# CHAPTER 5: ALTERNATIVES ANALYSIS

## Introduction

This chapter of the Airport Master Plan discusses airport development alternatives considered in the planning process for the Perham Municipal Airport (16D). The objective of this chapter is to clearly document the recommended airport development that meets the needs of airport users, as well as the strategic vision of the City of Perham.

Alternatives evaluated for this study are based on comparing existing conditions with facility requirements reviewed in detail in the previous chapters. Potential impacts of each alternative considered are discussed and used to help the airport select a preferred alternative(s) to be shown on the Airport Layout Plan. Alternatives outlined are split into the following functional facility areas:

- Airfield
- Terminal / Hangar Area

The recommended plan to implement the proposed development is outlined in **Chapter 6: Implementation**.

## Background

The overall guiding principle is to plan an airport facility that adequately serves aviation users, community needs and is flexible to industry changes. Airport development at Perham is primarily driven by the need to accommodate on-demand aircraft operations in support of local businesses. These operators will require access to the airport using increasingly larger and faster aircraft types. Additional hangar development space is also needed for future based aircraft. Alternatives must meet FAA and MnDOT design criteria and be implementable within the existing infrastructure and environment.

Each functional area of the airport has specific needs and constraints that affect the formulation of realistic, implementable development options. The most significant facility planning needs and assumptions are summarized in the following table based on Planning Activity Levels (PAL).

*Table 5-1 – Facility Needs and Assumptions*

| Facility Element | Planning Needs & Assumptions |
|---|---|
| Airfield Facilities | • Maintain Runway 31-31 at 4,102' x 75'. Evaluate an ultimate extension to 4,300'<br>• Install an automated weather observation system |
| Terminal/Apron/Hangar Area | • Accommodate additional based aircraft hangar storage prior to PAL 1.<br>• Provide storage space for corporate and transient aircraft.<br>• Reconfigure or expand the apron to accommodate additional ADG-I and ADG-II parking and meet ADG-II maneuvering standards. |
| Support/Landside Facilities | • Plan for an ultimate airport perimeter security and wildlife fence |

## Evaluation Process

A wide range of alternatives are evaluated to determine the best solution for the airport to meet facility needs. Evaluation criteria are developed to determine the relative strength and weaknesses of the alternatives. FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans* identifies criteria that would be examined in any alternatives evaluation. Using this guidance and local considerations, airport-specific criteria has been formulated. The alternative evaluation criteria utilized for this study is as follows:

### OPERATIONAL PERFORMANCE

This factor evaluates how well the airport operates as a functional system. These include:

- **Capacity** to meet forecasted activity demands within and beyond the planning horizon
- **Capability** to meet FAA design standards to safely accommodate the critical design aircraft
- **Efficiency** to accommodate alternative elements as a combined airport system

### BEST PLANNING TENETS AND OTHER FACTORS

This factor involves determining the relative strengths and weaknesses of the alternatives. The following tents are typically reviewed:

- Conformance to industry best practices for safety and security
- Conforms to the intent of FAA/MnDOT design standards and other guidelines
- Provides for the highest and best on- and off-airport land use
- Allows for forecast growth and growth beyond the planning horizon
- Provides flexibility to react to unforeseen changes
- Conforms to the City of Perham's strategic vision
- Conforms to appropriate local, regional, and state transportation and other plans
- Technically feasible, constructible, and implementable
- Socially and politically feasible
- Satisfies airport user needs

### ENVIRONMENTAL FACTORS

The potential effects of the alternatives upon the natural and built environment is an important consideration. These factors are evaluated early in the process to determine whether alternatives are likely to trigger impacts or if additional alternatives need to be considered.

### FISCAL FACTORS

A fiscal analysis is necessary to determine if the alternative fits within the financial resources of the airport, as well as potential state funding partners. Preparing rough planning-level development cost estimates is an effective way to compare alternatives.

# Airfield Development Alternatives

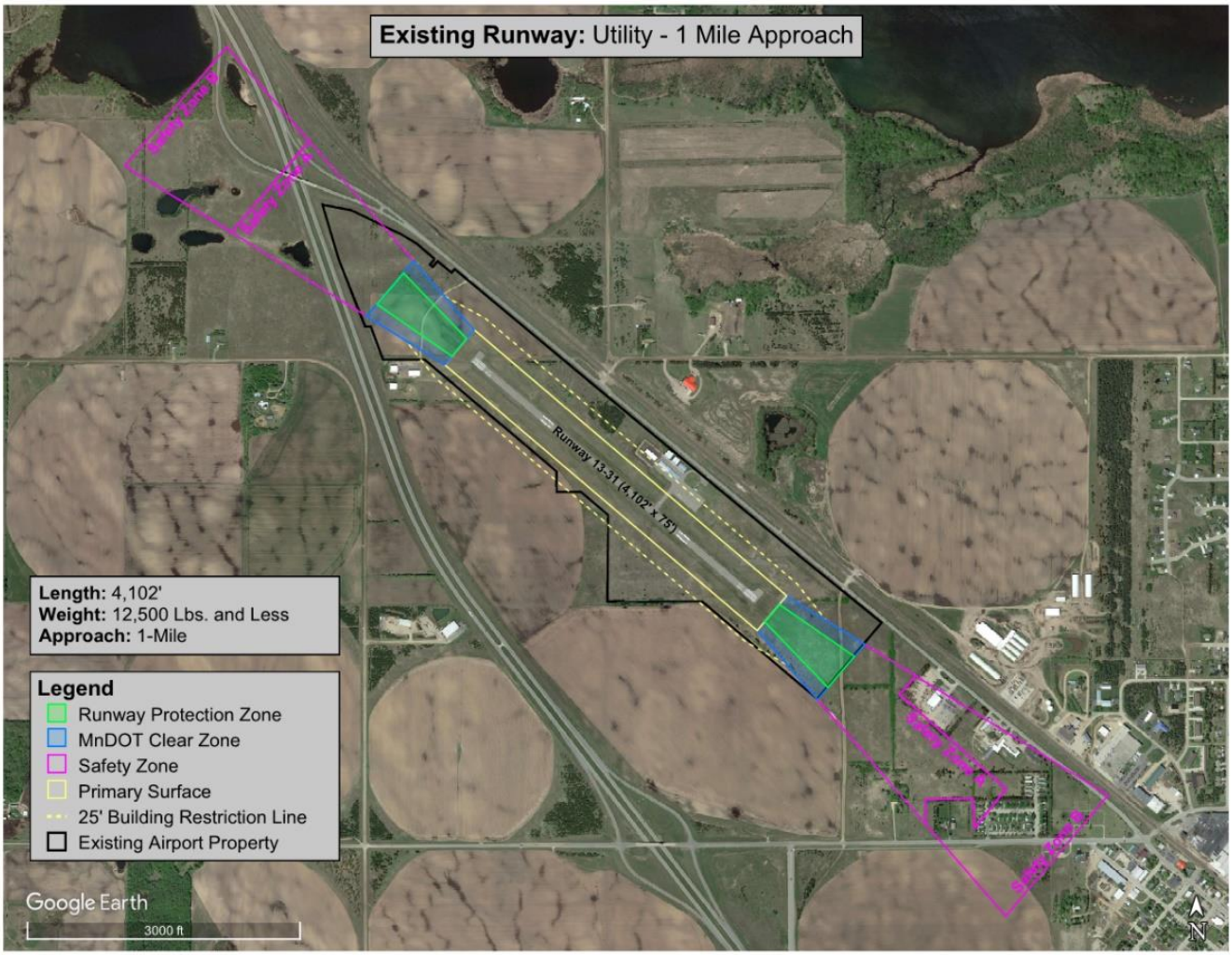
## *Needs Summary*

The airfield is vital to the airport's core infrastructure for accommodating aircraft operations. The following section summarizes key airfield facility requirement findings:

- **Runway 13-31:**
  - Maintain Runway 13-31 at the existing 4,102' x 75'. Evaluate ultimate extension to 4,300' to accommodate small aircraft fleet with at least 10 seats.
- **Weather Reporting:**
  - Install an automated weather observation system

## *Runway 13-31*

An evaluation of development alternatives to accommodate the airfield facility requirements elements for the Runway 13-31 is described in the following section. A key planning consideration to the master plan study was to evaluate airfield and runway expansion limitations.



## RUNWAY LENGTH

Runway 13-31's existing length of 4,102 feet is adequate to accommodate the existing aircraft fleet operating at Perham. However, per the Facility Requirements, it is recommended to evaluate an extension to 4,300' to preserve the ability to accommodate the regular operations of small aircraft fleet with at least 10 seats in the future. The following runway alternatives will examine the ability of the existing airport site to accommodate an ultimate runway extension and are depicted in **Exhibits 5-2 thru 5-4**.

The airfield is generally constrained with Highway 10 on the northwest end and commercial and residential development in the south east. Key considerations, when evaluating an extension to Runway 13-31, include both zoning, specifically MnDOT Safety Zones, and land use compatibility. The MnDOT Safety Zones dimensions are determined by overall runway length so any change to planned length or end of runway would require zoning action for the new Safety Zones. The airport is required to have ownership or adequate control of property within the MnDOT Clear Zone and restrict incompatible uses. As the end of the runway adjusts, new incompatible uses may be introduced into the zone or additional property may need to be acquired.

**No Change**: Runway length remains at current length of 4,100' and no extension shown on the Airport Layout Plan.

Advantages include:

- No new capital improvement costs
- Existing zoning may remain
- No need to relocate any runway lighting or change any runway markings
- No land acquisition would be needed

Disadvantages include:

- Runway length does not meet long range needs of small aircraft with at least 10 seats
- Does not protect for a potential runway extension in the future
- Non-compatible uses remain in the RPZ and MnDOT Clear Zone with driveway on Runway 13 end and unpaved road / snow mobile trail on Runway 31 end.

**200' Extension to Runway 31 End**: Runway 13-31 is extended from 4,100' to 4,300' with the extension of the Runway 31 end (southeast). The extension would require an additional 200' of pavement and corresponding grading, additional airfield lighting, relocation of PAPI and acquisition of land outside airport property for the RPZ and MnDOT Clear Zone.

Advantages of this alternative include:

- Runway extension meets long range capabilities of small general aviation aircraft with at least 10 seats

Disadvantages of this alternative include:

- Requires land acquisition (approximately 3.7 acres) from adjacent property for adequate control of RPZ and MnDOT Clear Zone.
- Runway 31 PAPI will need to be relocated
- MnDOT Safety Zones are extended and Runway 31 end shifts further east requiring rezoning.
- Non-compatible uses still exist in the RPZ and MnDOT Clear Zone with driveway on Runway 13 end and unpaved road / snow mobile trail on Runway 31 end.

**200' Extension to Runway 13 End**: Runway 13-31 is extended from 4,100' to 4,300' with the extension on the Runway 13 end (northwest). The extension would require an additional 200' of runway pavement and

corresponding grading, construction of turn-around pavement, additional airfield lighting and the relocation of the PAPI

Advantages of this alternative include:

- Additional land acquisition may not be required
- Runway extension meets long range capabilities of small general aviation aircraft with at least 10 seats

Disadvantages of this alternative include:

- Brings Runway 13 threshold closer to private driveway
- Runway 13 PAPI will need to be relocated
- MnDOT Safety Zones are extended and Runway 13 end shifts further east requiring rezoning.
- Non-compatible uses still exist in the RPZ and MnDOT Clear Zone with driveway on Runway 13 end and unpaved road / snow mobile trail on Runway 31 end.

**100' Extension to Both Runway Ends**: Runway 13-31 is extended from 4,100' to 4,300' with a 100' extension on both the Runway 13 and 31 ends. The extension would require a total of 200' of additional pavement and corresponding grading, construction of turn-around pavement, additional airfield lighting, relocation of PAPIs and acquisition of land outside airport property for the RPZ and MnDOT Clear Zone.

Advantages of this alternative include:

- Runway extension meets long range capabilities of small general aviation aircraft with at least 10 seats

Disadvantages of this alternative include:

- Brings Runway 13 threshold closer to private driveway
- Runway 13 and 31 PAPI will need to be relocated
- Requires land acquisition (approximately 2.1 acres) from adjacent property for adequate control of RPZ and MnDOT Clear Zone.
- MnDOT Safety Zones are extended and both runway ends shift further east requiring rezoning.
- Non-compatible uses still exist in the RPZ and MnDOT Clear Zone with driveway on Runway 13 end and unpaved road / snow mobile trail on Runway 31 end.

**Review -** After reviewing the alternatives and careful consideration, the MPAC and airport sponsor concluded that a No Change configuration would be incorporated into the ALP. The driving factors that led to this decision were allowing the existing custom zoning and Safety Zones to remain and the marginal benefit an ultimate runway extension would provide. Throughout this study, no user expressed a strong need for more than a 4,100-foot runway. The existing incompatible land use (private driveway) in Runway 13 RPZ and MnDOT Clear Zone is recommended to remain as the use is infrequent and a feasible alternative to access the property without going through the zones does not exist. The incompatible use (unpaved road / snow mobile trail) in Runway 31 RPZ and MnDOT Clear Zone is recommended to be rerouted outside the zones as an opportunity arises.

*Exhibit 5-2 - Runway 13-31 Extend Southeast*

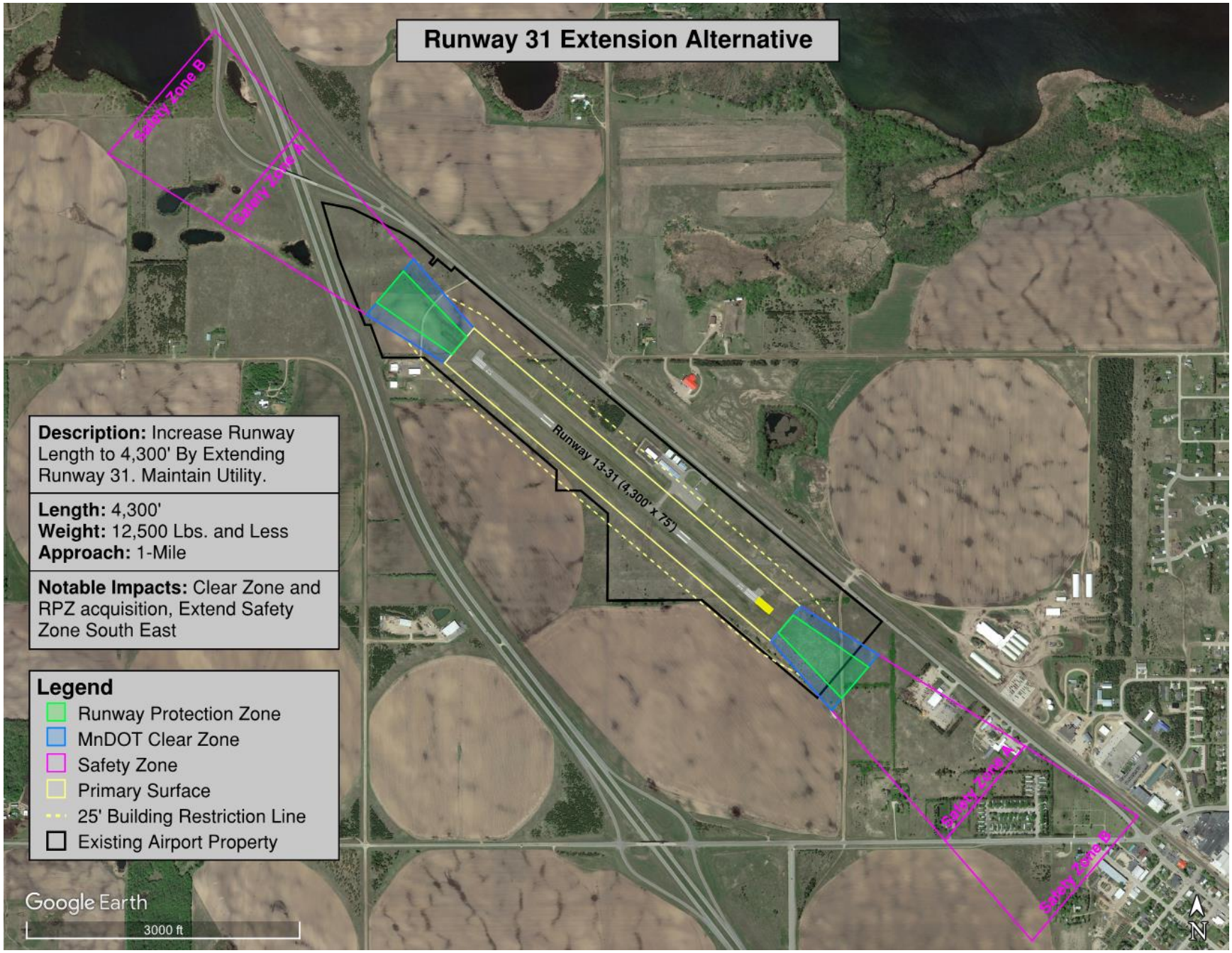


*Exhibit 5-3 - Runway 13-31 Extend Northwest*

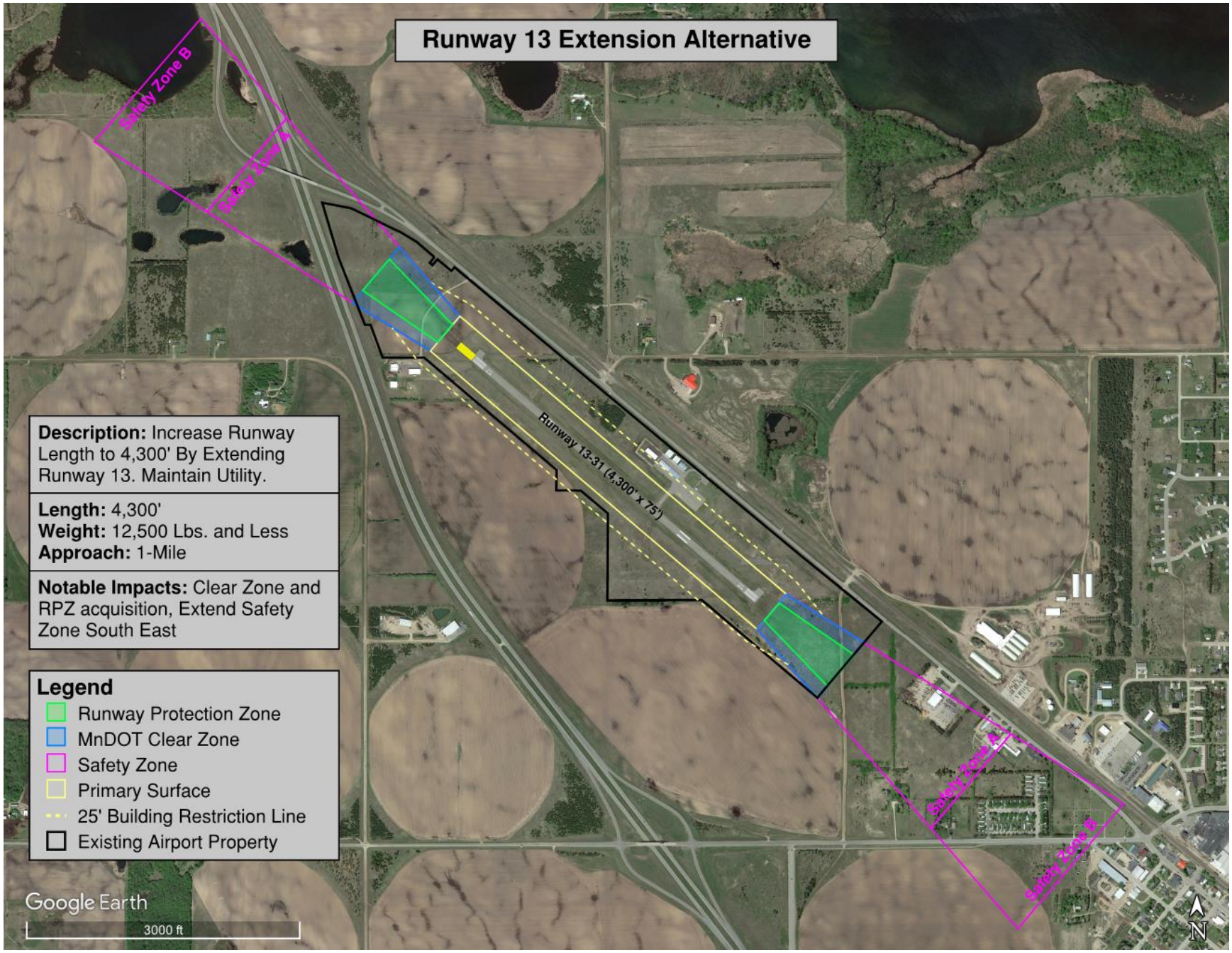
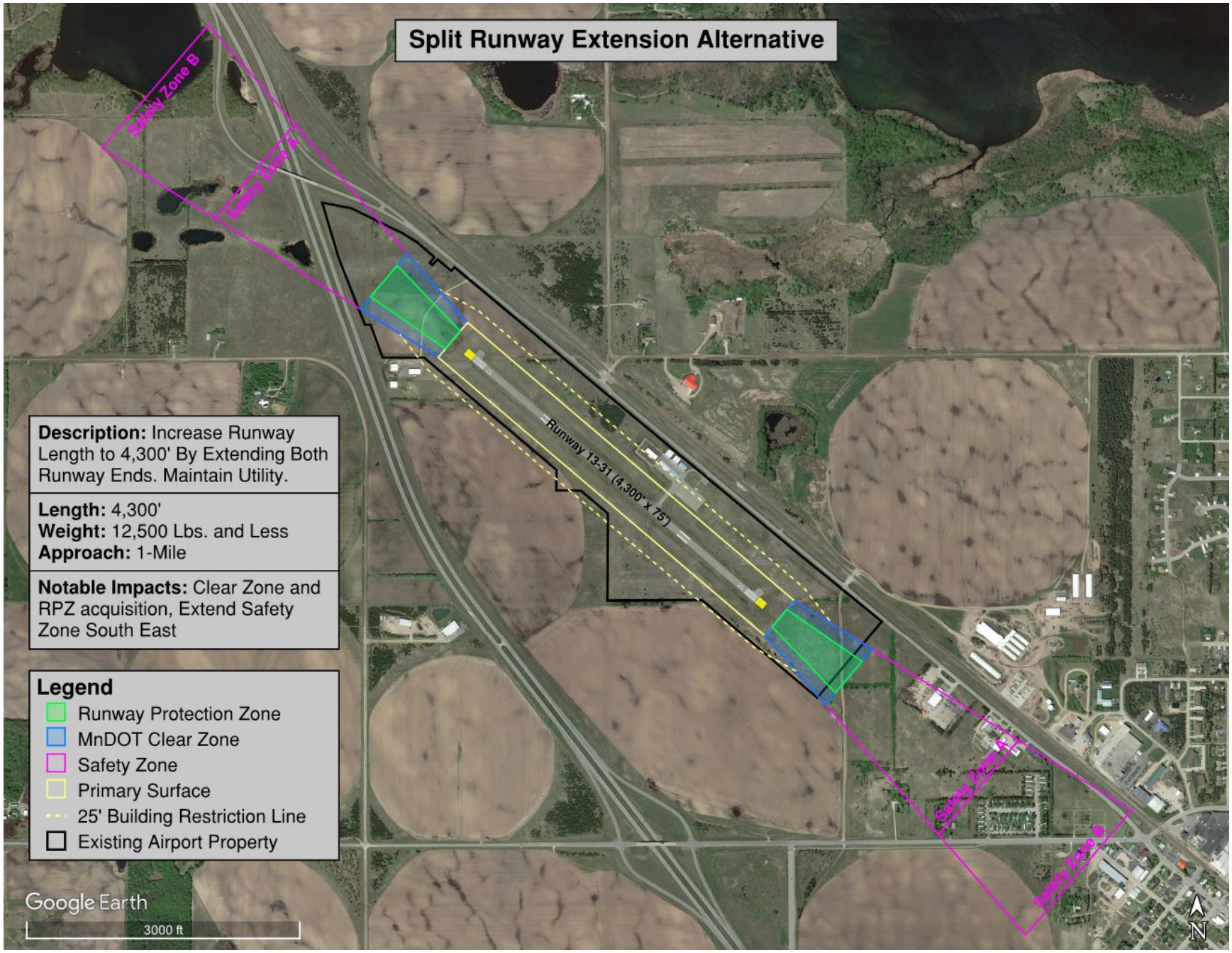


*Exhibit 5-4- Runway 13-31 Split Extension*



### *Taxiway*

Taxiways provide for the safe and efficient movement of aircraft between the runway and the terminal area. Perham is currently served by one taxiway that connects the apron to runway. This can lead to a point of conflict where an aircraft holding on the taxiway for departure impedes the exit of an aircraft that has just arrived on the runway. A secondary access taxiway solves this issue by allowing the arriving aircraft to exit the runway using the other taxiway. **A secondary taxiway accessing the runway from the apron is recommended.**

A parallel taxiway allows for the efficient movement of aircraft and reduces the time an aircraft is on the runway as back-taxiing is no longer needed. A full parallel taxiway at Perham would have significant cost and provide marginal benefit for the number of operations during the planning period. However, it is recommended the airport preserve the ability to construct a parallel taxiway if needed in the future.

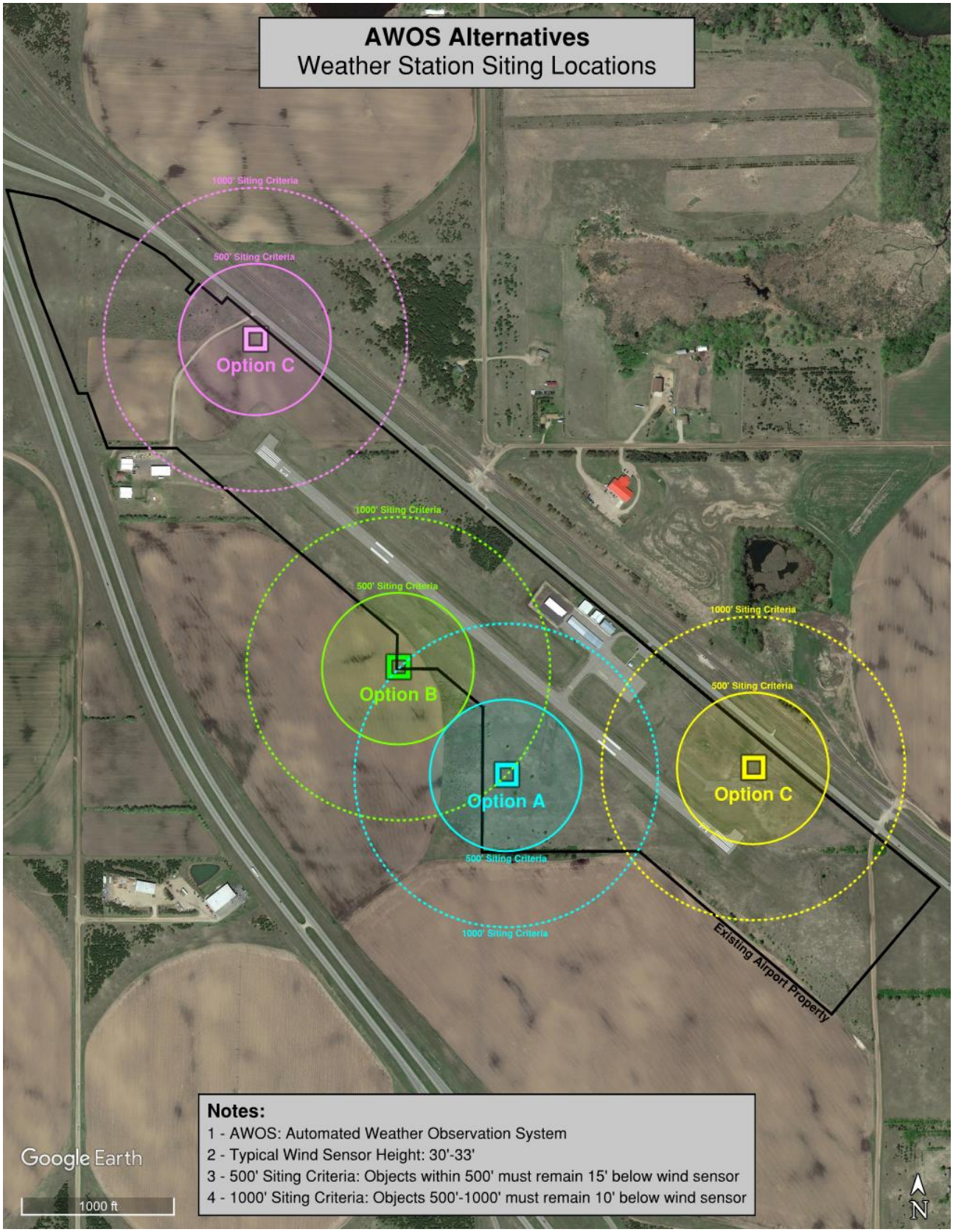
### *Weather Reporting Facility*

An automated weather observation facility provides timely and valuable weather information to pilots during inclement weather events. There are no automated weather observation systems (AWOS) installed at Perham. The nearest weather-reporting systems are at the Detroit Lakes and Wadena airports. During the course of the planning study, the local hospital system has expressed support for an AWOS at Perham to aid their air medical flight operations.

The siting of an AWOS must meet certain criteria to be certified by the FAA for aeronautical use. The facility should be located within a specific area in relation to the runway and the surrounding area should be free from structures or vegetation that would disrupt the wind flow. For the siting in relation to the runway, the AWOS should be between 1,000’ and 3,000’ from the threshold of the runway and offset between 500’ and 1,000’ from runway centerline. The criteria that ensures wind flow is not disrupted establishes a 500’ radius from the AWOS unit where structure or vegetation must be at least 15 feet lower than the height of the sensor (typically 30-33 feet).

A review of possible locations on airport for an AWOS unit that could meet both criteria produced one favorable location. Not far from the main wind cone, Option A, depicted in **Exhibit 5-5,** meets the distance requirements from the runway, has available power source nearby, and relatively easy access for maintenance. The 500’ radius critical area is free from existing and future structures; however, a few trees on property exceed the tolerance. These trees will need to be trimmed or lowered prior to certification. It would also be recommended to evaluate avigation easements to limit height of structures on adjacent farmland to protect the 500’ critical surface. **Option A is recommended as the location for the installation of a new AWOS unit at Perham.**

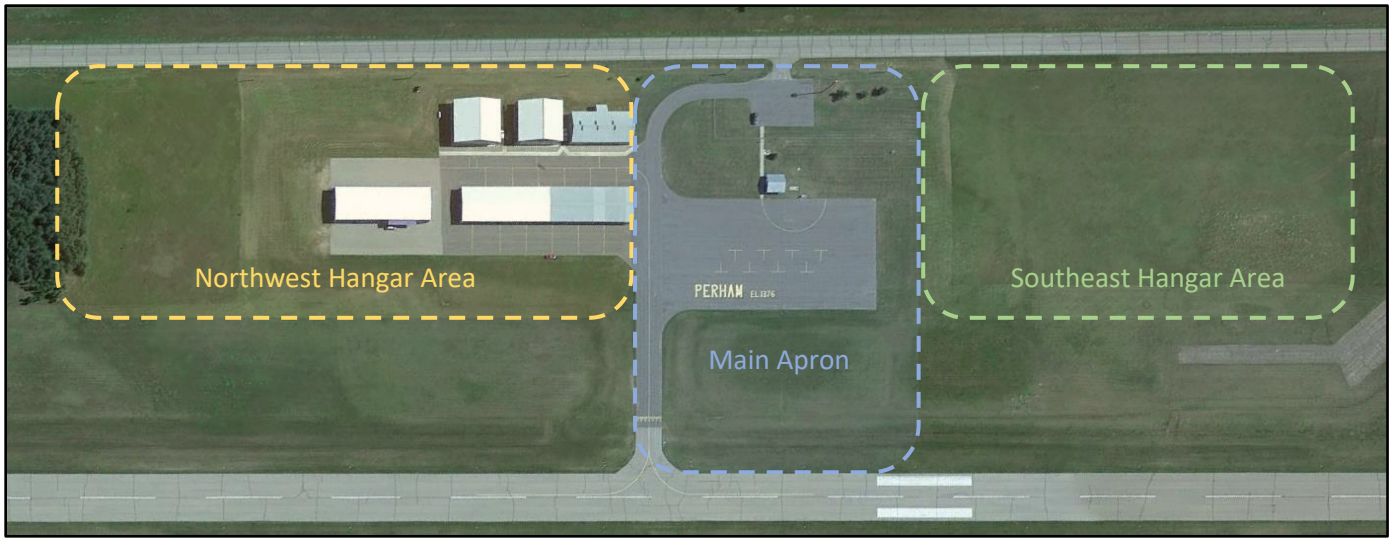
*Exhibit 5-5 – AWOS Siting*



# Terminal/Hangar Area Alternatives

## *Needs Summary*

The development concepts in the terminal/hangar area consider options for various infrastructure elements. The Terminal Area was evaluated as three separate areas where alternatives were formulated for each and provided to the MPAC for consideration. Several concepts were considered and discussed with the Airport Sponsor at the Master Plan Advisory Committee (MPAC) meeting on December 16th, 2019. The graphic below depicts the three areas: Northwest Hangar Area, Main Apron, Southeast Hangar Area.




As discussed in **Chapter 4: Facility Requirements**, the critical design aircraft for the Airport include aircraft with Group II wingspans. Terminal Area alternatives provide apron and hangar taxilanes that can accommodate separation standards for these Group II aircraft, but there are also areas limited to use by Group I aircraft in order to maximize the use of available space.

The following key elements were considered in preparing the alternatives:

- **Apron**
  - Reconfigure or expand the apron to accommodate additional ADG-I and ADG-II parking and meet ADG-II maneuvering standards.
- **Hangar**
  - Accommodate additional based aircraft hangar storage near-term
  - Provide storage space for corporate and transient aircraft.

## *Apron*

The existing aircraft apron pavement will require major rehabilitation in the mid-term (6-10 years). This project provides an opportunity to reconfigure and provide sufficient apron space to meet design standards and capacity needs.

The apron facility requirements show a need for additional parking positions for ADG-1 small aircraft and the ability to accommodate ADG-II parking. Additionally, for the maneuvering of the design aircraft, the apron taxilanes should meet ADG-II and TDG-2 taxilane standards. The location of the fuel facility

limits circulation and development and should be relocated where the fueling aircraft does not impede the movement of other aircraft.

A location should also be provided for the establishment of a Fixed Based Operator (FBO) or similar operator. An FBO hangar is one that is positioned on an apron with landside access and used to conduct aviation business. While a business like an FBO (Fixed Base Operator) or SASO (Specialized Aviation Service Operator) may or may not eventually operate from Perham, providing a site and hangar location on the apron will lend itself to accommodating these facilities should they be needed/constructed in the future.

Airport sponsor priorities include providing sufficient aircraft parking for based and transient aircraft, adequate maneuvering areas, and large aircraft parking. Any apron layout must be financially feasible while correcting the geometry and taxilane object free areas to meet FAA and state standards.

Alternative concepts were provided and reviewed with the MPAC to help the airport sponsor select an apron layout that meets long-term facility needs. The considerations and concepts are described below and shown graphically in **Exhibit 5-6**.

### APRON ALTERNATIVE 1

This alternative depicts an apron expansion (approx. 4,500 SY) on the southeast and southwest sides of the existing apron which creates the space for ADG-II taxilanes around the perimeter of the of apron. At the end of its useful life, the existing taxiway is shifted south to provide wingtip clearance from the existing T-Hangar. A secondary access to the runway is also provided from the south corner of the apron. Two more aircraft tie-downs are provided for a total of 10 ADG-I parking spots. The depth of the aircraft tie-down area may also accommodate some ADG-II aircraft, including the design aircraft, at the expense of ADG-1 parking. At the time of project implementation, the need for ADG-II parking and a concrete hardstand should be evaluated. The fuel system has been relocated to the other side of the terminal building and outside the TOFA which leaves developable space along the apron for a potential FBO or similar operation to be located next to the terminal.

### APRON ALTERNATIVE 2

This alternative mirrors the apron, aircraft parking, and taxiway/taxilane development of Apron Alternative 1 with the difference being the layout of the fueling system and future building developments. The fuel system in this alternative has been shifted slightly away from the main apron and terminal building to meet ADG-II TOFA standards. The developable space for an FBO has shifted to the corner of the apron to meet the state fire code requirement for a 50-foot separation from fueling systems. An additional building development location is provided on the apron just north of the terminal.

### APRON ALTERNATIVE 3

This alternative depicts an apron expansion (approx. 4,000 SY) on three sides of the existing apron which creates the space for ADG-II taxilanes around the perimeter of the of apron. At the end of its useful life, the existing taxiway is removed with access to the runway being provided by a taxiway at the south corner of the apron and a partial parallel to Runway 31 end. No additional aircraft tie-downs are provided, leaving a total of 8 ADG-I parking spots; however, like Apron Alternative 1 and 2, the parking area may accommodate some ADG-II aircraft, including the design aircraft, at the expense of ADG-1 parking. Due to the wingtip separation requirements of the partial parallel taxiway and the resulting apron expansion to the north east, the existing fuel system and terminal building will need to be relocated. The fueling system is located on the other side of the terminal building, while the terminal building shifted back. This allows developable space along the apron for a potential FBO or similar operation to be located next to the terminal.

### APRON ALTERNATIVE 4

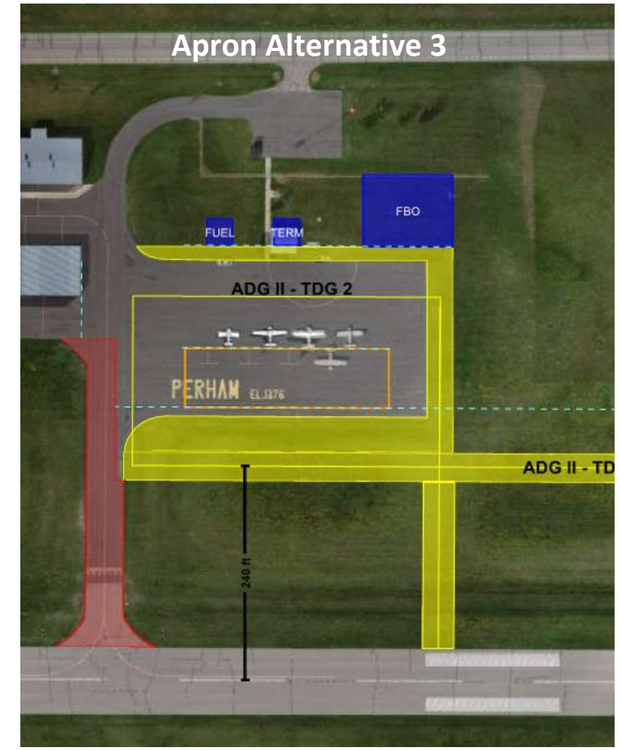
This apron layout depicts an apron expansion (approx. 5,800 SY) on three sides of the existing apron, creating the space for ADG-II taxilanes around the perimeter of the of apron. At the end of its useful life, the existing taxiway is shifted south to provide wingtip clearance from the existing T-Hangar. A secondary access to the runway is also provided from the south corner of the apron. Two more aircraft tie-downs are provided for a total of 10 ADG-I parking spots and, similar to previous apron alternatives, the parking area may accommodate some ADG-II aircraft, including the design aircraft, at the expense of ADG-1 parking. The fuel system is located along the southern portion of the apron, allowing the fueling operation to remain separated from aircraft maneuvering. The terminal building and developable space are relocated outside the TOFA but spread apart due to the constrained vehicle parking area.

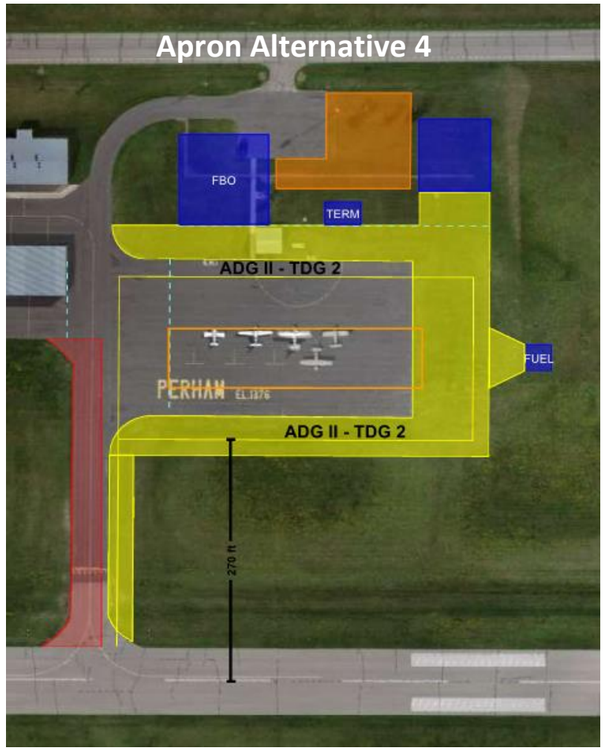
### APRON ALTERNATIVE 5

This alternative depicts an apron expansion (approx. 4,000 SY) on three sides of the existing apron, creating the space for ADG-II taxilanes around the perimeter of the of apron. At the end of its useful life, the existing taxiway is shifted south to provide wingtip clearance from the existing T-Hangar but, unlike previous alternatives, secondary access to the runway is not provided. No additional aircraft tie-downs are provided, leaving a total of 8 ADG-I parking spots; however, like previous alternatives, the parking area may accommodate some ADG-II aircraft, including the design aircraft, at the expense of ADG-1 parking. The fuel system and terminal building are relocated outside the TOFA with the fuel system centered on the apron and the terminal building adjacent to a potential FBO or similar operation. This option also adjusts the vehicle access point to the apron to allow an additional large hangar (80’x80’) along the existing row of box hangars.

### RECOMMENDATION

Following the review of the alternatives by the MPAC and the airport sponsor, Apron Alternative 1 was recommended to be included in the ALP. This alternative maximizes the use of the valuable apron frontage, provides two additional aircraft parking spots, a fuel system location that does not impede aircraft movement, and allows the existing terminal building to remain. This preferred apron concept is shown graphically with the preferred terminal development in **Figure 5-8**.



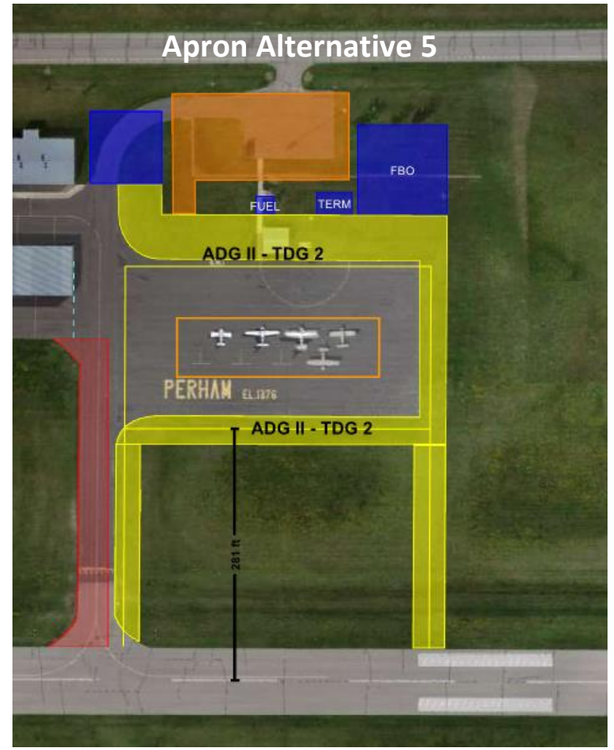




**Exhibit 5-6 - Apron Alternatives**

**Legend**
- Airfield Pavement
- Building Lot
- Landside Pavement
- Remove Pavement
- Taxilane Object Free Area
- Aircraft Parking Area

### *Northwest Hangar Area*

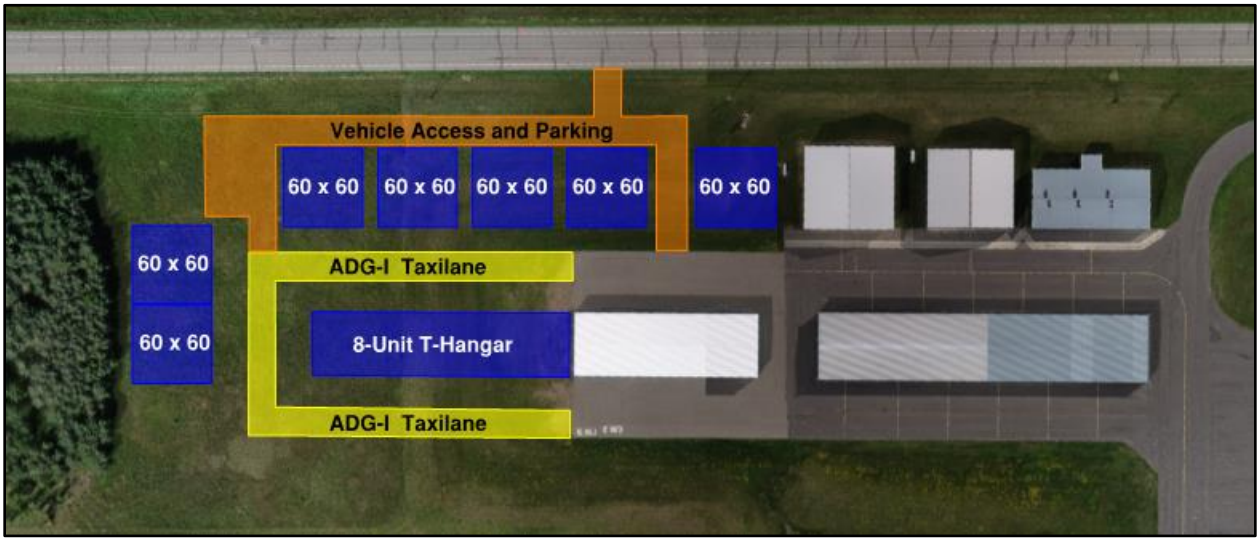
The northwest hangar area is located just north of the main apron and contains all the airport's aircraft hangars. The existing hangar area is designed for small aircraft; however, the separation (71') between the traditional hangars and T-hangar do not meet ADG-I separation standards (79'). When the individual hangars reach the end of their useful life, they should be removed and replaced with new development setback to meet standards. All new development proposed in the alternatives will be designed to meet taxilane separation standards. To efficiently utilize the existing ADG-I infrastructure and separation while maximizing the developable space, the alternative concepts for this area will accommodate ADG-I exclusively.

The hangar facility requirements showed a need to accommodate additional based aircraft in the near-term (0-5 years). These are mostly expected to be hangars designed for Design Group I aircraft (up to 49' wingspan). Sufficient space should also be preserved for additional storage hangars beyond the forecasted needs of the planning period so the airport can accommodate these facilities if future demand requires. While development looks significant, in reality, this area would be built out incrementally as demand dictates with this planning effort guiding the development.

Two alternative concepts were provided and reviewed with the MPAC to help the airport sponsor select a layout that meets long-term facility needs. The considerations and concepts are described below.

## HANGAR ALTERNATIVE 1

This concept continues the development of T-Hangars between the taxilanes with individual box hangars along the northeast edge. The two extended taxilanes are joined together around the end of an 8-Unit T-Hangar, creating a circuit that is aimed to relieve congestion in the hangar area. Two additional box hangars are placed along the turnaround to maximize individual hangar development. Additional vehicle access and parking is provided from the highway to provide efficient access and minimize vehicle traffic on the aircraft maneuvering surface.




## HANGAR ALTERNATIVE 2

Similar to Alternative 1, the development of the T-Hangars and individual box hangars continue on their current paths; however, this concept continues to extend the taxilanes just short of the stand of trees where they are joined. This maximizes the total number of available T-Hangar units that can be developed. With this configuration, further development beyond the stand of trees could also be a possibility in the future if demand requires.

### RECOMMENDATION

Following the review of the alternatives by the MPAC and the airport sponsor, a revision to Hangar Alternative 2 was made. The development of Alternative 2 was preferred; however, the airport desired to incorporate the additional vehicle access and parking. The revised alternative replaces the northern most box hangar with a small parking lot and access road to the highway. Revised Alternative 2 was recommended to be included in the ALP. This met the goals of the airport by maximizing the number of T-Hangar units, providing additional vehicle access and parking, and the flexibility in the future to expand if demand required. This preferred hangar concept is shown graphically with the preferred terminal development in **Figure 5-8**.

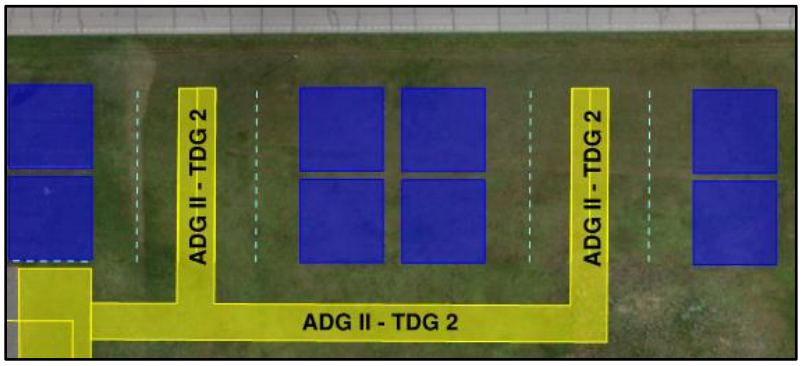
## *Southeast Hangar Area*

The southeast hangar area identifies land available for development located to the southeast of the existing main apron. The hangar facility requirements showed a need to provide hangar storage for corporate and transient aircraft. While these aircraft may be accommodated by a facility on the main apron, the need was apparent to provide a developable site for users that may want to base their larger aircraft at Perham in the future. Construction of future development is intended to be incremental, based on demand.

This hangar area is designed to accommodate the storage of larger ADG-II corporate aircraft and provides the infrastructure and facilities these aircraft and their users typically require. This includes taxilanes designed for ADG-II separation, additional building setback to provide space for aircraft loading/unloading, efficient vehicle access, and ample vehicle parking at the facility.

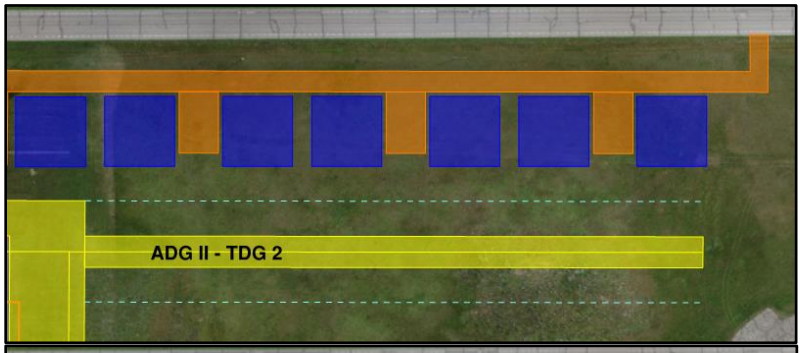
Concepts were developed to illustrate a design and sequence of large aircraft storage but were also intended to align with any of the apron configurations. The preferred large hangar concept will be integrated with the preferred apron layout while maintaining the intent of design and sequencing. The alternatives were provided and reviewed with the MPAC to help the airport sponsor select an apron layout that meets long-term facility needs. The considerations and concepts are described below.

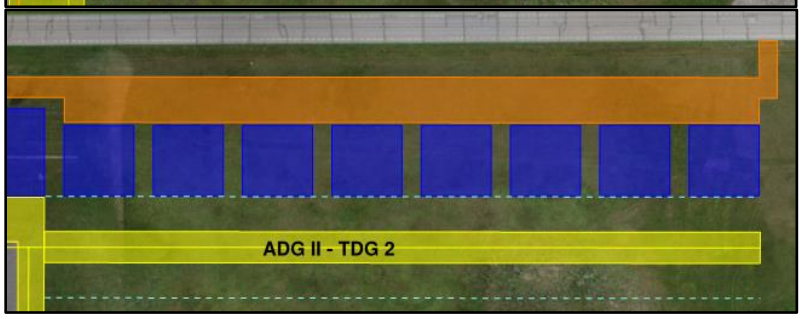
### CONCEPTS




The alternative concepts were developed utilizing two general designs. One incorporated sets of large hangars centered on a taxilane that is oriented perpendicular (NE/SW) to the surrounding development. The other was linear in design, running parallel with the apron development. The concepts that utilized the perpendicular sets of hangars allowed for the loading/unloading of multiple aircraft while not impeding the movement of aircraft on the taxilane. These concepts are also able to accommodate facilities bordering the main apron and parking lot. However, due to the space constraints from the county highway, landside vehicle access was not available and vehicle parking next to the hangar was not viable for many of the facilities. This would likely result in an increase in vehicular traffic on the airside surfaces as users access their hangars. These shortcomings led to the early dismissal of the concepts utilizing this design.

The two remaining concepts share a similar linear design where the taxilane serving the hangar area is an extension of the apron taxilane. Vehicle access to the facilities connects with the main parking lot as well as a separate highway entrance. Key differences between the designs are the layouts of the vehicle parking area and the hangar setbacks from the TOFA for the loading/unloading of aircraft.




### RECOMMENDATION

Following the review of the alternatives by the MPAC and the airport sponsor, elements from the two concepts were combined. The uninterrupted development of the hangars along the taxilane was preferred; however, the airport desired to incorporate the facility setback to allow loading and unloading of aircraft without blocking the taxilane. This revised design was recommended to be included in the ALP. This met the goals of the airport by providing a site for large hangar development that offers vehicle access and parking, aircraft loading/unloading setbacks, and the flexibility to expand the apron in the future if needed. This preferred hangar concept is shown graphically with the preferred terminal development in **Figure 5-8**.

## Summary

The recommended development identified in this chapter includes the following:

- Begin to develop the northwest hangar area to accommodate additional small based aircraft storage by extending the existing taxilanes and constructing T-Hangar.
- Install AWOS facility to provide valuable real-time weather to users during inclement weather.
- Implement Apron Alternative 1 and expand apron pavement to provide for additional aircraft parking and meet ADG-II separation standard for maneuvering aircraft. Construct the secondary access taxiway to the runway and relocate the fueling system.
- Plan to develop the southeast hangar area to accommodate the storage of corporate and other large aircraft. Includes the construction of the taxiway, vehicle access road and parking.
- Plan to construct a parallel taxiway, additional exit taxiway from the runway, and a wildlife perimeter fence in the Ultimate scenario.

## Preferred Development Strategy

The preferred development strategy identified in **Table 5-7** below outlines the overall development sequence for the preferred alternatives based on airport sponsor priorities. These elements are shown graphically in **Figure 5-8.** The implementation plan in **Chapter 6** will identify a realistic project sequencing based on available funding.

*Table 5-7– Preferred Development Strategy*

| | Near-Term<br>0-5 Years | Mid-Term<br>6-10 Years | Long-Term<br>11-20 Years | Ultimate<br>20+ Years |
|---|---|---|---|---|
| **Runway** | | | • Relocate Unpaved Road Outside Clear Zone | |
| **Taxiway** | | • Construct Secondary Access Taxiway to Runway | • Reconstruct/Relocate Existing Taxiway | • Construct Parallel Taxiway and Exit Taxiway |
| **Terminal & Hangar** | • Construct Small Hangar Site Taxilanes<br>• Construct T-Hangar | • Expand Main Apron Pavement<br>• Relocate Fuel System<br>• Install 10 Tie-Downs | • Construct Large Hangar Site Taxilane | • Construct T-Hangar |
| **Landside** | | • Expand Parking Lot | • Construct Vehicle Access Road and Parking for Large Hangar Site<br>• Construct Vehicle Access and Parking for Small Hangar Site | |
| **Support & Other** | • Install AWOS System | | | • Construct Perimeter Wildlife Fence/Gates |

*Source: KLJ Analysis*
*NOTE: Scope and timing of airport improvements depends on available funding and demand thresholds being met.*

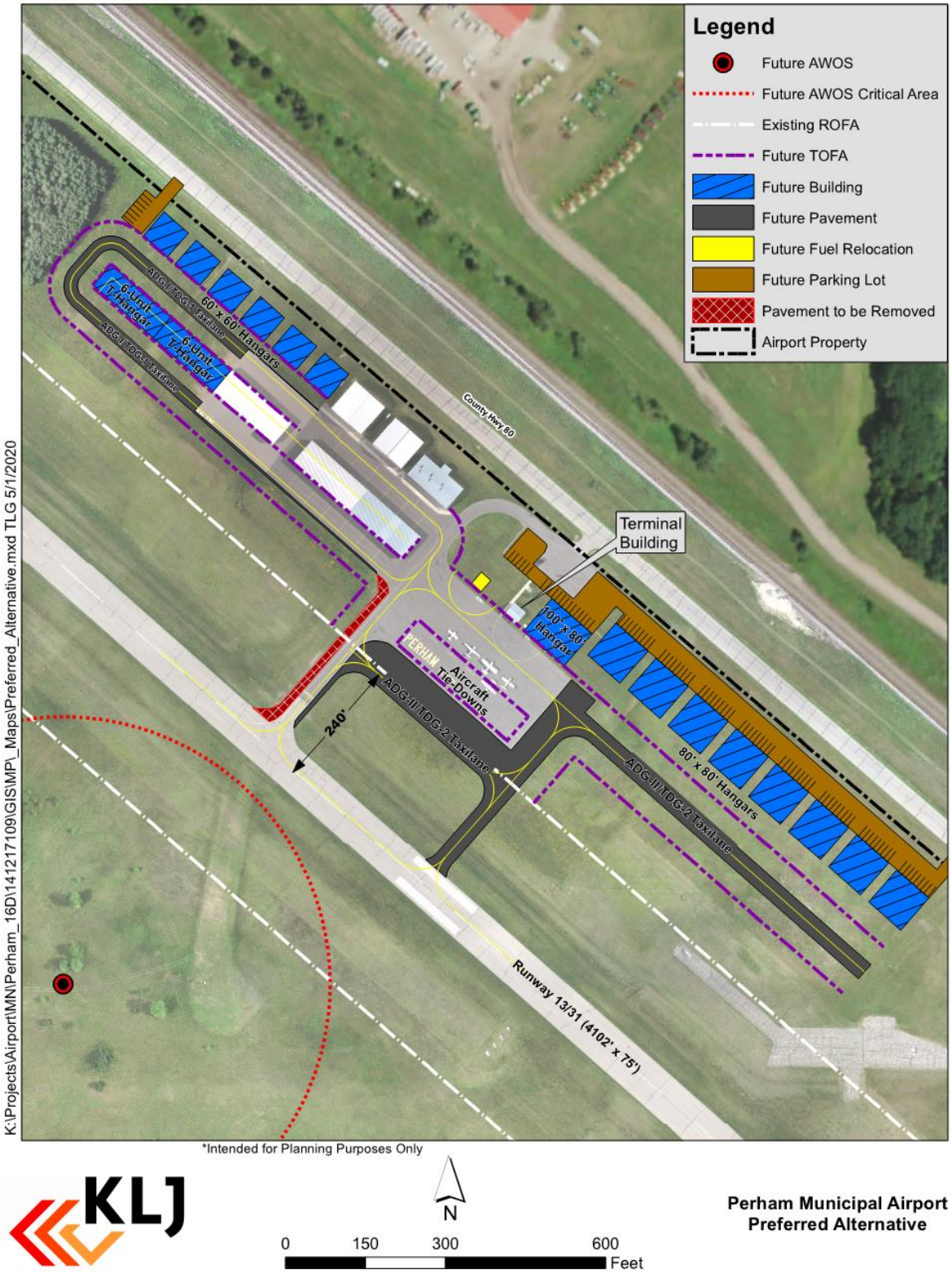



*Figure 5-8 – Preferred Development*