CHAPTER 4
IDENTIFICATION AND EVALUATION OF ALTERNATIVES

Chapter 4, Identification and Evaluation of Alternatives presents the various alternatives considered to address the facility requirements presented in Chapter 3, as well as their evaluation. The purpose of the alternatives development and evaluation process is to identify a single preferred development concept to integrate into the Airport Capital Improvement Program and future Airport Layout Plan for FAA's review and conditional approval.

Like all airport master plans, the plan presented herein provides the best long term solution for the Airport. The key implementation steps and necessary trigger points to accomplish specific projects are provided in **Chapter 5, Implementation Plan**. Furthermore, each project should be reevaluated prior to its full implementation to ensure that the Newport News-Williamsburg International Airport is developed with a long term emphasis on financial, operational, and environmental sustainability. This is in keeping with the desire of airport management to incorporate elements of sustainability into the study. The study scope of work states that the alternatives analysis provides the framework for making decisions regarding future airport development.

In order to present the alternatives development and evaluation process in a concise manner, a summary of the process and preferred development plan is presented first and then followed by a presentation of alternatives organized by airport functional area (e.g. airfield, terminal, landside, and ancillary facilities) as follows:

- Section 4.1: Alternatives Development and Evaluation Process Overview
- Section 4.2: Preferred Development Plan Summary
- Section 4.3: Airfield Alternatives
- Section 4.4: Terminal Alternatives
- Section 4.5: Landside Alternatives
- Section 4.6: Ancillary Facilities (e.g. Cargo and General Aviation)

The identification and evaluation of alternatives is an iterative process and the information presented within this chapter is a summary of the process intended to present the key criteria and factors that led to the selection of the Recommended Airport Development Plan.

4.1 ALTERNATIVES DEVELOPMENT AND EVALUATION PROCESS OVERVIEW

The analysis conducted in **Chapter 3, Facility Requirements**, identified which Newport News-Williamsburg International Airport facilities should be the focus of the near and long term capital improvement program in order to accommodate forecast passenger and aircraft activity, address FAA design standards, and meet the sponsor's strategic vision. The facility requirements analysis presented in Chapter 3 identifies needs to be addressed during the development of alternatives and validates many of the study issues and focus areas presented within the study scope of work. The following is a summary of the facility requirements and the Airport Sponsor's Strategic Vision organized by functional area providing the basis for development of alternatives:

Airfield (Section 4.3)

- Maintain both the extension of Runway 7R/25L and future parallel Runway 7L/25R on the Airport Layout Plan to preserve future airfield performance capability and to help preserve on and off-airport land use throughout the planning period.
- Incorporate the navigational aid upgrades recommended by the Virginia Department of Aviation (DOAV) in its recently completed Facilities and Equipment Study.
- Where practicable, evaluate revised airfield apron, taxiway, and runway geometry to incorporate the recommendations of FAA Engineering Brief 75 *Incorporation of Runway Incursion Prevention into Runway and Taxiway Design.*
- Improve taxiway access to Runway 7/25 and enhance efficiency by providing an exit taxiway at a location that increases the percentage of aircraft arriving on Runway 25 that are able to exit the runway prior to either crossing Runway 2/20 or continuing all the way to the end to exit at Taxiway A. According to FAA design criteria only 24 percent of large aircraft weighing greater than 12,500 pounds will exit at Taxiway F which is 4,500 feet from the Runway 25 threshold. A new exit taxiway located 6,000 feet from the Runway 25 threshold will increase that percentage to 92 percent on dry runways.

Terminal (Section 4.4)

- Expand the inbound baggage claim area to add one baggage claim device and provide additional passenger queue space which will raise the level of service.
- Evaluate the feasibility of consolidating the security screening checkpoint to help enhance efficiency for passenger screening and TSA staffing.
- Evaluate the feasibility of incorporating an in-line baggage screening system for outbound baggage.

Landside (Section 4.5)

- Evaluate the feasibility of segregating non-airport traffic on the airport's roadway system to improve access into the Airport and enhance terminal circulation.
- Prepare for the eventual development of a direct link between Interstate 64 and the Airport.
- Provide for future intermodal/high speed train access

Ancillary Facilities (Section 4.6)

- Adopt land use planning guidance that identifies and protects land for additional hangar development to accommodate potential growth of based and transient corporate jet aircraft and other general aviation and aviation related commercial development.

The alternatives development and evaluation process utilized for this master plan follows guidance provided by FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*. This guidance indicates that the alternatives development process for the airfield should begin with a broad review of alternatives and selectively narrow and refine the alternatives through an iterative analysis/refinement process.

A public participation process was conducted as part of this master plan as was an overview of potential environmental impacts as prescribed in the AC. The public participation process, as documented in the chapter, included technical and public advisory committee meeting, public workshops, and small group working sessions. In addition to the general public and airport community, stakeholders include airport staff, airport tenants and users, FAA Washington Airport District Office Staff, and Virginia Department of Aviation (DOAV) staff.

The development of the airfield is the most expensive and complicated component of the Recommended Airport Development Plan. As such, it required a higher degree of analysis and also has a long term implementation strategy. The process of study and recommended implementation is described as follows. Fourteen broad airfield concepts were developed for initial screening. The initial screening identified two concepts for more rigorous screening in a second round. The final preferred alternative evolved from these two alternatives. Improvements are recommended for implementation in three general phases beginning with those that can be immediately justified and concluding with those that fulfill the Peninsula Airport Commission's strategic vision.

The Recommended Airport Development Plan depicts the long range evolution of the Airport and incorporates all three phases of development in the illustration.

4.2 SUMMARY OF RECOMMENDED AIRPORT DEVELOPMENT PLAN (RESERVED)

The Recommended Airport Development Plan is the combination of each functional area preferred development alternative. The functional area alternatives have been evaluated to a degree of independence but must come together to work harmoniously and in balance. Once Airport staff, FAA, and the study team reach consensus on each functional area preferred alternative, the Recommended Airport Development Plan will be set and summarized in this section. Figure 4-1, presents a draft illustration of the current functional area preferred alternatives and will be updated to reflect the final Newport News/Williamsburg International Airport Recommended Development Plan.

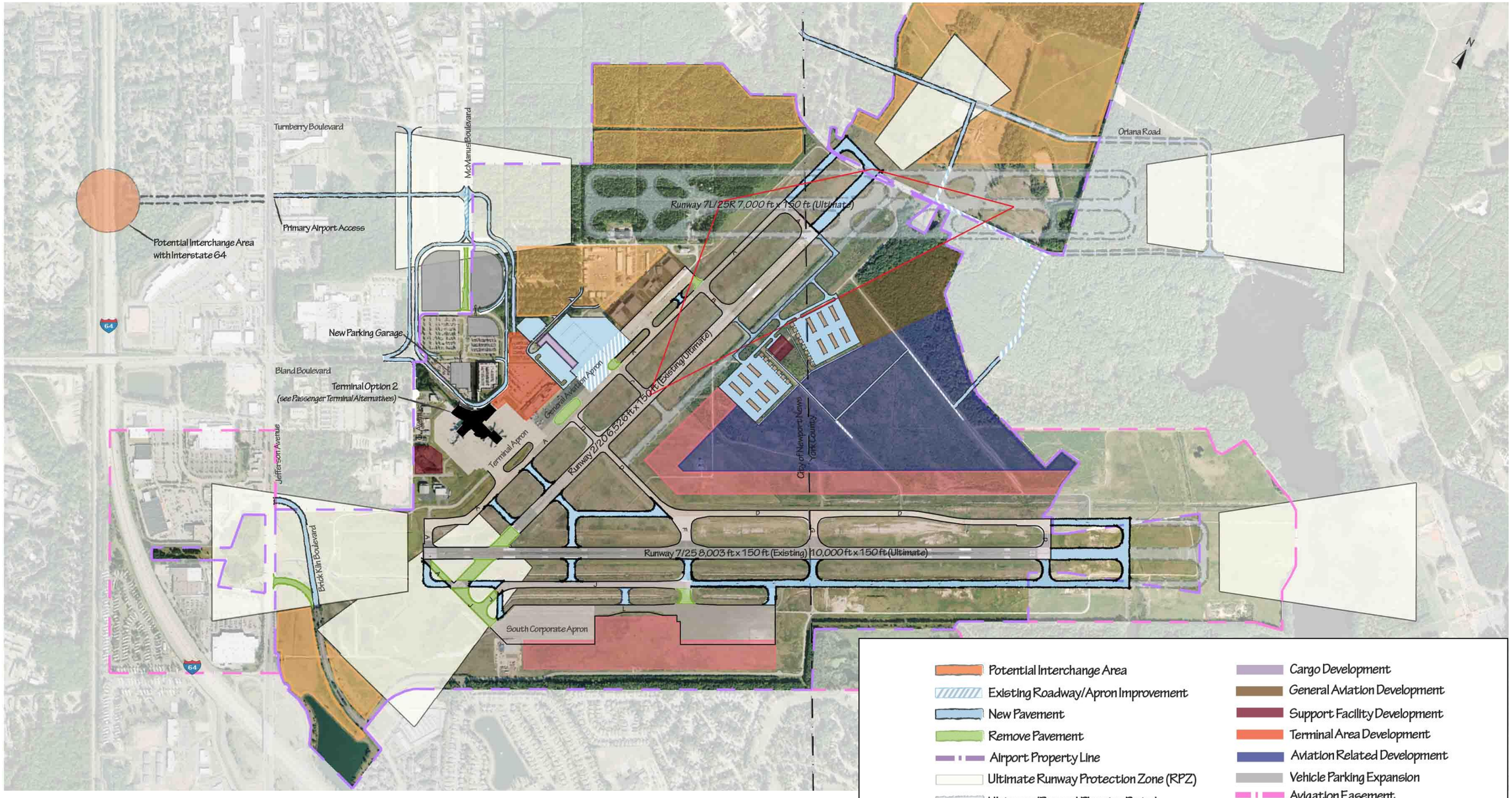

Figure 4-1
RECOMMENDED AIRPORT DEVELOPMENT PLAN

4.3 AIRFIELD ALTERNATIVES

An airport's airfield is its most essential component and effectively what differentiates an airport from any other type of transportation facility. The airfield allows the Airport to carry out its basic mission of allowing airplanes to land and take-off. The airfield must be safe and efficient and account for the airport's location and prevailing weather. The airfield consists of runways, taxiways, and apron facilities. Because the airfield is the most important airport asset, the airfield requirements are met first and all other facilities are planned around the airfield.

This section reviews the key goals, issues, and considerations associated with the existing airfield configuration and previously recommended airfield plans. The section is concluded with a recommended plan for the airfield's continued development and improvement.

4.3.1 Airfield Alternatives – Key Goals, Issues and Considerations

The following are the goals, issues, and considerations to be met and/or addressed through the development and evaluation of airfield alternatives. Airfield goals, issues and considerations were identified through the study process and in coordination with the Sponsor and FAA and were presented, in part, within the study scope of work.

- Development of General Aviation facilities in the South Corporate Apron area will increase air traffic utilizing Taxiway J to reach Runways 2 or 7 for departure. The close alignment of the two runways in this area is an airfield design factor that requires further evaluation because it has the potential to disrupt pilot situational awareness. It must be noted that Air Traffic Control has not documented that the existing geometry is resulting in pilot situational awareness concerns though historically, there have been very few departures originating from the South Corporate Apron. The study focuses on evaluating whether the geometry in this area could feasibly be modified to reduce or eliminate the potential for pilot misidentification of the assigned departure runway.
- Several recommendations contained within FAA Engineering Brief 75 – *Incorporation of Runway Incursion Prevention in Taxiway and Apron Design* could be implemented at the Airport to enhance pilot situational awareness and maintain the Airport's excellent safety record. These recommendations should be considered for implementation where practicable and focus on revising taxiway geometry and runway access in select locations. One such location is where Taxiway A intersects Runway 7 at an angle. Feasible geometry modifications should be evaluated.
- Preservation of land to accommodate a future parallel Runway 7L/25R should continue. The proposed runway would allow the Airport to accommodate additional demand as it materializes. Maintaining future Runway 7L/25R on the Airport Layout Plan will allow airport staff to make appropriate on-airport land use development decisions and discourage the encroachment of incompatible land uses off airport that would be impacted by the eventual construction and operation of the new runway. Planning for compatible land use is a core component of sustainability because it prevents the eventual need to replace facilities, which reduces costs, and can help guide off-airport land use decisions thus limiting the potential environmental impacts of the Runway's eventual implementation.
- Airport staff and the Peninsula Airport Commission desire an extension of Runway 7/25 to accommodate larger aircraft with longer stage lengths. The Sponsor's strategic vision for the Airport is to accommodate wide-body aircraft that would fly a stage length of approximately 4,000 nautical miles with full passenger loads. The Airport would require a runway with a length of 10,000 feet to meet these requirements. Runway 7/25 is the

primary runway and would require an approximately 1,997 foot extension to meet this requirement. The actual planning and development of the increase in runway length will be triggered by a specific user to regularly serve the Airport.

- The recommended plan incorporates and adopts the results of the Virginia Department of Aviation's (DOAV) Facilities and Equipment Study. The DOAV Study makes several recommendations, all of which are incorporated into the recommended plan unless obsolete due to modifications to the subject runway.

4.3.1.1 Modifying Airfield Geometry – Runway Intersection

The existing Newport News/Williamsburg International Airport runway geometry responds to the prevailing winds in the region by providing primary and crosswind runways that are offset by approximately 50 degrees. The two runways intersect near one end resulting in a closed "V" or modified "X" configuration. For two-runway airports in North America, this runway configuration is relatively common. This runway configuration has been scrutinized in recent years, however, as a result of an incident that occurred at Blue Grass Airport near Lexington, Kentucky in August 2006 which also had two runways that intersected near one end (the crosswind runway has since been relocated and the airfield now has an "Open V" configuration). In that incident, a Regional Jet was instructed to depart from the Airport's main runway and mistakenly departed from the crosswind runway. The crosswind runway was 3,500 feet shorter than the assigned runway and the aircraft was unable to takeoff resulting in the loss of 49 lives. There were additional mitigating circumstances that contributed to the incident, including ongoing construction at Blue Grass Airport. However, in the interest of preparing a thorough analysis and identifying opportunities to enhance safety, an evaluation of the existing Newport News/Williamsburg International Airport runway geometry merits review to reduce the likelihood of such an event occurring again.

First and foremost, it should be noted that the two runways at Newport News/Williamsburg International Airport are both 150 feet wide and their lengths differ by less than 1,500 feet. This is important to note because both runways are capable of accommodating the entire existing and forecast fleet mix reducing the risk in the event that a pilot were to mistake Runway 2 for Runway 7. It must also be noted that the risk is anticipated to be more acute as the South Corporate Apron area is developed. This is because the risk is associated specifically with a pilot having been assigned by Airport Traffic Control to depart the 8,003-foot Runway 7 and mistakenly departing the 6,526-foot Runway 2 reducing his or her available takeoff distance by 1,477 feet. The opposite situation presents less risk because Runway 7 would provide a pilot with more, rather than less, length. The situation is associated with the development of the South Corporate Apron because aircraft originating at this location would have to first cross the Runway 2 threshold before reaching the Runway 7 (assigned) runway threshold. A pilot who is not alert and aware of the situation could potentially depart from Runway 2 as Runway 2 is the first runway encountered in this scenario.

Per the recommendation of Airport staff and the Peninsula Airport Commission, the alternatives analysis reviews the existing relationship between the two runways and attempts to identify a feasible alternative that would reduce or eliminate the potential for a pilot mistake the runways.

4.3.1.2 Future Parallel Runway

A subcommittee of Airport stakeholders formed as part of this study convened to analyze the ultimate need for capacity enhancement. This subcommittee reviewed the existing concept for a

future parallel Runway 7L/25R. The subcommittee evaluated the issues and opportunities associated with planning for the eventual implementation of a new parallel runway (beyond the 20-year planning period), and determined that such a runway should continue to be shown on the Airport Layout Plan. However, it was noted that the forecast of aviation activity for Newport News/Williamsburg International Airport shows that there is not an immediate need for additional capacity as the existing runways are expected to accommodate demand for the next 20 years with limited or no airfield delay. A new runway, therefore, is not an immediate requirement. Detailed planning for additional capacity may need to begin between 2020 and 2030 such that the capacity can be available when needed approximately 10 to 15 years thereafter. Because the Airport exists in an urban environment with active development in the area, it is recommended that the Airport Layout Plan include a future parallel Runway 7L/25R. Planning for a parallel runway will help protect the feasibility of implementing it when the demand materializes that makes it necessary. Preservation of airport land for the runway is a worthwhile objective and the Airport Sponsor and FAA should actively seek to encourage off airport land uses that are compatible with the Runway's potential future construction and operation. Further, showing the runway extension and the ultimate parallel runway also helps protect the airspace through FAA 7460 *Notice of Proposed Construction or Alteration* reviews, York County and City of Newport News height and hazard zoning, and through airport safety overlay districts. This is a sustainability objective because it seeks to incorporate compatible land use within the Airport's surrounding environment and because the Airport would maintain an alternative that would reduce delays and their corresponding air quality impacts should additional capacity be needed.

It is important to note that the subcommittee's review of the proposed runway resulted in the following modifications of the proposed runway length and alignment.

- The orientation of the runway remains the same – parallel to existing Runway 7/25.
- The alignment of the runway centerline is shifted southeast 500 feet to accommodate on-airport aviation related development to the northwest of the proposed runway.
- The relocation of the runway southeast is desired to allow the City of Newport News to better utilize the IDA owned land between McManus Boulevard and Oriana Road that was impacted by the previous runway alignment.
- The length is reduced by a total of 1,000 feet from the current 8,000-foot length depicted on the approved ALP to a recommended 7,000-foot runway length.
    - The east end (Runway 25R end) is shortened 500 feet to minimize impacts to the existing Oriana Road alignment, area wetlands, and potential approach surface conflicts with high power transmission lines along the east bank of Harwood's Mill Reservoir. The runway was shortened to also allow for a full 1,000-foot RSA and ROFA length without impacting (e.g.) filling portions of the Reservoir.
    - The west end (Runway 7L end) is reduced 500 feet to preserve land for aviation related commercial development and to preserve the ability to potentially develop an additional interchange with Interstate 64 between Bland Boulevard and Turnberry Boulevard that would directly connect the Airport and the Interstate.

4.3.1.3 Existing Runway 7/25 Extension

Runway length is a primary variable when assessing the type of aircraft an airport can accommodate. Existing Runway 7/25 has a length of 8,003 feet. A runway length analysis prepared as part of the facility requirements assessment and presented in Chapter 3, determined that the existing length will accommodate projected demand on domestic routes, utilizing a stage length of 2,200 nautical miles with full passenger loads. However, additional analysis determined

that a runway length of 10,000 feet would be required to reach potential international markets, based on wide-body aircraft with a 4,000 nautical mile stage length and full passenger loads.

Airport staff and the Peninsula Airport Commission have established a strategic vision for the Airport that seeks to provide sufficient runway length for aircraft to conduct non-stop operations to select domestic and international markets.

The current Airport Layout Plan depicts a proposed 1,997-foot extension to Runway 25 for a total primary runway length of 10,000 feet. This runway length could accommodate large aircraft with full passenger loads on select international routes. The Recommended Airport Development Plan illustrates the 1,997 foot eastward extension of existing Runway 7/25 as a reflection of the strategic vision and the length analysis conducted as part of this master plan.

There are potential constraints that would require review and potential mitigation prior to implementing such an extension. They include but are not limited to:

- Wetlands are present between the existing Runway 25 threshold and Harwood's Mill Reservoir that could potentially be impacted by a runway extension.
- High power electrical transmission lines are located along the east bank of Harwood's Mill Reservoir approximately 4,700 feet northeast of the existing Runway 25 threshold. Further, the height of the power lines may interfere with the approach surfaces associated with the extended runway, as well as potentially penetrate TERPs surfaces, ostensibly raising the Airport's approach minimums, and reducing the approach availability; thus the utility of the Airport. Additional analysis and discussions with the electrical utility should be conducted well in advance of project implementation.

4.3.1.4 Enhanced Airfield Safety

In keeping with the Airport's ongoing and foundational goal of continued safe operation, this study reviewed the existing airfield layout to determine what potential airfield modifications may be available to further enhance airfield safety. Recent FAA guidance has focused on taxiway and apron design and is summarized in FAA Engineering Brief (EB) 75: *Incorporation of Runway Incursion Prevention into Taxiway and Apron Design*. EB 75 provides "guidance for the planning and design of taxiway and apron improvements to minimize the likelihood of runway incursions." Further EB 75 "provides recommended taxiway and apron layouts to enhance runway safety by encouraging certain configurations and identifying layouts to avoid when possible." EB 75 also suggests avoiding using taxiway nomenclature that assigns the same name to a taxiway making several turns along its route. Designating different taxiway names along a prescribed taxiway route forces a pilot to look for the next sequential taxiway segment where a turn is required.

The study team assessed the existing taxiway and apron layout to determine whether the existing airfield geometry could be modified to incorporate the latest recommendations for enhanced safety. Though the airfield meets the standards contained in FAA Advisory Circular 150/5300-13 – *Airport Design*, there are taxiway and apron modifications that are recommended that may enhance safety by improving pilot situational awareness.

The master plan study's recommendations focus on the south end of the airfield where Taxiway A meets Taxiway L at Runway 2, near where the Airport's two runways intersect. The study recommends modifying the airfield geometry in this area to remove the runway intersection and eliminate the segment of Taxiway A that meets Runway 7 at an acute angle. There is no history of

incursions in this area and no pilots or Air Traffic Control personnel consulted for purposes of this study identified this area as problematic though there has been relatively few operations in this area due to a lack of activity at the South Corporate Apron. Further, it is recommended that the Sponsor conduct a comprehensive Safety Risk Management assessment of the existing and proposed geometry and assemble an expert panel to review the plan prior to executing any modification to confirm that the recommended changes would not introduce any unanticipated risks.

A detailed analysis of the existing airfield geometry at the Airport in relation to EB 75 guidelines and FAA AC 150/5340-K – *Standards for Airport Markings* is presented in Chapter 3, Facility Requirements.

4.3.1.5 Enhanced Navigational Aids

The Commonwealth of Virginia Department of Aviation recently completed a Facilities and Equipment (NAVAID) Study. This study was conducted to evaluate each approach at all airports within the State system. The analysis was conducted to determine if improvements should be made to the approaches that would enhance efficiency and safety. The DOAV recommended the NAVAID improvements identified below for the Newport News/Williamsburg International Airport. An objective of this master plan study is to, where not obsolete; incorporate the recommendations from the Commonwealth of Virginia Study. Each of the concepts presented within this alternative chapter can accommodate these improvements if the Sponsor chooses to implement them within the planning period.

General

- Provide ADS-B coverage while on the ground
- Provide Local Area Augmentation System coverage to augment the existing global position system

Runway 7/25

- Install centerline lights for Runway 7/25

Runway 2

- Install Runway End Identifier Lights for Runway 2
- Request / complete an aeronautical survey to enable development of LPV approach to Runway 2
- Request development of RNAV (GPS) Runway 2 approach with LPV landing minimums

Runway 20

- Remove close-in obstruction (tree)
- Install a Medium Intensity Approach Light System for Runway 20
- Upon installation of approach lighting system and subsequent acceptance of visibility credit, different design standards apply (less than 1 mile)
- Request / complete an aeronautical survey to enable development of LPV approach to Runway 20
- Request development of RNAV (GPS) Runway 20 approach with LPV landing minimums.
- Install localizer and request development of LOC RWY 20 Approach

Runway 7

- Remove close-in obstruction (tree)
- Install 4-box Precision Approach Path Indicator for Runway 7
- Upgrade Medium Intensity Approach Light System to ALSF-II for Runway 7
- Install touchdown zone lights for Runway 7
- Upon installation of the ALSF-II approach lighting system, different design standards apply
- Install midfield and roll-out Runway Visual Range equipment
- Request development of Category II Instrument Landing System for Runway 7
- Request / update the aeronautical survey to enable development of LPV approach to Runway 7
- Request development of RNAV (GPS) Runway 7 Approach with LPV landing minimums

Runway 25

- Remove close-in obstructions
- Install Runway Visual Range equipment
- Install Medium Intensity Approach Light System for Runway 25
- Install touchdown zone lights for Runway 25
- Upon installation of approach lighting system and subsequent acceptance of visibility credit, different design standards apply

4.3.2 Airfield Alternatives – Fourteen Concepts for Initial Screening

The primary objectives outlined above provided the study team with a basis for developing airfield concepts. Concept development was, therefore, initiated with the following objectives:

- Resolve the runway intersection and airfield geometry in the vicinity of the runway intersection
- Incorporate recommendations from FAA Engineering Brief 75
- Improve efficiency
- Maintain the proposed future runway and Runway 7/25 extension as desired by Airport Staff and the Peninsula Airport Commission

With this in mind, the study team prepared 14 initial airfield development concepts that would potentially resolve the concerns associated with the runway intersection, eliminate the acute angle where Taxiway A abuts Runway 7, and provide the desired runway length of 10,000 feet. The initial 14 concepts were subjected to a high-level screening, the results of which were presented to Airport staff, FAA representatives, Virginia Department of Transportation representatives, and Technical and Public Advisory Committees. Figure 4-2 illustrates the 14 initial airfield concepts. The initial high-level screening eliminated all but two concepts for further consideration for the following reasons:

- Concepts that eliminated or shortened runways (1A, 1B, 2A, 2B, 2C) were eliminated because they reduce the aeronautical performance capability of the Airport.
- Concepts that extended Runway 2 or Runway 7 to the east/southeast (3A, 3B, 3C, 5A, 5B) were eliminated because of the heavy impacts associated with off-airport land use and development along Jefferson Avenue and Interstate 64.
- Concepts that increased the anticipated volume of runway crossings (4A, 4B) were eliminated because this does not meet the FAA's goal of reducing runway crossings as a means of enhancing safety at airports through reduced potential for runway incursions.

After high-level initial screening, two concepts remained:

- Concept 1C maintains the existing runway geometry but provides additional taxiways to improve airfield operational efficiency and safety.
- Concept 4C includes all the taxiway improvements proposed in Concept 1C and also shifts Runway 2/20 to the north/northeast approximately 1,113 feet to eliminate the existing runway intersection and more easily eliminate the angled Taxiway A intersection with Runway 2.

Concepts 1C and 4C are, therefore, carried forth for refinement and secondary screening.

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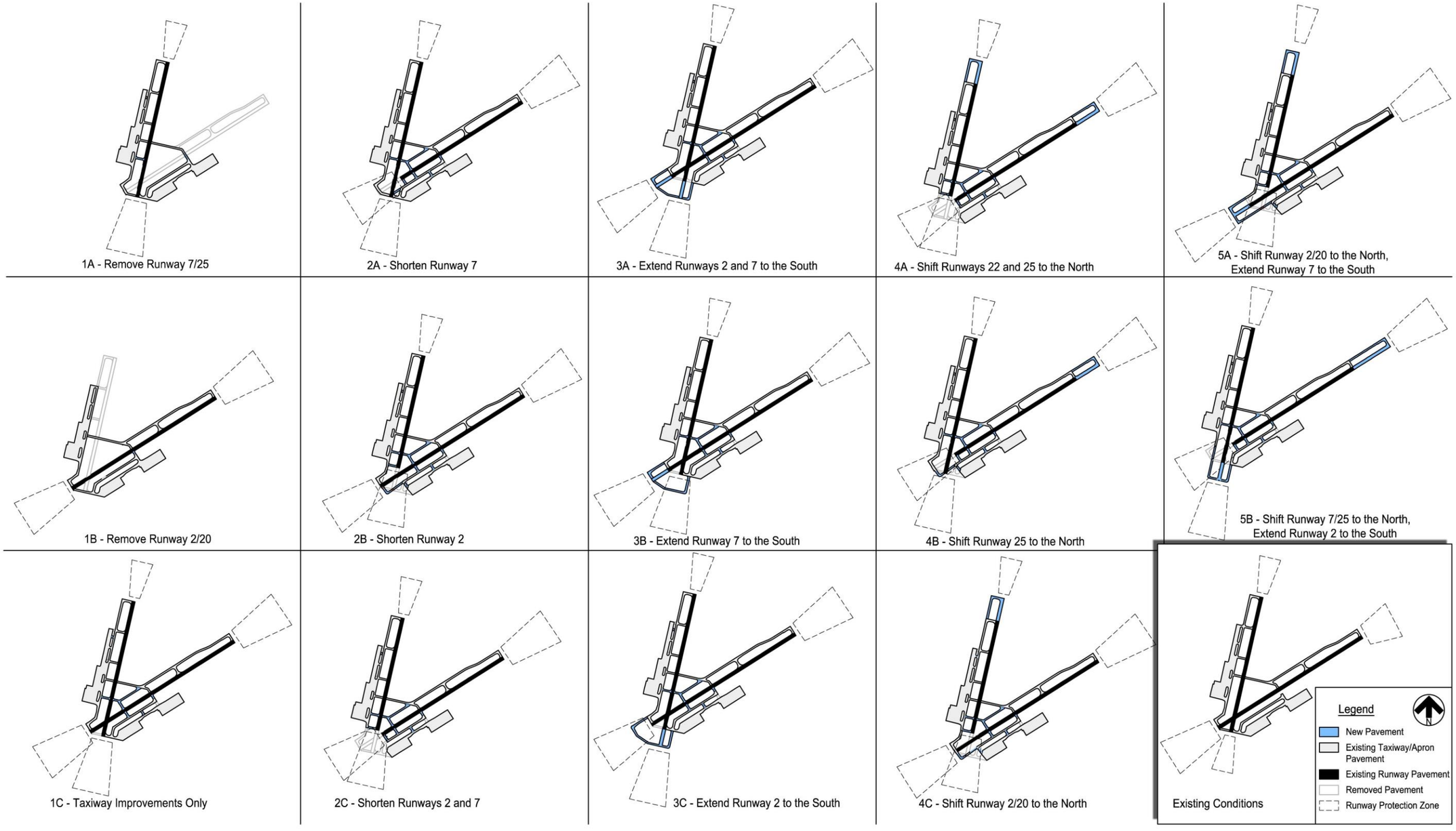


Figure 4-2
AIRFIELD ALTERNATIVES – FOURTEEN POSSIBLE SOLUTIONS

4.3.3 Airfield Alternatives – Two Alternatives for Secondary Screening

Concept 1C and 4C were deemed viable after initial screening and were refined into alternatives for a more rigorous secondary screening. The concepts that passed the initial screening and that have been refined into alternatives include:

- Alternative 1C - Modified Taxiway Geometry
- Alternative 4C - Modified Taxiway Geometry + Shift Runway 2/20 to the North

4.3.3.1 Alternative 1C - Modified Taxiway Geometry

Alternative 1C, illustrated in Figure 4-3 does not modify the runways but instead focuses on improving the airfield taxiway system to enhance both safety and efficiency by providing improved access to both runways from all existing aircraft parking facilities and aprons including areas to the east of Runway 7/25 that are to be developed in the future. Concept 1C includes the following general airfield improvements:

- Extend Taxiway J northeast to the Runway 25 end
- Extend Taxiway F across Runway 7/25 to intersect Taxiway J
- Provide a new taxiway connection between Taxiway A and Taxiway J south of Taxiway D
- Extend the portion of Taxiway D that is parallel to Runway 7/25 further south to intersect the new cross-field taxiway and re-name the roughly east-west portion of Taxiway D that crosses Runway 2/20.

4.3.3.2 Alternative 4C - Shift Runway 2/20 to the North

Alternative 4C, illustrated in Figure 4-4 would result in the northward shift of Runway 2/20. Alternative 4C would also include the improvements to taxiway geometry described above in Alternative 1C in addition to improvements to the taxiway geometry in the vicinity of the south end of Runway 2/20. Concept 4C eliminates the existing runway intersection. Though some runway crossings would be eliminated, aircraft would still be required to cross the approach areas to Runways 2 and 7 when accessing these two runway ends for departure. The taxiway geometry in the vicinity of the Runway 2 and Runway 7 ends would be modified to simplify the geometry in this area and is shown in Figure 4-4. In addition to the airfield improvements described above for Alternative 1C, Alternative 4C includes the following general airfield improvements:

- Shift Runway 2/20 to the North:
    - Remove 1,113 feet of pavement from the south end of Runway 2/20
    - Extend the north end of Runway 2/20 by 1,113 feet
        - Extending Runway 2/20 to the north would require the relocation of a portion of Oriana Road as well as removal of buildings along Kentucky Drive to maintain a free and clear Runway Protection Zone, Runway Object Free Area and to prevent obstructions to the Runway 20 Part 77 approach surfaces.
- Reconfigure Taxiways A and J to simplify the geometry in the vicinity of the Runway 7 end

Each alternative was refined using layouts on aerial mapping in order to more accurately study the improvements and their potential impacts. The technical merits of each airfield alternative were then thoroughly evaluated based on five essential criteria:

- Operational performance
- Fiscal factors
- Best planning tenets
- Environmental factors
- Sustainability

Scoring parameters for each of the technical criteria were established to measure distinctions between the two alternatives. The goal of the evaluation is an objective comparison of alternatives. The technical evaluation criteria are presented below in Table 4-1**.**

Table 4-1
AIRFIELD TECHNICAL EVALUATION CRITERIA

Category	Category
Operational Performance	**Environmental Factors**
A. Capacity	**A. Environmental**
Accommodates Forecasted Activity Levels	Potential Effects to Environmental Impact Categories
Improves the Airport Service Level Ratio	**Best Planning Tenets**
B. Capability	**A. Safety and Security**
Accommodates Forecasted Critical Aircraft	Improves Pilot Situational Awareness
Maintains 8,003' Primary Runway Length	Reduces Potential Runway Incursions
Supports Strategic Vision's 10,000' Runway Length	**B. Design Standards**
C. Efficiency	Meets Airside Facility Requirements
Reduces Aircraft Taxiing Time	Supports Airport Strategic Vision
Reduces Aircraft Runway Crossings	Incorporates EB 75 Recommendations
D. Facility Relocation	**C. Beyond the Planning Period**
Minimizes the Relocation of Existing Facilities	Accommodates Development Post Planning Period
Fiscal Factors	**D. Feasibility**
A. Cost Estimate	Minimizes Land Acquisition
Eligible for PFC & AIP Federal Funding	Meets Multi-Agency Concurrence
Least Impact on Operations	Accommodates Phaseable Implementation
Total Relative Cost Ranking	
Best Sustainability Management Practices	
A. Sustainability Goals	
Supports One or More Sustainability Goals	

The study team's evaluation was coordinated with and reviewed by Airport staff, agencies, and committees Figure 4-3 and Figure 4-4 illustrate the final airfield alternatives. Proposed improvements are illustrated in color while long-term enhancements desired by Airport staff and the Peninsula Airport Commission are illustrated with dashed lines indicating they would occur outside the horizon of this study.

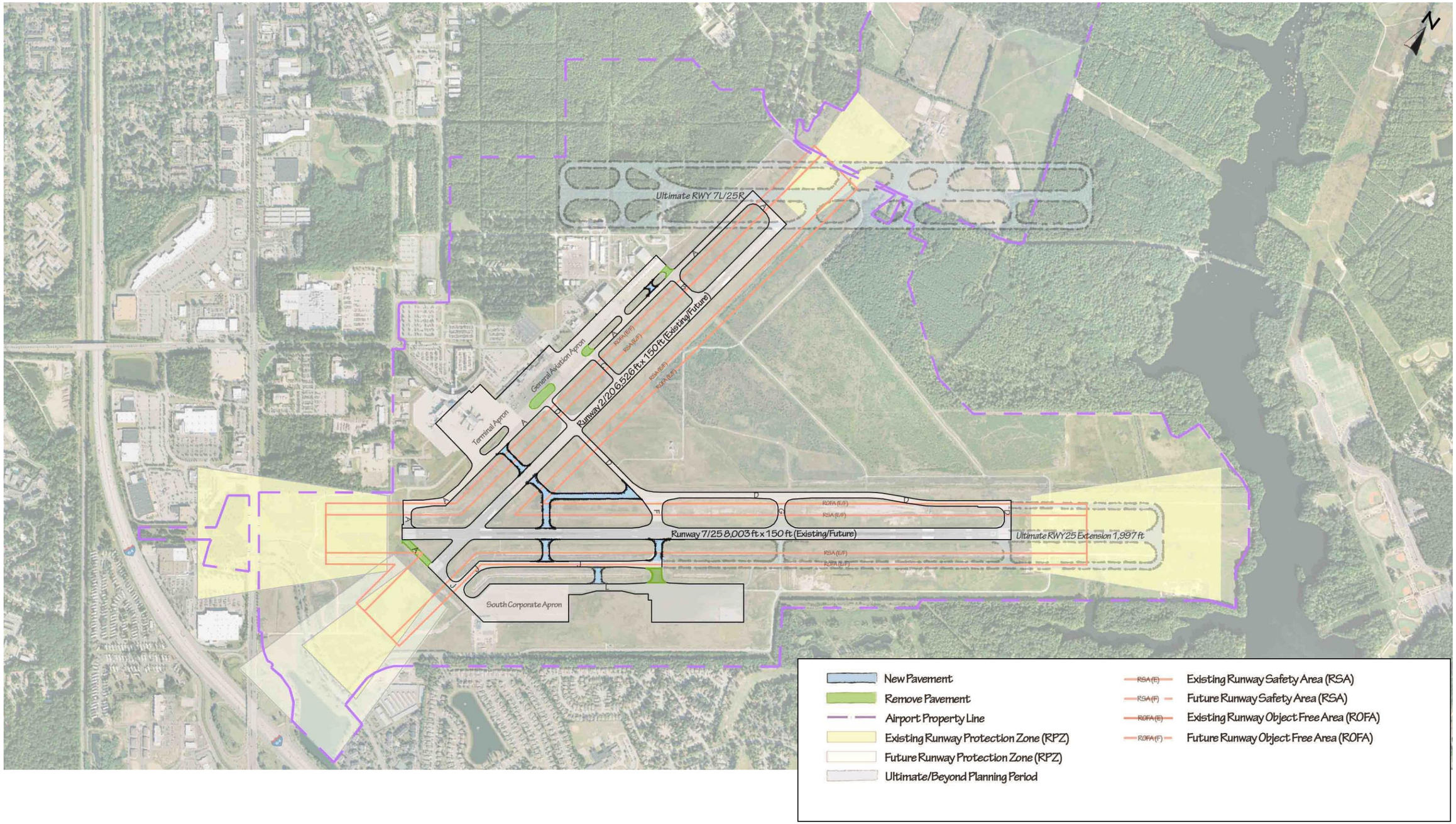


Figure 4-3
AIRFIELD ALTERNATIVE 1C - MODIFIED TAXIWAY GEOMETRY

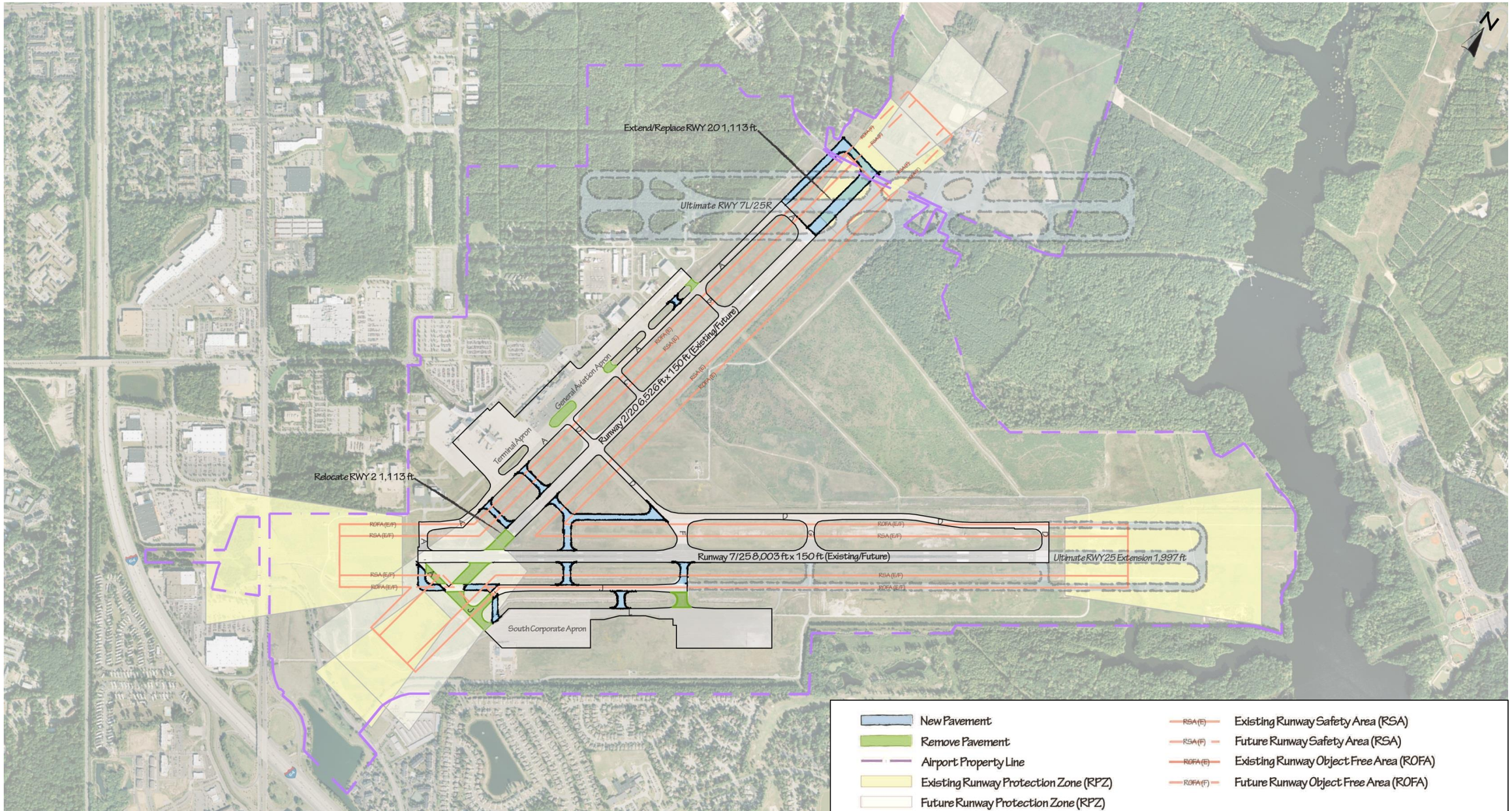


Figure 4-4
AIRFIELD ALTERNATIVE 4C - SHIFT RUNWAY 2/20 TO THE NORTH

A summary of the results of the secondary screening process for Alternatives 1C and 4C is presented below:

Operational Performance:

- Capacity
  - Alternatives 1C and 4C accommodate forecast activity levels through the duration of the planning horizon.
  - Alternatives 1C and 4C may both yield slight reductions in aircraft taxi time by providing additional taxiway access between aircraft parking areas and runways.
- Capability
  - Alternatives 1C and 4C maintain primary runway length (8,003 feet)
  - Alternatives 1C and 4C maintain crosswind runway length (6,526 feet)
  - Alternatives 1C and 4C accommodate existing (Boeing 737) and future (Boeing 757) design aircraft
  - Alternatives 1C and 4C preserve capability for the future northward extension of Runway 7/25 which would provide the Airport with a 10,000 foot runway.
- Efficiency
  - Improvements to the taxiway system in both alternatives would provide more efficient access between the apron areas and runways potentially reducing taxi times and enhancing the marketability of the South Corporate Apron Area to prospective third party developers.
  - Alternative 4C would eliminate the existing runway intersection[1]. However, the proximity of the runway ends would still require metering of taxi traffic in the area and would not eliminate the interaction of the two runways. In fact, aircraft taxiing on Taxiway J south to Runway 7 would have to cross the Runway 2 approach path and the ILS for Runway 2 approaches would require an ILS holding position marking across Taxiway J more than 1,000 feet from the end of Runway 7. During Instrument Meteorological Conditions when Instrument Flight Rules are in effect, aircraft originating from the South Corporate Apron and assigned Runway 7 for departure would have to hold at this location.
  - Alternative 1C does not include any modifications to runway pavement.
  - In Alternative 4C, aircraft originating at the general aviation ramp assigned Runway 2 for departure would queue on Taxiway A adjacent to the commercial ramp access points. This may lead to congestion and should be considered.
  - Both alternatives would provide a second taxiway crossing south of Taxiway D. This additional taxiway would provide a second location for aircraft to access the runways from the aircraft parking areas potentially reducing conflicts between taxiing aircraft as operations continue to grow at the Airport.

Best Planning Tenets:

- Safety
  - Alternatives 1C and 4C were planned to enhance overall taxiway system and airfield performance by improving taxiway access between runways and aprons. The

[1] The shifted Runway 20 end will create a future intersection with the ultimate parallel runway; however, as graphically depicted, this will not create a potential conflict as the future intersection occurs at the midpoint of the ultimate parallel runway. Further, since the ultimate runway concept is reserved beyond the 20-year planning period, the geometry of the ultimate parallel runway will be evaluated at that time.

airfield is planned to enhance pilot situational awareness. FAA has not established any hotspots at the Airport and there is no known propensity for incursions.

- Design Standards
  - Alternatives 1C and 4C are planned to meet the airside facility requirements that were presented in Chapter 3, Facility Requirements.
  - Alternatives 1C and 4C incorporate standards presented in FAA Advisory Circular 150/5340-1K – Standards for Airport Markings, for runway hold line position markings.
  - Alternatives 1C and 4C incorporate airfield geometry enhancements recommended in FAA Engineering Brief No. 75 – Incorporation of Runway Incursion Prevention into Apron and Taxiway Design. Examples include:
    - Avoiding the use of the short segment of existing Taxiway A connecting Runway 2 and Runway 7 (Alternative 4C),
    - Locating taxiways outside of the runway safety area of intersecting runways; and,
    - Connecting entrance taxiways to the runway end at a right angle by removing the Taxiway A connector located between the existing Runway 7 and Runway 2 thresholds (Alternative 4C).
    - The elimination of direct access onto a runway from a parking apron area through improvements to the general aviation apron area adjacent to Taxiway C as illustrated in Figure 4-1.
- Compatibility with Long Term Airport Development Beyond the Master Plan Horizon
  - Alternatives 1C and 4C are planned to accommodate the future 1,997 foot northward extension of Runway 7/25 to support the Sponsor's strategic vision for the Airport, and as shown on the current Airport Layout Plan
  - Alternatives 1C and 4C are planned to accommodate the potential development of a future parallel Runway 7L/25R by reserving lands necessary for the runway's ultimate development. The future parallel runway is also illustrated on the current Airport Layout Plan.
- Feasibility
  - Alternatives 1C and 4C can be implemented without land acquisition.
  - Alternatives 1C and 4C are believed to be socially and politically feasible as they would not result in a substantial change to the basic operation of the Airport. Noise impacts would be limited to those associated with the modest shift of Runway 2/20 approximately 1,113 feet northward.
  - Alternative 1C could be constructed in three primary phases with limited impacts to runway operations.
  - Alternative 4C could be completed in four primary phases with more substantial impacts to the operation of Runway 2/20 though some impacts may be lessened if construction can be timed to coincide with a required reconstruction project.
  - Alternative 1C can be implemented with at least one runway in use at all times.

Environmental Factors:

The following identifies the environmental issues of Alternative 1C and 4C that would need to be analyzed in future National Environmental Policy Act (NEPA) documentation.

Alternative 1C

- Temporary construction impacts such as noise and air pollution emissions could occur.
- Increases in construction and municipal waste could occur during construction activities.

- Reduction in aircraft taxi times could decrease criteria pollutant emissions associated with the operations.
- Potential increase in impervious pavement could result in the need for FAA compliant drainage improvements in order to accommodate additional storm water runoff.
- Additional impervious surfaces, within the Hardwood Mills Watershed Protection Area, could create a potential water quality impact.

Alternative 4C

- Temporary construction impacts such as noise and air pollution emissions could occur.
- Increase in construction and municipal waste could occur during construction activities.
- Potential acquisition of off-airport residential parcels along Robert Road, north of Oriana Road, as a result of construction or potential aviation noise impacts could require relocation of existing residents and businesses.
- Potential impacts to the equestrian activities at the Partners Tack Shop, which an on-airport property located along State Road 620 northeast of the runway shift, could be an effect on Section 4(f) properties. .
- Improvements could affect prime farmland soil types (e.g., Izagora loam and Slagle fine sandy loam).
- Reduction in aircraft taxi times could decrease criteria pollutant emissions associated with aircraft operations.
- Relocation of State Road 620 (Oriana Road) could result in environmental impacts, dependent on the preferred right-of-way that has not been established.
- Potential vegetative habitat modifications (i.e., tree clearing or trimming activities) north of Oriana Road could be required to remain compliant with FAR Part 77 surfaces (i.e., height clearances for aviation activities).
- Potential impact on a freshwater emergent wetland (PEM1E) north of the current Runway 2/20.
- Potential increase in impervious pavement could result in the need for FAA compliant drainage improvements to accommodate additional storm water runoff.
- Additional impervious surfaces within the Hardwood Mills Watershed Protection Area could create a potential effect on water quality.

Of the two remaining alternatives for the secondary screening, Alternative 1C would result in less ground disturbing activities and construction of airfield development at the Airport compared to Alternative 4C. Alternative 1C's fewer construction activities could result in less potential environmental impacts than Alternative 4C.

Fiscal Factors:

- Facility Relocation
    - Implementation of Alternative 1C would not require mitigation or relocation of any existing airfield facilities which is likely to help limit costs to construction.

- The estimated total cost for Alternative 1 C is $12,440,000.
- The estimated total cost for Alternative 4C is $25,299,000. The added cost is primarily attributable to the shift of Runway 2/20 and the additional taxiway modification work near the south end of the airfield.
- If the runway intersection is removed by shifting Runway 2/20 north, approximately 27 acres of additional developable land could be made available between the runways that would be otherwise off limits due to the existence of a Runway Visibility Zone for intersecting runways.
- Shifting Runway 2/20 to the north, as in Alternative 4C, would free land for potential commercial development along Jefferson Avenue on the south side of the Airport. This may diversify and enhance sources of revenue.
- Additional pavement is anticipated to increase pavement maintenance costs at the Airport. The degree to which maintenance costs would rise would be impacted by the types of pavements used as well as other variables. It is unlikely the proposed airfield improvements would reduce taxi-time and/or delay sufficiently to pay for themselves (e.g. result in a benefit/cost ratio greater than or equal to 1.0). However, the recommended projects are planned to enhance safety and, therefore, are not subject to benefit/cost analysis.

Best Sustainability Management Practices:

Alternative 1C and 4C can support sustainability goals through implementation of any of the following measures:

- Routing aircraft more directly between aircraft parking areas and runways would reduce taxi times and distances and result in a net reduction in greenhouse gas emissions and a net reduction in the amount of fuel used.
- Reduce noise as a result of taxiway improvements that result in reduced taxi time and distance. Implementation of Alternative 4C, which would result in a 1,113-foot northward shift of Runway 2/20, would not increase overall noise, but would change the location of noise contours generated by operations on the runway.
- Use Best Management Practices (BMPs) for stormwater management during and after construction. Although both alternatives are anticipated to increase the net impervious surface at the Airport, the use of BMPs would mitigate the effects of this net increase in impervious surfaces.
- Reduce material use thorough the re-use of existing runway pavement for construction.
- Indicate the strategies for reuse and quantities of reused runway and infrastructure; reuse refers to existing structures that are left in place.
- Design projects to ensure no, or minimal increase in the rate and quantity of stormwater runoff.
- Use low emission construction equipment.
- Recycle construction and demolition aggregate material for use during taxiway enhancement projects.
- Use “warm-mix” additives in asphalt for runway improvements, saving fuel and reducing emissions.

- Minimize areas of ground disturbing activities and leave vegetation intact when feasible.
- Locate material stockpile areas and lay-down areas in locations that will be disturbed or paved as part of construction.
- Use permanent and temporary soil stabilization techniques during and after construction such as hydro seeding, composting and straw mulching, and rolled mats to reduce the potential for erosion; especially on inclines.
- Reduce the use of potable water by using reclaimed water and stormwater runoff for irrigation and process water.
- Reduce runoff by constructing an integrated vegetated bioswale system that connects stormwater runoff to infiltration basins. These strategies should be conducted in a way that does not encourage wildlife habitat.
- Reduce stormwater flow velocities for conveyance systems in key areas to encourage the settling of suspended particles, and reduce erosion potential.
- Reduce runoff by constructing vegetated infiltration basins (rain gardens) to reduce effects of propylene glycol and to reduce reliance on stormwater conveyance systems and drainage basins.
- Reduce runoff by installing an underground stormwater drainage system that would reduce the instance of inundation, which reduces wildlife hazard attractants.
- Reduce runoff by installing pervious pavement on the shoulders of taxiways, runways, and non-traffic pavements.

Chapter 5, Implementation Plan, describes project components within each phase of PHF's CIP and recommended sustainable measures specific to each project.

The primary difference between the two final alternatives is the shift of Runway 2/20 to the north by a total of 1,113 feet included in Alternative 4C. Shifting Runway 2/20 northward would eliminate the existing intersection of the two runway surfaces but would not eliminate the interaction between the runways. In simple terms, air traffic control would not be able to operate the runways independently. Though Alternative 4C would also reconfigure the taxiways in the vicinity of the ends of Runway 2 and Runway 7, it would not provide an end around taxiway.

Alternative 4C would eliminate the runway intersection and remove the acute angled Taxiway A entrance to Runway 7. However, the study team notes that the interaction of the two runways remains and the concept does not eliminate the potential for pilot misidentification of the assigned departure runway. Based on the information available at this time and the study results, the study team recommends that Alternative 1C be considered for implementation.

Airport Staff and the Peninsula Airport Commission indicated their preference of Alternative 4C which includes shifting Runway 2/20 northward. Considering that Alternative 4C can be considered an evolution of Alternative 1C, the study team does not deem the two alternatives mutually exclusive. Thus, additional analysis focused and establishment of a Safety Risk Management panel and documentation should be convened to further assess the shift of Runway 2/20 and its implications to airfield operations. Should the Safety Risk Management determine that shifting Runway 2/20 northward would result in risk reduction and enhanced safety, the project should be initiated. This is in keeping with the FAA's continued emphasis on maximizing airfield safety.

In summary, the final recommended alternative is a hybrid of the two screened alternatives and phased implementation of Alternative 4C. The first phase, which would include the elements of Alternative 1C is discussed in the following section.

4.3.4 Summary of Recommended Airfield Development Alternative

The Recommended Airfield Development Plan is paired with the recommended terminal, landside, and land-use plans to form the Recommended Airport Development Plan. As noted in the previous section, the final airfield alternatives can be considered together because one is essentially an evolution of the other. Prior to implementing Alternative 4C and shifting Runway 2/20 northward, a formal Safety Risk Management Document should be conducted. For the purposes of this study, a detailed discussion of the initial phase – Implementation of Alternative 1C is presented below.

The selection of the recommended alternative is predicated primarily on the results of the secondary screening process, its ability to accommodate Newport News/Williamsburg International Airport's forecast demand, and its relative affordability and limited impact to existing facilities. The recommended plan would also continue to provide the Airport with the flexibility to implement more ambitious airfield development in future years, such as an extension of Runway 7/25 and the addition of a parallel runway, as demand and conditions warrant.

Features of the Recommended Airfield Development Plan are illustrated in Figure 4-5 and include maintaining the existing runway layout. The airfield would retain its current runway configuration, maintaining the existing runway lengths of 8,003 feet for Runway 7/25, and 6,526 feet for Runway 2/20. This reduces initial development costs and does not interfere with the potential shift of Runway 2/20. In summary, the airfield development plan should be phased as follows:

Near Term Actions – Implementation of Alternative 1C:

- Per the recommendation of FAA Engineering Brief No. 75 – Incorporation of Runway Incursion Prevention in Taxiway and Apron Design, prepare a comprehensive revision to the Airport's taxiway naming system. Taxiways should be renamed with a sequential/alphabetical format that eliminates, if feasible, the use of the same taxiway name along a route with multiple turns (e.g. existing Taxiways A and D)
- Improve the airfield, lighting, signage and markings:
    - Airfield lighting systems using LED-type fixtures are currently being installed as part of the Airport's Airfield Lighting Project.
    - Install Elevated Runway Guard Lights or, as grant funding permits, In-Pavement Runway Guard Lights at all runway holding position markings to aid pilot situational awareness and help prevent runway incursions.
    - Provide additional lighted airfield directional signage.
    - Replace the existing markings with thermoplastic pavement markings including surface painted hold position signs and runway hold lines.
- Extend Taxiway F south to connect to Taxiway J. This taxiway connection would allow aircraft arriving Runway 25 and heading to the South Ramp area to reduce runway occupancy time and avoid a runway crossing. Prior to implementation of this project, consideration should be given to revising the geometry that connects Taxiway J to the South Corporate Apron to avoid providing direct access to Runway 7/25 from the South Corporate Apron.
- In the existing general aviation area islands of unpaved area should be provided that prevent direct access from the GA aprons, across Taxiway A to Runway 2/20. Providing these islands would force pilots exiting the GA apron area to turn onto Taxiway A. The elimination of direct access to Runway 2/20 from the GA apron without having to make a turn onto Taxiway A is a safety improvement recommended within FAA Engineering Brief No. 75. Modifications include:

  - Expand the existing middle GA apron island further south such that it blocks access to the portion of Taxiway C that leads to Runway 2/20.
  - Add an additional apron island where existing Taxiway D currently intersects Taxiway A. This would, again, prevent direct access from the GA apron to Runway 2/20.
  - Relocate the segment of existing Taxiway B between the GA apron and Taxiway A further south such that it no longer provides direct access from the GA apron area to Runway 2/20.
- Construct a new taxiway connecting Taxiway D to Taxiway A crossing Runway 2/20. The taxiway is proposed to be located approximately 1,000 feet south of existing Taxiway D in the general vicinity of the airport terminal and would also extend across Runway 7/25 to connect with Taxiway J.
- Extend the segment of Taxiway D that is parallel to Runway 7/25 further south intersects the above described new taxiway.
- Review the use of and consider closure of the segment of Taxiway A between the Runway 2 and Runway 7 ends. Prior to closure, taxi operations moving between the south and west sides of the Airport that would be routed by ground control should be evaluated. A recommendation for changes to be depicted on the ALP should also be provided.

Mid-Range Actions – Implementation of Alternative 4C:

- After a formal SRMD is prepared and a Safety Risk Management panel concludes shifting Runway 2/20 northward is an effective means for reducing risk, Alternative 4C should be implemented resulting in the 1,113 foot northward shift of Runway 2/20 and the taxiway modifications recommended at the southernmost end of the airfield.

Long-Range Actions – Implementation of Capacity Enhancements:

- Demand will dictate the need for additional runway length and/or a parallel runway. As this demand materializes, further analysis should be conducted to prepare for implementation.

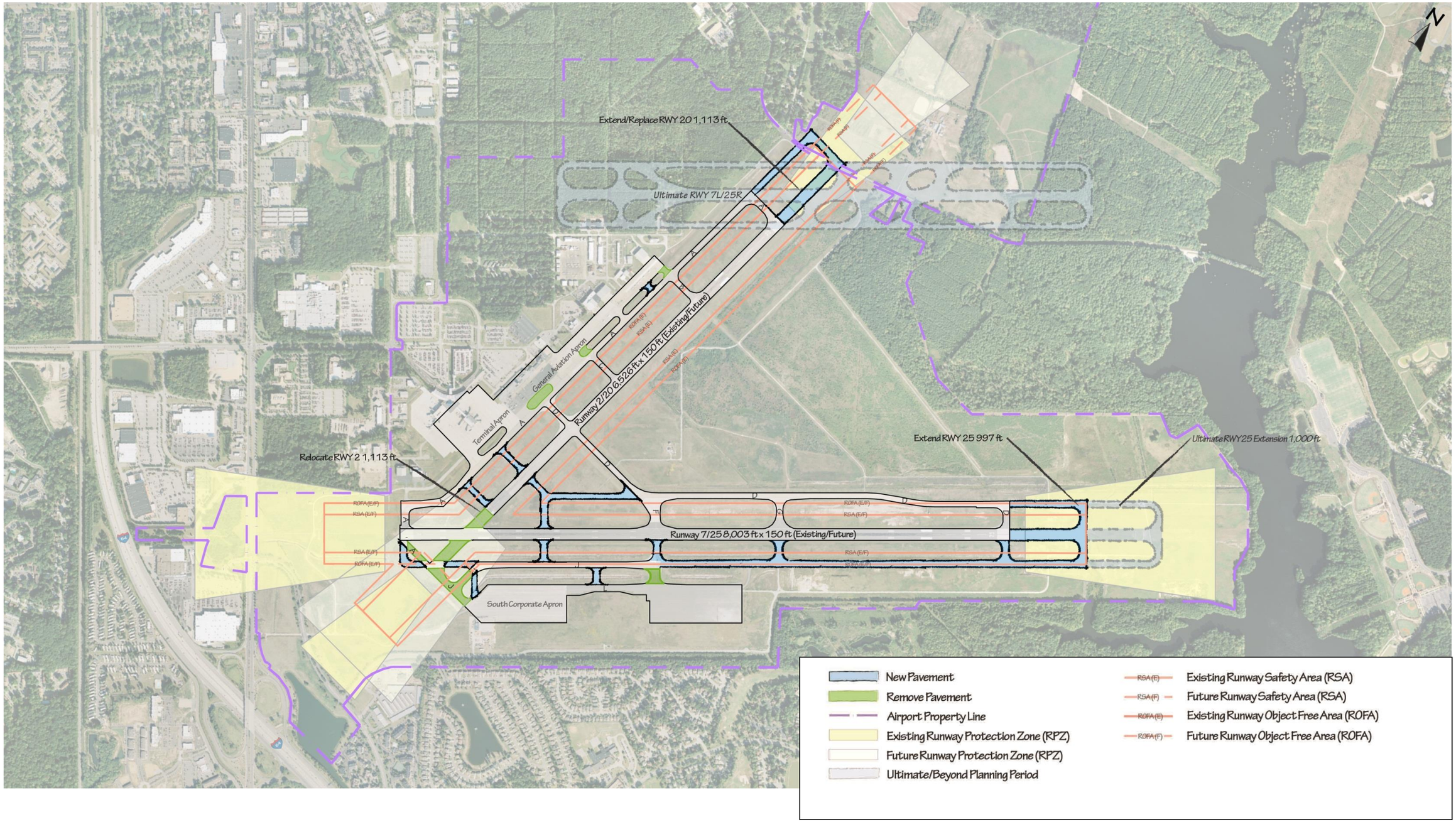


Figure 4-5
SPONSOR'S PREFERRED AIRFIELD DEVELOPMENT ALTERNATIVE

4.4 PASSENGER TERMINAL ALTERNATIVES

For a commercial service airport, the passenger terminal building is an essential facility second in importance only to the airfield. This section presents the key goals, issues, and considerations associated with the terminal at Newport News/Williamsburg International Airport. Because the terminal meets the essential functionality requirement for the Airport, only incremental enhancements are evaluated with the intent of improving passenger levels of service. Widely varied alternatives are not necessary for the evaluation of terminal improvements. For the passenger terminal evaluation, alternative enhancements are presented and the sponsor's preferred alternative is described.

4.4.1 Passenger Terminal Alternatives – Key Goals, Issues and Considerations

The facility requirements analysis identified several functional components of the passenger terminal that are not performing well resulting in a reduction of passenger levels of service. The following functional components are targeted for improvement through the alternatives assessed herein:

- Expand the inbound baggage claim area to add one baggage claim device to provide additional passenger queue space and raise the level of service.
- Evaluate the feasibility of consolidating the security screening checkpoint to help enhance efficiency for passenger screening and TSA staffing.
- Evaluate the feasibility of incorporating an in-line baggage screening system for outbound baggage.

Resolving these terminal facility issues may have ramifications to other functional areas including circulation and concessions (landside and airside). Thus, technical criteria were developed for the evaluation of each alternative to assess its merits. The technical criteria for evaluation of terminal alternatives are presented in Table 4-2.

Table 4-2
PASSENGER TERMINAL TECHNICAL EVALUATION CRITERIA

Category	Category
Operational Performance	**Environmental Factors**
A. Functional Capability	**A. Environmental**
Adequate Space for Components	Potential Affects to Environmental Impact Categories
Minimal Impact on Existing Structure, Systems, & Space	**Best Planning Tenets**
Capable of Future Forecasted Demand	**A. Ancillary Functions Success**
B. Operational Efficiency	Improves Adjacent Functional Areas
Efficient Use of Space by Function and Users	Provides Spatial Flexibility
Adequate Space for Entry/Egress	**B. Design Standards**
C. User Friendly	Meets Airside Facility Requirements
Improves Workflow and Operational Activities	Supports Airport Strategic Vision
Improves the Passengers Experience	**C. Beyond the Planning Period**
Minimizes Walking Distances for Passengers	Accommodates Development Post Planning Period
Intuitive Paths to Destinations	**D. Feasibility**
Reduces Congestion and Improves Ciculation	Least Impacts on Operations
D. Facility Relocation	Meets Multi-Agency Concurrence
Minimizes the Relocation of Existing Facilities	Accommodates Phaseable Implementation
Fiscal Factors	**Best Sustainability Management Practices**
A. Cost Estimate	**A. Sustainability Goals**
Eligible for PFC & AIP Federal Funding	Supports One or More Sustainability Goals
Total Relative Cost Ranking	Ability to Implement Sustainable Principles into Design

4.4.2 Passenger Terminal Alternatives - Screening Checkpoint

Currently, the Airport features two segregated airplane boarding areas. Each boarding area is served by a separate two-lane security screening checkpoint and passengers cannot transit between the boarding areas without exiting the secure area.

As referred to in **Chapter 1, Existing Conditions**, passengers occasionally pass through the wrong checkpoint and must exit and be re-screened to reach their assigned boarding area. Consolidating the checkpoints into one location would eliminate this confusion in addition to providing additional benefits such as allowing all screened passengers access to any concessionaire located in the secure area. In addition, both the Transportation Security Administration (TSA) and the airport sponsor prefer a single consolidated checkpoint as a means of more efficient utilization of TSA staff and equipment.

Though functional, the existing checkpoints do not meet the security screening checkpoint minimum standards established by TSA in *Checkpoint Design Guide, Revision 3, Transportation Security Administration, March 10, 2011*. The study team's evaluation was coordinated with and reviewed by Airport staff, agencies, and committees.

Figure 4-6 through Figure 4-10 illustrate five alternatives for consolidating the checkpoints. In each illustration, color indicates the proposed enhancements. Refer to Figures 1-8 and 1-9 for the existing terminal configurations in **Chapter 1, Existing Conditions**.

Figure 4-6
***SECURITY SCREENING CHECKPOINTS* ALTERNATIVE No. 1**

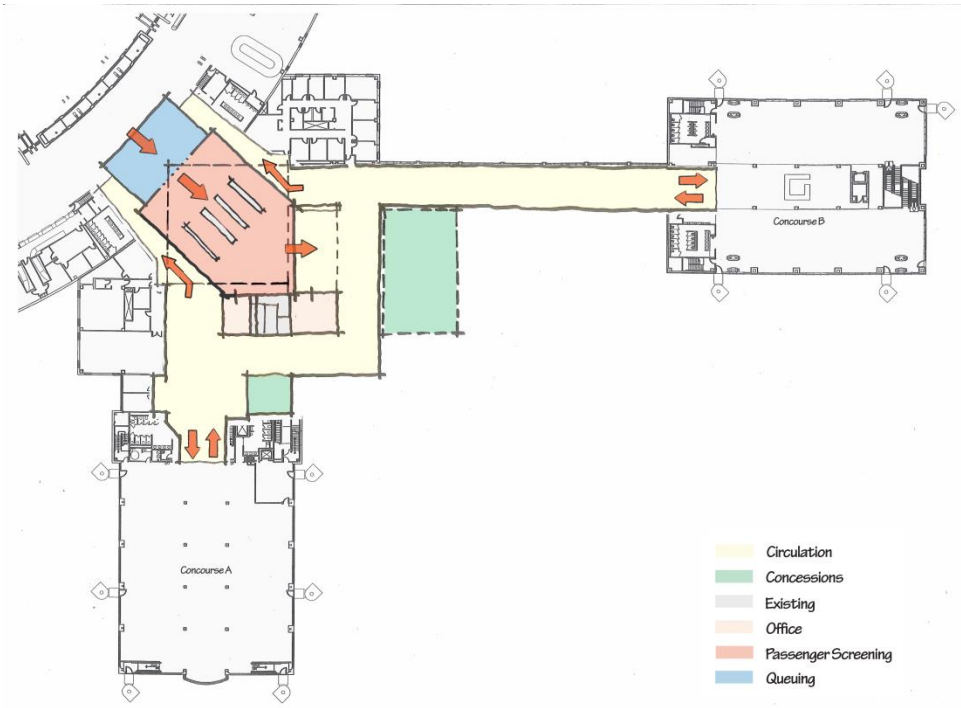


Figure 4-7
***SECURITY SCREENING CHECKPOINTS* ALTERNATIVE No. 2**

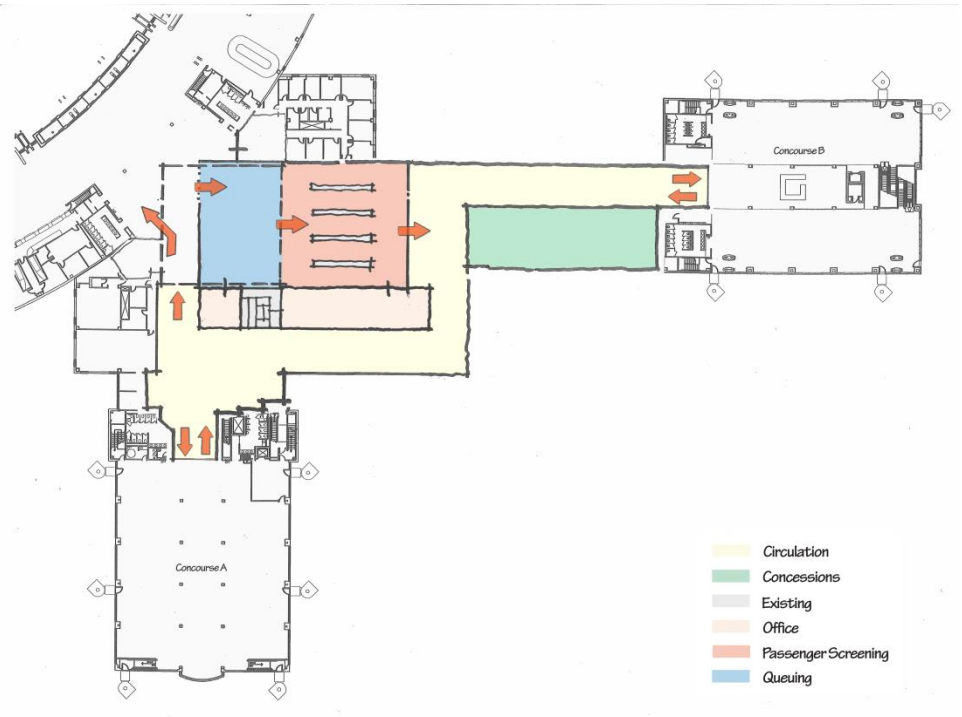


Figure 4-8
SECURITY SCREENING CHECKPOINTS ALTERNATIVE No. 3

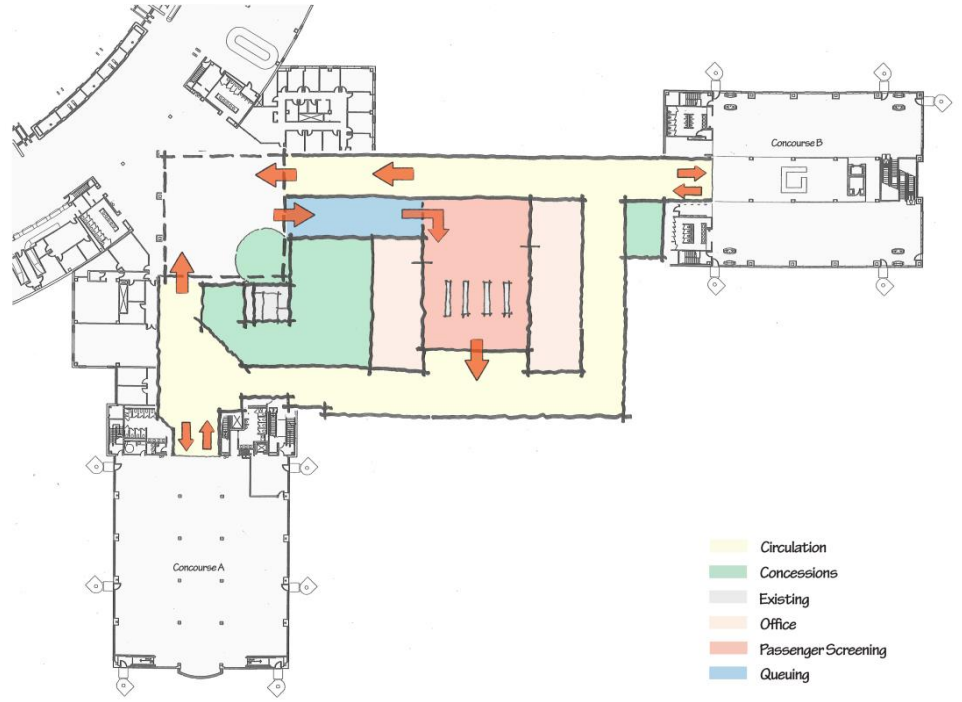


Figure 4-9
SECURITY SCREENING CHECKPOINTS ALTERNATIVE No. 4

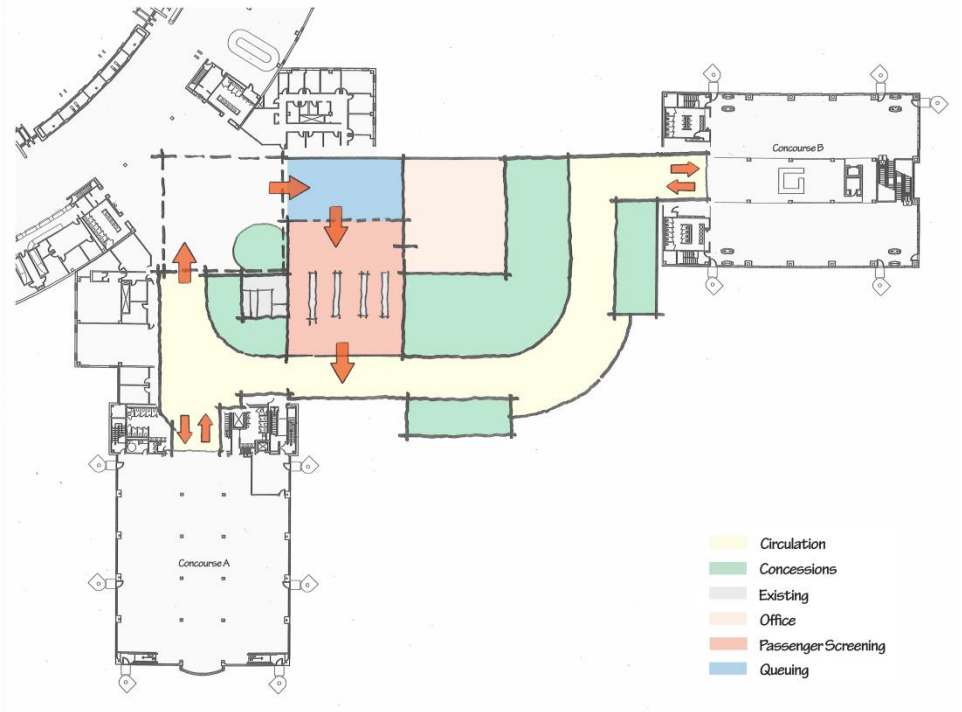
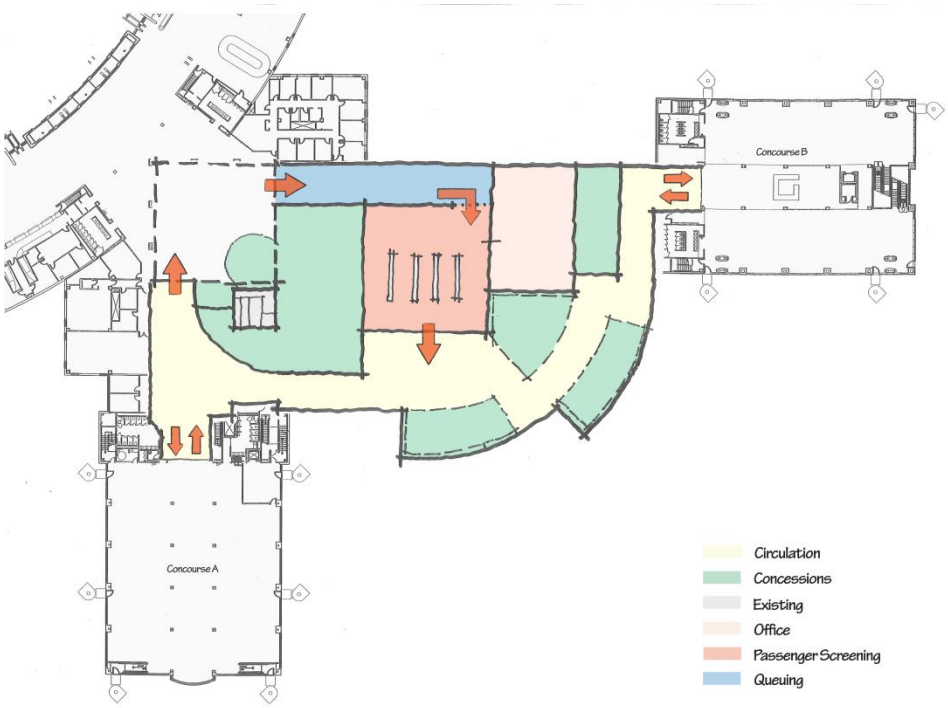


Figure 4-10
SECURITY SCREENING CHECKPOINTS ALTERNATIVE No. 5



Based on the evaluation criteria, the sponsor's decision making, and the collaborative process with the FAA, DOAV, TSA, and the Advisory Committee Meeting held on July 30th 2011, security screening checkpoint Alternative 1, 2, and 4 were removed from further consideration based on the following:

- Alternative 1 places the security screening checkpoint in the existing lobby area under the terminal's pyramidal skylight. This location would push the queuing into the curved circulation spine of the ticketing and baggage claim areas impacting circulation and reducing passenger levels of service and convenience.

- Alternative 2 places the checkpoint in an area currently occupied by a restaurant and kitchen, as well as the deplaning corridor from Concourse B. Relocating the security screening checkpoint to this location would result in passenger queuing in the existing lobby area under the pyramidal skylight. In addition, the proximity of the deplaning zone and the queuing area would create cross-traffic confusion reducing the ease of wayfinding and reducing passenger levels of service and convenience.

- Alternative 4 places the checkpoint in an area currently occupied by a restaurant and kitchen, which would result in the need for relocation of the restaurant and kitchen and the potential elimination of landside food concessions reducing passenger levels of service.

Alternatives 3 and 5 were selected for further evaluation utilizing the technical evaluation criteria. Key conclusions of this analysis are discussed below to present an order of magnitude comparison between the two alternatives.

Operational Performance: How well does each alternative function as part of the terminal system, based on functional capacity, operational efficiency, user friendliness, and facility relocation?

- Both alternatives provide ample security screening checkpoint space for TSA operations.
- Both alternatives accommodate forecast passenger activity levels.
- Both alternatives position passengers, following security, to a central location equidistant from both concourses.
- Both alternatives maintain the existing landside news and gift area.
- Alternative 3 maintains two deplaning corridors that empty into the main lobby space, which is less efficient for TSA staffing.
- Alternative 5 allocates the queuing space that was originally occupied by the access bridge to Concourse B, which will improve the overall phasing of implementation.
- Alternative 3 allows for most of the restaurant and kitchen to remain in its current position, although the northern portion would be reclaimed as part of the queuing area.
- Alternative 5 maintains the location and operation of the existing restaurant and kitchen; all other concessions could remain in their existing location.

Best Planning Tenets: What are the relative strengths and weaknesses of each alternative in regards to best ancillary functions; applicable design and planning guidelines; growth beyond the planning period; and, feasibility?

- Alternative 3 could be expanded into adjacent "soft spaces" (TSA operations and concession space) to the east and west.
- Alternative 5 allows ample room to expand the security screening checkpoint into the east "soft spaces".

- Alternative 3 provides space for additional airside concessions at the throat of Concourse B.
- Alternative 5 allows for significant concessions along the airside circulation path allow for multiple revenue-generating opportunities.
- Both Alternatives 3 and 5 are applicable to a phased approach as the bulk of the construction would be outside the current building envelope.

Fiscal Factors: What is the anticipated implementation cost of each alternative?

- Alternative 3 has an anticipated total project cost of $9,498,000 based on rough order of magnitude cost estimates of a refined concept prepared in February 2012.
- Alternative 5 has an anticipated total project of $10,181,000 based on rough order of magnitude cost estimates of a refined concept prepared in February 2012.

Environmental Factors:

The following identifies the environmental issues of Alternative 3 or 5 that would need to be analyzed in future NEPA documentation.

Alternative 3 or Alternative 5

- Temporary construction impacts such as noise, air quality, secondary impacts (e.g., construction-related jobs) could occur.
- Increase in construction and municipal solid waste could occur during construction activities.
- Change business and economic activity as a result of additional space for concessions, jobs for local residents, and Airport revenue.
- Visually affect the immediate environment; however, the design of either alternative is anticipated to be complimentary to the existing facilities, is expected to not be visually different from the existing Airport environment, and is anticipated to have no visual impact on any offsite resource or land use.

When either alternative is “ripe” for a decision, it is recommended that the appropriate documentation be prepared to fulfill FAA’s NEPA requirement.

Best Sustainability Management Practices:

The following sustainability measures can support sustainability goals for either security screening checkpoint alternative:

- Consider materials (i.e., glass) and systems that promote day lighting.
- Use compact fluorescent lights in place of incandescent lighting.
- Consider use of LED-lit signage.
- Install occupancy sensors to control lighting in areas that are intermittently occupied.
- Coordinate electrical lighting scenarios with daylight strategies.

- Establish a recycling program for liquid filled aluminum or glass containers not permitted through security.
- Provide liquid collection stations at security checkpoints where full beverage bottles and other liquids can be collected and recycled to minimize landfill bound waste. The liquid collection station should be designed to be easily rolled to a mop sink or drain.
- Install hydration stations after security checkpoints so that passengers can refill their beverage containers after dumping out liquids to pass through security.
- Collect liquids banned by the TSA at the security checkpoints and donate unopened items to local charities.
- Use regional materials sourced, produced, and manufactured within 500 miles of the project site.
- Use high-performance glazing and window systems as a means of climate control.
- Reduce overall energy consumption by implementing a policy for Energy Star compliant equipment purchases.
- Conserve water quality by installing low-flow water fixtures.
- Reduce the use of new materials and resources by using Forest Stewardship Council certified wood products and resources.

Chapter 5, Implementation Plan, describes project components within each phase of the PHF CIP and recommended sustainable measures specific to each project.

4.4.3 Passenger Terminal Alternatives - Checked Baggage

The existing checked baggage inspection system at Newport News/Williamsburg International Airport consists of five CT-80 type baggage screening devices distributed among three locations in front of unassigned check-in counters. In addition, there is one trace detection system table associated with each checked baggage screening device.

These machines and their placement are such that they make up a decentralized, low-automation, labor-intensive system that has limited capacity. The presence of bag screening machines in the ticketing lobby interferes with passenger circulation, reduces circulation area, diminishes aesthetics, and generally reduces levels of service for departing passengers with checked baggage. Further, these machines also constrain the ability of the Airport to provide check-in counter positions for new entrants to the market.

Optimal reconfiguration of the baggage screening system would relocate the system out of the ticketing lobby into a high-volume automated in-line configuration invisible to passengers.

Implementation of an in-line baggage screening system occurs in the “back of the house” outside the publicly accessible terminal areas. Outbound baggage is sorted in a “make up” area where baggage is distributed for delivery to its assigned aircraft. Two feasible alternatives have been evaluated to implement in-line outbound baggage screening. Alternative 1, illustrated in Figure 4-11 is a decentralized concept comprised of five mini in-line systems. Alternative 2, illustrated in Figure 4-12 is a medium volume in-line bag screening system.

Figure 4-11
CHECKED BAGGAGE INSPECTION SYSTEM ALTERNATIVE No. 1

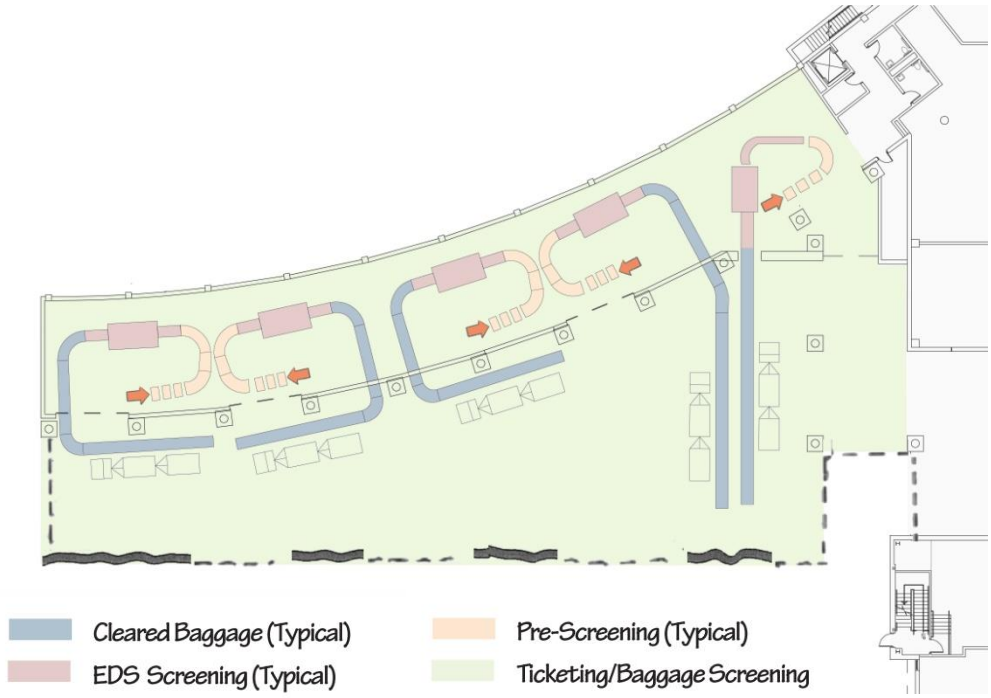
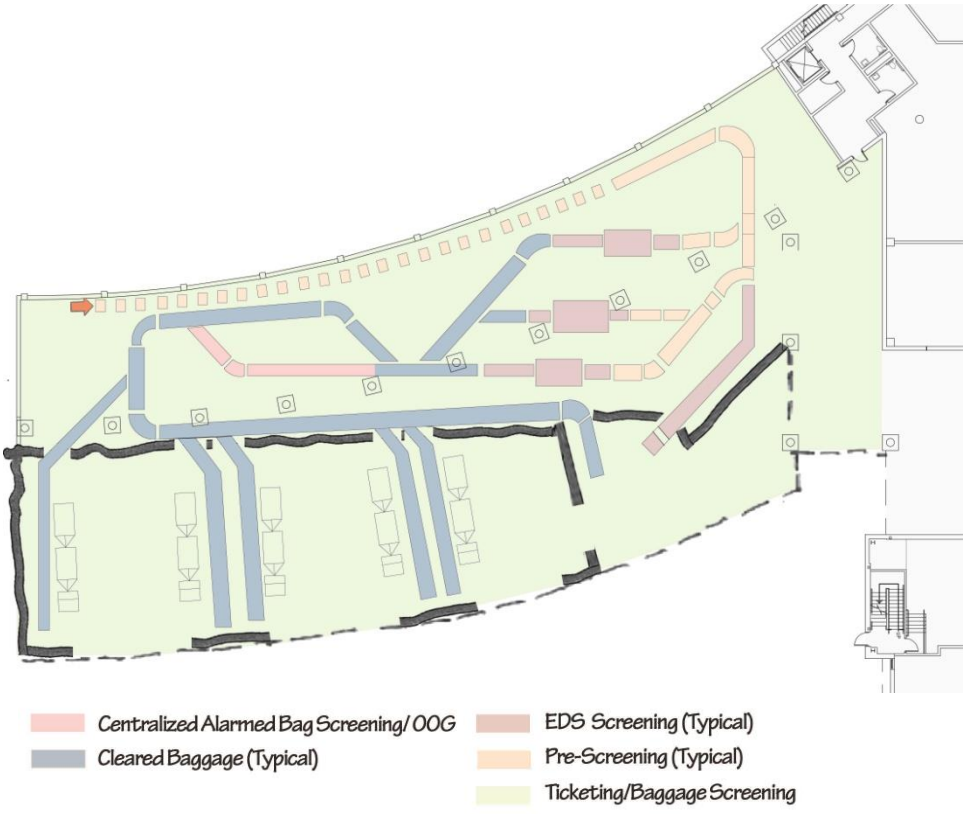


Figure 4-12
CHECKED BAGGAGE INSPECTION SYSTEM ALTERNATIVE No. 2



The alternatives were evaluated against the established criteria, as well as the Airport Sponsor's strategic goals, and with a collaborative process with FAA, DOAV, TSA, and advisory committees. The checked baggage inspection system alternatives selection process identified Alternatives 1 and 2 for further evaluation utilizing the technical evaluation criteria. Key conclusions of this evaluation are discussed below

Operational Performance: How does each system perform based on capacity, operational efficiency, user friendliness, and facility relocation?

- Both Alternatives 1 and 2 allow for staff in the Checked Baggage Resolution Areas to perform both on-screen resolution and explosive trace detection duties to increase efficiency.
- Alternative 2 provides a central location for the Checked Baggage Resolution Areas for on-screen resolution and explosive trace detection operations.
- Alternative 1 may require more TSA staff to operate with higher bag volumes.
- Alternative 1 deposits cleared bags onto separate bag make-up conveyors.
- Alternative 2 deposits cleared bags onto a common belt, and would also require a sortation system on the back side of the screening area to sort bags to the correct outbound pier.
- Alternative 1 would prevent intermingling of bags from different airlines and eliminate the need for automated sortation.

Best Planning Tenets: What are the relative strengths and weaknesses with regard to best ancillary functions; applicable design and planning guidelines; growth beyond the planning period; and, feasibility?

- Both alternatives would require reconfiguration and enlargement of the make-up area to accommodate the larger system.
- Both alternatives have advantages and disadvantages associated with future expansion. However, the complexity of future expansion is dependent on the specifics of future expansion which cannot be known at this time.

Fiscal Factors: What are the anticipated costs of each alternative?

Alternative 1 has an anticipated total project cost of $10,689,000 based on Rough Order of Magnitude Cost Estimates of a refined concept prepared in February 2012.
Alternative 2 has an anticipated total project of $11,608,000 based on Rough Order of Magnitude Cost Estimates of a refined concept prepared in February 2012.

Environmental Factors:

The following identifies the environmental issues of Alternative 1 or 2 that would need to be analyzed in future NEPA documentation.

Alternative 1 or Alternative 2

- Temporary construction impacts such as secondary impacts (e.g., construction related jobs) could occur.

- Increase in construction and municipal solid waste could occur during construction activities.
- There is potential for a visual impact. However, the design of either alternative is anticipated to be complimentary to the existing facilities and is not expected to visually differ from the existing airport environment. Neither alternative is anticipated to have visual impact on any offsite resource or land use.

When either alternative is "ripe" for a decision, it is recommended that the appropriate documentation be prepared to fulfill FAA's NEPA requirement.

Best Sustainability Management Practices:

The following sustainability measures can support sustainability goals for checked baggage alternatives:

- Implement a Phase I ASHRAE Energy Audit.
- Coordinate electrical lighting scenarios with day lighting strategies.
- Use compact fluorescent lights in place of incandescent lighting.
- Use occupancy sensors to control lighting in areas that are intermittently occupied.
- Consider using LED lighting in signage.
- Reduce the use of new materials and resources by using Forest Stewardship Council certified wood products and resources
- Use regional materials sourced, produced, and manufactured within 500 miles of the project site.
- Consider materials (i.e., glass) and systems that promote day lighting.
- Reduce waste and increase efficiency by encouraging a means of automated and remote check-in such as self-boarding and self-document scanning.

Chapter 5, Implementation Plan, describes project components within each phase of the PHFCIP and recommended sustainable measures specific to each project.

4.4.4 Passenger Terminal Alternatives - Baggage Claim

The baggage claim area at Newport News/Williamsburg International Airport consists of two slope-plate baggage claim devices shared by all airlines. The inventory and facility requirements analysis made note of several system deficiencies:

- Passenger flow into, though, and out of the claim area is inefficient and obstructed by the claim units.
- Passengers gathering and waiting in the baggage claim area obstruct the rental car counter queue area and resulting in low levels of service and passenger inconvenience.
- The existing claim devices cannot accommodate forecast demand levels.

- Circulation space in the baggage claim area is insufficient resulting in reduced levels of service for arriving passengers.
- Currently, there isn't a designated Baggage Service Office (BSO). Providing a BSO would improve the customer service experience for arriving passengers.

Two alternatives were developed to meet the facility requirements and improve levels of service for arriving passengers in the baggage claim area. The alternatives vary primarily in their design aesthetic. Alternative 1, illustrated in Figure 4-13 aligns with the rectilinear portion of the terminal that makes up the central lobby space. Alternative 2, illustrated in Figure 4-14 aligns with the curved entry lobby element. The consulting team's evaluation of the two alternatives was coordinated with and reviewed by airport staff, agencies, and committees.

Figure 4-13
BAGGAGE CLAIM ALTERNATIVE No. 1

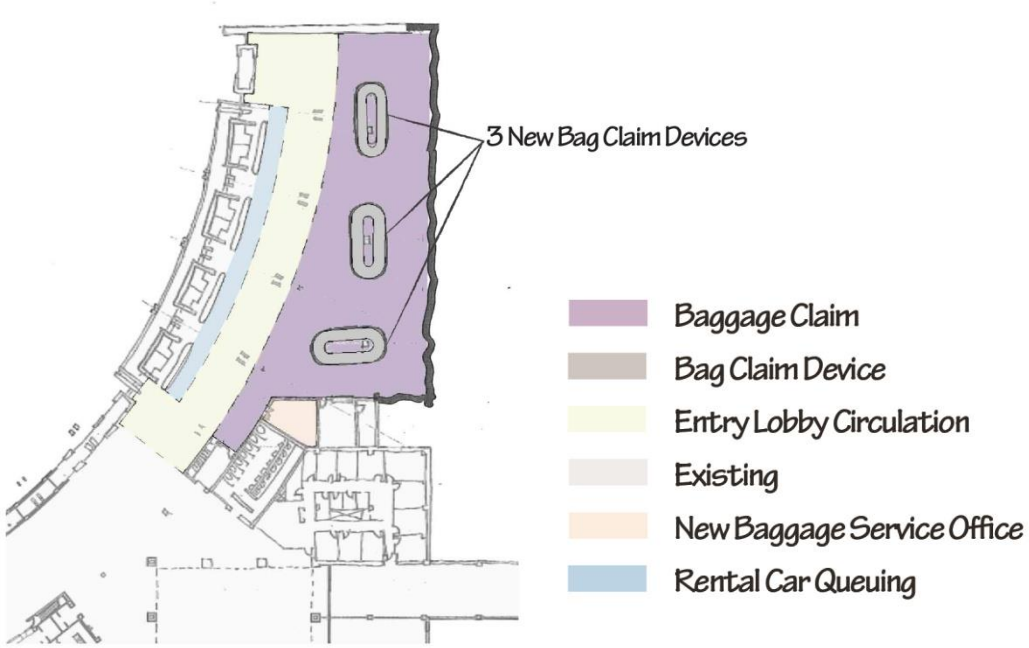
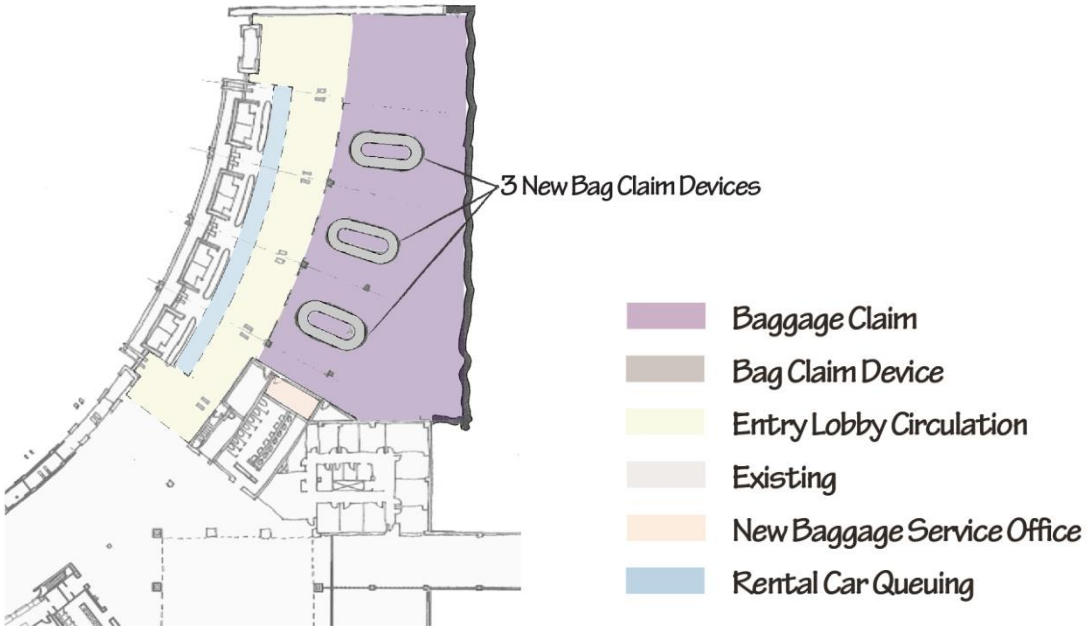


Figure 4-14
BAGGAGE CLAIM ALTERNATIVE No. 2



These two alternatives were evaluated against the established criteria, the Airport Sponsor's decision making, and the collaborative process with FAA, DOAV, TSA, and advisory committees. The baggage claim alternatives selection process identified Alternatives 1 and 2 for further evaluation utilizing the technical evaluation criteria. Key conclusions of this analysis are presented below to support an order of magnitude comparison between the two alternatives.

Operational Performance: How well does each alternative function as part of the terminal system, based on functional capacity, operational efficiency, user friendliness, and facility relocation?

- There is no discernible difference between the two alternatives – both function equally.

Best Planning Tenets: What are the relative strengths and weaknesses of the alternatives with regard for best ancillary functions; applicable design and planning guidelines; growth beyond the planning period; and, feasibility?

- There is no discernible difference between the two alternatives – both equally adhere to best planning tenets.

Fiscal Factors: What are the anticipated project costs?

- Alternative 1 has an anticipated total project cost of $9,188,000 based on rough order of magnitude cost estimates of a refined concept prepared in February 2012.
- Alternative 2 has an anticipated total project of $11,655,000 based on rough order of magnitude cost estimates of a refined concept prepared in February 2012.

Environmental Factors:

The following identifies the environmental issues of Alternative 1 or 2 that would need to be analyzed in future NEPA documentation.

Alternative 1 or Alternative 2

- Temporary construction impacts such as secondary impacts (e.g., construction related jobs) could occur.
- Increase in construction and municipal solid waste could occur during construction activities.

Potential for a visual impact; however, the design of either alternative is anticipated to be complimentary to the existing facilities, would not be visually different from the existing airport environment, and is anticipated to have no visual impact on any offsite resource or land use.

When either alternative is "ripe" for a decision, it is recommended that the appropriate documentation be prepared to fulfill FAA's NEPA requirement.

Best Sustainability Management Practices:

The following sustainability measures can support sustainability goals for terminal baggage claim alternatives:

- Implement a Phase I ASHRAE Energy Audit.
- Implement a policy for Energy Star Compliance with equipment purchases.
- Use Forest Stewardship Council certified wood products and resources.
- Coordinate electrical lighting scenarios with day lighting strategies.
- Use compact fluorescent lights in place of incandescent lighting.
- Use materials (i.e., glass) that allow for day lighting.
- Use occupancy sensors to control lighting in areas that are intermittently occupied.
- Consider use of LED lighting in signage.
- Consider using electronic baggage recovery.

Chapter 5, Implementation Plan, describes project components within each phase of the PHF CIP and recommended sustainable measures specific to each project.

4.4.5 Passenger Terminal Alternatives – Discussion of Sponsor's Preferred

Based upon the technical evaluation of each functional area alternative, the following alternatives are preferred:

- Security Screening Checkpoint Alternative 5
- Checked Baggage Inspection System Alternative 2
- Baggage Claim Alternative 2

Considerations for implementing the recommended improvements to the terminal facility include:

Security Screening Checkpoints Alternative 5

- Implementation phasing is eased if queuing occurs in the space currently occupied by the access bridge to Concourse B.
- The proposed checkpoints deposit passengers to a central location equidistant from both concourses.
- Maintains the location and operation of the existing restaurant and kitchen.
- Keeping the restaurant in its current location would not result in an intuitive wayfinding experience, as the SSCP would be "tucked" behind the restaurant and not in plain view as the passenger rounds the corner from the ticket lobby.

Checked Baggage Inspection System Alternative No. 2

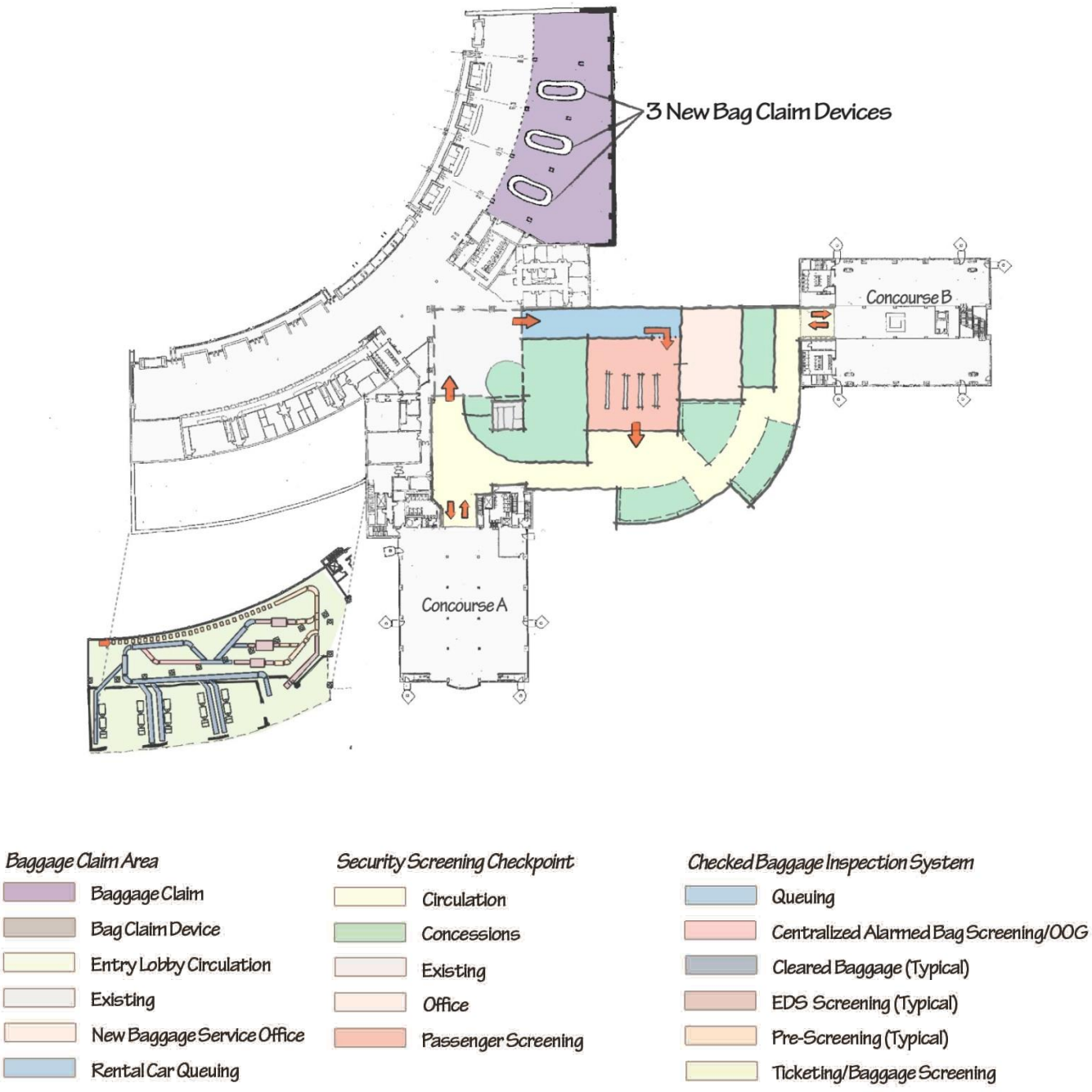
- Bags from all five take away belts would be consolidated onto a single overhead conveyor line along the north wall, at the ceiling of the lower level.
- The common conveyor transports and disperses baggage to three in-line EDS machines for screening.

Baggage Claim Alternative No. 2

- Three bag claim devices would align radially along the curve, centered in the spaces between columns.
- Ample circulation space is provided around each claim unit.
- The claim units would be shifted to the east providing more circulation space for passengers awaiting luggage and maintaining a clear circulation area near the entry lobby portals and rental car queues.
- Baggage Claim Alternative 2 is also anticipated to alleviate some congestion at the curb front by making use of the northern most entry lobby to the baggage claim area more convenient and allowing vehicles to utilize more of the curb front length.
- Implementation of this alternative would occur in phases from north to south. This would allow the existing baggage claim units to remain operational while the new baggage claim units and inbound baggage sortation facilities are constructed.

An illustration of the combined terminal improvements is presented in Figure 4-15**.** Advanced planning of the terminal improvements should follow the master plan study to assess the detailed design and construction requirements.

Figure 4-15
SPONSOR'S PREFERRED PASSENGER TERMINAL ALTERNATIVE



4.5 VEHICLE ACCESS ALTERNATIVES

Airport access from the regional roadway system is an important but somewhat flexible component of the airport system. Access must be provided to the terminal for airline passengers as well as cargo, general aviation, and airport maintenance areas. Vehicle access and circulation at Newport News/Williamsburg International Airport is assessed in this section and two alternatives are presented and evaluated.

4.5.1 Vehicle Access Alternatives - Key Goals, Issues and Considerations

Airport access is important to the viability of airport operations and airport businesses. Reliable and efficient access to the passenger terminal, cargo facilities, general aviation facilities, and commercial and industrial development facilities is important to maintain high levels of customer service and to provide a well-integrated transportation system linking the airways and roadways.

The following are the primary goals and objectives to be met by the vehicle access alternatives. These items were identified through the study process and in coordination with the Sponsor and FAA.

- Evaluate the feasibility of segregating non-airport traffic on the Airport's roadway system to improve access into the Airport and enhance terminal circulation.
- Provide long-term airport access to and from the interstate system.
- Provide for future intermodal/high speed train access.

Each alternative is conceptual in nature using layouts on aerial mapping in order to discern existing land use and physical implications. The technical merits of each vehicle access alternative were evaluated based on the previously presented criteria though modified somewhat to reflect relevance to vehicle access and circulation (Table 4-3).

The primary regional access route to the airport terminal is from Interstate 64 via Jefferson Avenue and Bland Boulevard. The distance from the interstate to the airport terminal is approximately one and a half miles. Both the Interstate and roadway network in the airport area can be congested as Jefferson Avenue is one of the busiest arterial roadways in the region serving a nearby shopping mall, several high-volume "big box" retailers, a business park and residential areas all within a short distance of the Airport.

Bland Boulevard is the main access route to airport property, including the terminal loop road, general aviation, and vehicle parking facilities. Bland Boulevard has way finding deficiencies and congestion issues due to its use by non-airport traffic.

McManus Boulevard is the secondary access road to the Airport. McManus Boulevard starts north of the Airport where it intersects Denbigh Boulevard and travels about one mile southeast, parallel to Jefferson Avenue, until it intersects with the terminal loop road and Bland Boulevard. At times, vehicles become backed up at the stop signs (T- intersection of the airport loop road (Siemens and McManus). The heavy traffic can result in delays for Airport users. The existing terminal loop road is currently accessed off either Bland or McManus Boulevard. The two-way, primarily one-lane road circulates around the short- and long-term parking lots, accesses the general aviation areas, and passes in front of the passenger terminal. There are three stop signs, one stop light, a transition from one-way to two-lane traffic, and merging non-aviation vehicle traffic that drivers must navigate to complete a cycle of the airport loop road.

Table 4-3
VEHICLE ACCESS TECHNICAL CRITERIA

Category	Category
Operational Performance	**Environmental Factors**
A. Capacity	**A. Environmental**
Accommodates Forecasted Activity Levels	Potential Effects to Environmental Impact Categories
Accommodates Direct Access to I-64 and Jefferson Ave	**Best Planning Tenets**
B. Capability	**A. Safety and Security**
Improve Functionality for All Vehicle Traffic	Improves Airport Way Finding for Vehicles and Pedestrians
Reduces Traffic Delays and Conflicts from Local Traffic	Creates a Direct and Clear Route for Vehicle Traffic
Simplifies Vehicles Traffic on the Terminal Loop Road	Provides a Safe and Efficient Pedestrian Route
C. Efficiency	**B. Design Standards**
Segregates Airport Vehicles Traffic from Non-Airport Traffic	Meets Landside Facility Requirements
Minimizes Vehicles Delays and Travel Time	Supports Airport Strategic Vision
D. Facility Relocation	Incorporates Future Intermodal/High Speed Train Access
Minimizes the Relocation of Existing Facilities and Roads	**C. Beyond the Planning Period**
Fiscal Factors	Accommodates Development Post Planning Period
A. Cost Estimate	**D. Feasibility**
Eligible for PFC & AIP Federal Funding	Minimizes Land Acquisition
Least Impact on Operations	Meets Multi-Agency Concurrence
Total Relative Cost Ranking	Accommodates Phase-able Implementation
Best Sustainability Management Practices	
A. Sustainability Goals	
Supports One or More Sustainability Goals	

The terminal loop road is both incomplete and confusing to drivers due to inconsistent street naming and a mixture of dedicated and shared airport access roadways. The complexity of the terminal loop road results in delays, congestion, and driver disorientation. Wayfinding and congestion enhancements include segregation of airport traffic from local roadways and enhanced airport access from the arterial roadways. However, the Airport Sponsor does not have jurisdiction over Interstate-64, Jefferson Avenue or Bland Boulevard. The Sponsor continues to foster cooperative relationships with Virginia Department of Transportation, Hampton Roads Transportation Planning Organization, and the City of Newport News to develop workable road improvements, as well as improvements to bus transit, light rail, and high-speed rail access for airport users.

The study team's evaluation was coordinated with and reviewed by Airport staff, agencies, and committees. The following figures (Figure 4-16 and Figure 4-17) depict a sketch of both Terminal Loop Road, landside access alternatives.

Figure 4-16
AIRPORT ACCESS ALTERNATIVE No. 1

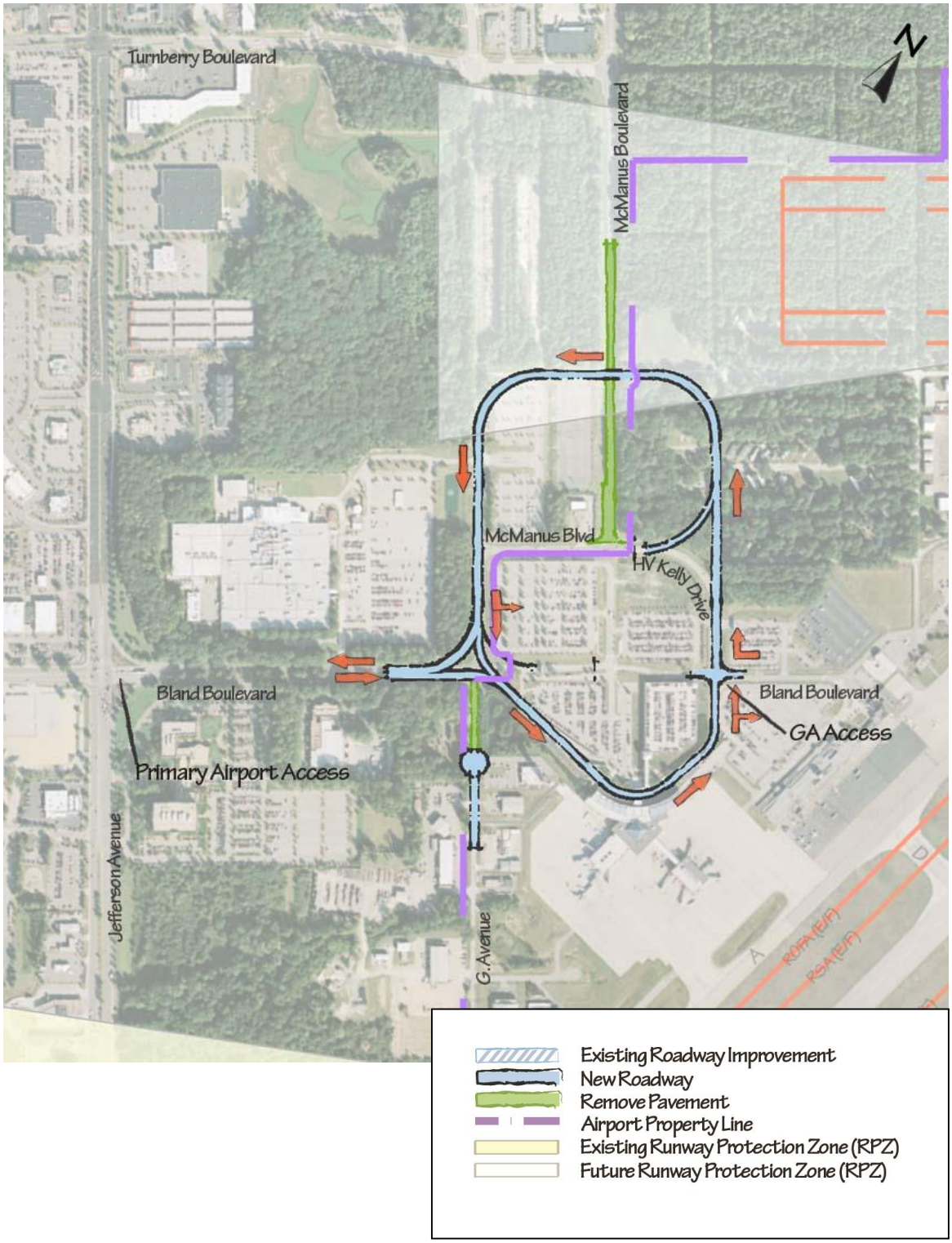
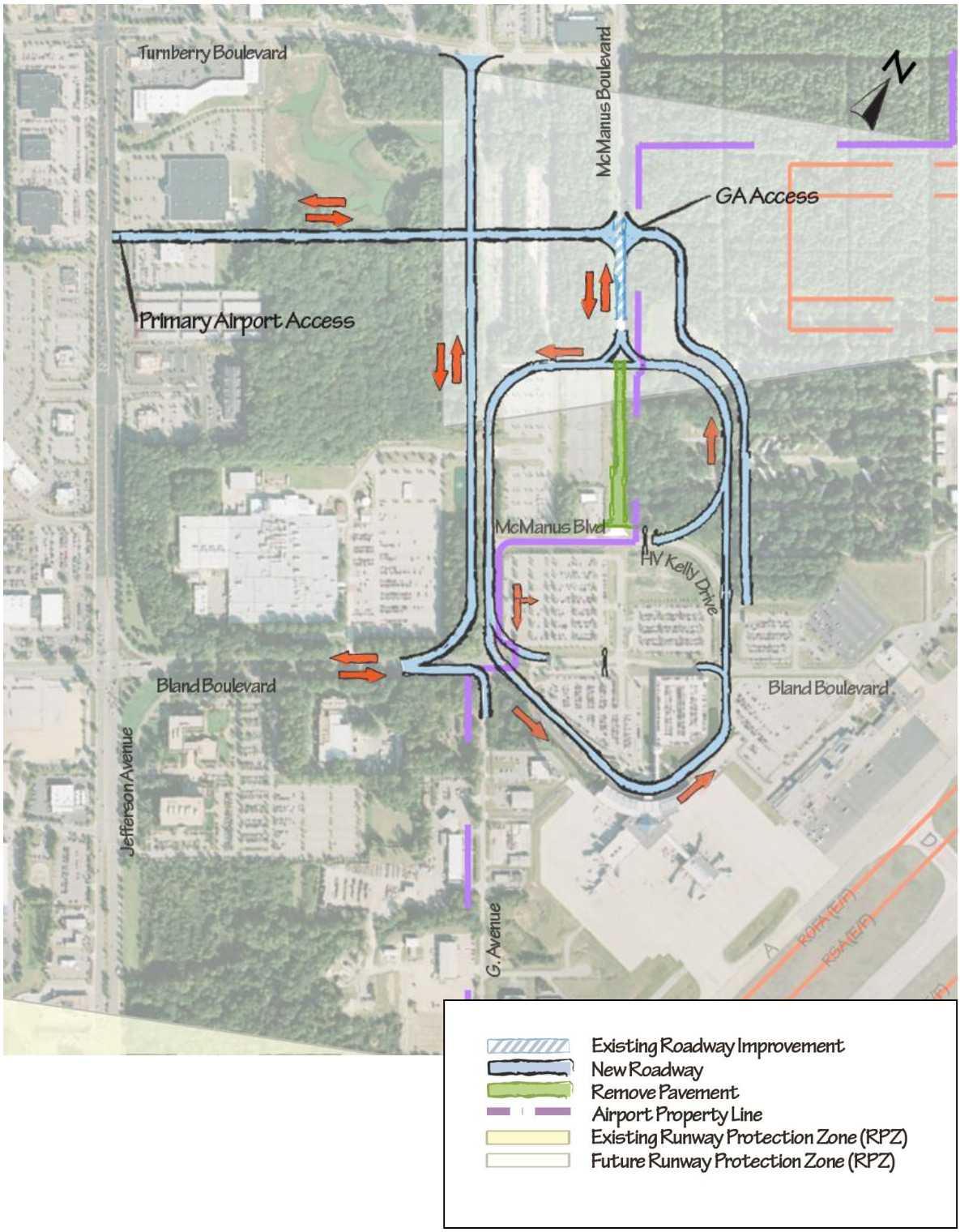


Figure 4-17
AIRPORT ACCESS ALTERNATIVE No. 2



4.5.2 Vehicle Access Alternatives – Two Alternatives for Consideration

Based on an analysis of the alternatives and a collaborative process with the FAA, Virginia Department of Transportation (VDOT), Virginia Department of Aviation (DOAV), City and County officials, and advisory committees, the vehicle access alternatives selection process resulted in two viable alternatives. Key conclusions of this analysis are discussed below to present an order of magnitude comparison between the two alternatives.

Operational Performance: How well does each vehicle access alternative accommodate capacity, operational efficiency, functionality, and facility relocation?

- Each alternative accommodates the forecasted activity levels.
- Alternative 2 is aligned to accommodate a potential connector providing dedicated access to I-64 with a new interchange, while Alternative 1 does not.
- Alternative 1 utilizes Bland Boulevard as the primary access to the dedicated Airport loop road while Alternative 2 utilizes Turnberry Boulevard and McManus Boulevard as the primary access to the dedicated airport loop road.
- Alternative 1 can be implemented without relocating portions of existing roadways and parking lots along McManus Boulevard while Alternative 2 would require more extensive roadway improvements and some impacts to existing landside facilities and parking lots.

Best Planning Tenets: What are the relative strengths and weaknesses of each vehicle access alternative with regard to improving vehicle access; applicable design and planning guidelines; supporting the sponsor's strategic vision for the Airport growth beyond the planning period; and, feasibility?

- Both alternatives accommodate two of the three key facility requirements (functionally improve the loop road, segregate airport and local traffic, and provide for future intermodal access).
- Alternative 2 is compatible with a planned dedicated interchange and connector road to Interstate 64.
- Alternative 1 utilizes more existing pavement, structures, and utilities.
- Though Alternative 2 is more complicated to implement, it would likely be viewed favorably.

Fiscal Factors: What are the anticipated project costs?

- Alternative 1 has an anticipated rough order of magnitude project cost estimate of $11,000,000.
- Alternative 2 has an anticipated rough order of magnitude project cost estimate of $17,000,000.
- Both alternatives would be partially eligible for federal funding.
- Both alternatives would require land acquisition though Alternative 2 would require more land acquisition than Alternative 1.

Environmental Factors:

The following identifies the environmental issues of Alternative 1 or 2 that would need to be analyzed in future NEPA documentation.

Alternative 1 or Alternative 2

- Temporary construction impacts such as noise and air quality could occur.
- Increase in construction and municipal solid waste could occur during construction activities.
- Acquisition of off-airport commercial property resulting in a potential secondary (induced) impact.
- Increase in traffic and a potential decrease in the level of service of area roads could occur.
- Relocation of residents living within the on-airport property mobile home park could occur.
- Potential wetland impacts as a result of clearing vegetation in the area south of Turnberry Boulevard and southwest of McManus Boulevard.
- Separation of airport and commuter traffic on the airport loop road access system could reduce vehicle idling, enhance the movement of vehicles and potentially reduce air quality impacts in the vicinity of the Airport.
- Additional impervious surfaces associated with Alternatives 1 or 2 have the potential to indirectly affect the 100-year floodplain from additional storm water runoff.

When either alternative is "ripe" for a decision, it is recommended that the appropriate documentation be prepared to fulfill FAA's NEPA requirement.

Best Sustainability Management Practices:

Both Alternative 1 and Alternative 2 can support the following sustainability initiatives:

- Reduce energy consumption through the use of solar energy powered roadway information signs.
- Reduce energy consumption and increases roadway efficiency by adopting a transit-first policy that prioritizes investments, design, and promotion of high-occupancy vehicles (HOV), lanes, and facilities before single-occupancy vehicles (SOV).
- Encourage reduced fuel consumption by providing preferred parking incentives for alternative fuel vehicles.
- Reduce material use by using at least 25% recycled aggregate in cement or asphalt bound pavement materials.
- Reduce material use by using excess asphalt paving to fix surrounding roads, drives, parking lots, etc.
- Reduce the heat island effect by using pavement materials that have a high solar reflectance index (SRI) of at least 29.
- Reduce runoff by installing permeable pavement for roadways, shoulders, non-traffic pavements, maintenance roads, utility yards, and airside and landside parking facilities, where possible.
- Reduce energy consumption by using high pressure sodium (HPS) lamps instead of metal halide (MH) lamps as streetlights; HPS lamps produce more lumens per watt, have less

mercury content per lamp, and have a greater average rated life expectancy than MH lamps.
- Increases efficiency by operating satellite 'check-in' facilities (downtown and suburban locations) to minimize congestion on terminal access roads.

Alternative 1 supports the following sustainability initiatives:
- Reduces runoff by modifying existing roadway design without adding a significant amount of new impervious surfaces when compared to the other alternative.
- Reduces the project footprint by requiring the least amount of greenfield development when compared to the other alternative.
- Reduces material use by requiring the least amount of materials when compared to other alternatives.
- Reduces polluted runoff by requiring the least amount of ground disturbance when compared to other alternatives.

Alternative 2 supports the following sustainability initiatives:
- Increases alternative transportation ridership by providing direct transit access to an existing - or planned and funded - commuter rail or subway/elevated train station (within 0.5-mile).
- Reduces fuel use by integrating multiple access routes into the Airport and reducing potential for traffic congestion on Jefferson Road.
- Reduces fuel consumption by separating airport and commuter traffic on the airport loop road access system, which reduces vehicle idling, and reduces the potential for congestion.
- Increases ridership of alternative transportation through communication with local and regional transit authorities to advance multiple transit connection opportunities.
- Integrates existing state, regional, and local transportation plans for the advent of additional modes of transportation, particularly transit rail.
- Increases alternative transportation ridership by providing a centralized intermodal ground transportation center.
- Increases alternative transportation ridership by providing employees and passengers with directions to public transportation facilities.
- Reduces fuel consumption and alternative transportation ridership by communicating with local and regional transit authorities to advance multiple alternative transit connection opportunities.
- Reduces energy consumption through the promotion of more efficient alternative transportation that serves the Airport.
- Reduces pollutant emissions by providing means for participation in the FAA's Voluntary Airport Low Emissions Vehicle Program (VALE), which include funding for intermodal connections.
- Reduces energy consumption and increase roadway efficiency by developing more integrated uses of alternative transportation systems.

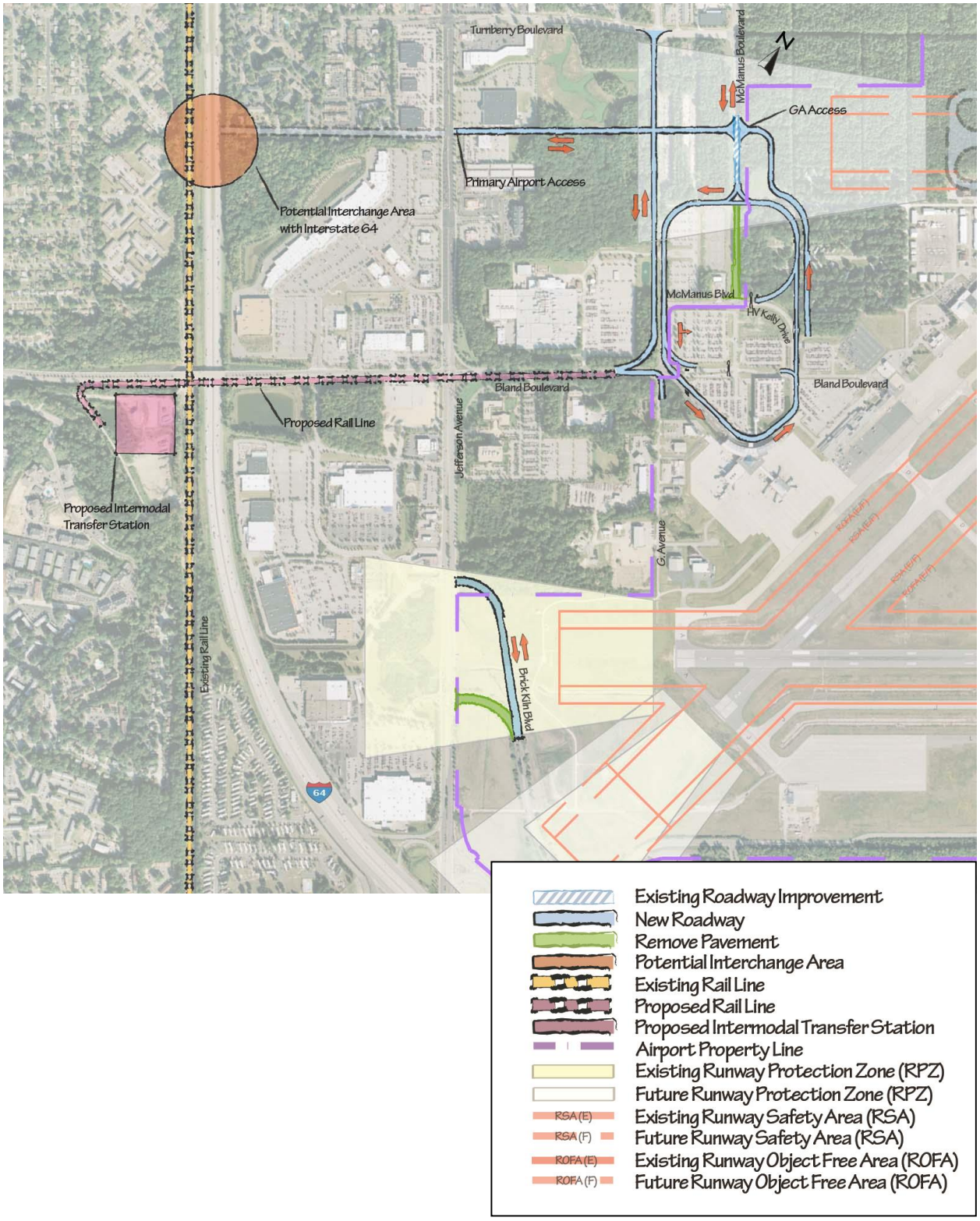
Chapter 5, Implementation Plan, describes project components within each phase of the PHF CIP and recommended sustainable measures specific to each project. From this evaluation and further input by the advisory committees, Airport Board, DOAV, FAA, Alternative 2 was identified preferred landside alternative.

4.5.3 Vehicle Access Alternatives - Discussion of Sponsor's Preferred

Based upon the previous technical evaluation, Alternative 2 (McManus Boulevard Access) is recommended as the vehicle access alternative to carry forward into the Airport Capital Development Plan, as part of the next phase of this Airport Master Plan.

The key components of this alternative include modifying the terminal loop roadway system to improve functionality and intuitive way finding and creating the potential for direct access to I-64 and Jefferson Avenue. This would reduce airport user and non-user traffic delay and create a completely segregated, simplified one-way terminal loop road. Provisions for future intermodal access to the Airport and passenger terminal should also be considered. Figure 4-18 illustrates the following recommended improvements for the Vehicle Access Alternative 2.

Figure 4-18
SPONSOR'S PREFERRED VEHICLE ACCESS ALTERNATIVE



4.6 ANCILLARY FACILITIES AND LAND USE

Ancillary facilities include all remaining essential facilities to support the operation of the Airport including general aviation (GA) facilities, cargo facilities, as well as maintenance and operations facilities. They are discussed within the context of land use because GA and cargo facilities are often developed by private investors on land leased from the Airport Sponsor. It is, therefore, the sponsor's responsibility to identify appropriate locations for GA and cargo facility development and preserve lands for future development by third parties.

Further, the facilities requirements analysis determined that the existing GA area can accommodate additional hangar development including the forecast GA and cargo demand through the 20 year planning horizon. It remains, however, a part of the Peninsula Airport Authority's strategic vision and Airport staff's preference to identify additional airport land that would be attractive to GA and cargo facility investors should they materialize. This approach is advisable and consistent with sustainability practices as noted earlier because it helps encourage compatible land use and mitigates the potential for future land use conflicts.

The remainder of this section presents the recommended land use and development plan as determined through the land use development study and the sponsor's strategic vision. A plan for GA development is presented first then followed by a cargo development plan. Because there is an immediate GA and cargo expansion needed, conceptual alternatives are presented and assessed below.

4.6.1 General Aviation Development Plan

Existing GA facilities are located in two areas at Newport News/Williamsburg International Airport.

- The main GA area is located north of the air carrier terminal area along Taxiway A and its primary axis runs parallel to Runway 2/20. The area includes a fixed base operator, flight school, and recreational general aviation aircraft within small box hangars and T-hangar units. This area is well developed though portions of the apron are in poor condition.
- The airport also has two large apron areas known as the South Corporate Apron located along Taxiway J in the south portion of the Airport. The South Corporate Apron currently accommodates Orion Air Group which maintains a hangar that was constructed in January 2011 along the apron's west side.

As mentioned above, GA facility alternatives were not prepared for assessment because the Airport's existing GA areas are capable of accommodating forecast growth. However, the Master Plan does identify areas better able to serve the needs of differing types of GA and it establishes areas that should be prioritized for development. The facility requirements analysis established a need for 43 total hangars by 2032 to accommodate general aviation demand. This total includes five replacement hangars and 10 new hangars. The analysis further details the need to replace three small existing conventional hangars and two existing 10-unit T-hangars, while adding nine large conventional hangars and one new 10-unit T-hangar. With these new and replacement facilities there would be a total of 21 small conventional hangars, 17 large conventional hangars,

and five 10-unit T-hangars for a total of 43 hangars. Future GA development at the airport should occur in the following three areas:

- Main GA Area – The main GA area should continue to serve as the primary location for existing GA facilities with a focus on privately owned aircraft, flight schools, and small aircraft hangar storage. Though these facilities could be constructed in the main GA area, it is the desire of airport staff to see the main GA area converted to future commercial development, while existing GA facilities are relocated to the midfield area. The midfield area would also accommodate new GA development and the expansion of support facilities, as necessary.

- South Corporate Apron – The South Corporate Apron area remains the Sponsor's desired location for the development of new facilities to serve corporate and large GA aircraft. The existing aprons are appropriately sized to serve larger corporate GA aircraft including Group III aircraft such as the Gulfstream G-550 and Boeing Business Jet. Landside access to this area is provided from Interstate 64 via Jefferson Avenue, Brick Kiln Boulevard, and Providence Boulevard. The facility requirements analysis identified a need for nine new large conventional hangars. Though these facilities could be constructed in the main GA area, it is the desire of Airport staff to see large hangars constructed adjacent to the South Corporate Apron to better segregate corporate GA and recreational GA activity.

- Midfield Area – The airport's midfield area is the undeveloped portion of the airport that is situated between the two runways. This greenfield site has been identified by Airport staff as a desirable location for future development of small GA (Aircraft Design Group II and smaller) facilities that primarily serve recreational GA. The site would be accessible from Oriana Road and is planned to accommodate single and multi-engine aircraft, auto parking, and infrastructure and utilities. In order to provide a basic assessment of the site, a preliminary site plan was prepared to assess scale and access and is illustrated in Figure 4-19. The plan provides a mixture of small box and T-hangars located on two separate aprons east of the approach end of Runway 20. The combined aprons would include approximately 30 acres of new pavement surface with five 10-unit T-hangar buildings and 21 small conventional hangars. The design and placement of the proposed T-hangars can be swapped with groupings of small box hangars should market conditions warrant. The site would be capable of supporting the ADG I and II aircraft forecast within the planning period. Airside access to the area would be via a new taxiway parallel to Runway 2/20. Advantages of future development in this area include:

    - It contributes to the Sponsor's goal of segregating recreational and business/corporate GA users.
    - It provides a development opportunity within both the City of Newport News and also York County which may have benefits for aircraft owners.
    - No additional airport property is required to accommodate the proposed development option.
    - Once an initial development phase occurs, the remaining portions can be developed in smaller phases as demand dictates.
    - It provides additional development opportunities beyond the planning period.
    - Poor drainage and pavement conditions within the existing GA area will require substantial pavement overhaul and reconstruction efforts.
    - Pavement rehabilitation within the existing GA area would require lengthy and costly phasing compromises to maintain the facility's operation during construction.

The following environmental and sustainability management factors should be considered in evaluating the development of general aviation facilities.

Environmental Factors:

The following identifies the environmental issues of the general aviation facilities that would need to be analyzed in future NEPA documentation.

- Temporary construction impacts such as noise and air pollutant emissions could occur.
- Increase in construction and municipal waste could occur during construction activities.
- A potential increase in impervious pavement could result in the need for FAA compliant drainage improvements to accommodate additional storm water runoff.
- Additional impervious surfaces within the Harwood's Mill Watershed Protection Area could create a potential effect on water quality.
- A potential impact to known wetlands could occur.
- A positive secondary (induced) impact could occur because of an increase in the potential for generating additional revenue for the Airport.
- A visual impact could occur; however, the facility is anticipated to be complementary with the existing design of the airport.

When implementation of ancillary facilities is "ripe" for a decision, it is recommended that the appropriate documentation be prepared to fulfill FAA's NEPA requirement.

Best Sustainability Management Practices:

The following sustainability measures can support sustainability goals for ancillary facilities and land use alternatives:

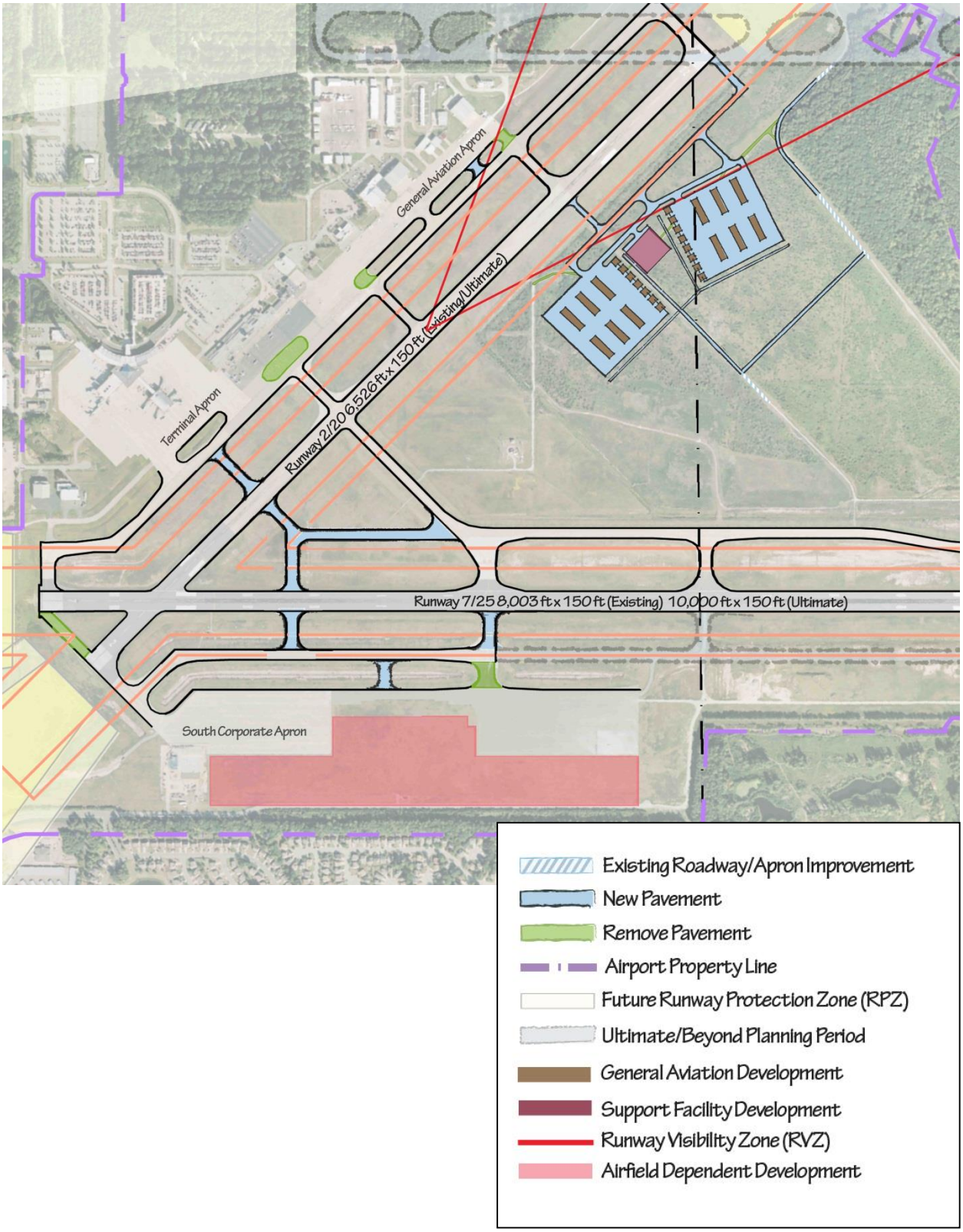
- Minimize areas of ground disturbing activities and leave vegetation intact when feasible.
- Locate material stockpile areas and lay-down areas in locations that will be disturbed or paved as part of construction.
- Bus construction employees into the construction site to reduce security checkpoint delays (and reduce emissions from individual riders and vehicle idling).
- Require the contractor(s) to develop a plan to protect existing vegetation during all construction activities to maintain existing tree and vegetation population.
- Protect vegetation from damage due to run-off or spillage during mixing and placement of construction materials.
- Relocate native vegetation, recycle and chip vegetated debris for landscaping purposes.
- Recycle metals, plastics, glass and paper resulting from construction and demolition (C&D) activities.
- Store, donate or recycle excess aggregate from C&D waste.
- Use C&D solid concrete waste to slow water velocities at drainage outfalls.

- During construction, ensure that the specified recycled content materials are used and quantify the total percentage of recycled content materials installed.
- Consider materials (i.e., glass) that allow for day lighting.
- Install metering/monitoring devices and energy management control systems.
- Encourage vegetative roofing.
- Coordinate electrical lighting scenarios with day lighting strategies.
- Use occupancy sensors to control lighting in areas that are intermittently occupied.
- Incorporate renewable energy sources into new construction.
- Use Forest Stewardship Council Certified wood products and resources.
- Use compact fluorescent lights or LED lights.
- To prevent erosion, minimize the extent and duration of bare ground surface exposure.
- Xeriscape, plant native flora, and avoid planting toxic exotics.
- Chip heavy vegetation for use in landscaped areas as mulch, compost vegetation and grass clippings.
- Leave vegetation intact when feasible.
- Plant drought-resistant vegetation that does not attract wildlife.
- Implement stormwater management practices during and after construction.
- Consider the use of automatic low-flow faucets and aerators in bathroom.
- Reduce the use of potable water by using reclaimed water and stormwater runoff for irrigation during the construction phasing.

Chapter 5, Implementation Plan, describes project components within each phase of the PHF CIP and recommended sustainable measures specific to each project.

In summary, Newport News/Williamsburg International Airport has sufficient existing acreage within areas already identified for GA development to meet forecast growth in GA demand. However, this master plan establishes a land use plan that prioritizes GA development in three areas by type. The midfield area is identified to help the long term migration from the existing main GA area to allow for its long term redevelopment to serve a growing commercial airline market, air cargo market, and aviation related development. The plan will help the Airport maintain compatible land uses, enable long term lease commitments, and encourage development in areas with appropriate land side access, which together help the airport's environmental and financial sustainability.

Figure 4-19
GENERAL AVIATION MIDFIELD DEVELOPMENT SITE PRELIMINARY PLAN



4.6.2 Air Cargo Development Plan

Newport News/Williamsburg International Airport does not presently accommodate scheduled air cargo operations and does not have dedicated facilities for air cargo operations. The aviation activity demand forecast did not identify the development of future demand for air cargo. However, there are several mitigating circumstances in the region that could result in a relatively rapid change in the Airport's role in regional air cargo demand. The intent of the master plan is to prepare the airport for the potential emergence of demand for integrated carrier operations (e.g. FedEx or UPS) and provide a thoughtful evaluation of how and where air cargo should be accommodated with minimal impact on existing airport users.

As presented in *Chapter 3, Facility Requirements*, the Sponsor should identify a location to develop a moderately sized facility capable of package distribution. A midsize package distribution center would include the following elements:

- A sorting building approximately 80,000 square feet, designed to process up to 15,000 packages per hour.
- An aircraft apron approximately 520,000 square feet, designed to accommodate three Aircraft Design Group (ADG) IV aircraft (e.g. Boeing 767) or smaller.
- A security restricted semi-truck parking lot approximately 120,000 square feet, designed for loading and unloading packages.
- A vehicle parking lot approximately 70,000 square feet, designed to accommodate the facilities' employees.

Landside access to cargo facilities is also essential as these facilities generate substantial truck trips and employee trips to and from the facility. Landside needs include:

- Semi-truck vehicle access to and from Interstate 64.
- Access to the air cargo facility should not conflict or interrupt passenger vehicle traffic to and from the passenger terminal.
- Adequate space must be preserved for future passenger terminal expansion, which includes the terminal building, parking facilities, and vehicle loop road.

The redevelopment of a portion of the primary general aviation area north of the air carrier apron is considered the preferred location for the future air cargo facility. A preliminary site plan was prepared to assess scale and access considerations for a midsize package distribution center and is illustrated in Figure 4-20.

The preliminary plan includes a sorting building, aircraft apron, and a secure semi-truck parking lot perpendicular to Runway 2/20 and adjacent to the area preserved for future passenger terminal expansion. This segregated apron would include approximately 11.5 acres of new/improved pavement surface and accommodate three ARC C-IV aircraft simultaneously. The design allows for the use of existing infrastructure and roadway systems. The placement of the proposed air cargo facilities allows for vehicle access to and from Interstate 64 without interfering with passenger vehicle traffic on the terminal loop road. The selected site provides the following advantages:

- This location will allow for uncomplicated access to the interstate and allows for highly compatible landside on-airport development opportunities.
- The pier layout provides the best potential for effectively utilizing the existing infrastructure including vehicle access, utilities, and smooth operational flow of aircraft.
- This location is centrally located between Runway 7/25 and the ultimate Runway 7L/25R and it has direct access to Runway 2/20.
- This design accommodates a segregated aircraft ramp and a secured semi-truck loading and unloading parking lot.
- No additional airport property is required to accommodate the proposed development option.

The following environmental factors and sustainability management practices should be considered in evaluating the development of air cargo facilities.

Environmental Factors:

The following identifies the environmental issues of the air cargo development that would need to be analyzed in future NEPA documentation.

- Temporary construction impacts such as noise and air pollution emissions could occur.
- Increase in construction and municipal waste could occur during construction activities.
- A positive secondary (induced) impact could occur because of an increase in the potential for generating additional revenue for the Airport.
- A visual impact could occur; however, the facility is anticipated to be complimentary with the existing design of the Airport.
- A potential socioeconomic impact could occur as a result of increased surface transportation traffic associated with the cargo facility and a potential decrease in the level of service of area roads.

When the air cargo development is “ripe” for a decision, it is recommended that the appropriate documentation be prepared to fulfill FAA’s NEPA requirement.

Best Sustainability Management Practices:

The following sustainability measures can support sustainability goals for the construction and operation of cargo facilities:

- Promote sustainable initiatives by tracking and reporting sustainable achievements, quantities, and innovations.
- Re-route materials from landfills by recycling aluminum; glass; plastics, paper, newspapers, magazines; phone books and corrugated cardboard.
- Reduce energy consumption by implementing a policy on energy star compliance with equipment purchases.
- Promote the use of renewable resources through the use of Forest Stewardship Council Certified wood products and resources.

- Reduce energy consumption by using LED lighting for signage.
- Promote water and energy conservation through the use of meters and sub-meters to identify potential leaks and to identify what systems consume the most water and energy.
- Reduce energy consumption through the use of compact fluorescent lights in place of incandescent lighting.
- Reduce energy consumption and increase occupant comfort by considering materials (i.e. glass) that allow for day lighting.
- Reduce water consumption through the use of automatic low-flow faucets and aerators in bathrooms.
- Increase indoor and outdoor air quality by working with tenants in privately leased spaces (such as cargo) to designate non-smoking areas.
- Improve indoor air quality by installing trickle ventilators in cargo facilities (small 'openers' concealed within a window or curtainwall's horizontal members), allowing fresh air to 'trickle' into the building and providing natural ventilation without the need for operating windows or sliding doors.
- Reduce energy consumption by installing relief vents or operable skylights in cargo and other applicable facilities to provide stack effect natural ventilation.
- Reduce the potential for air pollution by identifying efficient construction scheduling and operations to mitigate air emissions.
- Reduce material and energy consumption by re-using existing facilities.
- Reduce the potential for polluted runoff by installing temporary fencing during construction.
- Reduce the potential for ground disturbance and contamination of environmentally sensitive areas by emphasizing environmentally and socially sensitive areas to construction workers. Flag or otherwise mark all areas not to be disturbed by construction.
- Reduce the potential for polluted runoff by requiring hydroseed or fast-growing vegetation on disturbed areas.
- Reduce the potential for polluted runoff and dust emissions by constructing stabilized construction entrances on level ground where possible. Grade the entrance to prevent runoff from leaving the construction site and provide ample turning radii.
- Reduce consumption of potable water resource by use non-potable water or graywater for irrigation of landscaping on construction sites.
- Reduce the potential for ground disturbance and contamination of environmentally sensitive areas by requiring contractor(s) to develop a plan to protect existing vegetation during all construction activities. Attempt to maintain existing topography, terrain, and tree and vegetation population.

Figure 4-20
CARGO DEVELOPMENT OPTIONS