MASTER PLAN

Chapter 4 Alternatives Analysis

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CHAPTER 4 Alternatives Analysis

1. OVERVIEW

The objective of this chapter is to identify and evaluate options for providing the facilities identified in Chapter 3. The desired outcome of this analysis is to identify an optimal development pattern that best meets the needs of the airport over many years in terms of: Federal Aviation Administration (FAA)/Truckee Tahoe Airport District (TTAD) safety standards, airport service offerings, anticipated changes in aviation activity, and non-aviation facilities benefitting the community. Significant emphasis was devoted to reducing and mitigating annoyance resulting from aircraft overflights. To support a pattern of logical development, the exploration of alternatives progressed from the runways out to the building areas.

Any development situation has one or more alternatives, but in some cases only one is feasible. For some facility improvements where there is one clearly advantageous development concept, improvement alternatives are not developed and only the recommended improvement is presented as a concept. The following areas are evaluated as alternatives or concepts at Truckee Tahoe Airport (TRK):

- **Overflight Mitigation Alternatives**
  - Runway modifications
  - Off-airport mitigation
  - Enhanced flight control and advisory options
- **Design Standards**
  - Taxiways
  - Aprons
- **Land Use**
- **Building Development Concept**

2. OVERFLIGHT MITIGATION ALTERNATIVES

Community outreach efforts identified residential overflight annoyance as a primary concern to be addressed by this master plan. Among the specific concerns are: loudness of individual operations, repetitive frequency of overflights, and visual impacts related to aircraft (particularly jets) at low altitude.

To address these community concerns, the master plan study evaluated options in accordance with what TTAD can control directly (such as the physical layout of the airfield) and what can be influenced (e.g. incentives, outreach, etc.). In this way, alternatives were developed and proposed as follows: runway alternatives, enhanced flight control and advisory options, other policy and incentive programs, and off-airport mitigation.

2.1 Runway Alternatives

A total of six runway alternatives were identified. Two alternatives were eliminated during preliminary investigations. The remaining four were evaluated in detail. Two alternative scenarios involve primary Runway 11-29 and the potential to shift the runway ends to help reduce noise and overflight impacts on residential areas immediately west of the approach end of Runway 11. The other two alternative scenarios involve changes to secondary Runway 2-20 with the hopes of enticing aircraft to operate on this runway more often. One alternative is recommended for implementation. The four alternatives evaluated in detail are summarized in **Figure 4-1** Alternative Matrix.

DISMISSED RUNWAY OPTIONS

Described briefly in this section are two runway options that were identified but eliminated early during initial investigation.

New Runway Concept. This alternative involves the development of a new runway. Generally the alignment would be established by 1) minimizing residential overflight, 2) providing clear arrival and departure paths avoiding mountainous terrain, and 3) optimizing airport property usage to obtain sufficient runway length to maximize its utilization. The alternative was eliminated on the basis of cost (estimated at $27 million to construct). The inability to avoid wetland impacts was also a consideration. Though not specifically quantified, other concerns were highlighted as well. The alignment of this runway was not favorable for prevailing winds. Comparatively long taxi times would likely dissuade its use if the two existing runways were to remain operational. Likewise, a third runway arrival and departure stream would add additional traffic convergence risk. Finally, the additional runway would increase pavement maintenance costs considerably.

Extend Runway 2-20 North. A major barrier to increasing the utilization of Runway 2-20 is its length. Additional length can be provided to the north or south ends of the existing runway or at both ends. Mountainous terrain obstructs the southern flight corridor. The north corridor is comparatively clear. However, extending to the north is complicated by a steep drop of 100 feet at the runway's north end. Two options are available to extend the runway north: fill the ridge with new material or bridge over using pylon support structures. The incremental cost of providing additional length was deemed prohibitive—between $5 and $15 million for about 350 feet of additional length.

Alternative 1 – Runway 11-29 Modification

The purpose of Alternative 1 is to shift aircraft operations to the east so that aircraft are higher above the residences west of the airport. It consists of two sub-alternatives: 1A and 1B. Alternative 1A extends the runway east while retaining all existing pavement and landing thresholds. Alternative 1B removes pavement at the west end to retain the current runway length. Alternative 1A is illustrated in **Figure 4-2**, and Alternative 2A in **Figure 4-3**.

ALTERNATIVES:	ALTERNATIVE 1A		ALTERNATIVE 1B		ALTERNATIVE 2A		ALTERNATIVE 2B	
Description	Extend Runway 11-29 1,322' east with 1,332' displaced threshold at both runway ends.		Extend Runway 11-29 1,322' east with 874' displaced threshold on Runway 29 only.		Extend Runway 2-20 south to 5,000' with 556' displaced threshold on Runway 2 and widen to 100'.		Widen Runway 2-20 to 100'.	
Airfield Impacts								
Runway Length	8,322'		7,000' (No Change)		5,000'		4,650' (No Change)	
Runway Width	100' (No Change)		100' (No Change)		100'		100'	
Declared Distances	Runway 11	Runway 29	Runway 11	Runway 29	Runway 2	Runway 20	Runway 2	Runway 20
TORA	8,322'	8,322'	7,000'	7,000'	5,000'	4,444'	None	None
TODA	8,322'	8,322'	7,000'	7,000'	5,000'	5,000'		
ASDA	8,322'	8,322'	7,000'	7,000'	5,000'	5,000'		
LDA	7,000'	7,000'	7,000'	5,678'	4,444'	4,945'		
Taxiways	Extend Taxiway A east 1,322' to new end of Runway 29.		Extend Taxiway A east 1,322' to new end of Runway 29. Reduce Taxiway A at new approach end of Runway 11.		Offset Taxiway G, for new design category.		Offset Taxiway G, for new design category.	
Runway Safety Area Standards	Declared Distances used to satisfy RSA requirements.		Declared Distances used to satisfy RSA requirements.		Declared Distances used to satisfy RSA requirements.		No Change	
Impacts to Airport Property Use	Reduction in available building area west of relocated approach end of Runway 11 due to RPZ and approach surface shift.		Reduction in available building area west of relocated approach end of Runway 11 due to RPZ and approach surface shift.		Minor. Runway visual zone would shift slightly limiting hangar build out at east and of apron.		No significant change.	
Off-Airport / Community Impacts								
Over flight Impacts	Increased height of aircraft departing Runway 29 and arriving on Runway 11 would reduce overflight impacts west of Airport. Potential increase in aircraft weights / range.		Aircraft would depart on a lengthened Runway 29 allowing greater altitude when overflying nearby residences west. .		Increased utilization for departures on Runway 2.* Increased utilization or Runway 2-20 by all aircraft classifications* *-assumes RW 11-29 is not extended.		Possible increase in utilization of Runway 2-20 by all aircraft classifications* *- Decreased utilization if Runway 11-29 extended.	
Community Noise	See Single Event and Grid Analysis Graphics							
Impacts to Off-Airport Land Use Zones	Increased restrictions east.		Increased restrictions east and reduced restrictions west.		No Change		No Change	
Aeronautical Factors								
Construction impacts to airport operation (e.g., downtime, temporary changes, etc.)	Nighttime work inside RSA – 2 months (Rwy 11-29 closed at night). Daytime closure up to 7 days. Airport closed for 36 hours.		Nighttime work inside RSA – 2 months (Rwy 11-29 closed at night). Daytime closure up to 7 days. Airport closed for 36 hours.		Nighttime work inside RSA – 2.5 months (Rwy 11-29 closed at night). Daytime closure up to 7 days. Airport closed for 36 hours.		Nighttime work inside RSA – 2.5 months (Rwy 11-29 closed at night). Daytime closure up to 4 days. Airport closed for 36 hours.	
Runway Protection Zone	Runway 11 departure RPZ crosses Martis Creek Road. Requires FAA approval.		RW 11 departure RPZ crosses Martis Creek Road. Requires FAA approval. Relocated RW 29 app RPZ crosses Martis Road- requires FAA approval.		With declared distances, Hwy 267 removed from Rwy 2 RPZ. Portion of Rwy 20 RPZ remains off property.		No changes. Highway 267 would remain inside Rwy 2 RPZ. Portion of Rwy 20 RPZ remains off property.	
Potential Property Acquisition (RPZ compliance)	10.0 acres (Runway 29 RPZ)		10.0 acres (Runway 29 RPZ)		11.4 acres (Runway 2 RPZ)		11.4 acres (Runway 2 RPZ)	
Attract Larger Airplanes and Operating Weights and Range	Possible with longer published runway length for Runway 11-29.		Not likely since Runway 11-29 would remain the same length, while reducing LDA on Runway 29.		Possible with longer published runway length and width for Runway 2-20. However, the extension will not result in a runway longer than 11-29, meaning the longest runway at TRK would remain unchanged.		Not likely since Runway 2-20 would remain the same length.	
Effect on All-Weather Capabilities	No Change		No Change		No Change		No Change	
Effect on Night Operations	None. No new instrument lighting proposed.		None. No new instrument lighting proposed.		None. No new instrument lighting proposed.		None. No new instrument lighting proposed.	
Critical Airspace Approach and Departure Surface Considerations	No Change to instrument approach capabilities.		No Change to instrument approach capabilities.		No Change to instrument approach capabilities.		No Change to instrument approach capabilities.	
NAVAIDs	No Change		No Change		No Change		No Change	
Environmental Impact Potential								
Wetlands	Minor or No Impact.		Minor or No Impact.		Potential impact to wetland south of Rwy 2-20. Connection of ditch may be practical to mitigate by culverting.		None	
Earthwork / Fill	18,500 CY		18,500 CY		62,500 CY		None	
Impervious Surfaces (Runways and associated Taxiways)	23,700 SY of additional pavement. (includes extension to Twy A)		23,700 SY of additional pavement. (includes extension to Twy A)		18,778 SY of additional pavement. (does not include Txw G improvements)		13,100 SY of additional pavement. (does not include Txw G improvements)	
Construction Costs								
Estimated Costs (Design, Build and Environmental)	$6.1 Million		$6.1 Million		$6.8 Million		$3.4 Million	

Figure 4-1 RUNWAY ALTERNATIVE MATRIX

Fig 4-1 (11x17)
Reverse Side

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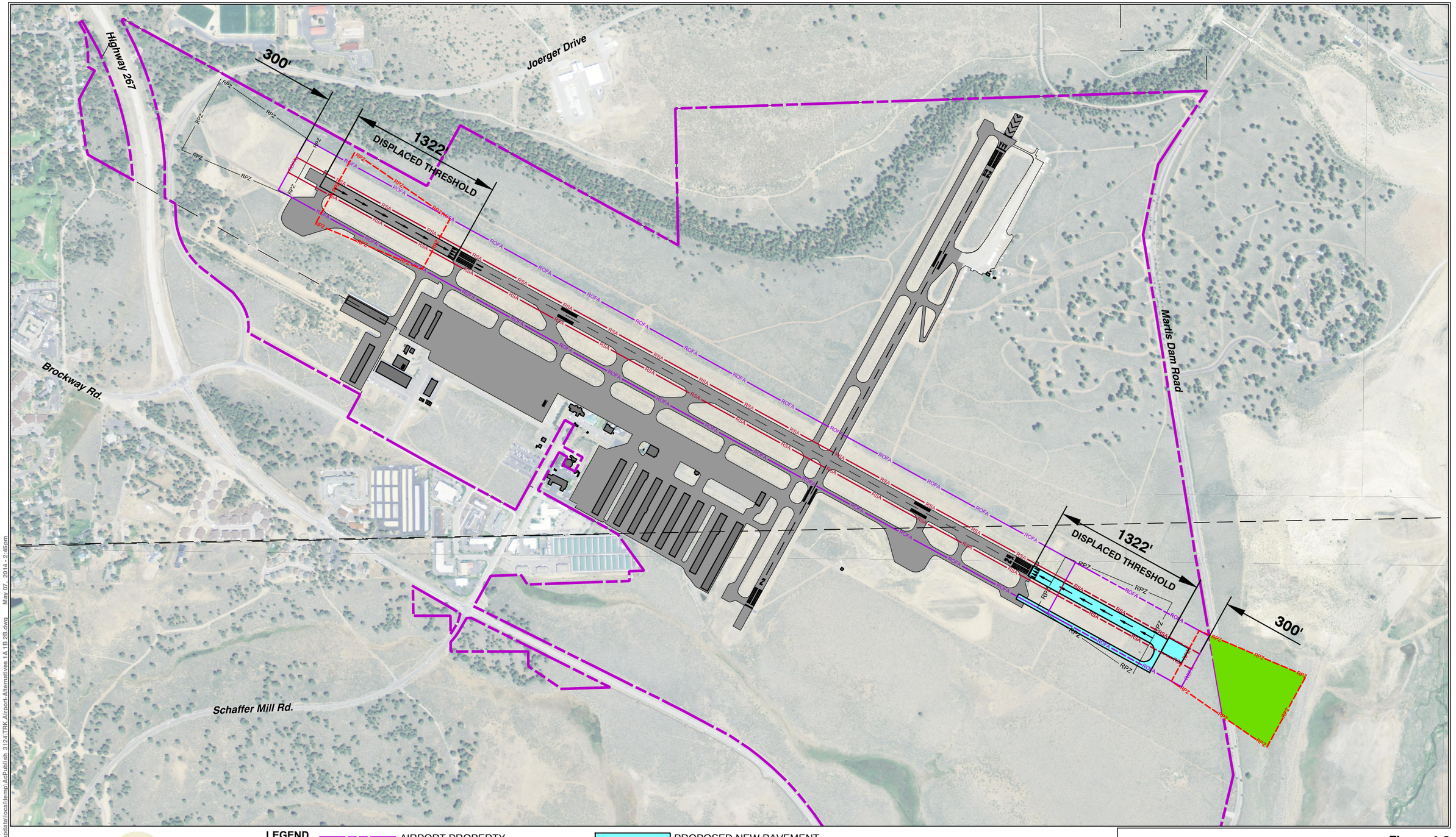

LEGEND

- AIRPORT PROPERTY
- EXISTING RSA
- EXISTING RPZ
- EXISTING OFA
- PROPOSED NEW PAVEMENT
- PROPOSED FUTURE RSA
- PROPOSED FUTURE RPZ
- RPZ - OFF AIRPORT
- PROPOSED FUTURE OFA

400
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DESTINATION 2025 TRUCKEE TAHOE AIRPORT
A MASTER PLAN PENNED BY THE COMMUNITY

Prepared By: Mead&Hunt www.meadhunt.com

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Figure 4-2

Runway Alternative 1A

Truckee Tahoe Airport

Fig 4-2 (11x17)
Reverse Side

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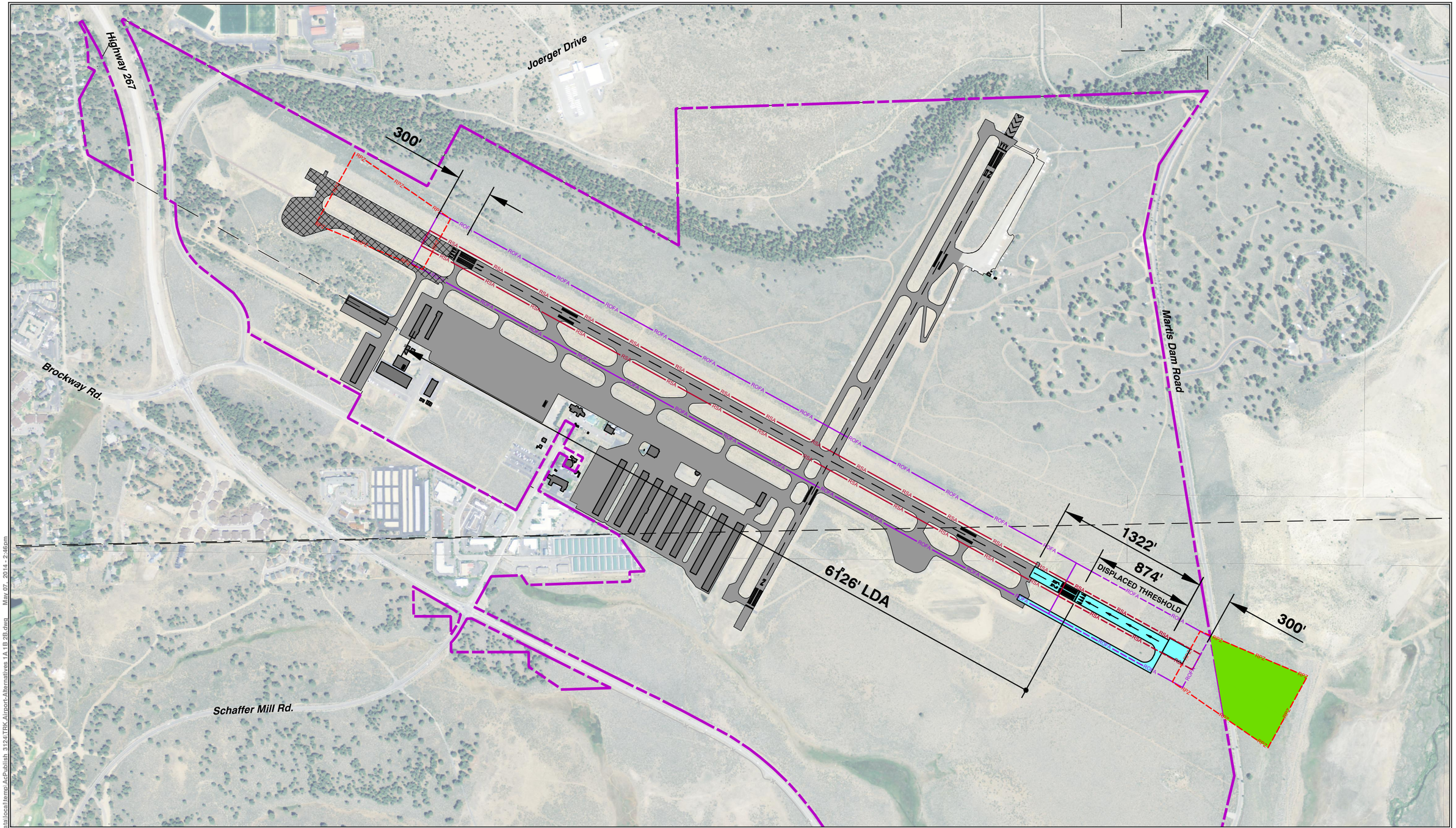

LEGEND

- AIRPORT PROPERTY
- EXISTING RSA
- EXISTING RPZ
- EXISTING OFA
- PAVEMENT TO BE REMOVED
- PROPOSED NEW PAVEMENT
- PROPOSED FUTURE RSA
- PROPOSED FUTURE RPZ
- RPZ - OFF AIRPORT
- PROPOSED FUTURE OFA

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DESTINATION 2025 TRUCKEE TAHOE AIRPORT — A MASTER PLAN PILOTED BY THE COMMUNITY

Prepared By: Mead&Hunt www.meadhunt.com

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Figure 4-3

Runway Alternative 1B

Truckee Tahoe Airport

Fig 4-3 (11x17)
Reverse Side

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TERRAIN CONSIDERATIONS

The analysis assessed the potential to reposition the Runway 29 landing further to the east. As demonstrated in **Figure 4-2** below, the position of the landing threshold is restricted by high terrain east of the airport.

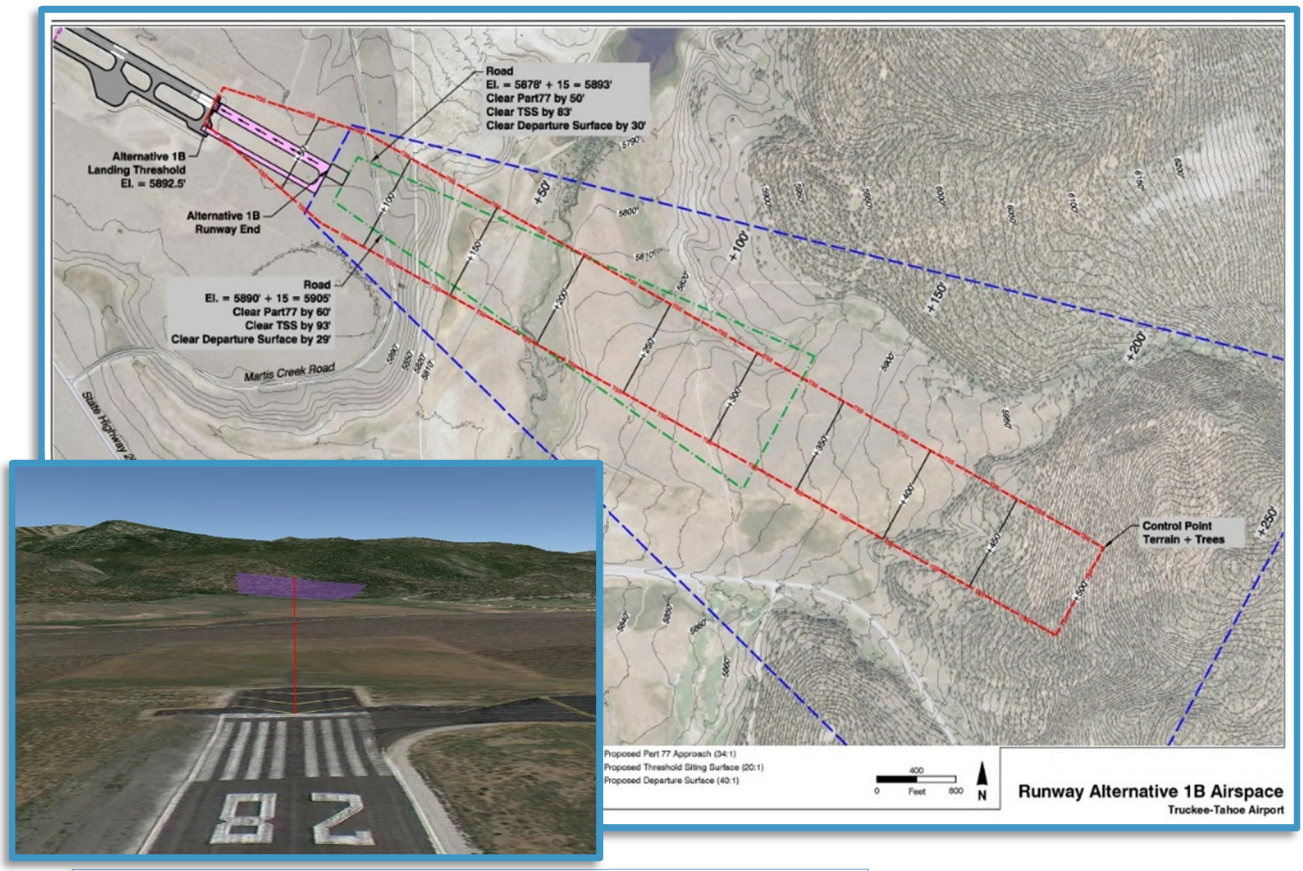


Figure 4-4 TERRAIN IMPACTS TO RUNWAY 29 LANDING THRESHOLD

For purposes of height and noise analysis over Martis Valley Estates and Olympic Heights, Alternatives 1A and 1B are essentially the same. Aircraft would depart on Runway 29 and land on Runway 11 at the same points in both alternatives. The only differences would be the published runway length and distance available for landings on Runway 29. If noise and overflight impacts decrease significantly on residences from this shift, then further analysis will be performed for which alternative (1A or 1B) is more suitable for operations at TRK.

HEIGHT ANALYSIS

An important factor in evaluating the effectiveness of Alternatives 1A and 1B is the height of aircraft over affected residential areas and the degree to which the alternative improves an observer's perception of the event. To assess the visual impacts, existing and future (with alternative implementation) flight profiles were evaluated. This was done by observing the departure profiles of three aircraft that TRK identified as prominent operators: the turbo jet Cessna Citation V (560), the turboprop Piaggio P180 Avanti, and the single-engine piston Cessna 172. **Figures 4-5** through **4-7** illustrate the flight profiles of aircraft after departure from the existing Runway 29 end and proposed Runway 29 end. Each graphic is broken into two viewports: a plan view of the departure path, and a profile view. The plan view gives a comparison of where aircraft are located above neighborhoods in relation to time after departure roll. The profile view compares the altitude of aircraft on a standard departure path, from the existing and proposed end of Runway 29.

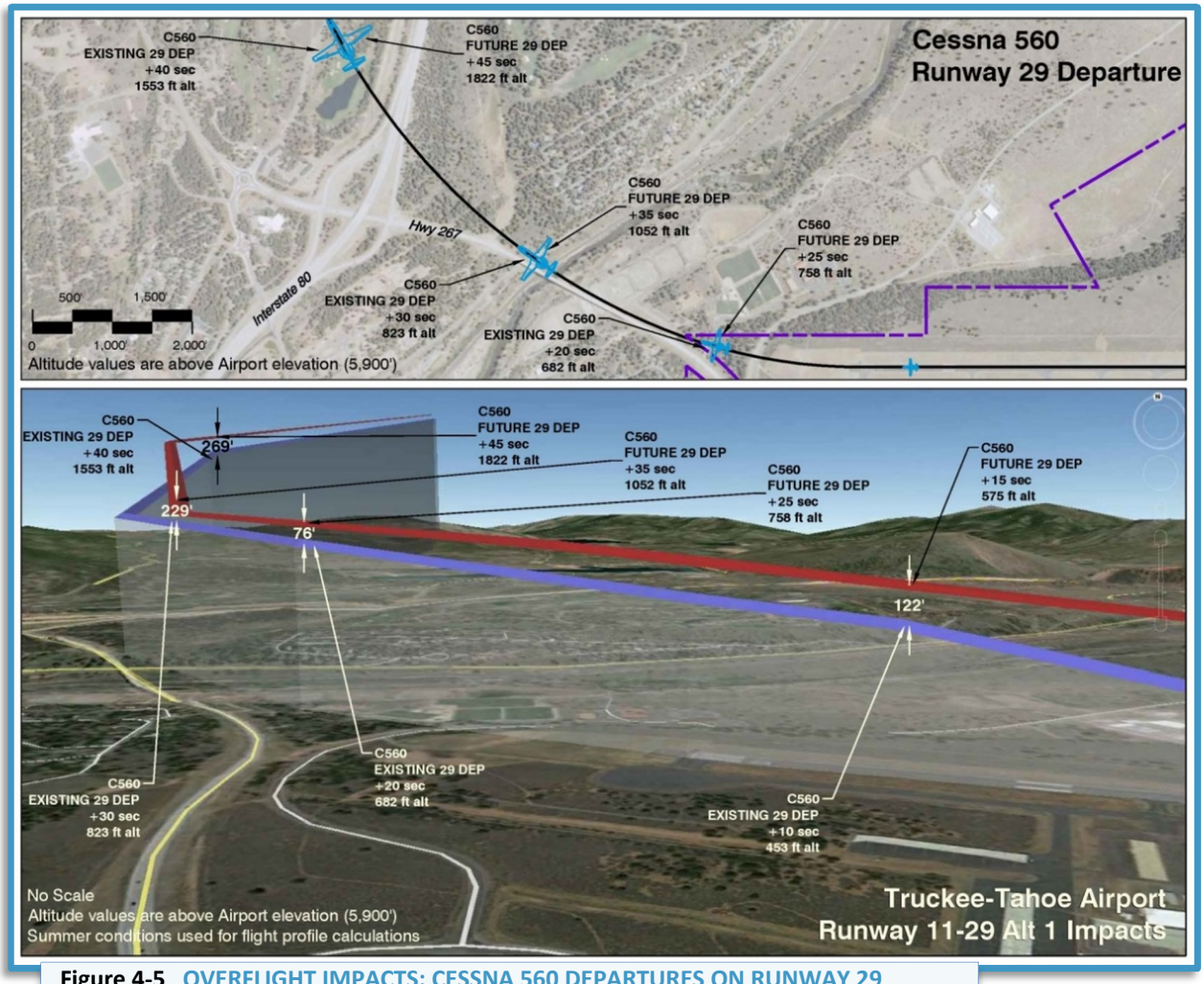


Figure 4-5 OVERFLIGHT IMPACTS: CESSNA 560 DEPARTURES ON RUNWAY 29

Departure Profile on Future Runway 29

Departure Profile on Existing Runway 29

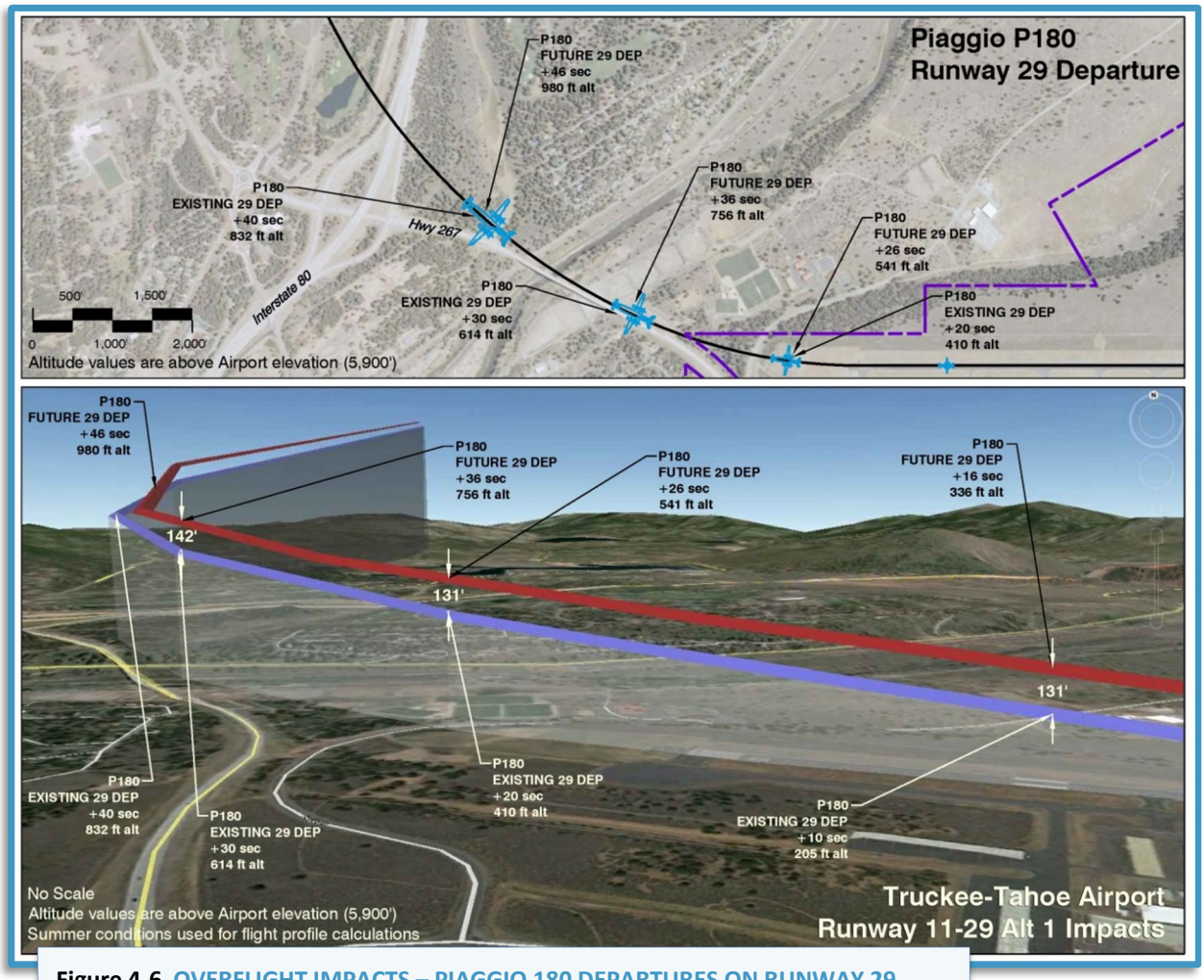


Figure 4-6 OVERFLIGHT IMPACTS – PIAGGIO 180 DEPARTURES ON RUNWAY 29

Departure Profile on Future Runway 29

Departure Profile on Existing Runway 29

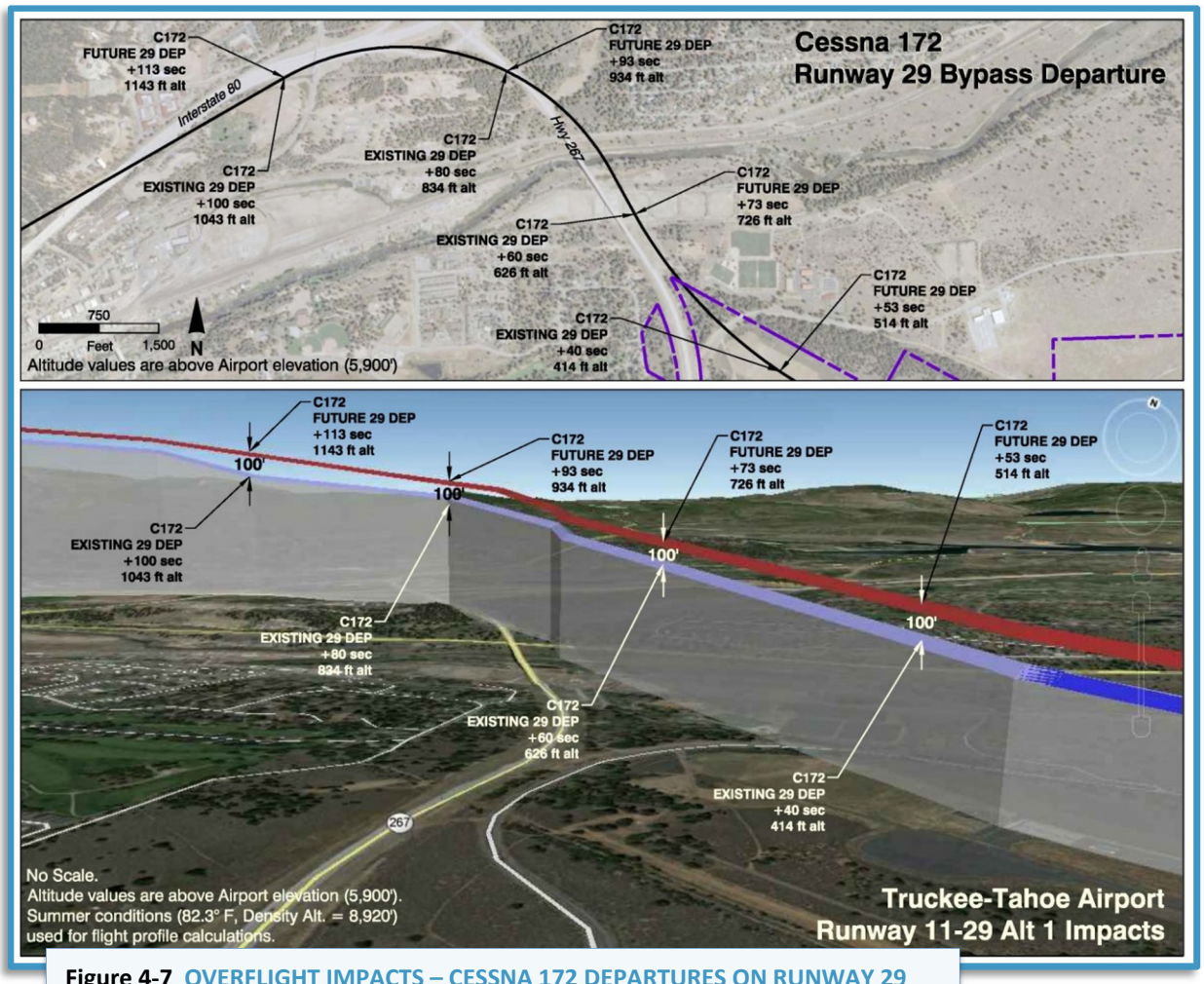


Figure 4-7 OVERFLIGHT IMPACTS – CESSNA 172 DEPARTURES ON RUNWAY 29

Departure Profile on Future Runway 29

Departure Profile on Existing Runway 29

For each aircraft scenario, aircraft would be higher when departing from the proposed end of Runway 29. For the Cessna 560 turbo-jet, differences in departure profile would be 120-200 feet. For the Piaggio 180, the difference in altitude on departure is 130 feet, and for the Cessna 172 the difference is 100 feet. It was determined that these differences of a hundred feet would not be noticeable to people on the ground.

NOISE ANALYSIS

An analysis was undertaken to quantify and convey aircraft noise and how it might improve if this alternative were to be implemented. TTAD specifically required an assessment of sound levels and event duration. Repetition of noise events are not specifically affected by this alternative.

The FAA's Integrated Noise Model (INM) was used to model single-event aircraft operations. The analysis assessed maximum noise levels for individual flight operations of the three aircraft noted above and displayed these as maximum noise contour lines. To assess annoyance related to duration, the grid-point analysis quantified time (in

seconds above 65 decibels). Points were spread out at 600-foot intervals. Graphics were then created to illustrate time above 65 decibels on a chromatic scale to help illustrate noise impacts.

Figure 4-8 illustrates examples of noise footprints for arrivals and departures of aircraft that typically operate at TRK. These footprints show single-event Lmax contours from a runway at 5,900 feet elevation above mean sea level. Figure 4-8 provides scale and a better understanding of the differences in noise impacts each aircraft produces.

Figures 4-9 through **4-18** illustrate noise impacts for Martis Valley Estates, Olympic Heights and vicinity for single event operations and seconds above 65 decibels per operation. Observing differences at common grid points (for identical aircraft in existing and future scenarios) shows little change in time exposure above 65 decibels.

For instance, when looking at the Cessna Citation departure from the existing Runway 29 end versus the proposed Runway 29 end (Figures 4-9 and 4-10), there is little difference in time exposure. The same is true for the other the aircraft—extending the runway 1,322 feet to the east does not produce a significant decrease in noise exposure over residences west of the airport.

LMAX and Single Event Definitions

Lmax (maximum sound level). This is the loudest sound measured at a location during an aircraft's operation. It is useful for determining detectable noise changes. A 3 dB increase in Lmax is "barely perceptible," while a 5dB increase in Lmax is "clearly perceptible."

TA (Time Above). This is a single-event metric. It provides the number of minutes an aircraft's noise level is louder than a reference noise level during a given period, Examples include the duration an aircraft is louder than the ambient noise or louder than the level above which speech interference may occur. TA may include information ranging from time above a specific noise level at a specific point, to the time above multiple levels (in 10 dB increments) throughout an area at specified grid points.

Source: FAA's Airports Desk Reference, Chapter 17 Noise

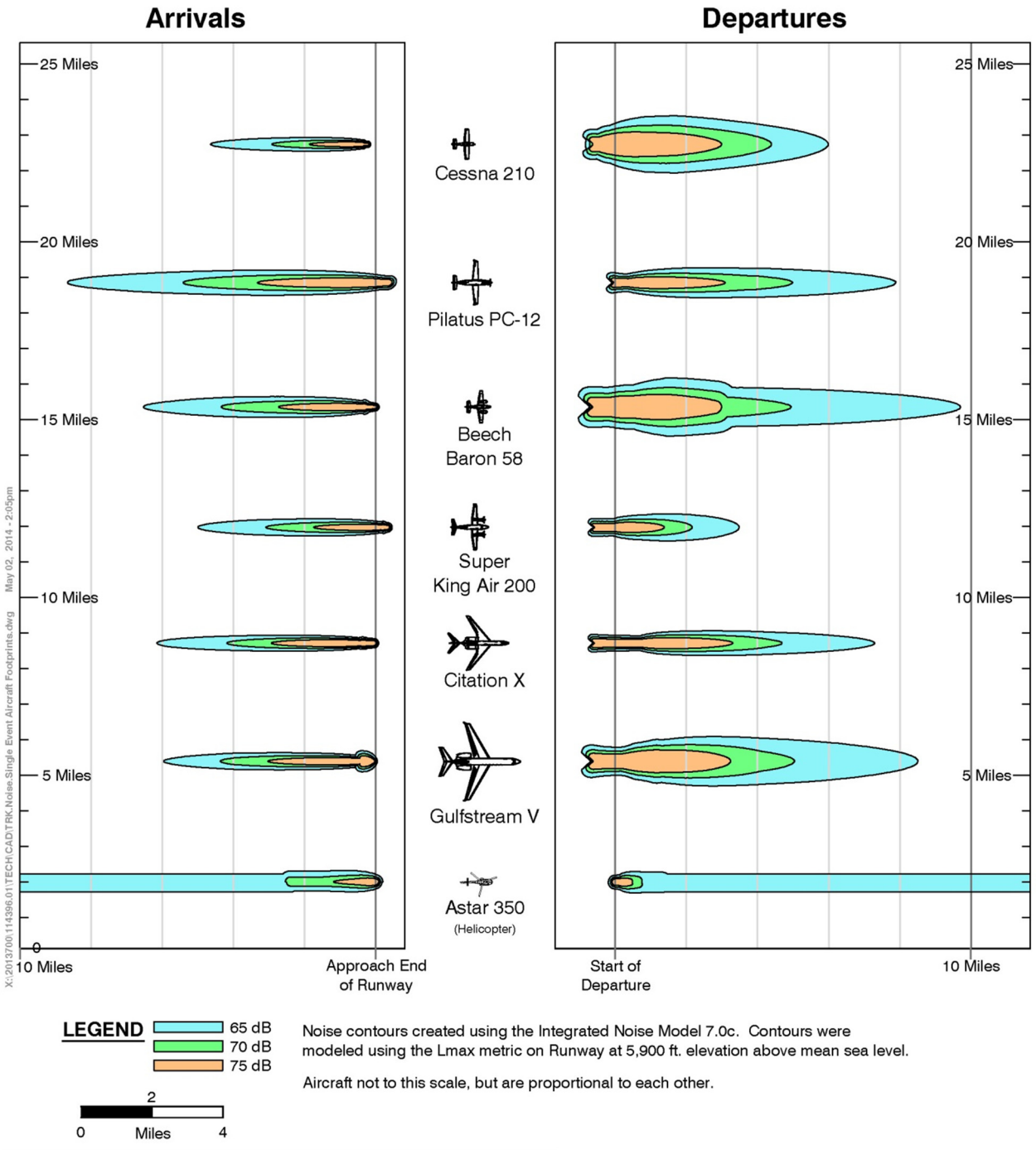


Figure 4-8 SINGLE EVENT AIRCRAFT NOISE FOOTPRINTS

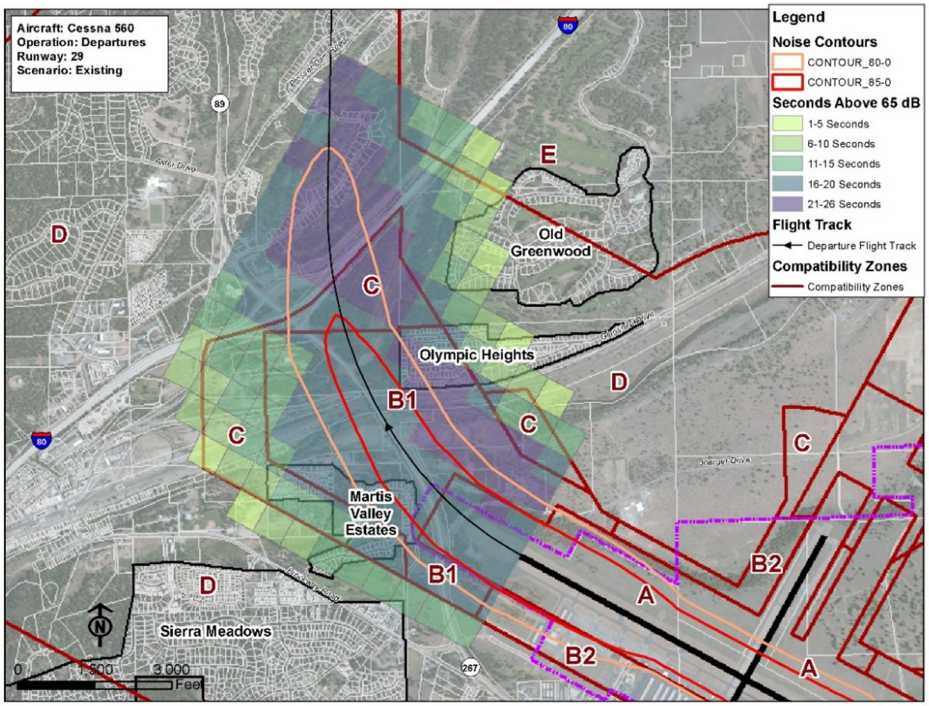


Figure 4-9 NOISE IMPACTS – CESSNA 560 DEPARTURE ON EXISTING RUNWAY 29

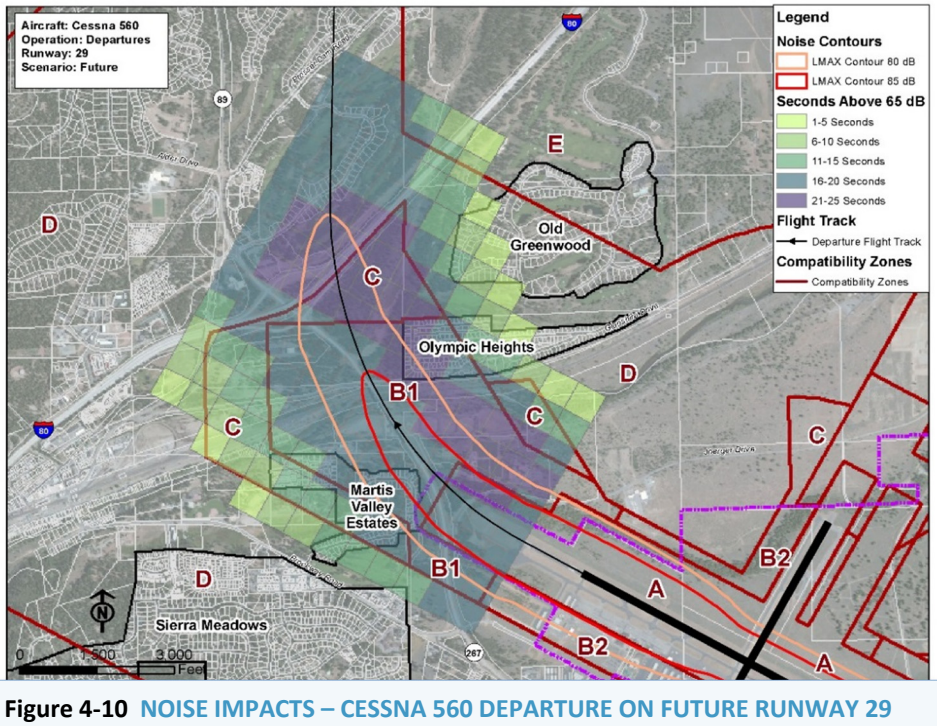


Figure 4-10 NOISE IMPACTS – CESSNA 560 DEPARTURE ON FUTURE RUNWAY 29

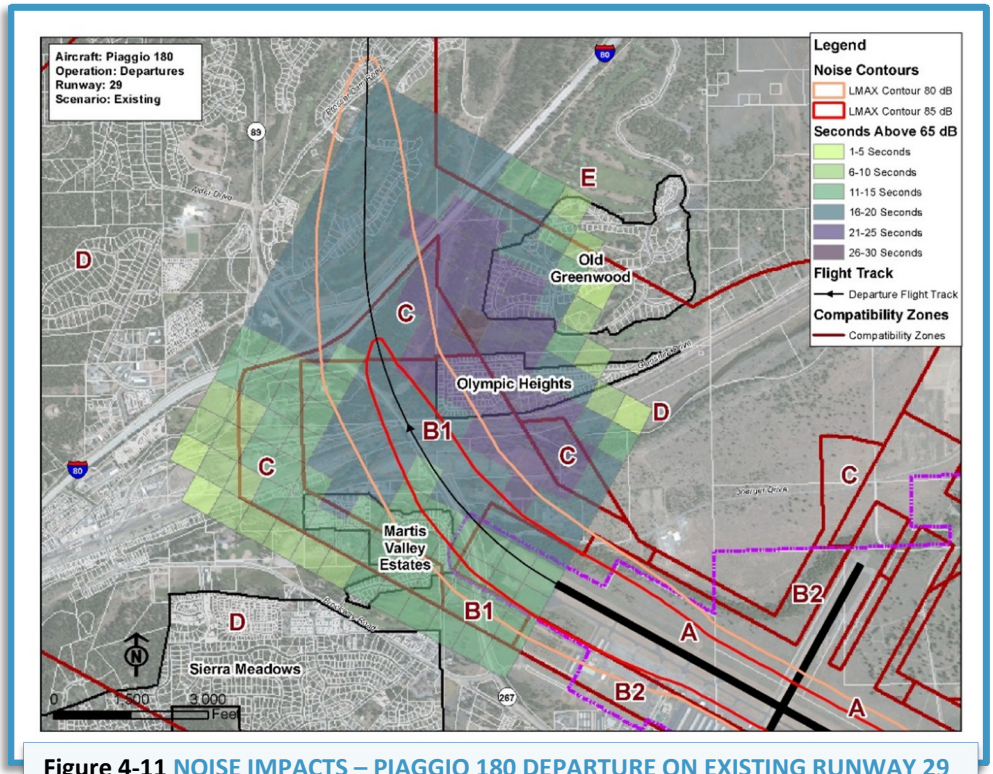


Figure 4-11 NOISE IMPACTS – PIAGGIO 180 DEPARTURE ON EXISTING RUNWAY 29

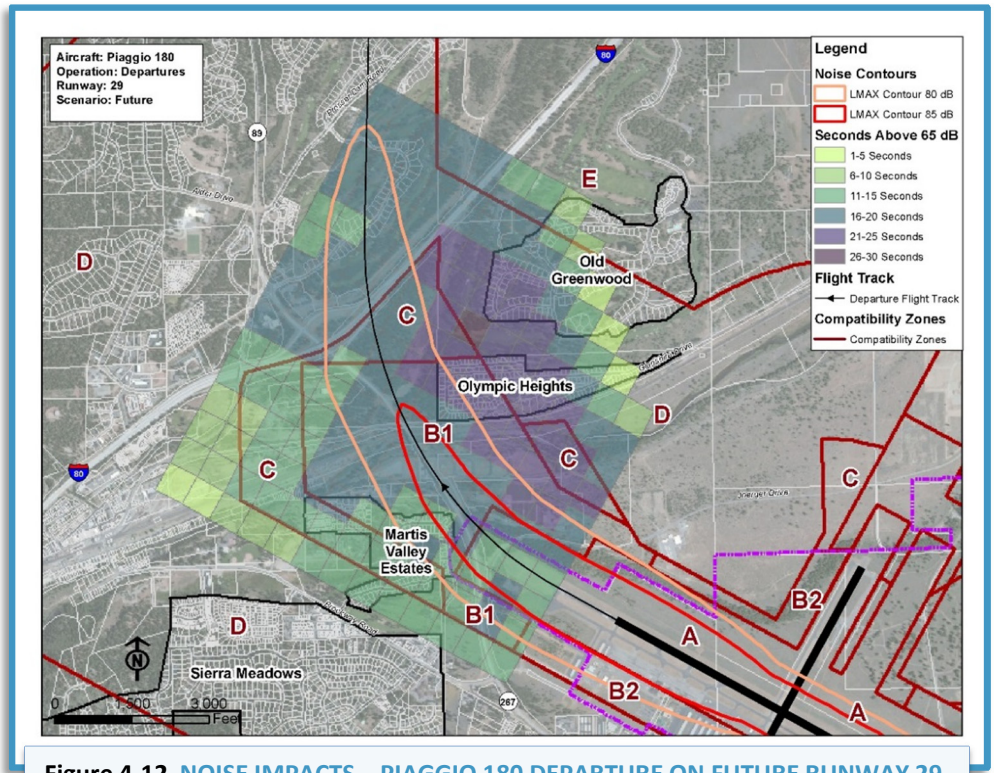


Figure 4-12 NOISE IMPACTS – PIAGGIO 180 DEPARTURE ON FUTURE RUNWAY 29

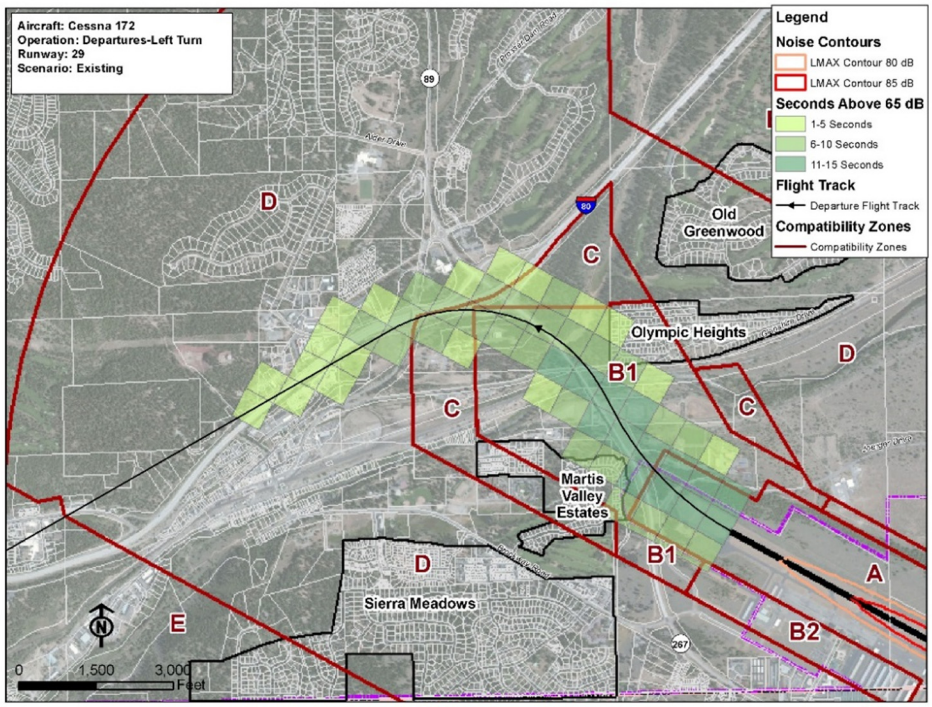


Figure 4-13 NOISE IMPACTS – CESSNA 172 DEPARTURE ON EXISTING RUNWAY 29

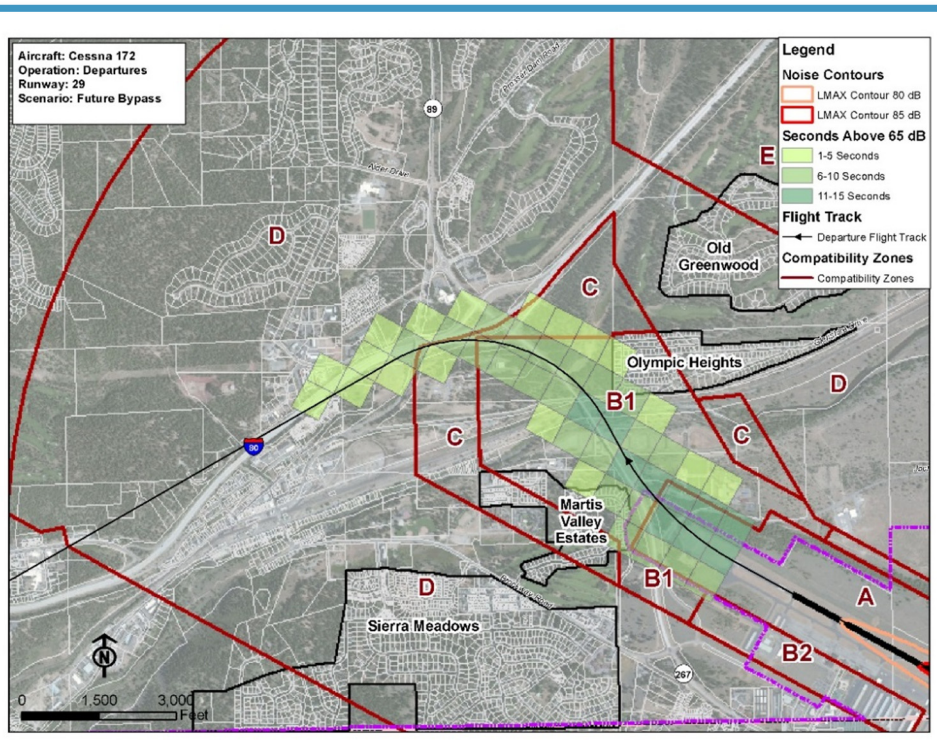


Figure 4-14 NOISE IMPACTS – CESSNA 172 DEPARTURE ON FUTURE RUNWAY 29

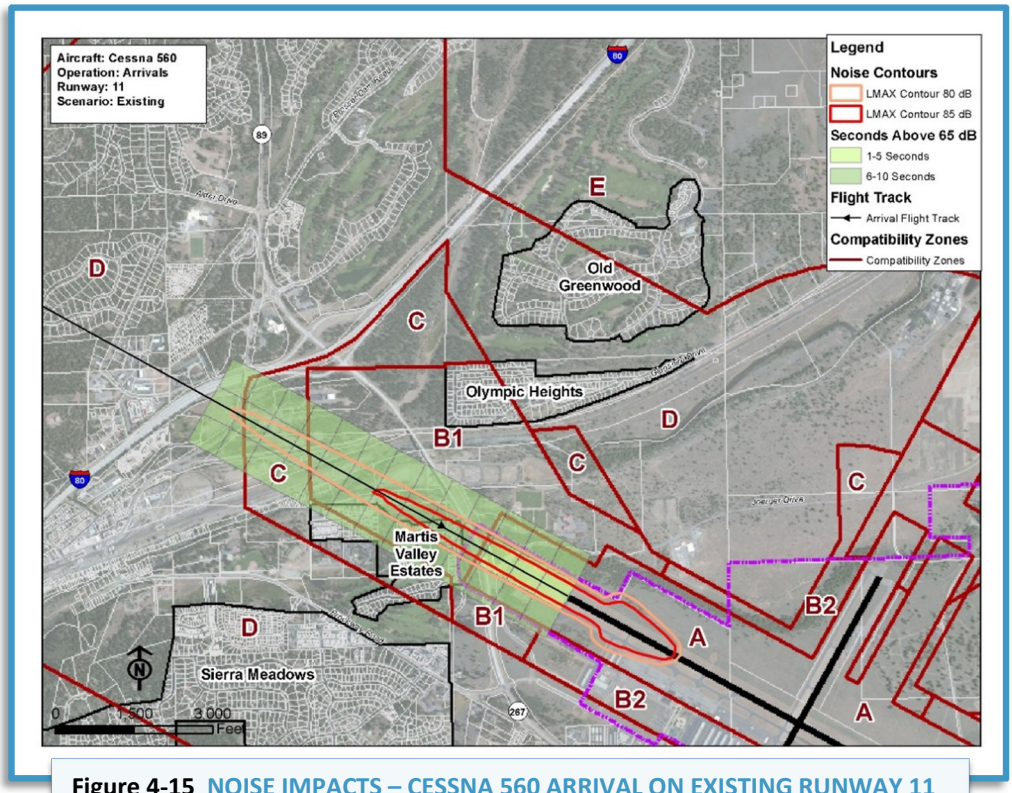


Figure 4-15 NOISE IMPACTS – CESSNA 560 ARRIVAL ON EXISTING RUNWAY 11

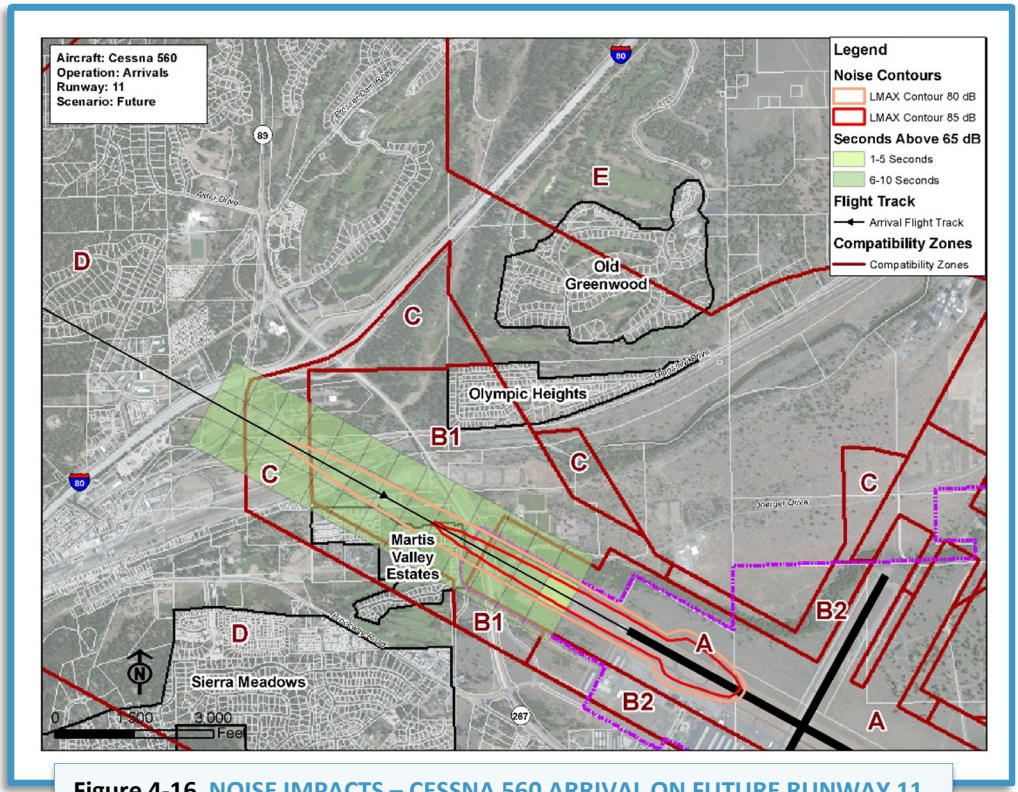


Figure 4-16 NOISE IMPACTS – CESSNA 560 ARRIVAL ON FUTURE RUNWAY 11

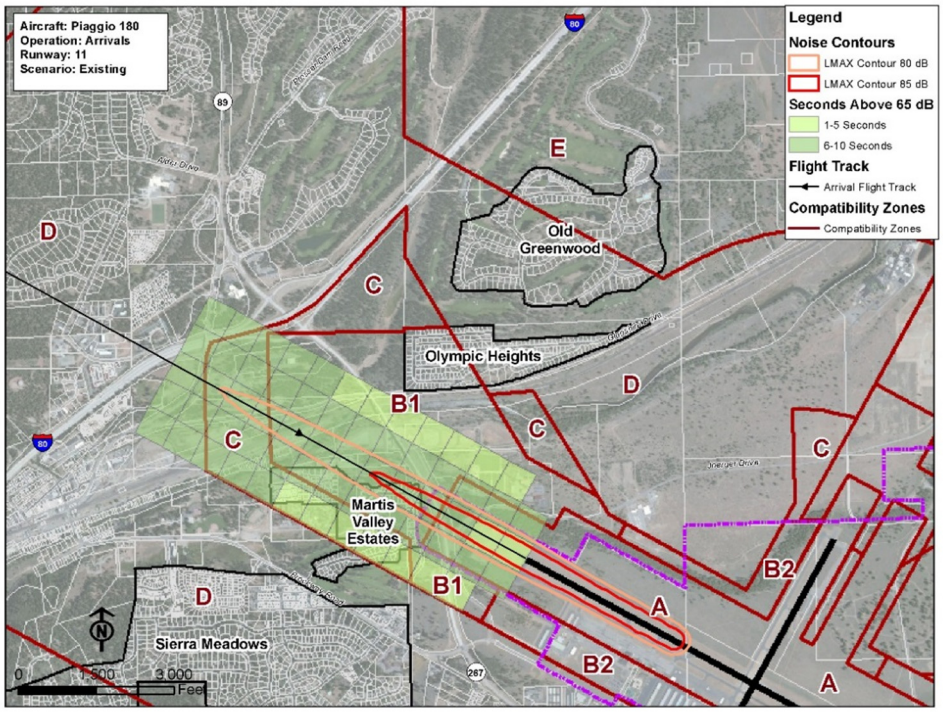


Figure 4-17 NOISE IMPACTS – PIAGGIO 180 ARRIVAL ON EXISTING RUNWAY 11

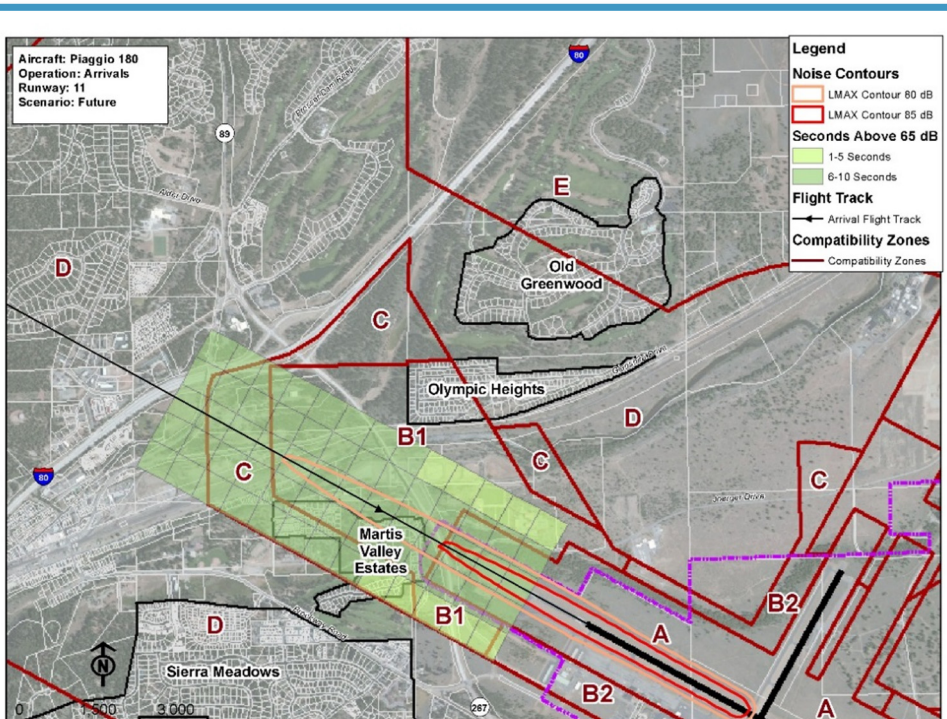


Figure 4-18 NOISE IMPACTS – PIAGGIO 180 ARRIVAL ON FUTURE RUNWAY 11

PRELIMINARY COSTS ESTIMATES

Costs to design and build Alternative 1A or 1B were calculated at $6.1 million. This figure includes design and environmental mitigation. Costs assume two months of nighttime work inside the RSA when Runway 11-29 would need to be closed at night, although other options for timing and closure are available.

Alternative 1 – Conclusion

The analysis was presented to the TTAD board and the public at an open house session. The general consensus of the participants was that the difference in aircraft altitude would not be perceptible.

Based on the conclusions from the following criteria, Alternatives 1A and 1B are not recommended for planning and implementation proposes.

- **Implementation and construction costs of $6.8 million – Acceptable only if adequate community benefits can be realized.**
- **Improvement to visual impacts – No significant benefit anticipated.**
- **Reduced noise impacts on a per operations basis (maximum sound levels and event duration) – No significant benefit anticipated.**

Declared Distances represent the maximum distances available and suitable for meeting takeoff, rejected takeoff, and landing distances performance requirements for turbine powered aircraft. The declared distances are Takeoff Run Available (TORA) and Takeoff Distance Available (TODA), which apply to takeoff; Accelerate Stop Distance Available (ASDA), which applies to a rejected takeoff; and Landing Distance Available (LDA), which applies to landing.

Declared distances may be used to obtain additional RSA and/or ROFA prior to the runway's threshold (the start of the LDA) and/or beyond the stop end of the LDA and ASDA, to mitigate unacceptable incompatible land uses in the RPZ, to meet runway approach and/or departure surface clearance requirements, in accordance with airport design standards, or to mitigate environmental impacts.

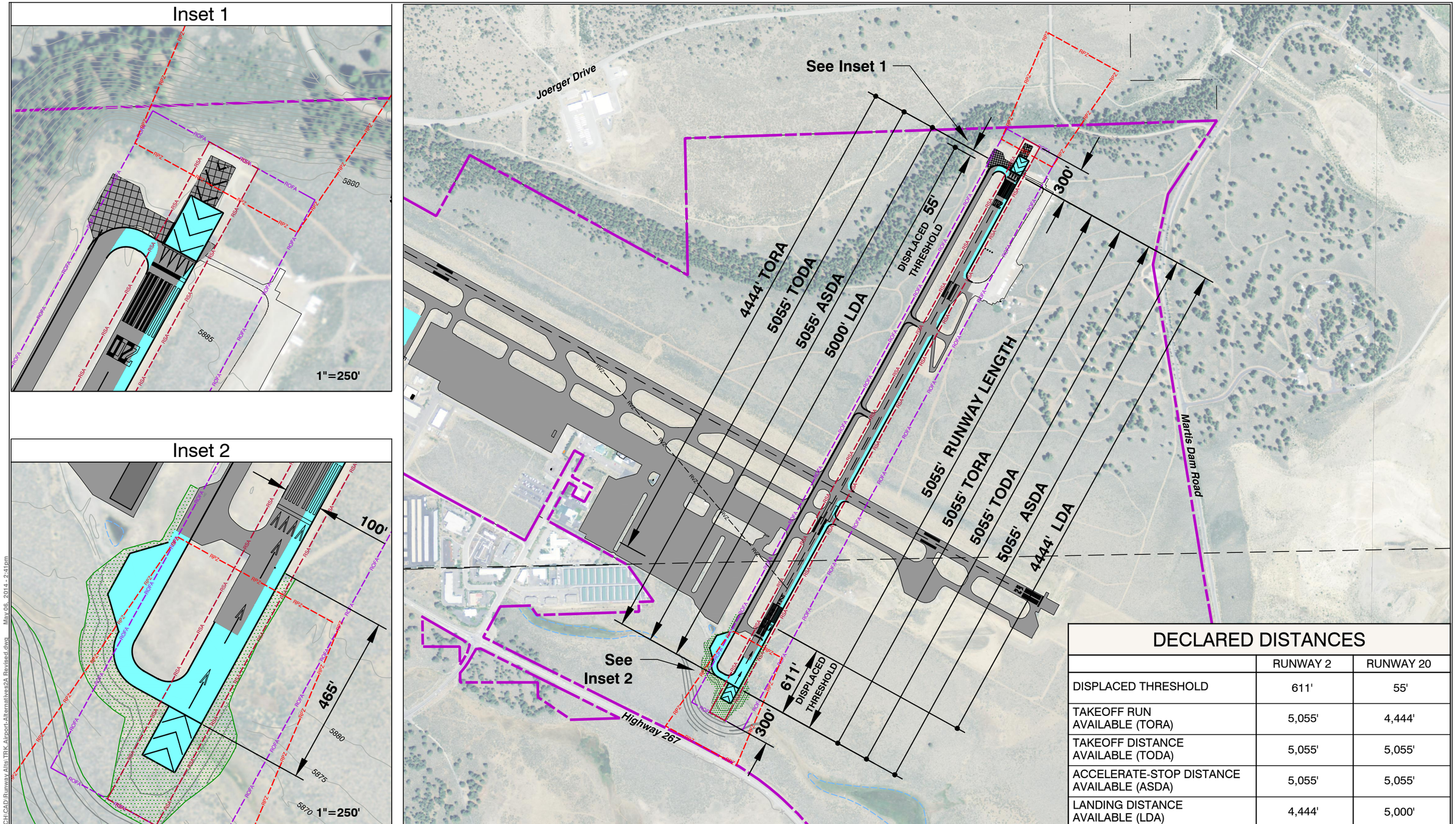
Source: FAA AC 150/5300-13A

Alternative 2 – Runway 2-20 Modifications

The purpose of Alternative 2 is to more evenly distribute air traffic between the two runways to reduce the number of noise events affecting residential areas west of the airport. The alternative involves physical improvements to make Runway 2-20 more attractive to aircraft operators. In this regard, two scenarios of improvements were considered: increase in length and width (2A) and width only (2B).

An upgrade to runway dimensions (length and width) is the most practical way to entice more operations on that runway. Alternative 2A considers widening Runway 2-20 to 100 feet, plus extending the runway to reach a landing distance available on Runway 20 of 5,000 feet (declared distances are used to accomplish this length – see side bar). General industry standards for charter companies cite 5,000 of runway length as a benchmark for being able to land and depart on.

To accomplish this, Runway 2-20 would be lengthened to the south. Lengthening to the north was considered but deemed impractical (see Dismissed Runway Options above) due to steep terrain at the approach end of Runway 20. Alternative 2A is presented in **Figure 4-19**. Alternative 2A extends Runway 2-20 465 feet to the south so total length of the runway equals 5,055 feet. The landing threshold for Runway 2 would be displaced 611 feet from the proposed runway end. The threshold displacement shifts the runway protection zone (RPZ) for Runway 2 north.



DECLARED DISTANCES

	RUNWAY 2	RUNWAY 20
DISPLACED THRESHOLD	611'	55'
TAKEOFF RUN AVAILABLE (TORA)	5,055'	4,444'
TAKEOFF DISTANCE AVAILABLE (TODA)	5,055'	5,055'
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	5,055'	5,055'
LANDING DISTANCE AVAILABLE (LDA)	4,444'	5,000'

Figure 4-19

Runway Alternative 2A

Truckee Tahoe Airport

Fig 4-19 (11x17)
Reverse Side

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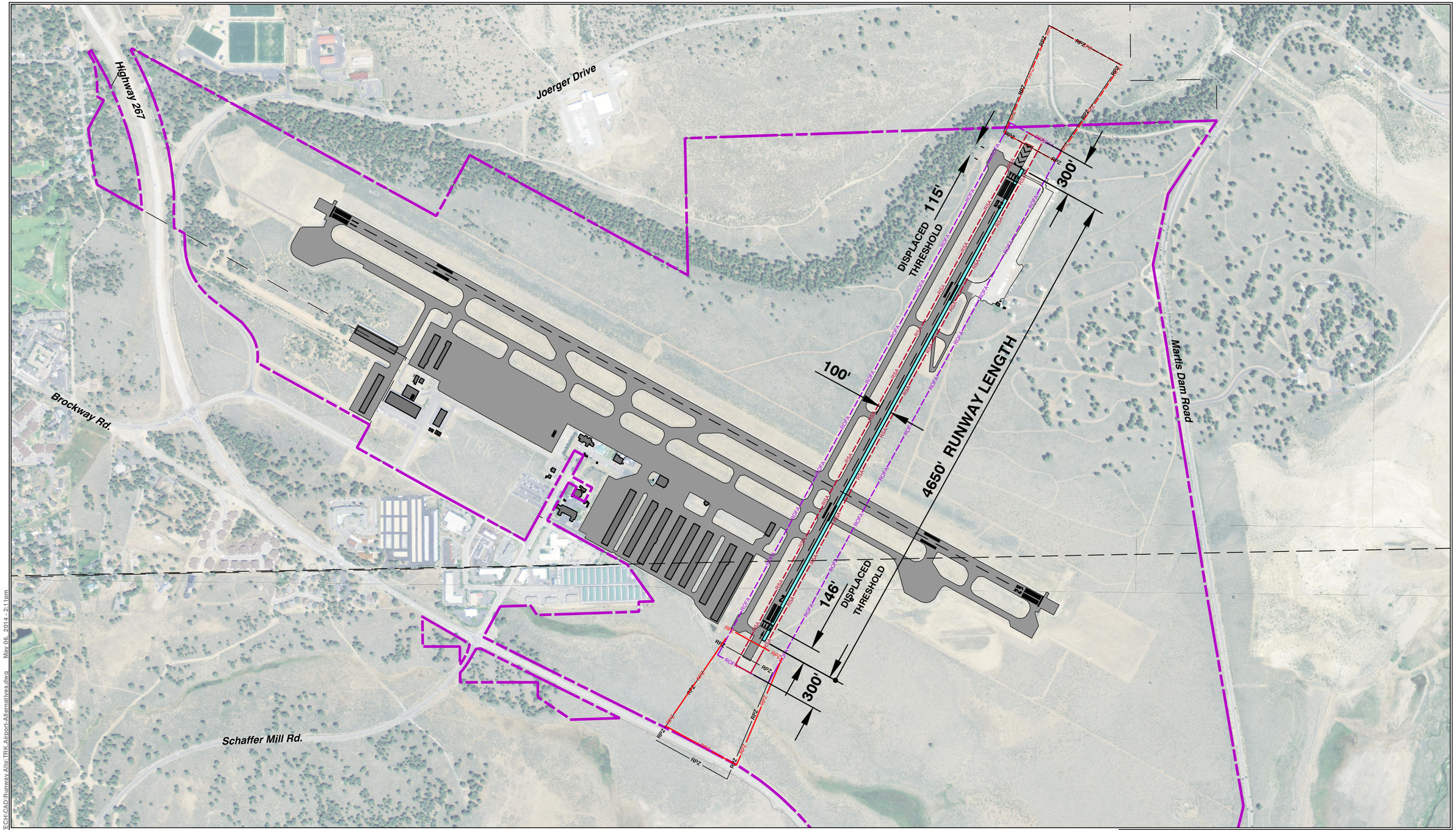

Figure 4-20

Runway Alternative 2B

Truckee Tahoe Airport

Fig 4-20 (11x17)
Reverse Side

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This results in the RPZ for Runway 2 avoiding Highway 267 and makes the RPZ compliant with current FAA design standards, as explained in Chapter 3.

Alternative 2B proposes only widening Runway 2-20 to 100 feet, with no lengthening. The objective remains to attract more aircraft to operate on Runway 2-20, but with less cost and environmental impact than Alternative 2A. The landing threshold for Runways 2 and 20 would remain in the same locations. Alternative 2A is presented in **Figure 4-20**.

VISUAL IMPACT OF RUNWAY EXTENSION

Maintaining scenic views of the Martis Valley area is of primary importance to the TTAD. Analysis was conducted to assess the visual impact of extending Runway 2-20 to the south. This would involve extending the graded runway safety area and realigning or culverting a drainage ditch off the south end of the runway.

A visual comparison between the existing configuration and extending the runway are shown below. **Figure 4-21** shows the view of the existing approach end of Runway 2 from Highway 267, looking northeast, and **Figure 4-22** shows the same view with proposed extension.

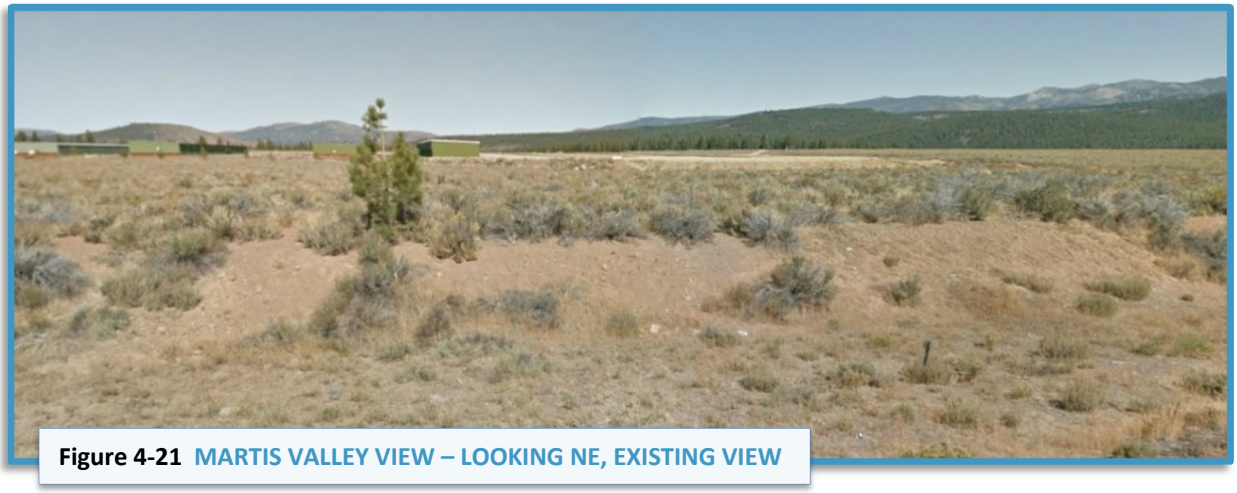


Figure 4-21 MARTIS VALLEY VIEW – LOOKING NE, EXISTING VIEW

Figure 4-22 MARTIS VALLEY VIEW – LOOKING NE, VIEW WITH RUNWAY EXTENSION

Figure **4-23** illustrates the view of the existing approach end of Runway 2 from Highway 267, looking northwest, and Figure **4-24** shows the same view with proposed extension.

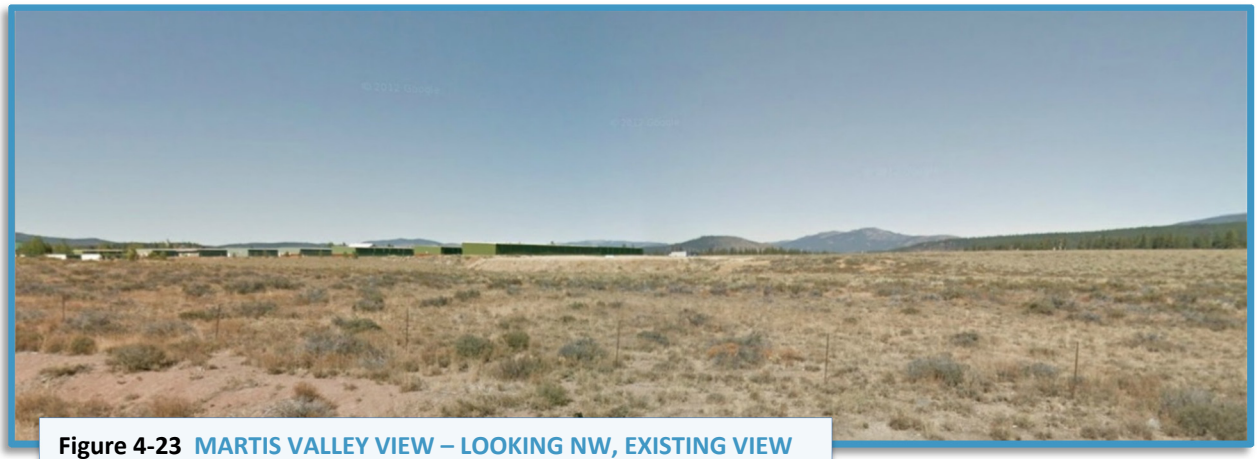


Figure 4-23 MARTIS VALLEY VIEW – LOOKING NW, EXISTING VIEW

Figure 4-24 MARTIS VALLEY VIEW – LOOKING NW, VIEW WITH RUNWAY EXTENSION

To give some perspective, Google Earth imagery was utilized to provide a birds-eye view of the extension, from an elevation of about 50 feet above Highway 267. **Figure 4-25** shows the existing layout of the approach end of Runway 2, and **Figure 4-26** shows the proposed layout looking northwest.

The information was presented to the TTAD board and to the public during an open house session. The consensus was that the proposed extension would not significantly affect the scenic views of Martis Valley.

Figure 4-25 MARTIS VALLEY VIEW – BIRDS EYE LOOKING NW, EXISTING VIEW

Figure 4-26 MARTIS VALLEY VIEW – BIRDS EYE LOOKING NW, VIEW WITH RUNWAY EXTENSION

PROJECTED RUNWAY UTILIZATION

Pilots have the final decision for determining the safe operation of their aircraft. Various factors go into choosing which runway to use at an airport with multiple runways. Discussions with local pilots determined the following priorities are typically used in runway selection at TRK:

- Pavement Strength
- Wind direction and velocity
- Runway length
- Instrument conditions/Approach availability
- Airport outreach/Local communication efforts
- Taxi distance
- On course/arrival direction
- Glider activity
- Runway width

Applying the above prioritization, an anecdotal analysis was conducted to assess runway utilization by aircraft classification by extrapolating known current activity to the two alternative scenarios (2A and 2B). **Tables 4-1** and **4-2** display the results of this analysis.

Table 4-1 Runway Utilization Percentages, Alternative 2A

		DEPARTURES				ARRIVALS			
		Existing		Alternative 2A		Existing		Alternative 2A	
		% of ops	Total Departures	% of ops	Total Departures	% of ops	Total Arrivals	% of ops	Total Arrivals
11	Piston	4%	357	---	357	4%	357	---	357
	Turboprop	4%	57	---	57	4%	57	---	57
	Turbo Jet	3%	23	---	23	3%	23	---	23
29	Piston	77%	6,865	58% ↓	5,171	66%	5,884	47% ↓	4,190
	Turboprop	88%	1,261	76% ↓	1,089	82%	1,175	64% ↓	917
	Turbo Jet	96%	735	88% ↓	674	94%	720	83% ↓	636
2	Piston	8%	713	16% ↑	1,426	8%	713	16% ↑	1,426
	Turboprop	2%	29	8% ↑	115	2%	29	8% ↑	115
	Turbo Jet	0.5%	4	6% ↑	46	1%	8	4% ↑	31
20	Piston	11%	981	22%↑	1,961	22%	1,961	33% ↑	2,942
	Turboprop	6%	86	12% ↑	172	12%	172	24% ↑	344
	Turbo Jet	0.5%	4	3% ↑	23	2%	15	10% ↑	77

--- No Change in Data

Table 4-2 Runway Utilization Percentages, Alternative 2B

		DEPARTURES				ARRIVALS			
		Existing		Alternative 2B		Existing		Alternative 2B	
		% of ops	Total Departures	% of ops	Total Departures	% of ops	Total Arrivals	% of ops	Total Arrivals
11	Piston	4%	357	---	357	4%	357	---	357
	Turboprop	4%	57	---	57	4%	57	---	57
	Turbo Jet	3%	23	---	23	3%	23	---	23
29	Piston	77%	6,865	---	6,865	66%	5,884	---	5,884
	Turboprop	88%	1,261	85.5% ↓	1,225	82%	1,175	78% ↓	1,118
	Turbo Jet	96%	735	95% ↓	728	94%	720	91.5% ↓	701
2	Piston	8%	713	---	713	8%	713	---	713
	Turboprop	2%	29	3% ↑	43	2%	29	3% ↑	43
	Turbo Jet	0.5%	4	1% ↑	8	1%	8	1.5% ↑	11
20	Piston	11%	981	---	981	22%	1,961	---	1,961
	Turboprop	6%	86	7.5% ↑	107	12%	172	15% ↑	215
	Turbo Jet	0.5%	4	1% ↑	8	2%	15	4% ↑	31

--- No Change in Data

NOISE ANALYSIS

An analysis of noise impacts was performed for departures on Runway 2. This analysis looked at neighborhoods located north of the airport, including the Glenshire community, which aircraft departing Runway 2 may overfly.

Since lengthening Runway 2-20 is considered, it was essential to provide a noise analysis identical to that performed for Alternatives 1A and 1B. As with Alternatives 1A and 1B, TTAD specifically required an assessment of sound levels and event duration. The number of events was not specifically considered in the evaluation of this alternative.

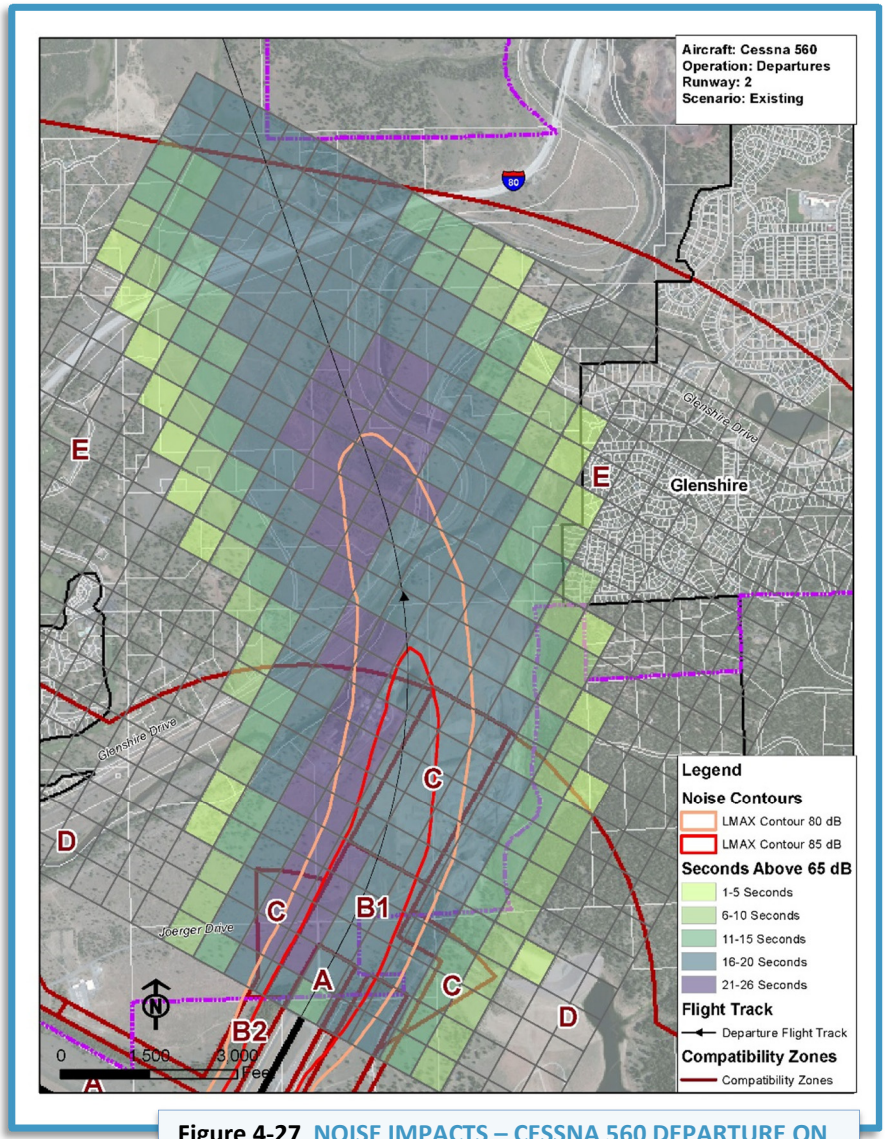


Figure 4-27 NOISE IMPACTS – CESSNA 560 DEPARTURE ON EXISTING RUNWAY 2

The analysis displayed maximum noise levels for individual flight operations as maximum noise contour lines. To assess annoyance related to duration, the grid-point analysis quantified time (in seconds above 65 decibels). Points were spread out at 600 feet intervals. The aircraft selected for evaluation was the turbo jet Cessna Citation V (560).

Figure 4-27 illustrates noise impacts for departures on existing Runway 2 from a Cessna Citation V and **Figure 4-28** for departures on the extended runway. Observing differences at common grid points between the two exhibits shows little change in time exposure above 65 decibels. It should also be observed that impacts from departures on the existing Runway 2 over Glenshire are minimal, since most aircraft follow the departure track shown in Figure 4-27 and turn left to avoid direct overflight of residences. It is anticipated this departure path will be retained in the future regardless of whether this alternative is implemented.

PRELIMINARY COSTS ESTIMATES

Costs to design and build Alternative 2A were calculated at $6.8 million and 2B at $3.4 million. These figures include design and environmental mitigation. Both alternatives would require new electrical work since the runway would be widened. Costs assume 2.5 months of nighttime work inside the RSA when Runway 2-20 would need to be closed at night. Nighttime closures are suggested, but add to the cost. Other construction timing and logistical options are available. A significant cost factor for 2A is acquiring fill for the southerly extension of the runway. If fill can be acquired from on site, the cost may be less.

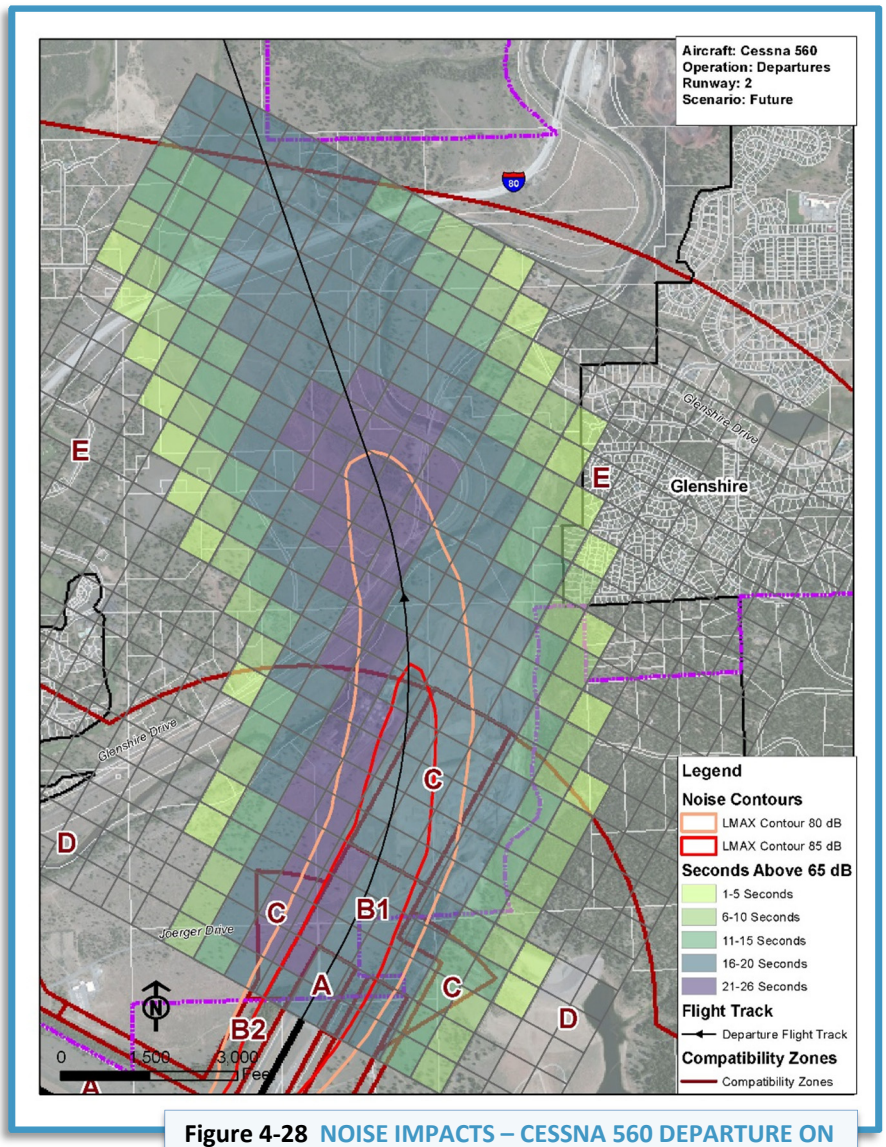


Figure 4-28 NOISE IMPACTS – CESSNA 560 DEPARTURE ON FUTURE RUNWAY 2

Alternative 2A and 2B Conclusions

Based on the conclusions drawn from the following criteria, Alternative 2A is recommended for planning and implementation purposes. Alternative 2B is not.

- **Scenic Impacts:**
  2A – Acceptable level of impact
  2B – Acceptable level of impact

- **Achieves Aircraft Dispersion Objectives**
  2A – Achievable with enhanced TTAD outreach and other airfield design upgrades.
  2B – No significant benefits.

SELECTED RUNWAY ALTERNATIVE

Alternative 2A is recommended for incorporation into the airport layout plan (ALP) and subsequent environmental and implementation plans. Extending Runway 2-20 to 5,055 feet and widening to 100 feet offers the best possibility for dispersing traffic. Detailed technical analysis for Runway 2-20 runway length requirement is provided in Appendix D. To fully achieve the dispersion objectives, Runway 2-20 should also incorporate RDC B-II design upgrade. The following actions are required to widen and lengthen Runway 2-20:

- **410 feet of additional of pavement for runway extension, plus 25 feet over the entire length to widen.**
- **62,500 cubic yards of fill.**
- **Drainage ditch realignment or culvert.**
- **New electrical on east side of Runway.**
- **New electrical on Taxiway G.**

To bring Runway 2-20 into conformance with B-II design standards, the following are required:

- **Widen the runway safety area (RSA) to 150 feet in width and extend 300 feet beyond each end.**
- **Offset the parallel taxiway (G) Runway to 240 feet from runway centerline (180 feet today).**
- **Offset the runway hold lines on connector taxiways to 200 feet from runway centerline (125 feet today).**
- **Increase runway object free area width to 500 feet.**

Offsetting Taxiway G is addressed in Section 3. By realigning Taxiway G to 240 feet from Runway 2-20 centerline, the hold lines and runway OFA non-standard conditions would also be alleviated.

2.2 Enhanced Flight Control / Advisory Options

The objective of this alternative is to reduce overflight frequency impacts by alternating runway usage, complimented by enhancing air-ground communications. Currently, no FAA standards exist that guide UNICOM communication to pilots, therefore there is no current standard for airport personnel to communicate to pilots. Rather, pilots are responsible for making these decisions at a non-towered airport. Several options are potentially available for enhancing flight control and advisory communications:

1. **Enhanced UNICOM** – modify TTAD communication procedures to include preferential runway-use advisories, possibly by adding qualifiers such as “conditions permitting”. These instructions would augment wind and traffic advisories.

2. **Remote Monitoring/Control** – changes in air traffic control standards may enable remote air traffic control and/or advisory services using a combination or surveillance and communication equipment. This would eliminate TTAD’s direct involvement with air traffic advisory support.

3. **Seasonal/Temporary Air Traffic Control Tower (ATCT)** – during peak activity periods, TTAD could implement air traffic control. Two options may be considered by TRK: a temporary tower that is used during peak seasonal activity (summer), and a permanent tower seasonally staffed (also only during summer). The temporary tower would be installed with the idea that if this successfully helps direct traffic and decrease residential overflight, a permanent seasonal tower would then be considered. Although the physical placement of structure may not be necessary to enhance situational awareness and help disperse overflight. A site is proposed here for planning purposes.

4. **NextGen** – The FAA is developing the Next Generation Air Transportation System (NextGen) to transition from ground-based NAVAIDs, radar surveillance and voice communication to a more self-contained (i.e. on board) system using GPS and computer communication. In the new model, aircraft operators will be able to assess traffic and surface conditions independently. "Text" data broadcasts could supply runway advisory information. NAVAID development is occurring simultaneously with improvements in aircraft onboard avionics. The higher precision afforded as part of NextGen is planned to reduce congestion, improve efficiency, and increase safety. As the NextGen system develops, many ground-based NAVAIDs will be decommissioned at the end of their useful lives with only some remaining as ground-based backup.

For planning purposes, this plan identifies **(Figure 4-29)** an acceptable location for a temporary air traffic control tower (ATCT). When siting an ATCT, it is important to consider the line of sight between a controller or camera's "eye" and each runway end. The plan also includes this site for purposes of avoiding obstructions of these views.

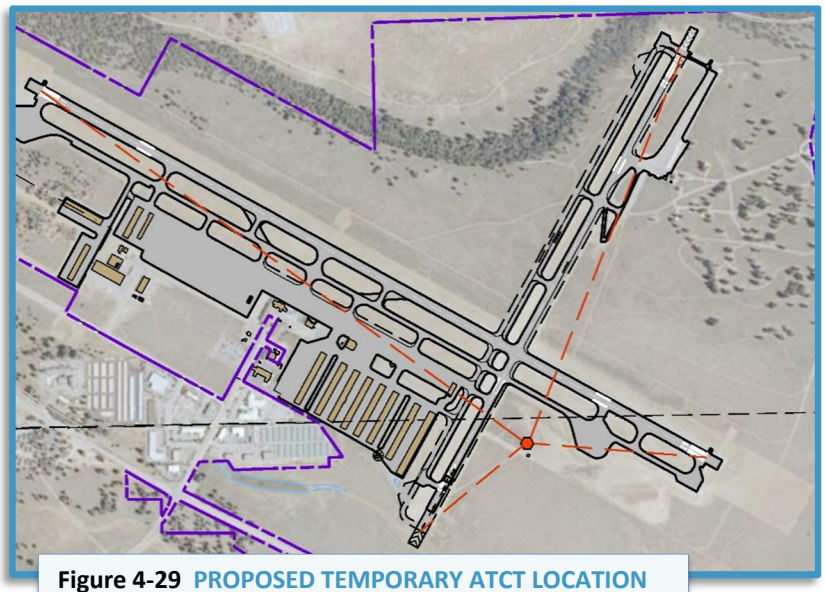


Figure 4-29 PROPOSED TEMPORARY ATCT LOCATION

2.3 Other Policy/Incentive Programs

Other options besides physical changes to the runway system configuration are available to help reduce and mitigate annoyance resulting from aircraft overflights of residential areas. These include monetary incentives that dissuade pilots form operating at night.

TTAD and community outreach found that reducing night operations should be a focus of this plan. Night operations are a small percentage of total operations at TRK. However, these operations generally produce the most noise complaints. Night operations are defined by the FAA as those that occur between 10:00 PM and 7:00 AM. Federal studies find that night operations seem to be louder than daytime operations. The perception results from the reduced ambient noise at these times and thus an increase in human sensitivity. Most people are at home or sleeping at these times. This increase in sensitivity creates a perceived notion that aircraft are louder and more disruptive at night. This is particularly true during early morning hours (4:00 AM – 7:00 AM), when the majority of noise complaint calls are made at TRK.

TTAD currently has a program of incentives for hangar tenants at TRK that intended to discourage night operations and residential overflight. The effectiveness of the program is monitored using a camera system. Operators of aircraft that takeoff during nighttime hours are given warnings and hangar fee reductions may be revoked.

Today, TRK is addressing and engaging in outreach to pilots of aircraft that are not based at the airport. Transient aircraft may arrive during nighttime hours and the pilots may not be aware of the current fly quiet program in place. These pilots may also be unaware of where residences are located and may unknowingly overfly homes. Options for TTAD to consider in the near future to help dissuade night operations include:

- **Continue to monitor night operations. If Runway 2-20 is extended and enhanced flight control is implemented, there is a possibility these actions could help reduce night operations (over residences). The incentive program may be redesigned at that time.**
- **Explore expanding the incentive program. This may include incentives to "regular" transient aircraft operators, including charter operators that utilize TRK often but are based elsewhere.**
- **Consider outreach to pilots at airports in the Bay Area, Southern California, and other areas where many transient aircraft flights originate. Communicating with these pilots about TRK's fly quiet program may help contain residential overflight and night time operations.**
- **Study the implications of possibly restricting night operations.**

2.4 Off-Airport Mitigations

During public open houses and discussion with TTAD, it was found that additional off-airport mitigation may be necessary to alleviate noise impacts to residences located directly west of TRK. Initial analysis looked at aircraft departures on Runway 29 and modifying the recommended procedure. Today, aircraft departing Runway 29 are asked to make a 10 degree right turn and fly over Highway 267 to the Interstate 80 interchange before turning east or west. Jets make this same turn and head towards the TRUCK or POWDR fixes to the north.

Figures 4-30 and **4-31** display the noise impacts of rerouting aircraft from today's procedure over Highway 267 to a straight-out departure. Much like the analysis for runway Alternate 1, impacts are calculated in time above 65 decibels with single-event noise (Lmax) contours illustrated for neighborhoods west and northwest of the airport. A comparison of a Cessna 560 jet aircraft event for current departures and straight-out departures is shown in Figure 4-30. A piston aircraft (Cessna 172) departing the current procedure and proposed straight-out departure is illustrated in Figure 4-31.

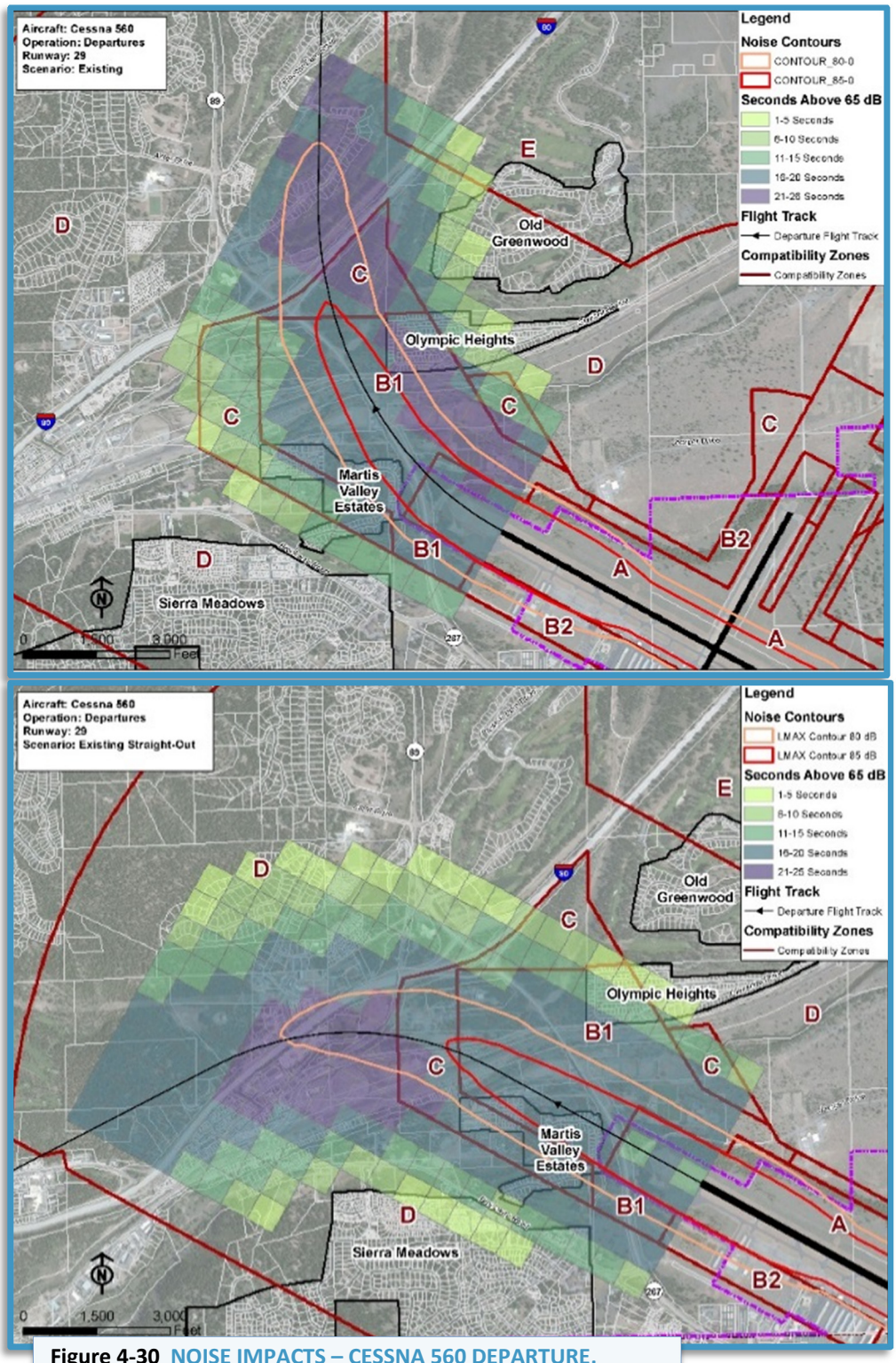


Figure 4-30 NOISE IMPACTS – CESSNA 560 DEPARTURE, CURRENT AND PROPOSED STRAIGHT-OUT

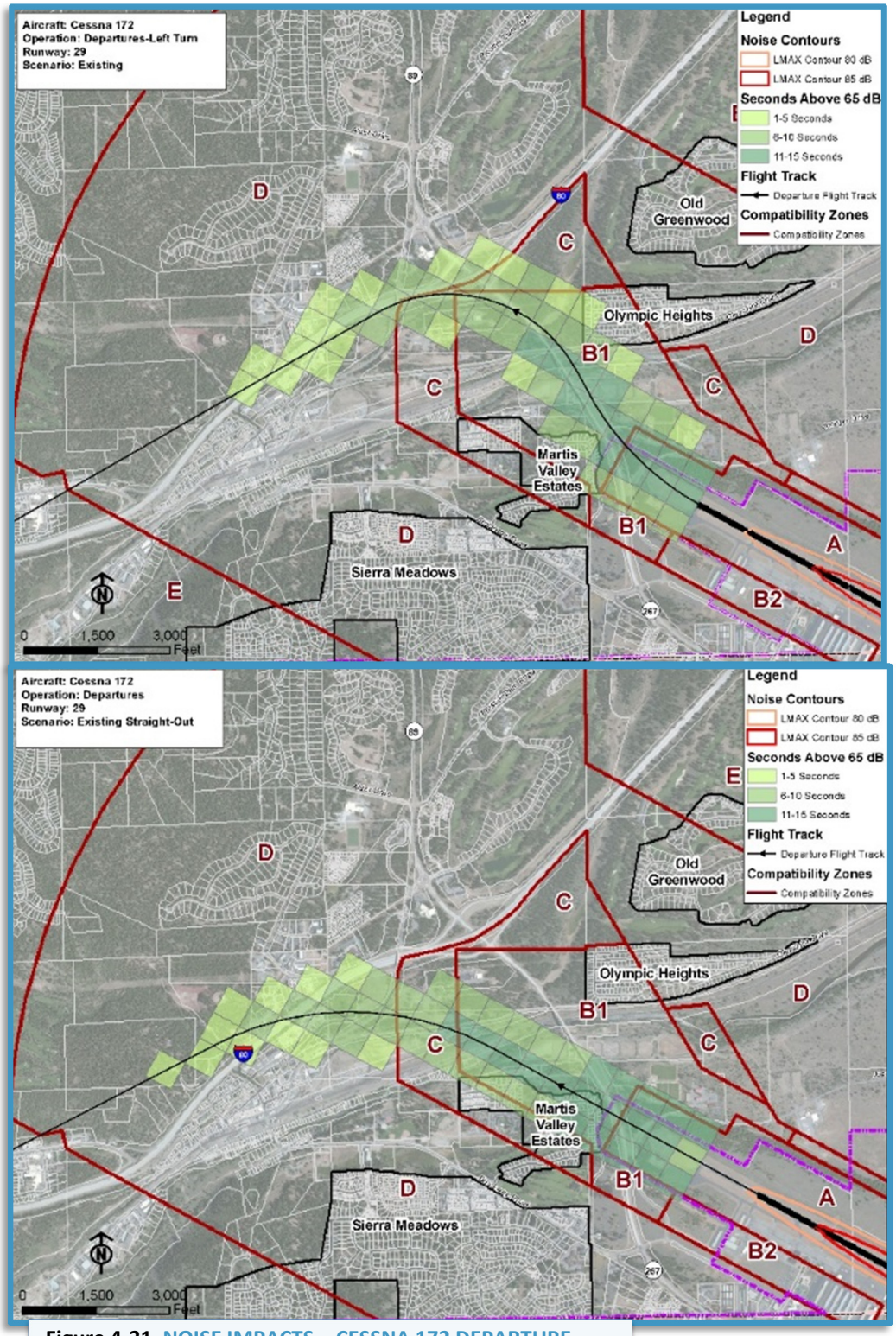


Figure 4-31 NOISE IMPACTS – CESSNA 172 DEPARTURE, CURRENT AND PROPOSED STRAIGHT-OUT

Closer examination of the proposed straight-out departure procedure reveals this would have no significant change on residences located directly west or northwest of TRK. It is anticipated that even with alternatives and policies recommended in the plan that focus on aircraft operations, there will still be impacts to residences directly west of Runway 11-29.

This plan recommends that TTAD continue to study and develop specific off-airport mitigation programs that will help further reduce annoyance impacts on these residences. Funding is advocated for a program(s) similar to what is currently in place for TTAD's open space property acquisition. It is recommended that TTAD focus primary mitigation efforts on residences in the area west of TRK within Zone B1 of the current airport land use compatibility plan. This area is shown in **Figure 4-32**.

To help mitigate impacts, TTAD may introduce the following:

- **Community Outreach Programs**
- **Home Sound Proofing Programs**
- **Land Acquisition Programs**

Developing off-airport mitigation policies would be consistent with FAA methodology for reducing community noise exposure. There are also advantages versus major runway changes: lower total cost, phased implementation, greater overall success, and fewer construction (runway) impacts.

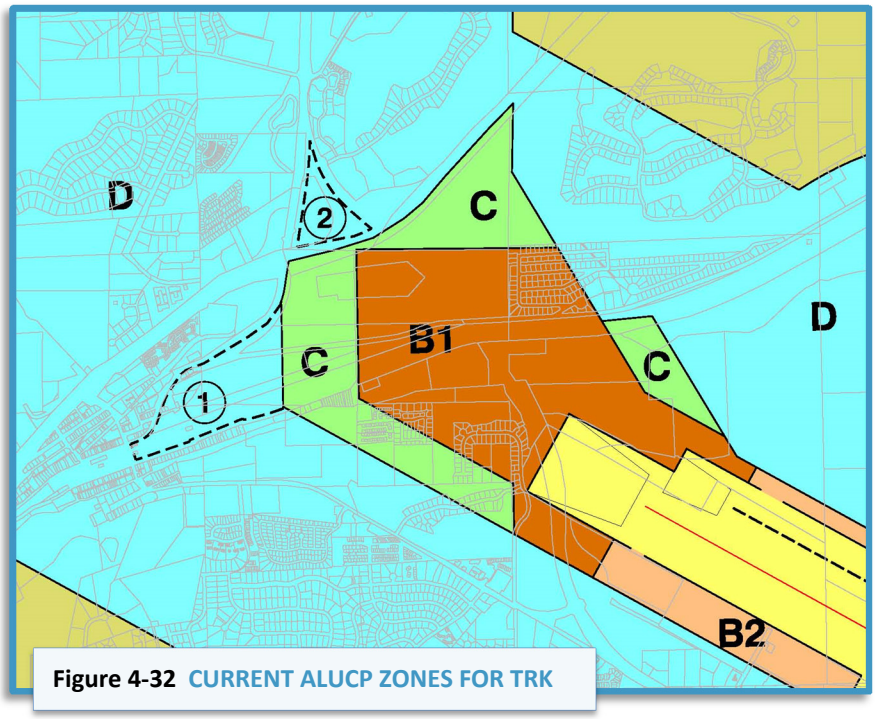


Figure 4-32 CURRENT ALUCP ZONES FOR TRK

3. TAXIWAY AND APRON CONCEPTS

Chapter 3 identified non-standard conditions on existing taxiways and taxilanes. Because the FAA's design standards are safety related, not activity driven, it is recommended that the TTAD perform the required upgrades. It should be noted that the FAA made significant changes to taxiway design standards in recent years. These changes most directly affect runway entrance / exit taxiway placement and taxiway orientation and intersections. The primary purposes of the changes are to 1) reduce the potential of inadvertent runway access and 2) simplify intersection directional choices. Proposed alignments that would bring taxiways and taxilanes up to standards are presented below.

3.1 Taxiway G Realignment

Parallel Taxiway G is too close to Runway 2-20. The standard centerline-to-centerline separation for runway design code (RDC) B-II is 240 feet. To comply with the standard, Taxiway G must be relocated 44 feet to the west. The realigned Taxiway G and object free area (TOFA) are illustrated in **Figure 4-33.**

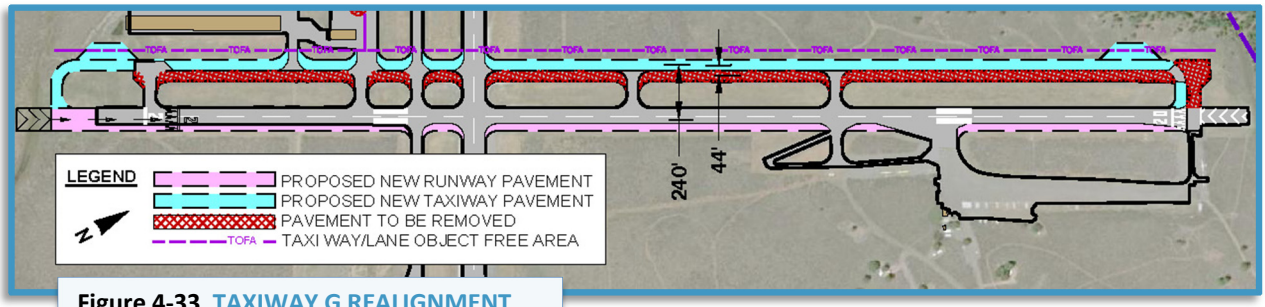


Figure 4-33 TAXIWAY G REALIGNMENT

3.2 Apron and Connector Taxiways

Chapter 3 identified non-standard conditions associated with several runway exit taxiways, specifically the acute angled exit Taxiways D and F and the length of Taxiways C and E. Acute angled exits are only to be used for high speed exits, but there is insufficient separation between Runway 11-29 and Taxiway A available to decelerate from high speed. Removing segments of Taxiways C and E reduces the potential for accidental runway incursion by forcing a turn between a parking apron and the runway. The realigned taxiways are presented in **Figure 4-34.**

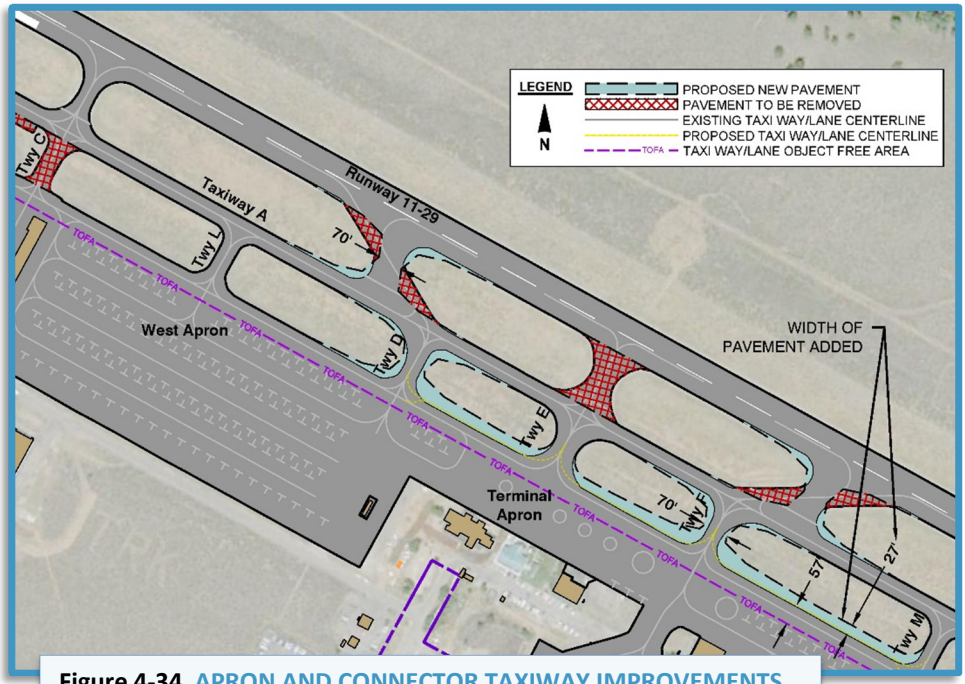


Figure 4-34 APRON AND CONNECTOR TAXIWAY IMPROVEMENTS

APRON TAXILANE AND PARKING POSITIONS

Chapter 3 revealed that aircraft parked on tie-downs on the terminal and east aprons penetrate the taxilane object free area. This creates a challenging situation for aircraft taxiing on the apron edge taxilane, especially during times of peak activity when the apron is full.

Expanding the apron edge closer to Taxiway A by adding a band of pavement approximately 27 feet wide from Taxiway D to Taxiway M allows the apron edge taxilane to shift closer to Taxiway A and away from the apron parking positions. This is acceptable because the distance between the apron edge taxilane and Taxiway A is greater than standard. The proposed concept of the apron edge taxilane realignment is shown in Figure 4-34.

4. ON AIRPORT LAND USE

Forecasts show minimal to moderate growth of aviation activity at TRK during the life of this plan. It is important to designate appropriate amounts and locations of land that will accommodate this growth. Surplus airport property, which is land not necessary to accommodate future aviation facilities, may be assigned for potential non-aviation uses and may be 'released' from federal conveyance or grant restrictions, if eligible. This section helps illustrate ultimate land use on airport property while considering future aviation related needs.

4.1 Development Suitability by Location

Numerous alternatives can be defined that will meet the various building area facility requirements. The purpose of the analysis that follows is to give some structure to the myriad of possibilities. Rather than attempting to identify a precise plan for development, the intent here is to establish a framework within which individual facility requirements can be accommodated over the lifespan of the Master Plan.

TRK has the advantage of having over 200 acres of land potentially usable for building area development with less than 20% of it built upon. Not all of this land is equal, however. To help assess which areas are best suited for what functions, **Figure 4-35** divides the building area into 10 blocks of land each having relatively uniform physical characteristics. **Table 4-3** lists the apparent development opportunities for each block together with the constraints and other design factors affecting the realization of those opportunities.

A review of Table 4-3 reveals that none of the land blocks is best for all things. Each offers development opportunities, but each also has significant constraints. Conclusions reached regarding the optimum usage of each block, both within and beyond the 12-year master planning time frame are as follows:

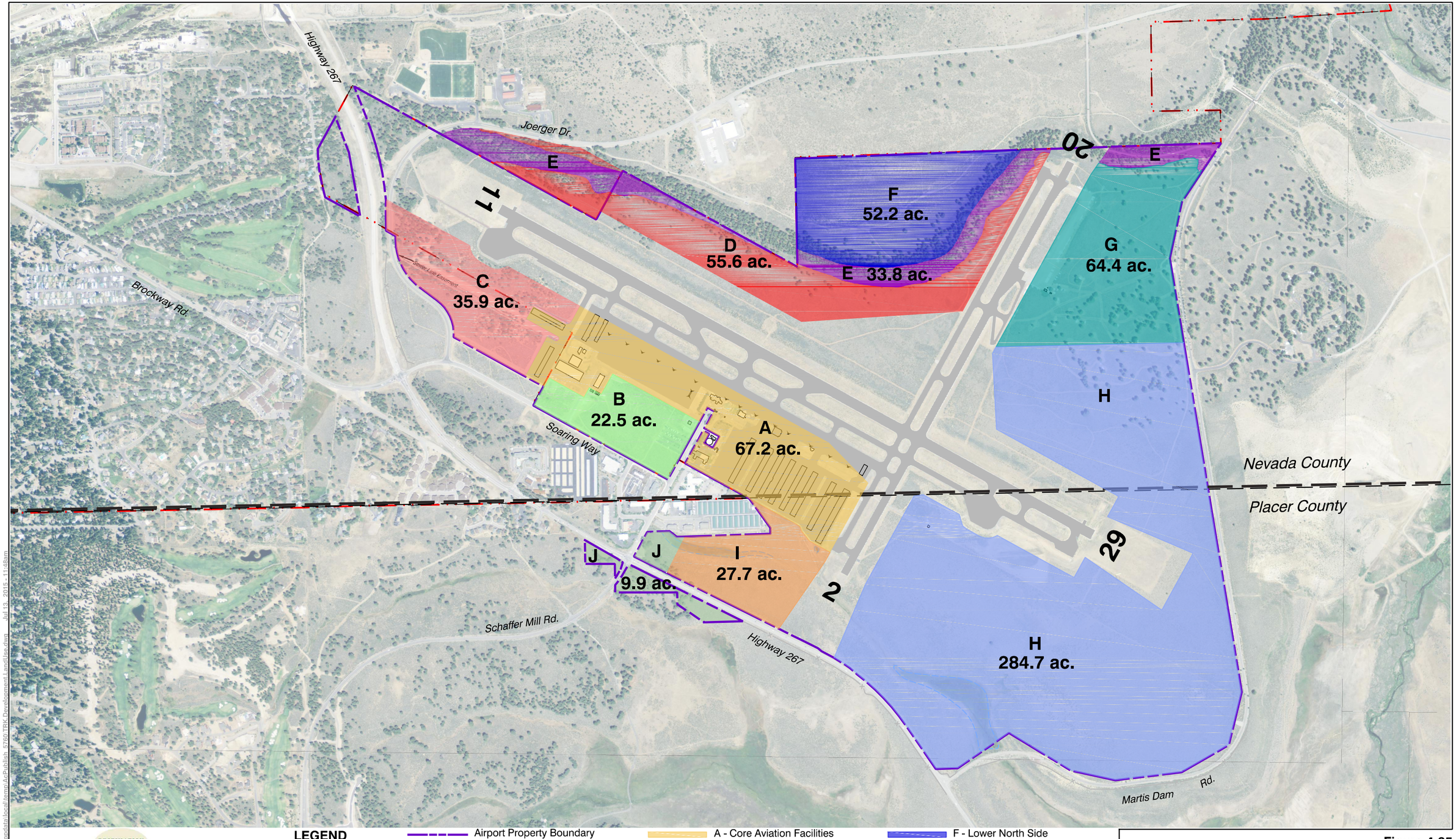
- **Block A (Existing core area aviation facilities)—**With excellent road and taxiway access, this location provides the core aviation facilities and services for based and transient aircraft owners and airport visitors and will continue in this capacity. The major portion of the area consists of aircraft parking apron and T-hangar buildings. There is likely a need to reconfigure parts of the apron layout to better accommodate larger aircraft, but for the most part the overall layout of Block A is expected to remain as is.
- **Block B (Adjacent to West Ramp)—**Lying between the existing aircraft apron and Soaring Way, this 22-acre block consists mostly of vacant land. The only present uses are for automobile rental and long-term parking. Its central location, high visibility, road access, utilities availability, and flat terrain make the site a prime candidate for future development, either aviation-related on nonaviation. Taxilane circulation through Block A would need to be modified to enhance the usability of this site for aviation-related uses, particularly ones involving large aircraft. Nonetheless, to the extent that the site is the best location for aviation-related development, such usage should have priority. If not fully needed for aviation-related functions, revenue-producing nonaviation development would be appropriate.

- **Block C (Southwest corner)—**Like Block B, Block C also provides an opportunity for expansion of the core aviation area or, alternatively, for nonaviation development. The site consists of approximately 36 acres of vacant, generally level land with good taxiway and road access. An important constraint is the site's proximity to the approach end of Runway 11—locations adjacent to runway ends have moderately high risks of aircraft incidents that warrant avoiding high-intensity uses. For this reason, many types of nonaviation development would be precluded.
- **Block D (Upper north side)—**While relatively flat, this linear 55-acre block has development constraints, most notably limited taxiway access, no adjacent road access, and no nearby utilities. However, acquisition of land north of the approach end of Runway 11 would bridge existing airport property to Joerger Drive, provide road access and increase the potential for aviation related use.
- **Block E (North bluff)—**This strip of land forms the edge of Blocks D and G, but differs in that it consists of steep, mostly wooded terrain. No development use is likely to be practical.
- **Block F (Lower north side)—**Sometimes referred to as the "North 40," this roughly 52-acre site is separated from the remainder of the airport by a 100-foot elevation difference created by the bluff in Block E. Aviation-related usage would be impractical. Nonaviation use is a possibility, but limited road accessibility and lack of utilities are significant impediments to most such uses.
- **Block G (Northeast corner)—**This block contains the sailplane apron and associated facilities, but is otherwise vacant. There are no defining features separating the area from Block H, the distinction is made for planning purposes. The sailplane facilities are expected to remain and could expand if the demand warrants, but no other uses are identified. Limited road access and utilities make most types of development difficult.
- **Block H (East side)—**This nearly 300-acre tract wraps around the approach end of Runway 29 and adjoins the approach end of Runway 2. Taxiway access is available to part of the area and it potentially could be suitable for future aircraft hangars if the demand should warrant as was once envisioned. Current planning assumes the area to remain as open space.
- **Block I (Runway 2 Approach and Hwy 267)—**This triangular 28-acre area has excellent road access, but limited taxiway access. The most suitable uses appear to be for nonaviation development. However, despite the flatness of the site, wetlands through the center are a constraint for future construction.
- **Block J (Airport Road / Hwy 267 Intersection)—**These three small parcels are airport-owned, but not contiguous to the remainder of the airport. Nonaviation usage is the only development possibility. The small size and irregular shape limits the options, however.

A key conclusion that can be gleaned from the preceding analysis is that essentially all of the reasonably foreseeable aviation-related development needs over the next 12+ years can be met within the airport's west quadrant (Blocks A, B, and C). Furthermore, substantial amounts of land can reasonably be made available for other purposes. The decisions to be made involve what types of development should go where, as well as what land would be best preserved in an undeveloped state.

Despite an ample amount of vacant acreage on the airport, there are competing demands for the prime land near the existing airport core area. At the center of this issue has been the debate over making land available for nonaviation development and, if so, where. Answering this question also means determining the amount of land likely to be needed in the foreseeable future for aircraft hangars and other aviation-related development and selecting the best locations for these uses.

Table 4-3 BUILDING AREA DEVELOPMENT SUITABILITY			
BLOCK	**LOCATION**	**POSITIVE FEATURES**	**DEVELOPMENT CONSTRAINTS**
A	***Existing core area aviation facilities*** *(67.2 acres)*	▪ Excellent taxiway and road access ▪ Utilities available ▪ Continue as focal area for visitors by air and ground ▪ Primary area for based aircraft hangars and apron ▪ Existing FBO facilities	▪ Limited apron width on east end can restrict movement of some aircraft ▪ Minimal vacant land for FBO expansion and other facilities due to need for apron parking during peak operation times and snow storage during winter months
B	***Adjacent to West Ramp*** *(22.5 acres)*	▪ Location well-suited to extension of core aviation area (Block A) ▪ Soaring Way frontage suitable for nonaviation ▪ High-visibility site next to main airport entrance road ▪ Utilities already provided to site ▪ Flat site	▪ Existing functions on all sides limits expansion ▪ Competing potential uses, aviation and nonaviation ▪ FAA release required for nonaviation use
C	***Southwest corner*** *(35.9 acres)*	▪ Potential extension of existing core aviation area ▪ Suitable for nonaviation uses ▪ Good airfield access to eastern portion ▪ Good road access ▪ Utilities nearby, but not adjacent ▪ Flat site	▪ Taxiway extension needed for access to western half of site ▪ Existing hangar limits aircraft access to south side of area ▪ Utility extensions required ▪ Competing potential uses, aviation and nonaviation ▪ Safety-related compatibility constraints due to proximity to runway end (more so if Runway 11 approach end moved eastward) ▪ Soaring Way frontage not currently airport owned
D	***Upper north side*** *(55.6 acres)*	▪ Adjacent to primary runway ▪ Taxiway access on east edge ▪ Generally flat terrain	▪ Parallel taxiway required on south side for aviation use ▪ Difficult to provide road access ▪ No utilities ▪ West end not currently owned by Airport ▪ FAA release required for non-aviation use
E	***North bluff*** *(33.8 acres)*	▪ Separates airport from adjacent property	▪ Steep, wooded terrain, not suitable for development
F	***Lower north side (North 40)*** *(52.2 acres)*	▪ Generally flat terrain with minimal vegetation	▪ 100-foot elevation difference from airfield makes site unsuitable for aviation use ▪ Not adjacent to public road (1,000 feet across non-airport property to Joerger Drive) ▪ Access easement limitations ▪ No utilities
G	***Northeast corner*** *(64.4 acres)*	▪ Western side currently used for sailplane activities ▪ Adjacent to parallel taxiway for secondary runway ▪ Road access on eastern edge ▪ Generally flat terrain with minimal vegetation ▪ Undeveloped portions potentially suitable for aviation and nonaviation uses	▪ Distant from core aviation area ▪ Lengthy road access from Hwy 267 ▪ Martis Dam Road not open year-round ▪ Limited utilities ▪ FAA release required for non-aviation use
H	***East side*** *(284.7 acres)*	▪ Edges of area adjacent to parallel taxiways ▪ Road access on south and east sides ▪ Highly visible from adjacent roads ▪ Largest contiguous block of undeveloped land on airport ▪ Generally flat terrain with minimal vegetation	▪ Partly within runway approach ▪ Limited utilities availability on edges only ▪ Wetlands south of Runway 29 approach end and east of Runway 2 approach end
I	***Runway 2 Approach and Hwy 267*** *(27.7 acres)*	▪ Highly visible site adjacent to Hwy 267 and airport access road ▪ Utilities available along roads ▪ Suitable for nonaviation use	▪ Triangular shape with taxiway access only on one side ▪ Wetlands through center of site ▪ FAA release required for non-aviation use
J	***Airport Road / Hwy 267 Intersection*** *(9.9 acres)*	▪ Three highly visible sites adjacent to Hwy 267 and airport access road ▪ Utilities available along roads ▪ Suitable for nonaviation use	▪ Sites are relatively small and odd-shaped.



DESTINATION 2025 TRUCKEE TAHOE AIRPORT
A MASTER PLAN PILOTED BY THE COMMUNITY

Prepared By: Mead&Hunt www.meadhunt.com

LEGEND

500
0 Feet 1,000

N

- Airport Property Boundary
- County Line
- Town of Truckee Limits
- A - Core Aviation Facilities
- B - Adjacent to West Ramp
- C - Southwest Corner
- D - Upper North Side
- E - North Bluff
- F - Lower North Side
- G - Northeast Corner
- H - East Side
- I - Airport Road at Highway 267
- J - Airport Road South of Hwy. 267

Figure 4-35

On Airport Land Use

Truckee-Tahoe Airport

Fig 4-35 (11x17)
Reverse Side

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4.2 Hangars

Hangar requirements were identified in Chapter 3. The forecasts in Chapter 2 indicate that the number of aircraft based at TRK is expected to increase during the planning period, dictating a need for 18 executive hangars. Hangars required to house these aircraft are proposed to be located on the west side of the airfield, west of the executive hangars in Row L. This area is best situated for hangar development because it has access to airfield pavements, it provides efficient aircraft movement, corresponds with other planned airfield development, and has access to existing roadways. The proposed layout of executive hangars is detailed in **Figure 4-36**. An additional six hangars are illustrated for a total of 24. This planning concept reserves additional land for hangars should demand for hangars outpace what is actually projected.

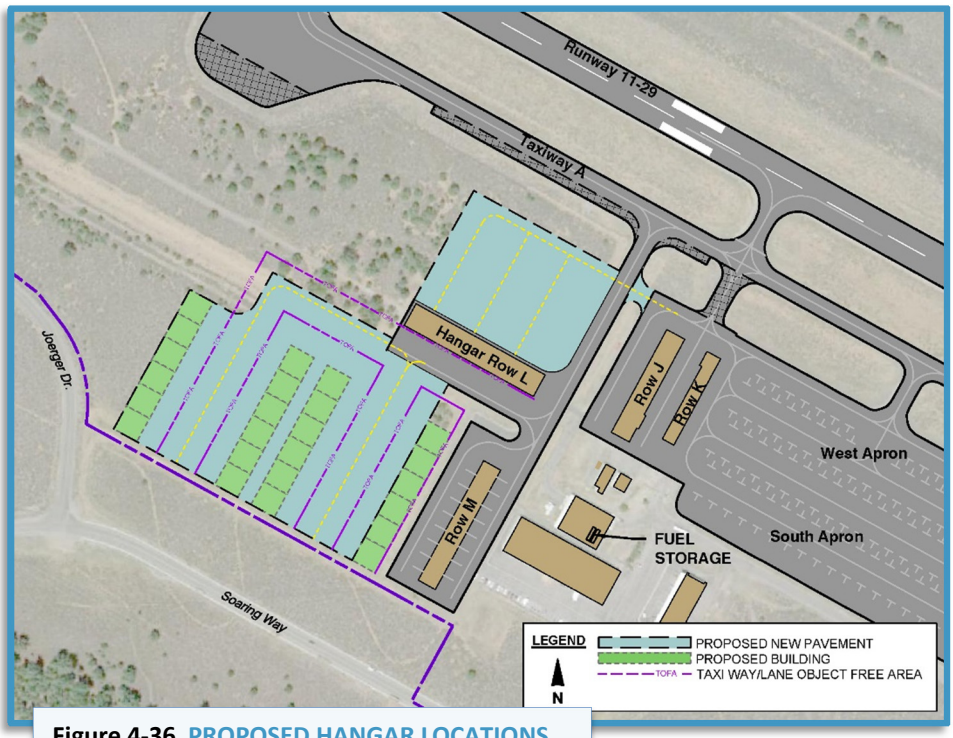

Figure 4-36 PROPOSED HANGAR LOCATIONS

4.3 Multi-Use Hangar Location

TTAD and community outreach indicated potential demand for a large executive hangar that could double as a structure to host community events. This multi-use hangar would be able to house aircraft during winter peak activity to shelter them from bad-weather conditions. Features of the multi-use hangar should include:

- **Capacity to hold multiple aircraft of different sizes that typically operate at TRK,**
- **Basic facilities to host community functions (kitchen, bathrooms, etc.), and**
- **Deicing capabilities (thermal, not chemical) may be included in the facility.**

Multiple locations were investigated for the multi-use hangar site. These are detailed on **Figure 4-37**. For planning purposes, a conceptual size of the hangar was determined to be 80’ x 100’. An example of multiple aircraft parked within an 80’ x 100’ hangar is included in Figure 4-37.

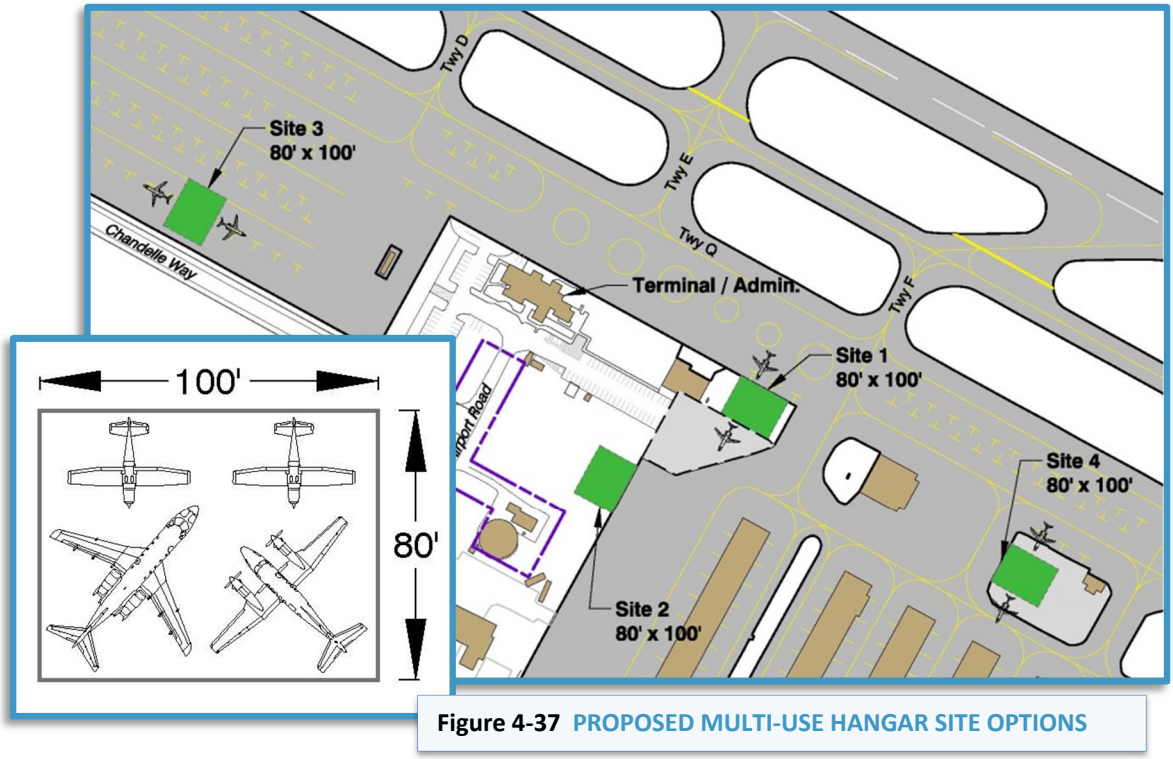

Figure 4-37 PROPOSED MULTI-USE HANGAR SITE OPTIONS

Table 4-4 Multi-Use Hangar Sites	
Site Location	**Site Features**
Site 1	Provides 'taxi-through' capabilities. Provides immediate access to roads and parking. Utilizes land near terminal apron.
Site 2	Provides immediate access to roads and parking. Utilizes land near terminal apron. Not able to accommodate taxi-through capabilities
Site 3	Provides 'taxi-through' capabilities. Immediate access to roads. Would displace existing tie-downs.
Site 4	Provides 'taxi-through' capabilities. Utilizes unused land near runway intersection. Poor access to roads and parking

TTAD and community outreach determined Site 1 was the best location. This site is near the administration building, offers direct access to the terminal apron, and has adequate landside access to Airport Road.

4.4 *Landside Access Concept*

Discussions with the TTAD board and the public at an open house session revealed a potential need to consolidate multi-modal transportation options at TRK. Today, there is a bus stop located on Truckee-Tahoe Airport Road. The transit-hub concept would expand this facility and consolidate rental car facilities. This would provide multiple options of access for people using TRK to fly in or out of the region. A conceptual transit facility with parking is exhibited in **Figure 4-38**.

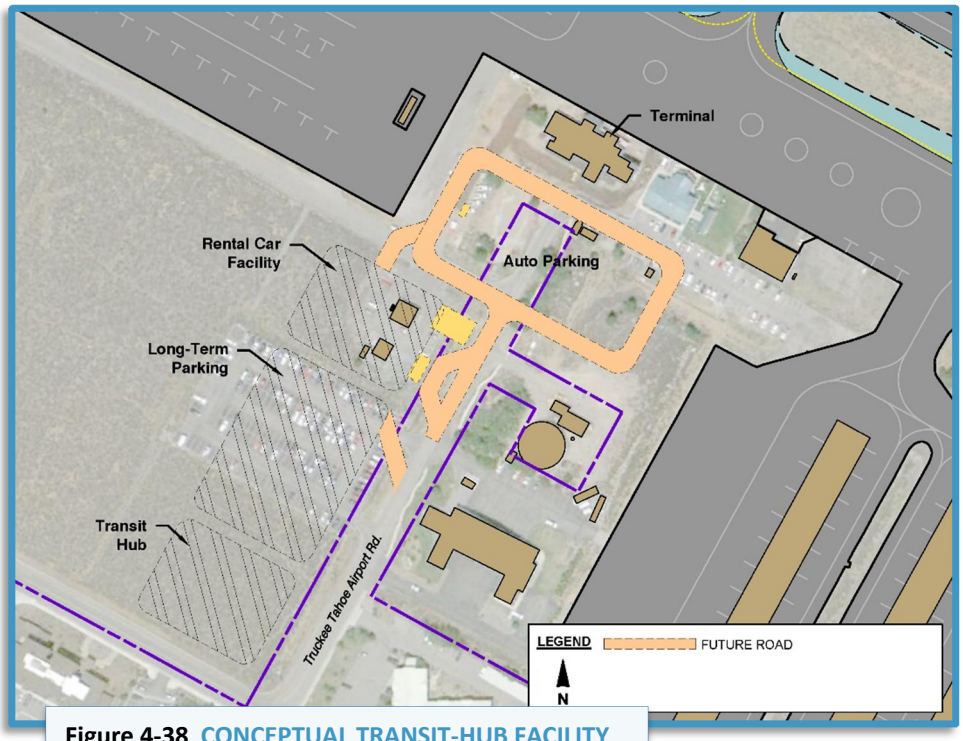

Figure 4-38 CONCEPTUAL TRANSIT-HUB FACILITY

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