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ALTERNATIVE DEVELOPMENT

5.1 INTRODUCTION

This chapter documents improvement alternatives and the recommended development plan to satisfy the facility requirements described in **Chapter 4** for Santa Barbara Airport (SBA). A description of factors, influences, concepts, and issues that will form the basis for the ultimate plan and program is provided in the following sections:

- ▶ Alternatives Approach
- ▶ Airfield System and Capacity
- ▶ Runway Length
- ▶ Commercial Passenger Facilities
- ▶ General Aviation Facilities
- ▶ Apron
- ▶ Cargo Facilities
- ▶ Support Facilities
- ▶ Access and Circulation
- ▶ Terminal Parking
- ▶ Utilities and Electrical
- ▶ Non-Aeronautical Properties
- ▶ Summary

5.2 ALTERNATIVES APPROACH

Alternatives for the major improvements identified in the Facility Requirements Chapter are systematically evaluated so that a preferred alternative can be identified. The combination of preferred alternatives will make up the 20-year preferred development concept for SBA, which is depicted in **Figure 5-26** at the end of this chapter. Ultimately, the preferred development concept will be depicted in finer detail on the Airport Layout Plan. The process used to develop, evaluate, refine, and select the preferred alternative and key considerations is described in the methodology section below.

Note: The Preferred Alternative for each section is marked with an asterisk in the title.



5.2.1 Methodology

Alternatives are developed and evaluated for meeting demand and facility requirement needs in accordance with Federal Aviation Administration (FAA) design standards. Initial alternatives were discussed at two input committee meetings and refinements were made based on feedback received. Each improvement identified in the Facility Requirements Chapter has its own evaluation criteria; however, this Master Plan also used seven "guiding principles" to conduct both the prior planning studies and the alternatives analysis.

<i>Provide safe and secure facilities and operating environment for aviators and the general public.</i>	Safety and Security
<i>Continue to serve as a vital economic contributor to the region while maintaining the Airport's economic self-sufficiency.</i>	Economic Vitality
<i>Provide modern, quality facilities to serve a variety of aviation needs and services. Facilitate ground transportation options for travel to and from the Airport.</i>	Transportation Diversity
<i>Be a good neighbor by coordinating planning, being responsive to community concerns, and proactive in our environmental stewardship.</i>	Community
<i>Support sustainable design of airport facilities and the wise use of resources.</i>	Sustainability
<i>Assess future development as it relates to the Goleta Sough and other sensitive habitats.</i>	Environmental Preservation
<i>Preserve and enhance our archeological and historic resources.</i>	Cultural Resource Protection

The guiding principles relevant to each alternative are discussed in their respective sections. The preferred alternative will reflect the results of the alternative evaluation using screening criteria for each facility requirement, 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, which may differ by functional area, and SBA development goals. These criteria may reflect a specific purpose or considerations for an area or variables associated with input from the community, airport leadership, users, or other stakeholders.

5.2.2 Alternatives Drainage Analysis and Implications

The preferred alternatives, discussed in the sections below, include analysis of their potential effect on airfield drainage and recommended drainage considerations. The SBA Drainage Master Plan, scheduled to be completed in 2024, evaluates the existing drainage conditions at the Airport and will evaluate the Preferred Alternative in greater detail regarding overall drainage impacts and specific drainage solutions.



FAA, State (Regional Water Quality Control Board), County, and City regulations regarding stormwater focus on public safety, protection of property and infrastructure, and protection of integrity of natural systems and waterways. The regulations provide hydrologic and hydraulic analysis and design requirements. FAA ACs specify guidelines for stormwater management to provide for safe passage of vehicles and operation of the facility without causing adverse onsite or offsite impacts. The FAA recommends further consideration of state and local regulations regarding water quantity and quality best management practices (BMPs) associated with stormwater runoff. State and local regulations include stormwater management requirements regarding the capture, treatment, retention (infiltration), and detention (discharge rate control) of runoff from development and redevelopment projects.

A general stormwater management recommendation that applies to all alternatives is to utilize existing stormwater outfalls around the perimeter of the Airport. For safety, FAA ACs state that airfield pavements must be protected from ponded water from frequent reoccurring storm events and that stormwater facilities must not be wildlife attractants by means of design including select vegetation or reducing long-duration standing water. Per state and local regulations, BMPs for treating, retaining, and controlling discharges of stormwater are required for each of these projects. Site soil maps and available geotechnical information point to low potential for infiltration, so some exemptions may apply, and discharge pipe and/or underdrain systems may be required for any retention-based facilities.

5.3 AIRFIELD SYSTEM AND CAPACITY

Airfield system and capacity alternatives start at a high level and address the runway system first. This section explains the analysis of the proposed runway consolidation preferred alternative and then presents taxiway geometric changes to accommodate the preferred runway configuration and improvements identified. The airside improvements discussed include a runway removal and associated taxiway improvements.

5.3.1 Runway Improvements - Crosswind Runway Justification

As a part of the Facility Requirements analysis of this Master Plan, a review of runway eligibility criteria contained in the FAA's Airport Improvement Program (AIP) Handbook concluded that SBA is not eligible for future FAA funding for three runways. This eligibility determination is based on crosswind coverage and total number of Airport operations expected within the 20-year planning period. However, the Airport is on the marginal limits of justification for a secondary runway based on the future operations forecast. Although this Master Plan is intended to be forward looking for only 20-years into the future, a significant asset like a runway should consider a slightly longer time frame. Given the Airport's growth history, it is reasonable to project that operations will continue to increase beyond the 20-year planning period and surpass the FAA's threshold for eligibility for a secondary runway; therefore, this Master Plan recommends planning for the FAA's continued funding of one crosswind runway, but not both.



Rwy Alternative No. 1

This alternative assumes that all runways remain at SBA throughout the planning period (see **Figure 5-1**). As mentioned above, SBA is not eligible for FAA funding on three runways; however, this lack of eligibility for funding does not necessarily require a runway closure in and of itself. SBA could choose to continue operating three runways throughout the planning period, but the Airport would be responsible for all on-going costs to keep an ineligible runway operational. The operational costs associated with continued operation of an ineligible runway would likely exceed 9 million dollars over the 20-year planning period.

Recommendation:

The estimated 9 million dollars would better serve the Airport users and traveling public if used elsewhere on the Airport. Therefore, due to FAA ineligibility and cost implication, Alternative #1 is not recommended as the preferred alternative.

Rwy Alternative No. 2 *

This alternative assumes that one of the crosswind runways is closed in the future, primarily due to the funding eligibility reasons (**Figure 5-2**). Given that the two parallel runways are almost identical in physical characteristics and serve the same role, the selection of which runway to close comes down to which closure would provide a net benefit to the long-term development of the Airport.

Closure of either crosswind runway would open potentially developable land under the existing RPZs off the approach ends to 15L and 15R. Closure of 15R/33L would not provide significant developable opportunities in the southwest quadrant of the Airport given the proximity to the Goleta Slough State Marine Conservation Area and the FAA's airport surveillance radar. Closure of 15L/33R will accommodate additional ramp space and taxiway/runway separation, and it will provide the airport with the flexibility to pursue other design alternatives in the southeast quadrant as well as potential expansion of general aviation facilities in the northeast quadrant.

The terminal and general aviation facilities will be discussed in **Sections 5.4** and **5.5** of this chapter.

Figure 5-1: Rwy Alternative 1



Figure 5-2: Rwy Alternative 2



Figure 5-3: Rwy Alternative 3



Recommendation:

Plan for the eventual closure of Runway 15R/33R as the preferred alternative. **Figure 5-26** at the end of this chapter depicts the preferred development concept. Taxiway improvements associated with this preferred alternative are addressed in **Section 5.2.2** of this chapter.

Closure of Runway 15L/33R is aligned with the following guiding principles of this Master Plan:

- ▶ **Economic Vitality:** The eventual closure of Runway 15L/33R will contribute to the long-term economic self-sufficiency of the Airport by eliminating future capital costs associated with maintaining the runway without federal grant contributions.
- ▶ **Sustainability:** The eventual closure of Runway 15L/33R supports the Sustainability guiding principle as it supports a “wise use of resources” with a net positive for long-term Airport development potential.

Rwy Alternative No. 3

This alternative explores the viability of closing both parallel runways. **Figure 5-3** depicts this runway configuration alternative. This alternative is not viable for the following reasons:

- ▶ **Separation of traffic:** Airport users, Airport management, and FAA air traffic control personnel generally agree that separating heavy airline or business jet traffic from lighter general aviation traffic is desired. Heavy airline aircraft generally require higher airspeed on approach/departure, which may exceed a lighter general aviation aircraft’s capability.
- ▶ Having more than one runway available to separate aircraft based on their operational characteristics benefits all users – removing both crosswind runways would eliminate this existing benefit.
- ▶ **Future need and eligibility:** The Airport is on the cusp of eligibility for a secondary runway, which is different from a crosswind in that it must meet different eligibility requirements established by the FAA. The need for a secondary runway is based on total airport operations, whereas eligibility for a crosswind runway is based on wind conditions. Given the high likelihood of SBA exceeding the eligibility threshold for a secondary runway in the future, closing both 15L/33R and 15R/33L in the near-term does not pose any benefits.

Stormwater Management Recommendations for the Preferred Alternative

The following stormwater management recommendations apply to the closure and removal of Runway 15L/33R:

- ▶ Assumed values for affected impervious area are 15.1 acres of removed impervious surface, zero acres of replaced impervious surface, and 0.3 acres of new impervious surface.
- ▶ Recommended BMPs for this alternative include:
 - Vegetated buffer strips¹;
 - Integrated grading and inlet design for temporary surface retention and detention;

¹ Vegetated Buffer Strips are vegetated surfaces designed to treat sheet flow from adjacent pavements. See Treatment Control (TC)-31 of the California Stormwater Quality Association Stormwater Best Management Practice Handbook, 2003. [California Stormwater Quality Association | CASQA](#)

- Underground runoff storage in tanks, vaults, or pipes to release runoff at pre-project flowrates.
- ▶ The project will require new storm-drain pipes, catch basins, manholes, and other structures to accommodate new site grading.
- ▶ With a net reduction of impervious area and the relative affordability of vegetative buffer strips compared to other stormwater treatment options, the relative cost of stormwater management improvements for this project is expected to be small.

5.3.2 Taxiway Improvements

The ultimate taxiway configuration is driven by the selection of other recommended alternatives. Specifically, the ultimate runway configuration, general aviation hangar development, and long-term terminal expansion all drive the ultimate taxiway needs. Additionally, geometric revisions (discussed in **Chapter 4**) are accommodated to comply with current FAA design standards. This results in one consolidated recommended taxiway concept, which is presented in the Preferred Development Concept in (**Figure 5-26**) at the end of this chapter.

Major taxiway improvements incorporated into the preferred development concept include:

- ▶ Removal of portions of Taxiway E located north of Runway 7/25 and the southern Taxiway E connector to Runway 7/25. This removal will occur in conjunction with the closure of Runway 15L/33R. With the Runway closure, Taxiway E will no longer be designated as a parallel taxiway and the closure of these segments will eliminate a crossing of Runway 7/25 in the middle third of the runway.
- ▶ Removal of wide expanses of pavement where Taxiway C crosses 15L and 15R.
- ▶ Removal of the intersection of Taxiways A3/C connecting to Runway 7/25. This removal eliminates non-standard design, direct access from aircraft apron to runway, and a middle third of the runway crossing.
- ▶ Realignment of Taxiway F to bisect the future FBO leaseholds in the northeast quadrant of the Airport. This will allow greater flexibility of design layouts within the FBO leaseholds. This realignment will also have the added benefit of removing a direct access from Taxiway F to the Runway 25 end.
- ▶ Geometric change to the Taxiway A5 entrance to the Runway 7 end. This geometric change and realignment will meet current FAA standards and incorporate a bypass taxiway at the runway end.
- ▶ Removal of the non-standard angled Taxiway D connection to Runway 15R/33L and the non-standard portion of Taxiway D between Runway 15L/33R and 15R/33L and connecting to Taxiway E.
- ▶ Construction (long term) of a new taxiway to provide access to the remaining secondary runway (15R/33L) after 15L/33R is closed. This new taxiway will also allow for more flexible aircraft movement into and out of the expanded long term terminal concept (see **Section 5.4**).
- ▶ Numerous applications of green paint, indicating unusable pavement, are incorporated into the preferred development concept. These marking changes achieve design compliance at a lower capital cost and allow flexibility of removal for reuse as active airfield pavement in the future.



- ▶ Extension of Taxiway B to form a complete parallel taxiway supporting Runway 7/25 was identified as a future project in the prior Airport Master Plan. The Airport is moving forward with plans and permitting for its construction. As it has not yet been constructed, it is being brought forward as a future project in this Master Plan as well.

The recommended ultimate taxiway reconfiguration is aligned with the following guiding principles of this Master Plan:

- ▶ **Safety and Security:** Changes associated with the ultimate taxiway configuration are driven by updated FAA design standards that aim to improve safety and reduce the chance of pilot error.

Stormwater Management Recommendations for the Ultimate Taxiway Reconfiguration

The following stormwater management recommendations apply to the closure and removal of Runway 15L/33R:

- ▶ Assumed values for affected impervious area are 2.9 acres of removed impervious surface, zero acres of replaced impervious surface, and 9.8 acres of new impervious surface (5.6 acres of which is Taxiway B expansion and is not directly associated with this planning effort).
- ▶ Recommended BMPs for this alternative include:
 - Vegetated buffer strips;
 - Integrated grading and inlet design for retention and detention;
 - Underground storage in tanks, vaults, or pipes.
- ▶ The project will require new storm-drain pipes, catch basins, manholes, and other structures to accommodate new site grading.
- ▶ The Taxiway B expansion (not specifically addressed in this Plan) may impact the Environmental Inventory Area and require special permitting and design. As most of this project will entail new impervious surface, significant stormwater detention facilities may be required.
- ▶ As stand-alone or grouped endeavors, taxiway connector removal entails a net reduction of impervious area and the associated shoulder replacements can utilize new vegetative buffer strips, this is a BMP that is more affordable than other comparable BMPs. The relative cost of stormwater management improvements for taxiway connector removal is expected to be small.

5.4 RUNWAY LENGTH

The runway length assessment conducted in **Chapter 4** concludes that existing runway lengths are adequate for the critical aircraft throughout the planning period. No improvement alternatives were developed.



5.5 COMMERCIAL PASSENGER FACILITIES

5.5.1 Long-Term Terminal Building Reconfiguration Alternatives

A Terminal Improvement Project (TIP) was conducted, separate from this Master Plan, to analyze and synthesis a forecast of conditions. The report is a needs assessment to determine what improvements are needed to accommodate future demand in the terminal building. Detailed development alternatives and the demand drivers for the TIP are located in **Appendix XX**. The TIP concludes with solutions for the short-term and mid-term terminal and landside facility improvements needed at SBA. The TIP programing is underway, and it is anticipated that the Airport will carry out these enhancements to satisfy short-term and mid-term demand. **Figure 5-4** below depicts the TIP related improvements.

The remainder of the commercial passenger facilities alternatives analysis is based on a long-term scenario that is likely outside of the 20-year planning period. Other than the runway and taxiway system, the passenger terminal is one of the Airport's most significant users of Airport property, and consideration should be given to its long-term needs, even those beyond the 20-year planning period of this Master Plan. For that reason, the Facility Requirements chapter introduced the concept of Planning Activity Levels (PALs) to separate forecast passenger enplanements from specific years and provide a holistic planning perspective for the commercial passenger terminal building based on specific levels of enplaned passengers. PALs 1, 2, and 3 (presented in **Chapter 4**) were used to analyze terminal demand for two intermediate passenger enplanement levels and one long term level (PAL 3). PAL 3 assumes 1.1 million passengers are enplaned at SBA at a point beyond the 20-year planning period of this Master Plan.

In order to reserve space that may be needed, should that demand materialize, alternatives were developed to reconfigure the terminal area in a way that would accommodate that demand. Long-term terminal needs identified in **Chapter 4** are broadly stated as the Airport needing four additional boarding bridge gates, for a total of eight, and two remain overnight (RON) parking positions. The following seven alternatives explore various configurations to achieve those planning goals. Alternatives are shown in conjunction with the ongoing TIP project and the Southfield Redevelopment Project and assume the preferred runway alternative, closing Runway 15L/33R, has been completed.

Because this project is expected to fall outside of the planning period of this Master Plan, these alternatives are high-level space planning concepts to illustrate potential location and configuration of a terminal expansion and reconfiguration. As the airport approaches passenger enplanement levels beyond PAL 2, a study similar to the ongoing TIP should be undertaken to identify specific square footage needs and design concepts.

Terminal Building Alternative No. 1 (no build)

This alternative shows the planned improvements associated with the TIP and Southfield Redevelopment Project. This development alternative will accommodate passenger demand throughout the near- and mid-term, but passenger experience would suffer if enplanement levels approached or reached PAL 3 (1.1 million enplanements). Although there are improvement projects depicted in Alternative 1 (TIP and South Field Redevelopment), for the purposes of this Master Plan it is assumed that the Airport moves forward with those in the near term. Therefore, **Figure 5-4** is depicted as the baseline, or no build alternative, for development of long-term terminal building improvements in alternatives 2 through 7.



Terminal Building Alternatives Nos. 2 & 3

Figure 5-5 and **Figure 5-6** below depicts two similar alternatives, both with two additional boarding bridge gates and associated terminal hold room to accommodate PAL 3 enplanement demands. These alternative concepts convert two ground boarding gates associated with the current TIP project into boarding bridge gates for a total of eight.

- ▶ Advantages of these alternatives
 - Terminal expansion could occur in general alignment with the ongoing TIP project.
- ▶ Disadvantages of these alternatives
 - Significant disruption of the Southfield Redevelopment Project.
 - Further constrains the southeast quadrant of the Airport.
 - No dedicated RON parking positions are provided.

Recommendation:

Alternatives 2 & 3 are not recommended due to the disadvantages listed above.

Terminal Building Alternative No. 4

Figure 5-7 below depicts four additional boarding bridge gates and associated terminal hold room to accommodate PAL 3 enplanement levels. In an effort to lessen the impact on the Southfield Redevelopment Project, this alternative presents a pier concept, expanding the terminal west towards the closed Runway 15L/33R.

- ▶ Advantages of this alternative
 - Moves the terminal expansion away from the constrained southeast quadrant towards now-usable infield area that is opened with Runway 15L/33R closure.
- ▶ Disadvantages of this alternative
 - Design would require reconfiguration of boarding bridge gates constructed as a part of the TIP project.
 - Significant disruption of the Southfield Redevelopment Project.
 - No dedicated RON parking positions are provided.

Recommendation:

Alternative 4 not recommended due to disadvantages listed above.

Terminal Building Alternative No. 5

Figure 5-8 below depicts five additional boarding bridge gates and associated terminal hold room to accommodate PAL 3 enplanement levels. This alternative a variation of Alternative 4 with emphasis placed on reducing the impact to the Southfield Redevelopment Project.



- ▶ Advantages of this alternative
 - Moves the terminal expansion away from the constrained southeast quadrant towards now-usable infield area that is opened with Runway 15L/33R closure.
 - Less impact on the Southfield Redevelopment Project
- ▶ Disadvantages of this alternative
 - Design would require reconfiguration of boarding bridge gates constructed as a part of the TIP project and existing terminal.
 - No dedicated RON parking positions are provided.

Recommendation:

Alternative 5 not recommended due to disadvantages listed above.

Terminal Building Alternative No. 6

Figure 5-9 below depicts an entirely new terminal concourse with eight boarding bridge gates constructed west of the existing terminal building. This concept would allow for a uniform gate layout, minimal impact on the Southfield Redevelopment Project and could accommodate two RON parking positions.

- ▶ Advantages of this alternative
 - Least impact on the Southfield Redevelopment Project.
 - Moves the terminal expansion away from the constrained southeast quadrant towards now-usable infield area that is opened with Runway 15L/33R closure.
 - Uniform gate and parking concept.
 - Concept could retain the existing terminal “head of house.”
- ▶ Disadvantages of this alternative
 - Construction phasing would make it difficult to ensure existing terminal gates are usable through the construction phase.

Recommendation:

Alternative 6 is not recommended due to disadvantages listed above.

Terminal Building Alternative No. 7 *

Figure 5-10 below depicts a variation of Alternative 6 with a shift of the new terminal concourse farther to the south. Eight new boarding bridge gates and two RON parking positions would be provided. This shift to the south would allow construction phasing to occur with minimal impacts to the existing terminal and remaining operational gates.

- ▶ Advantages of this alternative
 - Mostly free of impacts on the Southfield Redevelopment Project.
 - Moves the terminal expansion away from the constrained southeast quadrant towards now-usable infield area that is opened with Runway 15L/33R closure.



- Uniform gate and parking concept.
- Concept could retain the existing terminal “head of house.”
- Frees up re-use or re-development of the existing terminal area.
- Construction phasing could begin at the southernmost end of the future concourse and would be the least impactful on the existing terminal gates for usability throughout the construction period.
- ▶ Disadvantages of this alternative
 - Cost to implement would likely be high

Recommendation:

Alternative 7 is the recommended long-term terminal expansion concept to accommodate PAL 3 enplanement levels. It is the recommended that space and broad conceptual design be brought forward into the preferred development concept and onto the ALP to reserve and protect this area of the Airport for terminal expansion purposes for long-term planning purposes.

The preferred long-term terminal expansion concept (Alternative 7) is aligned with the following guiding principles of this Master Plan:

- ▶ **Safety and Security:** Planning for the long-term expansion of the passenger terminal will provide the traveling public with safe and secure facilities that match expected levels of demand beyond the planning period.
- ▶ **Economic Vitality:** Planning for an airport terminal that continues to respond to the demands of the traveling public will allow the Airport to continue to be an economic driver in the region.

Stormwater Management Recommendations for the Preferred Long-Term Terminal Reconfiguration Alternative

The following stormwater management recommendations apply to Alternative 7, the preferred long term passenger terminal reconfiguration:

- ▶ Assumed values for affected impervious area are zero acres of removed impervious surface, 3.2 acres of replaced impervious surface, and 6.0 acres of new impervious surface.
- ▶ Recommended BMPs for this alternative include:
 - Underground filter treatment systems;
 - Integrated grading and inlet design;
 - Surface storage or underground storage in tanks, vaults, or pipes for retention and detention.
- ▶ The project will require new storm-drain pipes, catch basins, manholes, and other structures to accommodate new site grading.
- ▶ As this project is mostly composed of impervious surface and as this location has little to no current qualitative or quantitative stormwater management facilities, the relative cost of stormwater management improvements for this project is expected to be high.



Figure 5-4: Terminal Alternative 1

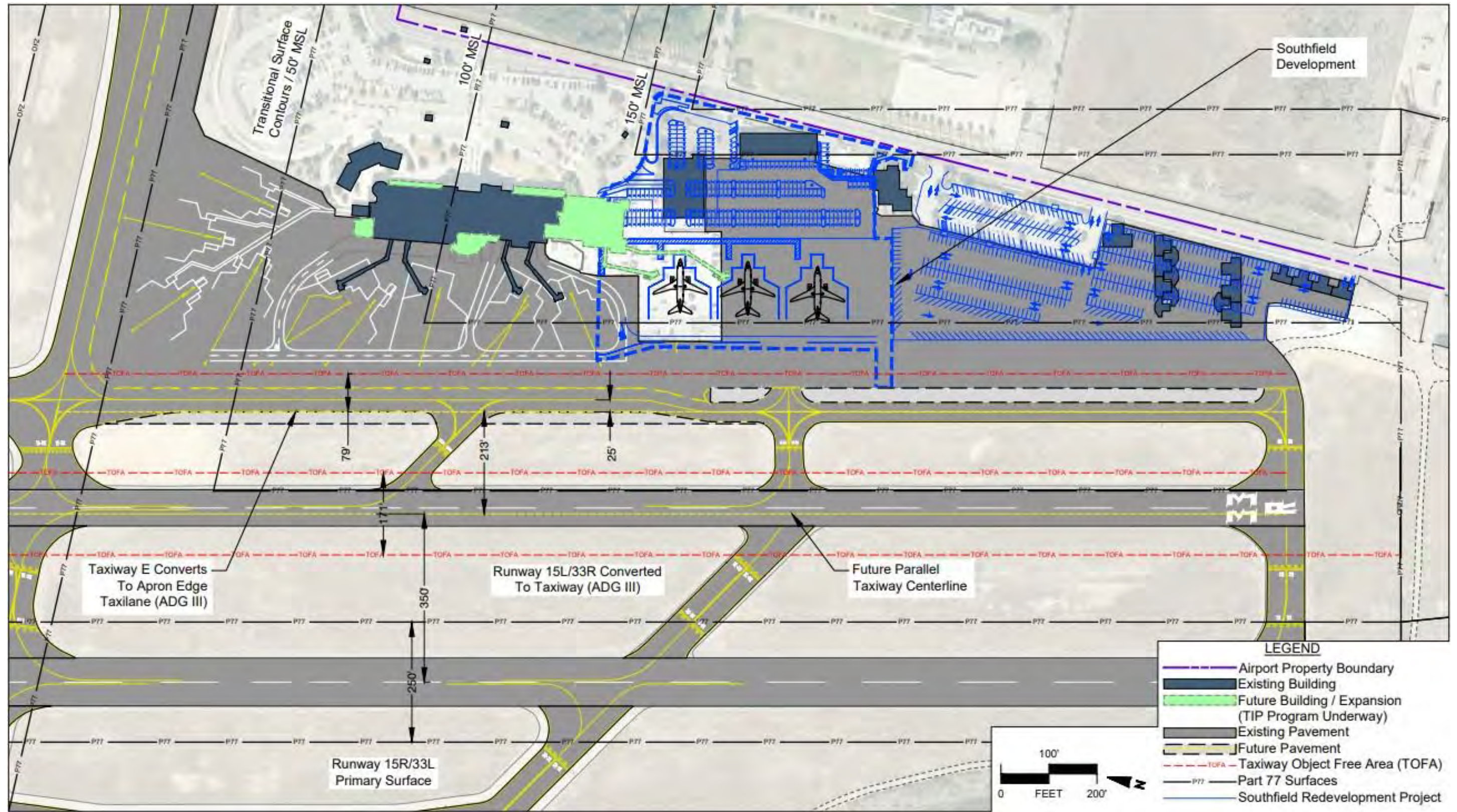


Figure 5-5: Terminal Alternative 2

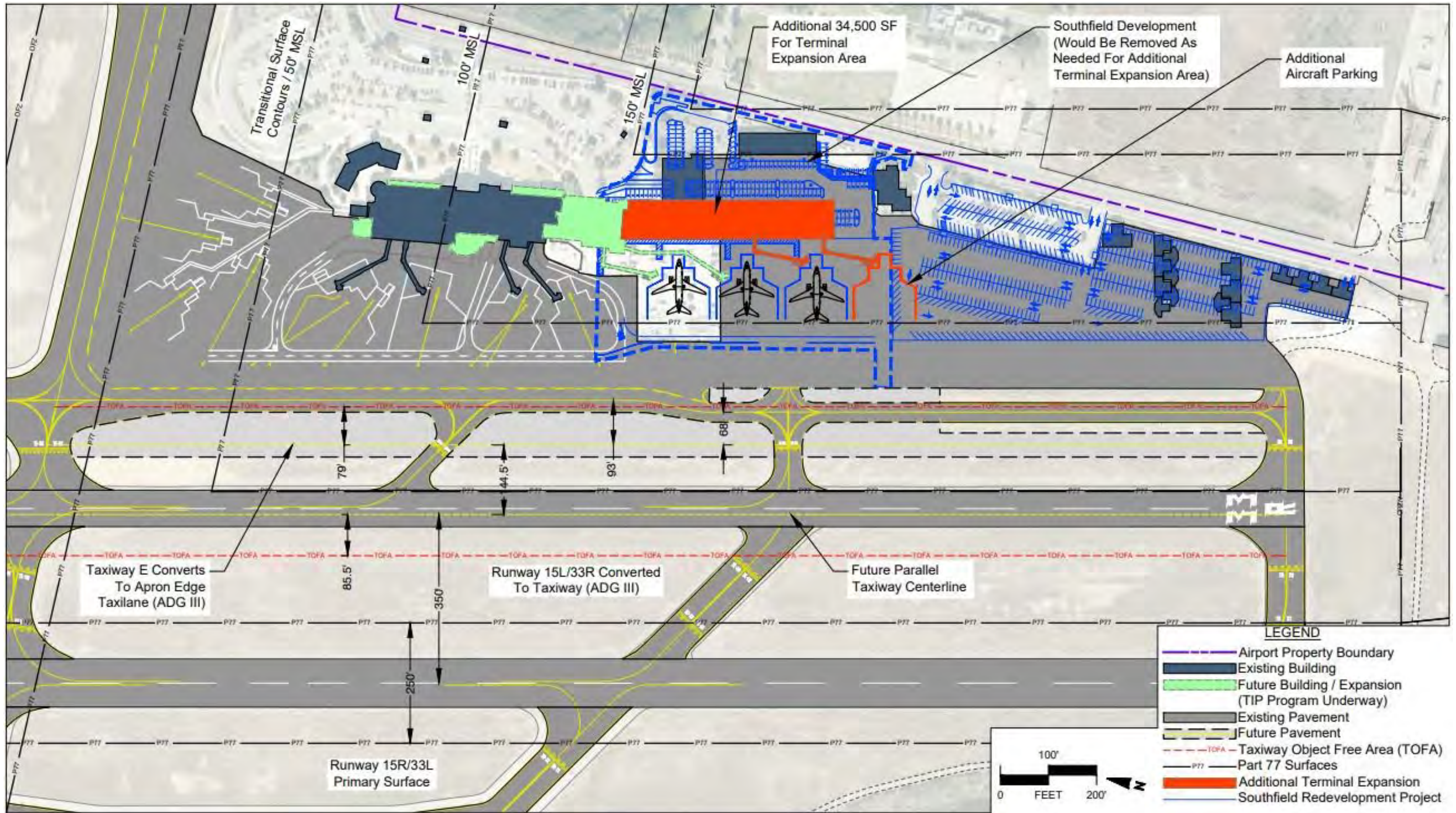


Figure 5-6: Terminal Alternative 3

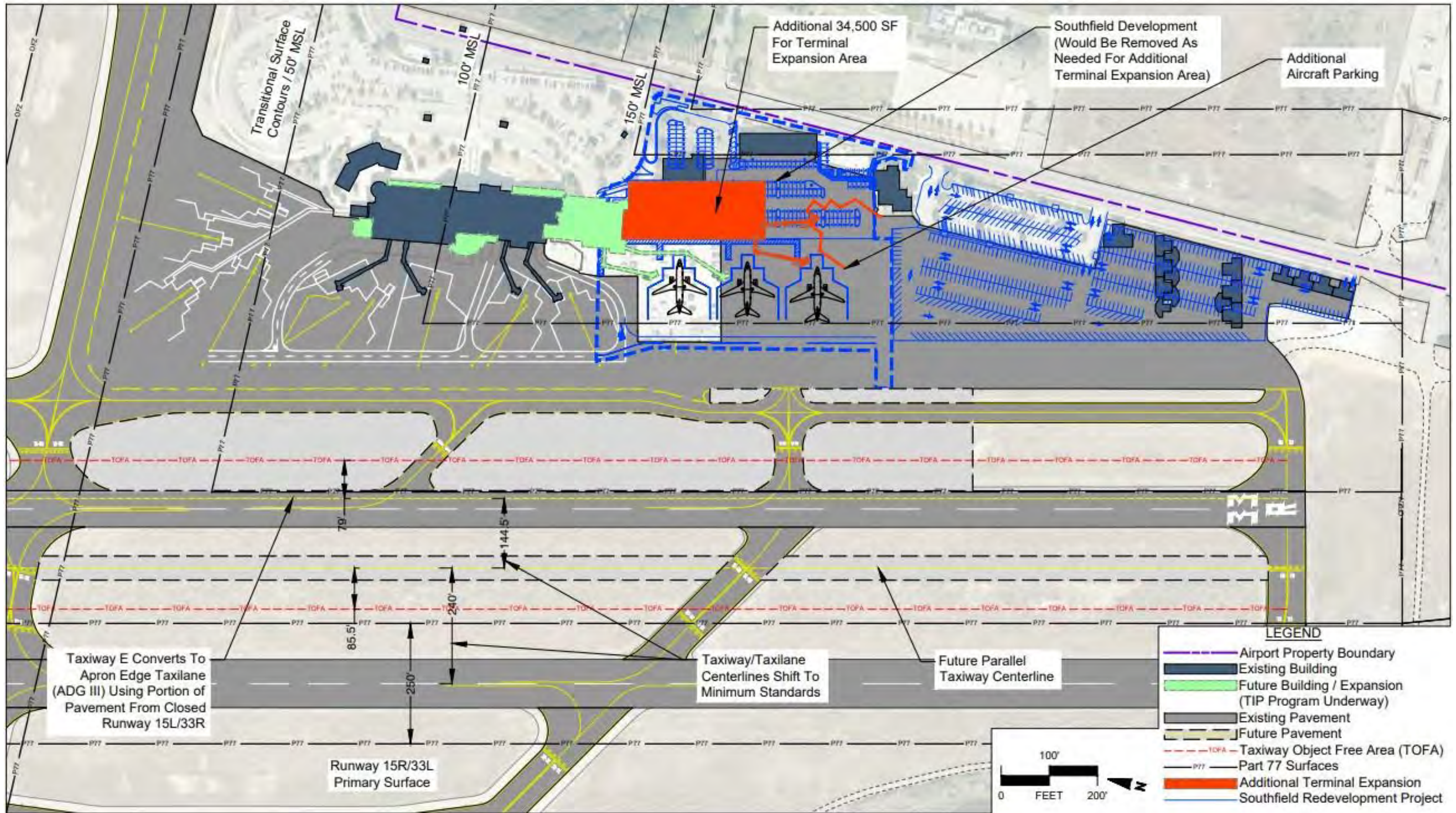


Figure 5-7: Terminal Alternative 4

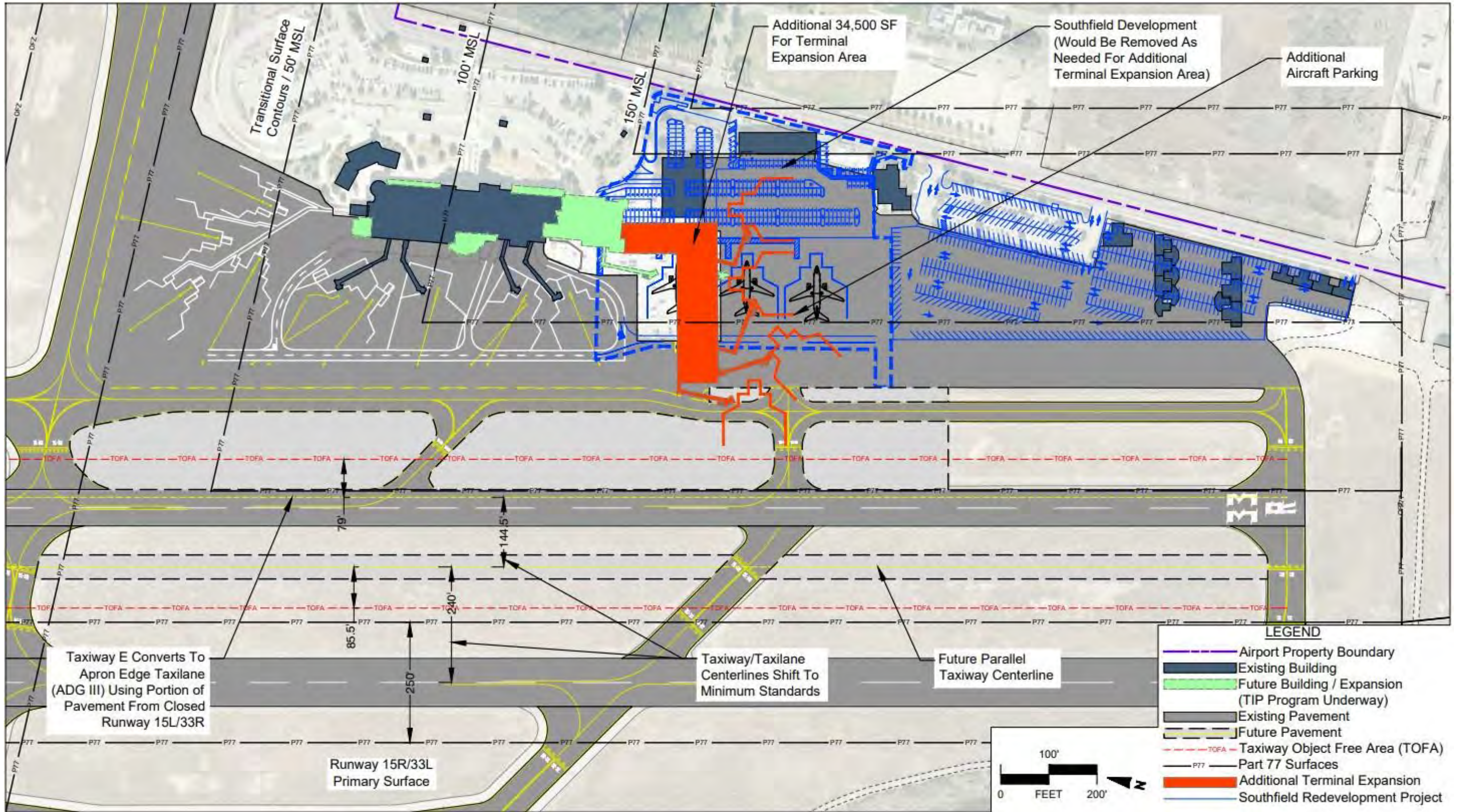


Figure 5-8: Terminal Alternative 5

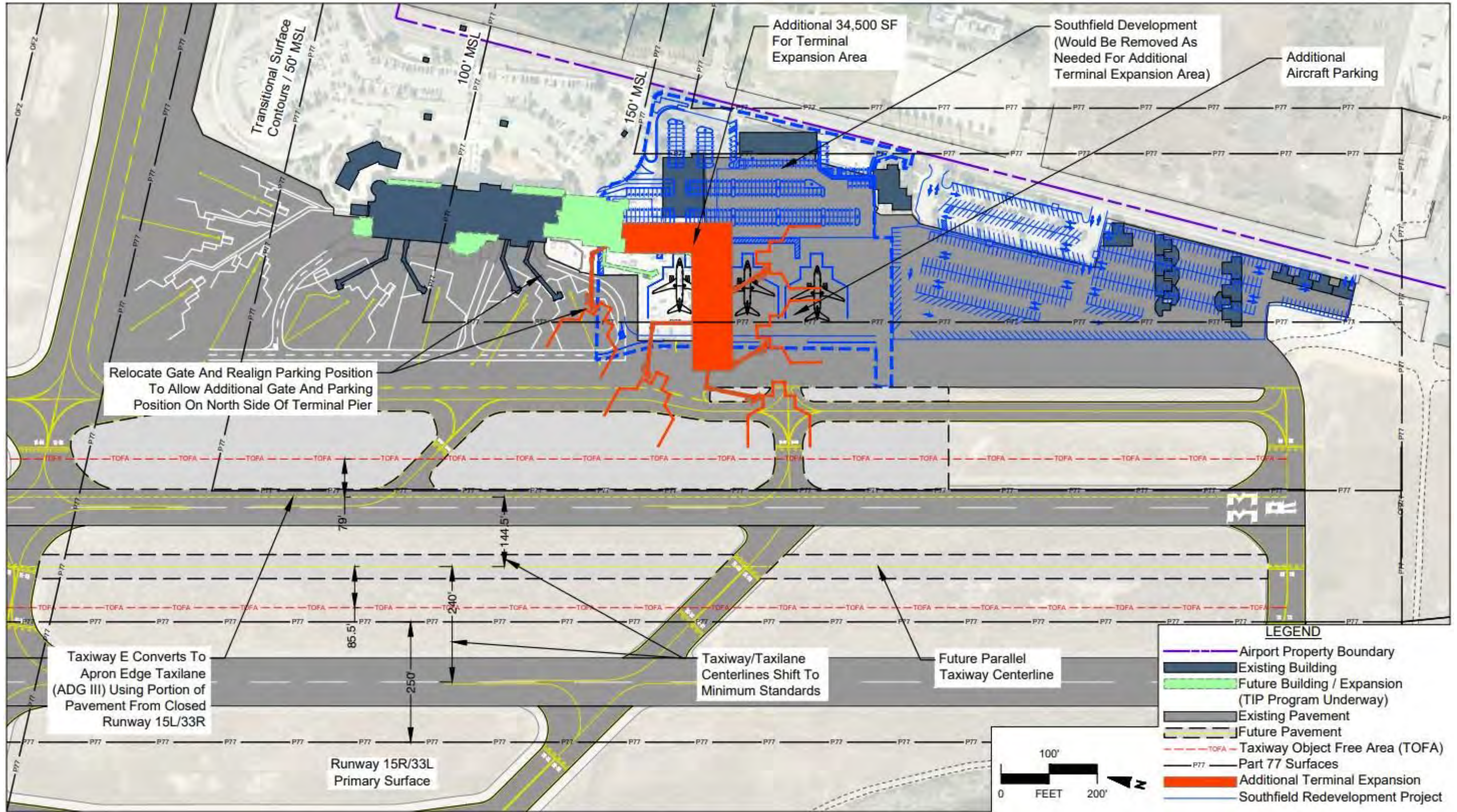


Figure 5-9: Terminal Alternative 6

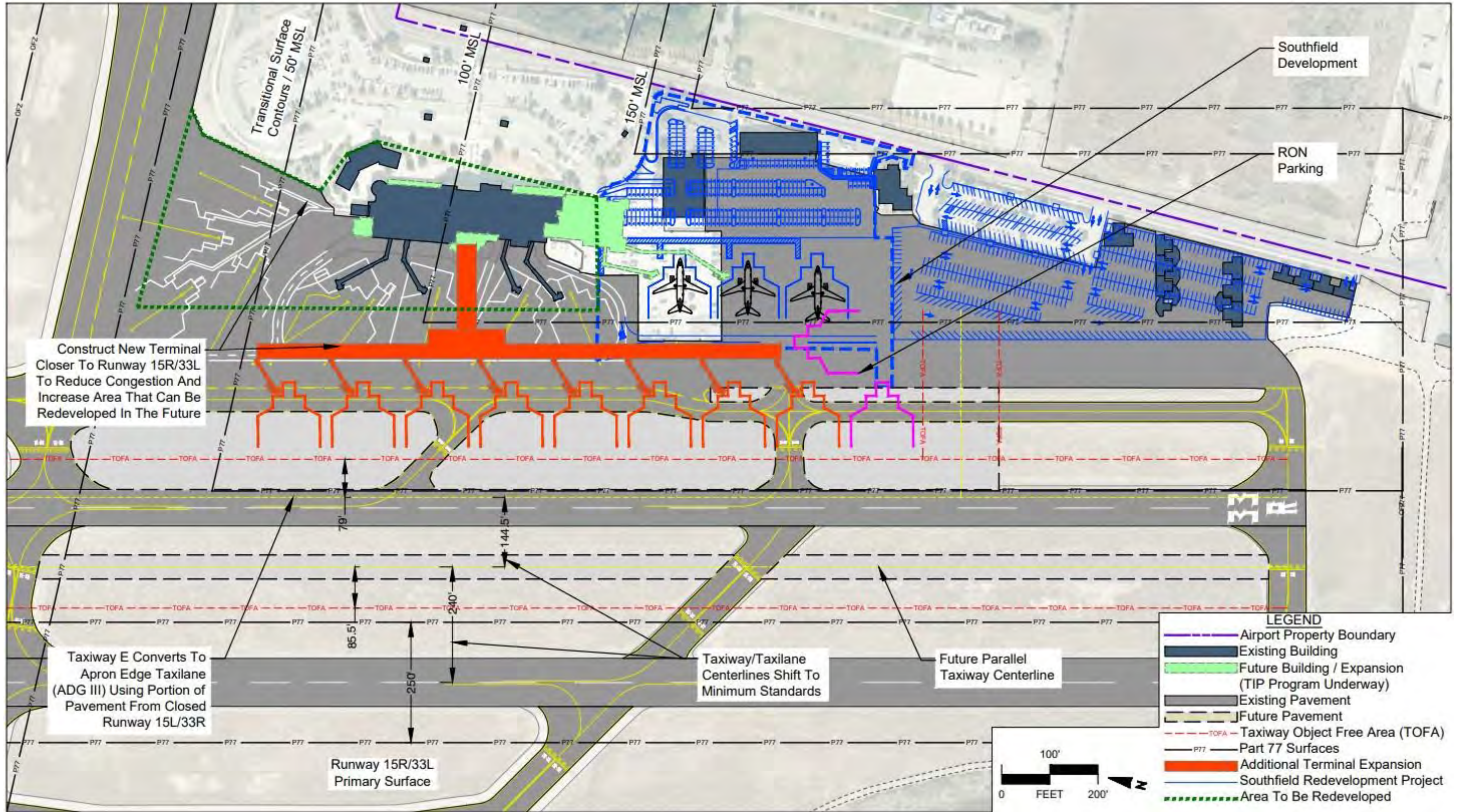
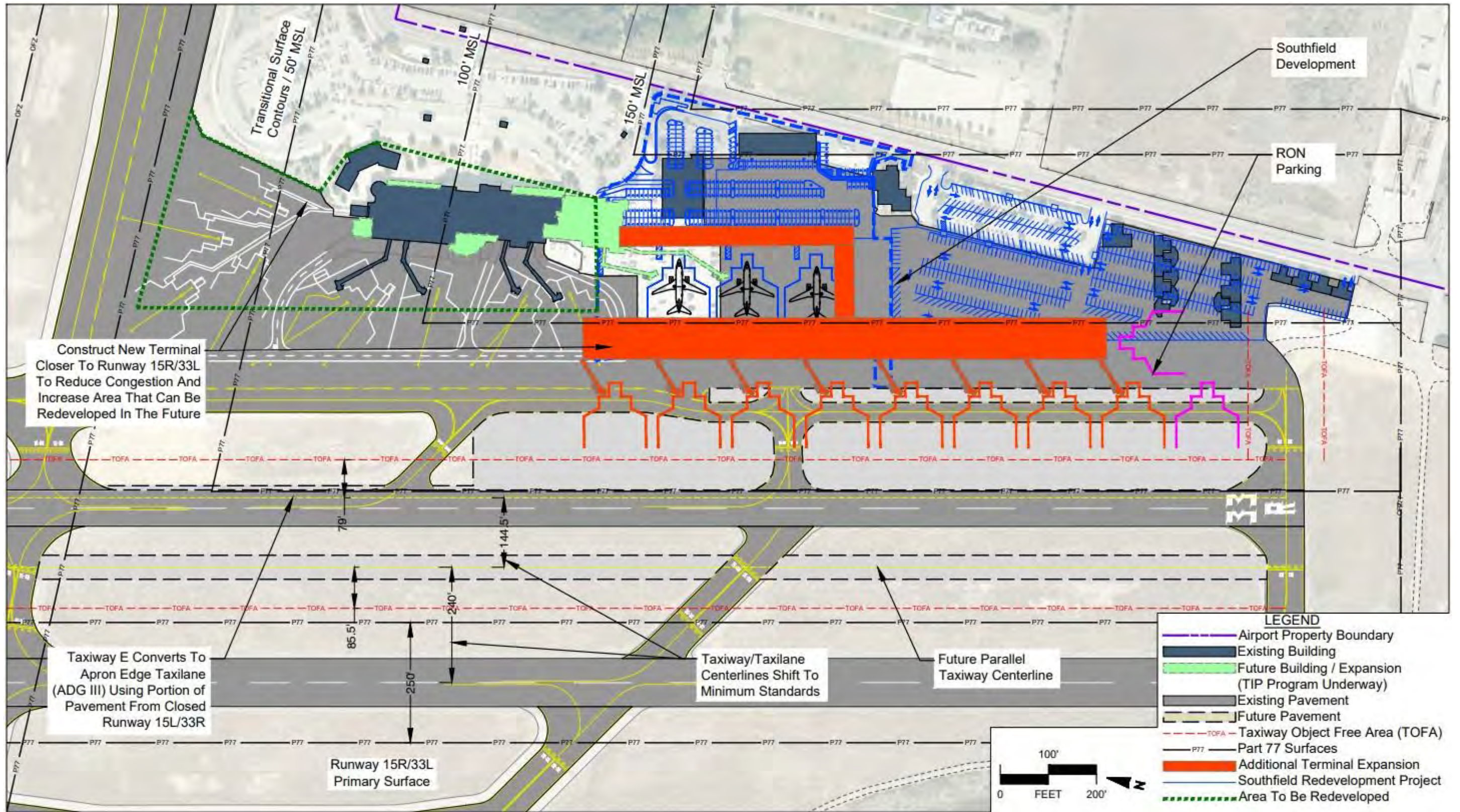


Figure 5-10: Terminal Alternative 7



5.5.2 Aircraft Rescue and Firefighting Buildings / Equipment

The critical aircraft, Boeing 737-800, is increasing in operations and SBA should consider preparing to become an Aircraft Rescue and Firefighting (ARFF) Index C when the 737-800 NG or 737-800 MAX reaches the five daily operations threshold. An additional study on the ARFF capacity and operational trends toward longer-fuselage-length aircraft should be considered to ensure the appropriate apparatus, facilities, equipment, and response times meet or exceed requirements. No development alternatives are proposed.

5.6 GENERAL AVIATION FACILITIES

5.6.1 General Aviation Hangars

The airport will need to construct a variety of general aviation hangar products to meet long-term demand. The FAA-approved aviation activity forecast presented in **Chapter 3** projects that an additional 11 single-engine aircraft, 19 jet aircraft, 9 multi-engine piston aircraft, and 6 helicopters will make SBA their home airport in the 20-year planning period. These projected increases should serve as a long-term guide for the Airport rather than a rigid requirement to be met; demand may materialize differently throughout the future and the Airport should remain nimble in the planning for GA storage facilities.

As the GA fleet at SBA becomes more sophisticated, larger, and more costly, aircraft owners, pilots, and operators are moving away from ramp parking and tie-down rentals in favor of hangars and storage arrangements that provide a higher level of environmental protection and security. Demand for exposed, outdoor tie-downs or shade hangars is not anticipated for based aircraft. Demand for temporary overnight ramp storage and hangars is expected to remain constant throughout the planning period.

The Airport has an FBO redevelopment project ongoing outside of this Master Plan effort. The redevelopment project will establish two new FBO leaseholds in the northeast quadrant of the Airport to accommodate the relocation of SBA's two existing FBOs. The boundaries for that redevelopment area are included in the hangar development alternatives shown below. The ultimate layout and facilities to be provided within the FBO redevelopment areas will be determined by the FBOs in conjunction with Airport management. It is expected that the ultimate configuration of the FBO redevelopment project will accommodate all future GA transient apron demand. The following alternatives provide potential concepts for development within these areas that is intended to facilitate design and discussion between the Airport and the FBOs once the new leases are in place. For this reason, the preferred development concept will show the future FBO redevelopment areas as broad zones to be improved and will not contain specific development recommendations.

Northeast Hangar Development Alternatives

NE Hangar Alternative No. 1

This concept depicts potential hangar development concepts for both inside and outside of the future FBO redevelopment areas in the northeast quadrant. As mentioned above, the concepts depicted inside the



FBO redevelopment area should serve as a guide for development discussions in conjunction with the FBOs that will eventually lease those areas.

Outside of the FBO redevelopment areas, two locations of Airport-owned hangar development are shown. A development of 36 T-Hangars could be accommodated under the approach to the existing Runway 15L end. This development concept would be contingent upon the closure of Runway 15L/33R. Additionally, five Airport-owned box hangars could be constructed east of the FBO redevelopment areas and north of Taxiway B.

NE Hangar Alternative No. 2

The second hangar development alternative for the northeast quadrant depicts similar facilities but in a slightly different configuration and orientation. The concept for development within the FBO redevelopment areas is shifted to provide aircraft access to the area in more north/south flow with direct access to Taxiway B, whereas Alternative 1 provides aircraft access to the area oriented east/west with direct access to Taxiway E and F.

Northwest Hangar Development Alternatives

NW Hangar Alternative No. 1

Three alternative development concepts are provided for GA hangar development in the northwest quadrant of the airfield. Consistent among all three is a T-hangar expansion concept that extends the existing T-hangar development located immediately northwest of Runway End 15R. Extending this development pattern east towards the ATCT would provide 15 additional hangars for small GA aircraft. Unique to Alternative 1 is the location of a large hangar to replace the existing Atlantic Aviation FBO facilities upon their relocation. This could serve as a potential 3rd FBO for the Airport or accommodate one large individual user.

NW Hangar Alternative No. 2

Alternative 2 for the northwest quadrant retains the T-hangar development concept from Alternative 1 but provides three large box hangars over the existing Atlantic Aviation FBO site. These could serve as hangars for individual users or as a home to aviation-related service providers or businesses. Any future hangars in the location of the existing Atlantic Aviation FBO site will be limited in height as the Part 77 Primary Surface runs through the middle of the existing apron.

NW Hangar Alternative No. 3

Alternative 3 is a slight variation of Alternatives 1 and 2 in that it would provide for four 80'x80' box hangars.

Combined Alternative *

The preferred hangar development alternative is a combination of Northeast Alternative 1 and Northwest Alternative 2, which are depicted together on the Preferred Development Concept (**Figure 5-26**). This gives the Airport maximum flexibility as to the type of hangars and locations to be developed. The hangars identified in the preferred development concept, in conjunction with development expected to occur within the FBO redevelopment areas, will provide for aircraft storage facilities sufficient to meet the expected demand throughout the planning period.



The preferred hangar development alternative is aligned with the following guiding principles of this Master Plan:

- ▶ **Safety and Security:** Additional hangar storage options will provide secure facilities and a secure operating environment for aviators throughout the planning period.
- ▶ **Economic Vitality:** The additional hangars and associated leases will contribute to the long-term financial self-sufficiency of the Airport and will contribute economically to the region.
- ▶ **Transportation Diversity:** Continuing to invest in GA users through these improvements demonstrates the Airport's intent to serve all types of aviation users at the Airport.

Stormwater Management Recommendations for the Preferred Hangar Development

The following stormwater management recommendations apply to the preferred hangar development alternative:

- ▶ Assumed values for affected impervious area are zero acres of removed impervious surface, 1.9 acres of replaced impervious surface, and 5.7 acres of new impervious surface.
- ▶ Recommended BMPs for this alternative include:
 - Bioretention facilities or underground filter treatment systems;
 - Integrated grading and inlet design;
 - Surface storage or underground storage in tanks, vaults, or pipes for retention and detention.
- ▶ The project will require new storm-drain pipes, catch basins, manholes, and other structures to accommodate new site grading.
- ▶ To protect natural waterways, hangars and maintenance bays require source-control BMPs with floor drains that connect to sanitary sewer.
- ▶ As this project is mostly composed of impervious surface and as this location has little to no current qualitative or quantitative stormwater management facilities, the relative cost of stormwater management improvements for this project is expected to be high.



Figure 5-11: NE Hangar Alternative 1

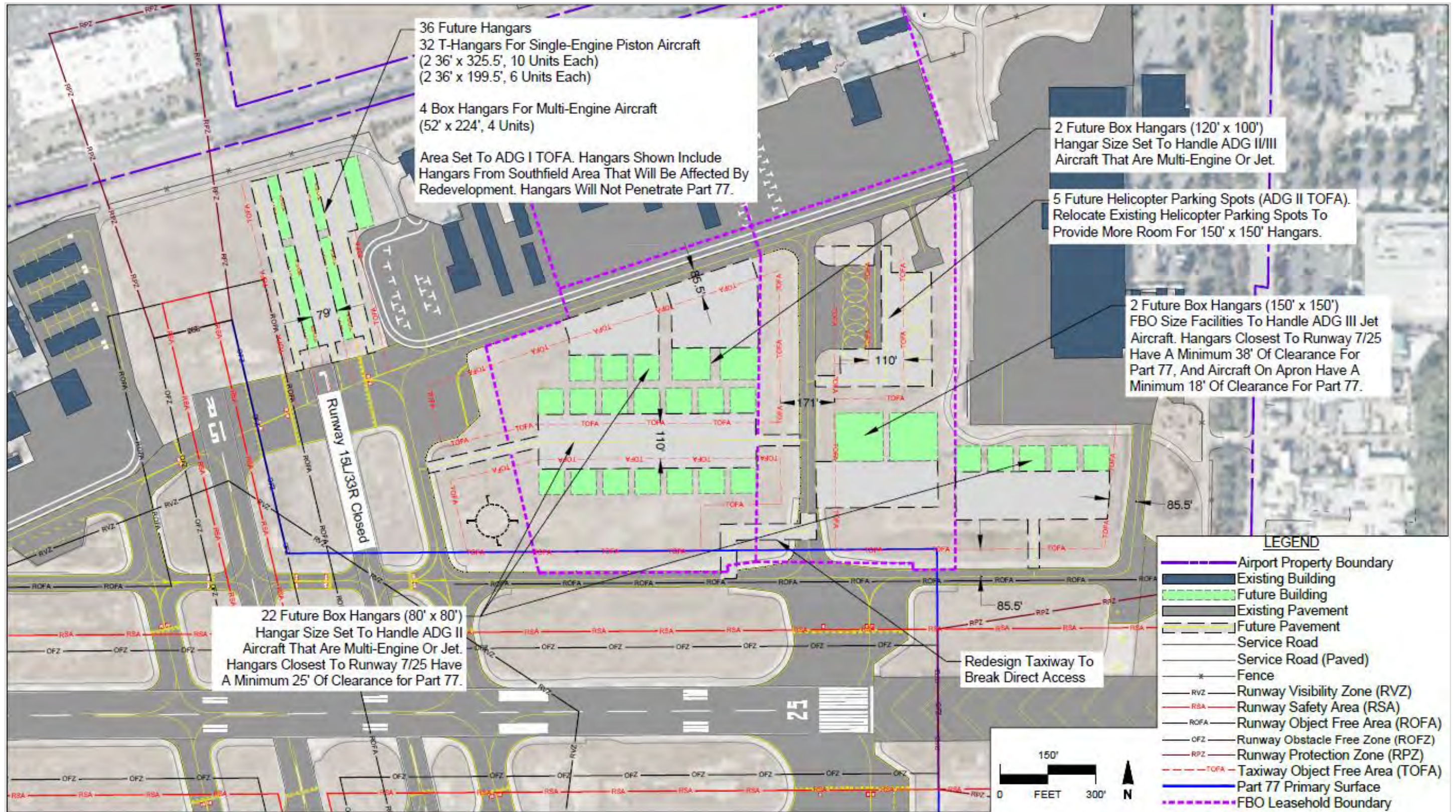


Figure 5-12: NE Hangar Alternative 2

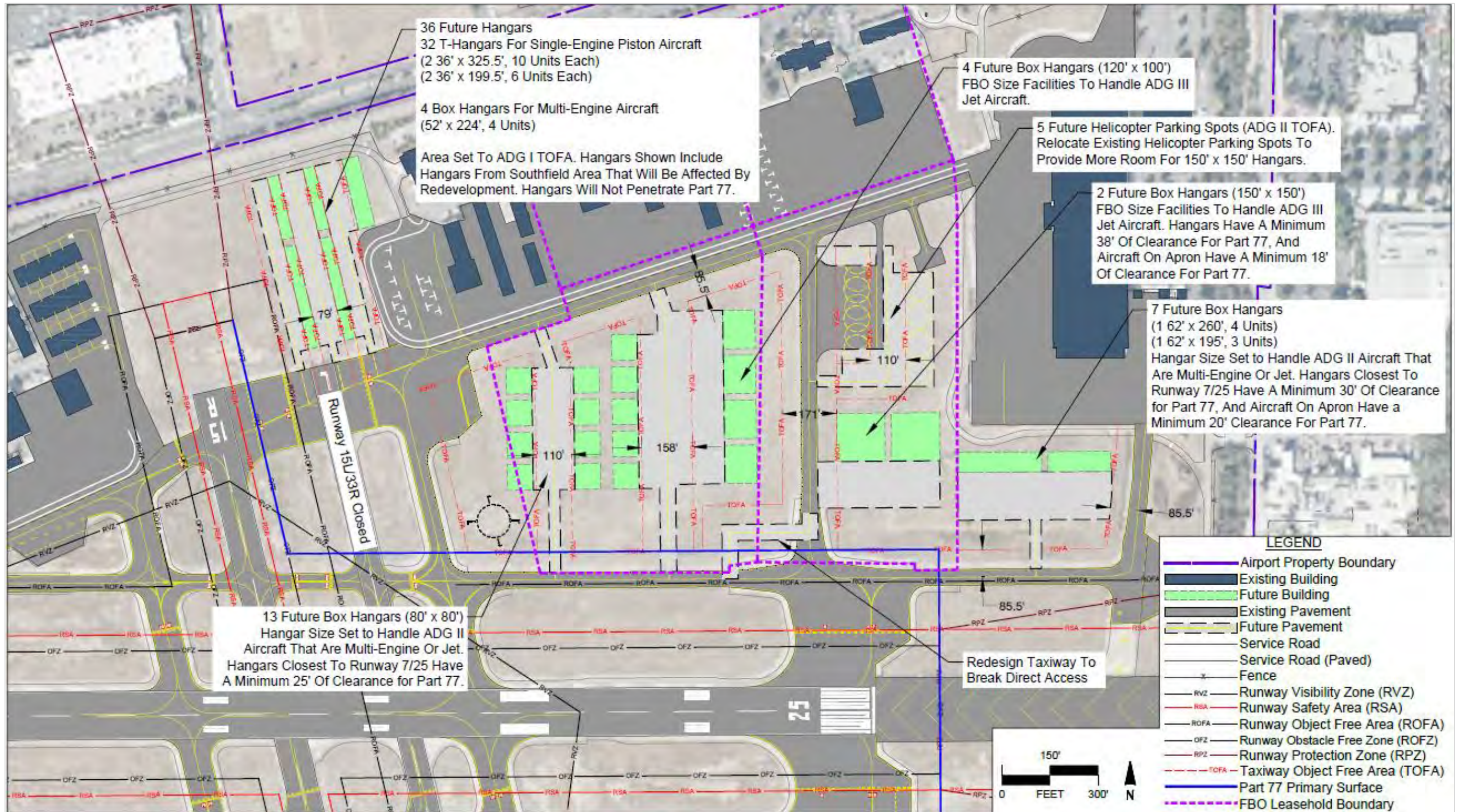


Figure 5-13: NW Hangar Alternative 1

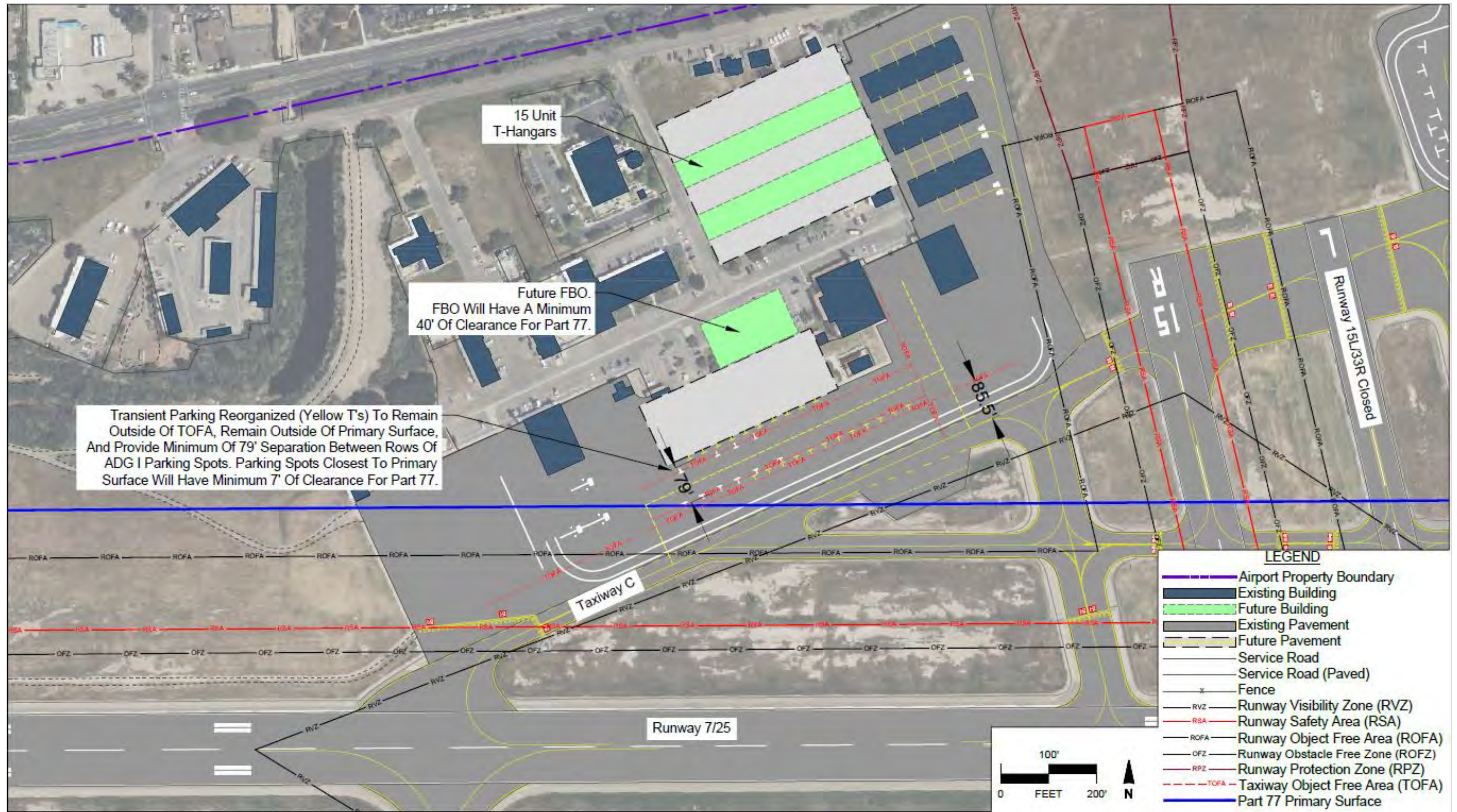


Figure 5-14: NW Hangar Alternative 2

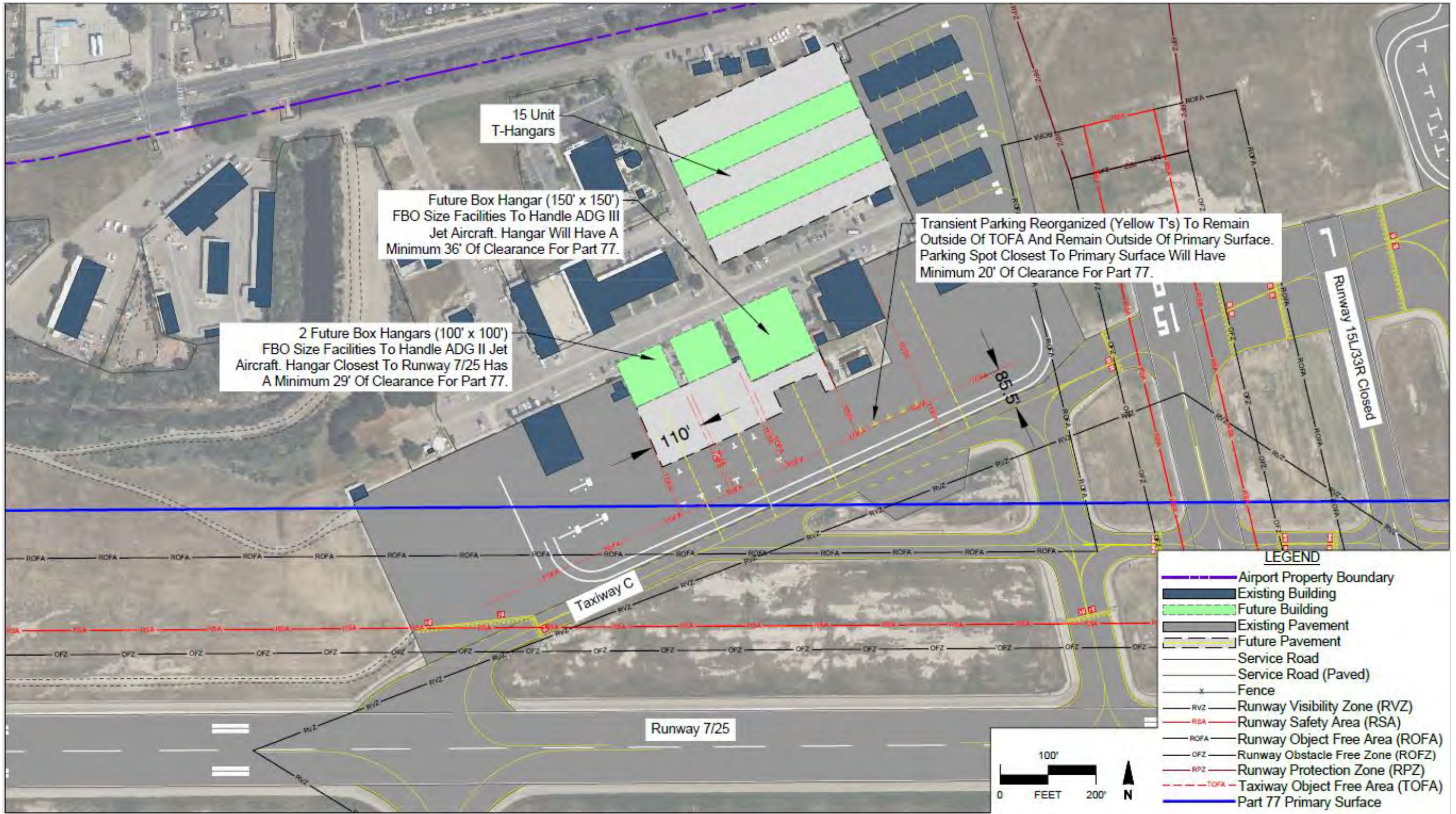
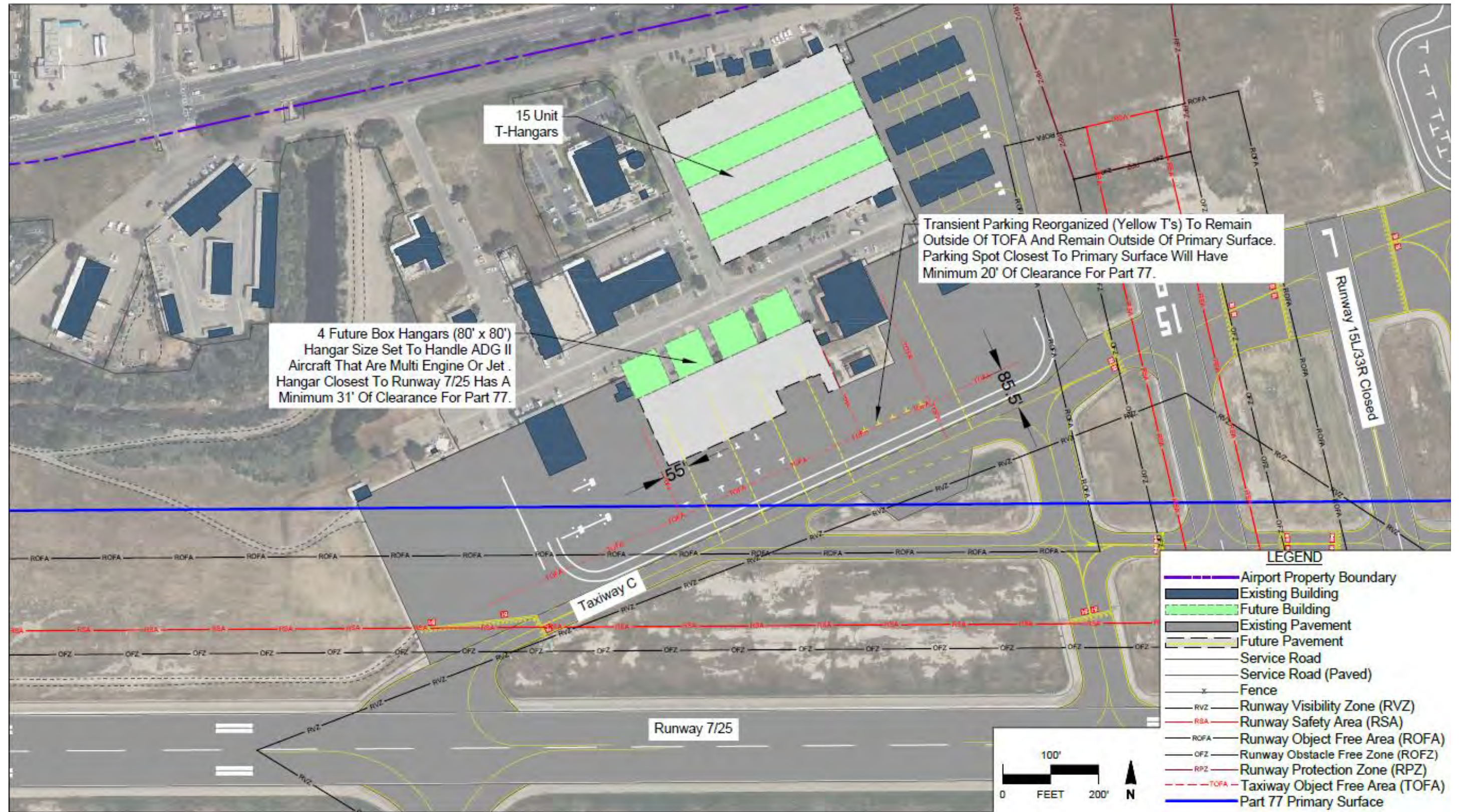


Figure 5-15: NW Hangar Alternative 3



5.6.2 Electric Aircraft and VTOL Infrastructure

The Airport should consider planning electric infrastructure and a vertiport to accommodate electric aircraft and electric vertical take-off and landing (eVTOL) aircraft to meet expected demand as the technology develops. The airport will need to anticipate installation of e-charge facilities. Capacity and location for e-charging facilities will need to be considered on a case-by-case basis; no specific alternative for locating charging infrastructure is proposed as it will be dependent upon the future FBO redevelopment of the northeast quadrant of the Airport. The guidance outlined in **Chapter 4** provides a framework to consider a future development process.

To accommodate anticipated future demand by eVTOL aircraft, a dedicated vertiport would help segregate these users from traditional fixed-wing operations. Similar to how fixed-wing aircraft of varying sizes have differing approach and departure requirements, eVTOL aircraft will likely operate in a manner that would benefit from separate facilities. Six sites, depicted and described below, were analyzed for potential vertiport locations. Utility infrastructure location and accessibility is critical to developing electric aircraft and vertiport facilities – the vertiport locations presented below have reasonable access to utility infrastructure that would support construction of facilities outlined in **Chapter 4**.

The FAA has established Engineering Brief No. 105, “Vertiport Design,” (EB 105) to provide guidance for the design of vertiports. The alternatives evaluation uses the following criteria taken from the EB 105 for potential vertiport sites:

- ▶ **Preferred Approach and Departure Paths:** Preferred approach/departure paths should be aligned with the predominant wind direction as much as possible.
- ▶ **Availability of More Than One Approach and Departure Path:** Vertiports should have more than one approach/departure path available and they should be as close to reciprocal in magnetic heading as possible (e.g., 180 degrees and 360 degrees). To meet the FAA-recommended degree of separation requirements, a minimum of 135 degrees of separation is desired if reciprocal paths are not possible.
- ▶ **Flight Path Independence:** Approach and departure paths are independent from approach/departures from primary runway.

The following matrix summarizes the evaluations of the six sites using the three criterion above, as well as additional considerations. The rationale for the findings is discussed in each site’s respective section below. **Figures 5-16** through **5-22** Error! Reference source not found. below depict the potential locations for the siting of a future vertiport at SBA.



Table 5-2: Site Evaluation Criterion

Site	1	2	3	4	5
Location	Adjacent to ATCT	Under Rwy 15L Approach	NW Industrial Park	Vacant Land Near E. Lot	Parking Lot in NE
Alignment with wind direction	◇	×	×	◇	✓
More than one path available (reciprocal)	✓	✓	✓	✓	✓
Paths are independent from approach / departures from primary runway	✓	×	×	✓	✓
Other factors	N/A	Requires closure of Rwy 15L/33R	Site occupied by existing tenant	Environmental concerns	Off-airport land use analysis

Does the site satisfy the criteria?

✓ Yes
 × No
 ◇ Partially



Figure 5-16: Vertiport Siting Location Options

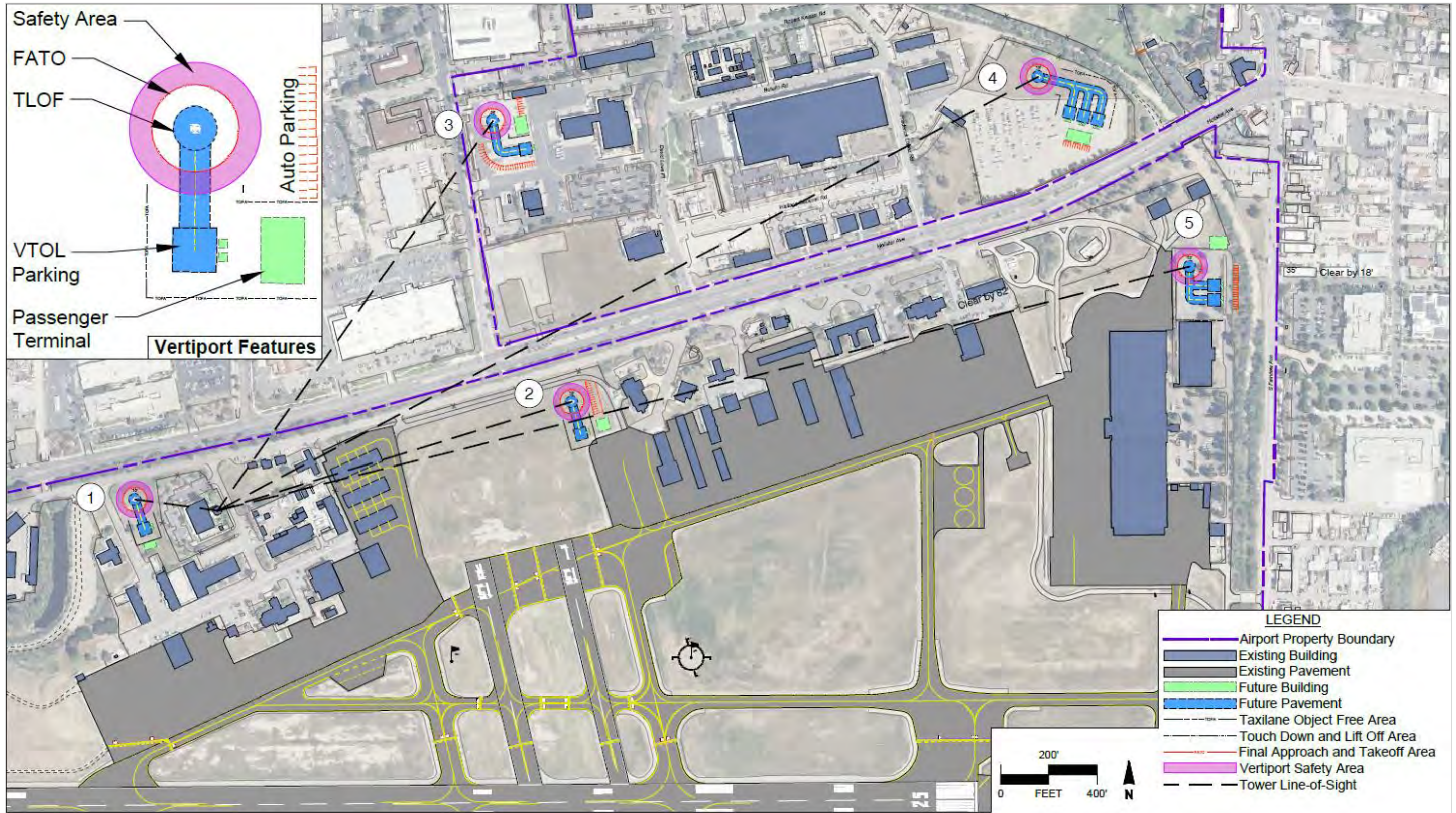


Figure 5-17: Site 1 – Located immediately west of the existing Airport Traffic Control Tower (ATCT)

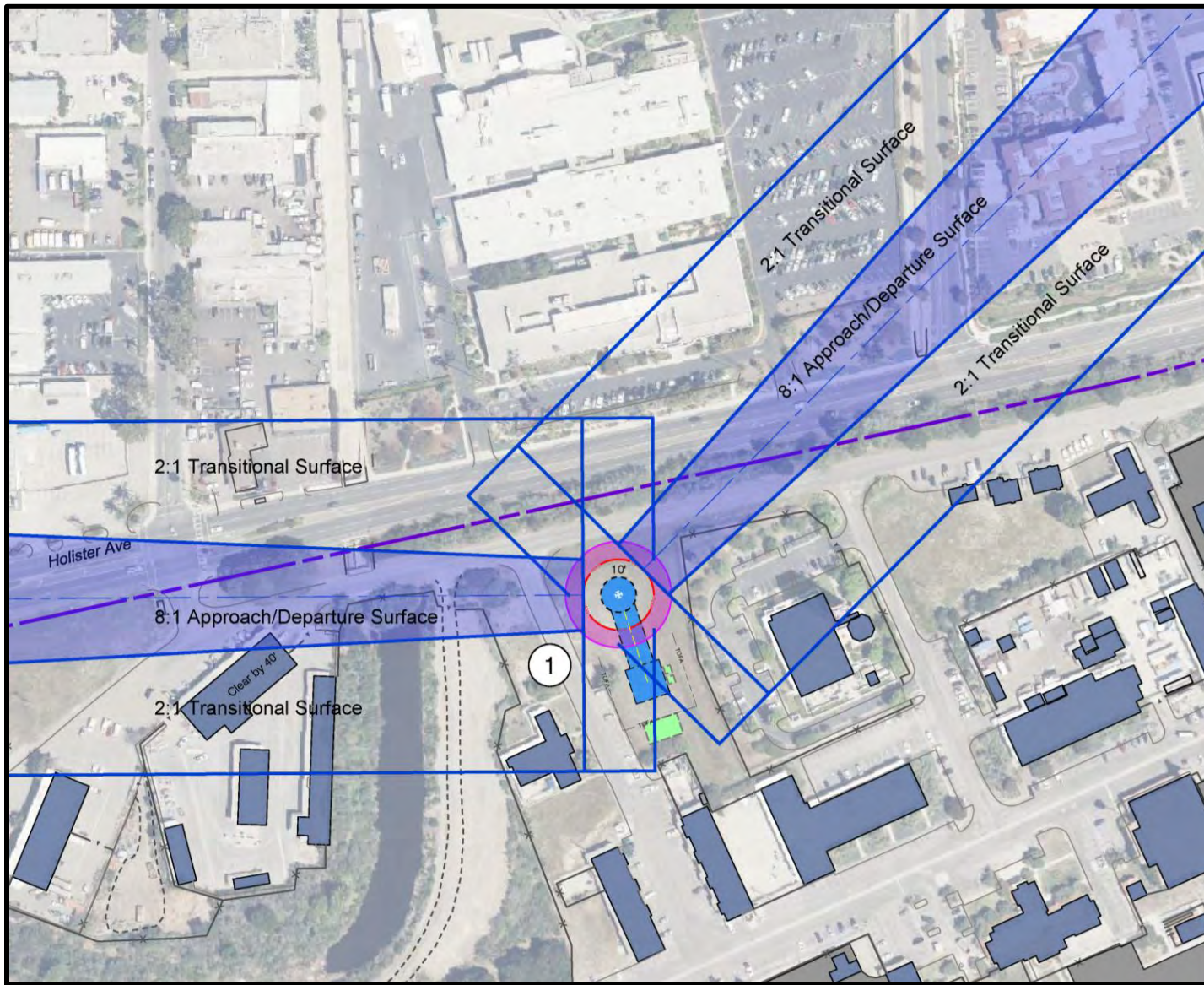


Figure 5-18: Site 2 – Under the approach to Runway 15L

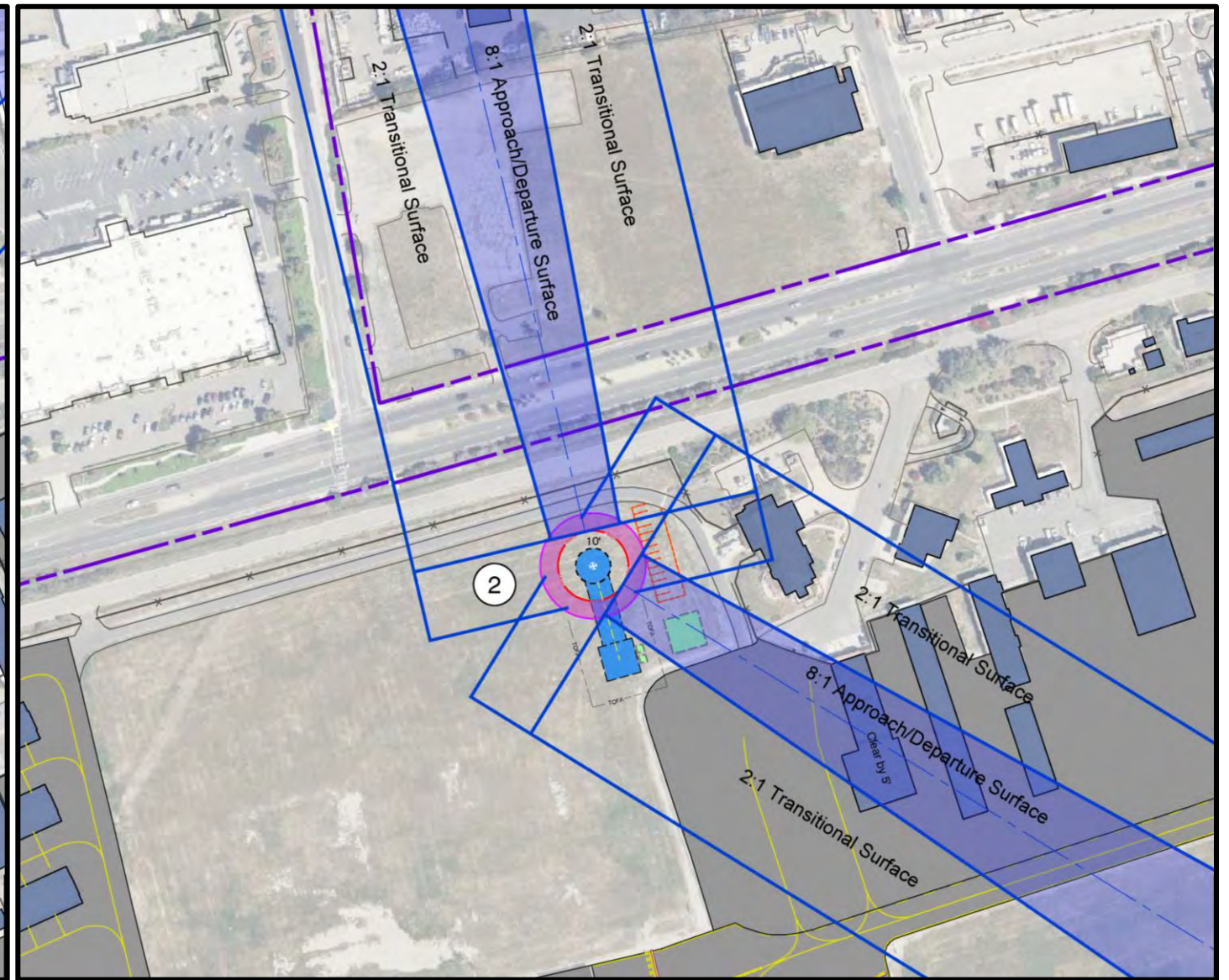


Figure 5-19: Site 3 - Northwest corner of industrial park, north of Hollister Ave

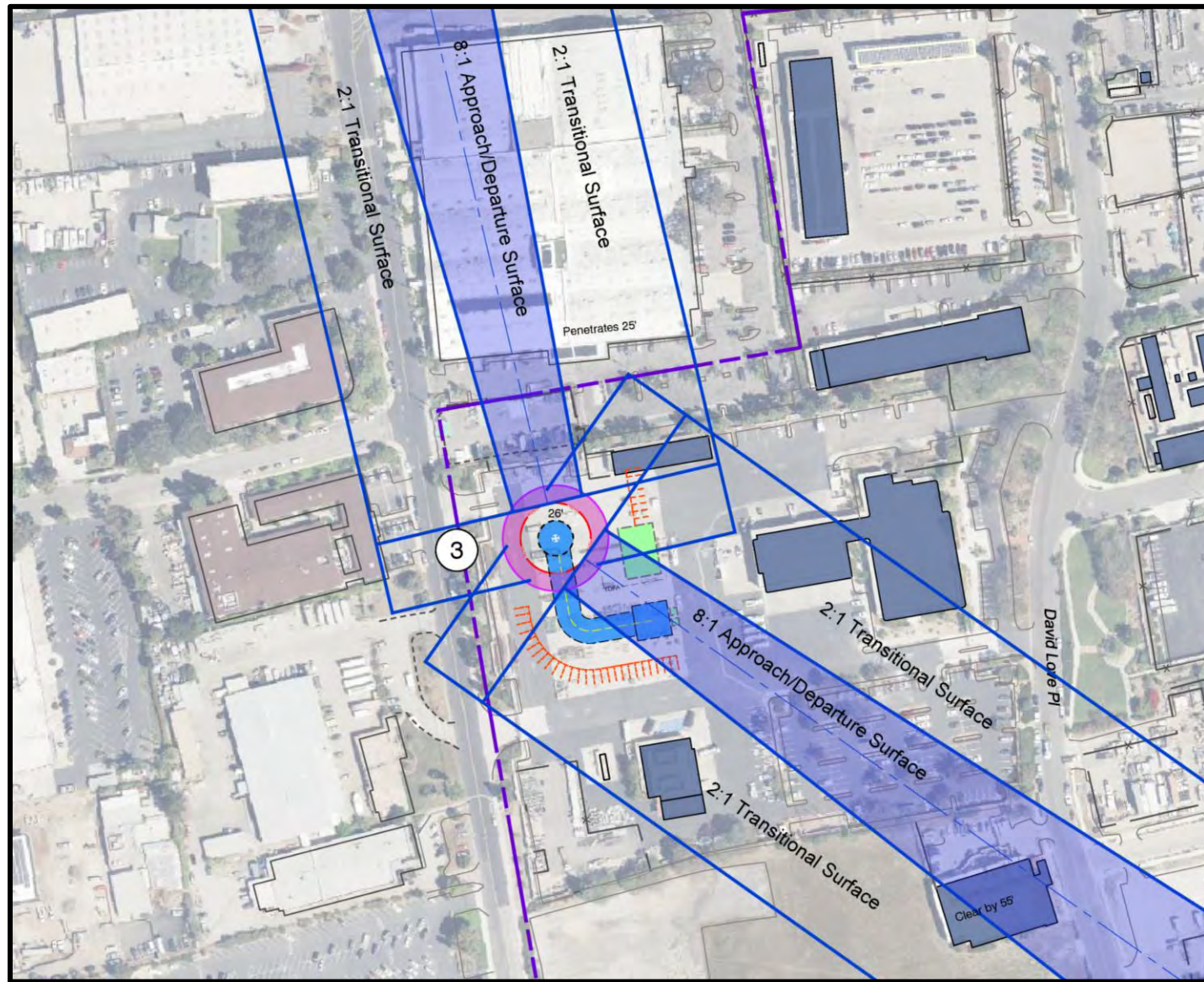


Figure 5-20: Site 4 - Vacant land near economy parking lot, north of Hollister Ave

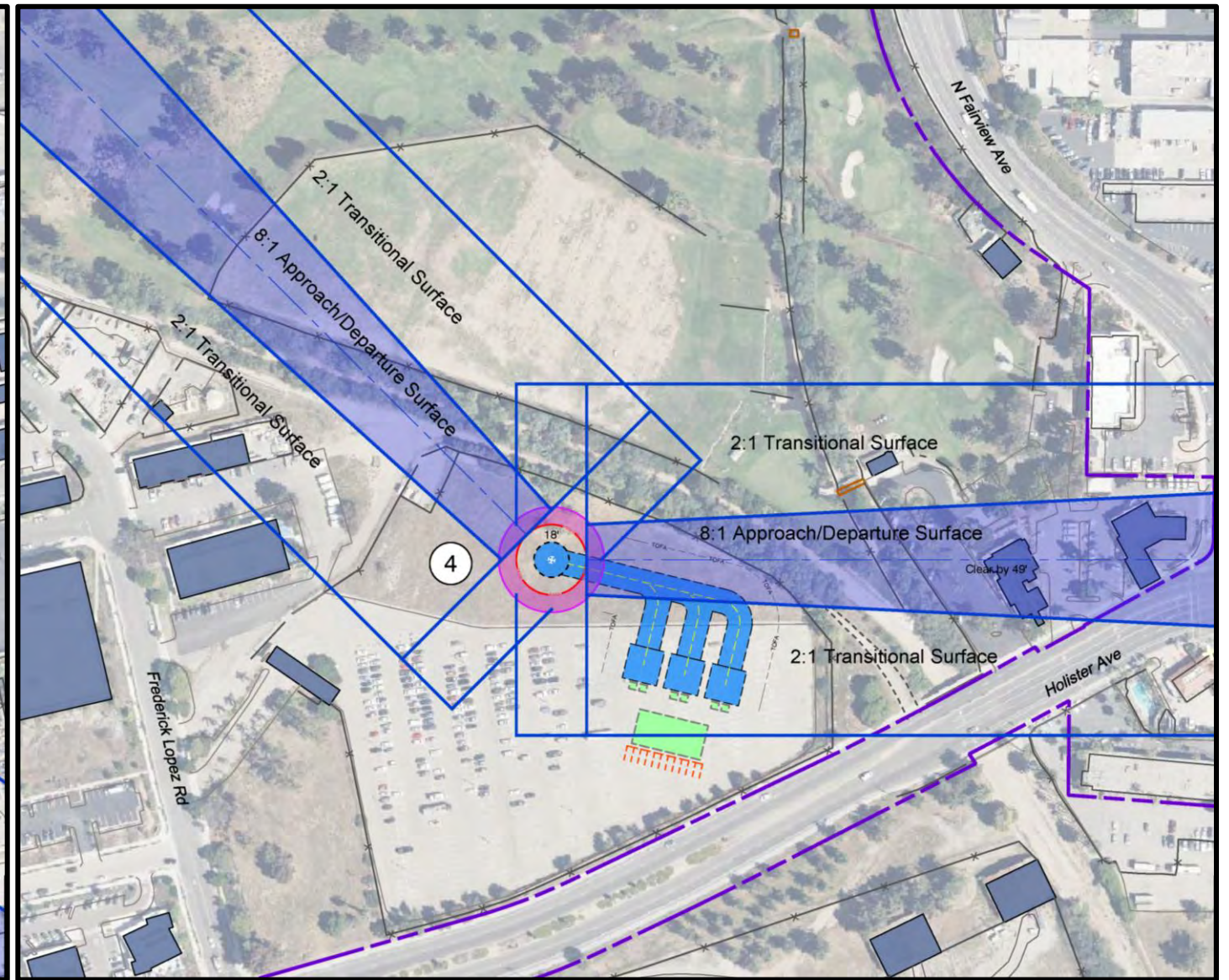


Figure 5-21: Site 5 – Automobile parking lot in northeast corner of Airport – Preferred Alternative

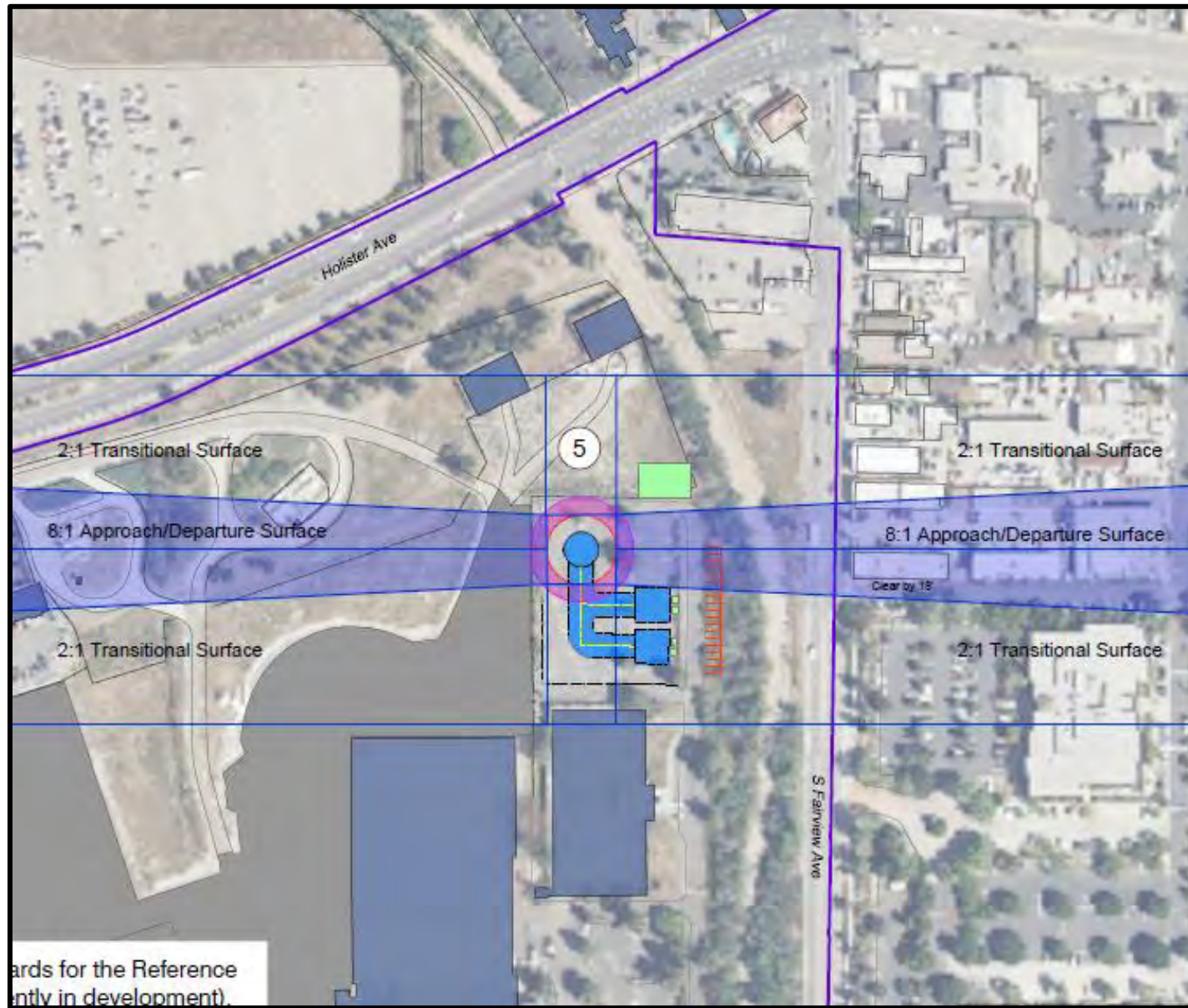
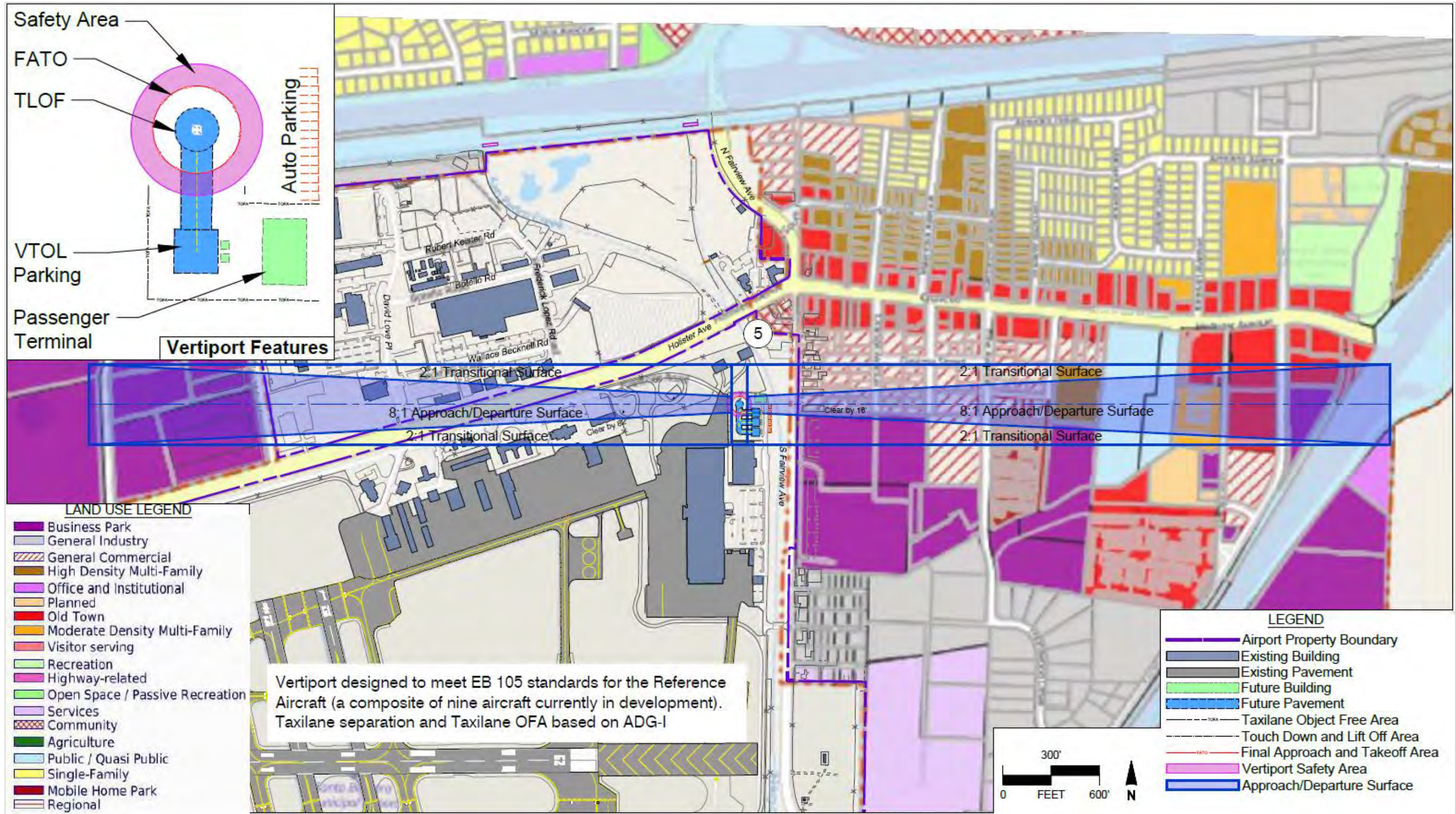


Figure 5-22: Vertiport Alternative No. 5 – Land Use Analysis



Vertiport Alternative No. 1

Site 1 is located immediately west of the existing Airport Traffic Control Tower (ATCT). Existing buildings (including the ATCT) preclude perfectly reciprocal approach/departure paths in alignment with the prevailing wind directions. However, more than one set of approach/departure paths is available, and this site does allow for the minimum 135-degree separation between approach and departure paths. These paths would be independent from the approach and departures of the primary runway.

Vertiport Alternative No. 2

Site 2 is located under the approach to Runway 15L. Two distinct approach departure paths that are separated by at least 135 degrees are possible. However, given the locations of existing buildings, they cannot be aligned with prevailing wind directions, and they are not independent from the primary runway.

Vertiport Alternative No. 3

Site 3 is located in the northwest corner of the industrial park and north of Hollister Ave. Two distinct approach departure paths that are separated by at least 135 degrees are possible. However, given the locations of existing buildings, they cannot be aligned with prevailing wind directions, and they are not independent from the primary runway.

Vertiport Alternative No. 4

Site 4 is located on vacant land near the economy parking lot and north of Hollister Ave. Two distinct approach departure paths that are separated by at least 135 degrees are possible. However, given the locations of existing buildings, they are only partially aligned with prevailing wind directions. The approach/departure paths would be independent from operations on the primary runway. Environmental concerns exist for this location due to the proximity to San Pedro Creek.

Vertiport Alternative No. 5 *

Site 5 is located in the automobile parking lot in northeast corner of the Airport. Two distinct approach and departure paths are possible in a reciprocal orientation. The paths would be aligned with the predominant wind direction and would also be allow operations independent of the primary runway. An off-airport land use analysis was conducted for the lands east of the Airport boundary (depicted below). The majority of the City of Goleta's General Plan land uses under the eastern approach/departure surface are "business park" and "general commercial." However, two areas of "High Density Multi-Family" and "Moderate Density Multi-Family" exist along the approach/departure surface. From an impact perspective, high- and medium-density residential are less impacted by aircraft overflight than single family or rural residential for comparison. Noise impacts from the proposed vertiport will be presented within the future 20-year noise contour map in the land use analysis to follow in **Chapter X**.

Preferred Alternative

Vertiport site 5 is the only site that meets all three of the critical evaluation criteria; therefore, it is recommended as the preferred alternative.



The recommended vertiport location is aligned with the following guiding principles of this Master Plan:

- ▶ **Safety and Security:** Providing a dedicated location for a vertiport at the Airport will establish a safe and secure location for new entrants to the aviation industry to operate.
- ▶ **Economic Vitality:** Planning accommodation for new entrants to the market will assist with marketing the Airport and will help the Airport to continue serving as an economic contributor to the region while maintaining the Airport's economic self-sufficiency.
- ▶ **Transportation Diversity:** Establishing a vertiport will accommodate a potential new user group at the Airport and a new mode of aviation transportation.

Stormwater Management Recommendations for the Preferred Vertiport Site

The following stormwater management recommendations apply to the preferred alternative (Site 5):

- ▶ Assumed values for affected impervious area are zero acres of removed impervious surface, 0.4 acres of replaced impervious surface, and 0.1 acres of new impervious surface.
- ▶ Recommended BMPs for this alternative include:
 - Bioretention facilities or underground filter treatment systems;
 - Integrated grading and inlet design;
 - Surface storage or underground storage in tanks, vaults, or pipes for retention and detention.
- ▶ The project will require new storm-drain pipes, catch basins, manholes, and other structures to accommodate new site grading.
- ▶ As this project is mostly composed of impervious surface and as this location has no current qualitative or quantitative stormwater management facilities, the relative cost of stormwater management improvements for this project is expected to be high.

5.7 APRON

Long-term apron demands are accommodated through the long-term terminal expansion alternatives presented in **Section 5.4**. The General Aviation apron demands are accommodated by the FBO redevelopment project discussed in **Section 5.5**.

5.8 CARGO FACILITIES

Chapter 4 concludes that current cargo facilities meet near-, mid-, and long-term needs with no expected changes in demand. No improvement alternatives are evaluated for the existing cargo facilities.



5.9 SUPPORT FACILITIES

5.9.1 Airport Administration

The Airport is in need of additional airport administration office and facility space. Assessment of space requirements and discussion of dispersed facilities is being undertaken outside of this Master Plan. Two potential locations (495 South Fairview and 404 Moffett Place) will be depicted on the Airport Layout Plan.

5.9.2 Fuel Storage

An expansion of fuel storage facilities is identified in **Chapter 4**. The existing fuel storage location in the far northeast corner of the Airport is well suited in its location and ability to accommodate expansion – the Airport could accommodate storage solutions that would double the existing fuel capacity at the existing site. Additionally, the Airport would have the option of incorporating sustainable aviation fuels in this location as well. A conceptual graphic of expansion options is presented in **Figure 5-23**. The preferred and only alternative for fuel storage expansion uses the existing location. This is presented on the preferred development concept in **Figure 5-26**.



The preferred fuel storage expansion is aligned with the following guiding principles of this Master Plan:

- ▶ **Safety and Security:** Establishing additional fuel capacity will allow the Airport to be more resilient against supply chain disruptions and would help ensure a safe and secure airport for all users.
- ▶ **Economic Vitality:** Additional fuel storage will allow the Airport to continue to receive fuel flowage fees, which contributes to the financial self-sufficiency of the Airport.
- ▶ **Transportation Diversity:** Continuing to serve all aviation users with a variety of fuels furthers the Airport's attractiveness to all aviation groups.
- ▶ **Sustainability:** The additional fuel storage concept allows the Airport to accommodate the sale of sustainable aviation fuels.

Stormwater Management Recommendations for the Recommended Fuel Expansion Alternative

The following stormwater management recommendations apply to the preferred fuel expansion alternative:

- ▶ Assumed values for affected impervious area are zero acres of removed impervious surface, zero acres of replaced impervious surface, and 0.1 acres of new impervious surface.
- ▶ Recommended BMPs for this alternative include:

- Oil-water separation units;
 - Bioretention facilities or underground filter treatment systems;
 - Integrated grading and inlet design;
 - Surface storage or underground storage in tanks, vaults, or pipes for retention and detention.
- ▶ The project may require new storm-drain pipes, catch basins, manholes, and other structures to accommodate new site grading.
 - ▶ This project does not include a large amount of impervious surface, but it will require more advanced water quality facilities such as oil-water separation units. The relative cost of stormwater management improvements for this project is expected to be high.

5.9.3 Airport Fencing

Chapter 4 identifies fencing improvements needed in the southwest portion of the Airport to meet FAA security requirements. Security fencing should be comprised of 8-foot-tall chain link fence with 12-inch extension arms and 3-strand barbed wire on top and a 3- to 4-foot concrete fence post footing for each post. This improvement will be identified on the Airport Layout Plan. No alternatives were developed.

5.9.4 Perimeter Service Roads

Chapter 4 identifies portions of perimeter service roads that should be relocated outside of runway surfaces where practical. These revisions will be identified on the Airport Layout Plan.

5.10 ACCESS AND CIRCULATION

5.10.1 Terminal Area and Roadway Capacity

As presented in **Chapter 4**, no terminal area or roadway improvements were identified as necessary throughout the 20-year planning period.

5.10.2 Curbside Loading Capacity Improvements

As described in **Chapter 4**, the curbside loading and unloading area located in the landside interface zone meets current and forecasted demand as configured. However, the first 190 feet of James Fowler Road (the Loop Road) are underutilized as drivers can't see the terminal and continue south, functionally utilizing approximately 345 feet of the curb after cross walks and shuttle staging is removed from the linear total of the curb length. Additionally, the curvature of the road prevents drivers from seeing where cars are stopped and parked, which adds to the compaction occurring in the last or southernmost portion of curb. To gain utilization of the curb and streamline the landside interface, the Airport may consider the three potential alternatives below.



Curbside Alternative No. 1

Develop signs, markings, way-finding, and messaging to gain utilization of approximately 190 feet of the northern curb. This would maximize the utilization while still combining pick-up and drop-off areas in the inner curb. This simple solution will accommodate most demand scenarios; however, peak periods may be impacted, and a marshal or parking attendant may be required for proper utilization.

Curbside Alternative No. 2

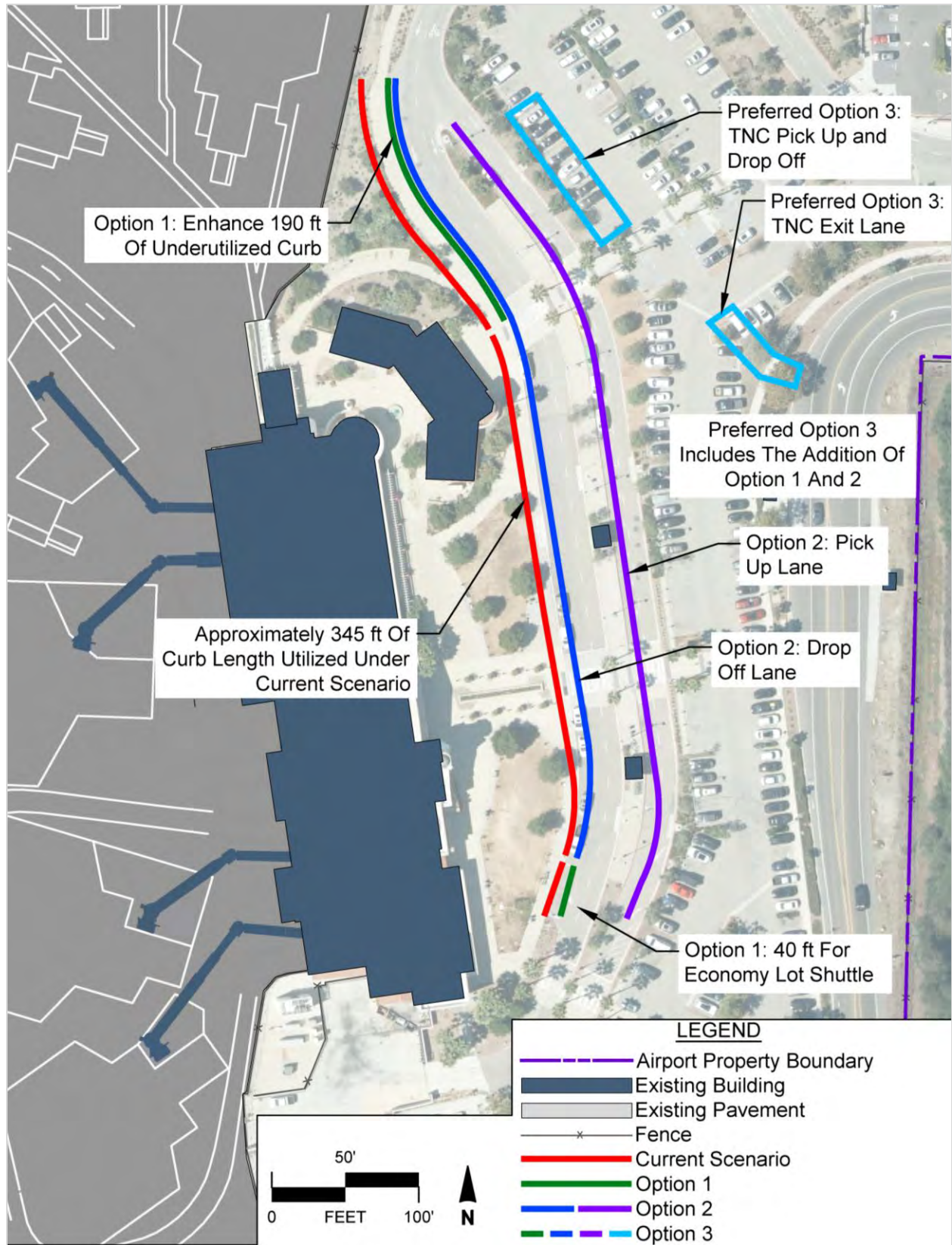
Continues from Alternative 1 and additionally separates the inner and outer curb for pick-up and drop-off. This alternative also develops the outer curb for pick-up and allows drop-off to occur on the inner curb. Additional signs, markings, way-finding, and messaging will be required. In this scenario, TNC may utilize the northern portion of the inner loop for drop-off and the northern portion of the outer loop for pick-up.

Curbside Alternative No. 3 *

Either of the first two alternatives may occur with a capacity building alternative that includes modification to the short-term parking area west of the loop road. TNC pick-up and drop-off may be accommodated by making modest modifications to the parking area. This would require development of staging, road connector, and pedestrian lanes to optimize the parking area. Parking revenue losses may be offset by TNC permit fees. This would allow capacity building and allow for either Alternative 1 or 2 to occur. This alternative is the preferred alternative.



Figure 5-24: Curbside Alternatives



5.11 TERMINAL PARKING

Parking need analysis, discussed in detail in **Chapter 4**, concluded that there is a system-wide parking deficit of 687 stalls. Additionally, the Airport plans to discontinue use of the remote economy parking lot on the north side of Hollister Ave (561 current parking stalls). The long-term parking demand in conjunction with the loss of parking stalls associated with the closure of the remote economy lot results in a net deficit of 1,248 parking stalls by the end of the 20-year planning period.

In the near-term, SBA is planning the Southfield Redevelopment Project outside of this Master Plan. Initial concepts for the Southfield Redevelopment Project include the addition of 608 parking stalls. If the Southfield redevelopment project is completed and the remote economy lot remains open, the system-wide parking deficit would decrease to 79 spaces needed to accommodate parking demand throughout the planning period.

Since the Airport intends to discontinue the use of the remote economy parking lot. The alternatives presented below are based on the most demanding scenario of a parking deficit of 1,248 parking stalls. This assumes the Southfield Redevelopment Project does not occur, or that the site is used for another purpose.

5.11.1 Parking Improvement Alternatives

Parking Alternative No. 1 (no build)

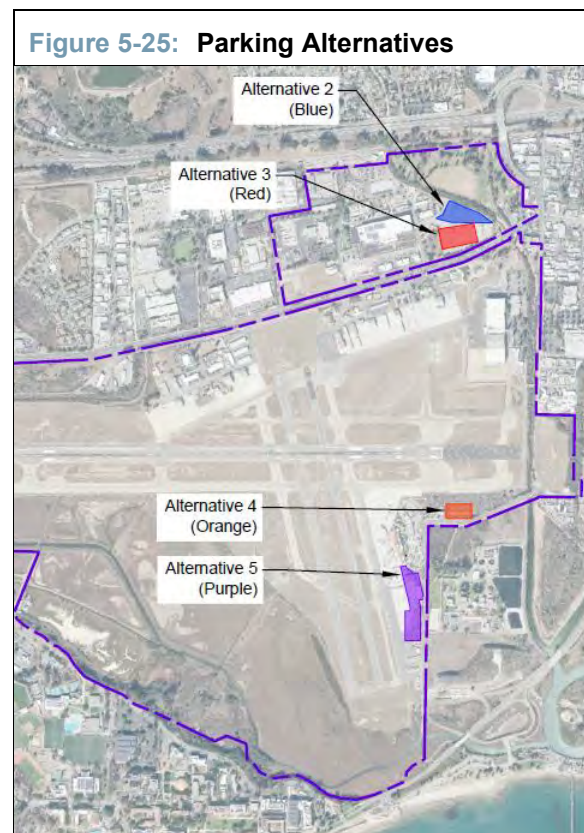
Alternative 1 is a no-build alternative that would incorporate technologies and systems such as valet and attendant assistance parking programs, automated parking guidance systems, transportation demand management, and parking rates that reflect availability. These no-build solutions would delay an over-crowded parking scenario but would not be able to offset the projected deficit of 1,248 parking stalls.

Recommendation:

Alternative 1 is not recommended as it would not resolve forecasted demand throughout the 20-year planning period.

Parking Alternative No. 2

As shown in **Figure 5-25**, Alternative 2 (blue) adds 281 parking spaces in the undeveloped area immediately adjacent to the existing remote economy parking lot. This site has environmental impacts associated with construction near San Pedro Creek and would not meet the projected parking deficit throughout the planning period.



Recommendation:

Alternative 2 is not recommended due to potential environmental impacts, not meeting expected parking deficits, and the Airport's desire to discontinue using the remote economy parking lot.

Parking Alternative 3

As shown in **Figure 5-25**, Alternative 3 (red) adds between 318 and 354 parking stalls by means of constructing a parking garage on the existing remote economy parking lot.

Recommendation:

Alternative 3 is not recommended as the concept would not meet expected parking deficits and due to the Airport's desire to discontinue using the remote economy parking lot.

Parking Alternative 4

As shown in **Figure 5-25**, Alternative 4 (orange) adds less than 100 parking stalls by means of constructing a parking garage on a portion of the existing long-term parking lot. In this location, vertical clearance is limited by airspace surfaces associated with Runway 7/25. The structure concept would be limited to the southernmost area of the existing long-term parking lot, closest to James Fowler Road. This location could only accommodate a structure with two levels of parking and a comparatively small footprint.

Recommendation:

Alternative 4 is not recommended as the site is limited by Runway 7/25 airspace surfaces and the concept would not meet expected parking deficits.

Parking Alternative 5 *

Alternative 5 (purple), shown in **Figure 5-25**, proposes constructing a three-story parking garage immediately south of the existing terminal building. This would replace much of the Southfield Redevelopment project. This alternative would accommodate approximately 1,250 new parking stalls, which meets the long-term parking demand and accommodated parking relocation from the eventual closure of the remote economy parking lot.

Recommendation:

Move forward with Alternative 5 as the recommended alternative as it meets all long-term parking demand and is located in an area convenient to the traveling public.

The recommended parking improvement alternative is aligned with the following guiding principles of this Master Plan:

- ▶ **Transportation Diversity:** Establishing a multi-level parking garage in close proximity to the terminal building provides ground transportation options for the traveling public and Airport users throughout the planning period.



Stormwater Management Recommendations for the Preferred Parking Alternative

The following stormwater management recommendations apply to the preferred parking alternative:

- ▶ Assumed values for affected impervious area are zero acres of removed impervious surface, 7.3 acres of replaced impervious surface, and zero acres of new impervious surface.
- ▶ Recommended BMPs for this alternative include:
 - Bioretention facilities or underground filter treatment systems;
 - Integrated grading and inlet design;
 - Surface storage or underground storage in tanks, vaults, or pipes for retention and detention.
- ▶ The project will require new storm-drain pipes, catch basins, manholes, and other structures to accommodate new site grading.
- ▶ As this project is outside the airfield, it has more flexibility in site grading and in the use of vegetated BMPs; still, it is a highly impervious area, and some facilities may be placed underground to save usable project footprint. Therefore, the relative cost of stormwater management improvements for this project is moderately high.

5.12 UTILITIES AND ELECTRICAL

Chapter 4 concludes that the Airport has sufficient utility infrastructure to meet current and projected demands. Additional facility needs for power will be handled as a condition within each development project.

5.13 NON-AERONAUTICAL PROPERTIES

Chapter 4 concludes that the Airport's 104 acres of non-aeronautical zoned properties north of Hollister Ave are sufficient for the 20-year planning period of this Master Plan. No improvements are identified.

5.14 SUMMARY

The improvement alternatives evaluation process presented in this chapter explores the ways that SBA can meet the 20-year facility requirements through capital projects. The preferred alternatives will be used for land-use analysis, development of a capital improvement plan, and for the ALP. A summary of the preferred improvement alternatives is included below.

- ▶ Closure of Runway 15L/33R - **Runway Alternative 2**.
- ▶ Reconfiguration of airport taxiways to support the Runway closure and other long-term development plans - Depicted on the preferred development concept below.
- ▶ Planning for a long-term terminal expansion and reconfiguration project to accommodate enplanement levels beyond the 20-year planning period - **Terminal Building Alternative 7**.
- ▶ Expanded hangars for general aviation accommodation – **Combined Alternative**.
- ▶ Constructing eVTOL vertiport - **Vertiport Alternative 5**.
- ▶ Addition fuel storage capacity - Depicted on the preferred development concept below.
- ▶ Curbside loading improvements - **Curbside Alternative 3**.



- ▶ Expanding terminal parking facilities - **Parking Alternative 5.**



Figure 5-26: Preferred Development Concept

