



AIRPORT MASTER PLAN

Working Paper No. 3

BISBEE DOUGLAS INTERNATIONAL AIRPORT

DOUGLAS, ARIZONA | APRIL 2014



ARMSTRONG

Chapter Four Alternatives



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4.1 INTRODUCTION

This chapter contains the description and evaluation of various development alternatives for the Bisbee Douglas International Airport. The basis for the airside and landside alternatives was derived from the recommendations contained in the Facility Requirements chapter.

According to FAA AC 150/5070-6B, *Airport Master Plans*, each identified alternative's technical feasibility, economic and fiscal soundness, and aeronautical utility should be examined. Ultimately, development alternatives will only be considered that meet the County's planning needs and those that the FAA or County will be realistically able to implement.

4.2 DEVELOPMENT CONCEPTS

The overall objective of the alternatives analysis is to 1) review the facility requirements that have been determined necessary to meet FAA design standards, and to safely and efficiently accommodate aviation demand over the planning period and 2) evaluate the best way to implement the facility requirements as presented in Chapter 3.

A range of airside and landside alternatives are typically created and evaluated in both a quantitative and qualitative manner for implementing the different facility requirements. In other instances where less robust development is anticipated, the selection of a preferred development plan can result from a more qualitative and logical evaluation of the various options resulting from discussions with the sponsor, Technical Advisory Committee (TAC) and input from the public.

The following best planning tenets, as recommended in FAA AC 150/5070-6B, *Airport Master Plans*, apply to the evaluation of the development alternatives:

- Conforms to best practices for safety and security.
- Conforms to the intent of FAA and other appropriate design standards.
- Provides for the "highest and best" land use on and off airport.
- Allows for forecast growth throughout the planning period.
- Provides for growth beyond the planning horizon.
- Provides balance between developmental elements.
- Provides flexibility to adjust to unforeseen changes.
- Conforms to the airport owner's strategic vision.
- Conforms to relevant local, regional, and state transportation plans.
- Is technically and financially feasible.
- Is socially and politically feasible.
- Satisfies user's needs.

After evaluating the demonstrated needs in a qualitative manner, the future development needs and recommendations are presented herein for implementing the facility requirements described in Chapter 3.

A combination of effective airside and landside planning is essential to the successful development of the airport. Airside components for the most part include areas of the airfield

where aircraft takeoff or land, taxi, and park. Landside components generally consist of a system of buildings, fueling facilities, roadways, and vehicle parking areas.

An alternative for the County involving both the airside and landside portions of the airport is a scenario where no improvements, alterations, or enhancements are made to the airfield at all, i.e. the airport remains in its current state with the existing airfield configuration and existing facilities. This would be considered a no-action alternative for development at the airport. However, over the last decade, the FAA and County have made a continuous investment in the airport infrastructure. To preserve the infrastructure and to ensure that additional federal funding is received, the County has an obligation to maintain the airport and make any necessary improvements. For example, there are three taxiways that exceed the recommended TDG 1 design standards that should be reconstructed. The pavement conditions of the taxiways vary from good to poor, but each will require rehabilitation and/or reconstruction in the planning period. Finally, the intersection of the end of Runway 17 and Runway 8-26 should be addressed to enhance safety on the airfield.

4.3 AIRSIDE DEVELOPMENT

Airside development is typically the most critical and physically dominant feature of airport development and therefore a focal point of an airport's planning process. This section discusses the airside development alternatives and addresses the needs of the existing and future aviation demand identified in Chapter 3, Facility Requirements.

Alternative Considerations – Airside Development

- Maintain FAA design standards for RDC C-I and B-I
- Extension of Runway 17-35 by 380 feet
- Resolve Runway 17 threshold and Runway 8-26 intersection issue
- Maintain FAA design standards for TDG 1
- Identify areas to expand the existing aircraft parking apron
- Addition of parallel taxiways and bypass taxiways
- Remove aligned taxiway serving the approach end of Runway 35

4.3.1 RUNWAY DEVELOPMENT

As previously identified in Table 3-6, a 380-foot extension to Runway 17-35 is recommended in the planning period. If implemented, the extension would ultimately make the runway 6,810 feet long.

Three alternatives were initially evaluated (although one was later dismissed) when considering the proposed lengthening to Runway 17-35. The two leading alternatives are described below.

- Alternative 1: No-action
- Alternative 2: Extend Runway 17 threshold by 380 feet

Alternative 1: The no-action alternative represents a scenario where Runway 17 is not extended at all and remains in its current configuration.

Alternative 2: The physical location of the Runway 17 threshold is located at the edge of pavement on Runway 8-26, thereby creating a 90 degree intersection. In order to enhance the overall safety on both runways, it is recommended that Runway 17-35 be extended. In addition, the existing location of the Runway 17 threshold also prevents the construction of a full parallel taxiway to Runway 17-35.

Alternative 2 depicts the Runway 17 end extended north to accommodate a future parallel taxiway for both Runway 17-35 and Runway 8-26. Given the geometry of the runway intersection, FAA AC 150/5300-13A, *Airport Design*, recommends that the minimum distance the pavement would need to be extended is equal to the required runway centerline to taxiway centerline separation plus half the taxiway width. With an RDC of B-I for Runway 8-26, the required minimum distance would equal 237.5 feet (225-foot separation for a RDC of B-I and half of the 25-foot taxiway width for a TDG 1 (12.5 feet)). Thus, by extending Runway 17 to the north by the entire 380 feet needed, an aircraft will be able to taxi to the end of Runway 17 and also remain outside of the Runway 8-26 RSA, OFA, and 14 CFR Part 77 primary surface.

Consideration was also given to a third alternative, which involved shifting the Runway 17 threshold far enough south so that there would be an adequate separation between the Runway 17 threshold and Runway 8-26. However, shifting Runway 17-35 south the required distance needed to remain outside of the existing Runway 8-26 safety area and the future Runway 8-26 parallel taxiway safety area, in addition to adding the recommended runway length of 380 feet to the end of Runway 35, would result in the new extended RSA and OFA extending across Highway 191. Runway 8-26 would also remain in the RPZ of Runway 17. Therefore, this potential alternative was dismissed from further consideration.

Between the alternatives considered, Alternative 2 is recommended because it addresses the demonstrated needs of the airport for the planning period by enhancing airfield safety and it is considered to be the most reasonable development alternative. Alternative 2 is illustrated on **Exhibit C**.

4.3.2 TAXIWAY DEVELOPMENT

Taxiway A presently serves the three most northern aircraft storage hangars on the airport. The taxiway is 75 feet wide and exceeds the recommended design standards for a TDG 1. Given the overall condition of the pavement and the excess pavement width, it is recommended that Taxiway A be reconstructed to meet TDG 1 design standards. The taxiway should also be reconfigured (as needed) to provide access to either the existing hangars if they are refurbished, or newly constructed hangars as the demand for them increases.

Taxiway A-1 should be abandoned (removed if possible) because its location and condition is inconsistent with typical airfield configurations. The configuration of Taxiway A-1 was practical when additional crosswind runways were active at the airport; however, with many of the old runways now gone, the configuration of Taxiway A-1 does not meet current FAA design standards.

Taxiway A-2 was constructed in 2013 to meet TDG 1 design standards. No modifications to this taxiway are recommended at this time beyond normal pavement maintenance.

Taxiway A-3 is located on an area of the airfield that provides efficient access from Runway 17-35 to the landside facilities. This taxiway should remain in its current location for the planning period. Although the taxiway is 35 feet wide and is presently in good condition, once the pavement reaches the end of its useful life, it should be reconstructed to a width of 25 feet to meet TDG 1 design standards.

Runway 17-35 is not served by a full length parallel taxiway. Taxiway A-4 is a partial parallel taxiway to Runway 17-35 and is located 500 feet from the runway centerline. Taxiway A-4 is also 35 feet wide. This runway to taxiway distance exceeds the required separation of 300 feet based on the RDC of C-I. As presented in Chapter 1, Taxiway A-4 is in fair condition and will need some level of rehabilitation or reconstruction in the planning period. It is recommended that the taxiway be reconstructed (as needed) to meet RDC C-I runway centerline to taxiway centerline separation design standards and to a width of 25 feet meeting TDG 1 design standards (shown on **Exhibit C**).

Runway 8-26 could benefit from the construction of bypass taxiways at both runway ends. With bypass taxiways at both runway ends, construction of a full parallel to Runway 8-26 could be done later in the planning period, if needed. Bypass taxiways and a parallel taxiway for Runway 8-26 would be constructed to meet RDC B-I and TDG 1 design standards.

4.3.3 AIRCRAFT APRON

Based on the recommendations from the Chapter 3, Facility Requirements, the existing aircraft apron is considered adequate for the planning period. As discussed in Chapter 3, it is assumed that beyond 2028 additional apron may be needed that presently cannot be accurately predicted because of unanticipated growth or other circumstances. The County should monitor the utilization of the apron and make adjustments in the apron size as needed throughout the planning period.

As presented in Chapter 1, Inventory, portions of the apron are in poor condition and will require either rehabilitation or reconstruction during the planning period. Alternative locations for adding additional apron are presented (for planning purposes only) to demonstrate where additional apron could be constructed if justified through a planning effort. New aircraft tie-down locations, including aircraft parking for transient aircraft are depicted on **Exhibit D**.

4.3.4 INSTRUMENT APPROACH DEVELOPMENT

As previously described in Chapter 1, the Airport currently has non-precision, GPS and VOR/DME instrument approach procedures in place for Runway 17, and it is recommended that these approaches be maintained in the future. The existing approach procedures are considered adequate for the type of aircraft operations anticipated to occur at the airport over the planning period. However, it was suggested that the development of a GPS approach with vertical guidance, such as a Localizer Performance with Vertical guidance (LPV) with 1-mile visibility minimums, be added in the future for Runway 35. A GPS LPV approach would provide enhanced safety and utility during hours of darkness and adverse weather conditions.

The costs associated with adding such an approach are considered minimal, and are primarily related to the completion of an aeronautical survey of the airport and its surrounding areas to

verify the height and location of any obstructions. If any critical obstructions were found they would need to be mitigated.

4.3.5 AIRFIELD LIGHTING AND SIGNAGE

The existing taxiway lighting on Taxiway A-2 is base mounted with conduit Medium Intensity Taxiway Lights (MITL) and was installed in 2013. Taxiway A-3 and portions of Taxiway A also have direct burial MITL; the installation dates of these lights are not known. The remaining existing taxiways are all unlit as discussed in Chapter 1. There are two alternatives being considered for the future lighting/marketing of airfield taxiways. The first alternative consists of installing base mounted with conduit MITL along any new taxiways. The options for taxiway edge light fixtures include either incandescent bulbs or light emitting diodes (LEDs). The second alternative includes installing retro-reflectors along any new taxiways. This method of marking is inexpensive and requires little in the way of construction or maintenance. However, the downside is retro-reflectors are not as easily seen by pilots as MITL are. It is recommended that any new taxiway have MITL installed.

To improve the utility and reliability of Runway 8-26, it is recommended that Medium Intensity Runway Lights (MIRL) be installed. The type of fixture (incandescent or LED) is a choice that should be made during the design phase.

For both the MITL and MIRL, preference is given to LED fixtures as they will significantly reduce the County's energy costs and have superior light quality over incandescent bulbs. LED fixtures for taxiways and runways (MIRL only) are FAA approved. It is important to note that LED fixtures do have higher initial costs. During the design phase of a lighting project, the County along with the FAA and the design engineer can evaluate what type of light fixture (incandescent or LED) best meets the needs of the County.

The Inventory and Facility Requirements chapters briefly discussed the condition of some of the airfield signage and made recommendations for replacement and/or new installation where signage currently does not exist. In the short term, it is recommended that the County replace the retro-reflective airfield signs which were identified in the Inventory chapter as being in fair to poor condition. Also, where MITL currently exist on some taxiways, it is recommended that any retro-reflective signage be replaced with lighted signs (if not already in place). In the medium to long-term planning period, as new taxiways are constructed/re-constructed and MITL is installed on the taxiways, it is recommended that lighted signage also be installed at the same time and all retro-reflective signage be removed.

Other airport signage that is not considered airfield signage may be added and/or removed as the County sees fit. If chain-link fencing and access gates in the terminal and surrounding areas are installed at some point in the planning period, the corresponding landside signage would be installed as part of the that fencing project.

4.3.6 MISCELLANEOUS DEVELOPMENT PROJECTS

The alternatives drawing (**Exhibit C**) will also depict the preferred location for the following additional recommended airfield improvements:

- Rotating beacon and self-supporting tower
- Lighted wind cone and segmented circle
- Installation of a Precision Approach Path Indicator (PAPI) at each end of Runway 17-35 and Runway 8-26
- Installation of Runway End Identifier Lights (REIL) at each end of Runway 17-35 and Runway 8-26

4.4 LANDSIDE DEVELOPMENT

Landside development is an important aspect of a well functioning airport. This section discusses the landside development alternatives and addresses the needs of the existing and future aviation demand identified in Chapter 3, Facility Requirements. The recommended landside development and other enhancements are illustrated on **Exhibits C and D**.

Alternative Considerations – Landside Development

- Areas to construct additional aircraft storage and T- hangars
- Locations for aeronautical and non-aeronautical related revenue generating parcels, i.e. FBO, etc.

4.4.1 TERMINAL BUILDING

Terminal buildings provide visitors with a first impression of an airport. The airport terminal building at Bisbee Douglas International Airport was constructed in the 1940's with only minor updates performed in 1949. At a minimum, the existing terminal building should be renovated to ensure that it meets current codes, and upgrades to the building should be considered as presented in Chapter 3, Facility Requirements. The facility requirements analysis concluded that the size of the terminal building is adequate for the planning period. Likewise, the location of the terminal building is considered sufficient and should be able to serve the needs of the Airport for the planning period. Therefore, alternatives for relocating the terminal to another part of the airport will not be included in this Master Plan.

4.4.2 HANGAR DEVELOPMENT

Hangar development is an important aspect at nearly every airport, including GA airports. When properly utilized, hangars are often a good source of revenue for the airport sponsor. As previously mentioned in Chapter 1, the Airport has four large conventional hangars that are not being utilized to their fullest capacity due to the limited number of aircraft presently based on the airfield. The largest of the four is approximately 40,000 square feet and is a wood-frame, metal-sided structure. The other three hangars are each approximately 12,500 square feet and are steel-frame, metal-sided structures. The total square footage of all hangars exceeds the current and forecasted demand presented in Chapter 2.

Currently all four hangars are located a significant distance away from the existing terminal building and fueling facilities. It is recommended that the land adjacent to the terminal building to the north running parallel to Taxiway A be preserved as future sites for shaded tie-downs and T-hangars/conventional hangars. The land from the terminal building up to the intersection of Taxiway A and A3 would be the ideal location for future hangar development.

The largest hangar (the 40,000 square-foot wood-frame, steel-sided one) is located the closest to the existing terminal building (at the intersection of Taxiway A and A2), however, it is also the hangar in the worst condition. The hangar currently houses a couple of based aircraft with room for more, and the location of the hangar is sufficient for the short-term planning period should demand for hangar space increase. Due to its present condition, it is recommended that the hangar be evaluated in depth to see if it could be refurbished. If not, the hangar could be torn down and the site could be developed with a new hangar.

If the demand for conventional hangar storage is not immediately needed, a practical and economical approach would be to construct shaded tie-down structures. Shaded tie-downs offer more protection from the elements than open tie-downs and are usually more affordable to aircraft owners than conventional or T-hangar storage. The land closest to the terminal building directly to the north would be a good location to designate as shaded tie-down space.

Over the course of the planning period, most likely in the medium to long-range time period, if sufficient demand for hangar storage increases, the following approach to hangar development should be considered by the County. The first approach would be to leave the remaining three 12,500 square-foot steel-framed hangars in their current location until such a time that additional hangar storage is needed. At that point, it is recommended that one of the three hangars be disassembled and relocated to the area designated for future hangar development described above. As noted in the Inventory chapter, the steel-frames of each of the hangars appear to be in good condition. Thus, if the steel-frame of the hangar to be relocated was evaluated and found to be in structurally sound condition, it could be relocated and erected in the recommended hangar development area. The metal-siding would, in all likelihood, need to be replaced. In addition, new utility services would need to be brought to the new hangar site. This approach to hangar development could continue with the remaining two steel-framed hangars over the course of the planning period as demand warrants.

A second approach would be to demolish all the original hangars and construct new hangar facilities in the designated hangar development area as demand warrants. The hangars could be removed individually, or all at once. Typically, hangars are developed privately on land leased by the airport owner. The land just north of the terminal building could be leased for this purpose, or the County may decide to construct a County owned hangar. If all three hangars located on the farthest north portion of the airfield were removed concurrently, this would free up this area of land for other revenue generating opportunities.

It is important to note that regardless of which approach is selected, one of the 12,500 square-foot hangars is currently being leased to an aircraft maintenance business, so relocating or demolishing the hangar would require coordination with the lessee.

4.4.3 AIRPORT SUPPORT AND MAINTENANCE

The support and maintenance building serves an important function for the Airport. The existing building is adequate for the planning period and should be maintained. Therefore, alternatives for relocating the Airport's support and maintenance building will not be included in this Master Plan. If additional covered storage is desired, the steel-framed structure could be enclosed with metal siding to keep the equipment out of the elements, or the County could also replace the existing structure with a new facility if needed.

The existing airport electrical building is located a significant distance from the terminal building, and the building itself is outdated and in fair condition. It is recommended that a new electrical building be constructed closer to the terminal area, and that a new electrical service entrance also be reconfigured as part of the relocation and reconstruction of the new building.

4.4.4 AERONAUTICAL DEVELOPMENT

A fixed base operator (FBO) is usually a private enterprise that leases land from the airport sponsor on which to provide services to based and transient aircraft. The extent of the services provided varies from airport to airport; however, these services frequently include aircraft fueling, minor maintenance and repair, aircraft rental and/or charter services, flight instruction, pilot lounge and flight planning facilities, and aircraft tie-down and/or hangar storage.

At general aviation airports, the location of the FBO is important to its users. For example, a FBO will normally be located near or adjacent to the terminal so passengers have more convenient access to the amenities the terminal building provides. At Bisbee Douglas International, the terminal building is located at the southern end of the airfield. It is recommended that a FBO also be planned and located in this general vicinity in the future.

Two development alternatives exist for the location of a future FBO on the Airport. One scenario would be to have the new FBO occupy the existing terminal building, giving the company the option to refurbish or renovate the building to the company's requirements and specifications. It is anticipated that County personnel and other airport tenants could remain within the building as well, as there is adequate space as determined within the Facility Requirements chapter. The second scenario would be for the prospective FBO to construct its own facility within the designated area reserved for aeronautical activity as shown on **Exhibit D**.

4.4.5 NON-AERONAUTICAL DEVELOPMENT

In October of 2013, the City of Douglas and Cochise County executed a Memorandum of Understanding (MOU) for the non-exclusive commercial use of the Bisbee Douglas International Airport. According to the MOU, it grants the City a non-exclusive five year license to:

1. Encumber portions of the airport property for economic development purposes;
2. Enter into agreements with private parties, non-profit organizations and/or governmental entities for the lease of a certain portion the airport property; and
3. Allow the construction of any structure to facilitate economic development provided it is airport-related or airport-compatible.

According to the MOU, all actions taken by the City will be subject to FAA approval. The MOU also describes additional terms and conditions such as income sharing resulting from economic development sponsored or undertaken by the City as well as other pertinent clauses. The MOU can be found in **Appendix A** for further review.

As previously mentioned in Chapter 1, the Airport encompasses approximately 3,000 acres. This is an extremely large amount of space that served the airport well when it was a military training airfield; however, with today's existing aeronautical activities, the vast majority of the land is not necessary in order to serve the general flying public. The hangar development alternatives presented within this chapter, if implemented, would consolidate the landside portion of the airfield in one area. With the terminal building, maintenance support facility, fuel system, shaded and open tie-downs, and hangars all located within the same general vicinity, not only will the airfield become more operationally efficient, it will also free up unused, vacant land for the purpose of development, either for aeronautical or non-aeronautical use.

It is not known if there are any future expansion plans for the State prison (located just east of the airfield), but the land between the prison and the airfield is a good example of land that could be re-developed for non-aeronautical use assuming the land was approved for non-aeronautical use by the FAA and re-zoned as compatible land use adjacent to airports. This vacant land was once part of the original military base, thus some infrastructure may still exist that could support future development, although the size of utilities and condition of the infrastructure is unknown. There is also a large amount of unused land to the west of the airfield that could also be developed in the future. Unlike the land east of the airfield, this land has had no previous development of any kind. If either or both areas were to be redeveloped for non-aeronautical use, it is important that the vacant land be compatible with the airport as defined by the FAA.

4.4.6 MISCELLANEOUS DEVELOPMENT PROJECTS

The installation of enhanced perimeter fencing and associated gates along the existing airport boundary is recommended to restrict inadvertent entry to the Airport by unauthorized people and wildlife. In addition, chain-link fencing topped with three-strands of barbed wire and electric access control gates are recommended in the terminal area in order to separate the landside area from the air operations area (AOA).

As discussed in the Facility Requirements chapter, it is recommended that the fueling facility add a self-fueling option for airport users that need fuel outside of the normal business hours of the airport staff. This could be done by adding a credit card payment device at the fueling facility. In addition to the self-fueling option, it is also recommended that the County invest in a more sophisticated aviation fuel management and accounting software system in order to keep more accurate fuel sales data. Several companies in the aviation market provide this type of software and integrated systems, such as TouchStar, Varec FuelsManager, and MyFBO, just to name a few. The County should conduct research into the various software systems and select one that best meets their current and future needs for fuel sales tracking at the Airport.

4.5 ENVIRONMENTAL IMPACTS

The proposed development will likely cause limited short-term effects resulting from construction activities. These short-term construction impacts would not persist beyond the construction period, and no long-term impacts are expected as a result of the proposed development at the Airport. The proposed projects are not expected to exceed the significant impact threshold for the impact resource categories defined by FAA Order 5050.4B, *Environmental Handbook* and FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*.

As mentioned in Chapter 1, Section 1.19.1 Air Quality, the Bisbee Douglas International Airport is partially located in the Sulphur Dioxide Attainment area with a maintenance plan, and the PM 10 Attainment area, with a maintenance plan. The resource impact categories and potential environmental impacts are evaluated in more detail in Chapter 6, Environmental Overview.

4.6 DEVELOPMENT COSTS

The planning costs for the proposed development presented in this Chapter will be discussed in more detail in Chapter 7, Airport Development and Financial Plan. Development costs discussed in this Chapter are for planning purposes only, are based on 2014 dollars, and reflect level of magnitude costs. The costs in **Table 4-1** are derived from the consultant's knowledge of contactors, construction material suppliers, and work performed at comparable facilities. The costs presented are not intended to be the full range of costs associated with each project. Additional costs such as operating and maintenance are not included. The objective of quantifying construction costs is to aid the County in the decision making process. A recommended development phasing plan, along with refined probable costs, will be presented in Chapter 7.

TABLE 4-1 DEVELOPMENT COSTS SUMMARY

Development Feature	Project Description	Probable Costs (2014 dollars)
Runway 17-35 Extension	Extend Runway 17, install edge lighting and signage	\$ 500,000
Parallel Taxiway	Construct parallel taxiway to Runway 17-35, install edge lighting and signage	\$ 2,200,000
Bypass Taxiway	Construct bypass taxiways on Runway 8-26, and install associated edge lighting and signage	\$ 250,000
Parallel Taxiway	Construct parallel taxiway to Runway 8-26, and install edge lighting and signage	\$ 2,500,000
Aircraft Apron	Construct aircraft parking apron, install edge lighting and signage (for planning purposes only)	\$ 900,000 ¹
Taxiway Reconstruction	Reconstruct Taxiway A-3 and A-4, install edge lighting and signage	\$ 1,700,000
Taxiway Closure	Close and remove Taxiway A-1 and excess runway pavement	\$ 95,000
Runway 8-26 Lighting	Install edge lighting and signage on Runway 8-26	\$ 300,000
Visual and Navigational Aids	Install REILs on Runway 17-35 and Runway 8-26 (both ends)	\$ 150,000
	Install PAPIs on Runway 17-35 and Runway 8-26 (both ends)	\$ 500,000
	Install wind cone and segmented circle	\$ 65,000
	Install rotating beacon and tower	\$ 80,000
Fencing	Install airfield fencing, gates, and appurtenances	\$ 550,000 ²
Hangar Development	Construct aircraft storage hangars (average square-foot cost)	\$ 80 to \$100 per SF ³
Terminal Building	Upgrade/renovate existing terminal building (average square-foot cost)	\$ 20 to \$80 per SF ⁴
Relocate Electrical Building	Relocate electrical service entrance to airport and construct a new electrical building	\$600,000
Fuel Facility Credit Card Reader	Install a credit card payment reader on the existing fuel facility	\$20,000

¹The need for additional apron does not currently exist based on the Facility Requirements. ²Wildlife fence is based on an average cost of \$13 per foot. ³Hangar development is based on actual demand; ⁴Unit costs per square-foot will vary depending on the level of renovation

Source: ACI, 2014

4.7 ALTERNATIVE DEVELOPMENT SUMMARY

Development alternatives presented in this Chapter addressed both airside and landside needs for the planning period. Airside alternatives include a proposed extension to Runway 17-35 in order to meet design standards and to satisfy runway length recommendations presented in the Facility Requirements chapter. Additionally, taxiway and runway lighting alternatives are suggested in order to enhance safety on the airfield, along with several other airside improvements. Landside alternatives include proposed hangar and land development locations and enhancements to the existing terminal building and fueling facility.

The recommended development alternatives will be carried forward and incorporated into the Airport Layout Plan (ALP) based on input that will be gathered from the Sponsor (Cochise County), the FAA, and the Technical Advisory Committee (TAC) during a scheduled alternatives development review meeting.

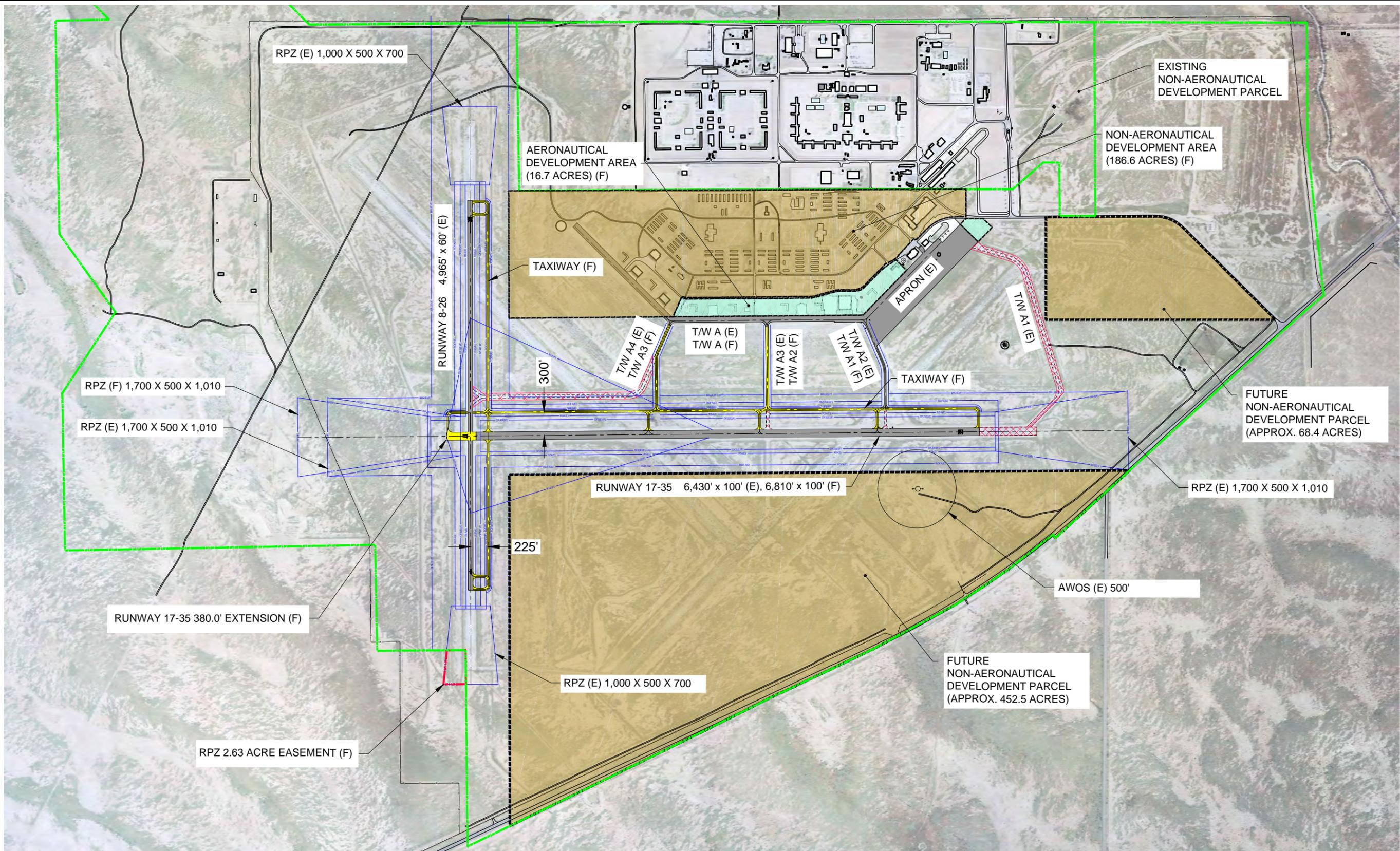
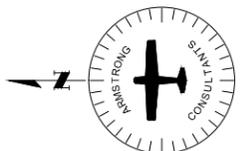
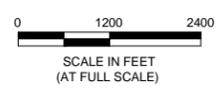


EXHIBIT C

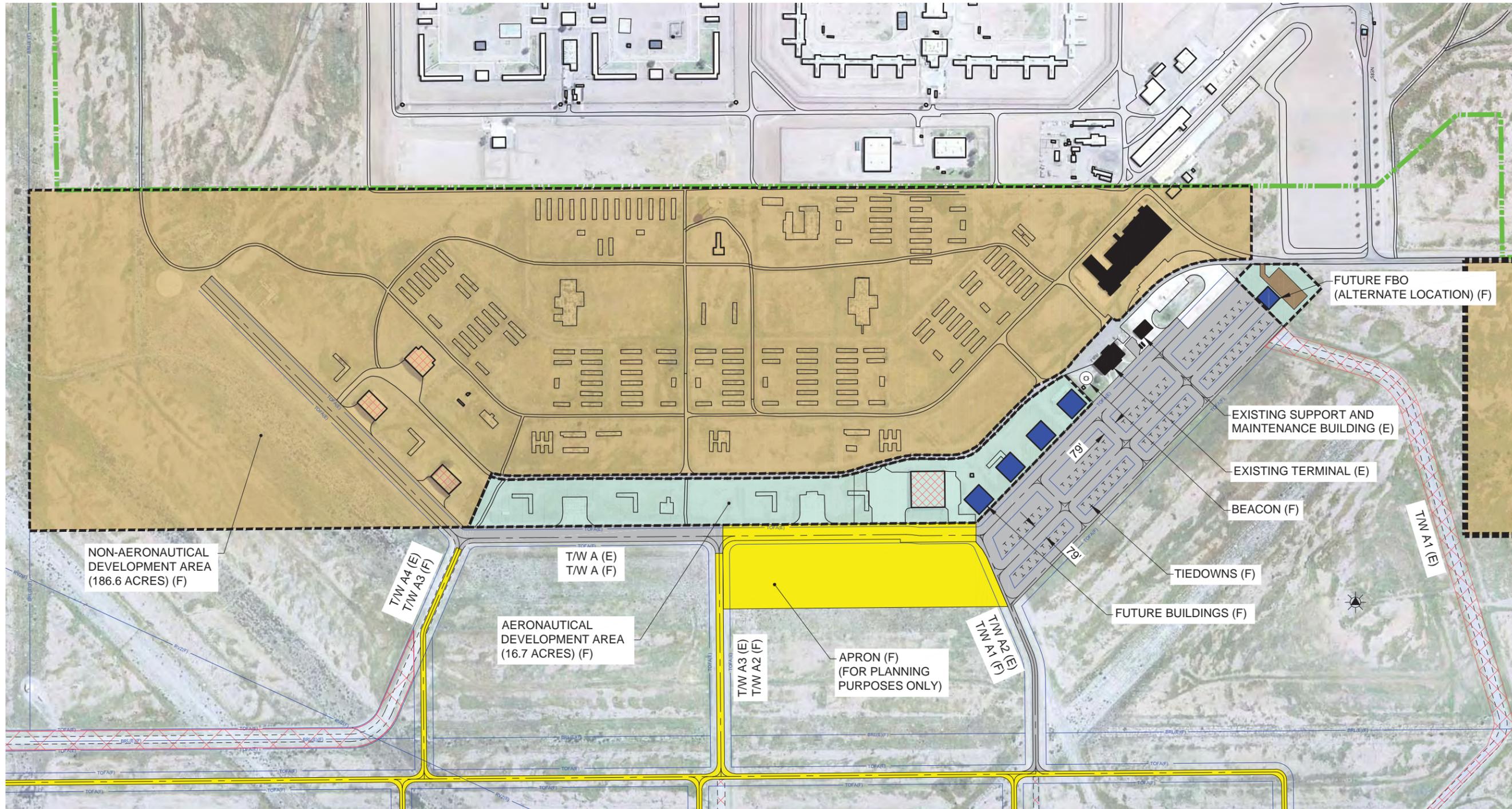
- LEGEND**
- FUTURE DEVELOPMENT AREA
 - FUTURE AIRFIELD PAVEMENT
 - TO BE REMOVED
 - EXISTING PROPERTY LINE
 - FUTURE PROPERTY LINE



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BISBEE DOUGLAS INTL AIRPORT Bisbee, Arizona	
AIRSIDE DEVELOPMENT	
SCALE: PER BAR SCALE	DATE: 03/2014
DRAWN: LDS	FILE: 6170600-AIRSIDE
CHKD: JZP	JOB NO.: 136170



LEGEND

- FUTURE DEVELOPMENT AREAS
- FUTURE AIRFIELD PAVEMENT
- FUTURE BUILDING/FACILITY
- FUTURE VEHICLE PARKING
- TO BE REMOVED
- EXISTING PROPERTY LINE
- FUTURE PROPERTY LINE
- FUTURE BEACON

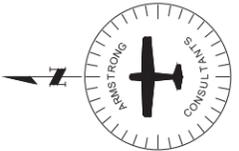
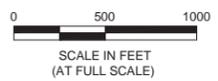


EXHIBIT D

ARMSTRONG
 PLANNING ENGINEERING CONSTRUCTION
 COLORADO: 970.242.0101 ARIZONA: 602.803.7079 NEW MEXICO: 505.508.2192
 www.armstrongconsultants.com

BISBEE DOUGLAS INTL AIRPORT Bisbee, Arizona	
FUTURE LANDSIDE DEVELOPMENT	
SCALE: PER BAR SCALE	DATE: 03/2014
DRAWN: LDS	FILE: 6170601-LANDSIDE
CHKD: JZP	JOB NO.: 136170

APPENDIX

A

MEMORANDUM OF UNDERSTANDING

**BISBEE DOUGLAS INTERNATIONAL AIRPORT
AIRPORT MASTER PLAN**



**MEMORANDUM OF UNDERSTANDING
BETWEEN COCHISE COUNTY
AND THE CITY OF DOUGLAS
FOR NON-EXCLUSIVE COMMERCIAL USE OF
BISBEE-DOUGLAS INTERNATIONAL AIRPORT**

This Memorandum of Understanding (“Agreement”) between the County of Cochise (“County”), owner of the property known as the Bisbee-Douglas International Airport (“BDI”), and the City of Douglas (“City”), which wishes to promote the development of airport-related or airport-compatible economic activities thereon, is intended to provide parameters for a license to be granted to the City for said purpose.

I. Definitions

BDI premises: All that property described in the quitclaim deed issued May 13, 1949, from the United States War Assets Administration to the County of Cochise, the legal description of which is incorporated herewith by reference.

FAA: Federal Aviation Administration.

Subject property: Any land on the BDI premises except those lands used for or within 200 feet of an airport runway, taxiway, parking apron; any fenced area; any land currently under lease or occupied by or planned to be occupied by any structure, road, highway, public utility line, pipeline, well; or any other easement of record for any rights of way for any purpose.

II. Scope of license

Subject to terms described herein, the City is hereby granted a non-exclusive five-year license to:

1. Encumber any of the subject property within the scope of this license for any economic development purpose that is determined by the FAA to be compatible with the use of said premises as an airport, and so long as such use does not interfere with other uses at BDI.
2. Enter into agreements with other private parties, non-profit organizations and/or governmental or quasi-governmental entities for the lease of any of the subject property within the scope of this license for any period of time within the term of this license, for any airport-compatible purpose, as determined by the FAA.
3. Construct or allow to be constructed within the boundaries of the subject property on the BDI premises any structures that the City deems to be necessary to its development of airport-related or airport-compatible economic activities, provided that any such construction shall comply with all County building codes

and shall be subject to all County permitting, permit fee and inspection requirements.

III. Procedures for exercise of license rights

Prior to entering any agreement pursuant to Section II above, the City shall:

1. Confirm with the County Administrator or his designee that the proposed use is within the scope of this license and not otherwise committed to another planned use. If approval by the Board of Supervisors is required, the County shall seek such approval within sixty (60) days of receipt of the proposal from the City.
2. Obtain written approval of the FAA for the proposed use as airport-compatible.

IV. Effective date

This Agreement shall be effective upon written approval of its terms of the FAA and signing of this Agreement by the parties hereto.

V. Term, termination

This Agreement shall remain in effect for five years and may be renewed by mutual agreement of the parties for successive five-year terms. It is subject to termination by either party, for any reason, on six months' written notice.

Termination by City or by expiration of term: If this Agreement is terminated by the City, or if this Agreement expires without renewal, any improvements made pursuant to this Agreement shall be retained by the County upon termination and the City shall be responsible for the cost of removal of any obstructions and/or repair of any damage to the property caused by or resulting from the City's use or control thereof.

Termination by County: If this Agreement is terminated by the County, the County shall reimburse the City the fair market value of any improvements it wishes to retain, but the City shall be responsible for the cost of removal of any obstructions and/or repair of any damage to the property caused by or resulting from the City's use or control thereof.

VI. Income

Any net income derived, directly or indirectly, by the City from any economic development sponsored or undertaken by the City under terms of this license shall be shared equally with the County.

VII. Reservations of mineral rights

Any rights granted to the City under this Agreement for use of the subject property on BDI premises shall be subject to those mineral rights specifically reserved by

the U.S. in the quitclaim deed referenced in Section I, above, and incorporated herewith; and all other mineral, oil and gas rights, in deposits in the lands covered by this Agreement, which are retained by Cochise County. Both the United States government and the County reserve the right to come on the land, or to grant that right to any other parties of their choosing, to prospect, making just compensation for any damage or injury caused thereby.

VIII. Amendment

This Agreement is intended to memorialize the purpose and basic terms of agreement between the parties with respect to City use of the subject property on the BDI premises. It is anticipated by the parties that it may be augmented from time to time by sub-agreements between the parties, consistent with the terms contained herein, that may serve to provide additional specific terms as to particular property uses, and/or evolving purposes and functions of the parties with respect to said property. The terms of this basic Agreement may be amended by the parties at any time, by mutual written agreement.

IX. Contacts

Any notices, questions, comments and concerns regarding the duties and responsibilities of the Parties under this Agreement are to be directed to:

COUNTY: Mike Ortega, Cochise County Administrator
1415 Melody Lane, Bldg. G
Bisbee, Arizona 85603

CITY: Carlos De La Torre, City Manager
City of Douglas
425 E. 10th Street
Douglas, Arizona 85607

X. General Terms

10.1 Compliance with Laws, Rules and Regulations. The Parties and their subcontractors shall comply with all applicable Federal and state laws, rules, regulations, standards and Executive Orders, without limitation to those designated within this Agreement. The laws and regulations, of the State of Arizona govern the rights of the Parties, the performance of this Agreement, and any disputes arising from the Agreement. Any action relating to this Agreement must be brought by arbitration to the extent required by A.R.S. § 12-1518 or in an appropriate court. Any arbitration award will be enforced in an appropriate court.

10.2 Non-Discrimination. The parties shall not discriminate against any employee, client or any other individual in any way because of that person's age, race, creed, color, religion, sex, disability or national origin in the course of carrying out their duties pursuant to this Agreement. The Parties shall comply with the provisions of

Executive Order 755, as amended by Executive Order 994, which is incorporated into this Agreement by reference, as if set forth in full herein.

10.3 ADA. The Parties shall comply with all applicable provisions of the Americans with Disabilities Act (Public Law 101-336, as modified by Pub. L. 110-325, codified at 42 U.S.C. §§ 12101 through -12213) and all applicable federal regulations under the Act, including 28 CFR Parts 35 and 36.

10.4 Conflict of Interest. This Agreement is subject to termination for conflict of interest pursuant to terms of A.R.S. § 38-511.

10.5 Severability. The provisions of this Agreement are severable. If any provision is held by a court to be invalid or unenforceable, the remaining provisions continue to be valid and enforceable to the full extent permitted by law.

10.6 Indemnification. Each Party (as Indemnitor) agrees to indemnify, defend and hold harmless the other Party (as Indemnitee) from and against any and all claims, losses, liability, costs or expenses (including reasonable attorney's fees) (hereinafter collectively referred to as "claims") arising out of bodily injury of any person (including death) or property damage, but only to the extent that such claims which result in vicarious/derivative liability to the Indemnitee, are caused by the act, omission, negligence, misconduct, or other fault of the Indemnitor, its officers, officials, agents, employees, or volunteers.

10.7 No Third Party Beneficiaries. Nothing in the provisions of this Agreement is intended to create duties or obligations to or rights in third parties not parties to this Agreement or effect the legal liability of any Party to the Agreement.

10.8 No Joint Venture. Nothing in this Agreement is intended to create a joint venture between or among the Parties, and it will not be so construed. None of the Parties' employees shall be considered officers, agents or employees of any of the other Parties, or be entitled to receive any employment related fringe benefits from any of the other Parties.

IN WITNESS THEREOF, the Parties hereto have executed this Agreement on the date and year specified below:

COCHISE COUNTY


Ann English, Chair

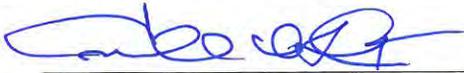
10-22-13
Date

Attest:


Arlethe Rios, Clerk of the Board

10/22/13
Date

CITY OF DOUGLAS



Carlos A. De La Torre, P.E., City Manager

10-14-2013

Date

Attest:



Brenda Aguilar, City Clerk

10/09/2013

Date