DRAFT
Phase 2 Report
Lake Tahoe Airport
Airport Master Plan

City of South Lake Tahoe
South Lake Tahoe, CA
June 2015

FAA AIP #3-06-0249-033

Prepared by

C&S COMPANIES®

Airport Master Plan Update

Draft Phase 2 Report

Prepared for
Lake Tahoe Airport

By
C&S Engineers, Inc.
2020 Camino Del Rio North
Suite 1000
San Diego, CA 92108

June 2015

FAA AIP No. 3-06-0249-033

"The preparation of this document was financed in part through a planning grant from the Federal Aviation Administration as provided in the Airport and Airway Improvement Act of 1982, as amended. The contents of this report reflect the analysis and finding of C&S Engineers, Inc., who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable with applicable Public Laws."

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CHAPTER 5 – ALTERNATIVES OF AIRPORT DEVELOPMENT

5.01 Introduction

The master plan process is one of evaluating existing conditions (Chapter 2), developing a forecast of anticipated operational activity (Chapter 3) and identifying the facilities needed to accommodate demand assuming they can be provided (Chapter 4). After facility requirements have been identified, a series of alternative solutions to satisfy them must be identified and evaluated. In light of the City's commitment to sustainability, opportunities to incorporate relative strategies into the various alternatives are also identified when pertinent to the evaluation process, i.e., if a certain strategy would be contingent upon the alternative selected. These are based on the information provided in Chapters 2 and 4.

5.02 Alternatives

At Lake Tahoe Airport, the airfield (specifically the runway and taxiway system) encompasses the greatest land area in which the physical layout is required to meet FAA safety and design standards. The airfield layout is used to define minimum building set-back distances from the runway and object clearance standards. Due to the Airport's configuration, landside facilities and certain airside facilities such as the apron area and hangars could be significantly impacted by any proposed changes to the airfield. Therefore, airfield alternatives will be evaluated first, prior to addressing the remaining airport facilities to ensure that critical design standards can be met while also addressing other fundamental needs.

5.03 Airfield Alternatives

Airfield alternatives were developed to address the forecasted demand documented in Chapter 3 and the facility requirements documented in Chapter 4. Although the runway length analysis determined that there is a need to extend the runway length to 11,340 feet in order for the existing fleet to operate at full payload on the runway, i.e., without restrictions, the existing property is constrained both physically and environmentally (see **Figure 5-1**).

Due to the construction complexities and financial commitment required of such an investment a runway extension is not deemed a feasible option worthy of analysis under the planning period. Because the current fleet can operate at 81 percent of its useful load this is considered an adequate runway length for the planning horizon. In addition, due to the Airport's high elevation and existing demand of jet aircraft activity, a reduction in runway length was also not considered feasible. Therefore, no alternatives for an extension or reduction in runway length were fully evaluated.

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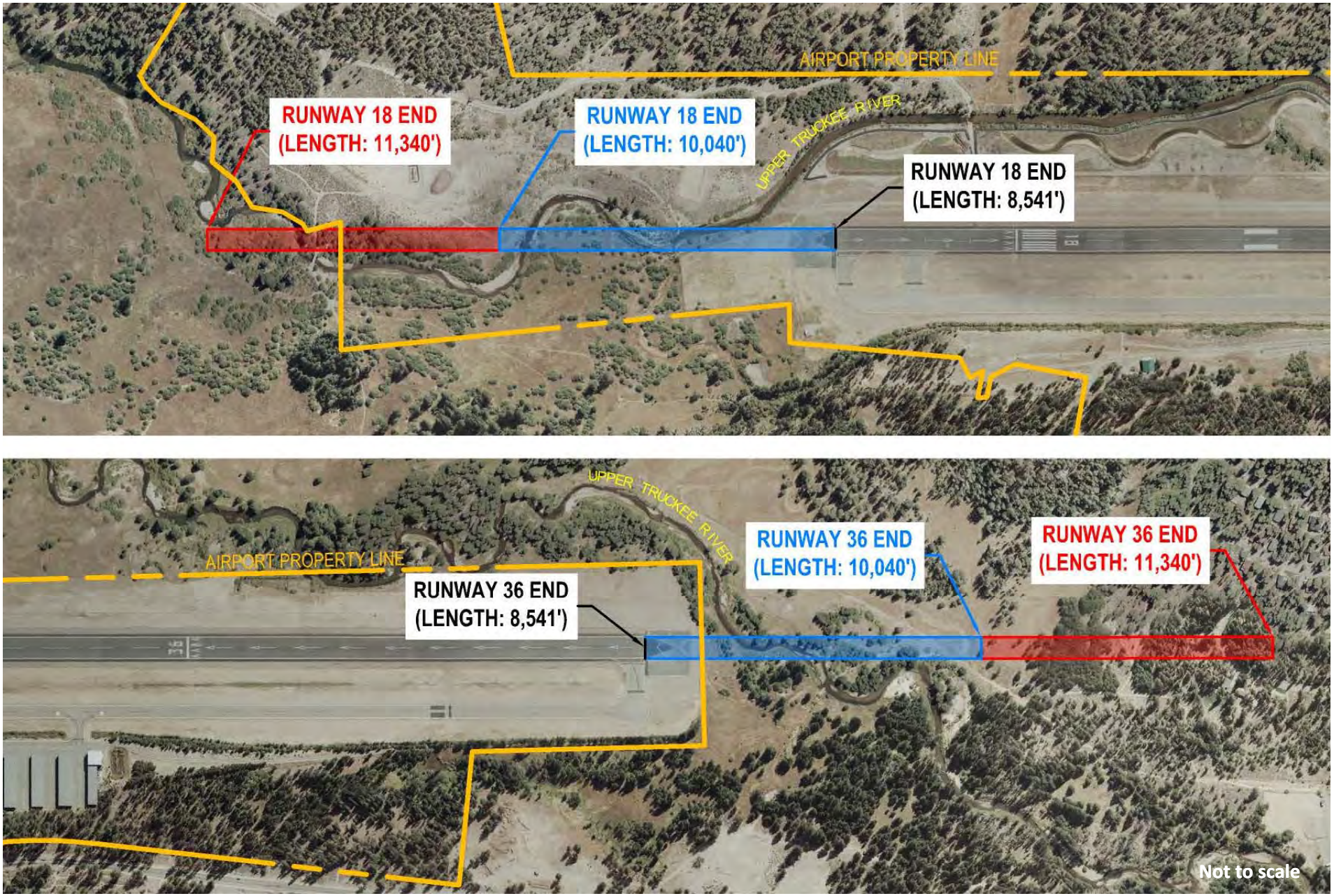

Lake Tahoe Airport

Runway Extension Challenges

Figure 5-1

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During the master plan process the City asked for community input with regards to the future of the Lake Tahoe Airport. Comments included a review of the Airport's full closure or a reduction in size to accommodate only operations of rotary-wing (helicopters) aircraft for emergency response services. A review of the existing and future aviation demand concluded that demand currently exists and will continue to exist for the 20 year planning period for aircraft that have an Airport Reference Code of B-II. Therefore, alternatives that cannot meet the minimum requirement of providing infrastructure and a safe aircraft operating environment to meet B-II design standards were not taken through the full evaluation process.

In addition to the projects listed within each alternative the City has identified specific projects within their Airport Capital Improvement Program (ACIP) for future development. These primarily focus on pavement maintenance and airport drainage. Since, these projects are independent, already meet a specific need, and would not be impacted by proposed development they were not reevaluated in the alternatives evaluation but will be incorporated into the final development plan once a preferred alternative has been selected.

Four alternatives for the runway and taxiway system have been presented, though there are several sub-alternatives that are possible to achieve each alternative's objectives.

AIRFIELD ALTERNATIVE 1 – NO ACTION

This alternative involves taking no action to address the issues described in the previous chapters and is considered for comparison purposes. Refer to **Figure 5-2**.

AIRFIELD ALTERNATIVE 2 – MEET ARC B-II DESIGN STANDARDS AND MAINTAIN FLEXIBILITY

This alternative involves ensuring the airfield facilities meet FAA design standards while preserving flexibility for future airport revenue generating operations. This is accomplished by maintaining the existing airfield pavement dimensions and configurations while making improvements to the taxiway system layout to meet updated FAA design standards. This alternative would accommodate the existing design aircraft, the Falcon 2000, but would not meet all design standards for the future design aircraft, the Gulfstream V[1]. Refer to **Figure 5-3**.

AIRFIELD ALTERNATIVES 3 AND 4 – MEET ARC B-II DESIGN STANDARDS AND REDUCE AIRPORT FOOTPRINT

These alternatives involve ensuring the airfield facilities meet FAA design standards and provide for a safe aircraft operating environment while minimizing impacts to the Airport's operation, environment, and surrounding community. These alternatives

[1] Section 2.05-5 Airport Design Standards of the Phase I Report provides a detailed description of the Falcon 2000 and Gulfstream V aircraft characteristics.

would accommodate the existing design aircraft, the Falcon 2000, but would not meet design standards for the future design aircraft, the Gulfstream V.
These alternatives are described below:

1. Alternative 3: Reduce airfield pavement dimensions to accommodate B-II standards; narrow runway to 75 feet from both edges to maintain the existing centerline location.
2. Alternative 4: Reduce airfield pavement dimensions to accommodate B-II standards; narrow runway to 75 feet from the eastern edge to minimize the Airport's footprint.

These alternatives are presented on **Figure 5-4** and **Figure 5-5.**

AIRFIELD ALTERNATIVES 5, 6 AND 7 - MEET ARC C-III DESIGN STANDARDS AND MAXMIZE AIRPORT POTENTIAL

Alternatives 5, 6 and 7 seek to maximize the Airport's future potential and, specifically, accommodate the future design aircraft (Gulfstream V) which already operates at the Airport frequently[2]. In order to do so, these involve improvements and configuration changes to accommodate aircraft within Aircraft Approach Category C (approach speeds 121 knots or more but less than 141 knots) and Airplane Design Group III (aircraft with wingspans up to 79 feet but less than 118 feet and tail heights up to 30 feet but less than 45 feet). The three alternatives are described below:

1. Alternative 5: Shift the runway east in order to meet the FAA design standard for runway centerline to taxiway centerline distance (400 feet; the Airport's current distance fluctuates between 285 and 292.5 feet).
2. Alternative 6: Shift the taxiway west in order to meet the FAA design standard for runway centerline to taxiway centerline distance (400 feet; the Airport's current distance fluctuates between 285 and 292.5 feet).
3. Alternative 7: Shift the runway east and the taxiway west (i.e., splitting the required distance) in order to meet the FAA design standard for runway centerline to taxiway centerline distance (400 feet; the Airport's current distance fluctuates between 285 and 292.5 feet).

These alternatives are presented on **Figures 5-6, 5-7** and **5-8.**

[2] As noted in Section 2.05-4 of the Phase I Report, airport operations records indicated that the Gulfstream V makes up ten percent of the jet operations that filed flight plans at Lake Tahoe Airport.

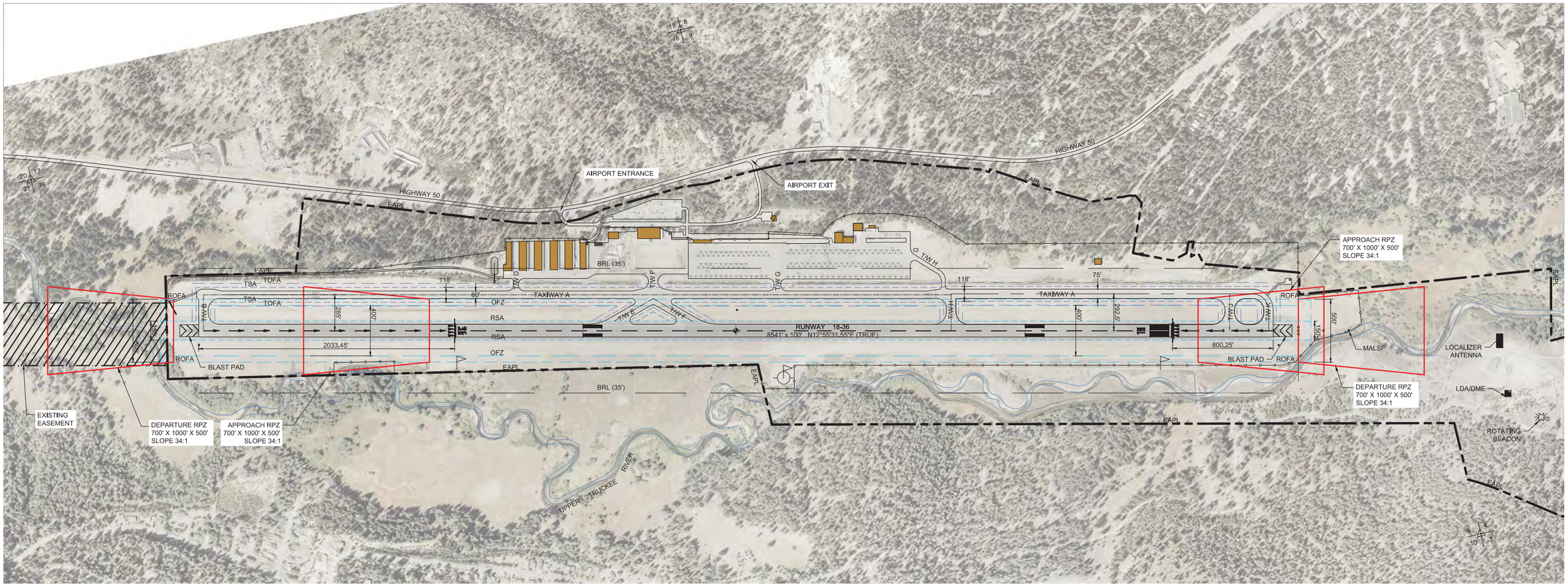

Figure 5-2 - Airfield Alternative 1: No Action

Scale: 1" = 400'

400' 400 0 400 800FT.

MAGNETIC NORTH

12° W (2014)

TRUE NORTH

LEGEND

SYMBOL	DESCRIPTION
EAPL	Existing Airport Property Line
FAPL	Future Airport Property Line
ARP	Airport Reference Point
RSA	Runway Safety Area (RSA)
ROFA	Runway Object Free Area (ROFA)
OFZ	Obstacle Free Zone (OFZ)
TSA	Taxiway Safety Area (TSA)
TOFA	Taxiway Object Free Area (TOFA)
	Runway Protection Zone (RPZ)
BRL (35')	Building Restriction Line (BRL 35')
	Airport Buildings
	Proposed Airport Pavement
	Pavement To Be Removed
	Fence
	Water Bodies, Streams
	Existing Avigation Eastment Area
	Proposed Aviation Easement Area
	Proposed Property Acquisition

C&S Engineers, Inc.
2020 Camino Del Rio North
Suite 1000
San Diego, California 92108
Phone: 619-296-9373
Fax: 619-296-5683
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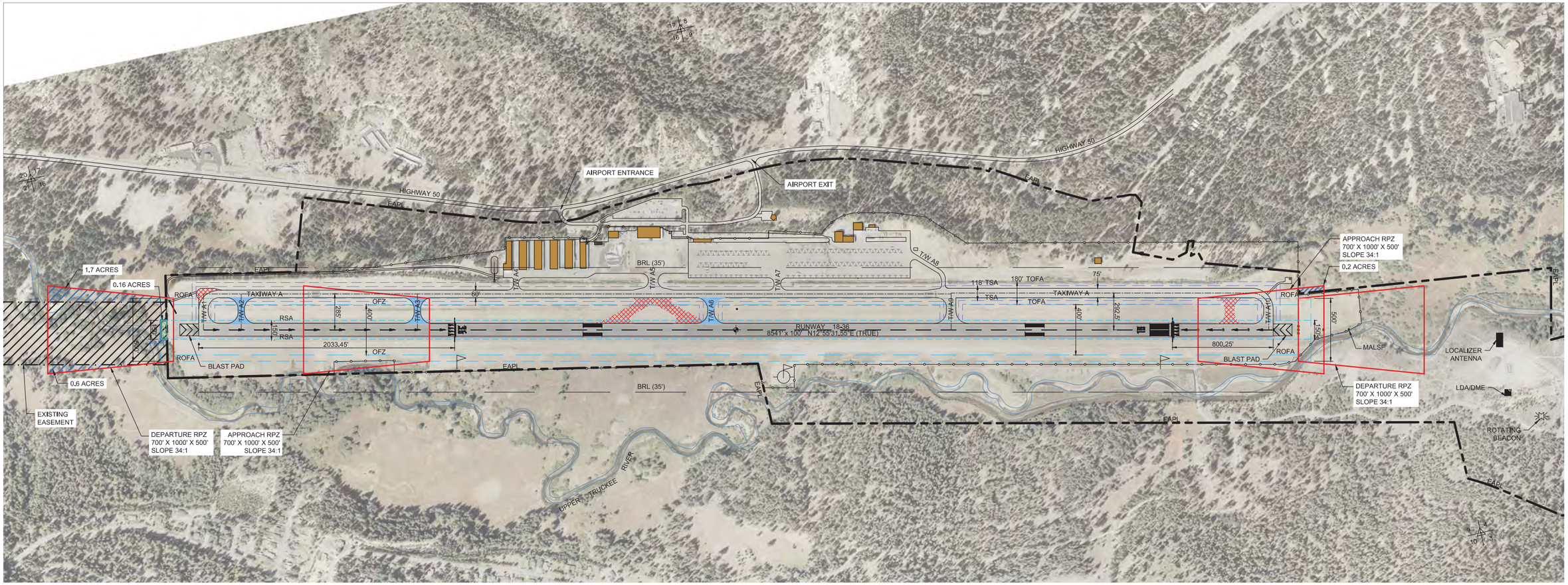

Figure 5-3 - Airfield Alternative 2

Scale: 1" = 400'

400 0 400 800FT.

400'

MAGNETIC NORTH

12° W (2014)

TRUE NORTH

LEGEND

SYMBOL	DESCRIPTION
FAPL	Existing Airport Property Line
FAPL	Future Airport Property Line
ARP	Airport Reference Point
RSA	Runway Safety Area (RSA)
ROFA	Runway Object Free Area (ROFA)
OFZ	Obstacle Free Zone (OFZ)
TSA	Taxiway Safety Area (TSA)
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Phone: 619-296-9373
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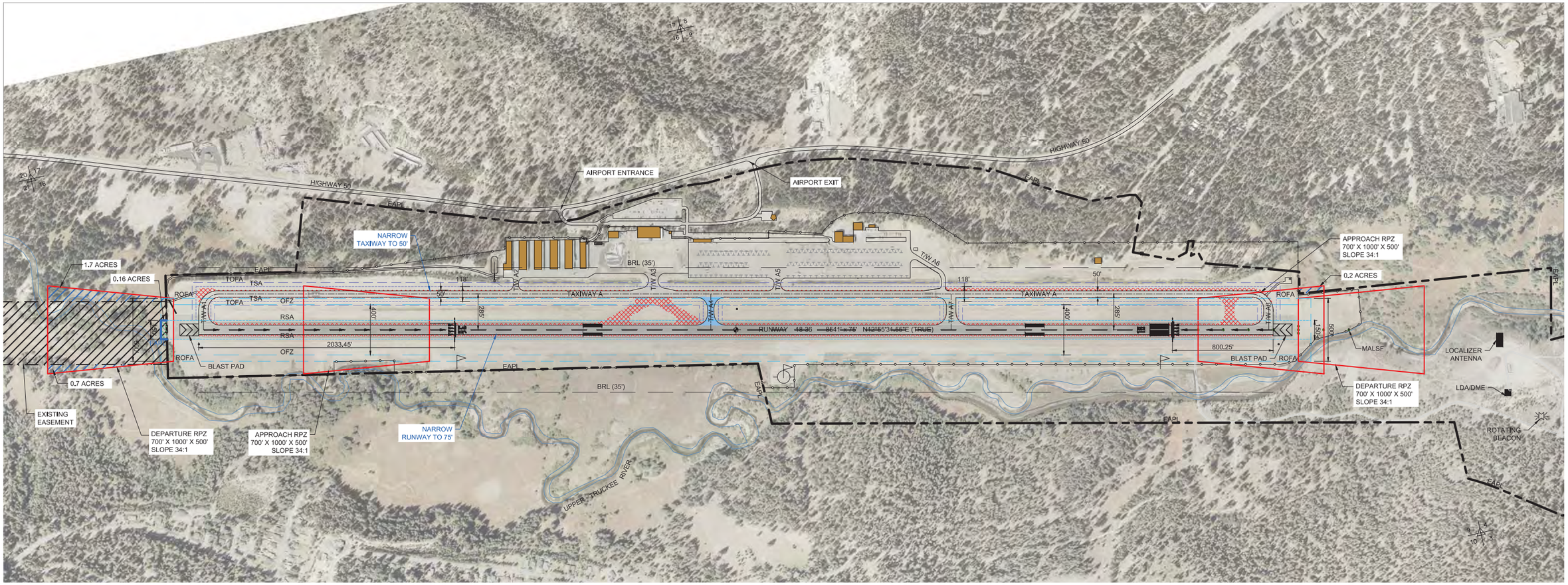

Figure 5-4 - Airfield Alternative 3

Scale: 1" = 400'

400 0 400 800FT.

400'

MAGNETIC NORTH

12° W (2014)

TRUE NORTH

LEGEND

SYMBOL	DESCRIPTION
EAPL	Existing Airport Property Line
FAPL	Future Airport Property Line
ARP	Airport Reference Point
RSA	Runway Safety Area (RSA)
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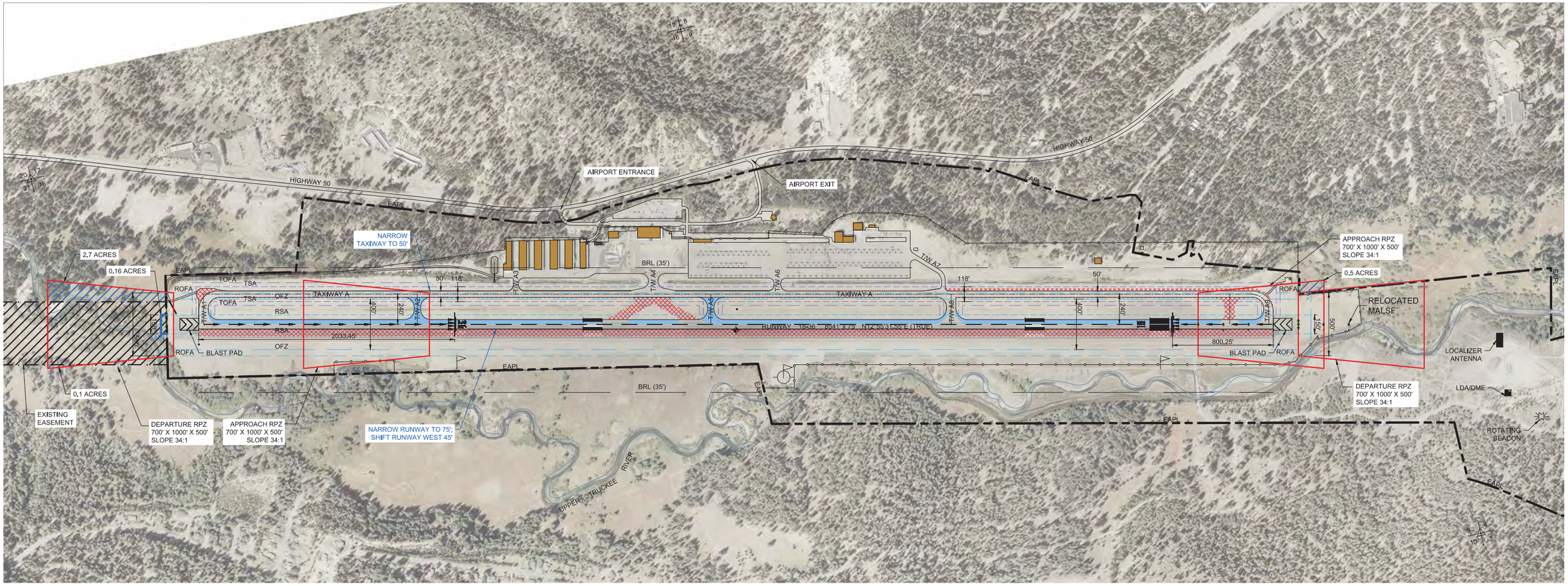

Figure 5-5 - Airfield Alternative 4

Scale: 1" = 400'

400' 400 0 400 800FT.

MAGNETIC NORTH

12° W (2014)

TRUE NORTH

LEGEND

SYMBOL	DESCRIPTION
EAPL	Existing Airport Property Line
FAPL	Future Airport Property Line
ARP	Airport Reference Point
RSA	Runway Safety Area (RSA)
ROFA	Runway Object Free Area (ROFA)
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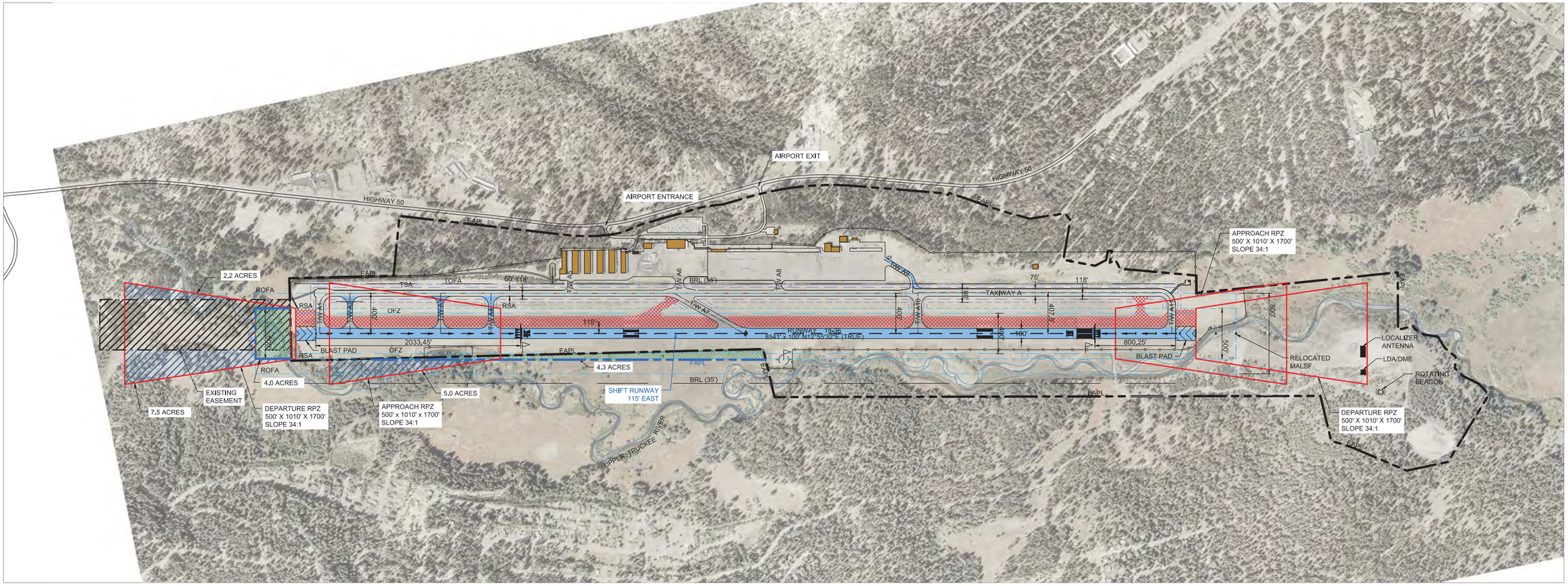

Figure 5-6 - Airfield Alternative 5

Scale: 1" = 500'

500' 500 0 500 1000FT.

MAGNETIC NORTH

12° W (2014)

TRUE NORTH

LEGEND

SYMBOL	DESCRIPTION
EAPL	Existing Airport Property Line
FAPL	Future Airport Property Line
ARP	Airport Reference Point
RSA	Runway Safety Area (RSA)
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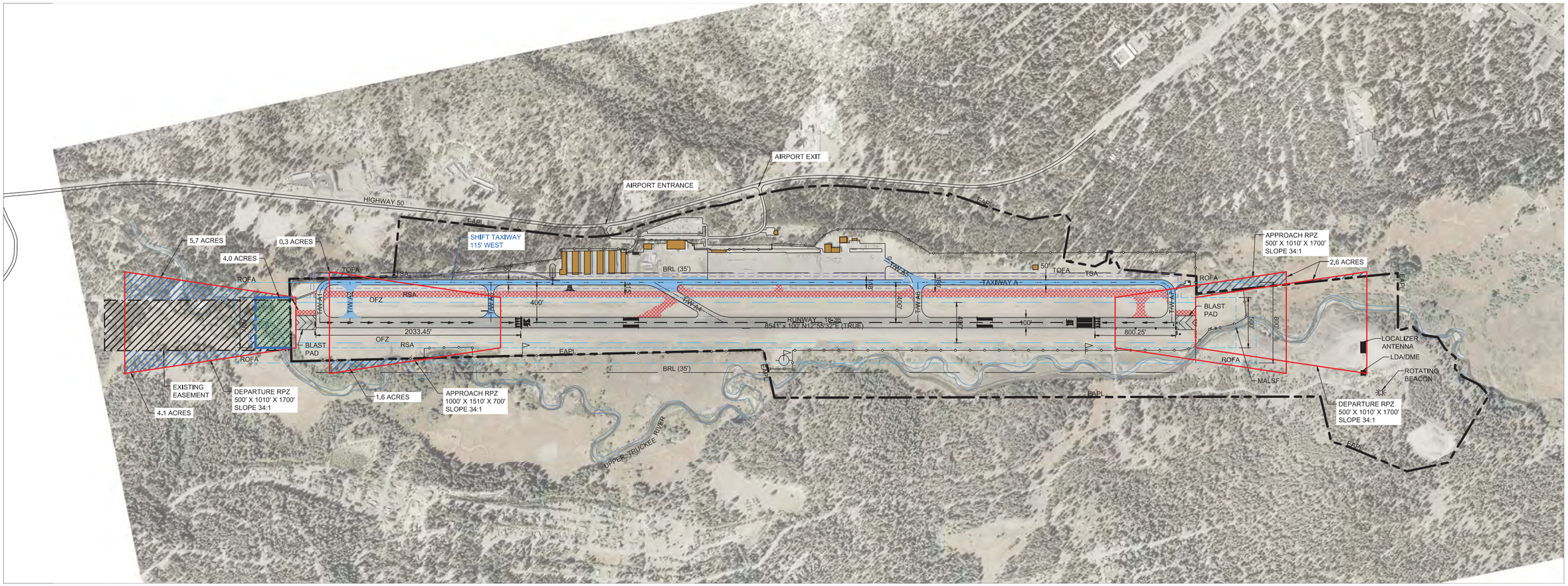

Figure 5-7 - Airfield Alternative 6

Scale: 1" = 500'

500 0 500 1000FT.

500'

MAGNETIC NORTH

12° W (2014)

TRUE NORTH

LEGEND

SYMBOL	DESCRIPTION
EAPL	Existing Airport Property Line
FAPL	Future Airport Property Line
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Fax: 619-296-5683
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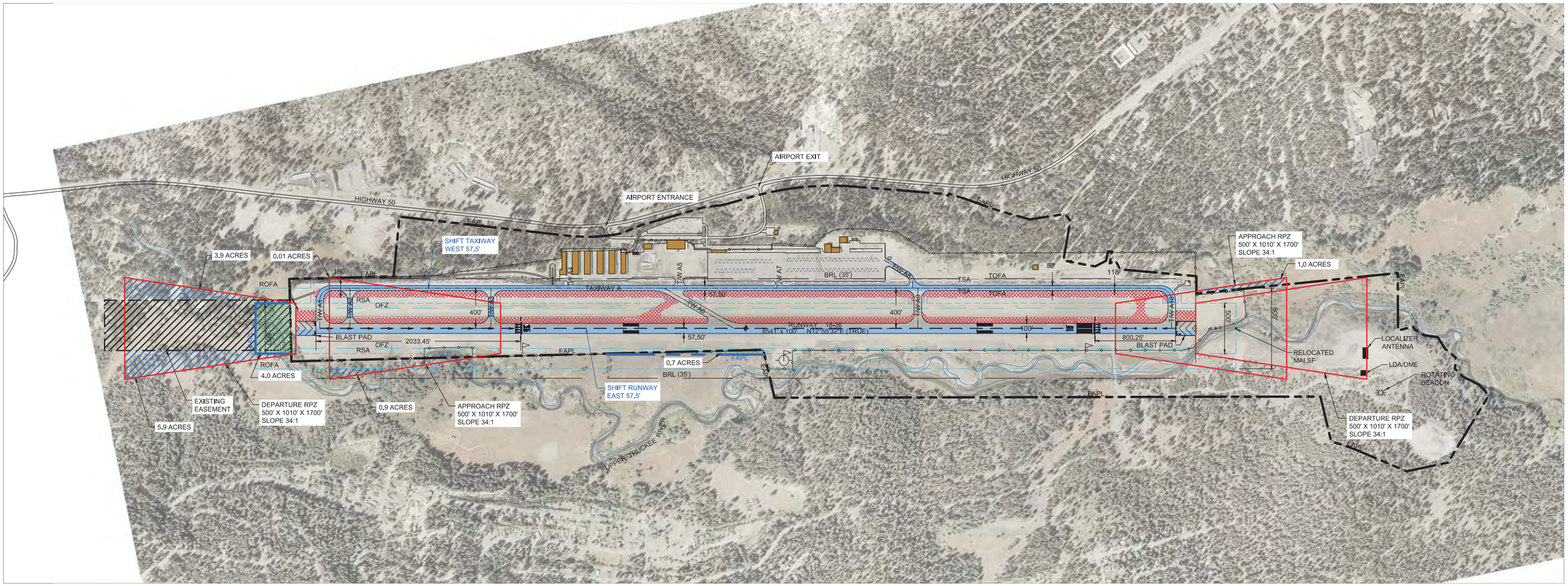

Figure 5-8 - Airfield Alternative 7

Scale: 1" = 500'

500 0 500 1000FT.
500'

MAGNETIC NORTH
12° W (2014)
TRUE NORTH

LEGEND

SYMBOL	DESCRIPTION
EAPL	Existing Airport Property Line
FAPL	Future Airport Property Line
ARP	Airport Reference Point
RSA	Runway Safety Area (RSA)
ROFA	Runway Object Free Area (ROFA)
OFZ	Obstacle Free Zone (OFZ)
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Suite 1000
San Diego, California 92108
Phone: 619-296-9373
Fax: 619-296-5683
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5.04 Associated Projects

A number of projects were identified that are necessary to meet each of the alternative's objectives and accommodate the associated users. These include efforts to address noncompliance issues for runway and taxiway separation distances, land acquisition and/or gaining control of land uses and activities on off-airport property located within FAA-defined safety surfaces, removal of identified obstructions, and the reconfiguration of taxiways that do not meet updated FAA design standards outlined under AC 150/5300-13A, *Airport Design*. Costs associated with design and construction of these projects are typically eligible for funding under the FAA Airport Improvement Program (AIP). Additional development cost details are provided in **Appendix H**.

With regard to proposed obstruction removal, an analysis of Federal Aviation Regulation (FAR) Part 77 and Threshold Siting Surface (TSS) obstructions was conducted as part of this master plan (see **Appendix A** included with Phase I Report). The aerial imagery used in this analysis was collected in 2009 as part of a separate project completed by the Federal Aviation Administration (FAA) with regards to aircraft approach procedures using satellite technology. Due to its spatial accuracy, which only met minimum FAA requirements, it is recommended that a new analysis be prepared with updated aerial imagery to confirm the location, height, and penetration of obstructions before mitigation measures are recommended or undertaken.

ASSOCIATED PROJECTS

Alternative 1 is the no-action alternative and therefore involves only continuation of ongoing maintenance activities and implementation of safety measures including obstruction removal or lighting. Associated projects for each of the alternatives are presented in **Table 5-1**:

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TABLE 5-1 ASSOCIATED PROJECTS

Project Type/Area	Specific Project	Purpose	Alternative						
			1	2	3	4	5	6	7
Runway Width	Reduce runway width from 100 feet (ft.) to 75 ft. by narrowing each edge and converting the pavement to meet 10-ft. shoulder requirements.	The Airport currently maintains pavement dimensions that exceed design standards for runways designated as B-II.			X				
	Reduce runway width to 75 ft. by narrowing the eastern edge and converting the pavement to meet 10-ft. shoulder requirements.					X			
Runway Shift	In conjunction with decreasing the runway width relocate the runway centerline west until it meets the standard 240-ft. separation distance to taxiway centerline.	The Airport currently maintains a separation distance that exceeds design standards for runways designated as B-II. Shifting the runway could provide additional vacant land to trade for ground cover or Stream Environmental Zone (SEZ) credits.				X			
	Shift the runway east 115 ft. Extend taxiway throats to new runway location.	The Airport currently does not maintain a runway centerline to taxiway centerline separation distance of 400 ft., which is necessary for runways designated as C-III.					X		
	In conjunction with a taxiway shift west (57.5 ft.), shift the runway east by 57.5 ft. Extend taxiway throats to the new Taxiway A and runway location.								X
Runway shoulders	Establish 20-ft.-wide shoulders along the runway.	Existing runway shoulders are 12.5 ft. on both sides. Shoulders would be constructed at a width of 20-ft. to meet C-III design standards.					X	X	X

Project Type/Area	Specific Project	Purpose	Alternative						
			1	2	3	4	5	6	7
Parallel Taxiway	Shift Taxiway A west 104 ft. Extend taxiway throats to the new Taxiway A location.	The Airport currently does not maintain a runway centerline to taxiway centerline separation distance of 400 ft., which is necessary for runways designated as C-III.						X	
	In conjunction with a runway shift east (57.5 ft.), shift Taxiway A west by 57.5 ft. Extend taxiway throats to the new Taxiway A and runway location.								X
Runway Lighting, Markings and NAVAIDs	Relocate runway and taxiway edge lighting, and navigational aids (NAVAIDs); update markings.	Lighting and markings will need to be adjusted and NAVAIDs relocated to meet FAA design standards and address the airfield shifts and/or new dimensions.			X	X	X	X	X
	Relocate the Medium Intensity Approach Lighting System with Sequenced Flashing Lights (MALSF) to align with the runway centerline.	The MALSF would have to be relocated to align with the shifted runway centerline.				X	X		X
Instrument Approach Procedures	Adjust non-precision approach procedures to Runway 18 and noise abatement departure procedures from Runway 36.	Due to the shifting of the runway centerline published approach and departure procedures would need to be revised and published by the FAA.				X	X		X
Taxiway Widths	Reduce Taxiway A width to 50 ft.	The Airport currently maintains pavement dimensions that exceed FAA design standards for aircraft within Taxiway Design Group (TDG) 3.			X	X			

Project Type/Area	Specific Project	Purpose	Alternative						
			1	2	3	4	5	6	7
RSA Improve-ments	Fill and grade or relocate a portion of Upper Truckee River.	Meeting C-III standards would expand the RSA over the Upper Truckee River. The FAA sets particular design standards for RSAs, including grading and drainage, that would require improvements be made to fill in the area. Although the use of declared distances, which the airport currently operates under, can be used to meet the required distances it is not the preferred method and all alternatives should be evaluated.					X	X	X
Runway Object Free Area (ROFA) Object Removal	Remove bushes/trees within the ROFA (0.01 ac.) on the approach end for Runway 36.	ROFA should be clear of all above-ground objects protruding above the nearest point of the Runway Safety Area (RSA).		X					
	Remove bushes/trees within the ROFA (0.30 ac.) on the approach end for Runway 18.				X	X			
	When considering C-III standards there are multiple penetrations of the ROFA on either end and east of the runway, requiring removal of approximately 20 ac. of trees and brush. The Upper Truckee River is also included within the ROFA.						X		
	Remove bushes/trees within the ROFA (14.5 ac.) on either end and east of the runway.							X	
	Remove bushes/trees within the ROFA (17.25 ac.) on either end and east of the runway.								X

Project Type/Area	Specific Project	Purpose	Alternative						
			1	2	3	4	5	6	7
Easement or Land Acquisition	Acquire or obtain avigation easements over areas of the Runway Protection Zones (RPZs) that extend off Airport (2.33 acres [ac.] for Runway 18 and 0.19 ac. for Runway 36). Acquire land (0.56 ac.) in the RSA on the Runway 36 approach end.	The RPZ's function is to enhance the protection of people and property on the ground. This is achieved through airport owner control preferably exercised through the acquisition of sufficient property interest in the RPZ and includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities. The RSA is intended to reduce the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway. The FAA sets particular design standards for these areas that the airport sponsor must maintain.		X					
	Acquire or obtain avigation easements over areas of the RPZs that extend off Airport (0.19 ac. for Runway 18 and 2.33 ac. for Runway 36). Acquire land (0.16 ac.) in the RSA on the Runway 36 approach end.				X				
	Acquire/obtain avigation easements over areas of the RPZs that extend off Airport (0.39 ac. for Runway 18 and 2.77 ac. for Runway 36). Acquire land (0.16 ac.) in the RSA on the Runway 36 approach end.					X			
	Acquire/obtain avigation easements over areas of the RPZs that extend off Airport (0.03 ac. for Runway 18 and 10.47 ac. for Runway 36). Acquire land (3.95 ac.) in the RSA on the Runway 36 approach end.						X		
	Acquire/obtain avigation easements over areas of the RPZs that extend off Airport (2.59 ac. for Runway 18 and 11.75 ac. for Runway 36). Acquire land (3.95 ac.) in the RSA on the Runway 36 approach end, as well as land within the ROFA.							X	

Project Type/Area	Specific Project	Purpose	Alternative						
			1	2	3	4	5	6	7
	Acquire/obtain avigation easements over areas of the RPZs that extend off Airport (0.95 ac. for Runway 18 and 10.83 ac. for Runway 36). Acquire land (3.95 ac.) in the RSA on the Runway 36 approach end, as well as land within the ROFA.								X
Ob-struction Removal	As noted an updated analysis should be prepared to confirm the location and disposition of the obstructions.	Penetrations to the FAR Part 77 and TSS surfaces should be cleared or mitigated to increase the safety of the airport operating environment.	X	X	X	X	X	X	X
Taxiway system reconfig-uration	Remove acute angled (high-speed) taxiways (currently Taxiways E and F) and construct right angled taxiway (Taxiway A5) north of Taxiway F.	The current configuration of Taxiways E and F does not meet FAA design standards as they exceed three nodes or decision points for the pilot to consider. A 90-degree turn would provide pilots with the optimal situational awareness as prescribed by AC 150/5300-13A.		X	X	X			
	Close acute angled (high-speed) taxiway (currently Taxiway E).	The current configuration of Taxiways E and F does not meet FAA design standards as they exceed three nodes or decision points for the pilot to consider. The northern acute angled (high-speed) taxiway (Taxiway A5) would be maintained for arrivals on Runway 18. The distance between the Runway 36 landing threshold and Taxiway E does not provide adequate distance (approximately 1,100 ft.) to be utilized consistently and improve airport operational efficiency.					X	X	X

Project Type/Area	Specific Project	Purpose	Alternative						
			1	2	3	4	5	6	7
Taxiway Removal	Remove bypass taxiway (currently Taxiway J).	Over 80% of departure procedures at Airport take place on Runway 36. Taxiway J is not necessary to provide enhanced traffic efficiency.		X	X	X			
Construct New Taxiway	Construct Taxiway A2 approximately 6,500 ft. from the landing threshold of Runway 18.	The new exit taxiway would increase efficient flow of traffic. The proposed distance to threshold would provide utilization percentages at 100% for small single engine and twin engine aircraft.[3]		X		X	X		
Taxiway Nomen-clature	Rename taxiway system and update markings/signage.	Taxiway nomenclature should be updated to meet AC 150/5340-18F and associated Engineering Brief guidelines.		X	X	X	X	X	X
Holding Apron/Pad	Remove excess pavement located on the south end of Taxiway A and construct a bypass taxiway.	The excess pavement located on the end of Taxiway A does not meet design standards for the proper layout of an aircraft holding bay and should be removed to prevent pilot confusion. A bypass taxiway could serve a similar purpose.		X	X	X	X	X	X
Blast Pads	Remove excess pavement on blast pads to meet design standards of 95 ft. wide and 150 ft. long.	The Airport currently maintains blast pad dimensions that exceed FAA design standards for runways designated as ARC B-II.			X	X			
	Expand blast pad width to 150 ft.	The blast pads do not currently meet dimensional standards for a C-III runway.					X	X	X

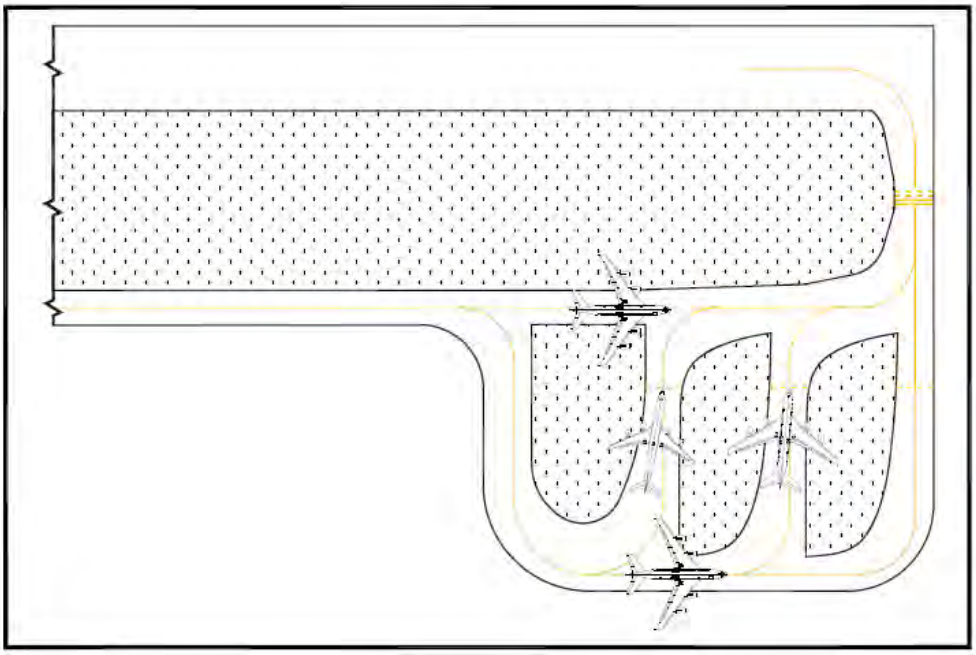
[3] According to AC 15/5300-13A, Table 4-13.

HOLDING BAY/BYPASS TAXIWAY

As noted above, the excess pavement located on the end of Taxiway A does not meet design standards for the proper layout of an aircraft holding bay and should be removed to prevent pilot confusion. Holding bays are designed to allow aircraft to bypass one another to taxi to the runway, though current activity levels do not deem this necessary at the Airport. However, according to the City this pavement is frequently used for these purposes due to the operational characteristics of the Airport. Due to the surrounding terrain aircraft typically depart on Runway 36 and arrive on Runway 18. During peak times this can create operational constraints as aircraft awaiting to depart Runway 36 have to hold on the apron until arriving aircraft have cleared Taxiway A or hold on the existing excess pavement that currently does not meet design standards.

The City may wish to consider alternative options that meet FAA design standards including a standard holding bay or bypass taxiway. Due to the property boundary restrictions a holding bay meeting FAA standards as shown in **Figure 5-9** would only accommodate small general aviation aircraft and would require grading and clearing of bushes/trees. A bypass taxiway would serve a similar purpose and could be constructed with less limitations to accommodate larger aircraft.

FIGURE 5-9 TYPICAL HOLDING BAY CONFIGURATION



Source: FAA Advisory Circular 150/5300-13A, Figure 4-26

CLEARWAY ESTABLISHMENT

Although a runway extension is not feasible, it may be possible to establish a clearway for the completion of takeoff operations of jet aircraft. A clearway increases the allowable aircraft operating takeoff weight without increasing runway length. A clearway is an area beyond the end of the runway that has been cleared of non-frangible obstacles but does not have to be suitable for stopping aircraft in the event of an aborted takeoff. The 2007 Draft Airport Layout Plan (ALP) proposed a clearway at the end of Runway 36, thus increasing the length available for takeoff distance available to 9,541 feet. The additional length would allow some aircraft types to lessen the weight penalty they currently take on departures from the Airport. The proposed clearway measured 500 by 1,000 feet. Because this could be incorporated into any of the runway and taxiway system alternatives, the clearway was omitted from the alternatives evaluation and will be considered in the development planning phase.

THRESHOLD DISPLACEMENT

Both runway ends at the Airport currently have displaced thresholds. The displacements are necessary to avoid obstacles that would penetrate the Airport's 20:1[4] Threshold Siting Surface (TSS) from each runway end. Runway 18 falls within Category 5 for the TSS surfaces meaning that it is meant to support instrument night operations serving greater than approach Category B aircraft. Runway 36 falls within Category 3 for the TSS surfaces meaning that it is meant to support large airplanes under visual operations (day or night) or instrument operations with visibility minimums equal to or greater than one mile during daytime only.

According to information published in the Airport Master Record, brush located 450 feet from the runway end, along the Upper Truckee River, have caused the displacement to Runway 18 of 800 feet. Runway 36 currently has a displaced threshold located 2,033.45 feet from the runway end created by the penetration of trees located 5,700 feet from the runway end.

Using the 2009 aerial imagery that was collected by the FAA an analysis of the TSS surface was prepared. That analysis identified different obstacles than what has been reported in the Airport Master Record. The TSS analysis identified the following obstacles based on the current displaced threshold location:

- Runway 18 – Brush located 400 feet west of the runway and 332 feet from the runway end that penetrate the TSS from the current displaced threshold location at 6.08 feet.
- Runway 36 – No obstacles to the TSS were identified from the current threshold location. Therefore, the TSS was analyzed from the runway end which showed

[4] 20:1 slope rises one unit vertically for every 20 units horizontally.

that trees located 6,504 feet from the runway end would penetrate the TSS by 56.12 feet.

Similar to the recommendation made with regards to obstructions that penetrate the Part 77 imaginary surfaces, a new analysis should be prepared with updated aerial imagery to confirm the location, height, and penetration of the obstacles before recommendations are made. Due to TSS analysis's reliance on data that does not have the optimal spatial accuracy recommendations on a realignment of the displaced threshold locations will not be made as part of this master plan process.

5.05 Alternatives Evaluation Criteria

Consistent with the integration of sustainability into this master planning process, the alternatives are evaluated according to the following criteria defined by the Airports Council International – North America as ensuring **E**conomic viability, **O**perational efficiency, **N**atural resource conservation and **S**ocial responsibility (EONS). It is important to keep in mind the sustainability goals identified in Phase 1:

Economic Viability

- **Goal 1: Become as self-sufficient as possible**
  - *Sub-Goal 1a*: Increase revenue
  - *Sub-Goal 1b*: Reduce resource consumption
  - *Sub-Goal 1c*: Minimize maintenance and operation costs

Operational Efficiency

- **Goal 2: Enhance aircraft capabilities**
- **Goal 3: Increase connectivity with the transportation system including alternative transportation**
- **Goal 4: Increase efficiency of Airport management / operation**

Natural Resource Conservation

- **Goal 5: Protect wetlands, lake clarity, and the Stream Environmental Zone (SEZ)**
- **Goal 6: Minimize air quality and noise impacts**

Social Responsibility

- **Goal 7: Ensure land use compatibility**
  - *Sub-Goal 7a: Minimize noise impacts (see Goal 6)*
- **Goal 8: Provide community benefits**

Relevant criteria that will help the Airport achieve these goals have been italicized below. A detailed matrix describing the evaluation criteria and how each strategy was assessed is provided in **Appendix H**:

ECONOMIC VIABILITY

The typical master planning alternatives analysis evaluates development costs associated with the various alternatives. However, in assessing the Airport's economic viability it is important to consider more than the initial construction costs in order to understand an alternative's impacts. Therefore, the evaluation criteria include:

- Economic impact to the community (associated with both direct and indirect impacts from the Airport's operation)
- *Development costs (order-of-magnitude costs)*
- *Operations and maintenance costs*
- *Revenue generation*

Though not specific criterion, this analysis will also consider economic trade-offs (i.e., any impacts resulting from investments in the Airport that take away from investments elsewhere) and the implications of existing or potential environmental credits.

OPERATIONAL EFFICIENCY

Operational efficiency is a key element of airport sustainability and an important addition to the widely accepted triple bottom line, which includes social responsibility, economics, and environmental stewardship (also referred to as the Three Ps for People, Profit, and Planet). An airport's success is highly dependent on its ability to operate efficiently while maintaining a safe environment. Therefore, this is included as a criterion of the alternatives analysis and considers:

- Airport design standards (ability to meet FAA design standards and ensure a safe operating environment)
- Constructability complexity (timeframe, availability of technology, and available support/partners for implementation)

- *Ownership/management of facility (impacts on management responsibilities)*
- *Impact on operations (operational impacts to pilots associated with the alternatives)*

NATURAL RESOURCE CONSERVATION

In evaluating each alternative's impact on the natural environment, the resources with potential to be impacted (see Chapter 2) were considered including:

- *Air Quality (anticipated change in emissions associated with airport activity)*
- *Wetlands and SEZ (impacts to existing wetlands and SEZ on the property)*
- *Water Quality (impacts on lake clarity)*
- *Land Use Compatibility*
- Fish, Wildlife & Plants (potential effect on fish, wildlife and plants, particularly as it relates to changes in habitat), and
- Construction impacts (air quality, noise, etc.)
- Floodplains (impacts to existing floodplains)

Alternatives with fewer impacts to the environment are considered preferable over those with greater impacts.

SOCIAL RESPONSIBILITY

Social responsibility relates to an alternative's impacts on the Airport's users and surrounding community and was evaluated according to:

- Community benefits/amenities/investment
- Emergency services (ability of Airport to facilitate these)
- *Connectivity with surrounding community and transportation systems*

Land use compatibility is considered covered under the Natural Resources Conservation criteria, which includes air quality and noise.

5.06 Alternatives Evaluation Summary

The following evaluation criteria were developed to highlight the differences between alternatives as well as the challenges and benefits of each. A detailed description of the evaluation criteria and how each alternative was assessed is provided in the Detailed Alternatives Evaluation Matrix in **Appendix H**. Based on the qualitative and quantitative assessment provided in the Detailed Alternatives Evaluation Matrix, each evaluation criteria was assigned a comparative rating. Similar to the Consumer Reports system, the rating system uses a modified circle to visually communicate the qualitative assessment. The ratings correlate to a simplified non-weighted score:

TABLE 5-2 ALTERNATIVE EVALUATION/SCORING

Rating	Evaluation of Impact	Score
●	Positive	2
◑	Neutral	1
○	Negative	0

Source: C&S Engineers, Inc.

Alternatives with a higher summary score have an overall positive impact based on the EONS evaluation criteria. The alternatives' evaluation scoring can be found in **Table 5-3** and a summary is provided in **Table 5-4**. As shown, Alternatives 1 and 2 received the highest summary score.

TABLE 5-3 ALTERNATIVE RANKING

Ranking	Summary Score	Alternative
First (tie)	19	1: No Action
First (tie)	19	2: Meet ARC B-II and Maintain Flexibility
Second	18	4: Meet ARC B-II and Reduce Airport Footprint (runway centerline shift)
Third	17	3: Meet ARC B-II and Reduce Airport Footprint
Fourth (tie)	13	5: Meet ARC C-III and Shift Runway East
Fourth (tie)	13	6: Meet ARC C-III and Shift Taxiway West
Fourth (tie)	13	7: Meet ARC C-III and Shift Runway/Taxiway

Source: C&S Engineers, Inc.

TABLE 5-4 ALTERNATIVES EVALUATION SUMMARY

● 2 - Positive
◐ 1 - Neutral
○ 0 - Negative

	Runway and Taxiway System Alternatives	1: No Action	2	3	4	5	6	7
		No changes to airfield configuration or infrastructure.	Maintain existing airfield pavement dimensions and configuration but decrease sizes of safety areas and required separation distances to meet B-II standards	Reduce airfield pavement dimensions to accommodate B-II standards; narrow runway from both edges to maintain the existing centerline location.	Reduce airfield pavement dimensions to accommodate B-II standards; narrow runway from the eastern edge to minimize the Airport's footprint. Relocate runway centerline to meet runway centerline to parallel taxiway centerline separation standards.	Maximize future potential and accommodate future design aircraft (Gulfstream V), meeting C-III standards. Shift the runway east to meet standard for runway centerline to taxiway centerline distance.	Maximize future potential and accommodate future design aircraft (Gulfstream V), meeting C-III standards. Shift the taxiway west in order to meet standard for runway centerline to taxiway centerline distance.	Maximize future potential and accommodate future design aircraft (Gulfstream V), meeting C-III standards. Shift the runway east and the taxiway west (i.e., splitting the required distance) in order to meet standard for runway centerline to taxiway centerline distance.
ECONOMIC VIABILITY								
Economic Impact to the Community	Associated with both direct and indirect impacts from the Airport's operation.	◐	◐	○	○	●	●	●
Development Costs	Order-of-magnitude costs.	●	◐	◐	○	○	○	○
Operations and maintenance costs	Considers annual cost to operate and maintain the airport.	◐	◐	●	●	○	○	○
Revenue generation	Considers the potential revenue generation from an increase in airport users.	◐	◐	○	○	●	●	●
OPERATIONAL EFFICIENCY								
Airport design standards	Ability to meet FAA design standards and ensure a safe and efficient operating environment.	○	◐	◐	◐	●	●	●
Constructability complexity	Timeframe, availability of technology, and available support/partners for implementation.	◐	◐	○	○	○	○	○
Impact on operations	Operational impacts to pilots associated with the alternatives.	◐	◐	○	○	●	●	●
Future flexibility	Ability to meet future demand if commercial service returns or other services needed.	◐	◐	○	○	●	●	●
NATURAL RESOURCE CONSERVATION								
Air Quality	Anticipated change in emissions associated with airport activity.	◐	◐	◐	●	○	○	○
Wetlands	Impacts to existing wetlands on the property.	◐	◐	●	●	○	○	○
Water Quality, Lake Clarity and the Stream Environmental Zone (SEZ)	Impacts on water quality, lake clarity and the Stream Environmental Zone (SEZ).	◐	◐	●	●	○	○	○
Land Use Compatibility	Considers the project alternatives potential effect on land use compatibility (safety and noise).	◐	●	●	●	○	○	○
Fish, Wildlife & Plants	Potential effect on fish, wildlife and plants, particularly as it relates to changes in habitat.	◐	◐	◐	●	○	○	○
Construction impacts	Air quality, noise, etc.	●	◐	○	○	○	○	○
Floodplains	Impacts to existing floodplains.	◐	◐	●	●	○	○	○
SOCIAL RESPONSIBILITY								
Community benefits/amenities/ investment	Considers the project alternative's potential effect on current and future community benefits/amenities.	◐	◐	◐	◐	◐	◐	◐
Emergency services	Ability of Airport to facilitate emergency services.	◐	◐	◐	◐	◐	◐	◐
Connectivity with surrounding community and transportation systems	Considers the alternative's ability to include other modes of transportation.	◐	◐	◐	◐	◐	◐	◐
SUMMARY SCORE								
SUMMARY SCORE		19	19	17	18	13	13	13
RANKING								
RANKING		2	2	1	3	4	4	4

5.07 Landside and Select Airside Facilities Alternatives

Following the selection of the preferred airfield alternative, potential development scenarios for the landside and select airside facilities were evaluated based on the forecasted demand documented in Chapter 3 and the facility requirements documented in Chapter 4. The primary functions of these facilities include aircraft storage, aircraft parking, terminal facilities, and automobile parking and airport access. Careful consideration was also given to parcels of land that could be considered for non-aviation related uses that can provide additional revenue support to the Airport and support economic development for the region. Three alternatives, in addition to the No-Action, have been presented and are further elaborated on in this chapter.

- Alternative A – No action taken.
- Alternative B – Maintain and consolidate facilities to minimize the Airport's footprint.
- Alternative C – Maintain flexibility to accommodate future growth potential.
- Alternative D – Focus on growth potential that seeks to maximize Airport revenues and optimize available land assets.

These alternatives address a number of facilities and opportunities for the Airport, discussed below.

LANDSIDE FACILITIES

Landside facilities at Lake Tahoe Airport consist of those facilities necessary for the processing of passengers and ground transportation vehicles. They include the airport terminal, parking lot, and Airport Road. In addition, vacant land located on airport property that exceeds the space needed for the forecasted aviation demand was evaluated to determine if it could be used for non-aeronautical purposes such as commercial, industrial, or manufacturing development. There may also be opportunities for providing community amenities such as a dog park or outdoor recreation/concert venue. For the purposes of this evaluation these areas were defined as property areas 1, 2 and 3.

- **Property Area 1** – Includes 17.8 acres of vacant land located east of Highway 50 and south of Airport Road (see image below). The area extends south from Airport Road to the edge of the airport property line and west to the airport perimeter road. The California Department of Transportation (Caltrans) maintains a 50-foot buffer/easement along Highway 50. The property is primarily forested land that has elevation changes that slope from 6,280 Mean Sea Level (MSL) from the western side of the airport property line to 6,260 MSL as you move east toward the airport perimeter road.

  Property Area 1 has TRPA land coverage designations of 1B – Stream Environmental Zone (SEZ) and 5 which allows for 25-percent base coverage. The SEZ, located on the area's eastern side, and elevation changes make development for aeronautical purposes difficult as it would require tying into the existing taxiway system. Previous cultural surveys have also indicated the location of an archeological site within the area and Highway 50 is designated as a scenic highway which could potentially limit development. All development within Property Area 1 would be reviewed by the Airport Land Use Commission (ALUC) to determine compatibility with airport operations.

- **Property Area 2** – Includes 4.3 acres of vacant land located east of Highway 50 and is bound within Airport Road (see image below). The property is primarily forested land that has sharp elevation changes moving from 6,350 MSL on the western side of the airport property line to 6,280 MSL as you move east toward Airport Road. The area has TRPA land coverage designations of 5 allowing for 25-percent base coverage. Highway 50 is designated as a scenic highway which could potentially limit development within the area.

  The areas location, west of Airport Road, and elevation changes make development for aeronautical purposes difficult as it would require tying into the existing taxiway system. Major improvements to the internal roadway system would have to be completed to provide access to aircraft. All development within Property Area 2 would be reviewed by the ALUC to determine compatibility with airport operations.

- **Property Area 3** – Includes 30.1 acres of vacant land located east of Highway 50 and north of Airport Road (see image below). The area extends north from Airport Road to Kyburz Avenue and Melba Drive. The property is primarily forested land that has elevation changes that slope from 6,300 MSL from the western side of the airport property line to 6,260 MSL as you move east toward the airfield. The area does not include the portion of property in which the now-closed Air Traffic Control Tower (ATCT) resides.

  This area has TRPA land coverage designations of 1B and 5. The SEZ is predominantly located on the area's southern side, between Highway 50 and the northern apron area. The northern portion of the area has been designated as 5 allowing for potential development. Highway 50 is designated as a scenic highway which could potentially limit development within the area. All development within Property Area 3 would be reviewed by the ALUC to determine compatibility with airport operations.

At this time the City does not have the approval to use airport property for non-aeronautical purposes. Federal law obligates an airport sponsor to use all property shown on an Airport Layout Plan (ALP) and/or Exhibit A – Airport Property Map for public airport purposes. A separate request justifying the use of airport property for non-aeronautical uses is currently being undertaken by the City for portions of Property Area 3 as it cannot be used for aeronautical purposes. A release is required even if the airport desires to continue to own the land and only lease the land for development. The obligations relate to the use of the land and revenue generated from it.

Regardless of each area's development potential the City should maintain ownership of the property to eliminate encroachment of non-compatible land uses. Although additional vacant land exists east of Runway 18-36 along the eastern boundary of the airport property line, it has limited access and lies within in the SEZ making it unavailable for future development. Therefore this land was not evaluated in the alternatives analysis.

AIRSIDE FACILITIES

Airside facilities at Lake Tahoe consist of those facilities necessary for the operation of aircraft and maintenance of the Airport. For the purposes of this evaluation, they include aircraft hangars, apron areas, and other support/adjacent facilities located within the airport perimeter fencing.

Self-service aircraft fueling station

Although capacity exists to meet the forecasted demand for aircraft fueling the location of the fuel farm combined with the practice of dispensing fuel from mobile tankers is not the preferred method of distribution. Despite the flexibility offered by fueling trucks their operation can be expensive due to an array of safety equipment features they must include and personnel needed to deliver fuel. The construction of a self-service aircraft fueling station would provide access to pilots 24 hours a day, lowers personnel and fuel vehicle costs (currently managed by the FBO), and reduces the impacts of spills by containing them in one area. This would also provide a sustainability benefit; by removing the need for mobile fueling trucks fuel demand and air emissions would in-turn decrease. Because the existing fuel facility is in good condition, it may be possible to maintain this and construct a limited-capacity self-service station that can be replenished as needed from the existing facility. This would also reduce the amount of space needed on the apron area. Below is an example of a self-fueling facility that could be constructed at the Airport.

Source: C&S Engineers, Inc.

Aircraft wash rack

Aircraft wash facilities (wash racks) provide aircraft owners a common area with access to water to wash and clean their aircraft. A wash rack also allows the Airport to address and meet any required environmental regulations with regard to wash water. A wash rack can collect the wash water, which can contain cleaning chemicals and aircraft fuel and oil. Treatment can range from a fuel trap and oil/water separator to complete collection and treatment at a sanitary sewer treatment plant or similar facility. Restricting the number of areas for washing reduces the risk of discharging wash water into the environment.

The Airport does not currently allow washing with water, only dry washing is approved by the City. There is no designated wash rack and aircraft owners could benefit from its construction/installation.

Conventional hangars (large aircraft)

Based on a review of available hangar storage, capacity exists at the Airport to meet aircraft storage requirements for small single-engine and twin-engine GA aircraft for the 20-year planning period. These aircraft types are mainly accommodated in the rows of box and T-hangars located south of the terminal owned by the City.

The mix of aircraft using Lake Tahoe Airport is expected to continue to include business class jet aircraft, which have larger wingspans. It is therefore anticipated that there will be demand for storage for these aircraft. Currently, storage does not exist to hangar the existing design aircraft (Dassault Falcon 2000) or the future design aircraft (Gulfstream V). Although these represent transient operations, i.e., not by aircraft based at the Airport, operators of these types of aircraft often prefer to park their aircraft in a hangar, even when visiting airports other than their base. Example photos of corporate aircraft hangars and accompanying facilities are provided below to depict possible options for the Airport.

Source: C&S Engineers, Inc.

The larger the hangar, the more flexibility there is with the types and number of aircraft that can be stored in that hangar. A 120-foot-by-120-foot hangar would have the room to store one Gulfstream V and two smaller business jets (e.g., Embraer Phenom 100). If the hangar is to be used for corporate, charter, or FBO purposes, office space may need to be provided. This space can either be an integral part of the hangar or constructed as an addition to the exterior of the hangar. A typical external addition would be a 25- to 30-foot-wide addition to the length of the hangar. This space could be added to either the side of the hangar, the back, or both if the space is needed. The amount of space needed and the functions of the space will depend on the function of the hangar and the needs of the tenants.

Source: C&S Engineers, Inc.

Additional or expanded FBO and/or Specialized Aviation Service Operation (SASO)[5] services could also support the goal of attracting additional corporate aviation to the Airport. The City should work with the current FBO to review and update existing facilities.

Source: C&S Engineers, Inc.

[5] A SASO does not provide aircraft fueling.

Helicopter parking

Lake Tahoe Airport currently accommodates helicopter operations, a large majority of which are related to emergency services. However, there is limited dedicated helicopter parking on the apron areas and, as a result, helicopters often have to hover adjacent to fixed-wing aircraft in order to arrive at their intended landing destination. The alternatives considered the designation of segregated parking areas for helicopters from fixed-wing aircraft, which is desirable. The proposed helicopter parking area is not a heliport, which is used by rotorcraft for takeoff and landing operations and requires a more extensive analysis.

Sustainability initiatives

While a number of sustainability initiatives can be easily incorporated into any alternative and therefore are not pertinent to the evaluation process, there are several that would be contingent upon the alternative selected. These are described below and were considered in the alternatives development.

1. Improved bicycle storage and/or rentals (currently provided through the FBO) to encourage alternative transportation methods.
2. Alternative fueling stations available to the public – The Airport currently has a Compressed Natural Gas (CNG) station but it is infrequently used. This could be marketed to the public and potentially coupled with an electric vehicle charging station to reduce air emissions and fuel use.
3. Pedestrian walking and bike paths – The current access road does not have a designated walking or bike lane, which would encourage alternative transportation modes if possible to connect into existing routes near the Airport. In addition, the development of a walking or bike path on airport property would provide a social benefit to the community.
4. Park and Ride to encourage reduced single-occupancy vehicle travel. This could be incorporated into a broader transit center that has been considered in the past.
5. Renewable energy generation such as solar photovoltaics.
6. Continued and expanded use of the terminal/administration building for office space, City Council Chambers and other meetings – With commercial service deemed infeasible at this time, the existing building is used for office space and City Council Chambers. The available space could also be made available to the public for other meetings and events for a small fee.
7. Establishment of a dog park that is available to the public (see previous discussion).
8. Establish outdoor recreation/concert venue.

ALTERNATIVE A – NO ACTION

This alternative involves taking no action to address the issues described in the previous chapters and is considered for comparison purposes. The Airport would maintain its current configuration and operations. Refer to **Figure 5-10**.

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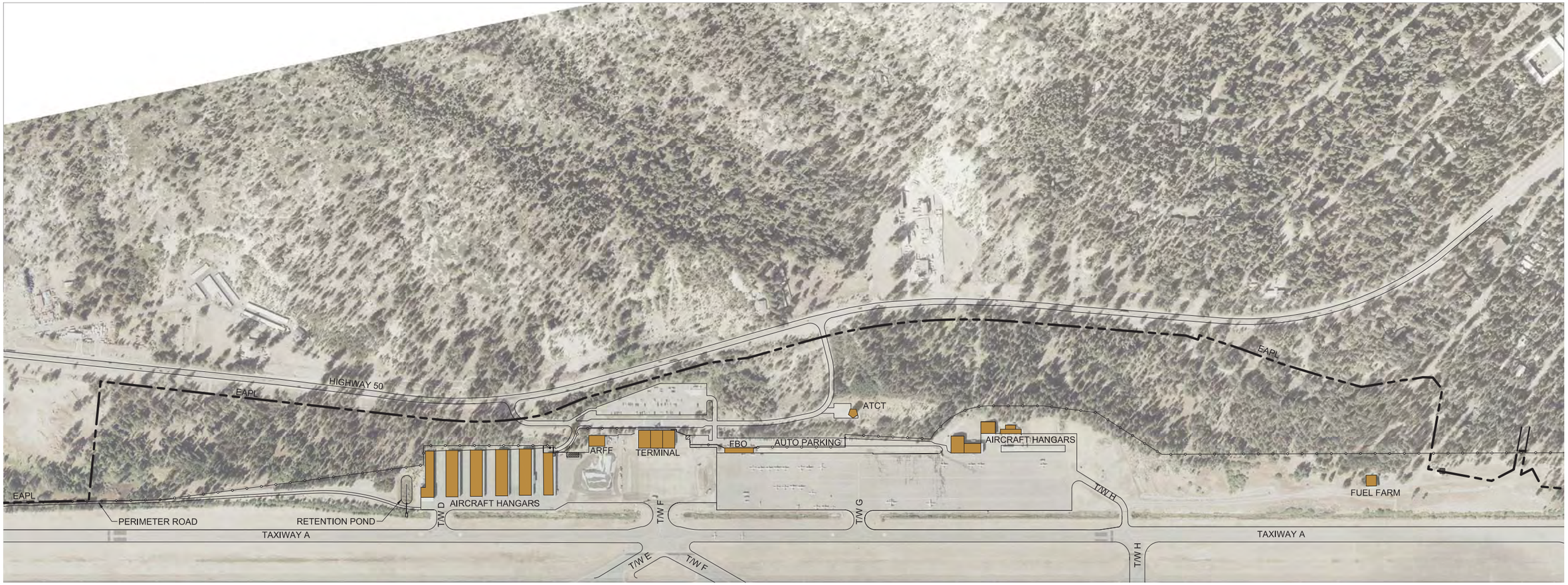

Figure 5-10 - Alternative A: No Action

Scale: 1" = 250'

250 0 250 500

250'

MAGNETIC NORTH

12° W (2014)

TRUE NORTH

LEGEND

- EAPL — EXISTING AIRPORT PROPERTY LINE
- BRL (35') — BUILDING RESTRICTION LINE (35')
- EXISTING FENCE
- AIRPORT BUILDINGS
- AERONAUTICAL USE
- NON-AERONAUTICAL USE
- DEMOLITION/ REMOVAL
- RELOCATED FACILITY
- PROPOSED ROOF TOP SOLAR ARRAY

C&S Engineers, Inc.
2020 Camino Del Rio North
Suite 1000
San Diego, California 92108
Phone: 619-296-9373
Fax: 619-296-5683
www.cscos.com

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ALTERNATIVE B

This alternative involves maintaining and consolidating existing facilities in order to minimize the Airport's footprint and restore vacant land to the environment or other development (see **Figure 5-11**). Associated projects are detailed in **Table 5-5**.

TABLE 5-5 ALTERNATIVE B – ASSOCIATED PROJECTS

Project Description	Purpose
Release Property Areas 1, 2 and 3 for non-aeronautical development	Based on the forecasted aviation demand these areas are no longer needed for aeronautical development and are limited by TRPA land coverage designations. Any development within the area should be restricted to compatible land uses or include mitigation.
Reduction of apron area	According to Chapter 4 – Facility Requirements, the Airport currently maintains an apron area beyond what is required. Under this alternative the apron would be downsized to maintain enough pavement for based aircraft storage, transient aircraft storage, and emergency or special events.
Extension of Taxiway G and closure of Taxiway H	Closure of Taxiway H would reduce the amount of pavement necessary to be maintained by the City. Based on the forecasted aviation demand the taxiway closure would have minimal impact on traffic flow.
Construction of self-service fueling station	Self-service fueling would be constructed adjacent to the FBO to allow for the elimination of fuel trucks operating on airport pavement and closure of the existing fuel farm.
Helicopter parking	Designated parking area would be marked for helicopters to segregate these activities from fixed-wing operations.
Relocation of aircraft storage, maintenance hangars, and Civil Air Patrol offices	Relocation of facilities located on aprons north end to the existing airport apron pavement would allow for the relocation of the airport perimeter fence and increase property available for non-aeronautical purposes.
Installation of electric charging stations	Electric charging stations would be constructed adjacent to the CNG station and available for public use.
Solar array	Existing load-bearing structures would be evaluated for possible solar panel installation.

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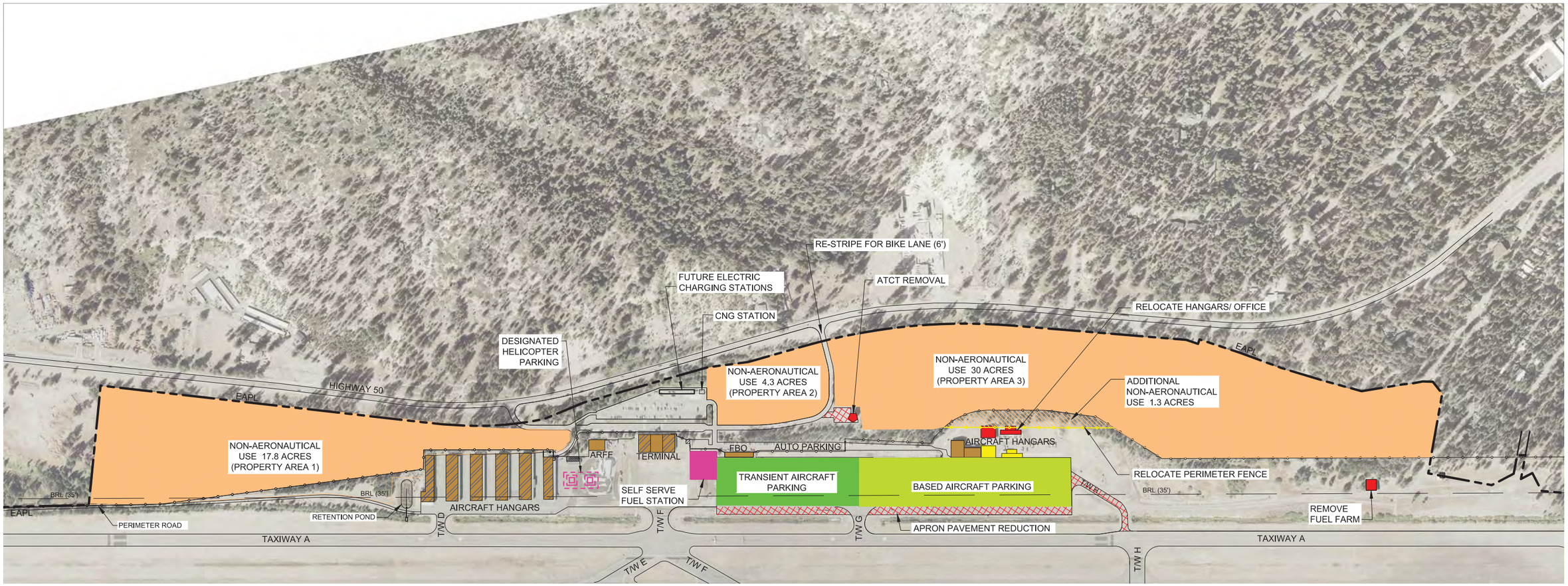

Figure 5-11 - Alternative B

Scale: 1" = 250'

250' 250 0 250 500

MAGNETIC NORTH

12° W (2014)

TRUE NORTH

LEGEND

- EAPL — EXISTING AIRPORT PROPERTY LINE
- BRL (35') — BUILDING RESTRICTION LINE (35')
- EXISTING FENCE
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- NON-AERONAUTICAL USE
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ALTERNATIVE C

This alternative involves maintaining flexibility to accommodate future growth potential (see **Figure 5-12**). Associated projects are detailed in **Table 5-6**.

TABLE 5-6 ALTERNATIVE C – ASSOCIATED PROJECTS

Project Description	Purpose
Release portions of Property Areas 1, 2 and 3 for non-aeronautical development	Based on the forecasted aviation demand these areas are no longer needed for aeronautical development and are limited by TRPA land coverage designations. Any development within the areas should be restricted to compatible land uses. A portion of Property Area 1 would be reserved for possible future expansion of aircraft hangars. Likewise, a portion of Property Area 3 would be maintained for future aeronautical purposes.
FBO expansion	The designated area would be reserved for potential upgrade and expansion of FBO facilities. Upgrades could include aircraft hangar storage, a maintenance shop, pilots lounge, and meeting rooms.
Conventional hangar construction	A conventional hangar (120-ft. by 120-ft.) would be constructed for large aircraft hangar storage.
Construction of self-service fueling station	Self-service fueling would be constructed adjacent to the FBO to allow for the elimination of fuel trucks operating on airport pavement and closure of the existing fuel farm.
Helicopter parking	Designated parking area would be marked for helicopters to segregate these activities from fixed-wing operations.
Installation of electric charging stations	Electric charging stations would be constructed adjacent to the CNG station and available for public use.
Solar array	Existing load-bearing structures would be evaluated for possible solar panel installation.

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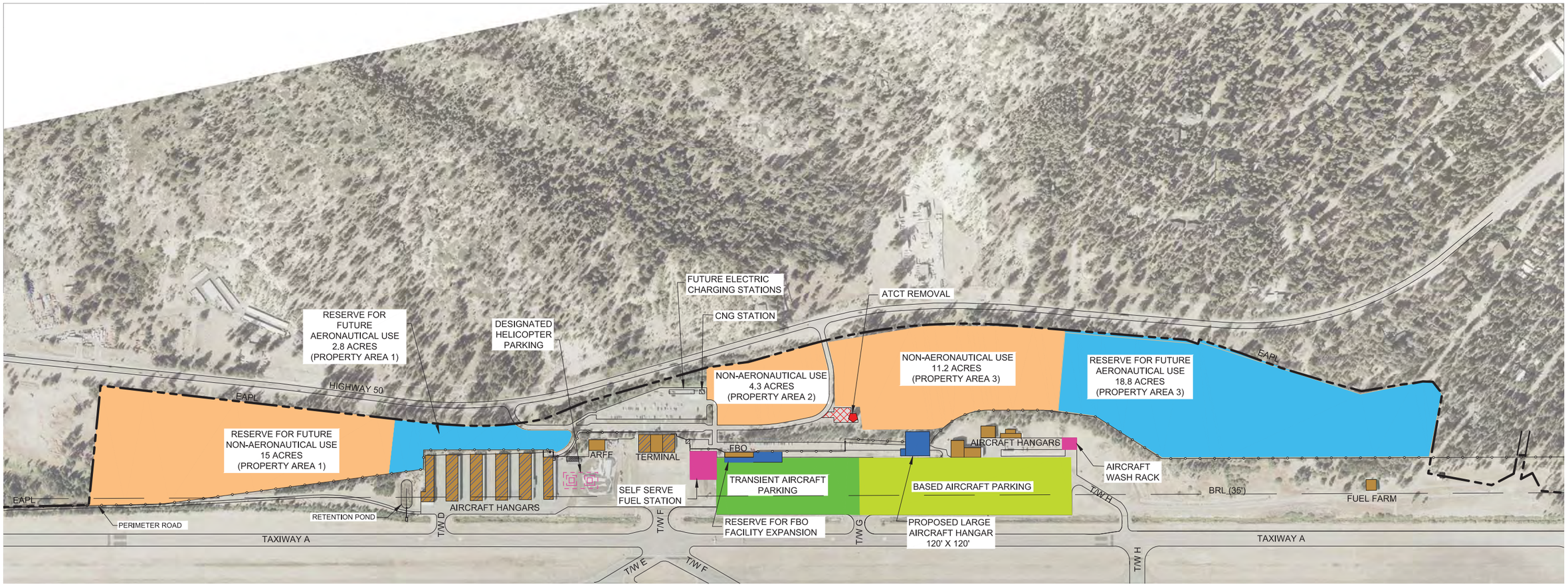

Figure 5-12 - Alternative C

Scale: 1" = 250'

250 0 250 500
250'

MAGNETIC NORTH
12° W (2014)
TRUE NORTH

LEGEND

- EAPL — EXISTING AIRPORT PROPERTY LINE
- BRL (35') — BUILDING RESTRICTION LINE (35')
- EXISTING FENCE
- AIRPORT BUILDINGS
- AERONAUTICAL USE
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San Diego, California 92108
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ALTERNATIVE D

This alternative involves focusing on growth potential that seeks to maximize airport revenues and optimize available land assets (see **Figure 5-13**). Associated projects are detailed in **Table 5-7**.

TABLE 5-7 ALTERNATIVE D – ASSOCIATED PROJECTS

Project Description	Purpose
Release portions of property areas 2 and 3 for non-aeronautical development	Based on the forecasted aviation demand the land is no longer needed for aeronautical development and is limited by TRPA land coverage designations. Any development within the area should be restricted to compatible land uses. Land located in property area 1 and 3 would be maintained for future aeronautical purposes.
FBO expansion	Area would be reserved for potential upgrade and expansion of FBO facilities. Upgrades could include aircraft hangar storage, maintenance shop, pilots lounge, and meeting rooms.
Conventional hangar construction	Conventional hangar (120’ x 240’) would be constructed for large aircraft hangar storage and associated office space.
Emergency services apron	Additional apron area would be constructed north of Taxiway H to accommodate aircraft and associated equipment during emergency events.
ARFF expansion	Area adjacent (north) to existing ARFF station would be specifically reserved for future expansion if necessary.
Terminal expansion	Area adjacent to existing terminal would be specifically reserved for future expansion of facility.
Construction of self-service fueling station	Self-service fueling would be constructed adjacent to the FBO to allow for the elimination of fuel trucks operating on airport pavement and closure of the existing fuel farm.
Helicopter parking	Designated parking area would be marked for helicopters to segregate these activities from fixed-wing operations.
Installation of electric charging stations	Electric charging stations would be constructed adjacent to the CNG station and available for public use.
Solar array	Existing load-bearing structures would be evaluated for possible solar panel installation.

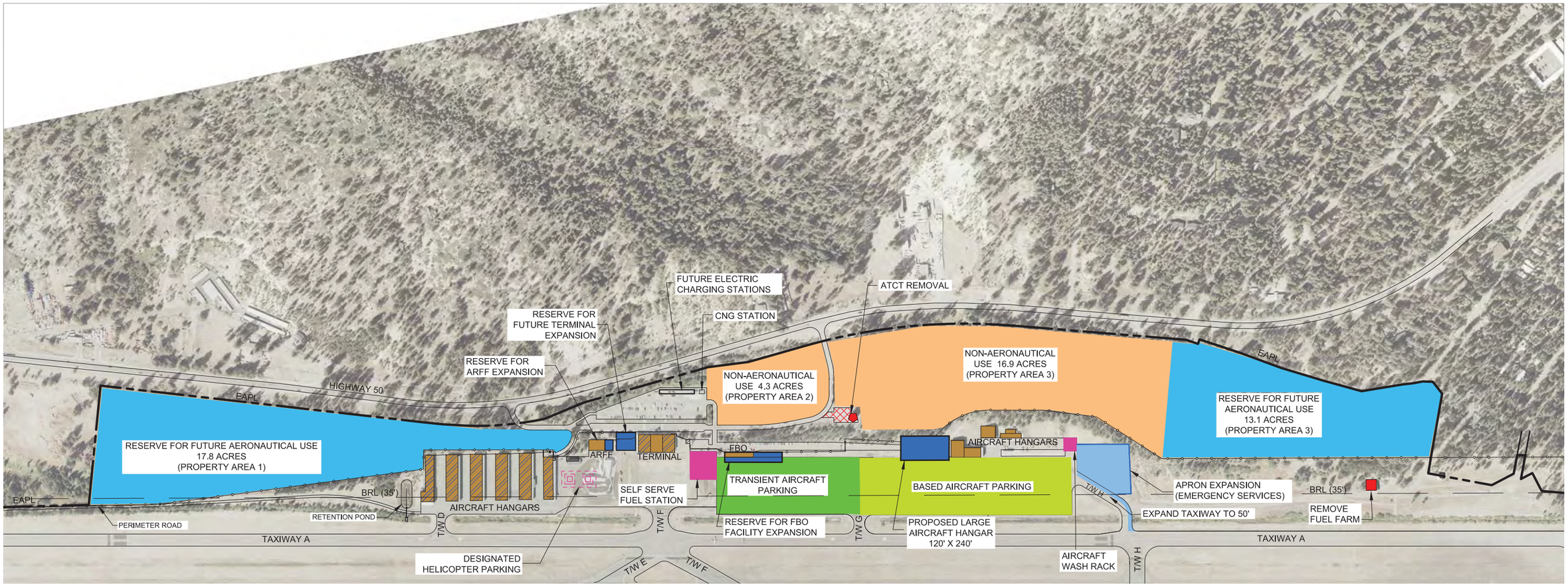

Figure 5-13 - Alternative D

Scale: 1" = 250'

250' 250 0 250 500

MAGNETIC NORTH

12° W (2014)

TRUE NORTH

LEGEND

- EAPL — EXISTING AIRPORT PROPERTY LINE
- BRL (35') — BUILDING RESTRICTION LINE (35')
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5.08 Alternatives Evaluation Summary

The following evaluation criteria were developed to highlight the differences between alternatives as well as the challenges and benefits of each. A detailed description of the evaluation criteria and how each alternative was assessed is provided in the Detailed Alternatives Evaluation Matrix in **Appendix H**. Based on the qualitative and quantitative assessment provided in the Detailed Alternatives Evaluation Matrix, each evaluation criteria was assigned a comparative rating. Similar to the Consumer Reports system, the rating system uses a modified circle to visually communicate the qualitative assessment. The ratings correlate to a simplified non-weighted score:

TABLE 5-8 ALTERNATIVE EVALUATION/SCORING

Rating	Evaluation of Impact	Score
●	Positive	2
◑	Neutral	1
○	Negative	0

Source: C&S Engineers, Inc.

Alternatives with a higher summary score have an overall positive impact based on the EONS evaluation criteria. The alternatives' evaluation scoring can be found in **Table 5-10** and a summary is provided in **Table 5-9.** As shown, Alternative C received the highest summary score.

TABLE 5-9 ALTERNATIVE RANKING

Ranking	Summary Score	Alternative
First	20	C: Maintain flexibility to accommodate future growth potential
Second (tie)	18	B: Maintain and consolidate facilities to minimize the airport's footprint
Second (tie)	16	D: Focus on growth potential that seeks to maximize airport revenues and optimize available land assets
Third	14	A: No Action

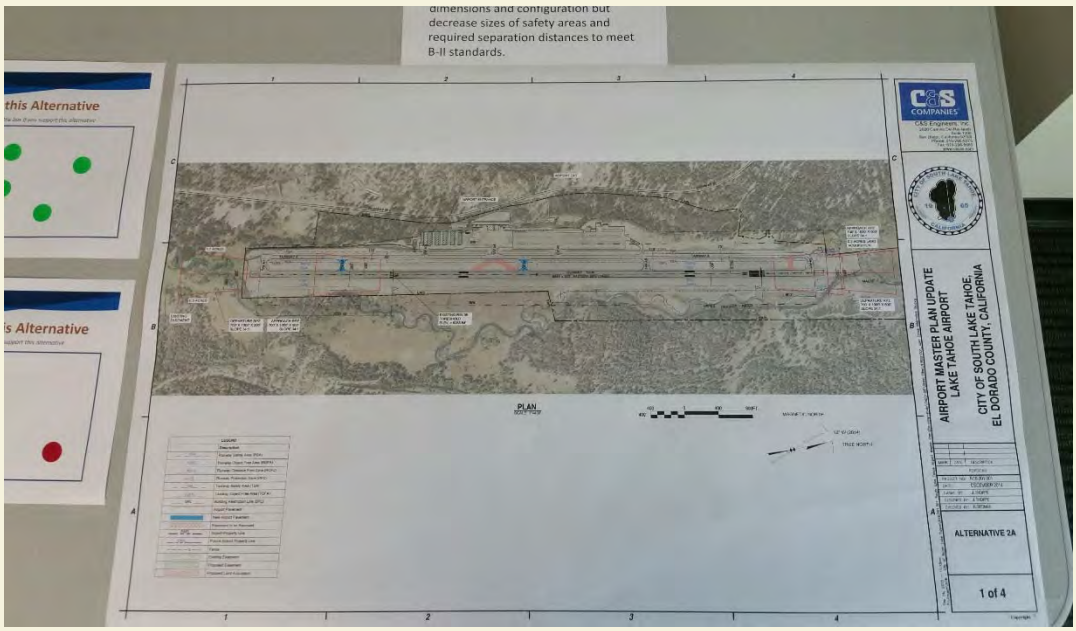
Source: C&S Engineers, Inc.

TABLE 5-10 ALTERNATIVES EVALUATION SUMMARY

● 2 - Positive ◐ 1 - Neutral ○ 0 - Negative **Comparative Features**	**Landside Devlopment Alternatives**	**A** No changes to landside configuration or uses.	**B** Maintain and consolidate facilities to minimize the airport's footprint.	**C** Maintain flexibility to accommodate future growth potential.	**D** Focus on growth potential that seeks to maximize airport revenues and optimize available land assets.
ECONOMIC VIABILITY					
Economic impact to the community	Associated with both direct and indirect economic impacts from the Airport's operation.	○	◐	●	●
Development Costs	Order-of-magnitude costs.	●	◐	◐	○
Operations and maintenance costs	Considers annual cost to operate and maintain the Airport.	○	●	○	○
Revenue generation	Considers the potential revenue generation from an increase in airport users or avaible land assets.	○	○	●	●
OPERATIONAL EFFICIENCY					
Airport design standards	Ability to meet FAA design standards and ensure a safe operating environment.	◐	◐	◐	◐
Constructability complexity	Timeframe, availability of technology, and available support/partners for implementation.	◐	○	○	○
Ownership/management of facility	Operational impacts to pilots associated with the alternatives.	◐	○	●	●
Impact on operations	Allows the ability to accommodate future changes in aircraft fleet mix.	○	○	●	●
NATURAL RESOURCE CONSERVATION					
Air Quality	Anticipated change in emissions associated with airport activity.	◐	●	◐	○
Wetlands	Impacts to existing wetlands on the property.	◐	◐	◐	◐
Water Quality, Lake Clarity and the Stream Environmental Zone (SEZ)	Impacts on water quality, lake clarity and the Stream Environmental Zone (SEZ).	◐	●	◐	○
Land Use Compatibility	Impacts are associated with noise and safety to surrounding areas.	◐	●	◐	○
Fish, Wildlife & Plants	Potential effect on fish, wildlife and plants.	◐	◐	◐	◐
Construction impacts	Air quality, noise, etc.	◐	○	○	○
Floodplains	Impacts to existing floodplains.	◐	●	◐	○
SOCIAL RESPONSIBILITY					
Community benefits/ amenities/investment	Considers the project alternative's potential effect on current and future community benefits/amenities.	◐	◐	●	●
Emergency services	Ability of Airport to facilitate emergency services.	◐	○	◐	●
Connectivity with surrounding community and transportation systems	Considers the alternative's ability to include other modes of transportation.	○	●	◐	◐
SUMMARY SCORE					
SUMMARY SCORE		14	18	20	16
RANKING					
RANKING		4	2	1	3

5.09 Preferred Alternative

The alternatives development and evaluation was presented to the City of South Lake Tahoe and the public at on open public meeting held on March 16, 2015, at the Airport. Copies of the public meeting materials are provided in **Appendix G**. As part of the meeting comments were received and polling was conducted to gather the opinions of the meeting participants on the proposed development alternatives. Each alternative (both airfield and landside) was displayed visually and participants were asked to provide feedback on which alternative they preferred. (Summary provided in **Appendix H**). For the purposes of the polling, participants were asked to vote on both airfield and landside alternatives separately.



Public Meeting #3 Example Polling Station
Source: C&S Engineers, Inc., March 2015

AIRFIELD ALTERNATIVES

Polling indicated that the Alternatives 1, 2, and 7 (ranked in that order) were the favored airfield development alternatives according to the public's feedback. Both Alternatives 1 and 2 require no changes to the existing runway dimensions and layout. Improvements to meet updated FAA design standards would be undertaken to the taxiway system under Alternative 2. Alternative 7 would require more capital investment to make changes to both the runway and taxiway system to meet ARC C-III standards. Written and verbal comments received on the airfield alternatives focused on maintaining the airports ability to accommodate all aircraft types necessary for firefighting and emergency services.

TABLE 5-11 AIRFIELD ALTERNATIVES DOT POLLING SUMMARY

Airfield Alternative	# of Votes
1 - No Action	24
2 - Meet ARC B-II and Maintain Flexibility	19
3 - Meet ARC B-II and Reduce Airport Footprint	2
4 - Meet ARC B-II and Reduce Airport Footprint (runway centerline shift)	1
5 - Meet ARC C-III and Shift Runway East	4
6 - Meet ARC C-III and Shift Taxiway West	4
7 - Meet ARC C-III and Shift Runway/Taxiway	18

After consideration of the airfield alternatives evaluation and community input, as well as feedback from the airport sponsor, Alternative 2 was determined to be the preferred airfield development alternative. This alternative preserves the existing airfield layout and pavement dimensions, allowing for the Airport to meet the ARC B-II design standards while also maintaining a safe operating environment for larger aircraft that use the Airport for tourism and emergency service operations. The evaluation concluded that the potential environmental impacts and capital costs associated with relocating the runway and/or taxiways, as proposed under the other airfield alternatives, outweighed the benefits that the Airport would receive. By omitting these projects, Alternative 2 involves lower development costs and reduces the financial burden to the City. The alternative will have minimal impact on the environment while also providing a sustainability benefit by focusing on improving existing infrastructure.

The proposed projects listed within Alternative 2 focus on maintaining existing facilities and making improvements to infrastructure as required according to updated FAA design standards. These projects will also score high in the FAA funding priority ranking system, allowing the City to capitalize on the grant match provided by the FAA and California Department of Transportation.

In summary, the primary reasons for selection of Alternative 2 as the preferred alternative include its ability to:

- Lower development costs associated with proposed projects
- Minimize impact to existing operations by maintaining the existing runway and taxiway locations
- Minimize environmental impacts associated with the relocation of infrastructure
- Maintain and improve current infrastructure as opposed to expansion

LANDSIDE AND SELECTED AIRSIDE ALTERNATIVES

According to the alternative polling, Alternative D received the most votes of the landside development alternative. Alternative D focuses on maximizing the potential to generate airport revenue. Written and verbal comments received on the landside alternatives were primarily directed at future non-aeronautical development. Comments reflected the need that any development in the area should be compatible with not only airport operations but the surrounding community.

TABLE 5-12 LANDSIDE ALTERNATIVES DOT POLLING SUMMARY

Landside and Selected Airside Alternative	# of Votes
A - No Action	18
B - Maintain and consolidate facilities to minimize the Airport's footprint	8
C - Maintain flexibility to accommodate future growth potential	11
D - Focus on growth potential that seeks to maximize airport revenues and optimize available land assets	27

After consideration of the landside alternatives evaluation and community input, as well as feedback from the airport sponsor, Alternative C was determined to be the preferred landside development alternative. This alternative releases portions of the airport property to non-aeronautical development while preserving areas that are needed to provide desired services to the aviation community. While there was strong public support for Alternative D, the financial and environmental impacts associated with the proposed expansion of facilities outweighed the potential benefit. The majority of funding for landside development would fall directly to the City or a private developer.

The primary reasons for selection of Alternative C as the preferred alternative include its ability to:

- Release land that is unusable for aeronautical purposes to potential non-aeronautical development with potential for revenue generation
- Maintain future growth potential for landside aviation development (e.g., hangars and expanded FBO facilities)
- Expand services to the aviation community
- Maximize current infrastructure by incorporating energy efficiency projects
- Minimize environmental impacts associated with the relocation of infrastructure

APPENDIX H

Detailed Alternatives Evaluation Matrices

DETAILED AIRFIELD ALTERNATIVES EVALUATION

Comparative Features	Runway and Taxiway System Alternatives	1: No Action	2	3	4	5	6	7
		No changes to airfield configuration or infrastructure.	Maintain existing airfield pavement dimensions and configuration and maintain existing separation distances to meet B-II standards.	Reduce airfield pavement dimensions to accommodate B-II standards; narrow runway from both edges to maintain the existing centerline location.	Reduce airfield pavement dimensions to accommodate B-II standards; narrow runway from the eastern edge to minimize the Airport's footprint. Relocate runway centerline to meet runway centerline to parallel taxiway centerline separation standards.	Maximize future potential and accommodate future design aircraft (Gulfstream V), meeting C-III standards. Shift the runway east to meet standard for runway centerline to taxiway centerline distance.	Maximize future potential and accommodate future design aircraft (Gulfstream V), meeting C-III standards. Shift the taxiway west in order to meet standard for runway centerline to taxiway centerline distance.	Maximize future potential and accommodate future design aircraft (Gulfstream V), meeting C-III standards. Shift the runway east and the taxiway west (i.e., splitting the required distance) in order to meet standard for runway centerline to taxiway centerline distance (400 ft.).
ECONOMIC VIABILITY								
Economic impact to the community	Associated with both direct and indirect economic impacts from the Airport's operation.	No change.	Would not reduce airfield infrastructure dimensions and therefore would have little effect on aircraft operating at the Airport.	Reducing dimensions may affect aircraft operating at the Airport and would limit operations by large business jets and the potential return of commercial service, thus having a negative economic impact on the community.	Reducing dimensions may affect aircraft operating at the Airport and would limit operations by large business jets and the potential return of commercial service, thus having a negative economic impact on the community.	Accommodating C-III aircraft would support corporate aviation and associated revenue while maintaining the potential for commercial service in the future, thus having a positive economic impact on the community.	Accommodating C-III aircraft would support corporate aviation and associated revenue while maintaining the potential for commercial service in the future, thus having a positive economic impact on the community.	Accommodating C-III aircraft would support corporate aviation and associated revenue while maintaining the potential for commercial service in the future, thus having a positive economic impact on the community.
Development costs	Order-of-magnitude costs. Considers FAA Airport Improvement Program (AIP) only (additional funding sources may apply) and will be dependent upon design and FAA determination.	No change.	$897,000 to complete recommended taxiway improvements, land acquisition and obtain easements.	$1,350,000 to complete recommended runway and taxiway improvements, land acquisition and obtain easements.	$6,600,000 to complete projects associated with relocation of runway, runway width decrease, recommended taxiway improvements, land acquisition and obtain easements.	$15,850,000 to complete projects associated with relocation of runway, recommended taxiway improvements, land acquisition and obtain easements.	$8,615,000 to complete projects associated with relocation of taxiway, other recommended taxiway improvements, land acquisition and obtain easements. Relocation of the taxiway (115') would trigger the need to relocate hangar facilities located in the TOFA and drainage improvements. These costs were not included in the development costs but were considered in the evaluation.	$19,700,000 to complete projects associated with relocation of runway/taxiway, other recommended taxiway improvements, land acquisition and obtain easements.
Operations and maintenance costs	Considers annual cost to operate and maintain the Airport.	No change but currently maintaining facilities that exceed required dimensions.	No change but currently maintaining facilities that exceed required dimensions.	Reduced maintenance costs due to minimized infrastructure upkeep (e.g. runway pavement).	Reduced maintenance costs due to minimized infrastructure upkeep (e.g. runway pavement).	Would require widening of runway shoulders, increasing length of taxiways, and expansion of safety areas, increasing maintenance costs.	Would require widening of runway shoulders, increasing length of taxiways, and expansion of safety areas, increasing maintenance costs.	Would require widening of runway shoulders, increasing length of taxiways, and expansion of safety areas, increasing maintenance costs.
Revenue generation	Considers the potential revenue generation from an increase in airport users or available land assets.	No change.	Would not reduce airfield infrastructure dimensions and therefore would have little effect on aircraft operating at the Airport.	Reducing dimensions may affect the aircraft operating at the Airport, thus having a negative impact on revenue related to fuel sales and tie-down rentals. However, the FBO currently handles these activities so it would have little impact on the City.	Reducing dimensions may affect the aircraft operating at the Airport, thus having a negative impact on revenue related to fuel sales and tie-down rentals. However, the FBO currently handles these activities so it would have little impact on the City. Available land created from runway shift could be sold as land coverage or SEZ credits.	Accommodating C-III aircraft would support corporate aviation, having a positive impact on revenue related to fuel sales and tie-down rentals. However, the FBO currently handles these activities so it would have little impact on the City.	Accommodating C-III aircraft would support corporate aviation, having a positive impact on revenue related to fuel sales and tie-down rentals. However, the FBO currently handles these activities so it would have little impact on the City.	Accommodating C-III aircraft would support corporate aviation, having a positive impact on revenue related to fuel sales and tie-down rentals. However, the FBO currently handles these activities so it would have little impact on the City.
OPERATIONAL EFFICIENCY								
Airport design standards	Ability to meet FAA design standards and ensure a safe operating environment.	Does not meet design standards for existing critical aircraft or accommodate future critical aircraft.	Accommodates existing critical aircraft (B-II) but does not accommodate future critical aircraft (C-III). Efforts to gain control of the protection zones would enhance the safety of the operating environment.	Accommodates existing critical aircraft (B-II) but does not accommodate future critical aircraft (C-III). Efforts to gain control of the protection zones would enhance the safety of the operating environment.	Accommodates existing critical aircraft (B-II) but does not accommodate future critical aircraft (C-III). Efforts to gain control of the protection zones would enhance the safety of the operating environment.	Accommodates existing and future critical aircraft. Efforts to gain control of the protection zones would enhance the safety of the operating environment.	Accommodates existing and future critical aircraft. Efforts to gain control of the protection zones would enhance the safety of the operating environment.	Accommodates existing and future critical aircraft. Efforts to gain control of the protection zones would enhance the safety of the operating environment.
Constructability complexity	Timeframe, availability of technology, and available support/partners for implementation.	N/A	Low complexity as development is limited and the current runway and taxiway configuration is maintained.	Minimal complexity as the runway centerline and taxiway centerline are maintained in current position.	Would require shift in runway centerline, which would complicate construction and require modifications to navigational aids (e.g. MALSF) and aircraft procedures.	High complexity due to the SEZ and change in runway centerline would require the relocation of navigational aids (e.g. MALSF) and aircraft procedures.	High complexity due to impacts to existing drainage infrastructure, aircraft apron space, tiedowns, and hangars.	High complexity due to the SEZ, change in runway centerline that would require relocation of navigational aids (e.g. MALSF), and impacts to existing drainage infrastructure, aircraft apron space, tiedowns, and hangars.
Impact on operations	Operational impacts to pilots associated with the alternatives.	No change.	No change operationally.	Would not meet design standards for future critical aircraft (C-III) so alternative may impact associated activity of larger jet aircraft.	Would not meet design standards for future critical aircraft (C-III) so alternative may impact associated activity. Modification to navigational aids due to runway centerline shift would temporarily affect operations.	Would accommodate future critical aircraft (C-III). Modification to navigational aids due to runway centerline shift would temporarily affect operations.	Would accommodate future critical aircraft (C-III). Temporary impact to taxiing aircraft until construction was completed.	Would accommodate future critical aircraft (C-III). Modification to navigational aids due to runway centerline shift would temporarily affect operations. Temporary impact to taxiing aircraft until construction was completed.
Future flexibility	Allows the ability to accommodate future changes in aircraft fleet mix.	No change.	Maintains flexibility since no major infrastructure changes are necessary.	Limits future flexibility for accommodating larger aircraft by reducing infrastructure dimensions.	Limits future flexibility for accommodating larger aircraft by reducing infrastructure dimensions.	Maintains future flexibility for accommodating larger aircraft.	Maintains future flexibility for accommodating larger aircraft.	Maintains future flexibility for accommodating larger aircraft.

Comparative Features	Runway and Taxiway System Alternatives	1: No Action	2	3	4	5	6	7
		No changes to airfield configuration or infrastructure.	Maintain existing airfield pavement dimensions and configuration and maintain existing separation distances to meet B-II standards.	Reduce airfield pavement dimensions to accommodate B-II standards; narrow runway from both edges to maintain the existing centerline location.	Reduce airfield pavement dimensions to accommodate B-II standards; narrow runway from the eastern edge to minimize the Airport's footprint. Relocate runway centerline to meet runway centerline to parallel taxiway centerline separation standards.	Maximize future potential and accommodate future design aircraft (Gulfstream V), meeting C-III standards. Shift the runway east to meet standard for runway centerline to taxiway centerline distance.	Maximize future potential and accommodate future design aircraft (Gulfstream V), meeting C-III standards. Shift the taxiway west in order to meet standard for runway centerline to taxiway centerline distance.	Maximize future potential and accommodate future design aircraft (Gulfstream V), meeting C-III standards. Shift the runway east and the taxiway west (i.e., splitting the required distance) in order to meet standard for runway centerline to taxiway centerline distance (400 ft.).
NATURAL RESOURCE CONSERVATION								
Air Quality	Anticipated change in emissions associated with airport activity.	No change.	No change.	Reducing to B-II standards may limit activity of larger jet aircraft and associated emissions.	Reducing to B-II standards may limit activity of larger jet aircraft and associated emissions.	Accommodating C-III aircraft may increase activity and associated emissions.	Accommodating C-III aircraft may increase activity and associated emissions.	Accommodating C-III aircraft may increase activity and associated emissions.
Wetlands	Impacts to existing wetlands on the property.	No change.	No change.	Reducing infrastructure dimensions and coverage.	Reduced infrastructure dimensions and coverage could allow for additional area to be designated under SEZ program.	Expanding infrastructure dimensions and coverage.	Expanding infrastructure dimensions and coverage.	Expanding infrastructure dimensions and coverage.
Water Quality, Lake Clarity and the Stream Environmental Zone (SEZ)	Impacts on water quality, lake clarity and the Stream Environmental Zone (SEZ)	No change.	No change.	Reduced impervious surfaces would have positive impact on water quality.	Reduced impervious surfaces would have positive impact on water quality.	Increased impervious surfaces would have negative impact on water quality unless mitigated.	Increased impervious surfaces would have negative impact on water quality unless mitigated.	Increased impervious surfaces would have negative impact on water quality unless mitigated.
Land Use Compatibility	Impacts are associated with noise and safety to surrounding areas.	No change.	Would obtain avigation easements over land within RPZs.	Would obtain avigation easements over land within RPZs. Meeting only B-II standards may reduce aircraft activity and reduce the size of noise contours.	Would obtain avigation easements of land within RPZs. Meeting only B-II standards may reduce activity but noise impacts associated with the relocation of the runway centerline would have to be determined.	Meeting C-III standards may increase the size of noise contours resulting from an increase in aircraft operations. Noise impacts associated with the relocation of the runway centerline would have to be determined. The alternative also requires an expansion of safety areas further off property.	Meeting C-III standards may increase the size of noise contours resulting from an increase in aircraft operations. The alternative also requires an expansion of safety areas further off property.	Meeting C-III standards may increase the size of noise contours resulting from an increase in aircraft operations. Noise impacts associated with the relocation of the runway centerline would have to be determined. The alternative also requires an expansion of safety areas further off property.
Fish, Wildlife & Plants	Potential effect on fish, wildlife and plants, particularly as it relates to changes in habitat.	No change.	Minimal effects.	Would reduce the infrastructure footprint and dimensions of safety areas.	Would reduce the infrastructure footprint and dimensions of safety areas.	Would increase the infrastructure footprint and dimensions of safety areas.	Would increase the infrastructure footprint and dimensions of safety areas.	Would increase the infrastructure footprint and dimensions of safety areas.
Construction impacts	Air quality, noise, etc.	N/A	Minimal effects.	Decreasing the width of the runway involves construction and associated impacts to air quality, water quality, waste generation, etc.	Decreasing the runway width and shifting the runway centerline involves significant construction and associated impacts to air quality, water quality, waste generation, etc.	Increasing the runway width and shifting the runway centerline involves significant construction and associated impacts to air quality, water quality, waste generation, etc.	Shift in taxiway and associated improvements involves significant construction and associated impacts to air quality, water quality, waste generation, etc.	Shifts in runway and taxiway involves significant construction and associated impacts to air quality, water quality, waste generation, etc.
Floodplains	Impacts to existing floodplains.	No change.	No change.	Reduced infrastructure would have potential positive impact on floodplains.	Reduced infrastructure would have potential positive impact on floodplains.	Expanding infrastructure would have potential negative impact on floodplains.	Expanding infrastructure would have potential negative impact on floodplains.	Expanding infrastructure would have potential negative impact on floodplains.
SOCIAL RESPONSIBILITY								
Community benefits/ amenities/investment	Considers the project alternative's potential effect on current and future community benefits/amenities.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Emergency services	Ability of Airport to facilitate emergency services.	No change.	No change.	No change.	No change.	No change.	No change.	No change.
Connectivity with surrounding community and transportation systems	Considers the alternative's ability to include other modes of transportation.	N/A	N/A	N/A	N/A	N/A	N/A	N/A

DETAILED LANDSIDE AND AIRSIDE ALTERNATIVES EVALUATION

Comparative Features	Landside Development Alternatives	A	B	C	D
		No changes to landside configuration or uses.	Maintain and consolidate facilities to minimize the Airport's footprint.	Maintain flexibility to accommodate future growth potential.	Focus on growth potential that seeks to maximize airport revenues and optimize available land assets.
ECONOMIC VIABILTY					
Economic Impact to the Community	Associated with both direct and indirect economic impacts from the Airport's operation.	No change.	Reducing dimensions may affect aircraft operating at the Airport and would limit operations by large business jets and the potential return of commercial service, thus having a negative economic impact on the community. Non-aeronautical development could bring in additional businesses to the Airport.	Improvements would support increased corporate aviation activity and non-aeronautical development, potentially having a positive economic impact on the community. Non-aeronautical development could bring in additional businesses to the Airport.	Improvements would support increased corporate aviation and associated revenue while maintaining the potential for commercial service in the future, thus having a positive economic impact on the community. Non-aeronautical development could bring in additional businesses to the Airport.
Development Costs	Order-of-magnitude costs.	No change.	Over $3 million for proposed improvements that include reducing the size of the apron area, construction of self serve fuel station, and other associated projects. The majority of these projects are not fundable under the FAA Airport Improvement Program as they are revenue producing.	Over $4.2 million for proposed improvements that include construction of large aircraft storage hangar, construction of self serve fuel station, and other associated projects. The majority of these projects would not be fundable under the FAA Airport Improvement Program as they are revenue producing.	Over $6.1 million for proposed improvements that include construction of large aircraft storage hangar, construction of self serve fuel station, apron improvements, and other associated projects. The majority of these projects would not be fundable under the FAA Airport Improvement Program as they are revenue producing.
Operations and maintenance costs	Considers annual cost to operate and maintain the Airport.	Without improvements, condition of facilities would eventually impact businesses that currently operate there and may result in departures from Lake Tahoe Airport.	Reduction in infrastructure would decrease costs to maintain and operate facilities by City staff.	Proposed infrastructure improvements would increase costs to maintain and operate facilities.	Proposed infrastructure improvements would increase costs to maintain and operate facilities.
Revenue generation	Considers the potential revenue generation from an increase in airport users or available land assets.	No change.	Consolidation of infrastructure would limit some aviation uses and constrain future growth capabilities. Redesignation of airport property to non-aeronautical uses could provide benefit and allow the City to lease land to outside businesses that are compatible with airport operations. Reduction in land coverage may provide an economic benefit as credits can be sold on market.	Opportunities to initiate new leases for airport tenants; additional GA and corporate aviation activity could increase fuel sales, though this benefits the FBO more directly than the City. Redesignation of airport property to non-aeronautical uses could provide benefit and allow the City to lease land to outside businesses that are compatible with airport operations.	Opportunities to continue existing and initiate new leases for airport tenants; additional GA and corporate aviation activity could increase fuel sales, though this benefits the FBO more directly. Reserves property for potential reintroduction of commercial service operations if forecasted demand changes. Redesignation of airport property to non-aeronautical uses could provide benefit and allow the City to lease land to outside businesses that are compatible with airport operations.
OPERATIONAL EFFICIENCY					
Airport design standards	Ability to meet FAA design standards and ensure a safe operating environment.	No change.	Meets projected demand. Delineation of areas enhances safety.	Exceeds projected demand. Delineation of areas enhances safety.	Exceeds projected demand. Delineation of areas enhances safety.
Constructability complexity	Timeframe, availability of technology, and available support/partners for implementation.	No change.	Requires changes to airport operational configuration and coordination with existing tenants to relocate facilities.	Construction of proposed facilities would be dependent upon demand, require utility upgrades, and possible private participation and funding. Proposed development would be limited to areas not designated as SEZ.	Construction of proposed facilities would be dependent upon demand, require utility upgrades, and possibly private participation and funding as improvements would not be FAA funded. Proposed development would be limited to areas not designated as SEZ.
Ownership/management of facility	Operational impacts to pilots associated with the alternatives.	No change.	Closure of Taxiway H may create impacts to operational efficiency for aircraft transiting apron area.	No significant change anticipated. Pilots could potentially benefit from improved services.	No significant change anticipated. Pilots could potentially benefit from improved services.
Impact on operations	Allows the ability to accommodate future changes in aircraft fleet mix.	Lack of large aircraft hangar storage would remain.	Meets the forecasted aviation demand but limits future growth potential.	Provides for growth potential without recommending improvements beyond forecasted aviation demand.	Provides for maximum growth potential without recommending improvements far beyond forecasted aviation demand.

Comparative Features	Landside Development Alternatives	A	B	C	D
		No changes to landside configuration or uses.	Maintain and consolidate facilities to minimize the Airport's footprint.	Maintain flexibility to accommodate future growth potential.	Focus on growth potential that seeks to maximize airport revenues and optimize available land assets.
NATURAL RESOURCE CONSERVATION					
Air Quality	Anticipated change in emissions associated with airport activity.	No change.	Short-term increases in construction emissions associated with proposed projects. Roadway improvements and self-serve fuel station could potentially reduce air emissions from use of on-road motor vehicles.	Short-term increases in construction emissions associated with proposed projects. Roadway improvements and self-serve fuel station could potentially reduce air emissions associated with the use of on-road motor vehicles. Additional aircraft operations generated from improved services could increase emissions in the long term.	Short-term increases in construction emissions associated with proposed projects. Roadway improvements and self-serve fuel station could potentially reduce air emissions associated with the use of on-road motor vehicles. Additional aircraft operations generated from improved services could increase emissions in the long term.
Wetlands	Impacts to existing wetlands on the property.	No change.	No anticipated impacts.	No anticipated impacts.	Emergency services apron would require development in SEZ.
Water Quality, Lake Clarity and the Stream Environmental Zone (SEZ)	Impacts on water quality, lake clarity and the Stream Environmental Zone (SEZ).	No change.	Reduction in pavement could provide water quality benefit.	Limited water quality impacts compared to existing conditions.	Limited water quality impacts compared to existing conditions.
Land Use Compatibility	Impacts are associated with noise and safety to surrounding areas.	No change.	Development within areas designated for non-aeronautical use would have to be compatible with current Airport Land Use Compatibility Plan (ALUCP).	Development within areas designated for non-aeronautical use would have to be compatible with current ALUCP.	Development within areas designated for non-aeronautical use would have to be compatible with current ALUCP.
Fish, Wildlife & Plants	Potential effect on fish, wildlife and plants, particularly as it relates to changes in habitat.	No change.	No significant impacts anticipated as the majority of construction would take place on land already disturbed.	No significant impacts anticipated as the majority of construction would take place on land already disturbed.	No significant impacts anticipated as the majority of construction would take place on land already disturbed.
Construction impacts	Air quality, noise, etc.	No change.	Construction would result in increased waste generation and pollutants temporarily.	Construction would result in increased waste generation and pollutants temporarily.	Construction would result in increased waste generation and pollutants temporarily.
Floodplains	Impacts to existing floodplains.	No change.	Reduction of pavemetn in f	Construction within floodplain.	Construction within floodplain.
SOCIAL RESPONSIBILITY					
Community benefits/ amenities/investment	Considers the project alternative's potential effect on current and future community benefits/amenities.	No change.	Limited airport growth with focus on shifting available airport property to non-aviation uses. Proposed projects include amenities that could benefit public and reduce costs associated with operating airport.	Focuses on providing flexibility for future airport growth while shifting some available land assets to non-aviation uses. Proposed projects include amenities that could benefit public and reduce costs associated with operating airport.	Considers potential for growth outside of forecast and reserves capability to expand existing facilities while shifting some available land assets to non-aviation uses. Proposed projects include amenities that could benefit public and reduce costs associated with operating airport.
Emergency services	Ability of Airport to facilitate emergency services.	No change.	Limited impact with no expansion of current capabilities.	Would reserve capabilities to provide for emergency services.	Would expand capabilities to provide for emergency services.
Connectivity with surrounding community and transportation systems	Considers the alternative's ability to include other modes of transportation.	No change.	Would include designated bike path along Airport Road but would not look to enhance or increase aviation usage.	Alternative limited to providing additional services to the aviation community.	Alternative limited to providing additional services to the aviation community.