5.0 ALTERNATIVES ANALYSIS

The Alternative Analysis chapter describes and evaluates the various development alternatives considered for Priest River Municipal Airport. In addition, it presents a preferred development plan that accommodates the identified demand, facility requirements and recommendations based on the Aviation Activity Forecasts and Facility Requirements chapters of this airport master plan.

Multiple options for both airside and landside alternatives were considered by the planning team and the County in arriving at the preferred alternatives. The preferred alternative serves as the basis for the Airport Layout Plan (ALP) drawing set shown in **Chapter 8**

5.1 AIRPORT DEVELOPMENT ASSUMPTIONS

Previous chapters of the Airport Master Plan have analyzed the impact of various development strategies at the airport and the practical application of these strategies led to several development alternatives. In particular, Chapter 3, Aviation Activity Forecasts, outlined future demand for improvements to airport facilities and Chapter 4, Facility Requirements, addressed the impact growth may have on specific airport features such as the runway, taxiway system, aprons and hangar space. This chapter will take the process a step further and outline specific development alternatives as well as the rationale behind the selection of specific alternatives.

The following sections describe specific considerations for development of the selected alternatives.

5.1.1 AIRPORT USERS

Chapter 3, Aviation Activity Forecasts, profiled typical users of the Priest River Municipal Airport today and over the course of the planning horizon. Currently, single-engine piston aircraft are the primary users of the airport, with occasional use by small turbo-prop and multi-engine aircraft. This group will continue to dominate the demographic of the airport during the planning period.

5.1.2 ACTIVITY LEVELS

The level of activity at Priest River Municipal Airport is predicted to slowly increase during the planning period. The growth of both based aircraft and total number of operations reflects national and state trends in aviation activity. Details of projected growth are reflected in Chapter 3, Aviation Activity Forecasts.

5.1.3 FACILITIES CONFIGURATION

The configuration of existing facilities at Priest River Municipal Airport was also a determining factor when analyzing the potential layout of future facilities. The layout of new aprons, taxiways and hangars must be complementary to existing facilities to provide useable and cost effective options to the airport. This Airport Master Plan seeks to make use of existing facilities to the greatest extent possible and enhance them for future development.

5.2 AIRPORT DEVELOPMENT GOALS

Realistic goals for development, which reflect the role of Priest River Municipal Airport in the community, have been identified in this planning effort. These goals were developed with consideration of both the short-term and long-term needs of the airport including interest of airport users, compatibility with the surrounding land use, safety, noise, and financial and economic conditions.

These goals include:

- Preparation of a logical development program for the airport that provides a realistic vision for the future.
- Analysis that provides financially feasible projects that enhance the self-sustaining capability of the airport.
- Adherence to minimum design standards and rules and regulations.
- Preservation of existing private and public investment in the airport and related facilities through land use compatibility.

As mentioned in Chapter 4, Facility Requirements, it is understood that the need for *full* build-out of the airport as depicted on the ALP drawing set is unlikely and not justified based on the aviation activity forecasts performed as part of this study. Nevertheless, recommendations and alternatives have been developed based on a proactive planning approach whereby long-term guidance has been presented to the County to assist them in facilitating logical and orderly development over the planning period, and beyond.

When such a plan does not exist, it is not uncommon to make development decisions based on what is most convenient and expedient at the time. For example, a new tenant may wish to build a hangar at a certain location at the airport. In the short-term, this location may work fine and be expedient. In the long-term, however, this location might have been better suited for other future development. The alternatives and plan presented provide the roadmap and guidance to Bonner County to avoid falling into this trap. Further, it is understood that inclusion of the identified projects on the ALP do not indicate a commitment on the part of the FAA or the State of Idaho to provide funding for any or all of the projects. That being said, projects are *not* eligible if *not* shown on the airport's approved ALP.

As previously stated, many of the recommendations contained in this planning study are demand driven and will only be considered when and if demand at the airport warrants.

5.3 EVALUATION CRITERIA

In order to assess and evaluate the different alternatives, several evaluation criteria were used:

- Operational and Feasible
- Environmental
- Compatibility with future needs
- Cost

Operational and Feasible

The operational and feasible criterion assesses the ability to accommodate current and forecasted demand in a safe and efficient manner, as well as the construction feasibility of each alternative.

Environmental

This criterion assesses the level of environmental impacts and environmental disruptions, including the potential impacts on the surrounding population, as Priest River Municipal Airport is located in an urban and developed environment.

Compatibility with future needs

This criterion assesses the compatibility with future short- and long-term needs.

Cost

This evaluation criterion provides an estimation of the project expenses and assesses the ability to answer the needs costs-effectively.

5.4 AIRPORT FACILITIES REQUIREMENTS

Table 5-1 lists all the facilities recommended at the airport, as previously identified in Chapter 4, Facility Requirements.

TABLE 5-1: SUMMARY OF FACILITY REQUIREMENTS

Facility	Existing	Recommended
Airside Alternatives		
Runway Width*	48’	60'
Runway Lighting*	LIRL	MIRL
Taxiway*	Partial Parallel Ramp Edge Taxiway	Full Parallel
Tiedowns*	9	At least 9
FBO*	No	Yes (Demand Driven)
Fuel Facility*	No	Yes (Avgas, Mogas)
Helicopter Parking Pad	No	Yes
Landside Alternative		
Box Hangars*	16	22
Terminal/Pilot’s lounge*	556 sq. ft.	Minimum of 556 sq. ft.
Access Road and Automobile*	10	17
Other Requirement listed on ALP		
REILs	None	RWY 2 & RWY 20
Segmented Circle*	No	Yes
Wind Cone*	Yes	Yes
Airport Beacon	No	Yes
Airfield Signage	None	Yes (Taxiway/Runway holding position signs)
SRE and Maintenance	Yes (inadequate)	New SRE and Storage Building
Automated Weather*	No	Long-term (as needed)
Renumber the runway	1-19	2-20
Parcel G Perimeter Fence	None	Yes
Purchase land/easements for RPZ		

*Facilities that will be detailed in this chapter of the airport master plan.
The other facilities will only be depicted on the ALP.
Source: T-O Engineers, Inc.

The facilities that will be detailed in the following sections of this Airport Master Plan are:

- Airside
  - Runway width and runway lighting
  - Obstructions and RPZ penetrations
  - Taxiway
  - Wind Cone and Automated Weather (AWOS)
- Landside
  - Aircraft storage and hangars
  - Aircraft apron and FBO
  - Road access and automobile parking

The other facilities that do not result in a detailed analysis of alternatives. However, they will be listed and depicted on the ALP as appropriate.

5.5 AIRPORT DESIGN STANDARDS

Priest River Municipal Airport meets most B-I Small design standards. The main concerns include the runway width, penetrations of the RPZs and approach surfaces on both runway ends, as well as penetrations of the ROFA and OFZ by the existing wind cone and an air relief valve.

Table 5-2 summarizes the design standards not already met at Priest River Municipal Airport. Alternatives to address these deficiencies are detailed in Section 5.6, Airside Alternatives.

TABLE 5-2: SUMMARY OF DESIGN STANDARDS

	FAA Standard	Existing
Airport Reference Code	B-I Small	B-I Small
Runway Width	60'	**48'**
Runway Protection Standards		
Runway Object Free Area and Obstacle Free Zone		
Runway Object Free Area (ROFA) Width	250'	**250'***
	250'	**250'***
Approach Surfaces		
20:1 Threshold Sitting Surface		
20:1 Part 77 Approach Surface		
Runway Protection Zone		
Inner Width	250'	**250'****
Outer Width	450'	**450'****
Length	1000'	**1000'****

*The ROFA and OFZ are impacted by the wind cone and an air relief valve
**Both RPZs penetrated by buildings, power lines, roads and trees
Source: Existing ALP and Narrative, T-O Engineers, Inc.

5.6 AIRSIDE ALTERNATIVES

During the planning period encompassed by this Airport Master Plan, no major deficiencies in airside capacity have been identified. Other airside considerations include the widening of the runway (from 48 feet wide to 60 feet wide) and the penetrations of the RPZs and approaches on both runway ends. Airside facility recommendations include meeting runway width design standards and providing options to mitigate for uses not allowed in the RPZs.

5.6.1 RUNWAY WIDTH AND RUNWAY LIGHTING

Two alternatives were developed to widen the runway:

- Alternative 1: Widen Runway 1/19 6 feet on each side (Maintain existing centerline)
- Alternative 2: Widen Runway 1/19 12 feet on one side only (Shift runway centerline)

The following paragraphs summarize these alternatives. The runway lighting system is old, does not meet standards and the wiring is not adequate. Both alternatives include new Medium Intensity Runway Lights (MIRL) as well as new electrical wiring.

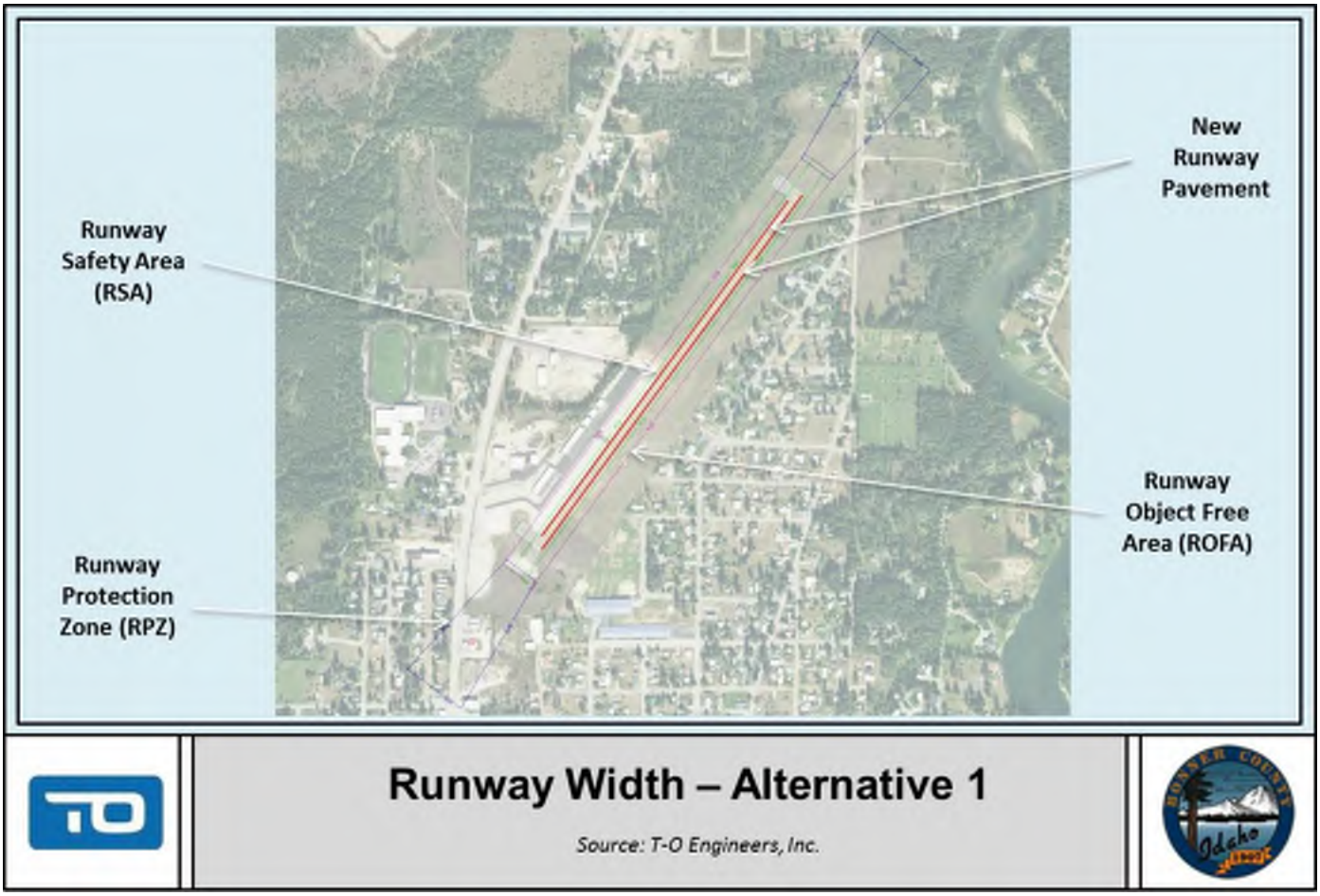
No Action

A "No-action" alternative is not considered desirable by the County or the FAA Helena Airports District Office. A No Action alternative does not provide a safe operating environment meeting current and foreseeable needs. The goal of this planning study is to provide the County with options for necessary improvements and for future development. This alternative does not meet this goal nor does it meet safety standards. Therefore, this alternative was not considered viable.

Alternative 1: Maintain existing centerline

Alternative 1 widens Runway 1/19 by 6 feet on each side to reach a runway width of 60 feet. As the runway is widened symmetrically on each side, the runway centerline is maintained at its existing location, as depicted in **Figure 5-1**.

FIGURE 5-1: MAINTAIN EXISTING CENTERLINE



Minor environmental impacts are expected as a result of the construction and grading operations. No land acquisition is needed as this alternative remains within the existing airport property limits and all construction occurs on previously disturbed land. This alternative does not change the runway protection or separation standards, as the runway centerline is maintained at its current location.

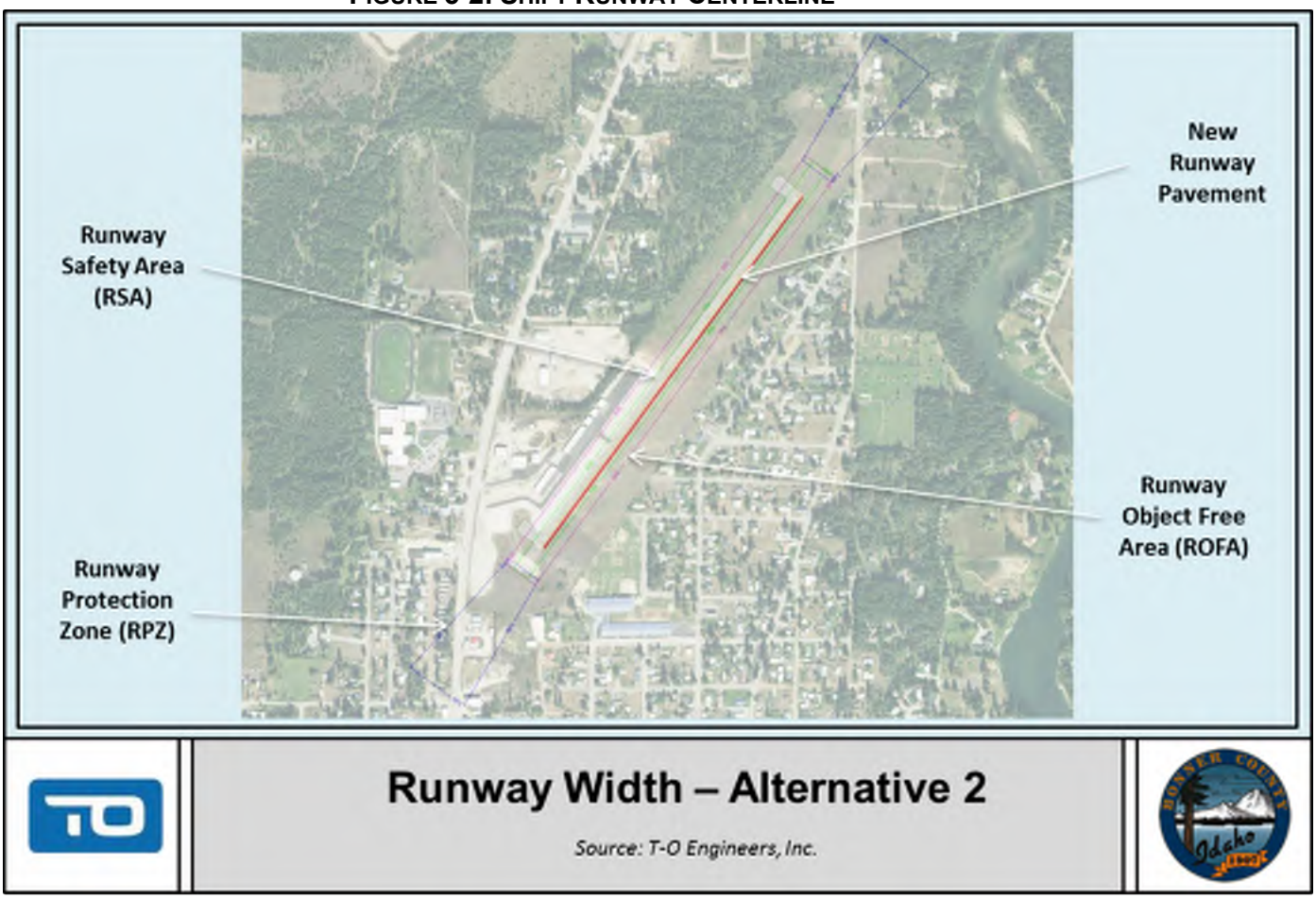
The estimated cost of this project is $1,669,000, including REILs and a PAPI.

Alternative 2: Shift runway centerline

Alternative 2 adds 12 feet of pavement to the east of the runway. Since the runway is not widened symmetrically on each side, this alternative shifts the runway centerline by 6 feet, as depicted in **Figure 5-2**.

This alternative also includes removal of existing pavement on the overall length of the runway.

FIGURE 5-2: SHIFT RUNWAY CENTERLINE



Minor environmental impacts are expected as a result of the construction and grading operations. No land acquisition is needed and this alternative remains within the existing airport property limits. All construction occurs on previously disturbed land.

As the runway centerline shifts by 6 feet, this alternative also shifts the RSA, ROFA, OFZ and RPZ by 6 feet. In addition, the runway to taxiway separation increases from 150 feet (minimum distance required for B-I Small airports) to 156 feet.

The estimated cost of this project is $1,710,000, including REILs and a PAPI on the Runway 1 end.

Alternatives Evaluation

Table 5-3 summarizes the different alternatives in relation to the selected criteria.

TABLE 5-3: RUNWAY ALTERNATIVES SUMMARY

	"No-Action" Alternative	Alternative 1: Maintain existing centerline	Alternative 2: Shift runway centerline
Operational and Feasibility	Does not meet safety standards (B-I Small Standards).	Existing operational capabilities of the runway are increased as Runway 1/19 meets B-I Small standards. Would necessitate closing the runway for an extended period of time.	Existing operational capabilities of the runway are increased as Runway 1/19 meets B-I Small standards. Would necessitate closing the runway for an extended period of time. Moving the centerline affects the grading and all existing asphalt needs to be removed to fix the crown of the runway.
Environmental	No additional environmental impacts.	Minimal environmental impacts are expected from construction and grading operations. All construction will occur on airport property and in already disturbed areas.	
Compatibility with future needs	Does not meet B-I Small standards and is not compatible with future needs.	Compatible with future needs. Runway to taxiway separation meets the minimum standards set in the FAA AC.	Compatible with future needs. Runway to taxiway separation exceeds the minimum set in the FAA AC by 6 feet. This increased separation allows more flexibility for connecting taxiway design.
Costs	No additional costs.	Costs Estimate: $1,669,000	Costs Estimate: $1,710,000.

Source: T-O Engineers, Inc.

Preferred Alternative

The preferred alternative for the runway widening is Alternative 2: Shift the runway centerline approximately 6 feet by adding an additional 12 of pavement to the southeast side of the runway and is shown on the ALP. The additional 12 feet of runway width will bring the runway into compliance with FAA airport design criteria which is critical for future project funding. Additionally, this alternative calls for the installation of REILs on both runway ends and a PAPI on the Runway 1 end. These NAVAIDS will increase the overall utility of the runway and create a safer operating environment. Although this alternative is slightly more expensive (approximately 2.39% more expensive), it offers more flexibility to the airport, especially for connecting taxiway design. Alternative 2 was deemed the most convenient alternative for this airport. In addition, there are no significant differences in the number and nature of obstructions in the RPZs and Approach Surfaces. Mitigation to airspace and runway design criteria are addressed in the subsequent sections of this chapter.

5.6.2 RPZs and Approach Penetrations

The RPZs on both runway ends are penetrated by uses not allowed in the RPZ; namely, Runway 19 by State Highway 57 and Runway 1 by Cemetery Road. Other obstructions located in both the RPZ and approach surfaces on each end include trees and power lines, as well as buildings. The portion of both the 20:1 Threshold Siting Surface (TSS) and the CFR Part 77 20:1 Visual Approach Surface were evaluated for obstruction penetrations in each of the alternatives.

Five alternatives, including a no-action alternative, were developed to mitigate the penetrations in the RPZs and approach surfaces:

- No Action Alternative
- Alternative 1: Land Acquisition and Incompatible Land Uses Removal
- Alternative 2: RPZs Partially Cleared and Declared Distances
- Alternative 3: Declared Distances and Additional Pavement (461')
- Alternative 4: Declared Distances and Additional Pavement (1,060')

The following paragraphs summarize these alternatives.

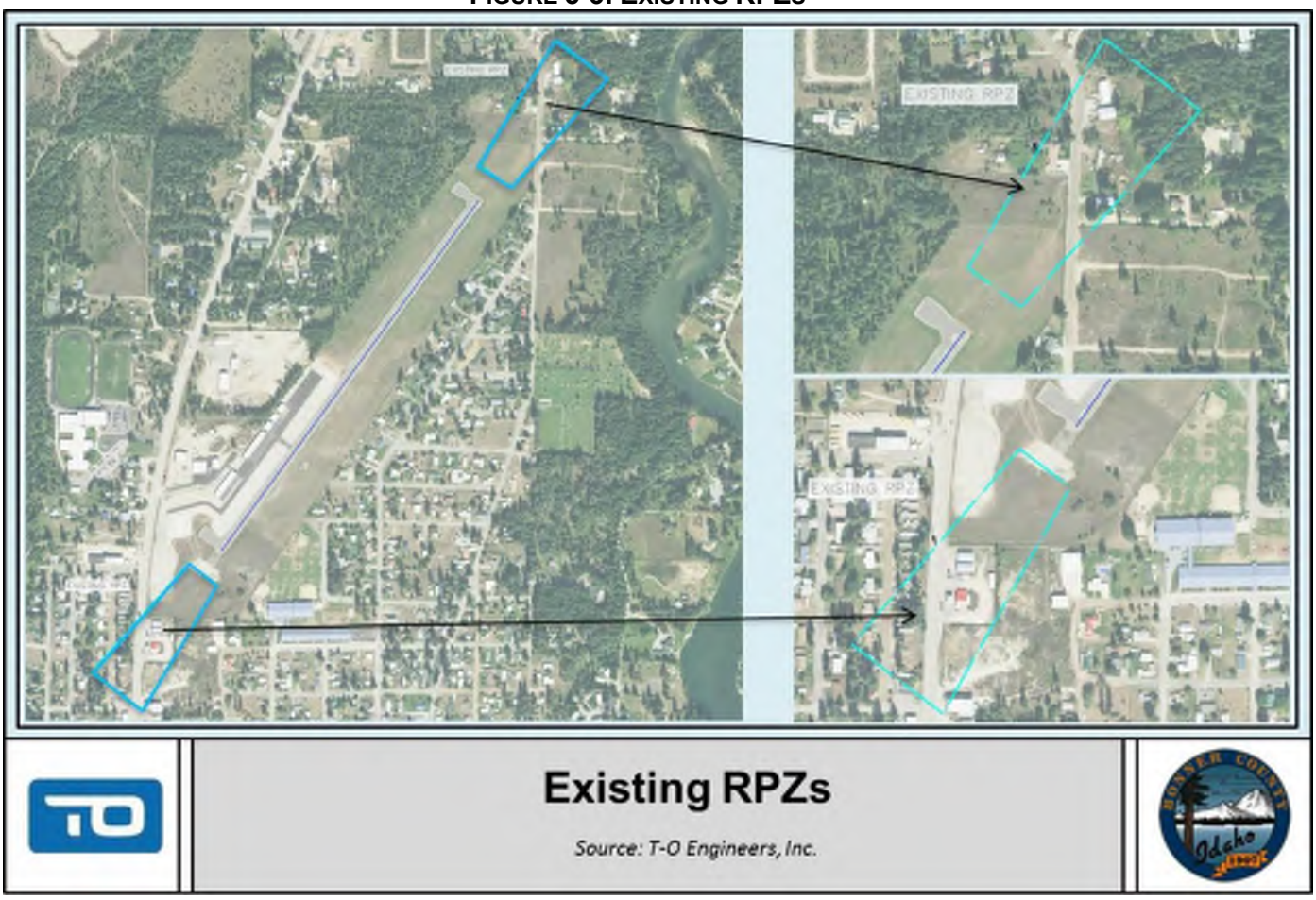
No Action

A "No-action" consists of maintaining the existing situation at the airport. This alternative does not clear any obstructions in the RPZ or approaches. **Figure 5-3** depicts the existing situation at the airport.

This alternative is not desirable by the FAA Helena Airports District Office (ADO). A No-Action alternative does not meet safety standards and RPZ design standards. The FAA considers that a no-action alternative does not provide a safe operating environment to meet current and foreseeable needs. This alternative is not considered viable by the FAA Helena ADO.

In addition, the FAA does not consider a "no-action" alternative feasible, even if it includes a plan to clear the structures as land becomes available as part of the variance. If Priest River Municipal Airport wants to acquire the structures in the future as they become available, cleared RPZs will be necessary during the transition, and declared distances will have to be enforced until the RPZs are cleared.

FIGURE 5-3: EXISTING RPZS



Alternative 1: Land Acquisition and Incompatible Land Use Removal

This alternative involves acquiring all properties and clearing the RPZs from incompatible land uses and obstructions. This includes nine properties on each runway end, for a total of 18 properties, including five properties zoned as commercial. In addition, this alternative includes rerouting State Highway 57 and Cemetery Road.

Clearing the existing RPZs is extremely costly. In addition to the initial costs, it could remove jobs and reduce the amount of property taxes collected by the City of Priest River.

Preliminary analysis and costs estimates were based on property value as described on the Bonner County GIS website. When this information was not available, it was assumed $150,000 per private property and $400,000 for commercial uses. Further, purchase prices for a fuel station vary greatly depending on the region, the location of the fuel station, the traffic, and commodities such as convenience store. It was assumed that purchase of the fuel station in the RPZ would cost $1.2 million assuming no environmental remediation was necessary. These costs were supplemented to include fees, relocation assistance, and demolition of the structures, as well as contingency. The total cost of property acquisition was estimated at $4.5 million.

As preliminary options, two alignments were considered for the relocation of State Highway 57: one alignment to the east of the City of Priest River, improving Bodie Canyon Road, and one alignment maintaining State Highway 57 at its current location, but rerouting a portion of it out of the RPZ. Costs estimates to improve Bodie Canyon Road are $5,070,000 (including right-of-way acquisition). However, this option does not provide adequate connectivity to the City of Priest River. The fire station is located on the airport and would not be able to adequately access the town. Other roads would need to be improved to provide appropriate connectivity.

The second option requires relocating 33 residences and 6 businesses. No further analysis was conducted on this option as the environmental impacts (socio-economic and environmental justice impacts) were considered too high for a town of 743 households.

Cost estimates to reroute Cemetery Road around the RPZ are $530,000, this cost includes the relocation of approximately 1,500 feet of unpaved roadway.

Using the Bodie Canyon Road alignment, a preliminary cost estimate for planning purpose indicates that Alternative 1 would cost over $10.1 million.

This alternative is not considered desirable by the County because of the socioeconomic impacts on the community and the City of Priest River.

Alternative 2: RPZ Partially Cleared and Declared Distances

This alternative consists of enforcing declared distances to clear the RPZs on each end of the runway. According to the FAA Advisory Circular AC 150/5300-13A, Change 1, Paragraph 322.a: "*Declared distances represent the maximum distances available and suitable for meeting takeoff, rejected takeoff, and landing distances performance requirements. The declared distances are Take Off Run Available (TORA) and Take Off 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*."

Further, the AC 150/5300-13A, Change 1, Paragraph 322.a (1) states: "*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."*

This alternative does not maintain the RPZs entirely on airport property, but it was discussed with the Helena ADO as an option to limit the runway length reduction. This alternative clears the RPZs from building and structures. However, State Highway 57 and Cemetery Road are both in the corners of the RPZs. The RSA, ROFA and OFZ are maintained on airport property.

Table 5-4 lists the declared distances that would be in effect at Priest River Municipal Airport to mitigate obstructions and unacceptable incompatible land uses in the RPZ, and **Figure 5-5** depicts the partially

cleared RPZs. Declared distances are currently not in use at Priest River Municipal Airport and all the distances (TORA, TODA, ASDA, LDA) are equal.

The distances listed in **Table 5-4** assume that the trees are cut or topped. Otherwise, Runway 19 threshold may have to be displaced up to 1,843 feet from the existing runway end and Runway 1 threshold may have to be displaced up to 1,039 feet from the existing runway end.

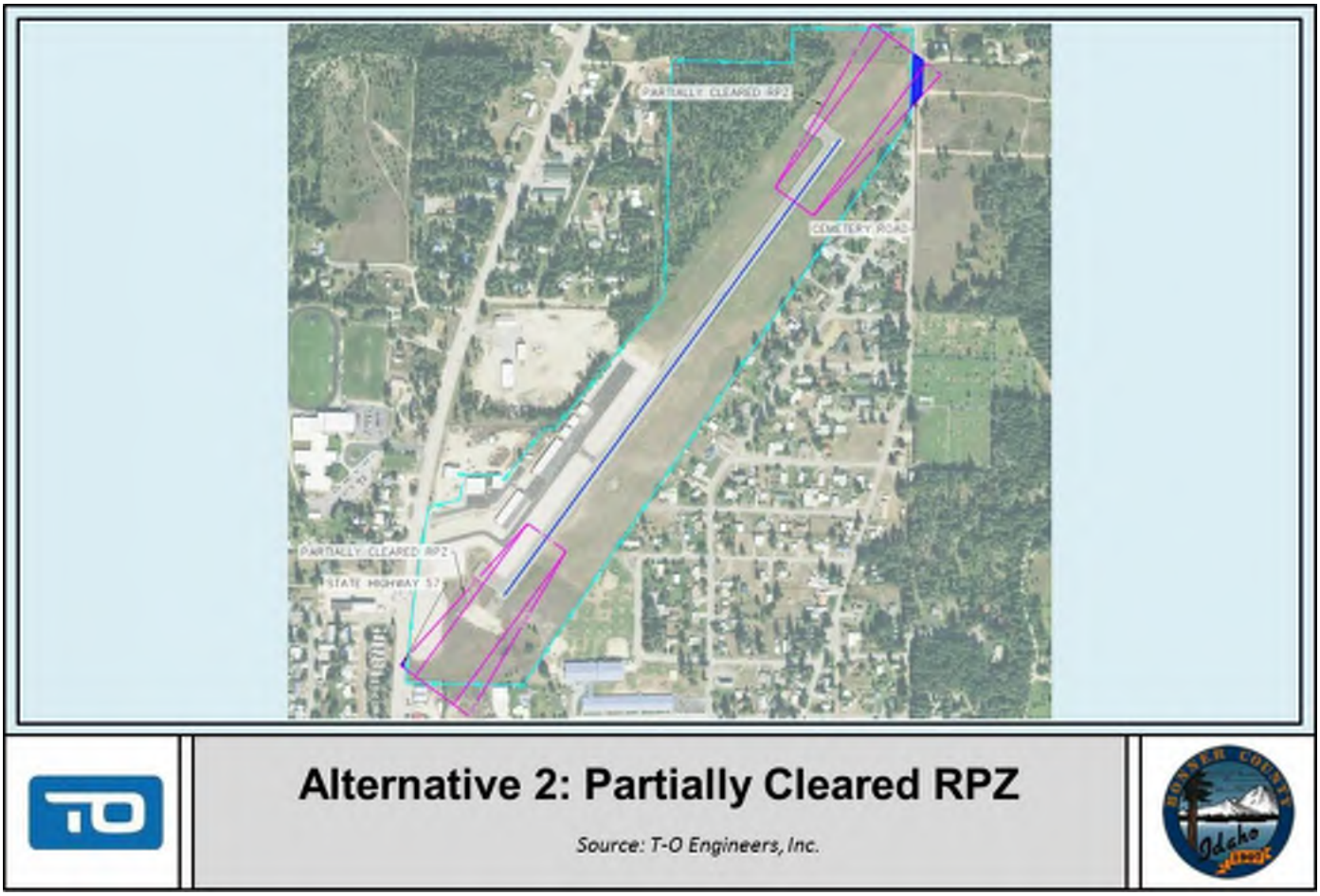
This alternative would considerably reduce the takeoff and landing distances available on both runways. This will decrease the ability of the airport to accept emergency services aircraft, a service critical for the welfare of Priest River and Bonner County residents. This alternative requires remarking and lighting the displaced threshold. The estimated costs of this project are $48,000.

TABLE 5-4: DECLARED DISTANCE

CURRENT DECLARED DISTANCES					
	Pavement Length	**TORA**	**TODA**	**ASDA**	**LDA**
Runway 1	2,983’	2,983’	2,983’	2,983’	2,983’
Runway 19	2,983’	2,983’	2,983’	2,983’	2,983’
FUTURE DECLARED DISTANCES					
	Pavement Length	**TORA**	**TODA**	**ASDA**	**LDA**
Runway 1	2,983’	2,376’	2,983’	2,983’	2,404’
Runway 19	2,983’	2,404’	2,983’	2,983’	2,376’

Source: T-O Engineers Inc.

FIGURE 5-4: PARTIALLY CLEARED RPZ



Alternative 3: Declared Distances and Additional Pavement (832')

Alternative 3 is similar to Alternatives 2 in that it consists of enforcing declared distances at the airport. However, this alternative consists of two steps. The first step includes displacing both runway thresholds and extending the runway pavement on both ends to minimize the takeoff and landing distance reduction due to the declared distances. Given the constrained environment of the airport, this runway pavement extension would remain entirely on existing airport property and maintain the RSA, ROFA and OFZ on airport property. The thresholds would be displaced approximately 538 feet on the approach end of Runway 19 and 578 feet on the approach end of Runway 01. The Runway 19 end would be extended 221 feet and the Runway 1 end would be extended 236 feet, for a total pavement length of 3,440 feet. The RPZs on both ends will be cleared with the exception of State Highway 57 and Cemetery Road. The TORA for Runways 2 and 20 departures will be reduced by 302 feet and 357 feet respectively. Similarly, these reductions apply to the LDA as well.

Phase two of Alternative 3 includes shifting the Runway 20 threshold 120 feet east reducing the impact of declared distances and creating more usable runway length. Shifting the threshold back will relocate the RPZ over the property boundaries of up to twelve parcels near the runway end. These properties will need to be acquired and their developments mitigated prior to shifting the threshold and changing the declared distances. The ultimate design would add an additional 375 feet of pavement beyond step one and would allow the Runway 20 threshold to be shifted 138 feet increasing the declared distances for both runways.

Table 5-5 lists the declared distances that would be in effect during step 1 and step 2, to mitigate the obstructions and unacceptable incompatible land uses in the RPZ. **Figure 5-5** depicts the RPZs. As previously mentioned, these distances assume that the trees are cut or topped. Terrain and trees in Runway 19 approach penetrates the Threshold Siting Surface (TSS). The displaced threshold due to these obstructions is more restrictive than the displaced threshold to clear the RPZ. Even if the RPZ is cleared, Runway 19 LDA has to be limited to 2,750'. Mitigation measures including obstruction lighting will be further discussed in Section 5.6.3 Obstructions and Approach Surface.

This alternative necessitates additional construction to extend the runway that will be limited to on-airport property. The estimated costs of Step 1 are $379,000. Step 2 consists in acquiring land as it becomes available. Preliminary estimated costs are $2,208,803 (based on property value as described on the Bonner County GIS website and considering $400,000 for commercial use properties).

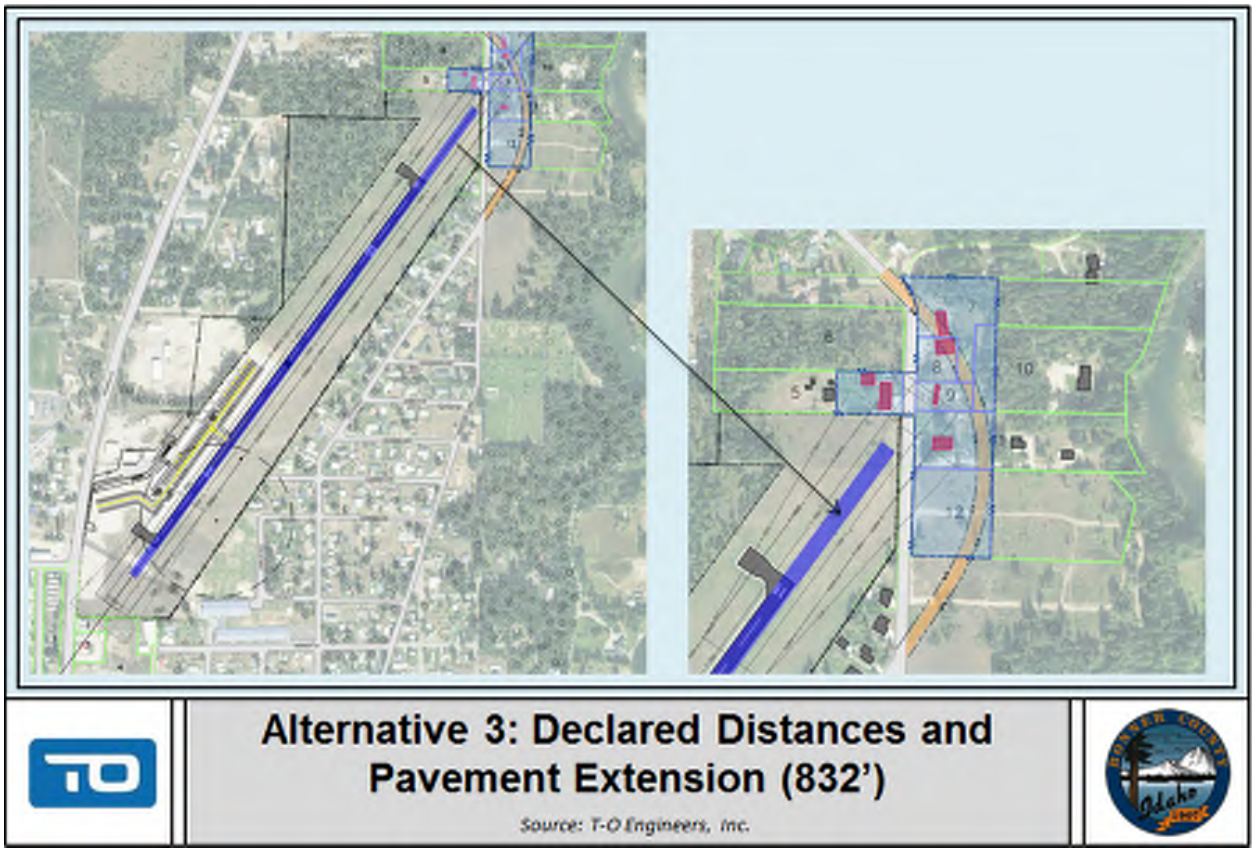
TABLE 5-5: DECLARED DISTANCE

CURRENT DECLARED DISTANCES					
	Pavement Length	TORA	TODA	ASDA	LDA
Runway 1	2,983'	2,983'	2,983'	2,983'	2,983'
Runway 19	2,983'	2,983'	2,983'	2,983'	2,983'
FUTURE DECLARED DISTANCES – STEP 1					
	Pavement Length	TORA	TODA	ASDA	LDA

Runway 1	3,440’	2,681	3,440’	3,440’	2,626’
Runway 19	3,440’	2,626’	3,440’	3,440’	2,681’
ULTIMATE DECLARED DISTANCES – STEP 2					
	Pavement Length	**TORA**	**TODA**	**ASDA**	**LDA**
Runway 1	3,815’	2,801’	3,797’	3,797’	2,983’
Runway 19	3,815’	2,983’	3,797’	3,797’	2,801’

Source: T-O Engineers Inc.

FIGURE 5-5: EXTENSION AND PARTIALLY CLEARED RPZ



Alternative 4: Declared Distances and Additional Pavement (1,060’)

Alternative 4 consists of implementing declared distances, and adding pavement to minimize the runway length reduction. However, this alternative does not maintain the RSA, ROFA and OFZ on airport property. As the RSA, ROFA and OFZ are not maintained on airport property and are not cleared of incompatible land uses, only the TORA and TODA would be extended. The ASDA and LDA would be similar to the first step of Alternative 3. The Runway 19 end would be extended by 515 feet and Runway 1 would be extended by 545 feet, for a total pavement length of 4,044 feet.

Table 5-6 lists the declared distances that would be in effect to mitigate the obstructions and unacceptable incompatible land uses in the RPZ. **Figure 5-6** depicts the cleared RPZs. As previously mentioned, only the TORA and TODA would be longer than with Alternative 3, the ASDA and LDA

would remain unchanged compared to the first step of Alternative 3. With this alternative, the TORA would be at 2,921', close to the existing TORA.

As previously mentioned, these distances assume that trees are cut or topped. Otherwise, Runway 19 threshold may have to be displaced up to 1,771 feet from the existing runway end and Runway 1 threshold may have to be displaced up to 978 feet from the existing runway end.

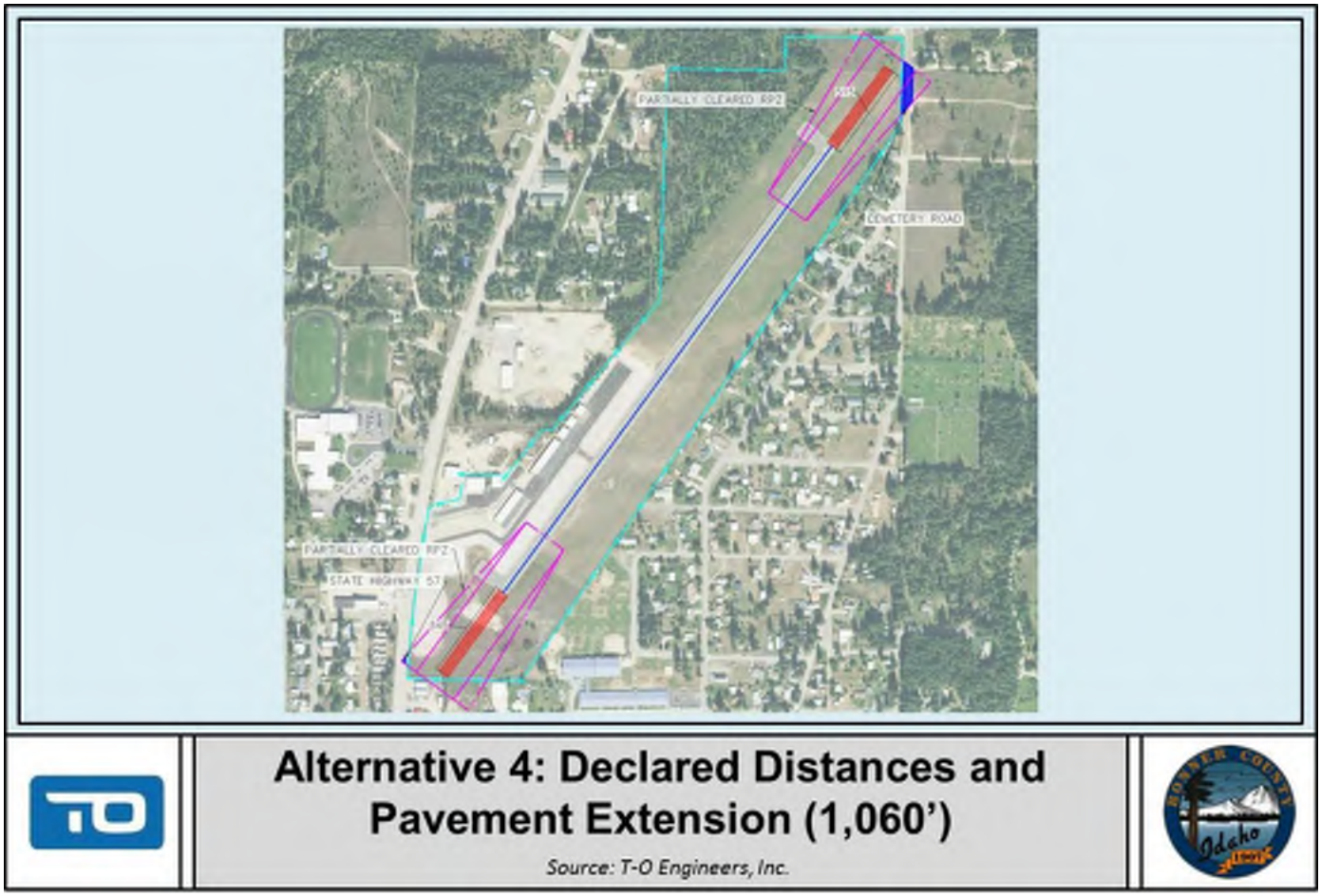
This alternative necessitates additional construction to extend the runway. However, this construction will be limited to on airport property, in already disturbed and developed areas. The estimated costs of this project are $870,000.

TABLE 5-6: DECLARED DISTANCE

CURRENT DECLARED DISTANCES					
	Pavement Length	**TORA**	**TODA**	**ASDA**	**LDA**
Runway 1	2,983'	2,983'	2,983'	2,983'	2,983'
Runway 19	2,983'	2,983'	2,983'	2,983'	2,983'
FUTURE DECLARED DISTANCES					
	Pavement Length	**TORA**	**TODA**	**ASDA**	**LDA**
Runway 1	4,044'	2,921'	4,044'	3,444'	2,629'
Runway 19	4,044'	2,921'	4,044'	3,444'	2,612'

Source: T-O Engineers Inc.

FIGURE 5-6: EXTENSION AND PARTIALLY CLEARED RPZ



Alternatives Evaluation

Table 5-7 summarizes the different alternatives in relation to the selected criteria.

TABLE 5-7: RUNWAY ALTERNATIVES SUMMARY

	"No-Action" Alternative	Alternative 1: Land Acquisition Land and Obstructions Removal	Alternative 2: Partially Cleared RPZ	Alternative 3: Declared Distances and Additional Pavement (832')	Alternative 4: Declared Distances and Additional Pavement (1,060')
Operational and Feasibility	Does not meet safety standards (B-I Small Standards), but maintains operational capability of the runway. Not considered as a viable option by the HLN ADO.	Extremely costly. Requires acquiring multiple residential and private properties, and commercial businesses, as well as relocating State Highway 57 and Cemetery Road. Not considered as a viable option by Bonner County.	Require a permanent reduction of TORA and LDA for both runways. Landing distance available on Runway 19 is reduced to 2,376 feet. Easy to implement and does not necessitate closing the runway. Does not totally clear the RPZ. However, only roads would be in the RPZ with no structures. Road relocation is extremely costly.	Requires a short-term reduction of TORA and LDA for both runways. Necessitates closing the runway for extended periods of time during the runway pavement extension. Could be phased with the runway widening. Roads and structures in the RPZ would ultimately be mitigated Landing distance available for Runway 2 could be similar to existing in the long-term if obstructions can be mitigated.	Requires a permanent reduction of TORA and LDA for both runways. Necessitates closing the runway for extended periods of time during the runway extension. Could be phased with the runway widening. Only roads would be in the RPZ with no structures. Landing distance available on Runway 19 is reduced to only 2,612 feet.
Environmental	No additional environmental impacts.	Multiple environmental impacts including socioeconomics and environmental justice. Several residents and businesses will have to be relocated	Does not create any additional environmental impacts.	Environmental impact is limited as construction is limited to airport property. Runway ends are closer to the airport property boundaryas well as surrounding buildings, and roads, which may increase noise impacts. Properties will be acquired in step 2 to clear the RPZ.	Environmental impact is limited as construction is limited to airport property. Runway ends are closer to the airport property boundary as well as surrounding building and roads, which may increase noiseimpacts.
Compatibility with future needs	Does not meet B-I Small standards and is not compatible with future needs. Not considered feasible by the HLN ADO	Maintain the existing runway length and maintain the existing operational capabilities of the airport. Not acceptable by Bonner County.	Reduce landing distance and takeoff run distance. May lead to weight or fuel reduction for the larger aircraft of the fleet. This alternative may have impacts on the aircraft fleet the airport can accommodate.	Alternative 3 is the alternative that provides the best flexibility to the airport. In the long-term, it is the alternative that ultimatley maintains the current runway length.	In the short-term, Alternative 4 offers the longest runway length. The Ultimate runway configuration may be confusing, with a runway end very close to the property limits.
Costs	No additional costs.	Cost estimates: $10.1 million.	Cost estimates: $48,000.	Cost estimates: $379,000 and $2,208,803 for property acquisition.	Cost estimates: $870,000.

Source: TO Engineers, Inc.

Preferred Alternative

The preferred alternative to mitigate obstructions in the approach surface and incompatible land uses in the RPZs is Alternative 3: Declared Distances and Additional Pavement, shown on the ALP. This alternative was discussed at length with the FAA Helena ADO and County personnel and determined to be the preferred alternative. Alternative 3 involves meeting federal standards while minimizing the loss of utility to the runway. In order to mitigate obstructions to the threshold siting surfaces and to meet federal standards the runway needs to be expanded to a width of 60 feet and both runway ends need to be displaced with the implementation of declared distances. By lengthening the runway pavement and clearing the RPZ and threshold siting surfaces of obstructions and incompatible land uses, the airport is able to regain usable runway length and reduce the impacts of declared distances.

The preferred alternative is a multi-phased approach that starts with extending the runway pavement on both ends and displacing the thresholds. The second phase further extends the pavement edge on the end of Runway 20 and adjusts the threshold accordingly thus gaining as much utility as possible while maintaining a clear RPZ. This phase results in the ultimate buildout of the runway and requires the relocation of a landside roadway; Cemetery Road. In order to accommodate the roadway relocation, several properties near the runway end will need to be procured and their structures mitigated.

The total estimated cost for this preferred alternative is $2,987,803 which includes the cost of design, construction, acquisition of property, and obstruction removal.

5.6.3 OBSTRUCTIONS AND APPROACH SURFACES

There are various airspace surfaces that protect the airport environment and they each serve a unique purpose. Title 14 Code of Federal Regulations Part 77 (Part 77) surfaces provide for initial object identification and depict when an object becomes an obstruction and when it needs to be mitigated or simply reviewed by the FAA. Other surfaces such as those referenced in the United States Standard for Terminal Instrument Procedures (TERPS) can impact/reduce the utility of the airport by amending published flight procedures when they are obstructed.

The most critical surfaces affecting any airport are the Threshold Siting Surfaces (TSS) which are referenced in AC 150/5300-13A. Penetrations to the TSS can require displacement of runway thresholds and the implementation of declared distances which can vastly reduce the usability and viability of the airport. For the purpose of maintaining compliance with FAA grant assurances, airport sponsors are required to actively mitigate penetrations to the Part 77 airspace surfaces.

In the case of Priest River Municipal Airport, there are numerous penetrations to the Part 77 surfaces and the TSS. As a result, the opportunity to seek future implementation of instrument approach procedures is limited. Similarly, the current penetrations to the TSS make the airport non-compliant with federal standards and negatively impact the siting of the runway thresholds.

The RPZ preferred alternative referenced threshold displacement for the purpose of mitigating obstructions within the RPZ; however, displacement of the threshold is required in order to mitigate penetrations to TSS as well.

The approach surfaces on both runway ends are penetrated by a significant number of obstacles. This includes mostly trees, but also the terrain as well as some power poles. To clear the approach surface, the existing threshold of Runway 19 should be displaced by 469 feet and the existing threshold of Runway 1 should be displaced by 100 feet. This assumes the trees are cut or topped. If the trees are not mitigated, Runway 19 threshold may have to be displaced up to 1,843 feet from the existing runway end and Runway 1 threshold may have to be displaced up to 1,039 feet from the existing runway end.

Additional details on the number of obstructions for the existing and ultimate runway configuration as well as mitigation measures are provided in **Appendix X**. As this is a safety issue, it will have a high-priority for FAA funding and should be addressed in the short-term.

No Action

The “No Action” alternative would not meet FAA standards and accommodates an unsafe environment for pilots and airport users. This alternative is not desirable by the County or the FAA. Consequently, the “No Action” alternative is rejected and not considered a viable option for the airport.

Alternative 1: Land Acquisition and Obstruction Removal

This alternative addresses airspace obstructions by the acquisition of land and/or avigation easements from nearby owners whose property contains objects that penetrate critical imaginary surfaces. Once the necessary land and/or easements have been procured, the airspace obstructions can be removed.

The obstructions encompass up to 60 separate parcels under the approaches for both runways. After the easements and properties have been acquired, the obstructions should be mitigated. The mitigation process will be different depending on the object, the surface it penetrates, and the significance of the penetration. The most preferred method of mitigation is removal but in some cases not all objects can be removed or relocated. Other forms of mitigation include obstruction marking, lighting, annotation on published departure procedures, and VGSI mitigation.

Nearly all obstructions off the approach end of Runway 1 can be removed with the exception of the power poles. These will likely require obstruction lighting. In the case of the Runway 19 end, the obstructions on the west side of the can likely be removed, however the penetrations on the east side of the river include both trees and terrain.

Alternatives Evaluation

Table 5-8 summarizes the different alternatives in relation to the selected criteria.

TABLE 5-8: RUNWAY ALTERNATIVES SUMMARY

	"No-Action" Alternative	Alternative 1: Land Acquisition Land and Obstructions Removal
Operational and Feasibility	The "No Action" alternative does not meet the needs of the airport, the County, or the FAA. If no action is taken then the airport will remain out of compliance with federal criteria and may not be eligible for future capital funding This is not considered to be a viable option for the airport	Accomplishment of this alternative will require the acquisition of numerous avigation easements and properties along with the removal and mitigation of obstructions to airspace. The benefits of this alternative are that it allows the airport to regain usable runway length and it is necessary to accommodate other preferred alternatives.
Environmental	This alternative has no environmental impacts.	This alternative is not expected to have any significant environmental impacts and is most likely eligible for a categorical exclusion.
Compatibility with future needs	This alternative is not compatible with future needs.	Alternative 1 is compatible with future needs of the airport and is essential for the operational success of other preferred alternatives in this chapter.
Costs	No cost	$500,000 (%90 eligible for AIP funding)

Source: TO Engineers, Inc.

Preferred Alternative

The preferred alternative for this section is Alternative 1 which involved acquiring avigation easements and properties for up to 60 parcels and then seeking obstruction mitigation through the removal of trees and marking/lighting of more permanent obstacles. The "No Action" alternative is not viable and would restrain the airport from developing and meeting future federal criteria.

5.6.4 FUTURE INSTRUMENT APPROACH PROCEDURES

Weather conditions that include cloud ceilings below 1,000 feet above ground level and 3 statute miles visibility are known as instrument meteorological conditions (IMC). In order for aircraft to land at airports in IMC there must be published instrument approach procedures (IAP) with supporting infrastructure. Types of supporting infrastructure include ground-based NAVAIDs like glide slopes, localizers, distance measuring equipment, and very high frequency

omnidirectional range, as well as approach lighting systems, visual approach slope indicators, upgraded markings, and more.

The use of IAPs typically involved more demanding and restrictive airspace and zones as well as the inclusion and protection of imaginary surfaces defined in the United States Standard for Terminal Instrument Procedures (TERPS). The benefit of IAPs is the added utility they offer airports. In many cases, the use of IAPs becomes necessary for businesses and pilots seeking reliable access to the airport. Better IAPs offer lower visibility minimums and decision altitudes making an airport more accessible but demanding more airspace and land use protections. These procedures typically fall within two categories, non-precision (not vertically guided) and precision (vertically guided).

Priest River Municipal Airport is a visual airport only and is not currently served by any instrument approach procedures. In order to design and publish a procedure for Priest River, several regulatory standards must be met. Firstly, the dimensions of the runway protection zones would increase and would impact more properties and require more mitigation for obstructions and incompatible land uses. Several TERPS surfaces would need to be cleared before adequate approach minimums could be acquired. Finally, a greater level of airport infrastructure would be required to properly facilitate such an approach. Given the current status and demand of the airport, the pursuit of a straight-in instrument approach procedures is not a preferred alternative. That being said, a more feasible alternative would be to pursue a circling approach.

While straight-in procedures allow pilots to fly directly to a runway end on a final approach course offering better minimums, the circling approach still creates a safe path to the airport in IMC. The pilot can plan and fly the approach to a low enough altitude until the airport is in sight at which point the pilot can circle for a visual landing on the active runway. Circling approaches do not have the same regulatory requirements as straight-in approaches making them more affordable and feasible to implement.

There are several types of IAPs that use various ground and orbital based forms of navigation. One particular procedure that is being heavily utilized across the country, particularly at smaller airports, is known as ‘area navigation’ (RNAV). Unlike the ILS, VOR, or NDB, the RNAV uses GPS technology forgoing ground-based radio NAVAIDs. Not having the burden of acquiring and maintaining expensive ground-based equipment means that small airports can now experience similar levels of accessibility without the cost or the hassle.

No Action

The ‘no action’ alternative maintains the status quo at Priest River Municipal Airport and does not provide any accessibility to the airport during inclement weather conditions. Pilots seeking reliable access to the region are more attracted to an airport bearing instrument approach procedures. The airport is surrounded by mountainous terrain where weather conditions can change quickly. Even in cases where weather conditions are considered ‘visual’, there is still the

risk that conditions could deteriorate during flight. A pilot in this situation would be forced to divert to an alternate airport.

Not only does not having an instrument approach procedure limit the airport's utility, it also means that pilots cannot file an IFR flight plan directly to the airport. A pilot wishing to fly IFR with direct support from the air traffic organization would need to file a flight plan to a nearby airport with an IAP and then cancel the flight plan mid-flight and proceed direct.

The no action alternative, although feasible, bears no direct value for the airport.

Alternative 1: Establish RNAV (GPS) Circling Approach

The development of the instrument approach procedure would be accomplished by the Flight Procedures department of the FAA. Since RNAV procedures utilize available satellite technology and the approach is a circling approach as opposed to a straight-in, it can be implemented at the airport without any added expense to Priest River, Bonner County, or the State of Idaho.

This alternative would allow pilots to more comfortably plan flights to the airport during visual, instrument, or marginal weather conditions. Simply increasing the margin of safety and a pilot's confidence in the flight can be a tremendous benefit to an airport. Ultimately, the procedure would result in greater utility for the airport as well as capacity during inclement weather conditions. This would result in more aircraft operations at the airport leading to more business and a positive economic impact.

Alternatives Evaluation

Table 5-9 summarizes the different alternatives in relation to the selected criteria.

TABLE 5-9: IAP ALTERNATIVES SUMMARY

	"No-Action" Alternative	Alternative 1: Establish RNAV (GPS) Circling Approach
Operational and Feasibility	The "No Action" alternative involves not pursuing the development of an instrument approach procedures for Priest River Municipal Airport. This alternative is feasible but does not provide the greatest level of utility for the airport. This is not considered to be a favorable option for the airport	Accomplishment of this alternative will require the establishment of a published instrument approach which will need to be developed by the Flight Procedures branch of the FAA. Since the circling approach is essentially an instrument approach that transitions to a visual landing, there are no requirements for precisions instrument markings, approach lighting systems, or other infrastructural requirements.
Environmental	This alternative has no environmental impacts.	This alternative is not expected to have any significant environmental impacts.
Compatibility with future needs	This alternative is less compatible with future needs.	Alternative 1 is compatible with future needs of the airport and is a cost effective way to make the airport more accessible and usable to pilots and the flying public.
Costs	No cost	No cost

Source: TO Engineers, Inc.

Preferred Alternative

The preferred alternative for this section is alternative 1 which involves publishing a RNAV (GPS) circling approach to the airport allowing pilots to descend low enough through IMC to visually acquire the airport and land. This alternative would allow pilots to add Priest River Municipal Airport to their instrument flight plan and to shoot approaches in instrument conditions but would not require the airport to pursue costly upgrades to its infrastructure in the form of approach lighting or precision/non-precision airfield markings. Having a published instrument approach procedure makes the airport more attractive for commercial applications. Airports become more appealing if they can be reliably used in most weather conditions. The "no action" alternative is viable but not recommended and does not allow the airport to increase its accessibility during instrument conditions.

5.6.5 PARALLEL TAXIWAY

A full-length parallel taxiway would contribute to an increased level of safety at the airport. In addition, a full-length parallel taxiway will be necessary to access future development on Parcel G. The existing parallel taxiway centerline is locating at 150 feet from the existing runway centerline and it meets B-I Small design standards. The preferred runway alternative shifts the runway centerline 6 feet to the east, and the existing and extended parallel taxiway will be located 156 feet from the runway centerline.

One alternative was developed:

- Alternative 1: Full parallel taxiway

Following is a summary of the taxiway alternative.

No Action
A "No-action" alternative consists of maintaining the existing configuration. This alternative does not reduce the need for back-taxi operations. In addition, without a full parallel taxiway, the only access to the newly acquired Parcel G would be provided through back-taxi operations on the runway. The goal of this planning study is to provide the County with options for necessary improvements and future development. This alternative does not meet this goal, as it does not provide a safe access to Parcel G.

Alternative 1: Full Parallel Taxiway
This alternative consists of a full parallel taxiway. The existing taxiway centerline would be maintained at its location and extended to Runway 1/19 thresholds. This full parallel taxiway would extend from the north side of the aircraft apron and would extend for a length determined by whichever RPZ alternative is chosen. A small length of taxiway on the south side of the apron would connect with a small paved run-up area adjacent to the approach end of Runway 1. These taxiway additions are depicted in **Figure 5-7**. In order for the taxiway to reach the full future end of pavement on the south end, the taxiway elevation would need to be raised by 4 to 6 feet in order to meet the runway's grade. This places undue burden on the airport design and is not realistically feasible. The estimated cost of this project is $415,000.

FIGURE 5-7: FULL PARALLEL TAXIWAY

Alternatives Evaluation

Table 5-10 summarizes the different alternatives in relation to the selected criteria.

TABLE 5-10: TAXIWAY ALTERNATIVES SUMMARY

	"No-Action" Alternative	Alternative 1: Full Parallel Taxiway
Operational and Feasibility	Does not reduce the need for back-taxi operations and does not provide safe access to Parcel G (the only access will be by back-taxiing on the runway).	Contributes to an increased level of safety at the airport by reducing the need for back-taxi operations.
Environmental	No additional environmental impacts.	Remains entirely on airport property and does not require land acquisition. Impacts areas in urban environment.
Feasibility	Feasible as it does not necessitate any construction or action.	Feasible without any impact on existing infrastructure.
Compatibility with future needs	Not compatible with future needs.	Compatible with future needs and provides an increased level of safety as it eliminates the need for back-taxi operations and provides a safe access to Parcel G.
Costs	No additional costs.	Costs Estimate: $415,000.

Source: T-O Engineers Inc.

Preferred Alternative

The Preferred Alternative is Alternative 1: Construction of a full-length parallel taxiway. This alternative will provide an increased level of safety and eliminate the need for back-taxi operations. Additional environmental analysis will be required and it is expected a Categorical Exclusion will meet the environmental requirements for this project. Taxiway extensions can usually be categorically excluded if they only have on-airport impacts under paragraph 5-6.4e from FAA Order 1050.1F (construction, repair, or extension an existing airport's taxiway). Additional coordination with the Helena ADO will be necessary before construction.

This preferred alternative is contingent on other alternatives from this chapter including the RPZ preferred alternative. The runway pavement is expected to increase in length by approximately 832 feet with extensions occurring on both ends. A total of roughly 2,763 feet of taxiway pavement would be required to meet the demands of the preferred alternatives in this chapter. The portion of future parallel taxiway on the north side of the apron will be approximately 2,233 feet in length while the southern portion will only be 530 feet long.

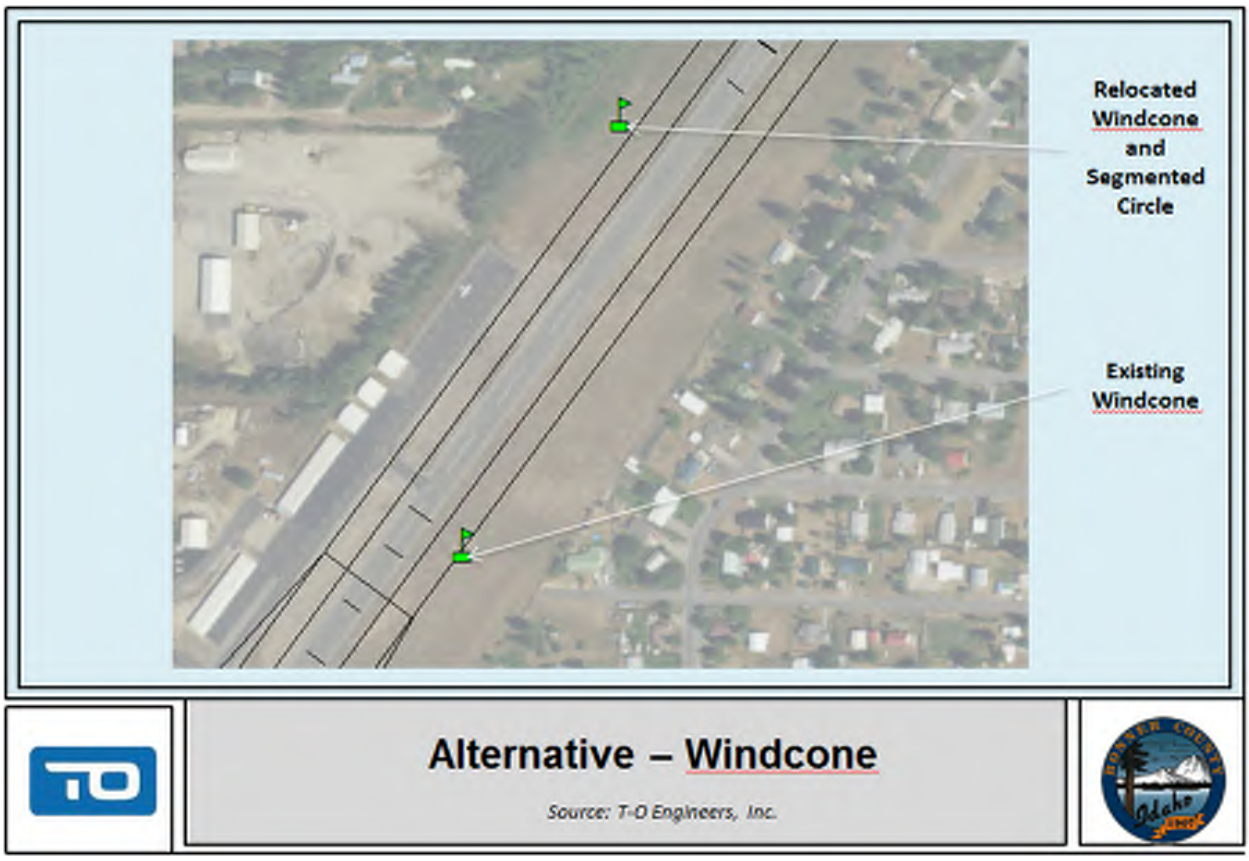
5.6.6 WIND CONE AND SEGMENTED CIRCLE

The ROFA and OFZ for Runway 1/19 at Priest River Municipal Airport do not meet design standards as they are impacted by the existing wind cone as well as an air relief valve. In addition, the airport is not currently equipped with a segmented circle. To meet B-I Small design standards, it is recommended to relocate the wind cone out of the ROFA and regrade around the air relief valve. In addition, the installation of a segmented circle is recommended at the new location of the lighted windcone.

A "No-action" alternative is not acceptable as the existing location of the wind cone does not meet safety standards. Therefore, it must be relocated outside of the runway protection areas. The air relief valve will be addressed when the runway is widened, and change in runway grade at Runway 1 threshold will address this issue.

To relocate the wind cone outside of the ROFA and OFZ, and remain on airport property, the wind cone and segmented circle would need to be relocated mid-field on the north side of the runway, as depicted in **Figure 5-8**. The estimated cost for this project is $30,000.

FIGURE 5-8: WIND CONE RELOCATION



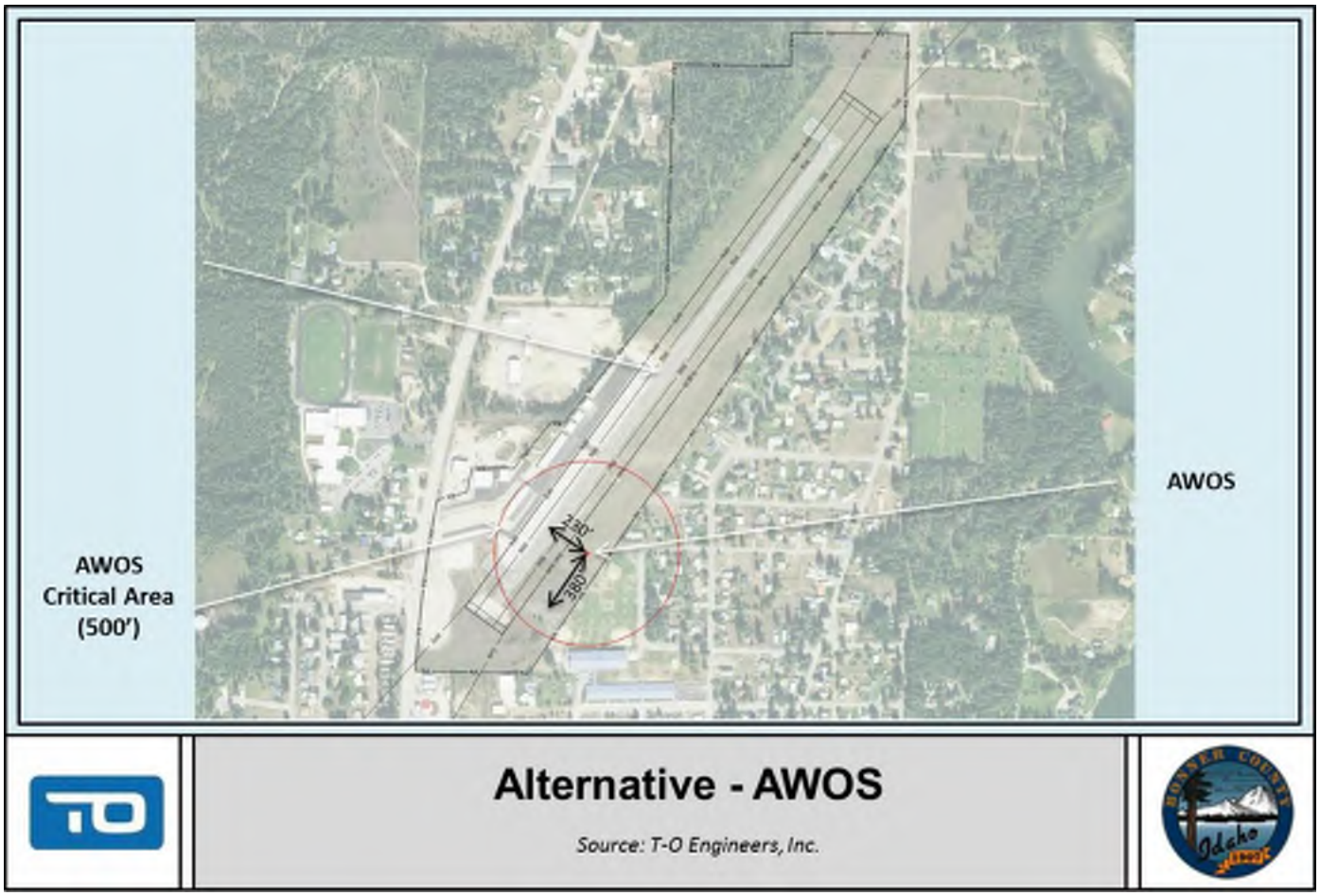
5.6.7 AUTOMATED WEATHER OBSERVING SYSTEM (AWOS)

As mentioned in Chapter 4, Facility Requirements, Automated Weather Observing Systems (AWOS) provide real time weather information to pilots and contribute to enhanced safety. However, Bonner County should keep in mind that AWOS equipment is expensive and the initial costs, approximately $150,000, do not include annual maintenance requirements, which can average $4,000 to $6,000 per year, not including additional unforeseeable maintenance repairs.

In accordance with FAA Order 6560.2B, Siting Criteria for Automated Weather Observing Systems, the AWOS has a 500-foot radius critical area, which needs to be protected to provide accurate wind and weather information.

Proactive planning recommends protecting areas for future development and a proposed AWOS site is depicted on the ALP and in **Figure 5-9**. The proposed location is 380 feet from the threshold of Runway 1 and 230 feet from the runway centerline. This location is out of the preferred sitting area described in the FAA Order 6560.2B, Siting Criteria for Automated Weather Observing Systems: 1,000 to 3,000 feet down runway from the threshold, and between 500 and 1,000 from the runway centerline. However, this location was deemed the most suitable given the constrained environment of the airport. It remains on airport property and minimizes the amount of buildings and obstructions in the critical area. Based on the proposed location, the airport would need to secure an easement to limit new buildings heights in the critical zone, and prevent the construction of additional buildings. If the County wants to pursue the installation of an AWOS it is recommended that additional coordination be conducted with the FAA.

FIGURE 5-9: AWOS



5.7 LANDSIDE ALTERNATIVES

The following section discusses the alternatives considered during the process of determining the preferred landside development alternatives shown on the ALP.

Landside facility development includes aircraft storage facilities, airport access roads, vehicle parking, and commercial development directly related to aeronautical activity. This section summarizes the various landside development alternatives considered and describes the selected alternative in each case.

When analyzing and developing the various landside alternatives, several basic development principles and goals were considered to guide the process:

- Future development will be planned in a manner whereby phased development is possible over the planning period thus providing flexibility to the County to accommodate growth as demand warrants.

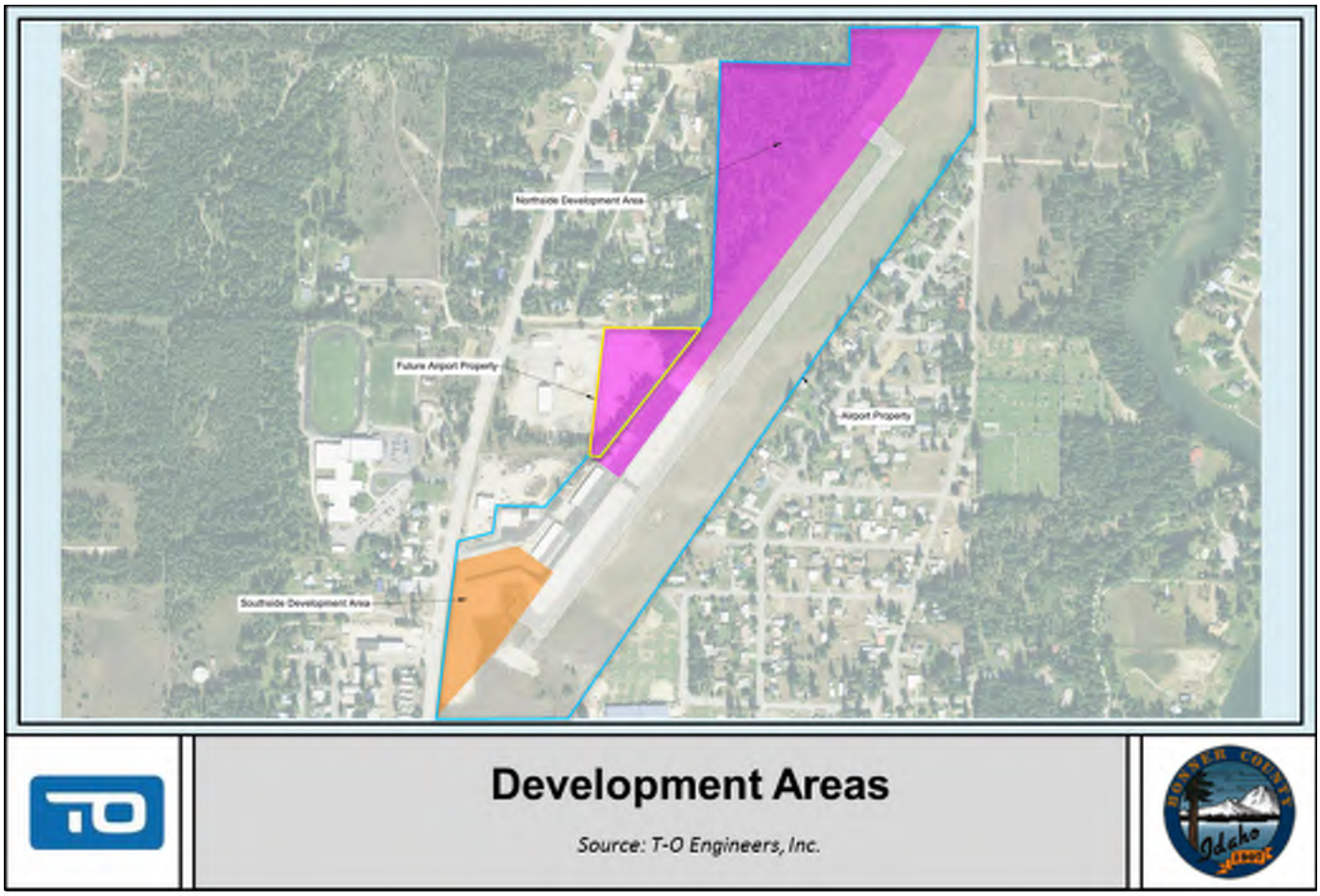
- **The need for *full* build-out of the airport as depicted on the ALP drawing set is not justified based on the aviation activity forecasts performed as part of this study. However, recommendations have been developed based on a proactive planning approach where space should be reserved and facilities will be built as demand warrants.**
- Future development of the airport should be mindful of various aircraft and activity types:
    - Uses such as helicopter traffic should be located in areas that ensure compatibility with other surrounding aviation uses (due to potential of foreign object debris (FOD) in particular).
    - Orderly development of hangar areas ensuring compatibility with FAA design standards based on current and anticipated aircraft use (i.e. aircraft design groups)
- Future development of the airport should be done in a manner that best optimizes access to public infrastructure including:
    - Vehicle/road access
    - Utilities
    - Available land/surrounding uses
- Future development should take into consideration and be mindful of environmental issues at the airport. In addition, future development should minimize potential effect on the environment.

The existing general aviation apron area at Priest River Municipal Airport is divided into two distinct areas and configured to accommodate a total of nine apron tie-down positions, with space available for both based and transient aircraft. Historically, only a small percentage of locally-based aircraft use ramp tie-down areas.

As identified in Chapter 4, Facilities Requirements, there is a no foreseeable shortfall of apron area at the end of the 20-year planning period. However, plans have been developed based on a proactive planning approach where space should be reserved and facilities will be built as demand warrants. Bonner County should keep in mind that pavement is expensive to maintain and that many of the recommendations are demand driven and should only be considered when and if demand at the airport warrants.

Two areas were studied for development opportunities at Priest River Municipal Airport. These areas are described as the Northside Development Area, which includes Parcel G and F, and the Southside Development and are depicted in **Figure 5-10**. Priest River Municipal Airport acquired Parcel G for future development and to limit encroachment of incompatible land uses and development on land adjacent to the airport. In addition, the airport is currently in the process of acquiring Parcel F using County funds only and no federal funds.

FIGURE 5-10: DEVELOPMENT AREAS



No Action

A "No-action" alternative would consist in maintaining landside facilities at their current location and not adding any new capacity. This is not considered as a viable alternative nor is it desirable by the County. The goal of this planning study is to provide the County with options for necessary improvements and for future development. A "No-action" alternative does not meet this goal nor does it meet safety standards. However, the County should keep in mind that pavement is expensive to maintain and that the development depicted on the ALP should only be considered when demand warrants.

5.7.1 SOUTHSIDE DEVELOPMENT AREA

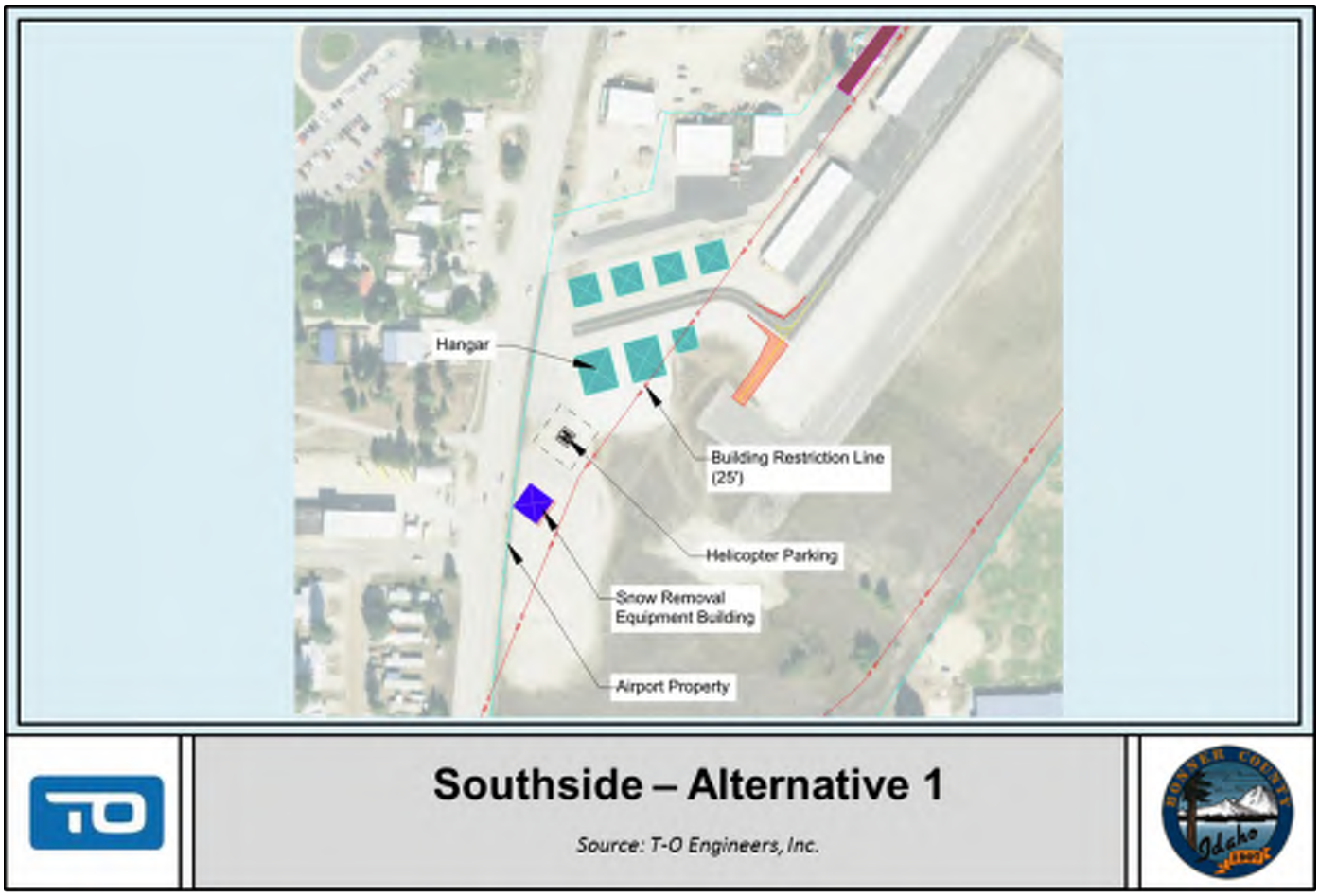
The area described as the Southside Development Area consists of the southern portion of the existing airport property along taxilane B. Two alternatives were developed for this area and are described hereafter. The two alternatives consist of hangars and a building to store snow removal equipment. Following is a summary of each alternative.

Alternative 1

This alternative consists of seven individual box hangars (four 50'*50', two 60'*70' and one 40'*40') as shown on the record of survey drawing established for this area in September 2013. This alternative also includes room for a helicopter parking, which consist of a concrete pad (25'*25') separated from parked aircraft to limit the Foreign Objects Debris (FOD) and adequate for most light turbine helicopter, as well as room for a snow removal equipment building, as depicted in **Figure 5-11**. The taxilane to access this area is already built and these hangars could be built in the short-term to address demand as needed.

This alternative remains entirely on airport property and does not require land acquisition. Most of the hangars are beyond the 25' Building Restriction Line (BRL). However, two of the hangars are within the 25'-BRL and will have to be built lower than 25' to remain clear of the transitional surface. Coordination with the FAA, using the Form 7460-1, will have to be made prior to construction. The estimated costs of this project, including the snow removal building and the helicopter parking pad, are $176,000.

FIGURE 5-11: SOUTHSIDE ALTERNATIVE 1

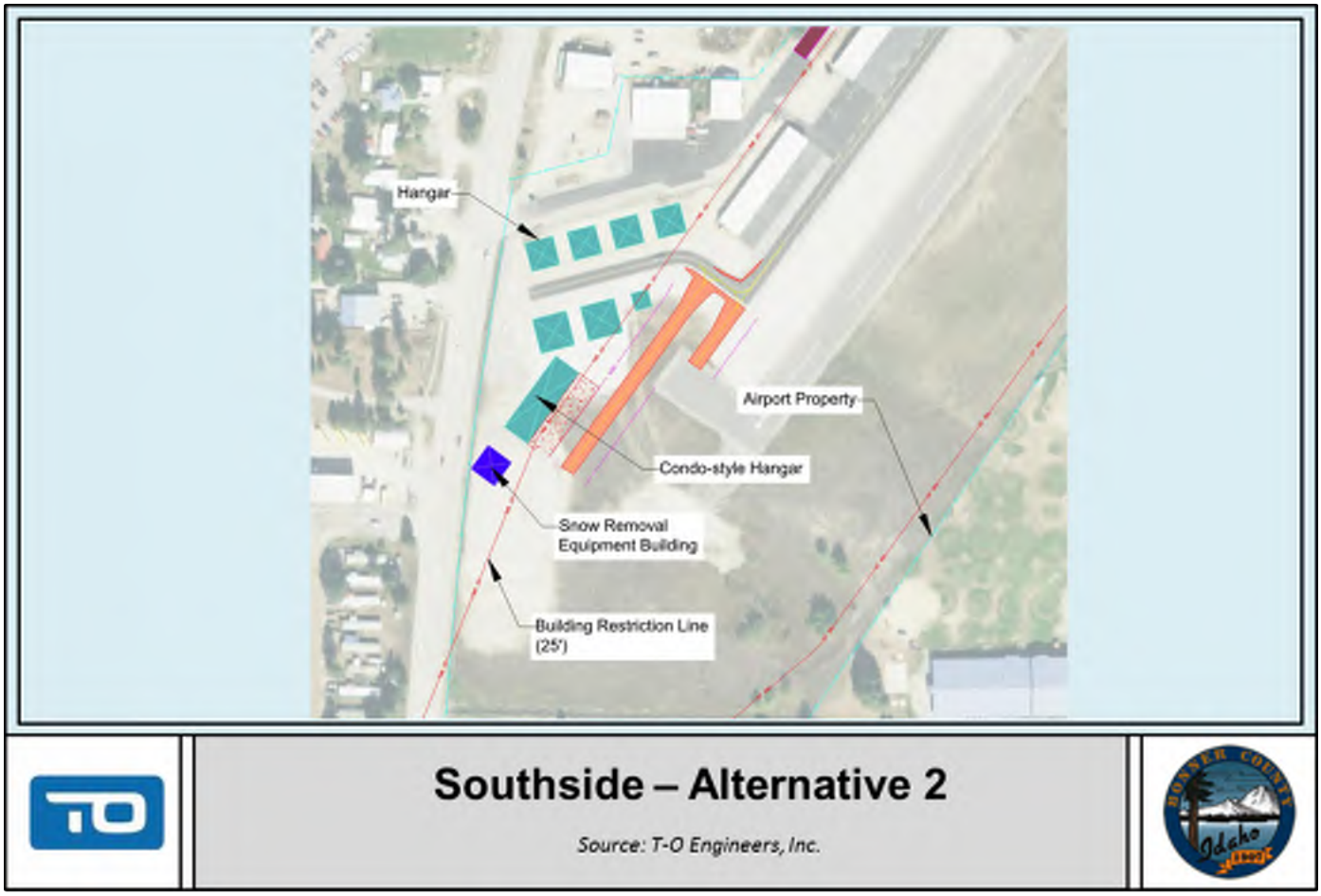


Alternative 2

This alternative consists of seven individual box hangars (four 50'*50', two 60'*60' and one 30'*30') as well as a condo-style hangar (150'*50') similar to the existing condo hangar at Priest River Municipal Airport. Hangar size for Alternative 2 slightly differs from the record of survey drawing established for this area in September 2013. This alternative also includes room for a snow removal equipment building, as depicted in **Figure 5-12**. One of the taxilanes to access this area is already built, while the other will have to be built. The seven individual box hangars could be built in the short-term to address demand as needed, while the condo-style hangar could be built in the short to mid-term.

This alternative remains entirely on airport property and does not require land acquisition. Most of the hangars are beyond the 25' Building Restriction Line (BRL). However, two of the individual box hangars are within the 25'-BRL and will have to be built lower than 25' to remain clear of the transitional surface. Coordination with the FAA, using the Form 7460-1, will have to be made prior to construction. The estimated costs of this project, including the snow removal building, are $271,000.

FIGURE 5-12: SOUTHSIDE ALTERNATIVE 2



Alternatives Evaluation

Table 5-11 summarizes the different alternatives in relation to the selected criteria.

TABLE 5-11: SOUTHSIDE ALTERNATIVES SUMMARY

	Alternative 1	Alternative 2
Operational and Feasibility	Provide capacity to store existing and future based aircraft. Maintain an acceptable level of safety and designed to Aircraft Design Group I. Hangars as shown on the record of survey drawing established for this area in September 2013. Technically feasible and could be developed in the short to mid-term when demand warrants. A FAA form 7460-1 will have to be filled prior to any construction. Maximum height of two hangars is limited by the transitional surface.	Provide capacity to store existing and future based aircraft. Maintain an acceptable level of safety and designed to Aircraft Design Group I. Hangars shown are slightly different from the record of survey drawing established for this area in September 2013. Technically feasible and could be developed in the short to mid-term when demand warrants. A FAA form 7460-1 will have to be filled prior to any construction. Maximum height of two hangars is limited by the transitional surface.
Environmental	Impacts areas that have been previously disturbed in an urban and developed environment. Requires small amount of earthwork to build the hangars. No major environmental impacts are foreseeable. Both alternatives impacts similar areas. Environmental coordination (Categorical Exclusion) will be necessary prior to construction and prior to any hangar development.	
Compatibility with future needs	Provide aircraft hangars space, easily built in the short-term.	
Costs	Costs Estimate: $176,000.	Costs Estimate: $271,000.

Source: TO Engineers Inc.

Preferred Alternative

The Preferred Alternative is a modified version of Alternative 1, as depicted in Section 5.7.3, Preferred Alternative. The revised Alternative 1 removes the smaller hangar and relocates the helicopter parking pad in this area. The preferred alternative also relocates the SRE building, it is the less expensive than Alternative 2, and provides appropriate box hangar space in the short-term. In addition, it provides a convenient parking area for helicopters that could be developed in the short-term.

The Preferred Alternative will consist of consists of six individual box hangars (four 50'*50' and two 60'*70'). The four smaller hangars are to be located along the north edge of Taxilane B while the two slightly larger hangars will be located across the taxilane on the south side. A proposed helicopter landing pad is located on the souths side of Taxilane B adjacent to the aircraft hangar. As previously mentioned, the SRE facility is relocated to the west of the existing aircraft apron behind the large aircraft hangars. Hangars in this area will provide additional covered aircraft parking near the approach end of Runway 2 with direct access to the future full length taxiway.

5.7.2 NORTHSIDE DEVELOPMENT AREA

The area described as the Northside Development Area consists of Parcels G and F.

Three alternatives were developed for this area and are described hereafter. The three alternatives consist of hangars and aircraft parking aprons. In addition, the three alternatives include development space for a FBO, a fuel island as well as a business development with airside access. The three alternatives include a helicopter parking area, which allows parking one helicopter separated from parked aircraft to limit the FOD. Several helicopter parking areas were planned to provide options to the County. However, the preferred alternative, described in Section 5.7.3, includes one helicopter parking pad only.

Parcel G requires a new access road and utility corridor, while Parcel F requires the extension of the existing road and utilities. Further, access road to Parcel F requires the demolition/relocation of the caretaker building located in the immediate vicinity of the existing pilot's lounge.

Space for a Business/Commercial development with airside access was reserved on Parcel G. This area can be used by industries or manufacturers compatible with airport operations that require an apron and taxilane access. FAA AIP participation is not expected for this development.

The development of parcel F could occur in the short to mid-term, while the development of parcel G could occur in the long-term. This area could be easily phased in several stages to answer demand if and when needs warrant.

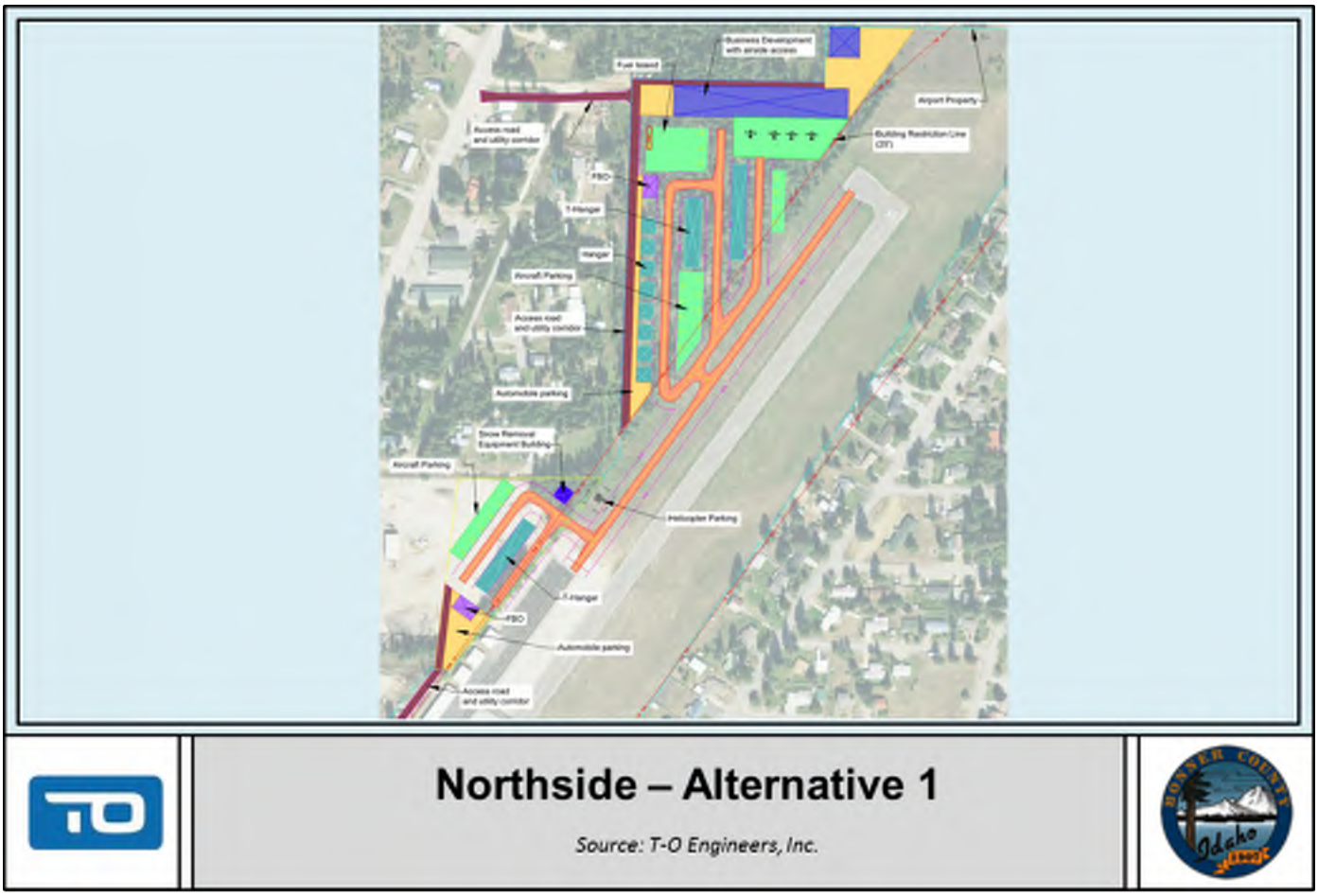
Following is a summary of each alternative.

Alternative 1

This alternative consists of one T-Hangar accommodating 12 aircraft and an apron to accommodate six small piston aircraft (designed for the Cessna 182) on Parcel F, as well as eight individual box hangars (50'x50'), two T-hangars (respectively 10 and 14 aircraft) and a new apron accommodating 16 small piston aircraft on Parcel G, as depicted in **Figure 5-13**.

The estimated costs of this alternative are $2,810,000.

FIGURE 5-13: NORTHSIDE DEVELOPMENT – ALTERNATIVE 1

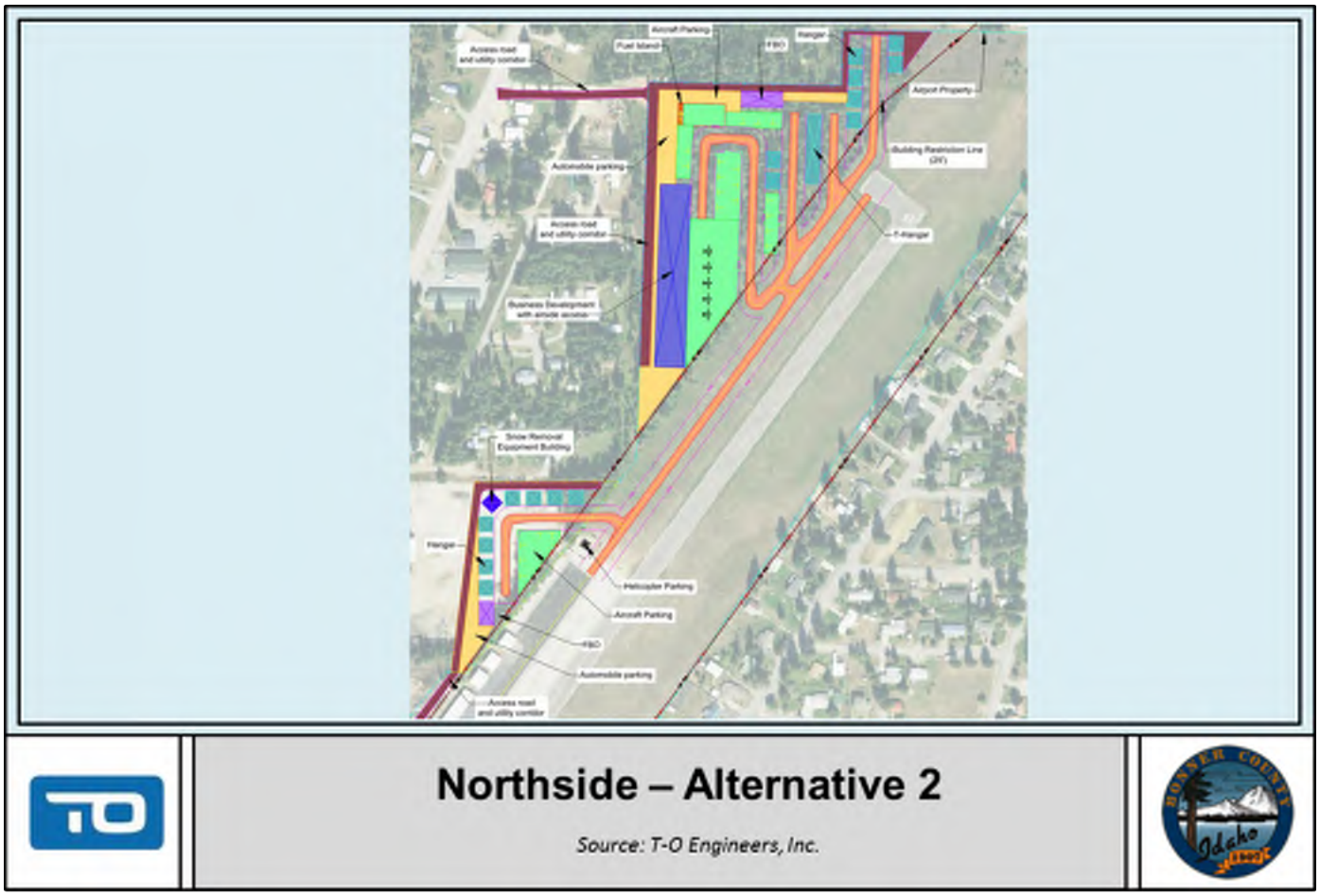


Alternative 2

This alternative consists of eight individual box hangars (50'x50') and an apron to accommodate five small piston aircraft (designed for the Cessna 182) on Parcel F, as well as eight individual box hangars (50'x50'), one T-hangar for 10 aircraft and a new apron accommodating 16 small piston aircraft on Parcel G, as depicted in **Figure 5-14**.

The estimated costs of this project are $2,716,000.

FIGURE 5-14: NORTHSIDE DEVELOPMENT – ALTERNATIVE 2

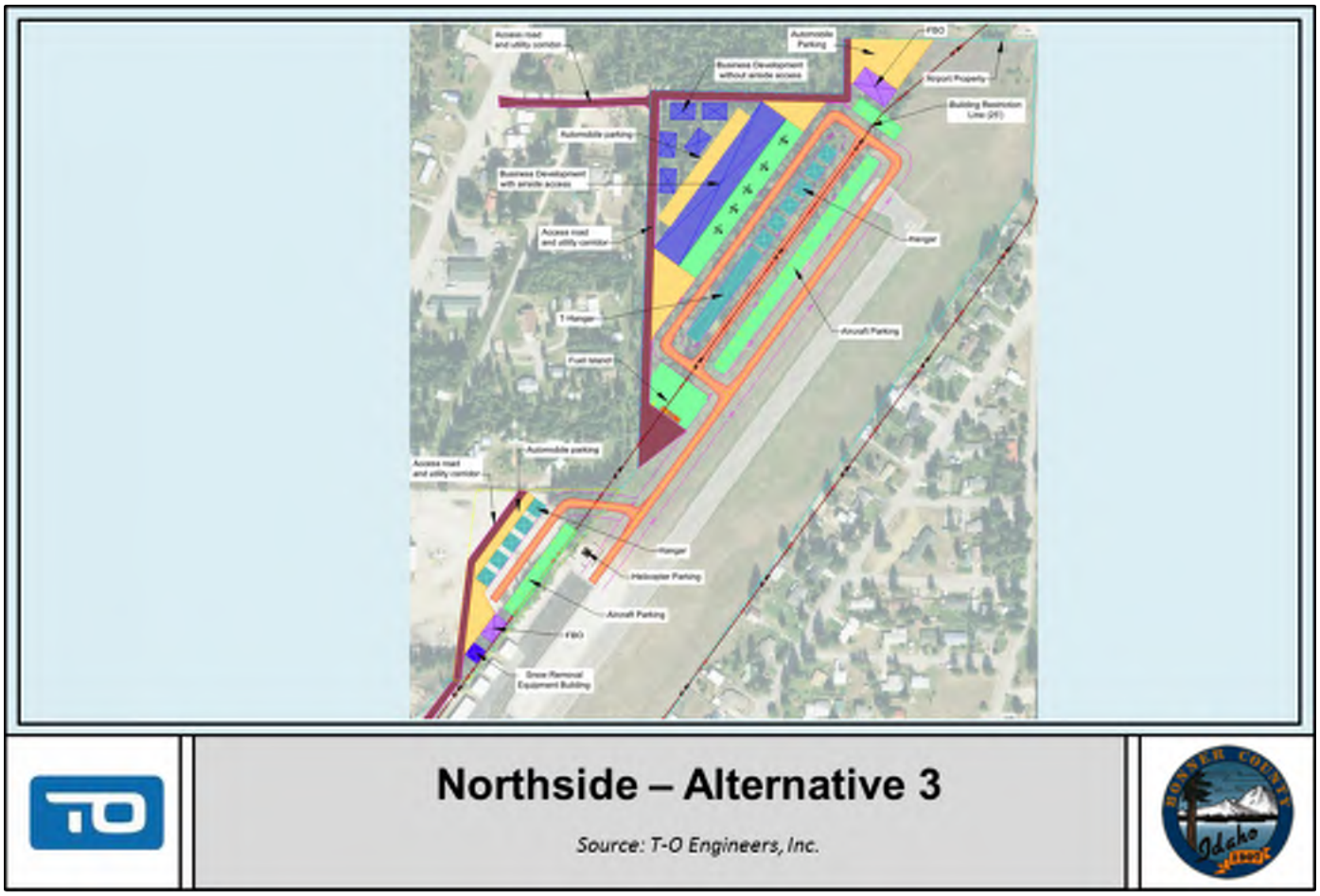


Alternative 3

This alternative consists of five individual box hangars (50'x50') and an apron to accommodate seven small piston aircraft (designed for the Cessna 182) on Parcel F, as well as eight individual box hangars (50'x50'), one T-hangar for 16 aircraft and a new apron accommodating 23 small piston aircraft on Parcel G, as depicted in **Figure 5-15**.

The estimated costs of this project are $2,922,000.

FIGURE 5-15: NORTHSIDE DEVELOPMENT – ALTERNATIVE 3



Alternatives Evaluation

Table 5-12 summarizes the different alternatives in relation to the selected criteria.

TABLE 5-12: NORTHSIDE ALTERNATIVES SUMMARY

	Alternative 1	Alternative 2	Alternative 3
Operational and Feasibility	Provide enough capacity to store existing and future based aircraft. Maintain an acceptable level of safety and designed to Aircraft Design Group I. The three alternatives provide a different number of hangars and apron space, but all provide enough space to meet existing and future demand at the airport. Technically feasible and could be phased appropriately to answer current and future demand. A FAA form 7460-1 will have to be filled prior to any construction.		
Environmental	Similar impacts on areas that have no previous airport development. Earthwork and environmental coordination will be required. No major environmental impacts are foreseeable. The three alternatives impacts similar areas. Environmental coordination will be necessary prior to construction and prior to any hangar development. An Environmental Assessment has been completed for the land acquisition and aeronautical development of Parcel G, including tree removal, grading and paving and construction of hangars, buildings and taxiway, in March 2011. It is anticipated that a similar process will be required prior to development on Parcel F.		
Compatibility with future needs	Provide aircraft apron areas and aircraft hangars.		
Costs	Costs Estimate: $2,810,000.	Costs Estimate: $2,716,000.	Costs Estimate: $2,922,000.

Source: TO Engineers Inc.

Preferred Alternative

After discussion during a public meeting held at Priest River, the Preferred Alternative is a modified version of Alternative 1, as depicted in Section 5.7.3, Preferred Alternative. The costs of the three alternatives are of the same order of magnitude. However, Alternative 1 offers more flexibility to the airport. The Airport Board, members of the public and consultants felt it was important to maintain the business development/commercial activity as far as possible of the existing residential uses. Main revisions include the addition of additional automobile parking and a different location for the SRE building and the helicopter parking pad.

The Preferred Alternative is featured on the final ALP and includes 19 tiedown locations facilitating additional aircraft parking along with seven box hangars and two additional T-hangars. Also, in Parcel G, there are two locations near the north end of the proposed apron that are expected to facilitate non-aviation businesses requiring airside access. There is a total of 94,600 square feet of apron area to be located in Parcel G at full buildout. Other developments on the north side include a proposed FBO facility to be located on the north side of the box hangars, and a fuel facility.

5.7.3 PREFERRED ALTERNATIVE

The preferred alternative combines a revised version of the Southside Alternative 1 and a revised version of the Northside Alternative 1. It is depicted in **Figure 5-16** and on the ALP. Main revisions include the addition of additional automobile parking, and a different location for the SRE building and helicopter parking pad.

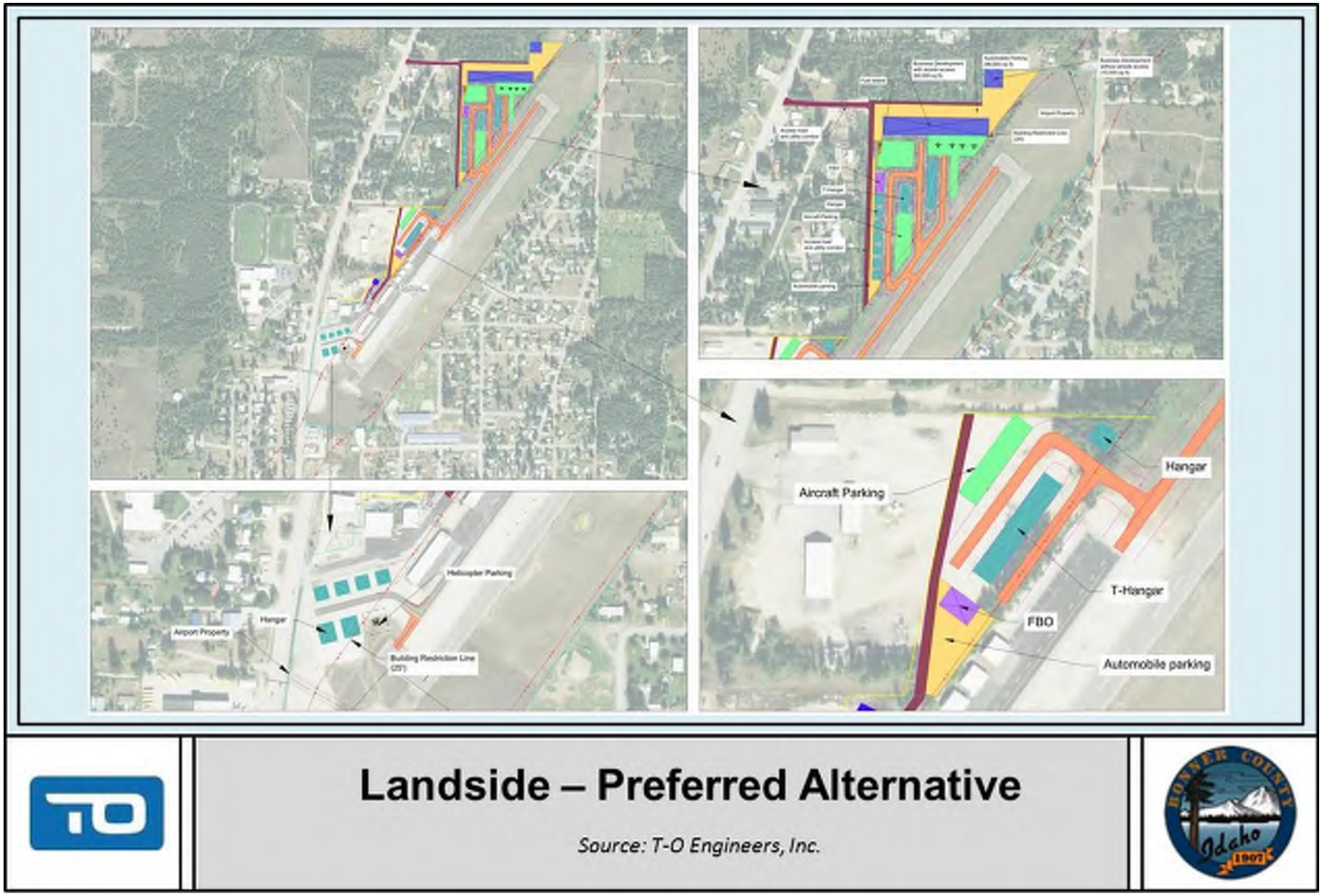
This alternative could be phased appropriately, and such phasing will be addressed in Chapter 6, Development Plan/Financial Overview. Bonner County should keep in mind that such a development is not fully justified at the moment based on existing and foreseeable traffic at the airport. In addition, pavement is expensive to maintain and should be only built as necessary, when demand warrants

This Alternative includes space for a commercial or business facility with on-airport access. However, this alternative is flexible and would allow easy expansion of the taxilane and apron to add additional hangars, if no commercial development occurs on airport property. As previously mentioned, FAA AIP funds are only available to fund infrastructures that are exclusively used by the airport. If a business wants to operate on Parcel G, improvements to utilities such as water, sewer and electrical as well as paving will have to be funded by the business or by using local or private funds. In addition, AIP funding is only available for one access road. Therefore, local funds will have to be used to provide an access road to Parcels F and G.

The Preferred Alternative for landside development, including all three locations along the airfield includes 14 box hangars, 3 T-hangars, 20+ tiedown spaces, 2 fuel facilities, 2 FBO facilities, 1 helipad, 5 apron areas with supporting taxilanes, 1 SRE facility, and 3 vehicle parking areas. As mentioned previously, full buildout of these facilities is not expected and development should be pursued at a rate matching the increase of demand for services and facilities at the airport. The Preferred Alternative provides ample options and opportunities for the airport to pursue over the 20-year planning horizon.

The total cost estimate in 2015 dollars for this alternative is approximately $2,810,000. It is expected an Environmental Assessment will be necessary to acquire and develop Parcel F. An Environmental Assessment has been completed for the land acquisition and aeronautical development of Parcel G, including tree removal, grading and paving and construction of hangar buildings and taxiway, in March 2011. As environmental assessments are assumed to be valid for a period of three years, coordination with the Helena ADO will be necessary to reevaluate the adequacy and validity of the environmental assessment before actual construction.

FIGURE 5-16: PREFERRED ALTERNATIVE



5.7.4 ACCESS ROAD AND AUTOMOBILE PARKING

Parcels F and G currently do not have any access roads. In addition, Parcel G is not currently served by any existing utilities. Access roads and automobile parking were developed based on the Preferred Alternative and are depicted in **Figure 5-17**. In addition, utilities extension should be planned and a utilities corridor should be installed along the road.

Parking areas were developed in the immediate vicinity of the apron and future FBO to provide convenient automobile parking to the airport's users.

No Action

The "No-action" alternative consists of doing nothing and not providing access or utilities to parcel F and G. This is not considered as a viable alternative nor is it desirable by the County. The goal of this planning study is to provide the County with options for necessary improvements and for future development. The "No-action" alternative does not meet this goal.

Alternative 1

This alternative includes construction of up to three vehicle parking areas with the largest located on the north side of Parcel G which is intended to support future non-aviation commercial development. The other two parking areas are located south of the box hangars in Parcel G and near the existing apron. A proposed access roadway joins Highway 57 and runs east/west to serve the future parking areas and non-aviation development areas with a leg breaking to the south serving the 7 box hangers and FBO facility located in Parcel G. A second roadway is a proposed extension of an existing access road leading to the future SRE facility and future apron expansion area west of the existing apron.

Alternative 1 was developed for the automobile parking, road and utilities extension. It was based on the preferred airside and landside alternatives, as depicted in **Figure 5-17**.

FIGURE 5-17: ACCESS ROAD, UTILITY CORRIDOR AND AUTOMOBILE PARKING

Alternatives Evaluation

Table 5-13 summarizes the different alternatives in relation to the selected criteria.

Alternatives Evaluation

TABLE 5-13: ALTERNATIVES SUMMARY

	"No-Action" Alternative	Alternative 1
Operational	Does not allow for access and utilities to Parcel F and G. Feasible but not recommended as it does not allow for additional airport development.	Meets operational demand at the airport and will provide an access road and utility corridor to Parcels F and G. Technically feasible and could be phased appropriately to answer current and future demand.
Environmental	A "No-Action" Alternative has no additional environmental impacts.	Impacts areas that have no previous airport development. Earthwork and environmental coordination will be required, but no major environmental impacts are foreseeable. Environmental coordination will be necessary prior to construction and development. An Environmental Assessment has been completed for the land acquisition and aeronautical development of Parcel G, including tree removal, grading and paving and construction of hangar buildings and taxiway, in March 2011. It is anticipated that a similar process will be required prior to development on Parcel F.
Compatibility with future needs	Constraints the airport layout and does not allow development on Parcel F or G.	Compatible with future needs and provides access to Parcel F and G.
Costs	No additional costs.	Costs Estimate: $515,000.

Source: TO Engineers Inc.

Preferred Alternative

Alternative 1 is the preferred Road Relocation Alternative. It should be noted that FAA AIP funding will not be available for these access roads, as AIP funds can only be used for one access road. If a business wants to operate on Parcel G, access road paving may be totally or partially funded by the business.

5.8 SUMMARY OF CONCLUSIONS

Following is a summary of conclusions. It is understood that the need for *full* build-out of the airport as depicted on the ALP drawing set is unlikely and not justified based on the aviation activity forecasts performed as part of this study. However, the various alternatives and recommendations have been developed based on a proactive planning approach whereby long-term guidance has been presented to the County to assist them in facilitating logical and orderly development over the planning period.

5.8.1 AIRSIDE ALTERNATIVES

B-I Small Standards

To meet B-I Small design standards, Runway 1/19 needs to be widened, the wind cone needs to be relocated out of the ROFA and the obstructions in the RPZs need to be addressed.

Addressing the RPZs will begin with displacing the runway thresholds on Runway ends 1-19 578 feet and 538 feet respectively. Displacing the runway thresholds and implementing declared distances is necessary to mitigate obstructions to the RPZs.

In order to return usable runway length to the airport, pavement extensions on both runway ends are going to be constructed in two phases. The first phase involves lengthening the 1 end by 236 feet and 19 by 221 feet. The second phase will further lengthen the pavement on the end of Runway 19 by an additional 375 feet. During the second phase, the threshold for Runway 19 will be relocated 138 feet closer to the runway end assuming that the threshold siting surfaces are clear of airspace obstructions and all properties within the RPZ have been acquired by the airport and cleared of developments and incompatible land uses.

Runway 1/19 centerline will be shifted 6 feet to the east in response to the runway being widened by 12 feet. This alternative includes removal of existing pavement on the overall length of the runway, new pavement as well as new Medium Intensity Runway Lights (MIRL), Runway End Identifier Lights (REIL) on both ends, Precision Approach Path Indicators (PAPI) on the Runway 1 end, and electrical wiring. This alternative also includes grading of the RSA after the runway ends to meet RSA slope design criteria wich will also mitigate the relief valve currently obstructing the RSA.

Obstructions and Approach Surfaces

In order to facilitate the RPZ preferred alternative and for the airport to become compliant with federal criteria, it is necessary that the current obstructions to airspace, particularly those obstructing TSS, are sufficiently mitigated.

Mitigation of existing obstacles can be accomplished by first acquiring avigation easement and properties where the obstructions are located. This allows the airport to have access to the obstacles and the legal precedence to mitigate them. In most cases the obstacles are trees or tree clusters and they will be removed. In other cases, methods of mitigation such as obstruction marking or lighting may be adequate.

In order for the airport to maximize its utility, become compliant with federal criteria, and pursue full implementation of the other preferred alternatives in this chapter, the mitigation of obstructions to critical airspace is essential.

Instrument Approach Procedure

Instrument approach procedures make airports more reliable and accessible to the flying public. As a result, they can greatly increase an airport's capacity yielding economic benefits for the communities served by the airport.

An opportunity exists for Priest River Municipal Airport to seek development of a published instrument approach procedures, specifically a RNAV (GPS) circling approach, without having to pursue costly and infeasible upgrades to the airport infrastructure and surrounding lands. The implementation of this procedure would greatly benefit the airport.

Parallel Taxiway

The construction of a nearly full parallel taxiway at Priest River Municipal Airport will improve the overall level of safety at the airport and limit the need for back-taxi operations. In addition, this taxiway will provide access to Parcel G. Construction should be phased as needed to provide access to Parcel G, when demand warrants. In order for a taxiway to reach the full future end of pavement on the south end, the taxiway would need to be raised by 4 to 6 feet in order to meet the runway's grade. This places undue burden on the airport design and is not realistically feasible. Phasing will be addressed in Chapter 6, Development plan/Financial Overview.

Other Airside Facilities

The existing wind cone is in the B-I Small standards protection areas. The existing wind cone needs to be relocated outside the ROFA and OFZ and a segmented circle must be constructed around the new location. A proposed location was analyzed, approximately 60 feet east of the existing position. This relocation does not require any land acquisition as the wind cone will remain on airport property.

A proposed location for an AWOS was analyzed and depicted on the ALP. The AWOS has a 500-feet radius critical area. The proposed location is 380 feet from the threshold of Runway 1 and 230 feet from the runway centerline. This location is out of the preferred siting area described in the FAA Order 6560.2B, Siting Criteria for Automated Weather Observing Systems: Based on the proposed location, the airport would need to secure an easement to limit new building height. If the County wants to pursue the installation of an AWOS at Priest River Municipal Airport it is recommended that additional coordination be conducted with the FAA.

5.8.2 LANDSIDE ALTERNATIVES

Alternatives for landside development at Priest River Municipal Airport focus on a variety of hangars, taxilanes, and apron layouts. These development alternatives focus on two areas: the Southside, and the Northside. The Southside consists of on-airport development alternative, and the Northside consists of development on Parcels G and F. Parcel G has already been acquired, while the airport is currently in the process of acquiring Parcel F. The preferred alternatives for these two areas are summarized below.

Southside Development Area

This alternative is planned along an existing taxilane. Therefore, it allows for hangar construction in the short-term without any major investment by the airport. Hangar construction can be phased appropriately when demand warrants. However, this alternative does not provide aircraft apron space. This area is preferred in the short-term over other areas around the airport because of its convenience to build new hangars without any additional cost to the airport. The existing Taxilane 'B' will be connected to the future parallel taxiway and provide easy access to the runway. The Southside Development Area is projected to accommodate up to six box hangars and a helipad.

Northside Development Area

The Northside Development area is composed of Parcel G and Parcel F. Both areas provide siting for hangars, aprons,tie-downs, vehicle parking, fuel facilities, and FBOs. Parcel G has already been acquired alternative and the airport is in the process of acquiring Parcel F. No other land acquisition will be necessary. Parcel G provides for the ultimate development at Priest River Municipal Airport, while Parcel F could be phased in the mid-term. This development area will be built only if and when demand warrants. This alternative offers the airport significant flexibility in terms of opening development opportunities for both aviation and non-aviation uses. Although air traffic demand may not warrant full buildout over the next 20 years, having this alternative in place will allow the airport to be dynamic when addressing future airport demands.

5.8.3 LIST OF ACTIONS

Following is summary of different projects and actions recommended at Priest River Municipal Airport based on the Alternative Analysis.

- **Airside Facilities**
  - Widen Runway 1/19 by 12 feet on one side (shift runway centerline by 6 feet).
  - Regrade the RSA around the air relief valve
  - Relocate existing windcone outside of the ROFA and OFZ
  - Install segmented circle
  - Construct parallel taxiway
  - Install REILs on Runways 1 and 19
  - Install PAPI on Runway 1
  - Install airfield signage, including runway direction signs, to avoid back-taxi in the wrong direction, holding position and direction signs to better identify the apron
  - Install AWOS if necessary and desired by the County
  - Renumber runway to Runway 2/20
  - Seek the publication of a RNAV (GPS) circling approach

- **Mitigate Obstructions to Critical Airspace**
  - Procure Avigation Easements on properties containing obstacles
  - Acquire select properties as needed containing obstacles
  - Remove, light, and mitigate obstructions to airspace

- **Apron and Hangars**
  - Provide lease space for small box hangars, T-Hangars, and tie-down spaces
  - Develop Parcel F
  - Develop Parcel G
  - Construct Taxilanes to access new development sites

- **Terminal Building/Pilot's lounge and Fixed Base Operator (FBO)**
  - Reserve space in Parcel F and G for a future FBO

- **Fueling Facilities**
  - Install Fuel Facilities

- **Airport Property**
  - Install security fence around Parcel G

- **Automobile Access**
  - Construct new access road to Parcel G and F as well as automobile parking

- **Business/Commercial Park**

- Reserve space on airport property, on Parcel G for Business/Commercial activities

5.9 ENVIRONMENTAL CONSIDERATIONS AND PERMITTING PRIOR TO DEVELOPMENT

A detailed overview on the environmental setting and potential environmental consequences at Priest River Municipal Airport is provided in **Appendix A**, Environmental Overview for the Priest River Municipal Airport.

More detailed environmental analysis will be required before proceeding with actual construction. This should include coordination with agencies such as FAA, United States Army Corps of Engineers, U.S. Fish and Wildlife Service, State and local health agencies, State Historical Preservation Office and others as deemed necessary.

A detailed environment analysis will be required for most of the projects and may also be required if projects impact farmlands. In addition, before any hangar construction, the form 7460-1, Notice of Proposed Construction or Alteration, must be submitted to the FAA and an environmental clearance for development must be obtained.

It is anticipated that an Environmental Assessment will be necessary for the runway widening, new runway lights and obstacles mitigation. A significant amount of trees will have to be cut or topped, and this will have to be addressed in the Environmental Assessment.

Further, an Environmental Assessment has been completed for the land acquisition and aeronautical development of Parcel G, including tree removal, grading and paving and construction of hangar buildings and taxiway, in March 2011. A Finding of No Significant Impact (FONSI) has been emitted by the FAA on March 28, 2011. Environmental Assessments are assumed to be valid for a period of three years. Coordination with the Helena ADO will be necessary to reevaluate the adequacy and validity of the environmental assessment before actual construction.

In addition, an Environmental Assessment for the land acquisition and development of Parcel F will also be required.

A determination on necessary action will be completed at the appropriate time to best facilitate the proposed project(s). With the exception of the wind cone relocation and runway shift, the majority of new development at the airport is expected to be demand driven and will only be considered when, and if, demand at the airport warrants.

5.9.1 CLEAN WATER ACT PERMITTING

Construction activities that disturb one acre or more of land (including clearing, grading, and excavating) require coverage by a National Pollutant Discharge Elimination System (NPDES) storm water permit. Future projects at Priest River Municipal Airport that impact more than 1 acre of land, will require a NPDES permit. In addition, a Storm Water Pollution Prevention Plan (SWPPP) will be required to describe the site controls.

5.9.2 LOCAL BUILDING PERMIT

A building permit has to be obtained, prior to any construction, throughout the City of Priest River.