CHAPTER FIVE

ALTERNATIVE PLAN CONCEPTS

The objective of this chapter is to identify an overall development plan for JIA that will meet the existing and long-term aviation needs. Airside and landside facilities required to satisfy the various elements of the aviation demand forecast over the 20-year planning period drive the alternatives analysis. The goal of the alternatives analysis is to provide JIA with a plan that ensures flexibility to meet both foreseeable and unforeseeable needs.

The three primary functional areas considered when identifying the development alternatives were the airfield, the terminal area, and the GA area. Support functional areas that were reviewed during the alternative analysis include the Airport support facilities and the SRE building, the air cargo facilities, and the vehicular access parking. When identifying and evaluating alternatives for the various functional areas it is important to consider the interrelationships among them. While an alternative for a particular functional area can be examined individually, the recommended alternatives for each functional area must be coordinated with one another to ensure the effectiveness and feasibility of the recommended alternative as a whole.

The alternatives analysis is presented in the following sections:

C Development Considerations
C Evaluation Criteria and Methodology
C Airfield Alternatives
C Runway Safety Alternatives
C Passenger Terminal Alternatives
C General Aviation Considerations
C Air Cargo Facility Considerations
C Airport Maintenance/Support Facility Alternatives
C Vehicular Access and Parking Alternatives
C Utilities/Infrastructure Requirements
C Duck Creek and Jordan Creek Issues
C Recommended Development Plan

DEVELOPMENT CONSIDERATIONS

The Master Plan that emerges from this alternatives analysis must be technically, economically, and environmentally sound. In order for the Master Plan to be implemented, it must also support the goals and objectives of the Airport. In formulating the development alternatives for JIA, facility needs identified in Chapter Four were reviewed. This alternatives analysis examines development options for meeting the following Airport requirements:

C *Plan for GA paved runway capacity enhancement.*

C *Add acute angle exit taxiway to Runway 8/26.*

C *Expand the RSA for Runway 8/26 to more fully comply with FAA criteria.*

C *Expand passenger terminal to approximately 171,000 square feet, add one air carrier gate and three air taxi gates. Maintain two dedicated commuter (part 121) gates. Expansion and renovation must comply with accessibility requirements.*

C *Expand air carrier aircraft parking apron from 46,000 square yards to 83,200 square yards.*

C *Expand conventional hangar space from 58,600 square feet to 105,100 square feet (to accommodate 17 additional GA aircraft).*

C *Expand T-hangar space from 41,500 square feet to 89,300 square feet (approximately 40 additional units).*

C *Expand based aircraft tie-downs from 77,800 square yards to 121,185 square yards (approximately 32 additional parking spaces).*

C *Expand transient tie-down space from 9,000 square yards to 23,800 yards (approximately 13 additional parking spaces).*

C *Expand floatplane slips from 73 to 103.*

C *Provide parking space for eight additional based helicopters and six additional transient helicopters.*

C *Expand public auto parking spaces for based GA aircraft tenants from 24 to 103.*

C *Provide expansion area for FBO facilities (buildings) to grow from approximately 42,900 square feet to 103,500 square feet.*

C *Add cargo apron to support additional B737/DC-9 aircraft hardstand (approximately 4,500 square yards).*

C *Construct 37,100-square-foot SRE building and 9,500-square-foot sand shed.*

C *Improve Airport vehicular access and circulation (including tour bus and non-Airport traffic impacts).*

C *Add 251 public auto parking spaces (110 short-term and 141 long-term); and 214 non-public auto parking spaces (137 for rental cars and 78 for employees).*

C *Provide basic facilities (i.e., electric, water, telephones, toilets) in the floatplane basin aircraft parking area.*

C *Provide basic utilities/infrastructure to support long-term development needs.*

EVALUATION CRITERIA AND METHODOLOGY

The criteria used to evaluate alternatives vary based on the functional area. Overall, however, similar criteria were used to measure the effectiveness and the feasibility of the various alternatives available for JIA. Criteria used in the alternatives review and evaluation process can be grouped into the following four general categories:

Operational Factors: The operational aspect of each alternative, which is directly related to safe airport operations, is the most important criterion in the evaluation process. Each alternative was evaluated on flexibility to accommodate aircraft ground operations, aircraft movements on the taxiways, and aircraft flight operations.

Economic Factors: Some alternatives may result in excessive costs based on construction, acquisition, or other development requirements. In order for a preferred alternative to serve the Airport and the community, it should satisfy development at a reasonable cost. A more detailed financial analysis of the selected alternative is presented in Chapter 6, Financial Plan. All estimated costs are represented using 1995 dollars.

Environmental Factors: Airport growth and expansion have the potential to impact the environment of the Airport. Therefore, the selected plans should seek to reduce those impacts. Alternatives should also strive for a reasonable balance between expansion and off-site acquisition and relocation impacts. Preferred development plans should also recognize sensitive environmental features that may be impacted by certain growth scenarios. The cost associated with environmental permitting, mitigation, etc., was included in the evaluation of economic factors. This criterion focused on key factors associated with the alternatives such as noise, air quality, land use impacts, wetland impacts, and social impacts. The potential to successfully meet environmental requirements without incurring significant impacts was also addressed as part of this criterion.

According to the FAA, *Airport Environmental Handbook*, Part 5050.4A, Chapter 3, paragraph 3, page 9, the following federal actions will normally require an environmental impact statement (EIS):

1) First time ALP approval or airport location approval for a commercial service airport located in a standard metropolitan statistical area.

2) Federal financial participation in, or ALP approval of, a new runway capable of handling air carrier aircraft at a commercial service airport in a standard metropolitan statistical area.

It is of note that even though these actions normally require an EIS, the EIS will usually be preceded by an EA. If the EA demonstrates that there are no significant impacts, the action shall be processed as a finding of no significant impact instead of an EIS.

Implementation Feasibility: Often, certain factors, both tangible and intangible, affect the ability of the Airport to implement certain development alternatives. Community and political acceptance and feasibility of land acquisition are examples of factors that are considered under this criterion. The preferred development alternative should support the development goals for the Airport and the long-term economic and diversification objectives of the region.

The evaluation criteria address operational, economic, environmental, and other important issues that are critical to making strategic long-range planning decisions. The following sections use these evaluation criteria, as applicable, to identify those alternatives that can meet the long-term goals and development needs of the Airport.

AIRFIELD ALTERNATIVES

The airfield, which includes the runway/taxiway system and associated airspace, is considered the most important component of the Airport. The operational efficiency, capacity, and safety of the airfield are vital to the long-term health of the other airport components. Several airfield alternatives were reviewed to ensure that all prudent and feasible development concepts were considered.

Airfield facility requirements for JIA are discussed in Chapter Four, *Demand/Capacity Analysis and Determination of Facility Requirements*. Primary airfield needs for the Airport include a second paved runway (for GA use) and an expanded RSA for Runway 8/26. Airfield requirements such as acute-angled exit taxiways on Runway 8/26 will be incorporated into the ALP. Options for addressing the airfield capacity issue are addressed below.

As discussed in Chapter Four, it is recommended that capacity enhancement measures be explored for the Airport. This is based on the fact that, as the Airport approaches its capacity, increasing delays will be incurred. As illustrated in Figure 4-2 (in Chapter Four), operations on the existing paved runway exceeded 91 percent of its capacity in 1995. The demand/capacity ratio will increase to approximately 92 percent in 2015. Planning capacity-enhancement measures well before an airport reaches 100 percent of its capacity is prudent, therefore, a new runway is proposed to increase available airfield capacity.[12] The type of runway identified to provide this additional capacity is a GA runway approximately 4,100 feet long.

The following alternatives were identified and evaluated to address the requirement for an additional 4,100-foot GA runway:

C New Runway Alternative 1 - No Action
C New Runway Alternative 2A - Parallel GA Runway (Close-In)
C New Runway Alternative 2B - Parallel GA Runway (South of Basin)
C New Runway Alternative 3A - GA Runway on West Douglas Island
C New Runway Alternative 3B - GA Runway on West Douglas Island

The alternatives are described and evaluated in the following subsections.

New Runway Alternative 1 - No Action

The No Action Alternative considers the option of a no-build scenario at the Airport. This alternative suggests that other than regular maintenance, no new airfield development will be planned or undertaken. Costs associated with this alternative would be limited to those associated with normal operation and maintenance.

One primary issue associated with the No Action Alternative is the increasing amount of delay that would be experienced by the users of the Airport. Based on the existing airfield capacity, *average* aircraft delays will increase from approximately 1.4 minutes per aircraft in 1995 to 1.6 minutes per aircraft in 2015. During periods of peak operation, aircraft delays range from 7.0 to 14.0 minutes in 1995, increasing to 9.0 to 18.0 minutes in 2015. It is significant to note that, as demand approaches capacity, delays increase exponentially.

[12] As a rule of thumb, capacity enhancement measures should be planned when a facility is at 60 percent of its capacity and should be implemented when a facility is at 80 percent of its capacity. Actual implementation of such measure at JIA depends, in parts, on the tolerance to accept delays.

New Runway Alternative 2A - Parallel GA Runway (Close-In)

New Runway Alternative 2A is depicted in **Exhibit 5-1**. Under this alternative, a new runway would be constructed parallel to existing Runway 8/26, at a separation of 700 feet between runway centerlines. The new 4,100-foot GA runway, designated Runway 8R/26L, would be constructed in the area currently occupied by the floatplane basin. Under this alternative, a new floatplane basin would be constructed south of parallel Runway 8R/26L, at a separation of approximately 1,000 feet between runway centerlines.

A new parallel runway as defined under Alternative 2A would increase the operational capacity of the airfield significantly, allowing aircraft to operate at JIA with minimal or no delay, well beyond the 2015 planning horizon. The new runway would be connected to the existing airfield via a series of taxiways, to allow for the efficient use of both runways. Under Alternative 2A, a limited amount of GA storage and support facilities (i.e., tie-downs, FBO) would be constructed in the area between the new runway and the relocated floatplane basin.

New Runway Alternative 2B - Parallel GA Runway (South of Basin)

New Runway Alternative 2B is depicted in **Exhibit 5-2**. Under this alternative, a new runway would be constructed south of the existing floatplane basin, at a separation of 700 feet between runway/floatplane basin centerlines. The new 4,100-foot GA runway, designated Runway 8R/26L, would be constructed with a full-length parallel taxiway to the south and would include a limited amount of GA storage and support facilities (i.e., tie-downs, FBO).

A new parallel runway as defined under Alternative 2B would increase the operational capacity of the airfield significantly, allowing aircraft to operate at the Airport with minimal or no delay, well beyond the 2015 planning horizon. The new runway would be connected to the existing airfield via a taxiway.

New Runway Alternative 3A - GA Runway on West Douglas Island

New Runway Alternative 3A is depicted in **Exhibit 5-3**. Under this alternative, a new runway would be constructed in an area on the western shore of North Douglas Island. The new 4,100-foot runway, which would essentially constitute a new GA airfield, would be constructed with a full-length parallel taxiway and would include GA storage and support facilities (i.e., tie-downs, hangars, FBO) sufficient to support an independent airfield operation.

New Runway Alternative 3B - GA Runway on West Douglas Island

New Runway Alternative 3B is also depicted in Exhibit 5-3. Similar to Alternative 3A, although more inland, a new runway would be constructed in an area on the western shore of North Douglas Island. The new 4,100-foot runway, which would essentially constitute a new GA airfield, would be constructed with a full-length parallel taxiway and would include GA storage and support facilities (i.e., tie-downs, hangars, FBO) sufficient to support an independent airfield operation.

Recommended New Runway Alternative

The ratings given to the new runway alternatives for the various evaluation criteria are presented in the Airfield Alternatives Analysis Matrix in **Table 5-A**. Alternative 2B is given the highest score, with Alternatives 2A, 3A, and 3B close behind. *Based on the results of this analysis, it is recommended that a site selection study be conducted to determine the best location for a new GA airport in the Juneau area.*

AIRFIELD ALTERNATIVES ANALYSIS MATRIX
Juneau International Airport

Criteria	*Alternative 1 No Action*	*Alternative 2A Parallel GA Runway*	*Alternative 2B Parallel GA Runway*	*Alternative 3A GA Runway W. Douglas Island*	*Alternative 3B GA Runway W. Douglas Island*
Operational	2	5	5	10	10
Economic	4	4	5	3	3
Environmental	3	6	6	3	3
Implementation Feasibility	4	2	4	2	2
Score	**13**	**17**	**20**	**18**	**18**

Rating Range: 10 = High Potential
5 = Moderate Potential to Meet Criterion
1 = Low Potential to Meet Criterion

Table 5-A

Given the land constraints at the existing Airport, developing a GA "reliever" facility is considered the most effective way to ensure the long-term growth and success of JIA. Since the ratings for the new runway alternatives are so close, it is also recommended that the land south of the floatplane basin be preserved in the near term until a proper site selection study is conducted. This preserves the option of a second hard-surface (parallel) runway to the south of the existing floatplane basin.

The following subsections provide discussions on the evaluation of the five new runway alternatives as compared with each evaluation criterion.

Operational Characteristics: Alternative 1, the No Action Alternative, does not include or cause any significant operational changes to the Airport. It is significant to note that, under airfield Alternative 1, aircraft delays would continue to increase in the future. This alternative would not provide the additional capacity required at the Airport to meet long-term demand. A No Action Alternative could limit air service at the Airport.

Alternatives 2A and 2B both provide the ability for simultaneous operations under VFR conditions on the existing Runway 8/26 (which would be designated 8L/26R) and on the proposed GA Runway 8R/26L. Alternative 2A would require filling the existing floatplane basin and building a new floatplane basin south of the new GA runway. Alternative 2B would require the construction of a parallel runway south of the existing floatplane basin, in an area at a much lower elevation than existing paved Runway 8/26. Vehicular access to

the development area associated with either parallel runway would be difficult and would likely affect the flow of aircraft traffic (i.e., movement through the RSA). However, the increase in operational capacity would more than offset any adverse effects due to ground vehicle movements.

The connection between the parallel runways would also have different operational impacts for Alternatives 2A and 2B. Under Alternative 2A, the new runway could be constructed at nearly the same elevation as the existing Runway 8/26. Although the amount of fill is extensive, this is the ideal operational situation for ensuring a relatively free flow of movement between the two portions of the airfield. Under Alternative 2B, it may not be cost effective to construct the new runway at the same elevation as Runway 8/26. Since the floatplane basin (which will generally be lower than Runway 8/26 due to water levels) would be located between the two parallel runways, the slope of a taxiway connection would possibly be significant.

Alternatives 3A and 3B both provide additional airfield capacity for the (local) airport system. Both variations, for what is essentially a new airport on West Douglas Island, are in airspace that is not congested. Either alignment would provide a functional benefit in terms of the ability to accommodate aircraft operations; however, a detailed wind analysis is necessary to determine the most favorable orientation and specific location. The fact that an airfield development on Douglas Island would represent a split airfield operation, in terms of its relationship to JIA, is considered a benefit from a pure capacity enhancement perspective, but may result in some inefficiencies from an airport systems perspective.

Economic Factors: Delay costs were calculated to illustrate the direct economic consequences of the no-build scenario. This takes into consideration the delay cost of operating the various types of aircraft at the Airport, in light of existing and future capacity constraints. As shown in **Table 5-B**, the aircraft operating cost associated with average aircraft delay in 1995, based on existing airfield capacity, is calculated at approximately $1,086,000 annually. In the year 2015, the cost associated with average aircraft delay would increase to approximately $3,442,000 annually (see Table 5-B). This analysis reflects only the costs associated with operating the various aircraft in the operational fleet and does not factor in the value of the passengers' time, which is believed to be significant but much more subjective from an analysis perspective.

Cost estimates were prepared for airfield development Alternatives 2A, 2B, 3A, and 3B. The cost estimates are appropriate for master plan level comparison purposes. They should, however, be considered preliminary and subject to refinement during more detailed design phases before implementation. A summary of total estimated costs associated with each of the development alternatives is shown in **Table 5-C**.

In developing cost estimates for the airfield development alternatives, it is assumed that the proposed runways and taxiways would be designed to meet B-II criteria (*Airport Approach Category B, Airplane Design Group II*, AC 150/5300-13). It is also assumed that some level of infrastructure development, including items such as hangar and apron, is required to support associated GA activities. This includes a 15-acre development area for Alternatives 2A and 2B, and a 30-acre development area for Alternatives 3A and 3B. Land acquisition costs for Alternatives 3A and 3B vary significantly, although the land envelope required is similar. This is because the land required for Alternative 3A is currently owned by Goldbelt, Inc., and would likely be very expensive to purchase. Land required for Alterative 3B is owned by the CBJ, and would have minimal costs associated with acquisition.

As shown, Alternative 2B, at approximately $30 million, would be the least expensive of the development alternatives. This is followed by Alternative 2A, at approximately $64 million. Alternatives 3A and 3B, at approximately $98 million and $92 million, respectively, are the most expensive of the development alternatives. By comparison, Alternative 1, the No Action Alternative, would result in ***annual*** delay costs

increasing from approximately $1,086,000 in 1995 to approximately $3,442,000 by the year 2015.

DELAY COSTS
Juneau International Airport

Aircraft Class	*1995 Operations*	*Average Delay Per Operation (min)*	*1998 Operating Cost (per min)*	*1995 Annual Delay Cost*	*2015 Operation*	*Average Delay Per Operation (min)*	*2015 Operating Cost (per min)*[1]	*2015 Annual Delay Cost*
Air Carrier	7,814	1.4	$37.07	$405,495	10,906	1.6	$81.22	$1,417,200
Commuter /Large GA	19,975	1.4	$7.30	$204,140	34,657	1.6	$16.00	$886,943
Multiengine	1,878	1.4	$3.70	$9,727	2,071	1.6	$8.11	$26,870
Single Engine	110,987	1.4	$1.80	$279,686	94,743	1.6	$3.94	$597,870
Helicopters [2]	30,409	1.4	$4.40	$187,319	22,247	1.6	$9.64	$512,852
Totals	171,063			**$1,086,367**	164,624			**$3,441,735**

1995	*Class IV*		*Class III*		*Class II*		*Class I*	
	Percent	*Annual Ops*	*Percent*	*Annual Ops*	*Percent*	*Annual Ops*	*Percent*	*Annual Ops*
Air Carrier	100.0%	7,814						
Air Taxi			17.0%	16,671			83.0%	81,394
GA			9.5%	3,304	5.4%	1,878	85.1%	29,593
Totals		7,814		19,975		1,878		110,987
2015								
Air Carrier	94.0%	10,906	6.0%	696				
Air Taxi			32.0%	29,100			68.0%	61,839
GA			12.2%	4,860	5.2%	2,071	82.6%	32,905
Totals		10,906		34,656		2,071		94,744

Source: *The Airport Technology and Planning Group, Inc., 1997.*
Aircraft Operating Cost, Air Carrier - Avitz, Inc.; Others - FAA AC 150/5060-5, 12/1/95.
Notes: [1] *Future aircraft operating costs assume 4.0% annual inflation rate.*
[2] *Military operations are included in the helicopter aircraft class.*

Table 5-B

AIRFIELD ALTERNATIVES COST COMPARISON
Juneau International Airport

	Alternative 2A Parallel GA Runway	*Alternative 2B Parallel GA Runway*	*Alternative 3A GA Runway W. Douglas Island*	*Alternative 3B GA Runway W. Douglas Island*
Total Estimated Cost	$64,334,000	$29,678,000	$98,353,000	$91,801,000

Source: *USKH, Inc., November 1997.*

Table 5-C

Environmental Factors: Several environmental resources on JIA require serious consideration when comparing alternatives for development: anadromous fish streams, including adjacent riparian zones, wetlands, and the adjacent MWSGR. Work in and adjacent to anadromous fish streams is regulated by several agencies, including the COE, the Alaska Department of Fish and Game (ADF&G), the National Marine Fisheries Service (NMFS), and the Alaska Coastal Zone Management Plan (AC2MP). Fill and dredging of wetlands are regulated by the COE, under the jurisdiction of Section 404 of the Clean Water Act, and also the CBJ. The Mendenhall Wetlands are managed by the Alaska Department of Natural Resources (ADNR), with the guidance of the refuge management plan, prepared by the ADF&G.

Work in or around anadromous fish streams may also involve wetland fill or dredge, with permitting requirements discussed below. Besides wetland considerations with fish streams, the ADF&G requires a Fish Habitat permit for crossing or altering the course of the stream, the NMFS comments on impacts to the anadromous fish, and the CBJ has an ordinance requiring setbacks from streams of 50 feet for grading and structures, and 25 feet for clearing of vegetation.

The guidelines implementing the Clean Water Act presume non-wetland alternatives for development, and the applicant must prove no feasible upland alternatives exist. In other words, an activity proposed for a wetland site must undergo a rigorous alternatives examination, to the satisfaction of the COE, before it can be permitted. Cost, logistics, and overall project need are considerations in the alternatives analysis. Once the alternatives analysis has been done, minimization and mitigation of wetland impacts are considered. Wetlands in the airport area are included within the Juneau Wetlands Management Plan (JWMP). This plan has classified wetlands according to function, value, and proximity to services such as roads, water, and sewer. Wetlands are classed from A to D, with the A and B wetlands being of highest value, and the C and D wetlands being of lower value. The COE has issued the CBJ a general permit for C and D wetlands. The C or D classification does not relieve the applicant of the alternative analysis discussed above, but does allow a more expeditious permitting process. Estuarine wetlands (tidally influenced) are not included in the JWMP.

The major environmental issue of direct impact for Alternative 2A is wetland impact. The most valuable wetlands impacted by this alternative are those outside the existing floatplane basin dike, classified as intertidal emergent wetlands. The construction of a new floatplane basin to the south would use up to 35 acres of this wetland from Airport property and the MWSGR. The use of this land would require an individual COE Section 404 permit and could require an analysis per Section 4(f) of the Department of Transportation Act (a rigorous examination of alternatives). Should mitigation of impacts not be reasonable, preparation of an EIS would be required. Other wetlands impacted by this alternative, including the float-plane pond, are classed B in the amended Juneau Wetlands Management Plan, and would also require an individual COE Section 404 permit for fill. These wetlands are rated high for functions relating to erosion control. They have been upgraded to Class B from Class C based upon environmental values and recreation use. The recreation use function refers to the "dike path."

As with Alternative 2A, the major environmental issue with Alternative 2B would be wetland impacts. However, in contrast to Alternative 2A, nearly all land to be used by this alternative would be contained within existing Airport property. The wetlands contained within the floatplane pond dike are classed B, meaning they would require a COE permit to fill. The existing floatplane pond remains in service under this alternative. Off-site or MWSGR impacts due to a new runway for floatplanes are unlikely. This alternative could probably be accomplished using an EA, in contrast to Alternative 2A. This alternative potentially has the least environmental impacts of the four action alternatives under consideration. This alternative could also free the Duck Creek site for other needs or postpone development there.

Alternative 3A is on Goldbelt, Inc., private land along the shore of Stephens Passage. Goldbelt, Inc., an urban Native Corporation, and the CBJ are currently preparing a master plan for their lands on West Douglas Island. A golf course, several housing development areas, and an industrial development area are currently proposed. The area shown for this alternative is currently planned as a low-impact culture camp by Goldbelt, Inc.

The runway would be within 330 feet of two known Bald eagle nests along the shore. Although the runway and parallel taxiway would only require fill of approximately 4 acres of forested wetland and another 1 to 2 acres of gravel, intertidal area; any access road and tiedown/hangar area would require several crossings of Peterson Creek (see following) and fill of up to 10 acres of forested and irregularly flooded wetlands adjacent to Peterson Creek.

Peterson Creek contains runs of pink, chum, and coho salmon; cutthroat trout; and Dolly Varden char. The creek and watershed are regarded as very valuable by environmental resource agencies.

Development of this alternative would most likely require the preparation of an EIS, should Alternatives 2A or 2B be shown to be feasible or if impacts cannot be reasonably mitigated.

Alternative 3B is shown on CBJ lands, near the end of North Douglas Highway. As with Alternative 3A, the land is currently in the master planning process. The entire proposed Airport would be on land currently in planning for a golf course. However, only the southeastern 1,200 feet of the runway would directly conflict with current golf course plans. Most of the proposed runway would conflict with the proposed golf course access road. Much is known about the wetlands and environmental resources in this area as a result of the golf course studies. The north end of the runway would be within 330 feet of a known bald eagle nest.

Most of the runway and parallel taxiway, and presumably most of the adjacent tiedown/hangar area, would be in forested wetlands underlain by organic muck soils, for a total wetland fill of up to 90 acres. At least three, and possibly more, tributaries of Peterson Creek would be impacted by this alternative. These tributaries are known to contain spawning and rearing habitat for the species of salmon, trout, and char mentioned above. In addition, a creek near the south end of the proposed runway exhibits violent outwashes of debris annually, scattering gravel and woody debris through the forest and changing course frequently.

Development of this alternative would also likely require preparation of an EIS for the same reasons described under Alternative 3A. Comparisons of environmental factors for development Alternatives 2A, 2B, 3A, and 3B are shown in **Table 5-D**.

The environmental factors associated with the No Action Alternative relate primarily to the adverse social and socioeconomic impacts that would result if the Airport had to constrain its operations. This is a significant issue since the Airport is viewed by the community as a vital transportation link to the world and as a key factor to successful economic development and growth.

Implementation Feasibility: New runway Alternative 1 can be viewed from several perspectives as it relates to implementation feasibility. It can be viewed as the "path of least resistance" and, therefore, the easiest to implement. Conversely, it can be viewed as an option that does not effectively provide a solution to the capacity problems of the Airport that are projected to become more severe. ***This evaluation criterion, as it relates to the No Action Alternative, can be reduced to a perspective that reflects the local public and political will to allow the Airport to grow in a way that adequately satisfies aviation activity or to constrain the growth of aviation activity in Juneau.***

ENVIRONMENTAL FACTORS - GA RUNWAY ALTERNATIVES
Juneau International Airport

Factor	*Alternative 2A Parallel GA Runway*	*Alternative 2B Parallel GA Runway*	*Alternative 3A GA Runway W. Douglas Island*	*Alternative 3B GA Runway W. Douglas Island*
Wetlands	220 ac., requires COE Sec. 404 permit	80 ac., requires COE Sec. 404 permit	Approx. 15 acres high value	Approx 90 acres, high value
Fish Streams	None	None	Peterson Cr., several Crossings	Tributaries to Peterson Cr., up to 4 crossings
Bald Eagle Nests	None	None	Two known within 330 feet	One known within 330 feet
Land Use/ Ownership	Airport Land and Mendenhall Wetlands	Airport Land	Private, new growth area, planned for low impact	CBJ land, golf course non-profit currently has option
Mitigation	Near-Airport wetland mitigation possible	Near-Airport wetland mitigation possible	Wetland, bald eagle and fisheries mitigation likely	Wetland, bald eagle, and fisheries mitigation likely
Estimated Time, Cost	2-3 year, $200K documentation, $100K mitigation + land acquisition	1 year, $30K document $10K mitigation	2-3 years, $200K documentation, $100K mitigation + land acquisition	Same as 3A, less land acquisition

Source: *Dunn Environmental Services, 1997.*
Note: *More involved EA or EIS if additional floatplane runway needed.*

Table 5-D

It is likely that both Alternatives 2A and 2B will face opposition based on potential environmental impacts. Both require filling the sloughs and affect wetlands; however, Alternative 2A requires filling the existing floatplane basin and dredging a new basin. Alternative 2A also requires development outside the current property boundary of the Airport within the MWSGR. The dike is used as a nature trail to the refuge. Both Alternatives 2A and 2B will substantially and permanently alter the quality of the trail access route by adding significant additional airport traffic and reducing the land available for wildlife viewing and habitat use close to the Airport. Although reduction of bird attractions near an airport is appropriate from an airport management and operations perspective, the disruption caused by either Alternative 2A or 2B may be considered unacceptable to the local environmental community. Alternatives 2A and 2B are rated relatively low from an implementation feasibility perspective based on these issues.

Alternatives 3A and 3B are viewed as having limited potential for implementation. The land associated with Alternative 3A is currently owned by Goldbelt, Inc., which plans to develop its land in conjunction with the CBJ. The land associated with Alternative 3B is currently owned by the CBJ and is being considered for development of a golf course. CBJ also plans to develop this area in conjunction with the development planned by Goldbelt, Inc. Sufficient information is not yet available to fully determine the implementation feasibility of either Alternative 3A or 3B. Such information would be developed more completely during the site selection study recommended by this Master Plan Update. It is significant to note, however, that potential land use conflicts may arise from any airfield development in this vicinity in light of the planned multi-use development. Such issues would have to be resolved before either Alternative 3A or 3B could be developed. Based on these factors, the implementation feasibility scores for Alternatives 3A and 3B are

placed in the low range.

RUNWAY SAFETY AREA ALTERNATIVES

This section presents an analysis of potential alternatives for providing RSAs at the JIA that meet current standards. The existing runway at the Airport is 8,456 feet in length. It has a paved asphalt surface which was reconstructed in 1997. The runway has a width of 150 feet. The existing RSA starts 250 feet from the threshold of Runway 8 and extends the full length of the runway to 230 feet beyond the threshold of Runway 26. The width of the RSA varies. The west end of the runway has an RSA width of 480 feet, decreasing to about 230 feet approximately 5,000 feet from the Runway 8 threshold. RSA pavement on the west 5,000 feet of the runway is failing. The existing RSA does not meet FAA design standards.

The RSA is an area of space centered on the runway centerline which surrounds the runway and is prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. An RSA is required to be a cleared, drained, and graded area abutting the edges of the usable runway and symmetrically located about the runway. It should be capable of supporting SRE, aircraft rescue and fire fighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft; and it must be cleared, graded, and free of objects. The length and width varies according to the type of runway and depending on the type of aircraft determined to be the most demanding aircraft type to routinely use the runway.

This Master Plan identified the Boeing 737-900 type aircraft as the design aircraft for the purpose of determining necessary facility requirements for the next 20 years. According to FAA AC 150/5300-13, this results in a C-III ARC for the JIA, based on the design aircraft approach airspeed and wingspan. Airports supporting C-III aircraft should have an RSA that extends 1,000 feet beyond the end of each runway threshold and 250 feet on either side of the runway centerline. The JIA RSA does not meet FAA design criteria and is identified as a Modification to Standards on the ALP.

A number of factors must be considered when identifying RSA development alternatives. From an operational perspective, it is important that the runway be of sufficient length and width to support the most demanding aircraft expected to routinely use the Airport throughout the planning period. Establishment of RSAs must not impact the ability of the primary runway to accommodate the projected aircraft throughout the planning period. From an environmental aspect, JIA is surrounded by wetlands and the Mendenhall Wildlife Refuge. It is important that any alternative evaluating RSA extensions at the Airport adequately consider the potential environmental impacts associated with the development recommendation. Finally, from an engineering aspect, expansion of the existing RSA will have different requirements for material fill placement. Based on the geographic features of the area surrounding the runway, most alternatives will require a substantial amount of fill and careful engineering techniques to minimize environmental impacts on the surrounding river, creeks, and wetlands.

Five alternatives are presented for consideration in resolving the RSA deficiency at JIA:

- C RSA Alternative 1 - Construct RSA to Full Standards
- C RSA Alternative 2 - Construct RSA to Full Standards, Shift Runway to East
- C RSA Alternative 3 - Declared Distances/Displaced Threshold
- C RSA Alternative 4 - Construct RSA on Airport Property
- C RSA Alternative 5 - No Action

Each of the Construct alternatives includes two subalternatives for treatment of Jordan Creek. Subalternative A includes extending the Jordan Creek culvert under the runway with an open-bottom arch for the width of the proposed RSA. Subalternative B would reroute Jordan Creek to avoid crossing under the parallel taxiway

and runway. Two possible routes for Jordan Creek include moving the mouth to the east, around the proposed RSA, and diverting Jordan Creek to Duck Creek north of Egan Drive.

RSA Alternative 1 - Construct RSA to Full Standards

This alternative involves constructing 1,000-foot RSAs beyond both the Runway 8 and Runway 26 thresholds. This alternative would provide the standard requirements for RSAs at each end of the runway, while retaining the full operational length of the runway. (Operational runway length requirements are described under RSA Alternative 3.) The RSA width would be 500 feet for the full length of the runway.

RSA Alternative 2 - Construct RSA to Full Standards, Shift Runway to East

This alternative provides 1,000-foot RSAs beyond both the Runway 8 and Runway 26 thresholds. However, to avoid the impacts of constructing into the Mendenhall River, the entire runway and RSA is shifted to the east so that the RSA on the west end is constructed on Airport property. This alternative provides the standard RSA requirements beyond each runway end. This alternative would also retain the full operational length of the runway. (Operational runway length requirements are described under RSA Alternative 3.) The parallel taxiway would be extended to the east and NAVAIDs would be relocated as necessary. Runway centerline and edge lights and taxiway edge lights would be provided on the east extension. More than 500 feet of the east end safety area would extend beyond the Airport boundary.

RSA Alternative 3 - Declared Distances/Displaced Threshold

Another potential method for achieving the required RSA standards is to relocate the runway thresholds and apply the FAA's Declared Distance Concept (FAA AC 150/5300-13, *Airport Design*, Appendix 14). The use of declared distance for airport design is limited to cases of existing constrained airports where it is impracticable to extend the RSA, the runway OFA, or the RPZ in accordance with the design standards contained in Chapters 2 and 3 of AC 150/5300-13.

Under the Declared Distance Concept, runway lengths are calculated independently for the following four aircraft operating modes:

- Takeoff Run Available
- Takeoff Distance Available
- Accelerate-Stop Distance Available
- Landing Distance Available

Coordination was conducted with Alaska Airlines, operator of the critical aircraft (various B737 series) at JIA, to determine the runway length requirements for such aircraft under the different operating modes. Based on discussions with Alaska Airlines Flight Operations personnel (and documented in a 10/12/98 letter), it was learned that relocating each of the Runway 8/26 thresholds to help in meeting the FAA's design criteria for RSAs would not adversely affect takeoff performance. However, it is documented by Alaska Airlines that the runway thresholds should not be relocated based on Runway 26 missed approach criteria and landing runway length requirements for adverse weather conditions. These conditions are addressed below.

Runway 26 Missed Approach Criteria: According to Alaska Airlines Flight Operations personnel, the Special Category I (SCAT I) approach to Runway 26 "has a limited approach minimum that is restricted by the terrain in the missed approach path. Moving the touchdown zone by any distance to the west would severely impact the missed approach capability. The result of this change would increase approach minimums to this runway and decrease landing reliability."

Runway Length Requirements for Landing: A reduction in landing distance available would decrease maximum landing weight for Alaska Airlines' B737 aircraft in abnormal or extreme weather and equipment conditions. Relocating both the Runway 8 and 26 thresholds to help in meeting the FAA's design criteria for RSAs results in a landing distance available of approximately 6,900 feet. Under this scenario, Alaska Airlines would have to decrease the aircraft landing weight by a factor of 30,000 pounds. Under scenarios whereby one or both of the runway thresholds would be relocated, any reduction in landing distance available would adversely affect Alaska Airlines capabilities and may result in additional diversion of flights under abnormal or extreme weather and equipment conditions. Abnormal and extreme conditions, such as a high tailwind and wet runway, are encountered frequently at JIA by Alaska Airlines and other airport users. Furthermore, it is recommended that the existing runway length be maintained based on the landing length requirements of the aircraft operational fleet. Discussions with Alaska Airlines Flight Operations personnel indicate that the full runway length is needed at JIA, based on margin of safety requirements during periods of inclement weather when aircraft braking action is less than ideal.

Based on discussions with and correspondence from Alaska Airlines, it is recommended that the Declared Distance Concept not be used as a measure to gain additional RSA for JIA. While reasonable (i.e., practicable) measures should be used to expand the RSAs, the expansion should not be done at the expense of limiting the safety or performance capabilities of the Airport users. This alternative was eliminated from consideration.

RSA Alternative 4 - Construct RSA on Airport Property

Under this alternative, the RSAs would be constructed within the existing Airport boundary. This provides a 425-foot RSA beyond the Runway 8 threshold and a 1,000-foot RSA beyond the Runway 26 threshold. This alternative provides the full RSA requirement for Runway 26. While it increases the present Runway 8 RSA, it only provides about one half the required length to meet FAA design standards. The Runway 26 length would be constructed in compliance with FAA airport design standards. This alternative retains the full operational length of the runway. (Operational runway length requirements are described under RSA Alternative 3.) The width of the RSA would be established at 300 feet. This is less than full compliance with C-III criteria, but is being considered due to the extensive cost of constructing a fully compliant RSA width and the environmental issues associated with constructing the RSA in wetlands and fish habitat adjacent to the runway.

RSA Alternative 5 - No Action

This alternative would not change the existing RSA conditions. The Airport would require a modification to standards to maintain its certification. *This alternative does not adequately address airport safety concerns and was eliminated from consideration.*

Recommended RSA Alternative

Alternative 2 is the recommended RSA alternative based on the ratings assigned to the evaluation criteria in the RSA Alternatives Analysis Matrix in **Table 5-E**.

RSA ALTERNATIVES ANALYSIS MATRIX
Juneau International Airport

Criteria	*Alternative 1A*	*Alternative 1B*	*Alternative 2A*	*Alternative 2B*	*Alternative 4A*	*Alternative 4B*
Operational	10	10	10	10	3	3
Economic	5	5	6	6	8	8
Environmental	2	1	5	3	7	5
Implementation Feasibility	2	1	5	2	7	4
Score	19	17	26	21	25	20

Rating Range
10 = High Potential to Meet Criterion
5 = Moderate Potential to Meet Criterion
1 = Low Potential to Meet Criterion

Table 5-E

The following subsections provide discussions on the evaluation of the three RSA alternatives that were considered.

Operational Characteristics: For this analysis, the ability of the alternative to meet FAA airport design standards is paramount. To evaluate this, it was important to maintain the operational runway length of 8,456 feet by 150 feet wide. This is an important aspect to the air carriers which serve Juneau: Alaska Airlines stated that under certain conditions they must operate with restricted departure weights due to the existing runway length. While other options may be available to achieve the RSA requirements, the operational factors considered important to this evaluation retained the existing runway length.

Alternative 1 provides the full operational length of runway and is compliant with FAA RSA design standards at each end of the runway. In constructing Alternative 1, no change in Part 77 imaginary surfaces or RPZs at the Airport would be required and no changes in approach procedures would be necessary. However, the access road and pedestrian trail on the west end of the Airport would have to be relocated and proposed approach lighting to Runway 26 would have to be extended further into the MWSGR.

Alternative 2 also provides the full operational length of runway. This alternative provides compliance with FAA design standards for RSAs at each end of the runway. Under this alternative, both thresholds, as well as approach/threshold lighting, would have to be relocated. Exit taxiway relocation would be necessary on the east end. Both FAR Part 77 imaginary surfaces and RPZs must be adjusted. All instrument approaches would have to be recalculated with new touchdown points. GPS approaches from the east might be impacted. As with the previous alternative, the access road and pedestrian trail on the west end of the Airport would have to be relocated and proposed approach lighting to Runway 26 would have to be extended further into the MWSGR.

Alternative 4 provides the full operational length of runway. It also provides a full-length RSA to Runway 26, but does not provide a full-length RSA to Runway 8. Under this alternative, no change to FAR Part 77 imaginary surfaces or RPZs would be necessary and no change to approach procedures would be needed. The access road and pedestrian trail on the west end of the Airport would have to be relocated and proposed approach lighting to Runway 26 would have to be extended further into the MWSGR.

Economic Factors: Cost estimates associated with each alternative were prepared. The cost estimates are

appropriate for master plan level comparison purposes. They should, however, be considered preliminary and subject to refinement during more detailed design. Because of the potential environmental impact to Jordan Creek, the development alternatives where subdivided for cost estimates. Each alternative provided an option for Jordan Creek remaining in its current location and alignment, while a second alternative would relocate Jordan Creek and eliminate the creek from crossing under the RSA, taxiway, and runway. Planning-level cost estimates were prepared. A summary of total estimated costs associated with each alternative is shown in **Table 5-F**.

RSA ALTERNATIVES COST COMPARISON
Juneau International Airport

	Alternative 1A	*Alternative 1B*	*Alternative 2A*	*Alternative 2B*	*Alternative 4A*	*Alternative 4B*
Total Estimated Cost	$9,693,000	$10,284,000	$7,089,000	$7,630,000	$3,366,000	$4,015,000

Table 5-F

Environmental Factors: Potential environmental impacts of developing the RSA were evaluated. These include impacts to wetlands, the MWSGR, Jordan Creek, the Mendenhall River, and other assorted environmental aspects of extending east and/or west beyond the existing runway ends and side. Acquisition and use of the MWSGR would require compliance with statutes that create the refuge, as well as with the policies regarding airport expansion presented in the refuge plan. These policies include "demonstration of the following: 1) that there is a significant public need for the expansion which cannot reasonably be met off-refuge or through the use of alternative transportation modes and technologies; 2) that the use of refuge lands are avoided or minimized to the maximum extent feasible; 3) that all impacts to the refuge and to refuge resources are fully mitigated through restoration and/or replacement; and 4) that the airport expansion project will not create a hazardous attraction for waterfowl." Alternatives 1, 2, and 4 require the crossing of Jordan Creek on the east end of the Airport. However, Alternative 1 presents the greatest environmental concern, as it also requires crossing or re-channeling the Mendenhall River on the west end of the Airport.

Alternative 1 extends the RSAs into the MWSGR. This alternative potentially reduces bird activity near the approach end to Runway 8 and impacts the wetlands at both ends of the runway. There is no change in the airport noise environment. Under this alternative there is minimal disruption to flood storage function of wetlands, although there exists a potential disruption to water fowl and fish habitat.

Alternative 2 extends into the MWSGR and potentially reduces bird activity at the approach end to Runway 8. This alternative presents a very slight noise reduction west of the Airport as the runway threshold is relocated east. Conversely, there is a very slight noise increase on the east end of the runway due to the threshold relocation. This alternative also impacts wetlands, with minimal disruption to flood storage function of the wetlands expected. However, there is a potential disruption to water fowl habitat.

Under Alternative 4, the RSAs are extended to the Airport property boundaries on both ends of the runway. The Runway 26 RSA crosses Jordan Creek. There is a reduction to bird activity at the threshold to Runway 8. Wetlands are impacted and the potential for disruption to water fowl habitat exists. Minimal disruption to flood storage function of wetlands is anticipated under Alternative 4.

Comparisons of environmental factors for RSA alternatives are summarized in **Table 5-G.**

Implementation Feasibility: Alternative 1 is the least likely to be implemented. Filling into the main channel of the Mendenhall River would have hydraulic and hydrologic effects. Impacts to fish and migratory bird habitat would be substantial. This alternative is also the most costly of those considered.

ENVIRONMENTAL FACTORS - RSA ALTERNATIVES
Juneau International Airport

Factor	*Alternative 1A/1B*	*Alternative 2A/2B*	*Alternative 4A/4B*
Wetland Quantity	26 Acres	26 Acres	8 Acres
Wetland Quality	High riparian support, reg. ecol. diver., dist. sens. wildlife/surface hydro. control, sed., tox. retention, nutrient export, erosion sens.	High riparian support, reg. ecol. diver., dist. sens. wildlife	High riparian support, reg. ecol. diver., dist. sens. wildlife
Fish Stream	Jordan Creek, Mendenhall River	Jordan Creek, Mendenhall River	Jordan Creek, Mendenhall River
Land Use/ Ownership	Airport Land and MWSGR	Airport Land and Mendenhall Wetlands	Airport Land
Permits	COE, ADF&G, DNR Special Use Permit	COE, ADF&G	COE, ADF&G
Mitigation	Acquire replacement land for Refuge	Near-Airport wetland mitigation possible	Near-Airport wetland mitigation possible
Estimated Time, Cost	3 yrs, $400K	1.5 yrs, $100K	1 yr, $70K

Source: Dunn Environmental Services, 1998.

Table 5-G

Alternative 2 has moderate implementation potential. This alternative requires acquiring additional Airport property.

Alternative 4 has the highest potential for implementation. Fill placed in the Mendenhall River flood plain would be contained behind an existing groin and should have minimal impact on the hydraulic characteristics of the river. This alternative is contained entirely on Airport property.

PASSENGER TERMINAL ALTERNATIVES

The terminal serving JIA is inadequate to meet existing and projected passenger demand. Virtually every functional component of the passenger terminal is either at design capacity or inadequate based on demand levels. This analysis reflects overall usage patterns and accounts for the low activity and peak demand times of the year. A terminal alternatives analysis matrix is presented in **Table 5-H**. The facility requirements analysis represents a compromise between an overbuilt situation (which provides full facilities during those peak times and a significant amount of empty space during non-peak periods) and an underbuilt situation (which, during periods of peak demand, tests the ability of the airport tenants to operate effectively and adversely affects passenger convenience).

For the reasons stated above, it is recommended that the passenger terminal be expanded to provide for adequate space to accommodate the various airport functions. This Master Plan analysis approaches the alternatives plan analysis from a gross square footage area perspective. This takes into account the overall square footage requirements for the year 2015 and factors in the terminal square footage of the first floor as

TERMINAL ALTERNATIVES ANALYSIS MATRIX
Juneau International Airport

	Alternative 1 Existing Configuration	*Alternative 2 West Air Carrier Concourse*	*Alternative 3 Realign East Air Carrier Concourse*
Criteria			
Operational	2	5	10
Economic	4	4	3
Environmental	3	6	3
Implementation Feasibility	4	2	2
Score	**13**	**17**	**18**

Rating Range: 10 = High Potential
5 = Moderate Potential to Meet Criterion
1 = Low Potential to Meet Criterion

Table 5-H

a percentage of the total square footage to arrive at a "building footprint" requirement. The existing terminal footprint has a ratio of 57 percent first floor space. For long-range terminal alternatives analyses, a ratio of 70 percent first floor space is used.[13] Based on this factor, a 2015 terminal requirement of approximately 171,000 square feet translates into a footprint of approximately 120,000 square feet.

The building footprint size will be used to define the various alternatives and their ability to accommodate the required overall terminal facilities. In addition, the terminal concepts are closely related to the vehicular access/circulation/parking requirements. *It is significant to note that, from an overall planning perspective, the general location of the existing terminal in relation to the other major functional components of the Airport (i.e., the airfield), remains the ideal site for future passenger terminal functions.* The following alternatives were identified and evaluated to address the requirement for expanded passenger terminal facilities at JIA:

- Terminal Development Alternative 1 - Existing Concourse Configuration
- Terminal Development Alternative 2 - West Air Carrier Concourse
- Terminal Development Alternative 3 - Realign East Air Carrier Concourse

Terminal Development Alternative 1 - Existing Concourse Configuration

Terminal Alternative 1 is depicted in **Exhibit 5-4**. This alternative essentially maintains the existing terminal site and expands the terminal and concourse space based on future requirements. Under Alternative 1, the air taxi concourse, gates, and aircraft parking spaces remain on the west side of the terminal and the air

[13] The 70 percent ratio, which is considered conservative from a planning perspective, is subject to refinement during subsequent design phases.

carrier concourse and gates remain on the east side.

Terminal Development Alternative 2 - West Air Carrier Concourse

Terminal Alternative 2 is depicted in **Exhibit 5-5**. This alternative essentially maintains the existing terminal site and expands the terminal and concourse space based on future requirements. Contrary to Alternative 1, however, Alternative 2 orients the air taxi concourse, gates, and aircraft parking spaces on the east side of the terminal, while the air carrier concourse and gates are on the west side of the terminal.

Terminal Development Alternative 3 - Realign East Air Carrier Concourse

Terminal Alternative 3, which is depicted in **Exhibit 5-6**, provides for an expansion of the air taxi concourse, gates, and aircraft parking spaces on the west side of the terminal. The item that differentiates Alternative 3 is that the air carrier concourse is oriented parallel to the runway. This expansion concept allows for adequate aircraft parking areas, but significantly increases the landside space available to meet vehicular access, parking, and circulation requirements.

Recommended Terminal Alternative

Alternative 3 was chosen as the preferred terminal alternative based on many benefits associated with the concept, especially the advantages of opening critical landside area for other development. To support the ultimate expansion of the terminal, it is recommended that the Airport acquire the Loken property east of the terminal. The following subsections provide discussion on the evaluation of the three terminal alternatives as compared with each evaluation criterion.

Operational Factors: Alternatives 1 and 3 are best suited for efficient air carrier operations, since the aircraft remain close to the runway/taxiway movement areas. This would result in less maneuvering conflicts with the more confined area currently used by air taxi aircraft. Alternative 3 is optimal, since it moves the air carrier aircraft further out into the airfield (without resulting in any conflicts) and opens a significant amount of landside area for other development.

Alternative 2 does provide the benefit of locating air carrier aircraft near the air cargo operations area west of the passenger terminal. Such an arrangement would allow for a more efficient movement of air cargo from the cargo operators to the aircraft. The layout under Alternative 2 would also simplify security requirements for FAR Part 121 carriers. However, it is believed that these advantages are outweighed by the disadvantages associated with Alternative 2. Placing air carrier aircraft in such a closed area would increase problems associated with jet blast or would create additional operational burdens with towing aircraft to the taxiway before engine spool-up. Alternative 2 would also move these noisier aircraft closer to the residential areas northwest of the Airport and into an area where jet engine noise would be reflected by the surrounding buildings (further discussed in Access and Circulation Alternatives).

From a landside perspective, Alternative 3 is the only alternative that provides additional landside space for development. This could potentially alleviate the access/parking problems without having to use adjacent lands or build a parking garage in the near term. Each of the three alternatives effectively cuts off traffic using Shell Simmons Drive. This factor would have to be integrated into discussions of an alternate access route for Glacier Highway traffic.

The ability of the various terminal alternatives to provide for the required facilities in the long-term (2015) time frame is also an important consideration. **Table 5-I** provides a breakdown of the key facility parameters provided under each alternative. As shown, all of the alternatives provide adequate total terminal square footage; air carrier/commuter gates and aircraft parking spaces; and air taxi gates. Alternative 2, however, does not provide the required number of air taxi aircraft parking spaces. This reflects an inefficiency in the overall layout of Alternative 2. Although more detailed analyses (including a curb front traffic survey) would have to be conducted to determine the specific requirements for the different transportation modes, using the Airport terminal curb front is shown for comparison purposes. Overall, a greater amount of terminal curb front is desirable.

TERMINAL ALTERNATIVES FACILITY COMPARISON
Juneau International Airport

Facility Item	*2015 Facility Requirements*	*Alternative 1 Existing Configuration*	*Alternative 2 West Air Carrier Concourse*	*Alternative 3 Realign East Air Carrier Concourse*
Total Building Square Footage	171,000	217,000	191,000	212,000
Air Carrier + Commuter Gates	6	6	6	6
Air Carrier Parking Spaces	6	6	6	6
Air Taxi Gates	4	4	4	4
Air Taxi Parking Spaces	77	77	63	77
Curb Front (LF)	[1]	1,580	1,370	1,670

Source: *The Airport Technology and Planning Group, Inc., November 1997.*
Note: [1] *Terminal curb front requirements not determined, requires additional study/traffic survey.*

Table 5-I

Economic Factors: Cost estimates were prepared for terminal development Alternatives 1, 2, and 3. The cost estimates are appropriate for master plan level comparison purposes. They should, however, be considered preliminary and subject to refinement during a more detailed design phase before implementation. A summary of total estimated cost associated with each of the terminal development alternatives is shown in **Table 5-J**. It is significant to note that the major differences in the estimated costs of the alternatives are based on the actual size of the terminal being planned at this conceptual stage.

Environmental Factors: The terminal development alternatives generate no major environmental issues. It is likely, however, that Alternative 2 would create additional aircraft engine spool-up noise closer to the residential area northwest of the terminal area.

Implementation Feasibility: *All three terminal alternatives have excellent potential for implementation, since they retain the existing location of the passenger terminal facility.* This is viewed as a strong, positive aspect because none of the alternatives would require relocating the terminal and disturbing a new area of JIA. The alternatives also maximize the potential future use of the existing facility, by avoiding any perception of previous unfavorable investments. They are also very viable because the terminal is currently well-located in its relationship to the airfield. This allows for maximum efficiency in airfield operations as it relates to passenger service. All three alternatives require relocating the sand storage building and will impact the operations of Coastal Helicopters.

Alternatives 1 and 3 may be more feasible for several reasons. Both Alternatives 1 and 3 retain the existing overall orientation of the terminal, with air taxi operations in the closed apron area and air carrier operations

TERMINAL ALTERNATIVES COST COMPARISON
Juneau International Airport

	Alternative 1 Existing Configuration	*Alternative 2 West Air Carrier Concourse*	*Alternative 3 Realign Air Carrier Concourse*
Total Estimated Cost	$35,325,000	$31,528,000	$34,525,000

Source: USKH, Inc., November 1997.

Table 5-J

in the open area facing the airfield. Remaining in the existing area is beneficial for the air taxi aircraft because of the wind protection afforded by the terminal.

GENERAL AVIATION CONSIDERATIONS

GA facilities at JIA include FBO facilities, T-hangars, conventional hangars, floatplane slips, and aircraft parking apron/tie-downs. These facilities are currently located throughout the airfield. Additional GA facilities required at the Airport through 2015, as determined in Chapter Four, *Demand/Capacity Analysis and Determination of Facility Requirements*, include the following:

- Conventional hangars to store 17 additional aircraft.
- 40 additional T-hangar units.
- 32 additional based aircraft tie-downs.
- 13 additional transient aircraft tie-downs.
- 30 additional floatplane slips.
- 8 additional based helicopter parking spaces.
- 6 additional transient helicopter parking spaces.
- 79 additional GA auto parking spaces.
- FBO expansion of 60,600 square feet (buildings only).

Plans to provide for the expansion of the above GA facilities have been developed within the context of this Master Plan Update. Many planned facilities are depicted on the existing ALP for JIA. Recognizing the value of previous planning efforts for the Airport, retaining some of those development schemes (i.e., west GA area), and refining them based on the analyses conducted for this Master Plan Update is logical. These development schemes have also been refined based on significant participation by the Airport tenants and users during this Master Planning process.

The GA development concepts are organized and presented based on the following GA areas of the Airport:

- West GA Development Area
- Central GA Development Area
- East GA Development Area

West GA Development Area

Exhibit 5-7 depicts the proposed development concept for the west GA area. As shown, the development of this area is highly contingent on realigning Duck Creek to the edge of the Airport property. A 100-foot natural buffer would be created as part of the Duck Creek realignment. Development in this area includes approximately 33 additional T-hangar units, 25,600 square yards of additional based aircraft tie-downs, 21,500 square yards of combination based and transient aircraft tie-downs (existing based aircraft tie-down area), and 18,400 square yards of transient tie-downs and cargo apron (existing).

The west GA development area also includes several parcels of land (Block "E") that could be developed more efficiently. The proposed layout shows several large-scale hangar/commercial buildings that would fit in logically with the nearby FBO development. Key to redeveloping this area is the fact that the USFWS holds restrictions on the development of several lease lots in that area. Maximizing the development of this area may require moving the USFWS facility to another part of the Airport.

Central GA Development Area

Exhibit 5-8 depicts the proposed development concept for the GA area in the central portion of the Airport. As shown, an additional 16-unit executive hangar (total of 33,600 square feet) is planned for the area east of Taxiway C-2 and south of Jordan Creek. Also, an additional 9-unit executive hangar (total of 21,600 square feet) is planned for the area south of Ward Air. The 9-unit hangar, which is an existing proposal at the Airport, is in an area currently being used for based aircraft tie-downs. Therefore, aircraft storage plans in other areas of the Airport should compensate for the tie-downs lost based on this proposed hangar development.

East GA Development Area

The large area east of Wings of Alaska, which is currently the site of the RTR antenna, is ideally suited for Airport-related and other commercial development. The RTR antenna, as discussed in the Airport Maintenance/Support Facility Alternatives Section of this chapter, would have to be moved to support long-term air traffic operations. Additionally, an Automated Surface Observing System (ASOS) test site is co-located with the RTR antenna. It is believed that the weather data generated by the ASOS at the current site is of limited use since it must be supplemented by manual weather observations. A strong case can be made to move the ASOS to a better site.

Once the RTR and the ASOS are moved, this approximately 37-acre site can be developed. A significant portion of the site immediately north of Taxiway A is ideally suited for aircraft tie downs, as indicated in **Exhibit 5-9.** Based on height restrictions defined by the FAR Part 77 (7:1 slope) Transitional Surface, building development would most likely begin 750 feet from the centerline of Runway 8/26. The remainder of this area, approximately 28 acres, should be subdivided to maximize the benefits to the Airport and its current and future users/tenants.

The optimum layout for this portion of the Airport should provide most of the parcels with airfield access (via taxiway) as well as roadway access. Establishing lease parcels that only have landside access is logical.

These parcels can be leased by commercial tenants for use in developing non-aviation facilities. Such parcels, which would not be needed for Airport activities in the foreseeable future, would serve to provide revenue enhancement opportunities for the Airport. Exhibit 5-9 depicts a desirable development concept for this area.

AIR CARGO FACILITY CONSIDERATIONS

Although projected demand does not suggest the specific need for an additional air cargo facility or expansion of the existing facilities, discussions with air cargo operators suggest the need for an additional hardstand for a narrow-body aircraft. The cargo aircraft hardstand, approximately 4,500 square yards, should be near the existing air cargo operators, just west of the passenger terminal. Belly-hold cargo operations will continue to be accommodated in existing facilities near the terminal through the 20-year planning period.

AIRPORT MAINTENANCE/SUPPORT FACILITY ALTERNATIVES

This section presents a comprehensive analysis of alternative development scenarios for a proposed new SRE building at JIA. This analysis draws upon research conducted by the CBJ, R&M Engineering, and Airport personnel. Previous research used in documenting this comprehensive alternative analysis includes a March 31, 1995, report on alternative sites by R&M Engineering and a March 1997 report on the SRE Building by the CBJ Engineering Department. This section is organized into the following subsections:

C Facility Requirements
C Alternative Development Sites
C Evaluation of Alternative Development Sites
C Selection of the Recommended Alternative

Facility Requirements

Background: The existing Airport maintenance building, immediately north of the FAR Part 135 (i.e., air taxi) aircraft apron, is approximately 5,200 square feet in size. It has served as the SRE storage and maintenance building since the early 1950s with only minor repairs done over the years. The existing building was designed to provide storage for three pieces of airfield equipment: a grader, loader, and plow truck. A 19,500-square-foot hangar, immediately east of the terminal, currently serves as a storage building for sand, pavement deicing/anti-icing compounds, and other materials and supplies. The hangar was built in the 1940s and is in a general state of disrepair.

Purpose and Need: A new SRE facility is needed at the Airport for several reasons and the primary justification is based on the current fleet of snow removal and maintenance equipment at the Airport. The Airport and the FAA have invested heavily in this equipment, which is critical to the safe operation of the Airport. The current value of the inventory of heavy equipment at the Airport is approximately $6.5 million.

A list of main-line SRE anticipated to be in place in 1999 is provided in **Table 5-K**.

The current storage facilities are inadequate to house the important and valuable SRE listed in Table 5-K. Moreover, the existing buildings are marginal, at best, in responding to local building codes, employee accessibility laws, and worker safety (OSHA) codes. Much of the Airport SRE is left outdoors and exposed to the elements. Since Juneau's northern maritime climate typically has several freeze/thaw cycles, freezing precipitation is a normal winter weather condition. To maintain the runway in a safe condition, maintenance equipment would have to be prepared to mobilize at short notice. The heavy equipment stored outside, under tarps or in the open air, is subject to freeze-up and significant long-term damage. One example that underscores the problems happened on Christmas Eve 1992, during a period of high flight activity. A new 980F Cat Loader was totally encapsulated with freezing rain, causing moving parts to freeze up and rendering the equipment unusable to clear the airfield.

FUTURE INVENTORY OF AIRPORT SRE
Juneau International Airport

Unit	Description
2	1999 Dodge 4x4 Pickup Snow Supervisor Braking Test
5	1997 Ford 4x4 Pickup Field Maintenance Snow Removal
9	1986 Ford Pickup 4x4 Chemical Spreader for Roadside Chemicals
10	1997 Oshkosh 4000 gal. Liquid Deicer for Runway, Taxiways
11	1998 Oshkosh High Speed Plow Truck with Dump Body
12	1998 Oshkosh High Speed Plow Truck with Dump Body
13	1998 Oshkosh High Speed Plow Truck with Dump Body
14	1981 Oshkosh High Speed Plow Truck with Dump Body
18	1987 CAT Snow Removal Grader
19	1982 CAT Grader
20	1983 CAT Snow Removal Loader 966D
21	1997 CAT Snow Removal Loader 980G
22	1992 CAT Snow Removal Loader 980F
24	1992 Oshkosh High Speed Runway Broom
25	1992 Oshkosh High Speed Runway Broom
26	1992 Oshkosh High Speed Runway Broom
32	1989 International 10 yd Sand Truck
33	1981 International 10 yd Sand Truck
38	1979 SMI High Speed Snow Blower
39	1992 Oshkosh High Speed Snow Blower

Sources: CBJ Engineering Department, March 1997, and discussions with Airport personnel on pending equipment purchases and replacement.

Table 5-K

Sensitive electronic controls, which fail much more rapidly when exposed to inclement weather, are common on modern heavy equipment. While the airfield operations and maintenance crew is trained to respond quickly and efficiently to changing weather conditions on the airfield, they spend a significant amount of time performing tasks such as thawing engine blocks on the heavy equipment. This often delays the critical work they must accomplish to ensure safe Airport operations. This represents a severe impediment, especially when considering the importance of JIA in Southeast Alaska.

The Alaskan Region FAA office has emphasized that a vehicle storage facility is critical to the long-term operation of the $6.5 million inventory of equipment they have, for which they will continue to provide funding. Besides the SRE listed in Table 5-K, the Airport has 11 maintenance vehicles and some miscellaneous equipment that would not require indoor storage.

Facility Requirements: Space requirements for storing and maintaining the critical SRE the Airport has in its current fleet or on firm order, are shown in **Table 5-L**.

Besides the SRE building requirements, a new facility is needed to store sand. Sand is used extensively as part of the snow removal operation and should be close to the SRE building, if possible. The sand storage building concept is a pre-engineered dome structure with 8-foot vertical concrete walls. The proposed

building size is a 110-foot-diameter circle, which is approximately 9,500 square feet. Such a structure has a capacity of 5,000 cubic yards of sand, which is sufficient for current operations and an emergency reserve.

SPACE REQUIREMENTS FOR SRE BUILDING
Juneau International Airport

Functional (SF)	Area Size
Vehicle Storage	22,800
Vehicle Wash Bay	700
Chemical Storage Area	1,600
Vehicle Repair Area	2,800
Parts Storage	900
Tire Repair and Storage	1,100
Electrical Shop	600
Paint Booth/Sign Making Area	1,000
Toilet/Locker Room	700
Training/Safety Room	600
Administrative Area	700
Mechanical/Electrical	300
Mezzanine Storage	1,500
Circulation/Structure	1,800
Total	**37,100 SF**

Source: CBJ Engineering Department, March 1997 (modified for two less vehicles per purchasing plans).

Table 5-L

Alternative Development Sites

Several important factors should be considered when identifying alternative sites for the SRE building. From a functional perspective, the site should have direct, secured access to the airfield and should not interfere with taxiway/apron areas. Having the facility near a runway end is desirable, based on the most efficient operational techniques for clearing ice and snow. Having public access to the facility for employee and vendor parking is also desirable. However, it is not desirable to use land for an SRE building that could be used for revenue-generating (*i.e.*, tenant) purposes.

Identifying viable alternative sites to construct an SRE building at JIA is challenging, primarily due to the constrained land envelope and natural features of the Airport. Based on this, some alternative sites may not be the most desirable from the perspective of addressing the basic functional needs for such a facility. A comprehensive evaluation of the alternative site, based on functional, economic, environmental, and long-range planning factors is presented in the next section. Six sites (plus derivatives based on two of the sites) are identified for this analysis, as described and depicted in **Exhibit 5-10**. Several of these sites have been analyzed as part of previous planning efforts.

C Sites 1A and 1B - West End
C Site 2 - East End
C Sites 3A and 3B - Existing SRE Facility
C Site 4 - Existing Sand Shed
C Site 5 - Maplesden Road
C Site 6 - Floatplane Basin

Sites 1A and 1B - West End. Site 1A is at the extreme west end of the Airport. The west site boundary is Radcliffe Road and the north site boundary is the Airport property line. Site 1A is currently isolated by wetlands and Duck Creek to the east. Therefore, bridging Duck Creek is necessary to make Site 1A usable. Site 1B is just east of Site 1A, in an area planned for GA (hangar) development. With Site 1B, Duck Creek would be rerouted to allow development of the entire area.

Site 2 - East End. Site 2 - East End, is at the east end of the Airport, near the Runway end 26. Site 2 is east of the TEMSCO Helicopters facility in an area of minimal development. This site is currently classified as wetlands.

Sites 3A and 3B - Existing SRE Facility. The existing SRE Facility is northwest of the passenger terminal and north of the air taxi aircraft apron. This site is considered valuable from a long-range planning perspective since options to expand the aircraft parking apron are limited and this is a logical place to expand the apron when such expansion is required. Site 3A would entail construction of an entirely new building on the present site. Site 3B would include the addition of storage space immediately north of the existing building and a complete renovation of the existing structure to meet current codes, regulations, and standards.

Site 4 - Existing Sand Shed. Site 4, Existing Sand Shed, is immediately east of the passenger terminal and the rental auto lot. To provide adequate space for the required SRE facilities, the Loken Aviation/Coastal Helicopters hangar, located adjacent to the sand shed, would be purchased from the current owner. The site is centrally located based on its proximity to the airfield. This site, however, represents a valuable piece of land from a long-range planning perspective. This site may be required for passenger terminal expansion or related facilities, or another aviation-related, revenue-producing development that requires "front door" visibility and access via the primary Airport entrance road.

Site 5 - Maplesden Road. Site 5, Maplesden Road, is off Yandukin Drive, near Old Dairy Road on the east end of the Airport. The site is near both TEMSCO Helicopters (to the east) and Wings of Alaska (to the west). It has excellent public access and would have good airfield access with the development of a taxiway. The site is large enough to develop the required SRE facilities, in conjunction with other Airport operational improvements. Moving the RTR antenna will be required to support long-term Airport operations. This is being considered and it appears there is a workable solution to overcoming the current development constraints associated with this large area. Additionally, an ASOS test site is co-located with the RTR antenna. It is believed that the weather data generated by the ASOS at the current site are of limited use since they must be supplemented by manual weather observations. Based on this and the fact that the ASOS has not yet been commissioned, a strong case can be made to move the ASOS to a better site.

Site 6 - Floatplane Basin. Site 6, Floatplane Basin, is south of the floatplane basin, near the west end. This site is currently a heavily wooded area and may be environmentally sensitive.

Evaluation of Alternative Development Sites

An objective evaluation was done on the six alternative SRE building sites identified and described in the previous section. The alternative sites were evaluated against a set of criteria similar to the criteria set forth in the airfield and terminal alternatives analyses to select a recommended alternative. This section is organized as follows:

C Evaluation Criteria
C Operational Factors
C Economic Factors
C Environmental Factors
C Long-Range Planning Factors

Evaluation Criteria: To compare and rate each of the six alternatives, four evaluation criteria were developed to determine which alternative meets the requirements of the Airport most effectively. These criteria are discussed in the following sections:

Operational Factors. For this analysis, the ability of the alternative sites to allow Airport personnel to accomplish the mission of snow and ice removal in the most efficient manner is evaluated. This includes the proximity of the SRE building to the airfield, public access to the site, and interaction with other Airport tenants/operations. Building height restrictions based on FAR Part 77 Imaginary Surfaces, were

evaluated and determined not to be a significant limiting factor for developing an SRE building at any of the alternative sites.

Economic Factors. Estimates of development costs associated with an SRE at each of the alternative sites were prepared. Cost estimates include site preparation costs, infrastructure costs, environmental/permitting costs, building construction costs, administration, and other costs. The sites were evaluated with the lowest cost site receiving the highest score and the highest cost site receiving the lowest score.

Environmental Factors. Potential environmental impacts of developing an SRE facility on the alternative sites were evaluated. The cost associated with environmental permitting, mitigation, etc., were included in the evaluation of economic factors. This criterion focused on the additional agency coordination and development lead time involved with development on the alternative sites. The viability of successfully accomplishing the required coordination, negotiation, and permitting was also estimated as part of this criterion.

Long-Range Planning Factors. The degree to which an SRE building at an alternative site fits within the long-range facility planning goals of the Airport was objectively evaluated under this criterion. The time frame for potential airport development that was considered in this evaluation is the next 20 to 30 years, based on useful economic life.

Operational Factors:

Site 1A and 1B - West End. Site 1 is a good site to develop an SRE facility from the standpoint of proximity to the airfield. Snow removal operations at either Site 1A or 1B could begin efficiently at the Runway end 8 and continue down to the Runway end 26. SRE would also have limited interaction with GA activity in the vicinity.

Site 2 - East End. Site 2 is an excellent site for an SRE facility based on its location near the Runway end 26 and unimpeded access to the airfield. Similar to Site 1, this would allow for a very efficient snow removal operation. This site also works well from a functional standpoint because such operations would not interfere with aircraft activity near the passenger terminal apron or any of the GA areas. Snow removal vehicles would only traverse those areas as necessary to conduct the required operations.

Site 3 - Existing SRE Facility. The location of the existing SRE facility is not the best from a functional standpoint. Although this site has served the Airport well for many years, it has several drawbacks. The existing SRE facility is near an area of significant aircraft activity. The vehicles must drive through the active apron area to reach the airfield. Its midfield location is also not the most efficient from an operations standpoint. The location of Site 3 also limits the expansion potential of the FAR Part 135 apron, which would have an operational impact on other Airport tenants/users. This issue will be explored in greater detail in the Long-Range Planning Factors section of this Chapter. Operational factors associated with Site 3A and 3B are the same.

Site 4 - Existing Sand Shed. This site is close to the passenger terminal, along the main Airport entrance road. Functionally, a snow removal operation from this site would have some disadvantages. Although this site does not interact with commercial aircraft operations to as much as Site 3, it is in an area that experiences aircraft activity, which might affect efficiency. Like Site 3, it is centrally located in relation to the airfield, which is not ideal from an operational efficiency standpoint. Public access for employees and vendors/contractors is excellent; however, it would mix with traffic bound for the passenger terminal. This would create additional impacts to the overall Airport access/circulation system which is already heavily

taxed.

Site 5 - Maplesden Road. This site offers a very good location from an operational standpoint. Although it is not situated as close to the Runway end 8 as Site 2, it does offer good access to the runway end, with minimal effect on other Airport users/tenants. SRE based at Site 5 would likely get to the airfield from Taxiway E (near the TEMSCO Helicopters facility). Public access to the site is excellent for employees and vendors/contractors, and is far removed from the more congested Airport access roadway system near the passenger terminal.

Site 6 - Floatplane Basin. Site 6 is near the Runway end 26, immediately south of the floatplane basin. Access to the airfield from this site is good; however, it would require upgrading of the access road leading to the paved runways and taxiways. One operational disadvantage of this site is the fact that the snow removal vehicles would have to go through the RSA of the Runway end 8, which poses a safety hazard and a potential delay to snow removal operations. Employee and verdor/contractor access to the site is poor and would require an escort through secure areas. This distraction would cause additional workload for maintenance and/or security employees. Public vehicular access could potentially be accomplished by upgrading the walking trail up to the site, but this would be a difficult project.

Economic Factors: Costs were estimated and/or compiled for constructing an SRE facility on each of the proposed sites on the Airport. Most of the information was gathered from existing sources and revised or supplemented to give a planning level cost of construction at the specific site. Specific consideration was not given to the phasing of the work as all building costs were the same. Cost differences are related to site preparation and access; providing water, sewer, and power; and environmental mitigation costs. Each site includes a 11,200-square-foot equipment repair and staff support building with an estimated cost of $1,512,000, a 25,900-square-foot vehicle storage building estimated at $2,382,000, and a sand barn estimated at $500,000.[14]

Construction of the facilities could be phased to match available funding. The initial work would be to design the facility, obtain permits, and get a builder under contract. The first phase of construction would include site preparation and access, utility construction, and environmental mitigation. Additional work could begin as funds become available. Constructing the storage facility initially would be feasible, with the sand storage and office coming later or another combination of new and old buildings that would move the project forward and allow Airport staff to continue providing this operation. *These combinations can vary considerably and are not presented herein.*

Site 1 - West End. Two options are possible for construction of the SRE building on this site: 1A - building on the west side of Duck Creek and crossing the stream with bridges or culverts; and 1B - rerouting Duck Creek as previously designed and constructing the SRE building in the area previously planned for apron expansion. The estimated development cost for Site 1A is $8,205,000 and for Site 1B is $8,800,000. The cost estimate for Site 1B includes $1,000,000 to realign Duck Creek.

Site 2 - East End. Development costs for Site 2 are based on CBJ Engineering Department cost estimates (March 1997 report: *Snow Removal Equipment Building*). Those costs were reduced for this analysis, based on smaller facility requirements and are estimated to be $10,942,000.

Site 3 - Existing SRE Facility. This location has two possibilities: 3A - construction of a new facility, and 3B

[14] Note that building construction costs were obtained from CBJ Engineering Department report, *Juneau International Airport Snow Removal Equipment Building*, March 1997. Cost estimates were reduced for this analysis, based on future vehicle storage requirements of 25,900 square feet, as opposed to 27,900 square feet as determined in the CBJ report.

- addition to the existing building. Under Site 3A, the existing building would be demolished and a completely new structure built. The estimated cost for this is $7,135,000. Site 3B includes constructing maintenance and storage space on the north side of the existing building and using the existing structure for equipment storage only. The estimated development cost for Site 3B is $5,488,000.

Site 4 - Existing Sand Shed. The work at this location includes the removal of the existing sand shed and the Alaska Coastal Helicopters hangar and the construction of a new facility. The estimated development cost for Site 4 is $7,946,000, which includes $680,000 for land acquisition.

Site 5 - Maplesden Road. A new facility would be constructed at this site. It has good vehicular access and utilities are readily available. It would be constructed following the relocation of the RTR antenna, as previously discussed under the site description. The estimated development cost for Site 5 is $7,497,000.

Site 6 - Floatplane Basin. This site is in the area south of the float pond. It will require the extension of water, sewer, and electricity to the site. This could follow the existing road at the west end of the runway. The estimated cost for development at Site 6 is $7,613,000.

Environmental Factors: Several environmental resources at JIA require serious consideration when comparing alternatives for the SRE facility: anadromous fish streams, including adjacent riparian zones; and wetlands. Work in and adjacent to anadromous fish streams is regulated by several agencies, including the COE, ADF&G, NMFS, and ACZMP. Filling and dredging of wetlands are regulated by the COE, under the jurisdiction of Section 404 of the Clean Water Act, and the CBJ.

Work in or around anadromous fish streams may also involve wetland fill or dredge, with the following permitting requirements discussion. Besides wetland considerations with fish streams, the ADF&G requires a Fish Habitat permit for crossing or altering the course of the stream, the NMFS comments on impacts to the anadromous fish, and the CBJ has an ordinance requiring setbacks from streams of 50 feet for grading and structures and 25 feet for clearing of vegetation.

The guidelines implementing the Clean Water Act presume non-wetland alternatives for development, and the applicant must prove that no upland alternatives are feasible. In other words, an activity proposed for a wetland site must undergo a rigorous alternatives examination, to the satisfaction of the COE, before it can be permitted. Cost, logistics, and overall project need are considerations in the alternatives analysis. Once the alternatives analysis has been done, minimization and mitigation of wetland impacts are considered. Wetlands in the Airport area are included within the JWMP. This plan classifies wetlands according to function, value, and proximity to services such as roads, water, and sewer. Wetlands are classed from A to D, with the A and B wetlands being of highest value, and the C and D wetlands of lower value. The COE has issued the CBJ a general permit for C and D wetlands. The C or D classification does not relieve the applicant of the alternative analysis discussed above, but does allow a more expeditious permitting process. Estuarine wetlands (tidally influenced) are not included in the JWMP.

An evaluation of the alternative sites is presented in the following subsections and is summarized in a matrix of environmental factors, as shown in **Table 5-M**.

ENVIRONMENTAL FACTORS - SRE BUILDING
Juneau International Airport

Issue	*Site 1A West End*	*Site 1B West End*	*Site 2 East End*	*Site 3 Existing SRE Facility*	*Site 4 Existing Sand Shed*	*Site 5 Maplesden Road*	*Site 6 Floatplane Basin*
Wetland Quantity	Least of 4 That Impact	Least of 4 That Impact	Most of 4 That Impact	None	None	2nd Most Impact	3rd Most Impact
Wetland Quality	Highest, 2nd Most Mitigation	Highest, Most Mitigation	Moderate, Little Mitigation	N/A	N/A	Moderate, Little Mitigation	Moderate, Some Mitigation
Fish Stream	Cross Duck Creek	Reroute Duck Creek	None	None	None	None	None
Permits	COE, ADF&G	COE, ADF&G	COE	None	None	COE	CBJ Wetland
Potential Hazardous Waste	Little	Little	Little	High	High	Little	Moderate
Environmental Costs [1]	$100,000	$10,000 [2]	$10,000	$100,000	$50,000	$10,000	$25,000

Source: *Source: Dunn Environmental Services, July 1997.*
Notes: [1] *Costs for Sites 2-6 are rough estimates for mitigation beyond normal environmental documentation and permitting costs and include potential hazardous waste cleanup costs.*
[2] *Costs based on previous project in the Airport area.*

Table 5-M

Site 1 - West End. This site has the most complex environmental considerations of the six alternatives. Duck Creek, an anadromous fish stream, flows along the edge of the developed Airport land and isolates the site from other Airport property. In addition, the area contains several wetlands, which comprise 5.6 acres of the 14-acre area. Wetlands adjacent to the creek are tidally influenced and are shown as "Greenbelt" in the JWMP. Wetlands not adjacent to the creek are shown as "Class C" in the JWMP. The site is part of a parcel considered for apron expansion in an EA prepared by R&M Engineering for the CBJ in 1996. That EA arrived at a preferred alternative that involved rerouting Duck Creek to a 114-foot-wide greenbelt/riparian area along the Airport boundary fence to the west of the site, leaving approximately 7.5 acres of developable area.

Two options are possible for construction of the SRE facility on this site: building on the west side of the stream and crossing the stream with bridges or culverts (Site 1A), or rerouting Duck Creek as previously proposed and constructing the SRE in an area previously planned for apron expansion (Site 1B). *It is significant to note that since the purpose and site requirements of the SRE building are quite different from those of the apron area previously planned for this site, it is certainly not a given that, from an environmental impact perspective, the SRE building could be substituted for apron construction.*

Construction of the SRE facility on Site 1A would require: a Section 404 wetland permit; an ADF&G Fish Habitat permit; and mitigation of wetland impacts including maintaining all individual functional on-site values, with no loss of any on-site value. These functions would include surface hydrologic control, sediment and toxicant retention, nutrient support, riparian support, salmonid habitat, and disturbing

sensitive wildlife habitat; and would be expensive and technically difficult to duplicate, given the site conditions. This option would require preparation of an EA to FAA specifications to qualify for federal funds, and it may be difficult to receive approval from resource agencies, given the previous coordination. In addition, this option may preclude future use of the remainder of the site for apron area by eliminating the option of rerouting the creek. The environmental cost of this option would most likely be comparable to that of Site 1B, described below, with the addition of the preparation of an EA.

Construction of the SRE facility on Site 1B would require reevaluation of the existing EA (most likely a formality, should this site be clearly the best alternative), obtaining the Section 404 and ADF&G permits described in the EA, and following the Duck Creek re-route and mitigation processes described in the EA. The creek re-route would take approximately three years to accomplish and would meet the on-site mitigation requirements described above for Site 1B.

Site 2 - East End. This site, as well as probable access routes to Old Dairy Road and the runway, is entirely in estuarine wetlands, shown in the JWMP as having high ratings for the functions of riparian support and regional ecological diversity. However, the function of riparian support applies only to those wetlands adjacent to Jordan Creek, and does not apply to the specific SRE site, nor the probable access routes to Old Dairy Road and the runway. The function of regional ecological diversity should be relatively easy to mitigate within the wetland ecosystem. This site would probably have the greatest quantity of wetland impact of all alternatives, given the need for an access road and access to the runway, both in wetlands. In addition, this site has the potential to alter the characteristics of the wetland area to the west of the (new) runway access by blocking the tidal influence extent, salinity, etc., of that area. Those indirect impacts may be difficult to quantify. This alternative would require a relatively simple, one issue EA, a Section 404 permit from the COE, and mitigation of the function of regional ecological diversity.

Site 3 - Existing SRE Facility. This site would have no wetland involvement and construction of a new facility could probably be accomplished under a Categorical Exclusion from the FAA, the most expeditious environmental documentation. However, this site has a high potential for petroleum product contamination of underlying soils, which would increase development cost for cleanup (a cost that would most likely be present under any development scenario). This site is the most obvious upland alternative to any site requiring wetland impacts.

Site 4 - Existing Sand Shed. Like Site 3, this site would have no wetland involvement and could probably be accomplished under a Categorical Exclusion. Like Site 3, the Alaska Coastal land also has a high potential for petroleum contamination. In this case, however, Alaska Coastal would be required to fund the cleanup. This site is also an obvious upland alternative.

Site 5 - Maplesden Road. This site is entirely in wetlands with the same functional analysis as the wetland at Site 2. Because this site would not need an access road, the quantity of wetland impact would be less than at Site 2. Likewise, because it is further west than Site 2, the potential indirect impacts to wetlands, as described in the Site 2 discussion, would be smaller.

Site 6 - Floatplane Basin. Most of this site is shown in the JWMP as a "Class B" wetland and could require a COE permit. Some mitigation would be required for the functions of sediment/toxicant retention, nutrient export, disturbance sensitive wildlife, and regional ecological diversity. These functions could be replaced or enhanced anywhere on the Juneau road system, or in a mitigation bank. A relatively simple EA would be necessary for National Environmental Policy Act (NEPA) documentation of this site. Despite the number of high-rated functions of this wetland, this site would most likely be viewed as the least environmentally damaging of sites that use wetlands because of its proximity to the floatplane pond and related activity, and the absence of a fish stream or tidal influence. This site has the potential for buried

hazardous materials because of its relatively hidden, end-of-the-road location.

Long-Range Planning Factors: Since this SRE building alternative is being prepared as part of the Airport Master Plan Update, considering the impacts of the alternative sites in the long-range Airport plan is prudent. This analysis identifies the highest and best use of the JIA property and determines whether a particular site is compatible with the long-range plan. Future expansion of certain airport functional facilities, such as the passenger terminal and related aircraft apron area, would progress logically from their existing locations.

Site 2 is considered the most desirable site from a long-range planning perspective since that section of the Airport is not designated for alternate land uses. Site 2 is near the helicopter operations area, which is likely to expand. However, the expansion room believed necessary to support helicopter air taxi traffic is not affected by Site 2. Site 2 is also advantageous from a long-range planning perspective because it lays out a significant amount of infrastructure that is necessary to support other (revenue-generating) development on the east side of the Airport.

Site 1A is also considered good from a long-range planning perspective, primarily because it is at the far west end of the Airport and would have minimal effect on GA aircraft operations. Site 1B is not as desirable as Site 1A from a long-range planning perspective because it is in an area identified for future GA development.

Similarly, Sites 5 and 6 impact long-range planning for future general and commercial aviation development. Site 5 is in an area between existing rotor wing operations and future fixed wing operations. Depending on the configuration of the building, views from the control tower may be obstructed. Site 6 is an area of the Airport for which specific planning details are not yet defined. It is likely that the area near Site 6 serves to support expansion of the floatplane parking area and other airport support facilities.

Sites 3 and 4 are not desirable from a long-range planning perspective since these areas are planned to be used for other airport purposes. Site 3 is planned for FAR Part 135 aircraft apron expansion; while Site 4 is planned in the long-term for terminal or terminal-related development. Based on the direct functional relationship between the terminal and aircraft apron, and the investments already made in those facilities, other options for expanding those facilities are very limited. Constructing an SRE building at either of these sites would seriously constrain the terminal and apron areas from needed future expansion.

Selection of the Recommended Alternative

A development alternative evaluation matrix is presented in **Table 5-N**. The matrix presents a summary of each of the six development alternatives (and derivatives for Sites 1 and 3) compared against the identified criteria, and presents the total score for each alternative. Based on the analyses presented in this document, Site 2 receives the highest overall score, with Site 5 running second.

SRE BUILDING ALTERNATIVE EVALUATION MATRIX
Juneau International Airport

Criteria	*Site 1A West End*	*Site 1B West End*	*Site 2 East End*	*Site 3A Existing SRE Facility*	*Site 3B Expand Existing SRE Facility*	*Site 4 Existing Sand Shed*	*Site 5 Maplesden Road*	*Site 6 Floatplane Basin*
Operational	9	9	10	5	5	6	9	6
Economic	8	7	6	9	10	8	8	8
Environmental	3	4	5	8	8	9	6	7
Long-Range Planning	9	7	10	2	2	2	7	7
Score	**29**	**27**	**31**	**24**	**25**	**25**	**30**	**28**

Rating Range
10 = High Potential to Meet Criterion
5 = Moderate Potential to Meet Criterion
1 = Low Potential to Meet Criterion

Table 5-N

VEHICULAR ACCESS AND PARKING ALTERNATIVES

The ground access system at JIA is a complex system of roadways, parking facilities, and terminal access curb front. Each of these components provides inadequate capacity to meet projected demand. For the reasons stated in the Passenger Terminal Alternatives section of this Chapter, it is recommended that terminal access curb fronts and parking facilities be expanded. Modifications to access roadways may also be warranted. All recommended alternatives must provide for the efficient handling of tour groups and related baggage. Sufficient curb front or staging areas for tour buses must be addressed in the design of vehicular access and parking alternatives.

Terminal Curb

The expansion of terminal access curb front is addressed by the terminal development alternatives described in this chapter. Each of the three alternatives presented provides about three and a half times more available curb front than what exists today. Analyses and recommendations for terminal access curb front expansion follow those for the terminal development alternatives.

Parking Facility Alternatives

To meet the anticipated demand, two parking expansion alternatives are considered: surface parking and a parking garage. Parking for passengers and visitors, employees, and rental auto storage must be satisfied.

Parking Alternative 1 - Surface Parking: All terminal expansion alternatives take the space now used for rental auto storage. Additional area for parking would be provided by acquiring the private parcel adjacent to Airport property across Yandukin Drive to the north and west of the existing parking lot. Parking Alternative 2, depicted in **Exhibit 5-11**, shows the location of the proposed acquisition. This parcel is currently being considered for construction of a hotel. Should the hotel be constructed, this alternative likely would not be economical due to the costs of purchasing and removing the building.

Parking Alternative 2 - Parking Garage: This alternative, depicted in **Exhibit 5-12**, proposes construction of a

multi-level parking garage within the boundaries of the existing parking lot.

Recommended Parking Alternative

The ratings given to the parking alternatives for the various evaluation criteria are presented in **Table 5-O**, the Parking Alternatives Analysis Matrix. The scores are very close, with Alternative 2 receiving the higher score. *This analysis does not provide a clear recommendation. The recommended terminal expansion alternative will provide some capability to meet near-term future parking needs. However, before the end of the planning period, the Airport will need to proceed with a parking alternative.*

The following subsections provide discussions on the evaluation of the parking alternatives as compared with each evaluation criterion.

PARKING ALTERNATIVES ANALYSIS MATRIX
Juneau International Airport

Criteria	*Alternative 1 Surface Parking*	*Alternative 2 Parking Garage*
Operational	6	8
Economic	8 (2*)	2
Environmental	5	10
Implementation Feasibility	4	4
Score	**23 (17*)**	**24**

*Note: * If this site is not acquired before the proposed hotel is constructed, the economic score drops to 2, the total score to 17.*

Rating Range 10 = High Potential to Meet Criterion
5 = Moderate Potential to Meet Criterion
1 = Low Potential to Meet Criterion

Table 5-O

Operational Characteristics:
Alternative 1 can be developed to improve landside operations at the Airport. The existing parking lot can be reconfigured to provide a motorcoach staging area to simplify the handling of tour groups and their baggage. The new parking lot can be used for long-term parking and rental auto storage. Pedestrian access to and from the new lot will not be as convenient as existing conditions. This alternative increases the land available to the Airport for development.

Alternative 2 provides convenient access to the terminal for pedestrians. A multi-level parking garage in the existing parking lot affords the opportunity for direct second level access to the terminal via a skybridge. The parking garage design, coupled with reconfiguration of the existing parking lot, can accommodate motorcoach staging and tour group processing.

Economic Factors: Cost estimates were prepared for the parking alternatives. The cost estimates are appropriate for master plan level comparison purposes. They should, however, be considered preliminary and subject to refinement during more detailed design phases before implementation. A summary of total estimated costs associated with each of the parking development alternatives is shown in **Table 5-P**. As shown, Alternative 1 is much less expensive than Alternative 2.

Environmental Factors: Construction of Alternative 1 would require fill of approximately 2.5 acres of persistent emergent, scrub/shrub wetlands. This wetland complex is noted as wetland M - 7 in the JWMP. The JWMP shows high or moderately high-rated functions of surface hydrologic control, sediment/toxicant retention, regional ecological diversity, and recreational use potential. In addition, high-rated functions of salmonid habitat and riparian support are present along Jordan Creek, which flows just to the east of the

Alternative 1 site.

The wetland is classified B in the JWMP, and would require an individual COE permit to fill. Since a parking lot is generally not considered a water-dependent or water-related use, an upland alternative to the use of wetlands is presumed. The upland alternative analysis would take into account cost, logistics, and overall project need. Construction of this parking lot would most likely require an EA, if implemented separately from other activities that would require wetland fills. In-kind mitigation for functions noted above would be required, most likely on or near Jordan Creek. A proposal to construct a hotel on this parcel recently met with opposition from the COE, based upon the need for the hotel to be in that location.

PARKING ALTERNATIVES COST COMPARISON
Juneau International Airport

	Alternative 1 Surface Parking	*Alternative 2 Parking Garage*
Total Estimated Cost	$3,846,000*	$12,662,000

Note: ** Cost based on assumption that proposed hotel is not constructed, or that site is acquired before the proposed hotel is constructed.*
Source: USKH, Inc., November 1997.

Table 5-P

A multi-level parking garage, Alternative 2, constructed on the site of the existing parking lot would have no impacts on wetlands, fish streams, or other important natural resources. Alternative 2 would most likely be eligible for a Categorical Exclusion.

Rating the alternatives from 1 to 10, the Alternative 1 would rate 5 and Alternative 2 would rate 10. Cost and logistics (proximity to the Airport terminal) would probably be the greatest factors in an upland alternative analysis to allow fill for the surface parking lot.

Implementation Feasibility: Both alternatives face restricted implementation potential. Alternative 1 would very likely be opposed from an environmental standpoint, although a proposed hotel development at this site was granted an environmental permit. Alternative 2 would likely be opposed, based on the high cost.

Access and Circulation Alternatives

Access roadways should be reconfigured and/or reconstructed to accommodate terminal expansion, terminal curb front, and parking requirements. At a minimum, additional lanes would be needed in front of the expanded terminal. Reconstruction and/or lane reconfiguration would be needed to serve the expanded parking area. Terminal access capacity would be improved if pass-through traffic was restricted or eliminated. The following access and circulation alternatives address pass-through traffic.

Access Alternative 1 - Convert Yandukin Drive to Two-Way Traffic: Yandukin Drive presently operates with one-way westbound traffic, serving inbound traffic from the downtown and Lemon Creek areas, and terminal return traffic. By converting Yandukin Drive to two-way traffic, as depicted in **Exhibit 5-13**, traffic bypassing the commercial district on Glacier Highway would not have to pass in front of the terminal.

Alternative 1 would require installation of a stop sign at the east end of the parking lot for traffic turning left onto Yandukin Drive. Right now, this traffic is not required to stop, only to merge with one-way traffic on Yandukin Drive. Implementing Alternative 1 would also require terminal return traffic on Yandukin Drive to yield to oncoming traffic at the intersection with Shell Simmons Drive. As a result of reducing pass-through traffic in front of the terminal, terminal return traffic would experience increased delays.

Access Alternative 2 - Close Shell Simmons Drive to Through Traffic: This alternative effectively eliminates pass-through traffic by installing channelization at the Shell Simmons Drive and Cessna Drive intersection, as depicted in **Exhibit 5-14**. Jordan Avenue would be extended to intersect with Yandukin Drive to provide access to the Airport from the Mendenhall Valley and areas to the north and west.

General circulation patterns near the terminal would remain as they are today. However, the route for traffic entering the airport that is bound for the east end development (Ward Air, Air National Guard, Silver Bay, Wings of Alaska) would be more circuitous.

Recommended Access and Circulation Alternative

The ratings given to the access alternatives for the various evaluation criteria are presented in **Table 5-Q**, the Access and Circulation Alternatives Analysis Matrix. *Although Alternative 1 receives the higher score, based on the results of this analysis, it is recommended that traffic studies be completed to address the need for rerouting pass-through traffic.* If those studies confirm a benefit to rerouting traffic, Yandukin Drive should be converted to two-way traffic.

The following subsections provide discussions on the evaluation of the access/circulation alternatives as compared with each evaluation criterion.

Operational Characteristics: Alternative 1 significantly changes landside access operations. While this alternative would decrease pass-through traffic in front of the terminal, circulation of Airport-related traffic is impeded. Delays to terminal return traffic are introduced at the two locations described in the Access Alternative 1 - Convert Yandukin Drive to Two-Way Traffic section of this Chapter. Due to environmental constraints and the proposed hotel development, lane additions and street widening should be toward the existing parking lot, reducing the size and function of the existing lot.

ACCESS AND CIRCULATION ALTERNATIVES ANALYSIS MATRIX
Juneau International Airport

Criteria	*Alternative 1 Convert Yandukin Drive to Two-Way Traffic*	*Alternative 2 Close Shell Simmons Drive to Through Traffic*
Operational	4	9
Economic	8	8
Environmental	9	3
Implementation Feasibility	8	6
Score	**29**	**26**
Rating Range	10 = High Potential to Meet Criterion 5 = Moderate Potential to Meet Criterion 1 = Low Potential to Meet Criterion	

Table 5-Q

The DOT&PF is planning to install traffic signals at the Shell Simmons Drive and Jordan Avenue intersection with Glacier Highway in 2000. Implementing Alternative 1 may increase traffic on Yandukin Avenue. Drivers may use Shell Simmons and Yandukin Drives to avoid the traffic signals on Glacier Highway. This change in traffic patterns would affect the operation of the signals.

Alternative 2 eliminates pass-through traffic without affecting circulation for Airport-related traffic. The proposed configuration of the Cessna Drive and Shell Simmons Drive intersection provides access between the east and west ramp areas, but does require this eastbound traffic to pass in front of the terminal. Neither additional lanes nor street widening should be needed on the north side of the existing parking lot. This

alternative uses less of the area currently used for parking than the other alternative.

Operationally, both alternatives benefit from the recommended terminal alternative that provides more landside area for parking and circulation.

Before proceeding with either alternative, comprehensive traffic studies should be conducted to determine the specific volume of pass-through traffic and the effect of pass-through traffic on circulation as it relates to the function of the Airport terminal area. Circulation issues should be coordinated with DOT&PF.

Economic Factors: The cost estimates prepared for the access alternatives are appropriate for master plan level comparison purposes. They should, however, be considered preliminary and subject to refinement during more detailed design phases before implementation. A summary of total estimated costs associated with each of the developments is shown in **Table 5-R**.

Environmental Factors: Alternative 1 could be accomplished with only a minor wetland fill at the corner of Shell Simmons Drive and Yandukin Drive. The wetland fill would require an individual permit from the COE, as the wetland is classified B in the JWMP, but should meet little opposition and not require mitigation because of the small size of the fill. Because of the wetland fill, this action would require an EA if funded by the FAA.

ACCESS AND CIRCULATION ALTERNATIVES COST COMPARISON
Juneau International Airport

	Alternative 1 Convert Yandukin Drive to Two-Way Traffic	*Alternative 2 Close Shell Simmons Drive to through Traffic*
Total Estimated Cost	$1,232,000	$1,131,000

Source: USKH, Inc., November 1997.

Table 5-R

Alternative 2 would require not only reconfiguration of the Shell Simmons Drive/Cessna Way intersection, but also extension of Jordan Avenue south to a new intersection with Yandukin Drive. The Cessna Way intersection work may require a small amount of fill in wetland M - 15, classified C in the JWMP. This work could be permitted by the CBJ and likely would not require any mitigation. The extension of Jordan Avenue south to Yandukin Drive, however, would require approximately 0.5 acres of wetland fill, including two crossings of Jordan Creek. Jordan Creek is an anadromous fish stream with populations of coho, chum, and pink salmon; cutthroat trout; and Dolly Varden char. The stream has an established buffer of 50 feet on either side that is classed A, and the other wetlands are classed C.

In addition, the street extension and intersection would occur in the same vicinity as previous wetland mitigation efforts that resulted in creation of a stream-side trail. Should the operational and cost characteristics of the alternative discussed above (to convert Yandukin Drive to two-way traffic) be similar to this alternative, then permitting of this alternative would be difficult. This alternative would require an EA, individual COE permit, and probably extensive mitigation for impacts to salmonid habitat and wetlands, and also additional mitigation to replace previous wetland mitigation work.

Rating the alternatives from 1 to 10, Alternative 1 would rate 9, while Alternative 2 would rate 3. Alternative 1 would likely require only construction-related erosion control measures, while Alternative 2 (especially the Jordan Avenue extension) would most likely require extensive fish habitat-related mitigation and wetland mitigation.

Implementation Feasibility: Alternative 1 introduces delays to traffic circulation at the Airport, but would be the easiest alternative to implement. Alternative 2 might face opposition from those resistant to changes in Airport access and circulation. From an environmental standpoint, extending Jordan Avenue might be problematic. However, the DOT&PF has a six-year plan that includes a traffic signal at the intersection of Jordan Avenue and Glacier Highway. This planned improvement should make Jordan Avenue a more efficient access route to the Airport terminal area than Shell Simmons Drive.

UTILITIES/INFRASTRUCTURE REQUIREMENTS

Airport utilities primarily include water, sanitary sewer, storm water drainage, electrical, and telephone. Such infrastructure should be provided to support all existing and future Airport activities and tenants. Some areas of current deficiencies include the helicopter operations area on the east end of the Airport (no sanitary sewer), and the floatplane basin aircraft parking area (no water, electric, sanitary sewer, or telephone).

Additional utilities/infrastructure should be implemented as needed in areas where future landside facilities are constructed. In addition, future demands may require expanding the capacity of certain existing utilities. The future development area in the current RTR site, for example, should be planned for utility/infrastructure improvements as an integral part of preparing those parcels for commercial development. The cost of providing such infrastructure can be passed on to future tenants as fees.

DUCK CREEK AND JORDAN CREEK ISSUES

The concept of combining the flows of Jordan Creek and Duck Creek is discussed within the context of this Master Plan Update because it can enhance the safety of aircraft operations at JIA. The purpose of rerouting would essentially be to eliminate the Jordan Creek flow and associated wetland on Airport property. The primary benefit is to eliminate a source of bird habitat, thus reducing the potential bird strike hazard. This concept raises three types of issues: logistical, economic, and environmental.

Logistical issues include hydrologic, topographic, and land-use considerations. Hydrologic considerations could include upgrading both road crossings and possibly stream-bed configurations on Duck Creek to accommodate flood waters of the combined Jordan Creek and Duck Creek flows. This part of the analysis would likely include a detailed hydrologic and morphologic study of both streams. Topographic considerations would include determining if Jordan Creek would indeed flow downstream to Duck Creek, and if so, would the grade of the connection be appropriate. Combined with the topographic issue would be a land-use issue. Several possible connection corridors come to mind: along the north side of Egan Drive and in the Nancy Street area. Any possible connections lower on the streams would either take valuable commercial and residential property, or result in more Airport property being used. Any possible connection corridors would require dedication of a strip more than 100 feet wide to comply with CBJ ordinances.

Economic considerations include construction and land acquisition costs, but would also include the costs of environmental documentation/studies and retrofit of whichever creek received the water. Obviously, the further upstream the connection was made, the greater the potential cost.

From an environmental perspective, the project would require an EA for documentation, and also an ADF&G fish habitat permit, an ADNR water appropriation permit, and COE permits. Should mitigation of impacts not be reasonable, preparation of an EIS would be required. The issue would likely be highly emotional, as many Juneau residents identify closely with their urban anadromous fish streams. Included in the environmental analysis would be a close and detailed look at the need for the project, with close attention to

the projected need for the Jordan Creek habitat corridor for Airport development, and any actual bird hazard resulting from the habitat corridor.

RECOMMENDED DEVELOPMENT PLAN

The proposed development plan for JIA represents a means by which balanced growth, of both airside and landside elements, will satisfy forecasted demand. In addition, the Master Plan provides for flexibility to meet activity growth during and beyond the 20-year planning period.

This chapter documents the evaluation of alternative development scenarios for functional areas requiring enhancement at JIA. The alternatives presented in this chapter have advantages and disadvantages. Once preferred alternatives were defined, a recommended plan was developed.

The recommended Master Plan is a set of alternatives determined as the most reasonable to satisfy demand at JIA through the year 2015. These projects range from major development projects to minor Airport improvements. Following completion of the EA and development of a financial management program, these projects will be phased over three periods, short-, mid-, and long-term. The goal of the Master Plan is that construction occurs ahead of capacity problems, and as the Airport is able to finance the project.

This phasing of the preferred development plan will be manifested in a series of ALP drawings. In addition, an environmental overview chapter, which provides a topical discussion of environmental issues related to the proposed development, will be developed. Finally, the recommended development Master Plan will be analyzed from a financial feasibility perspective.

Runways and Taxiways

The runway was recently reconstructed. It will remain 8,456 feet in length and 150 feet in width. The runway will remain paved and lighted. It is recommended that the RSA be improved by providing 1,000-foot RSAs beyond both the Runway 8 and Runway 26 thresholds. However, to avoid the impacts of constructing into the Mendenhall River, the Runway 26 threshold and RSA should be shifted to the east so that the RSA on the west end is constructed on Airport property. This alternative would also retain the full operational length of the runway. The parallel taxiway would be extended to the east and NAVAIDs would be relocated as necessary. Runway centerline and edge lights and taxiway edge lights would be provided on the east extension.

It is also recommended that acute-angled exit taxiways be constructed to reduce runway occupancy time for air carrier and air taxi aircraft using the Airport. This will improve the ASV identified in Chapter 4 of this Master Plan and result in decreased delays in future years.

Because of that action, the Master Plan does not recommend constructing a new GA runway at the existing Airport. However, due to the limited land available within the CBJ that is suitable for airport development, it is recommended that an airport site selection process be initiated to ascertain whether an area could be identified for development of a new GA airport. While a new GA airport is not necessary within the planning period of this report, it is essential that the CBJ look beyond the 20-year planning period and ensure that sufficient land be identified that could accommodate a small GA airport before all suitable land has been designated for other uses. Given the land constraints at the existing Airport, developing a GA "reliever" facility is considered the most effective way to ensure the long-term growth and success of JIA.

Implementation of GPS approaches at the JIA has improved reliability at the Airport and significantly

reduced air carrier diversions. To enhance the GPS procedures further, it is recommended that an approach light system be installed for Runway 26, the trees be topped on a portion of Douglas Island, and a stand of trees on the north side of Gastineau Channel be removed.

Passenger Terminal Facility

Terminal Alternative 3 is recommended for development. This alternative realigns and extends the east air carrier concourse parallel to the runway. In doing this, it reduces the amount of unused apron area on the airside of the terminal and increases the land available on the landside for use in roadway access and vehicle parking. This alternative allows for the expansion of the air carrier concourse to include four passenger boarding gates with passenger loading bridges (an increase of one) which can accommodate B737-700/800/900 and MD-80 sized aircraft. Larger aircraft would be served at the gate on the far east end of the concourse. Air carrier operations using aircraft not compatible with passenger loading bridges could use any of the air carrier parking positions.

To accommodate this expansion, the existing air carrier aircraft parking apron would be expanded from 46,000 square yards to 83,000 square yards, with hard stands installed at each of the air carrier aircraft parking locations. Each air carrier aircraft parking location will also have underground hydrant refueling equipment installed to more efficiently service the aircraft and reduce the number of vehicles operating on the apron.

The area currently occupied by Gates 2 and 3 of the existing terminal will be converted to two commuter (Part 121) aircraft gates. The gates will be constructed to accommodate disabled passengers in compliance with the ADA.

This recommended terminal plan retains the air taxi operations on the northwest side of the terminal. The air taxi concourse would be extended to provide for additional boarding gates, and to provide a wind barrier for passengers using this area. Retaining the air taxi operations at this location was deemed important by the air taxi operators. The terminal affords wind protection to passengers that must walk out on the ramp to enplane or deplane.

The development of Alternative 3 would displace the rental auto ready lot and require the removal of the existing sand storage facility owned and operated by the CBJ. It is also recommended that the Airport acquire the Loken property east of the terminal to provide separation between air carrier and GA operations. This plan would also require the relocation of the existing fuel tanks located on the apron. The tanks are in the proposed operation and taxi area for air carrier aircraft using the expanded terminal concourse.

Air Cargo

As previously mentioned, forecasts of projected aviation demand do not suggest the specific need for an additional air cargo facility. However, there has been continued growth in air cargo activities at JIA and further growth is anticipated.

While a significant amount of future freight and cargo demands will be handled through belly-hold cargo operations on passenger flights, it is expected that at least one additional freight operator will initiate service through Juneau within the planning period. Consequently, the existing air cargo aircraft parking positions will not accommodate potential operations over the next 20 years. Therefore, this Master Plan recommends the identification of another aircraft hardstand that could accommodate the size and weight of a Boeing 727-200 type aircraft (approximately 4,500 square yards).

To increase efficiency and reduce problems associated with the operation of dissimilar aircraft types close to each other, it is recommended that the air cargo hardstand be near the existing air cargo aircraft parking positions on the west side of the Airport.

General Aviation Aircraft Parking

Increases in GA activity at the Airport indicate the need for additional GA aircraft parking. Recommendations for development of GA aircraft parking at the Airport were combined with an evaluation of GA facility requirements. These include FBO, T-hangars, conventional hangars, both local and transient aircraft tie-downs, executive type hangars, and helicopter operations.

On the west end of the Airport, it is recommended that Duck Creek be relocated to the northern edge of the Airport boundary, with an appropriate greenbelt adjacent to the creek to provide adequate protection. South of the creek, the area would be developed for GA aircraft tiedowns and T-hangars. Thirty-three additional T-hangars could be developed in this area, along with 65,000 square yards of apron that could be used for both local and transient aircraft tie-downs.

It is also recommended that the area in front of Aero Services be reserved for FBO operations and cargo aircraft parking. This area is ideally located as a buffer between the operations of large (air carrier type) and small (Cessna 206 type) aircraft on the west side of the Airport.

GA activities in proximity to air carrier operations are not recommended in this plan. Rather, this Master Plan recommends that current incompatible aviation uses at the Airport be eliminated and that, in the future, operators of smaller sized aircraft be colocated for improved safety and operational efficiency.

This Master Plan recommends GA development in the area between the runway and the Ward Air facility. Over the past few years, this area has been used for development of executive style hangars. This concept is appropriate and should be continued, with additional executive-style hangars allowed. This will dislocate some GA tiedown positions, which will require relocation to the west and east sides of the Airport. It is recommended that this area be paved and that additional conventional/executive-style hangars be constructed by private investors.

The area east of Taxiway D-1 currently has very little development. This Master Plan recommends the relocation of the existing FAA RTR site and ASOS to allow for commercial development. Once these have been relocated, the area will be developed. The area east of Wings of Alaska and adjacent to Yandukin Drive should be developed for commercial purposes that can be converted to aviation uses once development of the area has been completed. The area situated between the Building Restriction Line and the parallel taxiway will be developed as an aircraft parking apron for long-term local tiedowns. North of this area to Yandukin Drive will ultimately be developed as commercial aviation lease lots with construction of a new connecting taxilane and apron area to support the aviation activities generated by development of this area.

Ultimately, this area will support an additional 17 conventional hangar lease lots and 20 aircraft long-term tiedown positions.

Helicopter Facilities

Due to the future extension of the passenger terminal and the importance of colocating similar aircraft type operations together, the majority of helicopter operations should be consolidated on the east end of the Airport. With the projected increase in rotor-winged operations, primarily due to tourism, sufficient facilities should be available to accommodate the projected demand. The facilities should be located to ensure safety and efficiency that benefit the operations of rotor-winged flight in a congested and developed area.

This relocation will improve the noise environment surrounding the Airport. The current Coastal Helicopter operation will be moved farther from the residential areas northwest of the Airport. The single helicopter operating area minimizes overflights of residential areas.

The Alaska National Guard helicopter operations will continue from the existing facility located just southeast of the ARFF station on Yandukin Drive. The Alaska National Guard has a very limited number of flights compared to the commercial operators at the Airport and can be safely accommodated from their existing location. Likewise, Silver Bay Logging operates rotor-winged flights from their hangar adjacent to the Alaska National Guard. These operations were not considered significant enough to warrant relocation. Likewise, occasional transient rotor-winged operations may occur at the Airport in areas other than those designated in this plan. However, operators that expect to have a significant amount of rotor-winged operations at the Airport will be located at the far east end of the Airport.

Snow Removal Equipment Building

The Master Plan recommends that a new SRE building will be constructed. The preferred location is just east of the proposed helicopter operating area. This facility will replace the existing maintenance and equipment building located at the north end of the air taxi apron. The new facility ensures that the majority of the $6.5 million inventory of equipment at the Airport can be properly accommodated within an enclosed facility that meets FAA standards.

Floatplane Basin Development

Floatplane basin development will consist of extending the existing floatplane slips along the north shore to the end of the existing floatplane basin, followed by extending the slips around the east end of the basin and back westward along the south shore. Accomplishing this will require the construction of a road along the shore to allow access to the new slip sites. A total of 30 additional floatplane slips will ultimately be developed. This Master Plan carries forward the previous master plan recommendation to expand floatplane slips into the estuaries located on the southwest side of the floatplane basin.

It is recommended, as part of the RSA extension on the west end of Runway 8, that both trail and road access between the Airport, floatplane basin, and MWSGR trail be retained. Furthermore, as development of the RSA and expansion of the floatplane basin occurs, utility services, such as electricity, water, and telephone, should be extended to serve this area.

Passenger Terminal Vehicle Parking Lot

This Master Plan considered two vehicle parking alternatives: First, surface parking, and second, a vertical parking garage. It is recommended that the existing vehicle parking lot be expanded to accommodate future growth and that other off-Airport options be pursued. With the reconstruction and reorientation of the passenger terminal air carrier concourse, additional land becomes available to expand the vehicle parking lot. This will provide approximately an additional 25 percent capacity to the existing parking lot. In addition, an analysis of the relationship between short-term and long-term parking requirements should be completed. Reconfiguring the mix of short-term and long-term parking may improve service and efficiency of parking operations.

Consideration was given to the vacant land located on the north side of Yandukin Drive, at the intersection with Shell Simmons Drive, for additional vehicle parking. This is private land and is being considered for development of a hotel. This parcel may also be ideal for additional vehicle parking, operated by either the Airport or the private owner. If that land is available, it is recommended that the Airport pursue off-Airport options for long-term parking demands.

Once the passenger terminal expansion project is complete, the rental auto pick-up and drop-off area will have to be relocated. It is recommended that the area just south of the FAA AFSS on Shell Simmons Drive be identified as a rental auto service area. However, it is not expected that this area can accommodate the full demand for rental auto service facilities and vehicle parking. Therefore, locating rental auto facilities off-Airport is recommended once all other on-Airport lands in vicinity of the passenger terminal have been exhausted.

The need for land for vehicle operations at the Airport is apparent. It is recommended that the Airport continue pursuing the availability of the land located on the north corner of the Yandukin Drive and Shell Simmons Drive intersection. If this land becomes available, it should be purchased for Airport expansion. Otherwise some aviation related activities will have to be located off-Airport, increasing the inconvenience for the traveling public and depriving the Airport of potential revenues.

Surface Transportation Access

Two access alternatives were considered in this Master Plan that would reduce or eliminate pass-through traffic in front of the terminal. Before implementing any revisions to Airport access, a comprehensive analysis of traffic conditions should be conducted. Data collection to support the analysis would include: traffic volume counts on Shell Simmons Drive, Yandukin Drive, Alex Holden Way, and the terminal access road; intersection turn movement counts at Shell Simmons Drive and Glacier Highway, Shell Simmons Drive and Alex Holden Way, Shell Simmons Drive and Yandukin Drive, and Yandukin Drive and the terminal access road; and a duration/turn-over study for the terminal access road and curb-front.

If the results of a quantitative analysis establish a benefit to rerouting traffic, Yandukin Drive should be converted to two-way traffic.