

Appendix F

SRM RUNWAY 12-30 FINAL REPORT



Sustainable Airport Master Plan



ALBUQUERQUE INTERNATIONAL SUNPORT (ABQ)

ALBUQUERQUE, NEW MEXICO

HOT SPOT #1 MITIGATION

Safety Risk Management Panel Meeting

March 2016

Contents

1. SUMMARY2

2. PROJECT DESCRIPTION.....4

3. FAA AIRPORTS SAFETY ASSESSMENT PROCESS11

4. AIRPORT SYSTEM FEATURES.....12

5. SRM PANEL MEETING12

6. HAZARD ASSESSMENTS.....15

7. CONCLUSION.....19

APPENDIX A. Safety Assessment Screening Form.....21

APPENDIX B. Hazard Assessment Worksheet24

APPENDIX C. Agenda and Attendance List27



Prepared by:
Applied Research Associates
7184 Troy Hill Dr., Suite N
Elkridge, MD 21-75

1. SUMMARY

Albuquerque International Sunport (ABQ) is completing a Sustainable Airport Master Plan that will describe the improvement of facilities to meet future demand, and to maintain an adequate, safe, and reliable airport. One important goal of the master planning process is to provide for continuous safety improvement. Accordingly, the master plan is considering several alternatives to achieve compliance with FAA airport design standards and to address issues associated with four (4) designated hot spots on the air field. Hot spots are defined as confusing intersections near runways that are more likely to contribute to runway incursions.

ABQ is conducting a Safety Assessment to evaluate alternative airfield configuration options that will address Hot Spot #1 on the FAA Airport Diagram (See Figure 1). A December 15-16 Safety Assessment panel meeting evaluated hazards and risks associated with five alternatives proposed by the ABQ planning team. These alternatives are intended to “decouple” the Runway 08 and 12 thresholds to prevent pilots from inadvertently lining up on the wrong runway. The panel reviewed each alternative and decided to eliminate two of these alternatives from the safety assessment because:

- They could not comply with FAA threshold siting criteria,
- They would introduce new problematic taxiway configurations that would not reduce overall risk levels, or
- They would shorten an existing runway to the point that it could no longer satisfy aeronautical demand at the airport

The remaining three alternatives, designated as **1B**, **1C**, and **2** were evaluated in terms of hazards, risk levels and risk mitigation measures where the panel concluded that they were necessary. The panel found that alternative **1B** presented an initial risk level of **low** while the remaining two were rated as **medium**. Although each of these alternatives can be modified to provide acceptable risks, the panel does not recommend alternative **2** because significant loss of runway length would impact aeronautical need requirements.

The planning team will use the results of the Safety Assessment to develop a final Airport Layout Plan (ALP) for submittal to the FAA for review and approval. For medium hub airports such as ABQ, the FAA requires a Safety Assessment in accordance with Order 5200.11 prior to approval of ALP submittals. The work under this Safety Assessment complies with FAA Order 5200.11 for planning projects. However, additional safety assessments or a follow-on to this assessment may be needed depending upon the final ALP submittal.

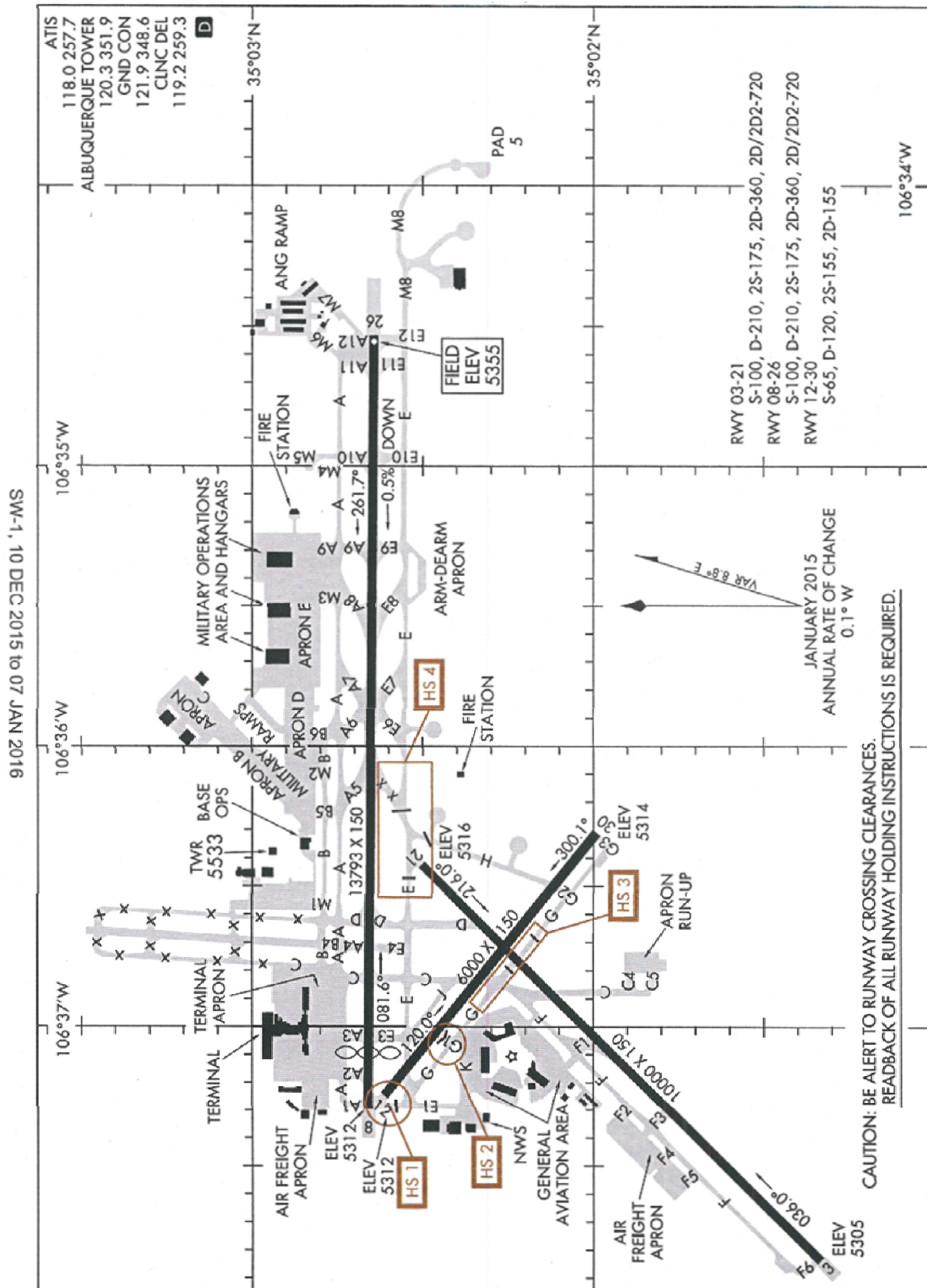


Figure 1- Airport Diagram.

2. PROJECT DESCRIPTION

Albuquerque International Sunport is currently in the process of developing a Sustainable Airport Master Plan (SAMP). Coffman Associates, a national airport planning firm based in Kansas City, Missouri, is the prime consultant on the project. Molzen-Corbin is the Airport consulting engineer and is a sub-consultant on the SAMP project. The SAMP is considering various alternatives to correct Hot Spot #1 on the airfield. The FAA Airport/Facilities Directory describes this Hot Spot as follows:

The hold position marking on Taxiway E1 is the hold short position for both Runway 8 and 12. When instructed by the tower to move beyond this point, pilots must ensure the proper alignment on the correct runway.

This Hot Spot is also identified by FAA as a Runway Incursion Mitigation (RIM) program location. The RIM is a preliminary inventory of airport locations where runway incursions have occurred. An analysis of data collected from 2007-2013 indicates that these locations experienced three or more peak annual runway incursions in a given year or more than six runway incursions cumulative during the study period. According to RIM data, ABQ Hot Spot #1 experienced nine runway incursions during this period. FAA has a priority to work with airports on mitigation strategies for these locations.

Correction of Hot Spot #1 is considered to be a near term ALP improvement. Airfield changes to address the remainder of the Hot Spots and other aeronautical needs at ABQ will be proposed at a future date as the SAMP unfolds. As of the date of the Safety Assessment meeting, five alternatives are being considered by the planning team:

Alternative 1A

This alternative, as shown in Figure 2, leaves the Runway 12 threshold in place, thereby providing the longest runway length of all of the alternatives. A new Runway 12 threshold entrance taxiway would provide a typical 90-degree entrance and eliminate the “in-line” taxiway arrangement where pilots approaching the threshold are unable to clearly determine the runway designation. This alternative would also move the Runway 08 hold bar further south to provide proper clearance for the threshold siting surface. As shown by Figure 2, the result creates problems with the new threshold taxiway to Runway 12 where two hold bars that would effectively only handle a single aircraft.

Alternative 1B

This alternative, as presented in Figure3, removes 75 feet of length from Runway 12. This allows for two separate taxiways (E1 and the new Runway 12 threshold entrance) with separate hold bars. While there is enough room to accommodate two aircraft simultaneously at the hold positions for Runway 08 and Runway 12, there are still some clearance issues for large aircraft. This solution introduces a new taxiway to an already wide expanse of pavement created by the intersection of Taxiways E, E1, and G.

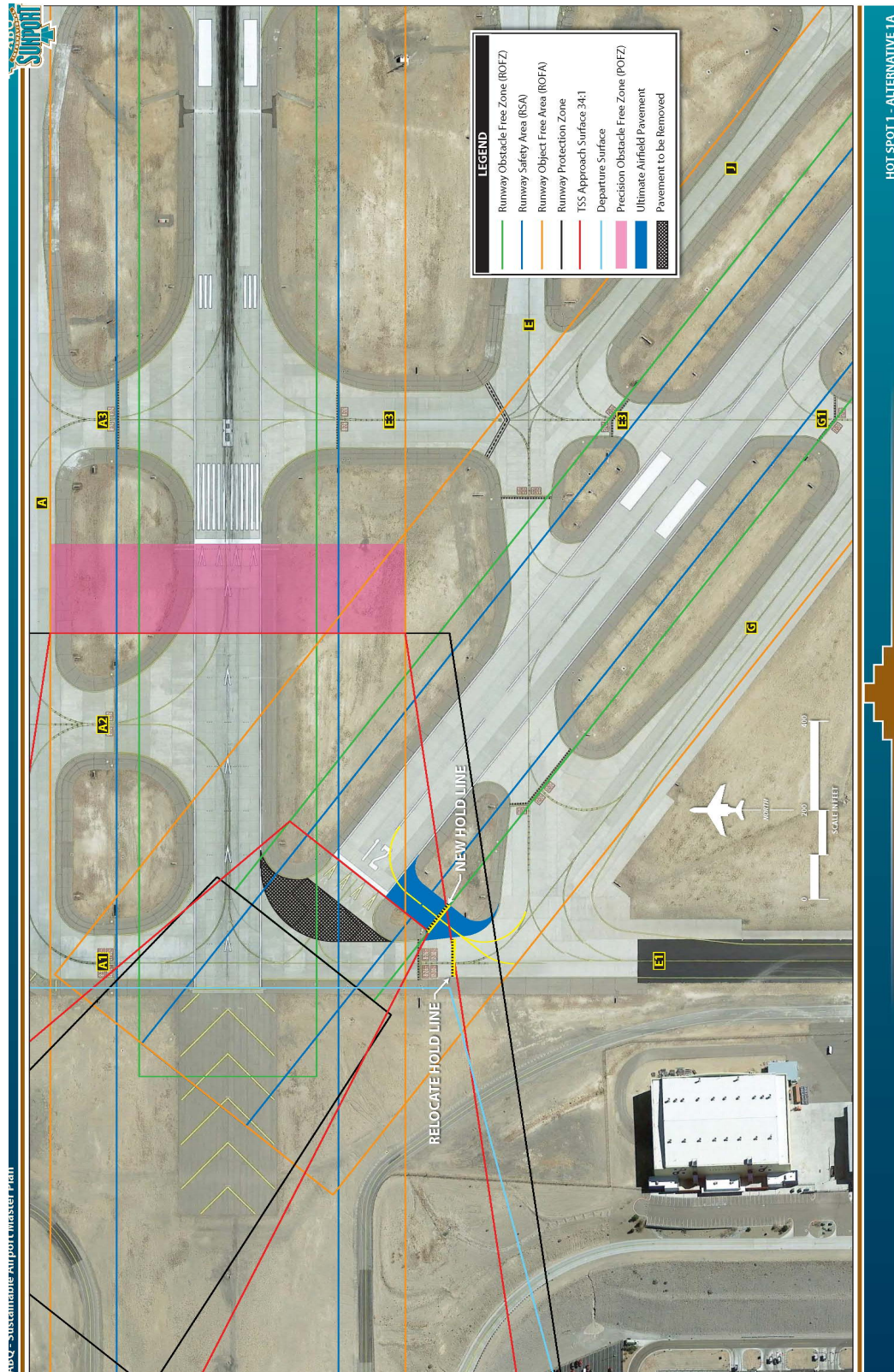


Figure 2- Alternative 1A.

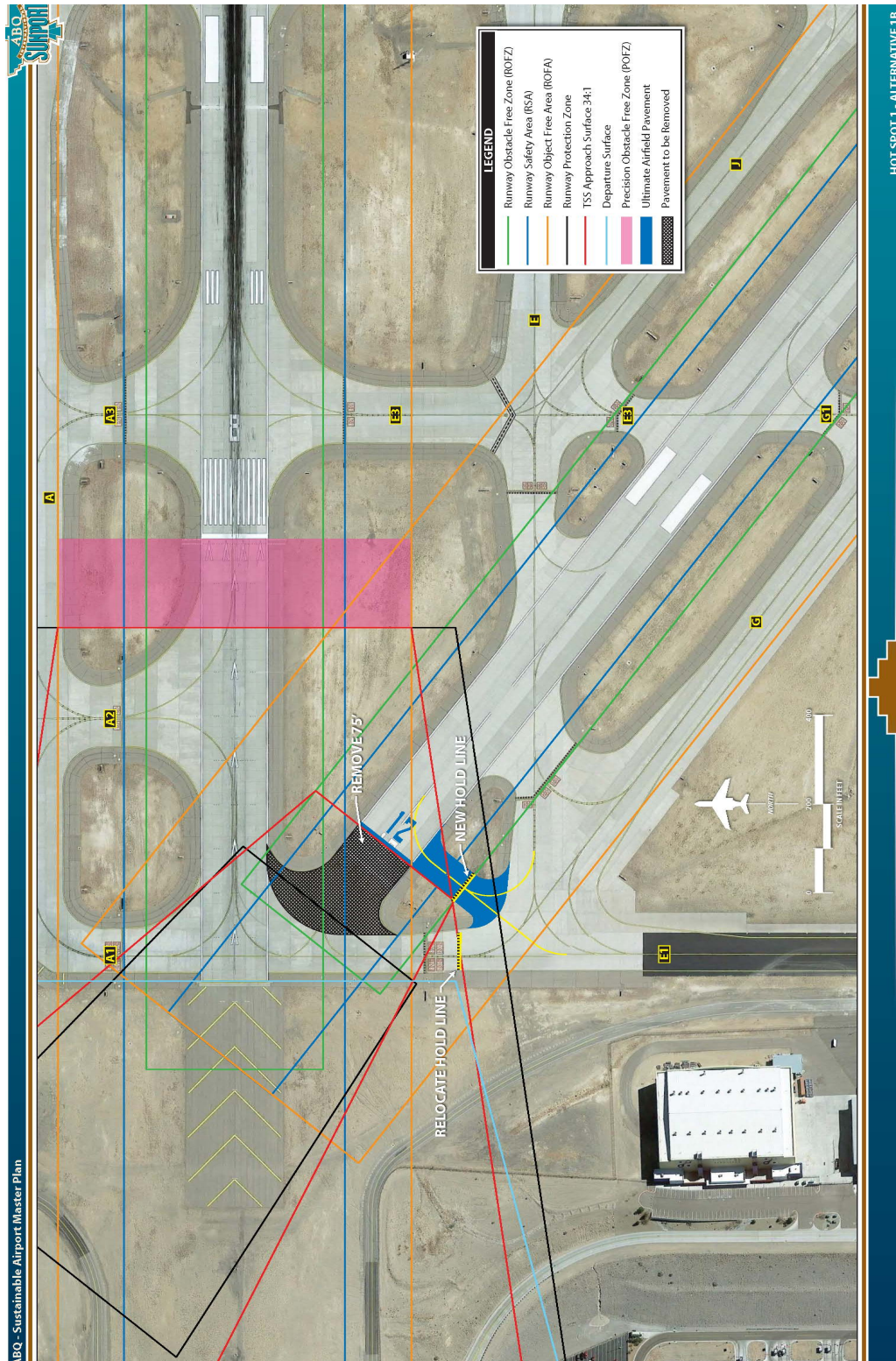


Figure 3- Alternative 1B.

Alternative 1C

This alternative, as presented in Figure 4, considers removing 150 feet of Runway 12 length and then adds a new threshold entrance taxiway to Runway 12. This alternative provides the necessary spacing to holding aircraft and for signage. This alternative also considers closing that portion of Taxiway E between Runway 12-30 and Taxiway E1 to simplify the complex and wide taxiway intersection.

Alternative 2

This alternative, as shown in Figure 5, shortens Runway 12 by 350 feet. It also simplifies taxiway intersections by removing parallel Taxiway E to the west of Taxiway E3 and replacing it with a Runway 12 threshold entrance taxiway. This alternative greatly simplifies the intersection of taxiways E1 and G.

Alternative 3

This alternative, presented in Figure 6, is similar to Alternative 2, except that it shortens Runway 12-30 by 1,000 feet in order to provide a “cleaner” Runway 12 threshold entrance taxiway. The resulting runway length (5,000 ft) is below what the planners are recommending for this runway.

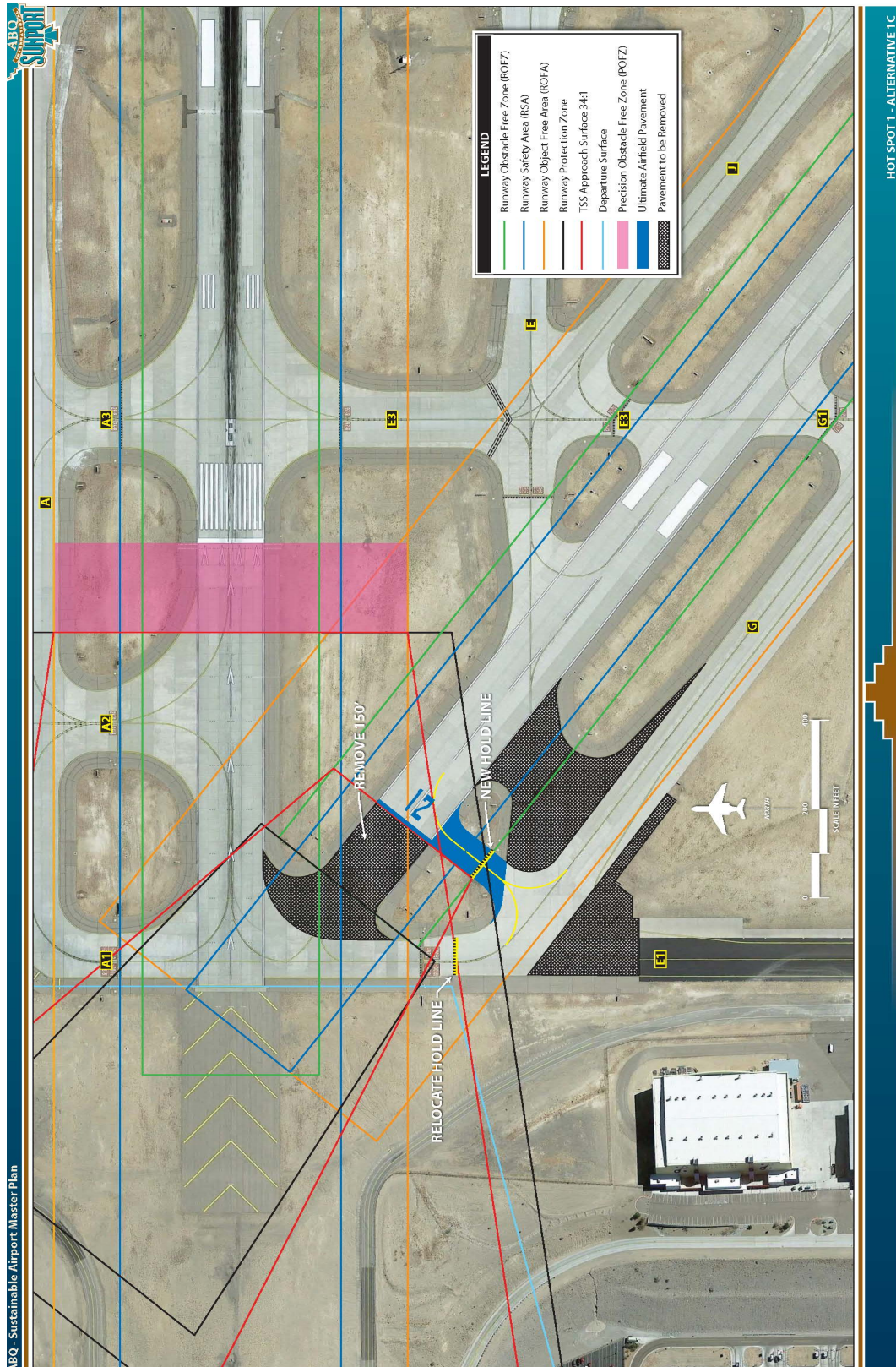


Figure 4- Alternative 1C.

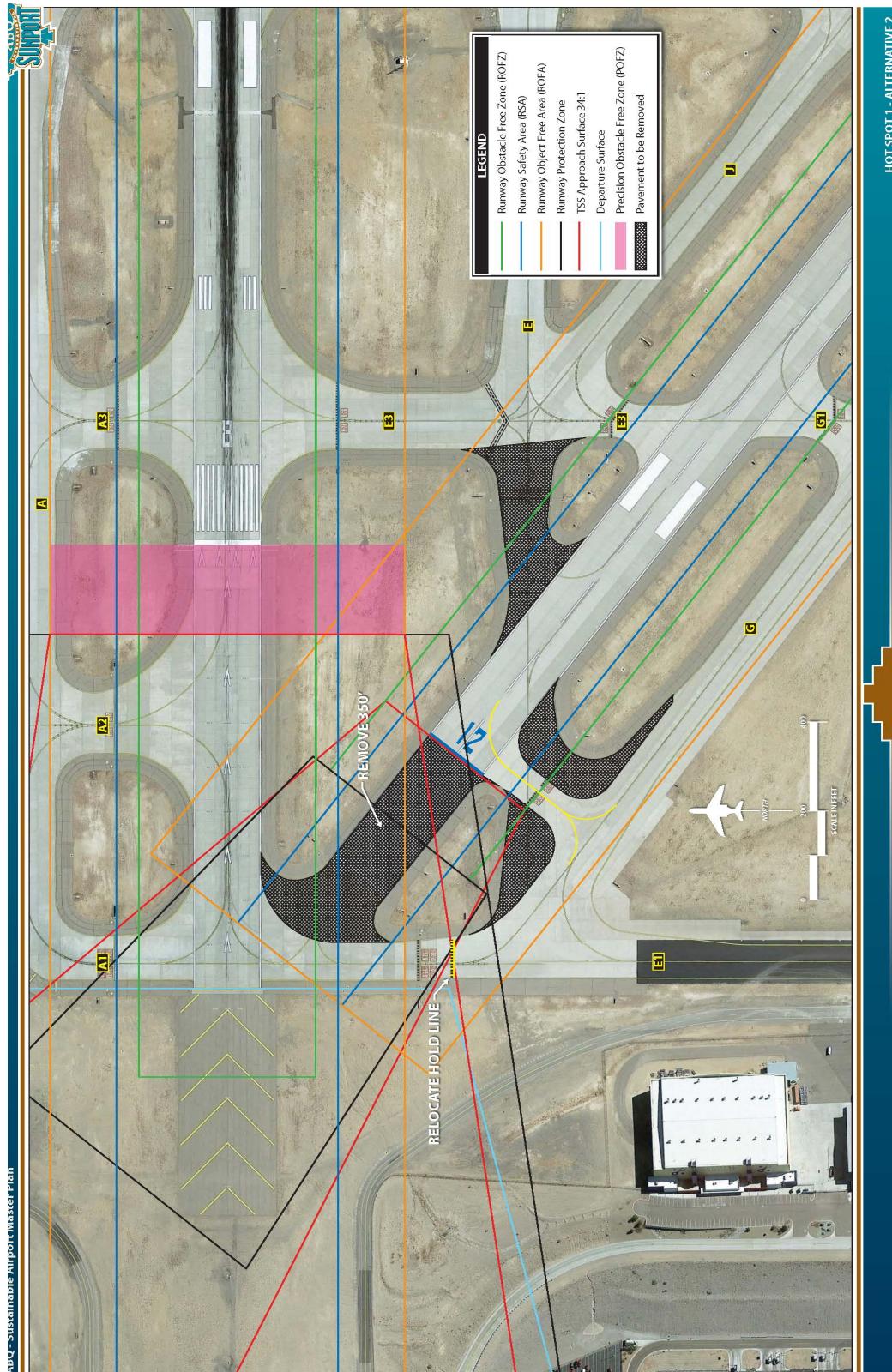


Figure 5- Alternative 2.

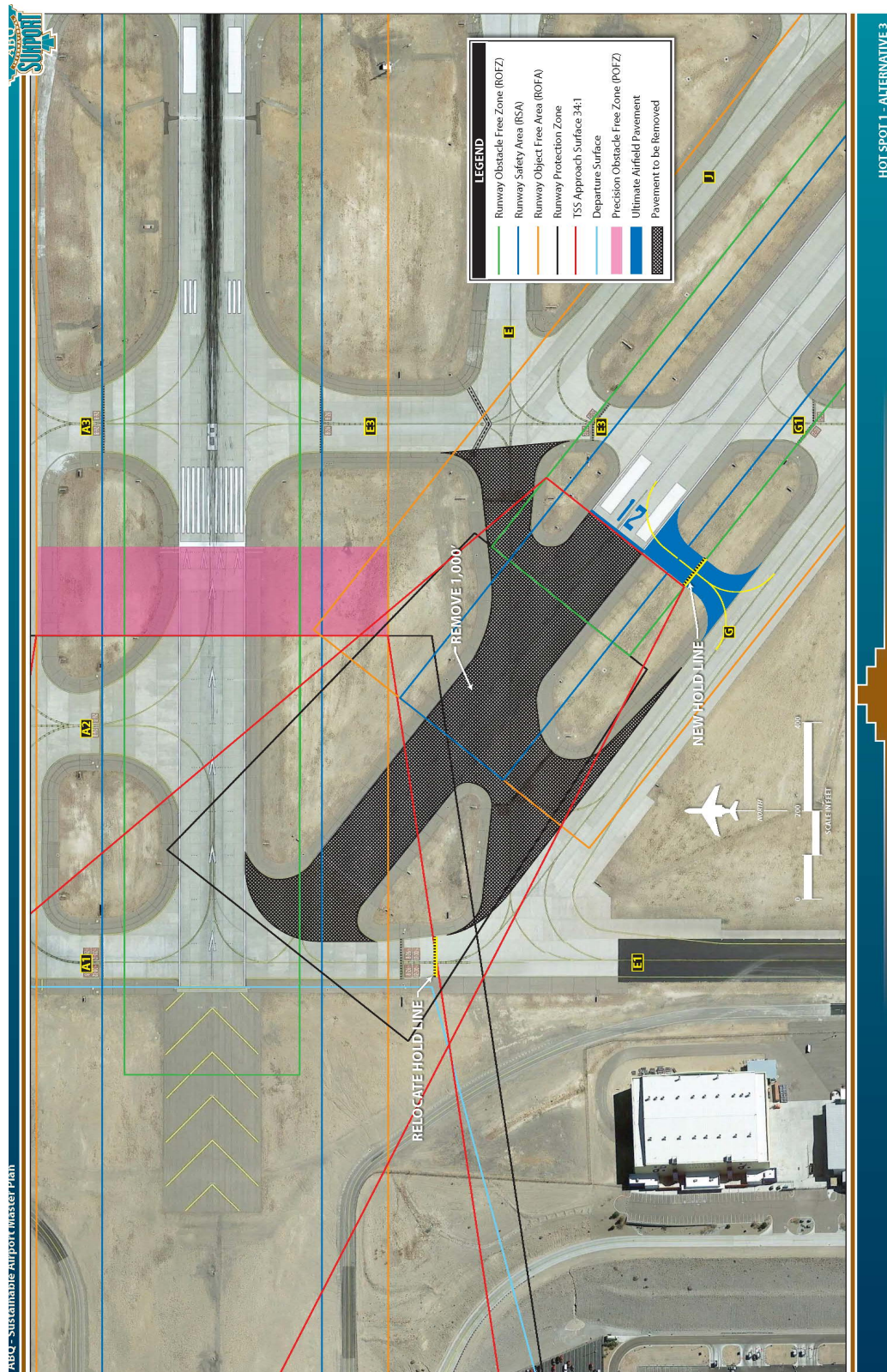


Figure 6- Alternative 3.

3. FAA AIRPORTS SAFETY ASSESSMENT PROCESS

FAA Order 5200.11 implements FAA Airport's (ARP's) requirements for a Safety Management System (SMS). This order requires the application of safety risk management principles whenever ARP reviews or approves an airport sponsor's proposals that could affect aviation safety. Specifically, FAA is required to perform SRM in connection with:

- Submittal of new or revised Airport Layout Plans (ALPs) for FAA approval
- FAA review and approval of construction safety and phasing plans
- FAA airspace determinations for airport sponsor requests for non-construction airport changes submitted by FAA Form 7480-1, Notice of Landing Area Proposal
- FAA approval of Part 150 noise compatibility programs and program changes that may affect aviation safety
- FAA approval of an airport sponsor's request for a Modification of Standards
- Final FAA approval of new and updated airport planning, design, or construction standards

These requirements do not apply to the approval or enforcement of Airport Certification Manuals under 14 CFR Part 139. SMS requirements related to Part 139 are the subject of a separate proposed rulemaking action. Instead, these requirements are the result of Federal obligations and grant assurances for airports that accept Federal financial assistance. Accordingly, an SRM process (safety assessment) is required to support the review and approval of the updated ALP for ABQ.

The FAA uses a Safety Assessment Screening (SAS) form as a decision and documentation tool for determining the applicability of FAA SRM requirements and for determining the need for an SRM panel to examine hazards, risks, and mitigations. Appendix A is the completed SAS form for this Safety Assessment. Block 6 of the form indicates whether an SRM panel is needed to complete the Safety Assessment. Prior to the Safety Assessment meeting, the FAA project manager determined that a panel was needed because the proposed alternatives might:

- Increase aviation safety risks, with existing controls in place
- Adversely affect aviation operations with existing controls in place
- Affect navigational aids
- Impact TERPS surfaces

Note that prior to the panel meeting, the SAS form makes no judgement as to whether the project would actually impose any new risks on the system. It merely documents situations where risks might be a concern and allows the SRM panel to proceed with a more thorough examination. The SRM panel completes the process by completing a Hazard Assessment Worksheet (HAW) that documents the five-step SRM process defined by Order 5200.11.

The panel used a Comparative Safety Assessment (CSA) approach to document hazard and risk findings for multiple alternatives. The CSA provides decision makers with a listing of all potential hazards along with a risk

assessment for each alternative-hazard combination that is considered. It is used to rank and compare options for decision-making purposes.

The completed SAS form requires three sets of signatures:

- Block 11 is a panel member certification. Signatures here certify that a thorough analysis of potential hazards and risk mitigation measures (if necessary) was conducted. They do not indicate concurrence with the overall findings of the SRM panel.
- Block 12 is certification by the airport sponsor. This signature indicates acknowledgement of the risk and mitigation findings of the SRM panel. Airport sponsors must maintain safe airport operations under Federal grant assurances and obligation and the panel findings do not relieve the sponsor of any legal obligations in that regard.
- Block 13 is the FAA SRM approval. This signature indicates that the SRM process complies with FAA Order 5200.11, and that mitigation measures, if any, are included in the formal FAA approval action. The signature level is determined by the initial risk found by the SRM panel.

4. AIRPORT SYSTEM FEATURES

An airport system description is an important first step in the hazard identification process. It often places boundaries on the analysis to keep the panel focused on the project scope. For this SRM panel, the scope of the project was strictly limited to airfield configuration changes needed to decouple the runway ends to prevent situations where pilots might line up on the wrong runway. The panel did discuss other issues such as Threshold Siting Surface (TSS) criteria, potential development of an apron in the vicinity of taxiways E1 and K, and other airfield improvements needed to address other Hot Spot issues. However, the primary discussions of this panel were limited to Hot Spot #1 only and assumed that other airfield improvements and projects would be evaluated and developed with the Hot Spot #1 changes already in place.

Albuquerque is a medium-hub commercial service airport. The airfield is owned and operated by the City of Albuquerque – Department of Aviation. Kirtland Air Force Base (KAFB) is adjacent to the airfield, shares the runways, and provides ARFF services. It accommodates significant general aviation, cargo and military operations in addition to commercial service. Runway 8-26 is 13,793 feet long with a 1,000-foot displaced landing threshold to Runway 8. This is the primary commercial service runway and the length is necessary to meet aeronautical demand. Runway 12-30 is 6,000 feet in length and is the general aviation runway. It also accommodates military C-130 operations. An analysis presented in the SAMP indicates that 6,000 feet should be maintained if feasible, however, a length of 5,500 feet would still accommodate the vast majority of general aviation aircraft utilizing the runway.

5. SRM PANEL MEETING

The SRM panel meeting was held on December 15 and 16, 2015 in the ABQ Terminal Building Aviation Department Main Conference Room. The meeting was attended by representatives of ABQ, the planning consultant, FAA Air Traffic Control, FAA Airports, the state of New Mexico, and airport fixed base operators

Atlantic Aviation and Cutter Aviation. The meeting also provided remote access for some participants using GoToMeeting. The draft agenda and attendance list is included as Appendix C. The meeting began with an SAMP overview by Coffman Associates and an introduction to the FAA Safety Assessment process. Next, the panel began a detailed examination of each alternative in order: **1A, 1B, 1C, 2, and 3**.

The panel brainstormed potential hazards for each alternative. Hazards are defined by FAA as “any existing or potential condition that can lead to injury, illness, or death to people; damage to or loss of a system, equipment, or property; or damage to the environment.” Many of the hazards identified by the panel are actually causes of a hazard. For example, a wide taxiway intersection can be the cause of a loss of situational awareness. In this case, loss of situational awareness is the hazard. This report reorganizes the hazard descriptions in this manner.

5.1 Eliminating Alternatives 1A and 3

After reviewing the alternatives with the planning team, the panel elected not to evaluate hazards and risks associated with alternatives **1A** and **3**. The panel believes that these alternatives are not feasible and received concurrence from the ABQ planning team and the FAA Project Manager.

Alternative **1A** (Figure 2) essentially removes a section of pavement beyond the threshold and replaces it with a short 90 degree entrance taxiway leading to the threshold. Although this option would successfully decouple the runways, the new taxiway would intersect with and complicate the existing intersection with Taxiways E1, E, and G. One of the objectives of the FAA RIM program is to eliminate confusing airfield geometry such as taxiway intersections with more than 3 nodes. This alternative would result in a taxiway with 4 nodes. The panel believes that any risk reduction associated with pavement removal beyond the runway threshold would be more than offset by the confusing taxiway intersection.

Alternative **3** retains all of the hazards identified for alternative **2** while failing to provide minimum runway length requirements for the majority of general aviation aircraft. (Paragraph 4 provides a discussion of length requirements for runway 12/30.) In addition, a shortened runway might lead to increased use of the main runways that could introduce new hazards into the system.

5.2 Alternatives 1B, 1C, and 2

The panel completed a thorough Comparative Safety Assessment (CSA) for alternatives **1B, 1C** and **2**. Like all Safety Assessments, the panel identified potential hazards for each alternative. A hazard alignment process identified hazards that apply to multiple alternatives. This process also helped clarify and refine hazard descriptions to ensure a thorough analysis. Table 1 presents the list of hazards identified by the panel and the alternatives they impact. Identified hazards are discussed in section 6 of this report.

Table 1- Alignment of Hazards with Alternatives.

ID	Hazard	<u>Alt 1B</u>	<u>Alt 1C</u>	<u>Alt 2</u>
ABQ-107-1	Loss of situational awareness for pilots and vehicle operators	✓		
ABQ-107-2	Shortened runway for Rwy 30 arrivals and departures	✓	✓	✓
ABQ-107-3	Inadequate wingtip clearance at the proposed hold bars for Runway 08 and Runway 12	✓		
ABQ-107-4	Increased Airfield Congestion		✓	
ABQ-107-5	Loss of maintenance run-up area south of Twy G		✓	
ABQ-107-6	Loss of Rwy 30 exit at Twy E		✓	✓
ABQ-107-7	Increased airfield congestion; increased runway crossings		✓	✓
ABQ-107-8	Twy A1 hold position			✓

Appendix B is the completed HAW. The risk analysis for each hazard began by developing a consensus for the outcome/severity for each hazard. Because the severity measure of risk is not likely to change across multiple alternatives, it becomes a starting point for the CSA. The panel then determined outcome likelihood and initial risk level for each alternative, followed by mitigation measures if necessary. For this Safety Assessment, several hazards resulted in an initial risk level of **Medium**. According to FAA guidance, medium risk levels are the minimum acceptable and are normally controlled or mitigated and tracked to ensure risks remain acceptable throughout the life of the improvement. Often, the mitigation measures include potential airport design changes. The panel recognizes that these changes will need to be thoroughly evaluated by the airport planning team before they are proposed on the final ALP submittal.

5.3 Modifications to Alternative 1A

During the initial presentation of alternatives, some panel members suggested that Alternative 1A could be improved if the new entrance taxiway at the end of the runway was eliminated. This modification would eliminate the complex intersection previously identified for Alternative 1A. The panel decided to consider this change as a parking lot item at the conclusion of the panel deliberations. This modification would use Taxiway E as the primary entrance taxiway for aircraft departing on Runway 12 (See Figure 2). It would require aircraft to back-taxi about 350 ft. to use the full length of the runway for departures. Back taxi operations might be rare since Runway 12 is lightly used for departures. It would take advantage of the existing Taxiway E intersection as a “high speed” exit. It would also simplify taxiway signage in the area. However, the panel identified safety concerns that would offset these advantages:

- The time required to back taxi would increase the risk of a conflict with other aircraft arriving on Runway 12 as well as Runway 08
- It is not a standard airport configuration. Parallel taxiways normally provide an entrance at the end of the runway
- Back taxi operations are not commonly used at ABQ

In the end, the panel believes that this is not a viable option because any improvements to the operation would be offset by new hazards and risks.

5.4 Line up and wait

FAA Air Traffic Control (ATC) has already implemented operational controls that are meant to minimize or eliminate the risk of aircraft lining up on the wrong runway for departure. The procedure implements an instruction for pilots to line up and wait (LUAW) before departing Runway 08 or 12. LUAW is standard ATC terminology that instructs pilots to enter a runway and to wait for departure clearance. It provides ATC and the pilot with enough time to verify that the aircraft is on the correct runway. ATC believes that this is an effective mitigation measure that effectively decouples the two runways. ATC may continue to support the LUAW procedures as the most viable option after reviewing the findings of the panel in this report.

6. HAZARD ASSESSMENTS

The panel identified 8 hazards that are applicable to the alternatives **1B**, **1C**, and **2**. Each is included on the Hazard Assessment Worksheet, Appendix B. Where applicable, resulting risk levels are plotted on an FAA Predictive Risk Matrix in Figure 7.

ABQ-107-1 Loss of situational awareness for pilots and vehicle operators

This hazard only applies to Alternative 1B (Figure 3). The panel identified three causes for this hazard related to the new intersection created by four separate taxiways: E1, E, G, and the new entrance taxiway: (1) Introduction of an additional taxiway node; (2) Wide pavement in the taxiway intersection, and (3) Non-standard placement of signs caused by the wide intersection

ABQ-107-1a. Multiple node taxiway intersection

FAA Advisory Circular 150/5300-13A, Airport Design, recommends a standard taxiway intersection that complies with the “three-node” concept, meaning that a pilot is presented with no more than three choices at intersections- left, right, and straight ahead. This arrangement keeps taxiway intersections simple and allows for proper placement of airfield markings, signage and lighting. This hazard adds a fourth node to the intersection.

Assessment: This hazard cause could lead to a loss of situational awareness for pilots who might cross the wrong runway and contribute to a runway incursion. However, the panel believes that the likelihood of a runway incursion is reduced compared to the existing configuration because the new taxiway would be the only way to access the runway 12 threshold. Therefore the final risk level is judged to be **Low**. If this alternative is selected, in pavement taxiway signs would be needed to provide pilots with positive feedback. The panel also believes that the conversion of Taxiway E1 south of Taxiway G to a non-movement area ramp would eliminate the fourth node and thereby eliminate this hazard altogether.

ABQ-107-1b. Wide pavement at taxiway intersection

Wide pavement sections can often require placement of taxiway and other guidance signs at a great distance from the pilot.

Assessment: The panel noted that this hazard cause exists today as shown by Figure 2. Although the potential outcome is an aircraft moving onto the wrong taxiway, the panel noted that there is no history of this kind of incident at the airport. Therefore, the likelihood is judged to be **Extremely Remote** and the risk as **Low**. The hazard mitigation measure are the same as hazard-cause (a) above.

ABQ-107-1c. Non-standard placement of signs caused by the wide taxiway intersection

This hazard cause recognizes the compounding issues that accrue with complex, non-standard taxiway intersections. The unusual arrangement of taxiways at the E1-E-G intersection (Figure 2) can result in a wide expanse of pavement, which in turn creates difficulties in finding an effective locations of the guidance signs. The result is the increased possibility of loss of situational awareness by the pilot and an increased risk of a runway incursion or movement in the wrong direction on a taxiway. Note that the standard (left side) placement of a guidance sign for aircraft heading west on Taxiway E would be over 200 ft from the cockpit.

Assessment: The panel recognized the similarities with hazard-cause (a) and confirmed the resulting risk level to be **Low**.

ABQ-107-2 Shortened runway for Runway 30 arrivals and departures

According to the panel, Runway 30 is heavily used by general aviation and military aircraft for arrivals and departures. Alternatives **1B**, **1C** and **2** shorten the runway by 75ft, 150ft, and 350ft respectively. Two outcomes or effects were considered by the panel:

- An increased likelihood of an overrun (ABQ-107-4).
- Aircraft that normally use runway 30 would be required to use the remaining two runways at ABQ. The result would be creased complexity of airfield operation and controller workload (ABQ-107-4a).

Assessment, ABQ-107-2a: Aircraft departing or arriving on runway 30 will have shorter runway length than existing and therefore may experience an overrun for aborted takeoff runway and for long landings. Published runway lengths are the primary control that allow pilots to consider aircraft performance characteristics when deciding to use the runway. The effects or outcome of this hazard are greater than existing because each alternative would remove pavement beyond the published runway end and would therefore increase the likelihood of minor aircraft damage should an overrun actually occur. However likelihood of an overrun were judged to be only slightly greater than existing and the resulting risk was rated as **Low** for all three alternatives. In order to maintain severity of the outcome at existing levels, the panel identified a mitigation measure that would retain the pavement beyond the end of the runway by marking it with green paint or by marking it as a blast pad.

Assessment: ABQ-107-2b: This outcome would increase the workload of the controllers because more aircraft with differing performance characteristics would be using the remaining two runways. The panel judged the outcome severity to be Minor based on the severity classification matrix for ATC services (loss of separation resulting in a Category C Runway Incursion or Operational Error). Likelihood for this

outcome increases as runway length is shortened and fewer aircraft use Runway 30. Using this criteria, the panel judged the likelihood for Alternatives 1B and 1C to be Remote, but assigned an increased likelihood of **Probable** for Alternative 2. Therefore, Alternatives 1B and 1C have a risk level of Low and Alternative 2 has a risk level of **Medium**. Although the panel recommends pilot briefings and runway length signs for all three alternatives, it does not believe the risk level for Alternative 2 can be lowered below **Medium**. Therefore, the panel does not recommend implementation of Alternative 2.

ABQ-107-3 Inadequate wingtip clearance caused by the distance between aircraft holding at the Runway 08 and the new entrance taxiway

This hazard only applies to Alternative 1B as shown in Figure 3. There does not appear to be enough wingtip clearance for aircraft that are holding at the relocated hold line for Runway 08 and the new hold line for the Runway 12 threshold taxiway. For example, an aircraft holding for a Runway 12 departure might create a hazard for aircraft using the new threshold taxiway for a runway 12 departure. The same might be true if an aircraft is holding for a Runway 8 departure while another is approaching the Runway 08 hold line.

Assessment: Although wingtip strikes are not credible, increased controller workload could introduce a **Minimal** severity for this hazard. The panel identified airport design standards as a control that would eliminate this hazard and is recommending that the design fully comply with proper clearances. The resulting risk for this hazard is **Low**.

ABQ-107-4 Increased airfield congestion

Alternative 1C is the only alternative that proposes a closure to Taxiway E1. It would eliminate one of two access routes to and from the runways at ABQ. However, the closure of Taxiway E1 can be applied to any of the remaining alternatives and the resulting hazards and risks would remain the same. The panel identified two causes of this hazard:

ABQ-107-4a. Closing of Taxiway E1 for access to Runway 08 and 12

Assessment: Taxiways E1 and K comprise the key access routes for aircraft in the Cutter Aviation ramp area. This is a busy ramp and Taxiway K is often blocked by large aircraft maneuvering in this area. Currently, aircraft needing access to the runways during these periods can use either Taxiway E1 to the west or Taxiway K to the east. If E1 is unavailable and Taxiway K is blocked, aircraft will be forced to taxi around the blocking aircraft or be faced with an unplanned delay. The result would be increased airfield congestion, increased controller workload, and airfield delays. The panel rated this hazard severity as **Minor** and the likelihood as **Frequent** based on the amount of traffic handled by Cutter Aviation. The resulting risk level is **Medium**. The panel identified conversion of Taxiway E1 to a non-movement area and retaining the access to taxiways E, G, and A1 as the only mitigation that would reduce risk. Converting Taxiway E1 to non-movement would simplify taxi instructions and thereby lower the risk of a runway incursion in this area.

ABQ-107-4b. Loss of departure queue flexibility

With Taxiway E1 closed, there are fewer alternatives for queuing aircraft departing on runways 08 and 12.

Assessment: The intersection of runways 08 and 12 is a major activity center at ABQ. Elimination of flexibility to manage aircraft waiting to depart these runways or needing to access other parts of the airfield will increase controller workload, increase taxiway congestion, and will introduce new airfield delays. The panel rated the severity as **Major** based on the credibility of a serious runway incursion and likelihood as **Frequent** with a resulting **Medium** risk level. The only mitigation measure is to restore access to this area via Taxiway E1.

ABQ-107-5 Loss of maintenance run-up area south of Taxiway G

This hazard is related to hazard ABQ-107-4a. Aircraft use the wide pavement section in the Taxiway E1, G, and E intersection to perform maintenance run-up procedures. This operation is done without interfering with other aircraft in the area and provides a simpler alternative to taxiing to remote locations on the airfield. During the discussion of this hazard, the planning team recognized that the availability of a near-by maintenance run-up area is an essential design requirement and agreed to provide one into the final proposal. Therefore, this hazard was eliminated by the panel without a risk assessment.

ABQ-107-6 Loss of Runway 30 exit at Taxiway E

Alternatives 1B and 2 eliminate an exit taxiway for arrivals on Runway 30. The geometry of this intersection allows aircraft to leave the runway at a higher speed than would otherwise be possible with a 90-degree exit.

Assessment: This action would create an operational change at the airport. Aircraft normally using the Taxiway E exit would remain on the runway slightly longer and might interfere or interrupt landing operations on runways 30 and 26 (aircraft exiting at the end of Runway 30 would be within protected operational surfaces for Runway 26). Although the panel rated this as a **Low** risk hazard, they are recommending provisions in the final design for an expedited exit from Runway 30.

ABQ-107-7 Increased airfield congestion and runway crossings caused by complex taxi routes due to closing of west end of parallel Taxiway E

Alternatives 1C and 2 (Figures 4 and 5) eliminate the western most portion of Taxiway E. Taxiway E is a full parallel taxiway for Runway 08-24. It provides a standard taxiway configuration that facilitates the east-west movement of aircraft. This hazard applies to both Alternative 1C and Alternative 2.

Assessment: Aircraft routinely need navigate one end of Runway 08/26 to the other in the event of a change in landing operations and to accommodate other operational needs. Aircraft holding on Taxiway A1 (Figure 3) can be instructed to cross the approach of Runway 08 and then turn left on Taxiway E to proceed to the east end of the runway. With the western section of Taxiway E no longer available, taxiway instruction become much more complicated. This change would increase controller workload, increase taxiway congestion, contribute to a loss of situational awareness for pilots, and increase the likelihood of runway incursions. Runway incursions are a credible outcome for this hazard, so the panel rated the severity as **Major**. The resulting risk level is **Medium** as documented by the HAW. The panel identified the restoration of the full parallel taxiway for Alternative 1C as the only

feasible mitigation measure. However, this mitigation is not feasible for Alternative 2 because of conflicts with the Runway 12 threshold.

ABQ-107-8 Taxiway A1 hold position

As shown in Figure 5, the relocation of the Runway 12 threshold by 350 ft (Alternative 2) places the existing hold line on Taxiway A1 inside the threshold siting surface for Runway 12. This situation violates current airport design surfaces and requires the relocation of the hold position further from the Runway 08 threshold (towards the terminal). The planning team will develop a configuration that addresses this issue if Alternative 2 is selected. Therefore, the panel did not complete the risk assessment for this hazard.

Hazards with a completed risk assessment are plotted on the FAA Predictive Risk Matrix in Figure 8.

7. CONCLUSION

The SRM panel performed a complete hazard assessment on three alternatives and 11 hazards. The panel is recommending mitigation measures for all alternatives to ensure that risk remains at acceptable levels. Table 2 summarizes the findings of the panel.

Table 2-- Alternatives, Hazards, and Risk Levels

Alternative	Hazards Evaluated	Initial Risk	Residual Risk with Mitigation Measures in Place
1B	3	Low	Low
1C	2	Medium	Low
2	3	Medium	Medium

The panel does not recommend implementation of Alternative 2 because:

- The shortened runway would divert too many aircraft onto the remaining air carrier runways, increasing operational complexity, and increasing the likelihood of operational incidents or runway incursions.
- This alternative includes the closing of the western end of parallel taxiway E which cannot be restored as a mitigation because of conflicts with the new runway 12 threshold. Failure to restore a full parallel taxiway would result in complex taxi routes and taxi instructions which also raise the likelihood of runway incursions.

The panel carefully considered the complex nature of the Taxiway E1, G and E intersection. The wide pavement sections and unusual geometry can contribute to loss of situational awareness for pilots. Alternative 1B provides an improvement to this arrangement by closing the Taxiway E1 entrance into the intersection. While this action improves the intersection, it also adds new complexity to airfield operations elsewhere. Therefore, the panel included restoration of the Taxiway E1 access point as a mitigation measure. The remaining option for improving this intersection is the conversion of Taxiway E1 to a non-movement area ramp as shown on the HAW as a mitigation measure for hazards ABQ-107-1, 2, and 3. Under this

arrangement, aircraft would hold at the edge of the movement area on what is now Taxiway E1 before requesting clearance to proceed onto the airfield. This procedure would simplify taxi instructions and reduce the possibility of loss of situational awareness.

			Negligible safety effect	• Physical discomfort to persons • Slight damage to aircraft/vehicle	• Physical distress or injuries to persons • Substantial damage to aircraft/vehicle	Multiple serious injuries; fatal injury to a relatively small number of persons (one or two); or a hull loss without fatalities	Multiple fatalities (or fatality to all on board) usually with the loss of aircraft/vehicle
	<div>Severity</div> <div>Likelihood</div>		Minimal 5	Minor 4	Major 3	Hazardous 2	Catastrophic 1
Occurs routinely	Frequent A			4a	4b		
Occurs often	Probable B						
Occurs infrequently	Remote C	6	2a 2b	7			
Occurs rarely i	Extremely Remote D	1b 1c	1a				
So unlikely that it is not anticipated to occur, but is not impossible	Extremely Improbable E	3				*	

Unacceptable Risk

Acceptable Risk with Mitigation

Acceptable Risk

* Unacceptable with Single Point and/or Common Cause Failures

Figure 7. FAA Predictive Risk Matrix with Hazards

Comparative Safety Assessment

Airports Safety Risk Management (SRM)	
Safety Assessment Screening for Projects (SAS-1)	Page 1
1. Project Location	
a. Locid ABQ b. Airport ALBUQUERQUE INTL SUNPORT c. City ALBUQUERQUE d. State NM e. Sponsor City of Albuquerque f. Service Level M g. CFR 139 Date 05/1973 h. CFR 139 Type I C S	SMS ID: 107
2. Describe the Proposed Action (Include any identifying number or date of submission (e.g., date of ALP))	
<p>Decoupling of runways 08 and 12 thresholds. The hold lines on Taxiway A1 and E1 are the hold lines for entry to both runways leading to the potential for a pilot to line up and takeoff from the wrong runway. This area is designated as "Hot Spot 1" on the FAA airport diagram. The proposed action is a revision to the Airport Layout Plan that reconfigures the runway thresholds and/or taxiways in this area to prevent this confusion. The airport is considering several alternatives to mitigate this hot spot.</p>	
3. Approval Action Type/Triggering Event (Select all that apply)	
<p> a. <input checked="" type="checkbox"/> Airport Layout Plan (ALP) (new or update) b. <input type="checkbox"/> Airport construction review, coordination, and approval c. <input type="checkbox"/> Other airport changes not involving construction d. <input type="checkbox"/> Part 150 Noise Compatibility Program (measures that may affect aviation safety) </p>	
4. Project Screening	
<p> a. <input type="radio"/> A preliminary analysis indicates that an SRM review is required (Complete pages 2 & 3) b. <input checked="" type="radio"/> The proposal does not require further SRM review (Discard pages 2 & 3) </p>	
<p>Prepared by: Andy Velayos</p>	
<p>Office: FAA Southwest Region, Airports Divisi</p> <p>Title: Senior/Lead Program Manager</p>	<p>Signature: _____</p> <p>Date: _____</p>

Comparative Safety Assessment

Safety Assessment Screening for Projects (SAS-1)		Page 2
SMS ID:		107
5. Was the proposal reviewed by OE/AAA?		
<div style="display: flex; justify-content: space-between;"> a. <input type="radio"/> Yes <input checked="" type="radio"/> No (Skip to block number 6) </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> b. Case Number: _____ </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> c. Determination Date: _____ </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> d. <input type="checkbox"/> OE/AAA review comments attached. </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> e. <input type="checkbox"/> OE/AAA review indicates an objection to the proposal. </div>		
6. A review of the proposal indicates the following: (Select all that apply)		
<div style="margin-bottom: 10px;"> ARP System Safety Impact Checklist </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <p>a. <input type="checkbox"/> The Proposed Action may deviate from applicable FAA standards</p> <p>b. <input checked="" type="checkbox"/> The Proposed Action may increase aviation safety risks, with existing controls in-place</p> <p>c. <input checked="" type="checkbox"/> The Proposed Action may adversely affect aviation operations with existing controls in-place</p> <p>d. <input checked="" type="checkbox"/> The Proposed Action may affect navigational aids</p> <p>e. <input checked="" type="checkbox"/> The Proposed Action may impact TERPS surfaces</p> <p>f. <input type="checkbox"/> Other Safety Impact: _____</p> </div> <div style="width: 35%; border-left: 1px solid black; padding-left: 10px; margin-left: 10px;"> SRM Panel </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 60%;"> <p>g. <input type="checkbox"/> The OE/AAA review indicates that an SRM panel is required.</p> <p>h. <input checked="" type="checkbox"/> The Safety Impact Checklist indicates that an SRM panel is required</p> </div> <div style="width: 35%; border-left: 1px solid black; padding-left: 10px; margin-left: 10px;"></div> </div>		
7. SRM Finding of No Increased Risk		
<p><i>The proposed action was reviewed with respect to known hazards and existing controls. Potential risks were evaluated with appropriate FAA personnel, airport operations, and other aviation officials with safety responsibilities. Based on this review, existing controls (including standard NOTAMS) will eliminate the probability of new risks being introduced into the aviation system. An SRM panel is not required.</i></p>		
Name and Title	Date	Signature
N/A		
8. SRM Panel and Findings		
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">a. Report date: _____</div> <div style="width: 35%;">b. <input type="checkbox"/> Report attached</div> </div>		
9. Initial Risk Determination		
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <p>a. <input checked="" type="radio"/> Low Initial Risk. Attach supporting documentation.</p> <p>b. <input type="radio"/> Medium Initial Risk. Attach detailed explanation of hazards.</p> <p>c. <input type="radio"/> High Initial Risk. Attach detailed explanation of hazards. (Requires review by ARP Safety Review Board)</p> </div> <div style="width: 35%; border-left: 1px solid black; padding-left: 10px; margin-left: 10px;"></div> </div>		
10. Final Risk Determination		
<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> <p>a. <input checked="" type="radio"/> Low Risk. Attach detailed explanation of mitigating measures, including NOTAM requirements.</p> <p>b. <input type="radio"/> Medium Risk. Attach detailed explanation of mitigating measures, including NOTAM requirements.</p> <p>c. <input type="radio"/> High Risk. The project proposal with risk mitigation in place is unacceptable.</p> </div> <div style="width: 35%; border-left: 1px solid black; padding-left: 10px; margin-left: 10px;"></div> </div>		

Comparative Safety Assessment

SMS ID: 107

Locid: ABQ


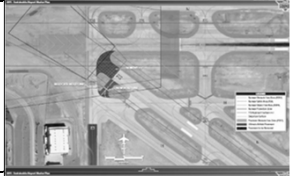
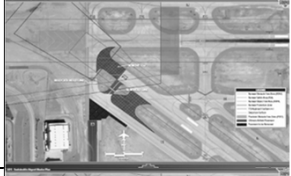
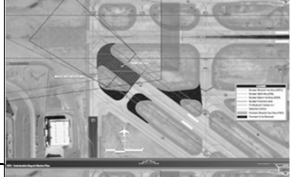
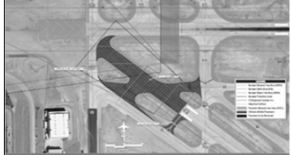
Project Manager: Andy Velayos

Airport: ALBUQUERQUE INTL SUNPORT

City: ALBUQUERQUE

Description: Decoupling of runways 08 and 12 thresholds. The hold lines on Taxiway A1 and E1 are the hold lines for entry to both runways leading to the potential for a pilot to line up and takeoff from the wrong runway. This area is designated as "Hot Spot 1" on the FAA airport diagram. The proposed action is a revision to the Airport Layout Plan that reconfigures the runway thresholds and/or taxiways in this area to prevent this confusion. The airport is considering several alternatives to mitigate this hot spot.

ALTERNATIVES

ID	Name	Description	Document
1	1A	Remove in-line pavement to runway 12, but leave threshold in place; install new entrance taxiway	
2	1B	Relocate runway 12 threshold 75 ft and remove in-line pavement; install new entrance taxiway	
3	1C	Relocate runway 12 threshold 150 ft and remove in-line pavement. Also remove section of taxiway E to the west of runway 12; install entrance taxiway	
4	2	Relocate runway 12 threshold 350 ft and remove in-line pavement. Also remove section of taxiway E to the west of taxiway E3; establish new entrance taxiway for runway 12	
5	3	Relocate runway 12 threshold 1000 ft and remove in-line pavement. Also remove remaining section of taxiway E to the west of taxiway E3; Install new entrance taxiway	

Comparative Safety Assessment

SMS ID: 107

Airport: ALBUQUERQUE INTL SUNPORT

Locid: ABQ

City: ALBUQUERQUE

Project Manager: Andy Velayos

Description:

Decoupling of runways 08 and 12 thresholds. The hold lines on Taxiway A1 and E1 are the hold lines for entry to both runways leading to the potential for a pilot to line up and takeoff from the wrong runway. This area is designated as "Hot Spot 1" on the FAA airport diagram. The proposed action is a revision to the Airport Layout Plan that reconfigures the runway thresholds and/or taxiways in this area to prevent this confusion. The airport is considering several alternatives to mitigate this hot spot.

1 Hazard ID	2 Hazard Description	3 Causes	4 System States	5 Effects	6 Severity	7 Severity Rationale	8 Existing Controls	9 1B Likelihood: Extremely remote- less likely than existing Risk: Low Mitigation: In-pavement signs; convert Twy E1 south to ramp (eliminates a node)	9 1C N/A	9 2 N/A
ABQ-107-1a	LOSA for pilots and vehicle operators	Multiple node Twy intersection	Itinerant and ground operations	Pilot deviation (R1): crossing wrong runway; go-arounds; increased controller communications	Minor	No history of greater collisions; improved separations over existing	ATC; pilot/driver awareness training (briefings, etc)	N/A	N/A	N/A
ABQ-107-1b		Wide pavement at Twy intersection	Itinerant and ground operations	Increased controller communications; wrong direction on taxiway	Minimal	No history; minimal disruption of airport operations	ATC; pilot/driver awareness training (briefings, etc)	Likelihood: Extremely remote- less likely than existing Risk: Low Mitigation: In-pavement signs; convert Twy E1 south to ramp	N/A	N/A
ABQ-107-1c		Non-standard placement of signs caused by the wide Twy intersection	Itinerant and ground operations	Increased controller communications; wrong direction on taxiway	Minimal	No history; minimal disruption of airport operations	ATC; pilot/driver awareness training (briefings, etc)	Likelihood: Extremely remote- less likely than existing Risk: Low Mitigation: In-pavement signs; tightening Twy fillets; convert Twy E1 south to ramp	N/A	N/A
ABQ-107-2a	Shortened runway for Rwy 30 arrivals and departures	Aircraft performance	All operations	Overrun	Minor	Aircraft damage for minor overrun	Published runway length	Likelihood: Remote-slight increase over existing Risk: Low Mitigation: Paint existing pavement or convert to blast pad/overrun	Likelihood: Remote-slight increase over existing Risk: Low Mitigation: Paint existing pavement or convert to blast pad/overrun	Likelihood: Remote-slight increase over existing Risk: Low Mitigation: Paint existing pavement or convert to blast pad/overrun
ABQ-107-2b			All operations	Increased complexity of airport operations; mixing aircraft types	Minor	Increased controller workload and increased traffic load to remaining runways	ATC; published runway length; airport diagram	Likelihood: Remote-slight increase over existing Risk: Low Mitigation: Pilot briefings; Runway length signs	Likelihood: Remote-slight increase over existing Risk: Low Mitigation: Pilot briefings; Runway length signs	Likelihood: Probable Risk: Medium Mitigation: Pilot briefings; Runway length signs (Not recommended by the SRM panel due to significant Rwy loss, residual risk remains medium)
ABQ-107-3	Inadequate wingtip clearance	Clearance between aircraft holding at the Rwy 08 and the new entrance taxiway holdline	All operations	Increased controller workload (wingtip strikes not credible)	Minimal	Design and operational constraints	ATC; pilot awareness; airport design standards	Likelihood: Extremely improbable Risk: Low Mitigation: Design for proper clearances	N/A	N/A

Comparative Safety Assessment

1 Hazard ID	2 Hazard Description	3 Causes	4 System States	5 Effects	6 Severity	7 Severity Rationale	8 Existing Controls	9 1B	9 1C	9 2
ABQ-107-4a	Increased airfield congestion	Closing of Twy E1 for access to Rwy 08 & 12	All operations with Twy K closed due to parked aircraft	Increased controller workload; increased taxiway congestion; inadequate airfield access; airfield delays	Minor	Significant disruption to airport operations	ATC	N/A	Likelihood: Frequent-Ramp activity Risk: Medium Mitigation: Convert E1 to ramp (non-movement area) and leave access point open	N/A
ABQ-107-4b		Loss of departure queue flexibility	All operations	Increased controller workload; increased taxiway congestion; inadequate airfield access; airfield delays	Major	Significant disruption to airport operations; potential delays	ATC		Likelihood: Frequent Risk: Medium Mitigation: Maintain ramp area at E1	
ABQ-107-5	Loss of maintenance run-up area south of Twy G (eliminated as hazard, run-up area will be maintained)	Increased airfield congestion; increased runway crossings increased frequency congestion; increased runup operations on ramp	Nighttime operations							
ABQ-107-6	Loss of Rwy 30 exit at Twy E	Loss of 'high speed' exit capabilities	Landing operations on Rwy 30	Slower, less timely runway exit; possible go-arounds and interference with Rwy 26 operations	Minimal	Go-around on Rwy 30 would intersect Rwy 26 departures	ATC		Likelihood: Remote Risk: Low Mitigation: Provide high-speed, non-standard exit taxiway	Likelihood: Remote Risk: Low Mitigation: Provide high-speed, non-standard exit taxiway
ABQ-107-7	Increased airfield congestion; increased runway crossings	Complex taxi routes due to closing of west end of parallel Twy E	Daily operations	Increased controller workload; increased taxiway congestion; inadequate airfield access; airfield delays; runway incursions	Major	Plot workload; complex taxi instructions	ATC; Existing parallel taxiway E simplifies taxi routes		Likelihood: Remote Risk: Medium Mitigation: Restore full parallel Twy E	Likelihood: Remote Risk: Medium Mitigation: None feasible (Not recommended by the SRM panel due to conflicts with Rwy 12 threshold)
ABQ-107-8	Twy A1 hold position (violates design standards, will be corrected, hazard eliminated for risk assessment)	Increased taxi/departure time	Daily operations	Increased controller workload; increased delays; go-around	Minimal	Minimal reduction of ATC services	ATC			

Albuquerque International Sunport
Runway 08 and 12 Threshold Decoupling
Safety Risk Management Panel Meeting: December 15-16, 2015

DRAFT Agenda

Location: ABQ Aviation Department's main conference room (top floor of terminal buildings on the east side of the escalators)

December 15	
1:00 pm	Welcome and Introductions
1:30 pm	Project Overview and Master Plan Status (Coffman Associates)
2:30 pm	FAA Safety Assessment Process (Ken Jacobs)
3:30 pm	Break
3:45 pm	Alternative 1B: Hazard Identification
5:00 pm	Adjourn
December 16	
8:00 am	Recap from previous day
8:30 am	Alternative 1C: Hazard Identification
9:30 am	Alternative 2: Hazard Identification
10:00 am	Break
10:15 pm	Alternative 3: Hazard Identification
10:30 am	Hazard Alignment: Identify hazards that apply to multiple alternatives
11:00 am	Risk Analysis and Mitigation Measures for Alternative 1B
12:00 pm	Lunch Break: On your own
1:00 pm	Risk Analysis and Mitigation Measures for Alternatives 1C, 2, and 3. Complete Hazard Assessment Worksheet
2:00 pm	Wrap up and SAS signatures
2:30 pm	Adjourn

SRM Sign-In Sheet: Albuquerque Sunport					
#	Name	Phone Number	Email Address	Day 1 Dec 15, 2015	Day 2 Dec 16, 2015
1	Leonie San Miguel	505-856-4901	leonie.sanmiguel@faa.gov	✕	✕
2	Betsy Sutton	505-856-4935	betsy.sutton@faa.gov	✕	✕
3	JD Huss	505-764-1221	jd.huss@faa.gov	✕	✕
4	Don L. Schroeder	505-856-4910	don.l.schroeder@faa.gov	✕	✕
5	Sammy Lockwood	505-934-9101	sam.lockwood@natca.net	✕	✕
6	Jimmy Chavez	505-366-8341	lostcrow2716@gmail.com	✕	✕
7	Steven Marruffo	505-842-4990	steven.marruffo@atlanticaviation.com	✕	✕
8	Jim Hinde	505-244-7725	jhinde@cabq.gov	✕	✕
9	Jane Lucero	505-244-1788	jane.lucero@state.nm.us	✕	✕
10	Mike Provine	505-242-5700	mprovine@molzencorbin.com	✕	✕
11	Steve Benson	816-524-3500	sbenson@coffmanassociates.com	✕	
12	Jessi Rowden	505-842-4184	jrowden@cutteraviation.com	✕	✕
13	Keith Reeves	505-856-4918	keith.reeves@faa.com	✕	✕
14	Andy Velayos	817-222-5647	andy.velayos@faa.gov	✕	✕
15	Patrick Taylor	816-524-3500	ptaylor@coffmanassociates.com	✕	✕
16	Gil Neumann	817-222-5627	gil.neumann@faa.gov	✕	✕
17	Larry Allen	972-615-2532	larry.f.allen@faa.gov	✕	✕
18					
19					
20					
21					
22					
23					
24					
25					