

Camarillo Airport



ALP Update and Narrative Report

Chapter 4

Airport Development Alternatives and Preferred Concept

In the previous chapter, airside and landside facilities required to satisfy the projected aeronautical demand through the long-range planning period were identified. The next step in the planning process is to identify and discuss concepts for meeting these requirements. This chapter provides an organized approach to identifying and discussing reasonable alternative development concepts. The concepts presented are unconstrained, meaning factors such as cost and environmental constraints are not weighted heavily at this point, as the goal of this chapter is to identify viable development concepts.

The concepts present various potential hangar layouts with the objective of maximizing airport land in an efficient and sustainable manner. This means identifying where future taxiways should be planned so that a single hangar development project does not block the potential for additional hangar development. The graphics depict hangars, vehicle parking lots, and roadways to give a clearer understanding of the development potential and the space requirements. The graphics are conceptual and do not represent, imply, or recommend any specific commercial or non-commercial aeronautical uses, only general aeronautical use.



The facility requirements chapter identified the need for an additional 81,000 square feet of new hangar space in the next five years (See Table 3J). In order to meet this projected need within the forecast horizon, this ALP Update should identify and reserve locations for facilities that could accommodate up to 21 new based aircraft in the next five years, while identifying adequate area to be reserved for future aeronautical use over the next 20 years.

REVIEW OF PREVIOUS PLAN

The Ventura County Department of Airports pursues a continuous planning process. Periodically, the local airport planning documents are updated for each airport. The currently active master plan for Camarillo Airport (CMA) was completed in 2011 and included a 20-year capital improvement program (CIP) and airport layout plan (ALP). This ALP Update and Narrative Report (ALP Update) is a more narrowly focused planning study which will result in an updated CIP and ALP that focus on short-term needs (up to 10 years). On an annual basis, the CIP is updated and adjusted to address development needs, funding availability, and regulatory requirements. Most capital improvement projects, especially those needing federal grant funding assistance, must be depicted on the ALP. The FAA reviews master plans and ALP updates but only approves the forecasting element and the ALP.

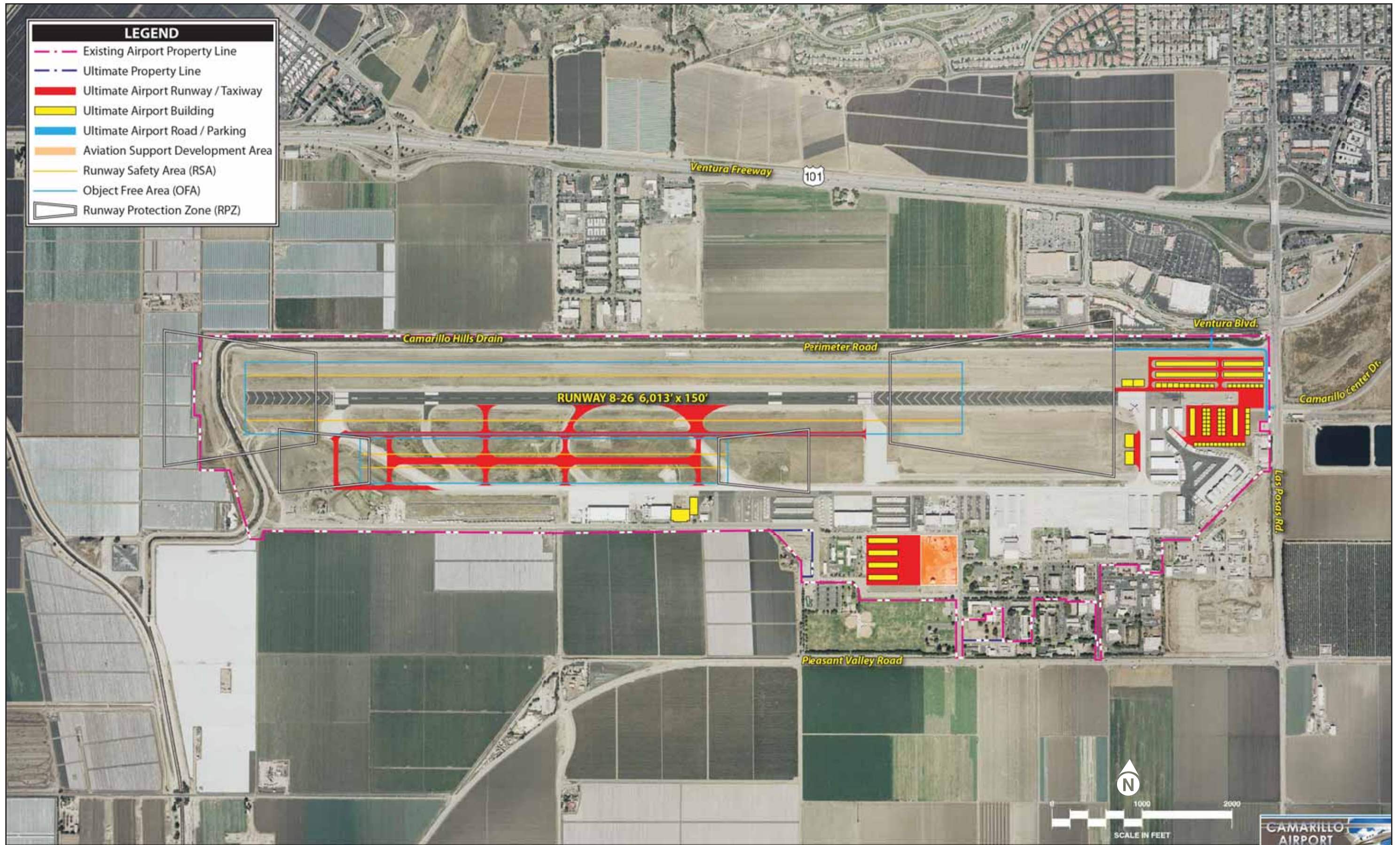
Exhibit 4A represents the development concept from the 2011 master plan. It is standard practice to review the previous planning effort and determine if the plan presented at that time is consistent with the current assumptions. It is not unusual for the plan to change over time, as new information may inform a change in how the original plan is further implemented during the planning period.

The previous plan identified several locations for future hangar development. While that plan presented suggested hangar types, hangar development is fluid and actual construction does not have to adhere to a specific type or dimension that may be depicted in a planning document. The runway was planned to remain 6,013 feet in length and an instrument approach with ½-mile visibility minimums was planned to the Runway 26 end. (See below for the recommendation to ultimately reduce the runway length to 6,000 feet to fully comply with the Joint Powers Agreement.) A short 4,000-foot-long parallel runway was planned to accommodate the future high volume of activity by smaller single-engine aircraft. It is valuable to reference the current 2011 master plan and ALP while analyzing various alternative development scenarios considered for this study.

BASELINE LAND USE ASSUMPTIONS

The objective of airport land use planning is to coordinate future uses of the airport property in a manner that is both functional with the design of the airport and compatible with the airport environs. There are two primary considerations for on-airport land use planning. The first is to secure those areas essential to the safe and efficient operation of the airport. The second is to determine compatible land uses for the balance of the property that would be most economically advantageous to the airport and the region it serves.

Prior to presenting development concepts, it is important to have a basic understanding of the land use guidelines. With this understanding, facilities can be located to ensure the highest and best use of airport property. Certain design standards also affect facility location options. For example, future structures should be planned so they do not compromise safe and efficient aircraft operations.



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Any property, when described as part of an airport in an agreement with the United States, defined by the ALP, or listed on the Exhibit “A” property map, is considered to be “dedicated” or “obligated” property for airport purposes. The primary purpose of airport property is for aeronautical use. In most cases, land designated for aeronautical use on the ALP may not be used for non-aeronautical purposes without FAA approval.

If it has been determined that obligated land on the airport is no longer needed for aeronautical use because it exceeds the forecasted need or is inaccessible by aircraft, that property may be considered for compatible non-aeronautical use. The revenue from this use can provide supplemental funds to the airport with the goal of making the airport as self-sustaining as possible.

By categorizing the entirety of airport property, airport management can plan and direct any development proposals to the appropriate locations. There are three primary land use categories on an airport: airfield operations, aeronautical reserve, and non-aeronautical reserve. **Exhibit 4B** presents preliminary land use classifications for the airport to guide the alternatives analysis. Once a plan for the airport is established, a formal land use plan is developed and included in the ALP set. The land uses depicted on **Exhibit 4B** are a starting point to guide this initial planning effort and may change as the concept review process proceeds.

AIRFIELD OPERATIONS

Airfield operations land use applies to the portion of airport property that encompasses the major airside elements, such as the runways; taxiways; runway safety area (RSA); runway object free area (ROFA); runway obstacle free zone (OFZ); runway protection zone (RPZ) (on airport property); taxiway safety area; taxiway object free area (TOFA); and navigational aid critical areas. Airfield operations areas are intended for the safe and efficient movement of aircraft to and from the airfield. This land use designation includes the various object clearing areas, and only elements necessary for aircraft navigation can be located here.

AERONAUTICAL RESERVE

The aeronautical development land use category includes those areas that should be reserved for types of development that require access to the airfield operations area, such as taxilanes, aircraft hangars, and aeronautical businesses. Generally, lands adjacent to the runway should be reserved for future aeronautical development to a depth that allows for future taxiways, taxilanes, aprons, hangars, and access roads. This land use category also includes airport support elements that may not require taxiway access, such as drainage infrastructure or fuel farms served by delivery trucks.

The map also shows certain areas that are already developed for aeronautical purposes; however, the structures are aging and may be near the end of their useful life. These areas may be considered for redevelopment and objectives for determining the best uses should be identified when offered for redevelopment.

A square-shaped parcel to the immediate southwest of the Ventura County Sheriff's Department hangar is undeveloped. This parcel is not currently within the perimeter fence and a roadway leading to the hangar prevents aircraft access. This parcel is planned to be brought inside the perimeter fence and used for unique aeronautical development.

NON-AERONAUTICAL RESERVE

With FAA approval, portions of the airport property may be used for non-aeronautical revenue support purposes. Typically, it is preferable for development in these areas to complement airport activities to some degree, but it is not required; however, any non-aeronautical facilities are required to be compatible with airport operations. Examples of compatible uses include light industrial and commercial/retail development; research facilities; laboratories; manufacturing and processing facilities; warehouses; and other facilities compatible with an airport environment.

Designating airport land for non-aeronautical uses is available only to those airports that have enough land to accommodate future aeronautical development needs. Land that is inaccessible by aircraft is often considered for a non-aeronautical revenue-supporting role. Any airport land considered for long-term (more than five years) non-aeronautical development must be formally released from obligation by the FAA. The property remains part of the airport and any revenue generated from the land must go to the airport fund to be used only for airport purposes.

At CMA, there are several parcels outside the airport perimeter fence that are physically disconnected from the airport by surface streets. These parcels, for the most part, are developed for non-aeronautical uses and are shaded in green on the exhibit.

PLANNING CONSIDERATIONS

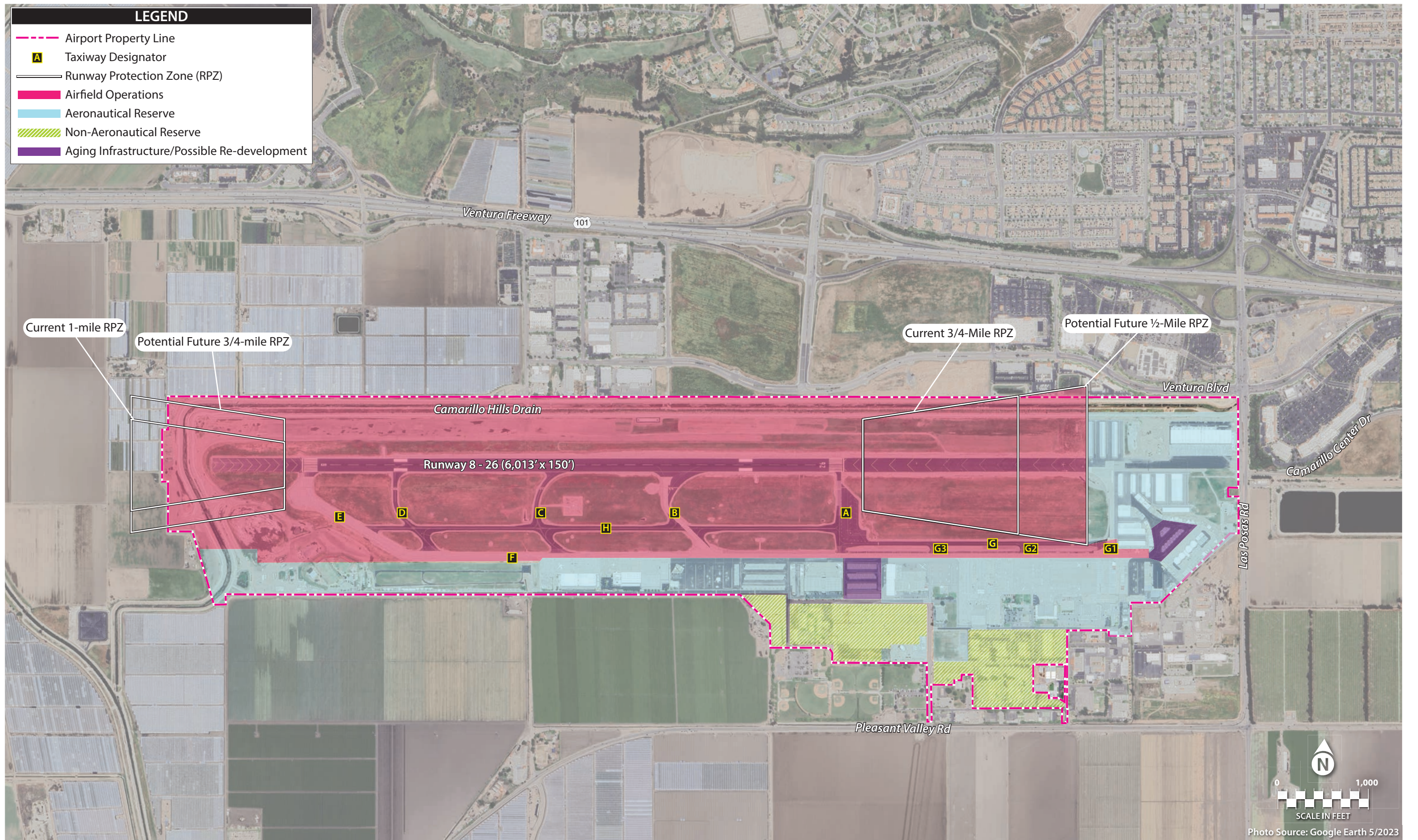
Analysis conducted in the previous chapters indicated that various elements of the airport need consideration in this chapter. These issues are the result of the findings of the forecasts and facility requirements.

The primary airfield element considerations include:

- Consider implementing a uniform taxiway width of 35 feet to meet the design standard for Taxiway Design Group (TDG) 2B.
- Consider reducing the runway length to 6,000 feet from the current 6,013 feet to be in complete compliance with the Joint Powers Agreement (JPA).
- Maintain the planned long-term 4,000-foot parallel runway, as currently shown in the 2011 master plan and the current airport layout plan. (Note: This is considered a long-term potential project, when needed).
- Consider adding a taxiway parallel to Taxiway G1 to facilitate ground movements to the north-east quadrant of the airport.
- Examine suitability of existing instrument approach procedures and the need for lower visibility minimums.

LEGEND

- Airport Property Line
- A Taxiway Designator
- Runway Protection Zone (RPZ)
- Airfield Operations
- Aeronautical Reserve
- Non-Aeronautical Reserve
- Aging Infrastructure/Possible Re-development



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- Strengthen the pavements to accommodate the current/future critical aircraft, consistent with the JPA.
- Consider narrowing the runway to the standard width of 100 feet.

The primary landside considerations include:

- Consider appropriate land use designations for all airport property.
- If needed, plan for additional T-hangars and/or smaller box hangars in the northeast quadrant of the airport.
- Consider adding the parcel to the southwest of the Ventura County Sheriff's Department hangar to the aeronautical reserve.

AIRSIDE DEVELOPMENT ALTERNATIVES

Airside elements include the runway, taxiways, taxilanes, safety areas, instrument approach capability, and airfield geometry.

RUNWAY(S)

Runway 8-26 is currently the only runway at CMA. It is 6,013 feet long and 150 feet wide. Analysis in the facility requirements chapter showed that the current mix of aircraft operating at the airport would benefit from a longer runway. However, the JPA limits the total runway length at CMA to 6,000 feet; therefore, it is recommended that the runway be shortened by 13 feet for a total length of 6,000 feet.

Shortening a runway is a significant project for an airport and it will take years of planning and coordination with multiple FAA lines of business. It is typical for adjustments to runway length to be undertaken in combination with other projects that affect the runway, such as a rehabilitation/resurfacing project; therefore, the runway shortening project should be combined with the next major runway rehabilitation project.

The runway is 150 feet wide, while the applicable design standard is 100 feet wide both now and in the future. Therefore, consideration is given to narrowing the runway to 100 feet in width if it makes financial sense. Since narrowing a runway has other financial considerations – such as relocating the runway edge lights – a case may be made that leaving the runway at its current width is more financially feasible. Narrowing a runway is typically undertaken when a major rehabilitation of the runway is needed. It is not typically undertaken for an overlay or other maintenance-type activity.

Future Parallel Runway

The 2011 master plan and this study acknowledged that the airport could benefit from construction of a parallel runway. A parallel runway is a capacity improvement project that is justified for FAA funding if airport operations are trending toward or exceed 80 percent of the capacity (annual service volume), as is the case at CMA. However, construction of a parallel runway is a very expensive investment and airport management has indicated no intent to pursue such a project within the near or intermediate planning

horizons. Since the 2011 master plan and current ALP identify the potential need for a parallel runway, it is planned to remain in consideration on the ALP for this study, but only as a long-term opportunity for the airport and to protect and preserve land uses for this potential.

Construction of a parallel runway is a long process that will require additional planning studies, a significant level of public involvement, environmental considerations (including noise impacts), local and federal approvals, and securement of funding. Consideration of a parallel runway is a carryover from the 2011 master plan, and it is still considered a long-term placeholder project. The parallel runway project does not fall within the short-term timeframe of this ALP Update.

INSTRUMENT APPROACH CAPABILITY

The instrument approach capability at an airport contributes to the economic viability and benefit of the airport. Instrument approaches are defined by visibility and cloud ceiling height minimums. The lower the minimums, the more opportunity there is for the airport to remain open, even in times of poor visibility.

Runway 8 has a GPS-based instrument approach with 1-mile visibility minimums. The current 2011 master plan reserves space for improving this instrument approach to $\frac{3}{4}$ -mile visibility minimums. This concept will be preserved in this ALP Update.

Runway 26 has an instrument approach with $\frac{3}{4}$ -mile visibility minimums. This visibility minimum is good for this airport, and it is on the runway end that receives the most use. Some general aviation airports have visibility minimums as low as $\frac{1}{2}$ -mile. The 2011 airport master plan shows a future instrument approach to Runway 26 with visibility minimums of $\frac{1}{2}$ -mile. To accommodate visibility minimums of $\frac{1}{2}$ -mile, the following impacts are considered:

- The RPZ would expand from 1,700 feet in length to 2,500 feet.
- The RPZ area would expand from 49 acres in size to 79 acres.
- Visibility minimums of $\frac{1}{2}$ -mile require a medium intensity approach lighting system with runway alignment indicator lights (MALSR).

Any upgrades to the instrument approach capability for both runway ends would occur beyond the short-term planning horizon of this ALP Update. Therefore, the ultimate $\frac{1}{2}$ -mile RPZ land is recommended to be maintained clear of development beyond the Runway 26 end. Preserving space for a future instrument approach with $\frac{3}{4}$ -mile visibility minimums on the Runway 8 end is also recommended. Upgrading the visibility minimums will be considered further in a future planning study beyond the planning horizon of this ALP Update.

TAXIWAYS

Most of the taxiways at CMA are 50 feet wide or more. The applicable design standard is for the taxiways and taxilanes to be 35 feet wide. The wheelbase width of the critical aircraft determines the applicable design standard. The current and future critical aircraft (or family of aircraft) for CMA is expected to have a wheelbase width of less than 20 feet, which corresponds to a taxiway/taxilane width of 35 feet; therefore, this plan suggests that future taxiways/taxilanes be constructed to the 35-foot width standard.

The airport has an opportunity to maintain 50-foot-wide taxiways under one of two conditions:

- If the operating fleet mix of aircraft with greater than 20-foot-wide wheelbases increases to more than 500 operations annually; or
- The airport can self-fund the extra 15 feet of taxiway width, with FAA construction and maintenance of the 35-foot width standard.

For this study, the taxiways will be shown at 50 feet on the airport layout plan; however, the airport should be aware that meeting one of the conditions listed above is needed for full FAA funding eligibility.

Recent hangar development in the northeast quadrant (Cloud Nine and APL hangars) of the airport and any additional development in the area will place capacity pressure on Taxilane G1, which is the only entry/exit point. To alleviate potential congestion and head-to-head aircraft conflicts, consideration should be given to constructing a new taxilane parallel to Taxilane G1. This planned parallel taxilane is positioned to be 144 feet, centerline to centerline, to the west of Taxilane G1. This is the taxilane separation standard for airplane design group (ADG) III aircraft (the current and future critical aircraft for the airport).

As noted in the facility requirements chapter, the taxiways extending from the runway have non-standard geometry. Taxiways B, C, and D are all curving taxiways that do not meet current FAA design recommendations. The airport has a plan in place to remedy the current taxiway geometry, which is shown on **Exhibit 4C**. Taxiways B, C, and D are all planned to be reconstructed at 90-degree angles to the runway. The portions of those taxiways between parallel Taxiways F and H are also planned to be reconstructed at 90-degree angles. These are also planned to be shifted slightly to eliminate the direct access to the runway, as required by FAA design standards.

HOLD BAYS

At a busy airport, it is not unusual for many departing aircraft to need a place to perform engine run-ups and other pre-flight checks. There is a hold bay adjacent to Taxiway A that currently allows up to seven small piston aircraft to pull off the taxiway to perform these pre-flight checks. Hold bays also provide space for aircraft to bypass one another. Recent FAA guidance contained in Advisory Circular (AC) 150/5300-13B, *Airport Design*, suggests a different geometry for hold bays. Specifically, the current recommendation is to design hold bays to allow independent aircraft movements to bypass one another, and the design should be based on the ADG of the critical aircraft. Islands (either grass or properly marked pavement) between the parking positions provide visual cues to pilots that assist them with situational awareness.

As shown on **Exhibit 4C**, when reconstructed to meet the current standard, two dedicated hold bay positions are feasible near the Runway 26 departure end. These hold bays are separated by 144 feet (centerline to centerline), which is the taxilane-to-taxilane separation standard.

PAVEMENT STRENGTH

As noted in the facility requirements chapter, the current runway pavement strength is 50,000 pounds for aircraft with a single wheel on each strut and 80,000 pounds for two-wheel struts. The pavement strength is an indicator of the weight limits for regular usage that will preserve the useful life of the pavement. Occasional activity by aircraft weighing more than the published pavement strength is permissible.

The current critical aircraft is classified as D-III-2B, and a representative aircraft is a large business jet such as a Gulfstream 550 or 650. These aircraft, which have dual-wheel struts, have a maximum takeoff weight (MTOW) of between 90,000 and 100,000 pounds; therefore, when the runway is planned for reconstruction, consideration should be given to making the pavement thick enough to fully accommodate the MTOW of the critical aircraft. It should be noted that the JPA limits the pavement strength to no more than 115,000 pounds for aircraft with dual-wheel landing struts.

LANDSIDE DEVELOPMENT ALTERNATIVES

Landside development includes consideration of projected future hangar development needs and other elements unrelated to the runway and taxiway system. As noted in the facility requirements chapter, the airport may need an additional 81,000 square feet of hangar space in the short term to accommodate forecast growth in based aircraft. This estimate is a net need, so if any older hangars are removed from service, that space would be added to the total needed.

Exhibit 4B – Preliminary Land Use Map presents a color-coded map of airport property. Any area that could have potential access to the runway and taxiway system was identified for aeronautical development. The type of development to occur is fluid and can change over time, based on demand. All hangars are currently occupied. Large conventional hangars typically house airport businesses that may provide FBO services, aircraft storage capability, or aircraft maintenance services. Medium-sized box hangars also often house aviation businesses, such as specialty operators that may focus on a specific aeronautical element like avionics or upholstery. Some individuals may desire a medium-sized box hangar for multiple aircraft or to support a flight department. Medium-sized box hangars are a current need for the airport.

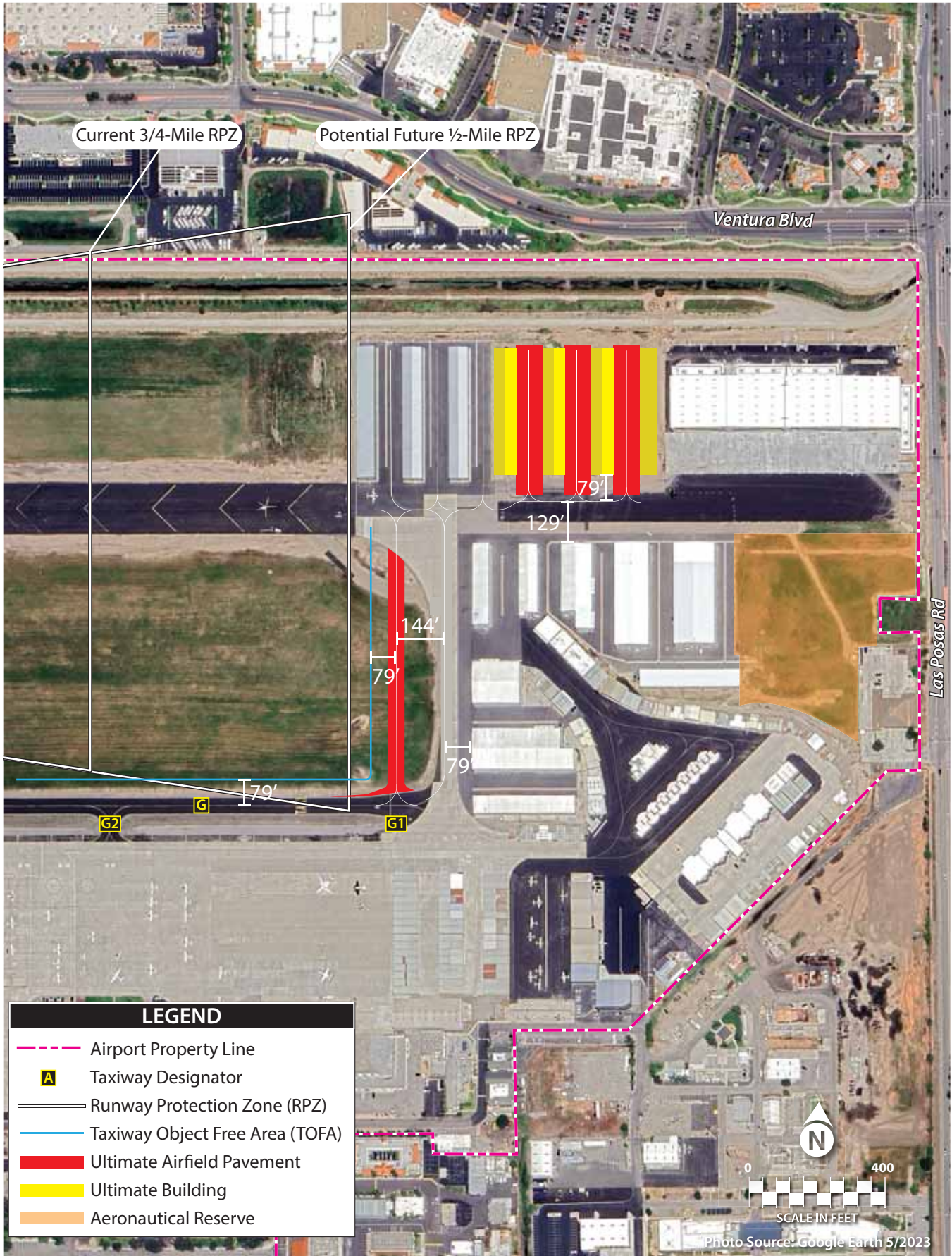
Small storage hangars for individual aircraft, like T-hangars or connected box hangars, are still desirable by aircraft owners. These types of storage units are not suited to aeronautical businesses but are needed to accommodate recreational flyers or individuals that use private aircraft for their business.

Exhibit 4D shows one possible concept for locating new T-hangars and connected box hangars in the northeast quadrant. The space between the new Cloud Nine hangars and the county-owned T-hangars is a logical place for new T-hangar development. As depicted, there are three T-hangar structures with eight units each and a connected box hangar structure with six units which provide a total of approximately 80,000 square feet of hangar space.

The based aircraft fleet mix projected 21 new based aircraft in the next five years of which 10 were turbines (business jets and turboprops), which typically are not stored in T-hangars or connected box hangars. Therefore, this concept can accommodate the 11 new based small aircraft and up to 19 other small aircraft such as those that may relocate from older hangars.



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LEGEND

- - - Airport Property Line
- A Taxiway Designator
- Runway Protection Zone (RPZ)
- Taxiway Object Free Area (TOFA)
- Ultimate Airfield Pavement
- Ultimate Building
- Aeronautical Reserve

Larger conventional and medium sized box hangars intended to accommodate the turbine aircraft are expected to be proposed within areas identified as aeronautical development/redevelopment or aeronautical reserve. These areas are also expected to accommodate hangars to house aircraft expected beyond the forecast period of this ALP Update. Detailed concepts for development beyond this forecast horizon will be the subject of a future study.

While this exhibit shows one possible development scenario with T-hangars and small connected box hangars, this is not the only option. Demand and financial feasibility will be factors in what is developed; however, the airport administration wanted to show this concept to convey a desire to develop smaller individual hangars, and locating such hangars in the northeast quadrant makes sense.

Also shown on the exhibit are other areas (shaded light blue) that can be used for hangar development. The specific type of hangar that could be developed would be subject to demand and funding. All light blue shaded areas are reserved for existing and future aeronautical development.

PREFERRED DEVELOPMENT CONCEPT

Exhibit 4E combines all the elements of the alternatives into a single preferred development concept. This concept represents potential improvements over the next five to 10 years, which is the planning horizon of this ALP Update.

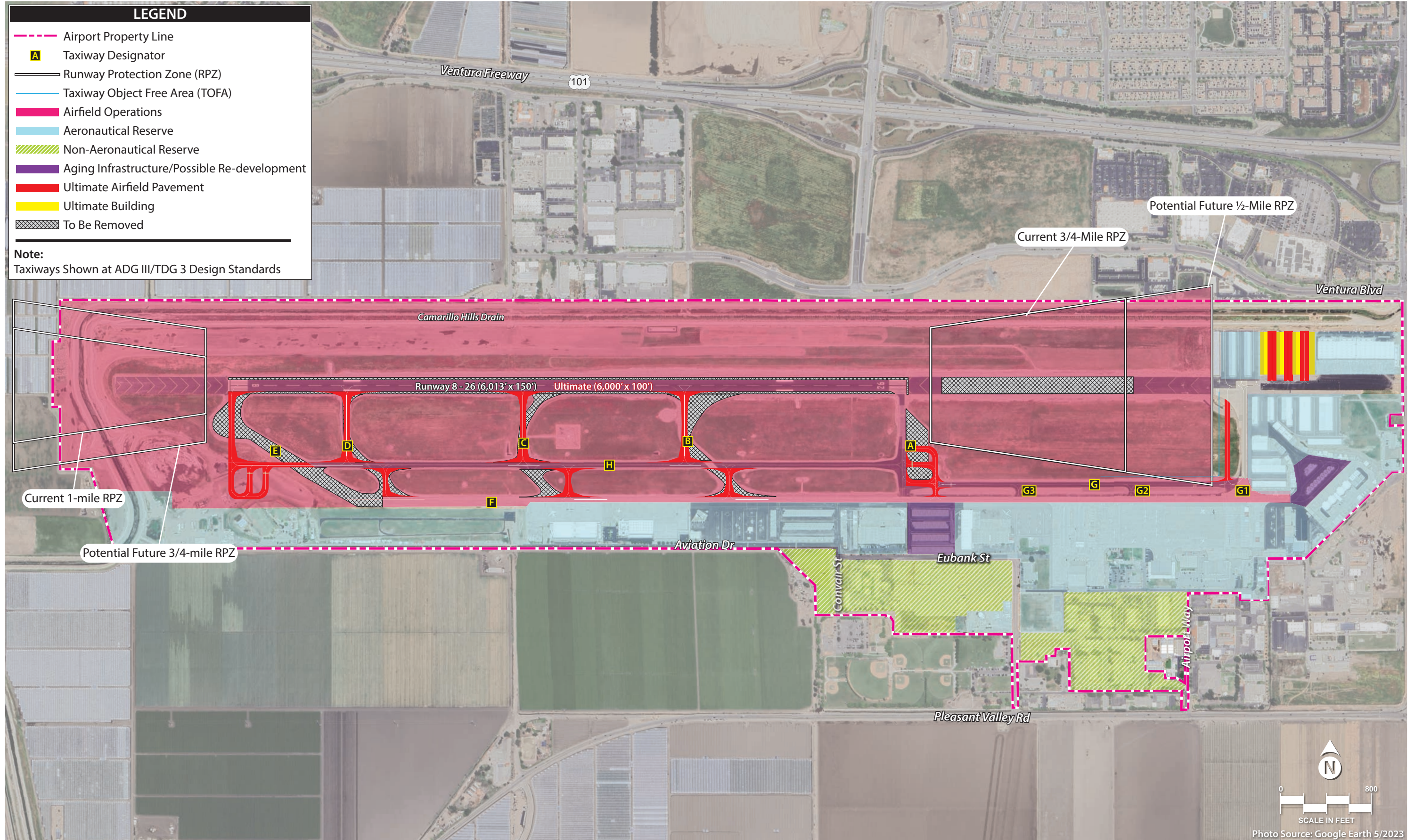
On the airside, the runway is planned to be shortened from its current length of 6,013 feet to 6,000 feet in the future. This change is necessary to fully comply with the JPA, which limits the runway length to 6,000 feet. The runway is also planned to be narrowed to 100 feet, which is the applicable design standard now and in the ultimate condition.

The current instrument approaches are planned to be maintained through the long-term planning period. The existing 1-mile visibility minimum to Runway 8 and the existing $\frac{3}{4}$ -mile visibility minimum to Runway 26 are planned to remain unchanged through the 5-to-ten-year term of this ALP Update. The ALP drawing set will maintain the possibility of long-term improvements to the instrument approaches with $\frac{3}{4}$ -mile minimums to Runway 8 and $\frac{1}{2}$ -mile minimums to Runway 26.

Taxiways B, C, and D are planned to be reconstructed to meet current design standards, which recommend that taxiways intersect with runways at a 90-degree angle where possible to improve pilot situational awareness. The portions of Taxiways B, C, and D between parallel Taxiways F and H are planned to be oriented at 90 degrees and offset to eliminate the direct access to the runway. Taxiway E is also planned to be reoriented to 90 degrees.

The aircraft hold bays are planned to be redesigned to meet the geometry recommendations of FAA AC 150/5300-13B, *Airport Design*. The current geometry recommendation is for the hold bays to have enough space for each individual aircraft and to allow bypass capability.

A new taxilane is planned parallel to Taxilane G1 to relieve congestion and enhance circulation for aircraft taxiing to and from the northeast quadrant of the airport. The new parallel taxilane is separated from Taxilane G1 by 144 feet, centerline to centerline, which is the ADG III standard.



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Exhibit 4E is color-coded to identify existing and possible future developments on airport property. The pink color is for airfield operations reserve. The airfield operations areas are strictly reserved for runways, taxiways, and object clearing surfaces. The light blue shading is aeronautical reserve land. These areas should be developed as demand dictates for additional aeronautical facilities, such as hangars. The purple color indicates those areas that airport management has identified as aging infrastructure, which may be available for redevelopment at some point in the future. Finally, the green shading represents current and future non-aeronautical development. The blue areas are outside the airport perimeter fence, without access to the runway and taxiway system.

SUMMARY

An ALP Update is a limited planning study for the airport. The goals of the study are to remain in compliance with FAA grant assurances; to keep the ALP up to date; to depict and justify projects that the Department of Airports may seek grant assistance from the FAA to implement within the planning period; and to update the prioritized list of projects (capital improvement program) with current estimated costs. The ALP is then used by both the airport and the FAA when making capital funding decisions. While the ALP will depict a long-term vision, the ALP Update focuses on needed projects in the next 10 years.

This chapter of the narrative report has presented some development alternatives for specific elements of the airport. On the airside, the taxiways are planned to be reconstructed to meet current design standards, which are meant to improve the safety of taxiing ground movements and to improve pilot situational awareness. The aircraft hold bays are also planned to be reconstructed to the current standard. A new taxilane, parallel to Taxilane G1, is planned to enhance circulation to and from the northeast quadrant of the airport. The current instrument approach visibility minimums to both runway ends are planned to be maintained through the five-to-10-year planning horizon of this ALP Update.

The possibility of a future instrument approach to Runway 26 with ½-mile minimums, as defined in the 2011 master plan, should be preserved by continuing to reserve the land area necessary for the associated RPZ. A potential future ¾-mile visibility minimum approach to Runway 8 is also preserved in this ALP Update. Ultimately, the airport may undertake an additional planning study to measure the cost benefit of upgrading the visibility minimums to both runway ends.

On the landside, airport property has been segmented into airfield reserve, aeronautical development, and non-aeronautical development. Specific future hangars have been identified only in a portion of the northeast quadrant, indicating that T-hangars and smaller connected box hangars are the preferred hangar type in this area. All aeronautical development areas are fluid in terms of development type. Several currently developed aeronautical parcels have been identified for potential redevelopment; some of these areas contain old hangars that are beyond their useful life. The redevelopment area also includes an apron area that may be considered for hangar development.

The next chapter of this study will present the CIP projects and cost estimates for those projects. The ALP technical documents will also be developed based on the preferred concept described in this chapter.