airport terms "primer" and assumptions), identification of the airport's critical aircraft, and the airport land and facility requirements for an estimated opening

year of 2007, and for the long term. The project's next phase, the airport site selection, was discussed also.

A question and answer session followed that focused on questions to clarify aspects of the aviation forecast, critical aircraft and facility requirements. Beyond technical clarifications, questions were also discussed on how landside facilities were determined, who's responsibility it was to build and maintain them, and whether campground facilities for travel-through pilots were desired. Some audience members were anxious to discuss possible airport sites, but this was premature, and would be the topic of the next meeting.

November 13, 2001 Public Meeting (note the following is section 7.2 in the Reconnaissance report)

The DOT&PF and the R&M Engineering consulting team hosted a public meeting in Angoon on November 13, 2001 to: a) review airport site evaluation work conducted over the last six months; b) review our preliminary recommendation to eliminate six possible airport sites from further review; and c) answer questions.

The team reviewed the site analysis and sequence of findings that led to narrowing possible airport sites down to two general areas (site 5/6/6A and site 3/4). We discussed the fact that instrumentation will be erected soon to gather wind direction and intensity data 24 hours a day, seven days a week, from (probably) the two general areas noted above for a period of at least six months. This will confirm the accuracy of earlier wind studies and data, and the suitability (or unsuitability) of the various sites. It will also provide data to assist with airport runaway layout and more detailed cost estimating that will occur with this study and as the Airport Master Plan/Environmental Documentation is prepared (2002-2004).

Residents were asked:

- Do you agree with the rationale to eliminate sites 1, 2, 5, 7, 8, and 9 from further consideration? (At the Nov. 13, public meeting in Angoon residents requested that site 5 remain a possible site encase wind patterns turn out different than expected and support this runway orientation.)

- If all other factors end up being about equal, do sites 6/6A and 3/4 both seem acceptable?

- At this time, does one of these areas (6/6A or 3/4) seem preferable? If so, what are your reasons or concerns?

- Provide any local knowledge about land use or environmental conditions, or other comments.

Residents had the following comments at the November 13, 2001, public meeting.

<u>General</u>

- Concern was expressed that recent wind data has not been gathered and analyzed. Residents want empirical, objective wind data and study. It was suggested that the State/team consider establishing an "observation protocol" and getting a resident to systematically assist with wind and fog observations as wind data is gathered.

- Residents have observed that there is more fog inland, less fog the closer you go to Chatham.

- It is important to clarify what Public Health's intentions are regarding the landfill. This could influence the airport location.

- If future wind study and analysis shows it is feasible, some find land use and planning advantages at site 5.

- The USFS wondered is it was too early to eliminate sites 8 and 9 from consideration. There was discussion about the rationale for eliminating these sites, based on multiple reasons: closeness to town, to already built homesites, to planned residential growth, for closeness to landfill, and for site 8 for conflicts with zoning and Angoon CMP designations for park and development of cultural site.

Sites 6, 6A

- If site 6 or 6A is selected, concern was expressed over people losing, even if compensated, their homesites. A suggestion was made to poll each affected lot owner to see their interests. A possible option is for Kootznoowoo to trade these lots and give shareholders a different lot. The DOT&PF Right-of-way staff noted that State would be very reluctant to take possession of lots if community was not in favor and if lot owners did not agree.

- It was suggested that a survey of residents and of students (future generation) about the sites would be beneficial. At the same time, land owners of homesites that might be affected could be surveyed.

- For sites 6 or 6A, city power lines would be extended as needed; for sites 3 and 4, it is likely to be a generator, but power could eventually be extended along the access road if maintenance and operation costs for generators proved too expensive. A resident asked about putting a submerged power cable across the head of Favorite Bay to get to sites 3 and 4? This was considered, but a road would be needed to maintain the power line, and that would be very expensive to build under that scenario.

Sites 3, and 4

- The BIA may have road, and especially bridge, funding available. Residents noted that it is generally skiff traffic, not large boats in Favorite Bay. Those in attendance did not object to the concept of restricting large boat traffic in and out of Favorite Bay.

- Commercial development could not take place adjacent to airport land on land within the Monument.

- The USFS notes it is supportive of airport development and possible location on Monument, but warns that Title XI and land purchase/swap process would probably take two-five years. Residents are concerned with the extra time the Title XI process and land acquisition could take.

- Some noted that it would be a long drive to the airport at sites 3 or 4, this could especially be a concern during emergencies. Others noted that whether 5-6 miles is a "long" distance is relative. Some expressed an interest in having more of a road system to drive and "get out."

- There was discussion about how much air traffic would there be during the hunting season, and a concern that sites 3 and 4 may be too close to community subsistence resources, and that increased access (more flights by outsiders, a road) would put pressure on the resource. Other residents expressed an opinion that the access road to these sites would benefit their subsistence hunting.

  Related discussion was about the community's ability, or lack thereof, to restrict access, lease lots, etc. to residents only due to concern over increased hunting and fishing guides and visitation causing more pressure on local resources. However, a public facility built with public money on public land must be available to all on an equal basis – one can not restrict who lots are leased to. It was noted that many communities in Southeast are dealing with outside pressure on their resources and visitation and figuring out what is the "right" mix/amount for their community. There are other tools (planning, zoning, permits, marketing, taxation, work on cooperative plans with USFS) to help Angoon control where activities happen, who owns them and who profits from them.

  Some residents commented that Angoon needs an airport for health and safety reasons --- Angoon will get hunters and fishers regardless --- not having an airport won't help that situation.

Appendix E

Pilot Observations

During early March 2001, Mark Morris, P.E. and Malcolm A. Menzies, P.E., & L.S. flew a Cessna 180 wheel aircraft to Angoon. Both men are pilots and Mark Morris has worked as an Alaska Bush Pilot stationed in both Sitka and Juneau for several years. The purpose of the flight was to fly and film the approach-departures of each Angoon airport site under study consideration.

Below is the narrative from these flights.

Site 3 – North Favorite Bay

This site is ideally located for the prevailing NE-SW winds. The runway is located parallel with the prevailing winds allowing a pilot to take off into the wind an estimated 95% of the time. The local topography should not significantly influence prevailing winds at the runway other than the typical reduction of wind that occurs below the tree line. When the aircraft descends below the surrounding trees, there will be some reduction of the wind velocity and there may be some turbulence or down/updrafts.

A land form that would alter the prevailing winds is approximately 1 mile to the southeast. This is a ridge that runs northeast and southwest. This appears far enough away that any downdrafts coming off the end of the ridge should not be a factor to departing aircraft.

This site offers the best location for a runway from a wind and obstacle perspective. It is oriented into the prevailing winds and the immediately adjacent topography should not significantly affect the winds. It does have topography within a mile from the runway that will affect the prevailing winds.

Site 4 – South Favorite Bay

This site is ideally located for the prevailing NE-SW winds. The runway is located parallel with the prevailing winds allowing a pilot to take off into the wind 95% of the time. The local topography should not significantly influence the prevailing winds at the runway other than the typical reduction of wind that occurs below the tree line. When the aircraft descends below the surrounding trees, there will be some reduction of wind velocity.

A land form that will alter the prevailing winds is a ridge located approximately 1.5(-) miles from the runway to the northeast and runs east-northeast to west-southwest. Smaller hills are closer. Downdrafts and other adverse wind conditions generated from this ridge may be a factor to departing aircraft.

Another land form that will alter the prevailing winds is a ridge located approximately 0.5 miles southeast of the runway. This is the same ridge discussed for Site 3 and will affect the prevailing winds. Unfortunately, the ridge runs into a 3,150 foot ridge that is oriented northeast and southwest and is located approximately 1.5 miles south of the runway. This ridge will also affect the prevailing winds. Affects to prevailing winds can include down drafts, changes in direction and velocity, among others. On days with strong winds, these ridges may affect aircraft departing to the southwest.

This site has no immediately adjacent topography that will significantly affect the prevailing winds. It does have topography within a mile from the runway that will affect the prevailing winds.

Site 5 – West Side of Killisnoo Peninsula

This site has a runway orientated 90 degrees out of the prevailing winds. The site is located on a steep side hill next to Chatham Strait and the entrance to Hood Bay. When there are strong winds that blow southwest or northeast (the prevailing wind direction), there may also be local winds that blow parallel with Chatham Strait or out of Hood Bay.

The runway orientation may be parallel to the local winds blowing out of Hood Bay or down Chatham. However, when these winds are present, the prevailing winds will probably also be present. Any approach from the north will have to fly through the prevailing winds creating a direct crosswind on approach. Also, since the runway is on the side of a ridge that is 90 degrees to the prevailing winds; these winds may create updrafts and downdrafts at the runway. Turbulence and wind shear may also be present. This could be a very dangerous condition. (The runway at Haines, Alaska, had to be moved because it was too close to terrain that disrupted the wind.)

On an approach from the south, the approach path will be along the end of the 3,150 foot ridge discussed in Site 4. This ridge could have large down drafts from the prevailing winds and create a turbulent and potentially dangerous condition.

This site is not desirable due to the runway orientation and immediately adjacent topography that will disrupt the winds creating many adverse wind conditions. This site has the potential for significant wind problems and should not be selected.

Site 6 – End of present road system and not orientated into the prevailing wind

This site has a runway orientation approximately 35 degrees out of alignment with the prevailing wind. This will create crosswind conditions most of the time for landing and departing aircraft.

The runway is also located into a ridge. The end of the runway will be approximately 120 feet below the peak of the ridge and approximately 1,200 feet off the end of the runway. The ridge will have to be removed at a 20:1 slope off the end of the runway. This will create a valley through the ridge which aircraft will have to fly when departing to the north-northeast or landing to the south-southeast.

When departing to the north-northeast with strong winds, there will probably be cross slope down drafts coming from the prevailing wind as it crosses the peak of the ridge and then flows down into the valley. Turbulence and wind shear may also be present. Because of the valley in the ridge, the departing aircraft will have limited maneuvering room when these winds are encountered. This is not a desirable situation.

The south end of the runway is just off the beach of Chatham Strait and the entrance to Hood Bay. There may be local winds orientated parallel to the shore line that won't be present at the north-northeast end of the runway, but will be present at the south-southeast end or just off the end of the runway. This creates a condition from the southwest and the local winds along the shoreline may be from the southeast with the runway orientation between the two, multiple crosswinds may be present from both sides of the runway. This is not a desirable situation.

This site has a runway orientation out of the prevailing winds and has immediately adjacent topography that may significantly affect the prevailing winds and thus should not be selected.

Site 6A – End of present road system and orientated into the prevailing wind

This site is in almost the same location as site 6. Site 6 had two main problems; it was not orientated into the wind and it ran into a ridge. This site solves the orientation problem; the runway is parallel with the prevailing wind. However, in order to rotate the runway into the wind, it is rotated deeper into the ridge, making the second problem with Site 6 even worse with site 6A.

The valley into the ridge required to provide a path for aircraft to depart to and approach from the northeast begins 1,100 feet before the end of the runway and is 60-feet deep at the end of the runway. This may cause significant down drafts, turbulence, and wind shear at or near the end of the runway. Also, for aircraft departing to the southwest, the change in wind conditions along the runway may be significant as the northeast end of the runway may be in the lee of local southeast winds along the shoreline. Once the aircraft approaches the southwest end of the runway, the protection from the valley will be gone and a crosswind from the southeast may be present.

This site has topography immediately adjacent to the runway that may significantly affect the prevailing winds and thus should not be selected.

Summary

No runway site will be without risks associated with adverse wind conditions. This report does not identify all potentially adverse wind conditions nor does it claim to discuss all possible wind movements and phenomenon at any or all of the sites. The purpose of this aerial review is to identify some of the more obvious affects the adjacent topography will have on the wind and thus serve to, hopefully, eliminate the airports with the worst potential wind problems from the selection since safety is the number one consideration when selecting an airport location.

Only two wind gauges will be used for this project. In order to more accurately identify local wind conditions at an airport location, multiple wind gauges are desired. The affects on wind that are being discussed here are very broad and general and should be viewed as general information. No site is being claimed or guaranteed to be safe or absent of risks and dangers due to wind.

Site 3 has no immediately adjacent topography that should cause significant changes due to wind except for the affects that come from descending below or climbing above the trees. The larger land forms that will affect the wind are over 0.5 miles from the runway. Site 4 may have some local and possible significant cross wind condition caused by the hillside and mountains to the east.

Sites 5, 6 and 6A have immediately adjacent topography that may cause serious affects to the wind. These sites could have local wind conditions that jeopardize safe aircraft operation.

In locating an airport, it is impossible to find a location that will have no adverse wind conditions. However, some locations will have less adverse wind conditions than others. Sites 5, 6 and 6A will probably have more adverse wind conditions than Site 3. Sites 4, 5, 6 and 6A each have potential for some to very serious adverse wind conditions. Because of these conditions, they should therefore be removed form the selection.