

## 6. Alternatives Analysis

This Alternatives chapter documents a variety of proposed development scenarios to accomplish the recommended facility improvements identified in Chapter 5, *Facility Requirements*. It evaluates the scenarios against several evaluation factors to determine if the recommended improvements enhance the safety and efficiency of Delaware Coastal Airport (GED or the Airport) and meet future demand while minimizing environmental and community impacts. The evaluation factors used to compare development options were selected based on specific considerations associated with the Airport.

Airside alternatives will be considered first followed by landside alternatives. The preferred alternatives are selected based on assessed criteria, as well as their compatibility with one another and the overall airport environment. These individual alternatives combine to create an overall Preferred Airport Development Alternative. This chapter also reviews land uses for aeronautical and non-aeronautical areas to maximize revenue generation as part of the landside alternatives.

The identification and evaluation of the Airport development alternatives are outlined as follows:

- Development Constraints
- Airside Alternatives
- Landside Alternatives
- Preferred Airport Development Alternative

### 6.1. DEVELOPMENT CONSIDERATIONS

The following development constraints were identified as part of this review:

- **Infrastructure:** While not insurmountable, adjacent infrastructure makes Airport development challenging and potentially more costly. The following infrastructure elements present challenges to future development:
  - **Runway 10:** Runway 4-22 and Taxiway A
  - **Runway 28:** Park Avenue
  - **Runway 4:** A rail line, as well as residential development
  - **Runway 22:** Rail lines, the on-airport creek, and the Sports at the Beach athletic complex
- **Environmental:** Off the approach end of Runway 22, there is an unnamed creek
- **Historic and Cultural Resources:** There have been some structures and archaeological sites that have been documented within Airport property. The presence of historical, archaeological, and cultural resources on or adjacent to the Airport may affect the development of project alternatives, and as required by the National Environmental Policy Act (NEPA), specific project documentation will need to be provided to the Delaware Division of Historical and Cultural Affairs (HCA) for evaluation prior to starting any future projects.

## 6.2. AIRSIDE ALTERNATIVES

Each airside alternative considers improvements to the runways and/or taxiways that have been identified in Chapter 5. Each alternative will be considered against the No Build Alternative and each other and will be evaluated according to the criteria identified below. Based on the alternatives available for each area, a Preferred Airside Alternative for the Airport will be presented.

### 6.2.1. Evaluation Criteria

A set of evaluation criteria was developed to provide an equal and consistent assessment of each alternative. These criteria pose questions regarding how each of the alternatives addresses identified issues, such as aviation user needs (facility requirements) and operational efficiency, environmental impacts, Federal Aviation Administration (FAA) standards, costs, and long-term flexibility/expansion. These evaluation criteria are as follows:

- **Facility Requirements:** Does the alternative meet the existing and future needs of the Airport and is the alternative feasible for implementation?
- **Environmental Impact:** What are the environmental impacts associated with the implementation of the alternative? A qualitative assessment of the potential environmental consequences associated with the implementation of the alternative. Important social, economic, and environmental effects of the alternative will be identified and described.
- **FAA Standards:** Does the alternative meet the design standards of FAA Advisory Circular (AC) 150/5300-13B, *Airport Design*, and Code of Federal Regulations (CFR) Part 77 surfaces to the maximum extent feasible?
- **Development Costs:** Does the alternative have reasonable development costs in comparison to other alternatives that achieve the same goal? Order of magnitude cost estimating will be used to evaluate and score each alternative.
- **Development Flexibility:** To what extent does this alternative leave flexibility for future change and additional surrounding development? Does this alternative allow flexibility from an operational standpoint?

These evaluation factors have been given scoring values as follows:

Facility Requirements:	None	(0)	Some	(1)	Most	(2)	All	(3)
Environmental Impact:	High	(0)	Moderate	(1)	Minor	(2)	None	(3)
FAA Standards:	None	(0)	Some	(1)	Most	(2)	All	(3)
Development Costs:	High	(0)	Medium	(1)	Low	(2)	None	(3)
Development Flexibility:	Poor	(0)	Fair	(1)	Good	(2)	Excellent	(3)

Alternatives were compared using both qualitative and quantitative comparisons and given a value based on the ability of the alternative to meet the requirements of the evaluation factor. Selection of a recommended alternative is based on the alternative meeting demand needs, enhancing operations and safety while minimizing environmental and community effects, and providing future flexibility.

### 6.2.2. Summary of Airside Facility Requirements

In Chapter 5, several airside improvements were identified that were recommended to be addressed within the 20-year planning period. These recommendations include:

- Consideration toward adding up to an additional 2,500 feet to the length of Runway 4-22 for a finished runway length of 7,000 feet, and 91 feet to Runway 10-28, coupled with a 75-foot shift toward the east for a finished runway length of 3,200 feet.
- Consideration toward decreasing the width of Runway 4-22 from 150 feet to 75 feet (B-II standard) for existing conditions, or 100 feet (C-II standard) for ultimate conditions, or keeping the 150-foot width using alternate funding sources.
- For Runway 4-22, planning for a runway safety area (RSA) that meets FAA grading standards under both existing (B-II) and ultimate (C-II) conditions, and an increased runway object free area (ROFA) as the Airport reaches the threshold for accommodating aircraft approach category (AAC), airplane design group (ADG) C-II aircraft.
- Correct non-standard geometry issues on taxiways such as:
  - Wide expanses of pavement
    - Taxiway A and Runway 22
    - Taxiway C and Runway 10
    - Taxiway M
  - High Energy Runway crossing
    - Taxiway B
  - Acute angle runway/taxiway intersection
    - Taxiway A and Runway 22 / Taxiways C/D and Runway 10
    - Taxiway M
- Install edge lighting along Taxiway M
- The mitigation of the following obstacles for runway extensions
  - Existing
    - Runway 4: 120 obstacles to the CFR Part 77 approach surface
    - Runway 22: 31 obstacles to the CFR Part 77 approach surface
  - Proposed
    - Runway 4: 116 obstacles to the CFR Part 77 approach surface
    - Runway 22: 22 obstacles to the CFR Part 77 approach surface
    - Runway 10: 76 obstacles to the CFR Part 77 approach surface, and 28 obstacles to the Airport Design Approach Surface #6
    - Runway 28: 60 obstacles to the CFR Part 77 approach surface, and 14 obstacles to the Airport Design Approach Surface #6
  - Ultimate
    - Runway 4: 134 obstacles to the CFR Part 77 approach surface, 25 obstacles to the Airport Design Approach Surface #4, and 56 obstacles to the Airport Design Approach Surface #6
    - Runway 22: 23 obstacles to the CFR part 77 approach surface

### 6.2.3. Alternatives Considered and Dismissed

Throughout the planning of this document, consideration was made toward increasing the length of Runway 4-22 to 7,000 feet to accommodate the future critical design aircraft at 90 percent

useful load. For the past two consecutive years of 2021 and 2022, the Airport has exceeded the FAA regular use threshold of 500 operations by AAC-ADG C-II aircraft. However, FAA has indicated a longer time period would be required to establish regular use. Also, non-standard conditions, including obstacle penetrations will need to be mitigated in order to implement runway extensions.

After reviewing surrounding constraints, it was decided that the railroad lines that bookend both ends of Runway 4-22 would be infeasible to reroute. As such, alternatives that considered a full runway length buildout of 7,000 feet were considered and dismissed, and other alternatives with shorter runway lengths that would still allow the design aircraft to operate, albeit with less payload or fuel, were brought forward below for exploration.

Also, it is recommended Runway 10-28 be extended, however extending Runway 10-28 toward the west would further complicate the intersection of the two runways. As such, an extension to the approach end of Runway 10 was considered and dismissed, and only a runway shift and an extension to the end of Runway 28 were considered.

#### 6.2.4. Alternative 1 – No Build

The No Build Alternative recommends no changes to the existing runways and taxiways layout at GED. Alternatives will be compared against the No Build option. The existing airport layout is shown in **Figure 6-1**.

As larger and faster aircraft become the critical design aircraft as detailed in previous chapters, and the AAC-ADG increases from B-II to C-II, the RSA and ROFA for Runway 4-22 will increase significantly in length and width, going from 300 feet beyond each runway end to 600 feet and 1,000 feet beyond the runway end, depending on which direction the aircraft is landing or taking off.

Without a corresponding runway extension, portions of runway pavement will need to be utilized as RSA and ROFA to satisfy FAA requirements. As such, the utility of Runway 4-22 will suffer as the Accelerate-Stop Distance Available (ASDA) and the Landing Distance Available (LDA) for Runway 4-22 will effectively shorten the runway for landing aircraft to meet FAA standards for the RSA and ROFA. It is not anticipated that the change to C-II will impact the Takeoff Run Available (TORA) nor the Takeoff Distance Available (TODA). **Table 6-1** Depicts the existing and ultimate declared distances.

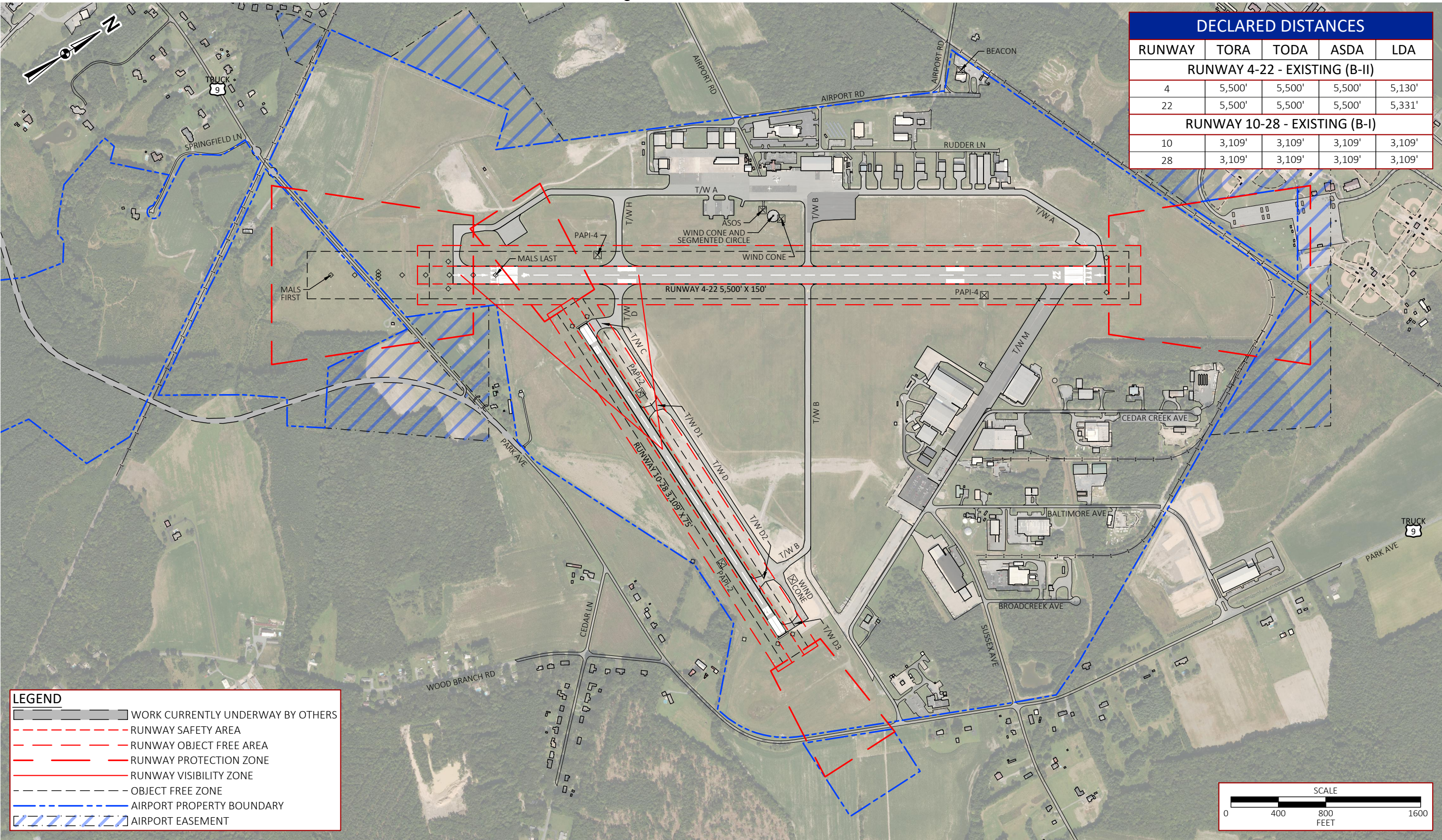
**Table 6-1: Existing and Ultimate Declared Distances Runway 4-22 (No Build)**

Runway	TORA	TODA	ASDA	LDA
<b>Existing (B-II)</b>				
4	5,500'	5,500'	5,500'	5,130'
22	5,500'	5,500'	5,500'	5,331'
<b>Ultimate (C-II)</b>				
4	5,500'	5,500'	4,833'	4,463'
22	5,500'	5,500'	4,965'	4,796'

Source: McFarland Johnson analysis, 2022.



Figure 6-1: Alternative 1 – No Build





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The No Build Alternative was assessed against the five evaluation factors; the results are below:

- **Facility Requirements:** The No Build Alternative does not meet GED’s future facility requirements related to runways, taxiways, instrumentation, or approach lighting. This evaluation factor was given a value of **None (0)** as it does not meet any of the recommended facility requirements.
- **Environmental Impact:** This alternative does not propose any additional construction, and as such, there are no environmental consequences. This evaluation factor was given the highest value of **None (3)** since the alternative has no additional environmental and/or natural resource impacts.
- **FAA Standards:** The No Build Alternative does not address FAA standards as identified in FAA AC 150/5300-13B, or Part 77, including runway protection zones and existing geometry criteria. The RSA and ROFA for Runway 4-22 would not be to standard due to the implementation of updated declared distances. The evaluation factor was assigned a value of **Some (1)** as it does not meet FAA standards.
- **Development Costs:** There are no design or construction costs associated with the No Build Alternative and it is therefore scored as **None (3)** for development costs.
- **Development Flexibility:** The No Build Alternative would leave potential for future flexibility, however it does not provide maximum operational flexibility. With an ultimate C-II runway, the existing Runway 4-22 will have a greatly diminished ASDA and LDA with the necessary implementation of updated declared distances. It is given a score of **Fair (1)** for future development flexibility.

#### 6.2.5. Proposed Runway Alternative 2 – Culverting the Creek

Proposed Runway Alternative 2 – Culverting the Creek includes the following changes and developments:

- The creek off the approach end of Runway 22 would be buried and placed in a culvert, thereby providing for an FAA standard RSA and ROFA when the Airport sees regular use by C-II aircraft.
- Remove both displaced thresholds, providing for the full 5,500 feet of runway to be utilized for arrivals and departures in both directions.
- Relocate the MALS as the displaced threshold will have been removed.
- Shift Runway 10-28 75 feet to the east.
- Extend Runway 10-28 91 feet toward the east for a finished runway length of 3,200 feet.
- Resolve minor grading issues within the RSA.

Proposed Runway Alternative 2 can be seen in **Figure 6-2** and will be evaluated against the evaluation factors and the No Build Alternative below.

- **Facility Requirements:** This alternative meets all of the identified facility requirements for the existing and proposed conditions for both Runway 4-22, and Runway 10-28. It is given a score of **All (3)** for meeting recommendations with respect to facility requirements for existing and proposed conditions, and also for ultimate conditions (with the exception of runway length on Runway 4-22).
- **Environmental Impact:** There will be very little new pavement, and very little development

in this alternative, however culverting the creek will have some environmental impact. This alternative is given a score of **Minor (2)** for anticipated impacts on the environment.

- **FAA Standards:** Proposed Runway Alternative 2 would meet all FAA standards with the current configuration of Runway 4-22, and the shifted and relocated Runway 10-28 and is given a score of **All (3)** for meeting FAA standards.
- **Development Costs:** It is anticipated that this alternative will cost approximately \$4 million, which is more than the No-Build Alternative, but lower than other runway alternatives. It is given a score of **Low (2)** for estimated development costs compared to other alternatives.
- **Development Flexibility:** This alternative provides maximum operational flexibility, while facilitating future development and is given a score of **Excellent (3)**.

#### 6.2.6. Ultimate Runway Alternative 3 – Runway Extension with Culverting the Creek

The second runway alternative can be seen in **Figure 6-3**, and is similar to Proposed Runway Alternative 2, however it plans for the ultimate final runway length of Runway 4-22. As discussed in Chapter 5, the Airport has seen regular use by C-II aircraft for the past two years. As such, one of the recommendations from Chapter 5 was to increase the length of Runway 4-22 to accommodate the ultimate design aircraft at 90 percent useful load. Runway 4-22 would be eligible for an ultimate runway length of up to 7,000 feet, however the runway is constrained by railroad tracks on both runway ends. As such, in order to keep the railroad tracks outside of the future AAC-ADG C-II RSA and ROFA, Runway 4-22 would only be extended 805 feet toward the southwest. This extension would need to be accompanied by a reduction (shift) of the runway 182 feet toward the southwest. These changes and others proposed in this alternative are summarized below:

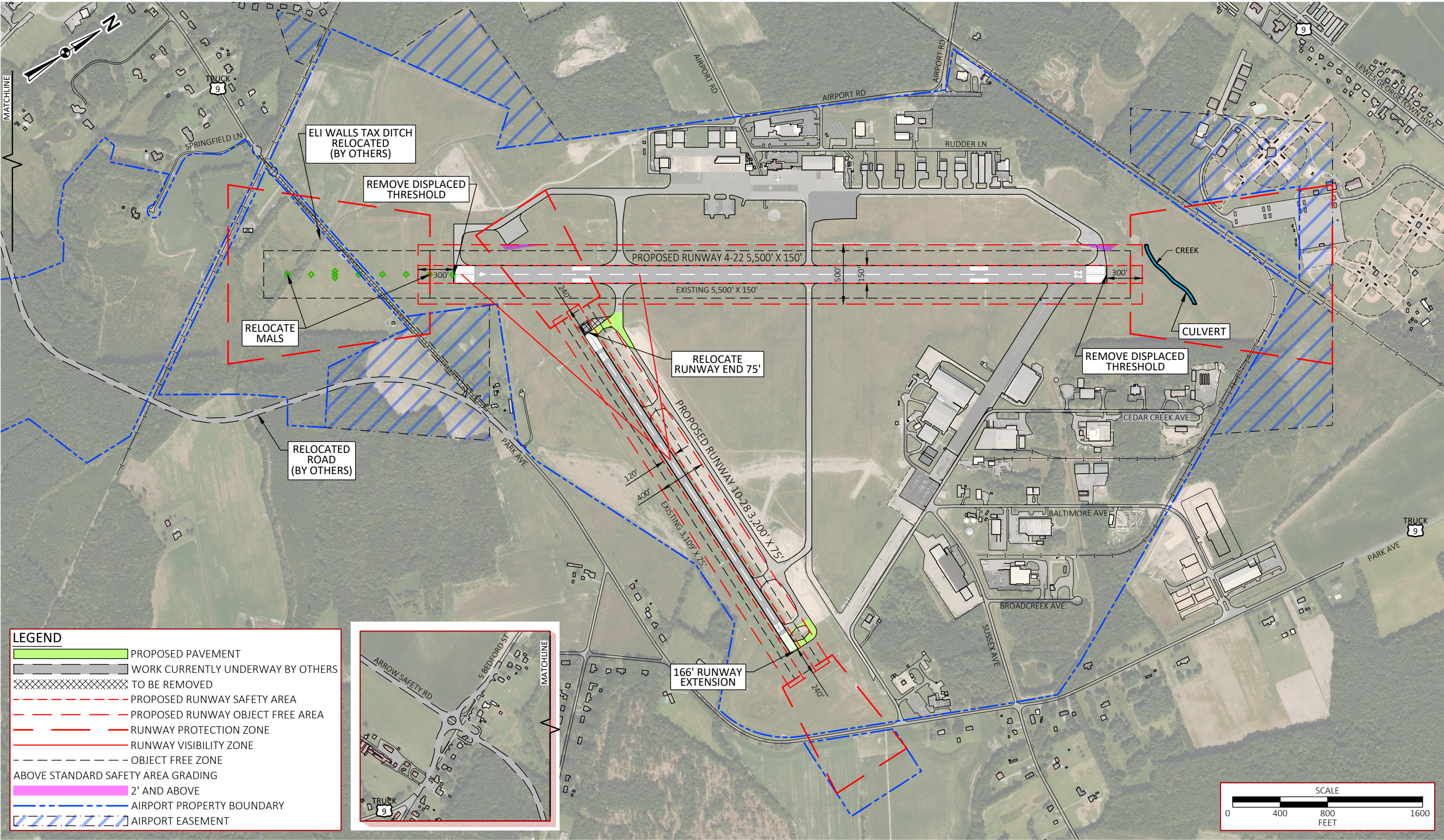
- Remove both displaced thresholds on Runway 4-22.
- Extend Runway 4-22 by 623 feet toward the southwest, accompanied by a corresponding extension of the parallel taxiway.
- Reduce the approach end of Runway 22 by 182 feet for a finished runway length of 6,123 feet.
- Culvert the creek off of the Runway 22 approach end so as to provide for an FAA standard RSA.
- Relocate the MALS to correspond with the runway extension/shift.
- Acquire 4.1 acres within the expanded ROFA in fee simple.
- Shift Runway 10-28 75 feet toward the east.
- Extend Runway 10-28 91 feet toward the east for a finished runway length of 3,200 feet.
- Resolve grading and ponding issues within the ultimate RSA.

These proposed changes are evaluated against other alternatives using the evaluation criteria below.

- **Facility Requirements:** This alternative meets all of the existing and ultimate runway needs of the Airport and is feasible for implementation once the Airport meets FAA regular use criteria. It is given a score of **All (3)** for meeting identified facility requirements.
- **Environmental Impact:** There is additional pavement for Runway 4-22 proposed, more so



Figure 6-2: Proposed Runway Alternative 2 - Culverting the Creek

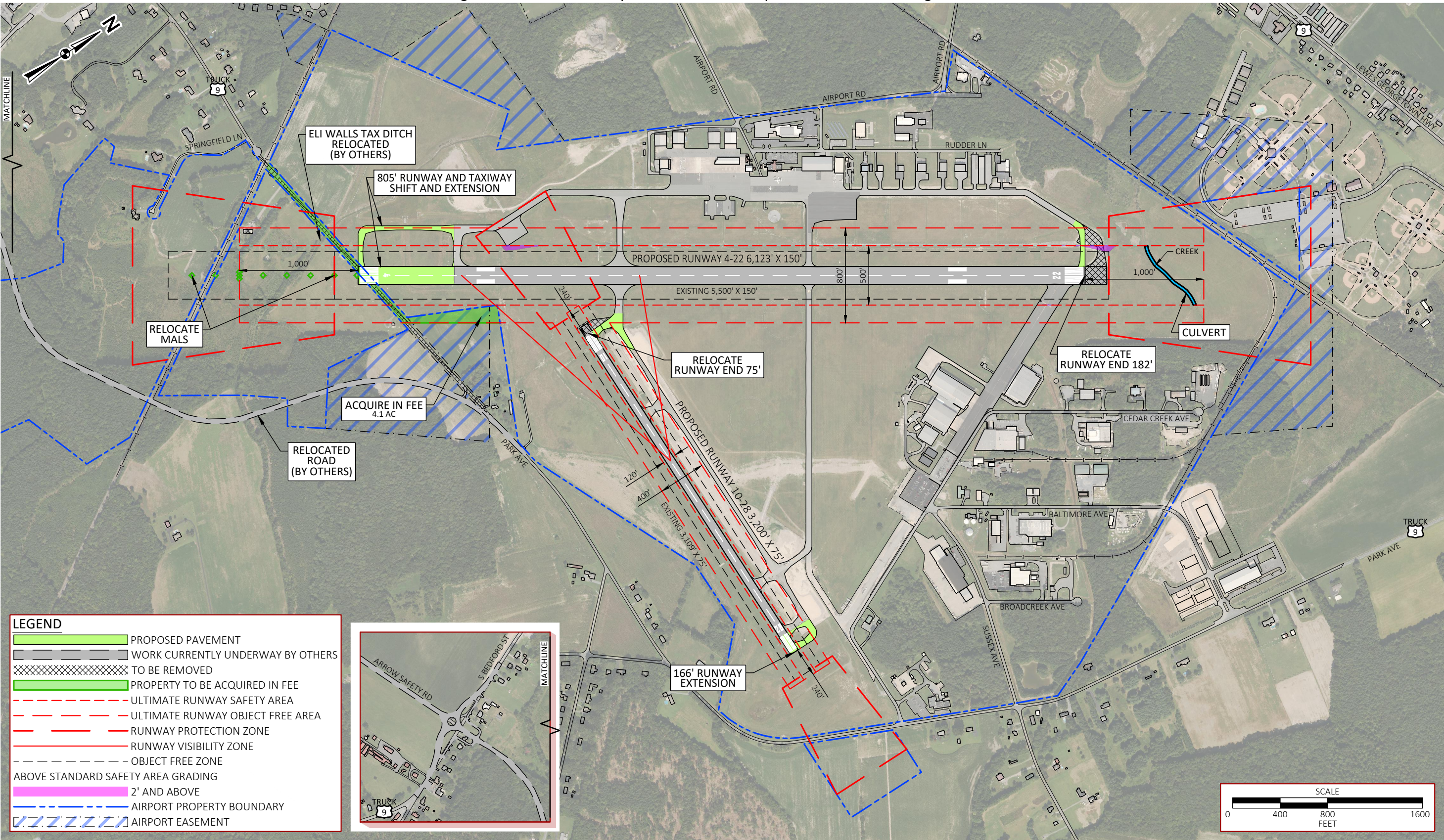




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Figure 6-3: Ultimate Runway Alternative 3 - Runway Extension with Culverting the Creek





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than the other runway alternative and the No-Build Alternative, however environmental impacts can be mitigated with proper grading and drainage. This alternative is given a score of **Moderate (1)** for impacts on the environment in comparison to other alternatives.

- **FAA Standards:** This alternative provides for improvements while meeting the design standards of FAA Advisory Circular (AC) 150/5300-13B, *Airport Design*, and Code of Federal Regulations (CFR) Part 77 surfaces to the maximum extent feasible. It is given a score of **All (3)** for meeting FAA standards.
- **Development Costs:** With the most development of the runway alternatives, it is also the costliest at an estimated \$20 million, and is given a score of **Medium (1)** for development costs in comparison to other runway alternatives.
- **Development Flexibility:** This alternative provides the maximum runway length given the constraints and provides for maximum operational flexibility. It is given a score of **Excellent (3)** for development flexibility.

### 6.2.7. Taxiway Alternative 1 – Full Parallel Taxiway

Taxiway Alternative 1 – Full Parallel Taxiway can be seen in **Figure 6-4**. The alternative proposes the following:

- The renumbering of taxiways to comply with FAA taxiway nomenclature standards.
- A full-parallel Taxiway A northwest of Runway 4-22 at FAA AAC-ADG C-II standard separation of 400 feet and a width of 35 feet to accommodate the ultimate scenario.
  - Taxiway A from Taxiway A3 to the Runway 22 end and Taxiway A3 from Runway 4-22 to Taxiway A would be constructed at 50 feet in width to accommodate the Boeing 737 family of aircraft that utilize the hangars along Taxiway M. In this instance, aircraft that are taxiing from Taxiway A to depart on Runway 22 can utilize the taxiway network instead of back-taxiing on the runway.
- The removal of portions of former Taxiway A at the approach ends of Runway 4-22 which are no longer needed due to the new parallel taxiway, including areas identified in Chapter 5 which were identified as wide expanses of pavements.
  - Holding bays would be installed per FAA standards to replace those lost by the removal of pavement.
- The installation of parallel Taxiway B and Taxiways B1 to TDG 1A standards and Taxiway B2 between Taxiway C (formerly Taxiway B) and Taxiway M to provide access to the approach end of Runway 28 for aircraft in the hangars on the north end of the airfield at a separation of 400 feet and a width of 35 feet. (Note: Taxiway B2 and other taxiways at the south end of the airport will be utilized by larger, Group III aircraft and taxiways are designed to TDG 3 standards. It is understood that taxiways that exceed standards for the critical design aircraft will need to be constructed with alternate funding.)
- The removal of pavement on existing Taxiway B between proposed Taxiway A and Taxiway B to resolve the issue of aircraft crossing the runway in the high energy portion of the runway, as well as direct access to the runway from the terminal apron, which is an issue identified in Chapter 5.
- The change of geometry of Taxiway M to intersect with Runway 4-22 at a 90-degree angle in line with Taxiway A.
- The installation of Medium Intensity Taxiway Edge Lighting (MITL) along Taxiway M.

The alternative provides for a more orderly development of the Airport, particularly northwest of the new Taxiway A, and opens up additional areas for development between the new parallel taxiway and the hangars and aprons, and along Taxiway B. Also, it resolves the geometry issues identified in Chapter 5. The alternative is assessed below.

- **Facility Requirements:** The alternative meets the existing and future applicable facility requirements identified in Chapter 5 and is feasible to implement. It is given a score of **All (3)**.
- **Environmental Impact:** The alternative incorporates the addition of new impervious surfaces to the airport, however, additional stormwater requirements are anticipated to be considered and accommodated in the Eli Walls stormwater project. With no wetlands, streams, or other fluvial elements impacted by these improvements, the alternative is given a score of **Minor (2)** for impacts on the environment.
- **FAA Standards:** The alternative resolves geometry issues identified and meets FAA standards related to RSAs, ROFAs, and RPZs and is given a score of **All (3)** for meeting FAA standards.
- **Development Costs:** Planning level estimates put the cost of the alternative at \$28.8 million which is higher than the No Build alternative and other taxiway alternatives. It is given a score of **High (0)** for costs in comparison to other taxiway alternatives.
- **Development Flexibility:** The alternative provides additional airside development between the new parallel Taxiway A and the existing ramps and hangars. It is given a score of **Excellent (3)** for future development flexibility.

#### 6.2.8. Taxiway Alternative 2 – Non-Standard Geometry

The second taxiway alternative, Taxiway Alternative 2 – Non-Standard Geometry proposes the following:

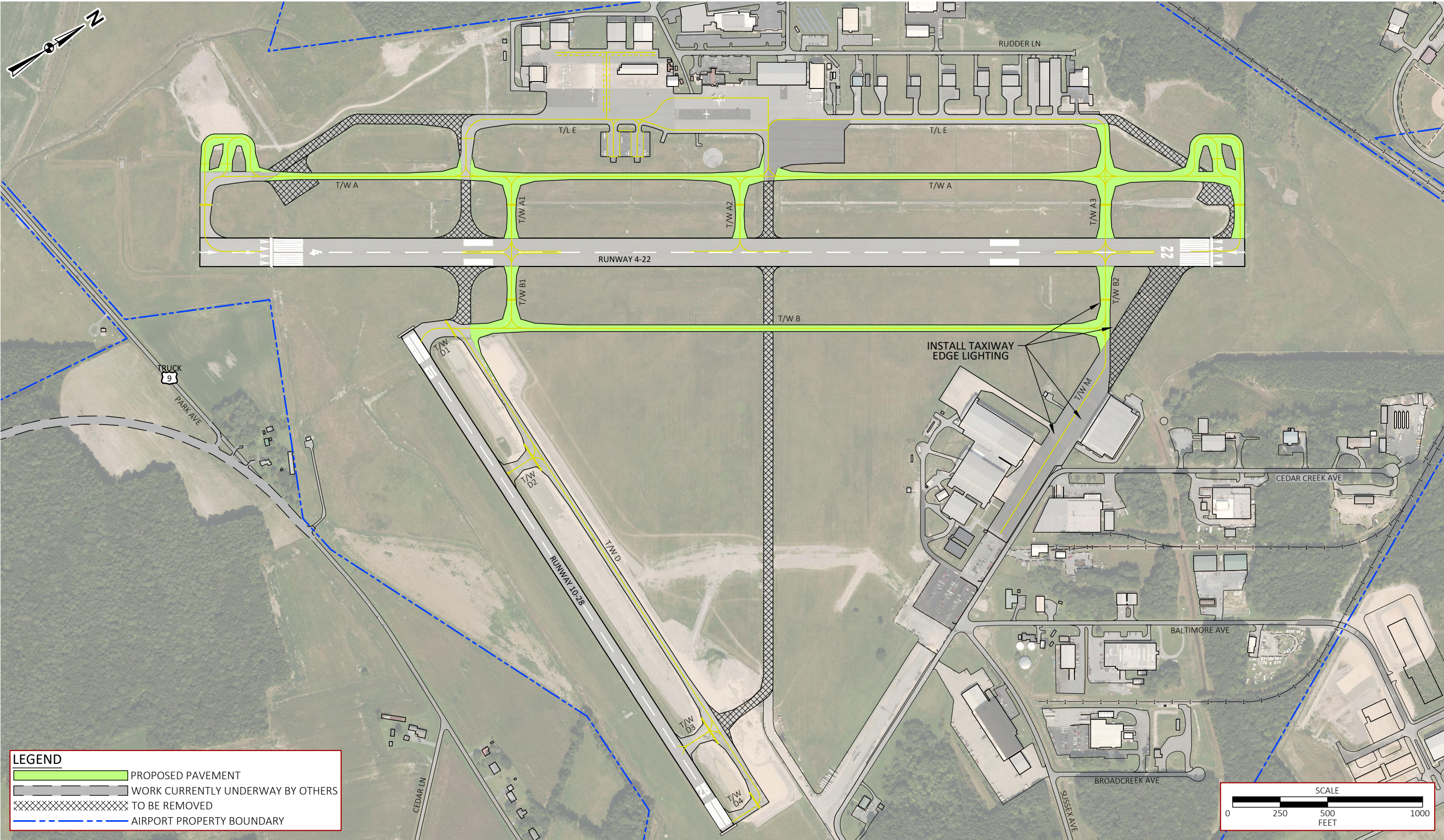
- Reducing the amount of pavement at Taxiway A where it meets the approach end of Runway 22.
- The connection of Taxiways C/D to Taxiway B via a new Taxiway E, and the severing of the connection of Taxiway B to Runway 4-22 which will no longer allow runway crossings in the middle third portion of the runway, which has been identified by FAA as a high energy portion of the runway.
- The shifting of Taxiways A1 and B1 toward the northeast along Runway 4-22 to improve the taxiway geometry at the intersection of Taxiway D1 and the approach end of Runway 10.

Taxiway Alternative 2 – Non-Standard Geometry can be seen in **Figure 6-5** and will be assessed against the evaluation factors and the No Build Alternative below.

- **Facility Requirements:** The alternative meets some of the facility requirements related to taxiways, however, direct access along Taxiway B is still provided from an apron, and a full-length parallel taxiway is not provided at a standard separation of 400 feet (although a full-length taxiway is provided at a significantly greater separation). and is given a score of **Some (1)** for meeting facility requirements.
- **Environmental Impact:** There are no impacts to wetlands or other fluvial elements.



Figure 6-4: Taxiway Alternative 1 - Full Parallel Taxiway





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Figure 6-5: Taxiway Alternative 2 - Non-Standard Geometry





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construction of additional impervious surfaces is minimized in this alternative and several areas of pavement will be removed and replaced with grass. As a result, the alternative is given a score of **Minor (2)** for impacts on the environment.

- **FAA Standards:** The wide expanses of pavement, and the middle third, high-energy runway crossing have all been resolved with this alternative, however the acute angle intersection between Taxiway M and Runway 22 has not been resolved, nor has the direct access to the runway from the apron. As a result, this alternative is given a score of **Most (2)** for meeting FAA standards.
- **Development Costs:** Between the No Build Alternative and Taxiway Alternative 1, Taxiway Alternative 2 falls in between at a cost of approximately \$6.7 million and is given a score of **Low (2)** in comparison to other taxiway alternatives.
- **Development Flexibility:** While this alternative provides more operational flexibility than the No Build Alternative, lacking a full-length parallel taxiway at a standard separation for Runway 4-22 inhibits aeronautical development on that side of the Airport. This alternative is given a score of **Fair (1)** for development flexibility.

As can be seen from the analysis above, Taxiway Alternative 1 provides much better future development opportunities. The ability to encourage more aeronautical development along Taxiway A, as well as closer adherence to FAA standards, is what pushes Taxiway Alternative 1 over the top to be selected to be included in the Preferred Airside Alternative.

#### 6.2.11. Preferred Airside Alternative

The evaluation and selection of a Preferred Airside Alternative must satisfy the long-term aeronautical needs of the Airport, including such factors as satisfying future aeronautical needs, minimizing environmental impacts, meeting FAA standards, cost, and flexibility. The summary of the evaluation can be seen in **Table 6-2**.

**Table 6-2: Airside Alternatives Evaluation Summary**

Alt.	Facility Requirements	Environmental Impact	FAA Standards	Development Costs	Development Flexibility	Total
Runway Alternatives						
1	None (0)	None (3)	Some (1)	None (3)	Fair (1)	8
2	All (3)	Minor (2)	All (3)	Low (2)	Excellent (3)	13
3	All (3)	Moderate (1)	All (3)	Medium (1)	Excellent (3)	11
Taxiway Alternatives						
TA1	All (3)	Minor (2)	All (3)	High (0)	Excellent (3)	11
TA2	Some (1)	Minor (2)	Most (2)	Low (2)	Fair (1)	8

Source: McFarland Johnson analysis, 2022.

In consideration of the analysis, it is recommended the Airport implement the improvements in Proposed Runway Alternative 2 and Taxiway Alternative 1 as shown in **Figure 6-2**, and **Figure 6-4** respectively, in the near term.

The Preferred Ultimate Airside Alternative can be seen in **Figure 6-6**. The Airport should implement the recommended changes, including culverting the creek, installing a full parallel and a partial

parallel for Runway 4-22, shifting and extending Runway 10-28, and extending Runway 4-22 to 6,123 feet, as soon as demand warrants. Tenant Aloft AeroArchitects has expressed the necessity of increasing the runway length beyond 6,000 feet today to accommodate operations by aircraft they service. Aloft has written a letter expressing their need for a longer runway to remain at GED which is included in **Appendix D**.

### 6.3. LANDSIDE ALTERNATIVES

The analysis conducted for landside facilities in Chapter 5 indicates that the development of additional landside facilities, including T-hangars and additional vehicle parking, is necessary to meet forecasted demand during the planning period at GED. The following sections will cover the remaining areas of the Airport that should be addressed during the planning period.

#### 6.3.1. Summary of Landside Facility Requirements

Like the airside facility requirements, Chapter 5 identified several facility requirements outside of the runways and taxiways that should be addressed within the 20-year planning period, including:

- An additional 48 T-hangar units
- An additional 53 vehicle parking spots at the terminal building
- Expansion of the general aviation terminal by approximately 630 square feet

There are two alternatives for additional T-hangars, and one alternative for additional automobile parking, including an expansion of the general aviation terminal. Each of these alternatives will be compared against each other and Alternative 1 – No Build.

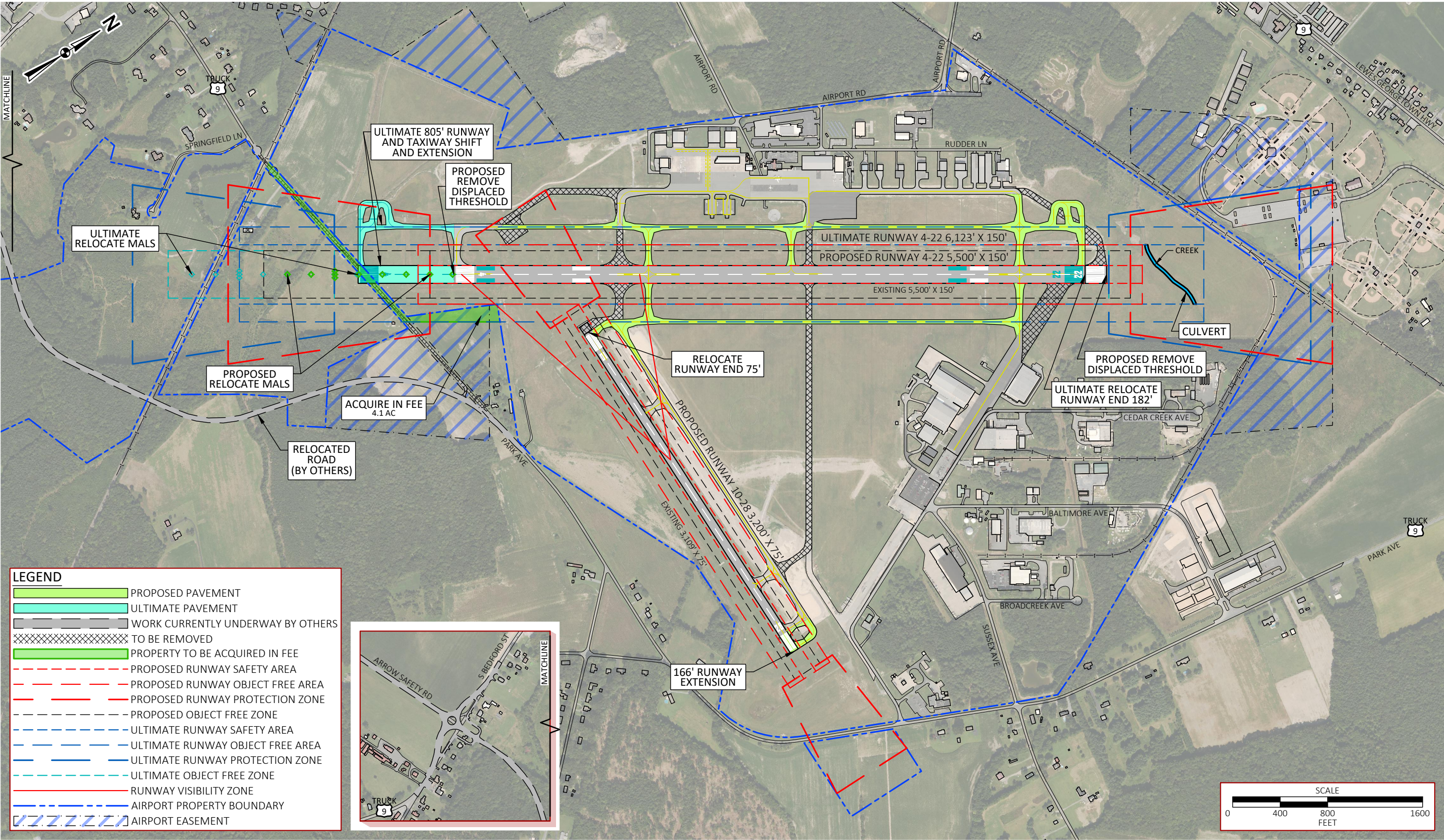
#### 6.3.2. Evaluation Criteria

A set of evaluation criteria was developed to provide an equal and consistent assessment of each alternative. These criteria pose questions regarding how alternatives address land use compatibility, environmental and cultural effects, the potential for expansion, operational efficiency, and revenue-generating capability.

- **Land Use Compatibility:** Is the alternative compatible with on-airport and off-airport patterns of land use? This criterion will evaluate such things as access to the airside movement areas and the local road network and the degree to which the alternative is compatible with activities occurring in surrounding on and off-airport properties.
- **Environmental Impact:** Important social, economic, and environmental effects of the alternative will be identified and described. Alternatives with higher environmental impacts will be scored lower than other alternatives.
- **Potential for Expansion:** Is the alternative flexible in the sense that it can accommodate future changes in demand and unanticipated expansion? This criterion recognizes the fact that location decisions made today will influence future airport development for many years to come.
- **Operational Efficiency:** Will this alternative contribute to the development of a smoothly functioning airport with efficient movement of aircraft? This criterion will consider whether the alternative makes the best and most efficient use of airport facilities and



Figure 6-6: Preferred Ultimate Airside Alternative





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infrastructure.

- **Revenue Generation Capability:** Does the alternative take a strategic business and capital-based approach that allows or creates opportunities for airport management to increase revenue generation and/or diversify revenue sources thereby improving the overall competitiveness and cost-effectiveness of the Airport?

These evaluation factors have been given a scoring value, as follows:

Land Use Compatibility:	Poor	(0)	Fair	(1)	Good	(2)	Excellent	(3)
Environmental Impact:	High	(0)	Moderate	(1)	Minor	(2)	None	(3)
Potential for Expansion:	Poor	(0)	Fair	(1)	Good	(2)	Excellent	(3)
Operational Efficiency:	None	(0)	Low	(1)	Moderate	(2)	High	(3)
Revenue Capability:	Poor	(0)	Fair	(1)	Good	(2)	Excellent	(3)

### 6.3.3. Landside Alternative 1 – No Build

Alternative 1 – No Build proposes no changes to the hangars, aprons, or parking lots at GED, as can be seen in **Figure 6-1**. The No Build will be assessed using the evaluation factors below.

- **Land Use Compatibility:** As the Airport exists today, it is compatible with surrounding land uses and the No Build Alternative would not change that. It is given a score of **Excellent (3)** For land use compatibility.
- **Environmental Impact:** With no changes, there would be no environmental impacts, and the alternative is given a score of **None (3)** for environmental impact.
- **Potential for Expansion:** While doing nothing leaves room for expansion, it also does nothing to prepare the Airport for future development. The No Build Alternative is given a score of **Fair (1)** for the potential for expansion.
- **Operational Efficiency:** Doing nothing does not contribute to a more smoothly functioning airport, nor does it make the best and most efficient use of Airport facilities and infrastructure and as such, the alternative is given a score of **None (0)** for operational efficiency.
- **Revenue Generation Capability:** In comparison to other alternatives that propose new infrastructure that can be leased, the No Build Alternative proposes no additional means of generating revenue and is given a score of **Poor (0)** for revenue generation capability.

### 6.3.4. Landside Alternative 2 – Additional T-hangars

Landside Alternative 2 can be seen in **Figure 6-7** and provides for an additional 54 T-hangar units north of Runway 10-28, with access to Taxiway D. The alternative includes six T-hangars with nine units each and vehicle parking north of the T-hangars. There are two access taxilanes from the T-hangar complex providing access to Taxiway D. Roadway access would be accomplished via Nanticoke Ave where a secure gate could be added for vehicles entering the site. Vehicle access would be somewhat challenging and Taxiway C/D3 is shown as severed to provide a roadway for vehicle access. The alternative will be assessed against the evaluation factors below.

- **Land Use Compatibility:** This alternative would place based group I aircraft adjacent to

Runway 10-28, which is designed for aircraft of that type and size. As a result, the alternative is given a score of **Good (2)** for land use compatibility.

- **Environmental Impact:** There are no wetlands or other environmental areas that would be impacted, however there would be slightly more environmental impact than the No Build Alternative. and this alternative is given a score of **Minor (2)** for impacts to the environment.
- **Potential for Expansion:** This alternative takes advantage of underutilized space while leaving other areas for larger corporate hangars. It also provides significant space for future general aviation development and will provide infrastructure to entice that development in the future. It is given a score of **Good (2)** for future expansion potential.
- **Operational Efficiency:** This alternative is better than the No Build Alternative but not better than other T-hangar alternatives at contributing to operational efficiency. The closing off of taxiways to accommodate vehicle traffic detracts from a smoothly functioning Airport, and this alternative is given a score of **Moderate (2)** for operational efficiency.
- **Revenue Generation Capability:** The additional T-hangars would be an excellent source of revenue for the Airport and this alternative is given a score of **Excellent (3)** for additional revenue generation capability.

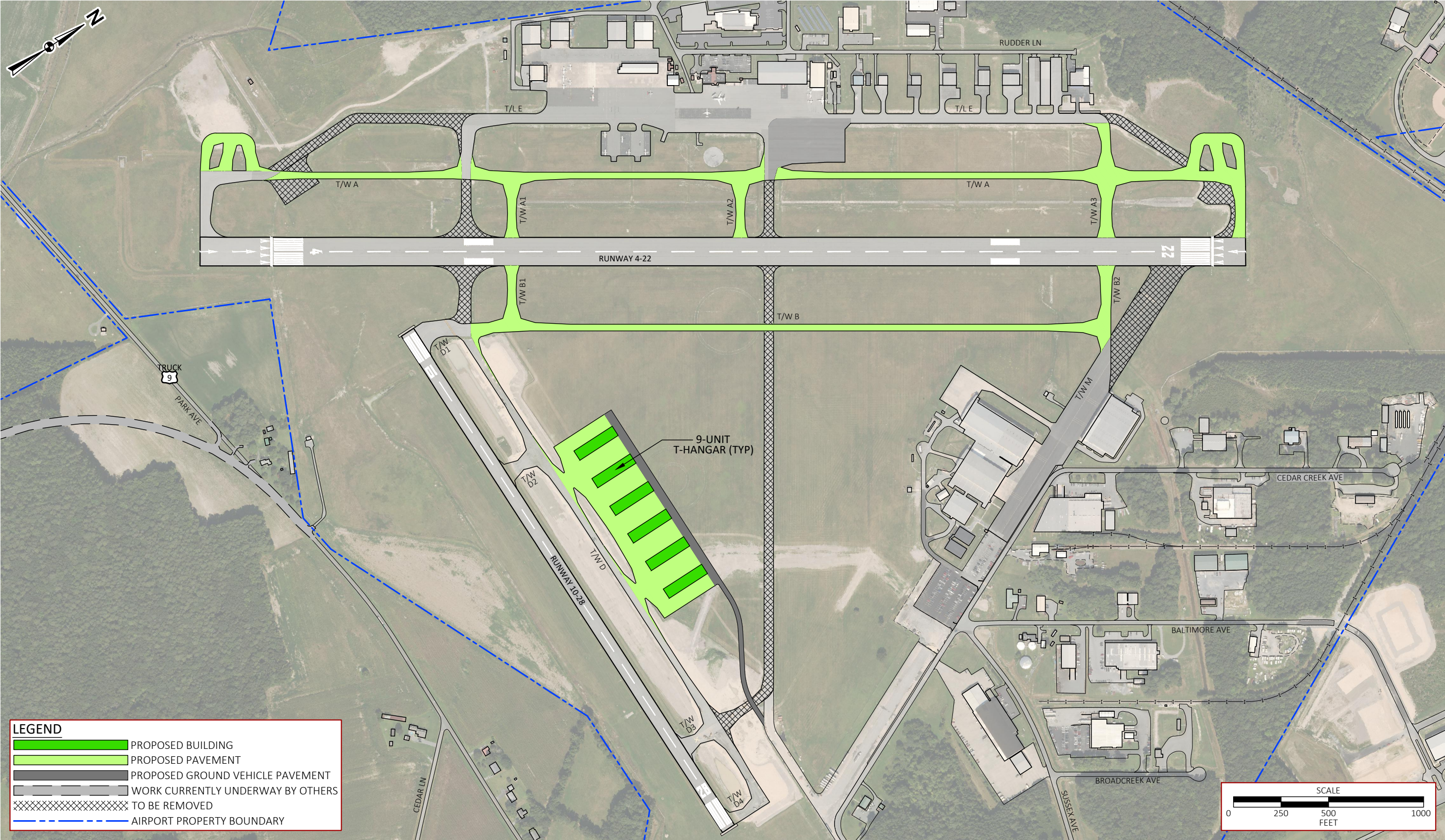
### 6.3.5. Landside Alternative 3 – Additional Hangar Storage

Landside Alternative 3 proposes additional T-hangars in the northwest quadrant of the Airport. It proposes the construction of three T-hangars, each capable of storing up to nine aircraft. Additionally, a fourth five-unit T-hangar would be constructed at the north end of the taxilane adjacent to the approach end of Runway 22 for a total of 32 additional T-hangar units. This falls short of the recommended 48 T-hangar units recommended in Chapter 5, however there are also 17 100-foot by 100-foot conventional hangars depicted along the new taxilane that can be used to meet existing and future demand. Also, an expanded aircraft parking apron for based and transient aircraft is proposed across from the terminal building. This expanded apron helps to meet the aircraft parking needs of the Airport and cleans up confusing and complicated taxi geometry in front of the terminal building. The alternative can be seen in **Figure 6-8** and will be assessed against the No Build Alternative and Landside Alternative 2 below.

- **Land Use Compatibility:** This alternative better situates the Airport than the No Build Alternative, and the space shown for T-hangars in Landside Alternative 3 is better suited for smaller group I aircraft so the infield area between Taxiways C, B, and M can be reserved for conventional hangars. As such, this alternative is given a score of **Excellent (3)**.
- **Environmental Impact:** The area proposed for development has already been developed and there are no wetlands or other environmental elements, but like Landside Alternative 2, there would be slightly more environmental impact than the No Build Alternative. This alternative scores as **Minor (2)** for environmental impact.
- **Potential for Expansion:** This alternative leaves land available for future corporate hangar development between Taxiways M, B, and C. In addition, additional space is available for the construction of T-hangars or other small conventional hangars in this area of the airport in the future. As a result, this alternative is given a score of **Excellent (3)** for the potential for expansion.



Figure 6-7: Landside Alternative 2 - Additional T-Hangars

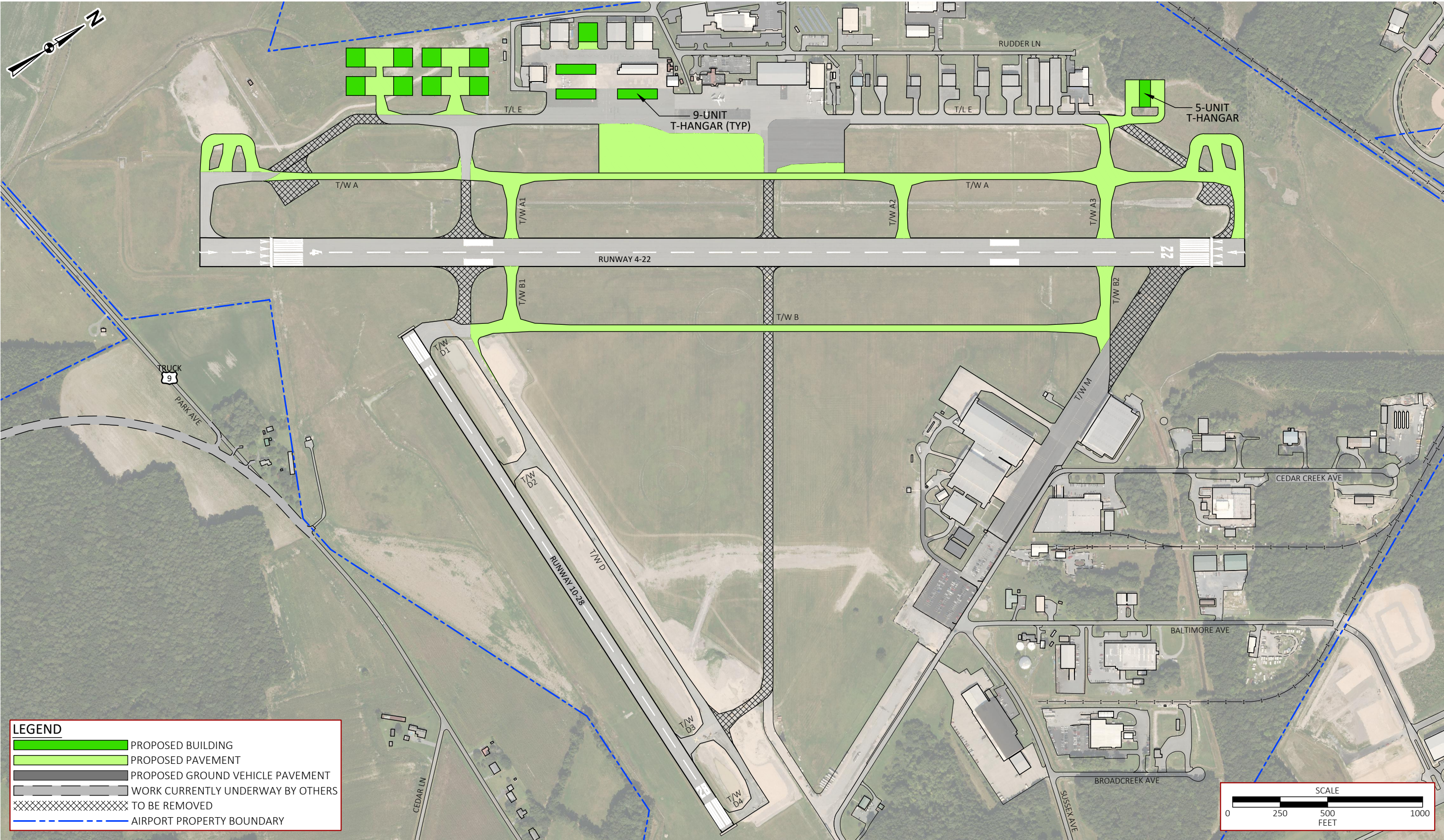




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Figure 6-8: Landside Alternative 3 - Additional Hangar Storage





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- **Operational Efficiency:** Unlike Landside Alternative 2, this alternative does not require the closing of any taxiways to accommodate vehicle traffic. Aircraft parking and storage are consolidated and vehicle traffic at the Airport is kept to a minimum. This alternative is given a score of **High (3)** for contributing to a smoothly functioning airport.
- **Revenue Generation Capability:** This alternative would be better than the No Build Alternative and is given a score of **Excellent (3)** for the potential to generate revenue.

#### 6.3.6. Preferred T-hangar Alternative

The results of the comparison of the landside alternatives can be seen in **Table 6-3**. Landside Alternative 3 is the preferred landside alternative and it is recommended the Airport move forward with the construction of T-hangars in these areas.

**Table 6-3: T-hangar Alternatives Comparison**

Alt.	Land Use	Environmental Impact	Expansion Potential	Operational Efficiency	Revenue Generation	Total
1	Excellent (3)	None (3)	Fair (1)	None (0)	Poor (0)	7
LA2	Good (2)	Minor (2)	Good (2)	Moderate (2)	Excellent (3)	11
LA3	Excellent (3)	Minor (2)	Excellent (3)	High (3)	Excellent (3)	14

Source: McFarland Johnson analysis, 2022.

#### 6.3.7. Landside Alternative 4 – Terminal and Parking Expansion

The final landside alternative can be seen in **Figure 6-9** and includes an expansion of the general aviation terminal and reconfiguration of the landside parking lot, as well as an expansion of overflow parking to meet future demand. This includes the construction of a 630-square-foot expansion on the northern end of the terminal, as well as adding 18 parking spots to the existing 71 parking spots by reconfiguring the parking lot, providing for 89 parking spots in front of the terminal building. Also, it is proposed an overflow lot to the north, across Rudder Lane be expanded by 20 spots for a total of 47 spots. In total, this would provide for 136 parking spaces, which is above the 124 spots identified in Chapter 5.

Landside Alternative 4 will be assessed against the evaluation factors and the No Build Alternative below.

- **Land Use Compatibility:** The expansion of the terminal and parking lot is compatible with the existing parking spaces; however, the takeover of terminal apron space is not a compatible land use, despite the minor amount of space required for parking. This alternative is given a score of **Fair (1)** for land use compatibility.
- **Environmental Impact:** There are no environmental impacts as the land is already developed and the alternative is given a score of **None (3)** for environmental impacts.
- **Potential for Expansion:** This alternative does not provide for as much expansion potential as the No Build Alternative since the parking lot is mostly built out in front of the terminal building. Further, the parking lot will constrain any further development of the general aviation terminal in the future. However, if additional vehicle parking is needed in the future, parking spaces could be reconfigured, and Rudder Lane could be relocated to further maximize vehicle parking. Further, the parking lot across Rudder Lane adjacent to

the solar panels could be utilized and expanded for overflow parking. This alternative is given a score of **Fair (1)** for future expansion potential.

- **Operational Efficiency:** This alternative makes the best use of underutilized space in front of the terminal building to provide for vehicle parking through the planning period, more so than the No Build Alternative while preserving the existing vehicular traffic flow and is given a score of **High (3)**.
- **Revenue Generation Capability:** While vehicles do not pay for parking at the terminal building for patronizing the restaurant or the fixed base operator (FBO), providing sufficient vehicle parking allows those tenants to serve their customers and better positions Airport tenants for success, thereby better situating the Airport for success. The expansion of the passenger terminal could further provide additional revenue generation opportunities for the Airport. Landside Alternative 4 is given a score of **Good (2)** for revenue generation capability.

### 6.3.8. Preferred Vehicle Parking Alternative

As can be seen in **Figure 6-9**, Landside Alternative 4 which proposes an expansion of the existing vehicle parking lot is the preferred vehicle parking alternative and it is recommended the Airport move forward with the expansion of the terminal parking lot as demand warrants.

**Table 6-4.: Vehicle Parking Alternatives Comparison**

Alt.	Land Use	Environmental Impact	Expansion Potential	Operational Efficiency	Revenue Generation	Total
1	Fair (1)	None (3)	Fair (1)	None (0)	Poor (0)	5
LA4	Fair (1)	None (3)	Fair (1)	High (3)	Good (2)	10

*Source: McFarland Johnson analysis, 2022.*

### 6.3.9. Aeronautical and Non-Aeronautical Land Use Alternative

A goal of the Airport, and the FAA is financial self-sufficiency. As part of this Master Plan Update, areas for future aeronautical and non-aeronautical development have been explored and included in this analysis to generate revenue and to ensure land is reserved for future aeronautical demand in the long-term or from uses that were not identified in this Master Plan. Three sites totaling approximately 69 acres have been identified that would be suitable for aeronautical development, and 25 acres have been identified that would be suitable for non-aeronautical development.



Figure 6-9: Landside Alternative 4 - Terminal and Parking Expansion



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The non-aeronautical site is approximately 25 acres along Park Avenue (Rd. 431) to the south of the Airport which could be suitable for concurrent non-aeronautical development. While much of this land is in areas recommended for acquisition associated with preserving the ROFA on Runway 4-22, a significant area is available for future non-aeronautical development along the new alignment of Park Avenue. The remainder of the sites that would be ideally suited for aeronautical development are as follows:

- Aeronautical Site 1
  - 11 Acres
  - Southwest of the apron areas and along Taxiway E
- Aeronautical Site 2
  - 9 Acres west of the approach end of Runway 22 and north of the existing hangars and aprons
    - Note: Mitigation for wetland impacts will need to be assessed
  - Roadway access would be accomplished via Rudder Lane; however, wetlands could be an issue to mitigate
- Aeronautical Site 3
  - 49 Acres
  - Between the Current Leasehold (and including parts of former Taxiway B) and Taxiway D
- Non-Aeronautical Site 1
  - 25 Acres
  - South of Runway 10-28

The Airport development areas, shown in **Figure 6-10**, depict multiple development tracts and sites that represent potential areas that are suitable for future development that may occur during and/or after the planning period.

#### 6.4. PREFERRED AIRPORT DEVELOPMENT ALTERNATIVE

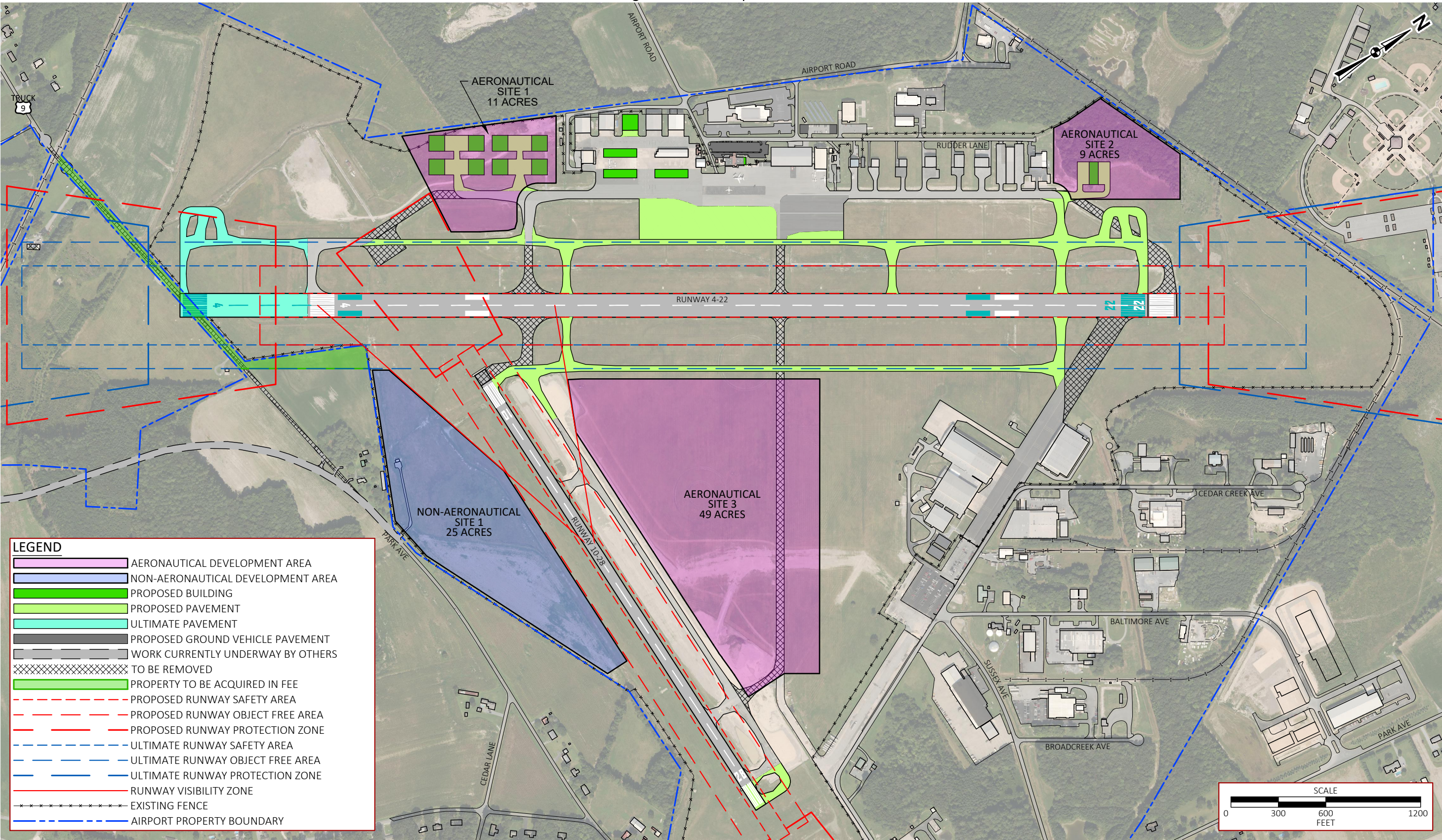
It is recommended the Airport address issues and concerns that can be accomplished today, by utilizing available FAA funding. This includes the elimination of the displaced thresholds and the installation of a culvert within the approach to Runway 4-22, and taxiway improvements, as well as additional hangars and parking and terminal building improvements. As demand warrants, the Airport should implement the Preferred Ultimate Runway Alternative to accommodate the demands of larger, C-II aircraft, and to meet the needs of existing and future tenants.

The Preferred Airport Development Alternative combines the recommended airside and landside alternatives, along with the Aeronautical and Non-Aeronautical Land Use Alternative, and is shown in **Figure 6-11**.

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Figure 6-10: Development Areas





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Figure 6-11: Preferred Airport Development Alternative

