Seward Airport Improvements

Selection of the Design Alternative

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Executive Summary

Current and future operations at the airport can easily be accommodated with a single runway. This statement is supported by the research of past, current and potential future operations.

Facility requirements are based upon a design aircraft as defined in the Federal Aviation Administration's (FAA) guidance. The design aircraft for the airport is the King Air B-200 (medivac) which corresponds to a design designation of B-II. A runway length of 3,300 feet (consistent with Community Class standards) is the minimum runway length under consideration. This runway length will accommodate the design aircraft with anticipated takeoff weights. The current runway length for Runway 13/31 is 4,533 feet and for Runway 16/34 is 2,289 feet (too short for the design aircraft). A reconstructed 3,300 foot runway will also allow occasional use by larger aircraft, provided they are not fully loaded.

Flood studies show that the 100 year flood water levels produced by construction of Alternative 1.1 will increase the base flood elevation up to 4 feet, impacting about 160 (private) more acres than the current 100 year flood, while reducing flooding on another 50 acres (mostly the existing airport). By contrast, construction of Alternative 2.2 will only impact an additional 22 (private) acres while reducing flooding on another 45 acres (existing airport and private). Also since Alternative 1.1 requires fill into the regulatory floodway on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), a Letter of Map Revision (LOMR) to the FIRM map will be needed. This process requires public approval and mitigation to affected property owners, resulting in additional project costs and schedule delay. Alternative 2.2 does not affect the floodway so the FIRM maps will not require revision. Mitigation will still be needed but at a lower cost, since impacts are smaller and the number of parcels affected is less.

Alternative 1.1 will require an additional permitting effort as it impacts the Resurrection River (a navigable water body) and will require fill below the Ordinary High Water (OHW). Construction will be more expensive and complex as the runway is longer (requires more riprap protection) and a diversion will be needed, both of which would impact fish habitat. The Alaska Department of Fish and Game (ADF&G) prefers Alternative 2.2. Medivac use during construction will also be an issue, since Runway 16/34 is not long enough to accommodate these aircraft. Flood permitting for Alternative 1.1 may not be possible. Although Alternative 2.2 impacts more wetlands, the Corps of Engineers (COE) may support this alternative if it is the more practicable alternative.

Alternative 2.2 had more advantages and less disadvantages, when compared with the other two alternatives, using specific evaluation criteria. The evaluation indicates that Alternative 2.2 is overall a better choice than the other 2 alternatives.

Wind coverage (98.6 – 99.5%) for the secondary runway (16/34) is better than the main runway (13/31). Impacts from occasional winter winds can be mitigated.

Eliminating the main runway will reduce maintenance costs at the airport by about 25% (does not account for cost savings associated with eliminating state emergency funding used for repairs during flood events). The location of Runway 16/34 is much further away from the river, reducing flooding and erosion risks for this runway, and it is shorter thereby minimizing the overall maintenance effort. Alternative 2.2 will also close Taxiway A which currently connects the two runways.

The Seward Highway, the airport access road and the Alaska Railroad bisect the center of the Runway Protection Zone (RPZ) for Runway 13. Vehicles using these facilities, currently penetrate the Approach Surface for Runway 13, creating an unsafe condition. Alternative 2.2 moves the position of these facilities further away from the runway threshold, eliminating the penetrations. FAA guidance indicates that all improvements should be removed from RPZ's to the extent practicable. This is a safety issue which is a cornerstone for FAA.

For the reasons stated above, the project team will be moving forward with Alternative 2.2 as the preferred alternative.

Introduction:

The State of Alaska owns and operates the Seward Airport, which includes a paved main runway (R/W 13/31), a paved crosswind runway (R/W 16/34), multiple taxiways, and two aprons. Runway 13/31 (main runway) is 4,533 ft x 100 ft and Runway 16/34 (crosswind) is 2,289 ft x 75 ft. The Seward Airport primarily serves residents of the City of Seward and the area between Seward and Moose Pass. Seward is also accessible by water, road and the Alaska Railroad.

Most of the airport is located within the floodplain of the Resurrection River Delta with half of Runway 13/31 contained within the regulatory floodway as shown on the Flood Insurance Rate Map (FIRM). The airport has been experiencing recurrent flooding from the Resurrection River and Resurrection Bay. Contributing to the flooding events is the deposition of material from upstream creeks. The river bottom flattens out next to the airport, before exiting into Resurrection Bay. The river bottom continues to aggrade with time as material collects from upstream. Metco, a local materials contractor, has a dredging operation on the other side of the Seward Highway, upstream of the airport. This operation may help to reduce the amount of material that collects next to the airport.

The Resurrection River is a braided river. Consistent with the behavior of braided rivers, the main channel of the river moves around, searching for a path of least resistance. For the last several years it has resided next to a significant length of Runway 13/31, continuing to erode the levee protecting the runway. This location also makes it easier for the river to overtop the runway during high water events. The runway has been overtopped 18 times since 2011, including a major event in the fall of 2016. Flood events have continued to damage airport facilities, especially Runway 13/31.

During 2013, several flooding events occurred between the spring and the fall. Evidence that water was washing through the structural section of Runway 13/31 was noted during field inspections, after several of these events. Concerned over the impact to the structural section from the flooding, the department's Materials section performed Falling Weight Deflectometer testing in the summer of 2014. The results of the testing showed a significant reduction in the strength of the runway's structural section. As a result, the aircraft loading on this runway was reduced to 12,500 lbs for safety reasons. The runway's strength has been measured twice more since then, due to public pressure. The results showed that the strength of Runway 13/31 has continued to decline, especially where the river was directing water straight at the runway embankment (about mid-way).

Flooding events have increased in intensity and frequency, since the Master Plan was approved in 2008. Due to the dynamic flooding situation at the Seward Airport, the project team chose to re-evaluate the information and the alternatives presented in the Master Plan.

First new data was collected to update the current and future operations presented in the Master Plan. This information was important in order to assess capacity and demand. Information in the Master Plan was used for past operations. The following is a synopsis of the results.

Capacity, Demand and Facility requirements:

All available sources were researched to determine the current air traffic and to project future air traffic. Types of aircraft were tabulated (including approach category and design group number) along with the number of operations for each. Predominately the airport serves general aviation aircraft (about 25 small engine fixed wing based aircraft), including 8 leaseholders. The operators consist of recreational users as well as tour operators who use the airport as a base for sightseeing tours of Kenai Fjords National Park via airplane and helicopter. The number of operations at the airport is much higher in the summer than in the winter. Medivacs also use the airport to transport patients from Seward to Anchorage.

Prior to implementation of the current weight restrictions, there was occasional use by larger aircraft. Coast Guard C-130's would use the main runway to practice touch and goes and to assist with search and rescue operations. Private charter aircraft would stop in Seward about 10 - 15 times/year.

FAA design guidance establishes facility requirements for an airport depending on the selected "design aircraft" or family of aircraft. Selection is based on the most demanding aircraft (largest) using the airport, corresponding to a minimum of 500 operations (landing or takeoff) per year. For this project, the design aircraft selected was the King Air B-200 (medivac), corresponding to the B-II design criteria. While all of the based operators have smaller aircraft corresponding to a smaller design designation of A-I, sufficient operations (500) by B-II aircraft exist. The department's Community Class standard runway length of 3,300' is the minimum runway length under consideration.

Past large aircraft use at the airport was well below the FAA threshold of 500 operations. The C-130's, used by the Coast Guard, could not be used in the traffic count, reducing the count even further. FAA indicated that they could not pay to construct a facility based on needs of another federal organization. The Coast Guard is responsible for providing their airport facility.

The City of Seward was interviewed to assess future aircraft demand due to economic development. They indicated that a possible increase to air traffic may result from several potential sources, including the wintering of the Coastal Village Region Fund fleet (still in negotiations), the purchase of the Seward dry dock by Vigor (with a potential for expansion), an anticipated future increase in cruise ships and other potential development. (See Chapter 3 of the project's Scoping Report for more details). Even though each source was consulted, information gathered indicated either occasional/seasonal use or no real substantial use, making it difficult to predict how much aircraft traffic may increase as a result from these potential development sources. FAA was consulted and indicated that they could not provide funding for a "build it then they will come" scenario. Therefore a potential future increase in large aircraft from economic development could not be included in the operation count to determine the design aircraft required for FAA funding.

Final air traffic counts were tabulated in the "Seward Airport Improvements – Scoping Report". Counts projected 15 years or more into the future were estimated at 15,000/year, well below the capacity for a single runway (minimum 60,000/year for Seward). Therefore air traffic (current, past and future) at this airport can easily be accommodated with a single runway.

In the past, a commercial operator provided passenger service to the airport. Records from the Department's Statewide Aviation Section indicate that the operator requested to be released from their Essential Air Service contract in 2002, as they wanted to discontinue service due to a lack of demand.

Commercial operators were contacted during the early stages of this project to determine what standards would need to be implemented for them to begin passenger service. They cited an increased demand for air service and an improved approach to the airport. Demand is not expected to increase significantly in the near future as the population (currently 2,754) is growing at a rate of less than 2% a year. Also recent departmental improvements to the Seward Highway, make the highway safer and reduce travel time to about 2 hours. It's probable that the highway improvements and the short drive were in part responsible for the reduced demand for air service. Finally Seward can also be accessed by the Alaska Railroad and by ship (Seward has an ice free port).

Currently Seward has only a circling approach, with a very high minimum descent altitude of 2660 feet, due to terrain. A pilot using this approach arrives at the airport, checks to see if the airport can be seen from this altitude, assesses wind/weather conditions and decides whether or not to land.

At the request from some of the local pilots, the FAA's Flight Standards section was consulted to determine if a straight in-approach (this type of approach brings the aircraft directly to a runway threshold) was feasible. FAA stated that a public approach was not feasible due to the existing terrain. They did indicate that a private approach may be possible but for them to work on the approach, funding from a private carrier would be needed. Special equipment at the airport and in the aircraft would be needed for a private approach as well as training for the pilots to learn how to use the approach. All of these requirements make a private approach very expensive.

Alternative Analysis

After considering input from pilots, the City of Seward and the public, three basic Alternatives were developed for the project. They include the following:

Alternative 1.1 – Reconstruct Runway 13/31 and raise it above the 100 year flood level. Riprap protection for erosion from the river is included in the alternative. (Considered in the Master Plan) See Figure 2, pg 28, Seward Airport Improvements Scoping Report.

Alternative 2.2 – Upgrade Runway 16/34 from an A-I facility to a B-II facility (considered in the Master Plan). This alternative would require shifting the existing runway to the east in order to increase the runway/apron offset to a value consistent with B-II requirements. The shift will also eliminate elevation changes to the existing apron and lease-lots, a concern of local lease lot holders. The runway would be reconstructed, raised above the 100 year flood level and extended to 3,300 feet. This alternative would close Runway 13/31 and allow it to be breached by the river at some time in the future, so riprap protection against flooding for the new runway is included as well. (See Figure 3, pg 29, Seward Airport Improvements Scoping Report.)

Alternative 3.0 – This alternative also upgrades Runway 16/34 to B-II standards and raises it above the 100 year flood, but then it increases the runway length from 3,300 feet to 4,000 feet.

The longer runway would accommodate larger commuter type of aircraft, a desire expressed by the City of Seward. Riprap protection is included.

An alternative analysis was completed for the 3 alternatives. Evaluation and scoring criteria were established prior to the evaluation. Evaluation categories included costs (construction, property acquisition, maintenance), ability to serve the community's needs (medivac, economic development, etc...), environmental impacts (flooding and associated property impacts, wildlife, wetlands) and engineering considerations (airspace, wind, construction ease, reliability, long term risks). Alternative 2.2 had more advantages and less disadvantages than the other two alternatives. (Copy available in Appendix B, Seward Airport Improvements Scoping Report) The Alternative Analysis was shared with members of the Seward Working Group and the public in 2016. Copies are available on the project's website.

Alternative 3 was developed based upon potential economic activity described by the City of Seward. Since FAA indicated they would not fund this option until the demand increases sufficiently, the City of Seward was afforded the opportunity to fund the difference between Alternative 2.2 and 3.0 (an additional runway length of 700 feet). If additional funding were to become available, the project would then construct Alternative 3.0. The City was unable to come up with the funding in time for the project design, so this Alternative has been dropped from further consideration. However in deference to the City's desire for a long runway in the future, the new Airport Layout Plan (ALP) will show this option as an Ultimate condition and development of Alternative 2.2 will not preclude a future runway extension. The City did express an interest in obtaining funding for a future extension.

Specific evaluation criteria are especially important to this project and as such warrant further discussion (see below). They include flood impacts, environmental impacts, maintenance considerations, wind coverage and safety concerns.

Flood Impacts:

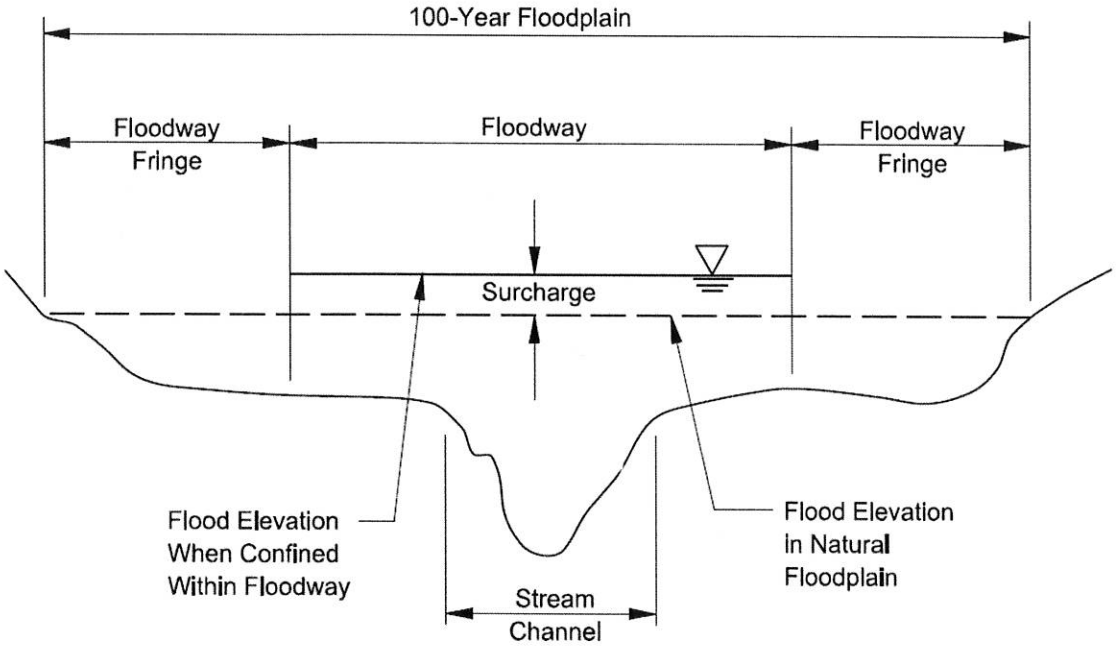
New survey data was obtained for the project. LIDAR was used for uplands. River cross-sections were physically measured in the field, at the same locations shown on the FEMA FIRM map. All of this information was incorporated into the flood modeling.

During larger discharges, bedload discharge is expected to be high. However, twice daily high tides significantly reduce the river water velocity near the runway and hence bedload sediment discharge decreases due to the reduced water velocity. Therefore it is expected that the Resurrection River bed elevation, adjacent to the airport, is increasing with time, at least during the larger discharges. This will cause the river water surface elevation to increase with time for any larger discharge. Therefore, the existing runway and taxiway elevations must increase to accommodate the future increases in the water elevation.

Modeling simulated the design flood (100 year flood elevation) for each alternative. Each final runway elevation included 2 feet of freeboard above the Base Flood Elevation (100 year flood elevation) per the Executive Order dated January 30, 2015. The freeboard was also used as a safety factor. The airport essentially acts as a levee for adjacent Alaska Railroad and private properties, protecting them from flooding caused by the river. Although the main runway has been overtopped several times by the river, the river has yet to overtop the secondary runway

or the apron, thereby protecting infrastructure beyond. Each alternative was modeled using these parameters, to assess impacts to surrounding properties resulting from raising each runway.

Up to one half of Runway 13/31 lies within the regulatory floodway[1] shown on the FEMA FIRM map (see figure below). The floodway essentially contains the stream or in this case the Resurrection River. According to FEMA, any fill into a floodway is to be avoided as it will result in an increase to the Base Flood Elevation, stipulated on the FIRM map. Alternative 1.1 requires fill, as well as placement of riprap protection, into the floodway in order to raise the runway to an elevation 2 feet above the 100 year flood level. Modeling showed that fill did indeed raise the Base Flood Elevation (up to 4 feet in some locations). As a result, flood water boundaries increased significantly on properties east of the airport (adjacent to the river), in the river and on the other bank of the river (affecting about 160 acres more than the existing 100 year event). Raising the runway also reduced flooding on about 50 acres, west of the airport, contained mostly within the existing airport. (See Figures 6 and 7, pgs 40 and 41, Seward Airport Improvements Scoping Report.)



1 – The floodway is the main stream channel and floodplain areas that should remain free of encroachment so the base flood (100 year flood) can be carried without a consider increase in water surface elevation. (reference 2014 American Association of State Highway and Transportation Officials)

A discussion with FEMA indicated that this impact would require a LOMR process to revise the Flood Base Elevation on the FIRM map. This process includes public comment/approval and mitigation (may include acquisition) for the properties impacted. This process is lengthy, and will impact both the project schedule and budget (cost estimated at $200,000, not including mitigation). Public approval may be difficult to achieve as the final result may be an increase in flood protection rates for affected property owners.

U.S. Department of Transportation (USDOT) Order 5650 states that "Department of Transportation agencies should ensure that proper consideration is given to avoid and mitigate adverse floodplain impacts in agency actions..." Executive Order 11988 "requires federal agencies to avoid to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of the 100 year floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative". Alternative 1.1 has a much greater impact to the floodplain than the No Build or Alternative 2.2.

Floodplain impacts associated with Alternative 1.1 qualify as a significant encroachment on the floodplain, as defined in the following excerpt from Section 14.2.1.1 of the FAA 1015.1F Desk Reference:

As defined in USDOT Order 5650.2, a significant encroachment is an encroachment in a floodplain that results in one or more of the following construction or flood-related impacts: 1) considerable probability of loss of human life, 2) likely future damage associated with the encroachment that could be substantial in cost or extent, including interruption of service on or loss of a vital transportation facility, and 3) a notable adverse impact on "natural and beneficial floodplain values."

USDOT Order 5650.2, paragraph 4.k states that natural and beneficial floodplain values include, but are not limited to: natural moderation of floods, water quality maintenance, groundwater recharge, fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, and forestry. The FAA 1050.1F Desk Reference also references factors to consider when assessing impacts on a floodplain's natural and beneficial values. Most notably, "would the proposed action or alternative(s) cause flow alterations that would result in unacceptable upstream or downstream flooding?"

This guidance further states that an alternative with a significant floodplain encroachment should not be selected if a practicable alternative exists (such as Alternative 2.2). Furthermore, FAA Order 1050.1F provides the following Significance Threshold for Floodplains:

The action would cause notable adverse impacts on natural and beneficial floodplain values such as water quality maintenance, fish, wildlife, plants, and natural beauty. Natural and beneficial floodplain values are further defined in Paragraph 4.k of USDOT Order 5650.2, Floodplain Management and Protection.

Proposed actions that have potential to result in impacts at or above these defined Significance Thresholds require preparation of an Environmental Impact Statement (EIS) to determine the extent of the impact. Preparation of an EIS would result in a significant delay in the project schedule as much more research and documentation is required. In the meantime, the airport would continue to suffer additional flood damage.

Alternative 2.2 requires fill into the floodplain only (floodway fringe); no fill within the floodway would occur. The 100 year flood waters generated from this alternative produce a minor increase (less than 1 foot) to about 22 acres of property, while reducing flood waters on another 45 acres. Impacts are minor compared to Alternative 1.1. (See Figures 6, 7 and 8, pgs 40-42, Seward Airport Improvements Scoping Report). According to FEMA, fill within the floodplain only will not require a LOMR process. Also, Alternative 2.2 does not meet the

conditions for a significant floodplain encroachment. Therefore the level of environmental documentation needed for this alternative should be consistent with a focused Environmental Assessment, a much shorter document than the EIS. Finally, since this runway is located some distance from the river, impacts from sediment deposits and flooding are expected to be significantly reduced as this alternative will allow the river to traverse a wider floodplain as well as eventually return to its natural condition.

Environmental Impacts:

Since Runway 13/31 is located adjacent to the river, fill (including riprap) placement below Ordinary High Water (OHW) in the river will be necessary for Alternative 1.1. As the land manager for state owned submerged lands, a permit from the Alaska Department of Natural Resources (ADNR) will be needed for this alternative. During agency scoping, ADNR requested that construction activities not impact river navigation. This may be difficult due to the river's location next to the runway and the river diversion that will be needed to place fill.

Construction activities associated with Alternative 1.1, including placement of fill below OHW level in the river, will disrupt existing fish habitat. Alternative 2.2 does not require fill within the river or the bay. The Alaska Department of Fish and Game stated at the Agency Scoping meeting (March 2017) that they prefer Alternative 2.2, as it has less impact on the fish.

While federal standards allow the base flood elevation to increase up to 1 foot in a regulatory floodway (if hazardous velocities are not produced), the Kenai Peninsula Borough (KPB) ordinance (Title 21, Chapter 21.06) does not allow any increase. Although the City of Seward is the flood permitting agency for this project, their regulations mimic the KPB's regulations. Since Alternative 1.1 is the only alternative that requires fill in the floodway (raising the base flood elevation), flood permitting is expected to be an issue for this option. It may not be possible to obtain a flood permit.

The Corps of Engineers (COE) is required to authorize the least environmentally damaging practicable alternative. While Alternative 2.2 affects more wetlands, the COE will consider another alternative if it is more practicable, in line with the purpose and need for the project, is feasible and if costs are reasonable. The COE representative indicated that Alternative 1.1 may not meet the purpose and need for the project, since when the river overtops this runway it is unusable during and after flood events. They also requested submission of an alternative analysis more in line with items described in Section 404B, in order to assess practicability.

Maintenance:

The maintenance budget for the department is predominately state funded and as such has undergone significant budget cuts over the last couple of years. Staff has been reduced drastically. Remaining staff have as much or even more (new) facilities to maintain. According to the Airport Manager, the current staff experienced difficulty this past winter just maintaining snow removal at the airport. Snow removal occurred typically only on the main runway, a single taxiway and a portion of the apron. The remaining facilities were left with snow cover for weeks or months at a time. There is not a manned maintenance station in Seward which makes maintaining the airport more cumbersome. The closest one is at Crown Point, about 24 miles away.

Recurrent flooding at the airport requires additional maintenance efforts to clean up and repair the airport after each flood event. One runway provides sufficient capacity for airport's current and future operations. Runway 13/31's location next to the river puts it at an increased risk of being overtopped, even if the runway is improved as discussed in Alternative 1.1. Erosive forces from the river are expected to damage the riprap protection over time, increasing future maintenance efforts. By contrast, Runway 16/34 is located some distance from the river, so it is not subject to the river's erosive forces.

Elimination of Runway 13/31 and Taxiway A would reduce regular maintenance costs at the airport by about 25%. This reduction does not include cost savings from state emergency funding used for clean up and repairs after a flood event. Alternative 2.2 may eliminate the need for emergency funding for the design period of the project.

Wind Coverage:

Pilots were interviewed during development of the project. In general, the pilots preferred the orientation of the crosswind runway (16/34) over the main runway (13/31). Some noted that occasional winter winds prevent them from using Runway 16/34. When this happens, some pilots use the main runway, while others choose not to fly.

Recent wind data was collected at the airport's Automated Weather Observation System (AWOS) and analyzed to investigate this issue. Results showed a minor increase in the wind coverage shown on the existing Airport Layout Plan (ALP). The main runway has a wind coverage of 91.1 – 96.0% while the crosswind runway has a wind coverage of 98.6-99.5%, depending on the crosswind component. Thus the crosswind runway has better wind coverage (exceeds the FAA requirement of 95%).

Further investigation indicated that the tour operators based at the airport use it primarily in the summer, with few operations in the winter, when the adverse winds occur. Thus winter winds would have a minor impact on most local operations. It is common practice for commercial pilots around the state to check weather conditions before flying. It is also common for carriers to delay or cancel a flight due to bad weather, just as some of the Seward pilots do when the winds occur.

Of concern was the potential impact of these winds on medical evacuation operations. Medivacs transport patients from Seward to Anchorage. The medivac service providers and pilots were contacted to determine impacts to their service, if Runway 13/31 was not available during these wind conditions. They responded that they would either wait out the winds or send an ambulance from Anchorage via the Seward Highway. There is a hospital in Seward. By comparison, most Alaskan villages have only simple medical clinics, so they rely heavier on medivac operations to reach better medical facilities.

Safety

The Seward Highway, the airport access road and the Alaska Railroad all bisect the center of the Runway Protection Zone (RPZ) for Runway 13. Both rail cars and passenger vehicles currently penetrate the Approach Surface for Runway 31, creating a safety hazard (See Sheet 5 of the 2008 ALP). Safety is one of the four cornerstones of the FAA. New FAA guidance indicates that all improvements, including railroads and roads, should be removed from RPZ's whenever feasible. Selection of Alternative 1.1 does not improve this situation much. Raising the runway will reduce the penetrations but likely will not eliminate them. Alternative 2.2 on the other hand, moves the RPZ for Runway 16 to position where the highway and railroad only cross the far corner of the RPZ, nearly 1,000 feet away from the runway threshold. At this location, vehicles can operate well below the Approach Surface. Thus Alternative 2.2 is a much safer option.

Construction of Alternative 1.1 may impact medivac operations. Runway 16/34 is currently not long enough for these aircraft to land. Special consideration for these operations will need to be accounted for during development of the Construction Safety and Phasing Plan (CSPP) for this option. Construction of Alternative 2.2 will not impact these or any other operations, as the main runway will still be available for use during construction.

Conclusion:

Significant research was completed during the project to assess the needs and facility requirements for the airport. This research resulted in the development of 3 alternatives for the project. Due to recurrent flooding, a flood model was created and analyzed for each project alternative. Each alternative was also carefully evaluated using extensive evaluation criteria. The following are the results from all tasks completed to date:

1. Construction of Alternative 1.1 will likely be an on-going maintenance effort. It's anticipated that the flood protection for the runway will fail before the design life of 20 years, due to the runways location next to the river.

2. A capacity analysis indicates only one runway is needed to serve existing and future aircraft demand.

3. There is not enough use (past or current) by large aircraft to justify a long runway.

4. The results from the Alternative Analysis indicated that Alternative 2.2 had more advantages and less disadvantages than the other 2 alternatives.

5. Flood studies indicate significant additional impacts to adjacent properties from constructing Alternative 1.1 as compared to constructing Alt 2.2.

6. Alternative 1.1 has greater environmental impacts. Permitting will likely be more difficult due to fish habitat impacts, work below OHW, construction issues associated with a diversion and continued operations by medivacs, and the preservation of navigability. Flood permitting may not be possible. These impacts are likely to elevate the environmental document into an EIS instead of the standard Environmental Assessment, impacting costs and schedule. In the meantime, the airport will continue to be damaged by flooding events.

7. Alternative 2.2 would result in cost savings for maintenance as it is shorter and further away from the river. Also construction of this alternative would include closure of the main runway and Taxiway A. Finally it's likely that flooding will not damage the runway for at least the design life of the project, resulting in additional cost savings, as state funding is used for clean up and repairs after flooding.

8. The wind coverage is better for Runway 16/34 (Alternative 2.2). Occasional winter winds can be mitigated.

9. Alternative 2.2 eliminates obstructions in the future Approach Surface and reduces the impacts of existing obstructions in the future RPZ.

For these reasons, the project team will be moving forward with developing Alternative 2.2. as the preferred alternative for this project.