Chapter Five

AIRPORT DEVELOPMENT
ALTERNATIVES

Sustainable Airport Master Plan
In the previous chapter, airfield and landside facilities required to satisfy the projected demand through the long-range planning period were identified. The next step in the planning process is to identify and discuss alternatives for meeting the needs of airport users as well as the mission and vision of the airport sponsor (City of Albuquerque). There are a wide variety of potential development options, so this chapter provides an organized approach to identifying and discussing reasonable alternative development options. The alternatives should be considered unconstrained, meaning reasonable options are first presented and discussed. Factors such as cost and environmental constraints are not weighted heavily at this point as the goal of this chapter is to identify a viable set of alternatives. The alternatives will ultimately be evaluated using a variety of criteria to arrive at a recommended alternative, which will be presented in the next chapter.

The key elements of this planning process are: (1) identification of alternative ways to address previously identified facility requirements; (2) evaluation of the alternatives, individually and collectively, so that planners gain a thorough understanding of the strengths, weaknesses, and other implications of each; and (3) selection of the recommended alternative.

Any development proposed for a Master Plan is evolved from an analysis of projected needs for a set time period (i.e., the 20-year forecasts). Though the needs were determined by utilizing industry accepted statistical methodologies, unforeseen future events could impact the timing of the needs identified. The master planning process attempts to develop a viable concept for meeting the needs resulting
from projected demands for the next 20 years. However, no plan of action should be developed which may be inconsistent with the future goals and objectives of the Sunport. This chapter presents alternatives that could meet the Sunport’s development needs to improve the Sunport as a system, while remaining responsive to environmental, fiscal, and other objectives.

The development alternatives for the Sunport can be categorized into two functional areas: the **airside** (runways, navigational aids, taxiways, etc.) and **landside** (hangars, apron, terminal area, support facilities, and vehicle access). Within each of these areas, specific capabilities and facilities are required or desired. Each functional area interrelates and affects the development potential of the others. Therefore, all areas are examined individually then coordinated together to ensure that the final plan is functional, efficient, and cost-effective.

Not all airside or landside elements will require a detailed alternatives discussion, which is intended to present solutions to specific issues. For those airside or landside elements where only one solution is reasonable or where no alternative is necessary, an explanatory narrative is provided.

The information presented in this Alternatives chapter will be presented to the Advisory Committees and the public for comments and input. Based on these comments and input, the project team will evaluate the alternatives and incorporate any relevant information to develop a final recommended airport alternative to be presented in the next chapter.

**NO-ACTION/RELOCATION ALTERNATIVES**

The City of Albuquerque is charged with managing the Sunport for the economic betterment of the community and region. In some cases, alternatives may include a no-action option; however, for the Sunport, this would effectively reduce the quality of services being provided to the public, affect the aviation facility’s ability to meet FAA design standards, and potentially affect the region’s ability to support commercial and general aviation needs. The ramifications of a no-action alternative extend into impacts on the economic well-being of the region. If facilities are not maintained and improved so that the Sunport provides a pleasant experience for the visitor or business traveler, or if delays become unacceptable, then these individuals may consider doing business elsewhere. The Sunport also serves as a vital link in the overall National Airport System, which is important for both economic development and national security. The no-action alternative is also inconsistent with the long-term goals of the FAA and the New Mexico Department of Transportation - Division of Aviation, which are to enhance local and interstate commerce. Therefore, an overall no-action alternative is not considered further in this Master Plan. The no-action alternative will be considered in connection with individual elements of the Master Plan to the extent reasonable and feasible.

Likewise, this study will not consider the relocation of services to another airport or development of a new airport site. The development of a new commercial service airport is a very complex and expensive
alternative. A new site will require greater land area, duplication of investment in airport facilities, installation of supporting infrastructure that is already available at the existing site, and greater potential for negative impacts to natural, biological, and cultural resources.

In this Alternatives chapter, various airport elements will be considered for improvement. As indicated above, one alternative for each element may be to take no action. The no-action alternative is then compared to other alternatives. In some cases, the existing condition (no-action alternative) may be the best alternative available. Following review by the Advisory Committees, Sunport staff, and the public, a recommended alternative will be developed; however, the final decision to pursuing development plan(s) rests with the City of Albuquerque and the FAA. The reasons for the selection of the recommended alternative will be clearly documented in Chapter Six – Recommended Master Plan Alternative.

**REVIEW OF PREVIOUS PLANNING DOCUMENTS**

The Sunport pursues a continuous planning process. On an annual basis, the capital improvement program is updated and adjusted to address development needs for the next five years. Most capital improvement projects, especially those needing federal grant funding assistance, must be depicted on the Airport Layout Plan (ALP). The most current ALP for the Sunport is dated October 2014 and was approved by the FAA on December 16, 2014. The last Master Plan for the Sunport was completed in July 2003.

**Exhibit 5A** presents the current ALP for the Sunport. Portions of the ALP were updated to address specific changes at the Sunport, including the closure of Runway 17-35 (occurred in 2012), the removal of several buildings, as well as improvements since the last master plan. The ALP reflects many of the future facility needs based on the forecasts of aviation activity identified during the previous Master Plan study, including a replacement terminal building.

The ALP will be updated with this Master Plan process. Some elements depicted on the current ALP may be carried over to the new ALP, while others may need to be adjusted or removed entirely. Nonetheless, it is valuable to reference the current ALP while analyzing various alternative development scenarios.

**PLANNING CONSIDERATIONS**

Analysis conducted in the previous chapters indicated that various elements of the Sunport need consideration in this Alternatives chapter. The primary issues to be considered are summarized on **Exhibit 5B**. These issues are the result of the findings of the Aviation Demand Forecasts, Demand/Capacity Analysis, and Aviation Facility Requirements.
The primary airfield elements considered include:
- Address Deficiencies to Runway Design Standards (i.e., RSA, ROFA, OFZ, RPZ)
- Mitigate “Hot Spots”
- Mitigate Taxiway Geometry Issues
- Identify Excess/Unjustified Pavement
- Identify Potential Improvements to the Instrument Approaches

The primary terminal complex considerations include:
- Reserve Space for Long Term Terminal Expansion
- Plan Improvements to Ticketing and Bag Screening to Address Changing Needs
- Identify Locations for Concessions Expansion

Other important elements to be considered in the alternatives discussion include:
- Air Cargo Expansion (Sort Building and Truck Staging/Parking)
- Identify Suitable Locations for Additional Conventional Hangars
- Identify Location for Consolidated Maintenance/Snow Removal Equipment Facility
- Present Options for the Highest and Best Use of Airport Specific Parcels

**AIRFIELD DEVELOPMENT CONSIDERATIONS**

The purpose of this section is to identify and evaluate various airfield development considerations at the Sunport to meet program requirements set forth in Chapter Four. Airfield facilities are, by nature, the focal point of an airport complex. Because of their primary role and the fact that they physically dominate airport land use, airfield facility needs are often the most critical factor in the determination of viable airport development alternatives. The runway system requires the greatest commitment of land area and defines minimum building set-back distances from the runways and object clearance standards. These criteria, depending upon the areas around the airport, must be defined first to ensure that the fundamental needs of the airport are met. Therefore, airside requirements will be considered prior to detailing land use development alternatives.

The issues to be considered in this analysis are summarized on Exhibit 5B. These issues are the result of the findings of the Aviation Demand Forecasts, Demand/Capacity Analysis, and Aviation Facility Requirements evaluations, and they include input from the Advisory Committees and Airport staff.

**RUNWAY DESIGN STANDARDS**

This section considers the RSA, ROFA, OFZ, and RPZ for each runway. Meeting the design standards to the greatest degree feasible is important to protecting the safety of aircraft operations. As noted in Chapter Three – Facility Requirements, several of the design surfaces extend beyond Sunport property. In several locations, the Sunport has lease or easement rights
**TERMINAL COMPLEX CONSIDERATIONS**
- Reserve Space for Long Term Terminal Expansion
- Plan Improvements to Ticketing and Bag Screening to Address Changing Needs
- Identify Locations for Concessions Expansion

**LAND USE CONSIDERATIONS**
- Present Options for the Highest and Best Use of Airport Specific Parcels

**LANDSIDE CONSIDERATIONS**
- Air Cargo Expansion (Sort Building and Truck Staging/Parking)
- Identify Suitable Locations for Additional Conventional Hangars
- Identify Location for Consolidated Maintenance/ Snow Removal Equipment Facility

**AIRSIDE CONSIDERATIONS**
- Mitigate "Hot Spots"
- Mitigate Taxiway Geometry Issues
- Address Deficiencies to Runway Design Standards (RSA, ROFA, OFZ, RPZ)
- Identify Excess/Unjustified Pavement
- Identify Potential Improvements to the Instrument Approaches

**DRAFT Chapter Five - 7**

Exhibit 5B

PLANNING CONSIDERATIONS
where these surfaces extend beyond Sunport property. For planning purposes, where the Sunport owns a lease or easement, the design surface is considered in compliance. The following alternatives analysis considers those areas where the design surfaces are not under the control of the Sunport either through ownership, lease, or easement.

Runway 26 Design Standards

Beyond the Runway 26 end, the RSA (1.6 acres), ROFA (4.7 acres), OFZ (0.06 acres) and RPZ (17.6 acres) extend beyond Sunport property and onto KAFB property. KAFB representatives on the Advisory Committees for this Master Plan provided written feedback on this issue. They indicated that KAFB is subject to the Air Installation Compatible Use Zone (AICUZ) Program as outlined in the Air Force Handbook 32-7084. They state, “Kirtland AFB makes every effort to comply with Air Force clear zone and accident potential zone (APZ) requirements in regards to planning or limiting development in these areas.” KAFB is also currently in the process of updating their master plan (Installation Development Plan) and they are designating the land under the RPZs and clear zones as “airfield” to further limit development in these areas.

Alternative 1: No-Action

Historically, the agreement between the Sunport and KAFB to protect the design surfaces of the runways has been acceptable to FAA. As a result, the first alternative considered for the design surfaces is a no-action alternative. The portions of the RSA, OFA, OFZ, and RPZs that fall on KAFB property are adequately protected under this agreement. Consideration might be given to memorializing the agreement through a Memorandum of Understanding (MOU) between KAFB and the Sunport.

Alternative 2: Acquire Property

The next option would be for the Sunport to purchase the KAFB land where the RSA, ROFA, OFZ, and RPZ are located (reference Exhibit 4G).

Alternative 3: Acquire Lease/Easement

The third option considered is to do what has been done in other locations at the Sunport, and that is to enter into an agreement with KAFB to lease or obtain an easement for the subject property.

Alternative 4: Shorten Runway

The next option considered is to physically shorten the runway. To bring the full RSA, ROFA, and OFZ onto Sunport property, the runway would have to be shorted by approximately 900 feet. This is not
considered a particularly viable option because the entire runway length is needed to accommodate current activity at the Sunport.

**Alternative 5: Runway Shift**

Shifting the runway would involve removing 900 feet from the Runway 26 end and adding 900 feet to the Runway 8 end. The RPZ would still extend onto KAFB property. Extending the Runway to the west would have several challenges, including significant terrain drop and construction over the former landfill (potential settling issues).

**Alternative 6: Declared Distances**

Declared distances could be implemented which would effectively declare the runway to be shorter for certain operations. Generally, the FAA would prefer to implement declared distances only when other options are not practicable.

**Runway 8 RPZ**

The approach and departure RPZ beyond the Runway 8 threshold have incompatibilities within them. The north edge of the approach RPZ crosses over the fuel truck refueling station. The RPZ also encompasses a portion of the rental car facility parking lots and car preparation buildings. Exhibit 5C presents both the existing condition as well as several alternatives intended to reduce incompatibilities within the RPZ.

FAA Memo titled, *Interim Guidance on Land Uses Within a Runway Protection Zone*, provides guidance on analyzing new incompatibilities introduced to an RPZ. Typically, new incompatibilities may be introduced as the result of:

1. An airfield project (e.g., runway extension or shift);
2. A change in the critical design aircraft that increases the RPZ dimensions;
3. A new or revised instrument approach procedure that increases the RPZ dimensions; or
4. A local development proposal in the RPZ (either new or reconfigured).

The new guidelines do not apply to existing incompatibilities within an RPZ; instead, the airport sponsor is to continue to pursue remedies following previous guidance. While existing incompatibilities are not technically “grandfathered,” it is new incompatibilities that are the primary focus of the *Interim Guidance*. The *Interim Guidance* provides a procedure for analyzing alternatives and requires review and approval of any solution by FAA Headquarters in Washington D.C.
Alternative 1: No Action: Existing RPZ Incompatibilities

Alternative 2: Shift RPZ 200’

Alternative 3: Shift RPZ 400’

Alternative 4: Shift RPZ 1,000’ (Pavement End)

Alternative 5: Shift RPZ 1,800’

LEGEND
- Departure Runway Protection Zone (RPZ)
- Approach RPZ
- Incompatible Land

Aerial Source: Google Earth 3/9/2014
**Alternative 1 – No Action**

Pursuing a no-action alternative would mean that the existing incompatibilities would remain within the RPZ. One positive consideration is that the incompatibilities are on the outer edges of the RPZ (Controlled Activity Area) and not within the Central Portion of the RPZ (defined by the extended ROFA). The identified incompatibilities are existing and not the result of a change in the size or location of the RPZ. The existing incompatibilities include 0.08 acres covering the refueling station and 7.77 acres over the rental car facilities. It should be noted that the refueling station is connected to an underground piping system and there is no fuel storage at this location.

**Alternative 2 – Shift Landing Threshold 200 feet West**

Several additional alternatives are considered that are intended to mitigate the existing incompatibilities. Of particular interest to the FAA are alternatives that would remove the refueling station from the RPZ. However, any of the alternatives considered will necessarily trigger the Alternatives Analysis procedure provided in the *Interim Guidance*.

Alternative 2 considers shifting the landing threshold to Runway 8 to the west 200 feet. This would remove the approach RPZ from the stands at the refueling station; however, the refueler queuing area would still be inside the RPZ. It would also increase the area of incompatibilities in the rental car facility. A total of 9.72 acres of incompatible land would be in the RPZ. As noted, this alternative, and any alternative that changes the size or location of the RPZ, would have to be reviewed by FAA Headquarters.

**Alternative 3 – Shift Landing Threshold 400 feet West**

Alternative 3 considers shifting the landing threshold to Runway 8 to the west 400 feet, which would provide additional separation from the refueling station, although still including much of the queuing area. Incompatibilities in the RPZ would increase to 10.16 acres, including a small portion of University Boulevard.

**Alternative 4 – Shift Landing Threshold 1,000 feet West**

Alternative 4 considers shifting the landing threshold to Runway 8 to the west 1,000 feet, which would place the threshold at the end of the pavement. While the refueling station would be completely removed, other incompatibilities in the RPZ would increase to a total of 15.69 acres. University Boulevard would traverse the central portion of the RPZ and George Road would be introduced to the controlled activity area of the RPZ. An office building on the west side of University Boulevard would now be encompassed in the RPZ as well.

**Alternative 5 – Shift Landing Threshold 1,800 feet East**

Alternative 5 considers the possibility of shifting the Runway 8 landing threshold an additional 1,800 feet to the east to completely remove the RPZ from the refueling station. While this action would eliminate
RPZ incompatibilities, it would have a significant negative impact on available landing length. It would also reduce the available terminal area apron where the RPZ would cross over. This alternative is primarily depicted to emphasize the impracticality.

**Runway 3-21 Design Standards**

On the Runway 21 end, a small portion of the RSA (0.1 acre), ROFA (2.5 acres), and RPZ (0.3 acres) extend onto KAFB property. This is much the same situation as exists at the end of Runway 26. A variety of alternatives may be considered including no-action, fee simple acquisition, easement/lease, runway shortening, runway shift, or declared distances. The area of deficiency is clearly dedicated to airside needs; therefore, the potential for an incompatible development is very low.

On the Runway 3 end, the RPZ extends beyond Sunport property. Review of this situation by the Advisory Committee indicated that this land is controlled by the New Mexico Department of Transportation, which owns and maintains Interstate 25 and the adjacent right-of-way easement. As a result, the possibility of a height hazard being installed is quite low and no action is required.

**COUPLED RUNWAYS**

With the publication of FAA AC 150/5300-13A, *Airport Design*, in 2012, the FAA is making a concerted effort to identify and mitigate coupled runway environments. Coupled runways are those where either the pavements cross or the runway safety areas (RSAs) cross. Most airports with a crosswind runway will have crossing runway environments; however, certain specific geometries should be avoided. For example, safety areas should not overlap because work (maintenance) in one area would affect the operations of both runways. In addition, operations on a runway should not penetrate the critical area of NAVAIDs on the other runway. Configurations where runway thresholds are close together should be avoided, as they can be confusing to pilots, potentially resulting in wrong-runway departures.

There are two locations on the airfield where the runways are coupled. The first is located at Runway 8 and Runway 12 where the thresholds are in proximity and are served by the same threshold taxiways, Taxiways A1 and E1. The runway safety areas of both runways also overlap in this area. This area is also a designated “Hot Spot” and is included in the FAA’s 2016 Runway Incursion Mitigation (RIM) program. Alternatives for this location are presented under the Taxiway “Hot Spot” Mitigation heading below.

The second location is beyond the Runway 21 end where the RSA extends onto Runway 8-26. This location has been the subject of previous action to increase the safety margin. These actions included closure of Taxiway E5 and installation of hold lines on Taxiway A (outside the RPZ for Runway 21) and on Taxiway E. The remaining mitigation measures that may be considered would shorten Runway 21 by at least 365 feet, either through physical pavement removal or through declared distances. Because the current length of the runway is needed to accommodate existing commercial activity, shortening the runway is not considered at this time.
RUNWAY LENGTH

Previous analysis in Chapter Four – Facility Requirements addressed runway length needs at the Sunport. At 13,793 feet in length, Runway 8-26 meets the needs of current users. At 10,000 feet in length, Runway 3-21 also meets the needs of users as a crosswind runway; however, consideration is given to preserving the potential to extend the runway an additional 1,000 feet to the southwest as shown on the current ALP. Runway 12-30 is 6,000 feet long, which meets the needs of the general aviation operators for whom this runway is intended. This length should be preserved to the greatest degree feasible; however, it should be noted that it was determined in Chapter Four, Airport Facility Requirements, that the general runway length needed is 5,500 feet.

RUNWAY WIDTH

All three runways are 150 feet wide. This is the design standard for Runway 8-26 and Runway 3-21. The design standard for Runway 12-30 is 100 feet. There are two primary alternatives available for addressing the width of Runway 12-30:

Alternative 1 – No Action

With this alternative, the width of Runway 12-30 would be maintained at a width of 150 feet. There is a possibility that at the next major rehabilitation/reconstruction, the FAA may not participate in funding beyond 100 feet in width. In this case, the cost to maintain the remaining 50 feet of pavement would be the responsibility of the Sunport.

Alternative 2 – Narrow to 100 feet

This alternative considers narrowing the runway to 100 feet in width at the next major rehabilitation/reconstruction. Narrowing would include moving the runway edge lights in to meet the applicable standard. At that time, a benefit-cost analysis may need to be performed on the alternatives.

HOLD LINE SEPARATION STANDARDS

The hold lines for Runway 8-26 and 3-21 are currently 250 feet from the centerline of the runways. For Runway 12-30 the hold lines are 200 feet from the runway centerline. According to FAA AC 150/5300-13A, Airport Design, the hold lines separation distance for all three runways is to be increased based on the elevation of the airport. By current standard, the hold lines for Runways 8-26 and 3-21 should be situated at 304 feet, and for Runway 12-30 they should be at 203 feet.

On November 23, 2004, the FAA approved a modification of standard (MOS) for all hold lines to remain in their existing location. The MOS approval letter from the FAA indicates that relocating the hold lines “could result in insufficient ramp separation and capacity issues.”
FAA Order 5300.1G, Modification to Agency Airport Design, Construction, and Equipment Standards, establishes the process for initiation, revision, coordination, and management of MOS. All MOS associated with the design standards are valid for no more than five (5) years and they must be reviewed whenever there is an opportunity to meet standards, when situations change, or if a MOS is no longer required. Review of existing MOS is typically undertaken during a master plan project or during planning for a specific capital project that may be impacted by the MOS.

The MOS for the taxiway hold lines was reviewed as part of this master plan study. An in-depth analysis is presented in Appendix D and is summarized as follows:

**Alternative 1**: Rescind the existing MOS and remark all hold lines associated with the runways at the standard distance based on elevation. This action would not address the concerns of the original MOS related to efficiency of ground movements.

**Alternative 2**: Issue a new MOS which reaffirms the need to maintain the hold lines in their current location. The safety intent of the hold line distance standard based on elevation would be maintained and the critical aircraft would not penetrate the inner-transitional OFZ.

**Alternative 3**: Issue a new MOS with revisions that identify specific connecting taxiways which can be maintained at a separation of 250 feet. At the very least, the hold lines on Taxiway A1, A2, A1 and C would be maintained at 250 feet from the runway centerline.

**TAXIWAYS**

The FAA is currently encouraging airports to assess the utility of all airfield pavements. For those pavements with low utilization or available alternate routes, the FAA may withdraw funding support for preservation and/or rehabilitation reserving limited grant funds for pavements with higher utilization rates. Under these cases, it would fall to the airport to either pay for pavement upkeep or to ultimately close the pavement.

**Taxiway Exits for Runway 8-26**

**Exhibit 5D** presents an analysis of the current exit taxiways serving Runway 8-26. The exhibit shows the distance from the landing threshold to the exit taxiway in both directions. FAA AC 150/5300-13A, Airport Design, presents a methodology to assess the utilization percentages for taxiway exits based on location. The methodology considers both right-angled and acute-angled exits (which typically have a higher utilization rate for larger aircraft) and presents an approximate percentage of the large aircraft and heavy aircraft fleet that would be able to exit under both wet and dry conditions. **Table 5A** shows the exit percentages in table format. As can be seen from the exhibit and the table, some utilization will be lost if any taxiways serving the central portion of Runway 8-26 (Twy A5-A9 and E6-E9) were to be closed.
Exhibit 5D
TAXIWAY EXIT ANALYSIS

LEGEND
- Dry Runway
- Wet Runway
- Large Aircraft (12,500 lbs. - 300,000 lbs.)
- Heavy Aircraft (> 300,000 lbs.)
- Ultimate Airfield Pavement
- Potential Excess Pavement to be Removed

Aerial Source: Google Earth 3/9/2014

Distance from Runway 26 threshold to marked taxiway
Distance from Runway 8 threshold to marked taxiway
### TABLE 5A
Taxiway Exit Utilization Percentage
Albuquerque International Sunport

<table>
<thead>
<tr>
<th>Runway Condition</th>
<th>Wet Runways</th>
<th>Dry Runways</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Right and Acute Angled Exits</td>
<td>Right Angled Exit</td>
</tr>
<tr>
<td></td>
<td>Large</td>
<td>Heavy</td>
</tr>
<tr>
<td><strong>LANDING RUNWAY 8</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twy E5 (Closed)/Twy A5</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Twy E6 &amp; E7/Twy A6 &amp; A7</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Twy E8/Twy A8</td>
<td>39</td>
<td>6</td>
</tr>
<tr>
<td>Twy E9/Twy A9</td>
<td>77</td>
<td>45</td>
</tr>
<tr>
<td>Twy E10/Twy A10</td>
<td>99</td>
<td>90</td>
</tr>
<tr>
<td><strong>LANDING RUNWAY 26</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twy A9/Twy E9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Twy A8/ Twy E8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Twy A7 &amp; A6/Twy E7 &amp; E6</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Twy A5/ Twy E5 (closed)</td>
<td>42</td>
<td>7</td>
</tr>
<tr>
<td>Twy D</td>
<td>99</td>
<td>89</td>
</tr>
</tbody>
</table>

Note: Adjustment made for Sunport elevation of 5,355 feet MSL
Large Aircraft: Those between 12,500 and 300,000 pounds.
Heavy Aircraft: Those greater than 300,000 pounds.
*Source: FAA AC 150/5300-13A, Airport Design; Coffman Associates analysis.*

On the north side of Runway 8-26, Taxiways A6 and A7 are considered for closure and replacement with a single right-angled taxiway exit. The existing layout of these taxiways does not meet current taxiway design standards which recommend that acute-angled taxiways not meet in the same location. Taxiway A9 is also considered for closure for two primary reasons: 1) it allows direct access from the KAFB apron to the runway, and 2) it provides limited benefit for aircraft exiting the runway. Ninety-five (95) percent of large aircraft landing on Runway 8 can generally exit prior to or at Taxiway A8. That percentage increases to 99 percent when utilizing Taxiway A9. Therefore, the presence of Taxiway A9 only increases the exit percentage of large aircraft by four percent. For heavy aircraft, the exit percentage increases from 89 percent to 93 percent.

On the south side of Runway 8-26, Taxiway E7 is considered for closure. Taxiways E7 and E6 intersect at the runway, thus violating current design standards. This is the same non-standard taxiway layout as Taxiways A6 and A7. To solve this issue, Taxiway A7 is considered for closure. Once Taxiway E7 is closed, Taxiways E6 and E8 would become the primary exits on the south side of the runway. It is estimated that 29 percent of large aircraft could utilize Taxiway E6 and 95 percent could utilize Taxiway E8.

Taxiway E9 is also considered for closure. It only provides a four percent improvement for exit percent. Nearly all aircraft landing on Runway 8 are able to exit prior to Taxiway E9. Taxiway E11 is also considered for closure. This is a bypass taxiway that is rarely utilized. Most aircraft that would need a bypass taxiway to depart on the Runway 26 end would utilize Taxiway A on the north side of the runway. Thus, bypass Taxiway A11 is considered to remain viable, while Taxiway E11 is considered for closure.
Excess Taxiway Pavement

Exhibit 5E presents an aerial of the airfield with several taxiways and other pavement areas shown for closure consideration. Taxiways A4 and E4 are remnants of closed Runway 17-35. These two taxiways are close to Taxiways C and D, which provide the same north/south access. Consideration is given to closing Taxiways A4 and E4.

Consideration is given to the closure/alteration of several existing taxiways that may be redundant and/or unnecessary. Taxiway J is a partial parallel taxiway to Runway 12-30. Its main function is to provide a third access route to the terminal apron in addition to Taxiways C and D. Taxiway J also intersects Taxiways E and E3 to form a wide expanse of pavement in violation of the three-node concept. By removing Taxiway J, this intersection becomes more intuitive for pilots.

The south end of Taxiway H intersects with Runway 12-30 at an angle. The primary function of Taxiway H is to provide military aircraft with access to hot pad number three. It is rarely utilized to access Runway 12-30. Consideration is given to closing that portion of Taxiway H south of military hot pad number three.

Taxiways A2, A3, and C allow for direct access from the terminal apron to Runway 8-26 in violation of current taxiway design standards. To address this layout, the Sunport has painted a yellow and black dashed line that segregates the taxiways from the terminal apron. This marking is effective in that there have been no incursions in this area to date. Nonetheless, as part of a Master Plan, it is important to examine other options that would further reduce the potential for an incursion.

One option to consider is closing Taxiways A2, A3, and C between the terminal apron and the runway, but this could potentially lead to significant congestion for aircraft taxiing into and out of the terminal area. A second option is the installation of apron “islands” that would force pilots to make a turn onto parallel Taxiway A prior to turning again to enter the runway environment. The ‘islands’ would have to be large enough to be properly signed and marked as non-movement areas. The ‘islands’ can be created with markings or by physically removing portions of the apron pavement.

TAXIWAY “HOT SPOT” MITIGATION

The FAA has identified four hot spots on the airfield where the potential for runway incursions is considered high. These hot spots were previously identified and discussed in Chapter Four - Facility Requirements and on Exhibit 4H. There may be a wide range of potential solutions for hot spots. In some cases, geometric solutions (i.e., relocating or removing pavement) may be considered, while in others simply improving signage can help increase pilot situational awareness. In some cases, the best hot spot solution may be to take no action because viable alternatives might make the layout even more confusing.
**Hot Spot 1 Alternatives**

Hot Spot 1 is located at the intersection of Runway 8 and Runway 12. 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. **Exhibit SF** presents the potential alternatives to mitigate this hot spot.

**Hot Spot 1 Alternative 1**

The first alternative considered is to close the pavement that leads directly to the Runway 12 threshold. A new Runway 12 threshold taxiway is then planned to provide the more typical 90-degree entrance to the runway. This option would force users of Runway 12 to make a more typical entrance to the runway and would remove the possibility of a pilot lining up on the wrong runway.

One potential negative to this solution is the introduction of a new taxiway to an already wide expanse of pavement created by the intersection of Taxiways E, E1, and G. Nonetheless, the existence of the wide expanse of pavement may be preferable to the hot spot concern.

**Hot Spot 1 Alternative 2**

The second alternative considers shifting the threshold of Runway 12 approximately 350 feet and constructing a new threshold entrance taxiway. This would require shortening the runway to 5,650 feet in length. Portions of Taxiway E would be planned to be removed, which would disrupt the full parallel nature of the taxiway. The pavement removal would have the benefit of reducing the existing wide expanse of pavement at the intersection of Taxiways E, E1, and G.

**Hot Spot 1 Alternative 3**

A third alternative considered is to shift the Runway 12 threshold a distance of 1,000 feet so that the threshold taxiway entrance can be clear of the intersection with Taxiway E. This also would also completely decouple the RSAs of both runways. There are several challenges to this alternative. It would shorten the runway to 5,000 feet, which is less than what is required. Additionally, that portion of Taxiway E between Taxiways E1 and E3 would be removed because it would traverse the RSA behind the Runway 12 end, which is not proper design for a taxiway that goes around a runway end.

**Hot Spot 2 Alternative**

Taxiway G and G1 are adjacent to the general aviation apron. Pilots must be alert so as to not inadvertently enter Runway 12-30. The geometry of this area also allows for direct access from the general aviation apron area to the runway. **Exhibit SG** presents alternatives to mitigate hot spot 2.
**ALTERNATIVE 1**

RELOCATE HOLD LINE

NEW HOLD LINE

RELOCATE HOLD LINE

**ALTERNATIVE 2**

REMOVE 350' OF PAVEMENT

**ALTERNATIVE 3**

REMOVE 1,000' OF PAVEMENT

---

**LEGEND**

- Ultimate Airfield Pavement
- Pavement to be Removed
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Protection Zone (RPZ)

---

Aerial Source: Google Earth 3/9/2014
ALTERNATIVE 1

Remove Taxiway G1 to eliminate direct access from apron to runway

ALTERNATIVE 2

Relocate Taxiway G1 to eliminate direct access from apron to runway

ALTERNATIVE 3

Install apron “island”

LEGEND

- Ultimate Airfield Pavement
- Pavement to be Removed
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Protection Zone (RPZ)

Aerial Source: Google Earth 3/9/2014
Hot Spot 2 Alternative 1

This alternative considers closing/removing Taxiways G1 and E3 and replacing them with a crossing taxiway that is perpendicular to Runway 12-30. By doing this, pilots will no longer be able to traverse directly from the general aviation apron into the Runway 12-30 environment. This alternative also includes the potential removal of that portion of Taxiway E3 between Taxiway E and Runway 12-30 because this pavement would likely be underutilized since most general aviation aircraft landing on Runway 30 would be exiting to the south. Taxiway J is also shown as excess pavement in this alternative.

Hot Spot 2 Alternative 2

This alternative considers shifting the location of Taxiway G1 slightly to the east, which would have the effect of eliminating the direct access issue. In this layout, Taxiway E3 is planned to remain, allowing for continued runway crossing movement as necessary. While this geometry does eliminate the direct access concern, pilots intending to cross the runway would have to make a slight turn on the runway to access the taxiway on the other side.

Hot Spot 2 Alternative 3

A third option is to install an apron “island” that would force pilots to turn onto Taxiway G prior to then turning on Taxiway G1. The “island” will need to be large enough to accommodate proper signage and non-movement area markings.

Hot Spot 3 Alternatives

This hot spot has the convergence of three taxiways (C, G, and F) and Runway 12-30. Pilots must be alert for the hold short line for Runway 3-21. The issue is primarily the wide expanse of pavement and the convergence of three taxiways and a runway in violation of the three-node concept, all of which could be confusing to pilots. At the same time, each of these taxiways is highly utilized, and two of them are parallel or partial parallel taxiways to their associated runway.

This intersection provides ready access to the terminal area via Taxiway C for commercial aircraft landing on Runway 3. Operational information indicates that many commercial flights landing to Runway 3 will exit on acute angled Taxiway C and proceed across Taxiway G toward the terminal area. This is what one might refer to as a straight shot to the terminal area. To facilitate this movement, it is common for the ATCT personnel to hold activity on Runway 12-30 until the landing aircraft crosses the runway via Taxiway C. Exhibit 5H presents three potential alternatives to mitigate this hot spot.

Hot Spot 3 Alternative 1

The first alternative considered is to convert Taxiway C (between Runway 3-21 and Taxiway F) from an acute-angled exit to a right-angled exit. The purpose of this layout is to force pilots to make a turn onto
Taxiway F. This movement would potentially increase pilot situational awareness and give them a little more time to assess the upcoming intersection. This alternative does not solve the wide expanse of pavement issue, but it would slow aircraft and provide additional time for pilots to acclimate to the intersection.

The exhibit shows the utilization percent of Taxiway C (between Runway 3-21 and Taxiway F) by both large and heavy aircraft. Under wet conditions, regardless if the exit is right- or acute-angled, approximately 15 percent of large aircraft and zero percent of heavy aircraft can exit. Under dry conditions and a right-angled exit, approximately 55 percent of large aircraft and 12 percent of heavy aircraft can exit. This utilization percent is significantly lower than the existing acute-angled exit provides with 80 percent for large aircraft and 61 percent of heavy aircraft.

*Hot Spot 3 Alternative 2*

The next alternative is a modest alteration to the pavement layout which considers removing the wide portion of Taxiway C between Taxiway G and Runway 12-30. This alteration would reduce the width of Taxiway C in this location to near the 75-foot standard. It is likely the taxiway fillet would have to be somewhat wider to continue to allow an aircraft travelling south of Taxiway C to turn east onto Taxiway G. This alternative would eliminate the acute-angled exit currently available for aircraft landing on Runway 30. In some cases, aircraft may have to continue to roll out to Taxiway G1 or the end of the runway.

*Hot Spot 3 Alternative 3*

The next alternative would bring the intersection up to standards; however, would be a much larger project in terms of cost and scope. Taxiway F would be extended parallel to Runway 3-21 across Taxiway G and Runway 12-30. At the point where it reaches the former Runway 17-35, it would angle north to connect with Taxiway E4, thus providing access to the terminal area. This alternative would create two standard three-node intersections: one with Taxiway F and Taxiway G, and one with Taxiway F and Runway 12-30.

In conjunction with this alternative is the potential closure/removal of a portion of Taxiways C and J. This is considered because most general aviation pilots landing on Runway 30 will proceed to the south general aviation apron rather than the commercial terminal apron to the north.

*Hot Spot 4 Alternatives*

This hot spot is identified by the FAA because of the potential for pilots to confuse Runway 3-21 and Taxiway H. In addition, there are hold lines on Taxiways E, H, and Hot Pad #2. These hold lines are at unusual angles to the runway, which can be confusing. *Exhibit 5J* presents three potential alternatives.
HOT SPOT 4 ALTERNATIVES

**Exhibit 5J**

**ALTERNATIVE 1**
Close Taxiway H

**ALTERNATIVE 2**

**ALTERNATIVE 3**

Hot Spot ID Description

<table>
<thead>
<tr>
<th>Hot Spot ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS4</td>
<td>Taxiway E5 is permanently closed. Hold short lines for Runway 3-21 on Taxiways E, H, and Hot Pad 2. The concern is the potential for pilots travelling on Taxiway E to confuse Taxiway H and Runway 3-21.</td>
</tr>
</tbody>
</table>
Hot Spot 4 Alternative 1

This alternative considers slightly relocating the northern portion of Taxiway H so that it is parallel and separated by the standard 400 feet from Runway 3-21. The new portion of the taxiway would then reconnect with the existing taxiway. The exhibit also shows the potential continued extension of the new taxiway to be parallel with the runway. While this alternative relocated a portion of Taxiway H to the standard separation distance, it would connect with Taxiway E in an unusual manner. The connection would meet Taxiway E at a location where there is a slight “jog” in the taxiway, and it would be at an angle. This layout does meet design standard, but it could still be somewhat confusing to pilots.

Hot Spot 4 Alternative 2

The next alternative is like Alternative 1 in that the northern portion of Taxiway H is shifted to the east and constructed parallel to the runway. The difference is that it is shifted to a separation distance of 600 feet so that the intersection with Taxiway E is not located at the “jog” in Taxiway E, thus reducing the potential for pilot confusion.

This alternative would place the new portion of Taxiway H closer to Military Hot Pad #2. KAFB has indicated that they no longer need to use Hot Pad #2; therefore, it is planned to be closed in this alternative.

As with Alternative 1, the new portion of Taxiway H could be angled back toward Runway 3-21 at a standard separation distance of 400 feet in the future.

Hot Spot 4 Alternative 3

A third alternative is the possibility of closing Taxiway H. This would mitigate the hot spot, but it would also eliminate access to Military Hot Pad #3 which is at the south end of Taxiway H. A sub-alternative may be to only close the north portion of Taxiway H and leave the south portion in order to maintain access to Military Hot Pad #3; however, there would be longer taxi times.

RUNWAY 8 APPROACH SURFACE

All runways have a defined approach surface (not to be confused with the Part 77 Approach Surface) which is designed to protect the use of the runway in both visual and instrument conditions. The approach surface is also referred to as the threshold sitting surface (TSS). The approach surface typically has a trapezoidal shape that extends away from the runway along the centerline and at a specific slope, expressed in horizontal feet by vertical feet. The specific size, slope and starting point of the approach surface depends upon the visibility minimums and the type of procedure associated with the runway end.
When approach surfaces are entirely clear of obstacles, instrument approach procedures will provide the optimum visibility and cloud ceiling minimums. When obstacles penetrate the approach surface, mitigation measures may include:

- Higher visibility minimums;
- Higher than normal glide path angles;
- Non-standard threshold crossing heights; and
- Final approach offset.

The approach surface for Runway 8 begins 200 feet from the displaced landing threshold. The inner width is 800 feet, the outer width is 3,800 feet, and it is 10,000 feet long. The surface slopes up and away from the inner width at a 34:1 angle. In addition, runways with a precision instrument approach, such as Runways 8 and 3, have a defined final approach “X” surface which must also meet the same obstacle clearing standards. The “X” surface begins at the sides of the approach surface, extending 200 feet at a slope of 7:1.

Because the Runway 8 landing threshold is displaced by 1,000 feet, the approach surface and associated “X” surface cross over aircraft movement areas, most notably portions of Taxiway A, A1, A2, and E1. If the critical design aircraft (A300-600) is holding on these taxiways at the current hold lines, it penetrates the approach surface.

During development of this master plan, the issue of approach surface penetration by holding aircraft was analyzed separately. Appendix E presents this alternatives analysis.

**DIRECT ACCESS AT TAXIWAYS A2 AND A3**

Per FAA guidance, “Do not design taxiways to lead directly from an apron to a runway. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway.” Currently, both Taxiways A2 and A3 do not conform to this standard. Four alternatives are considered to mitigate this existing condition and are shown on Exhibit 5K. Several of the imaginary surfaces surrounding the runway are also shown as they have an impact on what alternatives are feasible.

*Direct Access Alternative 1*

The first alternative considers closing Taxiway A2 to eliminate direct access from the terminal apron to the runway. The hold line currently on Taxiway A1 is moved back to a location on Taxiway A that would keep aircraft out of the TSS. A second hold line would have to be located on the terminal apron taxilane to prevent aircraft from entering Taxiway A until cleared. A “no-taxi” island on the terminal apron is planned to prevent direct access to the runway via Taxiway A3.
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Direct Access Alternative 2

This alternative considers shifting the location of the terminal apron taxilane to the west, which would eliminate the direct access to the runway via Taxiway A2. This alternative would preserve the utility of Taxiway A2, which is frequently used by tower controllers for sequencing, departures, and bypassing during busy times. Shifting the taxilane to the west also facilitates the planned extension of Concourse B to the west. A “no-taxi” apron island is planned to prevent direct access to the runway via Taxiway A3.

Direct Access Alternative 3

This alternative considers shifting the terminal apron taxilane to the east to eliminate direct access to the runway via Taxiway A2. A concern with this alternative is that several of the Remain-Over-Night (RON) aircraft parking positions would have to be removed. In addition, this alternative would necessitate several very tight turning movements by aircraft. A “no-taxi” apron island is planned to prevent direct access to the runway via Taxiway A3.

Direct Access Alternative 3A

This variation of Alternative 3 shifts the location of the terminal taxilane toward the terminal building so that it coincides with the existing east/west terminal taxilane. This alternative would require removal of even more RON positions. A “no-taxi” apron island is planned to prevent direct access to the runway via Taxiway A3.

TAXIWAY EXIT ON RUNWAY 3-21

Interviews with operators at the Sunport and with FAA tower personnel indicate a need for an additional exit from Runway 21 to Taxiway F. The location considered is between exit Taxiways F3 and F6. Analysis of the potential usefulness of this new taxiway exit is presented on Exhibit 5L.

Currently, aircraft landing on Runway 3 must exit the Runway at Taxiway F3, which is approximately 6,200 feet from the landing threshold or they must roll out an additional 3,800 feet and exit at Taxiway F6. Under typical dry conditions, approximately 29 percent of large aircraft and 7 percent of heavy aircraft can exit at Taxiway F3. If an additional taxiway exit were available between Taxiways F3 and F6, then approximately 92 percent of large aircraft and 71 percent of heavy aircraft could exit the runway sooner. Exiting the runway quickly has many benefits, including increasing airfield capacity and reducing fuel burn emissions.
**LANDSIDE DEVELOPMENT ALTERNATIVES**

Landside development alternatives include consideration of the general aviation services, air cargo facilities, the passenger terminal complex, and other areas.

**GENERAL AVIATION**

The existing general aviation services are consolidated in the southwest portion of the airfield. Much of this area is developed with aircraft apron, hangars, and vehicle parking. The general aviation alternatives will focus on the following needs:

- Additional conventional hangars (with taller doors to accommodate larger business jets);
- Infill conventional hangars;
- Location for an apron to accommodate heavier aircraft;
- Potential fuel farm expansion location;
Any future development of general aviation facilities, especially hangars, should only be undertaken when a need exists. For example, both fixed base operators (FBOs) have indicated a desire to build or lease new conventional hangars that have taller doors. This need is generated by the frequency of activity by operators of larger business jets. These operators typically prefer their aircraft to be parked in a hangar, especially if their visit includes an overnight stay.

In 1983, the City of Albuquerque opened Double Eagle II Airport, located approximately 10 miles to the northwest of the Sunport. This serves as a reliever to the Sunport and is designed to accommodate the range of general aviation operators. Today, the airport accommodates approximately 120 based airplanes, the majority of which are smaller single and multi-engine piston aircraft.

Over the years, Double Eagle II has established itself as the preferred base for owners of smaller general aviation aircraft, while general aviation facilities at the Sunport have evolved to primarily accommodate larger business jets. This trend is expected to continue, and new general aviation facilities are expected to serve this continuing development. As a result, alternatives for locating T-hangars or shade hangars for owners of smaller general aviation aircraft are not considered. Future general aviation facilities at the Sunport will focus on accommodating business aircraft.

Exhibit 5M presents several layouts for general aviation facilities. On the left panel, several new conventional hangars are considered. Those located immediately south of Taxiways E1 and K would require relocation of the existing fuel farm. Other large sites for conventional hangars include adjacent to the Atlantic Aviation FBO, on the back apron leased by Cutter Aviation, and finally slightly farther south adjacent to the existing T-hangars. A dedicated apron to support frequent use by large and heavy aircraft is considered in the triangle bounded by Taxiways E1, G, and K.

On the right side of the exhibit are two different layouts for the triangle area. The first is the possibility of closing Taxiway E1 to allow a public access road to enter the area. Several hangars are considered. The second considers a dual use for the triangle area, two hangars, and an adjacent heavy aircraft apron.

**AIR CARGO**

The Facility Requirement analysis indicated a future need for an additional 25,000 square feet of air cargo building space. In addition, approximately 13,000 square feet of delivery truck staging and parking is forecast to be needed. Input from Sunport staff indicates that aerial firefighting aircraft are staging from the air cargo apron with greater frequency. As a result, additional apron area is desired in proximity to the air cargo apron.

The location of air cargo facilities is well established in the southwest portion of the Sunport. Exhibit 5N presents two
options for building expansion. It also shows the potential expansion of the air cargo aircraft apron. Beyond the planned air cargo apron expansion is additional space for delivery truck staging and parking.

PASSENGER TERMINAL COMPLEX CONSIDERATIONS

As outlined in the Facility Requirements chapter, the overall size of the terminal building is adequate through the long-term planning period; however, several functional elements are undersized currently or may become undersized in the near future (reference Exhibit 4K). Areas that may need expansion include retail concessions, food and beverage, federal inspection services (especially if international flights resume), TSA operations, and general circulation. In addition, consideration is given to the installation of a consolidated baggage screening process.

Consolidated Bag Screening

While some modern airports have consolidated bag screening equipment, it is not universally accepted to be a more efficient process. As with any large mechanical system, problems can arise that may slow or stop the bag screening process. A centralized bag screening process necessarily mixes bags from different airlines that must then be resorted after screening. This extra layer of sorting can lead to errors.

The layout of the Sunport has challenges to implementing a consolidated bag screening process. The ticketing and bag check counters are split to either side of the main central corridor and the Great Hall. To centralize bag screening, a conveyor system would have to transfer bags a great distance. While it may be technically feasible to do so, the benefits may be minimal and should be further analyzed with additional study beyond this Master Plan.

While there are challenges to a centralized bag screening process today, the concept has been considered in the past. In fact, with construction of the TSA screening checkpoint, soldier piles were installed in the pavement below to accommodate such a facility. Other ideas have included two separate consolidated bag screening systems on either side of the central terminal corridor (Great Hall). This concept would require use of existing aircraft apron area and may not be feasible.

Currently, bag screening is done by TSA staff in rooms immediately behind the ticketing and bag check counters. This system has worked to satisfaction for years and can continue into the foreseeable future.

Concessions and Terminal Expansion

The previous ALP for the Sunport considered extending the concourse to the west to accommodate additional gates. This concept was also supported in the West Area Support Plan (May 2011). Current facility requirements continue to indicate a potential need for at least two additional gates. Previous analysis indicated that the most feasible method for adding gates was to extend concourse B to the
ABQ - Sustainable Airport Master Plan

ALTERNATIVE 1

ALTERNATIVE 2

ALTERNATIVE 3

Legend:
- Ultimate Building
- Ultimate Airfield Pavement
- Ultimate Road/Parking
- Pavement to Be Removed

Runway 12-30 6,000' x 150'

Runway 3-21 10,000' x 150'

Aviation Source: Google Earth 3/9/2014

General Aviation Alternatives

Exhibit 5M

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GENERAL AVIATION ALTERNATIVES
West. Extending the concourse in this direction would necessarily shift the aircraft taxilane on the west side of the terminal apron to the west as well. This taxilane shift is feasible when the current air freight building is removed as planned.

Additional retail concessions and food and beverage were shown to be needed in the short-term planning period. Consideration has been given to the functionality of the proposed concourse expansion. As depicted on Exhibit 5P, the expansion can accommodate up to four additional gates, additional passenger holdroom space, additional concessions, and potentially new Federal Inspection Services facilities. As such, the concourse expansion is planned to include a gate to be utilized for international flight and passenger processing.

Additional retail concessions and food and beverage were shown to be needed in the short-term planning period. Exhibit 5P shows potential locations for these facilities.

West Terminal Area Plan

The previously referenced West Area Support Plan (May 2011) presented a potential layout for a variety of support services. The primary feature of the plan was to accommodate an extension of concourse B by demolishing the belly freight building and shifting the aircraft taxilane slightly to the west. Support services such as the glycol storage, wash station, triturater and waste collection were then arranged in a linear fashion facing the aircraft apron.

Since the completion of the West Area Support Plan (May 2011), some alterations have been made to the plan. A new Snow Removal Equipment (SRE) building is currently under construction, replacing an existing building. The planned location for other support services in the West Area has also been shifted, as depicted on Exhibit 5P.

A new feature of the West Area plan is to expand the parking and staging area closest to airfield entrance gate number #23. This is the primary entrance gate to the airfield for delivery vehicles. Most mornings, this gate area becomes congested as vehicles are cleared by security personnel. To alleviate this issue, the gate area is planned to be expanded. This will be feasible once the freight building is demolished.

The previous ALP considered extending an access road from University Boulevard to the east side of Runway 3-21. The road was to serve a relocated and consolidated maintenance and SRE facilities. As previously mentioned, a new SRE building is currently under construction in the West Area of the terminal complex. The existing maintenance facilities located just southwest of the general aviation area are planned to remain in their current location. As a result, future development of the east side of Runway 3-21 is not planned to include replacement maintenance/SRE facilities.
NON-AVIGATION LAND USE CONCEPTS

In Chapter One – Inventory, several tracts of Airport property that are disconnected from the airfield system were identified for non-aviation land uses that can provide revenue to the Airport. Four specific areas are discussed in further detail below.

Aviation Center of Excellence (ACE)

The site plan approval process for the ACE project has been completed. The City Aviation Department can proceed with plans to lease the land to developers. A key component of the Site Plan for Subdivision is the provision for an expedited approval process for future Site Plans for Building Permit through the City’s Design Review Team (DRT). The planned development includes commercial/retail along Gibson Boulevard, Office/Research and Development in the central portion, and aviation related on the south portion with taxiway access to the airfield. Limited access (right-in, right-out, left-in) is allowed to the ACE development area from Gibson Boulevard. Since this development plan is already established, no additional land use alternatives are considered.

Puerto del Sol Golf Course

This 72-acre site is located along the north side of Gibson Boulevard. It is currently leased to the City Parks and Recreation Department for use as a municipal golf course. Originally, the golf course was developed as a land use compatible with the clear zone for former Runway 17-35. Now that Runway 17-35 is closed, there is no longer a clear zone. Therefore, consideration may be given to a different long-term plan for the property. While alternatives can be considered, maintaining the property as a municipal golf course is also an acceptable alternative.

Exhibit 5Q presents a development concept for the golf course area that shows a variety of land uses, including commercial, single family attached and detached units, and park land.

The commercial area is located along Gibson Boulevard and is approximately 15.5-acres in size with an approximate depth of 550 feet. This area would be appropriate for a hotel and general commercial retail use. It could also accommodate office use. Access to the commercial area is shown from Girard Boulevard, Wellesley Drive, and Gibson Boulevard. Gibson Boulevard is a limited access arterial, so providing access in this location would require a traffic study and access study to be submitted to the City Department of Municipal Development (DMD) for review. If DMD agreed to sponsor the modification to the Gibson access policy, the request would go through the Mid Region Council of Governments Transportation Coordinating Committee, the same process that City Aviation had to follow with the ACE project on the south side of Gibson Boulevard.

The park area is approximately 16.5-acres in size. It spans the entire north-south axis of the property and is visible from three sides of the property. The existing water tower is in the center of the park area.
TERMINAL AND WEST AREA CONSIDERATIONS

LEGEND
- Airport Property Line
- Relocated Fence
- Ultimate Building
- Truck Parking and Staging
- Ultimate Airfield Pavement
- Lease Parcel
- Building to be Removed

Taxiway shift may be a direct access option long-term.
A 50-foot buffer runs along the east side of Girard Boulevard from Gibson Boulevard to Vail Avenue where it then broadens out to a larger park area. A multi-use trail within the 50-foot buffer would provide a connection between the existing multi-use trail within the Gibson right-of-way and the park.

Two single family residential areas (approximately 20.5-acres in total) are located to the northwest and the southeast of the park area. Primary access to the single family residential areas is from Girard Boulevard. Two townhouse areas (approximately 18.5-acres in total) are located to the east of the park area along Wellesley Drive, which currently contains some townhouse development. Access to the townhouse areas is primarily from Wellesley Drive.

**Sunport Business and Technology Center**

This 65-acre site is located to the east of University Boulevard, west of Spirit Drive, and south of Clark Carr Road. It currently has a limited amount of development on the property, including existing airline operations on a 5-acre leased area and manufacturing on a 1.5-acre leased area. A Master Development Plan was approved by the Environmental Planning Commission for this property in 2008, which was also designated by the City Council as a Foreign Trade Zone. The Master Development Plan showed a north-south roadway through the property, but it was situated to the west of center. The lease areas were shown as a series of 17 small one- to three-acre lease areas. This limits development on this property particularly due to the topography and grade change from University Boulevard.

**Exhibit 5Q** shows a slightly different concept with the north-south internal road realigned to the east to provide more depth to the lease areas facing University Boulevard due to the topography challenges. As such, development of these lease areas would likely show a low floor area ratio. The internal road provides access to each of the eight proposed lease areas. Land uses include commercial retail, light industrial, and educational.

The commercial area, approximately 6-acres in size, is located at the northwest corner of the property along Clark Carr Road. It is across the street from the Sunport car rental facility. Due to this proximity, this portion of the property would be a good location for a gas station / convenience store.

To the south of the commercial area is the educational area, which is approximately 7.5-acres in size. Visibility and access from University Boulevard would be important for this use. As such, a limited access (right-in/right-out/left-in) from University Boulevard is shown. To provide this driveway access, retaining walls would be required on both sides of the proposed driveway.

The remainder of the site is shown with light industrial in variety of lease area sizes ranging from 5 to 10 acres. The exception is one lease area, 1.5-acres in size, located between the existing manufacturing use and the intersection of Spirit Drive and the proposed internal road.
Property West of ACE

This 12-acre site is located to the south of Miles Road and west of Girard Boulevard and the ACE project. It is envisioned as an extension of that project. A green space containing a multi-use trail runs north-south along the east edge of the property.

The concept presented on Exhibit 5Q shows one area each of office and light industrial uses, and the existing 2-acre green space. The office use is located on the northern 5-acres of the site, across from the existing Airport Business Park. Access to the office area is primarily from Miles Road via Girard Boulevard and is shown to align with Air Park Road. Secondary access to the office area would be from the existing Columbia Drive.

The light industrial area is located on the southern 5-acres of the site. A cross access easement with the office development would provide access to the light industrial area. Secondary access would be from an extension from the existing Columbia Drive to the south. The extension is currently platted, but it has not been constructed.

ALTERNATIVES SUMMARY

The process utilized in assessing airside, terminal, and landside development alternatives involved a detailed analysis of short and long-term requirements, as well as future growth potential. Current airport design standards were considered at each stage of development.

These initial alternatives present a proposed configuration of the Sunport to be developed over a long period of time. The next phase of the Master Plan will define a reasonable phasing program to implement a preferred master plan development concept over time.

Based on input from Airport staff, the Advisory Committee, and members of the public, a final Master Plan concept can be formed. The resultant plan will represent an airside facility that fulfills safety and design standards and a terminal area and landside complex that can be developed as demand dictates.

The preferred master plan development concept for the Sunport must represent a means by which the Sunport can grow in a balanced manner, both on the airside as well as the terminal area and landside, to accommodate forecast demand. In addition, it must provide for the flexibility to meet activity growth beyond the long-range planning period.

The remaining chapters will be dedicated to refining these basic alternatives into a final development concept with recommendations to ensure proper implementation and timing for a demand-based program.
SUSTAINABILITY GOALS AND OBJECTIVES

The Sustainability Baseline Assessment identified historical resource consumption rates and the applicable sustainability policies and procedures of the City of Albuquerque Aviation Department (Department). The information gathered in the Sustainability Baseline Assessment will serve as the foundation for the development of a series of goals, objectives and initiatives the Department can use to focus its sustainability efforts into the future. Furthermore, those sustainability goals will be utilized to evaluate the development alternatives considered in this Sustainable Airport Master Plan (SAMP) for potential sustainability benefits.

SUSTAINABILITY GOALS

The process of selecting appropriate goals begins by first restating the Aviation Department’s overall sustainability goal for the Sunport, which is, “The City of Albuquerque Aviation Department will be increasingly sustainable with regard to natural resource conservation, economic strength and community contributions.” Goals identified for each sustainability focus category are intended to be broad, achievable goals that do not identify specific performance targets or milestones. This allows flexibility for the Aviation Department to modify its program over time and keep within the framework of these goals.

The preliminary goals for each sustainability focus category, summarized in Table 5B, are intended as a starting point for further discussion and consideration by the Aviation Department and the Technical and Advisory Committees.

<table>
<thead>
<tr>
<th>TABLE 5B</th>
<th>Preliminary Sustainability Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Albuquerque International Sunport</strong></td>
<td><strong>Preliminary Goal</strong></td>
</tr>
<tr>
<td><strong>Sustainability Focus Categories</strong></td>
<td>1. Expand the Sunport’s existing waste management program to divert more waste from landfills through increased recycling, composting, and procurement policies.</td>
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<tr>
<td>Waste Management and Recycling</td>
<td>2. Expand energy efficiency measures and renewable energy opportunities.</td>
</tr>
<tr>
<td>Energy</td>
<td>3. Commit to the betterment of regional air quality by supporting efforts to reduce greenhouse gas emissions from Sunport users and enacting policies to reduce emissions from Aviation Department-controlled sources.</td>
</tr>
<tr>
<td>Air Quality and Greenhouse Gas Emissions</td>
<td>4. Reduce potable water consumption throughout the Sunport with expanded efficiency measures and reclaimed/grey water use.</td>
</tr>
<tr>
<td>Water Conservation and Water Quality</td>
<td>5. Promote the utilization and expansion of alternative transportation modes to and from the Sunport.</td>
</tr>
<tr>
<td>Surface Transportation</td>
<td>6. Incorporate procurement and construction policies to prioritize the use of more sustainable resources.</td>
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<td>Natural Resource Management</td>
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</table>
SUSTAINABILITY OBJECTIVES AND INITIATIVES

Tied to each sustainability goal are key objectives and initiatives. In contrast to the sustainability goals, sustainability objectives are more specific and can be measured using key performance indicators (KPIs). Initiatives are the individual projects that can be implemented by the Aviation Department to achieve specific objectives.

A preliminary list of sustainability objectives and initiatives has been identified for each goal from a variety of sources including the findings of the Sustainability Baseline Assessment, the Sunport’s Sustainability Management System (SMS) Reference Document (see Section 1 of the Sustainability Supplemental Report), and a database of sustainable principles and practices maintained by the Sustainable Aviation Guidance Alliance (SAGA). SAGA is a volunteer coalition of aviation interests that formed in 2008 to assist airport operators in planning, implementing, and maintaining sustainability programs. Membership of SAGA is made up of many aviation/airport industry organizations, including the American Association of Airport Executives (AAAE), Airports Council International – North America (ACI-NA), Airport Consultants Council (ACC), the FAA, Airlines for American (A4A), and various airport consultants.

The sustainability objectives and initiatives identified for the Energy goal are sourced from the Albuquerque International Airport Energy Audit Report (Energy Audit Report) prepared by Quest Energy Group in November 2015. The full Energy Audit Report for the Sunport can be found in Section 3 of the Sustainability Supplemental Report of this Airport Master Plan.

A summary of the preliminary sustainability objectives and initiatives is provided in Table 5C. As a reminder, these preliminary objectives and initiatives will be further evaluated later in the SAMP process and are subject to change. Once the goals, objectives, and initiatives are finalized, detailed evaluation of each initiative will be performed along with the identification of KPIs.

<table>
<thead>
<tr>
<th>TABLE 5C</th>
<th>Preliminary Sustainability Objectives and Initiatives</th>
<th>Albuquerque International Sunport</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td><strong>Initiatives</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Goal 1. Expand the Sunport’s existing waste management program to divert more waste from landfills through increased recycling, composting, and procurement policies.</strong></td>
<td>- Expand educational and marketing materials (e.g., signs, public service announcements, etc.) within the terminal to encourage waste reduction and recycling.</td>
<td></td>
</tr>
<tr>
<td>1.1 Expand recycling marketing and promotion efforts within the terminal.</td>
<td>- Coordinate with tenants to educate them on recycling opportunities available to them.</td>
<td></td>
</tr>
<tr>
<td>1.2 Engage tenants and airlines to ensure their involvement in the recycling program.</td>
<td>- As tenant and concessionaire contracts come up for renewal, incorporate incentives to ensure they are participating in recycling efforts.</td>
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</tr>
<tr>
<td>1.3 Collaborate with the City’s Solid Waste Management Department on expanding the Sunport’s recycling program.</td>
<td>- Provide food waste collection bins to separate food waste from normal waste.</td>
<td></td>
</tr>
<tr>
<td>1.4 Explore composting opportunities for food waste from on-site restaurants.</td>
<td>- Donate surplus food to local shelters.</td>
<td></td>
</tr>
<tr>
<td>1.5 Conduct regular (annual/biennial) waste assessments to monitor solid waste and recycling rates.</td>
<td>- Establish a paper conservation program within the Aviation Department.</td>
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<tr>
<td></td>
<td>- Conduct detailed waste composition assessments to identify the most common types and amount of waste collected.</td>
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<tr>
<td>Goal 2. Expand energy efficiency measures and renewable energy opportunities.</td>
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<tr>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Continue to transition to high-efficiency lighting.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2 Incorporate high-efficiency building equipment and HVAC systems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3 Expand on-site solar photovoltaic (PV) systems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Replace indoor and outdoor lighting with LED fixtures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Upgrade lighting control measures in offices, conference rooms, baggage claim and Level 1 of the terminal building.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Optimize daylighting controls in the gate areas.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Optimize building HVAC equipment and control systems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Transition to high efficiency HVAC filters.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Incorporate lighting and air conditioning efficiency measures into the terminal’s Data Center.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Install window film to south and west facing windows on the terminal building to lower solar heat gain and improve occupant comfort.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Expand PV systems to other available parking lots.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Consider PV systems in undeveloped areas of the Sunport.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Convert the rental car facility’s tracking solar thermal system to a tracking PV system.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goal 3. Commit to the betterment of regional air quality by supporting efforts to reduce greenhouse gas emissions from Sunport users and enacting policies to reduce emissions from Aviation Department controlled sources.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Promote the reduction or elimination of idling automobiles in and around the Sunport.</td>
</tr>
<tr>
<td>3.2 Promote purchase of replacement vehicle and ground support equipment powered with low-emission fuels.</td>
</tr>
<tr>
<td>3.3 Create an energy audit program for tenants to identify opportunities for energy use reductions.</td>
</tr>
<tr>
<td>• Post signage in common idle areas (e.g., cell phone lot, terminal curb)</td>
</tr>
<tr>
<td>• Ensure construction activities do not require vehicle idling.</td>
</tr>
<tr>
<td>• Issue notices or fines to vehicle operators who leave vehicles to idle for excessive periods.</td>
</tr>
<tr>
<td>• Purchase, operate and maintain alternatively fueled, electric, and hybrid vehicles.</td>
</tr>
<tr>
<td>• Promote the use of alternatively fueled ground support equipment (GSE), generators, and shuttle buses through future tenant lease agreements.</td>
</tr>
<tr>
<td>• Perform periodic energy audits and implement recommendations.</td>
</tr>
<tr>
<td>• Install carbon-offset kiosks where passengers can purchase offsets for their flight and discover the environmental impact of their flight.</td>
</tr>
<tr>
<td>• Install electric rechargers to allow airlines to buy electric GSE.</td>
</tr>
</tbody>
</table>
### Goal 4. Reduce potable water consumption throughout the Sunport with expanded efficiency measures and reclaimed/grey water use.

| 4.1 Expand fixture replacement to all outdated fixtures. | • Install motion sensors on all sink faucets.  
| 4.2 Improve facility metering to more accurately measure and manage water usage. | • Install waterless or water-efficient urinals.  
| 4.3 Implement both low impact development and green infrastructure techniques to improve stormwater runoff quality and to reduce water use for landscaped areas. | • Install sub-metering for concessionaires, cooling equipment, restrooms, and irrigation on mixed-use meters.  
| | • Convert to reclaimed/grey water for irrigation use.  
| | • Install bio-swales along parking areas to encourage groundwater infiltration of stormwater runoff.  
| | • Convert cool season turf areas to more efficient warm season turf.  
| | • Disconnect unused water meters.  
| | • Install rainwater-harvesting systems for irrigation and non-potable uses.  
| | • Utilize permeable pavement when applicable to promote absorption of stormwater.  

### Goal 5. Promote the utilization and expansion of alternative transportation modes to and from the Sunport.

| 5.1 Expand on-site bicycle facilities for public use and coordinate with the City to connect the terminal to the citywide bicycle trails and paths. | • Promote bicycling to Sunport employees by providing end-of-trip facilities, including employee showers, lockers, and bicycle parking.  
| 5.2 Incentivize employee use of public transit and alternative fuel vehicles. | • Provide priority parking locations to carpools/vanpools and alternatively fueled vehicles.  
| 5.3 Utilize social media and other public outlets and media to promote the use of public transit or cycling to/from the Sunport. | • Promote the City’s carpool matching service to employees and travelers on the Sunport website.  
| 5.4 Promote the Sunport as an expansion destination for the City’s pilot bike share program (BICI). | • Provide subsidized train and/or bus passes to employees and construction workers.  
| | • Install on-site electric vehicle (EV) charging stations.  
| | • Install low-emission refueling station.  

### Goal 6. Incorporate procurement and construction policies to prioritize the use of more sustainable resources.

| 6.1 Coordinate with the City’s Purchasing Division to establish a “Green” Procurement Program. | • Start a Green Procurement Program with emphasis placed on purchasing sustainable and/or locally sourced materials. The program should also require Energy Star certified equipment purchases when practicable.  
| 6.2 Utilize the FAA’s Voluntary Airport Low Emission (VALE) program to transition to low-emission fleet vehicles when practicable. | • Develop and implement a Green Concessions Policy with guidance and standards for minimizing waste, enhancing recycling, generating demand for eco-friendly products, and providing healthier foods for passengers and employees.  
| 6.3 Expand construction policies to include sustainable initiatives. | • Require a U.S. Green Building Council LEED or equivalent building standard for major new construction or renovation activities.  
| | • Expand records to monitor expenses dispersed to locally based vendors and supplies and for materials with recycled content.  

### ALTERNATIVE SUSTAINABILITY SCREENING CRITERIA

In addition to providing the framework for the Sunport’s sustainability program, the sustainability goals may be utilized to screen the applicable airside and landside development project alternatives proposed in this SAMP. Ultimately, it is not the expectation that the most “sustainable” alternative will be selected.
for development on that merit alone. Other considerations must also be accounted for and include meeting FAA design standards, operational safety/security and efficiency, and economic/financing considerations. The sustainability screening tool is simply a supplemental evaluation method to give additional perspective on the options being weighted. The list of alternative sustainability screening criteria is presented in Table 5D.

<table>
<thead>
<tr>
<th>TABLE 5D</th>
<th>Alternative Sustainability Screening Criteria</th>
<th>Albuquerque International Sunport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternatives Screening Criteria</td>
<td>Weight Value (3: Highest Importance – 1: Lowest Importance)</td>
<td></td>
</tr>
<tr>
<td>1. Waste Management and Recycling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Can a significant amount (25% or greater) of waste generated as a result of the project be reused, recycled, or composted?</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2. Energy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Will this project result in a decrease in energy consumption?</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2.2 Can on-site renewable energy generation be incorporated into this project?</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3. Air Quality and Greenhouse Gas Emissions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Will the project contribute towards a reduction in greenhouse gas emissions?</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4. Water Conservation and Water Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Will this project reduce potable water consumption?</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4.2 Will this project reduce the amount of impermeable surfaces on the Sunport?</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4.3 Can rainwater harvesting be incorporated into this project?</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5. Surface Transportation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Does the project provide opportunities for new public/alternative transit to/from the Sunport?</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6. Natural Resource Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1 Can locally sourced materials be utilized for this project?</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6.2 Can renewable materials be utilized for this project?</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Some of the sustainability screening criterions may or may not be applicable depending on the project considered. For example, projects involving the construction of additional airfield pavement or the installation of additional navigational aids will have no impact on enhancing alternative surface transportation modes to/from the Sunport. Each criterion is weighted based upon its relevance according to the results of the sustainability survey summarized in the Sustainability Baseline Assessment chapter. The results of that survey indicated that waste management and recycling, energy efficiency, and water conservation were the most important focus areas, while air quality, natural resource management, and surface transportation were less important focus areas. As such, alternatives that involve measures such as generating on-site renewable energy receive a higher score than alternatives that improve public/alernative transit opportunities. Alternatives are evaluated by adding up the overall sustainability score.

As was previously stated, this sustainability score is intended as a supplemental evaluation method and will not be the only factor considered when selecting projects for inclusion in the recommended SAMP development concept.