

# Auburn



*California*

## **Auburn Municipal Airport** Master Plan

2024

IMPROVEMENT ALTERNATIVES

January 2025 DRAFT

# CHAPTER 4

## IMPROVEMENT ALTERNATIVES

### 4.1 CHAPTER OVERVIEW

The conceptual planning process is designed to evaluate the information gathered to date during the inventory, forecast, and facility requirements stages and use this information to develop preliminary concept alternatives that meet the goals and objectives of the Auburn Municipal Airport (Airport or AUN). This chapter documents improvement alternatives and the recommended development plan to satisfy the facility requirements described in **Chapter 3**.

The alternative analysis is based on feedback that was collected throughout the planning process from an involved collaborative effort with the Study Committee (SC) and the public. The SC is a group of local agencies, tenant and user groups, and state and federal agencies. The SC's role in the Master Plan study is to serve as a sounding board to Staff and Consultants and to help ensure that Master Plan recommendations reflect community goals and interests while satisfying Federal Aviation Administration (FAA) requirements.

The outcome of the alternatives analysis, SC input, and public feedback is the selection preferred alternatives. A description of the various factors, influences, concepts, and issues that will form the basis for the ultimate plan and is outlined in the following section. This chapter is intended to facilitate discussion about the advantages and disadvantages of these development concepts and alternatives that are needed to meet forecasted demand at AUN and ultimately identify a Conceptual Development Plan (CDP) for AUN.

## 4.1.1 Assumptions and Goals

The alternatives were developed and evaluated for meeting demand and facility requirement needs in accordance with FAA design standards. The alternatives were evaluated based on the assumptions below. The Preferred Alternative reflects the results of the alternative evaluation, airport development goals, and best planning practices.

The process of defining and evaluating alternatives is iterative, beginning with a comprehensive range of possibilities. The possible alternatives are then refined based on evaluation criteria and AUN development goals. The different functional areas of AUN may have unique screening criteria during evaluation that reflect the appropriate purpose and considerations for each area.

### 4.1.1.1 Assumption One: *Recommended improvements must comply with local, state, and federal regulations*

The Airport will be developed and operated in a manner that is consistent with local ordinances and codes, federal and state statutes, federal grant assurances, and FAA regulations.

### 4.1.1.2 Assumption Two: *Role of the Airport*

The Airport will continue to serve as a facility that accommodates regional General Aviation (GA) activity.

### 4.1.1.3 Assumption Three: *Airfield design aircraft*

The size and type of the critical design aircraft that utilize AUN and their associated design standards are used as the basis for the layout of associated airport facilities.

- ▶ Runway 7/25 is designed to be used primarily by smaller GA aircraft. The existing critical design aircraft for this runway is a family grouping of B-I small aircraft types represented by the Cessna 421 Golden Eagle (C421) and the Beechcraft Baron (BE58). The future critical design aircraft is not forecasted to change. This indicates that this runway should continue to be planned and designed using RDC B-I small dimensional criteria.

### 4.1.1.4 Assumption Four: *Runway Length*

The existing length provided for Runway 7/25 is not adequate to accommodate the needs of the forecasted aircraft fleet. An additional 640 feet is necessary to accommodate 100 percent of the fleet by the end of the planning period.

### 4.1.1.5 Assumption Five: *Taxiway design*

The design of the taxiway system is in accordance with Federal Aviation Administration (FAA) standards, with each taxiway and taxilane being independently evaluated based on the Taxiway Design Group (TDG) of the critical types intended to use each surface. TDG 1 has been used to accommodate aircraft operating at AUN.

#### 4.1.1.6 Assumption Six: *Efficient and Targeted Development*

Efficient utilization of the limited landside development area at airports is paramount, especially for future expansions that cater to aviation-related activities such as GA facilities and passenger terminal facilities. It is essential to plan strategically to maximize the use of available space, ensuring that aviation use areas are developed in harmony with the surrounding land uses.

## 4.2 AIRSIDE IMPROVEMENT ALTERNATIVES

The airside recommendations outlined in this section are tailored to meet the anticipated airfield demand as detailed in **Chapter 3, Facility Requirements**. Given that AUN does not necessitate substantial alterations to the current airfield configuration or the Runway Design Code (RDC), the recommendations confirm the existing layout and provide alternatives for improvement. The proposed improvements are designed to align with current FAA design standards and to accommodate the runway length requirements for both the existing and future design aircraft along with addressing the increasing demand for covered aircraft parking.

### 4.2.1 Runway Length Alternatives

As identified in the previous chapter the existing runway length is insufficient for the current fleet mix operating at AUN. The following runway extension alternatives are presented to address the need for additional runway length:

- ▶ Westward
- ▶ Eastward
- ▶ Combined

Additionally, a runway length analysis for beyond the planning period has been completed to show the greatest length of runway that can be accommodated within the boundaries of the Airport.

#### 4.2.1.1 Alternative 1: Runway 7/25 Westward Extension

As depicted in **Figure 4-1**, Alternative 1 proposes the extension of Runway 7/25 towards the west. Features, advantages, and disadvantages include:

##### Features

- ▶ RY 7/25 Extension of 600 feet
- ▶ Total length of RY 7/25 after completion is 4,300 feet which meets 100% of the existing GA fleet

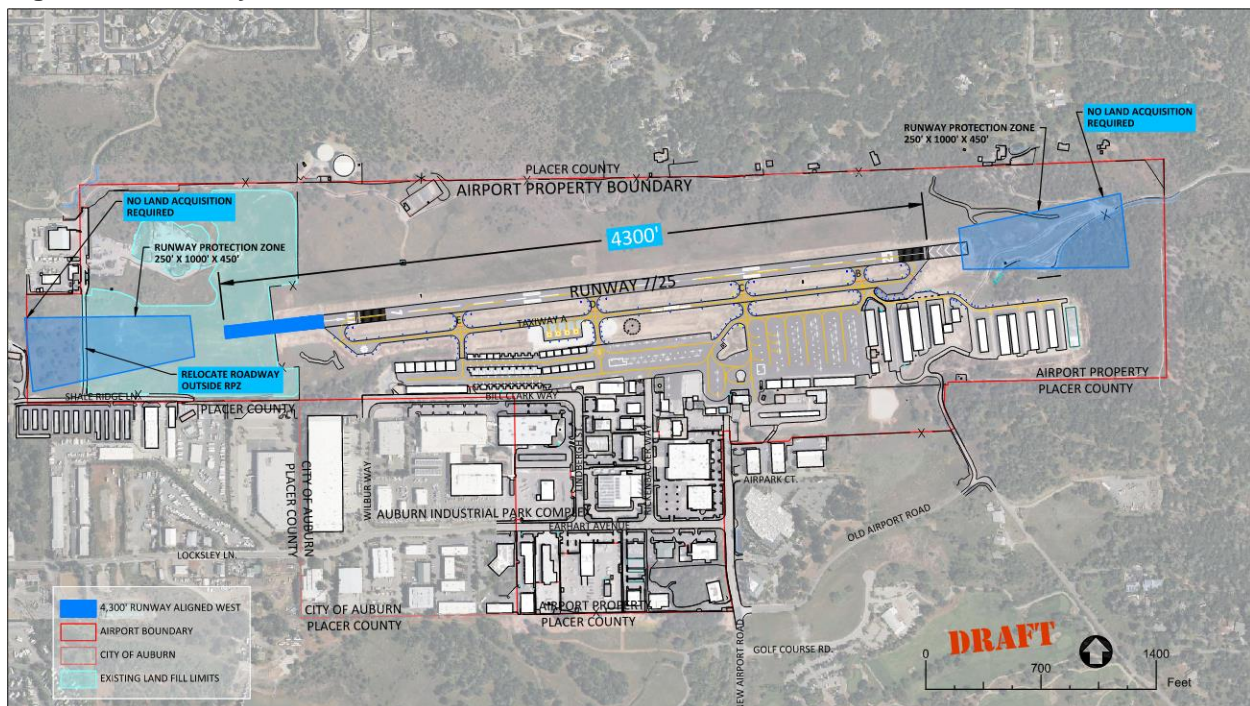
##### Advantages

- ▶ No land acquisition is required
- ▶ Less fill required

##### Disadvantages

- ▶ Environmental considerations will be required to address the historical land fill located to the west
- ▶ Relocation of public road required

**Figure 4-1: Runway 7/25 Westward Extension**



Source: Mead & Hunt, 2024.

#### 4.2.1.2 Alternative 2: Eastward Extension

Alternative 2, illustrated in **Figure 4-2** shows the extension of Runway 7/25 to the east. Potential features, advantages, and disadvantages of Alternative 2 include:

##### Features

- ▶ RY 7/25 Extension of 600 feet
- ▶ Total length of RY 7/25 after completion is 4,300 feet which meets 100% of the existing GA fleet

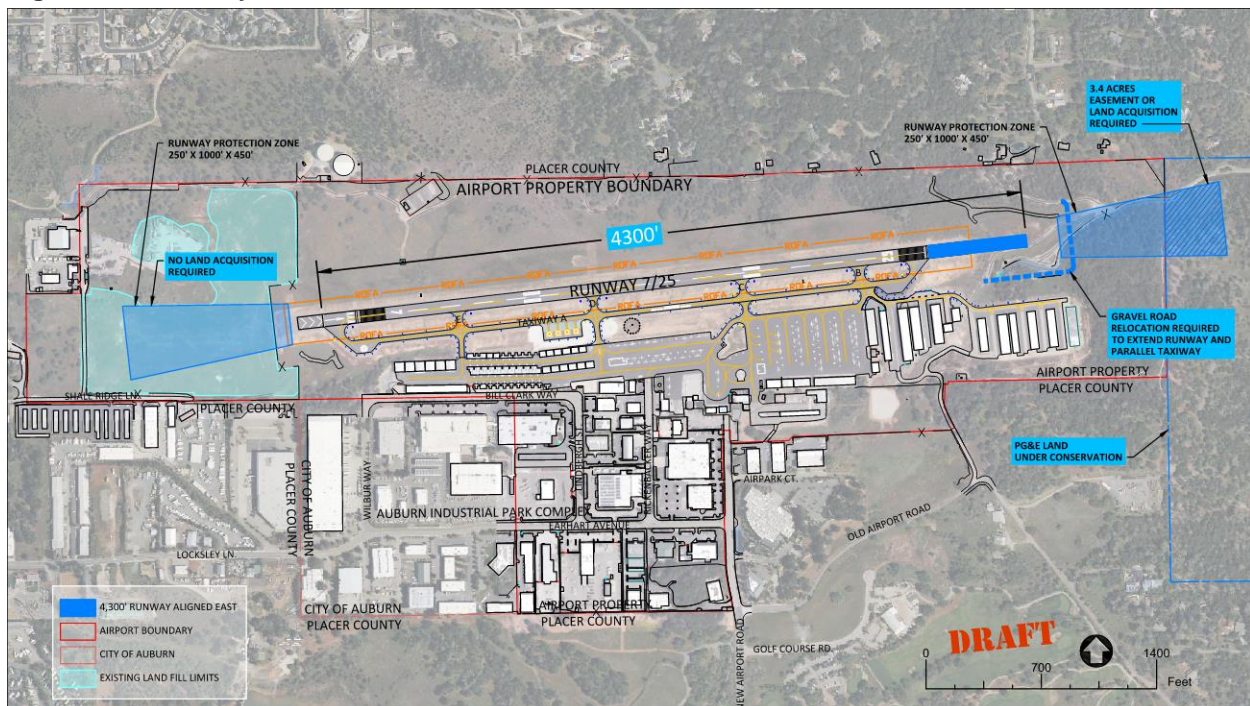
##### Advantages

- ▶ Only one road relocation required

##### Disadvantages

- ▶ Relocation of a gravel road is required
- ▶ Land acquisition or easement is required for 3.4 acres of land
- ▶ Significant fill required

**Figure 4-2: Runway 7/25 Eastward Extension**



Source: Mead & Hunt, 2024.

### 4.2.1.3 Alternative 3: Combined Extension

Alternative 3, illustrated in **Figure 4-3** shows the extension of Runway 7/25 to both the east and west. Potential features, advantages, and disadvantages of Alternative 3 include:

#### Features

- ▶ RY 7/25 Extension of 600 feet
  - 400 feet to the west
  - 200 feet to the east
- ▶ Total length of RY 7/25 after completion is 4,300 feet which meets 100% of the existing GA fleet

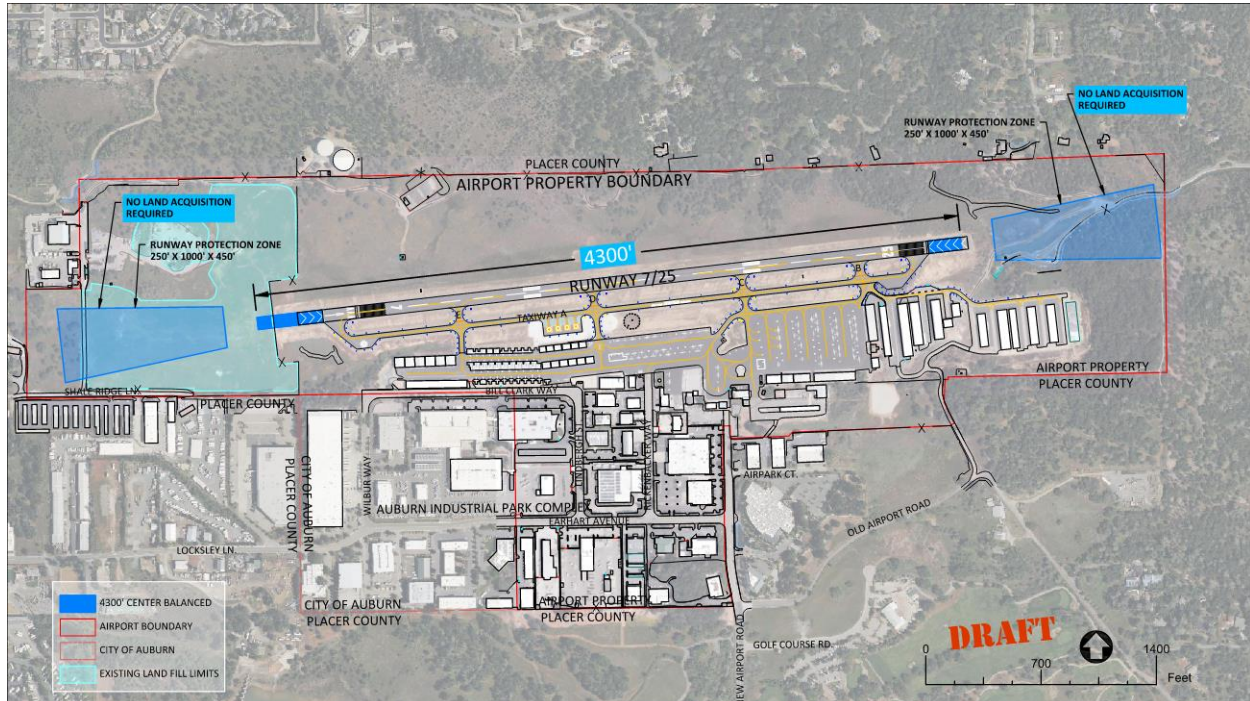
#### Advantages

- ▶ Minimizes amount of fill required by paving over existing blast pads at both runway ends and reducing the distance added to the west
- ▶ No land acquisition is required

#### Disadvantages

- ▶ Road relocations required to east and west

**Figure 4-3: Runway 7/25 Combined Extension**



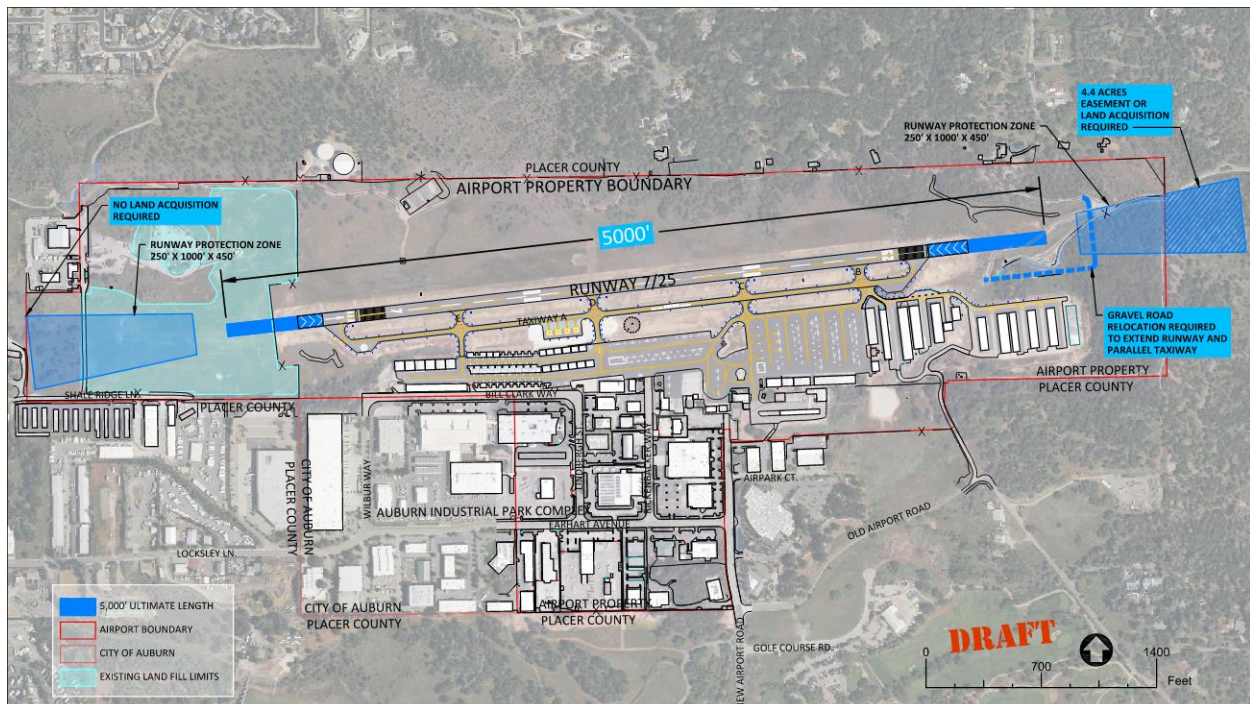
Source: Mead & Hunt, 2024.

#### 4.2.1.4 Alternative 4: Runway Length Beyond the Planning Period

Alternative 4, as depicted in **Figure 4-4**, presents the long-term vision for the runway AUN, illustrating the maximum extension achievable within the airport's existing boundaries. A runway length of 5,000 feet is a minimum length required for likely airport users beyond the master planning period. By illustrating this long-term extension on the Airport Layout Plan (ALP) for AUN, the city would protect the airspace and allow the long-term extension to be considered in potential land use decisions in the airport vicinity. The reservation of this space is essential for the strategic development of the airport and Placer County, as it facilitates necessary expansion through responsible planning. An important note for this alternative is that these larger jet aircraft are not included in the approved forecasts and therefore are considered outside the planning period of this study. Potential features of this extension include:

- ▶ Land acquisition or easement is required
- ▶ RY 7/25 Extension of 1,300 feet from existing length
  - 600 feet to the west
  - 700 feet to the east
- ▶ Total length of RY 7/25 after completion is 5,000 feet which meets the needs of the GA fleet beyond the planning period of this master plan study.

**Figure 4-4: Runway 7/25 Ultimate Extension**



Source: Mead & Hunt, 2024.

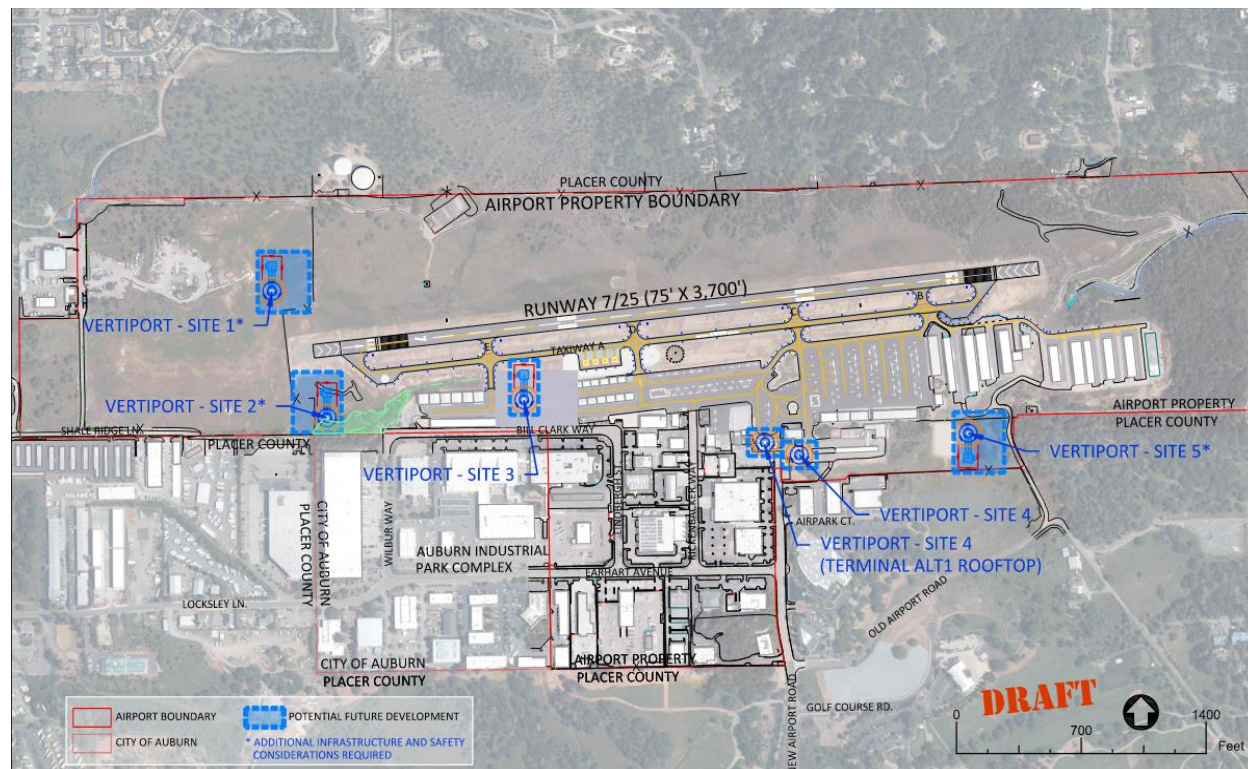
## 4.2.2 Vertical Takeoff and landing Improvement Alternatives

### 4.2.2.1 Potential Vertiport Sites

In Chapter 3, Facility Requirements, the integration of a dedicated vertiport and/or heliport to accommodate existing helicopter activity and/or emerging eVTOL aircraft is addressed. **Figure 4-5** highlights five potential sites for the vertiport at the Airport. Each site has been identified based on the preliminary guidance provided by the FAA in Engineering Brief No. 105 (EB No. 105), Vertiport Design. A matrix of these pros and cons is included in **Table 4-1**, it is important to note that this planning document did not evaluate all aspects of the EB No. 105 including identifying the approach and departure corridors. These items will need to be evaluated further prior to vertiport construction. Given its proximity to Sacramento International Airport and the Sacramento metropolitan area, as well as the Airport's proximity to Lake Tahoe and other mountain destinations, AUN is an ideal candidate for Advanced Air Mobility (AAM) as this emerging technology progresses towards practical application.
















Sites one through three as well as site five are envisioned as ground-level facilities, while Site four is proposed atop the future alternative one terminal building. Siting the vertiport as a elevated vertiport does come with some limitations on how and where charging would be provided. The selection of these sites has been guided by a focus on approach and departure corridors, as well as landside passenger access, to ensure the vertiports integrate seamlessly with other airport facilities and support efficient future AAM operations.

**Figure 4-5: Potential Vertiport Sites**



Source: Mead & Hunt, 2024.

**Table 4-1: Potential Vertiport Sites, Pros and Cons**

Site	1	2	3	4*	5
Location	Northwest of Runway 7 Threshold	Southwest of Runway 7 Threshold	Southeast of Taxiway Connector E	South of Existing Fuel Island (Elevated Site)	East of Existing Terminal Facility
Alignment with Wind Direction					
More Than One Path Available (Reciprocal)					
Paths are Independent from Approach/Departures from Primary Runway					
Other Factors	Infrastructure and Access	Environmental and Grading	Usable Land for Hangar Development	Safety Infrastructure and	Usable Land for Hangar Development

Does this site satisfy the criteria?

 Yes,  No,  Partially/To Be Determined

Source: Mead & Hunt, 2024.

Note: Site four is dependent on the selection of the preferred Terminal Alternative One (Rooftop) or an additional siting on the ground level.

## 4.3 LANDSIDE IMPROVEMENT ALTERNATIVES

### 4.3.1 Fuel Farm Preliminary Alternatives

The preliminary alternatives for the fuel farm address the requirements identified in Chapter 3, with a focus on replacing and enhancing the existing fueling facilities. The aeronautical improvements include a strategic relocation of the current fuel farm to better utilize the available space, allowing for the potential expansion of the apron and additional aircraft parking. The optimal placement of the new fuel facilities is closely tied to the future development of the terminal, suggesting that the best location would be near the existing site and in coordination with either Terminal Alternative one or two (presented on following pages).

#### 4.3.1.1 Potential Fuel Farm Sites

The potential sites for the future fuel farm, are illustrated in **Figure 4-6**. Site one shows two separate locations. Each of these site one locations are identified corresponding to potential terminal alternatives. Both fuel sites for site one are located along the fence line and adjacent to the each terminal alternative to accommodate the different types of fueling that occur at AUN Today. The ideal fuel farm site will allow aircraft to taxi and self-serve fuel or fuel trucks to utilize the facilities for refueling after offering full-service apron fueling. These fuel farm sites have been identified to accommodate additional above ground fuel tanks to meet increasing demand over the planning period. Sites two through five offer additional alternatives for consideration each of which allows for sites not associated with the future terminal project. Sites two through five, while possible locations for future fuel, move the fuel facilities farther from the ramp and would require additional access points for aircraft looking to self-serve fuel. These sites would also reduce the amount of aircraft storage and hangars that could be provided in these areas. Site 6 has been identified as the preferred fuel farm site. Locating the new facilities directly north of the existing location offers the least impact to existing hangars when planning for the new terminal while maximizing the visibility of the site.

**Figure 4-6: Potential Fuel Farm Sites**



Source: Mead & Hunt, 2024.

## 4.3.2 Terminal Improvement Alternatives

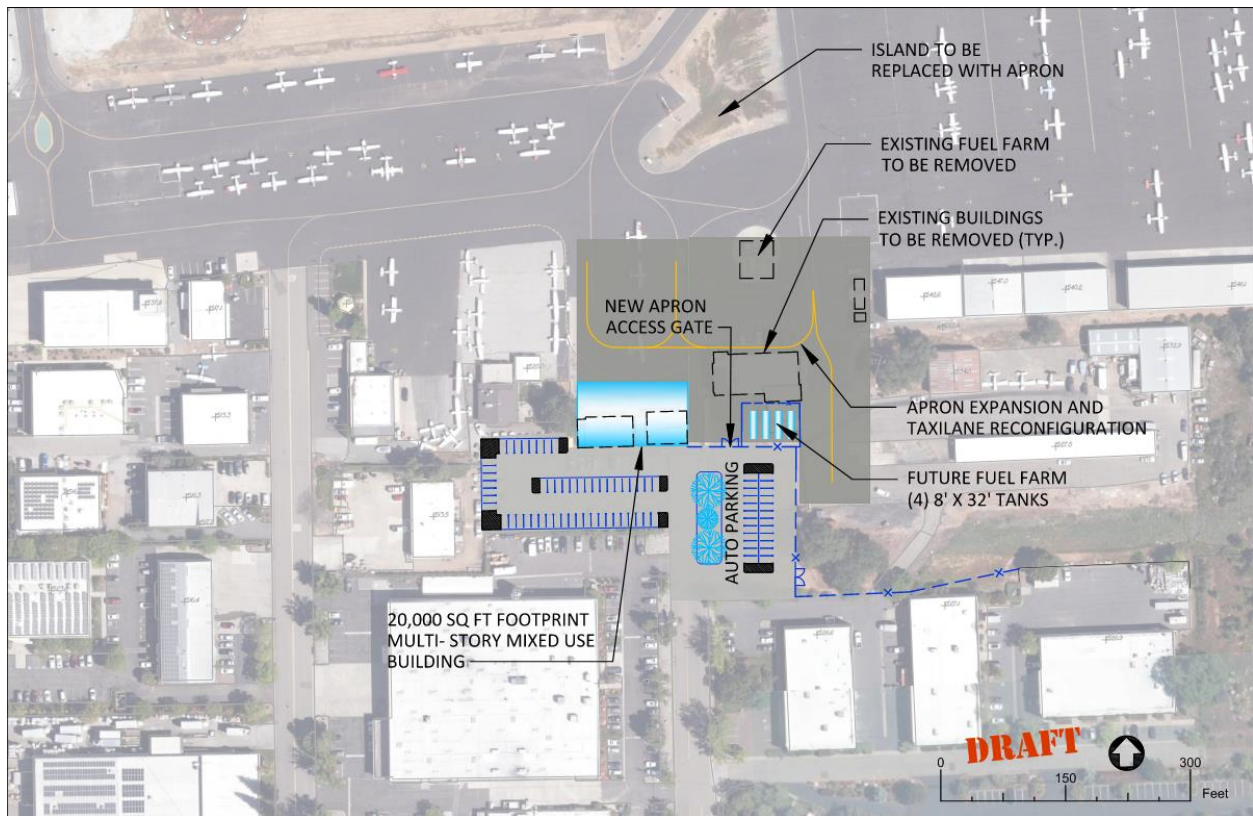
The terminal preliminary alternatives, as outlined in Chapter 3, Facility Requirements, provide an assessment of the terminal footprint require to meet the terminal program and include recommendations for the terminal's location. These alternatives address the operational deficiencies of the current facilities and offer a vision for an enhanced terminal that improves the landside-airside interface. Key considerations include reconfiguring aircraft parking, repairing degraded apron and pavement, and planning for future fuel facility needs. Each alternative also incorporates adequate auto parking.

### 4.3.2.1 Terminal Alternative One

Alternative 1, as depicted in **Figure 4-7**, features of this alternative include:

- ▶ Replacement of existing facilities with a 20,000 square foot multi-story mixed-use building
- ▶ Fuel farm located east of the terminal
- ▶ Planned infrastructure to support a rooftop vertiport
- ▶ Apron expansion and reconfiguration
- ▶ Reconfiguration of auto parking

**Figure 4-7: Terminal Alternative One**



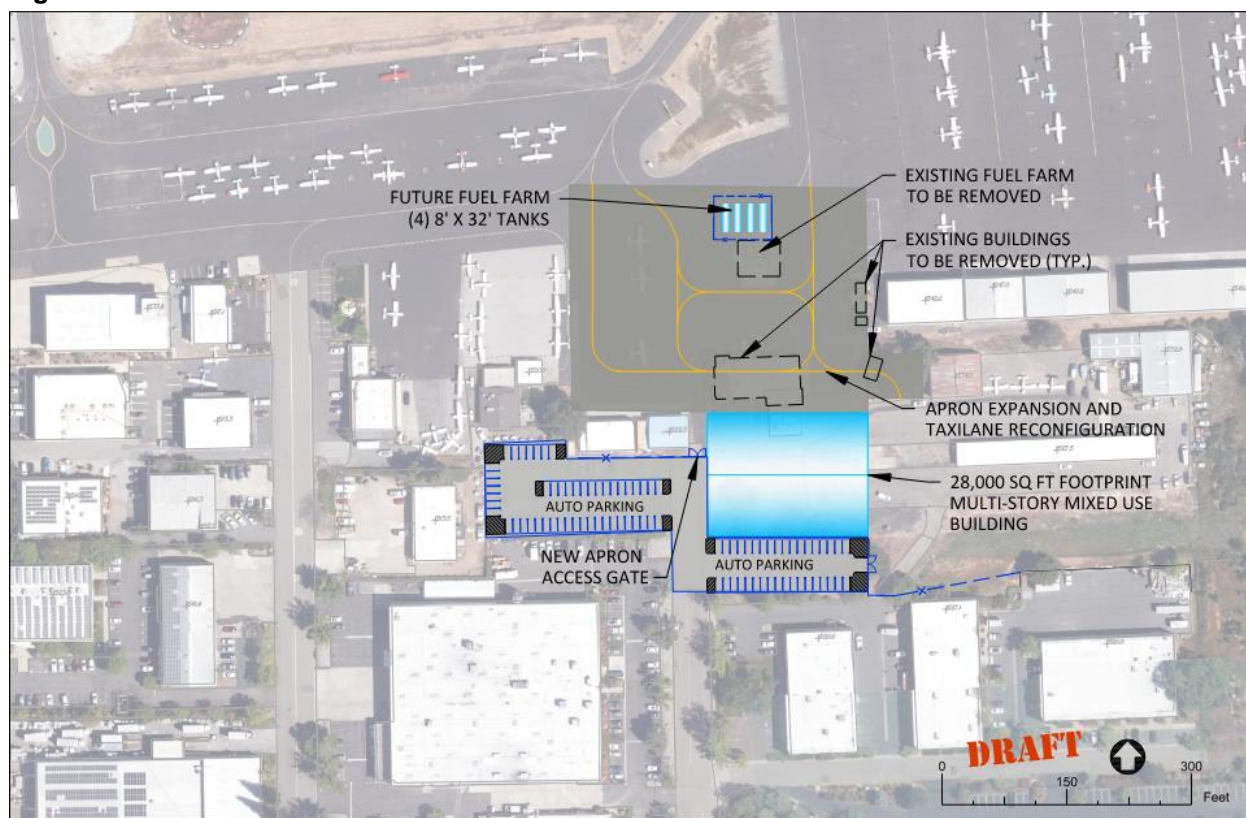
Source: Mead & Hunt, 2024.

#### **4.3.2.2 Terminal Alternative Two**

Alternative two, illustrated in **Figure 4-8** features:

- ▶ Replacement of existing facilities with a multi-story 28,000 sq ft mixed use building
- ▶ New fuel facility located north of the terminal and existing fuel facilities
- ▶ Apron expansion and reconfiguration
- ▶ Reconfiguration of auto parking

**Figure 4-8: Terminal Alternative Two**



Source: Mead & Hunt, 2024.

### 4.3.3 Aprons and Hangar Layout Alternatives

The preliminary alternatives for hangar development focus on identifying prime locations on existing airport property to continue the expansion of hangars in a manner consistent with current structures and layouts. **Chapter 2**, Aviation Demand Forecasts, identified the need for additional aircraft parking over the planning period. AUN is currently at capacity with the number of based aircraft it accommodates. To properly meet these needs these alternatives also explore the relocation of existing portable hangars and identification of new development areas which are required to maximize the number of parking spaces and overall efficiency at AUN.

#### 4.3.3.1 Hangar Layout Alternative: Northwest

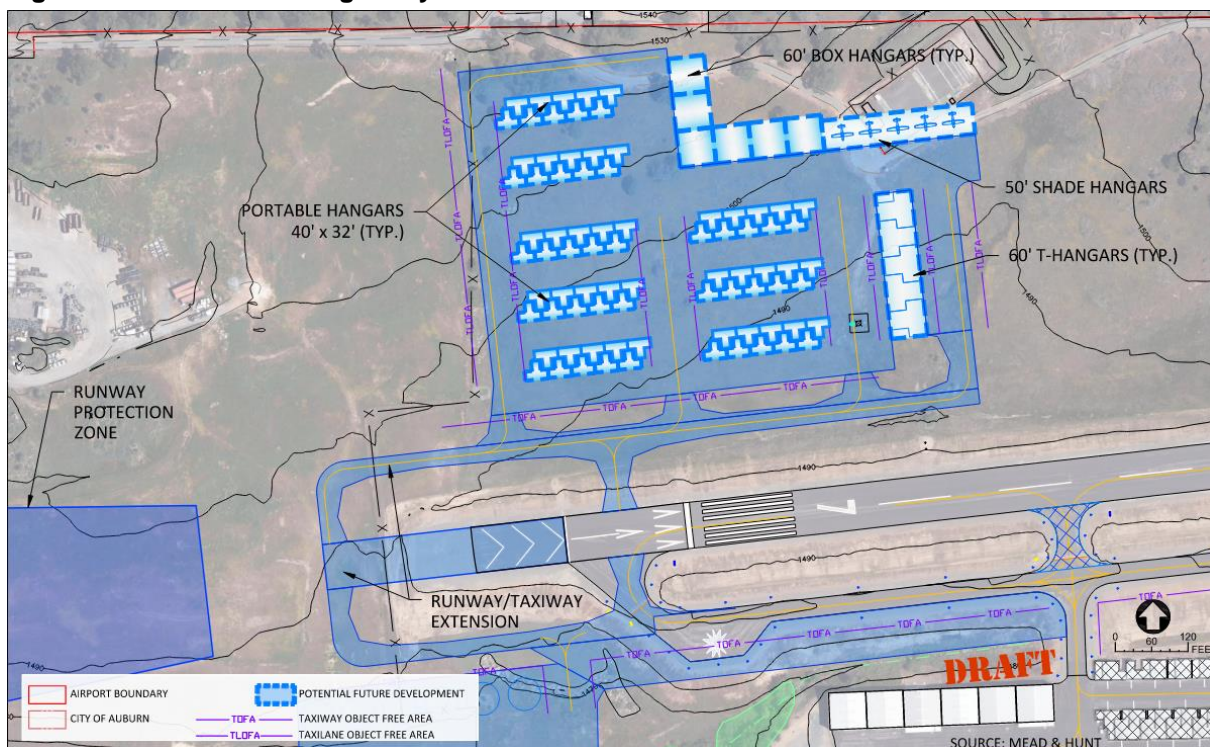
Figure 4-9 shows the northwest hangar layout, including areas for portable T hangars, shade hangars, and box hangars. While potential quantities are indicated, further planning will be needed after apron construction to determine optimal use. Site work will be required in the northwest area to facilitate grading requirements and public access to these hangars. The proposed apron footprint is located to the east of the existing landfill. This access is facilitated via the existing road situated to the north of the proposed site. The existing automated weather observing system (AWOS) will need to be relocated to the east to comply with FAA siting criteria for such units. Additionally, planning consideration for a vehicle road tunnel was considered to connect the northwest hangar alternative layout area to the southwest hangar layout

alternative. Due to cost and feasibility the tunnel is not shown on the figure below. Additional taxiways and taxilanes are planned to extend across the arrival end of Runway 7, ensuring connectivity to fuel services and the southern part of the airport. The northwest area of the Airport is a prime location for hangar development due to the limited amount of developable land that remains on the south side. Utilities, infrastructure, access and grading requirements will make north development expensive.

Features of the northwest hangar layout include:

- ▶ 80 portable T hangar sites
- ▶ Five shade hangar sites
- ▶ Six 60' box hangars
- ▶ Five 60' T Hangars
- ▶ Existing access from north

**Figure 4-9: Northwest Hangar Layout Area**



Source: Mead & Hunt, 2024.

#### 4.3.3.2 Hangar Layout Alternative: Southwest

Three hangar layouts are illustrated in **Figures 4-10** through **4-12** for the southwest area of the Airport. Each alternative relocates the three rows of existing small portable T hangars to better utilize the taxiway-facing apron they currently occupy. Additionally, each alternative includes increased runup areas, taxiway connector corrections, and taxiway extensions associated with the runway extension alternatives.

Alternative One repurposes the existing T hangar area for new helicopter facilities, including hangars, apron parking, and auto parking. This alternative also extends the existing taxiway to the west, increasing available space for hangars. The proposed layout offers versatile options for the box hangars along the extended taxilane, ranging from continuous rows to separate, individual units.

Alternatives Two and Three both aim to accommodate large helicopter operations farther west in currently undeveloped land that is currently lower than the elevation of the Runway 7 threshold. These sites include a connector road via tunnel to the proposed northwest area. Public access to these alternatives would require roadway extensions from Bill Clark Way and Shale Ridge Road, including gates.

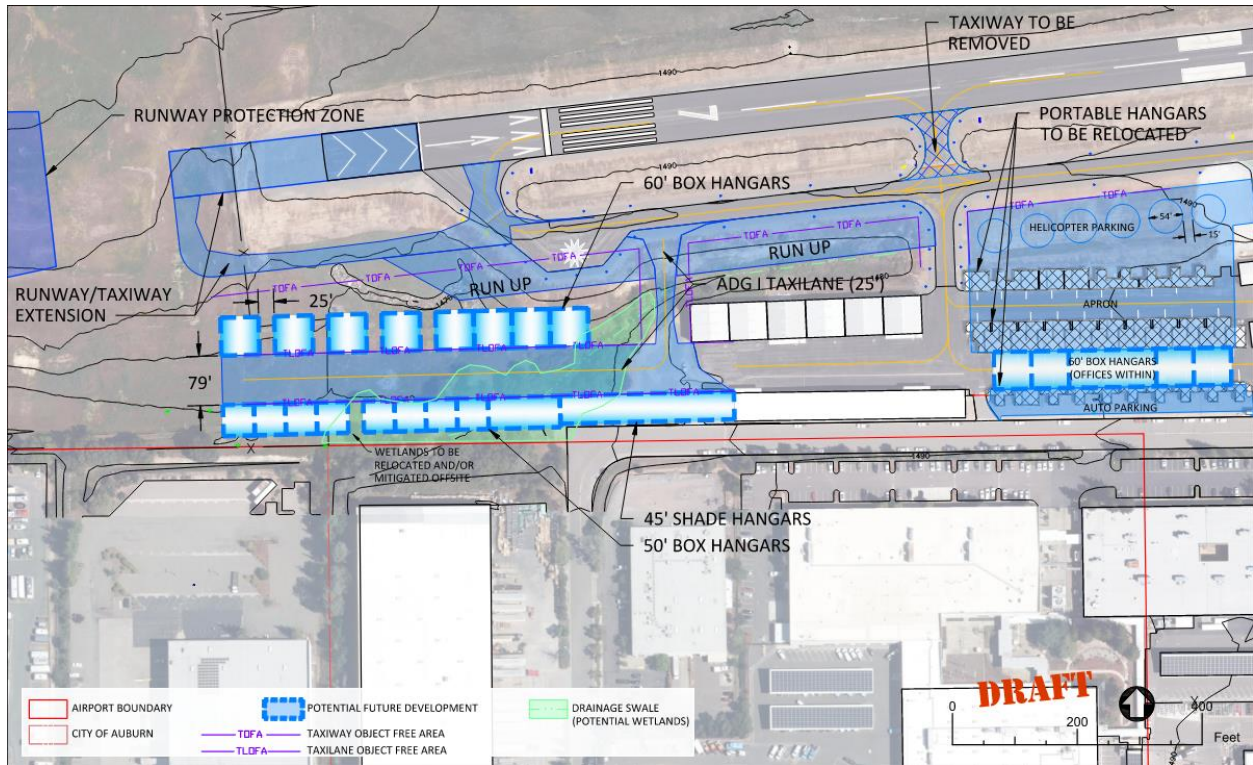
By moving the needed helicopter parking to the west, these alternatives allow for the provision of other aviation related development in the prime real estate currently occupied by the portable T hangars.

All three southwest alternatives must address potential wetlands, including additional environmental review. Additionally, the change in grade from the existing taxilane to the proposed apron extensions to the west is a significant consideration for any of these alternatives.

Features of the southwest hangar layout alternative include:

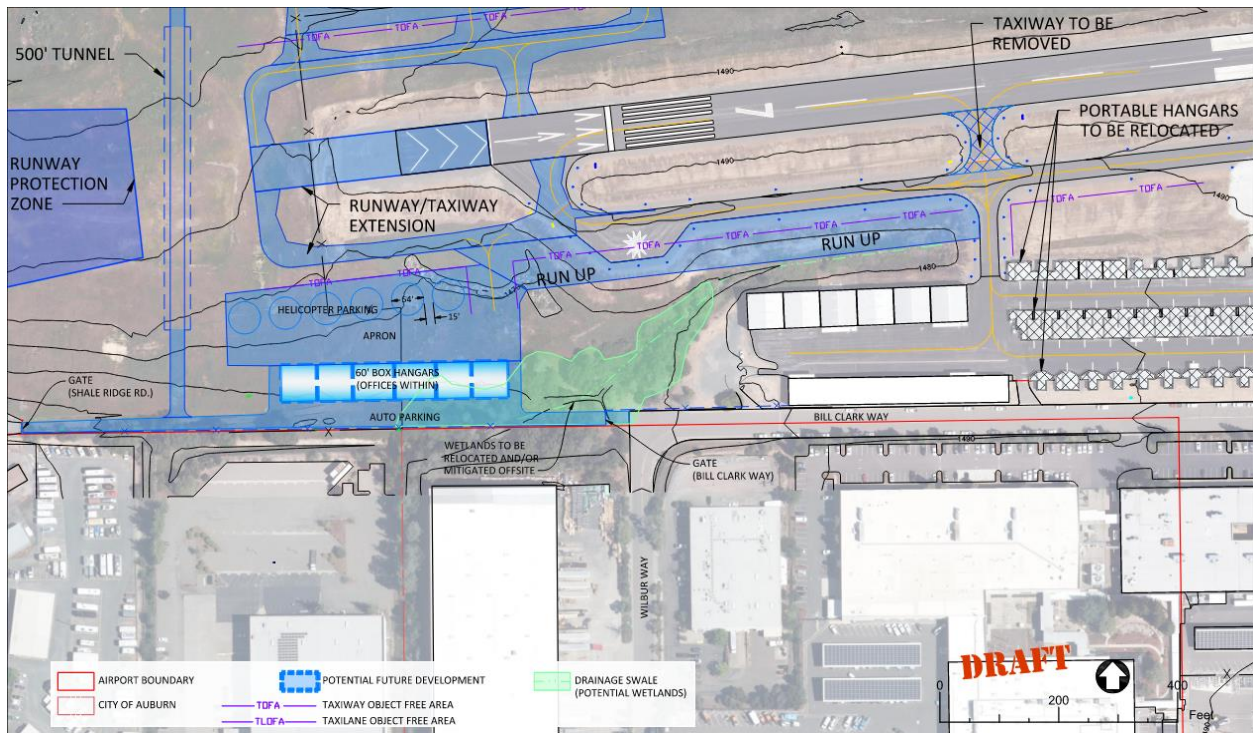
- ▶ Easy access to existing water and sewer utilities
- ▶ Apron expansion
- ▶ Larger helicopter parking on the proposed apron expansion, able to accommodate the most demanding rotorcraft currently using the Airport
- ▶ Additional runup areas

**Figure 4-10: Southwest Hangar Layout Area- Alternative 1**



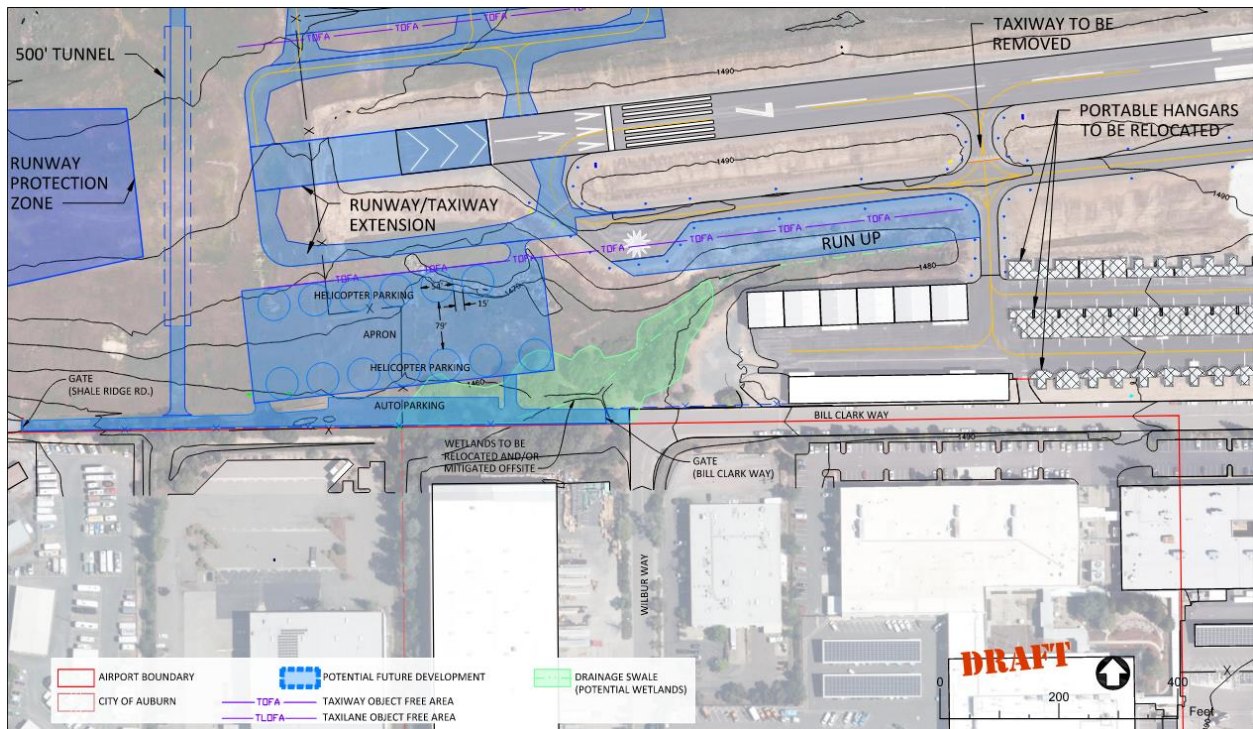
Source: Mead & Hunt, 2024.

**Figure 4-11: Southwest Hangar Layout Area- Alternative 2**



Source: Mead & Hunt, 2024.

**Figure 4-12: Southwest Hangar Layout Area- Alternative 3**



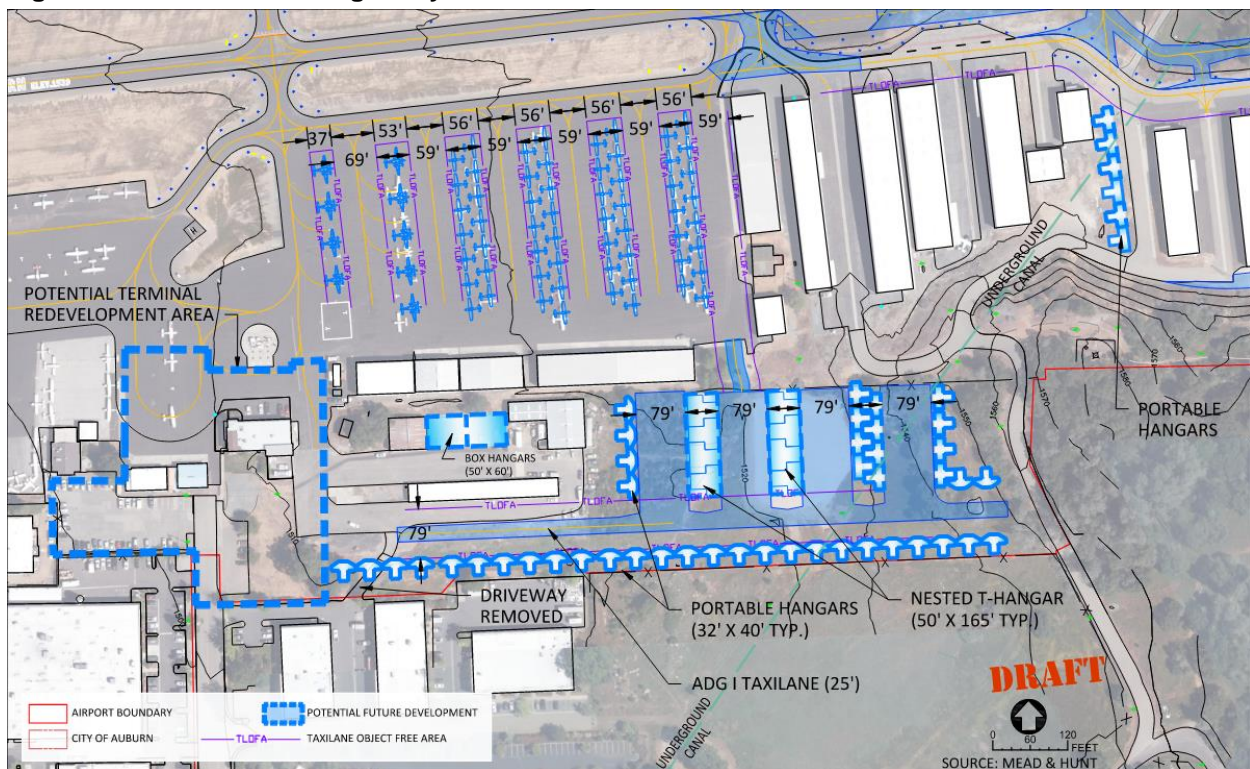
Source: Mead & Hunt, 2024.

### 4.3.3.3 Hangar Layout Alternative: Southeast

**Figure 4-13** illustrates the southeast hangar layout adjacent to the anticipated terminal improvements. The planning process has identified this hangar layout area as the most likely to be constructed first due to the existing conditions of the land and the accessibility for aircraft, the public, and utilities. The layout features sites for portable T hangars along the southern boundary of the Airport. These sites are reserved for the portable T hangars that are to be relocated from the west. Existing tiedowns to the north are planned to be reconfigured and have solar shade structures constructed over them. These improvements will maximize the total number of parking spaces and increase their usability. Additionally, a taxilane connector is proposed to link this area with the additional parking and the southern row of hangars, Features of the southeast hangar layout area include:

- ▶ 50 sites reserved for relocated and potential new portable T hangars
- ▶ Tiedown reconfiguration and solar shades structures

**Figure 4-13: Southeast Hangar Layout Area**



Source: Mead & Hunt, 2024.

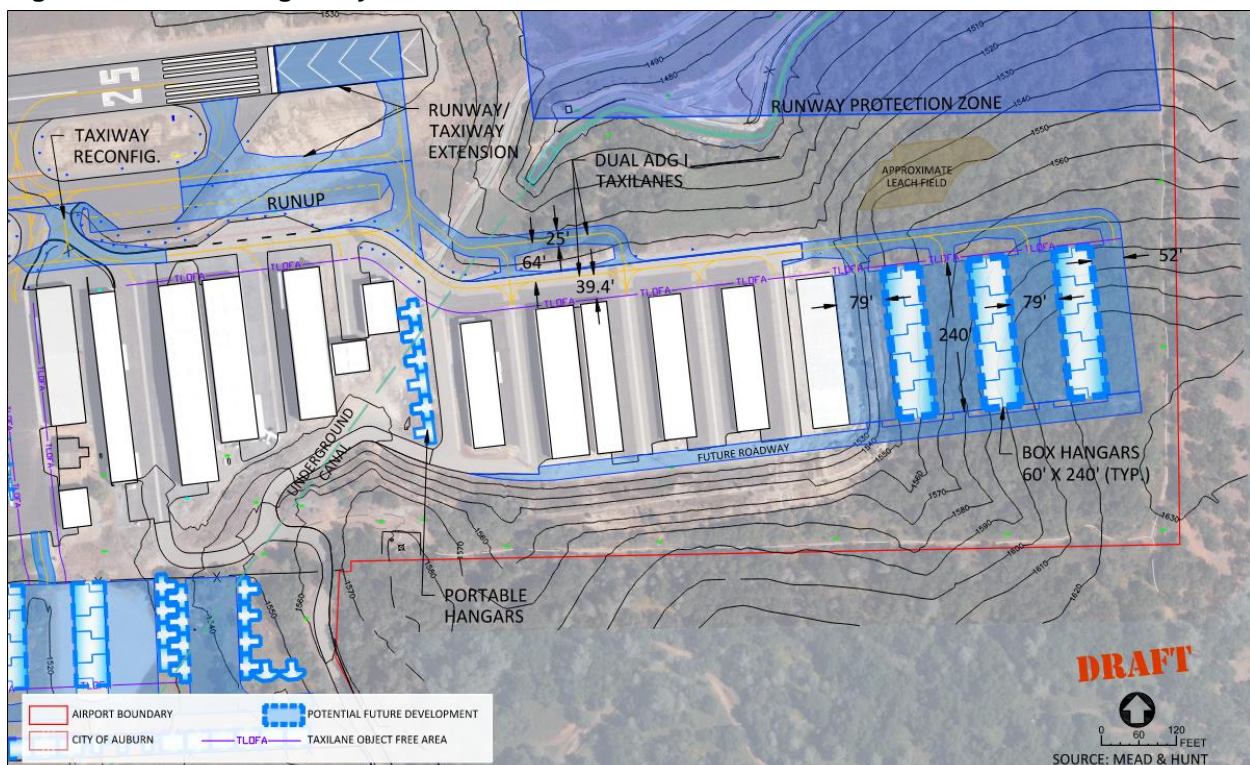
#### 4.3.3.4 Hangar Layout Alternative: East

**Figure 4-14** illustrates the expansion of the existing east hangar layout, an area already established for aircraft storage. This layout alternative proposes the construction of additional hangar rows to the east. An additional taxilane is planned to the north, facilitating improved access and movement. To accommodate increasing aircraft parking needs, portable T hangars are planned to the currently unoccupied spaces.

Features of this alternative include:

- ▶ Continuation and improvement of existing hangar configuration and airfield access
- ▶ Significant grading and cut of material will be required to level the site, but the fill material could be used on other low areas of the Airport.
- ▶ Expansion of existing runup areas identified

**Figure 4-14: East Hangar Layout Area**



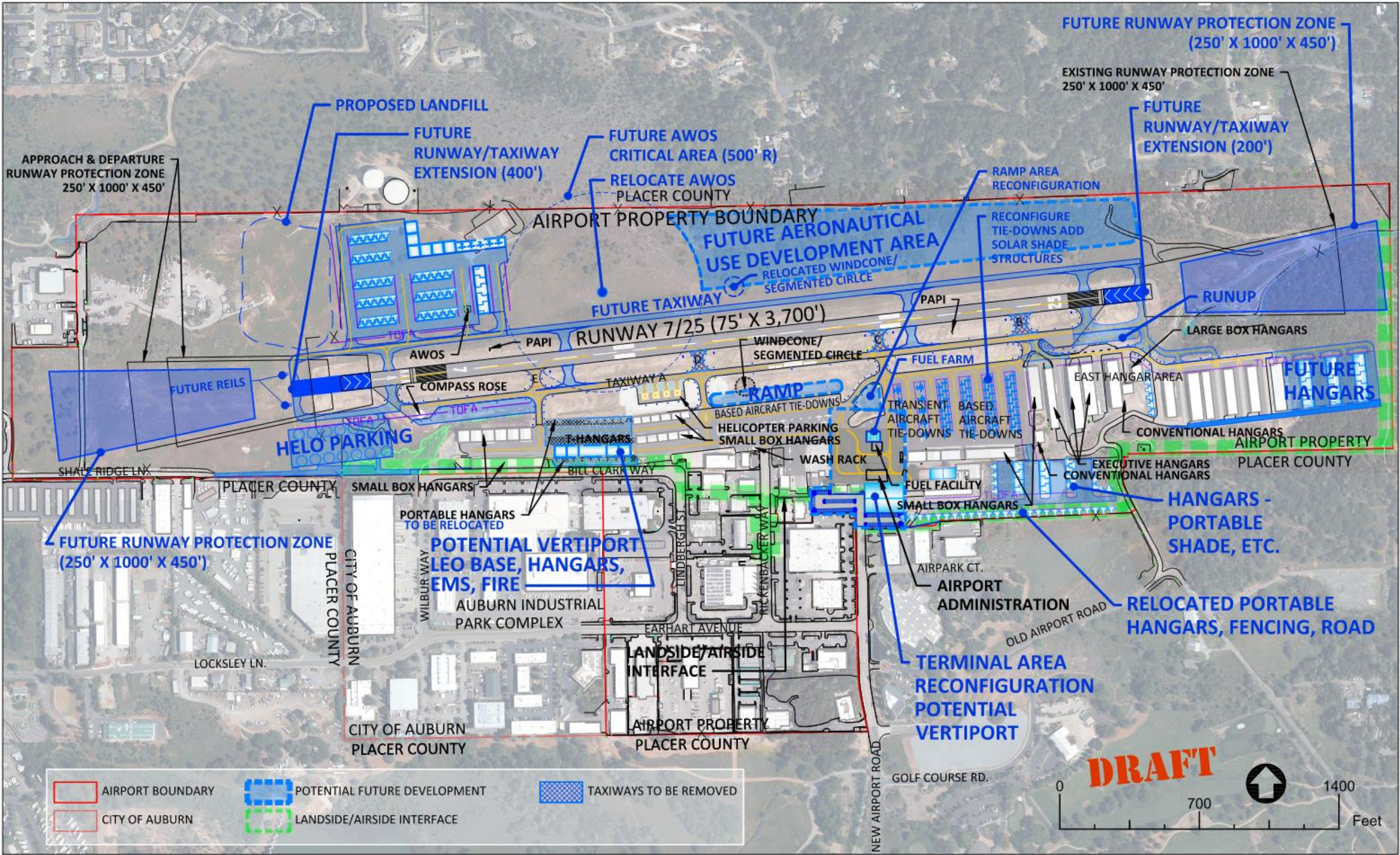
Source: Mead & Hunt, 2024.

## 4.4 CONCEPTUAL DEVELOPMENT PLAN

The Conceptual Development Plan (CDP) outlines the space reservations for needed facilities for the entire Auburn Municipal Airport. The main focus areas for AUN include recommendations for construction of a new terminal facility and new fueling facilities, the extension of Runway 7/25 and Taxiway A with geometrically corrected taxiway connectors, and the development of future hangar areas to the east, southeast, southwest, and northwest.

Based on the analysis of development alternatives, and input from Airport staff, the recommended CDP illustrated in **Figure 4-15** was developed. After incorporating any comments received throughout the process, a revised CDP will be prepared, along with a project list and preliminary cost estimates for the proposed enhancements. These elements will form the basis for the Financial Feasibility Analysis detailed in the following chapter.

Figure 4-15: Conceptual Development Plan



Source: Mead & Hunt, 2024.