MARANA REGIONAL AIRPORT

AIRPORT MASTER PLAN

Working Paper No. 3

MARANA REGIONAL AIRPORT

MARANA, ARIZONA | MAY 2016

ARMSTRONG

Marana Regional Airport

Airport Master Plan

Draft Working Paper No. 3

Prepared for
Town of Marana, Arizona

By
Armstrong Consultants, Inc.
2345 S. Alma School Road, Suite 208
Mesa, AZ 85210

In association with
The Genesis Consulting Group, LLC
Woolpert, Inc.

May 2016

ADOT No. E5S3N

The preparation of this document was financed in part through a planning grant from the Arizona Department of Transportation. The contents of this report reflect the analysis and finding of Armstrong Consultants, Inc. who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policy of the ADOT. Acceptance of this report by the Federal Aviation Administration (FAA) does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable with applicable Public Laws.

TABLE OF CONTENTS

Chapter 5 – Development Alternatives 5-1
5.1 Introduction 5-1
5.2 Development Concepts 5-1
5.3 Airside Development 5-2
5.3.1 Runway Development 5-3
5.3.2 Taxiway Development 5-4
5.3.3 Aircraft Apron 5-4
5.3.4 Airfield Lighting and Signage 5-5
5.3.5 Miscellaneous Airfield Development Projects 5-5
5.4 Landside Development 5-6
5.4.1 Proposed Development Strategy 5-6
5.4.2 Terminal Building 5-7
5.4.3 Hangar Development 5-8
5.4.4 Airport Support and Maintenance Equipment Building 5-8
5.4.5 Fuel Facility 5-9
5.4.6 Expansion of Vehicle Parking Areas 5-9
5.4.7 Air Traffic Control Tower 5-10
5.4.8 Aeronautical/Non-Aeronautical Development 5-10
5.4.8 Miscellaneous Landside Development Projects 5-11
5.5 Environmental Impacts 5-11
5.6 Development Costs 5-11
5.7 Alternative Development Summary 5-12

LIST OF TABLES

TABLE 5-1 ESTIMATED DEVELOPMENT COSTS SUMMARY 5-12

EXHIBITS 5-14

EXHIBIT 3 PROPOSED DEVELOPMENT PLAN
EXHIBIT 4 LANDSIDE/TERMINAL ALTERNATIVE NO. 1
EXHIBIT 5 LANDSIDE/TERMINAL ALTERNATIVE NO. 2
EXHIBIT 6 DEVELOPMENT COMPLEXES
EXHIBIT 7 LANDSIDE/EAST APRON ALTERNATIVE NO. 1
EXHIBIT 8 LANDSIDE/EAST APRON ALTERNATIVE NO. 2
EXHIBIT 9 LANDSIDE/S.A.S.C. ALTERNATIVE NO. 1

Chapter 5 – Development Alternatives

5.1 Introduction

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. This chapter contains the description and evaluation of various development alternatives for the Marana Regional Airport. The basis for the airside and landside alternatives were 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 Town's planning needs and those that the FAA or Town will be realistically able to implement.

5.2 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 4.

Furthermore, 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; and
- Satisfies user's needs.

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 logical evaluation of the various options resulting from discussions with the sponsor, Technical Advisory Committee (TAC), Public Advisory Committee (PAC), and input from the public. 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 4.

An alternative for the Town of Marana 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, ADOT, and the Town have made a significant investment in the airport infrastructure. To preserve the infrastructure and to ensure that additional federal funding is granted, it is in the best interest of the Town to maintain the Airport and make any necessary improvements. Thus, the option of a no-action alternative was not explored or described in any of the major future proposed development alternatives.

5.3 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 4, Facility Requirements.

Alternative Considerations – Airside Development

- Extension of Runway 3-21 by 1,938 feet
- Additional taxiway pavement on the east and west sides of Runway 3-21
- Rehabilitation and strengthening of Runway 12-30 and 3-21 pavement
- Rehabilitation and strengthening of all taxiway pavements
- Removal of non-standard taxiway configuration (Taxiway A2 and Taxiway B2)
- Removal of portion of itinerant parking apron which falls within the runway visibility zone (RVZ); identify areas to replace removed apron and open tie-downs
- Reconfigure existing helicopter parking apron
- Identify location for additional conventional box hangars and shade structure with taxiway access
- Upgrade all airfield lighting fixtures and lighted signage, including the rotating beacon and PAPIs, to light-emitting diode (LED) fixtures

5.3.1 RUNWAY DEVELOPMENT

As previously identified in **Table 4-4,** Runway 12-30 is currently 6,901 feet long and provides adequate runway length to satisfy 75 percent of large aircraft (greater than 60,000 pounds) at 60 percent useful load. Therefore, the existing runway length is adequate for the planning period.

Runway 3-21 is 3,892 feet long and is presently displaced 494 feet as noted in **Table 4-5**. With the displacement, the runway provides 3,398 feet available for landing on Runway 3. To satisfy 75 percent of large aircraft (greater than 60,000 pounds) at 60 percent useful load, the runway would need to be 5,500 feet long.

A review of the Runway 3 displacement reveals that the correct displacement should only be 330 feet. The corrected displacement would provide the recommended 15 feet clearance over Avra Valley Road. The displacement would also be based on a Threshold Siting Surface (TSS) for runways expected to support instrument night operations, serving approach Category A and B aircraft only. In order for Runway 3 to support instrument night operations serving greater than approach Category B aircraft, the runway would need to be displaced 880 feet. The reason for the increased displacement is due to the TSS's increase in size for larger approach category aircraft. Thus, based on the corrected displacement of 330 feet, Runway 3-21 would need to be extended 1,938 feet to the northeast.

Extending the end of Runway 21 1,938 feet may have several impacts. For example, the need to acquire approximately 40 acres of land to accommodate the runway, parallel taxiways, and the runway protection zone would be needed. The land needed for the extension is vacant land owned by the Town of Marana and State of Arizona. The relocation of businesses and or residents would not be required. There is also an existing irrigation canal that would need to be either relocated around the runway extension, or more likely, be piped and left in its current alignment beneath the new airfield pavement. The terrain in the area also appears relatively flat making construction straightforward. Consideration to extend the Runway 3 end is not recommended. It is not practical to extend the Runway 3 end given the location of Avra Valley Road. Relocating or terminating the road is not feasible and would be cost prohibitive given the abundance of land available on the Runway 21 end. Therefore, it is recommended the Runway 21 end be extended as shown on **Exhibit 3**.

On September 27, 2012, the FAA published *Interim Guidance on Land Uses Within a Runway Protection Zone*. The interim policy only addresses the introduction of new or modified land uses to an RPZ and proposed changes to the RPZ size or location. The existing runway protection zone on the Runway 3 end crosses Avra Valley Road. The size and location of the Runway 3 RPZ is not recommended to change, therefore the interim policy doesn't apply to the Runway 3 RPZ. If it was desirable to remove Avra Valley Road from the Runway 3 RPZ, then the Runway 3 threshold would need to be relocated approximately 1,000 feet, and thereby in turn require that the Runway 21 be extended an additional 1,000 feet. Because the land use within the Runway 3 RPZ is compatible with the exception of Avra Valley Road, it is recommended that the Runway 3 RPZ remain in its current location.

The existing runway width and wind coverage for Runway 12-30 and Runway 3-21 are both adequate for the planning period. Regarding pavement strength and condition, Section 4.4.4 discussed the need to consider rehabilitating and strengthening the pavement of Runway 12-30 to accommodate the current operations by large aircraft. Furthermore, Section 4.4.4 also recommended rehabilitation in the short-term of Runway 3-21; as of today, the pavement strength is adequate for the types of aircraft utilizing Runway 3-21. However, should the runway ever be extended to accommodate large aircraft (over 60,000 pounds) as is proposed, the runway pavement strength would need to be increased as well.

5.3.2 Taxiway Development

Section 4.4.5 recommends that the TDG for new pavement meet the design standards for TDG 1A and 1B, and separation standards for Airplane Design Group (ADG) II. As such, new taxiway pavement should be constructed to a width of 25 feet. The proposed development plan recommends a new partial-parallel taxiway be constructed on the west side of Runway 3-21 to provide access from the existing west hangar apron to the Runway 12 threshold. In addition, it is recommended that a partial-parallel taxiway be constructed on the east side of Runway 3-21 from the threshold of Runway 21 to Taxiway B3, ultimately making Taxiway B a full-parallel taxiway. This is illustrated on **Exhibit 3**.

The removal of two connector taxiways is recommended to comply with FAA guidance about runway incursions. The recommended connectors slated for removal are shown on the proposed development plan (**Exhibit 3**) and should be addressed in the short-term.

Taxiway C currently begins at the approximate mid-point of parallel Taxiway A and continues to Runway 3-21, providing access to the existing specialized aviation related businesses off of Wright Way and the west hangar apron. The proposed development plan recommends terminating Taxiway C approximately 100 feet short of the west hangar apron. With the removal of this portion of pavement, access to the infield will be established allowing additional aviation related development to take place as shown on the proposed development plan (**Exhibit 3**). Access to the infield would be via a new entrance road off of Wright Way.

5.3.3 Aircraft Apron

Based on the findings from Chapter 4, Facility Requirements, the Airport may need to add additional apron parking at some point in the planning period (**Table 4-6** estimates sometime in the 2025 timeframe). As such, this chapter presents an improved allocation of apron use at the Airport, which improves aircraft flow and parking availability. Various apron configurations were developed with the best locations in mind to park the different types of aircraft using the Airport, i.e., fixed-wing, rotor, single-engine aircraft, and corporate jets. The Town of Marana should monitor the utilization of the apron and make adjustments in the apron size as needed throughout the planning period. Likewise, as presented in Chapter 2, portions of the existing apron are in fair to poor condition and will require either rehabilitation or reconstruction and strengthening in the planning period.

As previously mentioned, a portion of the existing itinerant parking apron is within the Runway Visibility Zone (RVZ). The apron is approximately 34,000 square yards and provides

parking primarily for itinerant traffic. Based on current FAA guidance, the RVZ must be clear of all obstacles, both permanent and temporary (such as parked aircraft). An analysis was conducted to determine if the line-of-sight was clear within the RVZ; it was revealed that approximately 12,000 square yards of the apron do not comply with the line-of-sight guidelines. Thus, that portion of the apron that violates the line-of-sight requirement must be removed. In an effort to replace this portion of apron that must be removed, the preferred alternative recommends constructing approximately the same amount of square yards of apron to the east of the existing T-hangars on the itinerant parking apron and to the west of the existing helicopter parking apron as shown on **Exhibit 4**. This is the preferred alternative because it is the only option which replaces the same amount of apron that will be lost due to the removal of the apron within the RVZ. As discussed further in Section 5.4.7 later in this chapter, the proposed air traffic control tower as shown on **Exhibit 5** limits the option to replace the removed RVZ apron parking due to the presence of the proposed tower, parking lot, and access road. Therefore, the only viable option is the preferred alternative shown on **Exhibit 4**.

5.3.4 Airfield Lighting and Signage

The Airport is currently replacing all airfield signage, semi-flush taxiway lights, and the Runway 12-30 Runway End Identifier Lights (REILs) on both ends. All of the new fixtures and signs will be light-emitting diode (LED) type fixtures and signs.

As mentioned in Section 4.4.8, Taxiway C should have MITL installed to improve visibility during nighttime operations. It is also recommended that the existing rotating beacon be replaced with a more energy efficient fixture. Likewise, the aerial lighting located above the existing shade structure should also be replaced with a more energy efficient fixture. Additionally, any new pavement shown on the proposed development plan should also include the installation of LED lighting and signage. Finally, it is also recommended that all PAPIs should be replaced with LED models.

5.3.5 Miscellaneous Airfield Development Projects

The proposed development plan also depicts the preferred location for the following recommended airfield improvements (with the exception of the pavement markings) as shown on **Exhibit 3**:

- Refresh runway and taxiway pavement markings;
- Removal of hangar (building No. 6) for CFR Part 77 primary surface obstruction violation;
- Relocation of hangar (building No. 20) to increase utilization of apron area for larger aircraft parking in the short-term planning period;
- Identify future land acquisitions and easements; and
- Identify areas for retention basins according to 2007 Master Drainage Plan study.

5.4 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 4, Facility Requirements.

Alternative Considerations – Landside Development

- Identify areas for specific aeronautical function, e.g. general aviation, corporate, and maintenance and specialty operations;
- Propose new corporate terminal site and related east apron development for corporate aviation operations;
- Addition of fuel facility to east apron complex;
- Identify locations for aeronautical and non-aeronautical related revenue generating parcels;
- Identify locations for a future air traffic control tower (ATCT);
- Identify locations for an airport-owned maintenance and equipment building and an aircraft rescue and fire fighting (ARFF) building; and
- Identify areas for expansion and/or addition of vehicle parking areas.

5.4.1 PROPOSED DEVELOPMENT STRATEGY

The development strategy for the Airport is focused on grouping similar operations, businesses, and functions together to improve aircraft movements and parking, thereby enhancing the overall safety and efficiency of the Airport. Once the strategy is fully implemented, the level of customer service should also improve, primarily to the corporate aircraft using the Airport. To achieve this development strategy, the Airport will be grouped into three sectors:

- Corporate Development Complex
- General Aviation Complex
- Specialty Aviation Services Complex

Corporate Development Complex
To reduce the congestion of mixing corporate aircraft and smaller general aviation aircraft, the development strategy is to move all corporate aircraft to the southeast side of the Airport where the existing east apron is located. This area on the Airport is more conducive to accommodating the corporate aircraft due to its proximity to Runway 12-30 and the large amount of space provided by the east apron. Additionally, the long-term strategy includes development of a passenger terminal and aviation related services targeted to the corporate aircraft clientele.

General Aviation Complex
The long-term objective is to consolidate all general aviation parking, services, and storage to the south side of the Airport. This would include the continued use of the itinerant parking apron, terminal apron, south hangar apron, east hangar apron, west hangar apron, and conversion of the existing helicopter apron to general aviation parking. Currently, corporate aircraft are required to circulate and maneuver among the general aviation aircraft on the south side of the Airport making parking and servicing of the corporate aircraft challenging.

Specialty Aviation Services Complex
There are several businesses on the Airport that provide specialized aviation related services such as aircraft restoration and repair. Two of these specialized businesses are currently located on the west side of the Airport located along Wright Way. The proposed development plan recommends that this area of the Airport continue to be further developed for businesses that provide specialized aviation related services.

Summary
The boundaries of the three aviation related sectors on the Airport are represented on **Exhibit 6**. Although the sectors are not actual boundaries, they are meant to illustrate areas on the Airport that best target development to meet the unique needs of the aviation community over the course of the planning period.

5.4.2 Terminal Building

Terminal buildings often provide visitors with a first impression of an airport. As discussed in Chapter 2, the existing terminal/FBO building is located off Avra Valley Road. The terminal building is in good condition and should meet the needs for general aviation customers for the planning period. Therefore, no expansion is recommended for the existing terminal/FBO building.

However, as stated above, the development strategy for the Airport is focused on grouping similar aviation operations, businesses, and functions into defined sectors on the airfield. The terminal building is a key component of an airport and should be located closest to the customers its serves. For that reason, it is recommended that a second corporate terminal building be constructed adjacent to the east apron. The new corporate terminal, along with additional development, is shown on **Exhibits 7** and **8**. **Exhibit 7** was created during this master plan process after several discussions with airport management and several site visits; this layout provides for efficient use of the land while also taking into consideration the panoramic scenery of the area. **Exhibit 8** illustrates a rendering of the proposed development when the airport first began exploring the idea of relocating corporate operations to the east apron; this layout is similar, however does not maximize the potential of some of the existing land parcels. Therefore, the layout as shown on **Exhibit 7** is the preferred alternative.

The new corporate terminal building should be designed with at least a 20-year lifespan with minimal renovation and upgrades needed. Attention should be given in the design phase to ensure the building's functionality throughout the entire planning period is met. A new corporate terminal building will also allow the opportunity to incorporate numerous sustainable features such as a high-energy efficient heating and cooling system, solar hot water,

LED lighting, drought tolerant landscaping, and the use of low VOC and recycled materials in the construction of the building. The proposed terminal should include the following at a minimum:

- Common area/lobby
- Airport Administration offices
- Meeting rooms
- Outdoor public space
- Restrooms
- Pilot lounge
- Flight planning room
- Storage

5.4.3 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. The demand for additional hangars will be based on the Town's ability to attract and retain new tenants. To that end, the proposed development plan (**Exhibit 3**) shows where an additional shade structure, T-hangars, conventional box hangars, and corporate hangars could be constructed on the airfield if demand warranted. Furthermore, the preferred layout for additional hangars within each of the three development sectors are also illustrated.

The preferred alternative location of a shade structure and additional T-hangars within the general aviation complex is shown on **Exhibit 4**. The location of each structure was chosen due to the proximity to the other existing T-hangars and the ease in which aircraft would be able to taxi to/from the apron and taxiways from these locations. The preferred alternative location of corporate hangars within the corporate development complex is shown on **Exhibit 7**. The location of these hangars best utilizes the amount of space on the east apron for large corporate aircraft that may be taxiing and parking in this area. Finally, the preferred alternative location of an additional T-hangar and conventional box hangars within the specialty aviation services complex is shown on **Exhibit 9**. This layout illustrates hangar options both with and without additional land; this option gives potential tenants ease of access to both runways, and for those with a specialty aviation business, the option to own a larger parcel of land with taxiway access. This preferred layout optimizes a developable portion of aeronautical revenue generating on-airport land, whilst also remaining clear of the RVZ.

5.4.4 Airport Support and Maintenance Equipment Building/ARFF Building

The support and maintenance equipment building serves an important function for most airports. The need to protect existing equipment, as well as future equipment, is crucial to the upkeep of the airfield and other areas of the airport. Currently, the Town does not own a storage building at the Airport for this purpose; a private building is currently leased by the Town in order to accommodate the Airport's support and maintenance equipment. It is

recommended that a new 3,000 to 5,000 square-foot support and maintenance building be constructed. In addition, although the airport does not currently require the presence of an aircraft rescue and fire fighting (ARFF) facility and crew, it is an optional feature that some GA airports choose to have in order to enhance the airport's ability to respond to emergencies. Given the existing and continued use of the airport by large corporate aircraft, airport management and the PAC and TAC committees would like to see an ARFF facility constructed at the Airport at some point in the future.

The preferred alternative for the location of both buildings is shown on **Exhibit 4**, and is the only option which seemed to make the most logical sense for the airport. This location is centrally located on the airfield within the general aviation complex. It will have quick access to the apron and the airport perimeter road. Furthermore, it will also have access to Avra Valley Road via a proposed paved access road, which will ease the process of getting large equipment onto and off of the airport with very little interference to the aircraft operations area. This is also crucial for emergency vehicles in order to reach hospitals in the fastest manner possible.

5.4.5 Fuel Facility

The existing fuel facility and fuel truck parking area located west of the terminal building and restaurant are recommended to remain in the same location for the planning period. The location of the facility adequately serves the needs of the general aviation community.

On the other hand, with development of the corporate development complex, the need for additional fueling capabilities will be needed. It is not practical for fuel trucks to travel from the existing fuel facility to the east parking apron on a routine basis because of the need to cross the active runway (Runway 30). It is recommended that the east parking apron provide both Jet A and AvGas, although because of the expected use of the apron, it is likely that the need for Jet A will be considerably higher than AvGas. The location of the fuel facility on the preferred alternative, as shown on **Exhibit 7**, is ideal because it is located in a more secure and remote area which will not take away from the aesthetics of the new terminal area. Furthermore, the preferred location does not hinder the potential development of the desirable land adjacent to the taxiway.

5.4.6 Expansion of Vehicle Parking Areas

Additional vehicle parking is recommended for the planning period. Three areas on the Airport have been identified to address the demand. These include:

- Expansion of the existing vehicle parking area to the east of the existing vehicle parking area in front of the existing terminal building;
- To provide vehicle parking for aircraft owners located in hangar facilities 10 through 13 a vehicle parking area is planned with direct access from W. Avra Valley Road; and
- Additional vehicle parking will be needed in the area of the corporate development complex once development occurs.

The alternative drawings depict the recommended locations for the additional vehicle parking as described above.

5.4.7 Air Traffic Control Tower

Marana Regional Airport does not have an air traffic control tower (ATCT). An ATCT is a staffed facility that uses air/ground communications and other air traffic control systems to provide air traffic services on and in the vicinity of an airport. The previous airport master plan for the Marana Regional Airport explored the possibility of constructing an ATCT at the Airport. Subsequent to the airport master plan, the Town of Marana underwent the preparation of a benefit-cost analysis and an environmental assessment to identify the potential environmental impacts associated with constructing an ATCT. The benefit-cost analysis concluded that full funding of an ATCT would be likely if air traffic levels represented in the previous master plan were realized. The environmental assessment was not finalized and a Federal finding was never issued.

During the PAC and TAC meetings held for the current master plan, considerable discussion took place regarding the need for an ATCT at the Airport. Because of the history behind the desire for an ATCT and recent discussions at the PAC and TAC meetings, it was agreed that the location for a future ATCT should be considered as part of the planning process. Thus, two locations have been identified within the proposed development plans for the location of an ATCT. The first location, which is the preferred alternative, is illustrated on **Exhibit 4**. The second location illustrates the ATCT as originally conceived within the draft environmental assessment completed in 2008 as shown on **Exhibit 5**. As mentioned previously, a portion of the existing itinerant aircraft parking apron resides in the RVZ and therefore needs to be removed. To make up for this loss of apron, new apron has been proposed east of the existing T-hangars as shown on **Exhibit 4**. Thus, the original location of ATCT described within the 2008 EA (**Exhibit 5**) would not be feasible due to the need to construct new apron to replenish the apron removed from the RVZ, which makes the location as shown in **Exhibit 4** the preferred alternative.

For the construction of an ATCT to take place, an updated benefit-cost analysis would need to be prepared taking into consideration the forecasted air traffic contained in this master plan. The results of the benefit-costs analysis will determine funding eligibility of an ATCT. It's important to note that a benefit-cost analysis is not part of the current master plan. Additionally, a new environmental assessment will need to be prepared for the ATCT to be constructed.

5.4.8 Aeronautical/Non-Aeronautical Development

The two areas on the airport property that lend themselves best to economic development are located within the specialty aviation services complex and the corporate development complex as shown on **Exhibit 6**. The first area includes an abundance of state land north and east of the corporate development complex that, if acquired, would allow for significant expansion of this area. The type of development in this area could be a mix of aeronautical and non-aeronautical revenue generating development. All development in this area must be compatible with the Airport, as defined by the FAA, and will be a key element for growth.

The second area is within the specialty aviation services complex located off of Wright Way and the west side of the Airport. With the newly created access to the infield between Taxiway C and Taxiway A, this area becomes available for aviation related development provided that all development remains outside of the RVZ.

Any land that is proposed to be developed for non-aeronautical development that is located on airport property adjacent to Wright Way will need to be approved for non-aeronautical use by the FAA. Again, it is important that any redevelopment of the vacant land be compatible with the airport, as defined by the FAA.

5.4.8 Miscellaneous Landside Development Projects

The following landside improvements are also recommended, but may not necessarily be illustrated on the alternative drawings:

- Additional aerial lighting around the expanded vehicle parking areas;
- Install airport entrance signage for the corporate development complex and the specialized aviation business development complex;
- Enhance security fencing and gate access as necessary around landside buildings; and
- Improve recycling efforts and coordinate receptacle locations with tenants to reduce excessive travel by haulers.

5.5 Environmental Impacts

The proposed development projects 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, *National Environmental Protection Act (NEPA) Implementing Instructions for Airport Projects* and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*. The resource impact categories and potential environmental impacts are evaluated in Chapter 7, Environmental Overview.

5.6 Development Costs

The planning costs for the proposed development presented in this Chapter will be discussed in more detail in Chapter 8, Airport Development and Financial Plan. Development costs discussed in this Chapter are for planning purposes only, are based on 2016 dollars, and reflect level of magnitude costs. The costs in **Table 5-1** 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 Town in the decision making process. A recommended development phasing plan, along with refined probable costs, will be presented in Chapter 8.

Table 5-1 Estimated Development Costs Summary

DEVELOPMENT FEATURE	PROJECT DESCRIPTION	ESTIMATED COST (2016 DOLLARS)
Fencing	Install airfield perimeter fencing, gates, and appurtenances	$420,000
Shade Structure	Construct new shade structure	$300,000
Building Demolition	Demolish building	$100,000
Land Acquisition	Acquire approximately 175 acres of land (fee simple and avigation easements)	$437,500
Runway 21 Extension	Extend Runway 21 including edge lighting and signage	$1,292,000
Runway 3-21 Parallel Taxiway (west side)	Construct parallel taxiway (west side) including edge lighting and signage	$1,084,000
Runway 3-21 Parallel Taxiway (east side)	Construct parallel taxiway (east side) including edge lighting and signage	$484,000
Aircraft Apron	Construct approximately 44,500 SY of new aircraft parking apron; install edge lighting and signage	$2,700,000
Fuel Storage Facility	Construct new fuel storage facility adjacent to east apron	$500,000
Visual and Navigational Aids	Install four (4) LED PAPIs, relocate segmented circle, and install new LED rotating beacon	$110,000
Hangar Development	Construct aircraft storage hangars (average SF costs)	$10,080,000
Terminal Building	Construct new airport terminal building adjacent to east apron (average SF cost)	$2,550,000
Vehicle Access Road and Parking	Construct new access roads and vehicle parking areas	$841,500
Airport Maintenance Building	Construct new airport maintenance building	$1,200,000
Airport ARFF Building	Construct new airport rescue and firefighting building	$1,200,000
Pavement Removal	Removal of airfield pavement (apron or taxiway)	$64,000
Taxiway C edge lighting	Install taxiway edge lighting and signage	$140,000

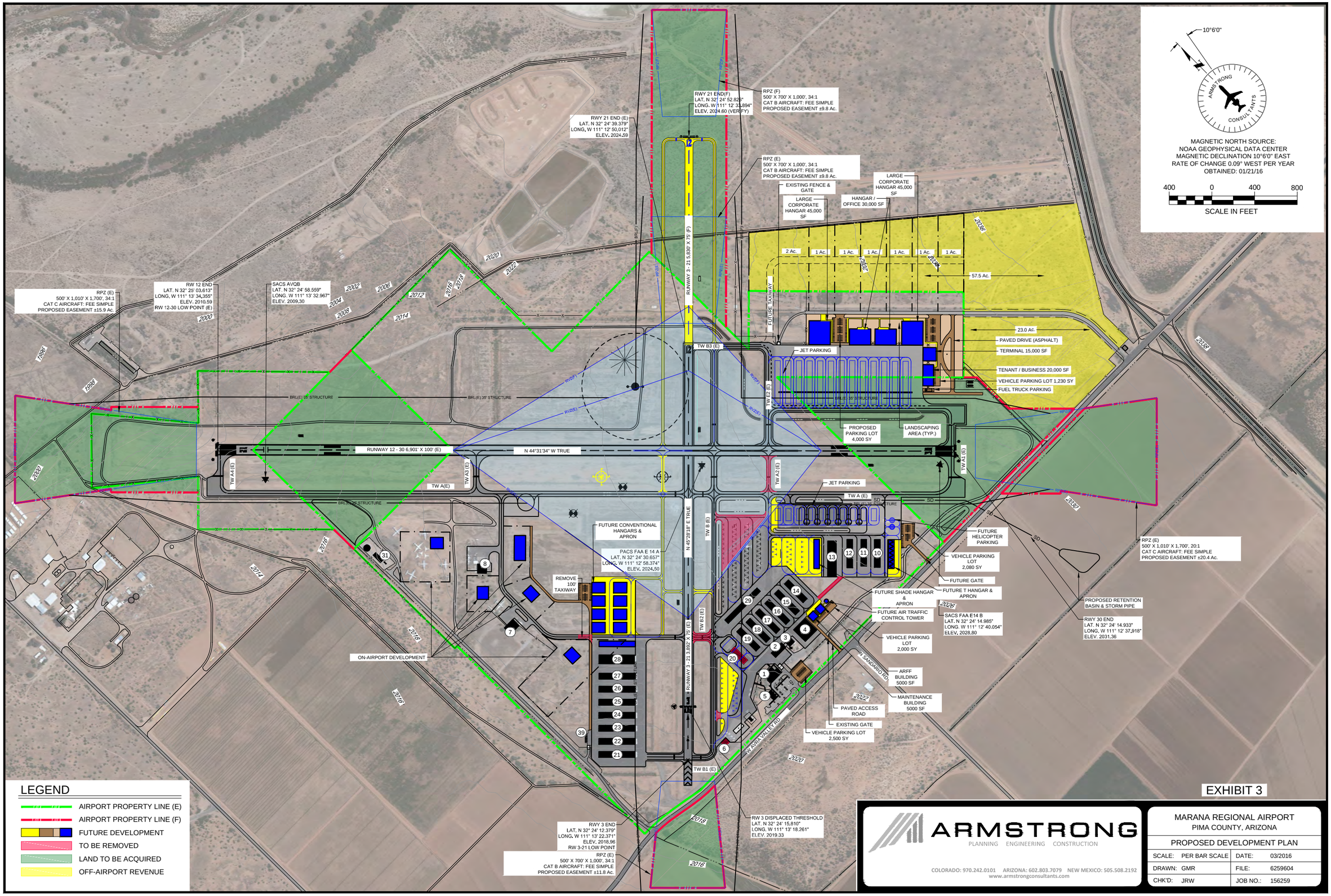
Note. Fencing is based on an average cost of $20 per linear foot; hangar construction cost is approximately $80 per square foot, and hangar development will depend on actual demand; terminal buildings are not typically paid for with FAA or State grants.
Source: Armstrong Consultants, 2016

5.7 Alternative Development Summary

Development alternatives presented in this Chapter addressed both airside and landside needs for the planning period, as well as several miscellaneous needs. Airside alternatives include additional partial-parallel taxiways to Runway 3-21, removal of apron within the RVZ, apron expansion to improve aircraft maneuvering, and development of the east apron area (designated as the corporate development complex) to provide better services to corporate aircraft users. Landside alternatives include proposed hangar development locations (as demand warrants), a new corporate terminal building, a new ARFF and maintenance support and equipment buildings, a location for an ATCT, additional vehicle parking areas, and proposed areas for aeronautical and non-aeronautical revenue generating development.

The recommended development alternatives will be carried forward and incorporated into the draft Airport Layout Plan (ALP) based on input that is gathered from the Sponsor (Town of Marana), FAA, ADOT, the Technical Advisory Committee (TAC), and the Public Advisory Committee (PAC) during a scheduled alternative development review meeting. The proposed development plan (**Exhibit 3**), along with the other Exhibits found in this chapter, will be used for discussion at this review meeting.

EXHIBITS



ARMSTRONG
PLANNING ENGINEERING CONSTRUCTION

COLORADO: 970.242.0101 ARIZONA: 602.803.7079 NEW MEXICO: 505.508.2192
www.armstrongconsultants.com

MARANA REGIONAL AIRPORT
PIMA COUNTY, ARIZONA

PROPOSED DEVELOPMENT PLAN

SCALE:	PER BAR SCALE	DATE:	03/2016
DRAWN:	GMR	FILE:	6259604
CHK'D:	JRW	JOB NO.:	156259

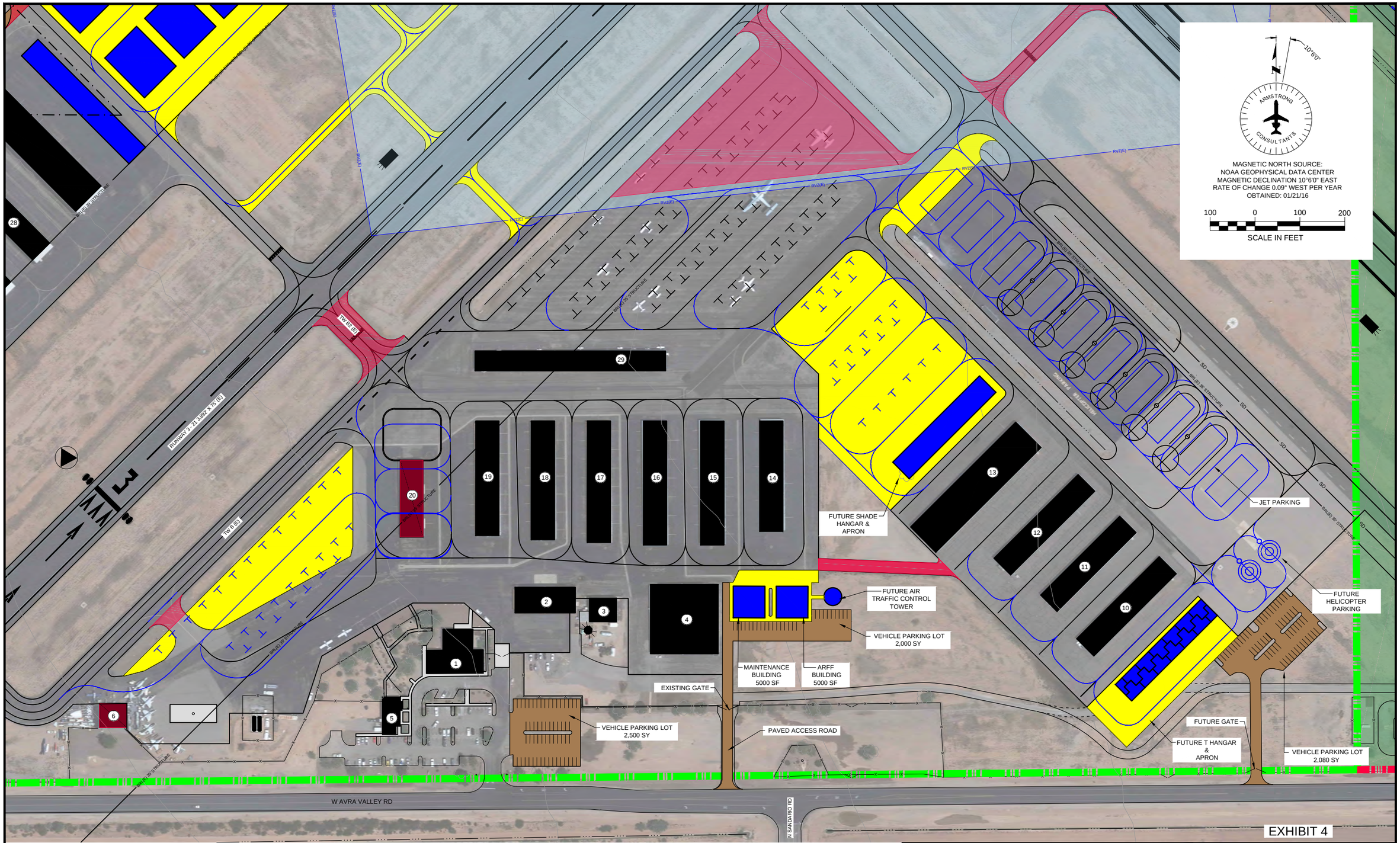


EXHIBIT 4

LEGEND

- AIRPORT PROPERTY LINE (E)
- AIRPORT PROPERTY LINE (F)
- FUTURE DEVELOPMENT
- TO BE REMOVED

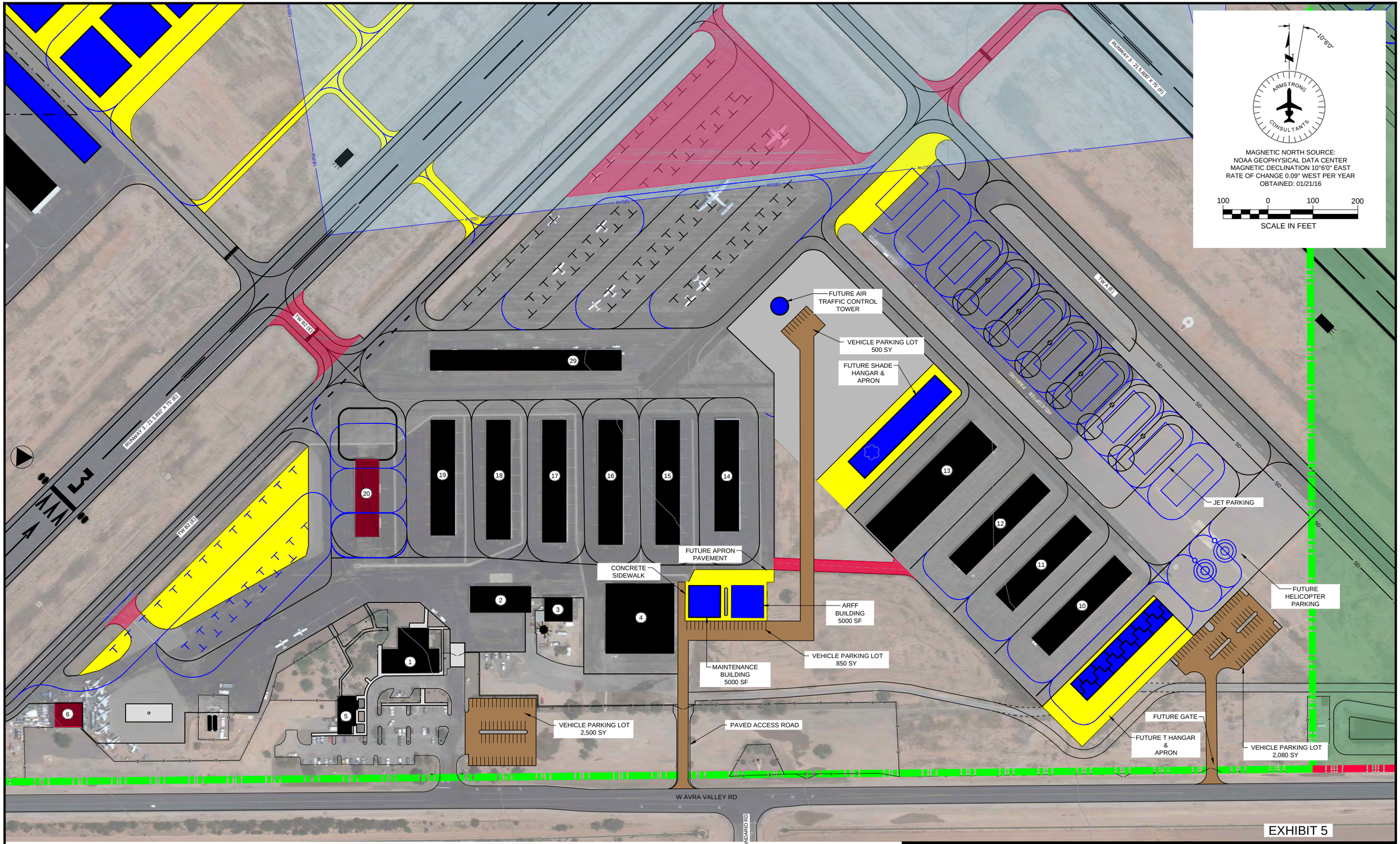
ARMSTRONG
PLANNING ENGINEERING CONSTRUCTION

COLORADO: 970.242.0101 ARIZONA: 602.803.7079 NEW MEXICO: 505.508.2192
www.armstrongconsultants.com

MARANA REGIONAL AIRPORT
PIMA COUNTY, ARIZONA

LANDSIDE / TERMINAL ALT. 1

SCALE:	PER BAR SCALE	DATE:	03/2016
DRAWN:	GMR	FILE:	6259604
CHK'D:	JRW	JOB NO.:	156259



LEGEND

- AIRPORT PROPERTY LINE (E)
- AIRPORT PROPERTY LINE (F)
- FUTURE DEVELOPMENT
- TO BE REMOVED
- FUTURE LAND ACQUISITION

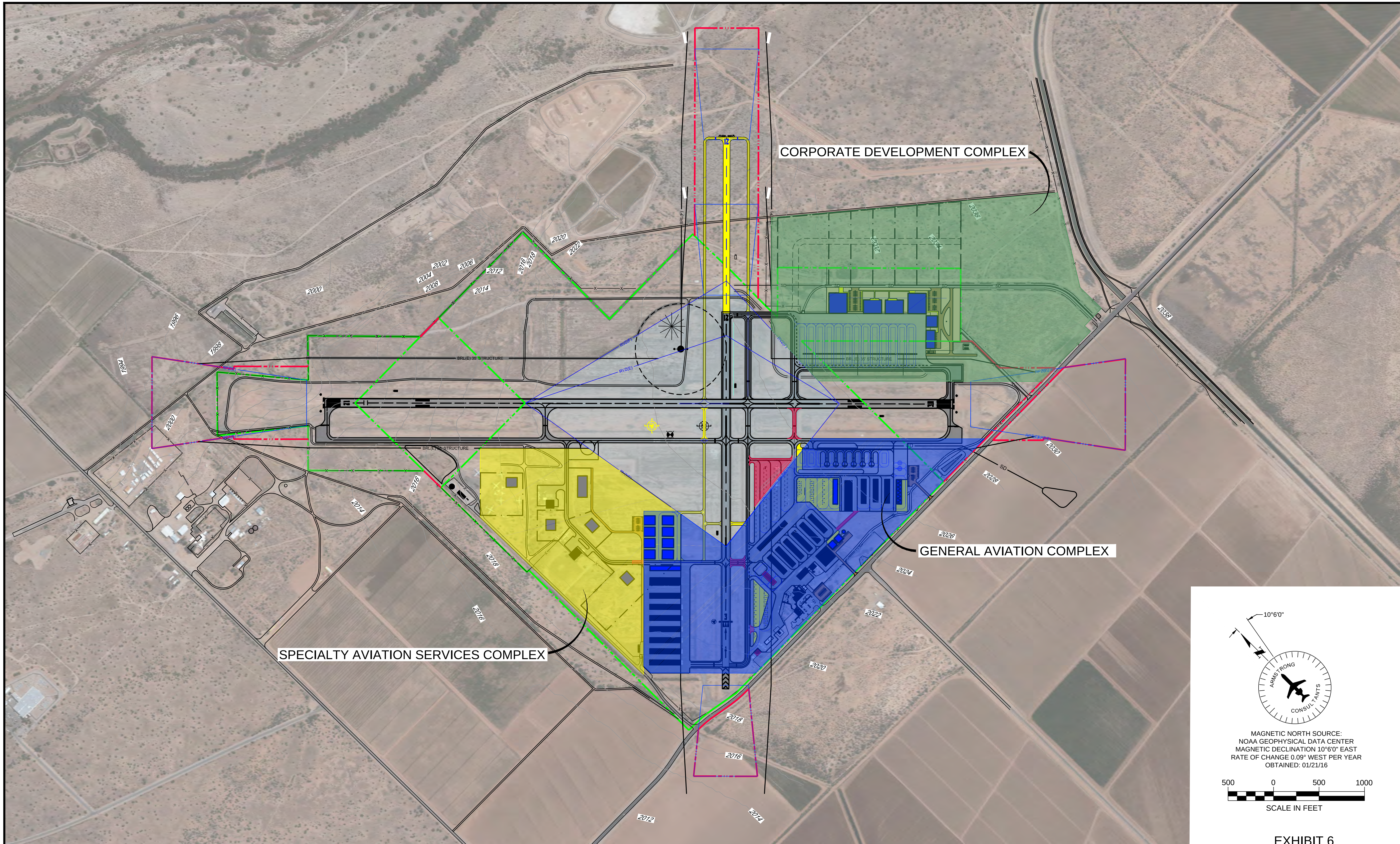
ARMSTRONG
PLANNING ENGINEERING CONSTRUCTION

COLORADO: 970.242.0101 ARIZONA: 602.803.7079 NEW MEXICO: 505.508.2192
www.armstrongconsultants.com

MARANA REGIONAL AIRPORT
PIMA COUNTY, ARIZONA

LANDSIDE / TERMINAL ALT. 2

SCALE:	PER BAR SCALE	DATE:	03/2016
DRAWN:	GMR	FILE:	6259605
CHK'D:	JRW	JOB NO.:	156259



MAGNETIC NORTH SOURCE:
NOAA GEOPHYSICAL DATA CENTER
MAGNETIC DECLINATION 10°6'0" EAST
RATE OF CHANGE 0.09° WEST PER YEAR
OBTAINED: 01/21/16

500 0 500 1000
SCALE IN FEET

EXHIBIT 6

LEGEND

- AIRPORT PROPERTY LINE (E)
- AIRPORT PROPERTY LINE (F)
- FUTURE DEVELOPMENT
- TO BE REMOVED
- CORPORATE DEVELOPMENT COMPLEX
- GENERAL AVIATION COMPLEX
- SPECIALTY AVIATION SERVICES COMPLEX

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

MARANA REGIONAL AIRPORT
PIMA COUNTY, ARIZONA

DEVELOPMENT COMPLEXES

SCALE:	PER BAR SCALE	DATE:	04/2016
DRAWN:	GMR	FILE:	6259603
CHK'D:	JRW	JOB NO.:	156259

10°6'0"

ARMSTRONG CONSULTANTS

MAGNETIC NORTH SOURCE:
NOAA GEOPHYSICAL DATA CENTER
MAGNETIC DECLINATION 10°60' EAST
RATE OF CHANGE 0.09° WEST PER YEAR
OBTAINED: 01/21/16

100 0 100 200
SCALE IN FEET

PROPOSED FENCE & GATE

2 Ac.

1 Ac. 1 Ac. 1 Ac. 1 Ac. 1 Ac. 1 Ac.

VEHICLE PARKING LOT 4,000 SY

LANDSCAPING AREA (TYP.)

SIDEWALK

VEHICLE PARKING LOT 4,000 SY

EAST APRON ACCESS ROAD

FUTURE TAXIWAY

EXISTING FENCE & GATE

LARGE CORP. HANGAR 45,000 SF

HANGAR / OFFICE 30,000 SF

HANGAR / OFFICE 30,000 SF

LARGE CORP. HANGAR 45,000 SF

TERMINAL 15,000 SF

TENANT / BUSINESS 20,000 SF

PAVED DRIVE (ASPHALT)

FLAG POLE

LANDSCAPING AREA (TYP.)

FUEL TRUCK PARKING

VEHICLE PARKING LOT 1,230 SY

PROPOSED GATE

FUEL TANKS (2) & CONTAINMENT WALL

EXISTING TRENCH DRAIN

TW E (E)

TW B3 (E)

TW B (E)

RUNWAY 3 - 21 5,830' X 75' (F)

RUNWAY 3 - 21 3,892' X 75' (E)

BRL(E) 35' STRUCTURE

BRL(F)

RPZ(E)

RPZ(F)

RVZ(E)

RVZ(F)

EXHIBIT 7

LEGEND

- AIRPORT PROPERTY LINE (E)
- AIRPORT PROPERTY LINE (F)
- FUTURE DEVELOPMENT
- TO BE REMOVED
- FUTURE LAND ACQUISITION

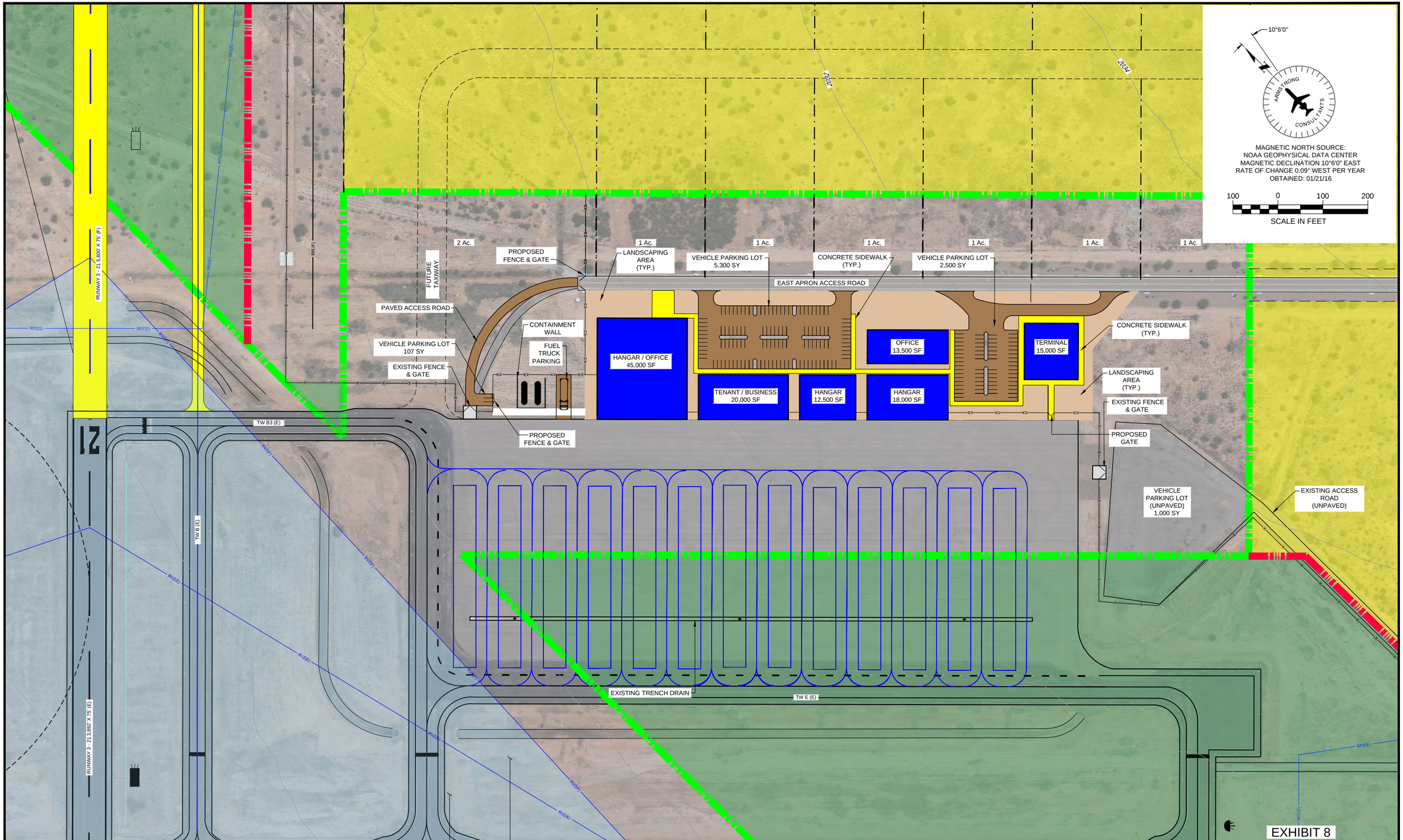
ARMSTRONG
PLANNING ENGINEERING CONSTRUCTION

COLORADO: 970.242.0101 ARIZONA: 602.803.7079 NEW MEXICO: 505.508.2192
www.armstrongconsultants.com

MARANA REGIONAL AIRPORT
PIMA COUNTY, ARIZONA

LANDSIDE / EAST APRON ALT. 1

SCALE:	PER BAR SCALE	DATE:	03/2016
DRAWN:	GMR	FILE:	6259604
CHK'D:	JRW	JOB NO.:	156259



LEGEND

- AIRPORT PROPERTY LINE (E)
- AIRPORT PROPERTY LINE (F)
- FUTURE DEVELOPMENT
- TO BE REMOVED
- FUTURE LAND ACQUISITION

ARMSTRONG
PLANNING ENGINEERING CONSTRUCTION

COLORADO: 970.242.0101 ARIZONA: 602.803.7079 NEW MEXICO: 505.508.2192
www.armstrongconsultants.com

MARANA REGIONAL AIRPORT
PIMA COUNTY, ARIZONA

LANDSIDE / EAST APRON ALT. 2

SCALE:	PER BAR SCALE	DATE:	03/2016
DRAWN:	GMR	FILE:	6259605
CHK'D:	JRW	JOB NO.:	156259

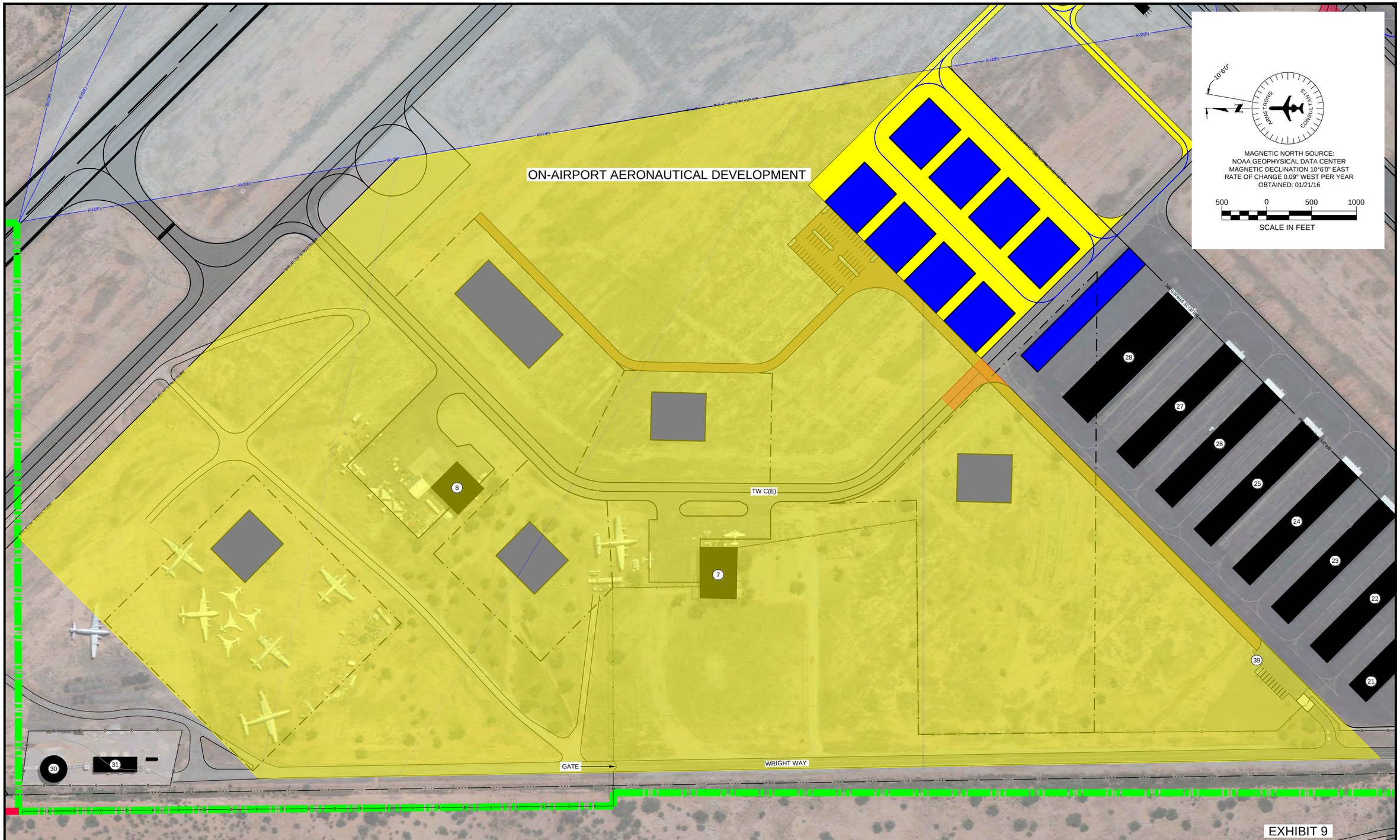


EXHIBIT 9

LEGEND

- AIRPORT PROPERTY LINE (E)
- AIRPORT PROPERTY LINE (F)
- FUTURE DEVELOPMENT
- TO BE REMOVED
- ON-AIPRORT AERONAUTICAL DEVELOPMENT

ARMSTRONG
PLANNING ENGINEERING CONSTRUCTION

COLORADO: 970.242.0101 ARIZONA: 602.803.7079 NEW MEXICO: 505.508.2192
www.armstrongconsultants.com

MARANA REGIONAL AIRPORT
PIMA COUNTY, ARIZONA

LANDSIDE / S.A.S.C. ALT. 1

SCALE:	PER BAR SCALE	DATE:	04/2016
DRAWN:	GMR	FILE:	6259603
CHK'D:	JRW	JOB NO.:	156259

OUR BUSINESS IS AVIATION. OUR PRIORITY IS YOU.

Corporate Office
861 Rood Avenue
Grand Junction, Colorado 81501
970.242.0101

Arizona Office
2345 S. Alma School Road, Suite 208
Mesa, Arizona 85210
602.803.7079

New Mexico Office
2305 Renard Place SE, Suite 210
Albuquerque, New Mexico 87106
505.508.2192

www.armstrongconsultants.com