



**FRIEDMAN  
MEMORIAL  
AIRPORT**

## **AIRPORT ALTERNATIVES TECHNICAL ANALYSIS**

**JANUARY 2013**



**T-O ENGINEERS**

Friedman Memorial Airport / T-O Engineers



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## **1.0 BACKGROUND AND PURPOSE OF ANALYSIS**

### **1.1 BACKGROUND**

The Friedman Memorial Airport (SUN) is located in Hailey, Idaho. The airport serves the Wood River Valley region of Idaho, including the Sun Valley resort area.

The airport does not meet current Federal Aviation Administration (FAA) standards based on the current critical aircraft that utilize the airport. Traffic by aircraft such as the Bombardier Q400, operated by Horizon Air, and several models of large general aviation (GA) aircraft (e.g., Gulfstream G-V and Bombardier Global Express) dictates that the Runway Design Code (RDC) (formerly Airport Reference Code (ARC)) for the airport is C-III. Due to terrain and man-made constraints, the geometry of the existing site does not meet object clearance and separation standards for many C-III standards, most critically the Runway Safety Area. Comparatively, the airport currently fully meets only B-I object clearance and separation standards. Operational restrictions allow the Q400 to operate at the airport, but these restrictions were intended as a temporary measure until a new airport would be constructed. Additionally, SkyWest Airlines has recently requested permission from the FAA to operate the Canadair Regional Jet 700 (CRJ700) at SUN. The CRJ700 is a C-II aircraft, and the airport does not meet C-II design standards either.

FAA Advisory Circular 150/5300-13A, *Airport Design* describes various design standards for airports. Of these, the most critical is the Runway Safety Area. As described in Chapter 3, a 2005 Congressional mandate requires that all commercial service airports in the U.S. airport system comply with FAA design standards for Runway Safety Areas no later than December 31, 2015. Until recently, the planned solution to the various design deficiencies at SUN was to relocate the airport to a new site south of the existing airport and away from the valley cities. The FAA was conducting an Environmental Impact Statement (EIS) study for a new location until the decision was made to suspend the study in August, 2011, due to financial and wildlife concerns with the sites under consideration.

The FAA is currently evaluating options for moving forward with the process and has determined a need for additional data. The purpose of this effort is to collect and present that data to the FAA Seattle Airports District Office (ADO). The results of this study will provide the data necessary to assist the FAA in making informed decisions pertaining to existing non-standard conditions existing at SUN.

### **1.2 PURPOSE OF ANALYSIS**

The purpose of this technical analysis is to investigate alternatives which can provide an increased level of safety at the airport for the type and size of aircraft that use the facility today. This study is necessary to address the safety improvements needed based on the type of commercial and corporate aircraft currently using the airport, not to accommodate future





demand by larger aircraft. The analysis considers the requirements to meet both RDC C-II (e.g. the CRJ700) and RDC C-III (e.g. the Q400) standards. This effort consists of technical analyses of various alternatives to achieve compliance with standards at the existing airport site. Comparative evaluation and selection of alternatives is not included. The goal was to develop alternatives that are technically feasible at the existing site, regardless of cost or potential environmental or social impact. Alternatives were developed to the point that costs and potential impacts can be identified and presented to the FAA. Evaluation of alternatives and, ultimately, selection of preferred alternatives, if necessary, is expected to be addressed as part of a future planning study.

Alternatives evaluated consider full compliance with FAA design standards and other potential alternatives which offer partial compliance but may require Modification of Airport Design Standards as well. Various alternatives for full compliance have been studied in detail previously, and this information was revisited and updated for this effort. It is anticipated that the safety of alternatives developed during this study will be evaluated by a Safety Risk Management panel at a later date to determine their acceptability from a safety standpoint.

The analysis completed under this effort made maximum use and references significant information that is available from previous planning efforts and other studies at the airport including:

- 1990 Airport Site Selection and Feasibility Study
- 1994 Airport Master Plan
- 1998 Airport Layout Plan Update
- 2004 Airport Master Plan Update
- 2006 Airport Site Selection and Feasibility Study
- Draft documentation from the suspended Environmental Impact Statement (as available)
- Informal analysis and public involvement undertaken in late 2011 and early 2012, after the suspension of the EIS.

This analysis does not restrict improvements that can be made within the existing airport property boundary, but instead considers all alternatives in order to accurately evaluate what can be done to meet standards. It is important to understand the costs and factors associated with meeting standards to determine the practicability of pursuing each option. In addition, this information will be useful in determining whether or not the EIS effort should continue.

## 2.0 AIRPORT SETTING, CONFIGURATION AND OPERATIONAL CONSIDERATIONS

As previously mentioned, the Friedman Memorial Airport (SUN) is located in Hailey, Idaho. The airport serves the Wood River Valley region of Idaho, including the Sun Valley resort area. SUN is currently served by two commercial service air carriers: Horizon Air and SkyWest. A large number of corporate jets and other general aviation aircraft also use the airfield for business, recreation and travel to and from the large number of second homes in the area. The Friedman Memorial Airport Authority (FMAA) governs and manages the airport under a joint powers agreement between the City of Hailey and Blaine County, co-sponsors of the airport.

As of September 2012, airport management and FAA Form 5010-1 records reported 147 based aircraft (101 single engine, 38 multi-engine and 8 jets). Through the first nine months of 2012, the airport's Air Traffic Control Tower operations record indicates a total of 23,220 operations (takeoffs and landings) at SUN. Calendar year 2011 operations counts totaled approximately 30,550 operations. Using available data provided by the Airport, the breakdown of 2011 operations by Runway Design Code was calculated as follows:

Runway Design Code	Approximate Percentage	Approximate Operations
D-II GA	1.4%	428
C-III Commercial	2.6%	794
C-III GA	0.5%	153
C-II GA	7.2%	2,200
C-I GA	3.8%	1,161
B-III	0.0%	0
B-II Commercial	10.6%	3,283
B-II GA	33.9%	10,356
Smaller Than B-II (GA)	40.0%	12,220

Source: T-O Engineers

Similarly, the breakdown of operations by design group is as follows:

Design Group	Approximate Percentage	Approximate Operations
III Commercial	2.6%	794
III GA	0.5%	153
II Commercial	10.6%	3,283
II GA	42.5%	12,984
I	43.8%	13,381

Source: T-O Engineers

It should be noted that the percentages used above are calculated based on available operational data by aircraft type. This data is limited; therefore a number of assumptions were made in this analysis. The intent is to provide a picture of the operational breakdown, rather than to produce exact values. It should be further noted that there is a discrepancy between the



tower records used in this analysis and operational data published on the SUN's FAA Form 5010-1. The Airport is currently working to correct this discrepancy.

## **2.1 SURROUNDING AREA**

SUN is surrounded by residential, industrial, and commercial development on the north and west, with agricultural land to the south. State Highway 75 runs immediately along the east side of airport property. The City of Hailey core area is located immediately north and east of the airport, with high density residential development east of the airport and Highway 75. Commercial, industrial and lower density residential development resides west of the airport. The Flying Hat Ranch lies south and west of the airport. South of the Flying Hat Ranch lies the City of Bellevue, with the closest residential development approximately 1.5 miles south of the existing runway end. The City of Hailey and surrounding areas have seen significant growth over the past years resulting in increased encroachment of development upon the airport. As the Wood River Valley continues to grow, the constrained environment in the valley is expected to result in further encroachment on the airport.

**Figure 2-1** provides a perspective of the airport's location within the valley.

**Figure 2-1 – Vicinity Aerial of SUN, Looking North**



Source: T-O Engineers



## **2.2 AIRFIELD CONFIGURATION AND AIRPORT FACILITIES**

Existing airside, landside, and support facilities are summarized below. Information was taken from the 2004 Master Plan and updated as appropriate. Information was also taken from the current Airport Master Record (FAA Form 5010-1) effective July 2012. SUN's current 5010-1 form is included as **Appendix A**.

Existing airport facilities are presented in three categories: airside, landside, and support facilities. Landside facilities include such items as the airport terminal building, vehicular access, and automobile parking. Support facilities include fuel facilities, Aircraft Rescue and Firefighting facilities, airport maintenance, and snow removal equipment.

### **2.2.1 Airside Facilities**

Airfield facilities consist of facilities that are required to accommodate safe aircraft operations and include runways, taxiways, aprons, lighting, and navigational aids. A summary of existing airside facilities is included below.

**Exhibit 2-1** graphically depicts the airside facilities.

#### **Runway**

SUN has a single runway, Runway 13-31, and has a field elevation of 5,320. The runway pavement is 7,550 feet long by 100 feet wide with a grooved asphalt surface. A displaced threshold on the Runway 13 end and declared distances has been applied to the runway to provide the appropriate Runway Safety Area (RSA) length prior to landing thresholds (RSA width remains non-standard), Runway Protection Zones (RPZ) and clear approach surfaces. Further discussion of the RSA, RPZ, displaced threshold and declared distances is included in **Chapter 4**.

The pavement of Runway 13-31 is rated in "good" condition on the airport's Form 5010-1. Runway pavements are rated for single wheel, dual wheel, and dual tandem. The pavement strength of Runway 13-31 is currently rated for 65,000-pound single wheel aircraft, 95,000-pound dual wheel aircraft, and 150,000-pound for dual tandem wheel configurations.

#### **Taxiways**

The airport is served by partial parallel taxiways on both sides of Runway 13-31. Taxiway A is on the east side of the airport. It extends from the A-2 taxiway connector to the A-3 connector to the north and begins again at the A-4 connector extending south to the A-8 connector. The separation between runway centerline and the centerline of Taxiway A varies from 185 feet to 250 feet.

Taxiway B is located on the west side Runway 13-31 and extends from the north end of the runway to just south of the terminal apron near the B-5 taxiway connector. Taxiway B then continues from the main apron to the south providing access to the general aviation aprons and









hangars in this area. The runway-taxiway separation for Taxiway B varies from 250 feet to 335 feet.

### **Aprons**

There are three primary apron areas on the airport: the air carrier apron, general aviation apron, and Fixed Base Operator (FBO) apron. There are also two “deconfliction” aprons on the north end of the airfield west of Taxiway B which provide bypass outlets for taxiing aircraft. Portions of the air carrier apron, and the Taxiway B hold aprons are located within the Runway 13-31 OFA and Taxiway B OFA.

### **Lighting and Navigational Aids.<sup>1</sup>**

Lighting and navigation aids are used to facilitate identification, approach, landing, and taxiing at night and in adverse weather conditions. SUN is equipped with a number of lighting and navigational aids including:

- Air Traffic Control Tower – hours of operation 7:00 a.m. MT to 11:00 p.m. MT, daily. The tower is located on the airfield’s east side and is operated by Serco Management Services, Inc. as part of the National Air Traffic Control Contract with the FAA.
- High Intensity Runway Lighting system (HIRL)
- Medium Intensity Taxiway Lighting system (MITL) along most of the taxiways.
- Precision Approach Path Indicator (PAPI-4) system on Runway 31.
- Runway Distance Remaining (RDR) signs along Runway 13-31.
- A rotating beacon and three wind cones.
- Precision Instrument runway markings on Runway 31 and Non-Precision Instrument markings on Runway 13.
- RNAV, GPS, RNP NDB/DME approaches to Runway 31 and an instrument departure procedure for Runway 31.
- Hailey NDB/DME (located south of Bellevue, approximately 12 miles south of the airport).

### **2.2.2 Landside Facilities**

Landside facilities consist of GA hangars, FBO, passenger terminal, ground access/roads, and parking facilities. A summary of existing landside facilities is included below and **Exhibit 2-2** graphically depicts the landside facilities.

### **General Aviation Facilities**

SUN has a number of aircraft storage hangars located along the west side of the airfield. These facilities include general aviation T-hangars, FBO maintenance and aircraft storage hangars, and corporate aircraft storage hangars. The various needs of the general aviation aircraft are served by one FBO, Atlantic Aviation. Atlantic Aviation is a full service FBO that offers aircraft maintenance, fuel services, aircraft rental, hangared aircraft parking and tie down spaces. Additionally, Atlantic Aviation facilitates flight instruction through Glass Cockpit Aviation and offers aircraft sales and charter services.

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<sup>1</sup> Sources include 2004 Master Plan, FAA Form 5010-1; effective date 07/26/2012, and AirNav.com



## **Airport Terminal Building**

The passenger terminal building is a single story building located approximately midway along the west side of Runway 13-31. The original building was constructed in 1976. The building has been renovated and expanded a number of times since, with the most recent renovation completed in 2006. The existing terminal building totals approximately 14,320 square feet on one level and is accessed via a single-level loop road.

The terminal building accommodates two airline ticketing counters with adjacent airline offices and baggage make-up space, TSA facilities, three rental car counters, a small snack/gift shop retail concession, baggage claim facilities, two sets of non-secured restrooms, and a secured departure lounge.

## **Ground Access**

The only access to SUN is from the north via Airport Way, which runs north-south along the west side of the Airport. The paved two-lane road serves as the primary access for all activities on the airport and extends beyond the terminal area to serve the general aviation hangar facilities south of the passenger terminal apron.

A previously discussed, the major arterial highway through Blaine County is State Highway 75, which runs along the east boundary of the airport. State Highway 75 is a two lane highway and serves as the main arterial through the Wood River Valley. Airport Way accesses directly onto Highway 75, at the mid-point of the “S” curve that the highway makes around the north end of the Airport. It passes through the City of Hailey’s principal commercial zone.

A commercial-light industrial development located adjacent to the west side of the airport provides relocated access to the passenger terminal, GA hangars, apron, and FBO facilities at the southwest area of the airport.

## **Parking**

Public parking at the airport is located to the west of the passenger terminal building. The parking lot is divided to include short and long-term public parking, rental car parking, handicap parking, and employee parking. The FBO and the hangar facilities each have ground vehicle parking in the vicinity of their facilities.

### **2.2.3 Support Facilities**

Support facilities consist of Aircraft Rescue and Firefighting, airport maintenance, snow removal and fuel facilities. A summary of existing support facilities is included below and are also shown on **Exhibit 2-2**.









### **Aircraft Rescue and Firefighting (ARFF)**

The airport is currently an ARFF Index A airport, but the airport is ARFF Index B capable. The ARFF station houses the airport's firefighting equipment and occupies 4,435 square feet. The current ARFF building is located south of the Airport Manager's office, adjacent to the main passenger terminal apron.

### **Airport Maintenance and Snow Removal Equipment (SRE)**

SRE and other miscellaneous maintenance equipment is housed in a portion of the ARFF building and in the Snow Removal/Maintenance Equipment Building just west of the ARFF building. The Snow Removal/Maintenance Equipment Building occupies approximately 3,185 square feet.

### **Fuel Facilities**

Atlantic Aviation handles the majority of the fuel service at SUN. The FBO's fuel storage is located near the northern end of the GA hangars west of Taxiway B. This is an above ground facility with four 20,000 gallon tanks, one for avgas and three for Jet A. All fuel is dispensed from this facility via tank truck by Atlantic. Atlantic Aviation also operates a self-fueling facility located near the south end of the GA hangar area west of Taxiway B adjacent to the taxiway access to the GA hangars. This is a 5,000-gallon underground tank with a small pump for self-fueling.

### **Airport Manager's Office**

The airport manager's office is located in a separate building approximately 200 feet south the terminal. This small structure houses the airport manager, along with support staff.

## **2.3 OPERATIONAL CONSIDERATIONS**

### **2.3.1 Head to Head Operations**

The airport is surrounded by rising terrain to the north, east and west. As a result, a majority of operations are conducted "head-to-head" with Runway 13 being used for departures and Runway 31 being used for arrivals. It is important to point out that not all operations occur head to head at SUN. Aircraft occasionally land from and depart to the north though most of these operations are conducted by smaller piston powered aircraft. Due to the location of the City of Hailey core area immediately north of the airport, aircraft departing to the south and landing from the south also helps to reduce noise impacts on the City. ATCT personnel ensure all air traffic operations into and out of the valley are well coordinated during operating hours.

NOTE: Due to safety concerns, in August, 2012, FAA issued temporary restrictions for head to head instrument operations at numerous airports throughout the country. Initially, SUN was included in these restrictions. Due to the operational importance of air traffic being able to operate head to head in the constrained environment around SUN, FMAA and SUN ATCT tower management were able to work with the FAA to exempt SUN from these restrictions.





### 2.3.2 Taxiway Sterilization

Due to deficiencies in runway/taxiway separations standards, with approval from the FAA, FMAA and ATCT management have entered into an operational agreement (Letter of Agreement) whereby ATCT personnel sterilize Taxiways A and B from aircraft and vehicles when Category C air carrier aircraft are operating. This procedure provides an increased level of safety for Category C air carrier aircraft operating into and out of SUN. It is important to point out that this procedure is *not* implemented for general aviation aircraft operations.

### 2.3.3 Instrument Procedures

There are currently four published instrument procedures in effect at SUN: three instrument approach procedures and one instrument departure procedure. Published approach procedures consist of an RNAV (GPS) approach to Runway 31, an RNAV (RNP) approach to Runway 31, and an NDB/DME/GPS-A approach. While published, the RNAV (RNP) approach requires the aircraft operator be authorized by the FAA to fly the approach. Due to the airport's location within the valley and surrounding terrain, approach minima are high and as follows:

- Runway 31 RNAV (GPS) - LNAV minima, Category C - 1790 foot ceiling and 3 mile visibility.
- Runway 31 RNAV (RNP) – RNP 3.0 minima, Categories A-C - 974 foot ceiling and 3 mile visibility. **Authorization Required.**
- NDB/DME or GPS-A – Circling – Categories A-C – 2687 foot ceiling and 5 miles visibility.

**Appendix B** includes the current instrument approach and departure plates for SUN<sup>2</sup>. Discussion of the impacts the high approach minima has on reliability of the airport is included in **Chapter 4**.

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<sup>2</sup> Source: AirNav.com



### 3.0 CURRENT REGULATORY ENVIRONMENT

#### 3.1 RUNWAY SAFETY AREA (RSA) COMPLIANCE – CONGRESSIONAL MANDATE

In November of 2005, the U.S. Congress passed a law mandating all airports certificated under 49 U.S.C 44706 comply with FAA design standards for RSA as required by 14 CFR 139. SUN is certificated under 49 U.S.C 44706 and complies with 14 CFR Part 139 and must therefore meet the RSA mandate. The mandate reads:

*“...Not later than December 31, 2015, the owner or operator of an airport certificated under 49 U.S.C. 44706 shall improve the airport’s runway safety areas to comply with the Federal Aviation Administration design standards required by 14 CFR part 139: Provided further, That the Federal Aviation Administration shall report annually to the Congress on the agency’s progress toward improving the runway safety areas at 49 U.S.C. 44706 airports.”<sup>3</sup>*

14 CFR Part 139 safety area requirements are as follows<sup>4</sup>:

§ 139.309 *Safety areas.*

(a) *In a manner authorized by the Administrator, each certificate holder must provide and maintain, for each runway and taxiway that is available for air carrier use, a safety area of at least the dimensions that—*

*(1) Existed on December 31, 1987, if the runway or taxiway had a safety area on December 31, 1987, and if no reconstruction or significant expansion of the runway or taxiway was begun on or after January 1, 1988; or*

*(2) Are authorized by the Administrator at the time the construction, reconstruction, or expansion began if construction, reconstruction, or significant expansion of the runway or taxiway began on or after January 1, 1988.*

(b) *Each certificate holder must maintain its safety areas as follows:*

*(1) Each safety area must be cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations.*

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<sup>3</sup> Pub. L. 109-115, div. A, title I, Nov. 30, 2005, 119 Stat. 2401

<sup>4</sup> <http://ecfr.gpoaccess.gov>

- (2) *Each safety area must be drained by grading or storm sewers to prevent water accumulation.*
  - (3) *Each safety area must be capable under dry conditions of supporting snow removal and aircraft rescue and firefighting equipment and of supporting the occasional passage of aircraft without causing major damage to the aircraft.*
  - (4) *No objects may be located in any safety area, except for objects that need to be located in a safety area because of their function. These objects must be constructed, to the extent practical, on frangibly mounted structures of the lowest practical height, with the frangible point no higher than 3 inches above grade.*
- (c) *FAA Advisory Circulars contain methods and procedures for the configuration and maintenance of safety areas acceptable to the Administrator.*

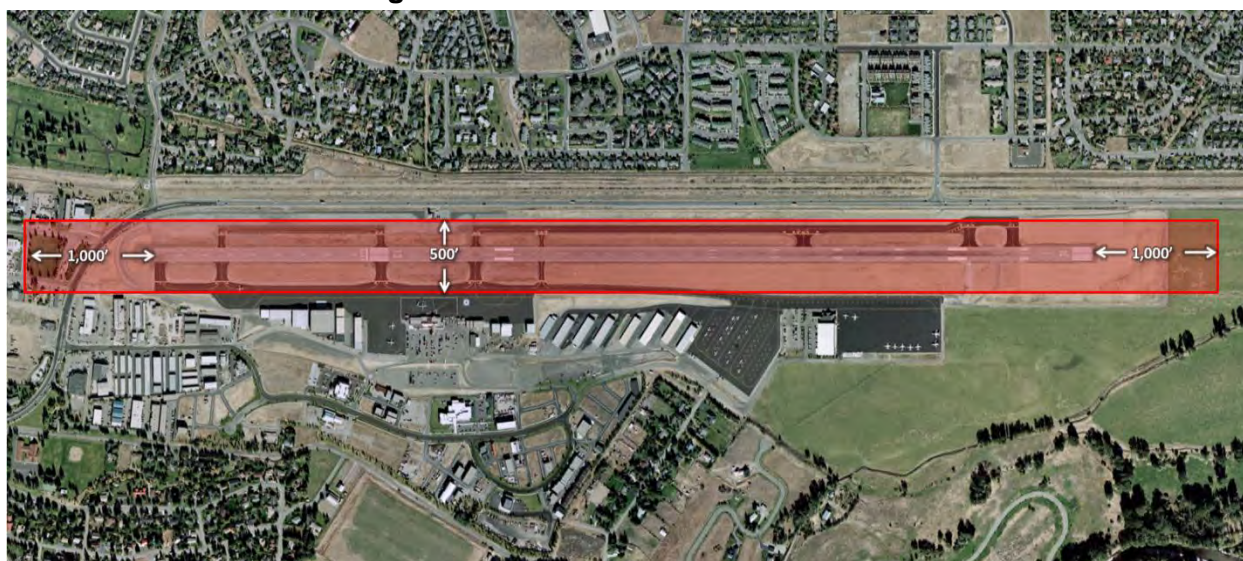
### 3.1.1 Runway Safety Area Dimensions and Grading Requirements

Per the above regulatory requirements, FAA Advisory Circular 150/5300-13A defines the RSA dimensions and grading for SUN as below<sup>5</sup>. **Figure 3-1** depicts a standard RDG III RSA at SUN.

#### Dimensions

Length: 1,000 feet past runway end  
Width: 500 feet total width (250 feet from runway centerline)

**Figure 3-1 – Standard C-III RSA at SUN**



Source: T-O Engineers

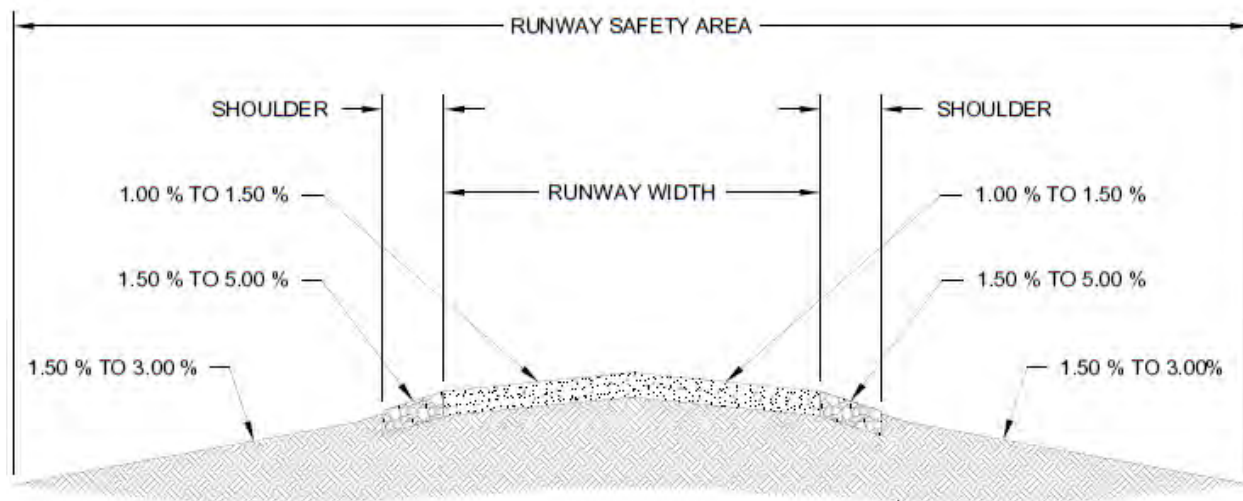
<sup>5</sup> Based on a future RDC of C-III

## Grading

AC 150/5300-13A also describes longitudinal and transverse grading standards for runways, RSAs and other design areas. **Figure 3-2** illustrates the transverse grading standards for RSAs. Currently SUN does not meet all RSA grading standards.

**Figure 3-2** depicts standard RSA grading.

**Figure 3-2 – RSA Grading Standards**



Source: FAA AC 150/5300-13A

Further discussion of current RSA deficiencies at SUN and proposed disposition to meet the Congressional RSA mandate is included in **Chapter 5**.

## 3.2 MODIFICATION OF AIRPORT DESIGN STANDARDS

The current approved Airport Layout Plan for SUN lists several non-standard conditions relative to airport design standards and CFR Part 77. In some instances, the FAA can approve Modification of Airport Design Standards (MOS) should an airport be unable to fully meet design standards. The FAA defines Modification of Airport Design Standards as follows<sup>6</sup>:

*“Modification to standards” means any change to FAA design standards other than dimensional standards for Runway Safety Areas. Unique local conditions may require Modification of Airport Design Standards for a specific airport. A modification to an airport design standard related to new construction, reconstruction, expansion, or upgrade on an airport which received Federal aid requires FAA approval. The request for modification should show that the modification will provide an acceptable level of*

<sup>6</sup> Per FAA AC150/5300-13 and FAA Order 5300.1



*safety, economy, durability, and workmanship... Rationale may be used to show that the modification will provide an acceptable level of safety for the specified conditions, including the type of aircraft.*

Unique local conditions exist at SUN. Modification of Airport Design Standards is *not* allowed for RSA dimensional standards and SUN will be required to comply with the Congressional RSA mandate by the end of 2015. Several alternatives considered in this analysis would require modification to one or more design standard. The applicability of Modification of Airport Design Standards to address existing non-standard conditions other than RSA dimensions will be discussed for each alternative in **Chapter 5** and in detail in **Appendix D**.

### **3.3 FAA AIRPORT DESIGN ADVISORY CIRCULAR (AC) 150/5300-13**

As of September 29, 2012, the FAA has issued a new Airport Design Advisory Circular (AC). AC 150/5300-13A, Airport Design, replaces AC 150/5300-13 Change 18, Airport Design, originally released by the FAA in September of 1989. Per the FAA, “the new AC was substantially revised to fully incorporate all previous Changes to AC 150/5300-13, as well as new standards and technical requirements.” Efforts were made to incorporate the new standards and technical requirements into the analysis performed for SUN as part of this report.





## 4.0 EXISTING AIRPORT DEFICIENCIES SUMMARY

This chapter summarizes various existing deficiencies at SUN including object clearance and separation standards, and CFR Part 77 including:

- Runway Safety Area
- Runway Object Free Area
- Runway Object Free Zone
- Runway Protection Zone
- Runway Centerline to Holdline
- Runway Centerline to Parallel Taxiway Separation
- Runway Centerline to Aircraft Parking Separation
- CFR Part 77 Penetrations
- Service Reliability

### 4.1 RUNWAY PROTECTION STANDARDS<sup>7</sup>

#### 4.1.1 Runway Safety Area (RSA)

The RSA is a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. The RSA also provides greater accessibility for firefighting and rescue equipment during incidents and accidents. The RSA should be cleared and graded and not have potentially hazardous ruts, humps, depressions, or other surface variations.

Standard RSA dimension for total width centered on runway centerline is 400 feet for RDC C-II and 500 feet for RDC C-III (200 and 250 feet from centerline respectively). Standard RSA dimension beyond the runway end is 1,000 feet for both RDC C-II and C-III. Currently, SUN does not meet C-II or C-III RSA design standards for width. On the east side of the runway, current RSA width is only 150 feet and on the west side it is 200 feet. RSA width is non-standard due to the location of taxiways or portions of taxiways within the RSA on both sides of the runway. RSA length (beyond runway end) requirements are currently met with the use of a displaced threshold on the Runway 13 end and declared distances. As currently configured, the RSA at SUN only meets RDC B-I standards. Discussion of the displaced threshold and declared distances is included in Section 4.3 below. Further, the RSA does not meet transverse grade standards along many portions of the runway being either too steep or too flat a grade.

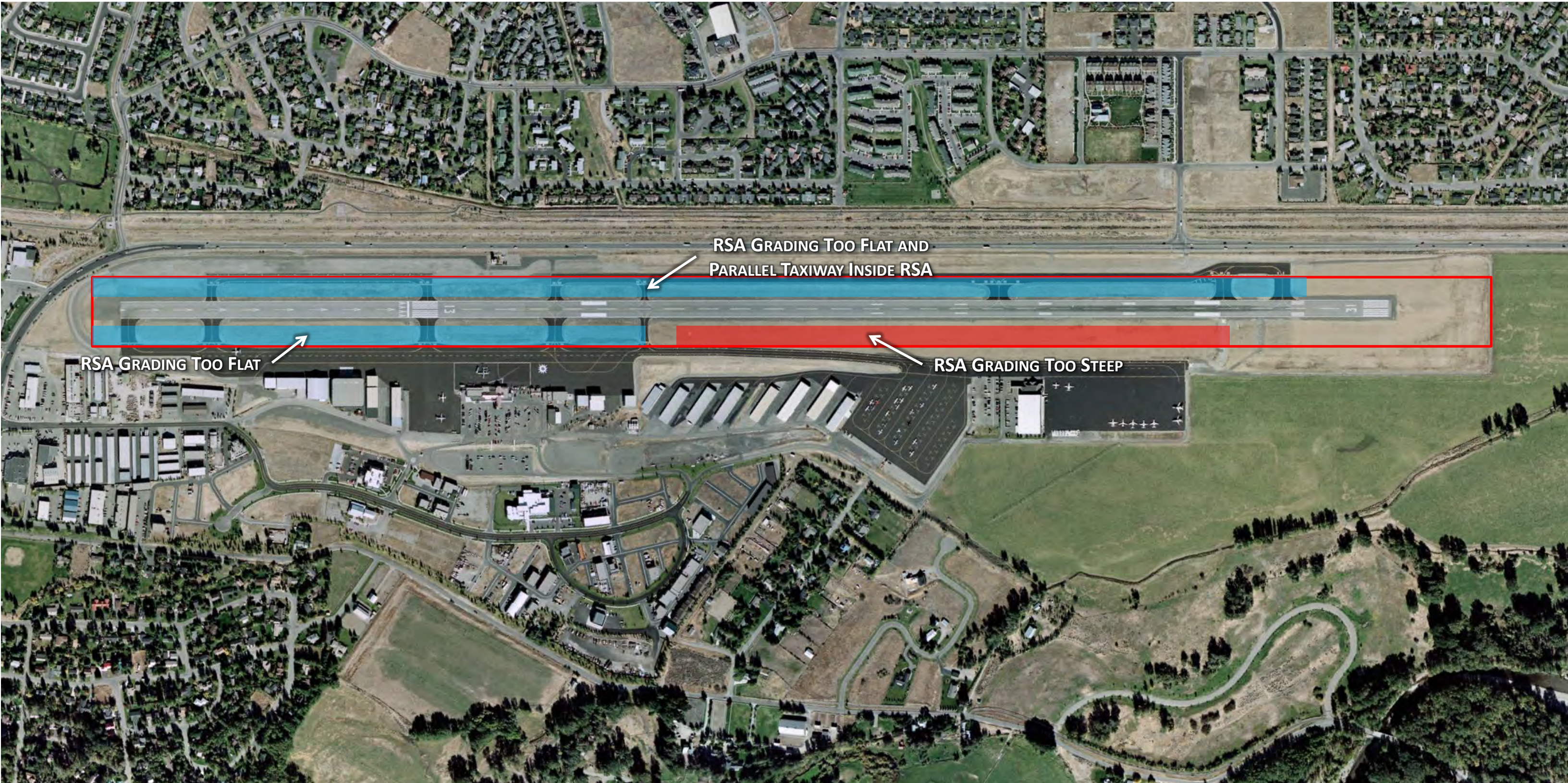
As discussed in Chapter 3, SUN will be required to comply with the Congressional RSA mandate by 2015.

**Exhibits 4-1 (C-II) and 4-1a (C-III)** depict current RSA deficiencies at SUN.

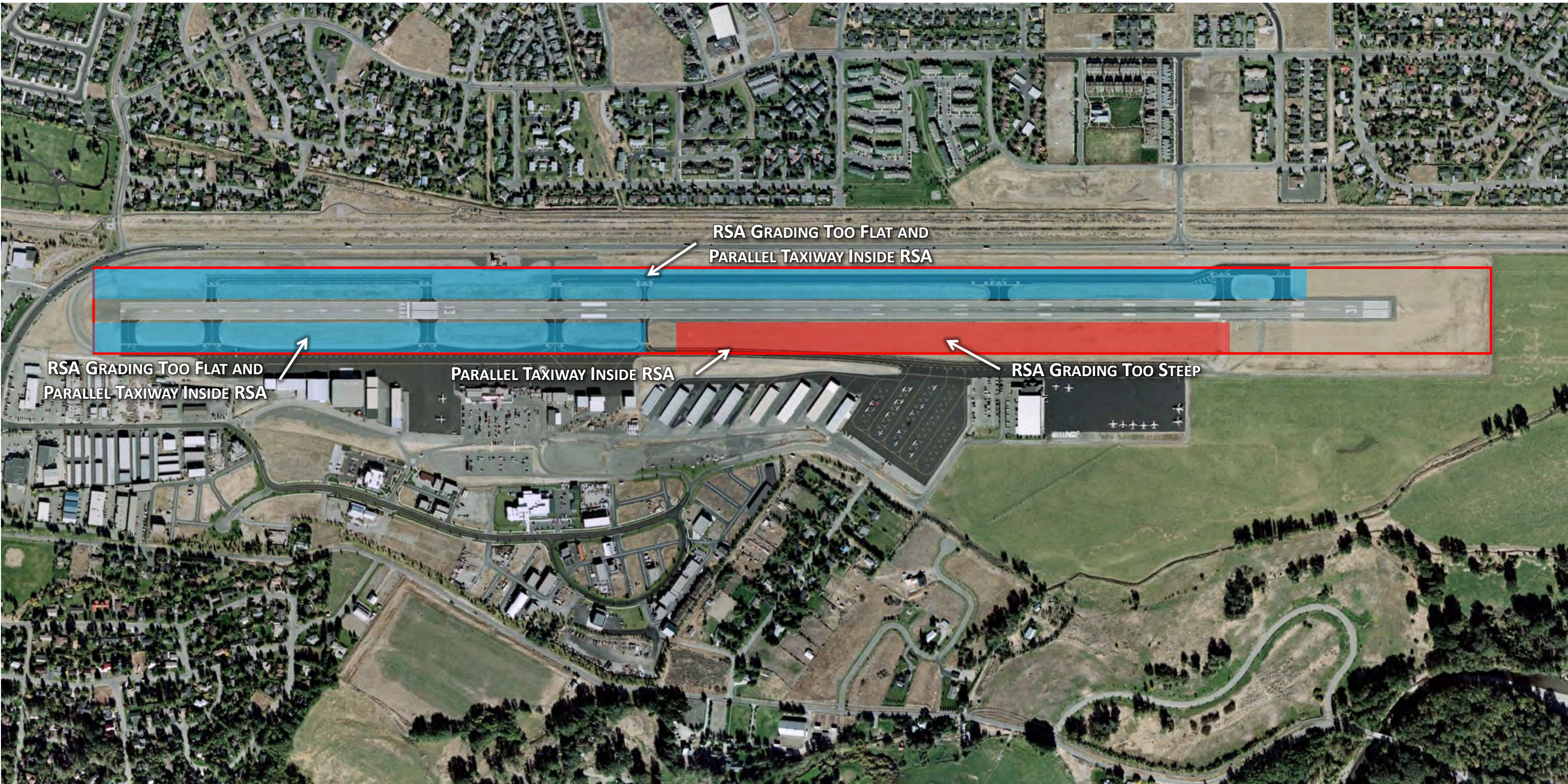
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<sup>7</sup> As defined in new FAA Advisory Circular (AC) 150/5300-13A, Airport Design, effective 9/28/2012













#### **4.1.2 Runway Object Free Area (OFA)**

The OFA is a defined surface surrounding the runway established to keep above ground objects from protruding above the RSA edge elevation. Objects can be located in the OFA for air navigation or aircraft ground maneuvering purposes such as taxiing or holding aircraft. Parked aircraft cannot be allowed in the OFA.

Standard OFA dimensions for RDC C-II or C-III are 800 feet total width centered on runway centerline (400 feet from runway centerline) and 1,000 feet beyond runway end. Currently, SUN does not meet OFA design standards for width due to the presence of the Air Traffic Control Tower (ATCT), terminal aircraft parking, east perimeter fence and Highway 75, along with other objects within the OFA.

OFA length (beyond runway end) requirements are currently met with the use of a displaced threshold on the Runway 13 end and declared distances. Discussion of the displaced threshold and declared distances is included in Section 4.3 below.

**Exhibit 4-2** depicts current OFA deficiencies at SUN.

#### **4.1.3 Runway Obstacle Free Zone (OFZ)**

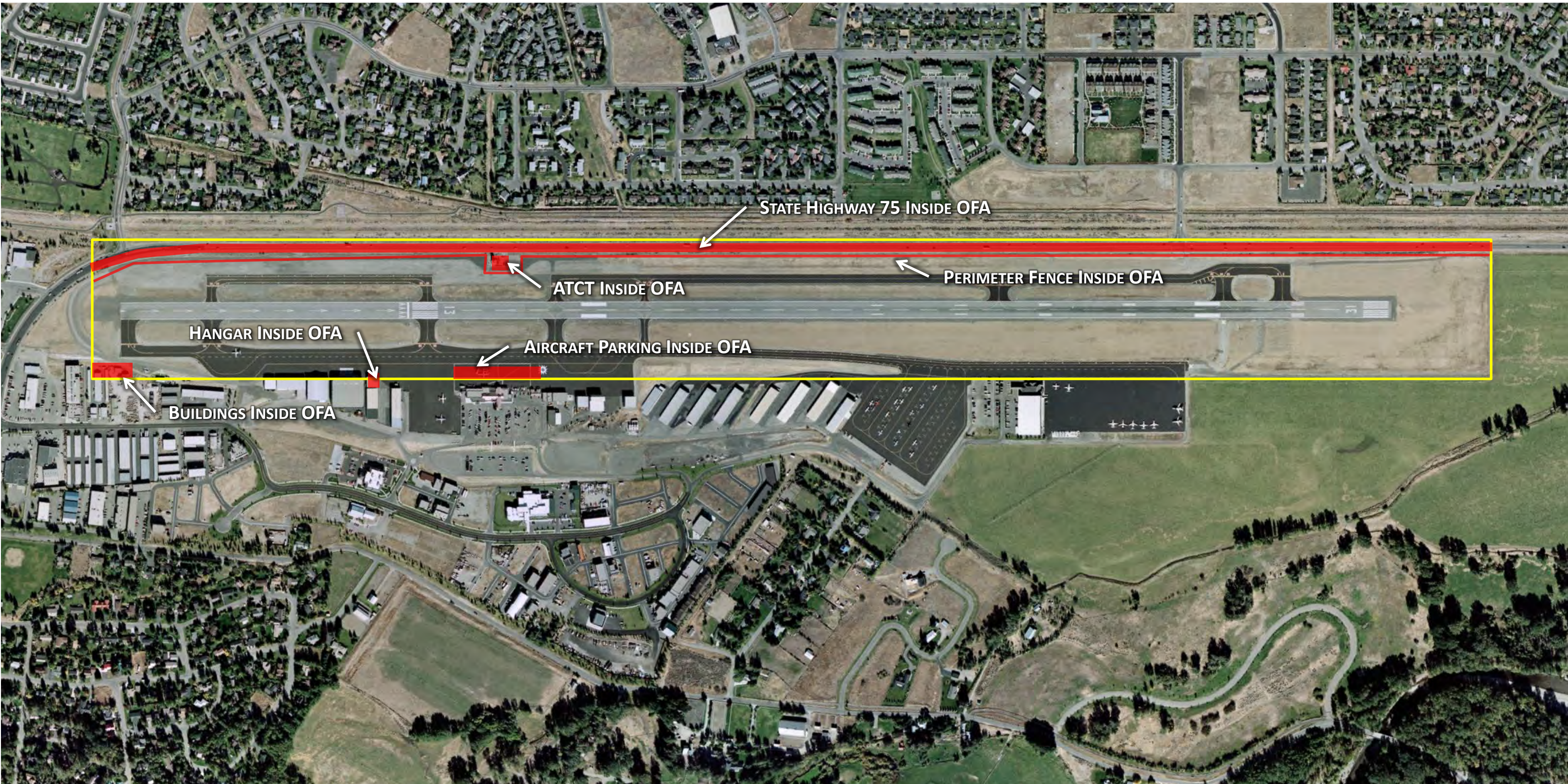
The OFZ is defined as a volume of airspace centered above the runway centerline which precludes taxiing and parked aircraft and object penetrations, except for frangible visual navigational aids that need to be located in the OFZ due to their function.

Standard OFZ dimensions for SUN are 400 feet total width centered on runway centerline (200 feet from runway centerline) and 200 feet beyond runway end. The OFZ rises to a vertical height of 150 feet above the ground.

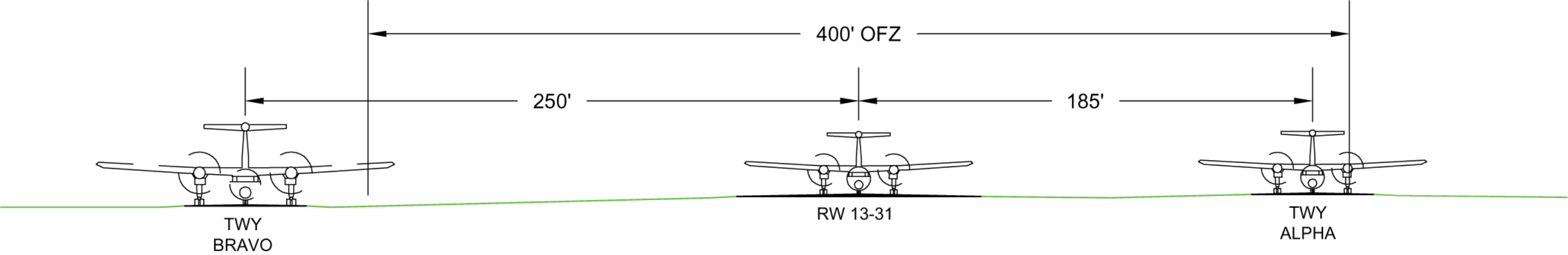
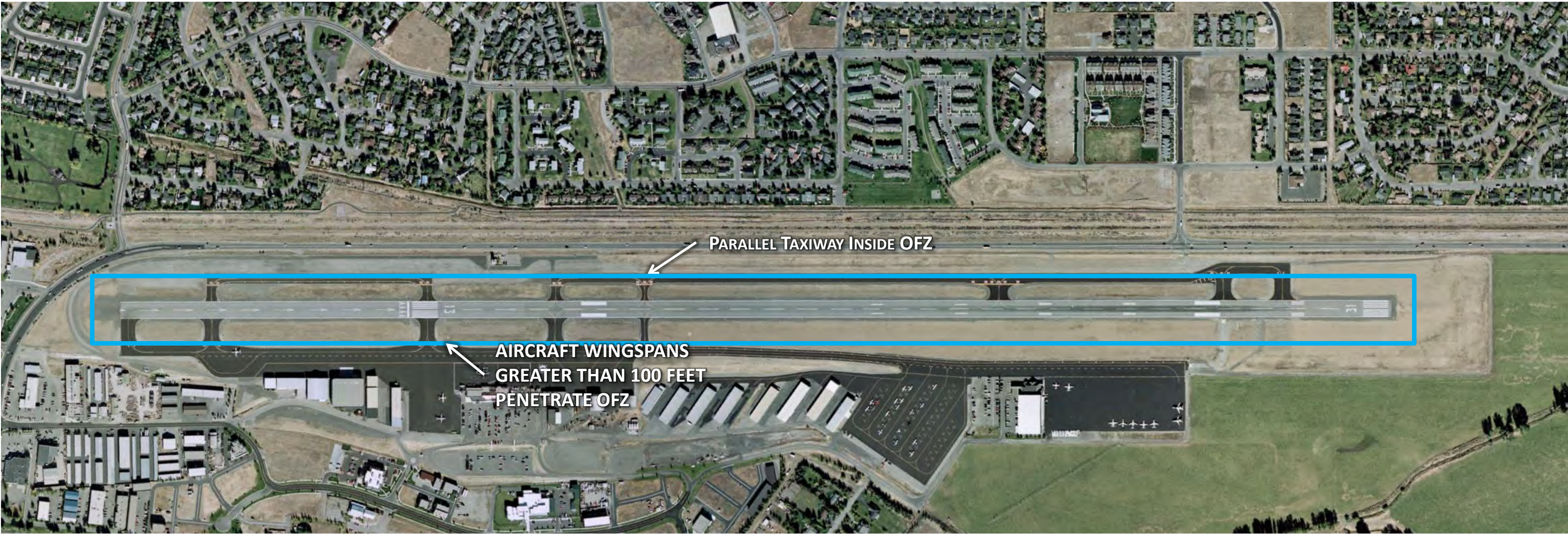
Currently, SUN does not meet OFZ design standards for width as a result of the non-standard runway/taxiway separation on the east side of the airport. Current separations allow taxiing aircraft to penetrate the OFZ.

**Exhibit 4-3** depicts current OFZ deficiencies at SUN.













#### **4.1.4 Runway Protection Zones (RPZ)**

RPZ are defined areas on the ground beyond the end of the runway that are maintained clear of incompatible objects and activity in order to protect persons and property from collision hazards.

RPZ are trapezoidal in shape and typically begin 200 feet from the runway end or displaced threshold. The RPZ associated with Runway 13/31 at SUN are sized to meet FAA design standards for visual and not lower than 1 mile approach visibility instrument approach minimums for aircraft approach categories C and D. The existing RPZ inner dimension is 500 feet centered on the runway, the length is 1,700 feet, and the width at the outer end of the trapezoid is 1,010 feet.

Due to the critical nature and intent of the RPZ, FAA recommends airport sponsors control the land within the RPZ via fee simple acquisition or easement. Current FAA policy on RPZs states, "...airport owner control of the RPZ land is emphasized to achieve the desired protection of people and property on the ground. Although the FAA recognizes that in certain situations the airport sponsor may not fully control land within the RPZ, the FAA expects airport sponsors to take all possible measures to protect against and remove or mitigate incompatible land uses"<sup>8</sup>

Currently, only portions of RPZ on both runway ends are within the current airport property boundary and are under full control of the airport. A portion of the approach and departure RPZ on the Runway 31 end is controlled via an airspace easement. Outer portions of both runway end RPZ remain uncontrolled by SUN.

Utilization of a displaced threshold on the Runway 13 end and declared distances help achieve greater compliance with RPZ protection standards on both runway ends. A 1,700 foot displaced threshold on the Runway 13 end results in an RPZ located primarily on airport property. However, portions of this RPZ are encroached upon by roads and structures. Separate Arrival and Departure RPZ are located on the Runway 31 end. A portion of these RPZ is also encroached upon by a road.

Based on current FAA policy and discussions with the FAA as part of this analysis, existing conditions of RPZs and encroachments will be allowed to remain in place. FAA encourages FMAA obtain full control of all areas of the RPZs if the opportunity arises. For purposes of this analysis, alternatives that consider relocating the runway reflect configurations that would provide full control of the RPZ by FMAA.

**Tables 4-1 and 4-2** provide a summary matrix of existing conditions at SUN as related to RDC C-II and C-III design standards.

**Exhibit 4.4** depicts current RPZ deficiencies at SUN.

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<sup>8</sup> FAA Interim Guidance on Land Uses Within a Runway Protection Zone – September 27, 2012

Table 4-1  
RDC C-II Design Standards

**RUNWAY PROTECTION STANDARDS**

Runway Safety Area (RSA)	FAA Standard	FMA Existing	
		Runway 13/31(1)	Meets Standard?
Width from Runway Centerline (feet)	250	150-200	NO
Length Prior to Landing Threshold (feet)	600	1000/600	YES(2)/YES
Length Beyond Runway End (feet)	1000	1000/1000	YES(2)/YES
Lateral Gradient (%)	1%-3%	Up to 5%	NO
Runway Object Free Area (OFA)			
Width from Runway Centerline	400	219-320	NO
Length Beyond Runway End	1000	1000/1000	YES(2)/YES
Runway Obstacle Free Zone (OFZ)			
Width from Runway Centerline	200	120-155	NO
Length Beyond Runway End	200	200/200	YES/YES
Runway Protection Zone (RPZ)(3)			
Inner Width	500	500	YES(3)/YES(3)
Outer Width	1010	1010	YES(3)/YES(3)
Length	1700	1700	YES(3)/YES(3)
Clear of Objects?		NO/NO	NO/NO

**RUNWAY SEPARATION STANDARDS**

Runway Centerline to Holdline	FAA Standard	FMA Exsiting			
		East Side	Meets Standard?	West Side	Meets Standard?
	250	150	NO	200	NO
Runway Centerline to Parallel Taxiway		East Side (Taxiway A)		West Side (Taxiway B)	
	300	185-250	NO	250	NO
Runway Centerline to Aircraft Parking		East Side		West Side	
	400	N/A	N/A	260	NO

(1) Distances per existing, approved ALP  
(2) With Displaced Threshold and/or Declared Distances  
(3) Arrival and Departure RPZ in place on the RWY 31 end. The Arrival RPZ is in effect for aircraft landing RWY 31 and the Departure RPZ is in effect for aircraft departing RWY 13.

Table 4-2  
RDC C-III Design Standards

**RUNWAY PROTECTION STANDARDS**

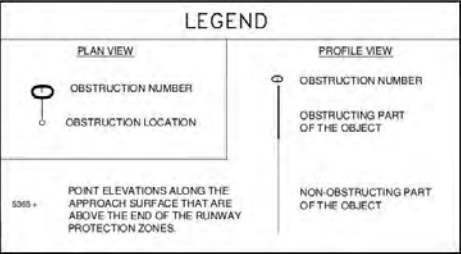
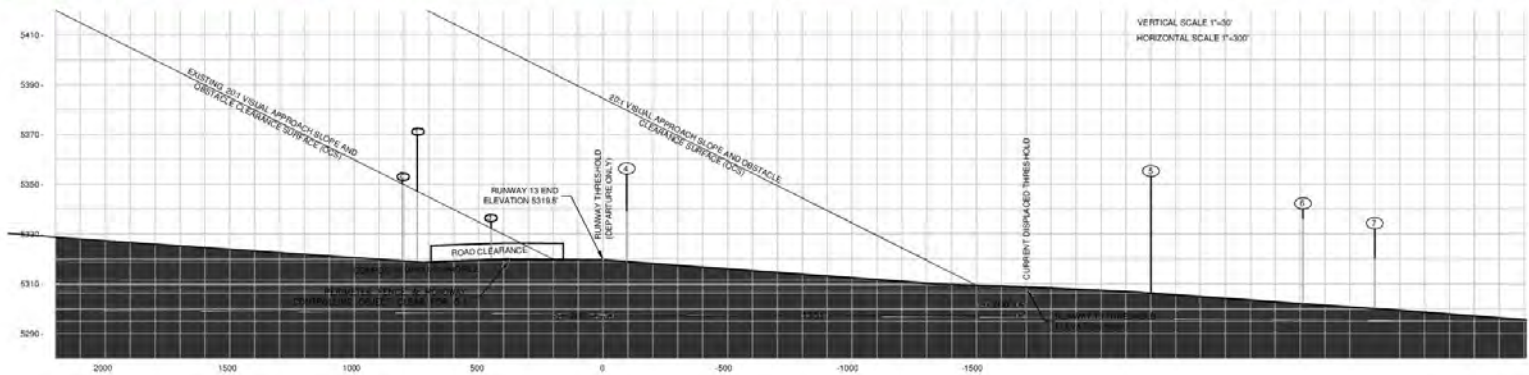
Runway Safety Area (RSA)	FAA Standard	FMA Existing	
		Runway 13/31(1)	Meets Standard?
Width from Runway Centerline (feet)	250	150-200	NO
Length Prior to Landing Threshold (feet)	600	1000/600	YES(2)/YES
Length Beyond Runway End (feet)	1000	1000/1000	YES(2)/YES
Lateral Gradient (%)	1%-3%	Up to 5%	NO
Runway Object Free Area (OFA)			
Width from Runway Centerline	400	219-320	NO
Length Beyond Runway End	1000	1000/1000	YES(2)/YES
Runway Obstacle Free Zone (OFZ)			
Width from Runway Centerline	200	120-155	NO
Length Beyond Runway End	200	200/200	YES/YES
Runway Protection Zone (RPZ)(3)			
Inner Width	500	500	YES(3)/YES(3)
Outer Width	1010	1010	YES(3)/YES(3)
Length	1700	1700	YES(3)/YES(3)
Clear of Objects?		NO/NO	NO/NO

**RUNWAY SEPARATION STANDARDS**

Runway Centerline to Holdline	FAA Standard	FMA Exsiting			
		East Side	Meets Standard?	West Side	Meets Standard?
	250	150	NO	200	NO
Runway Centerline to Parallel Taxiway		East Side (Taxiway A)		West Side (Taxiway B)	
	400	185-250	NO	250	NO
Runway Centerline to Aircraft Parking		East Side		West Side	
	500	N/A	N/A	260	NO

(1) Distances per existing, approved ALP  
(2) With Displaced Threshold and/or Declared Distances  
(3) Arrival and Departure RPZ in place on the RWY 31 end. The Arrival RPZ is in effect for aircraft landing RWY 31 and the Departure RPZ is in effect for aircraft departing RWY 13.



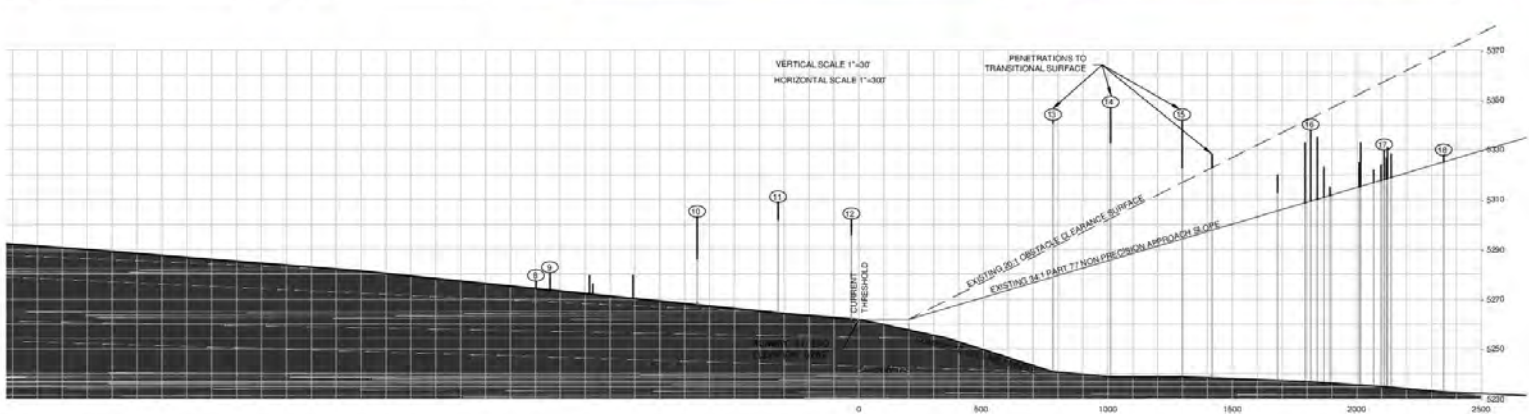


FAR PART 77 OBSTRUCTIONS					
ITEM NO.	DESCRIPTION	MAX ELEV.	SURFACE PENETRATED	AMOUNT OF PENETRATION	RECOMMENDED ACTION
EXISTING & FUTURE RUNWAY APPROACHES					
RUNWAY 13					
1	TREE	5370	APPROACH	27'	SEE NOTE 1
2	TREE	5367	APPROACH	4'	SEE NOTE 1
3	BUILDING	5335	TRANSITIONAL	15'	SEE NOTE 1
4	HANGAR	5347	TRANSITIONAL	15'	NONE
5	CONTROL TOWER	5353	TRANSITIONAL	49'	RELOCATE
6	HANGAR	5340	TRANSITIONAL	4'	OBST. LIGHT
7	WINDSOCK	5352	TRANSITIONAL	12'	OBST. LIGHT
RUNWAY 31					
8	WINDSOCK	5381	TRANSITIONAL	8'	OBST. LIGHT
9	AWOS	5396	TRANSITIONAL	15'	OBST. LIGHT
10	ROAD	5303	TRANSITIONAL	7'	NONE
11	POLE	5309	TRANSITIONAL	7'	NONE
12	POLE	5355	TRANSITIONAL	6'	NONE
13	TREE	5342	TRANSITIONAL	16'	OBST. LIGHT
14	TREE	5348	TRANSITIONAL	16'	OBST. LIGHT
15	GROUP OF TREES	5341	TRANSITIONAL	19'	OBST. LIGHT
16	GROUP OF TREES	5356	APPROACH	38'	OBST. LIGHT
17	GROUP OF TREES	5331	APPROACH	12'	OBST. LIGHT
18	TREE	5327	APPROACH	3'	OBST. LIGHT



NOTES

1. THE EXISTING DISPLACED THRESHOLD FOR THE RUNWAY 13 APPROACH ELIMINATES PENETRATIONS OF THE FAR PART 77 20:1 APPROACH SURFACE FOR RUNWAY 13 AND MEETS OBSTACLE CLEARANCE SURFACE CRITERIA PER APPENDIX 2 OF AC 150/5300-13, CHANGE 11, AIRPORT DESIGN.
2. THE AIRPORT IS CURRENTLY ZONED VIA CITY OF HAILEY ZONING ORDINANCE, ARTICLE 4.11 AND BLAINE COUNTY ZONING REGULATION, 9-18. FAR PART 77 AIRSPACE IS PROTECTED.
3. REFER TO DECLARED DISTANCE TABLE ON SHEET 2 FOR ADDITIONAL INFORMATION.
4. TREE PENETRATIONS ARE MITIGATED BY SIX (6) OBSTRUCTION LIGHTS AGREED TO BY FAA. REFERENCE AERONAUTICAL STUDY 2008-ANM-142-NRA.







## 4.2 SEPARATION STANDARDS<sup>9</sup>

### 4.2.1 Runway Centerline to Holdline

This separation standard is intended to satisfy the requirement that no part of an aircraft (i.e. nose, wingtip, tail, etc) penetrates the RSA or OFZ when holding at a holdline prior to entering the runway or remains clear of the RSA and OFA when exiting the runway.

The separation standard for runway centerline to holdline is 252 feet for RDC C-II and C-III. Currently, SUN does not meet this standard as all existing holdlines on both the east and west sides of the runway are located at distances less than 252 feet. On the east side of the runway the current runway centerline to holdline distance is 150 feet and 200 feet on the west. These separations currently only meet full B-I standards.

### 4.2.2 Runway to Parallel Taxiway Separation

This separation standard is intended to satisfy the requirement that no part of an aircraft (i.e. wing tip, tail tip) when located on the parallel taxiway centerline is within the RSA or penetrates the OFZ.

Separation standards for runway centerline to parallel taxiway centerline are 300 feet for C-II and 400 feet for C-III. Currently, the runway/parallel taxiway separation between Runway 13/31 and Taxiway A (east side) ranges from 185 to 250 feet and does not meet the standard. Separation between Runway 13/31 and Taxiway B (west side) varies from 250 feet to 335 feet along various segments of the parallel taxiway, and therefore, is not in full compliance with the standard.

### 4.2.3 Runway to Aircraft Parking Separation

This separation standard is intended to ensure parked aircraft do not penetrate the OFA and OFZ.

Current standards for runway to aircraft parking separation are 400 feet for C-II and 500 feet for C-III airports. Parking nearer than this exists in several locations at the airport.

**Exhibit 4.5** depicts current separation standard deficiencies at SUN.

**Tables 4-1 and 4-2** provide summary matrices of existing conditions at SUN as related to RDC C-II and C-III design standards.

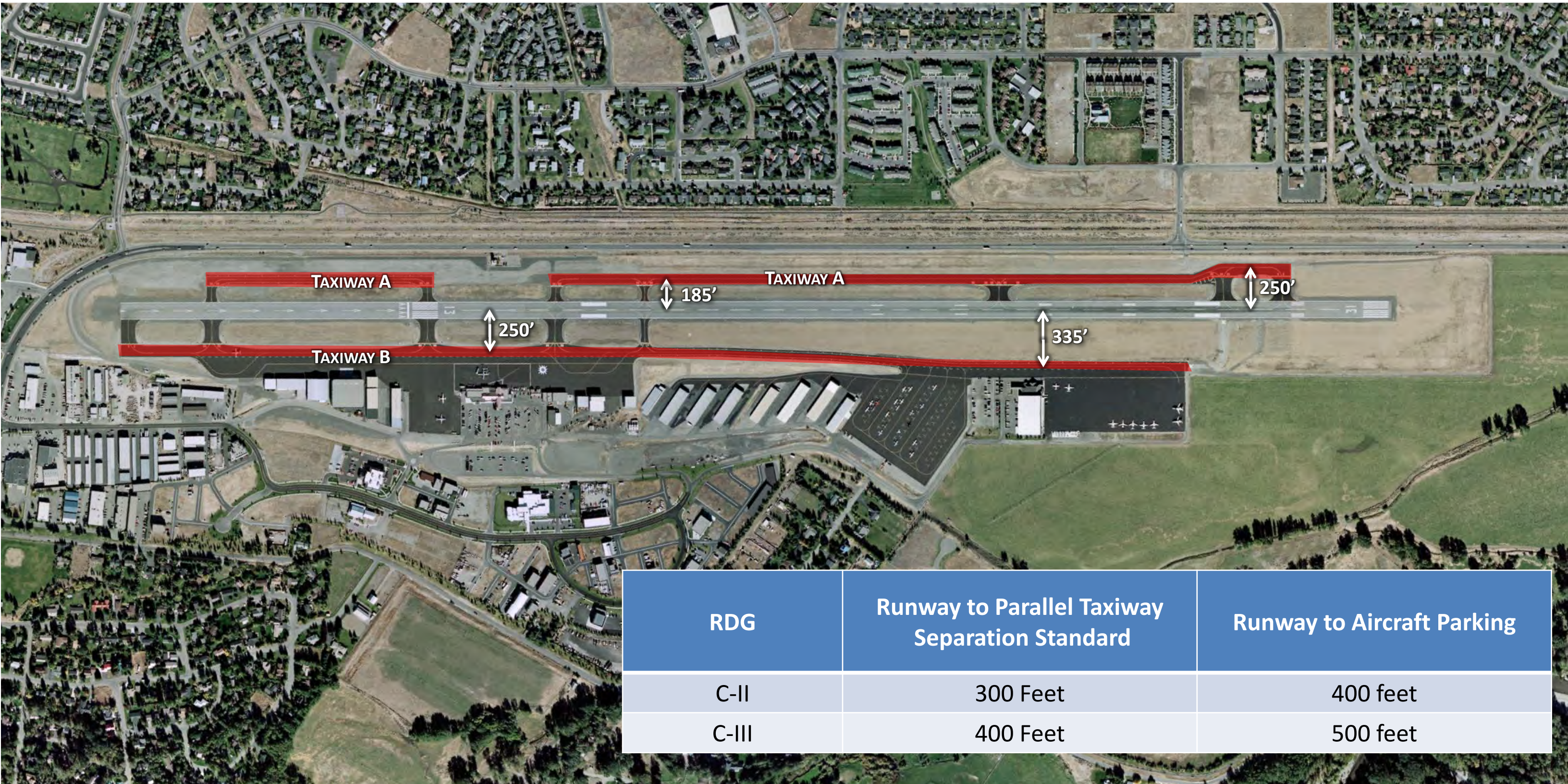
## 4.3 DISPLACED THRESHOLDS AND DECLARED DISTANCES

In order for object clearance requirements to be met for RSA, OFA and RPZ at SUN, a displaced threshold is in place for Runway 13 and declared distances are in effect for both

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<sup>9</sup> As defined in new FAA Advisory Circular (AC) 150/5300-13A, Airport Design, effective 9/28/2012









runway ends. The displaced threshold and/or declared distances provide the necessary object clearances while considering aircraft takeoff run, takeoff distance, accelerate-stop distance, and landing distance performance requirements.

FAA defines four declared distances: takeoff run available (TORA), takeoff distance available (TODA), accelerate-stop distance available (ASDA), and landing distance available (LDA).

The practical impact of displaced thresholds and declared distances at SUN is that the existing full runway pavement length of 7,550 feet is not available for all aircraft landing and take-off operations. Further, declared distances are incorporated into the approved Operations Specifications of commercial aircraft operators and they are a critical performance consideration for GA turbojet aircraft operating at SUN as well.

**Table 4-3** summarizes the declared distances currently in effect for Runway 13/31 at SUN.

**Table 4-3 – SUN Declared Distances**

<b>SUN RUNWAY 13/31 DECLARED DISTANCES</b>				
<b>RUNWAY</b>	<b>TORA</b>	<b>TODA</b>	<b>ASDA</b>	<b>LDA</b>
13	7150'	7550'	7150'	5450'
31	5850'	7550'	6631'	6631'

Source: SUN ALP

For purposes of this analysis, it is assumed that the continued use of the displaced threshold on the Runway 13 end and resulting declared distances will be allowed by the FAA in order to address RSA, OFA and RPZ clearance requirements for alternatives that are not fully compliant with standards. Full compliance alternatives are configured without declared distances.



## 4.4 CFR PART 77

Title 14 of the Code of Federal Regulations (14 CFR) Part 77, Objects Affecting Navigable Airspace, provides for airspace notification and protection requirements at and around public-use airports. Airport airspace requirements are determined by the weight of the aircraft that predominantly operate at an airport and the type of instrument approach, if any, that exists or is planned.

For public-use civilian airports, CFR Part 77 identifies the following “imaginary” airport airspace surfaces.

- ✈ Primary Surface
- ✈ Approach Surface
- ✈ Transitional Surface
- ✈ Horizontal Surface
- ✈ Conical Surface

Numerous penetrations to various Part 77 surfaces exist at SUN. Some penetrations to the Approach and Transitional Surfaces have been mitigated via the displacement of the Runway 13 threshold, the removal of facilities (Transponder Landing System) and the installation of obstruction lighting. Significant penetrations exist to the airport’s Horizontal and Conical Surfaces as a result of surrounding terrain. Given these physical constraints, realistic mitigation efforts are not possible.

**Exhibit 4.6** includes the SUN FAR Part 77 Airspace Plan from the current approved ALP drawing set.

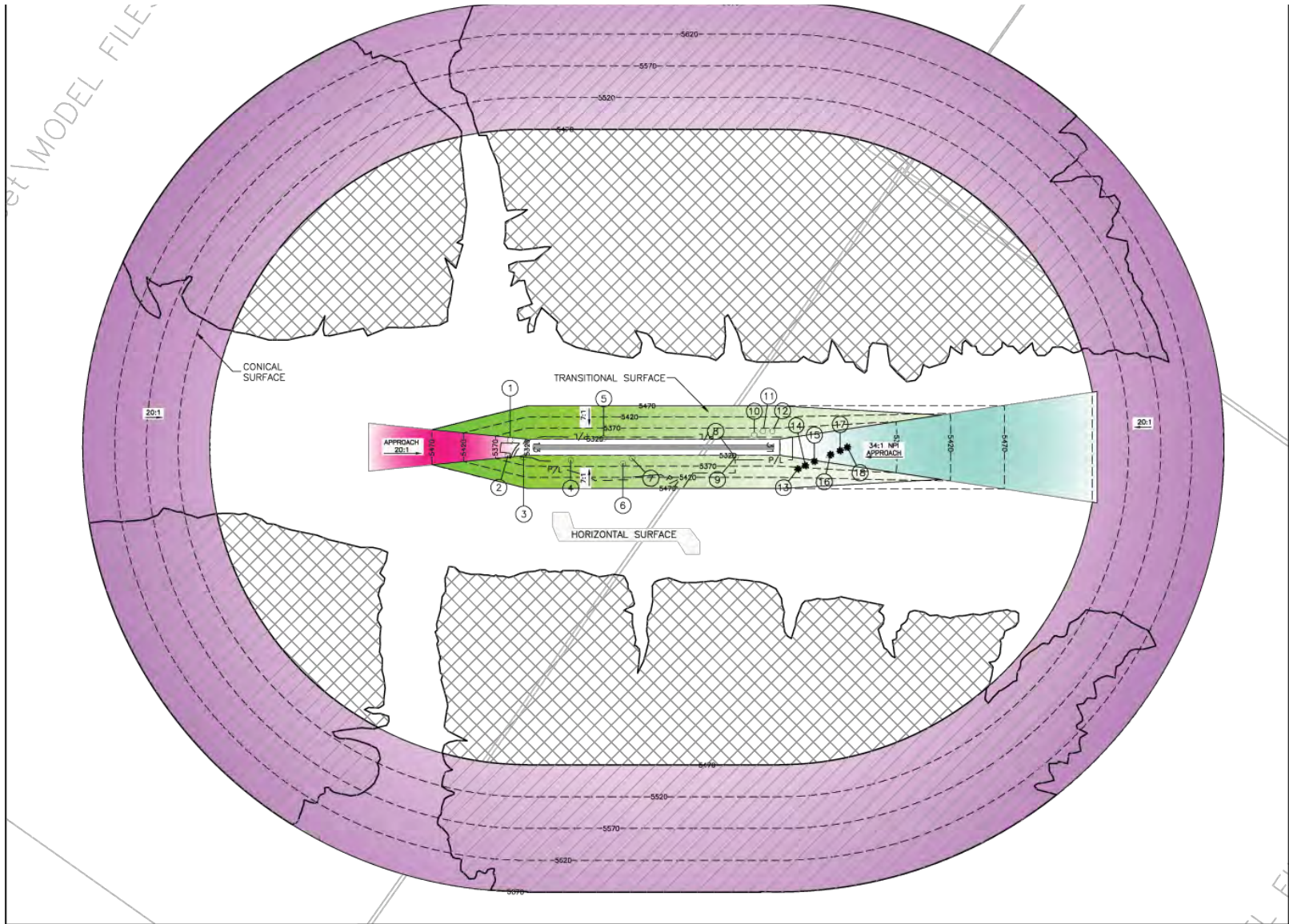
## 4.5 RELIABILITY

As discussed in Section 2.2.4, there are three published instrument approach procedures available at SUN. Due to the surrounding terrain, existing approach minimums are high (see the approach plates in **Appendix B**). As a result of the approach minima, reliability, or the ability of aircraft to access the airport during Instrument Meteorological Conditions, is greatly decreased.

According to the *Draft Friedman Memorial Replacement Airport Environmental Impact Statement*<sup>10</sup>, during winter months approximately 22 percent of commercial flights and an unknown number of GA flights are diverted to other airports rather than being able to land at SUN. Commercial flights are primarily diverted to Boise Airport (BOI) or the Magic Valley Regional Airport (TWF) in Twin Falls, Idaho. During these diversions, passengers are typically

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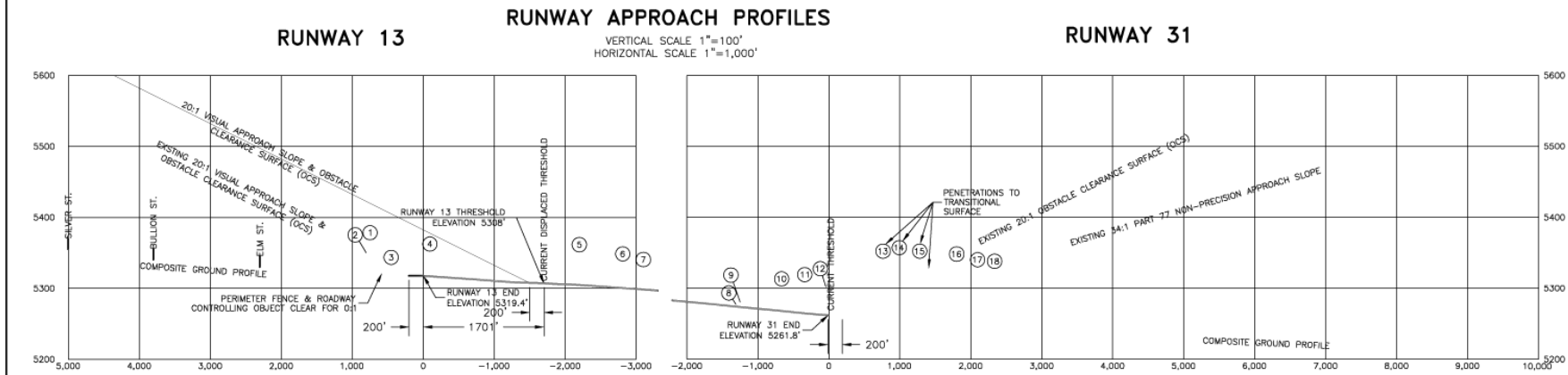
<sup>10</sup> EIS Purpose and Need/Alternatives Working Paper – July 2008



FAR PART 77 OBSTRUCTIONS					
ITEM NO.	DESCRIPTION	MAX. ELEV.	SURFACE PENETRATED	AMOUNT OF PENETRATION	RECOMMENDED ACTION
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2	TREE	5352'	APPROACH	4'	SEE NOTE 1
3	BUILDING	5335'	TRANSITIONAL	15'	SEE NOTE 1
4	HANGAR	5347'	TRANSITIONAL	15'	NONE
5	CONTROL TOWER	5353'	TRANSITIONAL	49'	RELOCATE
6	HANGAR	5340'	TRANSITIONAL	4'	OBST. LIGHT
7	WINDSOCK	5332'	TRANSITIONAL	12'	OBST. LIGHT
8	WINDSOCK	5281'	TRANSITIONAL	8'	OBST. LIGHT
9	AWOS	5298'	TRANSITIONAL	15'	OBST. LIGHT
10	ROAD	5303'	TRANSITIONAL	17'	NONE
11	POLE	5309'	TRANSITIONAL	7'	NONE
12	POLE	5305'	TRANSITIONAL	6'	NONE
13	TREE	5342'	TRANSITIONAL	1'	OBST. LIGHT
14	TREE	5348'	TRANSITIONAL	18'	OBST. LIGHT
15	GROUP OF TREES	5341'	TRANSITIONAL	19'	OBST. LIGHT
16	GROUP OF TREES	5338'	APPROACH	28'	OBST. LIGHT
17	GROUP OF TREES	5331'	APPROACH	12'	OBST. LIGHT
18	TREE	5327'	APPROACH	3'	OBST. LIGHT
	TERRAIN	7360'	HORIZONTAL	VARIES	NONE
	TERRAIN	8158'	CONICAL	VARIES	NONE

NOTES

- SEE SHEET 6, INNER PORTION OF THE APPROACH PLAN, FOR CLOSE-IN OBSTRUCTIONS.
- THE EXISTING DISPLACED THRESHOLD FOR THE RUNWAY 13 APPROACH ELIMINATES PENETRATIONS OF THE FAR PART 77 20:1 APPROACH SURFACE FOR RUNWAY 13 AND MEETS OBSTACLE CLEARANCE SURFACE CRITERIA PER APPENDIX 2 OF AC 150/5300-13, CHANGE 11, AIRPORT DESIGN.
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LEGEND	
PLAN VIEW	PROFILE VIEW
(27)	OBSTRUCTION NUMBER AND LOCATION
5365 +	POINT ELEVATIONS ALONG THE APPROACH SURFACE THAT ARE ABOVE THE END OF THE RUNWAY PROTECTION ZONES.
	OBSTRUCTING PART OF THE OBJECT
	NON-OBSTRUCTING PART OF THE OBJECT



transferred to a bus and bussed to SUN. Drive time from BOI to SUN is approximately 2.5 hours and from TWF to SUN is approximately 1.75 hours, when road conditions are good.

Based on current technology and FAA instrument approach development criteria, FAA Flight Procedures Office has stated that instrument approach minima cannot be improved at the existing site at this time. Other independent analysis indicates that some improvement to reliability could be made, but further investigation would be necessary to verify what level of improvement is possible. This analysis does not consider any impact to reliability for the alternatives shown. **Figure 4-7** depicts the constrained environment around SUN.

**Figure 4-7 – Constrained Environment around SUN**



Source: T-O Engineers



## 5.0 ALTERNATIVES ANALYSIS

This chapter describes seven alternatives that were developed under this study effort for SUN to comply with FAA design standards. Four of the alternatives would achieve full compliance with all FAA airport design standards. An additional three alternatives consider proposed improvements that provide an acceptable level of safety while not being fully compliant with design standards.

The four full compliance alternatives include:

- **Alternative 1 – Shift Runway and Highway East**
- **Alternative 2 – Shift Runway East and Highway West**
- **Alternative 3 – Shift Runway West**
- **Alternative 4 – Shift Runway South and Rotate**

The three less than full compliance alternatives include:

- **Alternative 5 – Shift Runway 13-31 1,700 Feet South**
- **Alternative 6 – Shift Taxiway B West – No Land Acquisition**
- **Alternative 7 – Shift Taxiway B West – Modest Land Acquisition**

The goal in developing these alternatives included meeting all RSA dimensional requirements, meet or significantly improve the OFA (including no aircraft parking within the OFA), and significantly improve runway-taxiway separation. **All less than full compliance alternatives are achievable but will require Modification of Airport Design Standards (MOS) and will have potential adverse operational impacts.** The applicability of MOS is included in each alternative discussion and in **Appendix D**.

Each full and less than full compliance alternative is presented with a brief description, a table describing proposed disposition and/or comments and an exhibit. The following general considerations apply to all of the alternatives analyzed.

### RSA GRADING STANDARDS

Runway grading standards are met in the full compliance alternatives (Alternatives 1-4) due to the relocation of the runway. For cost estimating purposes as part of this analysis, it was assumed full RSA grading standards are met in all less than full compliance alternatives (Alternatives 5-7). However, if allowed by the FAA via MOS, RSA grades on the north end of the airfield may be functional in their current condition. While currently flatter than standard, the existing grading drains very well and the surface is adequate to support aircraft that may leave the runway. Leaving the existing RSA grade intact will result in significant cost savings and does not decrease the level of safety at the airport. Further coordination with the FAA to maintain





existing RSA grading conditions should be accomplished during project design and the appropriate MOS(s) discussed at such time.

## HIGHWAY 75

The proximity of Highway 75 to the airport is a major consideration when considering alternatives for the airport to meet airport design standards. The Highway conflicts primarily with Runway Object Free Area in its existing alignment. The study team coordinated with Idaho Transportation Department (ITD) regarding options related to Highway 75 during this analysis. Three approaches to addressing highway conflicts were discussed with ITD and are discussed in general terms below.

First, consideration was given to signaling Highway 75 to prevent traffic on the portion of the road adjacent to the airport while aircraft above a certain approach category are taking off or landing. This would require modifying signals at four locations and providing the appropriate controls to permit air traffic controllers to stop traffic at the appropriate time. The portion of the highway that would need to be clear in such a situation is long (approximately 2.5 miles) and the amount of time required to clear such a distance would mean that all traffic on the highway and adjacent arterials would need to be stopped at least four minutes prior to takeoff or landing of aircraft. This alternative was discussed with ITD and with the Air Traffic Control Tower manager. Based on these discussions and additional analysis, the following concerns were raised related to this option:

- Highway 75 is the main travel route in the Wood River Valley and the level of service on this route is already fairly low during peak travel times. Significant delays of this type on this highway would exacerbate this problem. Any changes of this nature would require approval by the Idaho State Transportation Board, along with an appropriate public process.
- ITD was also concerned about access by emergency vehicles, school buses and public transportation. As this signalization option would be virtually unpredictable, its impact to this type of access would be undesirable.
- Tower personnel would require a procedure to know when to stop traffic, including at what point in the approach the traffic must be stopped, which aircraft it would be required for, etc. This measure would require traffic to be stopped only when a Category C aircraft was landing or taking off, and tower personnel have no way of knowing what Category each aircraft falls into.

Due to the objections raised by both ITD and the air traffic control tower manager, this alternative was determined to not be feasible and was not evaluated in detail.

The second approach to Highway 75 is to relocate the highway. Alternatives 1, 2, 5 and 7 all include this approach, in one form or another. ITD has plans to reconstruct all of Highway 75 from just north of Ketchum south through Hailey to the intersection of Highways 75 and 20,



south of Bellevue. ITD is not opposed to relocating the portion of the highway adjacent to the airport in conjunction with any airport improvement efforts, in principle. However, an Environmental Impact Statement was completed for this project. (available online at <http://itd.idaho.gov/projects/d4/Idaho75TimmermanToKetchum/default.asp>). Based on this environmental study, ITD offered the following potential environmental issues with relocating the highway:

- There is an existing abandoned railroad berm between the existing highway and bike path that has been identified as an historic structure.
- One of the concerns raised during ITD's EIS was noise from the highway, and moving the highway closer to the adjacent residential areas would potentially increase noise impacts.
- Environmental justice would also be a consideration, in ITD's opinion. The Woodside neighborhood consists of higher density housing (apartments, duplexes, smaller lots, etc.) and a number of minority families live in this area. Displacing these families or increasing the environmental impact of the highway on this segment of the population would need to be evaluated carefully.

The final option regarding Highway 75 is not to relocate it. This would not provide a fully compliant Object Free Area on the east side of the airport. This alternative and the associated risks are discussed in association with the applicable alternatives and MOS in **Appendix D**.

## ENVIRONMENTAL CONSIDERATIONS

There is always a potential for airport improvement projects to result in environmental impacts. The Scope of Work for this analysis did not include any environment analysis as part of the study efforts. Therefore, only potential, major environmental impacts, that are either obvious or that have been raised during public processes associated with previous studies are included in the associated tables for each alternative. Potential impacts resulting from the alternatives are based on the impact categories included in FAA Order 1050.1E, Change 1 – *Environmental Impacts: Policies and Procedures and Order 5050.4B National Environmental Policy Act [NEPA] Implementing Instructions for Airport Projects*. **Further coordination with the FAA and future environmental analysis will be required as part of future refined planning efforts and prior to any potential construction.**

## COST CONSIDERATIONS

Several considerations were made relative to cost impacts for the development of the alternatives and include:

- Costs for all alternatives reflect effort toward meeting standards based on current demand, not to accommodate additional demand.





- Cost estimates were obtained from prior projects at SUN and recent construction bid results in the region.
- Cost estimates for land acquisition used comparative data from recent sales. It should be noted that the current economic climate has resulted in property values much lower than estimated in previous planning efforts.

Cost estimates are included in the following narrative for each individual alternative. A detailed cost estimate summary is included as **Appendix C**.

## **OPERATIONAL CONSIDERATIONS**

Several considerations were made relative to construction impacts for the developed alternatives and include:

- All alternatives considered a schedule to comply with the Congressional Runway Safety Area mandate no later than December 31, 2015.
- Preliminary construction phasing was considered to limit major operational impacts. There is a limited construction season in the Wood River Valley (May – September at best) and long term closure of the airport could have potentially disastrous economic impacts to the airport and community.



## 5.1 ALTERNATIVE 1 – FULL COMPLIANCE - SHIFT RUNWAY AND HIGHWAY EAST

Alternative 1 includes a shift of Runway 13-31 south and east of its existing location. Shifting the runway also requires relocation of Highway 75 and the bike path currently located along the east property boundary of the airport.

By shifting the runway and highway/bike path east, enough space can be gained to fully comply with C-III standards including RSA, OFA, OFZ, and separation standards. Existing Runway 13-31 and Taxiway A pavement will be removed. Portions of existing Taxiway B could remain in place with some improvements. Portions of RPZ on both runway ends will still be encroached by the highway. This condition may be allowable if approved by the FAA. The configuration shown reflects shifting the runway south far enough to include most of the northern RPZ on airport property without declared distances or a relocated threshold and far enough east to provide separation between the runway and parallel Taxiway B.

110 acres of land acquisition will be necessary to accommodate this alternative. Land is necessary to provide for the runway OFA and Highway 75 Right-of-Way (ROW) as well as RPZ protection on the Runway 31 end. **As part of the land acquisition, the purchase of 105 homes (including townhome units) and one church will be necessary.**

This alternative has been discussed during previous studies and significant public opposition has been noted.

### ALTERNATIVE 1 COST ESTIMATE

Description	Estimated Cost
Airfield	\$46.4M
Highway Relocation	\$20.7M
<b>Construction Total</b>	<b>\$67.1M</b>
<b>Property Acquisition</b>	<b>\$50.0M</b>
<b>Environmental (EIS)</b>	<b>\$2.0M</b>
<b>TOTAL COST</b>	<b>\$119.1M</b>

Source: T-O Engineers





## SCHEDULE

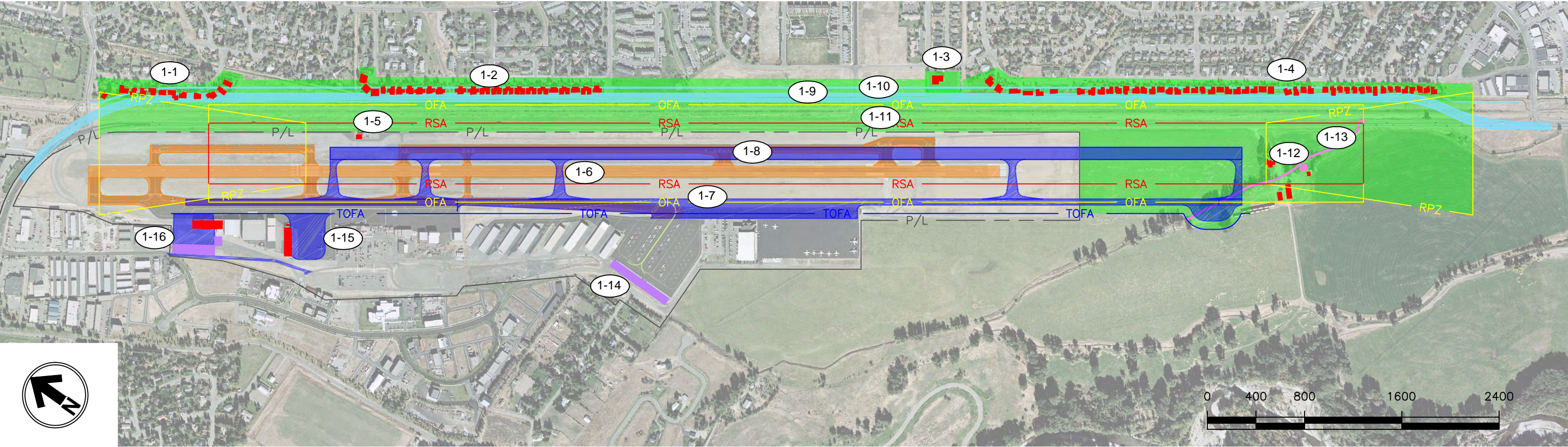
Based on anticipated airport planning, environmental planning, project design, and construction requirements, a completion timeline for this alternative is estimated to take a minimum of 4+ years. **This schedule will not meet the December 31, 2015, deadline to comply with the RSA mandate.**

## MODIFICATION OF AIRPORT DESIGN STANDARDS

Alternative 1 does not require MOS.

**Exhibit 5-1** depicts Alternative 1. **Table 5-1** summarizes various aspects of the alternative including Runway Protection and Separation standards, as well as major environmental and other considerations.





ITEM	DESCRIPTION
1-1	ACQUIRE 12 RESIDENTIAL PROPERTIES ON CREEKSIDE DRIVE
1-2	ACQUIRE 44 RESIDENTIAL PROPERTIES ON BRIARWOOD DRIVE
1-3	ACQUIRE CHURCH PROPERTY ON SHENANDOAH DRIVE
1-4	ACQUIRE 49 RESIDENTIAL PROPERTIES ON GLENBROOK DRIVE
1-5	RELOCATE AIR TRAFFIC CONTROL TOWER
1-6	REMOVE EXISTING AIRFIELD PAVEMENT
1-7	CONSTRUCT PARALLEL TAXIWAY AND CONNECTORS
1-8	SHIFT RUNWAY 13-31 1,900' SOUTH AND 150' EAST
1-9	RELOCATE HIGHWAY 75 235' TO THE EAST

ITEM	DESCRIPTION
1-10	RELOCATE BIKE PATH
1-11	ACQUIRE 70 ACRES OF HIGHWAY ROW FOR OFA
1-12	ACQUIRE MIN. 40 ACRES OF RANCH LAND FOR OFA AND RPZ, REMOVE EXISTING BUILDINGS
1-13	RELOCATE/LOWER IRRIGATION CANAL (PAVEMENT/RSA)
1-14	RELOCATE HANGAR AREA
1-15	RELOCATE TERMINAL AIRCRAFT PARKING
1-16	RELOCATE AIRCRAFT PARKING/HANGARS, RECONSTRUCT BUS ROUTE ACCESS ROAD

### AIRCRAFT PARKING IMPACTS

FBO:	-17,650 SF
GENERAL AVIATION:	-21,200 SF
TERMINAL APRON:	+41,200 SF
AIR CARGO APRON:	-34,000 SF
NET DIFFERENCE:	-31,650 SF

LEGEND	
1-1	KEY NUMBER
[Blue Box]	NEW AIRFIELD PAVEMENT
[Orange Box]	AIRFIELD PAVEMENT REMOVAL
[Purple Box]	NEW BUILDING / HANGAR / STRUCTURE AREA
[Red Box]	BUILDING / HANGAR / STRUCTURE REMOVAL
[Green Box]	NEW LAND ACQUISITION
[Light Blue Box]	RELOCATED HIGHWAY/BIKE PATH
[Pink Box]	WETLAND

### NOTES

- PROPERTY ACQUISITION SHOWN REFLECTS ASSUMED AREAS. ADDITIONAL PROPERTY ACQUISITION MAY BE NECESSARY TO AVOID UNECONOMICAL REMNANTS.





**Table 5-1 – Alternative 1 – Shift Runway and Highway East**

RDC C-III $\geq 1$ Mile	MEETS STANDARDS?	DISPOSITION/COMMENTS
<b>RUNWAY PROTECTION STANDARDS</b>		
Runway Safety Area (RSA)	Yes	<ul style="list-style-type: none"> <li>Shift of Runway 13-31 east and south combined with the removal of Taxiway A provides a fully compliant RSA. <b>CANNOT MEET RSA DEADLINE.</b></li> </ul>
Object Free Area (OFA)	Yes	<ul style="list-style-type: none"> <li>Relocation of Highway 75 and bike path to the east provides a fully compliant OFA.</li> <li>Requires the acquisition of land to relocate Highway 75 and bike path Right-of-Ways (ROW).</li> <li>Requires the removal of 105 homes and one church to accommodate the relocated ROW.</li> <li>Requires removal and relocation of Air Traffic Control Tower (ATCT).</li> </ul>
Object Free Zone (OFZ)	Yes	<ul style="list-style-type: none"> <li>Provides fully compliant OFZ</li> </ul>
Runway Protection Zone (RPZ)	No	<ul style="list-style-type: none"> <li>Portions of Highway 75 remain in RPZ (may be allowed via approval of FAA).</li> <li>Land acquisition required to accommodate RPZ on Runway 31 end.</li> </ul>
<b>SEPARATION STANDARDS</b>		
Centerline to Holdline(s)	Yes	<ul style="list-style-type: none"> <li>Fully compliant at 250 feet</li> </ul>
Centerline to Parallel Taxiway	Yes	<ul style="list-style-type: none"> <li>Fully compliant at 400 feet</li> </ul>
Centerline to Aircraft Parking	Yes	<ul style="list-style-type: none"> <li>Fully compliant at 500 feet</li> </ul>
<b>MAJOR ENVIRONMENTAL CONSIDERATIONS</b>		
Compatible Land Use Secondary (Induced) Impacts Environmental Justice Wetlands	N/A	<ul style="list-style-type: none"> <li>110 total acres of land acquisition including the acquisition of and removal of 105 homes and one church may have adverse environmental impacts based on these impact categories.</li> <li>Documented community opposition to this alternative based on previous study and analysis.</li> </ul>
<b>OTHER</b>		
Compliance and Infrastructure	N/A	Provides full compliance with airport design standards without the use of MOS. Requires modest relocation/removal of existing aircraft parking and hangars.
Schedule (including planning/ environmental/land acquisition/construction)	N/A	<b>Minimum 4+ years (2013-2017). Lengthy airport shutdown required. CANNOT MEET RSA DEADLINE.</b>
<b>COST ESTIMATE</b>		<b>\$119,100,000</b>



## **5.2 ALTERNATIVE 2 – FULL COMPLIANCE - RUNWAY EAST AND HIGHWAY WEST**

Alternative 2 is similar to Alternative 1 and includes a shift of Runway 13-31 south and east of its existing location. The proposed runway location is identical to that shown in Alternative 1. The primary difference between Alternative 1 and this alternative is the relocation of Highway 75 to the west of the airport.

By relocating the highway west of the airport, enough space can be gained to meet C-III standards including full compliance with RSA, OFA, OFZ and runway separation standards. Further, acquisition of homes on the east side is reduced from 105 homes to six. The acquisition of six homes will still be necessary to keep the Runway 13 RPZ clear of structures on the east side. Similar to Alternative 1, existing Runway 13-31 and Taxiway A pavement will be removed while portions of existing Taxiway B will be able to remain in place with some improvements. Only minor portions of RPZ on both runway ends will be located outside the new airport property boundary.

Approximately 305 total acres of land acquisition will be necessary to accommodate this alternative. 120 acres of ROW for the relocated Highway 75 to the west; 50 acres for RPZ protection; 180 acres of ranch land on the south end of the existing airport property boundary to accommodate the new highway and future airport and compatible development. The acquisition of 19 homes will be necessary along Broadford Road and an additional six along existing Highway 75 on the northeast end to accommodate the ROW for the relocated Highway 75 and RPZ. While technically feasible, this alignment for Highway 75 presents a number of challenges. ITD expressed several concerns with this alternative, including a more winding alignment with many access points for residences. Based on these concerns, ITD would require significant additional study and justification before supporting this alternative. Acquisition of property from residents would be very difficult and have an adverse impact on all current residents in this area.

This alternative has been discussed during previous studies and significant public opposition has been noted, primarily to moving the airport closer to Bellevue and to relocating the highway to Broadford Road.



## ALTERNATIVE 2 COST ESTIMATE

Description	Estimated Cost
Airfield	\$46.5M
Highway Relocation	\$22.8M
<b>Construction Total</b>	<b>\$69.3M</b>
<b>Property Acquisition</b>	<b>\$52.0M</b>
<b>Environmental (EIS)</b>	<b>\$2.0M</b>
<b>TOTAL COST</b>	<b>\$123.3M</b>

Source: T-O Engineers

## SCHEDULE

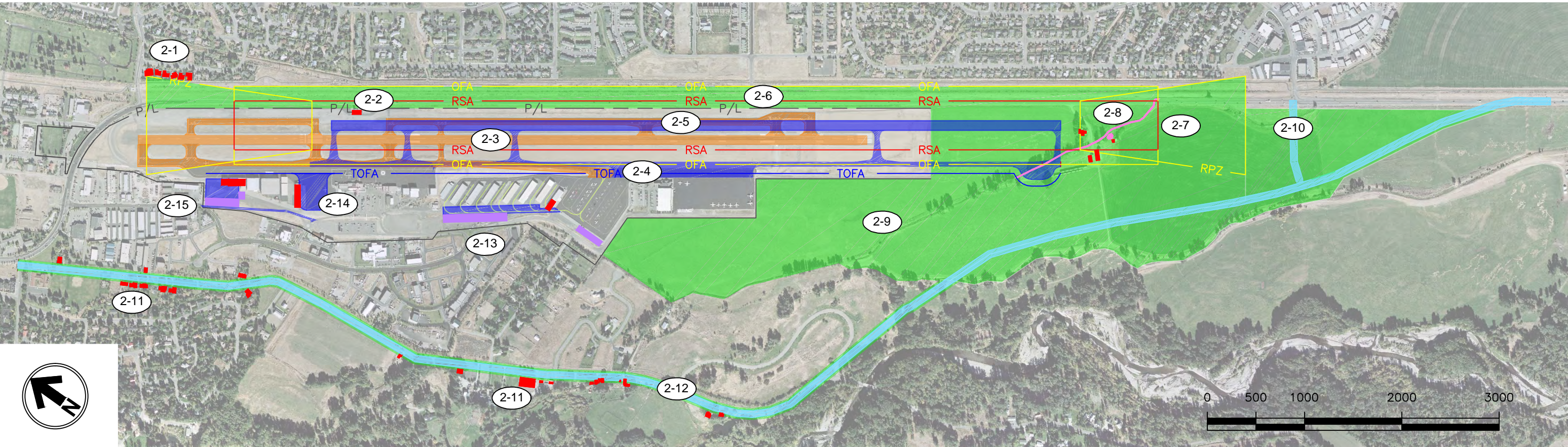
Based on anticipated airport planning, environmental planning, project design, and construction requirements, a completion timeline for this alternative is estimated to take a minimum of 5+ years. **This schedule will not meet the December 31, 2015, deadline to comply with the RSA mandate.**

## MODIFICATION OF AIRPORT DESIGN STANDARDS

Alternative 2 does not require MOS.

**Exhibit 5-2** depicts Alternative 2. **Table 5-2** summarizes various aspects of the alternative including Runway Protection and Separation standards, as well as major environmental and other considerations.





ITEM	DESCRIPTION
2-1	ACQUIRE 6 RESIDENTIAL PROPERTIES ON CREEKSIDE DRIVE (RPZ)
2-2	RELOCATE AIR TRAFFIC CONTROL TOWER
2-3	REMOVE EXISTING AIRFIELD PAVEMENT
2-4	CONSTRUCT PARALLEL TAXIWAY AND CONNECTORS
2-5	SHIFT RUNWAY 13-31 1,900' SOUTH AND 500' EAST
2-6	ACQUIRE 60 ACRES OF HIGHWAY ROW FOR OFA
2-7	ACQUIRE 50 ACRES OF RANCH PROPERTY FOR RPZ, REMOVE EXISTING BUILDINGS
2-8	RELOCATE/LOWER IRRIGATION CANAL
2-9	ACQUIRE 180 ACRES OF RANCH PROPERTY WEST OF THE OFA FOR HIGHWAY RELOCATION AND FUTURE DEVELOPMENT

ITEM	DESCRIPTION
2-10	EXTEND WOODSIDE BOULEVARD TO RELOCATED HIGHWAY 75
2-11	ACQUIRE 19 RESIDENTIAL PROPERTIES ON BROADFORD ROAD
2-12	RELOCATE HIGHWAY 75 TO THE WEST, ACQUIRE 45 ACRES FOR HIGHWAY AND ROW
2-13	NEW TAXILANE TO RELOCATED HANGARS
2-14	RELOCATE TERMINAL PARKING
2-15	RELOCATE AIRCRAFT PARKING/HANGARS, RECONSTRUCT BUS ROUTE ACCESS ROAD

AIRCRAFT PARKING IMPACTS

FBO:	-17,650 SF
GENERAL AVIATION:	-21,200 SF
TERMINAL APRON:	+41,200 SF
AIR CARGO APRON:	-34,000 SF
NET DIFFERENCE:	-31,650 SF

LEGEND	
2-1	KEY NUMBER
[Blue Box]	NEW AIRFIELD PAVEMENT
[Orange Box]	AIRFIELD PAVEMENT REMOVAL
[Purple Box]	NEW BUILDING / HANGAR / STRUCTURE AREA
[Red Box]	BUILDING / HANGAR / STRUCTURE REMOVAL
[Green Box]	NEW LAND ACQUISITION
[Light Blue Box]	RELOCATED HIGHWAY
[Pink Box]	WETLAND

- NOTES
- PROPERTY ACQUISITION SHOWN REFLECTS ASSUMED AREAS REQUIRED TO AVOID UNECONOMICAL REMNANTS.
  - RIGHT OF WAY ACQUISITION SHOWN REPRESENTS THE MINIMUM NECESSARY. SIGNIFICANT ADDITIONAL PROPERTY MAY BE REQUIRED.



**Table 5.2 – Alternative 2 – Shift Runway East and Highway West**

<b>RDC C-III <math>\geq 1</math> Mile</b>	<b>MEETS STANDARDS?</b>	<b>DISPOSITION/COMMENTS</b>
<b>RUNWAY PROTECTION STANDARDS</b>		
Runway Safety Area (RSA)	Yes	<ul style="list-style-type: none"> <li>Shift of Runway 13-31 east and south combined with the removal of Taxiway A provides fully compliant RSA. <b>CANNOT MEET RSA DEADLINE.</b></li> </ul>
Object Free Area (OFA)	Yes	<ul style="list-style-type: none"> <li>Relocation of Highway 75 to the west side of the airport provides for a fully compliant OFA.</li> <li>Requires removal and relocation of Air Traffic Control Tower (ATCT).</li> </ul>
Object Free Zone (OFZ)	Yes	<ul style="list-style-type: none"> <li>Provides fully compliant OFZ</li> </ul>
Runway Protection Zone (RPZ)	No	<ul style="list-style-type: none"> <li>Portions of Highway 75 remain in RPZ (may be allowed via approval of FAA).</li> <li>Land acquisition required to accommodate RPZ on Runway 31 end.</li> </ul>
<b>SEPARATION STANDARDS</b>		
Centerline to Holdline(s)	Yes	<ul style="list-style-type: none"> <li>Fully compliant at 250 feet</li> </ul>
Centerline to Parallel Taxiway	Yes	<ul style="list-style-type: none"> <li>Fully compliant at 400 feet</li> </ul>
Centerline to Aircraft Parking	Yes	<ul style="list-style-type: none"> <li>Fully compliant at 500 feet</li> </ul>
<b>MAJOR ENVIRONMENTAL CONSIDERATIONS</b>		
Compatible Land Use Secondary (Induced) Impacts Environmental Justice Wetlands	N/A	<ul style="list-style-type: none"> <li>305 acres of land acquisition including the acquisition and removal of 25 homes and six ranch structures for the relocated Highway 75 ROW and RPZ protection may have adverse environmental impacts based on these impact categories.</li> <li>Documented community opposition to this alternative based on previous study and analysis.</li> </ul>
<b>OTHER</b>		
Compliance and Infrastructure	N/A	Provides full compliance with airport design standards without the use of MOS. Requires modest relocation/removal of existing aircraft parking and hangars.
Schedule (including planning/ environmental/land acquisition/construction)	N/A	<b>Minimum 5+ years (2013-2018). Lengthy airport shutdown required. CANNOT MEET RSA DEADLINE.</b>
<b>COST ESTIMATE</b>		<b>\$123,300,000</b>



### 5.3 ALTERNATIVE 3 – FULL COMPLIANCE - RUNWAY WEST

Alternative 3 includes a shift of Runway 13-31 and associated parallel Taxiway B west and south of its existing location.

Moving the airfield west provides full C-III compliance for RSA, OFA, OFZ, and runway separation standards without impacting Highway 75. However, it significantly impacts existing airport facilities. This alternative effectively requires all on-airport hangars and facilities to be relocated. Further, on the north end, approximately six acres of land and the removal of an additional 13 structures will be necessary to clear the Runway 13 RPZ. An additional 70 acres of land acquisition will be necessary for RPZ protection on the Runway 31 end.

Relocation/replacement of the removed airport hangars and facilities must be accomplished to keep the airport a viable facility. The acquisition of 140 acres of land including remnant parcels on the south end of the airport will facilitate the relocation of displaced facilities.

This alternative has been discussed during previous studies and significant public opposition has been noted.

#### ALTERNATIVE 3 COST ESTIMATE

Description	Estimated Cost
Airfield	\$61.8M
Highway Relocation	\$0.0M
<b>Construction Total</b>	<b>\$61.8M</b>
<b>Property Acquisition/Facility Relocation</b>	<b>\$83.8M</b>
<b>Environmental (EIS)</b>	<b>\$2.0M</b>
<b>TOTAL COST</b>	<b>\$147.6M</b>

Source: T-O Engineers





## SCHEDULE

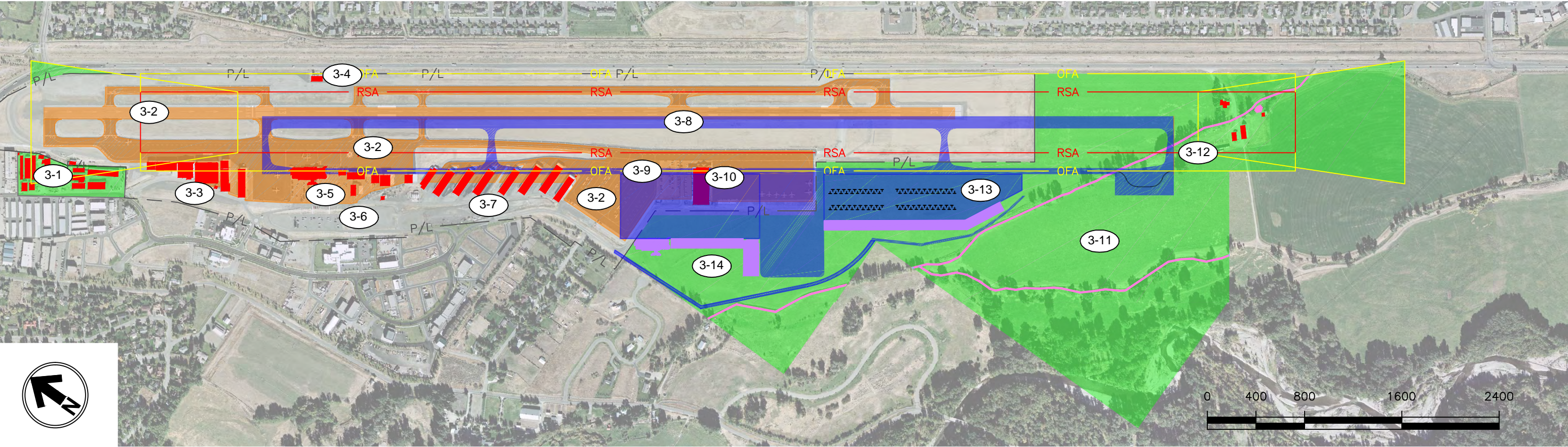
Based on anticipated airport planning, environmental planning, project design, and construction requirements, a completion timeline for this alternative is estimated to take a minimum of 6+ years. **This schedule will not meet the December 31, 2015, deadline to comply with the RSA mandate.**

## Modification of Airport Design Standards

Alternative 3 does not require MOS.

**Exhibit 5-3** depicts Alternative 3. **Table 5-3** summarizes various aspects of the alternative including Runway Protection and Separation standards, as well as major environmental and other considerations.





ITEM	DESCRIPTION
3-1	ACQUIRE 6 ACRES, REMOVE 13 BUILDINGS (RPZ)
3-2	REMOVE EXISTING AIRFIELD PAVEMENT
3-3	RELOCATE 7 HANGARS
3-4	RELOCATE AIR TRAFFIC CONTROL TOWER
3-5	RELOCATE TERMINAL BUILDING
3-6	RELOCATE AIRPORT MANAGER'S OFFICE, AIRPORT OPERATIONS, AND 3 HANGARS
3-7	RELOCATE 8 HANGARS
3-8	SHIFT RUNWAY 13-31 1,800' SOUTH AND 75' WEST
3-9	CONSTRUCT PARALLEL TAXIWAY AND CONNECTORS

ITEM	DESCRIPTION
3-10	RELOCATE FBO
3-11	ACQUIRE 210 ACRES OF RANCH PROPERTY FOR RPZ AND HANGAR RELOCATION
3-12	RELOCATE/LOWER IRRIGATION CANAL (PAVEMENT/RSA)
3-13	CONSTRUCT NEW AIRCRAFT APRONS
3-14	CONSTRUCT NEW HANGARS AND TERMINAL

AIRCRAFT PARKING IMPACTS

FBO:	+96,400 SF
GENERAL AVIATION:	+209,900 SF
TERMINAL APRON:	+155,000 SF
AIR CARGO APRON:	-34,000 SF
NET DIFFERENCE:	+427,300 SF

LEGEND	
3-1	KEY NUMBER
[Blue Box]	NEW AIRFIELD PAVEMENT
[Purple Box]	NEW BUILDING / HANGAR / STRUCTURE
[Red Box]	BUILDING / HANGAR / STRUCTURE REMOVAL
[Green Box]	NEW LAND ACQUISITION
[Orange Box]	PAVEMENT REMOVAL
[Pink Box]	WETLAND

NOTES

1. PROPERTY ACQUISITION SHOWN REFLECTS ASSUMED AREAS. ADDITIONAL PROPERTY ACQUISITION MAY BE NECESSARY TO AVOID UNECONOMICAL REMNANTS.



**Table 5-3 – Alternative 3 – Shift Runway West**

<b>RDC C-III <math>\geq 1</math> Mile</b>	<b>MEETS STANDARDS?</b>	<b>DISPOSITION/COMMENTS</b>
<b>RUNWAY PROTECTION STANDARDS</b>		
Runway Safety Area (RSA)	Yes	<ul style="list-style-type: none"> <li>Shift of Runway 13-31 and Taxiway B west and south combined with the removal of Taxiway A provides fully compliant RSA. <b>CANNOT MEET RSA DEADLINE.</b></li> </ul>
Object Free Area (OFA)	Yes	<ul style="list-style-type: none"> <li>Shift provides for fully compliant OFA.</li> <li>Shift results in no impact to Highway 75.</li> <li>Requires relocation of Air Traffic Control Tower (ATCT).</li> </ul>
Object Free Zone (OFZ)	Yes	<ul style="list-style-type: none"> <li>Provides fully compliant OFZ.</li> </ul>
Runway Protection Zone (RPZ)	No	<ul style="list-style-type: none"> <li>Portions of Highway 75 remain in the RWY 13 RPZ (may be allowed via approval of FAA).</li> <li>Land acquisition required to remove 13 structures from Runway 13 RPZ on the northwest corner.</li> <li>Additional acquisition necessary to accommodate RPZ on the Runway 31 end.</li> </ul>
<b>SEPARATION STANDARDS</b>		
Centerline to Holdline(s)	Yes	<ul style="list-style-type: none"> <li>Fully compliant at 250 feet</li> </ul>
Centerline to Parallel Taxiway	Yes	<ul style="list-style-type: none"> <li>Fully compliant at 400 feet</li> </ul>
Centerline to Aircraft Parking	Yes	<ul style="list-style-type: none"> <li>Fully compliant at 500 feet</li> </ul>
<b>MAJOR ENVIRONMENTAL CONSIDERATIONS</b>		
Compatible Land Use Secondary (Induced) Impacts Environmental Justice Wetlands	N/A	<ul style="list-style-type: none"> <li>216 acres of land acquisition, including the acquisition and removal of 13 (including ranch structures) structures may have adverse environmental impacts based on these impact categories.</li> <li>Documented community opposition to this alternative based on previous study and analysis.</li> </ul>
<b>OTHER</b>		
Compliance and Infrastructure	N/A	Provides full compliance with airport design standards without the use of MOS. Requires major relocation/reconstruct of existing airport facilities/infrastructure.
Schedule (including planning/ environmental/land acquisition/construction)	N/A	<b>Minimum</b> 6+ years (2013-2019). Lengthy airport shutdown required. <b>CANNOT MEET RSA DEADLINE.</b>
<b>COST ESTIMATE</b>		<b>\$147,600,000</b>



## 5.4 ALTERNATIVE 4 – FULL COMPLIANCE - SHIFT RUNWAY SOUTH AND ROTATE

Alternative 4 includes a significant shift of Runway 13-31 and associated parallel Taxiway B south of its existing location and slightly rotates the airport to the southwest.

Moving the airfield significantly south and west provides full C-III compliance for RSA, OFA, OFZ and runway separation standards without impacting Highway 75. Significant land acquisition of approximately 545 acres to the south is required to accommodate this shift. This alternative results in the airport moving significantly closer to the City of Bellevue. All existing runway and taxiway pavements will be removed with existing aprons, hangars and other facilities remaining in place.

Operationally, aircraft would be required to taxi long distances to access the airfield, in particular for aircraft departing Runway 31. Initially, existing hangars and facilities would remain in their existing location. However, this configuration is not optimal and relocation will be necessary for operational efficiency. As a result, relocation of existing airport hangars and facilities adjacent to the relocated airfield complex is recommended.

This alternative has been discussed during previous studies and significant public opposition has been noted, primarily due to potential impacts to residents south of the airport.

### ALTERNATIVE 4 COST ESTIMATE

Description	Estimated Cost
Airfield	\$54.3M
Highway Relocation	\$0.0M
<b>Construction Total</b>	<b>\$54.3M</b>
<b>Property Acquisition/Facility Relocation</b>	<b>\$79.2M</b>
<b>Environmental (EIS)</b>	<b>\$2.0M</b>
<b>TOTAL COST</b>	<b>\$135.5M</b>

Source: T-O Engineers





## SCHEDULE

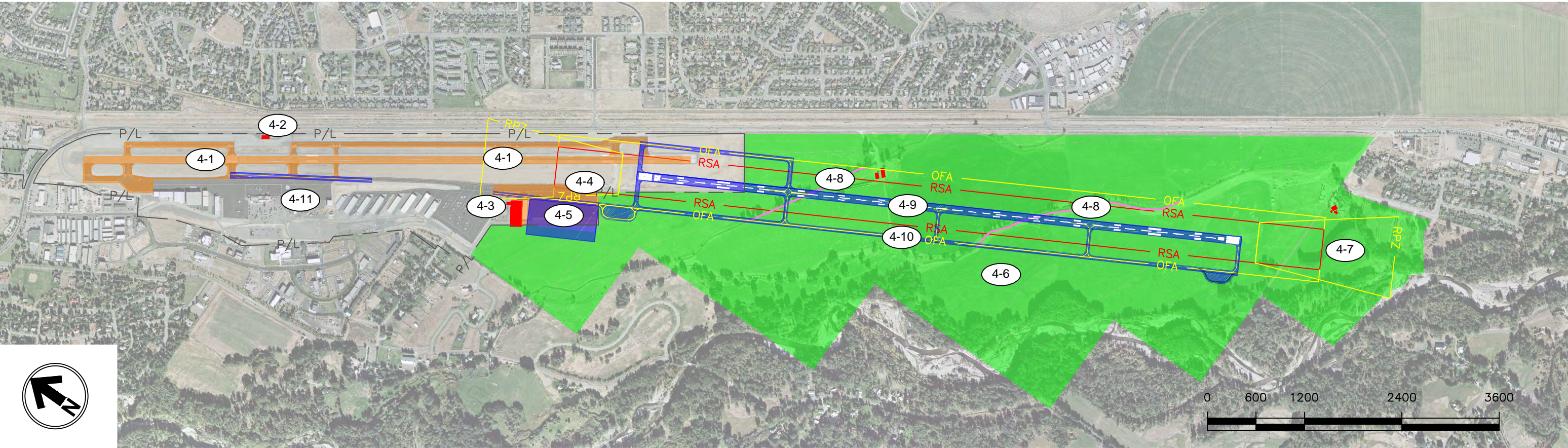
Based on anticipated airport planning, environmental planning, project design, and construction requirements, a completion timeline for this alternative is estimated to take a minimum of 5+ years. **This schedule will not meet the December 31, 2015, deadline to comply with the RSA mandate.**

## MODIFICATION OF AIRPORT DESIGN STANDARDS

Alternative 4 does not require MOS.

**Exhibit 5-4** depicts Alternative 4. **Table 5-4** summarizes various aspects of the alternative including Runway Protection and Separation standards, as well as major environmental and other considerations.





ITEM	DESCRIPTION
4-1	REMOVE EXISTING AIRFIELD PAVEMENT
4-2	RELOCATE AIR TRAFFIC CONTROL TOWER
4-3	RELOCATE FBO
4-4	EXTEND TAXIWAY B AND DE-CONFLICTION APRON
4-5	RELOCATE AIRCRAFT PARKING APRON
4-6	ACQUIRE 545 ACRES OF RANCH PROPERTY FOR OFA AIRFIELD CONSTRUCTION AND FUTURE HANGAR RELOCATION
4-7	ACQUIRE 18 ACRES OF RESIDENTIAL PROPERTY (RPZ)

ITEM	DESCRIPTION
4-8	RELOCATE/LOWER IRRIGATION CANAL (PAVEMENT/RSA)
4-9	SHIFT RUNWAY 13-31 6,070' SOUTH AND 3,070' EAST
4-10	CONSTRUCT PARALLEL TAXIWAY AND CONNECTORS
4-11	EXTEND TAXIWAY

AIRCRAFT PARKING IMPACTS	
FBO:	0 SF
GENERAL AVIATION:	0 SF
TERMINAL APRON:	+19,000 SF
AIR CARGO APRON	0 SF
NET DIFFERENCE:	+19,000 SF

LEGEND	
4-1	KEY NUMBER
	NEW AIRFIELD PAVEMENT
	NEW BUILDING / HANGAR / STRUCTURE
	BUILDING / HANGAR / STRUCTURE REMOVAL
	NEW LAND ACQUISITION
	PAVEMENT REMOVAL
	WETLAND

- NOTES**
1. PROPERTY ACQUISITION SHOWN REFLECTS ASSUMED AREAS. ADDITIONAL PROPERTY ACQUISITION MAY BE NECESSARY TO AVOID UNECONOMICAL REMNANTS.
  2. ULTIMATE DEVELOPMENT WOULD LIKELY REQUIRE RELOCATING ALL EXISTING AIRPORT FACILITIES ADJACENT TO RELOCATED RUNWAY TAXIWAY. COSTS FOR THESE RELOCATIONS ARE NOT INCLUDED IN ESTIMATE.





**Table 5-4 – Alternative 4 – Shift Runway South and Rotate**

<b>RDC C-III <math>\geq 1</math> Mile</b>	<b>MEETS STANDARDS?</b>	<b>DISPOSITION/COMMENTS</b>
<b>RUNWAY PROTECTION STANDARDS</b>		
Runway Safety Area (RSA)	Yes	<ul style="list-style-type: none"> <li>Shift south and rotation of Runway 13-31 provides fully compliant RSA. CANNOT MEET RSA DEADLINE.</li> </ul>
Object Free Area (OFA)	Yes	<ul style="list-style-type: none"> <li>Shift results in fully compliant OFA.</li> <li>Shift results in no impact to Highway 75.</li> <li>Requires removal and relocation of Air Traffic Control Tower (ATCT).</li> </ul>
Object Free Zone (OFZ)	Yes	<ul style="list-style-type: none"> <li>Provides fully compliant OFZ</li> </ul>
Runway Protection Zone (RPZ)	No	<ul style="list-style-type: none"> <li>Portions of Highway 75 remain in north RPZ (may be allowable with approval from FAA).</li> </ul>
<b>SEPARATION STANDARDS</b>		
Centerline to Holdline(s)	Yes	<ul style="list-style-type: none"> <li>Fully compliant at 250 feet</li> </ul>
Centerline to Parallel Taxiway	Yes	<ul style="list-style-type: none"> <li>Fully compliant at 400 feet</li> </ul>
Centerline to Aircraft Parking	Yes	<ul style="list-style-type: none"> <li>Fully compliant at 500 feet</li> </ul>
<b>MAJOR ENVIRONMENTAL CONSIDERATIONS</b>		
Compatible Land Use Noise Secondary (Induced) Impacts Cumulative Impacts Wetlands	N/A	<ul style="list-style-type: none"> <li>545 acres of land acquisition, including the acquisition and removal of six ranch structures may have adverse environmental impacts based on these impact categories. Moves the airport significantly closer to the City of Bellevue.</li> <li>Documented community opposition to this alternative based on previous study.</li> </ul>
<b>OTHER</b>		
Compliance and Infrastructure	N/A	<ul style="list-style-type: none"> <li>Provides full compliance with airport design standards without the use of MOS.</li> <li>Requires major relocation/reconstruct of existing airport facilities/infrastructure and would result in unrealistic distances for taxiing aircraft and is not operationally efficient.</li> </ul>
Schedule (including planning/ environmental/land acquisition/construction)	N/A	<b>Minimum 5+ years (2013-2018). Existing runway could remain open during construction. CANNOT MEET RSA DEADLINE.</b>
<b>COST ESTIMATE</b>		<b>\$135,500,000</b>



## **5.5 ALTERNATIVE 5 – LESS THAN FULL COMPLIANCE - SHIFT RUNWAY 13-31 SOUTH/SHIFT TAXIWAY B WEST**

Alternative 5 includes shifting Runway 13-31 and the parallel taxiway 1,700 feet to the south and then removing 1,700 feet from the existing runway and taxiway on the north end. The purpose for the shift is to accommodate RSA and OFA standards (per C-III standards) on existing airport property at the north end of the airfield. This alternative also shifts Taxiway B west of its existing location on the northern portion of the airfield so that the runway to parallel taxiway separation is at least 320 feet along the length of Taxiway B. In development of this alternative, a shift of the runway 500 feet south was also considered. It was determined that the advantages of such an alternative were not significant enough to warrant carrying the analysis forward.

Shifting the runway 1,700 feet south removes the need for declared distances and relocates the OFA onto airport property at the north end of the airfield. As a result of the shift in the OFA, several structures on the far northwest end of the airfield will now be clear of the OFA. Further, relocation of the OFA also removes the intersection of Highway 75/Fox Acres Road outside the OFA. Existing runway and taxiway pavement will be removed behind the current Runway 13 displaced threshold. Several hangars north and west of the threshold could remain in place, however the OFA would be located immediately adjacent to the hangar fronts, restricting the amount of time aircraft stored in the hangars would be permitted to park in front of the hangars.

On the south end of the existing runway, at least 126 acres of land acquisition will be required to accommodate the south shift in the runway and for appropriate RPZ protection. On both ends of the runway, portions of the RPZ will be penetrated by Highway 75. A large portion of the acquired land on the south side of the airport west and south of the FBO provides additional land to replace facilities impacted by the above changes as well as for future airport development.

On the east side of the airport, Alternative 5 proposes relocation of Highway 75 to the east. On the west side, Taxiway B is relocated a minimum of 320 feet from runway centerline on the north end and a maximum of 330 feet on the south end. These are the maximum distances the taxiway can be relocated without the need to remove numerous existing hangars/facilities (including the passenger terminal). Toward the south end, the relocation to 330 feet facilitates improved transverse grades in the RSA while still allowing existing facilities to remain in place. While grade standards can be met for RSA as a result of the 330 foot separation, an additional MOS will be necessary to meet recent changes to runway OFA grade standards. The relocated runway and taxiway OFA on the west side of the airport would require the reconfiguration of the existing commercial service apron and one existing deconfliction apron and the construction of





one new deconfliction apron. Further, the existing taxiway that provides access to the GA hangar complex will also need to be relocated. Reconfiguration of these facilities will also require the removal/relocation of several existing hangars.

A MOS for Runway to Parallel Taxiway separation of less than 400 feet (C-III standards) will be required to relocate Taxiway B at 320 feet from the Runway centerline. In addition, a MOS would also be required for a Taxiway OFA width of less than 186 feet (C-III standards). The proximity of Taxiway B to several hangar fronts provides only enough clearance for a 160 feet wide Taxiway OFA, thus requiring the MOS. The Taxiway OFA would accommodate aircraft with a wingspan up to 100 feet which includes all aircraft that currently use the airfield.

In order to meet full C-III RSA requirements, the removal of both Taxiway A on the east side and relocation of Taxiway B on the west side will be required.

## ALTERNATIVE 5 COST ESTIMATE

Description	Estimated Cost
Airfield	\$31.4M
Highway Relocation	\$15.3M
<b>Construction Total</b>	<b>\$46.7M</b>
<b>Property Acquisition/Facility Relocation</b>	<b>\$22.9M</b>
<b>Environmental (EIS)</b>	<b>\$2.0M</b>
<b>TOTAL COST</b>	<b>\$71.6M</b>

Source: T-O Engineers

## SCHEDULE

Based on anticipated airport planning, environmental analysis, land acquisition, project design, and construction requirements, a completion timeline for this alternative is estimated to take over four years. **This schedule will not meet the December 31, 2015 deadline to comply with the RSA mandate.**



## MODIFICATION OF AIRPORT DESIGN STANDARDS

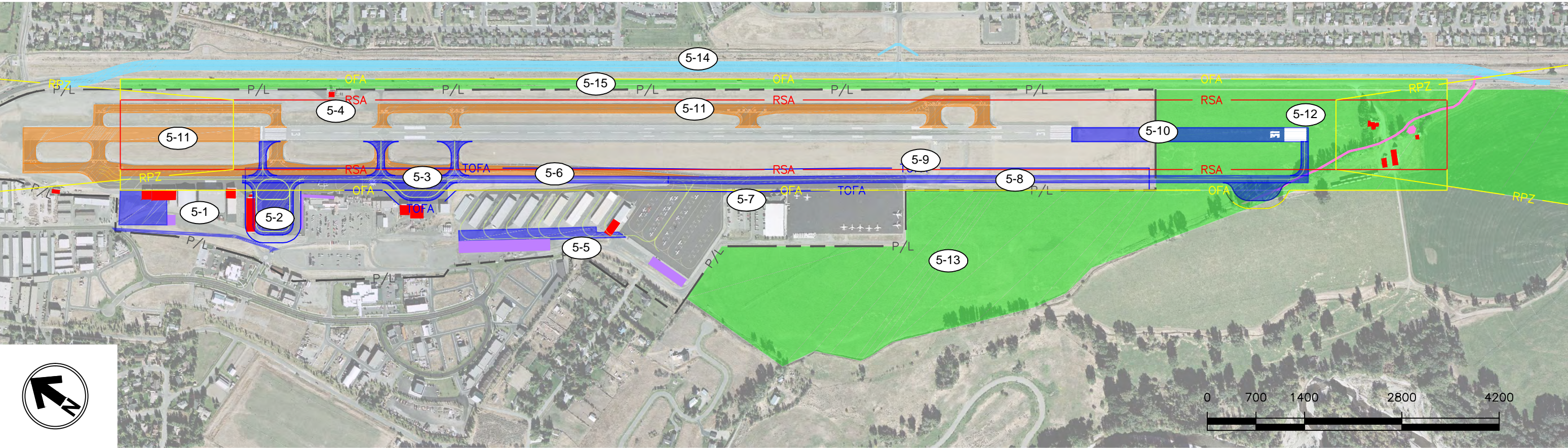
The following MOS are necessary for Alternative 5. Further discussion and justification for the MOSs is included in **Appendix D**.

Standard	MOS
Runway OFA Grading	Non-standard grading - Existing site cannot meet full OFA grading requirements
Runway to Parallel Taxiway Separation	320 feet (from 400 feet)
Taxiway OFA	160 feet (Aircraft Specific)
Runway centerline to aircraft parking	420 feet (from 500 feet)

Source: T-O Engineers

**Exhibit 5-5** depicts Alternative 5. **Table 5-5** summarizes various aspects of the alternative including Runway Protection and Separation standards, as well as major environmental and other considerations.





- | ITEM | DESCRIPTION   |
|------|---|
| 5-1  | RELOCATE AIRCRAFT PARKING/HANGARS, RECONSTRUCT BUS ROUTE                      |
| 5-2  | RELOCATE TERMINAL AIRCRAFT PARKING  |
| 5-3  | RELOCATE HANGARS, RELOCATE DE-CONFLICTION AREA                                |
| 5-4  | RELOCATE AIR TRAFFIC CONTROL TOWER  |
| 5-5  | NEW TAXILANE TO ACCESS T-HANGARS  |
| 5-6  | RELOCATE TAXIWAY B  |
| 5-7  | RELOCATE EXISTING FBO FENCE AND PORTION OF PARKING LOT OUTSIDE OF TAXIWAY OFA |
| 5-8  | EXTEND TAXIWAY B  |

- | ITEM | DESCRIPTION   |
|------|---|
| 5-9  | RELOCATE AWOS   |
| 5-10 | EXTEND RUNWAY 13-31 1,700 FEET  |
| 5-11 | REMOVE PARALLEL TAXIWAY A AND GRADE RSA   |
| 5-12 | ACQUIRE 51 ACRES OF RANCH PROPERTY FOR RSA AND RPZ  |
| 5-13 | ACQUIRE 60 ACRES OF PROPERTY FOR STORM WATER RETENTION POND, RELOCATED TOWER, AIRCRAFT PARKING, AWOS, AND HANGARS |
| 5-14 | RELOCATE HIGHWAY  |
| 5-15 | ACQUIRE 15 ACRES OF HIGHWAY ROW FOR RUNWAY OFA  |

AIRCRAFT PARKING IMPACTS

FBO:	-39,000 SF
GENERAL AVIATION:	-95,000 SF
TERMINAL APRON:	+41,200 SF
AIR CARGO APRON:	-88,500 SF
NET DIFFERENCE:	-181,300 SF

POTENTIAL MODIFICATIONS REQUIRED

AIRPORT DESIGN STANDARD	STANDARD DIMENSIONS	AS SHOWN
RUNWAY TO PARALLEL TAXIWAY SEPARATION	400'	320'
RUNWAY TO AIRCRAFT PARKING	500'	400'
RUNWAY OFA GRADING	10:1	4:1
TAXIWAY OBJECT FREE AREA	186'	160'

- LEGEND
- 5-1 KEY NUMBER
  - NEW AIRFIELD PAVEMENT
  - AIRFIELD PAVEMENT REMOVAL
  - NEW BUILDING / HANGAR / STRUCTURE AREA
  - BUILDING / HANGAR / STRUCTURE REMOVAL
  - NEW LAND ACQUISITION
  - RELOCATED HIGHWAY
  - WETLAND

NOTES

1. PROPERTY ACQUISITION SHOWN REFLECTS AN ASSUMED PARCEL FOR ACQUISITION. ALTERNATE CONFIGURATION MAY BE PREFERABLE TO LANDOWNER.





**Table 5-5 – Alternative 5 – Shift Runway 13-31 South/Shift Taxiway B West**

<b>RDC C-III <math>\geq 1</math> Mile</b>	<b>MEETS STANDARDS?</b>	<b>DISPOSITION/COMMENTS</b>
<b>RUNWAY PROTECTION STANDARDS</b>		
Runway Safety Area (RSA)	Yes	<ul style="list-style-type: none"> <li>Meets RSA grading and dimensional standards. Dimensional standards met with the removal of Taxiway A on the east side and relocation of Taxiway B on the west side.</li> </ul>
Runway Object Free Area (OFA) – dimensional standards	Yes	<ul style="list-style-type: none"> <li>Relocation of Highway 75 and bike path to the east provides for a fully compliant OFA.</li> </ul>
Runway Object Free Area (OFA) – grading standards	No – MOS Required	<ul style="list-style-type: none"> <li>Requires the acquisition of 15 acres of land to relocate Highway 75 and bike path Right-of-Ways (ROW).</li> </ul>
Taxiway Object Free Area (TOFA)	No – MOS Required	<ul style="list-style-type: none"> <li>Requires removal and relocation of Air Traffic Control Tower (ATCT).</li> <li><b>MOS for runway OFA grading and aircraft specific TOFA.</b></li> </ul>
Object Free Zone (OFZ)	Yes	<ul style="list-style-type: none"> <li>Provides fully compliant OFZ</li> </ul>
Runway Protection Zone (RPZ)	No	<ul style="list-style-type: none"> <li>Portions of Highway 75 remain in RPZ on both ends (may be allowable with FAA approval).</li> <li>Land acquisition required to accommodate RPZ on Runway 31 end.</li> </ul>
<b>SEPARATION STANDARDS</b>		
Centerline to Holdline(s)	Yes	<ul style="list-style-type: none"> <li>Fully compliant at 250 feet</li> </ul>
Centerline to Parallel Taxiway	No – MOS Required	<ul style="list-style-type: none"> <li>Taxiway A – Removed. <b>320-330 foot runway to Taxiway B centerline – Requires MOS.</b></li> </ul>
Centerline to Aircraft Parking	No – MOS Required	<ul style="list-style-type: none"> <li><b>Requires MOS. Existing separation 420 feet – standard is 500 feet.</b></li> </ul>
<b>MAJOR ENVIRONMENTAL CONSIDERATIONS</b>		
Compatible Land Use Secondary (Induced) Impacts Wetlands	N/A	<ul style="list-style-type: none"> <li>126 acres of land acquisition, including the acquisition and removal of six ranch structures may have adverse environmental impacts based on these impact categories.</li> </ul>
<b>OTHER</b>		
Compliance and Infrastructure	N/A	<ul style="list-style-type: none"> <li>Requires the use of MOS. Results in loss of current hangars and aircraft parking. Will require modest relocation/reconfiguration of some hangars and facilities.</li> </ul>
Schedule (including planning/ environmental/land acquisition/construction)	N/A	4+ years (2013-2017), depending on time required for land acquisition. <b>WILL NOT MEET RSA DEADLINE.</b>
<b>COST ESTIMATE</b>		<b>\$71,600,000</b>





## **5.6 ALTERNATIVE 6 – LESS THAN FULL COMPLIANCE - NO LAND ACQUISITION**

Alternative 6 results in reconfiguration of Taxiway B on the west side to accommodate C-III runway and taxiway OFA similar to Alternative 5. Further, no land acquisition is proposed in this alternative; all disposition requirements will take place within the current airport property boundary.

Aside from no land acquisition, primary differences between this alternative and Alternative 5 include no runway extension or shift in the runway OFA on the north end of the airfield. Also, on the east side of the airport, no relocation of Highway 75 is proposed. A MOS is proposed to allow Highway 75 to remain in the OFA. As in Alternative 5, the relocated runway and taxiway OFA on the west side of the airport would require reconfiguration of the existing commercial service apron and one existing deconfliction apron and the construction of one new deconfliction apron with additional adjacent apron space. The existing taxiway that provides access to the GA hangar complex will also need to be relocated. Reconfiguration of these facilities will also require the removal/relocation of several existing hangars however the lack of available land without land acquisition limits relocation options. There will be a net loss of hangars and aircraft parking with this alternative, as proposed.

As with Alternative 5, this alternative results in Taxiway B being relocated a minimum of 320 feet from runway centerline on the north end and a maximum of 330 feet on the south end. As previously discussed, these are the maximum distances the taxiway can be relocated without the need to remove numerous existing hangars/facilities (including the passenger terminal). On the south end, the relocation to 330 feet facilitates improved transverse grades in the RSA while still allowing existing facilities to remain in place. While grade standards can be met for RSA as a result of the 330 foot separation, an additional MOS will be necessary to meet recent changes to runway OFA grade standards.

Portions of the runway OFA will remain in its existing condition including encroachment by Highway 75 and structures on the north end. Further, RPZ on both runway ends remain in their existing condition with encroachment of roads and structures in the outer portions of the RPZ. This condition may be allowable if approved by the FAA.

Also as with Alternative 5, a MOS for Runway to Parallel Taxiway separation of less than 400 feet (C-III standards) will be required to relocate Taxiway B at 320 feet from the Runway centerline. In addition, a MOS would also be required for a Taxiway OFA width of less than 186 feet (C-III standards). The proximity of Taxiway B to several hangar fronts provides only enough clearance for a 160 feet wide Taxiway OFA. At 160 feet, the OFA would accommodate aircraft



with a wingspan up to 100 feet which includes all aircraft that currently use the airfield. This non-standard Taxiway OFA would require a MOS.

In both Alternatives, in order to meet full C-III RSA requirements, the removal of both Taxiway A on the east side and relocation of Taxiway B on the west side will be required.

## ALTERNATIVE 6 COST ESTIMATE

Description	Estimated Cost
Airfield	\$29.9M
Highway Relocation	\$0.0M
<b>Construction Total</b>	<b>\$29.9M</b>
<b>Property Acquisition/Facility Relocation</b>	<b>\$7.8M</b>
<b>Environmental (?)</b>	<b>\$0.3M</b>
<b>TOTAL COST</b>	<b>\$38.0M</b>

Source: T-O Engineers

## SCHEDULE

Based on anticipated airport planning, environmental planning, project design, and construction requirements, a completion timeline for this alternative is estimated to take approximately 3 years. **This schedule may meet the December 31, 2015, deadline to comply with the RSA mandate but immediate implementation is necessary.**





## MODIFICATION OF AIRPORT DESIGN STANDARDS

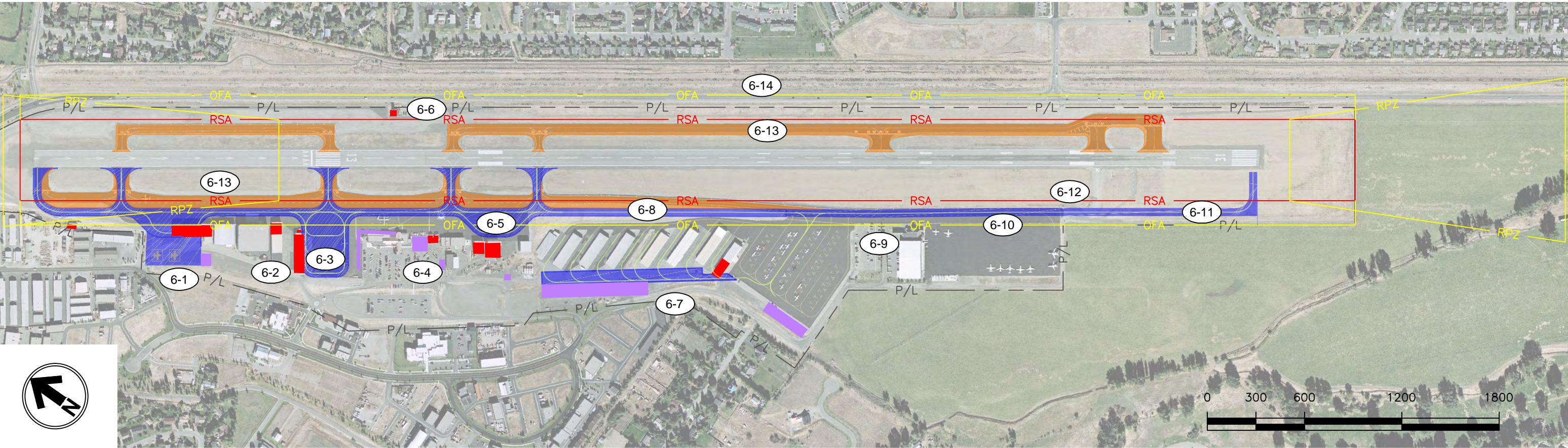
The following MOS will be necessary for Alternative 6. Further discussion and justification for the MOSs is included in **Appendix D**.

Standard	MOS
Runway OFA	350 feet (from 400 feet) on east side to allow Highway 75 to remain in place  Allow buildings in OFA on Northwest Corner
Runway OFA Grading	Existing site cannot meet full OFA grading requirements
Runway to Parallel Taxiway Separation	320 feet (from 400 feet)
Taxiway OFA	160 feet (Aircraft Specific)
Runway centerline to aircraft parking	420 feet (from 500 feet)

Source: T-O Engineers

**Exhibit 5-6** depicts Alternative 6. **Table 5-6** summarizes various aspects of the alternative including Runway Protection and Separation standards, as well as major environmental and other considerations.





ITEM	DESCRIPTION
6-1	RELOCATE AIRCRAFT PARKING/HANGARS, RECONSTRUCT BUS ROUTE ACCESS ROAD, CLOSE WINTER BUS ROUTE
6-2	REMOVE HANGARS, RELOCATE ELECTRICAL VAULT
6-3	TERMINAL AIRCRAFT PARKING
6-4	RELOCATE AIRPORT OFFICES, AND HANGAR
6-5	REMOVE HANGARS, RELOCATE DE-CONFLICTION
6-6	RELOCATE AIR TRAFFIC CONTROL TOWER
6-7	NEW TAXILANE TO ACCESS T-HANGARS
6-8	RELOCATE TAXIWAY B

ITEM	DESCRIPTION
6-9	RELOCATE EXISTING FBO FENCE AND PORTION OF PARKING LOT OUTSIDE OF TAXIWAY OFA
6-10	LOSS OF PARKING DURING HIGH DEMAND: 79,000 SF
6-11	EXTEND TAXIWAY B
6-12	RELOCATE AWOS
6-13	REMOVE PAVEMENT AND GRADE RSA
6-14	HIGHWAY 75 ALIGNMENT REMAINS THE SAME

AIRCRAFT PARKING IMPACTS

FBO:	-39,000 SF
GENERAL AVIATION:	-95,000 SF
TERMINAL APRON:	+41,200 SF
AIR CARGO APRON:	-88,500 SF
NET DIFFERENCE:	-181,300 SF

POTENTIAL MODIFICATIONS REQUIRED

AIRPORT DESIGN STANDARD	STANDARD DIMENSIONS	POTENTIAL MODIFICATIONS REQUIRED AS SHOWN
RUNWAY TO PARALLEL TAXIWAY SEPARATION	400'	320'
RUNWAY TO AIRCRAFT PARKING	500'	400'
RUNWAY OFA GRADING	10:1	4:1
RUNWAY OFA CLEARING	NO FIXED OBJECTS	HWY 75/BUILDINGS AT NE CORNER
TAXIWAY OBJECT FREE AREA	186'	160'

LEGEND	
6-1	KEY NUMBER
[Blue Box]	NEW AIRFIELD PAVEMENT
[Purple Box]	NEW BUILDING / HANGAR / STRUCTURE AREA
[Red Box]	BUILDING / HANGAR / STRUCTURE REMOVAL
[Orange Box]	PAVEMENT REMOVAL

- NOTES
- THIS ALTERNATIVE RESULTS IN A NET LOSS OF 2 HANGARS.
  - OPERATIONAL CHALLENGES (SNOW REMOVAL/DISPOSAL, ETC.) WILL BE CREATED BY THIS ALTERNATIVE.
  - EXISTING STORM DRAINAGE DISPOSAL SYSTEM WILL REQUIRE EXTENSIVE MODIFICATION.





**Table 5-6 – Alternative 6 – No Land Acquisition**

RDC C-III $\geq 1$ Mile	MEETS STANDARDS?	DISPOSITION/COMMENTS
<b>RUNWAY PROTECTION STANDARDS</b>		
Runway Safety Area (RSA)	Yes	<ul style="list-style-type: none"> <li>Meets RSA grading and dimensional standards. Dimensional standards met with the removal of Taxiway A on the east side and relocation of Taxiway B on the west side.</li> </ul>
Runway Object Free Area (OFA) – dimensional standards	No – MOS Required	<ul style="list-style-type: none"> <li>MOS required for Highway 75 is runway OFA.</li> <li>MOS for runway OFA grading and aircraft specific TOFA.</li> <li>Requires removal and relocation of Air Traffic Control Tower (ATCT).</li> </ul>
Runway Object Free Area (OFA) – grading standards	No – MOS Required	
Taxiway Object Free Area (TOFA)	No – MOS Required	
Object Free Zone (OFZ)	Yes	<ul style="list-style-type: none"> <li>Provides fully compliant OFZ</li> </ul>
Runway Protection Zone (RPZ)	No	<ul style="list-style-type: none"> <li>Portions of Highway 75 remain in RPZ on both ends (may be allowable with FAA approval).</li> <li>Land acquisition required to accommodate RPZ on Runway 31 end.</li> </ul>
<b>SEPARATION STANDARDS</b>		
Centerline to Holdline(s)	Yes	<ul style="list-style-type: none"> <li>Fully compliant at 250 feet</li> </ul>
Centerline to Parallel Taxiway	No – MOS Required	<ul style="list-style-type: none"> <li>Taxiway A – Removed. 320-330 foot runway to Taxiway B centerline – Requires MOS.</li> </ul>
Centerline to Aircraft Parking	No – MOS Required	<ul style="list-style-type: none"> <li>Requires MOS. Existing separation 400 feet – standard is 500 feet.</li> </ul>
<b>MAJOR ENVIRONMENTAL CONSIDERATIONS</b>		
None anticipated	N/A	<ul style="list-style-type: none"> <li>Necessary disposition to meet standards will be limited to existing airport property. As a result, no major environmental impacts are anticipated.</li> </ul>
<b>OTHER</b>		
Compliance and Infrastructure	N/A	<ul style="list-style-type: none"> <li>Requires the use of MOS. Results in a net loss of current hangars, aircraft parking and snow storage.</li> </ul>
Schedule (including planning/ environmental/land acquisition/construction)	N/A	<b>Maximum 3 years (2013-2015). MUST BE IMPLEMENTED IMMEDIATELY TO MEET RSA DEADLINE.</b>
<b>COST ESTIMATE</b>		<b>\$38,000,000</b>

## 5.7 ALTERNATIVE 7 – LESS THAN FULL COMPLIANCE – MODEST LAND ACQUISITION

Alternative 7 includes only a few differences compared to Alternative 6.

Primary differences between this alternative and Alternatives 6 is the acquisition of 41 acres of land adjacent to the airport, south and west of the existing FBO complex. Land acquired on the south end will provide an area to relocate displaced aircraft parking and structures due to the Taxiway B shift. Depending on the configuration of land acquired, some additional space may be available for future airport development. Lastly, as in Alternative 5, this alternative proposes the relocation of Highway 75 to the east of its existing location within the existing highway ROW.

### ALTERNATIVE 7 COST ESTIMATE

Description	Estimated Cost
Airfield	\$29.2M
Highway Relocation	\$14.9M
<b>Construction Total</b>	<b>\$44.1M</b>
<b>Property Acquisition/Facility Relocation</b>	<b>\$11.5M</b>
<b>Environmental (EA)</b>	<b>\$.5M</b>
<b>TOTAL COST</b>	<b>\$59.5M</b>

Source: T-O Engineers

### SCHEDULE

Based on anticipated airport planning, environmental planning, project design, and construction requirements, a completion timeline for this alternative is estimated to take approximately 3 years. **This schedule may meet the December 31, 2015, deadline to comply with the RSA mandate but immediate implementation is necessary.**





## MODIFICATION OF AIRPORT DESIGN STANDARDS

The following MOS will be necessary for Alternative 7.

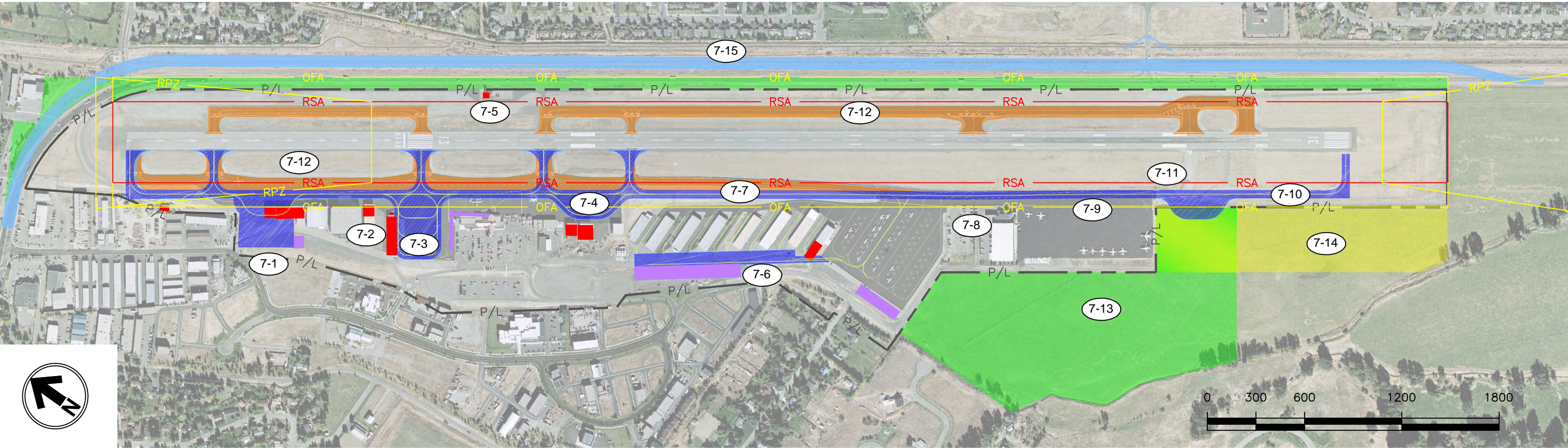
Standard	MOS
Runway OFA	Allow buildings in OFA on Northwest corner
Runway OFA Grading	Existing site cannot meet full OFA grading requirements
Runway to Parallel Taxiway Separation	320 feet (from 400 feet)
Taxiway OFA	160 feet (Aircraft Specific)
Runway centerline to aircraft parking	420 feet (from 500 feet)

Source: T-O Engineers

Further discussion and justification for the above MOS is included in **Appendix D**.

**Exhibit 5-7** depicts Alternative 7. **Table 5-7** summarizes various aspects of the alternative including Runway Protection and Separation standards, as well as major environmental and other considerations.





ITEM	DESCRIPTION
7-1	RELOCATE HANGARS, RELOCATE DE-CONFLICTION, CONSTRUCT APRON FOR FED EX AND UPS, CLOSE WINTER BUS ROUTE
7-2	REMOVE HANGARS, RELOCATE ELECTRICAL VAULT
7-3	RELOCATE TERMINAL AIRCRAFT PARKING
7-4	RELOCATE HANGARS AND DE-CONFLICTION APRON
7-5	RELOCATE AIR TRAFFIC CONTROL TOWER
7-6	NEW TAXILANE TO ACCESS T- HANGARS
7-7	RELOCATE TAXIWAY B
7-8	RELOCATE EXISTING FBO FENCE AND PORTION OF PARKING LOT OUTSIDE OF TAXIWAY OFA

ITEM	DESCRIPTION
7-9	LOSS OF PARKING DURING HIGH DEMAND: 79,000 SF
7-10	EXTEND TAXIWAY B
7-11	RELOCATE AWOS
7-12	REMOVE EXISTING PAVEMENT AND GRADE RSA
7-13	OPTION A: ACQUIRE 36 ACRES FOR STORM DRAINAGE RETENTION POND, RELOCATED AIRCRAFT HANGARS AND APRON OPTION B: ACQUIRE 17 ACRES FOR STORM DRAINAGE RETENTION POND, RELOCATED AIRCRAFT HANGARS AND APRON
7-14	
7-15	ACQUIRE 15 ACRES OF HIGHWAY 75 ROW FOR RUNWAY OFA

AIRCRAFT PARKING IMPACTS

FBO:	-39,000 SF
GENERAL AVIATION:	-95,000 SF
TERMINAL APRON:	+41,200 SF
AIR CARGO APRON:	-88,500 SF
NET DIFFERENCE:	-181,300 SF

POTENTIAL MODIFICATIONS REQUIRED

AIRPORT DESIGN STANDARD	STANDARD DIMENSIONS	POTENTIAL MODIFICATIONS REQUIRED AS SHOWN
RUNWAY TO PARALLEL TAXIWAY SEPARATION	400'	320'
RUNWAY TO AIRCRAFT PARKING	500'	400'
RUNWAY OFA GRADING	10:1	4:1
RUNWAY OFA CLEARING	NO FIXED OBJECTS	HWY 75/BUILDINGS AT NE CORNER
TAXIWAY OBJECT FREE AREA	186'	160'

LEGEND	
7-1	KEY NUMBER
[Blue Box]	NEW AIRFIELD PAVEMENT
[Orange Box]	AIRFIELD PAVEMENT REMOVAL
[Purple Box]	NEW BUILDING / HANGAR / STRUCTURE AREA
[Red Box]	BUILDING / HANGAR / STRUCTURE REMOVAL
[Green Box]	NEW LAND ACQUISITION - OPTION A
[Yellow Box]	NEW LAND ACQUISITION - OPTION B
[Light Blue Box]	RELOCATED HIGHWAY

NOTES

1. PROPERTY ACQUISITION SHOWN REFLECTS AN ASSUMED PARCEL FOR ACQUISITION. ALTERNATE CONFIGURATION MAY BE PREFERABLE TO LANDOWNER.



**Table 5-7 – Alternative 7 – Modest Expansion**

RDC C-III $\geq 1$ Mile	MEETS STANDARDS?	DISPOSITION/COMMENTS
<b>RUNWAY PROTECTION STANDARDS</b>		
Runway Safety Area (RSA)	Yes	<ul style="list-style-type: none"> <li>Meets RSA grading and dimensional standards. Dimensional standards met with the removal of Taxiway A on the east side and relocation of Taxiway B on the west side.</li> </ul>
Runway Object Free Area (OFA) – dimensional standards	Yes	<ul style="list-style-type: none"> <li>Relocation of Highway 75 and bike path to the east provides for a fully compliant OFA.</li> </ul>
Runway Object Free Area (OFA) – grading standards	No – MOS Required	<ul style="list-style-type: none"> <li>Requires the acquisition of 15 acres of land to relocate Highway 75 and bike path Right-of-Ways (ROW).</li> </ul>
Taxiway Object Free Area (TOFA)	No – MOS Required	<ul style="list-style-type: none"> <li>Requires removal and relocation of Air Traffic Control Tower (ATCT).</li> <li>MOS for runway OFA grading and aircraft specific TOFA.</li> </ul>
Object Free Zone (OFZ)	Yes	<ul style="list-style-type: none"> <li>Provides fully compliant OFZ</li> </ul>
Runway Protection Zone (RPZ)	No	<ul style="list-style-type: none"> <li>Portions of Highway 75 remain in RPZ on both ends (may be allowable with FAA approval).</li> <li>Land acquisition required to accommodate RPZ on Runway 31 end.</li> </ul>
<b>SEPARATION STANDARDS</b>		
Centerline to Holdline(s)	Yes	<ul style="list-style-type: none"> <li>Fully compliant at 250 feet</li> </ul>
Centerline to Parallel Taxiway	No – MOS Required	<ul style="list-style-type: none"> <li>Taxiway A – Removed. 320-330 foot runway to Taxiway B centerline – Requires MOS.</li> </ul>
Centerline to Aircraft Parking	No – MOS Required	<ul style="list-style-type: none"> <li>Requires MOS. Existing separation 400 feet – standard is 500 feet.</li> </ul>
<b>MAJOR ENVIRONMENTAL CONSIDERATIONS</b>		
Compatible Land Use Wetlands	N/A	<ul style="list-style-type: none"> <li>41 acres of land acquisition, including the acquisition of some ranch land and land for Highway 75 ROW may have adverse environmental impacts based on these impact categories.</li> </ul>
<b>OTHER</b>		
Compliance and Infrastructure	N/A	<ul style="list-style-type: none"> <li>Requires the use of MOS. Results in loss of current hangars, aircraft parking and snow storage. Replacement of lost facilities can be recovered on acquired land.</li> </ul>
Schedule (including planning/ environmental/land acquisition/construction)	N/A	<b>Maximum 3 years (2013-2015). MUST BE IMPLEMENTED IMMEDIATELY TO MEET RSA DEADLINE.</b>
<b>COST ESTIMATE</b>		<b>\$59,500,000</b>



# **APPENDIX A**

## **SUN CURRENT FAA FORM 5010-1**



# AIRPORT MASTER RECORD

PRINT DATE: 10/24/2012  
APR 1982  
Form DOT/FAA/1082-2120-0015

1. AIRPORT CITY: HAILEY		4. STATE: ID		6. COUNTY: BLAINE		7. AIRPORT NAME: FRIEDMAN MEMORIAL	
2. AIRPORT NAME: FRIEDMAN MEMORIAL		5. REGIONAL: ANNUER		8. COUNTY: BLAINE		9. AIRPORT NAME: FRIEDMAN MEMORIAL	
3. AIRPORT (NM): 01.85		6. REGIONAL: ANNUER		7. AIRPORT NAME: FRIEDMAN MEMORIAL		8. COUNTY: BLAINE	

10. OWNERSHIP: PU		11. FUEL: ADULT		12. SERVICES: MAJOR		13. BASED AIRCRAFT: 101	
14. OWNER: CITY OF HAILEY		15. AIRFRAME: MAJOR		16. FUEL PLANTERS: MAJOR		17. MILITARY: 1	
18. ADDRESS: BLANE CO - BOX 204		19. BOTTLE OXYGEN: HIGH		20. BULK OXYGEN: HIGH		21. TOTAL: 101	
22. PHONE NR: 208-788-5501		23. TSTNT STORAGE: HOR. TIE		24. OTHER SERVICES: APT. AND. CARDS. CHTR. INSTR. ENCL. BAKES		25. HELICOPTERS: 1	
26. MANAGER: RICHARD R. BARD		27. TSTNT STORAGE: HOR. TIE		28. OTHER SERVICES: APT. AND. CARDS. CHTR. INSTR. ENCL. BAKES		29. GLIDERS: 1	
30. ADDRESS: HAILEY, ID 83833		31. TSTNT STORAGE: HOR. TIE		32. OTHER SERVICES: APT. AND. CARDS. CHTR. INSTR. ENCL. BAKES		33. MILITARY: 1	
34. PHONE NR: 208-788-5501		35. TSTNT STORAGE: HOR. TIE		36. OTHER SERVICES: APT. AND. CARDS. CHTR. INSTR. ENCL. BAKES		37. ULTRA-LIGHT: 2	
38. ATTENDANCE SCHEDULE: ALL		39. TSTNT STORAGE: HOR. TIE		40. OTHER SERVICES: APT. AND. CARDS. CHTR. INSTR. ENCL. BAKES		41. OPERATIONS: 1,039	
42. AIRPORT USE: PUBLIC		43. TSTNT STORAGE: HOR. TIE		44. OTHER SERVICES: APT. AND. CARDS. CHTR. INSTR. ENCL. BAKES		45. AIR CARRIER: 1,039	
46. AIRPT. CAT: 1500-15500 ESTIMATED		47. TSTNT STORAGE: HOR. TIE		48. OTHER SERVICES: APT. AND. CARDS. CHTR. INSTR. ENCL. BAKES		49. AIR TAXI: 1,039	
50. AIRPT. CONZ: 174-174-0000		51. TSTNT STORAGE: HOR. TIE		52. OTHER SERVICES: APT. AND. CARDS. CHTR. INSTR. ENCL. BAKES		53. GAIL LOGAN: 1,039	
54. AIRPT. ELEV: 5220 SURVEYED		55. TSTNT STORAGE: HOR. TIE		56. OTHER SERVICES: APT. AND. CARDS. CHTR. INSTR. ENCL. BAKES		57. SA. ITINETS: 2,001	
58. AIRCRAFT: 241		59. TSTNT STORAGE: HOR. TIE		60. OTHER SERVICES: APT. AND. CARDS. CHTR. INSTR. ENCL. BAKES		61. TOTAL: 1,039	
62. RIGHT TRAFFIC: YES		63. TSTNT STORAGE: HOR. TIE		64. OTHER SERVICES: APT. AND. CARDS. CHTR. INSTR. ENCL. BAKES		65. OPERATIONS FOR 12 MONTHS ENDING: 1,039	
66. NON COMM LANDING: YES		67. TSTNT STORAGE: HOR. TIE		68. OTHER SERVICES: APT. AND. CARDS. CHTR. INSTR. ENCL. BAKES		69. MONTHS ENDING: 1,039	
70. IMPROVED AGREEMENT: YES		71. TSTNT STORAGE: HOR. TIE		72. OTHER SERVICES: APT. AND. CARDS. CHTR. INSTR. ENCL. BAKES		73. MONTHS ENDING: 1,039	
74. FAR 135 INDEX: J.A. 101874		75. TSTNT STORAGE: HOR. TIE		76. OTHER SERVICES: APT. AND. CARDS. CHTR. INSTR. ENCL. BAKES		77. MONTHS ENDING: 1,039	

1. RUNWAY IDENT: 1301		2. LENGTH: 7,300		3. WIDTH: 100		4. SURF TYPE COND: ASPHALT	
5. SURF TREATMENT: SW		6. GROSS WT: 1,000		7. GROSS WT: 1,000		8. GROSS WT: 1,000	
9. GROSS WT: 1,000		10. GROSS WT: 1,000		11. GROSS WT: 1,000		12. GROSS WT: 1,000	
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FAX SITE NO. 04001A

BASED AIRCRAFT	
00 SINGLE ENG.	
01 MULT. ENG.	
02 JET	
TOTAL	
93 HELICOPTERS	
94 GLIDERS	
95 MILITARY	
96 ULTRA LIGHT	

**FACILITIES**  
 00 ARPT SCNF  
 01 ARPT LST SHED  
 02 LINC ON  
 03 WIND INDICATOR  
 04 SEGMENTED CIRCLE  
 05 CONTROL TWR  
 06 FSE  
 07 FSE ON ARPT  
 08 FSE PHONE NR  
 09 TOLL FREE NR

OPERATIONS  
100 AIR CARRIER  
102 AIR TAXI  
103 IS A LOCAL  
004 GAITHER  
105 MILITARY  
TOTAL  
OPERATIONS FOR 12  
MONTHS ENDING

**LIGHTING/APCH AIDS**

- \*40 EDGE INTENSITY: —
- \*42 RWY MARK TYPE COND
- \*43 VGR
- \*44 THR CROSSING APT
- \*45 VISUAL CLIMB ANGLE
- \*46 CNTRLN ILL
- \*47 RWY RWY
- \*48 ILL
- \*49 APCH LIGHTS

**OBSTRUCTION DATA**  
 00 FAR 77 CATEGORY:  
 = 51. DISPLACED THH:  
 = 52 CTLG OBSTN:  
 = 53 OBSTN MARKED LTD:  
 = 54 HGT ABOVE RWY END:  
 = 55 DIST FROM RWY END:  
 = 56 QNTRLN OFFSET:  
 = 57 OBSTN CLNC SCORE:  
 = 58 CLOSE IN OBSTN:

**DECLARED INSTANCES:**  
 1. TAKE OFF RUN AVE (TODAY)  
 2. TAKE OFF DIST AVE (TODAY)  
 3. ACT STOP DIST AVE (ASDA)  
 4. LING DIST AVE (LDA)

STARTING PLEASE ADVISE FSS IN ITEM 88 WHEN CHANGES OCCUR TO ITEMS PRECEDED BY 2

REMARKS:

2 081 1. ONLY ACT. ACTIVITY HOURS: 1951-1: STAF WHEN ATCT CLSD. PAFI RY 31. OPER 24 HRS.  
 2 130-1 WHEN ATCT CLSD. LAND RY 31. TAKE OFF RY 15. DUE TO OPPOSITE DIRECTION TRAFFIC USE DUNDING LIGHT IN TRAFFIC PATTERN.  
 2 110-2 NOT REMOVED FOR NIGHT USE OR IN MARSHAL WEATHER BY UNFAMILIAR PILOTS DUE TO MOUNTAINOUS TERRAIN.  
 2 110-3 HIRP ACTIVITY 25 AND RY 31.  
 2 110-4 CTC LAUGH 20-788.145 OR 20-788.310Z FOR NOISE ABATEMENT PROCEDURES. APU OPERATION LIMITED TO 30 MINUTE MAXIMUM RUN TIME.  
 2 110-5 IERT REFLECTORS ONLY.  
 2 110-6 DUE TO OPPOSITE TTC. ARCH RY 31. ALONG E SIDE OF VALLEY. DEP RY 13 ALONG W SIDE OF VALLEY. SHOWING 1237.

**INSPECTOR: (T.S.)**

412 LAST INSP

081452012

### THE LISTENERS



# AIRPORT MASTER RECORD

PRINT DATE 10/10/2012  
APP EFF 09/10/2012  
Form Approved OMB 2120-0045

1. AIRPORT CITY:  
2. AIRPORT NAME:  
3. OLD TO AIRPORT NAME:

CONTINUED

4. STATE: ID

5. LOCUS: SUN  
6. COUNTY:

7. FAA SITE NO: 14222CA

8. REGIONAL: AMHSEA

7. SECT AERO CNT:

10. OWNERSHIP:  
11. OWNER:  
12. ADDRESS:  
13. PHONE NR:  
14. MANAGER:  
15. ADDRESS:  
16. PHONE NR:  
17. ATTENDANCE SCHEDULE:

## GENERAL

17. FUEL:  
17.1 AIRFRAME RPRS:  
17.2 FUEL PLANT RPRS:  
17.3 BOTTLE OXYGEN:  
17.4 BULK OXYGEN:  
17.5 TSTMT STORAGE:  
17.6 OTHER SERVICES:

## SERVICES

## BASED AIRCRAFT

18. SINGLE ENG:  
19. MULTI ENG:  
20. JET:  
TOTAL:  
21. HELICOPTERS:  
22. GLIDERS:  
23. MILITARY:  
24. ULTRALIGHT:

25. AIRPORT USE:  
26. ART LAY:  
27. ART LIONS:  
28. ART ELEV:  
29. ACHEASE:  
30. RIGHT TRAFFIC:  
31. NON COMM LANDING:  
32. NPASSED AGREEMENTS:  
33. FAR 101 INDEX:

## PACITIES

34. ART BEN:  
35. ART LST SEED:  
36. UNICOM:  
37. DIND INDICATOR:  
38. SEGMENTED CIRCLE:  
39. CONTROL TWR:  
40. FSS:  
41. FSS ON AIRPT:  
42. FSS PHONE NR:  
43. TOLL FREE NR:

OPERATIONS:  
100. AIR CARRIER:  
101. AIR TAXI:  
102. A LOCAL:  
103. A THERNT:  
104. MILITARY:  
TOTAL:  
OPERATIONS FOR 12 MONTHS ENDING:

## RUNWAY DATA

44. RUNWAY IDENT:  
45. LENGTH:  
46. WIDTH:  
47. SURF TYPE COND:  
48. SURF TREATMENT:  
49. GROSS WT:  
50. UNTHDST:  
51. DTW:  
52. DTW:  
53. PCN:

## LIGHTING/APCH AIDE

54. EDGE INTENSITY:  
55. RWY MARKS TYPE COND:  
56. VSSR:  
57. THR CROSSING HGT:  
58. VISUAL GUIDE ANGLE:  
59. CONTRAILER:  
60. RWY RWY:  
61. RWY:  
62. RWY LIGHTS:

## OBSTRUCTION DATA

63. FAR 77 CATEGORY:  
64. DISPLACED THR:  
65. CITYG OBSTN:  
66. OBSTN MARKED LGTH:  
67. HGT ABOVE RWY END:  
68. DIST FROM RWY END:  
69. OBSTN OFFSET:  
70. OBSTN CLNC SLOPE:  
71. CLOSE-IN OBSTN:

## DECLARED DISTANCES

72. TAKE OFF RUNWAY (TORA):  
73. TAKE OFF DIST AVBL (TODA):  
74. ACFT STOP DIST AVBL (ASDA):  
75. LNDG DIST AVBL (LDA):

IF ANY OF THE ABOVE PLEASE ADVISE FSS IN ITEM 25 WHEN CHANGES OCCUR TO ITEMS PRECEDED BY

## REMARKS

A-110-12 NO LOCKED BRAKE TURNS.  
A-110-13 APU OPERATION LIMITED TO 30 MINS WITHOUT EXCEPTION.  
A-110-14 TAXIWAYS A, B AND C ARE RESTRICTED TO AIRCRAFT WITH WINGSPAN OF 47' OR LESS (AIRCRAFT DESIGN GROUP 1 ONLY).  
A-110-15 TAXI A OPEN RTN A 2 & AT DLT HRS ONLY.  
A-110-16 A-110-17 A-110-18 A-110-19 A-110-20 A-110-21 A-110-22 A-110-23 A-110-24 A-110-25 A-110-26 A-110-27 A-110-28 A-110-29 A-110-30 A-110-31 A-110-32 A-110-33 A-110-34 A-110-35 A-110-36 A-110-37 A-110-38 A-110-39 A-110-40 A-110-41 A-110-42 A-110-43 A-110-44 A-110-45 A-110-46 A-110-47 A-110-48 A-110-49 A-110-50 A-110-51 A-110-52 A-110-53 A-110-54 A-110-55 A-110-56 A-110-57 A-110-58 A-110-59 A-110-60 A-110-61 A-110-62 A-110-63 A-110-64 A-110-65 A-110-66 A-110-67 A-110-68 A-110-69 A-110-70 A-110-71 A-110-72 A-110-73 A-110-74 A-110-75 A-110-76 A-110-77 A-110-78 A-110-79 A-110-80 A-110-81 A-110-82 A-110-83 A-110-84 A-110-85 A-110-86 A-110-87 A-110-88 A-110-89 A-110-90 A-110-91 A-110-92 A-110-93 A-110-94 A-110-95 A-110-96 A-110-97 A-110-98 A-110-99 A-110-100 A-110-101 A-110-102 A-110-103 A-110-104 A-110-105 A-110-106 A-110-107 A-110-108 A-110-109 A-110-110 A-110-111 A-110-112 A-110-113 A-110-114 A-110-115 A-110-116 A-110-117 A-110-118 A-110-119 A-110-120 A-110-121 A-110-122 A-110-123 A-110-124 A-110-125 A-110-126 A-110-127 A-110-128 A-110-129 A-110-130 A-110-131 A-110-132 A-110-133 A-110-134 A-110-135 A-110-136 A-110-137 A-110-138 A-110-139 A-110-140 A-110-141 A-110-142 A-110-143 A-110-144 A-110-145 A-110-146 A-110-147 A-110-148 A-110-149 A-110-150 A-110-151 A-110-152 A-110-153 A-110-154 A-110-155 A-110-156 A-110-157 A-110-158 A-110-159 A-110-160 A-110-161 A-110-162 A-110-163 A-110-164 A-110-165 A-110-166 A-110-167 A-110-168 A-110-169 A-110-170 A-110-171 A-110-172 A-110-173 A-110-174 A-110-175 A-110-176 A-110-177 A-110-178 A-110-179 A-110-180 A-110-181 A-110-182 A-110-183 A-110-184 A-110-185 A-110-186 A-110-187 A-110-188 A-110-189 A-110-190 A-110-191 A-110-192 A-110-193 A-110-194 A-110-195 A-110-196 A-110-197 A-110-198 A-110-199 A-110-200 A-110-201 A-110-202 A-110-203 A-110-204 A-110-205 A-110-206 A-110-207 A-110-208 A-110-209 A-110-210 A-110-211 A-110-212 A-110-213 A-110-214 A-110-215 A-110-216 A-110-217 A-110-218 A-110-219 A-110-220 A-110-221 A-110-222 A-110-223 A-110-224 A-110-225 A-110-226 A-110-227 A-110-228 A-110-229 A-110-230 A-110-231 A-110-232 A-110-233 A-110-234 A-110-235 A-110-236 A-110-237 A-110-238 A-110-239 A-110-240 A-110-241 A-110-242 A-110-243 A-110-244 A-110-245 A-110-246 A-110-247 A-110-248 A-110-249 A-110-250 A-110-251 A-110-252 A-110-253 A-110-254 A-110-255 A-110-256 A-110-257 A-110-258 A-110-259 A-110-260 A-110-261 A-110-262 A-110-263 A-110-264 A-110-265 A-110-266 A-110-267 A-110-268 A-110-269 A-110-270 A-110-271 A-110-272 A-110-273 A-110-274 A-110-275 A-110-276 A-110-277 A-110-278 A-110-279 A-110-280 A-110-281 A-110-282 A-110-283 A-110-284 A-110-285 A-110-286 A-110-287 A-110-288 A-110-289 A-110-290 A-110-291 A-110-292 A-110-293 A-110-294 A-110-295 A-110-296 A-110-297 A-110-298 A-110-299 A-110-300 A-110-301 A-110-302 A-110-303 A-110-304 A-110-305 A-110-306 A-110-307 A-110-308 A-110-309 A-110-310 A-110-311 A-110-312 A-110-313 A-110-314 A-110-315 A-110-316 A-110-317 A-110-318 A-110-319 A-110-320 A-110-321 A-110-322 A-110-323 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A-110-424 A-110-425 A-110-426 A-110-427 A-110-428 A-110-429 A-110-430 A-110-431 A-110-432 A-110-433 A-110-434 A-110-435 A-110-436 A-110-437 A-110-438 A-110-439 A-110-440 A-110-441 A-110-442 A-110-443 A-110-444 A-110-445 A-110-446 A-110-447 A-110-448 A-110-449 A-110-450 A-110-451 A-110-452 A-110-453 A-110-454 A-110-455 A-110-456 A-110-457 A-110-458 A-110-459 A-110-460 A-110-461 A-110-462 A-110-463 A-110-464 A-110-465 A-110-466 A-110-467 A-110-468 A-110-469 A-110-470 A-110-471 A-110-472 A-110-473 A-110-474 A-110-475 A-110-476 A-110-477 A-110-478 A-110-479 A-110-480 A-110-481 A-110-482 A-110-483 A-110-484 A-110-485 A-110-486 A-110-487 A-110-488 A-110-489 A-110-490 A-110-491 A-110-492 A-110-493 A-110-494 A-110-495 A-110-496 A-110-497 A-110-498 A-110-499 A-110-500 A-110-501 A-110-502 A-110-503 A-110-504 A-110-505 A-110-506 A-110-507 A-110-508 A-110-509 A-110-510 A-110-511 A-110-512 A-110-513 A-110-514 A-110-515 A-110-516 A-110-517 A-110-518 A-110-519 A-110-520 A-110-521 A-110-522 A-110-523 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A-110-724 A-110-725 A-110-726 A-110-727 A-110-728 A-110-729 A-110-730 A-110-731 A-110-732 A-110-733 A-110-734 A-110-735 A-110-736 A-110-737 A-110-738 A-110-739 A-110-740 A-110-741 A-110-742 A-110-743 A-110-744 A-110-745 A-110-746 A-110-747 A-110-748 A-110-749 A-110-750 A-110-751 A-110-752 A-110-753 A-110-754 A-110-755 A-110-756 A-110-757 A-110-758 A-110-759 A-110-760 A-110-761 A-110-762 A-110-763 A-110-764 A-110-765 A-110-766 A-110-767 A-110-768 A-110-769 A-110-770 A-110-771 A-110-772 A-110-773 A-110-774 A-110-775 A-110-776 A-110-777 A-110-778 A-110-779 A-110-780 A-110-781 A-110-782 A-110-783 A-110-784 A-110-785 A-110-786 A-110-787 A-110-788 A-110-789 A-110-790 A-110-791 A-110-792 A-110-793 A-110-794 A-110-795 A-110-796 A-110-797 A-110-798 A-110-799 A-110-800 A-110-801 A-110-802 A-110-803 A-110-804 A-110-805 A-110-806 A-110-807 A-110-808 A-110-809 A-110-810 A-110-811 A-110-812 A-110-813 A-110-814 A-110-815 A-110-816 A-110-817 A-110-818 A-110-819 A-110-820 A-110-821 A-110-822 A-110-823 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A-110-1021 A-110-1022 A-110-1023 A-110-1024 A-110-1025 A-110-1026 A-110-1027 A-110-1028 A-110-1029 A-110-1030 A-110-1031 A-110-1032 A-110-1033 A-110-1034 A-110-1035 A-110-1036 A-110-1037 A-110-1038 A-110-1039 A-110-1040 A-110-1041 A-110-1042 A-110-1043 A-110-1044 A-110-1045 A-110-1046 A-110-1047 A-110-1048 A-110-1049 A-110-1050 A-110-1051 A-110-1052 A-110-1053 A-110-1054 A-110-1055 A-110-1056 A-110-1057 A-110-1058 A-110-1059 A-110-1060 A-110-1061 A-110-1062 A-110-1063 A-110-1064 A-110-1065 A-110-1066 A-110-1067 A-110-1068 A-110-1069 A-110-1070 A-110-1071 A-110-1072 A-110-1073 A-110-1074 A-110-1075 A-110-1076 A-110-1077 A-110-1078 A-110-1079 A-110-1080 A-110-1081 A-110-1082 A-110-1083 A-110-1084 A-110-1085 A-110-1086 A-110-1087 A-110-1088 A-110-1089 A-110-1090 A-110-1091 A-110-1092 A-110-1093 A-110-1094 A-110-1095 A-110-1096 A-110-1097 A-110-1098 A-110-1099 A-110-1100 A-110-1101 A-110-1102 A-110-1103 A-110-1104 A-110-1105 A-110-1106 A-110-1107 A-110-1108 A-110-1109 A-110-1110 A-110-1111 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# **APPENDIX B**

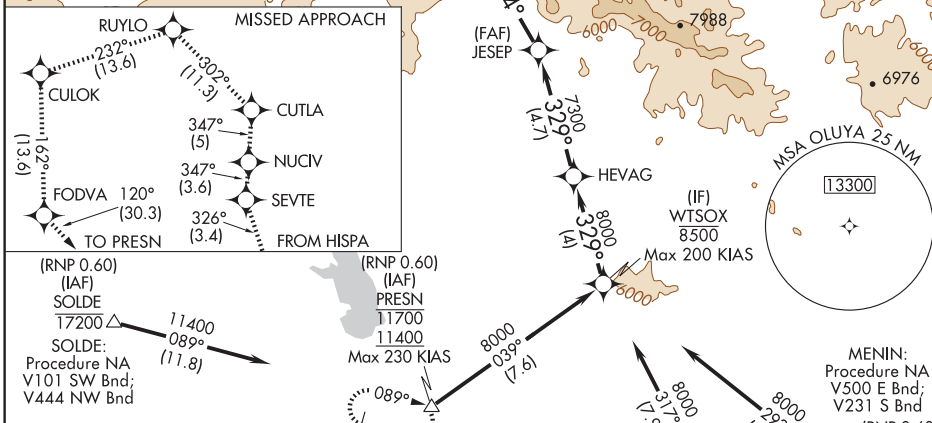
## **CURRENT INSTRUMENT APPROACH PROCEDURES**



11321

RNAV (RNP) Y RWY 31  
HAILEY/FRIEDMAN MEMORIAL (SUN)

**MISSED APPROACH:** Climb to 15000 via 314° track to LOCIR, 314° track to HISPA, 326° track to SEVTE, 347° track to NUCIV, 347° track to CUTLA, 302° track to RUYLO, 232° track to CULOK, 162° track to FODVA, 120° track to PRESN and hold.

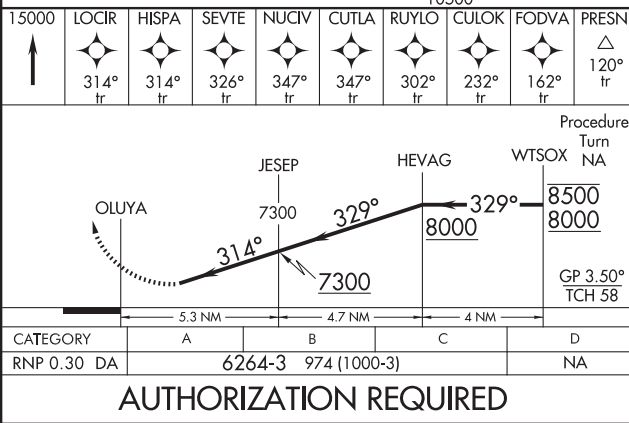


8 NM  $\nearrow 26^\circ$  PRESN:  
Procedure NA  
V500 W Bnd;  
V484 S Bnd

REAPS:  
Procedure NA  
V500 E Bnd;  
V101 SE Bnd

(RNP 0.60) (IAF) (RNP 0.60) (IAF)  
MENIN 12500

REAPS 10500



HAILEY/FRIEDMAN MEMORIAL (SUN)  
RNAV (RNP) Y RWY 31

AL-6239 (FAA)

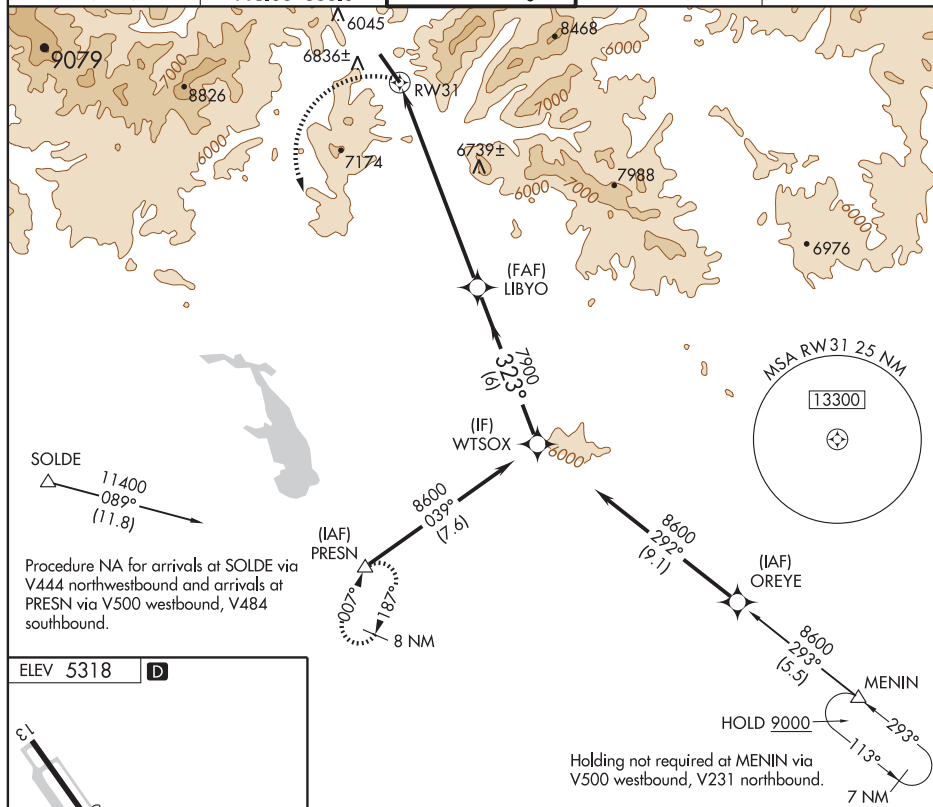
APP CRS <b>323°</b>	Rwy Idg TDZE Apt Elev	<b>6631</b> <b>5290</b> <b>5318</b>
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RNAV (GPS) W RWY 31  
HAILEY/FRIEDMAN MEMORIAL (SUN)

<b>T</b>	Circling NA at night.
<b>A</b>	Circling NA east of Rwy 13-31. DME/DME RNP-0.3 NA. Visibility reduction by helicopters NA.

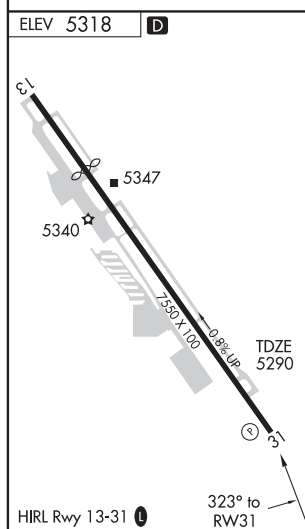
**MISSED APPROACH:** Climbing left turn to 8700 direct PRESN and hold. When authorized by ATC, climb-in-hold to 12500.

ATIS 128.225	SALT LAKE CENTER 118.05 353.0	HAILEY TOWER★ 125.6 (CTAF) L	GND CON 121.7	UNICOM 122.95
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NW-1, 18 OCT 2012 to 15 NOV 2012

NW-1, 18 OCT 2012 to 15 NOV 2012



CATEGORY	A	B	C	D
LNAV MDA	7080-1¼ 1790 (1800-1¼)	7080-1½ 1790 (1800-1½)	7080-3 1790 (1800-3)	NA
CIRCLING	7180-1¼ 1862 (1900-1¼)	7180-1½ 1862 (1900-1½)	7180-3 1862 (1900-3)	NA

HAILEY, IDAHO  
Amdt 2 11013

43°30'N - 114°18'W HAILEY/FRIEDMAN MEMORIAL (SUN)  
RNAV (GPS) W RWY 31



AL-6239 (FAA)

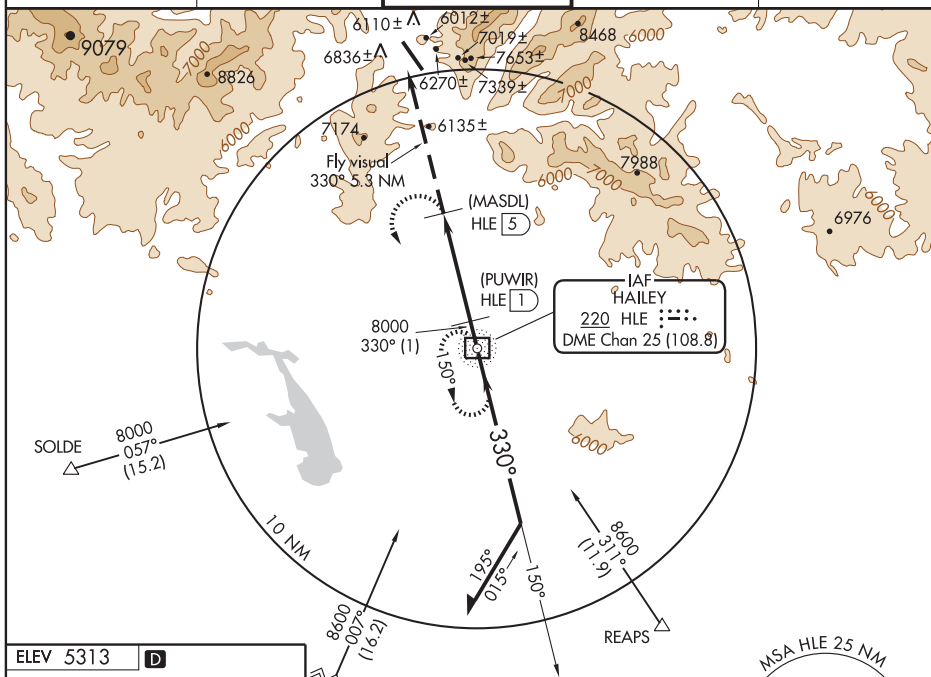
NDB/DME HLE <b><u>220</u></b> DME Chan <b>25</b>	APP CRS <b>330°</b>	Rwy Idg TDZE Apt Elev <b>5313</b>
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NDB/DME or GPS-A  
HAILEY/FRIEDMAN MEMORIAL (SUN)

<b>T</b>	Occasional ADF needle swings away from the final approach course are to be expected north of missed approach point.
<b>A</b> NA	When control tower closed, procedure not authorized. Procedure not authorized at night.

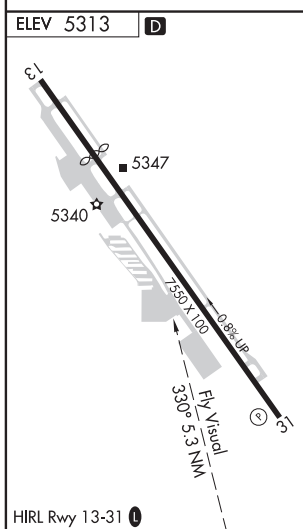
**MISSED APPROACH:** Left turn to 8000 direct HLE NDB/DME and hold.

ATIS <b>128.225</b>	SALT LAKE CENTER <b>118.05 353.0</b>	HAILEY TOWER★ <b>125.6 (CTAF) 0</b>	GND CON <b>121.7</b>	UNICOM <b>122.95</b>
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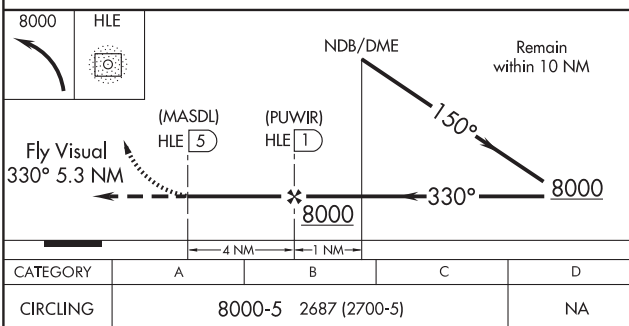


NW-1, 18 OCT 2012 to 15 NOV 2012

NW-1, 18 OCT 2012 to 15 NOV 2012



HAILEY, IDAHO  
Orig-B 11013



HAILEY/FRIEDMAN MEMORIAL (SUN)  
NDB/DME or GPS-A

43°30'N - 114°18'W

AURELIA TWO DEPARTURE (RNAV)

## TAKE-OFF OBSTACLE NOTES

Rwy 13: Multiple trees beginning 763' from DER, 3' right of centerline, up to 100' AGL/5345' MSL.

## TAKE-OFF MINIMUMS

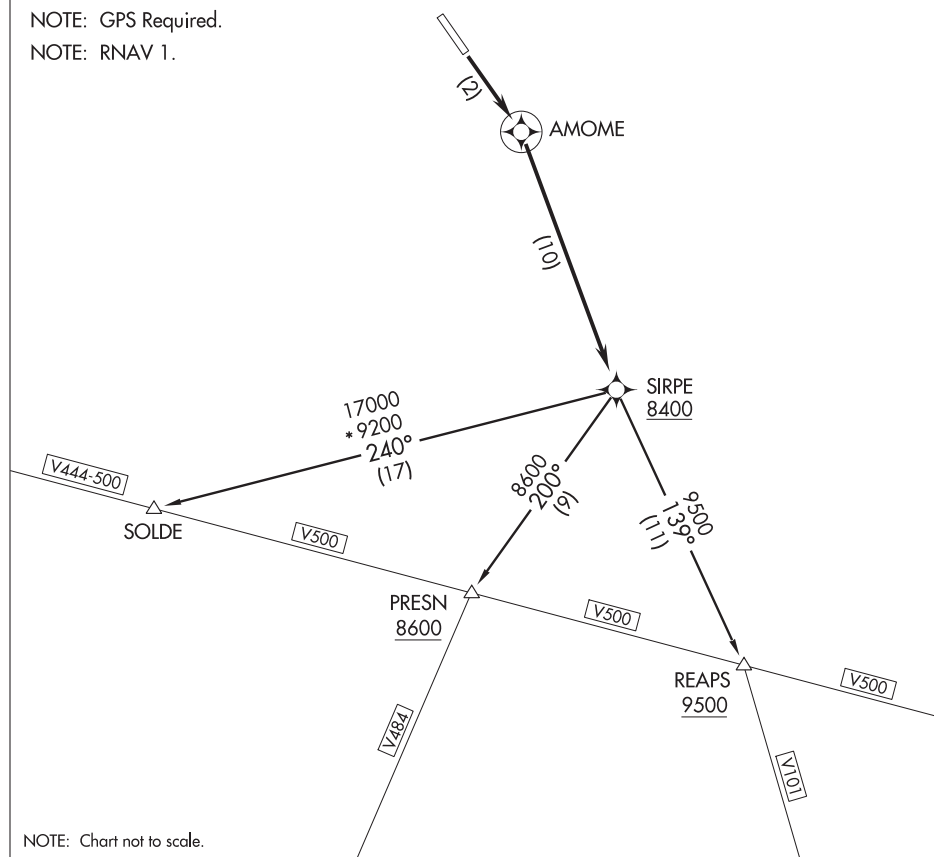
Rwy 13: Standard with minimum climb of 400' per NM to 6700.  
ATC climb of 400' per NM to 7300.

Rwy 31: NA, Obstacles.

NOTE: GPS Required.

NOTE: RNAV 1.

GND CON  
121.7  
HAILEY TOWER★  
125.6  
SALT LAKE CENTER  
118.05 353.0  
UNICOM 122.95



## DEPARTURE ROUTE DESCRIPTION

TAKE-OFF RUNWAY 13: Climb direct AMOME, then climbing right turn direct SIRPE to cross SIRPE; cross SIRPE at or above 8400, Thence....via (Transition).

PRESN TRANSITION (AUREL2.PRESN)

REAPS TRANSITION (AUREL2.REAPS)

SOLDE TRANSITION (AUREL2.SOLDE)

AURELIA TWO DEPARTURE (RNAV)  
(AUREL2.AUREL) 07298

HAILEY, IDAHO  
HAILEY/ FRIEDMAN MEMORIAL (SUN)





# **APPENDIX C**

## **DETAILED COST ESTIMATES**

Item	Unit Cost	Unit	Alternative 1 (Runway East/Hwy East)		Alternative 2 (Runway East/Hwy West)		Alternative 3 (West)		Alternative 4 (South and Twist)	
			Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost
Site Work										
Topsoil Strip/Replace	\$1.00	SY	825,000	\$825,000.00	825,000	\$825,000.00	805,000	\$805,000.00	660,000	\$660,000.00
Excavation to Embankment	\$10.00	CY	300,000	\$3,000,000.00	300,000	\$3,000,000.00	400,000	\$4,000,000.00	500,000	\$5,000,000.00
Excavation To Be Disposed Offsite	\$15.00	CY	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
Unsuitable Overdepth Excavation	\$25.00	CY	30,000	\$750,000.00	30,000	\$750,000.00	40,000	\$1,000,000.00	50,000	\$1,250,000.00
Storm Drainage	Varies	LS	1	\$1,000,000.00	1	\$1,000,000.00	1	\$1,000,000.00	1	\$1,000,000.00
Fencing	\$22.00	LF	14,000	\$308,000.00	18,000	\$396,000.00	11,000	\$242,000.00	21,000	\$462,000.00
Gates	\$25,000.00	Each	5	\$125,000.00	5	\$125,000.00	5	\$125,000.00	5	\$125,000.00
Perimeter/Access Road	\$10.00	LF	13,500	\$135,000.00	18,000	\$180,000.00	14,000	\$140,000.00	21,000	\$210,000.00
Wetland Mitigation										
Pipe Existing Canal	\$120.00	LF	1,600	\$192,000.00	1,600	\$192,000.00	1,800	\$216,000.00	4,300	\$516,000.00
Re-establishment	\$100,000.00	Acre	0.7	\$70,000.00	0.7	\$70,000.00	0.8	\$80,000.00	2.0	\$200,000.00
Subtotal, Site Work Direct Costs				\$6,405,000.00		\$6,538,000.00		\$7,608,000.00		\$9,423,000.00
Indirect Costs (Mobilization, Safety, Etc.)	10%			\$640,500.00		\$653,800.00		\$760,800.00		\$942,300.00
Subtotal, Site Work				\$7,045,500.00		\$7,191,800.00		\$8,368,800.00		\$10,365,300.00
Airfield										
Pavement Removal	\$1.50	SY	180,000	\$270,000.00	180,000	\$270,000.00	367,000	\$550,500.00	210,333	\$315,500.00
Runway										
Pavement (100'x7,500')	\$85.00	SY	84,000	\$7,140,000.00	84,000	\$7,140,000.00	84,000	\$7,140,000.00	84,000	\$7,140,000.00
Shoulders (20')	\$10.00	SY	34,000	\$340,000.00	34,000	\$340,000.00	34,000	\$340,000.00	34,000	\$340,000.00
Edge Drains	\$15.00	LF	15,000	\$225,000.00	15,000	\$225,000.00	15,000	\$225,000.00	15,000	\$225,000.00
Markings	\$50,000.00	LS	1	\$50,000.00	1	\$50,000.00	1	\$50,000.00	1	\$50,000.00
Connecting Taxiways										
Pavement (50')	\$80.00	SY	17,300	\$1,384,000.00	17,300	\$1,384,000.00	13,600	\$1,088,000.00	24,000	\$1,920,000.00
Shoulders (20')	\$10.00	SY	7,200	\$72,000.00	7,200	\$72,000.00	5,800	\$58,000.00	11,000	\$110,000.00
Edge Drains	\$15.00	LF	3,250	\$48,750.00	3,250	\$48,750.00	2,600	\$39,000.00	5,000	\$75,000.00
Markings	\$3,000.00	Each	5	\$15,000.00	5	\$15,000.00	4	\$12,000.00	7	\$21,000.00
Parallel Taxiway										
Pavement (50')	\$80.00	SY	66,000	\$5,280,000.00	66,000	\$5,280,000.00	42,000	\$3,360,000.00	72,000	\$5,760,000.00
Shoulders (20')	\$10.00	SY	29,000	\$290,000.00	29,000	\$290,000.00	28,000	\$280,000.00	50,000	\$500,000.00
Edge Drains	\$15.00	LF	13,000	\$195,000.00	13,000	\$195,000.00	11,250	\$168,750.00	23,000	\$345,000.00
Markings	\$15,000.00	LS	1	\$15,000.00	1	\$15,000.00	1	\$15,000.00	2	\$30,000.00
Terminal Apron										
Pavement	\$80.00	SY	12,100	\$968,000.00	12,100	\$968,000.00	24,800	\$1,984,000.00	0	\$0.00
Markings	\$1,000.00	LS	1	\$1,000.00	1	\$1,000.00	1	\$1,000.00	1	\$1,000.00
Deconfliction Aprons										
Pavement	\$80.00	SY	5,000	\$400,000.00	5,000	\$400,000.00	5,000	\$400,000.00	12,000	\$960,000.00
Markings	\$500.00	LS	1	\$500.00	1	\$500.00	1	\$500.00	2	\$1,000.00
GA Aprons/Taxilanes										
Pavement	\$75.00	SY	18,000	\$1,350,000.00	18,000	\$1,350,000.00	154,000	\$11,550,000.00	34,000	\$2,550,000.00
Markings	\$2,000.00	LS	2	\$4,000.00	2	\$4,000.00	4	\$8,000.00	1	\$2,000.00
Electrical										
HIRLs	\$30.00	LF	15,000	\$450,000.00	15,000	\$450,000.00	15,000	\$450,000.00	15,000	\$450,000.00
MITLs	\$25.00	LF	16,000	\$400,000.00	16,000	\$400,000.00	14,000	\$350,000.00	27,000	\$675,000.00
Vault	\$150,000.00	LS	1	\$150,000.00	1	\$150,000.00	1	\$150,000.00	0	\$0.00
Signs	\$6,000.00	Each	30	\$180,000.00	30	\$180,000.00	50	\$300,000.00	50	\$300,000.00
NAVAIDs										
Relocate PAPIs	\$50,000.00	LS	1	\$50,000.00	1	\$50,000.00	1	\$50,000.00	1	\$50,000.00
Relocate AWOS	\$50,000.00	LS	1	\$50,000.00	1	\$50,000.00	1	\$50,000.00	1	\$50,000.00
Terminal Modifications (Walkway)	\$200,000.00	LS	1	\$200,000.00	1	\$200,000.00	0	\$0.00	0	\$0.00
Air Traffic Control Tower										
Demolish Existing	\$50,000.00	LS	1	\$50,000.00	1	\$50,000.00	1	\$50,000.00	1	\$50,000.00
Construct New Tower	\$5,100,000.00	LS	1	\$5,100,000.00	1	\$5,100,000.00	1	\$5,100,000.00	1	\$5,100,000.00
Subtotal, Airfield Direct Costs				\$24,678,250.00		\$24,678,250.00		\$33,769,750.00		\$27,020,500.00
Indirect Costs (Mobilization, Safety, Etc.)	10%			\$2,467,825.00		\$2,467,825.00		\$3,376,975.00		\$2,702,050.00
Subtotal, Airfield				\$27,146,075.00		\$27,146,075.00		\$37,146,725.00		\$29,722,550.00
Infrastructure										
Airport Access Road	\$75.00	LF	1,200	\$90,000.00	1,200	\$90,000.00	5,000	\$375,000.00	0	\$0.00
Utilities (Dry and Wet)	Varies	LS	1	\$100,000.00	1	\$100,000.00	1	\$250,000.00	1	\$100,000.00
Subtotal, Infrastructure Direct Costs				\$190,000.00		\$100,000.00		\$250,000.00		\$100,000.00
Indirect Costs (Mobilization, Safety, Etc.)	10%			\$19,000.00		\$10,000.00		\$25,000.00		\$10,000.00
Subtotal, Infrastructure				\$209,000.00		\$110,000.00		\$275,000.00		\$110,000.00
Subtotal, Airfield Construction										
				\$34,400,575.00		\$34,447,875.00		\$45,790,525.00		\$40,197,850.00
Construction Contingency	10%			\$3,440,057.50		\$3,444,787.50		\$4,579,052.50		\$4,019,785.00
Planning	5%			\$1,720,028.75		\$1,722,393.75		\$2,289,526.25		\$2,009,892.50
Engineering	20%			\$6,880,115.00		\$6,889,575.00		\$9,158,105.00		\$8,039,570.00
Total, Construction				\$46,440,776.25		\$46,504,631.25		\$61,817,208.75		\$54,267,097.50



Item	Unit Cost	Unit	Alternative 1 (Runway East/Hwy East)		Alternative 2 (Runway East/Hwy West)		Alternative 3 (West)		Alternative 4 (South and Twist)	
			Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost
Highway Relocation										
Pavement Removal	\$1.50	SY	72,000	\$108,000.00	95,000	\$142,500.00	0	\$0.00	0	\$0.00
New Pavement Construction	\$55.00	SY	100,000	\$5,500,000.00	145,000	\$7,975,000.00	0	\$0.00	0	\$0.00
Curb/Gutter	\$15.00	LF	26,000	\$390,000.00	34,000	\$510,000.00	0	\$0.00	0	\$0.00
New Pedestrian Path	\$25.00	LF	12,000	\$300,000.00	0	\$0.00	0	\$0.00	0	\$0.00
Relocate Signal	\$150,000.00	Each	3	\$450,000.00	2	\$300,000.00	0	\$0.00	0	\$0.00
Clearing and Grading	\$10.00	SY	0	\$0.00	137,000	\$1,370,000.00	0	\$0.00	0	\$0.00
Sound Wall	\$600.00	LF	11,500	\$6,900,000.00	8,000	\$4,800,000.00	0	\$0.00	0	\$0.00
Subtotal, Highway Direct Costs				\$13,648,000.00		\$15,097,500.00		\$0.00		\$0.00
Indirect Costs (Mobilization, Safety, Etc.)	10%			\$1,364,800.00		\$1,509,750.00		\$0.00		\$0.00
Subtotal, Highway Relocation				\$15,012,800.00		\$16,607,250.00		\$0.00		\$0.00
Construction Contingency	10%			\$1,501,280.00		\$1,660,725.00		\$0.00		\$0.00
Planning	5%			\$750,640.00		\$830,362.50		\$0.00		\$0.00
Engineering	20%			\$3,002,560.00		\$3,321,450.00		\$0.00		\$0.00
Environmental Impact Study Update	\$ 400,000.00	LS	1	\$400,000.00	1	\$400,000.00	0	\$0.00	0	\$0.00
Total, Highway Relocation				\$20,667,280.00		\$22,819,787.50		\$0.00		\$0.00
Property Acquisition/Facility Relocation										
Residential Homes										
Purchase Home	\$150,000.00	Each	105	\$15,750,000.00	30	\$4,500,000.00	4	\$600,000.00	1	\$150,000.00
Residential Property	\$150,000.00	Acre	0	\$0.00	0	\$0.00	0	\$0.00	18	\$2,700,000.00
Relocation Expense	\$25,000.00	Each	105	\$2,625,000.00	30	\$750,000.00	4	\$100,000.00	1	\$25,000.00
Demolish	\$15,000.00	Each	105	\$1,575,000.00	30	\$450,000.00	4	\$60,000.00	1	\$15,000.00
Churches										
Purchase	\$1,000,000.00	Each	1	\$1,000,000.00	0	\$0.00	0	\$0.00	0	\$0.00
Demolish	\$40,000.00	Each	1	\$40,000.00	0	\$0.00	0	\$0.00	0	\$0.00
Light Industrial/Commercial										
Land Purchase	\$450,000.00	Acre	0	\$0.00	0	\$0.00	6	\$2,700,000.00	0	\$0.00
Existing Facility Purchase	\$100,000.00	Each	0	\$0.00	0	\$0.00	12	\$1,200,000.00	0	\$0.00
Demolish Existing Structures	\$5.00	SF	0	\$0.00	0	\$0.00	54,781	\$273,905.00	0	\$0.00
Ranch										
Agricultural Land	\$100,000.00	Acre	47	\$4,700,000.00	216	\$21,600,000.00	196	\$19,600,000.00	523	\$52,300,000.00
Light Industrial Land	\$150,000.00	Acre	0	\$0.00	0	\$0.00	3	\$450,000.00	0	\$0.00
Building Demolition	\$15,000.00	Each	4	\$60,000.00	4	\$60,000.00	13	\$195,000.00	4	\$60,000.00
Irrigation Modifications	\$50,000.00	LS	1	\$50,000.00	1	\$50,000.00	0	\$0.00	0	\$0.00
Tree Removal	\$50,000.00	LS	1	\$50,000.00	1	\$50,000.00	1	\$50,000.00	3	\$150,000.00
Acquire ROW from ITD for Runway OFA	\$150,000.00	Acre	60	\$9,000,000.00	60	\$9,000,000.00	0	\$0.00	0	\$0.00
Hangars										
Lease Buyout	Varies	LS	0	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00
Demolition	\$5.00	SF	34,000	\$170,000.00	34,000	\$170,000.00	250,000	\$1,250,000.00	0	\$0.00
Replacement Construction	\$100.00	SF	34,000	\$3,400,000.00	34,000	\$3,400,000.00	250,000	\$25,000,000.00	0	\$0.00
Terminal										
Demolition	\$5.00	SF	0	\$0.00	0	\$0.00	28,000	\$140,000.00	0	\$0.00
Construction	\$200.00	SF	0	\$0.00	0	\$0.00	28,000	\$5,600,000.00	0	\$0.00
Airport Administration Office										
Demolition	\$5.00	SF	0	\$0.00	0	\$0.00	2,150	\$10,750.00	0	\$0.00
Construction	\$125.00	SF	0	\$0.00	0	\$0.00	2,150	\$268,750.00	0	\$0.00
Airport Operations and ARFF										
Demolition	\$5.00	SF	0	\$0.00	0	\$0.00	4,800	\$24,000.00	0	\$0.00
Construction	\$200.00	SF	0	\$0.00	0	\$0.00	4,800	\$960,000.00	0	\$0.00
Airport Operations Storage										
Demolition	\$5.00	SF	0	\$0.00	0	\$0.00	3,400	\$17,000.00	0	\$0.00
Construction	\$100.00	SF	0	\$0.00	0	\$0.00	3,400	\$340,000.00	0	\$0.00
Airport Operations Covered Storage										
Demolition	\$5.00	SF	0	\$0.00	0	\$0.00	2,100	\$10,500.00	0	\$0.00
Construction	\$50.00	SF	0	\$0.00	0	\$0.00	2,100	\$105,000.00	0	\$0.00
FBO Office										
Demolition	\$5.00	SF	0	\$0.00	0	\$0.00	9,500	\$47,500.00	9,500	\$47,500.00
Construction	\$150.00	SF	0	\$0.00	0	\$0.00	9,500	\$1,425,000.00	9,500	\$1,425,000.00
FBO Hangar										
Demolition	\$5.00	SF	0	\$0.00	0	\$0.00	31,000	\$155,000.00	31,000	\$155,000.00
Construction	\$125.00	SF	0	\$0.00	0	\$0.00	31,000	\$3,875,000.00	31,000	\$3,875,000.00
Subtotal, Property Acquisition/Facility Relocation				\$38,420,000.00		\$40,030,000.00		\$64,457,405.00		\$60,902,500.00
Contingency	10%			\$3,842,000.00		\$4,003,000.00		\$6,445,740.50		\$6,090,250.00
Consulting (Legal, Survey, Real Estate, Admin.)	20%			\$7,684,000.00		\$8,006,000.00		\$12,891,481.00		\$12,180,500.00
Environmental Studies				\$2,000,000.00		\$2,000,000.00		\$2,000,000.00		\$2,000,000.00
Total, Property Acquisition/Facility Relocation				\$51,946,000.00		\$54,039,000.00		\$85,794,626.50		\$81,173,250.00
TOTAL COSTS				\$119,054,056.25		\$123,363,418.75		\$147,611,835.25		\$135,440,347.50

Item	Unit Cost	Unit	Alternative 5 (1700' South)		Alternative 6 (No Expansion)		Alternative 7 (Modest Expansion)		
			Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost	
Site Work									
Topsoil Strip/Replace	\$1.00	SY	610,000	\$610,000.00	580,000	\$580,000.00	580,000	\$580,000.00	
Excavation to Embankment	\$10.00	CY	250,000	\$2,500,000.00	55,000	\$550,000.00	300,000	\$3,000,000.00	
Excavation To Be Disposed Offsite	\$15.00	CY	0	\$0.00	245,000	\$3,675,000.00	0	\$0.00	
Unsuitable Overdepth Excavation	\$25.00	CY	25,000	\$625,000.00	30,000	\$750,000.00	30,000	\$750,000.00	
Storm Drainage	Varies	LS	1	\$500,000.00	1	\$250,000.00	1	\$500,000.00	
Fencing	\$22.00	LF	12,900	\$283,800.00	11,000	\$242,000.00	14,000	\$308,000.00	
Gates	\$25,000.00	Each	5	\$125,000.00	5	\$125,000.00	5	\$125,000.00	
Perimeter/Access Road	\$10.00	LF	13,000	\$130,000.00	10,000	\$100,000.00	10,000	\$100,000.00	
Wetland Mitigation									
Pipe Existing Canal	\$120.00	LF	1,600	\$192,000.00	0	\$0.00	0	\$0.00	
Re-establishment	\$100,000.00	Acre	0.7	\$70,000.00	0.0	\$0.00	0.0	\$0.00	
Subtotal, Site Work Direct Costs				\$5,035,800.00		\$6,272,000.00		\$5,363,000.00	
Indirect Costs (Mobilization, Safety, Etc.)				10%	\$503,580.00		\$627,200.00		\$536,300.00
Subtotal, Site Work					\$5,539,380.00		\$6,899,200.00		\$5,899,300.00
Airfield									
Pavement Removal	\$1.50	SY	110,000	\$165,000.00	75,550	\$113,325.00	85,000	\$127,500.00	
Runway									
Pavement (100'x7,500')	\$85.00	SY	19,000	\$1,615,000.00	0	\$0.00	0	\$0.00	
Shoulders (20')	\$10.00	SY	32,000	\$320,000.00	0	\$0.00	0	\$0.00	
Edge Drains	\$15.00	LF	14,350	\$215,250.00	0	\$0.00	0	\$0.00	
Markings	\$50,000.00	LS	1	\$50,000.00	0	\$0.00	0	\$0.00	
Connecting Taxiways									
Pavement (50')	\$80.00	SY	6,000	\$480,000.00	12,200	\$976,000.00	12,200	\$976,000.00	
Shoulders (20')	\$10.00	SY	6,000	\$60,000.00	9,500	\$95,000.00	9,500	\$95,000.00	
Edge Drains	\$15.00	LF	2,550	\$38,250.00	4,200	\$63,000.00	4,200	\$63,000.00	
Markings	\$3,000.00	Each	4	\$12,000.00	5	\$15,000.00	5	\$15,000.00	
Parallel Taxiway									
Pavement (50')	\$80.00	SY	43,000	\$3,440,000.00	42,200	\$3,376,000.00	42,200	\$3,376,000.00	
Shoulders (20')	\$10.00	SY	29,200	\$292,000.00	25,500	\$255,000.00	25,500	\$255,000.00	
Edge Drains	\$15.00	LF	13,100	\$196,500.00	11,400	\$171,000.00	11,400	\$171,000.00	
Markings	\$15,000.00	LS	1	\$15,000.00	1	\$15,000.00	1	\$15,000.00	
Terminal Apron									
Pavement	\$80.00	SY	12,100	\$968,000.00	12,500	\$1,000,000.00	14,000	\$1,120,000.00	
Markings	\$1,000.00	LS	1	\$1,000.00	1	\$1,000.00	1	\$1,000.00	
Deconfliction Aprons									
Pavement	\$80.00	SY	9,550	\$764,000.00	11,000	\$880,000.00	14,000	\$1,120,000.00	
Markings	\$500.00	LS	1	\$500.00	1	\$500.00	1	\$500.00	
GA Aprons/Taxilanes									
Pavement	\$75.00	SY	11,318	\$848,875.00	10,000	\$750,000.00	10,000	\$750,000.00	
Markings	\$2,000.00	LS	1	\$2,000.00	1	\$2,000.00	1	\$2,000.00	
Electrical									
HIRLs	\$30.00	LF	14,350	\$430,500.00	0	\$0.00	0	\$0.00	
MITLs	\$25.00	LF	15,650	\$391,250.00	15,600	\$390,000.00	15,600	\$390,000.00	
Vault	\$150,000.00	LS	1	\$150,000.00	1	\$150,000.00	1	\$150,000.00	
Signs	\$6,000.00	Each	16	\$96,000.00	24	\$144,000.00	24	\$144,000.00	
NAVAIDs									
Relocate PAPIs	\$50,000.00	LS	1	\$50,000.00	0	\$0.00	0	\$0.00	
Relocate AWOS	\$50,000.00	LS	1	\$50,000.00	1	\$50,000.00	1	\$50,000.00	
Terminal Modifications (Walkway)	\$200,000.00	LS	1	\$200,000.00	1	\$200,000.00	1	\$200,000.00	
Air Traffic Control Tower									
Demolish Existing	\$50,000.00	LS	1	\$50,000.00	1	\$50,000.00	1	\$50,000.00	
Construct New Tower	\$5,100,000.00	LS	1	\$5,100,000.00	1	\$5,100,000.00	1	\$5,100,000.00	
Subtotal, Airfield Direct Costs				\$16,001,125.00		\$13,796,825.00		\$14,171,000.00	
Indirect Costs (Mobilization, Safety, Etc.)				10%	\$1,600,112.50		\$1,379,682.50		\$1,417,100.00
Subtotal, Airfield					\$17,601,237.50		\$15,176,507.50		\$15,588,100.00
Infrastructure									
Airport Access Road	\$75.00	LF	1,200	\$90,000.00	0	\$0.00	1,200	\$90,000.00	
Utilities (Dry and Wet)	Varies	LS	1	\$100,000.00	1	\$50,000.00	1	\$100,000.00	
Subtotal, Infrastructure Direct Costs				\$100,000.00		\$50,000.00		\$100,000.00	
Indirect Costs (Mobilization, Safety, Etc.)				10%	\$10,000.00		\$5,000.00		\$10,000.00
Subtotal, Infrastructure					\$110,000.00		\$55,000.00		\$110,000.00
Subtotal, Airfield Construction					\$23,250,617.50		\$22,130,707.50		\$21,597,400.00
Construction Contingency				10%	\$2,325,061.75		\$2,213,070.75		\$2,159,740.00
Planning				5%	\$1,162,530.88		\$1,106,535.38		\$1,079,870.00
Engineering				20%	\$4,650,123.50		\$4,426,141.50		\$4,319,480.00
Total, Construction					\$31,388,333.63		\$29,876,455.13		\$29,156,490.00



Item	Unit Cost	Unit	Alternative 5 (1700' South)		Alternative 6 (No Expansion)		Alternative 7 (Modest Expansion)	
			Quantity	Item Cost	Quantity	Item Cost	Quantity	Item Cost
Highway Relocation								
Pavement Removal	\$1.50	SY	45,000	\$67,500.00	0	\$0.00	38,000	\$57,000.00
New Pavement Construction	\$55.00	SY	52,000	\$2,860,000.00	0	\$0.00	71,000	\$3,905,000.00
Curb/Gutter	\$15.00	LF	21,500	\$322,500.00	0	\$0.00	17,000	\$255,000.00
New Pedestrian Path	\$25.00	LF	400	\$10,000.00	0	\$0.00	400	\$10,000.00
Relocate Signal	\$150,000.00	Each	1	\$150,000.00	0	\$0.00	2	\$300,000.00
Clearing and Grading	\$10.00	SY	0	\$0.00	0	\$0.00	0	\$0.00
Sound Wall	\$600.00	LF	11,000	\$6,600,000.00	0	\$0.00	8,750	\$5,250,000.00
Subtotal, Highway Direct Costs				\$10,010,000.00		\$0.00		\$9,777,000.00
Indirect Costs (Mobilization, Safety, Etc.)	10%			\$1,001,000.00		\$0.00		\$977,700.00
Subtotal, Highway Relocation				\$11,011,000.00		\$0.00		\$10,754,700.00
Construction Contingency	10%			\$1,101,100.00		\$0.00		\$1,075,470.00
Planning	5%			\$550,550.00		\$0.00		\$537,735.00
Engineering	20%			\$2,202,200.00		\$0.00		\$2,150,940.00
Environmental Impact Study Update	\$ 400,000.00	LS	1	\$400,000.00	0	\$0.00	1	\$400,000.00
Total, Highway Relocation				\$15,264,850.00		\$0.00		\$14,918,845.00
Property Acquisition/Facility Relocation								
Residential Homes								
Purchase Home	\$150,000.00	Each	0	\$0.00	0	\$0.00	0	\$0.00
Residential Property	\$150,000.00	Acre	0	\$0.00	0	\$0.00	0	\$0.00
Relocation Expense	\$25,000.00	Each	0	\$0.00	0	\$0.00	0	\$0.00
Demolish	\$15,000.00	Each	0	\$0.00	0	\$0.00	0	\$0.00
Churches								
Purchase	\$1,000,000.00	Each	0	\$0.00	0	\$0.00	0	\$0.00
Demolish	\$40,000.00	Each	0	\$0.00	0	\$0.00	0	\$0.00
Light Industrial/Commercial								
Land Purchase	\$450,000.00	Acre	0	\$0.00	0	\$0.00	0	\$0.00
Existing Facility Purchase	\$100,000.00	Each	0	\$0.00	0	\$0.00	0	\$0.00
Demolish Existing Structures	\$5.00	SF	0	\$0.00	0	\$0.00	0	\$0.00
Ranch								
Agricultural Land	\$100,000.00	Acre	110	\$11,000,000.00	0	\$0.00	33	\$3,300,000.00
Light Industrial Land	\$150,000.00	Acre	3	\$450,000.00	0	\$0.00	3	\$450,000.00
Building Demolition	\$15,000.00	Each	5	\$75,000.00	0	\$0.00	0	\$0.00
Irrigation Modifications	\$50,000.00	LS	0	\$0.00	0	\$0.00	0	\$0.00
Tree Removal	\$50,000.00	LS	1	\$50,000.00	0	\$0.00	0	\$0.00
Acquire ROW from ITD for Runway OFA	\$150,000.00	Acre	15	\$2,250,000.00	0	\$0.00	15	\$2,250,000.00
Hangars								
Lease Buyout	Varies	LS	0	\$0.00	1	\$50,000.00	0	\$0.00
Demolition	\$5.00	SF	36,000	\$180,000.00	52,000	\$260,000.00	52,000	\$260,000.00
Replacement Construction	\$100.00	SF	36,000	\$3,600,000.00	52,000	\$5,200,000.00	52,000	\$5,200,000.00
Terminal								
Demolition	\$5.00	SF	0	\$0.00	0	\$0.00	0	\$0.00
Construction	\$200.00	SF	0	\$0.00	0	\$0.00	0	\$0.00
Airport Administration Office								
Demolition	\$5.00	SF	0	\$0.00	2,150	\$10,750.00	0	\$0.00
Construction	\$125.00	SF	0	\$0.00	2,150	\$268,750.00	0	\$0.00
Airport Operations and ARFF								
Demolition	\$5.00	SF	0	\$0.00	0	\$0.00	0	\$0.00
Construction	\$200.00	SF	0	\$0.00	0	\$0.00	0	\$0.00
Airport Operations Storage								
Demolition	\$5.00	SF	0	\$0.00	0	\$0.00	0	\$0.00
Construction	\$100.00	SF	0	\$0.00	0	\$0.00	0	\$0.00
Airport Operations Covered Storage								
Demolition	\$5.00	SF	0	\$0.00	0	\$0.00	0	\$0.00
Construction	\$50.00	SF	0	\$0.00	0	\$0.00	0	\$0.00
FBO Office								
Demolition	\$5.00	SF	0	\$0.00	0	\$0.00	0	\$0.00
Construction	\$150.00	SF	0	\$0.00	0	\$0.00	0	\$0.00
FBO Hangar								
Demolition	\$5.00	SF	0	\$0.00	0	\$0.00	0	\$0.00
Construction	\$125.00	SF	0	\$0.00	0	\$0.00	0	\$0.00
Subtotal, Property Acquisition/Facility Relocation				\$17,605,000.00		\$5,789,500.00		\$11,460,000.00
Contingency	10%			\$1,760,500.00		\$578,950.00		\$1,146,000.00
Consulting (Legal, Survey, Real Estate, Admin.)	20%			\$3,521,000.00		\$1,157,900.00		\$2,292,000.00
Environmental Studies				\$2,000,000.00		\$250,000.00		\$500,000.00
Total, Property Acquisition/Facility Relocation				\$24,886,500.00		\$7,776,350.00		\$15,398,000.00
TOTAL COSTS				\$71,539,683.63		\$37,652,805.13		\$59,473,335.00



# **APPENDIX D**

## **PROPOSED MODIFICATION OF AIRPORT DESIGN STANDARDS**





## APPENDIX D – PROPOSED MODIFICATION OF AIRPORT DESIGN STANDARDS

As discussed in Chapter 3, the current approved Airport Layout Plan for SUN lists several non-standard conditions relative to airport design standards. Alternatives 5-7 included in Chapter 5 propose several Modification of Airport Design Standards (MOS) to improve existing non-standard conditions while maintaining an acceptable level of safety at the airport. Use of MOS is *not* allowed for RSA dimensional standards and SUN will be required to comply with the Congressional RSA mandate by the end of 2015.

In 2011, the Transportation Research Board (TRB) published Airport Cooperative Research Program (ACRP) Report 51 – *Risk Assessment Method to Support Modification of Airfield Separation Standards*. This ACRP report provides a process to justify MOS for airports where standards cannot be met using practical means. This document is recognized by the FAA and was used in the development of the proposed MOS included in this analysis.

A Technical Memo was prepared that summarizes the analysis used in development of these MOS. A copy of that Memo is included in this Appendix.

Proposed draft MOS are also included in this Appendix. The draft MOS have been developed in the current FAA format. Further coordination with the FAA Airports District and Regional Offices regarding the approval of the proposed draft MOS will be necessary.

- Runway OFA
- Runway-Taxiway Separation
- Taxiway OFA
- Runway OFA Grading
- RSA Grading
- Runway Centerline to Aircraft Parking



## **APPENDIX D - MOS TECHNICAL MEMO**





## **Technical Memorandum**

### **RE: SUN Modifications of Design Standards**

**Prepared by: Nathan Cuvala, T-O Engineers**

The intent of this memorandum is to explain the methodology behind the requests for Modifications of Airport Design Standards (MOS) at the Friedman Memorial Airport. The requested MOS forms will be submitted separately.

## **1. BACKGROUND**

The Friedman Memorial Airport is located in Hailey, Idaho. This airport serves the Wood River Valley region of Idaho, including the Sun Valley resort area. The Airport is currently served by two commercial service air carriers: SkyWest and Horizon Air. A large number of corporate jets and other general aviation aircraft also use the airfield for business, recreation and travel to and from the large number of second homes in the area. The Friedman Memorial Airport Authority (FMAA) governs and manages the airport under a joint powers agreement between the City of Hailey and Blaine County, who jointly sponsor the airport.

Traffic by aircraft such as the Bombardier Q400, operated by Horizon Air, and several models of large GA aircraft (e.g., Gulfstream G-V and Bombardier Global Express) dictates the Airport Reference Code for the airport is C-III. Due to the geometry of the existing site, the airport does not meet current FAA design standards for many criteria including:

- Runway to Parallel Taxiway Separation
- Parallel Taxiway Object Free Area
- Runway Object Free Area Grading
- Runway Object Free Area (OFA) Width
- Runway Safety Area (RSA) Grading
- Runway to Aircraft Parking Separation

Until recently, the planned solution to meeting these standards was to relocate the airport to a new site to the south and away from the valley cities. The Federal Aviation Administration (FAA) was conducting an Environmental Impact Statement (EIS) study for a new location until the decision was made to suspend the study in August 2011, due to financial and environmental concerns with the sites under consideration.

A relocated airport is still the ultimate solution, as it will provide airport infrastructure that will meet standards, accommodate all foreseeable demand and provide a reliable all-weather airport. Locating a site and building a new airport is likely to take time, however, and some improvements are required in order for the Airport to survive and thrive at the existing site.

The FMAA has developed a plan to meet standards at the existing site wherever possible and provide an equivalent level of safety where standards can't be met. This technical memorandum will provide the background and justification for each of the requested MOS. These MOS are



seen as an interim solution while the sponsor continues the process of locating a site for the future airport.

## **2. METHODOLOGY**

In 2011, the Transportation Research Board (TRB) released Airport Cooperative Research Program (ACRP) Report #51 – Risk Assessment Method to Support Modifications of Airfield Separation Standards. The ACRP is funded by the Federal Aviation Administration (FAA). This report was used to support several of the MOS requested at the Friedman Memorial Airport. Engineering Brief (EB) #78 – Linear Equations for Evaluating the Separation of Airplane Design Groups on Parallel Taxiways and Taxiways to Fixed/Movable Objects was also used.

The following four MOS listed below were modeled in accordance with Appendix A – Risk Assessment Methodology of ACRP Report #51:

- Runway to Parallel Taxiway Separation
- Runway to Aircraft Parking Separation
- Runway Object Free Area (OFA) Width
- Parallel Taxiway Object Free Area

This report uses a series of risk plots along with the annual number of operations to analyze the risk associated with either Runway to Parallel Taxiway, Runway to Object, or Taxiway to Object Separations. The operations numbers at SUN over the last decade were reviewed to determine the average annual number of operations. The average annual number of operations from 1990 to 2011 was approximately 50,000 operations. Since 2001, operations levels steadily declined until 2008 when they leveled off at approximately 30,000 annual operations. For the purpose of this risk analysis, the average annual operation level was used as it was deemed to be more conservative.

For operations involving the runway, the risk is analyzed based on three distinct phases of flight:

- Landing - Airborne Phase
- Landing - Ground Phase
- Takeoff

The separation distance from the runway centerline to either the parallel taxiway centerline or an object is used with the associated risk plot to calculate the risk of collision per operation. An example of one of the risk plots is shown below:



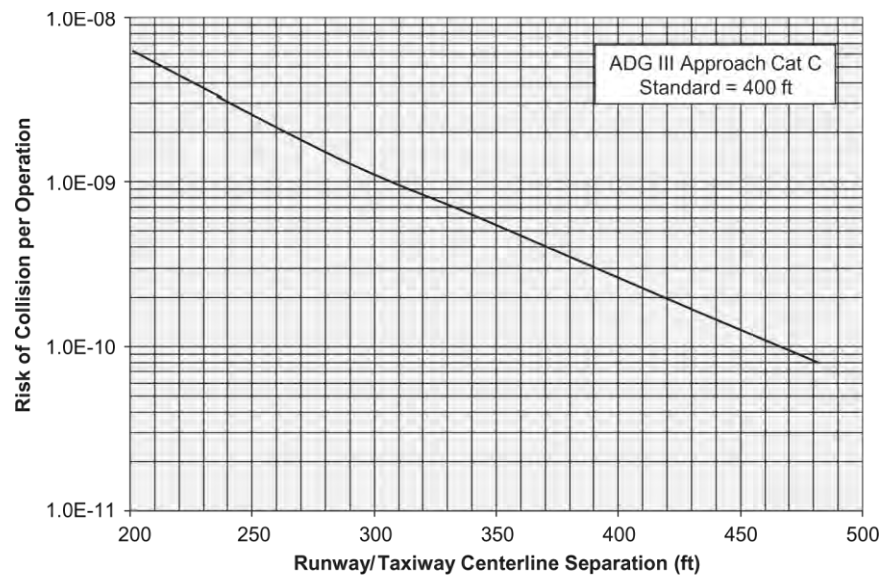


Figure AA-33. Missed approach collision risk for ADG III Cat I.

Source: ACRP Report #51

The risk of collisions per operation is then analyzed along with the number of annual airport operations for the appropriate phase of flight to determine the frequency of occurrence. The frequency of occurrence is used to determine the FAA likelihood level using Table A-3 from ACRP Report #51 which is shown below:

Table A-3. FAA likelihood levels (FAA, 2010).

	General	Airport Specific	ATC Operational	
			Per Facility	NAS-wide
Frequent A	Probability of occurrence per operation is equal to or greater than $1 \times 10^{-3}$	Expected to occur more than once per week or every 2,500 departures ( $4 \times 10^{-4}$ ), whichever occurs sooner	Expected to occur more than once per week	Expected to occur every 1–2 days
Probable B	Probability of occurrence per operation is less than $1 \times 10^{-3}$ , but equal to or greater than $1 \times 10^{-5}$	Expected to occur about once every month or 250,000 departures ( $4 \times 10^{-6}$ ), whichever occurs sooner	Expected to occur about once every month	Expected to occur several times per month
Remote C	Probability of occurrence per operation is less than $1 \times 10^{-5}$ but equal to or greater than $1 \times 10^{-7}$	Expected to occur about once every year or 2.5 million departures ( $4 \times 10^{-7}$ ), whichever occurs sooner	Expected to occur about once every 1–10 years	Expected to occur about once every few months
Extremely Remote D	Probability of occurrence per operation is less than $1 \times 10^{-7}$ but equal to or greater than $1 \times 10^{-9}$	Expected to occur once every 10–100 years or 25 million departures ( $4 \times 10^{-8}$ ), whichever occurs sooner	Expected to occur about once every 10–100 years	Expected to occur about once every 3 years
Extremely Improbable E	Probability of occurrence per operation is less than $1 \times 10^{-9}$	Expected to occur less than once every 100 years	Expected to occur less than once every 100 years	Expected to occur less than once every 30 years

Note: Occurrence is defined per movement.



Source: ACRP Report #51

A Hazard Severity Classification is then assigned based on the worst credible outcome of an incident. The Hazard Severity Classifications were determined in accordance with Table A-4 FAA Severity Definitions from ACRP Report #51 and are shown below:

**Table A-4. FAA severity definitions (FAA, 2010).**

Hazard Severity Classification				
Minimal 5	Minor 4	Major 3	Hazardous 2	Catastrophic 1
No damage to aircraft but minimal injury or discomfort of little consequence to passenger(s) or workers	<ul style="list-style-type: none"> <li>- Minimal damage to aircraft;</li> <li>- Minor injury to passengers;</li> <li>- Minimal unplanned airport operations limitations (i.e. taxiway closure);</li> <li>- Minor incident involving the use of airport emergency procedures</li> </ul>	<ul style="list-style-type: none"> <li>- Major damage to aircraft and/or minor injury to passenger(s)/worker(s);</li> <li>- Major unplanned disruption to airport operations;</li> <li>- Serious incident;</li> <li>- Deduction on the airport's ability to deal with adverse conditions</li> </ul>	<ul style="list-style-type: none"> <li>- Severe damage to aircraft and/or serious injury to passenger(s)/worker(s);</li> <li>- Complete unplanned airport closure;</li> <li>- Major unplanned operations limitations (i.e. runway closure);</li> <li>- Major airport damage to equipment and facilities</li> </ul>	<ul style="list-style-type: none"> <li>- Complete loss of aircraft and/or facilities or fatal injury in passenger(s)/worker(s);</li> <li>- Complete unplanned airport closure and destruction of critical facilities;</li> <li>- Airport facilities and equipment destroyed</li> </ul>

Source: ACRP Report #51

Using both the FAA likelihood level and the Hazard Severity Classification the risk was then analyzed using Figure A-1 FAA Risk Matrix from ACRP Report #51, shown below:



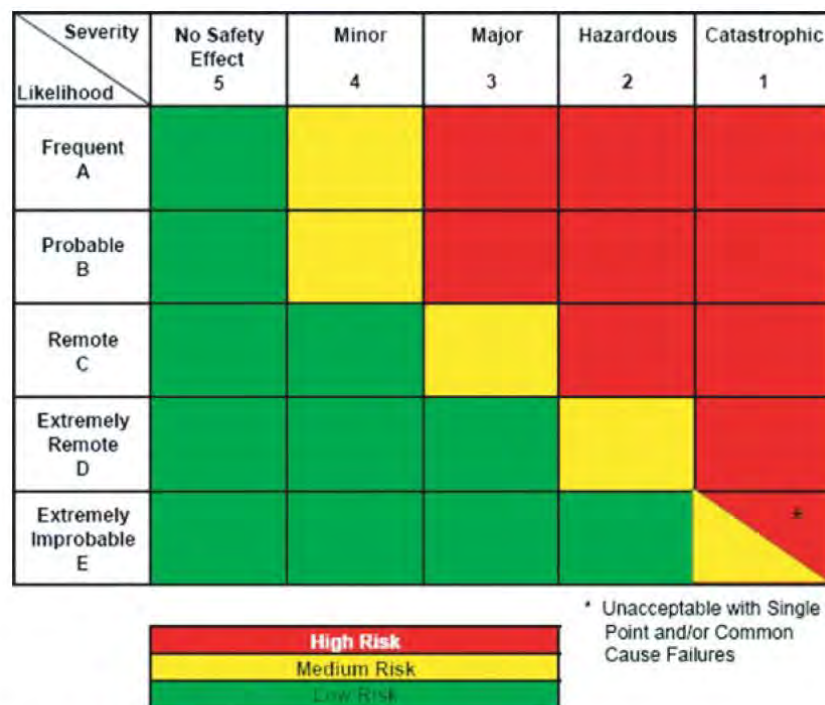


Figure A-1. FAA risk matrix (FAA, 2010).

Source: ACRP Report #51

The MOS for Parallel Taxiway Object Free Area was analyzed in accordance with Engineering Brief #78.

The MOS for both Runway Safety Area and Object Free Area grading were analyzed in accordance with the stated purpose of each of the FAA design standards in either Advisory Circular 150/5300-13A or 150/5300-13 Change 18.

### 3. ANALYSIS

Several of the MOS are tied directly together in that if one is not approved there is no need for the others. The first three related MOS are:

- 1A - Runway to Parallel Taxiway Separation
- 1B - Parallel Taxiway Object Free Area
- 1C - Runway Object Free Area (OFA) Grading

The remaining MOS are shown below:

- 2- Runway Object Free Area (OFA) Width
- 3- Runway Safety Area (RSA) Grading
- 4 - Runway to Aircraft Parking Separation

Several of the MOS listed above are related to MOS 1A, B or C. If MOS 3 – RSA Grading is approved, MOS 1C – Runway OFA Grading is not required. If MOS 1A, B or C are not



approved, MOS 4 – Runway to Aircraft Parking will not be applicable. In the introduction to the analysis for each MOS below, the relation to the other MOS is noted. The following table shows the relationship between each MOS.

<b>MOS</b>	<b>Decision</b>	<b>MOS Not Applicable</b>
1A	Not Approved	1B, 1C, 3, 4
1B	Not Approved	1A, 1C, 4
1C	Not Approved	1A, 1B, 4
3	Approved	1C
4	Not Approved	1A, 1B, 1C, 2, 3

As the relationship between each MOS is complex, it is recommended all proposed MOS be considered together. Following is the analysis of each individual MOS.





## **MOS 1A - Runway to Parallel Taxiway Separation**

The FAA design standard for Runway to Parallel Taxiway Separation for ARC C-III is 400'. The requested MOS for Runway to Parallel Taxiway Separation of Taxiway B is 320'. This MOS is requested in conjunction with MOS 1B - Parallel Taxiway OFA and MOS 1C - Runway OFA Grading. If this MOS is not approved, MOS 4 – Runway to Aircraft Parking Separation is not required.

When analyzing the risk associated with a reduction in Runway to Parallel Taxiway Separation it is important to consider the purpose of the design standard. Appendix 8, Paragraph 1 b. of Advisory Circular 150/5300-13 Change 18 provides the design rationale for separations associated with runway to parallel taxiway:

*“Runway to parallel taxiway/taxilane separation is determined by the landing and takeoff flight path profiles and physical characteristics of airplanes. The runway to parallel taxiway/taxilane standard precludes any part of an airplane (tail, wingtip, nose, etc.) on a parallel taxiway/taxilane centerline from being within the runway safety area or penetrating the OFZ.”*

Paragraph 321 a. (1) of Advisory Circular 150/5300-13A provides the same rationale; however the reference to penetrations of the runway safety area or OFZ has been removed:

*“These standards are determined by landing and takeoff flight path profiles and physical characteristics of aircraft.”*

Additional background on the research that went into determining Runway to Parallel Taxiway Separation is further discussed on Page 5 of ACRP Report #51:

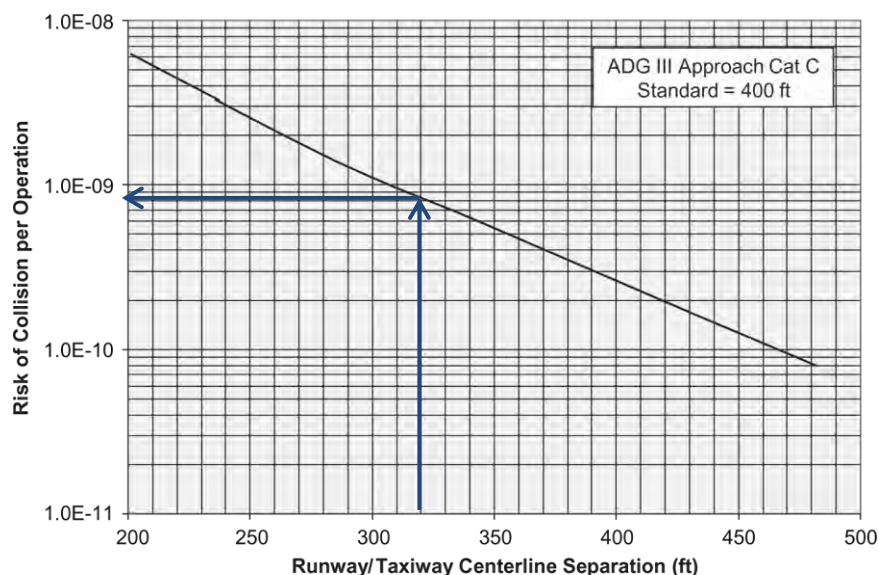
*“In the 1960s, the FAA’s Flight Standards organization and the ICAO Obstacle Clearance Panel (OCP) developed the Collision Risk Model (CRM) for ILS operations. The CRM was based on actual observation of 2,500 aircraft on an ILS precision approach to a runway. Four observations were made for each aircraft’s approach. This model was used to define the area that needed to be protected on an airport when an aircraft was making an ILS approach. The runway/taxiway separation also took into account the possibility of an aircraft on landing rollout or takeoff roll veering off the runway.”*

A separation to the C-III standard could be met in one of two ways, either shift Runway 13-31 and State Highway 75 to the east or shift all facilities on the airfield including the terminal, FBO facilities, ARFF, maintenance and all hangars to the west. The estimated costs of each alternative are shown below:

- Shift Runway 13-31 and State Highway 75 East - \$144 Million dollars
- Shift Airfield Facilities West - \$115 Million dollars

The maximum separation possible at SUN without major impacts to airfield facilities is 320' from Runway 13-31 centerline. There is a small area on the south end of the airfield where the separation could be increased to 330'; however as 320' is the controlling separation, a separation of 330' was not analyzed. The risks associated with each of the phases of flight described previously are analyzed for a Runway to Taxiway Separation of 320' below:

Airborne Landing Phase - Using the separation of 320' and Figure AA-33 in Appendix A of ACRP Report #51, the following provides a risk level  $8.4\text{E-}10$  or one chance in 1.2 billion landings. This can be seen in the figure below:

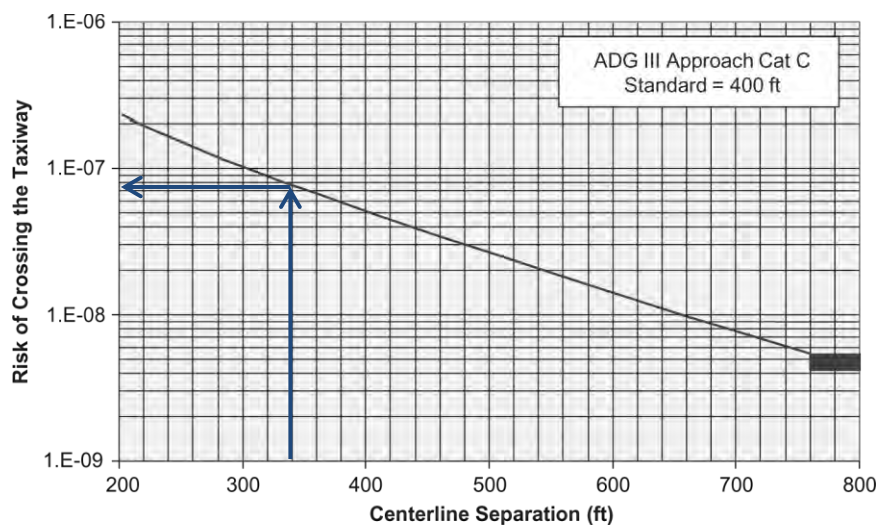


**Figure AA-33. Missed approach collision risk for ADG III Cat I.**

Source: ACRP Report #51

The current annual number of landing operations at SUN is approximately 25,000 or half of the 50,000 annual operations. As the risk is one incident in every 1.2 billion landings, the occurrence is calculated as 1.2 billion divided by 25,000 operations per year which equates to one incident every 47,620 years.

Landing Roll Phase - Using the separation of 320' and Figure AA-43 in Appendix A of ACRP Report #51, provides a risk level  $9.0\text{E-}08$  or one chance in 11 million landings. This can be seen in the figure below:

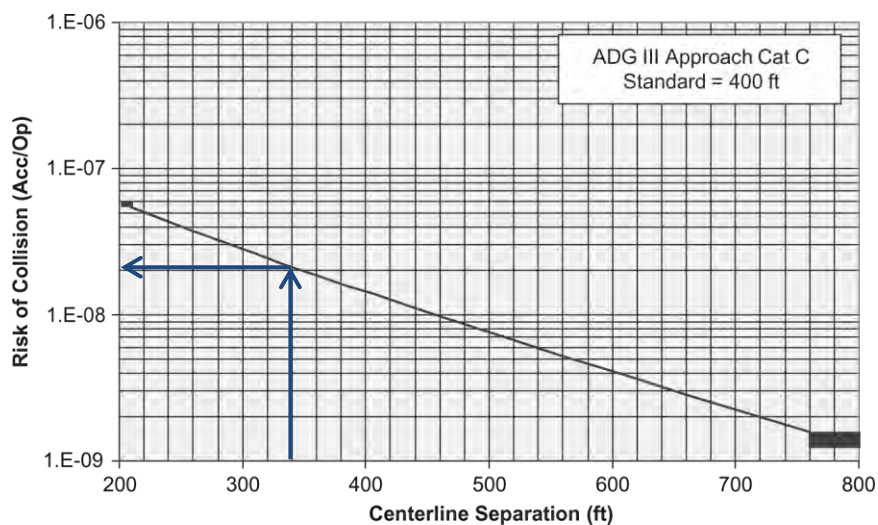


**Figure AA-43. Landing veer-off collision risk for ADG III.**

Source: ACRP Report #51

As the risk is one incident in every 11 million landings, the occurrence is calculated as 11 million divided by 25,000 operations per year which equates to one incident every 440 years.

Takeoff Roll Phase - Using the separation of 320' and Figure AA-50 in Appendix A of ACRP Report #51, provides a risk level 2.5E-08 or one chance in 40 million takeoffs. This can be seen in the figure below:



**Figure AA-50. Takeoff veer-off collision risk for ADG III.**

Source: ACRP Report #51

As the risk is one incident in every 40 million landings, the occurrence is calculated as 40 million divided by 25,000 operations per year which equates to one incident every 1,600 years.

Considering the risk of each phase of flight, the risk of collision during the landing roll is the controlling factor. The Hazard Severity Classification for this type of operation would be





catastrophic and the acceptable probability of occurrence is extremely improbable ( $1E-09$ ) or less than once every 100 years. The following table summarizes the risk associated with each phase of flight:

Phase of Flight	Rate of Occurrence	Acceptable Level?
Airborne Phase	Once every 47,620 years	Yes
Landing Roll Phase	Once every 440 years	Yes
Takeoff Roll Phase	Once every 1,600 years	Yes

A Runway to Parallel Taxiway Separation of 320' appears to provide an acceptable level of risk. In addition a separation of 320' would keep any part of an aircraft on the taxiway from penetrating the RSA, the Runway Obstacle Free Zone (OFZ) and the Part 77 Primary Surface.

## **MOS 1B - Taxiway Object Free Area Width**

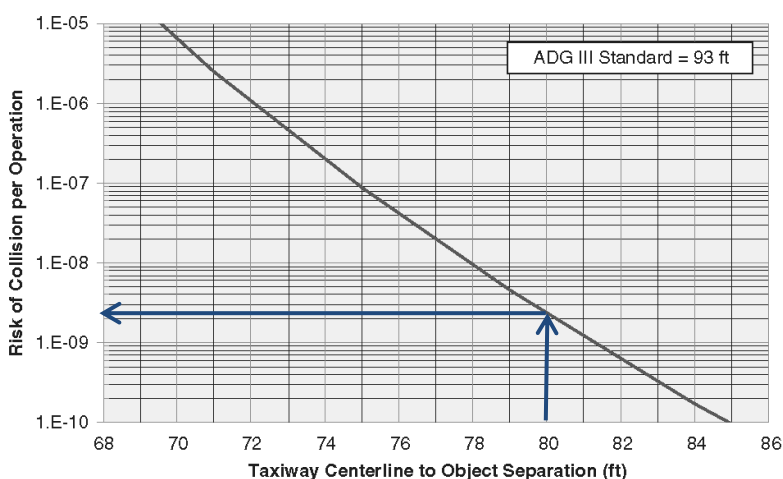
The FAA design standard for Taxiway OFA for ARC C-III is 186'. The requested MOS for Taxiway OFA is 160'. This MOS is requested in conjunction with the MOS - 1A for Runway to Parallel Taxiway Separation and MOS - 1C Runway OFA Grading.

In the airport's current configuration, relocation of Parallel Taxiway B to a separation of 320 feet with a full C-III Taxiway OFA of 186 feet would require significant modification to existing airport facilities, along with property acquisition and removal of adjacent buildings. The estimated cost of these improvements is approximately \$11 million dollars.

When considering the current and anticipated traffic at the airport, these improvements are not necessary. The published pavement strength for Runway 13-31 at SUN is 95,000 pounds. For the current fleet of all available aircraft, no aircraft with a maximum takeoff weight of 95,000 pounds or less has a wingspan of greater than 100 feet. Therefore, existing and anticipated aircraft traffic will include only aircraft with wingspans less than 100 feet.

Equation #2 from Table 1 in EB #78 gives the separation from centerline to an object as  $0.7 \times \text{Wingspan} + 10$  feet. Using this equation and a wingspan of 100', an aircraft specific Taxiway OFA is calculated at 160 feet. For the aircraft that use and are anticipated to use the airport, this Taxiway OFA meets standards and therefore will provide an acceptable level of safety.

In addition, ACRP Report #51 provides the methodology for analyzing the risk of taxiway to object separations. Using the separation of 80' and Figure AA-10 in Appendix A of ACRP Report #51, provides a risk level  $2.5\text{E-}09$  or one chance in 400 million operations. This can be seen in the figure below:



**Figure AA-10. Collision risk associated with taxiway to object separation for ADG III.**

Source: ACRP Report #51

As the risk is one incident in every 400 million operations, the occurrence is calculated as 400 million divided by 50,000 operations per year which equates to one incident every 8,000 years.



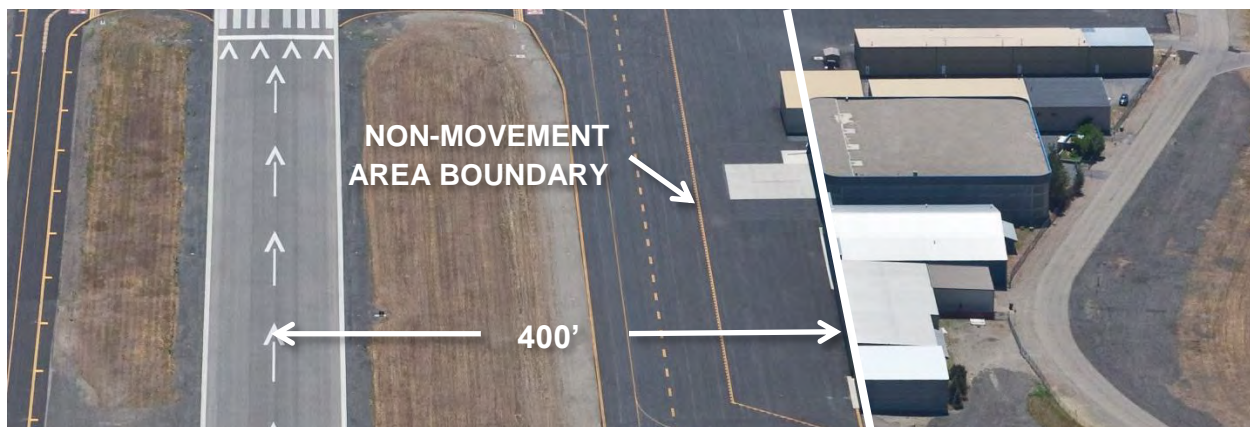
The Hazard Severity Classification for this type of operation would be major and the acceptable probability of occurrence is remote ( $1E-05$ ) or less than once every 1-10 years. A Taxiway OFA of 160' appears to provide an acceptable level of safety especially when considering the current and future aircraft fleet.



### **MOS 1C - Runway Object Free Area Transverse Grading**

The FAA design standard for maximum transverse OFA grading for ADG III is a 10:1 slope for the first 59' of the OFA followed by a maximum slope of 4:1. The requested MOS for maximum transverse OFA grade is a 4:1 slope from the edge of OFA. This MOS is requested in conjunction with MOS - 1A for Runway to Parallel Taxiway Separation and MOS 1B - Parallel Taxiway OFA. This MOS is not required if MOS 3 - Runway Safety Area Grading is approved.

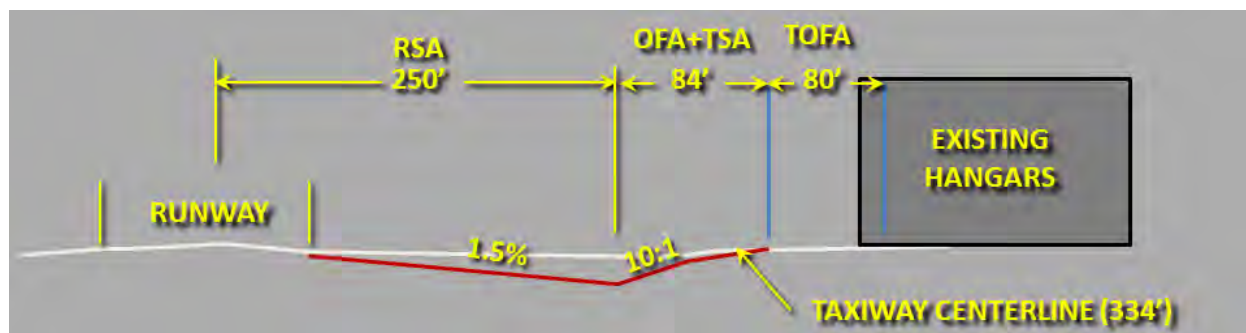
There is one area at the north end of the airfield, where meeting a 10:1 slope incurs significant impacts and cost. At the north end of the airfield, a series of existing hangars are located at approximately 400' from the runway centerline. The estimated cost of relocating these hangars is approximately \$7 Million dollars. This cost does not include any land acquisition costs to accommodate the similar size hangars. The hangars are shown in the figure below:



Source: T-O Engineers

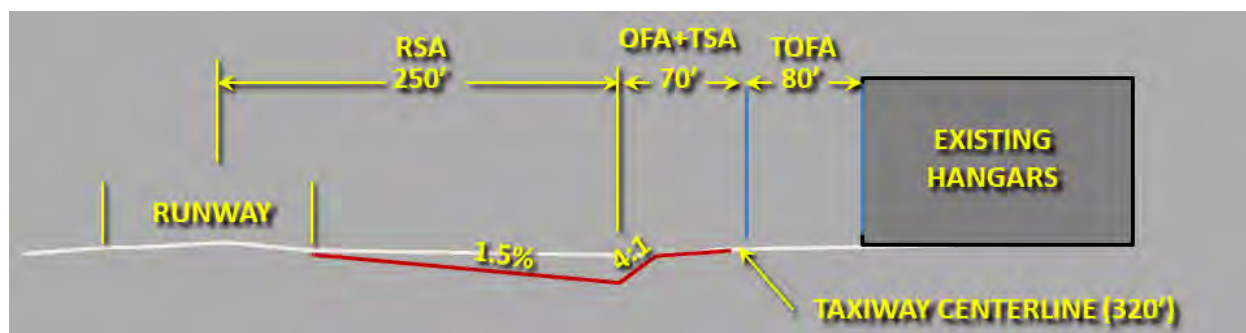
For reference, the current runway to parallel taxiway separation is 250' and a separation of 320' would place the taxiway centerline on the non-movement area boundary marking shown to the right in the photo above. One hangar is currently located less than 400' from the runway centerline and is planned to be removed.

In this area, the existing RSA grades are less than the minimum of 1.5%. Meeting the minimum transverse RSA grade of 1.5% requires removal of up to 4.5' of material at the outside edge of the RSA. In this area, the new RSA grade would be below the TSA and using the maximum allowable grades in the TSA decreases the total elevation change between the RSA and TSA to approximately 2.5', requiring 25' of grading at a 10:1 slope. This grading combined with the RSA grading and TSA grading results in a minimum runway to parallel taxiway separation of 334' and is shown in the figure below:



Source: T-O Engineers

If the parallel taxiway were located at 334' from runway centerline, the hangars shown above would need to be removed as they would be located inside the aircraft specific Taxiway OFA of 160'. Allowing a maximum OFA grade of 4:1 results in a minimum runway to parallel taxiway separation of 319' and would not impact the hangars on the north end. This is shown in the figure below:



Source: T-O Engineers

Prior to the release of AC 150/5300-13A, the previous maximum gradient for the Runway OFA was a 4:1 slope. This MOS is required due to the recent change in the design standard. The main hazard associated with allowing a slope of greater than a 4:1 is the risk a wingtip striking the ground in the event of an excursion from the runway.. At the north end of the airfield, the ground would penetrate approximately 30 inches above the edge of the RSA and would be the same height as an airfield light. The total cost required to meet the maximum OFA slope of a 10:1 at the north end of the airfield is in excess of \$7 Million dollars. Considering the cost and benefit involved in meeting the new design standard, a slope of 4:1 inside the OFA appears to be acceptable.



## **MOS 2 - Runway Safety Area Transverse Grading**

The FAA design standard for transverse RSA grades for ADG III is a minimum of 1.5% and a maximum of 3%. The requested MOS for transverse RSA grade is for less than 1.5%. If this MOS is approved, MOS 1C – Runway Object Free Area Transverse Grading is not required.

Meeting the minimum gradient of 1.5% at SUN requires the removal of 300,000 cubic yards of earthwork. In order to accomplish this, 250,000 cubic yards of earthwork would have to be disposed of off of airport property. The estimated cost of disposing of the material is in excess of \$3.5 Million dollars. In addition, nearly the entire storm drainage system would need to be removed and relocated in order to meet the new grades. This includes 10,000 feet of pipe along with 30 aircraft rated inlets. The estimated cost of relocating the storm drainage system is \$1.5 Million dollars. The work required to grade the RSA and relocate the storm drainage system would require the airport to be closed for 90 days. In the mountain environment of Hailey this work would have to take place in the summer months and would require the runway to be closed during the peak travel season.

When considering this MOS it is important to understand the purpose of the RSA. Paragraph 307 of Advisory Circular 150/5300-13A gives the purpose of the RSA:

*“The RSA enhances the safety of aircraft which undershoot, overrun or veer off the runway, and it provides greater accessibility for fire-fighting and rescue equipment during such incidents.”*

Paragraph 307 b. of Advisory Circular 150/5300-13A defines the requirements of the RSA:

- “(1) cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations;*
- (2) drained by grading or storm sewers to prevent water accumulation;*
- (3) capable under dry conditions of supporting snow removal equipment, Aircraft Rescue and Fire Fighting (ARFF) equipment, and the occasional passage of aircraft; and*
- (4) free of objects, except for objects that need to be relocated in the RSA because of their function.”*

As the purpose of the RSA is to enhance the safety of aircraft in the event of a departure from the runway, the distance an aircraft departs from the runway is affected by three (3) major elements: weight of the aircraft, speed of the aircraft and RSA gradient. The third variable and the subject of this modification, the RSA gradient, affects the rate at which an aircraft slows after departing the runway. The steeper the gradient the longer it will take for an aircraft to stop. The existing transverse RSA gradients at SUN are flatter than standard; meaning an aircraft would actually come to a stop sooner if all other variables were equal. Paragraph 307 f in AC 5300-13 describes this condition:





*“Keeping negative grades to the minimum practicable contributes to the effectiveness of the RSA.”*

Though flatter than standard, the RSA at SUN is graded smoothly and is capable of safely accommodating an aircraft without damage, in the case of a veer off.

The negative aspect of gradients flatter than standard are their inability to adequately drain the RSA during rainfall events. The existing RSA at SUN drains extremely well, with no accumulation of standing water. Existing soils have a very high permeability and the local climate is dry, with an average annual rainfall of only 16 inches. In addition, the runway is equipped with a storm drainage system that collects and removes drainage efficiently. The following table summarizes the design requirements that would be met at SUN:

RSA Requirement	Standard Met
Cleared and Graded	Yes
Drained by grading or storm sewers	Yes
Capable of supporting SRE, ARFF and aircraft	Yes
Free of objects	Yes

The total estimated cost of meeting the minimum transverse grade of a 1.5% is \$5 Million dollars and will require a full airport closure for 3 months. As the proposed RSA at SUN will meet the RSA requirements defined in AC 5300-13A, the grades flatter than standard will provide an acceptable level of safety.

### **MOS 3 - Runway Object Free Area (OFA) Width**

The FAA design standard for Runway OFA Width for ARC C-III is 800', centered on the runway. The deficiencies in the existing Runway OFA at SUN are shown in the Figure below:

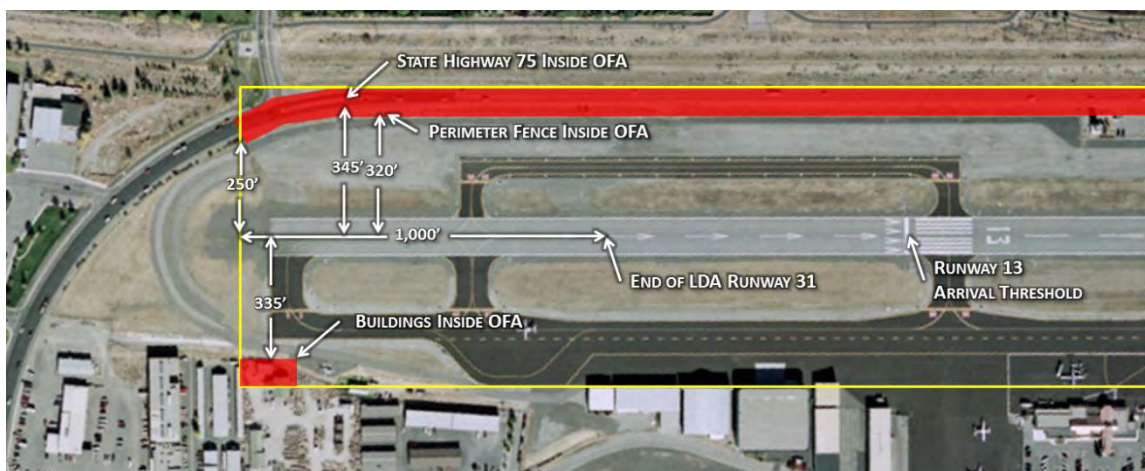


Source: T-O Engineers

The current deficiencies include:

- ATCT Inside OFA (To be relocated)
- Aircraft Parking Inside OFA (To be relocated)
- Hangar Inside OFA (To be relocated)
- Perimeter Fence Inside OFA (250'-320' from Runway CL)
- State Highway 75 Inside OFA (275'-345' from Runway CL)
- Off Airport Buildings Inside OFA (335' from Runway CL)

This MOS only includes the Perimeter Fence, State Highway 75 and the Off Airport Buildings inside the OFA; all of which are located off or at the edge of airport property. The remainder of the OFA deficiencies are located on airport property and could be relocated. State Highway 75 and the Perimeter Fence run parallel to Runway 13-31 from south to north until approximately 210' from the Runway 13 pavement end at which point they curve toward the runway until they are a minimum distance of 250' for the Perimeter Fence and 275' for State Highway 75 from the extended runway centerline. The following figure shows the deficiencies on the north end of the airfield in more detail:



Source: T-O Engineers

As SUN is currently configured using declared distances, the OFA for arrivals and departures in each direction have different deficiencies. The OFA to the east of Runway 13-31 for both arrivals and departures is penetrated by both State Highway 75 and the Perimeter Fence at 345' and 320' respectively. The OFA for Runway 13 departures and Runway 31 arrivals are penetrated to a greater degree at the north end of the airfield by the Perimeter Fence and State Highway 75 along with two buildings located off airport property. The deficiencies are summarized in the following table:

Runway OFA	State Highway 75	Perimeter Fence	Off Airport Buildings
<b>13 Arrivals</b>	345'	320'	None
<b>13 Departures</b>	275' to 345'	250' to 320'	335'
<b>31 Arrivals</b>	275' to 345'	250' to 320'	335'
<b>31 Departures</b>	345'	320'	None

Relocating the perimeter fence is not possible without the relocation of State Highway 75. A large residential neighborhood is located to the east of the SH 75 and the relocation of State Highway 75 closer to the residential neighborhood would raise significant environmental concerns including Historical Resources, Noise and Environmental Justice. Environmental impacts notwithstanding, the estimated costs to relocate State Highway 75 are in excess of \$17 Million dollars.

The buildings located outside of airport property are currently located in an area zoned as light industrial. As the availability of light industrial land in the area is very low, the land is highly desirable. The estimated cost to acquire the light industrial land and remove the structures is \$2 Million dollars.





When analyzing the risk associated with a reduction in Runway OFA it is important to consider the purpose of the design standard. Paragraph 309 of Advisory Circular 150/5300-13A defines the OFA but does not give the design rationale behind the standard:

*“The ROFA is centered about the runway centerline. The ROFA clearing standard requires clearing the ROFA of above-ground objects protruding above the nearest point of the RSA.”*

Appendix 8, Paragraph 4 of Advisory Circular 150/5300-13 Change 18 provides the only available reference to the design rationale behind the Runway OFA width:

*“The ROFA is a result of an agreement that a minimum 400-foot (120 m) separation from runway centerline is required for equipment shelters, other than localizer equipment shelters.”*

Below is a summary of RSA and OFA width for each Runway Design Code (RDC):

RDC	RSA Width	OFA Width
A/B-I Small	120'	250'
A/B-I	120'	400'
A/B-II	150'	500'
A/B-III	300'	800'
C-I through E-IV	500'	800'

Source: AC 150/5300-13A

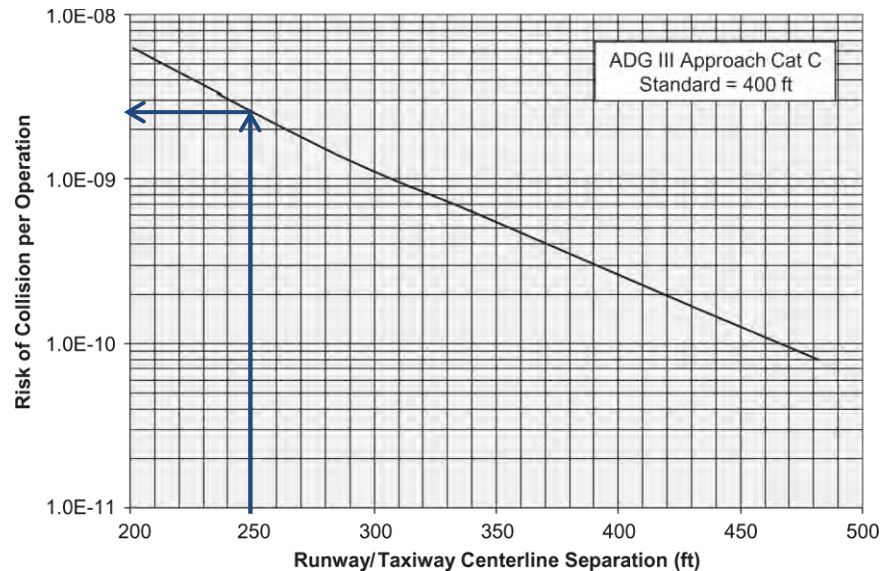
As shown in the table above, the OFA width for any RDC above A/B-II is 800'. This means an airport such as SUN serving the Canadair Regional Jet 700 and the Bombardier Q400 with a Non Precision approach has the same size OFA as Denver International or SEATAC airports, which serve very large commercial aircraft (such as the Boeing 747) with CAT III Precision approaches. Logically it appears a smaller OFA would be acceptable for smaller aircraft. The risk analysis procedure outlined in ACRP Report #51 appears to substantiate this.

Using the same risk based analysis as in the Runway to Parallel Taxiway Separation, there are three separate objects that must be considered; the Perimeter Fence, State Highway 75 and the buildings located off airport property. The risk associated with allowing each of these to remain will be analyzed separately.

#### **Perimeter Fence (250' Separation)**

The Perimeter Fence at the northernmost corner on the OFA is located 250' from the extended runway centerline. The risks associated with each of the phases of flight are analyzed below:

Airborne Landing Phase - Using the separation of 250' and Figure AA-33 in Appendix A of ACRP Report #51, the following provides a risk level  $2.6\text{E-}09$  or one chance in 384 million landings. This can be seen in the figure below:

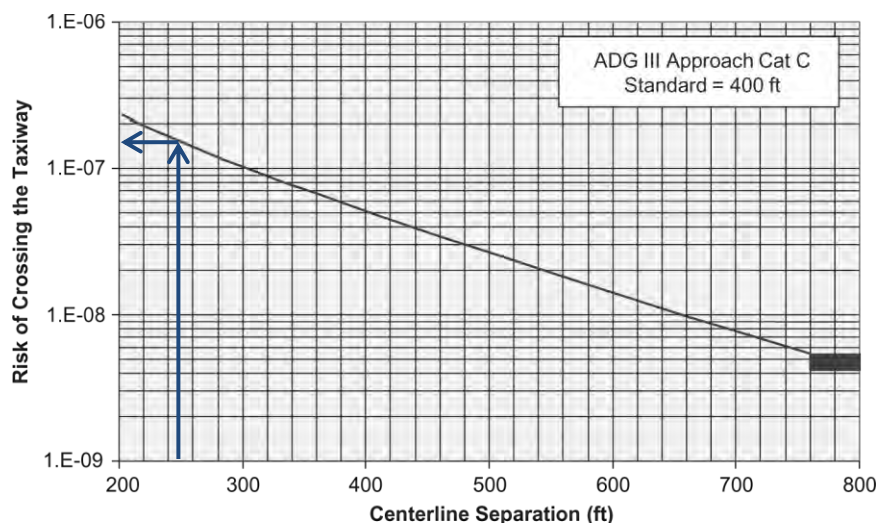


**Figure AA-33. Missed approach collision risk for ADG III Cat I.**

Source: ACRP Report #51

The current annual number of landing operations at SUN is approximately 25,000 or half of the 50,000 annual operations. As the risk is one incident in every 384 million landings, the rate of occurrence is calculated as 384 million landings divided by 25,000 landing operations per year which equates to one incident every 15,360 years.

Landing Roll Phase - Using the separation of 250' and Figure AA-43 in Appendix A of ACRP Report #51, provides a risk level  $1.6\text{E-}07$  or one chance in 6.25 million landings. This can be seen in the figure below:

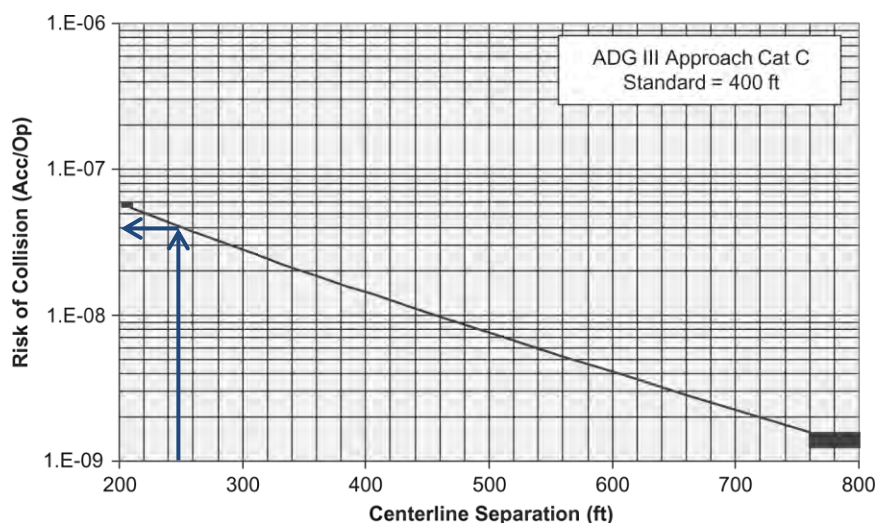


**Figure AA-43. Landing veer-off collision risk for ADG III.**

Source: ACRP Report #51

As the risk is one incident in every 6.25 million landings, the rate of occurrence is calculated as 6.25 million landings divided by 25,000 landings per year which equates to one incident every 250 years.

Takeoff Roll Phase - Using the separation of 250' and Figure AA-50 in Appendix A of ACRP Report #51, provides a risk level 4E-08 or one chance in 25 million takeoffs. This can be seen in the figure below:



**Figure AA-50. Takeoff veer-off collision risk for ADG III.**

Source: ACRP Report #51

As the risk is one incident in every 25 million takeoffs, the rate of occurrence is calculated as 25 million takeoffs divided by 25,000 takeoffs per year which equates to one incident every 1,000 years.





Considering the risk of each phase of flight, the risk of collision during the landing roll is the controlling factor. The Hazard Severity Classification for this type of operation would be major and the acceptable probability of occurrence is remote ( $1E-05$ ) or less than once every 1-10 years. The following table summarizes the risk associated with each phase of flight:

Phase of Flight	Rate of Occurrence	Acceptable Level
Airborne Phase	Once every 15,360 years	Yes
Landing Roll Phase	Once every 250 years	Yes
Takeoff Roll Phase	Once every 1,000 years	Yes

A Runway to object separation of 250' appears to provide an acceptable level of risk as the controlling occurrence is once every 250 years.

#### **Perimeter Fence (320' Separation)**

The Perimeter Fence runs along the east side of Runway 13-31 OFA and is located 320' from the extended runway centerline. The risks associated with each of the phases of flight are exactly the same as those for a Runway to Parallel Taxiway Separation of 320':

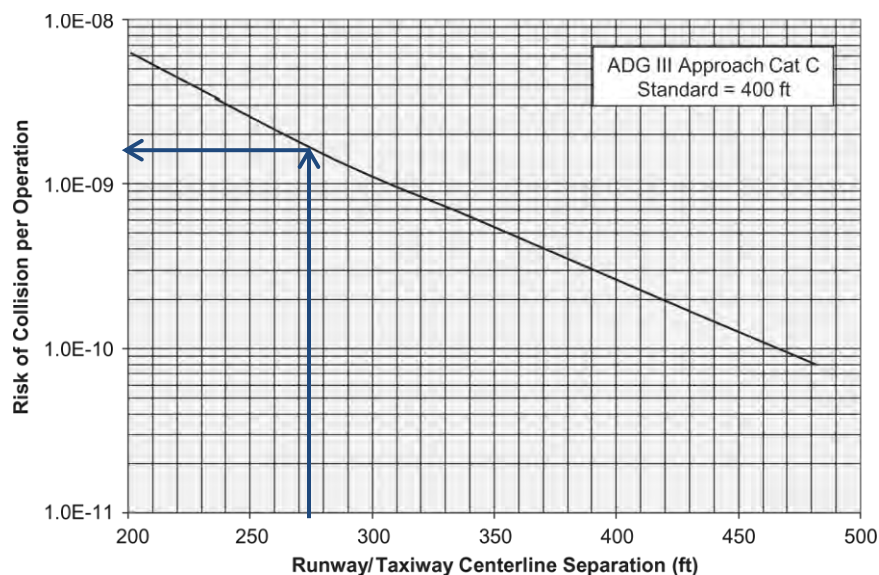
- Airborne Landing Phase - one incident every 47,620 years
- Landing Roll Phase - one incident every 440 years
- Takeoff Roll Phase - one incident every 1,600 years

Considering the risk of each phase of flight, the risk of collision during the landing roll is the controlling factor. The Hazard Severity Classification for this type of operation would be major and the acceptable probability of occurrence is remote ( $1E-05$ ) or less than once every 1-10 years. A Runway to object separation of 250' appears to provide an acceptable level of risk as the controlling rate of occurrence is once every 440 years.

#### **State Highway 75 (275' Separation)**

State Highway 75 at the northernmost corner on the OFA is located 275' from the extended runway centerline. The risks associated with each of the phases of flight are analyzed below:

Airborne Landing Phase - Using the separation of 275' and Figure AA-33 in Appendix A of ACRP Report #51, the following provides a risk level  $1.8E-09$  or one chance in 555 million landings. This can be seen in the figure below:

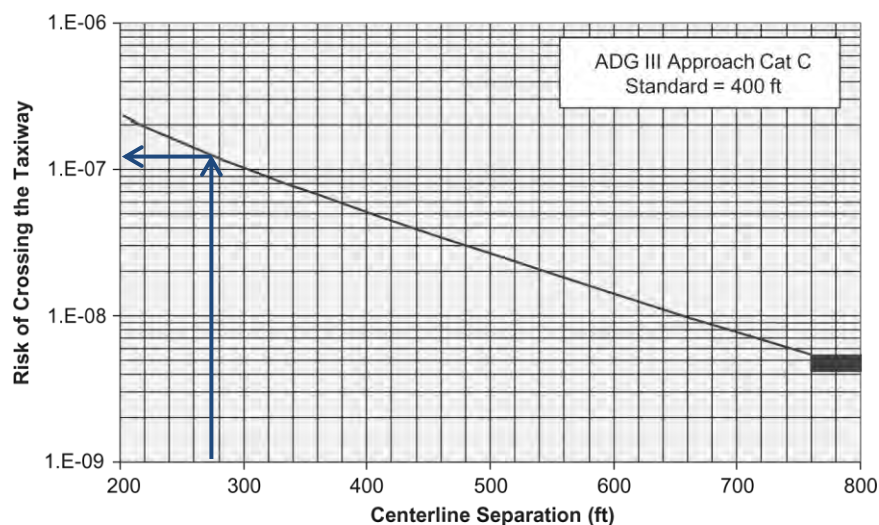


**Figure AA-33. Missed approach collision risk for ADG III Cat I.**

Source: ACRP Report #51

The current annual number of landing operations at SUN is approximately 25,000 or half of the 50,000 annual operations. As the risk is one incident in every 555 million landings, the rate of occurrence is calculated as 555 million landings divided by 25,000 landing operations per year which equates to one incident every 22,200 years.

Landing Roll Phase - Using the separation of 275' and Figure AA-43 in Appendix A of ACRP Report #51, provides a risk level  $1.2\text{E-}07$  or one chance in 8.33 million landings. This can be seen in the figure below:

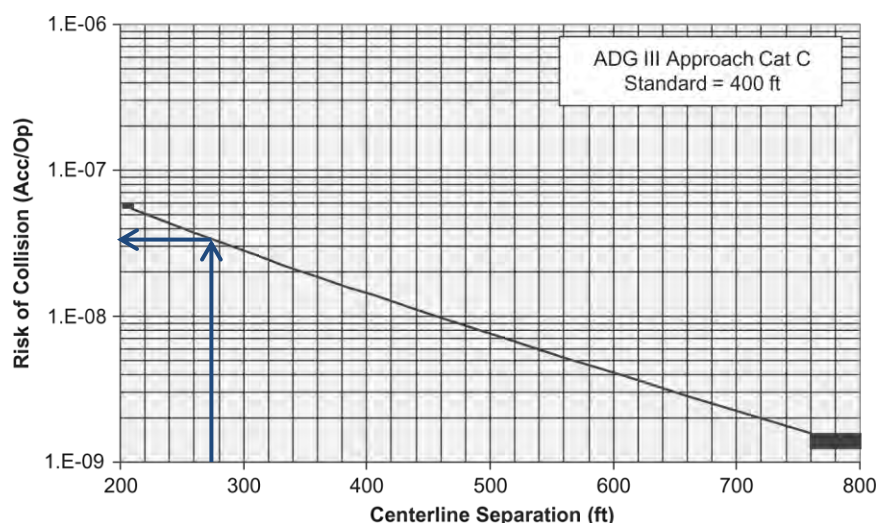


**Figure AA-43. Landing veer-off collision risk for ADG III.**

Source: ACRP Report #51

As the risk is one incident in every 8.33 million landings, the rate of occurrence is calculated as 8.33 million landings divided by 25,000 landings per year which equates to one incident every 333 years.

Takeoff Roll Phase - Using the separation of 275' and Figure AA-50 in Appendix A of ACRP Report #51, provides a risk level  $3.2\text{E-}08$  or one chance in 31 million takeoffs. This can be seen in the figure below:



**Figure AA-50. Takeoff veer-off collision risk for ADG III.**

Source: ACRP Report #51

As the risk is one incident in every 31 million takeoffs, the rate of occurrence is calculated as 31 million takeoffs divided by 25,000 takeoffs per year which equates to one incident every 1,240 years.

Considering the risk of each phase of flight, the risk of collision during the landing roll is the controlling factor. The Hazard Severity Classification for this type of operation would be catastrophic and the acceptable probability of occurrence is extremely improbable ( $1\text{E-}09$ ) or less than once every 100 years. The following table summarizes the risk associated with each phase of flight:

Phase of Flight	Rate of Occurrence	Acceptable Level
Airborne Phase	Once every 22,200 years	Yes
Landing Roll Phase	Once every 333 years	Yes
Takeoff Roll Phase	Once every 1,240 years	Yes

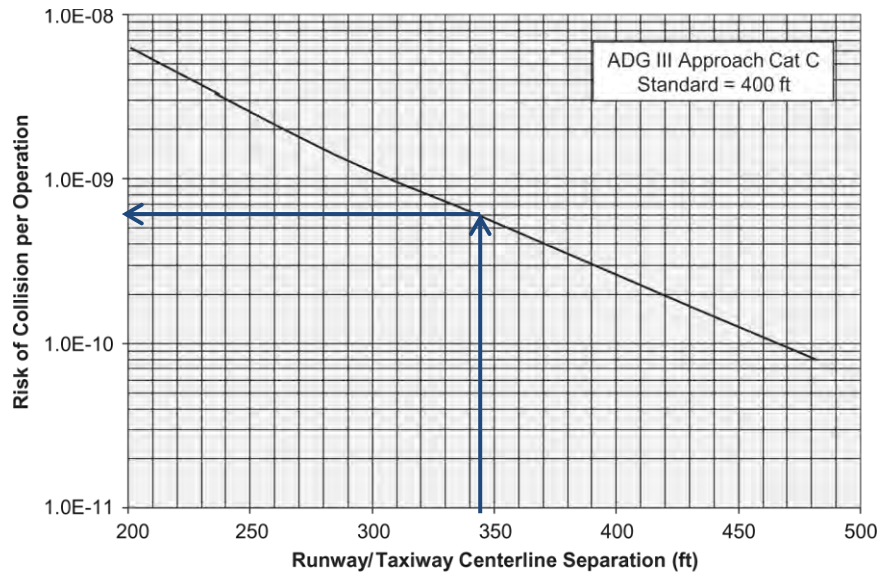
A Runway to Object Separation of 275' appears to provide an acceptable level of risk as the controlling rate of occurrence is once every 333 years.

### State Highway 75 (345' Separation)



State Highway 75 runs along the east side of the Runway 13-31 OFA and is located 345' from the extended runway centerline. The risks associated with each of the phases of flight are analyzed below:

Airborne Landing Phase - Using the separation of 345' and Figure AA-33 in Appendix A of ACRP Report #51, the following provides a risk level  $6E-10$  or one chance in 1.7 billion landings. This can be seen in the figure below:

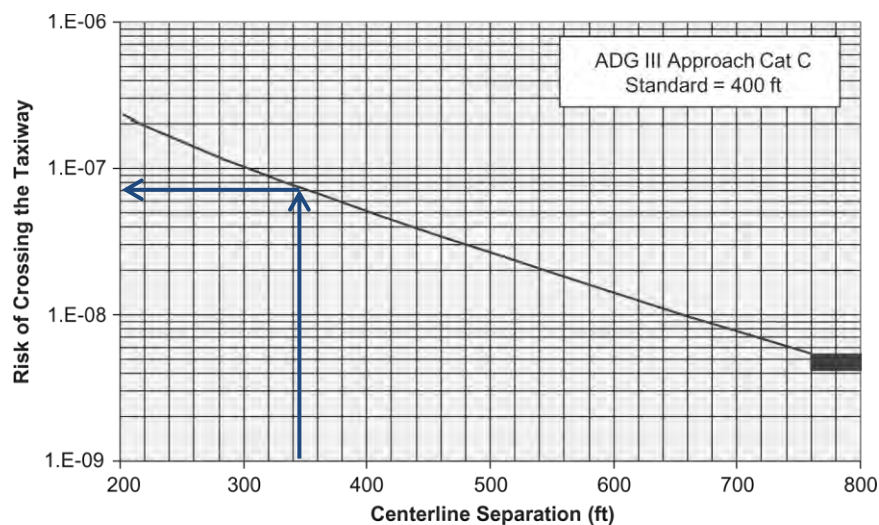


**Figure AA-33. Missed approach collision risk for ADG III Cat I.**

Source: ACRP Report #51

The current annual number of landing operations at SUN is approximately 25,000 or half of the 50,000 annual operations. As the risk is one incident in every 1.7 billion landings, the rate of occurrence is calculated as 1.7 billion landings divided by 25,000 landing operations per year which equates to one incident every 66,666 years.

Landing Roll Phase - Using the separation of 345' and Figure AA-43 in Appendix A of ACRP Report #51, provides a risk level  $7E-08$  or one chance in 14 million landings. This can be seen in the figure below:

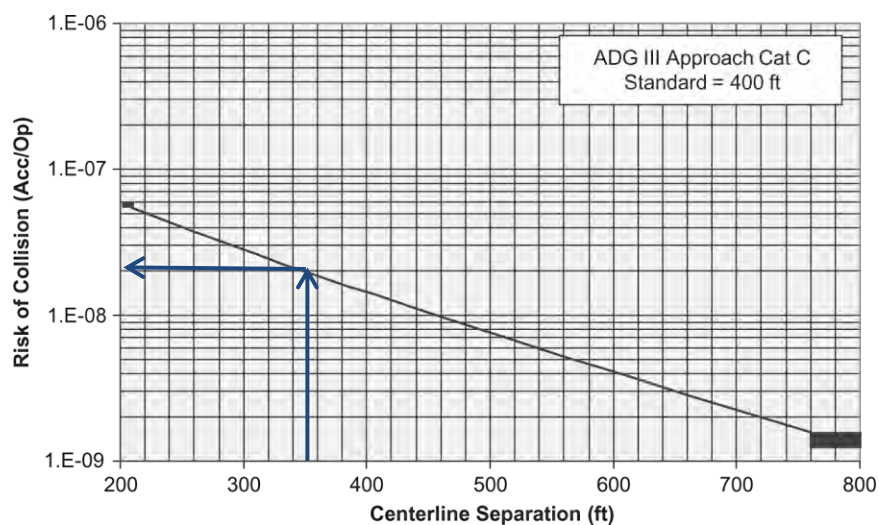


**Figure AA-43. Landing veer-off collision risk for ADG III.**

Source: ACRP Report #51

As the risk is one incident in every 14 million landings, the rate of occurrence is calculated as 14 million landings divided by 25,000 landings per year which equates to one incident every 571 years.

Takeoff Roll Phase - Using the separation of 345' and Figure AA-50 in Appendix A of ACRP Report #51, provides a risk level 2E-08 or one chance in 50 million takeoffs. This can be seen in the figure below:



**Figure AA-50. Takeoff veer-off collision risk for ADG III.**

Source: ACRP Report #51

As the risk is one incident in every 50 million takeoffs, the rate of occurrence is calculated as 50 million takeoffs divided by 25,000 takeoffs per year which equates to one incident every 2,000 years.



Considering the risk of each phase of flight, the risk of collision during the landing roll is the controlling factor. The Hazard Severity Classification for this type of operation would be catastrophic and the acceptable probability of occurrence is extremely improbable ( $1E-09$ ) or less than once every 100 years. The following table summarizes the risk associated with each phase of flight:

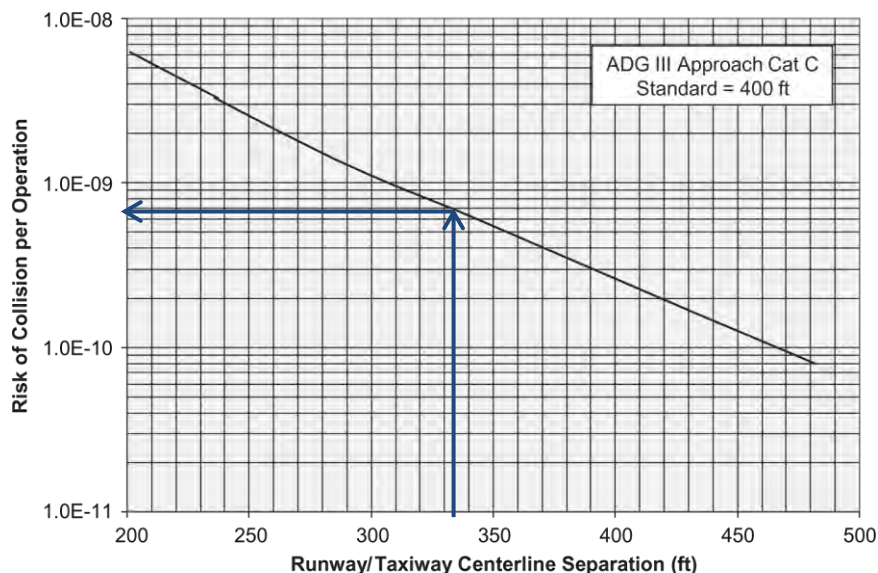
Phase of Flight	Rate of Occurrence	Acceptable Level
Airborne Phase	Once every 66,666 years	Yes
Landing Roll Phase	Once every 571 years	Yes
Takeoff Roll Phase	Once every 2,000 years	Yes

A Runway to Object Separation of 345' appears to provide an acceptable level of risk as the controlling rate of occurrence is once every 571 years.

#### **Buildings Located Off Airport Property (335' Separation)**

The buildings located at the northernmost corner on the west side of the OFA are located 335' from the extended runway centerline. The risks associated with each of the phases of flight are analyzed below:

Airborne Landing Phase - Using the separation of 335' and Figure AA-33 in Appendix A of ACRP Report #51, the following provides a risk level  $6E-10$  or one chance in 1.6 billion landings. This can be seen in the figure below:



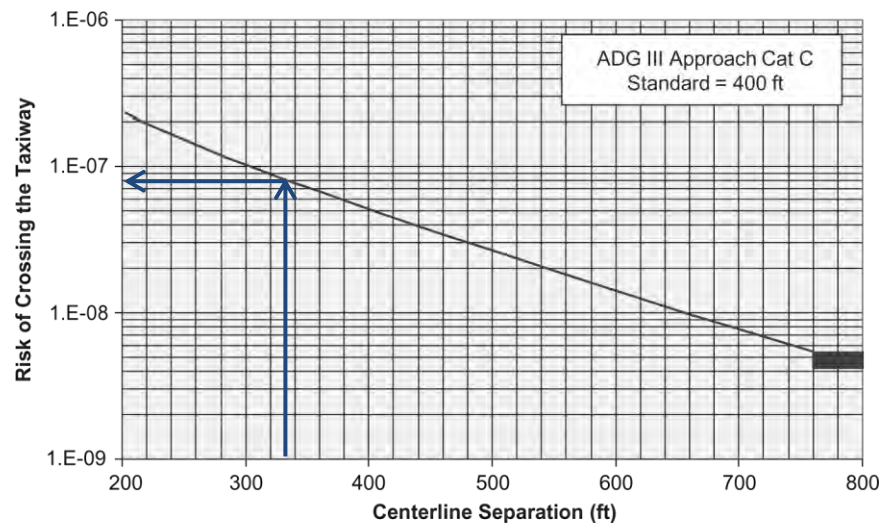
**Figure AA-33. Missed approach collision risk for ADG III Cat I.**

Source: ACRP Report #51



The current annual number of landing operations at SUN is approximately 25,000 or half of the 50,000 annual operations. As the risk is one incident in every 1.6 billion landings, the rate of occurrence is calculated as 1.6 billion landings divided by 25,000 landing operations per year which equates to one incident every 64,000 years.

Landing Roll Phase - Using the separation of 335' and Figure AA-43 in Appendix A of ACRP Report #51, provides a risk level 8E-08 or one chance in 12.5 million landings. This can be seen in the figure below:

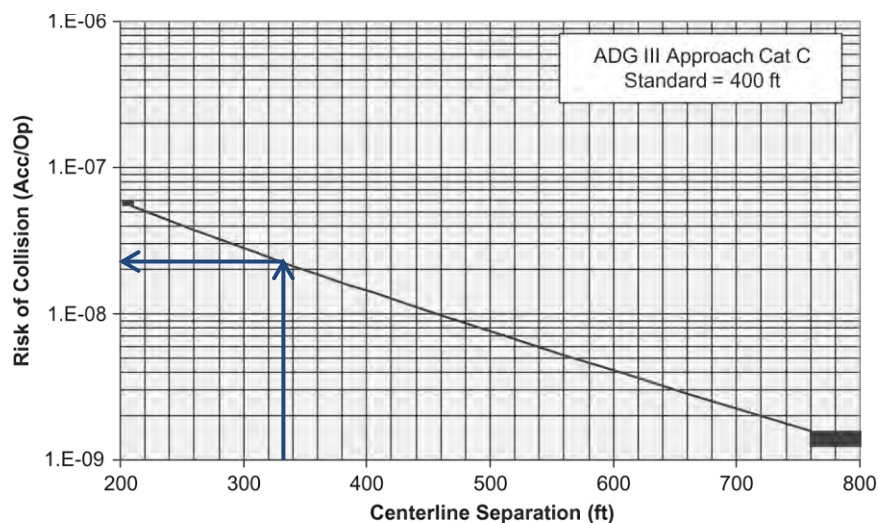


**Figure AA-43. Landing veer-off collision risk for ADG III.**

Source: ACRP Report #51

As the risk is one incident in every 12.5 million landings, the rate of occurrence is calculated as 12.5 million landings divided by 25,000 landings per year which equates to one incident every 500 years.

Takeoff Roll Phase - Using the separation of 335' and Figure AA-50 in Appendix A of ACRP Report #51, provides a risk level 2.2E-08 or one chance in 45 million takeoffs. This can be seen in the figure below:



**Figure AA-50. Takeoff veer-off collision risk for ADG III.**

Source: ACRP Report #51

As the risk is one incident in every 45 million takeoffs, the rate of occurrence is calculated as 45 million takeoffs divided by 25,000 takeoffs per year which equates to one incident every 1,800 years.

Considering the risk of each phase of flight, the risk of collision during the landing roll is the controlling factor. The Hazard Severity Classification for this type of operation would be catastrophic and the acceptable probability of occurrence is extremely improbable (1E-09) or less than once every 100 years. The following table summarizes the risk associated with each phase of flight:

Phase of Flight	Rate of Occurrence	Acceptable Level
<b>Airborne Phase</b>	Once every 64,000 years	Yes
<b>Landing Roll Phase</b>	Once every 500 years	Yes
<b>Takeoff Roll Phase</b>	Once every 1,800 years	Yes

A Runway to Object Separation of 335' appears to provide an acceptable level of risk as the controlling rate of occurrence is once every 500 years.

For each of the various object separations the Landing Roll phase of flight provided the controlling risk. Each of the separations and the associated rate of occurrence are summarized in the following table:

Object (Separation)	Controlling Phase of Flight	Hazard Severity Classification	Rate of Occurrence	Acceptable Level?
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<b>Perimeter Fence (250')</b>	Landing Roll	Major	Once every 250 years	Yes
<b>Perimeter Fence (320')</b>	Landing Roll	Major	Once every 440 years	Yes
<b>State Highway 75 (275')</b>	Landing Roll	Catastrophic	Once every 333 years	Yes
<b>State Highway 75 (345')</b>	Landing Roll	Catastrophic	Once every 571 years	Yes
<b>Off Airport Buildings (335')</b>	Landing Roll	Catastrophic	Once every 500 years	Yes

As shown in the table above, each of the various Runway to Object Separations provide an acceptable level of risk. In addition, the closest separations are all located on the north end of the airfield. Though each of these penetrates the departure OFA for Runway 13, the risk of an incident is actually much lower as an aircraft would be taking off in the opposite direction of the objects. For arrivals on Runway 31, due to the use of declared distances, the objects are located a minimum of 1,000' from the end of the runway declared suitable for landing operations. Their location is modeled as if the objects are located laterally to the runway and as such the actual risk of an incident is much lower.





#### **MOS 4 - Runway to Aircraft Parking Separation**

The FAA design standard for Runway to Aircraft Parking Separation for ARC C-III is 500'. The requested MOS for Runway to Aircraft Parking Separation is 400'. This MOS is not applicable if MOS 1A, 1B, or 1C are not approved.

A separation to the C-III standard of 500' could be met in one of two ways, either shift Runway 13-31 and State Highway 75 to the east or relocate the majority of apron parking on the airfield including the terminal, to the southwest. The estimated costs of each alternative are shown below:

- Shift Runway 13-31 and State Highway 75 East - \$144 Million dollars
- Shift Airfield Parking and Terminal Southwest - \$30 Million dollars

The maximum separation possible at SUN without major impacts to airfield facilities is 400' from Runway 13-31 centerline. When analyzing the level of safety associated with a reduction in Runway to Aircraft Parking Separation it is important to consider the purpose of the design standard. Paragraph 321 a. (3) of Advisory Circular 150/5300-13A provides the design rationale:

*“Runway to aircraft parking area separation is determined by the landing and takeoff flight path profiles and physical characteristics of the aircraft. The runway to parking area separation standard precludes any part of a parked aircraft (tail, wingtip, nose, etc.) from being within the ROFA or penetrating the OFZ.”*

A Runway to Aircraft Parking Separation of 400' at SUN will preclude any part of an aircraft from penetrating the Runway OFA or Runway OFZ. In addition, a separation of 400 feet would also provide the following benefits:

- Prevent parked aircraft from penetrating the Runway Primary Surface
- Prevent parked aircraft from penetrating the Runway Transitional Surface
- Prevent parked aircraft from penetrating the Taxiway OFA

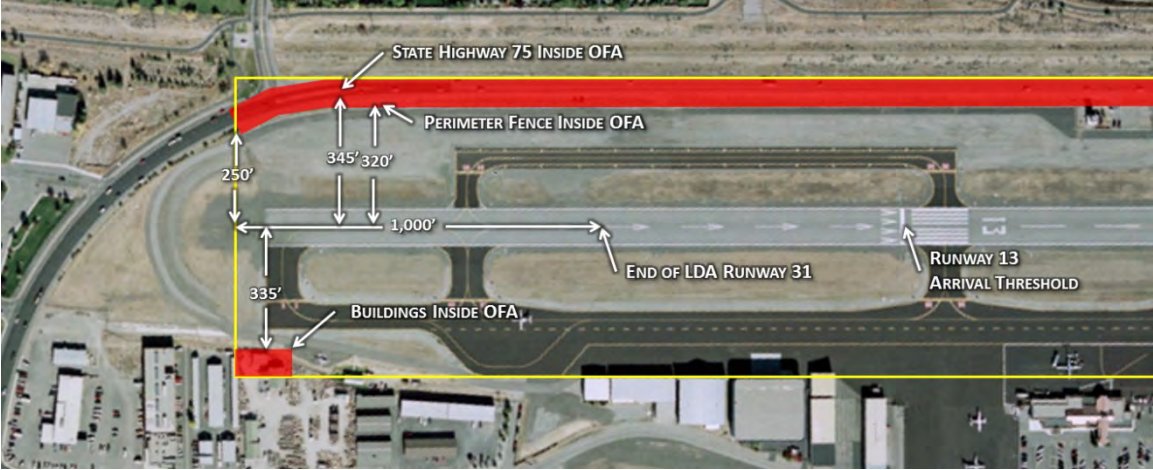
As the runway to aircraft parking area separation of 400 feet meets the purpose of this standard as stated in AC 150/5300-13A, this configuration will provide an acceptable level of safety.



## **APPENDIX D - MOS RUNWAY OFA**

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND			
1. AIRPORT: <b>Friedman Memorial Airport</b>	2. LOCATION(CITY,STATE): <b>Hailey, ID</b>	3. LOC ID: <b>SUN</b>	
4. EFFECTED RUNWAY/TAXIWAY: <b>RUNWAY 13-31</b>	5. APPROACH (EACH RUNWAY): <b>RW 13 VISUAL RW 31 NPI</b>	6. AIRPORT REF. CODE (ARC): <b>C-III</b>	
7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY): <b>Bombardier Q-400 and Gulfstream G-V</b>			
MODIFICATION OF STANDARDS			
8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):  <b>Runway Object Free Area (OFA), Advisory Circular 150/5300-13A, <i>Airport Design</i> (AC 150/5300-13A)</b>			
9. STANDARD/REQUIREMENT:  800 feet (400 foot either side of centerline) per Table 3-8 on page 94 of AC 150/5300-13A.			
10. PROPOSED:  Varies see below.			
11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1E):  State Highway 75 and the Perimeter Fence run parallel to Runway 13-31 from south to north until approximately 210' from the Runway 13 pavement end at which point they curve toward the runway until they are a minimum distance of 250' for the Perimeter Fence and 275' for State Highway 75 from the extended runway centerline. The following figure shows the deficiencies on the north end of the airfield in more detail:			
			
<p>As SUN is currently configured using declared distances, the OFA for arrivals and departures in each direction have different deficiencies. The OFA to the east of Runway 13-31 for both arrivals and departures is penetrated by both State Highway 75 and the Perimeter Fence at 345' and 320' respectively. The OFA for Runway 13 departures and Runway 31 arrivals are penetrated to a greater degree at the north end of the airfield by the Perimeter Fence and State Highway 75 along with two buildings located off airport property. The deficiencies are summarized in the following table:</p>			
Runway OFA	State Highway 75	Perimeter Fence	Off Airport Buildings
<b>13 Arrivals</b>	345'	320'	None
<b>13 Departures</b>	275' to 345'	250' to 320'	335'
<b>31 Arrivals</b>	275' to 345'	250' to 320'	335'
<b>31 Departures</b>	345'	320'	None



U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

In order to meet OFA requirements either the Runway and all airport facilities would have to be shifted to the West or State Highway 75 would have to be shifted to the East.

Neither of these options are seen as practicable and providing a less than standard OFA will provide an acceptable level of safety, based on the aircraft traffic at the airport.

### 12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1E):

The airport sponsor has considered three alternatives to provide a Runway OFA at the airport that complies with standards. The first two alternatives, though viable, are not practicable, due to cost and environmental impact.

1. Relocate Runway And All Airport Facilities To The West – Not Practicable
  - Essentially reconstructs the entire airport west of existing facilities, including the terminal, FBO facilities, all hangars and maintenance/ARFF facilities.
  - Total estimated cost exceeds \$144 million.
2. Relocate Highway to the East – Not Practicable
  - Requires relocation of approximately 2 miles of State Highway 75 approximately 75 feet to the east.
  - A large neighborhood exists east of the airport in this location and relocating the highway will greatly increase the environmental impact of the highway on that neighborhood. Idaho Transportation Department has completed an Environmental Impact Statement study for a proposed project on this highway, which identifies the following environmental impacts of the highway in this location, all of which would be exacerbated significantly by relocating the highway as described. Note that an environmental analysis for the proposed action relative to the airport has not been completed – these impacts are identified based on previous studies and would require further evaluation.
    - Historical Resources: Relocation of the highway would require removal of a railroad berm that has been identified as a potential historic structure.
    - Noise: The noise levels of a relocated highway may exceed those permitted by Federal Highway Administration guidelines and require mitigation. Mitigation is difficult at this location, due to local ordinances prohibiting construction of noise walls.
    - Environmental Justice: The adjacent neighborhood is high density, with relatively low incomes and a high minority population. Based on these factors, relocating the highway could induce environmental justice impacts.
  - Costs for relocating the highway are estimated to exceed \$17 million.
3. Allow Highway, Fence and Buildings To Remain
  - Do not relocate the highway.
  - Based on existing traffic at the airport, this will provide an acceptable level of safety. (See explanation below.)

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP (FAA ORDER 5300.1E):

In 2011, the Transportation Research Board (TRB) published ACRP Report 51 – Risk Assessment Method to Support Modification of Airfield Separation Standards. This report provides a method for calculating the probability and associated risk for various runway to object separations, with the purpose of determining acceptability of modifications of standards. The method outlined in the report involves calculating the risk for three separate phases of aircraft operation: airborne phase, landing roll and takeoff roll. The highest risk value is then used to evaluate whether the separation is acceptable. The report provides figures for each of the phases of aircraft operations where the runway to object separation is used to determine the risk.

Current traffic at SUN includes less than 50,000 operations (25,000 takeoffs and 25,000 landings) per year. Using these operational numbers and the procedure outlined in ACRP Report 51, the estimated risk along with the return period for each phase of operation is summarized below for each of the objects located in the Runway Object Free Area. In each case, the controlling phase of flight was the Landing Roll. The table below summarizes the risk associated with each object.

Object (Separation)	Controlling Phase of Flight	Hazard Severity Classification	Rate of Occurrence	Acceptable Level?
Perimeter Fence (250')	Landing Roll	Major	Once every 250 years	Yes
Perimeter Fence (320')	Landing Roll	Major	Once every 440 years	Yes
State Highway 75 (275')	Landing Roll	Catastrophic	Once every 333 years	Yes
State Highway 75 (345')	Landing Roll	Catastrophic	Once every 571 years	Yes
Off Airport Buildings (335')	Landing Roll	Catastrophic	Once every 500 years	Yes

As shown in the table above, each of the various Runway to Object Separations provide an acceptable level of risk. In addition, the closest separations are all located on the north end of the airfield. Though each of these penetrates the departure OFA for Runway 13, the risk of an incident is actually much lower as an aircraft would be taking off in the opposite direction of the objects. For arrivals on Runway 31, due to the use of declared distances, the objects are located a minimum of 1,000' from the end of the runway declared suitable for landing operations. Their location is modeled as if the objects are located laterally to the runway and as such the actual risk of an incident is much lower.

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
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AIRPORT IMPROVEMENT PROGRAM

**MODIFICATION OF AIRPORT DESIGN STANDARDS**

MODIFICATION:		LOCATION:		PAGE 2 OF 2	
14. SIGNATURE OF ORIGINATOR:		15. ORIGINATOR'S ORGANIZATION:		16. TELEPHONE:	
17. DATE OF LATEST FAA SIGNED ALP:					
18. ADO RECOMMENDATION:		19. SIGNATURE:		20. DATE:	
21. FAA DIVISIONAL REVIEW (AT, AF, FS):					
ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR	
COMMENTS:					
22. AIRPORTS' DIVISION FINAL ACTION:					
<input type="checkbox"/> UNCONDITIONAL APPROVAL		<input type="checkbox"/> CONDITIONAL APPROVAL		<input type="checkbox"/> DISAPPROVAL	
DATE:	SIGNATURE:		TITLE:		
CONDITIONS OF APPROVAL:					



U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

---

ITEMS 1-17 ARE TO BE COMPLETED BY THE AIRPORT SPONSOR(ORIGINATOR). ALL OTHER ITEMS WILL BE COMPLETED BY THE FAA.

THE COMPLETED FORM WILL BE TRANSMITTED BY THE ORIGINATOR TO THE APPLICABLE ADO/AFO. THE ADO/AFO WILL TRANSMIT THE FINAL FAA DETERMINATION TO THE ORIGINATOR.

MODIFICATION TO AIRPORT DESIGN STANDARDS REQUESTS SHOULD INCLUDE SKETCHES OR DRAWINGS WHICH CLEARLY ILLUSTRATE THE NONSTANDARD CONDITION.

### ITEMS

1. LEGAL NAME OF AIRPORT.
2. ASSOCIATED CITY.
3. AIRPORT LOCATION IDENTIFIER (SEE APPROACH PLATES/AIRPORT FACILITY DIRECTORY).
4. IDENTIFY THE RUNWAY(S), TAXIWAY(S) OR OTHER FACILITIES EFFECTED BY THE PROPOSED MODIFICATION TO STANDARDS REQUEST.
5. IDENTIFY THE MOST CRITICAL APPROACH FOR EACH RUNWAY IDENTIFIED IN #4.
6. AIRPORT REFERENCE CODE - SEE PARAGRAPH 2, PAGE 1 AC 150/5300-13(CHANGE 4) - I.E. C-II, B-II, A-I (SMALL).
7. NOTE THE DESIGN AIRCRAFT (ARC OR SPECIFIC AIRCRAFT) FOR EACH FACILITY IDENTIFIED IN #4. A DESIGN AIRCRAFT MUST MAKE REGULAR USE OF THE FACILITY. NORMALLY, FAA CONSIDERS REGULAR USE TO BE 500 OR MORE ANNUAL INTINERANT OPERATIONS.  
  
IF THE AIRPORT SERVES A WHOLE FAMILY OF AIRCRAFT IN A PARTICULAR GROUP, THE ARC (I.E. B-II) SHOULD BE SPECIFIED. IF, HOWEVER, THE AIRPORT IS USED BY ONLY 1 OR 2 OF A FAMILY OF AIRCRAFT (IX- BEECH KING AIR C90), THE MOST DEMANDING (APPROACH SPEED, WINGSPAN) AIRCRAFT SHOULD BE SPECIFIED.
8. IDENTIFY THE SPECIFIC NAME OF THE STANDARD THAT IS PROPOSED TO BE MODIFIED FOR THE SUBJECT LOCAL CONDITION.
9. DESCRIBE (WORDS AND NUMBERS) THE DIMENSIONS AND REQUIREMENTS OF THE STANDARD AS PROVIDED IN AC 150/5300-13.
10. STATE THE PROPOSED MODIFICATION TO THE STANDARD.
11. DISCUSS THE LOCAL CONDITIONS THAT MAKE IT IMPRACTICAL OR IMPOSSIBLE TO MEET THE STANDARD.
12. IDENTIFY ALTERNATIVES TO THE SUBJECT PROPOSED MODIFICATION, AND SHOW WHY THESE ALTERNATIVES ARE NOT VIABLE.
13. DISCUSS HOW THE PROPOSED MODIFICATION WOULD IMPACT AIRPORT SAFETY AND EXPLAIN WHY AN ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP WOULD STILL EXIST.
14. TYPED NAME AND SIGNATURE OF AIRPORT AUTHORITY REPRESLNTATIVE.
15. SELF-EXPLANATORY.
16. SELF-EXPLANATORY.
17. SELF-EXPLANATORY.
18. TO BE COMPLETED BY FAA.

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
AIRPORT IMPROVEMENT PROGRAM

**MODIFICATION OF AIRPORT CONSTRUCTION STANDARDS**

SPECIFICATION & PARA. REQUESTED MODIFICATION & JUSTIFICATION

DATE

SPONSOR

DATE

APPROVED BY (FAA)

Attachment A



## **APPENDIX D - MOS RUNWAY-TAXIWAY SEPARATION**



U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND		
1. AIRPORT: <b>Friedman Memorial Airport</b>	2. LOCATION(CITY,STATE): <b>Hailey, ID</b>	3. LOC ID: <b>SUN</b>
4. EFFECTED RUNWAY/TAXIWAY: <b>RUNWAY 13-31 TAXIWAY B</b>	5. APPROACH (EACH RUNWAY): <b>RW 13 VISUAL RW 31 NPI</b>	6. AIRPORT REF. CODE (ARC): <b>C-III</b>
7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY): <b>Bombardier Q-400 and Gulfstream G-V</b>		
MODIFICATION OF STANDARDS		
8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):  <b>Runway to Parallel Taxiway Separation, Advisory Circular 150/5300-13A, <i>Airport Design</i> (AC 150/5300-13A)</b>		
9. STANDARD/REQUIREMENT:  400 feet, per Table 3-8 on page 94 of AC 5300-13A.		
10. PROPOSED:  320 feet.		
11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1E):  In the airport's current configuration, relocation of Parallel Taxiway B to a separation of 400 feet would either require relocating the runway, adjacent Highway 75 and other facilities to the east or relocating all existing airport facilities to the west. Neither of these options are seen as practicable and providing a less than standard Runway to Parallel Taxiway Separation will provide an acceptable level of safety, based on the aircraft traffic at the airport.		
12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1E):  The airport sponsor has considered three alternatives to improve Runway To Parallel Taxiway Separation at the airport. The first two alternatives, though viable, are not practicable, due to cost and environmental impact.		
<ol style="list-style-type: none"> <li>1. Relocate Runway And All Airport Facilities To The West – Not Practicable <ul style="list-style-type: none"> <li>• Essentially reconstructs the entire airport west of existing facilities, including the terminal, FBO facilities, all hangars and maintenance/ARFF facilities.</li> <li>• Total estimated cost exceeds \$144 million.</li> </ul> </li> <li>2. Relocate Runway and Highway to the East – Not Practicable <ul style="list-style-type: none"> <li>• Requires relocation of approximately 2 miles of State Highway 75 to the east.</li> <li>• Requires acquisition of over 100 homes to accommodate relocated highway.</li> <li>• Idaho Transportation Department has completed an Environmental Impact Statement study for a proposed project on this highway, which identifies the following environmental impacts of the highway in this location, all of which would be exacerbated significantly by relocating the highway as described. Note that an environmental analysis for the proposed action relative to the airport has not been completed – these impacts are identified based on previous studies and would require further evaluation. <ul style="list-style-type: none"> <li>○ Historical Resources: Relocation of the highway would require removal of a railroad berm that has been identified as a potential historic structure.</li> <li>○ Noise: The noise levels of a relocated highway may exceed those permitted by Federal Highway Administration guidelines and require mitigation. Mitigation is difficult at this location, due to local ordinances prohibiting construction of noise walls.</li> <li>○ Environmental Justice: The adjacent neighborhood is high density, with relatively low incomes and a high minority population. Based on these factors, relocating the highway could induce environmental justice impacts.</li> </ul> </li> <li>• Costs for this alternative are estimated to exceed \$115 million.</li> </ul> </li> <li>3. Relocate Taxiway B to 320-foot Separation From Runway 13-31 <ul style="list-style-type: none"> <li>• Requires reconstruction of Taxiway B.</li> <li>• Requires relocation of several hangars and terminal parking apron to accommodate aircraft parking and maneuvering.</li> <li>• Based on existing traffic at the airport, this will provide an acceptable level of safety. (See explanation below.)</li> </ul> </li> </ol>		

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP (FAA ORDER 5300.1E):

Runway to Parallel Taxiway separation serves two purposes; the first is to prevent an aircraft on the taxiway from colliding with an aircraft that departs the runway surface during landing or takeoff and the second is to prevent an aircraft executing a missed approach from colliding with an aircraft on the taxiway. In 2011, the Transportation Research Board (TRB) published ACRP 51 – Risk Assessment Method to Support Modification of Airfield Separation Standards. This report provides a method for calculating the probability and associated risk for various runway to parallel taxiway separations. The method outlined in the report involves calculating the risk for three separate phases of aircraft operation: airborne phase, landing roll and takeoff roll. The highest risk value is then used to evaluate whether the less than standard separation is acceptable. The report provides figures for each of the phases of aircraft operations where the runway to taxiway separation is used to determine the risk.

Current traffic at SUN includes less than 50,000 operations (25,000 takeoffs and 25,000 landings) per year. Using these operational numbers and the procedure outlined in ACRP Report 51, the estimated risk along with the return period for each phase of operation is summarized below.

Airborne Phase –  $8.4E-10$  (one chance in 1.2 billion landings or once every 47,620 years)  
Landing Roll –  $9.0E-08$  (one chance in 11 million landings or once every 440 years)  
Takeoff Roll –  $2.5E-08$  (one chance in 40 million landings or once every 1,600 years)

The risk of collision during the landing roll is the controlling factor. Using the FAA's risk matrix, a severity level of catastrophic was assigned to the landing roll phase for this type of incident. Using the FAA likelihood levels, the acceptable level of risk associated with a catastrophic event is extremely improbable or less than once every 100 years. As shown above, the expected rate of occurrence is once every 440 years. A Runway to Parallel Taxiway Separation of 320' appears to provide an acceptable level of risk. In addition a separation of 320' would keep any part of an aircraft on the taxiway from penetrating the RSA, the Runway Obstacle Free Zone (OFZ) and the Part 77 Primary Surface.

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

**MODIFICATION OF AIRPORT DESIGN STANDARDS**

MODIFICATION:		LOCATION:		PAGE 2 OF 2	
14. SIGNATURE OF ORIGINATOR:		15. ORIGINATOR'S ORGANIZATION:		16. TELEPHONE:	
17. DATE OF LATEST FAA SIGNED ALP:					
18. ADO RECOMMENDATION:		19. SIGNATURE:		20. DATE:	
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ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR	
COMMENTS:					
22. AIRPORTS' DIVISION FINAL ACTION:					
<input type="checkbox"/> UNCONDITIONAL APPROVAL		<input type="checkbox"/> CONDITIONAL APPROVAL		<input type="checkbox"/> DISAPPROVAL	
DATE:	SIGNATURE:		TITLE:		
CONDITIONS OF APPROVAL:					



U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

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ITEMS 1-17 ARE TO BE COMPLETED BY THE AIRPORT SPONSOR(ORIGINATOR). ALL OTHER ITEMS WILL BE COMPLETED BY THE FAA.

THE COMPLETED FORM WILL BE TRANSMITTED BY THE ORIGINATOR TO THE APPLICABLE ADO/AFO. THE ADO/AFO WILL TRANSMIT THE FINAL FAA DETERMINATION TO THE ORIGINATOR.

MODIFICATION TO AIRPORT DESIGN STANDARDS REQUESTS SHOULD INCLUDE SKETCHES OR DRAWINGS WHICH CLEARLY ILLUSTRATE THE NONSTANDARD CONDITION.

### ITEMS

1. LEGAL NAME OF AIRPORT.
2. ASSOCIATED CITY.
3. AIRPORT LOCATION IDENTIFIER (SEE APPROACH PLATES/AIRPORT FACILITY DIRECTORY).
4. IDENTIFY THE RUNWAY(S), TAXIWAY(S) OR OTHER FACILITIES EFFECTED BY THE PROPOSED MODIFICATION TO STANDARDS REQUEST.
5. IDENTIFY THE MOST CRITICAL APPROACH FOR EACH RUNWAY IDENTIFIED IN #4.
6. AIRPORT REFERENCE CODE - SEE PARAGRAPH 2, PAGE 1 AC 150/5300-13(CHANGE 4) - I.E. C-II, B-II, A-I (SMALL).
7. NOTE THE DESIGN AIRCRAFT (ARC OR SPECIFIC AIRCRAFT) FOR EACH FACILITY IDENTIFIED IN #4. A DESIGN AIRCRAFT MUST MAKE REGULAR USE OF THE FACILITY. NORMALLY, FAA CONSIDERS REGULAR USE TO BE 500 OR MORE ANNUAL INTINERANT OPERATIONS.  
  
IF THE AIRPORT SERVES A WHOLE FAMILY OF AIRCRAFT IN A PARTICULAR GROUP, THE ARC (I.E. B-II) SHOULD BE SPECIFIED. IF, HOWEVER, THE AIRPORT IS USED BY ONLY 1 OR 2 OF A FAMILY OF AIRCRAFT (IX- BEECH KING AIR C90), THE MOST DEMANDING (APPROACH SPEED, WINGSPAN) AIRCRAFT SHOULD BE SPECIFIED.
8. IDENTIFY THE SPECIFIC NAME OF THE STANDARD THAT IS PROPOSED TO BE MODIFIED FOR THE SUBJECT LOCAL CONDITION.
9. DESCRIBE (WORDS AND NUMBERS) THE DIMENSIONS AND REQUIREMENTS OF THE STANDARD AS PROVIDED IN AC 150/5300-13.
10. STATE THE PROPOSED MODIFICATION TO THE STANDARD.
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12. IDENTIFY ALTERNATIVES TO THE SUBJECT PROPOSED MODIFICATION, AND SHOW WHY THESE ALTERNATIVES ARE NOT VIABLE.
13. DISCUSS HOW THE PROPOSED MODIFICATION WOULD IMPACT AIRPORT SAFETY AND EXPLAIN WHY AN ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP WOULD STILL EXIST.
14. TYPED NAME AND SIGNATURE OF AIRPORT AUTHORITY REPRESLNTATIVE.
15. SELF-EXPLANATORY.
16. SELF-EXPLANATORY.
17. SELF-EXPLANATORY.
18. TO BE COMPLETED BY FAA.

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
AIRPORT IMPROVEMENT PROGRAM

**MODIFICATION OF AIRPORT CONSTRUCTION STANDARDS**

SPECIFICATION & PARA. REQUESTED MODIFICATION & JUSTIFICATION

--

DATE

SPONSOR

DATE

APPROVED BY (FAA)

Attachment A



## **APPENDIX D - MOS TAXIWAY OFA**



U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND		
1. AIRPORT: <b>Friedman Memorial Airport</b>	2. LOCATION(CITY,STATE): <b>Hailey, ID</b>	3. LOC ID: <b>SUN</b>
4. EFFECTED RUNWAY/TAXIWAY: <b>TAXIWAY B</b>	5. APPROACH (EACH RUNWAY): <b>RW 13 VISUAL RW 31 NPI</b>	6. AIRPORT REF. CODE (ARC): <b>C-III</b>
7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY): <b>Bombardier Q-400 and Gulfstream G-V</b>		
MODIFICATION OF STANDARDS		
8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):  <b>Parallel Taxiway Object Free Area (OFA), Advisory Circular 150/5300-13A, <i>Airport Design</i> (Advisory Circular 150/5300-13A)</b>		
9. STANDARD/REQUIREMENT:  186 feet per Table 4-1 on page 124 of AC 150/5300-13A.		
10. PROPOSED:  160 feet.		
11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1E):  In a separate modification request, the airport proposes relocating Taxiway B to 320 feet separation from Runway 13-31. In the airport's current configuration, relocation of Parallel Taxiway B to a separation of 320 feet with a full C-III Taxiway OFA of 186 feet would require significant modification to existing airport facilities, along with property acquisition and removal of adjacent buildings. This significant effort is not necessary, due to current and anticipated aircraft traffic at the airport.		
12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1E):  The airport sponsors have considered two alternatives for Taxiway OFA on Taxiway B. Though both are viable, the first is not seen as practicable, due to the high costs and impacts, nor is it seen as necessary, due to the existing traffic at the airport.  <div style="margin-left: 20px;"><div>1. Provide full C-III Taxiway OFA</div><ul style="list-style-type: none"><li>• Requires removal/relocation of 6 private hangars (1 of which is multi-unit condo hangars) on the north end of the airfield along with relocation of the FBO access at the south end of the airfield.</li><li>• Several businesses northwest of the airport outside of the existing property boundary would need to be acquired and removed.</li><li>• The estimated cost of removing the hangars and reconfiguring the FBO is at least \$8.5 million. The estimated cost of acquiring the land northwest of the airport is \$2.5 million, for a total cost in excess of \$11 million.</li></ul><div>2. Reduce Taxiway OFA to 160 feet.</div><ul style="list-style-type: none"><li>• Provides acceptable level of safety for aircraft that currently use the airport.</li></ul></div>		

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP (FAA ORDER 5300.1E):

The published pavement strength for Runway 13-31 at SUN is 95,000 pounds. For the current fleet of all available aircraft, no aircraft with a maximum takeoff weight of 95,000 pounds or less has a wingspan of greater than 100 feet. Therefore, existing and anticipated aircraft traffic will include only aircraft with wingspans less than 100 feet.

Using equation #2 from Table 1 in Engineering Brief (EB) 78 and this maximum wingspan, an aircraft specific Taxiway OFA was calculated. Equation #2 from EB 78 gives the separation from centerline to an object as  $0.7 \times \text{Wingspan} + 10$  feet. Using the 100' wingspan described above, this calculation results in a Taxiway OFA of 160 feet. For the aircraft that use the airport, this Taxiway OFA meets standards and therefore will provide an acceptable level of safety.

In addition, ACRP Report #51 provides the methodology for analyzing the risk of taxiway to object separations. Using the separation of 80' and Figure AA-10 in Appendix A of ACRP Report #51, provides a risk level of  $2.5E-09$  or one chance in 400 million operations. As the risk is one incident in every 400 million operations, the occurrence is calculated as 400 million divided by 50,000 operations per year which equates to one incident every 8,000 years. The Hazard Severity Classification for this type of operation would be major and the acceptable probability of occurrence is remote ( $1E-05$ ) or less than once every 1-10 years. A Taxiway OFA of 160' appears to provide an acceptable level of safety especially when considering the current and future aircraft fleet.

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

**MODIFICATION OF AIRPORT DESIGN STANDARDS**

MODIFICATION:		LOCATION:		PAGE 2 OF 2	
14. SIGNATURE OF ORIGINATOR:		15. ORIGINATOR'S ORGANIZATION:		16. TELEPHONE:	
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18. ADO RECOMMENDATION:		19. SIGNATURE:		20. DATE:	
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ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR	
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22. AIRPORTS' DIVISION FINAL ACTION:					
<input type="checkbox"/> UNCONDITIONAL APPROVAL		<input type="checkbox"/> CONDITIONAL APPROVAL		<input type="checkbox"/> DISAPPROVAL	
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U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

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ITEMS 1-17 ARE TO BE COMPLETED BY THE AIRPORT SPONSOR(ORIGINATOR). ALL OTHER ITEMS WILL BE COMPLETED BY THE FAA.

THE COMPLETED FORM WILL BE TRANSMITTED BY THE ORIGINATOR TO THE APPLICABLE ADO/AFO. THE ADO/AFO WILL TRANSMIT THE FINAL FAA DETERMINATION TO THE ORIGINATOR.

MODIFICATION TO AIRPORT DESIGN STANDARDS REQUESTS SHOULD INCLUDE SKETCHES OR DRAWINGS WHICH CLEARLY ILLUSTRATE THE NONSTANDARD CONDITION.

### ITEMS

1. LEGAL NAME OF AIRPORT.
2. ASSOCIATED CITY.
3. AIRPORT LOCATION IDENTIFIER (SEE APPROACH PLATES/AIRPORT FACILITY DIRECTORY).
4. IDENTIFY THE RUNWAY(S), TAXIWAY(S) OR OTHER FACILITIES EFFECTED BY THE PROPOSED MODIFICATION TO STANDARDS REQUEST.
5. IDENTIFY THE MOST CRITICAL APPROACH FOR EACH RUNWAY IDENTIFIED IN #4.
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7. NOTE THE DESIGN AIRCRAFT (ARC OR SPECIFIC AIRCRAFT) FOR EACH FACILITY IDENTIFIED IN #4. A DESIGN AIRCRAFT MUST MAKE REGULAR USE OF THE FACILITY. NORMALLY, FAA CONSIDERS REGULAR USE TO BE 500 OR MORE ANNUAL INTINERANT OPERATIONS.  
  
IF THE AIRPORT SERVES A WHOLE FAMILY OF AIRCRAFT IN A PARTICULAR GROUP, THE ARC (I.E. B-II) SHOULD BE SPECIFIED. IF, HOWEVER, THE AIRPORT IS USED BY ONLY 1 OR 2 OF A FAMILY OF AIRCRAFT (IX- BEECH KING AIR C90), THE MOST DEMANDING (APPROACH SPEED, WINGSPAN) AIRCRAFT SHOULD BE SPECIFIED.
8. IDENTIFY THE SPECIFIC NAME OF THE STANDARD THAT IS PROPOSED TO BE MODIFIED FOR THE SUBJECT LOCAL CONDITION.
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15. SELF-EXPLANATORY.
16. SELF-EXPLANATORY.
17. SELF-EXPLANATORY.
18. TO BE COMPLETED BY FAA.

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
AIRPORT IMPROVEMENT PROGRAM

**MODIFICATION OF AIRPORT CONSTRUCTION STANDARDS**

SPECIFICATION & PARA. REQUESTED MODIFICATION & JUSTIFICATION

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DATE

SPONSOR

DATE

APPROVED BY (FAA)

Attachment A

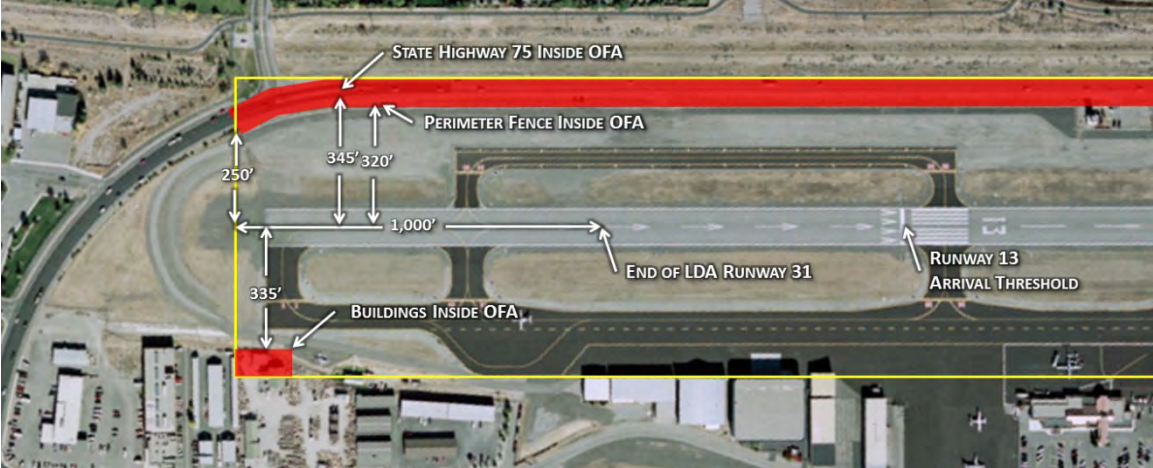


## **APPENDIX D - MOS RUNWAY OFA GRADING**



U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND			
1. AIRPORT: <b>Friedman Memorial Airport</b>	2. LOCATION(CITY,STATE): <b>Hailey, ID</b>	3. LOC ID: <b>SUN</b>	
4. EFFECTED RUNWAY/TAXIWAY: <b>RUNWAY 13-31</b>	5. APPROACH (EACH RUNWAY): <b>RW 13 VISUAL RW 31 NPI</b>	6. AIRPORT REF. CODE (ARC): <b>C-III</b>	
7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY): <b>Bombardier Q-400 and Gulfstream G-V</b>			
MODIFICATION OF STANDARDS			
8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):  <b>Runway Object Free Area (OFA), Advisory Circular 150/5300-13A, <i>Airport Design</i> (AC 150/5300-13A)</b>			
9. STANDARD/REQUIREMENT:  800 feet (400 foot either side of centerline) per Table 3-8 on page 94 of AC 150/5300-13A.			
10. PROPOSED:  Varies see below.			
11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1E):  State Highway 75 and the Perimeter Fence run parallel to Runway 13-31 from south to north until approximately 210' from the Runway 13 pavement end at which point they curve toward the runway until they are a minimum distance of 250' for the Perimeter Fence and 275' for State Highway 75 from the extended runway centerline. The following figure shows the deficiencies on the north end of the airfield in more detail:			
			
<p>As SUN is currently configured using declared distances, the OFA for arrivals and departures in each direction have different deficiencies. The OFA to the east of Runway 13-31 for both arrivals and departures is penetrated by both State Highway 75 and the Perimeter Fence at 345' and 320' respectively. The OFA for Runway 13 departures and Runway 31 arrivals are penetrated to a greater degree at the north end of the airfield by the Perimeter Fence and State Highway 75 along with two buildings located off airport property. The deficiencies are summarized in the following table:</p>			
Runway OFA	State Highway 75	Perimeter Fence	Off Airport Buildings
<b>13 Arrivals</b>	345'	320'	None
<b>13 Departures</b>	275' to 345'	250' to 320'	335'
<b>31 Arrivals</b>	275' to 345'	250' to 320'	335'
<b>31 Departures</b>	345'	320'	None

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

In order to meet OFA requirements either the Runway and all airport facilities would have to be shifted to the West or State Highway 75 would have to be shifted to the East.

Neither of these options are seen as practicable and providing a less than standard OFA will provide an acceptable level of safety, based on the aircraft traffic at the airport.

### 12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1E):

The airport sponsor has considered three alternatives to provide a Runway OFA at the airport that complies with standards. The first two alternatives, though viable, are not practicable, due to cost and environmental impact.

1. Relocate Runway And All Airport Facilities To The West – Not Practicable
  - Essentially reconstructs the entire airport west of existing facilities, including the terminal, FBO facilities, all hangars and maintenance/ARFF facilities.
  - Total estimated cost exceeds \$144 million.
2. Relocate Highway to the East – Not Practicable
  - Requires relocation of approximately 2 miles of State Highway 75 approximately 75 feet to the east.
  - A large neighborhood exists east of the airport in this location and relocating the highway will greatly increase the environmental impact of the highway on that neighborhood. Idaho Transportation Department has completed an Environmental Impact Statement study for a proposed project on this highway, which identifies the following environmental impacts of the highway in this location, all of which would be exacerbated significantly by relocating the highway as described. Note that an environmental analysis for the proposed action relative to the airport has not been completed – these impacts are identified based on previous studies and would require further evaluation.
    - Historical Resources: Relocation of the highway would require removal of a railroad berm that has been identified as a potential historic structure.
    - Noise: The noise levels of a relocated highway may exceed those permitted by Federal Highway Administration guidelines and require mitigation. Mitigation is difficult at this location, due to local ordinances prohibiting construction of noise walls.
    - Environmental Justice: The adjacent neighborhood is high density, with relatively low incomes and a high minority population. Based on these factors, relocating the highway could induce environmental justice impacts.
  - Costs for relocating the highway are estimated to exceed \$17 million.
3. Allow Highway, Fence and Buildings To Remain
  - Do not relocate the highway.
  - Based on existing traffic at the airport, this will provide an acceptable level of safety. (See explanation below.)

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP (FAA ORDER 5300.1E):

In 2011, the Transportation Research Board (TRB) published ACRP Report 51 – Risk Assessment Method to Support Modification of Airfield Separation Standards. This report provides a method for calculating the probability and associated risk for various runway to object separations, with the purpose of determining acceptability of modifications of standards. The method outlined in the report involves calculating the risk for three separate phases of aircraft operation: airborne phase, landing roll and takeoff roll. The highest risk value is then used to evaluate whether the separation is acceptable. The report provides figures for each of the phases of aircraft operations where the runway to object separation is used to determine the risk.

Current traffic at SUN includes less than 50,000 operations (25,000 takeoffs and 25,000 landings) per year. Using these operational numbers and the procedure outlined in ACRP Report 51, the estimated risk along with the return period for each phase of operation is summarized below for each of the objects located in the Runway Object Free Area. In each case, the controlling phase of flight was the Landing Roll. The table below summarizes the risk associated with each object.

Object (Separation)	Controlling Phase of Flight	Hazard Severity Classification	Rate of Occurrence	Acceptable Level?
Perimeter Fence (250')	Landing Roll	Major	Once every 250 years	Yes
Perimeter Fence (320')	Landing Roll	Major	Once every 440 years	Yes
State Highway 75 (275')	Landing Roll	Catastrophic	Once every 333 years	Yes
State Highway 75 (345')	Landing Roll	Catastrophic	Once every 571 years	Yes
Off Airport Buildings (335')	Landing Roll	Catastrophic	Once every 500 years	Yes

As shown in the table above, each of the various Runway to Object Separations provide an acceptable level of risk. In addition, the closest separations are all located on the north end of the airfield. Though each of these penetrates the departure OFA for Runway 13, the risk of an incident is actually much lower as an aircraft would be taking off in the opposite direction of the objects. For arrivals on Runway 31, due to the use of declared distances, the objects are located a minimum of 1,000' from the end of the runway declared suitable for landing operations. Their location is modeled as if the objects are located laterally to the runway and as such the actual risk of an incident is much lower.



U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

**MODIFICATION OF AIRPORT DESIGN STANDARDS**

MODIFICATION:		LOCATION:		PAGE 2 OF 2	
14. SIGNATURE OF ORIGINATOR:		15. ORIGINATOR'S ORGANIZATION:		16. TELEPHONE:	
17. DATE OF LATEST FAA SIGNED ALP:					
18. ADO RECOMMENDATION:		19. SIGNATURE:		20. DATE:	
21. FAA DIVISIONAL REVIEW (AT, AF, FS):					
ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR	
COMMENTS:					
22. AIRPORTS' DIVISION FINAL ACTION:					
<input type="checkbox"/> UNCONDITIONAL APPROVAL		<input type="checkbox"/> CONDITIONAL APPROVAL		<input type="checkbox"/> DISAPPROVAL	
DATE:	SIGNATURE:		TITLE:		
CONDITIONS OF APPROVAL:					

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

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ITEMS 1-17 ARE TO BE COMPLETED BY THE AIRPORT SPONSOR(ORIGINATOR). ALL OTHER ITEMS WILL BE COMPLETED BY THE FAA.

THE COMPLETED FORM WILL BE TRANSMITTED BY THE ORIGINATOR TO THE APPLICABLE ADO/AFO. THE ADO/AFO WILL TRANSMIT THE FINAL FAA DETERMINATION TO THE ORIGINATOR.

MODIFICATION TO AIRPORT DESIGN STANDARDS REQUESTS SHOULD INCLUDE SKETCHES OR DRAWINGS WHICH CLEARLY ILLUSTRATE THE NONSTANDARD CONDITION.

### ITEMS

1. LEGAL NAME OF AIRPORT.
2. ASSOCIATED CITY.
3. AIRPORT LOCATION IDENTIFIER (SEE APPROACH PLATES/AIRPORT FACILITY DIRECTORY).
4. IDENTIFY THE RUNWAY(S), TAXIWAY(S) OR OTHER FACILITIES EFFECTED BY THE PROPOSED MODIFICATION TO STANDARDS REQUEST.
5. IDENTIFY THE MOST CRITICAL APPROACH FOR EACH RUNWAY IDENTIFIED IN #4.
6. AIRPORT REFERENCE CODE - SEE PARAGRAPH 2, PAGE 1 AC 150/5300-13(CHANGE 4) - I.E. C-II, B-II, A-I (SMALL).
7. NOTE THE DESIGN AIRCRAFT (ARC OR SPECIFIC AIRCRAFT) FOR EACH FACILITY IDENTIFIED IN #4. A DESIGN AIRCRAFT MUST MAKE REGULAR USE OF THE FACILITY. NORMALLY, FAA CONSIDERS REGULAR USE TO BE 500 OR MORE ANNUAL INTINERANT OPERATIONS.  
  
IF THE AIRPORT SERVES A WHOLE FAMILY OF AIRCRAFT IN A PARTICULAR GROUP, THE ARC (I.E. B-II) SHOULD BE SPECIFIED. IF, HOWEVER, THE AIRPORT IS USED BY ONLY 1 OR 2 OF A FAMILY OF AIRCRAFT (IX- BEECH KING AIR C90), THE MOST DEMANDING (APPROACH SPEED, WINGSPAN) AIRCRAFT SHOULD BE SPECIFIED.
8. IDENTIFY THE SPECIFIC NAME OF THE STANDARD THAT IS PROPOSED TO BE MODIFIED FOR THE SUBJECT LOCAL CONDITION.
9. DESCRIBE (WORDS AND NUMBERS) THE DIMENSIONS AND REQUIREMENTS OF THE STANDARD AS PROVIDED IN AC 150/5300-13.
10. STATE THE PROPOSED MODIFICATION TO THE STANDARD.
11. DISCUSS THE LOCAL CONDITIONS THAT MAKE IT IMPRACTICAL OR IMPOSSIBLE TO MEET THE STANDARD.
12. IDENTIFY ALTERNATIVES TO THE SUBJECT PROPOSED MODIFICATION, AND SHOW WHY THESE ALTERNATIVES ARE NOT VIABLE.
13. DISCUSS HOW THE PROPOSED MODIFICATION WOULD IMPACT AIRPORT SAFETY AND EXPLAIN WHY AN ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP WOULD STILL EXIST.
14. TYPED NAME AND SIGNATURE OF AIRPORT AUTHORITY REPRESELNTATIVE.
15. SELF-EXPLANATORY.
16. SELF-EXPLANATORY.
17. SELF-EXPLANATORY.
18. TO BE COMPLETED BY FAA.

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
AIRPORT IMPROVEMENT PROGRAM

**MODIFICATION OF AIRPORT CONSTRUCTION STANDARDS**

SPECIFICATION & PARA. REQUESTED MODIFICATION & JUSTIFICATION

DATE

SPONSOR

DATE

APPROVED BY (FAA)

Attachment A





## **APPENDIX D - MOS RSA GRADING**

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

<b>BACKGROUND</b>		
1. AIRPORT: <b>Friedman Memorial Airport</b>	2. LOCATION(CITY,STATE): <b>Hailey, ID</b>	3. LOC ID: <b>SUN</b>
4. EFFECTED RUNWAY/TAXIWAY: <b>RUNWAY 13-31</b>	5. APPROACH (EACH RUNWAY): <b>RW 13 VISUAL RW 31 NPI</b>	6. AIRPORT REF. CODE (ARC): <b>C-III</b>
7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY): <b>Bombardier Q-400 and Gulfstream G-V</b>		
<b>MODIFICATION OF STANDARDS</b>		
8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):  <b>Runway Safety Area (RSA) Grading, Advisory Circular 150/5300-13A, <i>Airport Design</i> (AC 150/5300-13A)</b>		
9. STANDARD/REQUIREMENT:  Per Figure 3-23 on page 82 of AC 5300-13, the RSA transverse grades vary from 1.5% to 3% from the edge of runway shoulder down to the edge of the runway safety area.		
10. PROPOSED:  Existing transverse grades in the north half of the airport vary from 0% to 1% to remain.		
11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1E):  In order to meet the RSA grading standards, approximately 250,000 cubic yards of excavation would be disposed of offsite in addition to approximately 50,000 yards of onsite embankment. The estimated cost of disposing of the material offsite alone is over \$3.7 million dollars. In the mountain environment of Hailey, the project would need to occur in the summer during peak travel times and the airport's single runway would need to be shut down for approximately 90 days to complete the work. The closure of the airport for an extended period of time would have significant negative economic impacts on the community.		
12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1E):  The airport sponsor has considered two alternatives to meet this standard. Though viable, the first alternative is not seen as practicable due to cost and operational impacts relative to the improvement in safety. 1. Grade the RSA so transverse grades are -1.5% to -3%. <ul style="list-style-type: none"> <li>• Requires excavation of over 300,000 cubic yards of material, over 250,000 of which would need to be disposed of off site.</li> <li>• Additional cost of over \$3.7 million to dispose of material off site.</li> <li>• Additional cost of \$1.5 million to relocate storm drainage system.</li> <li>• Would require runway shut down of up to 90 days during summer months, with a huge negative impact to the airport and local economy.</li> </ul> 2. Allow existing grades of 0% to +1% to remain. <ul style="list-style-type: none"> <li>• Provides acceptable level of safety, as described below.</li> <li>• No operational or cost impacts.</li> </ul>		

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP (FAA ORDER 5300.1E):

From AC 150/5300-13A, the purpose of the RSA is to *“enhance the safety of aircraft which undershoot, overrun or veer off the runway, and it provides greater accessibility for fire fighting and rescue equipment during such incidents.”* The distance an aircraft departs from the runway is affected by three (3) major elements: weight of the aircraft, speed of the aircraft and RSA gradient. The third variable and the subject of this modification, the RSA gradient, affects the rate at which an aircraft slows after departing the runway. The steeper the gradient the longer it will take for an aircraft to stop. The existing transverse RSA gradients at SUN are flatter than standard; meaning an aircraft would actually come to a stop sooner if all other variables were equal. Paragraph 307 f in AC 5300-13 describes this condition: *“Keeping negative grades to the minimum practicable contributes to the effectiveness of the RSA.”* Though flatter than standard, the RSA at SUN is graded smoothly and is capable of safely accommodating an aircraft without damage, in the case of a veer off.

The negative aspect of gradients flatter than standard are the inability to adequately drain the RSA during rainfall events. The existing RSA at SUN drains extremely well, with no accumulation of water. Existing soils drain very well and the local climate is dry, with an average annual rainfall of only 16 inches. In addition, the runway is equipped with a storm drainage system that collects and removes drainage efficiently.

The total estimated cost of meeting the minimum transverse grade of a 1.5% is \$5 Million dollars and will require a full airport closure for 3 months. As the proposed RSA at SUN will meet the RSA requirements defined in AC 5300-13A, the grades flatter than standard will provide an acceptable level of safety.



U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

MODIFICATION:		LOCATION:		PAGE 2 OF 2	
14. SIGNATURE OF ORIGINATOR:		15. ORIGINATOR'S ORGANIZATION:		16. TELEPHONE:	
17. DATE OF LATEST FAA SIGNED ALP:					
18. ADO RECOMMENDATION:		19. SIGNATURE:		20. DATE:	
21. FAA DIVISIONAL REVIEW (AT, AF, FS):					
ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR	
COMMENTS:					
22. AIRPORTS' DIVISION FINAL ACTION:					
<input type="checkbox"/> UNCONDITIONAL APPROVAL		<input type="checkbox"/> CONDITIONAL APPROVAL		<input type="checkbox"/> DISAPPROVAL	
DATE:	SIGNATURE:		TITLE:		
CONDITIONS OF APPROVAL:					

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

---

ITEMS 1-17 ARE TO BE COMPLETED BY THE AIRPORT SPONSOR(ORIGINATOR). ALL OTHER ITEMS WILL BE COMPLETED BY THE FAA.

THE COMPLETED FORM WILL BE TRANSMITTED BY THE ORIGINATOR TO THE APPLICABLE ADO/AFO. THE ADO/AFO WILL TRANSMIT THE FINAL FAA DETERMINATION TO THE ORIGINATOR.

MODIFICATION TO AIRPORT DESIGN STANDARDS REQUESTS SHOULD INCLUDE SKETCHES OR DRAWINGS WHICH CLEARLY ILLUSTRATE THE NONSTANDARD CONDITION.

### ITEMS

1. LEGAL NAME OF AIRPORT.
2. ASSOCIATED CITY.
3. AIRPORT LOCATION IDENTIFIER (SEE APPROACH PLATES/AIRPORT FACILITY DIRECTORY).
4. IDENTIFY THE RUNWAY(S), TAXIWAY(S) OR OTHER FACILITIES EFFECTED BY THE PROPOSED MODIFICATION TO STANDARDS REQUEST.
5. IDENTIFY THE MOST CRITICAL APPROACH FOR EACH RUNWAY IDENTIFIED IN #4.
6. AIRPORT REFERENCE CODE - SEE PARAGRAPH 2, PAGE 1 AC 150/5300-13(CHANGE 4) - I.E. C-II, B-II, A-I (SMALL).
7. NOTE THE DESIGN AIRCRAFT (ARC OR SPECIFIC AIRCRAFT) FOR EACH FACILITY IDENTIFIED IN #4. A DESIGN AIRCRAFT MUST MAKE REGULAR USE OF THE FACILITY. NORMALLY, FAA CONSIDERS REGULAR USE TO BE 500 OR MORE ANNUAL INTINERANT OPERATIONS.  
  
IF THE AIRPORT SERVES A WHOLE FAMILY OF AIRCRAFT IN A PARTICULAR GROUP, THE ARC (I.E. B-II) SHOULD BE SPECIFIED. IF, HOWEVER, THE AIRPORT IS USED BY ONLY 1 OR 2 OF A FAMILY OF AIRCRAFT (IX- BEECH KING AIR C90), THE MOST DEMANDING (APPROACH SPEED, WINGSPAN) AIRCRAFT SHOULD BE SPECIFIED.
8. IDENTIFY THE SPECIFIC NAME OF THE STANDARD THAT IS PROPOSED TO BE MODIFIED FOR THE SUBJECT LOCAL CONDITION.
9. DESCRIBE (WORDS AND NUMBERS) THE DIMENSIONS AND REQUIREMENTS OF THE STANDARD AS PROVIDED IN AC 150/5300-13.
10. STATE THE PROPOSED MODIFICATION TO THE STANDARD.
11. DISCUSS THE LOCAL CONDITIONS THAT MAKE IT IMPRACTICAL OR IMPOSSIBLE TO MEET THE STANDARD.
12. IDENTIFY ALTERNATIVES TO THE SUBJECT PROPOSED MODIFICATION, AND SHOW WHY THESE ALTERNATIVES ARE NOT VIABLE.
13. DISCUSS HOW THE PROPOSED MODIFICATION WOULD IMPACT AIRPORT SAFETY AND EXPLAIN WHY AN ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP WOULD STILL EXIST.
14. TYPED NAME AND SIGNATURE OF AIRPORT AUTHORITY REPRESLNTATIVE.
15. SELF-EXPLANATORY.
16. SELF-EXPLANATORY.
17. SELF-EXPLANATORY.
18. TO BE COMPLETED BY FAA.

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
AIRPORT IMPROVEMENT PROGRAM

**MODIFICATION OF AIRPORT CONSTRUCTION STANDARDS**

SPECIFICATION & PARA. REQUESTED MODIFICATION & JUSTIFICATION

DATE

SPONSOR

DATE

APPROVED BY (FAA)

Attachment A



# **APPENDIX D - MOS RUNWAY CENTERLINE TO AIRCRAFT PARKING**



U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND		
1. AIRPORT: <b>Friedman Memorial Airport</b>	2. LOCATION(CITY,STATE): <b>Hailey, ID</b>	3. LOC ID: <b>SUN</b>
4. EFFECTED RUNWAY/TAXIWAY: <b>RUNWAY 13-31</b>	5. APPROACH (EACH RUNWAY): <b>RW 13 VISUAL RW 31 NPI</b>	6. AIRPORT REF. CODE (ARC): <b>C-III</b>
7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY): <b>Bombardier Q-400 and Gulfstream G-V</b>		
MODIFICATION OF STANDARDS		
8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT):  <b>Runway to Aircraft Parking Area, Advisory Circular 150/5300-13A, <i>Airport Design</i> (Advisory Circular 150/5300-13A)</b>		
9. STANDARD/REQUIREMENT:  500 feet per Table 3-8 on page 94 of AC 150/5300-13A.		
10. PROPOSED:  400 feet		
11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1E):  In the airport's current configuration, relocation of aircraft parking area to a separation of 500 feet would either require the reconfiguration of all airfield facilities on the west side of the airport or relocating the runway and Highway 75 to the east to provide the required separation. Neither of these options are seen as practicable and providing a separation of 400 feet between Runway 13-31 and Aircraft Parking will provide an acceptable level of safety, based on the aircraft traffic at the airport.		
12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1E):  The airport sponsor has considered three alternatives to provide meet or improve compliance with standards at the airport, including Runway to Aircraft Parking Separation. The first two alternatives, though viable, are not practicable, due to cost and environmental impact.		
<ol style="list-style-type: none"> <li>1. Relocate Terminal and Aircraft Parking To The Southwest – Not Necessary <ul style="list-style-type: none"> <li>• Acquire 30 Acres of land, relocate terminal building and access road, extend utilities and construct 50,000 SY of aircraft parking</li> <li>• Total estimated cost exceeds \$30 million.</li> </ul> </li> <li>2. Relocate Runway and Highway to the East – Not Practicable <ul style="list-style-type: none"> <li>• Requires relocation of approximately 2 miles of State Highway 75 approximately 75 feet to the east.</li> <li>• A large neighborhood exists east of the airport in this location and relocating the highway will greatly increase the environmental impact of the highway on that neighborhood. Idaho Transportation Department has completed an Environmental Impact Statement study for a proposed project on this highway, which identifies the following environmental impacts of the highway in this location, all of which would be exacerbated significantly by relocating the highway as described. Note that an environmental analysis for the proposed action relative to the airport has not been completed – these impacts are identified based on previous studies and would require further evaluation. <ul style="list-style-type: none"> <li>○ Historical Resources: Relocation of the highway would require removal of a railroad berm that has been identified as a potential historic structure.</li> <li>○ Noise: The noise levels of a relocated highway may exceed those permitted by Federal Highway Administration guidelines and require mitigation. Mitigation is difficult at this location, due to local ordinances prohibiting construction of noise walls.</li> <li>○ Environmental Justice: The adjacent neighborhood is high density, with relatively low incomes and a high minority population. Based on these factors, relocating the highway could induce environmental justice impacts.</li> </ul> </li> <li>• Costs for relocating the Runway and Highway are estimated to exceed \$119 million.</li> </ul> </li> <li>3. Reconfigure Aircraft Parking to Provide 400 Feet Separation <ul style="list-style-type: none"> <li>• Can be accomplished along with other proposed standards improvements, without additional cost or environmental impact.</li> <li>• Provides acceptable level of safety.</li> </ul> </li> </ol>		

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

13. STATE WHY MODIFICATION WOULD PROVIDE ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP (FAA ORDER 5300.1E):

According to AC 150/5300-13A Paragraph 321 a (3), "Runway to aircraft parking area separation is determined by the landing and takeoff flight path profiles and physical characteristics of the aircraft. The runway to parking area separation standard precludes any part of a parked aircraft (tail, wingtip, nose, etc.) from being within the ROFA or penetrating the OFZ."

A runway to aircraft parking area separation of 400 feet would preclude any part of a parked aircraft from penetrating the Runway OFA or the Runway OFZ. In addition, a separation of 400 feet would also provide the following benefits:

1. Prevent parked aircraft from penetrating the Runway Primary Surface
2. Prevent parked aircraft from penetrating the Runway Transitional Surface
3. Prevent parked aircraft from penetrating the Taxiway OFA

As the proposed runway to aircraft parking area separation of 400 feet meets the purpose of this standard as stated in AC 150/5300-13A, this configuration will provide an acceptable level of safety.

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

**MODIFICATION OF AIRPORT DESIGN STANDARDS**

MODIFICATION:		LOCATION:		PAGE 2 OF 2	
14. SIGNATURE OF ORIGINATOR:		15. ORIGINATOR'S ORGANIZATION:		16. TELEPHONE:	
17. DATE OF LATEST FAA SIGNED ALP:					
18. ADO RECOMMENDATION:		19. SIGNATURE:		20. DATE:	
21. FAA DIVISIONAL REVIEW (AT, AF, FS):					
ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR	
COMMENTS:					
22. AIRPORTS' DIVISION FINAL ACTION:					
<input type="checkbox"/> UNCONDITIONAL APPROVAL		<input type="checkbox"/> CONDITIONAL APPROVAL		<input type="checkbox"/> DISAPPROVAL	
DATE:	SIGNATURE:		TITLE:		
CONDITIONS OF APPROVAL:					

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
AIRPORT IMPROVEMENT PROGRAM

## MODIFICATION OF AIRPORT DESIGN STANDARDS

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ITEMS 1-17 ARE TO BE COMPLETED BY THE AIRPORT SPONSOR(ORIGINATOR). ALL OTHER ITEMS WILL BE COMPLETED BY THE FAA.

THE COMPLETED FORM WILL BE TRANSMITTED BY THE ORIGINATOR TO THE APPLICABLE ADO/AFO. THE ADO/AFO WILL TRANSMIT THE FINAL FAA DETERMINATION TO THE ORIGINATOR.

MODIFICATION TO AIRPORT DESIGN STANDARDS REQUESTS SHOULD INCLUDE SKETCHES OR DRAWINGS WHICH CLEARLY ILLUSTRATE THE NONSTANDARD CONDITION.

### ITEMS

1. LEGAL NAME OF AIRPORT.
2. ASSOCIATED CITY.
3. AIRPORT LOCATION IDENTIFIER (SEE APPROACH PLATES/AIRPORT FACILITY DIRECTORY).
4. IDENTIFY THE RUNWAY(S), TAXIWAY(S) OR OTHER FACILITIES EFFECTED BY THE PROPOSED MODIFICATION TO STANDARDS REQUEST.
5. IDENTIFY THE MOST CRITICAL APPROACH FOR EACH RUNWAY IDENTIFIED IN #4.
6. AIRPORT REFERENCE CODE - SEE PARAGRAPH 2, PAGE 1 AC 150/5300-13(CHANGE 4) - I.E. C-II, B-II, A-I (SMALL).
7. NOTE THE DESIGN AIRCRAFT (ARC OR SPECIFIC AIRCRAFT) FOR EACH FACILITY IDENTIFIED IN #4. A DESIGN AIRCRAFT MUST MAKE REGULAR USE OF THE FACILITY. NORMALLY, FAA CONSIDERS REGULAR USE TO BE 500 OR MORE ANNUAL INTINERANT OPERATIONS.  
  
IF THE AIRPORT SERVES A WHOLE FAMILY OF AIRCRAFT IN A PARTICULAR GROUP, THE ARC (I.E. B-II) SHOULD BE SPECIFIED. IF, HOWEVER, THE AIRPORT IS USED BY ONLY 1 OR 2 OF A FAMILY OF AIRCRAFT (IX- BEECH KING AIR C90), THE MOST DEMANDING (APPROACH SPEED, WINGSPAN) AIRCRAFT SHOULD BE SPECIFIED.
8. IDENTIFY THE SPECIFIC NAME OF THE STANDARD THAT IS PROPOSED TO BE MODIFIED FOR THE SUBJECT LOCAL CONDITION.
9. DESCRIBE (WORDS AND NUMBERS) THE DIMENSIONS AND REQUIREMENTS OF THE STANDARD AS PROVIDED IN AC 150/5300-13.
10. STATE THE PROPOSED MODIFICATION TO THE STANDARD.
11. DISCUSS THE LOCAL CONDITIONS THAT MAKE IT IMPRACTICAL OR IMPOSSIBLE TO MEET THE STANDARD.
12. IDENTIFY ALTERNATIVES TO THE SUBJECT PROPOSED MODIFICATION, AND SHOW WHY THESE ALTERNATIVES ARE NOT VIABLE.
13. DISCUSS HOW THE PROPOSED MODIFICATION WOULD IMPACT AIRPORT SAFETY AND EXPLAIN WHY AN ACCEPTABLE LEVEL OF SAFETY, ECONOMY, DURABILITY, AND WORKMANSHIP WOULD STILL EXIST.
14. TYPED NAME AND SIGNATURE OF AIRPORT AUTHORITY REPRESLNTATIVE.
15. SELF-EXPLANATORY.
16. SELF-EXPLANATORY.
17. SELF-EXPLANATORY.
18. TO BE COMPLETED BY FAA.



U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
AIRPORT IMPROVEMENT PROGRAM

**MODIFICATION OF AIRPORT CONSTRUCTION STANDARDS**

SPECIFICATION & PARA. REQUESTED MODIFICATION & JUSTIFICATION

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DATE

SPONSOR

DATE

APPROVED BY (FAA)

Attachment A