



CHAPTER 5

RECOMMENDED DEVELOPMENT CONCEPT

The airport master plan for Sierra Vista Municipal Airport (FHU) has progressed through a systematic and logical process with a goal of formulating a recommended 20-year development plan. The process began with an evaluation of existing and future operational demand, which aided in creating an assessment of future facility needs. Those needs were then used to develop alternative facility plans to meet projected needs. Each step in the planning process has included the development of draft working papers, which were presented and discussed at previous planning advisory committee (PAC) meetings and public information workshops and have been made available on the project website.

In the previous chapter, several development alternatives were analyzed to explore options for the future growth and development of FHU. The development alternatives have been refined into a single recommended concept for the master plan. This chapter describes, in narrative and graphic form, the recommended direction for the future use and development of the airport. It should be noted that the majority of the recommendations are for Airport Improvement Program (AIP)-eligible improvements; however, the plan also depicts several projects that are currently planned or are assumed to be funded by the U.S. Army.





The recommended concept provides the ability to meet the disparate needs of various airport operators. The goal of this plan is to ensure the airport can continue (and even improve) in its role of serving military and general aviation operators and support the potential for future spaceport facilities. The plan has been specifically tailored to support existing and future growth in all forms of potential aviation activity as the demand materializes.

The recommended master plan concept, as shown on **Exhibits 5A** and **5B**, presents a long-term configuration for Sierra Vista Municipal Airport that preserves and enhances the role of the airport while meeting Federal Aviation Administration (FAA) design standards. The phased implementation of the recommended development concept will be presented in Chapter Six. The following sections describe the key details of the recommended master plan concept.

AIRFIELD PLAN

The airfield plan generally considers improvements related to the runway and taxiway system and navigational aids. The following sections provide descriptions of the airfield recommendations.

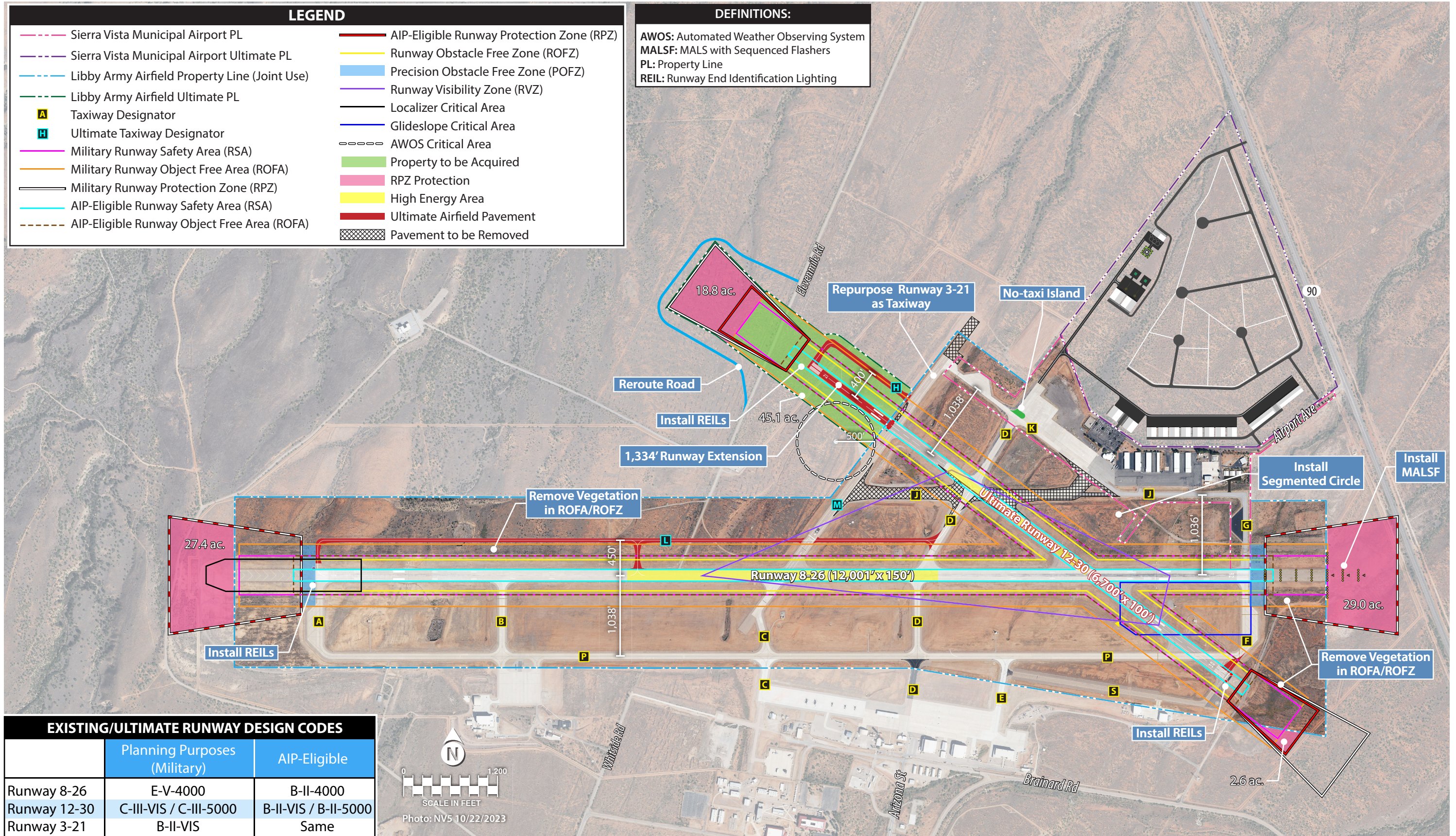
DESIGN STANDARDS

The FAA has established design criteria to define the physical dimensions of runways and taxiways, as well as the imaginary surfaces surrounding them, to enhance the safe operation of aircraft at airports. These design standards also define the separation criteria for the placement of landside facilities.

As previously discussed, the design criteria primarily center on the airport's critical design aircraft. The critical design aircraft is the most demanding aircraft, or family of aircraft, that currently conducts (or is projected to conduct) 500 or more operations (takeoffs and landings) per year at the airport. Factors included in airport design are an aircraft's wingspan, approach speed, tail height, and the instrument approach visibility minimums for each runway. The FAA has established the runway design code (RDC) to relate these design aircraft factors to airfield design standards.

While airfield elements, such as safety areas, must meet design standards associated with the applicable RDC, landside elements can be designed to accommodate specific categories of aircraft. For example, an airside taxiway must meet taxiway object free area (TOFA) standards for all aircraft types using the taxiway, while the taxilane to a T-hangar area only needs to meet the width standards for the smaller single- and multi-engine piston aircraft expected to utilize the taxilane.

The applicable RDC and critical design aircraft for each runway at FHU in the existing and ultimate conditions, as established in Chapter Two, are summarized in **Table 5A**.



Note: Acreages depicted are approximate.

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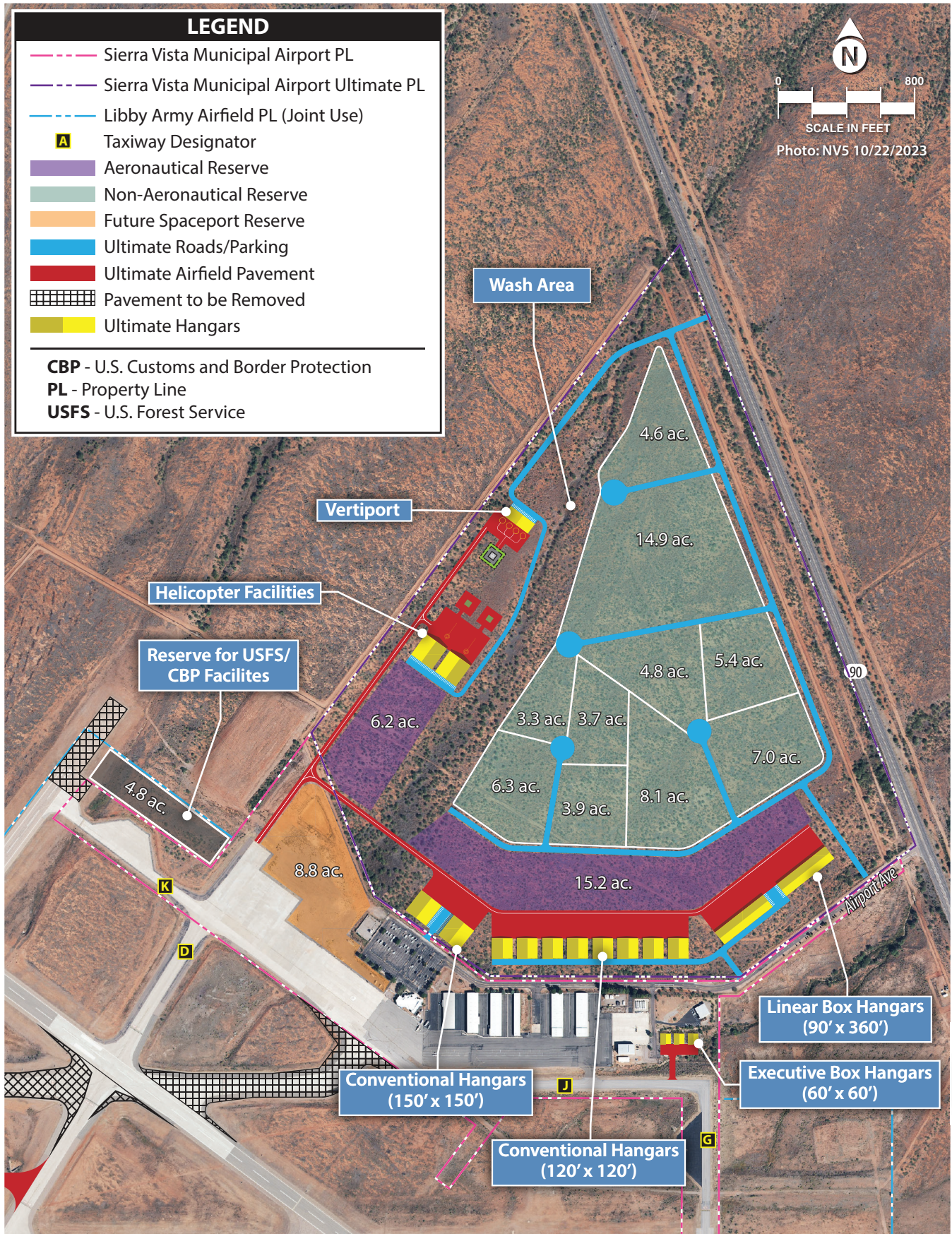


TABLE 5A | Airport and Runway Classifications

	Runway 8-26 (existing/ultimate) Planning Purposes (includes military)	Runway 8-26 (existing/ultimate) AIP Eligible	Runway 12-30 (existing/ultimate) Planning Purposes (includes military)	Runway 12-30 (existing/ultimate) AIP Eligible	Runway 3-21 (existing/ultimate*)
ARC	E-V	B-II	C-III	B-II	B-II
Critical Aircraft	F-15 F-16 Boeing 777-200	EMB Brasilia 120	Boeing 737-300	EMB Brasilia 120	EMB Brasilia 120
RDC	E-V-4000	B-II-4000	C-III-VIS (existing) C-III-5000 (ultimate)	B-II-VIS (existing) B-II-5000 (ultimate)	B-II-VIS
TDG	TDG 5	TDG 3	TDG 5	TDG 3	TDG 3
APRC	D/VI/4000	D/VI/4000	D/VI/VIS	D/VI/VIS	N/A
DPRC	D/VI	D/VI	D/VI	D/VI	N/A
*Runway 3-21 is planned to be decommissioned in the future. APRC = approach reference code DPRC = departure reference code TDG = taxiway design group ARC = airport reference code RDC = runway design code					

Source: FAA AC 150/5300-13B, Airport Design; Coffman Associates analysis

PRIMARY RUNWAY 8-26

Runway Dimensions

Runway 8-26 is 12,001 feet long and 150 feet wide. At this length, the runway can continue to serve the military and civilian aircraft that utilize the airport; therefore, the recommended airfield development concept reflects no change to the length of Runway 8-26 in the ultimate condition. The current runway width of 150 feet meets the standard for military planning standards (RDC E-V-4000) and exceeds the AIP-eligible standard (RDC B-II-4000); as such, no change to the runway width is recommended.

Pavement Strength

Runway 8-26 is currently strength-rated for up to 75,000 pounds for single wheel loading aircraft (S), 200,000 pounds for dual wheel loading aircraft (D), 450,000 pounds for dual tandem wheel loading aircraft (2D), and 700,000 pounds for double dual tandem wheel aircraft (2D2). These strength ratings are adequate for all aircraft operating at FHU currently and in the future; therefore, no additional strength is planned.

Instrument Approach Procedures

Runways 8 and 26 are both equipped with instrument approach procedures. The instrument landing system (ILS) approach to Runway 26 provides the lowest visibility minimums at FHU with minimums down to ¾-mile. Runway 26 is also equipped with a lateral navigation (LNAV) global positioning system (GPS) approach with one-mile minimums for Categories A and B aircraft and 1¼-mile minimums for Categories C and D aircraft. A very high omnidirectional range (VOR) approach is also available to Runway 26. Runway 8 provides a localizer performance with vertical guidance (LPV) via an area navigation (RNAV) GPS instrument approach with visibility minimums down to ¾-mile. Finally, tactical air navigation system (TACAN) approaches are available to military operators on Runways 8 and 26. These approaches are adequate and no new approaches are planned for Runways 8 or 26.



Visual Approach Aids

Each end of Runway 8-26 is equipped with a four-box precision approach path indicator (PAPI-4). These systems are planned to be maintained. Neither runway end is equipped with runway end identification lights (REILs) or an approach lighting system (ALS). It is recommended that REILs be made available, at a minimum, if a more sophisticated ALS is not planned. As such, the master plan concept includes the addition of REILs on Runway 8. Runway 26, which provides the ILS approach, is planned to be equipped with an ALS, which is recommended for runways that offer instrument approaches with minimums of $\frac{3}{4}$ -mile or lower. The plan includes a medium intensity approach light system with sequenced flashers (MALSF), which consists of steady burning white lights and sequenced flashing lights. The MALSF does not include runway alignment indicator lights (RAILs), which extend beyond the sequenced flashers and are not feasible due to the location of State Highway 90.

Safety Areas

The safety areas associated with Runway 8-26, which include the runway safety area (RSA), runway object free area (ROFA), and runway obstacle free zone (ROFZ), are located entirely on Libby Army Airfield (LAAF) property and are free from obstructions when considering the AIP-eligible portion of these safety areas. As discussed in Chapter Three, the safety areas associated with the military planning standards are larger and encompass a greater area that contains sparse vegetation. Removal of this vegetation is recommended; however, this decision is entirely within the purview of the U.S. Army.

The runway protection zones (RPZs) extending off each runway end are the same size for both military and civilian planning standards. As shown on **Exhibit 5A**, approximately 27.4 acres of the Runway 8 RPZ and 29.0 acres of the Runway 26 RPZ extend beyond LAAF property and onto land controlled by Fort Huachuca. Typically, land within an RPZ that is not controlled by the airport is recommended to be acquired or protected via an aviation easement; however, as this property is maintained by Fort Huachuca, it is considered controlled and should continue to be protected from future vertical development or incompatible land uses. It should also be noted that a portion of State Highway 90 passes through the northeast corner of the Runway 26 RPZ. While public roads are generally considered incompatible land uses within an RPZ, options to remove the highway from the RPZ, such as rerouting the highway or displacing the Runway 26 threshold, are not considered feasible. As such, no changes related to the Runway 8-26 RPZs are recommended.

CROSSWIND RUNWAY 12-30

Runway Dimensions

Runway 12-30 is currently 5,366 feet long and 100 feet wide. Analysis in Chapter Three determined that a length of 6,000 feet is recommended to accommodate 95 percent of small aircraft with fewer than 10 passenger seats and a length of 6,700 feet is recommended to accommodate 75 percent of the large aircraft fleet at 60 percent useful load; longer lengths are necessary to accommodate these aircraft at higher useful loads. The alternatives in Chapter Four considered various extension options to better serve both military and civilian aircraft using the crosswind runway. Ultimately, following discussion with



both City of Sierra Vista and LAAF personnel, it was determined that prudent planning should include a 1,334-foot extension to the northwest (Runway 12), which would bring the total runway length to 6,700 feet. Action items related to the extension include:

- Acquisition of approximately 45.1 acres of property beyond the current LAAF boundary to protect the ultimate RSA and ROFA and ultimate partial-parallel taxiway
 - This area is based on the larger military safety areas; approximately 26.3 acres would be needed to protect the AIP-eligible safety areas, which encompass a smaller area. It should be noted that the FAA is unlikely to participate in acquisition of property beyond what is required to protect the AIP-eligible portion(s) of the safety areas.
- Construction of a 75-foot wide partial-parallel taxiway (ultimate Taxiway H) providing access to the extended Runway 12 threshold
- Installation of new medium intensity runway lighting (MIRL), medium intensity taxiway lighting (MITL), light-emitting diode (LED) signage, and markings
- Relocation of visual approach aids (precision approach path indicators [PAPIs], REILs)
- Protection of land within the ultimate Runway 12 RPZ and a reroute of Elevenmile Road around the ultimate RPZ

Prior to any runway extension, justification must be provided to the FAA in the form of regular use (500 annual itinerant operations) by civilian aircraft that require the additional length. This would be necessary, at a minimum, before the FAA would consider funding such an extension. Moreover, given the joint-use nature of FHU, additional justification may be required and coordination between the airport sponsor, the FAA, and the U.S. Army will be necessary.

The width of Runway 12-30 is currently 100 feet, which meets the standard for military planning standards and exceeds the 75-foot width requirement for civilian planning standards. No changes to the runway width are planned.

Pavement Strength

Runway 12-30 is currently strength-rated at 46,000 pounds S, 106,000 pounds D, 137,000 pounds 2D, and 172,000 pounds 2D2. These strength ratings are considered adequate and no additional strength is planned.

Instrument Approach Procedures

Runways 12 and 30 are visual runways with no published instrument approach procedures. Future planning maintains the potential for the implementation of a GPS approach with visibility minimums not lower than one mile. No ground-based equipment is required for this type of instrument approach. If the airport sponsor wishes to implement an approach, coordination with the FAA through the Instrument Flight Procedures Information Gateway and with LAAF personnel will be necessary.



Visual Approach Aids

Each end of Runway 12-30 is equipped with a PAPI-4. These systems are planned to be maintained. Neither runway end is equipped with REILs or an ALS. The plan includes the addition of REILs on each runway end.

Safety Areas

Runway 12-30 has several safety area deficiencies that were previously detailed in Chapter Three and on **Exhibit 3D**. These deficiencies include portions of the RSA, ROFA, and ROFZ that extend beyond the LAAF boundary near the Runway 12 end. This applies to both the military and civilian planning design standards. From an AIP-eligibility standpoint, approximately 2.5 acres of land within the RSA and ROFA are outside the current LAAF property line. For the more stringent military design standards, the safety areas are larger and encompass a larger portion of property beyond the current boundary. The development concept includes ultimate acquisition/control of this property in support of the planned runway extension; however, if the runway extension is not implemented, it is recommended that LAAF gain positive control over these safety areas as they exist today and any obstructions (i.e., vegetation) be removed. On the Runway 30 end, the AIP-eligible safety areas are located entirely within LAAF property; however, it should be noted that a portion of the larger military RSA and ROFA extend beyond the property line.

The RPZs associated with Runways 12 and 30 also extend beyond the LAAF boundary; however, they are located on land controlled by Fort Huachuca. As such, no changes in ownership or other modifications are recommended, with the exception of the planned reroute to Elevenmile Road if/when Runway 12 is extended.

RUNWAY 3-21

The ultimate disposition of Runway 3-21 was evaluated in Chapter Three. All runways at FHU are owned and maintained by Fort Huachuca and previous discussions with LAAF personnel indicated a desire to ultimately decommission Runway 3-21. As such, each of the airside alternatives depicted in Chapter Four included closure of this runway, with various options for removing the pavement entirely or maintaining a portion of it for use as a taxiway. As shown on **Exhibit 5A**, the plan includes the decommissioning of Runway 3-21, with the pavement repurposed as a 75-foot-wide taxiway (ultimate Taxiway M) providing access to and from Runway 12 from the south side of the airport. The blast pad at the end of Runway 21 is planned to be removed.

TAXIWAY IMPROVEMENTS

North Side Partial-Parallel Taxiway | Primary Runway 8-26 is served by full-length parallel Taxiway P, which is located south of the runway near the military facilities. Civilian operators departing on Runway 8 must use Taxiway P to access the runway for departure. To better segregate military and civilian movements, the plan includes the construction of a partial-parallel taxiway on the north side of Runway



8-26 (ultimate Taxiway L). This 50-foot-wide taxiway is proposed to extend from Taxiway D west to Runway 8 at a separation of 450 feet from the runway centerline. This width and separation are in accordance with AIP-eligible taxiway design group (TDG) 3 standards. An additional north side connector is planned west of existing Runway 3-21 to facilitate a faster departure from the runway for landing aircraft on Runway 8-26.

Taxiway J | Taxiway J extends from the civilian apron and crosses Runway 12-30 and Taxiway D to connect to Runway 3-21. Its intersection with Runway 12-30 and Taxiway D does not follow the FAA-recommended three-path concept, which states that taxiway intersections should be limited to a maximum of three choices of travel, with right-angled connections preferred. To eliminate this potentially confusing intersection and align with the FAA’s recommendation, Taxiway J is planned to be closed and the pavement removed.

Taxiway F | Taxiway F extends from the south side of Runway 26 and connects to Taxiway P, crossing Runway 12-30 near the Runway 30 threshold. Presently, there is no access from the north to Runway 30; pilots departing on this runway must first cross the runway, taxi west along Taxiway P, and then turn south to access Taxiway S, which connects to Runway 30. To improve efficiency and enhance safety by limiting runway crossings, additional taxiway pavement is planned to be constructed from Taxiway F to the north side of Runway 30.

Direct Access Points | Taxiway D provides direct access to Runways 12-30 and 8-26 from the civilian apron. To mitigate this non-standard condition, a no-taxi island is planned at the entrance to Taxiway D, which would force pilots to taxi around the island to access the taxiway.

Taxiway Lighting | Taxiways at FHU are equipped with MITL, with the exception of Taxiway P and Taxiway S. It is recommended that these taxiways be equipped with MITL to enhance safety during low visibility conditions; however, as these taxiways are owned by the military and are used predominantly by military aircraft, federal grant funds through the FAA may not be available. If the City of Sierra Vista wishes to pursue this project, coordination with LAAF is recommended to determine feasibility. All new taxiway pavement, including the planned partial-parallel taxiway north of Runway 8-26, the partial-parallel taxiway corresponding to the ultimate Runway 12 extension, the conversion of Runway 3-21 to an ultimate taxiway, and the Runway 30 north side access taxiway, is planned to be equipped with MITL.

WEATHER REPORTING EQUIPMENT

FHU is equipped with three lighted wind cones, which are planned to be maintained in their existing locations. The plan recommends installation of a segmented circle, which is a visual indicator of traffic pattern information. The segmented circle is planned to be co-located with the wind cone located south of Taxiway J, as depicted on **Exhibit 5A**.

Other on-airport weather reporting equipment includes a fixed base weather observation system (AN/FMQ-23), which is owned and maintained by LAAF and is planned to remain. An automated weather observation station (AWOS) is located near the intersection of Runway 12-30 and Runway 3-21, although its service has been intermittent. This system is planned to be maintained and the City of Sierra Vista is currently (2025) working to restore all functionality with the addition of new sensors.



LANDSIDE CONCEPT

The primary goal of landside facility planning is to provide adequate space to meet reasonably anticipated general aviation needs, while also optimizing operational efficiency and land use. Achieving these goals yields a development scheme that segregates functional uses while maximizing the airport's revenue potential. The key issues to be addressed in the landside areas at Sierra Vista Municipal Airport are typical of most general aviation airports and include increasing hangar and apron capacities while adding amenities to accommodate existing users and attract new users.

As depicted on **Exhibit 5B**, planned landside facility development at Sierra Vista Municipal Airport is focused entirely on the north side of the airfield, where existing municipal facilities (terminal, hangars, etc.) are located. The south side of the airport (military use) has not been evaluated, and no recommendations are made regarding development in this area, with the exception of the potential relocation of the U.S. Forest Service (USFS) and U.S. Customs and Border Protection (CBP) facilities to the north side (to be discussed). The concept also includes planned aeronautical and non-aeronautical use development on a 203-acre parcel to the north that the City of Sierra Vista is in the process of acquiring.

NOTE: All landside development should occur only as dictated by demand. The locations and sizes of hangars and other facilities proposed in the recommended plans are conceptual and may not reflect the needs of future developers and their customers. The recommended concept is intended to be used strictly as a guide for City of Sierra Vista staff when considering new developments.

TERMINAL BUILDING AND PARKING

The terminal building at Sierra Vista Municipal Airport comprises approximately 9,500 square feet (sf) of space that includes a lobby, office space, a pilots' lounge, a flight planning room, and restrooms. Because the airport previously provided scheduled passenger flights, the terminal also includes features typical of commercial service, including a ticketing area, baggage claim, and rental car counters. A parking lot with approximately 298 spaces is located north of the terminal building. The terminal building and parking area exceed the general aviation needs projected in this master plan; as such, no changes to these facilities are recommended.

EXISTING HANGAR AREA

All hangars at the airport are located east of the terminal building, primarily including linear box hangars, which offer approximately 87,300 sf of storage space, and one executive box hangar (Air Evac) sized at approximately 5,000 sf. With a projected need of an additional 52,400 sf of aircraft storage space, the concept includes the planned development of a variety of hangar types and sizes to accommodate a diverse range of users; however, there is limited space for development on the existing Sierra Vista Municipal Airport property, with just two areas available for building construction. One is an 8.8-acre parcel west of the terminal/parking lot; this area is reserved for spaceport facility development (to be discussed). The remaining developable area is located east of the Air Evac hangar on the helipad site. This area is planned to be redeveloped with new apron pavement to support hangar development; three 60-foot by 60-foot executive box hangars are shown for conceptual planning purposes. A single taxilane is planned to connect this area to Taxiway J to provide access to the airfield.



NORTH SIDE DEVELOPMENT

As mentioned, the City of Sierra Vista is in the process of acquiring approximately 203 acres of property north of the airport. This land is currently owned by Fort Huachuca. For future planning purposes, this master plan assumes the successful transfer of this property to the city with an intended use of both aeronautical and non-aeronautical development.

Hangar Facilities

Due to the limited available space on the existing city-owned portion of airport property, part of the 203-acre parcel is planned to be used for aeronautical development – specifically, hangar construction. A wash area traverses the west side of the parcel, limiting some of the overall development potential and resulting in a segregation of facilities, with planned hangars located immediately north of Airport Avenue and helicopter and vertiport facilities located west of the wash (to be discussed). Access to the planned hangar area from the airfield is provided via a new taxilane extending northeast from the existing taxiway stub on the west side of the apron. The taxilane is planned to turn southeast, crossing the wash area, and ultimately provide access to future hangar facilities. For conceptual planning purposes, three separate apron areas are planned to support a variety of hangar types, as shown on **Exhibit 5B**. Larger conventional hangars (sized at 150 feet by 150 feet) are planned opposite the parking lot, with smaller conventional hangars (sized at 120 feet by 120 feet) located farther east. The third apron area is planned to support linear box hangars. Vehicle access is planned from Airport Avenue, along with parking areas for users.

Helicopter Facilities

As mentioned, the wash area creates a natural separation of the planned north side aeronautical-use area. There is some benefit to this, as segregating rotor activity from fixed-wing activity is generally considered to be a safer practice. Helicopter facilities, including hangars, apron, and helicopter parking areas, are planned along the west side of the parcel. The taxilane extension from the existing apron connects this area to the airfield and allows helicopters to hover-taxi onto other areas on the airfield.

Vertiport

Since the turn of the decade, private companies have been developing and testing advanced air mobility (AAM) technologies. AAM is a new concept of air transportation using electric vertical takeoff and landing (eVTOL) aircraft to move people and cargo between places that are not easily or currently served by surface or air modes. A common example is the air taxi, in which a person or small group of people could travel within or between metropolitan areas, including airports, using small eVTOL aircraft. Development of infrastructure in support of AAM is currently underway in test cities across the world and AAM is expected to become a key component of the nation's air transportation network. Images are provided below of several different AAM/eVTOL aircraft currently in development that would use a vertiport such as the one proposed in these recommendations.



Various eVTOL Aircraft in Development (Courtesy of VoloCopter, Joby, and Lilium)

Guidelines for Vertiport Facilities

This section reviews applicable guidelines established by the FAA regarding the design of vertiports for eVTOL aircraft. A vertiport is defined as an aviation facility with the primary purpose of supporting eVTOL aircraft. As previously stated, AAM is still a developing technology. Recently, the FAA Office of Airports and Technical Center solicited aircraft design information from AAM developers. Nine companies responded to the inquiry with varying levels of cooperation, including aircraft design and specifications, operational concepts, infrastructure design, and takeoff and landing profiles. As a result of the feedback, the FAA was able to develop an interim document on the design of vertiports, titled Engineering Brief (EB) 105, *Vertiport Design*.

Reference Aircraft

The design criteria established in *Vertiport Design* are intended for eVTOL aircraft that meet the performance criteria and design characteristics of the reference aircraft. The reference aircraft denotes an eVTOL aircraft that integrates certain performance and design features of emerging aircraft. These aircraft models are rapidly evolving and manufacturers are approaching aircraft certification with a wide range of designs. Furthermore, new eVTOL aircraft have not yet received FAA airworthiness certification and do not have established safety records, which makes it impractical for the FAA to categorize these aircraft the way fixed-wing and helicopter aircraft have been; however, the feedback from eVTOL manufacturers revealed common characteristics, which the FAA used to produce *Vertiport Design*. These preliminary design characteristics, as well as expected performance capabilities and assumptions regarding takeoff and landing area design for eVTOL aircraft, are summarized in **Table 5B** and **Figure 5A**.

TABLE 5B | Reference Aircraft

Design Characteristics	Criteria
Propulsion	Electric battery driven, utilizing distributed electric propulsion
Propulsive Units	Three or more
Battery Systems	Two or more
Maximum Takeoff Weight (MTOW)	12,500 pounds (5,670 kg) or less
Controlling Dimension (CD)	50 feet (15.2 m) or less
Flight Control	Highly augmented stability and control

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TABLE 5B | Reference Aircraft (continued)

Design Characteristics	Criteria
Operating Conditions	
Operation Location	Land-based (ground or elevated) – no amphibian or float operations
Pilot	On board
Flight Conditions	VMC
Performance	
Hover	Hover out of ground effect (HOGE) in normal operations
Takeoff	Vertical
Landing	Vertical from a steady state hover
FATO = final approach and takeoff area TLOF = touchdown and liftoff area	

Source: FAA Engineering Brief 105, Vertiport Design

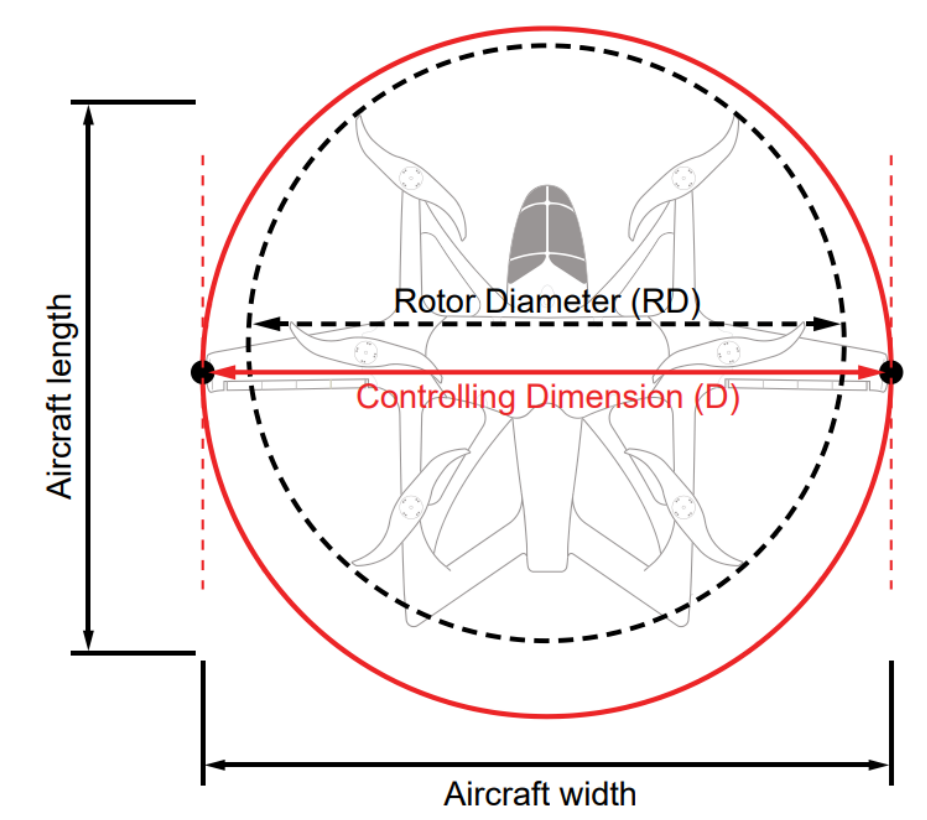


Figure 5A – Reference Aircraft Controlling Dimensions

Design Standards for Vertiports

Once the reference aircraft is determined, the design dimensions for the vertiport can be established. A vertiport may consist of several facilities, including aircraft charging and storage, passenger terminal, and takeoff and landing areas. The landside facilities of a vertiport will be specific to and determined by the unique AAM company that chooses to establish a presence in the study area. The airside facilities are the focus of EB 105. The takeoff and landing area design and geometry contained in *Vertiport Design* include the TLOF, the FATO, and the Safety Area, which are defined in detail as follows.



- **Touchdown and Liftoff Area (TLOF)** | The TLOF is a load bearing, generally paved area centered in a FATO on which the eVTOL aircraft performs a touchdown or liftoff.
- **Final Approach and Takeoff Area (FATO)** | The FATO is a defined load-bearing area over which the aircraft completes the final phase of the approach to a hover or landing, and from which the aircraft initiates takeoff.
- **Safety Area** | The Safety Area is a defined area surrounding the FATO that is intended to reduce the risk of damage to eVTOL aircraft unintentionally diverging from the FATO. The vertiport safety area is identical in purpose to a runway or taxiway safety area.

The dimensions for these areas are presented in **Table 5C** and are based on the controlling dimension (D) or rotor diameter (RD) of the design eVTOL aircraft as defined for the vertiport facility. “D” is the diameter of the smallest circle enclosing the entire eVTOL aircraft on a horizontal plane while the aircraft is in the takeoff or landing configuration with rotors turning (if applicable). “RD” is the largest length of all the rotors from tip to tip, using the diameter of the smallest circle enclosing all the lift-producing propulsion units, with rotors turning.

TABLE 5C Takeoff and Landing Area Minimum Dimensions	
Element	Dimension (length and width or diameter)
TLOF	1 RD
FATO	2 RD
Safety Area	2.5 RD
FATO = final approach and takeoff area RD = Rotor diameter TLOF = touchdown and liftoff area	

Sources: FAA EB 105, Vertiport Design (Table 2-1); Coffman Associates analysis

Each element is centered within the subsequent element: the TLOF is located in the center of the FATO, which is centered within the Safety Area, as shown by **Figure 5B**. Vertiports are distinguished with the addition of a “VTL” marking on the TLOF. Both the TLOF and FATO are expected to be located on level terrain or a structure, be clear of penetrations and obstructions, and support the weight of the design eVTOL aircraft. The TLOF may be circular, square, or rectangular in shape. A study conducted in 2011 found that a square is the preferred visual cue by EMS helicopter pilots: it was rated higher than a circle, triangle, or octagon. Regardless of the shape, the FATO and Safety Area will have the same shape.

Downwash/Outwash (DWOW) Caution Guidance

Downwash is the airflow created by the propulsion units producing lift in vertical flight. When the downwash hits the ground, it moves horizontally as outwash. The downwash and outwash created from the propulsion units of eVTOL aircraft can be dangerous to people, property, equipment, and other aircraft. This downward and outward flow can result in ground surface erosion, wake recirculation, foreign object debris (FOD) and wind hazards. When planning a vertiport, a Downwash/Outwash Caution Area (DCA) should be established based on the size of the largest operating eVTOL aircraft to restrict access/movement in the area. The DCA should extend beyond the Safety Area and appropriate measures should be taken to mitigate the risks of DWOW.

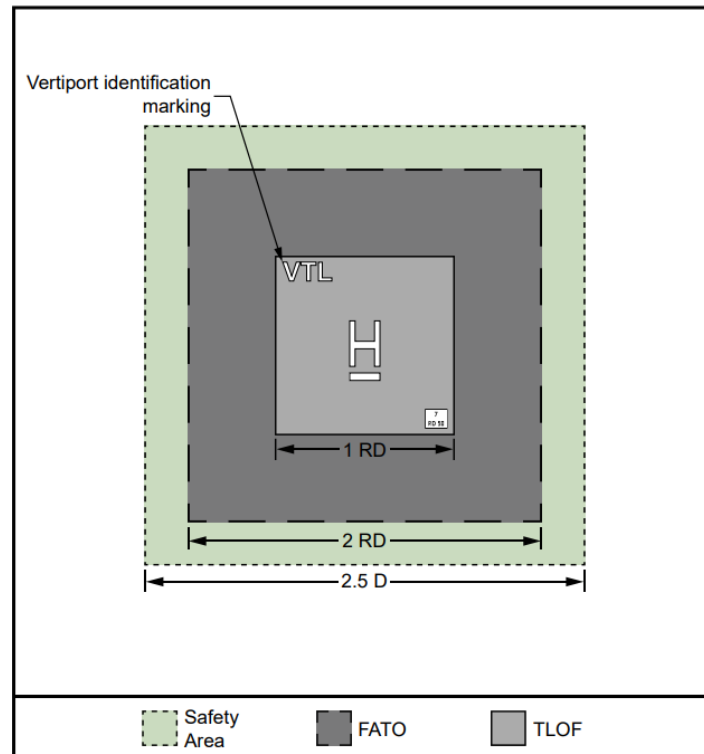


Figure 5B – Takeoff and Landing Area

Approach Profiles

- **Imaginary Surfaces** | The imaginary surfaces defined for heliports in Title 14 Code of Federal Regulations (CFR) Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, are applicable to vertiports and include the primary surface, approach, and transitional surfaces. Section 77.23 defines these surfaces for heliports, and they have been adopted for use and presented in *Vertiport Design*.
 - **Primary Surface** | The primary surface is the same size and shape as the FATO. This surface is a horizontal plane at the established vertiport elevation.
 - **Approach Surface** | The approach surface begins at each end of the vertiport's primary surface, has the same width as the primary surface, and extends outward and upward for a horizontal distance of 4,000 feet, where its width is 500 feet. The slope of this surface is 8:1 and it doubles as the departure surface.
 - **Transitional Surface** | The transitional surface extends outward and upward from the lateral boundaries of the primary and approach surfaces at a slope of 2:1 for 250 feet horizontally from the centerline of the primary and approach surfaces.

The primary, approach, and transitional surfaces should remain clear of penetrations whenever possible, unless an FAA analysis determines the penetrations to any Part 77 surface not to be hazardous. **Figure 5E** is a visual representation of the imaginary surfaces as they apply to vertiports.

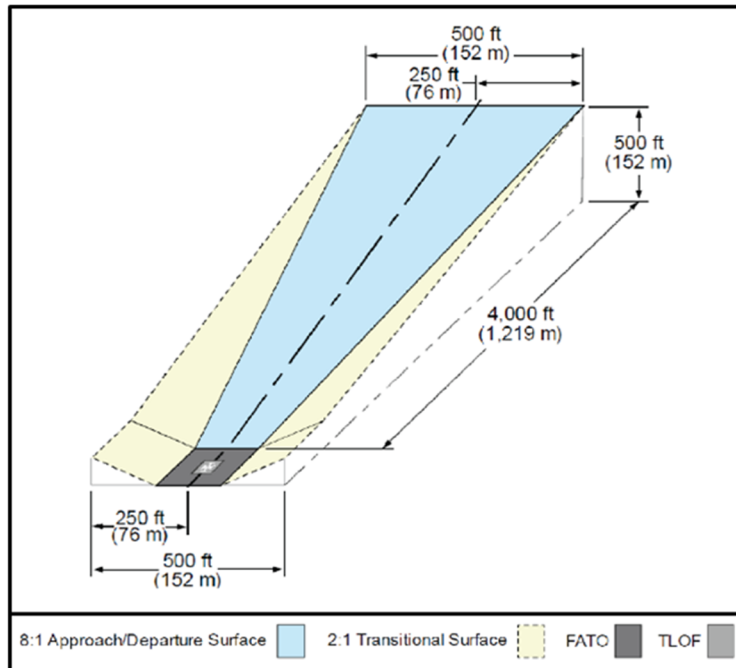


Figure 5E – Vertiport Imaginary Surfaces

Vertiport Summary

eVTOLs and AAM are an emerging yet unproven aviation market. Testing and initial adoption is likely to occur in large metropolitan areas, then expand to mid-sized and smaller markets. Full integration of eVTOL into the national airspace system may not occur for many more years; however, it is prudent for this planning study to consider the potential for this activity at Sierra Vista Municipal Airport. For this reason, the plan includes the development of a vertiport and associated terminal facility on the west side of the northwest portion of the 203-acre parcel. The vertiport dimensions depicted are conceptual and not based on a specific reference aircraft. The planned facilities include a 12,000-sf terminal facility and parking apron with four eVTOL parking spaces.

Electrical infrastructure will also be needed at the vertiport to provide power and recharging capabilities for the aircraft. Initial estimates from manufacturers range between 500-kilowatt (kW) to 1.0-megawatt (MW) power supply per charger. The vertiport in the terminal area is planned to have four parking spaces, which equates to 4.0 MWs, on the high end: the goal is for the charging stations to provide an 80 percent charge in 15-25 minutes.

Spaceport Facilities

Recently, the City of Sierra Vista began coordination with a space exploration company to establish engineering and manufacturing operations at the airport. A Spaceport Feasibility Study was conducted that ultimately determined such facilities would be feasible at FHU when considering existing military and civilian activity and would provide economic benefits to the city. At the time of this writing (May 2025), the city is in the process of acquiring a Title 14 CFR Part 450 Launch and Reentry License in order to accommodate the reentry of spacecraft vehicles and components, anticipated to be issued in early 2027.

To plan for this future use, the development concept has reserved an 8.8-acre parcel on existing airport property, adjacent to the terminal apron (shown in orange shading on **Exhibit 5B**). This area is expected to accommodate a spacecraft manufacturing facility and related infrastructure, including access roads and expanded utilities.

USFS/CBP Facilities

Facilities associated with the USFS and CBP are currently located on the south side of the airport. In an effort to better segregate military and civilian activities, the plan includes a relocation of these facilities to an area on the north side of the airport. **Exhibit 5B** details the preferred site for these operations, adjacent to Taxiway K and near the current Runway 21 threshold. Approximately 4.8 acres of LAAF property are reserved for the relocated USFS and CBP facilities (shown in gray shading). Additional coordination with LAAF personnel will be necessary to confirm site specifics prior to any relocation activities.

Aeronautical Reserve

In the event demand arises for expanded landside facilities beyond what is depicted on the development concept, two additional parcels of property have been set aside for future aeronautical use. West of the wash area, a 6.2-acre parcel is reserved along the extended taxilane and adjacent to planned helicopter facilities. A second, 15.2-acre area is reserved east of the wash area and opposite the planned hangar development along Airport Avenue. These areas, shaded in purple, have aeronautical development potential as they are located along the planned taxilane extensions and could support additional aircraft parking aprons, hangars, and aviation-related businesses.

Non-Aeronautical Reserve

As discussed, the 203-acre parcel the city is acquiring is planned to support both aeronautical and non-aeronautical development in the future. Non-aeronautical development on airport property is intended to maximize and diversify revenue streams, ultimately helping the airport become more self-sustaining and generate a larger economic impact within the community.

Exhibit 5B depicts the area planned for future non-aeronautical development (shown in green shading) at Sierra Vista Municipal Airport. For conceptual planning purposes, the larger tract has been divided into smaller parcels that could accommodate a variety of tenants. Access roads are also depicted, with one extending from State Highway 90 and another from Airport Avenue, as well as interior roads.

Non-aeronautical development on or adjacent to an airport should be compatible with airport operations and activities. Airport-compatible land uses are those that can coexist with a nearby airport without constraining the safe and efficient operation of the airport or exposing people living or working nearby to significant environmental impacts. Examples of compatible land uses include industrial and manufacturing facilities, office parks, research and development complexes, and storage facilities, among others. The City of Sierra Vista should use its regulatory authority to implement compatible use zoning over the non-aeronautical reserve area.



AIRPORT RECYCLING, REUSE, AND WASTE REDUCTION

The primary objective of this section is to provide the City of Sierra Vista and its airport administration with recommendations for future improvements and processes that promote suitable sustainability principles in addressing future airport operations and aviation demand. By prioritizing recycling in the planning process and identifying best management practices, the airport can become a more environmentally friendly economic hub.

REGULATORY GUIDELINES

FAA Modernization and Reform Act of 2012

The *FAA Modernization and Reform Act of 2012* (FMRA), which amended Title 49, United States Code (USC), included several changes to the AIP. Two of these changes are related to recycling, reuse, and waste reduction at airports:

- Section 132(b) of the FMRA expanded the definition of airport planning to include “developing a plan for recycling and minimizing the generation of airport solid waste, consistent with applicable State and local recycling laws, including cost of a waste audit.”
- Section 133 of the FMRA added a provision requiring any airport that has or plans to prepare a master plan, and receives AIP funding for an eligible project to ensure the new or updated master plan addresses issues related to solid waste recycling at the airport, including the following:
 - The feasibility of solid waste recycling at the airport
 - Minimizing the generation of solid waste at the airport
 - Operation and maintenance requirements
 - A review of waste management contracts
 - The potential for cost savings or generation of income

State of Arizona Solid Waste Management

The Arizona Department of Environment Quality (ADEQ) enforces the state’s solid waste program.¹ The purpose of the program is to ensure proper management of solid waste. Solid waste includes the municipal solid waste that is typically collected and disposed of in the municipal landfills, as well as other nonhazardous waste. Duties assigned to this program include the following:

- Issuances of permits, certifications, and licenses to solid waste facilities
- Conduction of solid waste facility inspections to ensure such facilities are compliant with state and federal regulations

¹ ADEQ (<https://www.azdeq.gov/SolidWaste>)



- Conduction of compliance inspections and enforcement actions
- Investigation of complaints
- Provision of information to the general public on recycling, reuse, and proper management of waste-like materials

City of Sierra Vista Waste Management

The city's Public Works Department oversees and manages the city's waste and environmental stewardship programs. In 2019, the city eliminated its curbside recycling program;² however, the city continues to operate its compost program, which allows for the proper disposal of green waste, as well as programs that encourage the disposal of hazardous waste. Furthermore, while no formal recycling program is enforced at a citywide level, a number of businesses and centers accept various recyclable goods.³

SOLID WASTE

Airport sponsors typically have purview over waste-handling services in facilities they own and operate, such as passenger terminal buildings, hangars, aircraft rescue and firefighting (ARFF) stations, and maintenance facilities. Tenants of airport-owned buildings/hangars or tenants that own their facilities are typically responsible for coordinating their own waste-handling services.

For airports, waste can generally be divided into eight categories:⁴

- **Municipal Solid Waste (MSW)** is more commonly known as trash or garbage and consists of everyday items that are used and then discarded, such as product packaging.
- **Construction and Demolition (C&D)** is considered non-hazardous trash resulting from land clearing, excavation, demolition, and renovation or repair of structures, roads, and utilities. C&D waste includes concrete, wood, metals, drywall, carpet, plastic, pipes, cardboard, and salvaged building components. C&D is also generally labeled MSW.
- **Green Waste** is a form of MSW yard waste consisting of trees, shrubs, and glass clippings, leaves, weeds, small branches, seeds, and pods.
- **Food Waste** includes unconsumed food products or waste generated and discarded during food preparation and is also considered MSW.
- **Deplaned Waste** is waste removed from passenger aircraft. Deplaned waste includes bottles, cans, mixed paper (i.e., newspapers, napkins, and paper towels), plastic cups, service ware, food waste, and food-soiled paper/packaging.

² Sierra Vista Arizona, Public Works, Environmental Stewardship (<https://www.sierravistaaz.gov/our-city/departments/marketing-communications/environmental-stewardship>), accessed May 2025

³ Sierra Vista Arizona, Public Works, Environmental Stewardship, What and Where to Recycle (<https://www.sierravistaaz.gov/our-city/departments/public-works/recycling/recycling-opportunities>), accessed May 2025

⁴ FAA, Recycling, Reuse and Waste Reduction at Airports, April 24, 2013

- **Lavatory Waste** is a special waste that is emptied through a hose and pumped into a lavatory service vehicle. The waste is then transported to a triturator⁵ facility for pretreatment prior to discharge in a sanitary sewage system. Chemicals in lavatory waste can present environmental and human health risks if mishandled; therefore, caution must be taken to ensure lavatory waste is not released to the public sanitary system prior to pretreatment.
- **Spill Clean and Remediation Wastes** are special wastes that are generated during cleanup of spills and/or remediation of contamination from several types of sites on an airport.
- **Hazardous Wastes** are governed by the *Resource Conservation and Recovery Act (RCRA)*, as well as by the regulations in Title 40 CFR Subtitle C, Parts 260 to 270. The U.S. Environmental Protection Agency (EPA) developed less stringent regulations for certain hazardous waste (universal waste), described in 40 CFR Part 237, the *Universal Waste Rule*.

As shown on **Exhibit 5C**, the airport potentially contributes to the waste stream in multiple areas, including the passenger terminal building, on-airport tenants (e.g., fixed base operators [FBOs]), and airport construction projects. To create a comprehensive waste reduction and recycling plan for the airport, all potential inputs must be considered.

Existing Services

The airport currently contracts with the city to remove and transport its solid waste. Tenants at the airport are responsible for overseeing their own solid waste. Sierra Vista Municipal Airport does not currently enforce a recycling program.

Types of Solid Waste Management Systems

Airports generally utilize either centralized or decentralized waste management systems. The differences between these two methods are summarized in **Exhibit 5D** and described as follows. Sierra Vista Municipal Airport currently operates a decentralized waste system.

- *Centralized waste management system* | With a centralized management system, the airport provides receptacles for the collection of waste, recyclable materials or compostable materials and contracts for their removal by a single local provider.⁶ The centralized waste management system allows for more participation from airport tenants that may not be incentivized to recycle on their own and can reduce the overall cost of service for all involved. A centralized strategy can be inefficient for some airports as it requires more effort and oversight on the part of airport management; however, the centralized system is advantageous in that it involves fewer working components in the overall management system of solid waste and recycling efforts. It also allows greater control by the airport sponsor over the type, placement, and maintenance of dumpsters, thereby saving space and eliminating the need for tenants to have individual containers.

⁵ A triturator turns lavatory waste into fine particulates for further processing.

⁶ National Academies of Science, Engineering, and Medicine, Airport Cooperative Research Program, Synthesis 92, Airport Waste Management and Recycling Practices, 2018



AIRPORT AREA

POTENTIAL INPUTS

POTENTIAL OUTPUTS

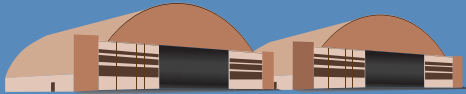
AIRFIELDS



Aircraft
Operations

Runway Rubber
Green Waste

HANGARS



Goods
Movements

Plastic
Wood
Vehicle Waste
(Tires & Fluids)

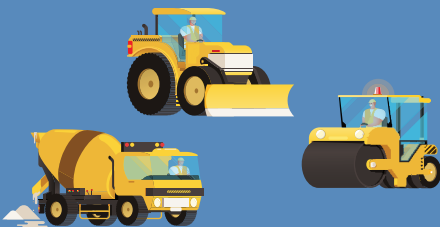
AIRPORT TRAFFIC CONTROL TOWER



Employees

Paper
Trash
Aluminum Cans

AIRPORT CONSTRUCTION

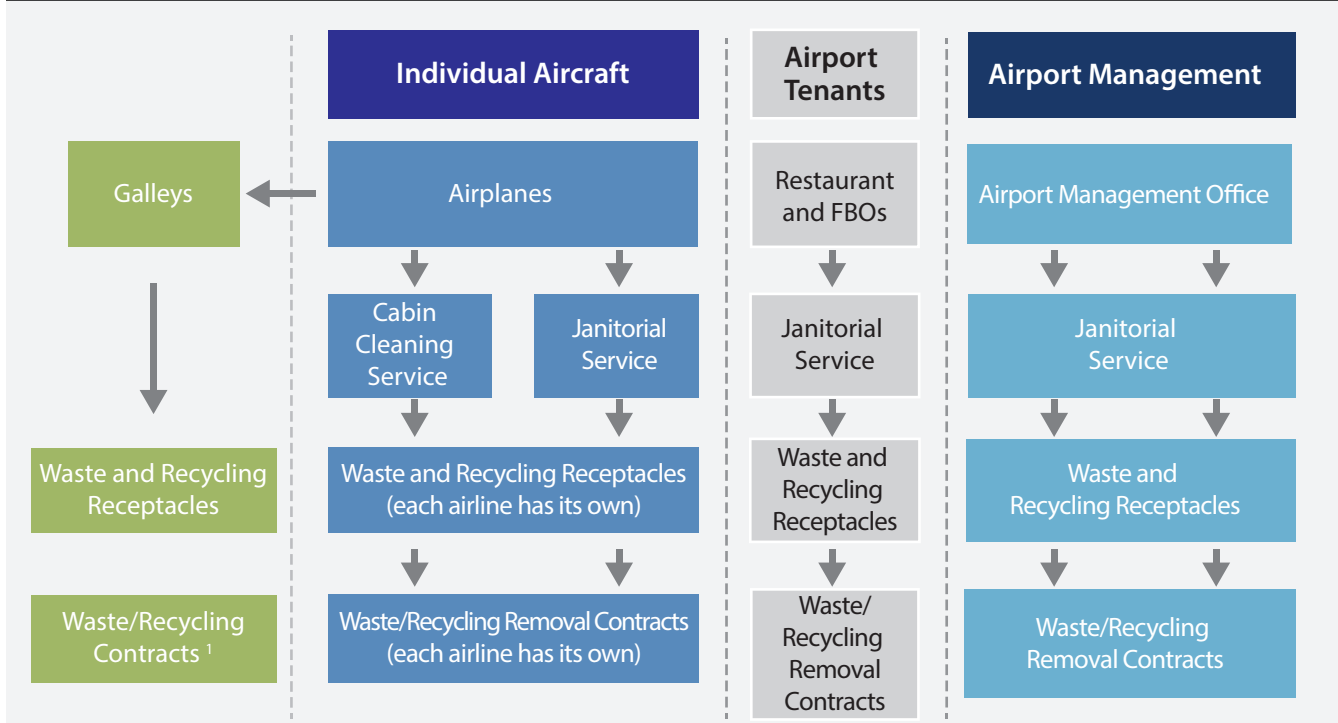


Construction
Re-Construction
Demolition

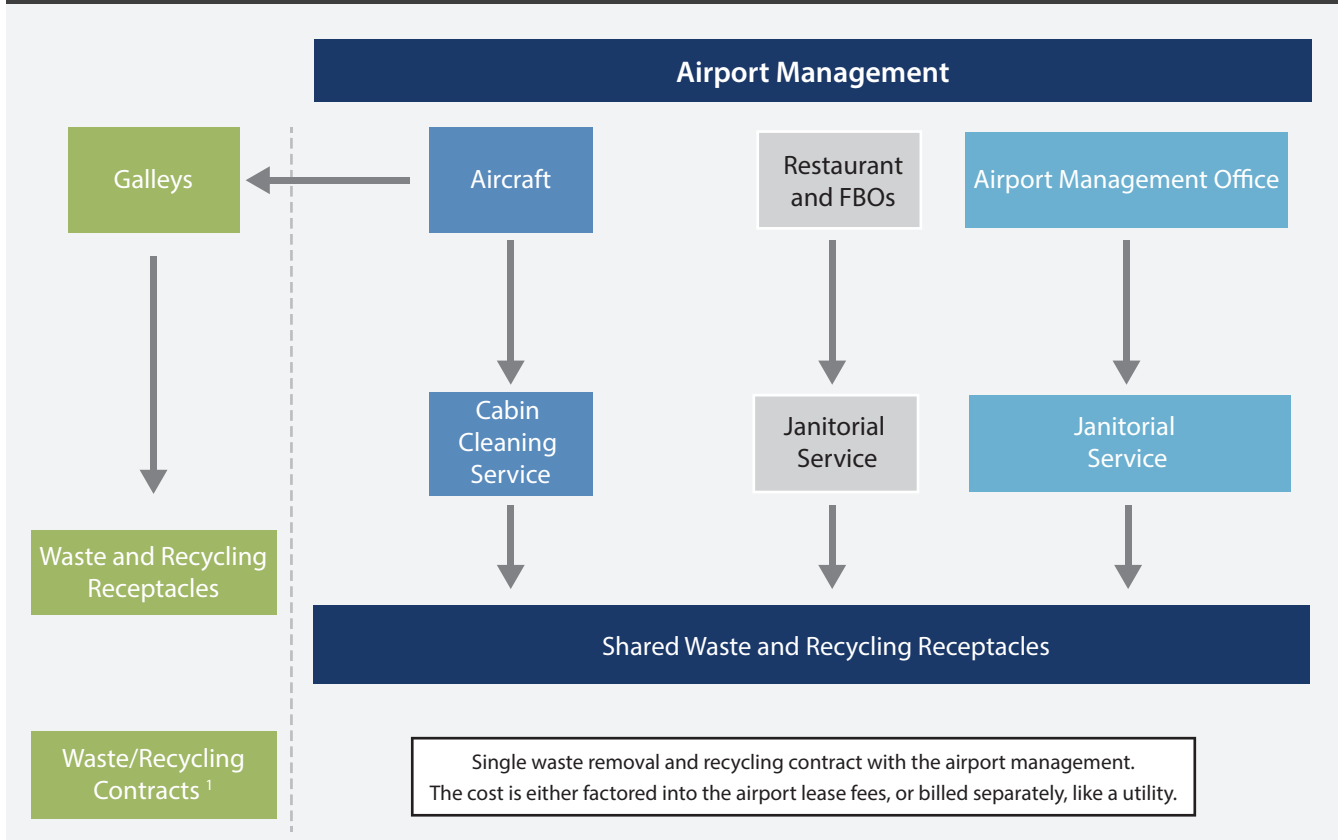
Reused Concrete
Reused Asphalt
Vehicle Waste
Soils
Building Materials
Wood
General Waste



Components of a Decentralized Airport Waste Management System



Components of a Centralized Airport Waste Management System



¹ Galleys usually manage their own waste even if an airport relies on a centralized system

Source: Natural Resources Defense Council, Trash Landings: How Airlines and Airports Can Clean Up Their Recycling Programs, December 2006.



- **Decentralized waste management** | Under a decentralized waste management system, the airport provides waste containers and contracts for the hauling of waste materials in the airport-operated spaces only; however, airport tenants (such as FBOs, retail shops, and others) manage the waste from their leased spaces with separate contracts, billing, and hauling schedules. A decentralized waste management system can increase the number of receptacles on airport property and the number of trips by a waste collection service provider should tenants' and airport's collection schedules differ.

Existing Services

The airport currently contracts with the city to remove and transport its solid waste. Tenants at the airport are responsible for overseeing their own solid waste. Sierra Vista Municipal Airport does not currently enforce a recycling program.

GOALS AND RECOMMENDATIONS

To maximize waste reduction and introduce recycling efforts at the airport, the following recommendations have been made to achieve the goals outlined in **Table 5D**.

TABLE 5D Waste Management and Recycling Goals	
Goals	Objectives
Create a Recycling Program	Encourage waste and tracking and data management Introduce recycling services to all areas of the airport
Reduce Amount of Solid Waste Generated	Conduct a waste audit to identify the most common types of waste Reduce waste through controlled purchasing practices and the consumption of nonessential products

Source: Coffman Associates, Inc.

Objective 1: Encourage waste and recycling tracking and data management

- Create a centralized waste management system at the airport. FHU currently participates in a decentralized waste management system, as airport tenants are responsible for overseeing their own waste management. Airport staff could consider engaging tenants to create a centralized waste management system at the airport to streamline waste management and recycling efforts at FHU.
- Assign the responsibility of waste management to a dedicated individual(s). Designating one person or a group of people to oversee and manage solid waste and recycling at the airport will create efficient and cost-saving solutions to solid waste management. People dedicated to this operational aspect of the airport will be familiar with the necessary processes and can identify areas of improvement and potential cost-cutting measures.
- Create a tracking and reporting system. Tracking solid waste generated at FHU will help identify areas where a significant amount of waste is generated, which will help the airport estimate annual waste volumes. Understanding the cyclical nature of waste generation will allow the airport to estimate costs and identify areas of improvement.

Objective 2: Introduce recycling services in all areas of the airport

- Create a recycling program at the airport. To guarantee the airport reduces the amount of waste hauled to the landfill, materials that cannot be reused or avoided should be recycled, if possible. Once a recycling program is in place, the city should review internal procedures to ensure there are no unacceptable items contaminating recycling containers or recyclables being thrown in the trash. Clearly marked signage communicating what is and is not accepted should be placed near the solid waste and recycling containers; this is another significant component of a consistent, effective recycling program.
- Recycle waste and electronic waste (e-waste). Recyclable materials (such as paper, aluminum, plastic, electronics, etc.) should be sorted from the airport's solid waste. The airport can check with the city's Public Works Department to confirm which businesses and organizations accept the various types of recyclable material.

Objective 3: Conduct a waste audit to identify the most common types of waste

- Audit the current waste management system. The mark of an effective program requires accurate data of current waste and recycling rates. There are several ways to gain insight into an airport's waste stream, such as requesting weights from the hauler, tracking the volume, or reviewing the bills; however, managing a waste system starts with a waste audit. A waste audit is an analysis of the types of waste produced and is the most comprehensive and intensive way to assess waste stream composition, opportunities for waste reduction, and capture of recyclables. A waste audit should include the following actions:
- Examine records and data
 - Examine waste hauling and disposal records and contracts
 - Inspect supply and equipment invoices
 - Evaluate other waste management costs (commodity rebates, container costs, etc.)
 - Track waste from the point of origin
 - Establish a baseline for metrics
- Organize a facility walk-through conducted by the airport
 - Attain qualitative waste information to determine major waste components and waste-generating processes
 - Identify the locations at the airport that generate waste
 - Identify what types of waste are generated by the airport to determine what can be reduced, reused, or recycled
 - Understand waste pick-up and hauling practices
- Sort through waste
 - Provides quantitative data on total airport waste generation
 - Allows problem-solving design / enhances the recycling program for the airport



Objective 4: Reduce waste through controlled purchasing practices and consumption of nonessential products

- Reduce waste by controlling purchasing and decrease the consumption of nonessential products. The airport can control the amount of waste generated by prioritizing the purchase of items or supplies that are reusable, recyclable, compostable, or made from recycled materials.

ENVIRONMENTAL OVERVIEW

An analysis of potential environmental impacts associated with proposed airport projects is an essential consideration in the airport master plan process. The primary purpose of this discussion is to review the recommended development concept (**Exhibits 5A and 5B**) and the airport's capital program to determine whether projects identified in the airport master plan could, individually or collectively, significantly impact existing environmental resources. Information contained in this section was obtained from previous studies, official internet websites, and analysis by the consultant. This section provides an overview of potential impacts to existing resources that could result from the implementation of the planned improvements outlined on the recommended development concept.

If the FAA retains approval authority over a project, then the project is typically subject to the *National Environmental Policy Act* (NEPA). For projects not categorically excluded under FAA Order 1050.1G, *FAA National Environmental Policy Act Implementing Procedures*, compliance with NEPA is generally satisfied through the preparation of environmental assessment (EA). In instances where significant environmental impacts are expected, an environmental impact statement (EIS) may be required.

The 2024 FAA Reauthorization Act has also introduced a variety of updated and new environmental guidelines. The primary environmental-related updates are outlined in three sections: Section 743 and Section 783.

- Section 743 details the FAA's authority to regulate uses of airport property for projects on land acquired without federal assistance and outlines limitations imposed on non-aeronautical review. Section 743 also states that a notice of intent for proposed projects outside FAA jurisdiction should be submitted by an airport sponsor to the FAA.
- Section 783 outlines that airport capacity enhancement projects, terminal development projects, and general aviation airport improvement projects will be subject to coordinated and expedited environmental review requirements. Section 783 also introduces a new process for determining which safety-related projects should be prioritized during the environmental review process.

The following portion of the master plan is not designed to satisfy NEPA requirements for a specific development project, but it provides a preliminary review of environmental issues that may need to be considered in more detail within the environmental review processes. It is important to note that the FAA is ultimately responsible for determining the level of environmental documentation required for airport actions.

Table 5E summarizes potential environmental concerns associated with implementation of the ultimate recommended development concept for FHU. Analysis under NEPA includes effects or impacts a proposed action or alternative may have on the human environment (see 40 Code of Federal Regulations [CFR] §1508.1).

TABLE 5E | Summary of Potential Environmental Concerns

FAA Order 1050.1F, <i>Significance Threshold/Factors to Consider</i>	Potential Environmental Concerns
AVIATION EMISSIONS AND AIR QUALITY¹	
<i>The action would cause pollutant concentrations to exceed one or more of the National Ambient Air Quality Standards (NAAQS), as established by the United States (U.S.) Environmental Protection Agency (EPA) under the Clean Air Act, for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations.</i>	Potential Impact. An increase in operations could occur over the 20+ year planning horizon of the master plan that would likely result in additional emissions. However, the portion of Cochise County that contains the airport is in attainment for all federal criteria pollutants. For construction or operational emissions, project-specific qualitative or quantitative emissions inventories under NEPA may be required, depending on the type of environmental review needed for specific projects defined on the development plan concept.
BIOLOGICAL RESOURCES (including fish, wildlife, and plants)²	
<i>The U.S. Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS) determines that the action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species or would result in the destruction or adverse modification of federally designated critical habitat.</i> <i>FAA has not established a significance threshold for non-listed species. However, factors to consider are if an action would have the potential for:</i> • Long-term or permanent loss of unlisted plant or wildlife species; • Adverse impacts to special status species or their habitats;	Federally Protected Species Potential Impact. According to the U.S. FWS Information for Planning and Consultation (IPaC) report, there is potential for 14 non-essential experimental, proposed threatened, threatened, or endangered species at FHU, including: • jaguar – endangered • ocelot – endangered • cactus ferruginous pygmy-owl – threatened • Mexican spotted owl – threatened • northern aplomado falcon – non-essential experimental • yellow-billed cuckoo – threatened • Chiricahua leopard frog – threatened • desert pupfish – endangered • Gila chub – endangered • Gila topminnow – endangered <i>Continues on next page</i>

TABLE 5E | Summary of Potential Environmental Concerns (continued)

FAA Order 1050.1F, <i>Significance Threshold/Factors to Consider</i>	Potential Environmental Concerns
BIOLOGICAL RESOURCES (including fish, wildlife, and plants)² (continued)	
• Substantial loss, reduction, degradation, disturbance, or fragmentation of native species' habitats or their populations; or • Adverse impacts on a species' reproductive rates, non-natural mortality, or ability to sustain the minimum population levels required for population maintenance.	• monarch butterfly – proposed threatened • Arizona eryngo – endangered • Canelo Hills ladies'-tresses - endangered • Huachuca water umbel – endangered Out of this list, the monarch butterfly may occur within the airport. Based on a biological resources evaluation for FHU, Milkweed and flowering species have been observed with the airport. <u>Designated Critical Habitat</u> No Impact. There are no designated critical habitats within airport boundaries. <u>Non-Listed Species</u> Potential Impact. Non-listed species of concern include those protected by the <i>Migratory Bird Treaty Act</i> (MBTA) and the <i>Bald and Golden Eagle Protection Act</i>. Based on a Biological Resources Evaluation for FHU, there have been no documented occurrences of bald eagles within the airport. Furthermore, suitable bald eagle foraging habitat (i.e., flowing rivers or lakes containing fish) is not present at FHU or adjacent to FHU within the ultimate property line. Unlike the bald eagle, there have been documented occurrences of golden eagles within FHU's existing property boundaries. Bird species protected by the MBTA could be adversely affected if construction occurs during the nesting and breeding seasons. Pre-construction surveys of vegetated areas at the airport are recommended for projects that involve ground clearing unless such projects occur outside the nesting and breeding seasons (mid-February through later September and January through June for raptors). Projects related to future acquisitions of land that contain vegetation may also be areas of concern.

Continues on next page



TABLE 5E | Summary of Potential Environmental Concerns (continued)

FAA Order 1050.1F, <i>Significance Threshold/Factors to Consider</i>	Potential Environmental Concerns
COASTAL RESOURCES³	
FAA has not established a significance threshold for Coastal Resources. Factors to consider are if an action would have the potential to: • Be inconsistent with the relevant state coastal zone management plan(s); • Impact a coastal barrier resources system unit; • Pose an impact on coral reef ecosystems; • Cause an unacceptable risk to human safety or property; or • Cause adverse impacts on the coastal environment that cannot be satisfactorily mitigated.	No Impact. The airport is not located within a coastal zone. The closest National Marine Sanctuary is the Channel Islands National Marine Sanctuary, situated 545 miles away from FHU.
DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(f) (Now codified in 49 United States Code [U.S.C.] § 303)⁴	
The action involves more than a minimal physical use of a Section 4(f) resource or constitutes a “constructive use” based on an FAA determination that the aviation project would substantially impair the Section 4(f) resource. Resources that are protected by Section 4(f) are publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance; and publicly or privately owned land from an historic site of national, state, or local significance. Substantial impairment occurs when the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished.	No Impact. No wilderness areas, public recreational facilities, or National Register of Historic Places (NRHP)-listed resources would be impacted by proposed development at the airport.
FARMLANDS⁵	
The total combined score on Form AD-1006, Farmland Conversion Impact Rating, ranges between 200 and 260. (Form AD-1006 is used by the U.S. Department of Agriculture, Natural Resources Conservation Service [NRCS] to assess impacts under the Farmland Protection Policy Act [FPPA].) FPPA applies when airport activities meet the following conditions: • Federal funds are involved; • The action involves the potential for the irreversible conversion of important farmlands to non-agricultural uses. Important farmlands include pastureland, cropland, and forest considered to be prime, unique, or statewide or locally important land; or • None of the exemptions to FPPA apply. These exemptions include:	No Impact. According to the NRCS Web Soil Survey, the airport and land to be acquired to the north of the existing property line is comprised of White House complex, 1 to 30 percent slopes soils that are classified as not prime farmland.

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TABLE 5E | Summary of Potential Environmental Concerns (continued)

FAA Order 1050.1F, Significance Threshold/Factors to Consider	Potential Environmental Concerns
FARMLANDS⁵ (continued)	
○ When land is not considered “farmland” under FPPA, such as land already developed or already irreversibly converted. These instances include when land is designated as an urban area by the U.S. Census Bureau or the existing footprint includes rights-of-way. ○ When land is already committed to urban development. ○ When land is committed to water storage. ○ The construction of non-farm structures necessary to support farming operations. ○ The construction/land development for national defense purposes.	
HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION⁶	
FAA has not established a significance threshold for Hazardous Materials, Solid Waste, and Pollution Prevention. However, factors to consider are if an action would have the potential to: • Violate applicable federal, state, tribal, or local laws or regulations regarding hazardous materials and/or solid waste management; • Involve a contaminated site; • Produce an appreciably different quantity or type of hazardous waste; • Generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal and/or would exceed local capacity; • Use a different method of waste collection, treatment, storage, or disposal that, as an action, would adversely impact the site, surroundings, or affected community, and/or would exceed extant state, Tribal, or local capacity; or • Adversely affect human health and the environment.	Potential Impact. There are no identified brownfields or Superfund sites within a one-mile buffer of the airport. Prior to any proposed land acquisition, a Phase I site assessment should be conducted to provide a more detailed understanding of what hazardous materials may be located on the land to be purchased. Due to existing regulatory environmental management regarding hazardous materials and waste and stormwater management, no impacts related to ultimate airport development are anticipated. If a future spaceport is located at the airport, project-specific impacts related to this unique land use would be evaluated in a project-specific NEPA document. The construction of proposed hangars on the north side of the existing property line would increase the amount of solid waste generated at the airport; however, no long-term impacts related to solid waste disposal are expected. The city has several drop locations for recyclable materials, and the closest landfill is less than three miles from the airport.
HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES⁷	
FAA has not established a significance threshold for Historical, Architectural, Archaeological, and Cultural Resources. Factors to consider are if an action would result in a finding of “adverse effect” through the Section 106 process. However, an adverse effect finding does not automatically trigger the preparation of an EIS (i.e., a significant impact).	No Impact. As part of this master plan, a cultural resources survey and archival review was conducted for the 77.18 acres of existing Sierra Vista Municipal Airport property and 201.8 acres of Fort Huachuca land that may be acquired for airport use. No archaeological sites or isolated occurrences of cultural materials were identified during this survey. Furthermore, there are no NRHP-listed resources on or within one mile of the airport.

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TABLE 5E | Summary of Potential Environmental Concerns (continued)

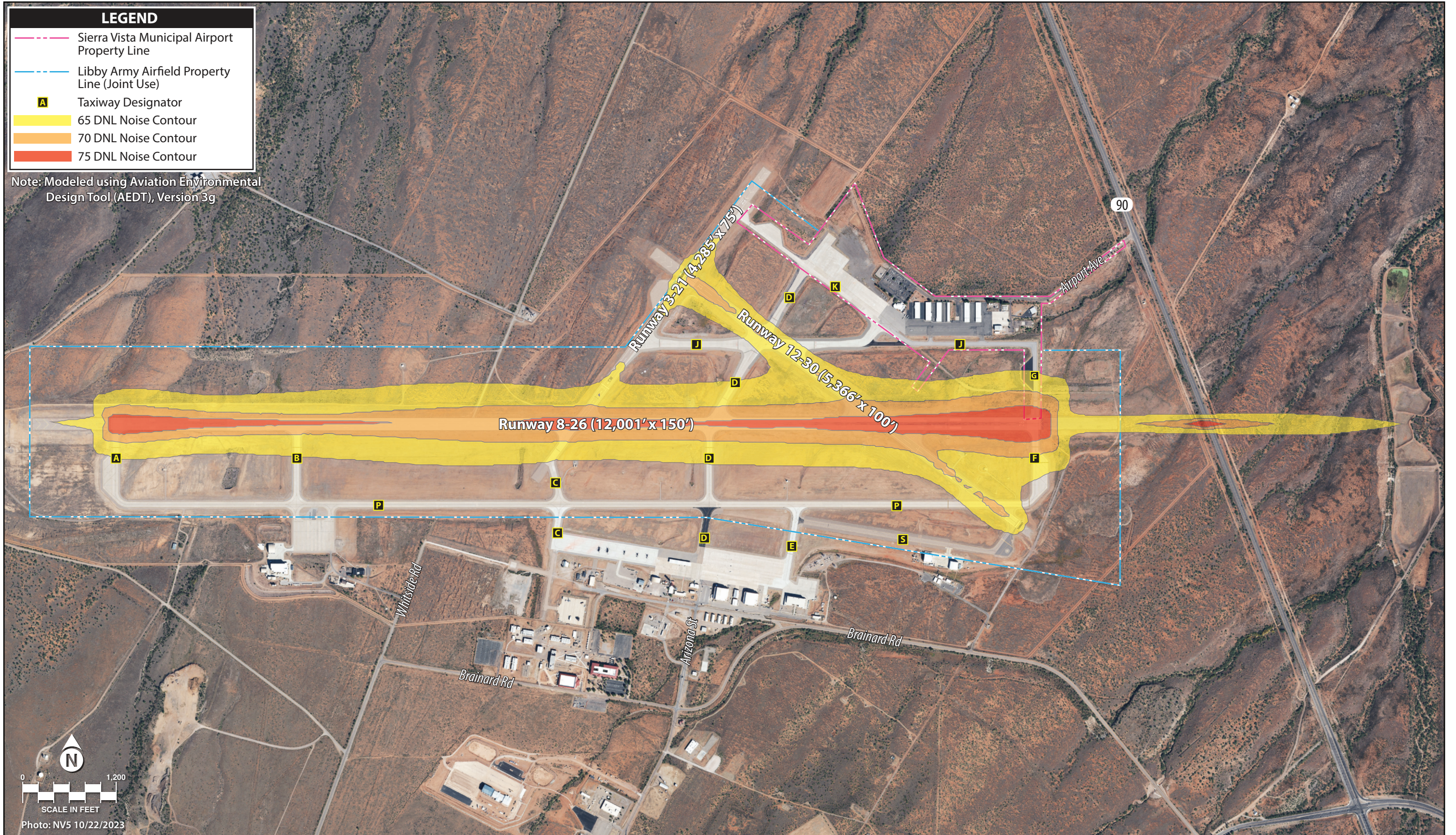
FAA Order 1050.1F, Significance Threshold/Factors to Consider	Potential Environmental Concerns
LAND USE <i>FAA has not established a significance threshold for Land Use. There are also no specific independent factors to consider. The determination that significant impacts exist is normally dependent on the significance of other impacts.</i>	No Impact. Proposed airport improvements include new hangars, an ultimate Runway 12 extension, acquisition of land to the north and west for aeronautical and non-aeronautical purposes, repurpose of Runway 3-21 as a taxiway, construction of Taxiway L, installation of a segmented circle south of Taxiway J, and the installation of a medium intensity approach light system (MALSF) for Runway 26. These airside and landside airport improvements would primarily be contained to the existing airfield environment (with the exception of the runway extension and areas slated for RPZ protection) and a parcel of land to the north of the existing property boundaries. These areas are currently vacant and would not displace or relocate residences or local businesses. A portion of Elevenmile Road (west of the airport) would also be removed and relocated as a result of the proposed runway extension to Runway 12. The road closure and relocation are not anticipated to have a significant impact on vehicular traffic, as there are currently no businesses or residences near this area. Exhibit 5A depicts property to be protected within the Runway 8-26 and Runway 12-30 RPZs. Common practices to enforce when protecting an RPZ may include property acquisition or implementing an avigation easement. These parcels do not currently house any residential land uses or local businesses that would be relocated as a result of the RPZ protection.
NATURAL RESOURCES AND ENERGY SUPPLY <i>FAA has not established a significance threshold for Natural Resources and Energy Supply. However, factors to consider are if the action would have the potential to cause demand to exceed available or future supplies of these resources.</i>	No Impact. Planned development projects at the airport could increase demands on energy utilities, water supplies and treatment, and other natural resources during construction; however, significant long-term impacts are not anticipated. If long-term impacts become a concern, coordination with local service providers is recommended.
NOISE AND NOISE-COMPATIBLE LAND USE <i>The significance threshold applies to all civil aviation activities, including aircraft and airports; UAS and hubs; AAM and vertiports; and commercial space vehicles and launch and reentry sites.</i> <i>The action would result in noise exposure from impulsive noise sources (e.g. sonic booms) that meet or exceed 60 CDNL – equivalent to DNL 65 dBA.</i> <i>The action would increase noise by Day-Night Average Sound Level (DNL) 1.5 decibel (dB) or more for a noise-sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the no action alternative for the same timeframe.</i>	No Impact. Exhibit 5E shows existing and anticipated noise contours for the airport. As shown on Exhibit 5E for existing conditions, the 65, 70, and 75 DNL noise exposure contour is outside the airport property line on the east side. A small portion of the 65 DNL contour extends beyond the LAAF boundary near Runway 12. In the future (2043) noise contours, the contours extend farther outside FHU/LAAF property to the east and northwest. There are no residential units within the 65 DNL noise contour. The future development at the airport is not expected to change the overall noise environment by more than the 1.5-dB threshold; however, this should be confirmed prior to implementing a runway extension on ultimate Runway 12, as depicted on Exhibit 5A. There are no noise-sensitive land uses (i.e., places of worship, schools, or overnight medical facilities) less than a mile from the airport. It should also be noted that, since the development of the noise contours, the RC-12 aircraft utilized by the Army has been retired, which would likely reduce the size of the contours. <i>Continues on next page</i>



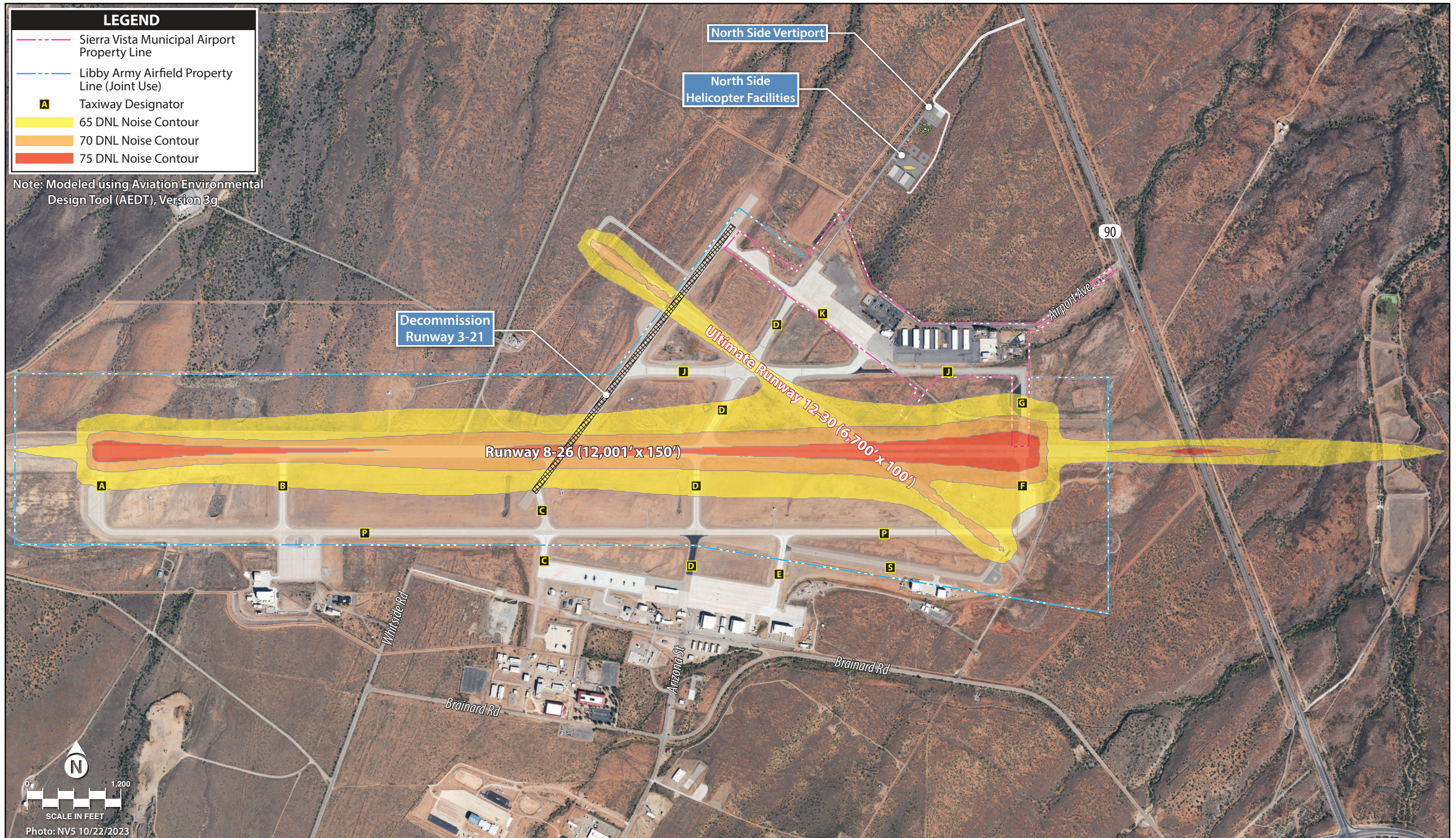
TABLE 5E | Summary of Potential Environmental Concerns (continued)

FAA Order 1050.1F, Significance Threshold/Factors to Consider	Potential Environmental Concerns
NOISE AND NOISE-COMPATIBLE LAND USE (continued)	
Another factor to consider is that special consideration should be given to the evaluation of the significance of noise impacts on noise-sensitive areas within Section 4(f) properties where the land use compatibility guidelines in Title 14 Code of Federal Regulations (CFR) Part 150 are not relevant to the value, significance, and enjoyment of the area in question.	
SOCIOECONOMICS AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS	
Socioeconomics	
FAA has not established a significance threshold for Socioeconomics. However, factors to consider are if an action would have the potential to: • Induce substantial economic growth in an area, either directly or indirectly (e.g., through establishing projects in an undeveloped area); • Disrupt or divide the physical arrangement of an established community; • Cause extensive relocation when sufficient replacement housing is unavailable; • Cause extensive relocation of community businesses that would cause severe economic hardship for affected communities; • Disrupt local traffic patterns and substantially reduce the levels of service of roads serving the airport and its surrounding communities; or • Produce a substantial change in the community tax base.	No Impact. Proposed development would not relocate or disrupt existing businesses or residents. No division of existing neighborhoods or housing/business relocations would occur due to the proposed development on the airport. Ultimate airport projects may result in temporary disruption of local traffic patterns along Arizona State Route 90 during construction. New land use facilities such as the proposed hangars are not expected to generate a significant increase in vehicular traffic.
Children's Health and Safety Risks	
FAA has not established a significance threshold for Children's Environmental Health and Safety Risks. However, factors to consider are if an action would have the potential to lead to a disproportionate health or safety risk to children.	No Impact. No disproportionately high or adverse impacts are anticipated to affect children living, playing, or attending school near the airport because of the proposed ultimate development. The closest residential area is located over one mile south of FHU. The airport is an access-controlled facility and children are not allowed within the fenced portions of the airport without adult supervision. All construction areas should be controlled to prevent unauthorized access.

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Note: Since the development of the noise contours, the RC-12 aircraft has been retired, which may reduce the size or shape of the contours.



Note: Since the development of the noise contours, the RC-12 aircraft has been retired, which may reduce the size or shape of the contours.



TABLE 5E | Summary of Potential Environmental Concerns (continued)

FAA Order 1050.1F, Significance Threshold/Factors to Consider	Potential Environmental Concerns
VISUAL EFFECTS (INCLUDING LIGHT EMISSIONS AND VISUAL RESOURCES/VISUAL CHARACTER)	
Light Emissions	
<i>FAA has not established a significance threshold for Light Emissions. However, a factor to consider is the degree to which an action would have on the potential to:</i> • <i>Create annoyance or interfere with normal activities from light emissions;</i> • <i>Affect the nature of the visual character of the area due to light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resources;</i>	No Impact. Existing lights at the airport include a rotating beacon, medium intensity runway lighting (MIRL) at Runway 12-30 and Runway 3-21, medium intensity taxiway lighting (MITL) on taxiways, and four-box precision approach path indicator (PAPI) lights at each runway end for Runway 8-26. Proposed lighting at the airport includes the installation of runway end identifier lights (REILs) at the end of Runway 12, Runway 8, and Runway 30. The installation of a medium intensity approach light system is proposed for Runway 26. A runway extension is proposed to Runway 12. Night lighting during construction phases within the runway environment is typically directed downward to the construction work area to prevent light spilling outside the airport boundaries. There are no incompatible land uses located near Runway 12, which is surrounded by vacant land. Other ultimate projects such as the proposed hangars north of the airport would include new lights fixtures during the operation of the new facilities. Building security lights would be directed downwards and would not create glare issues for users on the nearby highway.
Visual Resources/Visual Character	
<i>FAA has not established a significance threshold for Visual Resources/Visual Character. However, a factor to consider is the extent an action would have on the potential to:</i> • <i>Affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources;</i> • <i>Contrast with the visual resources and/or visual character in the study area; and</i> • <i>Block or obstruct the views of the visual resources, including whether these resources would still be viewable from other locations.</i>	No Impact. The proposed runway extension would extend Runway 12 by 1,334 feet. This runway extension is not anticipated to visually alter the line of sight for other land uses, as the parcels of land bordering this runway extension are vacant.

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TABLE 5E | Summary of Potential Environmental Concerns (continued)

FAA Order 1050.1F, <i>Significance Threshold/Factors to Consider</i>	Potential Environmental Concerns
WATER RESOURCES (Including Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers)	
Wetlands⁸	
<i>The action would:</i> • <i>Adversely affect a wetland's function to protect the quality or quantity of municipal water supplies, including surface waters and sole source and other aquifers;</i> • <i>Substantially alter the hydrology needed to sustain the affected wetland system's values and functions or those of a wetland to which it is connected;</i> • <i>Substantially reduce the affected wetland's ability to retain floodwaters or storm runoff, thereby threatening public health, safety or welfare (the term welfare includes cultural, recreational, and scientific resources or property important to the public);</i> • <i>Adversely affect the maintenance of natural systems supporting wildlife and fish habitat or economically important timber, food, or fiber resources of the affected or surrounding wetlands.</i> • <i>Promote the development of secondary activities or services that would cause the circumstances listed above to occur; or,</i> • <i>Be inconsistent with applicable state wetland strategies.</i>	No Impact. According to the NWI, there is one mapped riverine that runs through the airport and on the land to be acquired for future airport development. This riverine appears to be ephemeral in nature. Based on an aquatic resources assessment/jurisdictional delineation conducted at the airport, there are no potential waters of the U.S., special aquatic sites, relatively permanent waters, or traditional navigable waters at the airport.
Floodplains⁹	
<i>The action would cause notable adverse impacts on natural and beneficial floodplain values. Natural and beneficial floodplain values are defined in Paragraph 4.k of DOT Order 5650.2, Floodplain Management and Protection.</i>	Potential Impact. Based on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), the airport is in Zone D, an area of undetermined flood hazard. Prior to the development of the proposed hangar facilities to the north of the existing property line, a site-specific flood risk analysis should be conducted to determine flood frequency and potential inundation levels.

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TABLE 5E | Summary of Potential Environmental Concerns (continued)

FAA Order 1050.1F, Significance Threshold/Factors to Consider	Potential Environmental Concerns
WATER RESOURCES (Including Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers) (cont.)	
Surface Waters¹⁰	
<i>The action would:</i> • <i>Exceed water quality standards established by federal, state, local, and tribal regulatory agencies; or</i> • <i>Contaminate public drinking water supply such that public health may be adversely affected.</i> Factors to consider include: • Adversely affects natural and beneficial water resource values to a degree that substantially diminishes or destroys such values; • Adversely affect surface waters such that the beneficial uses and values of such waters are appreciably diminished or can no longer be maintained and such impairment cannot be avoided or satisfactorily mitigated; or • Present difficulties based on water quality impacts when obtaining a permit or authorization.	Potential Impact. The airport is located in the Huachuca Canyon-Babocomari River and Soldier Creek watersheds. There are no known impaired waters within these watersheds. There are also no Outstanding Arizona Waters located within or near the airport. As noted in the inventory, there are a number of ephemeral streams that traverse the airport. The proposed vertiport, helicopter facilities, and non-aeronautical reserve would be adjacent to the ephemeral wash area denoted on Exhibit 5B. A project-specific stormwater pollution prevention plan (SWPPP) would be applied during the construction of the proposed projects listed above if the individual project disturbs more than one acre.
Groundwater¹¹	
<i>The action would:</i> • <i>Exceed groundwater quality standards established by federal, state, local, and tribal regulatory agencies; or</i> • <i>Contaminate an aquifer used for public water supply such that public health may be adversely affected.</i> <i>Factors to consider are when a project would have the potential to:</i> • <i>Adversely affect natural and beneficial groundwater values to a degree that substantially diminishes or destroys such values;</i> • <i>Adversely affect groundwater quantities such that the beneficial uses and values of such groundwater are appreciably diminished or can no longer be maintained and such impairment cannot be avoided or satisfactorily mitigated; or</i> • <i>Present difficulties based on water quality impacts when obtaining a permit or authorization.</i>	No Impact. There are no groundwater resources at the airport. The airport property is not located over a sole source aquifer. The closest sole source aquifer is the Bisbee-Naco Sole Source Aquifer located more than 22 miles southeast from FHU.

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TABLE 5E | Summary of Potential Environmental Concerns (continued)

FAA Order 1050.1F, <i>Significance Threshold/Factors to Consider</i>	Potential Environmental Concerns
WATER RESOURCES (Including Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers) (cont.)	
Wild and Scenic Rivers¹²	
FAA has not established a significance threshold for Wild and Scenic Rivers. Factors to consider are when an action would have an adverse impact on the values for which a river was designated (or considered for designation) through: • Destroying or altering a river's free-flowing nature; • A direct and adverse effect on the values for which a river was designated (or under study for designation); • Introducing a visual, audible, or another type of intrusion that is out of character with the river or would alter outstanding features of the river's setting; • Causing the river's water quality to deteriorate; • Allowing the transfer or sale of property interests without restrictions needed to protect the river or the river corridor; or • Any of the above impacts preventing a river on the Nationwide Rivers Inventory (NRI) or a Section 5(d) river that is not included in the NRI from being included in the Wild and Scenic River System or causing a downgrade in its classification (e.g., from wild to recreational).	No Impact. The closest designated National Wild and Scenic River identified is the Verde River, located 194 miles from the airport. The nearest Nationwide River Inventory feature is the San Pedro River East, located nine miles from the airport. Projects delineated on the proposed development concept would not have adverse effects on the outstanding remarkable values of these water resources (i.e., scenery, recreation, geology, fish, wildlife, and history).

Sources:

¹U.S. EPA Green Book, Arizona Nonattainment / Maintenance Status for Each County by Year for All Criteria Pollutants,

(https://www3.epa.gov/airquality/greenbook/anayo_az.html), accessed April 2025; U.S. EPA NEPAAssist,

(<https://nepassisttool.epa.gov/nepassist/nepamap.aspx>), accessed April 2025

²USFWS IPaC (<https://ipac.ecosphere.fws.gov/location/AYIUD53MDNHVZHNAGTUCZEAWHQ/resources>), accessed May 2025; SWCA Environmental Consultants, Biological Resources Evaluation for the Sierra Vista Municipal Airport Master Plan Update Project in Cochise County, Arizona / SWCA Project No. 78239, dated December 15, 2023

³National Oceanic and Atmospheric Administration, National Marine Sanctuaries (<https://sanctuaries.noaa.gov/>), accessed April 2025

⁴NRHP (<https://www.nps.gov/maps/full.html?mapId=7ad17cc9-b808-4ff8-a2f9-a99909164466>), accessed April 2025

⁵Web Soil Survey (<https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>), accessed April 2025

⁶U.S. EPA, NEPAAssist, (<https://nepassisttool.epa.gov/nepassist/nepamap.aspx>), accessed April 2025

⁷SWCA Environmental Consultants, *Cultural Resources Survey for the Sierra Vista Municipal Airport Master Plan Update in Cochise County, Arizona*, by Heather West, dated December 2023

⁸SWCA Environmental Consultants, *Aquatic Resources Assessment/Jurisdictional Delineation for Sierra Vista Municipal for the Sierra Vista Municipal Airport Master Plan Update Project, Cochise County, Arizona, November 2023*;

⁹U.S. FEMA, (<https://msc.fema.gov/portal/search?AddressQuery=sierra%20vista%20municipal%20airport>), accessed April 2025

¹⁰U.S. EPA, How's My Waterway (<https://mywaterway.epa.gov/community/sierra%20vista%20municipal%20airport/overview>), accessed April 2025

¹¹Sole Source Aquifer (<https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=9ebb047ba3ec41ada1877155fe31356b>), accessed April 2025

¹²National Wild and Scenic Rivers System (<https://www.rivers.gov/arizona>); National Park Service, Nationwide Rivers Inventory (<https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm>)



SUMMARY

The best way to begin implementation of the recommendations in the master plan is to first recognize that planning is a continuous process that does not end with completion and approval of this document. Rather, the ability to continuously monitor the existing and forecasted status of airport activity must be provided and maintained. The issues on which the master plan is based will remain valid for many years.

The actual need for facilities at Sierra Vista Municipal Airport is most appropriately established by general aviation activity levels, rather than by a specified date. For example, projections have been made as to when additional hangars may be needed; however, the timeframe in which development occurs may be substantially different. Actual demand may be slower to develop than expected, or high levels of demand may establish the need to accelerate the development. Although every effort has been made in this master planning process to conservatively estimate when facility development may be needed, actual aviation demand will dictate when facility improvements need to be delayed or accelerated.

The real value of a usable master plan is its ability to keep the issues and objectives in the minds of the managers and decision-makers so they are better able to recognize change and its effect. In addition to adjustments in aviation demand, decisions made as to when to undertake the improvements recommended in the master plan will impact the period for which the plan remains valid. The format used in this plan is intended to reduce the need for formal and costly updates by simply adjusting the timing. Updates can be conducted by City of Sierra Vista staff in conjunction with Fort Huachuca personnel, thereby improving the plan's effectiveness.

In summary, the planning process requires airport management to consistently monitor progress in terms of aircraft operations and based aircraft. Analysis of aircraft demand is critical to the timing and need for certain airport facilities. The information obtained from continually monitoring activity will provide the data necessary to determine if the development schedule should be accelerated or decelerated.