

# Greenlee County Airport Master Plan

(2000-2020)



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Chapter 5  
Alternatives Analysis  
June, 2002



Stantec

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**Introduction**

Earlier master planning tasks in Chapter 4, Facility Requirements established that projected demand at Greenlee County Airport is not anticipated to exceed the capacity of existing airside and landside facilities during the 20-year planning window. However, there are improvements recommended for the airport to include a 303-foot runway extension to accommodate 95 percent of the B-II aircraft fleet (see Chapter 3) as well as other improvements associated with FAA design standards compliance and ADOT-recommended facilities for B-II. Further, long-term planning for the airport should be flexible to allow for changing or unanticipated demand. This includes contingency development necessary as a result of the community's ongoing economic development efforts.

This chapter starts with the identification of airport development opportunities and constraints. Then, general development concepts with respect to the regional aviation system are presented and reviewed. Finally, development alternatives for the existing airport are identified and evaluated. All alternatives, to varying degrees, support both recommended improvements and contingency development, as previously outlined in Chapters 3 and 4. The primary contingency development scenario is the construction and operation of a Federal Prison.

The process concludes with the selection of a "preferred alternative," which may include elements from a combination of alternatives. The Planning Advisory Committee (PAC) selects the "preferred alternative," which is subsequently presented to the public and recommended to the County. The preferred alternative represents the development plan which best meets the needs and wishes of the airport and the community it serves.

**Opportunities and Constraints**

The first step in the alternatives analysis process is to identify airport development opportunities and constraints. Opportunities and constraints that have the greatest influence on possible future development for Greenlee County Airport are presented here. Airport opportunities offer flexibility in the alternatives identification process by increasing the possibilities for development. Airport constraints are challenges or limitations to future airport development. While some constraints may limit or prohibit development in certain areas, other constraints may be overcome by responding with mitigation and /or engineering solutions. See Exhibit 5-1.

**Opportunities**

- Undeveloped, underutilized land
- Large apron area
- Adjacent land compatible with existing and future operations
- Infrastructure (i.e water, septic tanks, roadway access) available on north side of airport

## Constraints

- Current airport property boundary to the west and the north confined by State Route 78.
- Utility easements (high pressure gas lines)
- Significant terrain north and along the eastern boundary of the airport
- Willow Creek environmental considerations along eastern boundary of the airport

## Review of General Development Concepts

In advance of identifying and evaluating various Greenlee County Airport development alternatives, a set of general development concepts are reviewed with respect to the regional aviation system. These concepts, summarized here, are typically common to all master planning efforts and discuss the broader options available to the airport sponsor, community and other aviation system interests.

- No Development/No Action
- Move to Other Surrounding Airports - Evaluation of "Displacing Aviation Demand"
- Develop A New Airport - Evaluation of "Relocating Airport"
- Improve the Existing Airport (Scope of this Master Plan & Preferred Concept)

### "No Development"

The "No Development" concept, also referred to as "No Action," is based on the assumption that no additional facilities will be constructed, but the existing airport facilities will continue to be maintained. This alternative is primarily based on the premise that additional capital investment is undesirable and that any additional demand will be accommodated up to maximum capacity of the existing facilities.

The primary advantage is the low cost. However, inadequate facilities could negatively impact an airport's long-term economic viability and contribution to the community and regional airport system. While most of the existing facilities are anticipated to be sufficient at Greenlee County during the planning window, a "No Development" policy could make the airport much less desirable to business traffic and other users. Further, the "No Development" alternative is not consistent with the ultimate goals and objectives of Greenlee County. This alternative was eliminated from further consideration.

### Move to Other Surrounding Airports - Evaluation of "Displacing Aviation Demand"

Existing airports within the Greenlee County area have been examined for their ability to accommodate the airport's forecast demand. The examination included such factors as physical expansion, potential limitations, local growth trends, convenience and political climate. The two closest airports with similar airport services to Greenlee County are Safford Regional Airport, 22 nautical miles west, and Lordsburg Airport in New Mexico, 46 nautical miles southeast. These airports would receive the majority of the displaced aviation demand for facilities. This would release Greenlee County from the financial and administrative responsibility of owning and maintaining an airport.



While this concept may not significantly impact Safford Regional and Lordsburg since Greenlee County projected based aircraft and aviation activity levels are low, these airports have limited resources and any unexpected growth in facility needs could disrupt their ability to accommodate all demand. In addition, recent efforts have been made to reestablish the closed Duncan Airport (located 30 miles south). However, information available on this process suggests that the airport will not be fully operational within the planning period. Thus, displacing Greenlee County Airport's demand to Duncan would not be considered. Further and more importantly, Greenlee County Airport's current location plays an integral part in the regional airport system and serves the local economy. Displacing demand is also not consistent with the ultimate goals and objectives of Greenlee County. For these reasons, this concept was considered undesirable and eliminated from further consideration.

### **Develop A New Airport - Evaluation of "Relocating Airport"**

Development of an airport at a new site is even more difficult than attempting to expand an existing facility. There have been very few new airports developed throughout the U.S. over the last two decades. The time factors associated with developing a new airport nearly prohibits some programs from ever realizing anything beyond conceptual plans since the required land is usually lost to other immediate development needs. Although major expansion programs at the existing Greenlee County Airport are not deemed necessary or probable, even less viable is the development of an airport at a new site.

It is apparent that a new airport would provide a "clean slate" opportunity to develop the airport in the most land use efficient and effective manner while minimizing community impacts with a careful site selection. However, Greenlee County Airport is a well-established facility. The majority of future facility requirements can be accommodated through the planning period and beyond. The capital investment required to build a new airport would be considerable, making a new airport a significant financial burden and potentially impossible to develop in a reasonable timeframe. Therefore, this option was also eliminated.

### **Improve the Existing Airport (Scope of this Master Plan & Preferred Concept)**

As discussed in the previous chapters, the aviation demand for Greenlee County Airport can be accommodated beyond 2020 at the existing site. Improving the existing airport is the preferred concept for the same reasons that the other three concepts were not desirable. Further, the development constraints identified for the existing airport are manageable issues and are relatively insignificant in comparison to issues such as cost of a new airport.

This development concept maintains the integrity of the current investment, serves the current aviation demand, offers an opportunity for continued and functional landside development to accommodate future demand, and avoids displacing demand that could in turn disrupt and overburden the regional airport system. Most importantly, the airport has a cooperative and willing sponsor, which fully supports the future development of the airport.

The "Improve Existing Airport" concept is both the scope of this master planning effort and the overall preferred concept. The next section summarizes the alternatives analysis effort for the existing Greenlee County Airport.

## Alternatives Analysis Methodology

Understanding Greenlee County's "vision" for the Airport is the first step in the alternatives analysis effort. This "vision" evolved from the early identification of airport issues, goals and objectives and the more recent effort that included the identification of facility requirements and the Federal Prison contingency scenario. Concurrently, a set of planning and development guidelines and assumptions were defined based on study input and general planning guidelines. These guidelines and assumptions include:

- Future development will be demand-driven as identified by aviation forecasts and the Federal Prison Contingency scenario.
- Proposed development alternatives will include consideration for all current applicable FAA design standards and airspace regulations.
- Both airside and landside facility elements will be addressed, but presented together on airside development alternatives.
- Development proposed will be presented in terms of airport land use with details provided for major facility projects such as runway extensions and new runways.

Land use designations offer a cohesive presentation of the Development Alternatives and provide a simple overview of the magnitude of change amongst the Alternatives. Further, all key facilities will not exceed capacity during the planning period and, thus, long-term and contingency planning is Greenlee County's primary need. Land use planning serves the long-term planning needs well, while offering flexibility. Facility layouts may shift within their respective land use designations when demand changes. However, land use designations should be defined and distributed by function. The functional distribution should support future airport development through an appropriate balance of safety, efficiency, and flexibility.

Further, the land use categories and layout should be defined in accordance with the goals and objectives for the airport. Consequently, the contingency development is included in this land use development plan. This approach incorporates the County's long-term goals and preliminary development plans for the airport to increase the airport's economic benefit to the community as well as protect its long-term viability. The following presents the Land Use approach taken to include both airside and landside development alternatives.

A total of seven (7) land use categories are defined for Greenlee County Airport and they are as follows:

- Air Operations Area (AOA)/Critical Areas
- Helicopter Operations Area
- Aviation or Non-Aviation Industrial Areas
- General Aviation (GA)
- Terminal Area
- Fixed Based Operator (FBO)
- Federal Prison Area

### ***Air Operations Area (AOA)/Critical Areas***

The air operations area is the portion of the airport designed and used for landing, takeoff, or surface maneuvering of airplanes, and critical areas define the clearing and separation

requirements for the navigational aids and special facilities such as a fuel farm. The AOA dimensions are defined by the FAA geometric design standards as dictated by the airport's classification or airport reference code. As mentioned earlier, Greenlee County Airport is classified as an ARC B-II airport and is anticipated to maintain the same classification through the study's 20-year planning period. However, the Federal Prison contingency scenario includes C-III aircraft.

***Helicopter Operations Area***

The area used or intended to be used by rotorcraft (helicopters). While rotorcraft operations are projected to be less than one percent through the planning period, this area allows the airport flexibility in accommodating rotorcraft loads and operations as the demand occurs. The criteria used are based on FAA Advisory Circular 150/5390-2A, Helipoint Design Standards.

***Aviation or Non-Aviation Industrial Areas***

In support of providing additional future airport revenue, this area is designed to accommodate growing industrial and business-related activities from the mining operations or other economic development efforts.

***General Aviation (GA)***

GA refers to that portion of civil aviation that includes corporate and private operations. It is typically associated with smaller size aircraft. While the existing primary GA area consists of tiedowns, future development may include additional hangars or shades. GA areas support based and transient general aviation aircraft.

***Terminal Area***

The terminal area is the area used or intended to be used for the terminal facility and ancillary functions. It may include a lobby, food service, shops, restrooms, airport management, auto parking, and other support services. While the new 800-square foot terminal building is adequate for the projected demand during the planning period, long-term expansion needs should be considered.

***Fixed Based Operator (FBO)***

A FBO is generally a private firm providing airport services such as fuel sales, aircraft maintenance, aircraft rental, and flight instruction. Although Greenlee County is without a FBO at this time, an area is designated for long-term planning. Some airports of low activity levels similar to Greenlee County use a FBO to provide both airport services and maintenance.

***Federal Prison Area***

This area is designated for the potential construction and operation of a Federal Prison at the airport. The land use is sized to include some or all of the following elements: secured apron areas for prisoner staging activities, prison office space, cargo staging area, access, and other space necessary for Boeing 727 operations.

**Identification of Development Alternatives**

This section identifies the specific development alternatives for the airport. While both airside and landside development is presented, airside is the controlling factor in all physical layouts and drives the landside development locations by function. Consequently, landside development remains in the area generally bounded by SR 78, Runway 7-25, and abandoned Runway 18-36.

## Airside Alternatives

Airside alternatives presented here include development concepts for runways and taxiways. Based on the facility requirements analysis and potential for the Federal Prison scenario becoming a reality, there were four (4) key airside alternatives identified as follows:

1. Extend existing Runway 07-25 to 5,280 feet to accommodate 95% of B-II aircraft operations (approximately an additional 303 feet)
  - A – extension to the east
  - B – extension to the west
2. Construct new Runway 07-25 at 5,280 with full-length taxiway at existing runway location
3. Construct new Runway 18-36 at 8,700 feet on abandoned runway alignment
4. Construct new Runway 03-21 at 8,700 feet

It should be further noted that landside development, such as hangar construction, might drive the need for additional connecting taxiways beyond that shown in the airside alternatives. Such needs are considered inherent in certain proposed development projects.

## Landside Alternatives

For Greenlee County, landside alternatives address development associated with the four primary airside alternatives. General aviation aircraft parking and storage, terminal facilities, FBO, and surface access are examples of landside elements. As previously discussed, Greenlee County's existing landside facilities will not exceed capacity during the master planning period, but are considered in all alternatives for long-term and contingency planning efforts. For example, the airport has adequate tiedowns to meet projected based and transient aircraft demand. However, future based or transient aircraft demand may increase beyond projections or operators may prefer aircraft hangars to tiedowns. As a result, additional hangars or t-shades may be developed in the GA land use area.

### Alternative 1 – Extend Runway 07-25 to 5,280 feet

#### **Airside**

Alternative 1 presents minimal airfield development. This alternative is primarily based on the premise that the airfield will continue to accommodate aircraft types similar to today's traffic and that activity levels will generally remain low. A 303-foot runway extension is proposed on existing Runway 7-25 to bring runway length to 5,280 feet to accommodate 95 percent of the B-II aircraft fleet mix. However, this alternative is presented with two options (see Exhibit 5-2) – extend Runway 25 end (Alternative 1A) or extend Runway 7 end (Alternative 1B).

**Landside**

Similar to all four development alternatives, landside development (business, GA, terminal, helicopter and FBO) is proposed to remain on the north side of Runway 7-25. The existing GA apron area remains with additional GA development (beyond 2020) proposed west of the FBO and helicopter operations area. GA land use totals approximately eight (8) acres. The Terminal land use allows for expansion and the adjacent FBO land use is designated for long-term planning. These two land uses total less than two (2) acres, and the helicopter operations area proposed just west of the FBO land use totals one (1) acre. Although this alternative does not include a C-III aircraft runway to accommodate the B727 in the Federal Prison scenario as shown in Alternatives 3 and 4, a Federal Prison land use is still presented on the landside. This approach assumes that the Federal Prison will transport prisoners and staff via ground vehicles and smaller aircraft.

Due to significant drops in terrain along the east and south portions of the airport, no specific land use development is proposed. Further, all proposed development has adequate space on the north side of Runway 7-25 where existing utility infrastructure and access is available. Therefore, several areas are identified as "open area reserved" and left blank/white on all four alternatives.

**Alternative 2 – Construct New Runway 07-25 at 5,280 feet with Full-Length Taxiway at Existing Runway Location****Airside**

The basis of this alternative is to add a parallel taxiway to the airfield. However, the runway-to-landside facility dimensions do not provide adequate area for a full-length parallel taxiway. Therefore, this alternative proposes to use existing Runway 7-25 as the parallel taxiway with a new Runway 7-25 constructed to the south to meet separation standards (see Exhibit 5-3). The runway-taxiway system would total 5,280 feet in length for B-II aircraft with associated airfield lighting and navigational improvements, similar to Alternative 1.

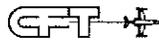
The AOA land use in this alternative increases from the estimated 129 acres in Alternative 1 to 189 acres for Alternative 2.

**Landside**

This alternative is similar to the landside development in Alternative 1, but provides slightly larger land use areas for GA, FBO, and Helicopter Operations with the shift of the airfield to the south.

**Alternative 3 – Construct New Runway 18-36 at 8,700 feet on Abandoned Runway Alignment****Airside**

Alternative 3, like Alternative 4, assumes the full realization of the Federal Prison contingency scenario – regular B-727 operations. While primary Runway 7-25 remains for smaller aircraft, a secondary runway is proposed to accommodate the large aircraft operations (see Exhibit 5-4). This alternative utilizes the abandoned north-south runway (Runway 18-36) for the secondary runway alignment. However, the runway length



extends to a total of 8,700 feet to accommodate B-727 operations, bringing the AOA land use to an estimated 369 acres. The new runway includes a partial parallel taxiway. The AOA includes a runway visibility zone (RVZ). A RVZ is required for two intersecting runways so pilots can avoid operational conflicts, especially at uncontrolled airports.

#### ***Landside***

As shown, the RVZ cuts across a significant portion of the existing landside development area. As shown, this impact is reflected on the Federal Prison and Industrial land use areas. Further, it may be necessary to reduce the Industrial land use area to accommodate future Federal Prison land use needs.

While much of the Terminal, FBO, Helicopter, and "ultimate" GA land use development areas remain similar in size to Alternatives 2 and 3, other facilities and a portion of the GA apron fall inside of the RVZ. This implies that these facilities be removed or relocated. Although the GA apron area may lose tiedowns, the apron area inside the RVZ may remain for aircraft circulation.

### **Alternative 4 – Construct New Runway 3-21 at 8, 700 feet**

#### ***Airside***

The concept of Alternative 4 is nearly identical to Alternative 3. However, the secondary runway/partial parallel taxiway system for B-727 operations is aligned as Runway 3-21 (see Exhibit 5-5). This also changes the RVZ and its associated impact on the landside area. The AOA land use for this alternative totals 359 acres – a minimal change over Alternative 3.

#### ***Landside***

GA, FBO, Terminal, and Helicopter land use areas are similar in size to Alternative 3. However, Alternative 4 identifies a larger area for Federal Prison development and a smaller area for Industrial development – the reverse of Alternative 3. However, these land use designations are adjacent and boundaries can be modified to expand the land use development area based on the growing needs of a tenant.

## **Alternatives Evaluation**

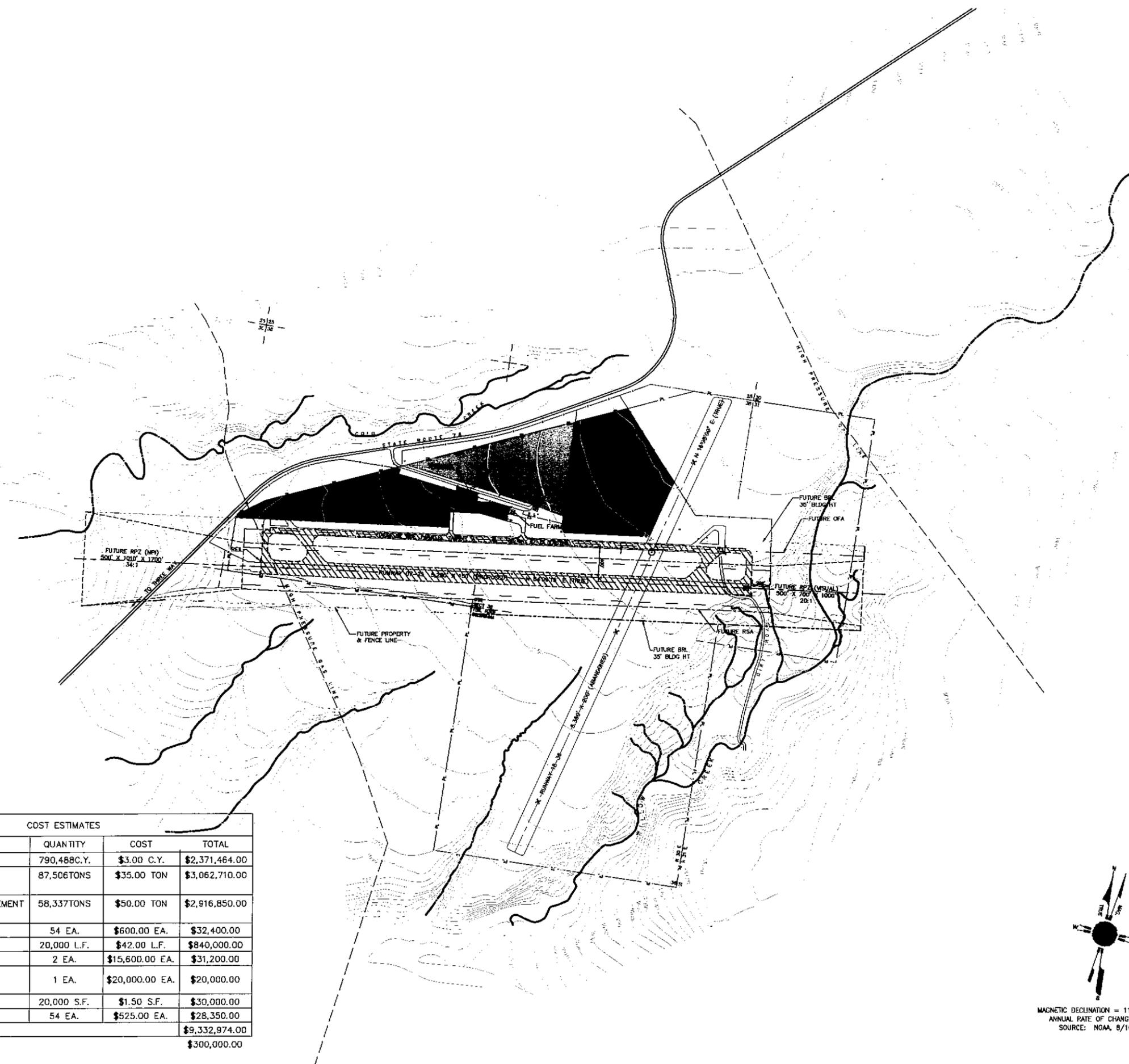
The preceding development alternatives are evaluated by summarizing the advantages and disadvantages of each. This effort represents a preliminary evaluation which generally addresses four categories: cost, function/operation, environmental considerations, and overall public acceptance. These categories are described here with reference to some or all of them in the preliminary evaluation that follows. However, further evaluation was conducted with the Planning Advisory Committee (PAC) during the October 2001 PAC meeting/ work session. At that time, a preferred alternative was selected. Appendix C includes a worksheet used by PAC members to assess their own preferences and to facilitate the discussion and selection process. Following the preferred alternative selection, proposed development projects were reviewed in more detail, refined and incorporated into a capital improvement program – presented in Chapter 8.





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LAND USE TABLE	
LAND USE	KEY
AIRPORT OPERATIONS AREA	189 ACRES
HELICOPTER OPERATIONS AREA	[Pattern]
AVIATION / NON-AVIATION INDUSTRIAL AREA	[Pattern]
GENERAL AVIATION	[Pattern]
TERMINAL AREA	[Pattern]
FBO	[Pattern]
FEDERAL PRISON AREA	[Pattern]
OPEN AREA RESERVED	[Pattern]

AIRFIELD IMPROVEMENTS	
ALTERNATES	KEY
NEW RUNWAY 7-25	[Pattern]

File Name: airside-df2.dwg R 10/01  
 Den. Chd. Dgn. MM.DOTY

Permit-Seal

Client/Project  
 GREENLEE COUNTY AIRPORT  
 CLIFTON / MORENCI, ARIZONA  
 GREENLEE COUNTY AIRPORT  
 MASTER PLAN

Title  
 AIRSIDE ALTERNATIVE 2  
 CONSTRUCT NEW RUNWAY 7-25 WITH A FULL  
 LENGTH TAXIWAY AT EXISTING RUNWAY

Project No. 81400902 Scale 1"=500'

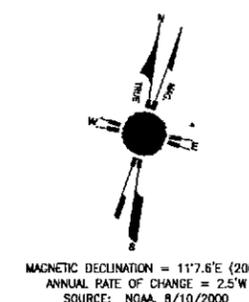
Drawing No. Sheet

5-3

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COST ESTIMATES			
DESCRIPTION	QUANTITY	COST	TOTAL
FILL	790,488 C.Y.	\$3.00 C.Y.	\$2,371,464.00
AGGREGATE BASE COURSE 12" (ABC) (P209)	87,506 TONS	\$35.00 TON	\$3,062,710.00
ASPHALTIC CONCRETE PAVEMENT 8" (AC)(P401)	58,337 TONS	\$50.00 TON	\$2,916,850.00
NEW MIRL	54 EA.	\$600.00 EA.	\$32,400.00
CONDUIT	20,000 L.F.	\$42.00 L.F.	\$840,000.00
PAPI LIGHT SYSTEM	2 EA.	\$15,600.00 EA.	\$31,200.00
AIRFIELD LIGHT SYSTEM DEMOLITION AND SALVAGE	1 EA.	\$20,000.00 EA.	\$20,000.00
MARKINGS	20,000 S.F.	\$1.50 S.F.	\$30,000.00
TAXIWAY EDGE LIGHTS	54 EA.	\$525.00 EA.	\$28,350.00
<b>GRAND TOTAL</b>			<b>\$9,332,974.00</b>
LAND ACQUISITION			\$300,000.00

\*2001 Dollars



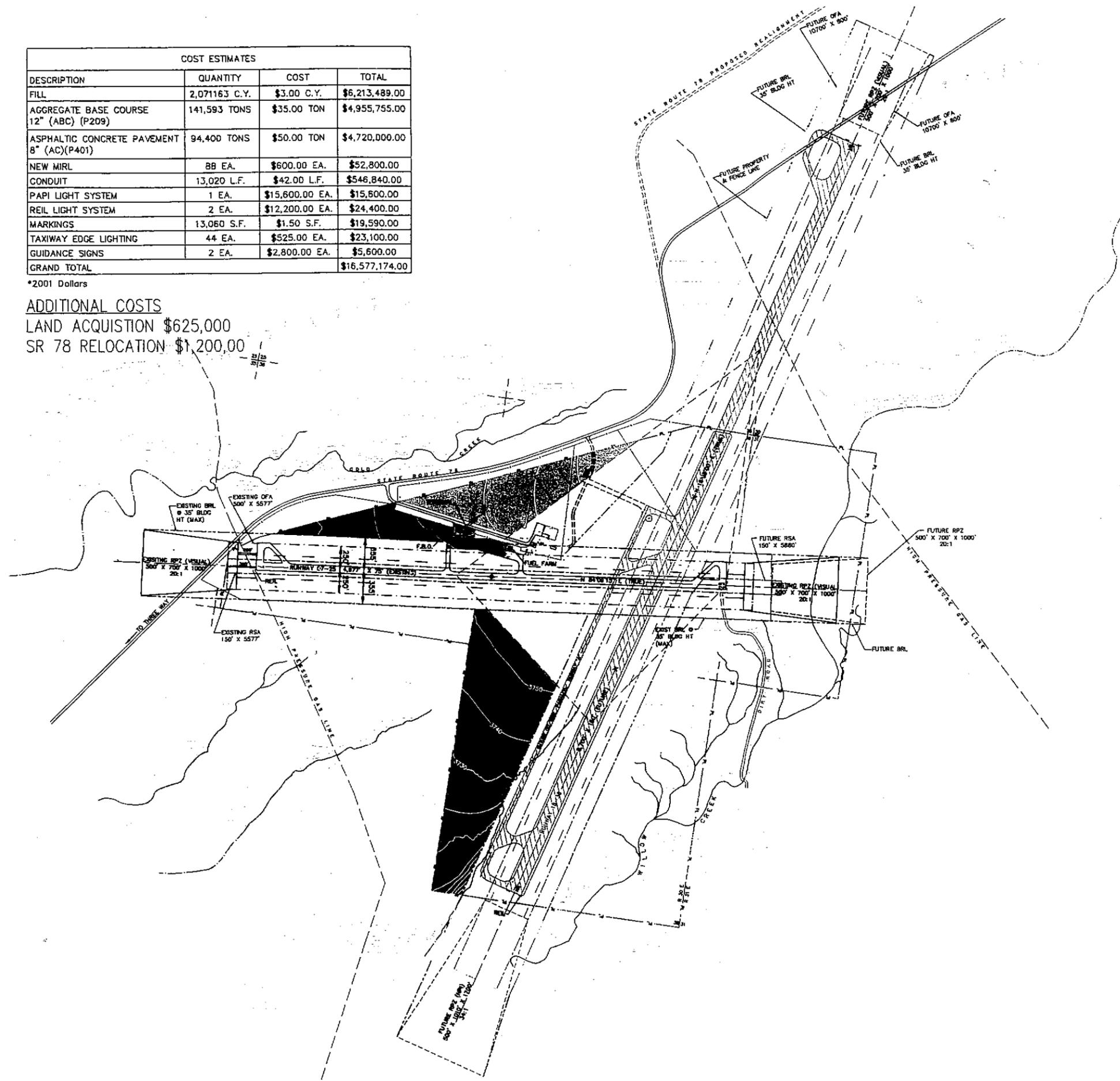
COST ESTIMATES			
DESCRIPTION	QUANTITY	COST	TOTAL
FILL	2,071,163 C.Y.	\$3.00 C.Y.	\$6,213,489.00
AGGREGATE BASE COURSE 12" (ABC) (P209)	141,593 TONS	\$35.00 TON	\$4,955,755.00
ASPHALTIC CONCRETE PAVEMENT 8" (AC)(P401)	94,400 TONS	\$50.00 TON	\$4,720,000.00
NEW MIRL	88 EA.	\$600.00 EA.	\$52,800.00
CONDUIT	13,020 L.F.	\$42.00 L.F.	\$546,840.00
PAPI LIGHT SYSTEM	1 EA.	\$15,600.00 EA.	\$15,600.00
REIL LIGHT SYSTEM	2 EA.	\$12,200.00 EA.	\$24,400.00
MARKINGS	13,060 S.F.	\$1.50 S.F.	\$19,590.00
TAXIWAY EDGE LIGHTING	44 EA.	\$525.00 EA.	\$23,100.00
GUIDANCE SIGNS	2 EA.	\$2,800.00 EA.	\$5,600.00
<b>GRAND TOTAL</b>			<b>\$16,577,174.00</b>

\*2001 Dollars

**ADDITIONAL COSTS**

LAND ACQUISITION \$625,000

SR 78 RELOCATION \$1,200,000



Stantec Consulting Inc.  
6211 South 48th Street  
Phoenix AZ U.S.A.  
85044  
Tel. 602.438.2200  
Fax. 602.431.9562  
www.stantec.com



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LAND USE TABLE	
LAND USE	KEY
AIRPORT OPERATIONS AREA	369 ACRES
HELICOPTER OPERATIONS AREA	[Pattern]
AVIATION / NON-AVIATION INDUSTRIAL AREA	[Pattern]
GENERAL AVIATION	[Pattern]
TERMINAL AREA	[Pattern]
FBO	[Pattern]
FEDERAL PRISON AREA	[Pattern]
OPEN AREA RESERVED	[Pattern]

AIRFIELD IMPROVEMENTS	
ALTERNATES	KEY
NEW RUNWAY 18-36	[Pattern]

File Name: airside-alt3.dwg  
Des. Chd. Dgn. WALDO.YY  
Permit-Seal

Client/Project  
GREENLEE COUNTY AIRPORT  
CLIFTON / MORENCI, AIRZONA  
GREENLEE COUNTY AIRPORT  
MASTER PLAN  
Title  
AIRSIDE ALTERNATIVE 3  
DEVELOPMENT OF NEW RUNWAY ON THE  
ABANDONED RUNWAY 18-36 ALIGNMENT

Project No. 81400902 Scale 1"=500'  
Drawing No. 5-4 Sheet 4 of 5



EX: 10/20/00 Greenlee County Airport Master Plan/Design and Construction 2000/10/20/00-03.dwg  
 2002-01-10 09:27:04 BR: hester@stn.com



- **Cost:** Although all engineering costs are estimates, they offer an element of comparison in terms of magnitude. Costs for the Greenlee County Airport development alternatives<sup>1</sup> were prepared to include earthwork, grading, quantities, and relative engineering costs. Pertinent project development line items, unit costs, quantities, and total costs are reflected on each development alternative (Exhibits 5-2 through 5-5). Cost estimates for land acquisition and SR 78 relocation are included on the exhibits. It should be noted that the cost estimates presented on the exhibits actually represent revised costs that were prepared following input from the October 2001 PAC meeting.
- **Function/operation:** This category primarily addresses the functional distribution of land uses or the operational feasibility of the configuration. This is typically evaluated in terms of airport design standards, efficiency of airport operations on the airfield, flexibility of landside development, ability of plan to grow to meet the airport's goals and objectives, ability of plan to meet airport user needs, and safety and security of operations.
- **Environmental Considerations:** For Greenlee County, the most significant environmental considerations include development of potentially undisturbed land for airfield development (i.e. new runway or runway extensions), land acquisition, relocation of SR 78, potential impacts residential development and potential impacts to Willow Creek. Additional discussion of environmental issues surrounding the airport are included in Chapter 6.
- **Overall Public Acceptance:** This category is the most subjective and is sensitive to the specific community issues, goals, and objectives as well as the political climate.

Table 5-1 provides an overview of each alternative's land use acreages and cost for reference. A table similar to this was provided to the PAC at the October 2001 meeting.

## Alternative 1 – Extend Runway 07-25 to 5,280

### ***Alternative 1A –Extension to the East - Advantages***

The primary advantage of Alternative 1A is the low cost (estimated \$575,000) and no additional land acquisition associated with the development is necessarily required. Although the approach surface extends beyond airport property, this small and outermost portion of the approach could be protected with an easement. The extension on one end versus both minimizes disruption to operations and keeps construction costs down. The runway extension would serve to accommodate a wider range of B-II aircraft. Similar to the other alternatives, all landside development areas generally have direct access to State Route 78.

### ***Alternative 1A - Extension to the East - Disadvantages***

Significant sloping terrain to the east requires excessive fill to meet FAA design standards. Willow Creek is located to the east so potential environmental impacts associated with the extension and the fill would require mitigation. This alternative does not include a parallel taxiway so all aircraft are required to back-taxi on the runway similar to current airfield taxi operations. Large C-III aircraft operations would not be accommodated.

<sup>1</sup> Note: Costs are presented in the exhibits and are approximate based on 2001 dollars.

### **Alternative 1B - Extension to the West - Advantages**

Like Alternative 1A, Alternative 1B also minimizes disruption to airfield operations during construction and improves the airport's ability to accommodate B-II aircraft. However, this alternative avoids fill on the east end where Willow Creek is located.

### **Alternative 1B- Extension to the West - Disadvantages**

This alternative requires significantly more fill than Alternative 1A bringing the total cost of 1B to an estimated \$4.9 million or eight times that of Alternative 1A. This alternative requires land acquisition estimated to cost up to \$125,000, and the relocation of a portion of SR 78 to the west at an estimated cost of \$600,000. The relocation of SR78 is an undesirable option in terms of public acceptance. Current back-taxi operations on the runway would continue and large C-III aircraft operations would not be accommodated.

## **Alternative 2 - Construct New Runway 07-25 at 5,280 feet with a Full-Length Taxiway at Existing Runway Location**

### **Advantages**

A parallel taxiway improves efficiency and safety of airfield operations. This alternative, which proposes a 5,280-foot runway/taxiway system, eliminates back-taxiing on the runway at a lower cost than Alternative 1B. While delays are not an issue for the airport at this time, long-term aviation demand may suggest that a parallel taxiway is needed for efficiency and safety. Further, landside development is not impacted by a RVZ with this one-runway alternative. Portions of the runway protection zones could be protected by avigation easements in lieu of fee simple acquisitions.

### **Disadvantages**

The primary disadvantage is the high cost (estimated \$8.9 million) and perceived low and slow return on investment since the airport has no significant revenue source on-airport. Further, land acquisition would be required if avigation easements were not feasible. Associated environmental studies would also be required and more undisturbed land would be impacted. Large C-III aircraft operations would not be accommodated in this alternative.

## **Alternative 3 – Construct New Runway 18-36 at 8,700 feet on Abandoned Runway Alignment**

### **Advantages**

Alternative 3 accommodates the Federal Prison contingency scenario, an economic development effort that the County has continued to pursue with the Federal Prison System. Although existing Runway 7-25 provides greater than 95 percent wind coverage, the new secondary runway would provide crosswind coverage to the small aircraft operators when needed. Combined wind coverage would be 98.78 percent at 12 mph. This development represents an aggressive economic development effort by the County to bring the Federal Prison to the airport. Although costs are significant for the proposed 8700-foot runway, Alternative 3's total project costs are \$2.7 million lower than Alternative 4. Further, this contingency could be phased depending on the realization of the contingency and funding sources related to the contingency.

**Disadvantages**

Alternative 3 requires a capital investment in airport-related facilities of nearly \$16.6 million. In addition, land acquisition costs are estimated to total approximately \$625,000 (including appraisals, land costs, and associated environmental studies), and the required relocation of SR 78 is estimated to reach more than \$1.2 million for a total of \$18.4 million for this alternative. This alternative also requires a significant level of construction and requires a comprehensive environmental assessment. Residential development to the south is located approximately 1.2 miles from the proposed south end of Runway 18-36.

**Alternative 4 – Construct New Runway 3-21 at 8,700 feet****Advantages**

This alternative accommodates the Federal Prison contingency scenario, like Alternative 3, but does not require the relocation of SR 78. In comparison to Alternative 3's wind coverage, combined wind coverage for Runway 7-25 and proposed Runway 3-21 would be an insignificant difference. Landside development presents sufficient development space for all functions and/or flexibility to change to accommodate growing needs of a specific airport user/tenant.

**Disadvantages**

This alternative is anticipated to require the highest capital investment (\$2.7 million more than Alternative 3) in airport-related facilities totaling nearly \$20.1 million plus \$1 million for land acquisition – including appraisals, actual land costs, and associated environmental studies. This project requires more than three million cubic yards of fill compared to the two million required in Alternative 3's Runway 18-36 alignment.

**Preferred Airport Development**

The next step in this process included the presentation of the development alternatives to the Planning Advisory Committee (PAC) for discussion and detailed evaluation. The process concluded with the selection and refinement of a preferred alternative, which is illustrated in Exhibit 5-6, and presented in further detail on the airport layout plan (Chapter 7) and in the capital improvement program (Chapter 8).

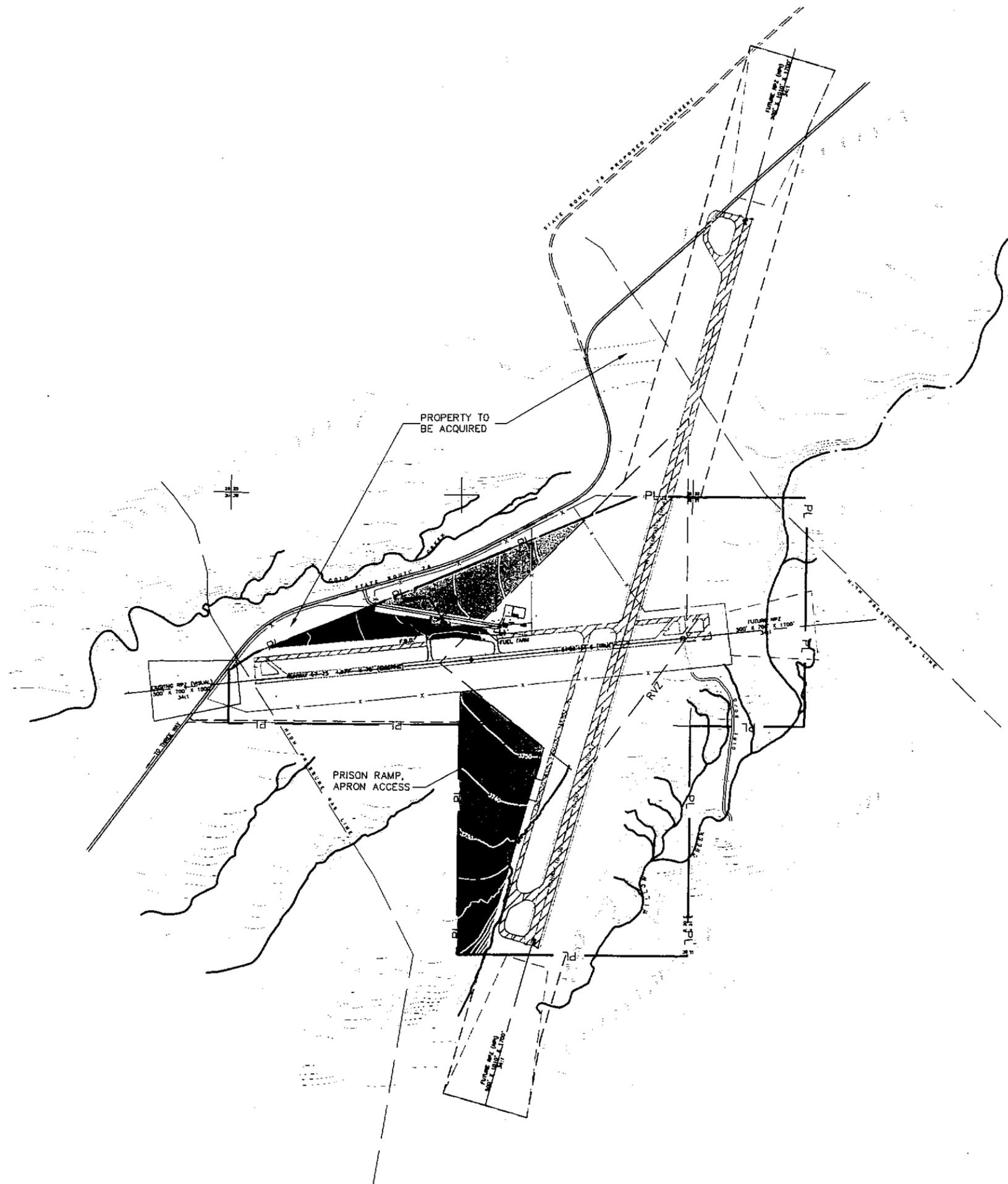
The preferred alternative represents a combination of two alternatives with modifications – Alternatives 1A and 3. The following outlines the proposed 20-year planning period and contingency development selected:

- Extend Runway 7-25 to the east for a total length of 5,280 feet to accommodate 95 percent of the small aircraft fleet and some large B-II aircraft
- Construct a partial parallel taxiway system to Runway 7-25 to include taxiways which connect to the apron area. As a result, landside development will be reduced to protect taxiway object free area and existing Part 77 transitional airspace surfaces. However, costs for a parallel taxiway system are reduced by eliminating the need to relocate Runway 7-25 to the south.
- On an as-needed basis, construct Contingency Runway 18-36, including land acquisition and relocation of SR78, to accommodate the possible Federal Prison scenario or other economic development scenario. Development of the contingency runway should be keyed or phased to the actual realization of the contingency and its associated funding.

- Construct Contingency roadway access to south side of airport in support of proposed contingency facility development.
- Construct Federal Prison facility (or other economic development facilities) and associated infrastructure on the south side of the airport (west of Runway 18-36) to accommodate the possible Federal Prison scenario or other economic development scenario. This development was moved to the south side of the airport to separate this non-aviation use from the aviation activity near the terminal area since its security and other unknown needs may be better accommodated.
- On an as-needed basis, construct additional facilities to meet demand for general aviation hangar parking and storage, terminal expansion, helicopter operations area, and FBO. Based on projected aviation demand, these facilities are not proposed in the 20-year capital improvement program, but are identified for long-term planning purposes by land use development category.

This preferred alternative represents the PAC's recommendation to the County for development in the 20-year planning period and long-term/contingency planning.

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LAND USE TABLE	
LAND USE	KEY
AIRFIELD OPERATIONS AREA	369 ACRES
HELICOPTER OPERATIONS AREA	[Hatched pattern]
AVIATION / NON-AVIATION INDUSTRIAL AREA	[Stippled pattern]
GENERAL AVIATION	[Hatched pattern]
TERMINAL AREA	[Stippled pattern]
FBO	[Hatched pattern]
FEDERAL PRISON AREA	[Stippled pattern]
OPEN AREA RESERVED	[White box]

AIRFIELD IMPROVEMENTS	
	KEY
TAXIWAY & RUNWAY 18-36	[Diagonal hatching]
TAXIWAY & RUNWAY 7-25	[Diagonal hatching]

**GENERAL NOTES**

1. NORTH AMERICAN DATUM (NAD 83) USED FOR ALL LAT/LONG IDENTIFICATIONS.



Stantec Consulting Inc.  
8211 South 48th Street  
Phoenix AZ U.S.A.  
85044  
Tel. 602.438.2200  
Fax. 602.431.9562  
www.stantec.com

**Stantec**

Revision	By	Appd.	Date
2. MASTER PLAN AND ALP UPDATE	LT	PT	02.15.01
1. MASTER PLAN AND ALP UPDATE	AM	WR	00.06.26

File Name: 7-Gre-on-aplu.dwg RC RC 00.06.26  
Dwn. Dsgn. Dsgn. Date

Title  
**PREFERRED ALTERNATE  
GREENLEE COUNTY AIRPORT  
CLIFTON/MORENCI, ARIZONA**

Project No. 81451310 Scale 0 600 900 1200  
Drawing No. Sheet 5 of 6 Revision



**Table 5-1  
Land Use Area, Land Acquisition, and Cost for Alternatives**

Land Use	Alternatives (Estimated Acres)			
	1-A/B	2	3	4
AOA	129	189	369	359
Helicopter	1	1.5	1	1
Industrial	20	20	12	7
GA	8	19	10	10
Terminal	1	1	1	1
FBO	½	1	½	½
Federal Prison	23	28	7	15
Land Acquisition (1)	5-10*	15-24*	50	80
Cost (millions) (2)	\$0.6 / \$1.5	\$9.6	\$18.4	\$21.1

\*Avigation Easements may be sufficient for part of acquisition

(1) Land cost calculated at \$12,500 inclusive of land cost, administrative, appraisal and legal expenses as well as appreciation in land value.

(2) Total cost of alternative inclusive of land and improvements.