Chapter 6
Alternatives Analysis

6.0 INTRODUCTION

This section presents potential airside and landside alternative development scenarios based upon the facility requirements identified is Chapter 5 *Facility Requirements*. The alternatives analysis process is based upon a three step process: 1) development of individual airside and landside alternatives; 2) comparison of alternatives based upon a defined set of evaluation criteria; and 3) a qualitative assessment to identify the best possible development option. The evaluation criteria used in this analysis are presented below and followed by the development of both airside and landside development options.

6.1 EVALUATION PROCESS AND CRITERIA

The process for developing and evaluating the alternatives is a three step process. The first step is to develop alternatives based upon facility needs as outlined in Chapter 5 *Facility Requirements*. The second step was to develop evaluation criteria upon which a comparative assessment of the alternatives can be accomplished. The third step is to complete a qualitative assessment to identify the preferred alternative. The process is described in more detail below.

A range of alternatives were developed for each facility. The facility requirement recommendation for each set of alternatives is reiterated and key considerations to develop the alternatives are also noted. In most cases, there were several alternatives that were developed, but the viability one or several of the possible alternatives were limited. As such, the discussion describing the development of alternatives will note the possible alternatives that were developed and dismiss those alternatives that are not viable. In this way, the next step in the process is focused on realistic alternatives that can be brought forward to further assess.

The evaluation criteria were developed in consultation with Buffalo Niagara International Airport (BNIA) staff. Six evaluation factors were identified and cover financial, environmental and facility needs and include the following:

Facility Requirements - The proposed solution in each alternative will be evaluated for the degree to which it meets the necessary facility requirements.

Safety and Standards - Safety is a key component in the operation of an airport, covering items from preventing runway incursions to protecting pedestrians in the terminal area. Elements that provide enhanced safety and meet applicable design standards will be evaluated favorably.

National Environmental Policy Act (NEPA) - With the goal of streamlining the planning and NEPA process alternatives will identify the appropriate NEPA categories and applicable key issues with the project. The impacts and consequences of the proposed projects on the airport will be evaluated. Favorable consideration will be given to projects that avoid or minimize the effect of the airport on the surrounding environment.

Financial Feasibility - Airport development projects have the ability to be costly and complex. The financial feasibility and funding eligibility will be assessed in the evaluation of airport alternatives. Measures such as payback period and revenue generation/loss will be key considerations for determining the financial feasibility.

Constructability - Large projects on the airport have the potential to disrupt the normal flow of activity on both the airside and landside areas. The operational impacts and the ability to phase projects will be assessed in the evaluation of airport alternatives.

Sustainability - One of the key goals in completing a Sustainable Master Plan is to review and identify opportunities to implement a sustainable practice or introduce a sustainable design into a project. **Appendix E** in this report will identify sustainable opportunities achievable within the preferred alternative conducted in this analysis. The sustainable review will identify opportunities to incorporate sustainable ideas. Elements within sustainability to be evaluated include:

- Building Efficiency
- Airfield Operations
- Landside Vehicles/Parking
- Waste Management/Recycling
- Water Quality
- Social Responsibility/Environmental Stewardship

The third and final step is a qualitative assessment of the alternatives compared to the No-Build Alternative and among the various alternatives that were developed for each facility. The purpose of the No-Build alternative is to provide a baseline upon which to evaluate the benefits and potential impacts of the various alternatives. Selecting the recommended alternative is derived by selecting an alternative which provides the greatest benefit at a reasonable cost and minimal impacts to the environment.

In the next sections, both airside and landside alternatives are developed and assessed against these six evaluation factors.

6.2 AIRSIDE ALTERNATIVES

This section presents and evaluates alternatives for improvements to runways, taxiways, navigational aids (NAVAIDS), and instrument approaches. Alternatives recommended for implementation will be included in the Airport Layout Plans (ALPs) and the Facilities Improvement Plan.

6.2.1 Runways and Runway Safety Areas

Facility Requirements and Key Considerations

The conclusion of the runway length analysis presented in Chapter 5 *Facility Requirements* was that the existing runway system at BNIA is adequate to meet existing and projected operational requirements throughout the study period. The safety areas surrounding the existing runways currently meet FAA standards through a combination of displaced thresholds in conjunction with declared distances. However, this section examines whether any further increases in runway length and/or safety area improvements could be made in lieu of the current displaced thresholds and declared distances.

Alternatives Reviewed but not Considered

Two alternatives were reviewed, but not considered for further analysis. These include the construction of standard Runway Safety Areas (RSAs) and changes to landing threshold locations.

FAA design standards specify a RSA width of 500 feet and a length that extends 600 feet prior to the landing threshold and 1,000 feet beyond the runway end for runways serving aircraft in approach categories C and D. This includes typical commercial service aircraft that use BNIA such as the Boeing 737 and the Airbus A320.

There is not sufficient land within the existing airport boundary to provide standard RSA lengths at the end of the existing runways due to the proximity of adjacent off-airport roads and structures. Building compliant RSAs within the existing property would effectively reduce runway length. Further, construction of standard RSAs beyond each end of the existing runways would require property acquisition and the relocation of existing businesses, residences, and numerous roadways, as well as significant amounts of infrastructure. For these reasons, the construction of standard RSAs beyond the ends of the existing runways at BNIA is seen as a cost effective or feasible strategy. Consequently, this alternative was not considered.

The current use of declared distances at BNIA provide 1,000 feet of equivalent RSA prior to the landing threshold on each runway, yet the current FAA design standard requires only 600 feet of RSA prior to the landing threshold. Consequently, an assessment was conducted to determine if the existing landing thresholds could be relocated closer to the physical end of pavements, thereby increasing runway landing lengths.

Relocating landing thresholds would impact numerous items including NAVAIDS, approach lighting systems, runway markings, runway lighting, and published instrument approach procedures. The expenses associated with changes to the existing ILS and approach lighting system on Runways 5, 23, and 32 would be substantial and, therefore, are not cost effective for the resulting gain of 400 feet of landing length that may be possible from changing the landing threshold locations. On Runway 14, the associated costs would be lower due to the lack of both the ILS and an approach lighting system. However, few arrivals occur on Runway 14 and; therefore, a relocation of the landing threshold on Runway 14 would not be cost effective since the only gain would be a 400 foot increase of landing length. Therefore, the alternative of relocating landing thresholds was not considered further.

Alternatives Brought Forward for Review

Alternatives brought forward for review are the No-Build Alternative and the use of Engineered Materials Arresting System (EMAS) to replace declared distance to meet RSA requirements.

No-Build Alternative

The existing runway system at BNIA meets FAA standards for RSAs through the use of displaced landing thresholds and the implementation of declared distances. All runway ends currently provide 1,000 feet or more of equivalent RSA prior to landing and 1,000 feet of equivalent RSA beyond the runway end. With the No-Build Alternative the existing runways would be maintained at their current lengths with no changes to existing safety areas, threshold

locations, or declared distances. Existing declared distances are depicted graphically in **Figures 6-1** and **6-2**.

Evaluation of the No-Build alternative against the evaluation factors is presented below:

Facility Requirements

The current combination of displaced thresholds and declared distances meets facility requirements.

Safety and Standards

The current combination of displaced thresholds and declared distances meets FAA safety standards. With respect to the amount of safety area prior to the landing threshold, the existing combination exceeds FAA standards.

National Environmental Policy Act

There are no National Environmental Policy Act (NEPA) processing requirements associated with maintaining the existing displaced thresholds and declared distances.

Financial Feasibility

There are no costs associated with maintaining the existing system of displaced thresholds and declared distances.

Constructability

Not applicable.

Sustainability

There are no sustainability issues associated with the No-Build Alternative. No additional resources would be needed for implementation.

Alternative 1 - Install Engineered Materials Arresting System

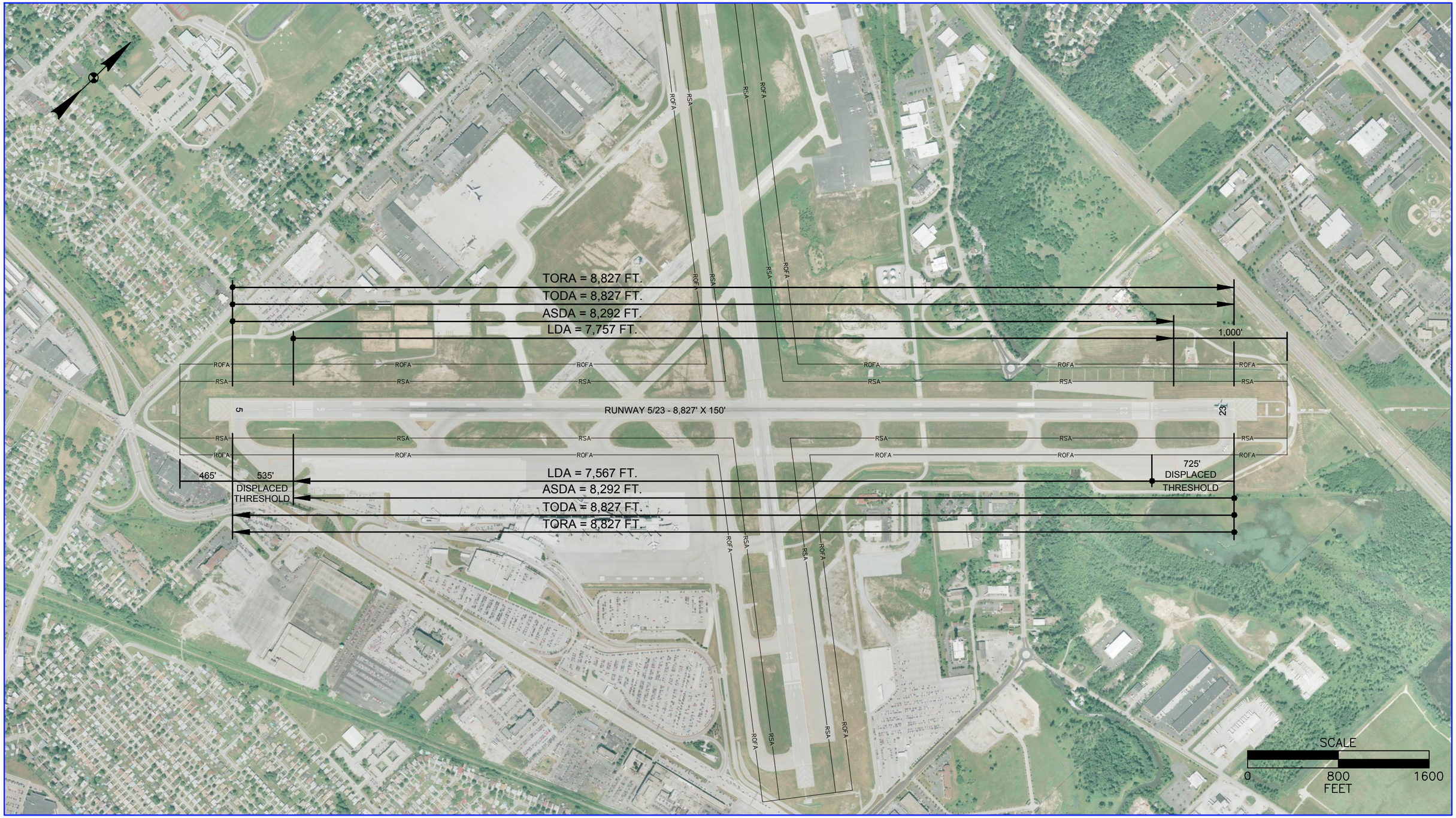
Alternative 1 examines the potential to increase runway take-off lengths through the use of EMAS instead of declared distances. The FAA defines EMAS as “high energy absorbing materials of selected strength, which will reliably and predictably crush under the weight of an aircraft.” The installation of EMAS is recognized by the FAA as an acceptable method of improving RSAs and/or bringing them into compliance with FAA standards.

An EMAS installation may be “standard” or “non-standard.” The FAA defines a standard EMAS installation as:

- Being constructed in accordance with FAA Advisory Circular (AC) 150/5220-22A, “Engineered Materials Arresting Systems for Aircraft Overruns.”

DECLARED DISTANCES ON RUNWAY 5/23

FIGURE 6-1



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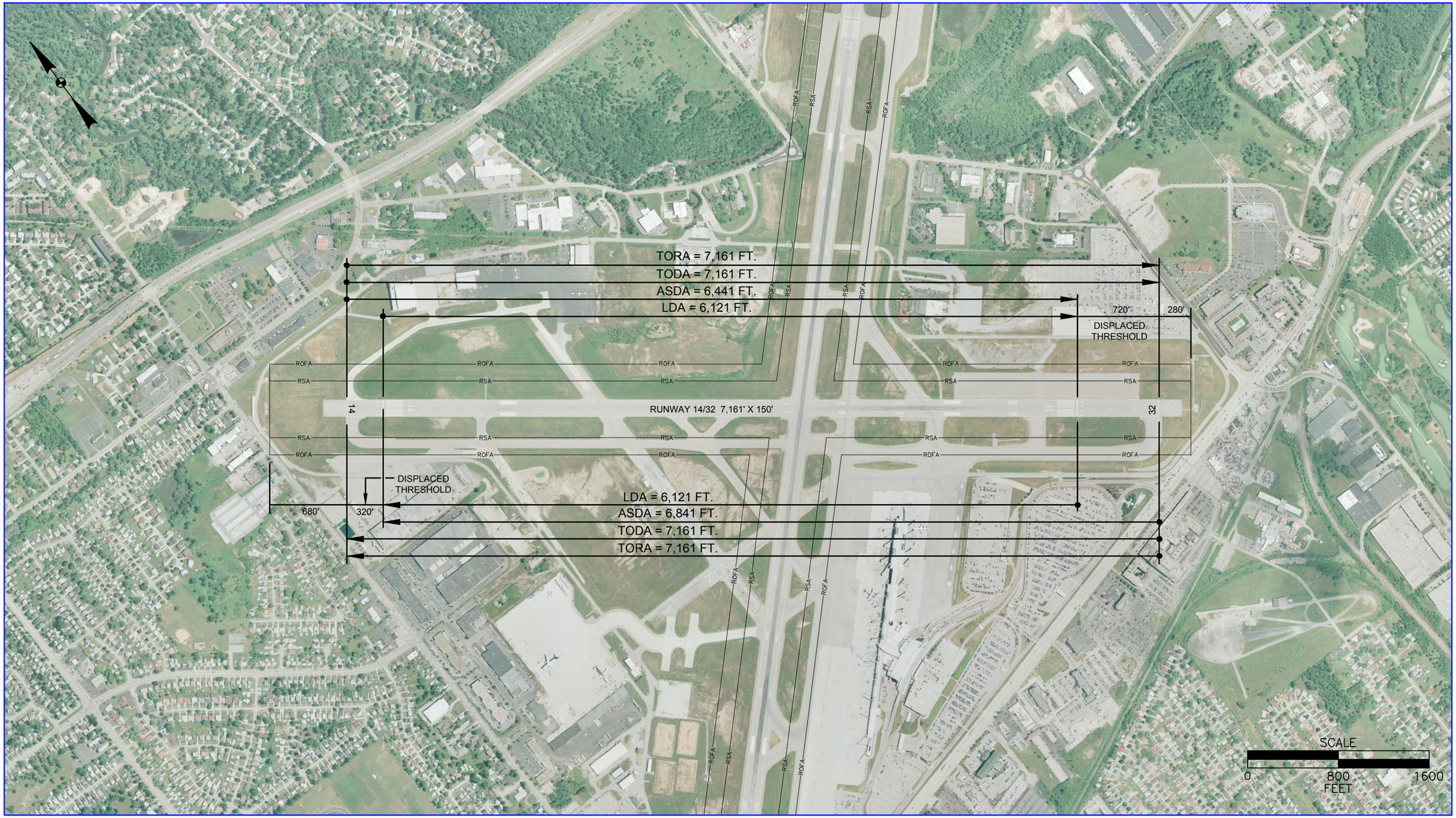
DECLARED DISTANCES ON RUNWAY 14/32

FIGURE 6-2



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- Being capable of safely stopping a design aircraft that leaves the runway at a speed of 70 knots.
- Providing adequate protection for aircraft undershoots by providing vertical guidance and 600 feet between the end of the EMAS bed and the runway threshold. Vertical guidance consists of either an instrument approach procedure or a visual guidance lighting aid, such as a Precision Approach Path Indicator (PAPI).

An EMAS installation that is not able to meet these criteria is defined as a non-standard installation. Furthermore, FAA guidance indicates that an EMAS is not a cost effective safety enhancement unless it is capable of stopping the design aircraft leaving the runway at a minimum exit speed of 40 knots.

The potential to increase existing runway lengths through the installation of EMAS was examined on all runways at BNIA. Preliminary performance and cost estimates for EMAS installations was obtained from Engineered Arresting Systems Corporation on the basis of a modeling request that provided basic runway information, prevailing topography, and the anticipated types and quantity of aircraft operations projected to occur on each runway. The results of the modeling effort are described in the following paragraphs. Results are presented by runway departure ends. For example, the results for Runway 5 are for an EMAS installation on the approach end of Runway 23.

Runway 5

An assessment of EMAS on the departure end of Runway 5 examined what level of performance could be achieved by an EMAS installation having a length of 465 feet (i.e., the available distance between the physical end of the runway and the localizer antenna) as shown in **Figure 6-3**. Use of an EMAS on this runway has the potential to increase the declared Accelerate-Stop Distance Available (ASDA) from 8,292 feet to 8,828 feet, if the EMAS is capable of providing the required performance.

The modeling results indicate that a bed length of 430 feet with a setback of 35 feet would provide stopping capability at a runway exit speed of 56 knots for an Airbus A300-600 and 63 knots for a Boeing 757. Therefore, an EMAS installation on Runway 5 would not meet the FAA definition of a standard installation and would not be considered equivalent to the standard safety area allowances provided through the existing declared distances.

Runway 23

The amount of space available for an EMAS on the departure end of Runway 23 is also 465 feet from the physical end of the runway to the localizer antenna. Likewise, the potential increase in the declared ASDA on this runway is the same as for Runway 5. It would increase to 8,828 feet from the existing distance of 8,292 feet

Consequently the modeling effort on Runway 23 also considered a bed length of 430 feet with a setback distance of 35 feet (see **Figure 6-3**). The results were nearly the same as for Runway 5. The EMAS would provide stopping capability at a runway exit speed of 57 knots for the A300-600 and 63 knots for the Boeing 757. The reason why the results on Runway 23 are slightly better than the results on Runway 5 is due to the less steep topography beyond the end of Runway 23 which allows for a slightly flatter and hence more effective bed installation. Nonetheless, an EMAS on Runway 23 would not meet the FAA definition of a standard

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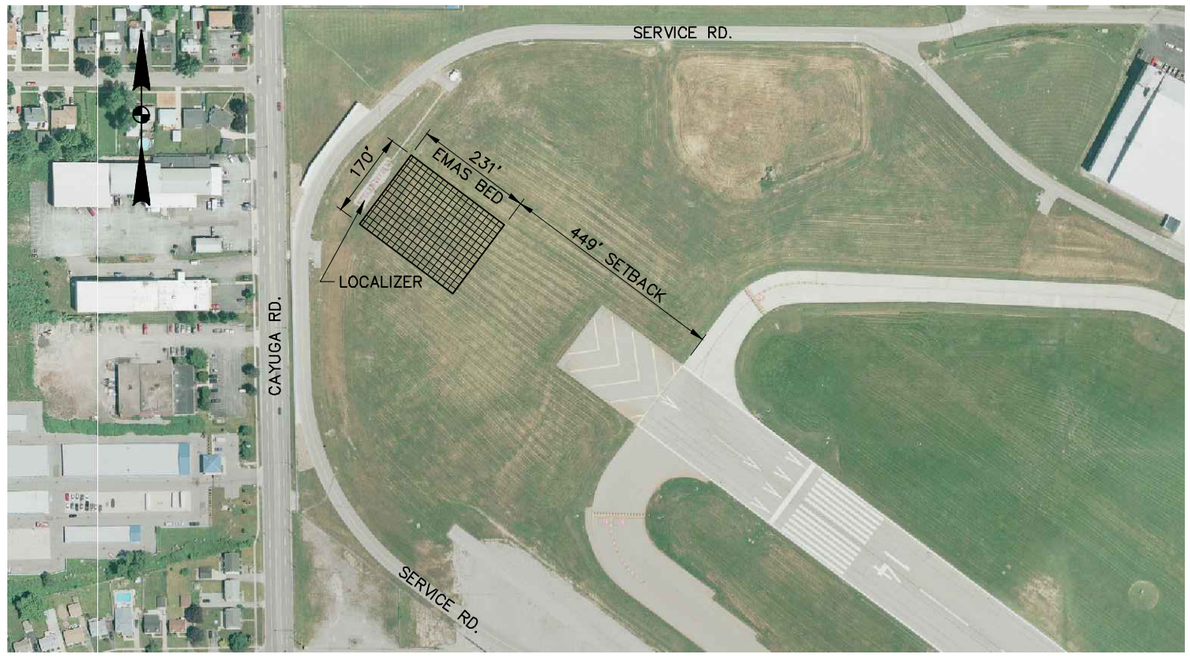
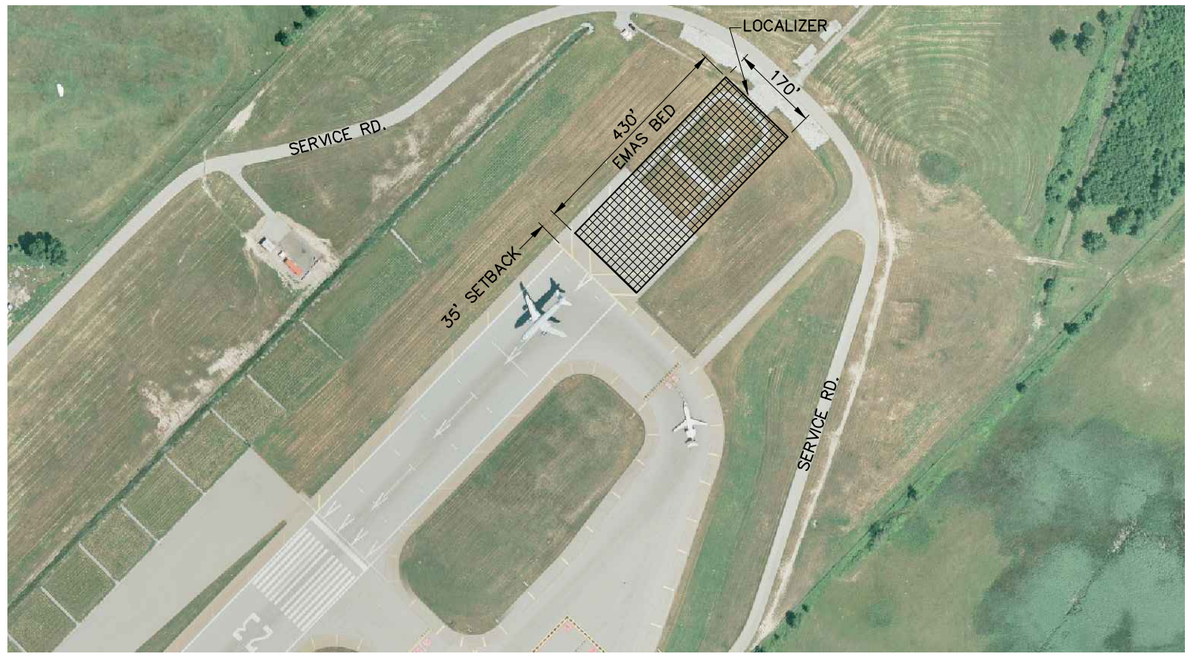
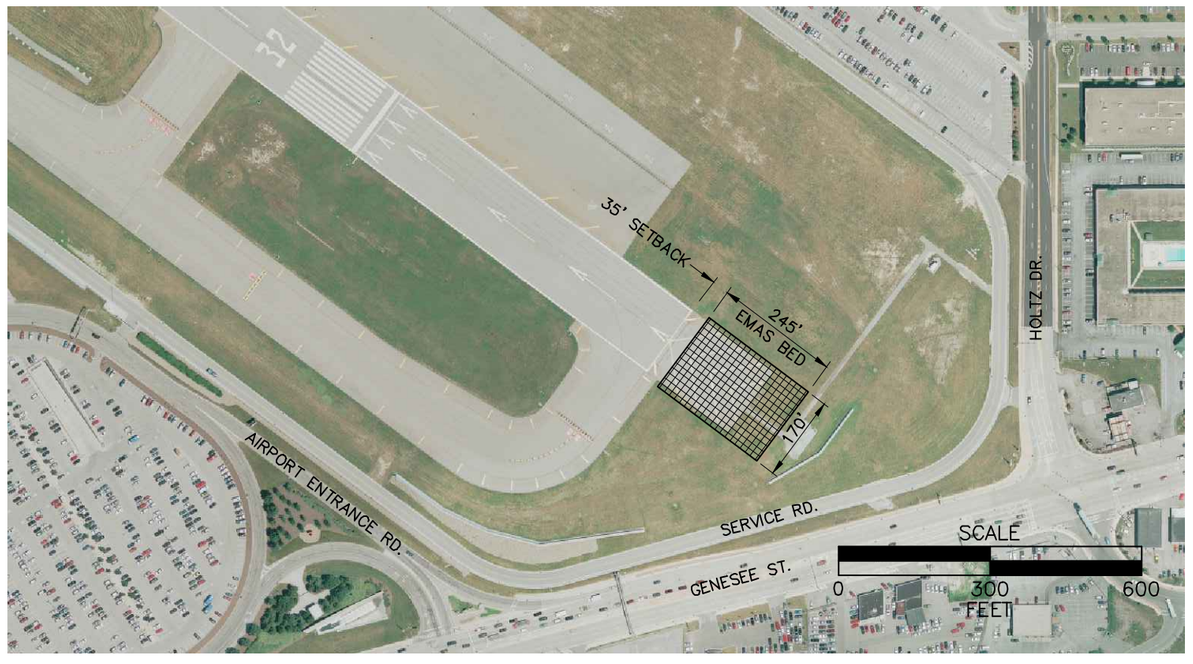
POTENTIAL EMAS INSTALLATIONS ON RUNWAY 14/32 & RUNWAY 5/23

FIGURE 6-3







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installation and would not be considered equivalent to the standard safety area allowances provided through the existing declared distances.

Runway 14

A distance of only 280 feet exists between the physical end of Runway 14 and the beginning of a blast fence. Consequently there is not much room for an EMAS on this runway end. The modeling effort assumed a bed length of 245 feet and a setback distance of 35 feet (see **Figure 6-3**). The EMAS would provide a stopping capability at a runway exit speed of 56 knots for a Boeing 737 and a stopping capability of 54 knots for a MD-88. Stopping capability for regional jets would be in the range of high 60 knots. Therefore, the EMAS would not meet the FAA definition of a standard installation and would not be considered equivalent to the standard safety area allowances provided through the existing declared distances.

Runway 32

The distance available at the end of Runway 32 is 680 feet, which is greater than the available distances beyond all other runways at BNIA. Consequently, a standard EMAS installation would be possible on this runway end. The modeling effort indicated that a bed length of 231 feet with a setback distance of 449 feet (see **Figure 6-3**) would provide a stopping capability at a runway exit speed of 71 knots for the Boeing 737 and 70 knots for the MD-88. Consequently, an EMAS installation on Runway 32 would be capable of providing an equivalent level of safety as the current safety area allowance provided through the use of declared distances. Therefore, if an EMAS were installed on Runway 32 it would allow the ASDA to increase to 7,161 feet from its current length of 6,841 feet. The Landing Distance Available (LDA) would increase to 6,441 feet from its current length of 6,121 feet.

In summary, the results of the modeling effort indicate that Runway 32 is the only runway that could attain an increase of its existing declared distances through the installation of an EMAS. However, this benefit has to be weighed against the cost of installing and maintaining the EMAS. The estimated cost of installing an EMAS on Runway 32 exclusive of design fees and costs for site preparation is $7.3 million. Annual maintenance costs would also be incurred with the installation of an EMAS. Consequently, the costs associated with the installation of an EMAS on Runway 32 would be substantial and appear to outweigh the benefits of increasing the effective runway length by 320 feet.

Facility Requirements

As noted, the existing runway system at BNIA meets FAA requirements through a combination of displaced landing thresholds and declared distances. The installation of EMAS would not improve compliance with FAA standards.

Safety and Standards

As noted, EMAS would not meet FAA standards for stopping capability on the critical aircraft except on the departure end of Runway 32.

NEPA

The environmental processing requirements associated with the installation of EMAs would likely consist of a Categorical Exclusion. Some increase of impermeable area would occur with the installation of EMAS when compared to the No-Build Alternative.

Financial Feasibility

The installation of EMAS is expensive to install and to maintain. The estimated cost for installation of an EMAS on Runway 32 is $7.3 million exclusive of design and program costs. With these costs, and the fact that the EMAS won't stop aircraft at the full 70 Knot requirement, EMAS is not a financially feasible project.

Constructability

There are no physical barriers to the installation of EMAS on Runways 32 and 23. The existing slope below the end of Runway 5 would present challenges and would likely require regarding of existing RSA. The installation of an EMAS on the departure end of Runway 14 would be limited to a very small area due to the presence of the localizer and a blast fence.

Sustainability

The construction and installation of an EMAS would cause the use of resources not required for the No-Build Alternative.

Preferred Alternative

The **No-Build Alternative is the preferred alternative** for runway and RSAs at BNIA. It meets facility requirements and FAA standards. It would have no costs, NEPA processing requirements, or sustainability impacts.

6.2.2 Instrument Approaches / NAVAIDS

Facility Requirements and Key Considerations

As described in Chapter 1 *Inventory*, BNIA currently has a variety of precision and non-precision instrument approach procedures. Precision approaches are currently provided to Runways 5, 23, and 32 via existing instrument landing systems. Runway 14 has a non-precision area navigation (RNAV) (Global Positioning System (GPS)) approach that provides approach minimums of a 400-foot ceiling and a 1-mile horizontal visibility. No additional instrument approach procedures are required to serve BNIA. However, improvements to existing instrument approach procedures could be considered and are discussed in the following paragraphs.

Alternatives Reviewed but not Considered

There were no alternatives that were reviewed, but not considered.

Alternatives Brought Forward for Review

There was one alternative developed to improve the existing instrument approach procedures and NAVAIDS at BNIA was examined to determine whether it is feasible and would provide operational benefits. This alternative consists of upgrading from a Category (CAT) I to a CAT II ILS approach on Runway 23. The alternative is described in the following paragraphs.

Alternative 1 - Upgrade to CAT II Approach to Runway 23

Establishment of a CAT II ILS on Runway 23 would enable the existing ceiling height to be reduced from 200 feet to 100 feet and the existing visibility minimum to be reduced from 1800 to 1600 or 1200 runway visual range (RVR). Runway 23 previously had a CAT II ILS instrument approach procedure years ago, but was discontinued due to changes in equipment. The existing ILS installation cannot meet CAT II requirements due to a number of issues including the fact the existing glide slope antenna is located within the RSA, Obstacle Free Zone (OFZ), and the CAT II/III missed approach surface. Other issues include a lack of remote monitoring and 1-second transfer to backup power for the approach and runway lighting, as well as lack of a far field monitor and the potential need for an inner maker due to topography changes in the approach.

As earlier studies acknowledged[1,2] the present location of the glide slope antenna is not viable for a CAT II ILS approach because it violates the RSA, the OFZ, and the CAT II/III missed approach surface. In order for the glide slope antenna to meet these criteria, it would need to be relocated approximately 200 feet further away from the runway centerline. However, a relocation of that distance would be highly problematic because the antenna would then be located over Ellicott Creek.

To resolve this constraint, a concept was prepared (see **Figure 6-4**) that relocates the landing threshold and the glide slope antenna 300 feet toward the approach end of Runway 23. A distance of 300 feet was derived because it allows for the placement of three more approach light stations (i.e., a 300-foot shift of the existing ALSF-2 approach lighting system) while still keeping the system on existing airport property north of the New York State Thruway. This 300-foot shift would also allow the placement of additional earth fill without impacting Ellicott Creek because the additional earth embankment would end before reaching the area where the creek passes through the existing earth embankment. The size of the proposed earth embankment was established on the basis of grading criteria for ILS glide slopes as defined in FAA Advisory Order 6750.16C, “Siting Criteria for Instrument Landing Systems.”

This concept would require approximately 400,000 cubic yards of fill to create the required earth embankment on the northwest side of the existing runway platform. As **Figure 6-4** indicates, the additional fill would fit within the existing airport property line, but a portion of the service road around the end of Runway 23 would require relocation, as would several small buildings located on the northwest side of the runway and the localizer building on the west side of the service road.

[1] Draft Design Rationale Report by DMJM Harris, December 12, 2003.
[2] Correspondence from Dr. Richard H. McFarland to C&S Companies and DMJM Harris, December 19, 2003.

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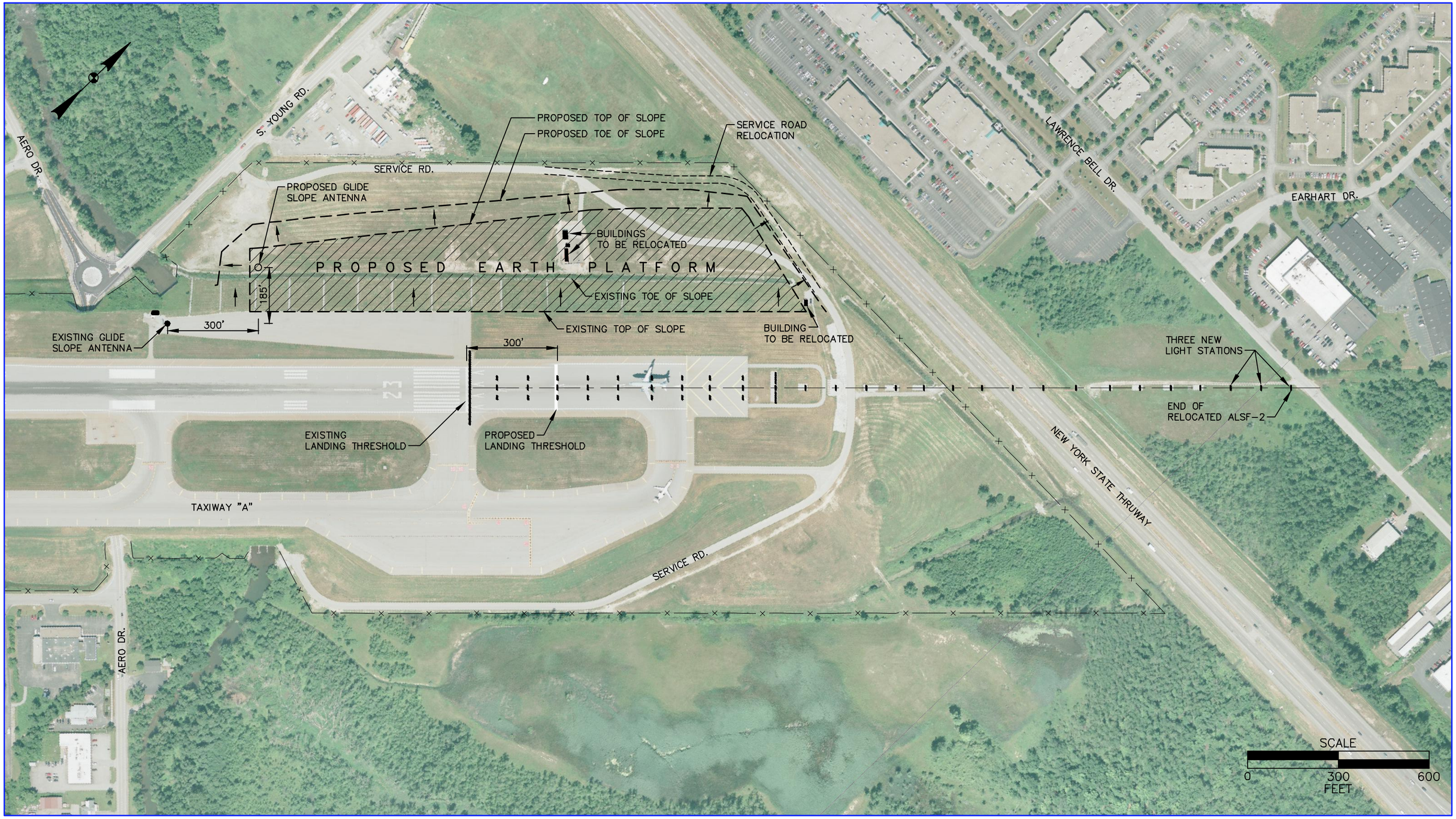
IMPROVEMENTS FOR CAT II APPROACH TO RUNWAY 23

FIGURE 6-4



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Other actions required with this concept include the installation of new glide slope antenna (while the existing one is kept operational), changes to approach and runway lighting, installation of remote light monitoring with appropriate back-up power and transfer capability, changes to runway marking, and the installation of a far field monitor and inner marker. A formal engineering assessment, including computer modeling of expected NAVAID performance, would be required to definitively determine the operational feasibility of this alternative.

Facility Requirements

The need for a CAT II approach is based upon prevailing weather conditions. **Table 6-1** presents the occurrence of CAT I, II and III conditions at BNIA on the basis of meteorological data from 2000 to 2009.

Table 6-1 Average Annual IFR Hours by Month and Approach Category

Month	CAT I	CAT II	CAT III	Total IFR
January	126	3.8	1.7	131
February	103	4.6	1.6	109
March	86	7.0	1.9	95
April	66	6.1	1.3	73
May	39	3.2	1.7	44
June	28	2.2	0.8	31
July	25	1.5	0.5	27
August	24	0.4	0.4	24
September	28	1.4	0	29
October	41	3.7	2.4	47
November	64	3.4	3.9	72
December	89	7.8	4.6	101
Total Annual	718	45.0	20.7	784

Source: National Climatic Data Center data for BNIA, 2000-2009. Data compiled by McFarland Johnson, Inc.

The data indicates that CAT II conditions average 45 hour per year during the 10-year period examined. No data was obtained on the time of day that these conditions occur. Overall, the number of hours that CAT II conditions occur annually is relatively small at 45. Furthermore, consultation with airport management and airline representatives indicated that few diversions presently occur at BNIA due to the inability to meet existing CAT I approach minimums. Most diversions and delays at BNIA are due to other factors.

Financial Feasibility

The estimated cost of upgrading the ILS on Runway 23 from CAT I to CAT II is $14.4 million. The single largest element of this cost is the cost for fill to create the needed embankment. The embankment cost alone is $7 million. This is a substantial cost that would require a benefit cost analysis to obtain Federal funding. However, as the system will provide an additional benefit to lowering the minimums and further enhancing safety, the cost is financially feasible.

Safety and Standards

This alternative would relocate the existing glide slope antennae and its associated equipment building outside of the RSA, thereby providing a safety benefit. All FAA standards would be met

with implementation of this alternative. The RSA prior to landing threshold would decrease from over 1,000 to just over 600 feet, but would still exceed FAA standards.

NEPA

The required environmental documentation would likely be an Environmental Assessment (EA) due to the amount of fill required and its proximity to Ellicott Creek.

Constructability

Implementation of this alternative would require a sizable construction effort due to the need to create the required embankment area. The proposed area of fill would be on airport property as would the proposed extension of the approach lighting system. No property acquisition would be required. Existing storage and NAVAID power buildings would need to be relocated. The drainage ditch at the base of the existing embankment would need to be relocated to the base of the proposed embankment.

Sustainability

Implementation of this alternative would improve economic viability by improving airline schedule reliability and reducing potential delays. With regard to natural resources, this alternative would require the use, transport, and placement of an estimated 400,000 cubic yards of fill. Sustainability objectives could be improved by using the closest local source for this fill, thereby reducing transport costs and impacts.

Preferred Alternative

Consultation with airport management indicated that the existing GPS approach to Runway 14 appears to meet the need of airport users and; therefore, a request to upgrade this approach is not a high priority at this time. Likewise, there does not appear to be a pressing need to upgrade the existing CAT I approach on Runway 23 to a CAT II approach at this time. However, consideration to incorporate the CAT II system should be further evaluated in the mid-term (2019 timeframe).

6.2.3 Taxiways

Facility Requirements and Key Considerations

As noted in Chapter 5 *Facility Requirements*, improvements to taxiway access are needed at BNIA in terms of providing more direct taxi routes and reducing runway crossings. A parallel taxiway for Runway 14-32 and alternate access to the cargo ramp were identified needs.

Alternatives Reviewed but not Considered

The 2002 Master Plan Update examined and recommended a realignment of Taxiway M to eliminate its curves and provide a straight segment from Runway 5-23 to the cargo apron. This alternative is no longer recommended because the existing taxiway adequately meets demand and reconstruction of this taxiway on top of its existing location would be difficult to construct while maintaining access to the cargo ramp.

Alternatives Brought Forward for Review

There were several alternatives developed for taxiways at BNIA and they include:

- No-Build Alternatives
- Alternative 1 – Construct New Taxiways Segments
  - Parallel Taxiway on Northeast Side of Runway 14-32
  - Partial Parallel Taxiway on Northwest side of Runway 5-23
  - Connecting Taxiway from Taxiway M to Taxiway A

These alternatives are described in detail below.

No-Build Alternative

The existing taxiway system at BNIA meets FAA standards, but does not provide for the most efficient or direct path for all desired aircraft movements. With the No-Build Alternative, the existing taxiways would be maintained in their current locations.

Facility Requirements

The No-Build Alternative would not meet the facility requirements stated in Chapter 5 *Facility Requirements* of improving access to and from the general aviation ramp or the air cargo ramp.

Safety and Standards

The current taxiway system meets FAA safety standards. However, aircraft at the General Aviation facility must cross three runways to get to Runway End 23 or two runways to get to Runway End 5. Multiple runway crossings increase the potential for runway incursions.

NEPA

There are no NEPA processing requirements associated with maintaining the existing taxiway system.

Financial Feasibility

There are no costs associated with the No-Build Alternative other than maintaining the existing taxiway system.

Constructability

Not applicable.

Sustainability

Aircraft movements to and from the general aviation and air cargo ramp would not be as direct or efficient as with implementation of a build alternative. Thus, the efficiency of aircraft movements would be lower and would experience somewhat greater delays. These inefficiencies and delays increase aircraft fuel consumption and associated air emissions.

Alternative 1 – Construct New Taxiways Segments

Alternative 1 consists of several segments of taxiway as depicted in **Figure 6-5** and described in the following paragraphs.

Parallel Taxiway on Northeast Side of Runway 14-32

As noted in Chapter 5 *Facility Requirements*, a parallel taxiway on the northeast side of Runway 14-32 would improve the operational efficiency of the airfield by providing more direct taxi routes for general aviation aircraft and reducing the required number of runway crossings. It would also reduce tower communications and the potential for unauthorized runway crossings.

This project could be broken into two phases. Phase 1 could include a partial parallel taxiway on the east side of Runway 14-32 extending from Taxiway Quebec to Taxiway Juliet. This phase is shown in **Figure 6-5** in a light blue color and would allow general aviation aircraft arriving on Runway 5 to taxi to the general aviation area without crossing back over Runway 14-32 to use Taxiway Delta. Likewise, smaller general aviation aircraft arriving Runway 23 could also potentially turn off on the proposed taxiway and avoid crossing Runway 14-32 to use Taxiway M.

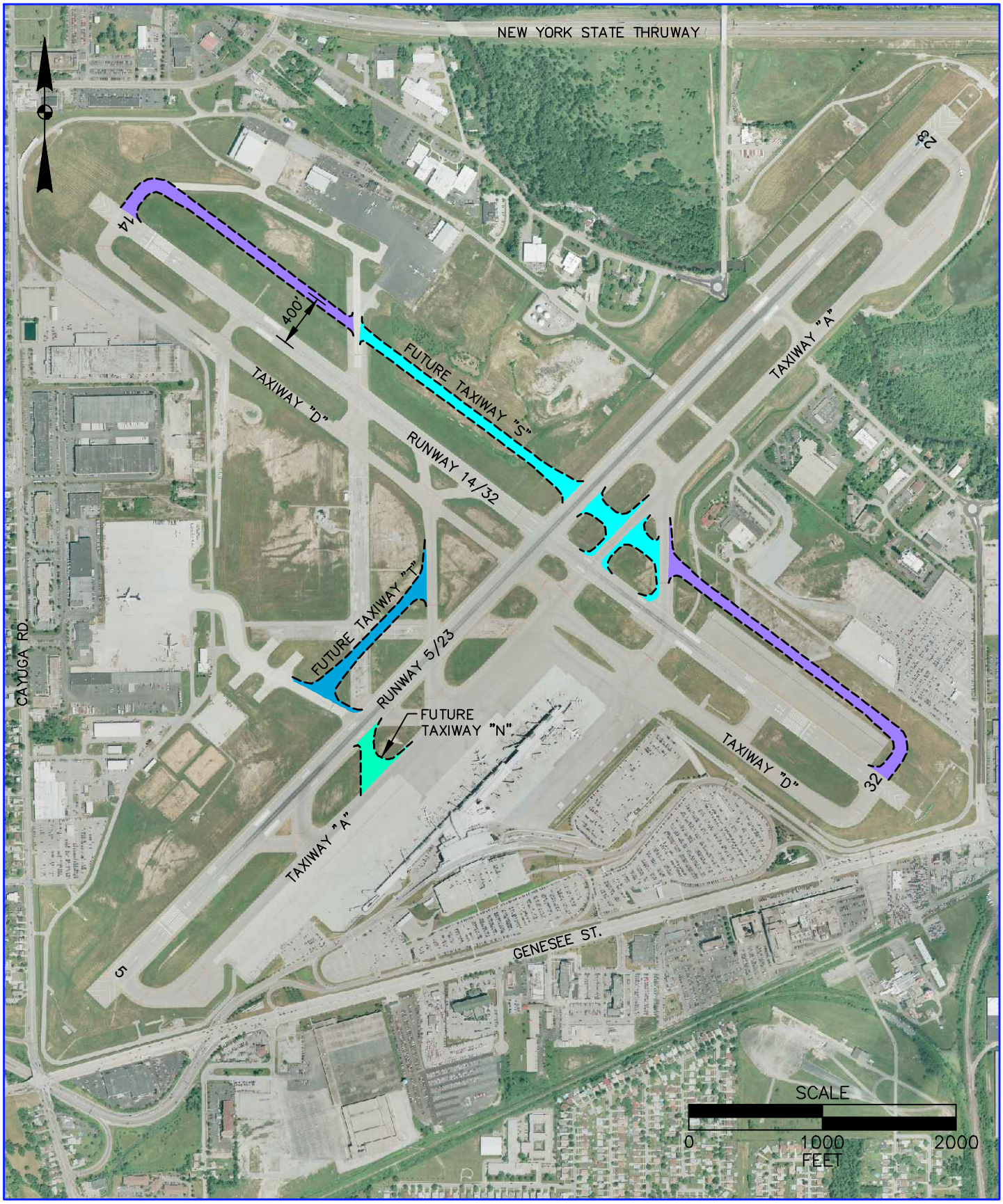
The same type of benefits would accrue when general aviation aircraft depart from Runway 23. Instead of having to taxi across Runway 14-32 to Taxiway Delta and then cross Runway 5-23 and Runway 14-32 again to reach Taxiway A, aircraft could taxi directly via the proposed parallel and then to Taxiway A with only one crossing of Runway 5-23. This would reduce the required number of runway crossings and would reduce tower communications and controller workload. It would also enhance safety by reducing the potential for unauthorized runway crossings. Furthermore, smaller general aviation aircraft could depart directly from the intersection with Runway 23.

Phase 2 of this project could include extending the Phase 1 segment to create a full parallel taxiway on the east side of Runway 14-32 extending from Taxiway P (at the approach end of Runway 14) to the approach end of Runway 32. This phase is shown in **Figure 6-5** in purple and would provide all of the operational benefits described above for Phase 1 and would provide a taxiway that could accommodate the needs of air carrier aircraft operations on Runway 14-32 in the event that Taxiway D is closed for maintenance or other reasons.

This alternative would also provide direct airfield access from airport property located between Mercy Flight and the long-term B parking lot, as well as property located between the existing general aviation facilities and Runway 14-32. This airfield access would increase the types of land uses that could be considered on both parcels, thereby increasing the potential for generating additional airport revenues. This alternative also provides additional space for future general aviation development because existing general aviation facilities would no longer be constrained by Taxiway P.

RECOMMENDED TAXIWAY IMPROVEMENTS

FIGURE 6-5



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Partial Parallel Taxiway on Northwest side of Runway 5-23

Another recommended segment of taxiway proposes the construction of a partial parallel taxiway extending from the existing Taxiway M to the Taxiway E. This segment of taxiway is shown in **Figure 6-5** in dark blue. The purpose of this taxiway would be to enhance the efficiency of aircraft going to/from the general aviation area, as well as air cargo aircraft utilizing Runway 14-32. This taxiway could ultimately be extended to connect to the parallel on the east side of Runway14-32

Connecting Taxiway from Taxiway M to Taxiway A

In addition to the partial parallel taxiway on the northwest side of Runway 5-23, a connecting taxiway from Taxiway M to Taxiway A (shown in green on **Figure 6-5**) would facilitate the movement of aircraft from the air cargo ramp to the departure end of Runway 5 along with improving the ability of air traffic control personnel to bypass inbound and outbound aircraft from the air cargo ramp. This taxiway segment may also provide some capacity gains for arrivals on Runway 23, but that is not the primary reason it is proposed.

Facility Requirements

The combination of the taxiway segments described above would meet the facility requirements identified in Chapter 5 *Facility Requirements*. Specifically, they would improve access to and from the general aviation area and the air cargo ramp.

Safety and Standards

All taxiway segments would be designed to Design Group IV standards unless otherwise noted. The parallel taxiway segments would be constructed at a runway to taxiway centerline separation of 400 feet. Overall, these taxiway segments would improve safety by providing more direct taxi routes that decrease tower communications and controller workload.

NEPA

The environmental processing required for the approval of these taxiway segments would likely consist of an EA, although it is possible that a Categorical Exclusion could be obtained for smaller segments, such as Taxiway N and T.

Financial Feasibility

The costs associated with the proposed taxiway segments are as follows: $13.8 million for Phase 1 of Taxiway S, $14.6 million for Phase 2 of Taxiway S, and $10.7 million for Taxiway T and N. These projects are financially viable as they enhance safety, provide an environmental benefit by reducing taxi time and can be funded by FAA. Phasing these projects over time will allow for other capital improvements to be programmed without significantly affecting capacity or safety.

Constructability

There are no significant barriers to construction of any of the taxiway segments. A runway visual range transmissometer on Runway 5-23 would need to be relocated in order to construct the proposed Taxiway T.

Sustainability

Construction of these taxiway segments would consume natural materials and would increase impervious pavement. However, the proposed taxiway segments would improve the efficiency of aircraft taxi routes, thereby reducing fuel consumption and their associated air emissions.

Preferred Alternative

Alternative 1 - Construct New Taxiway Segments is the preferred alternative. This alternative will improve access to and from the general aviation ramp and the air cargo ramp. It will also reduce runway crossings, tower communications and air traffic controller workload. It will reduce holding delays for aircraft waiting runway crossing clearances and, thereby reduce fuel consumption and air emissions. In short, this alternative will meet the stated facility requirements while also providing efficiency, operational, and safety benefits.

6.2.4 Remain Overnight Aircraft Parking

Facility Requirements and Key Considerations

Chapter 5 *Facility Requirements* indicated that existing demand for Remain Overnight (RON) parking is estimated at 7 to 11 aircraft parking positions and would increase to 10 to 16 parking positions by the end of the study period. Currently, there are seven designated RON parking positions on concrete pads along the south side of Taxilane K-1. However, use of these spaces constricts aircraft taxiing to Taxilane K, thereby leading to taxi delays when multiple gates on the south side of the passenger terminal are being used at the same time. Additional RON parking occurs on the ramp at the west end of the passenger terminal, but this area is limited to smaller aircraft and does not have formally designated positions. Consequently, up to 10 spaces may currently be available. This leaves a future requirement for six additional aircraft parking positions.

Alternatives Reviewed but not Considered

The previous Master Plan Update recommended a RON parking area on the east side of Runway 14-32 between Mercy Flight and Long-Term Parking Lot B. That parking area would have accommodated nine air carrier aircraft parking positions. Airport management conducted a benefit-cost analysis (BCA) for the proposed RON parking area following the previous Master Plan Update in order to seek Federal funding of the project. The result of the BCA was positive, but the subsequent reduction in airline operations following the events of September 11, 2001 resulted in the project being deferred.

When airline operations increased again to the point that additional RON parking was being sought, the BCA was re-conducted but was negative due to changes in aircraft fleet mix from air carrier aircraft to regional jets. For that reason, and the ramp's less than desirable location

across an active runway, the site recommended by the previous Master Plan Update was not considered further.

Alternatives Brought Forward for Review

Four options in two areas were identified as potential RON parking. Each alternative is described in detail below.

RON Alternative 1

Alternative 1 consists of constructing one additional concrete pad along the south side of Taxilane K-1. This alternative is shown in **Figure 6-6**. A review of aerial photography and site mapping indicates that one additional parking space at the west end of Taxiway K-1 could be used for RON parking. Use of this space would be limited to a push-back and tug-out use. The site is too constrained to be used in a power-in configuration. An air carrier aircraft will fit in this location, but the clearance to the adjoining blast fence would only be between 15 to 20 feet. A regional jet would easily fit in this location.

Facility Requirements

This alternative does not meet facility requirements for up to 16 parking positions through the study period, but it could provide one additional RON parking position in a cost-effective manner.

Safety and Standards

As noted, the use of this parking position would be limited to a push-back and tug-out operation only and may require wing walkers for air carrier aircraft. A regional jet would easily fit in this location. The parking position would be designed to meet all FAA standards.

NEPA

The environmental processing for this action would be limited to a Categorical Exclusion.

Financial Feasibility

The estimate construction cost of this alternative is $126,000 and can be funded through FAA the limited cost provides for one additional parking position to accommodate RON needs.

Constructability

There does not appear to be any constructability issues associated with this alternative. The area is currently used as taxilane.

Sustainability

Construction associated with this alternative is minimal and would primarily consist of one concrete pad. No significant sustainability issues would be associated with this alternative.

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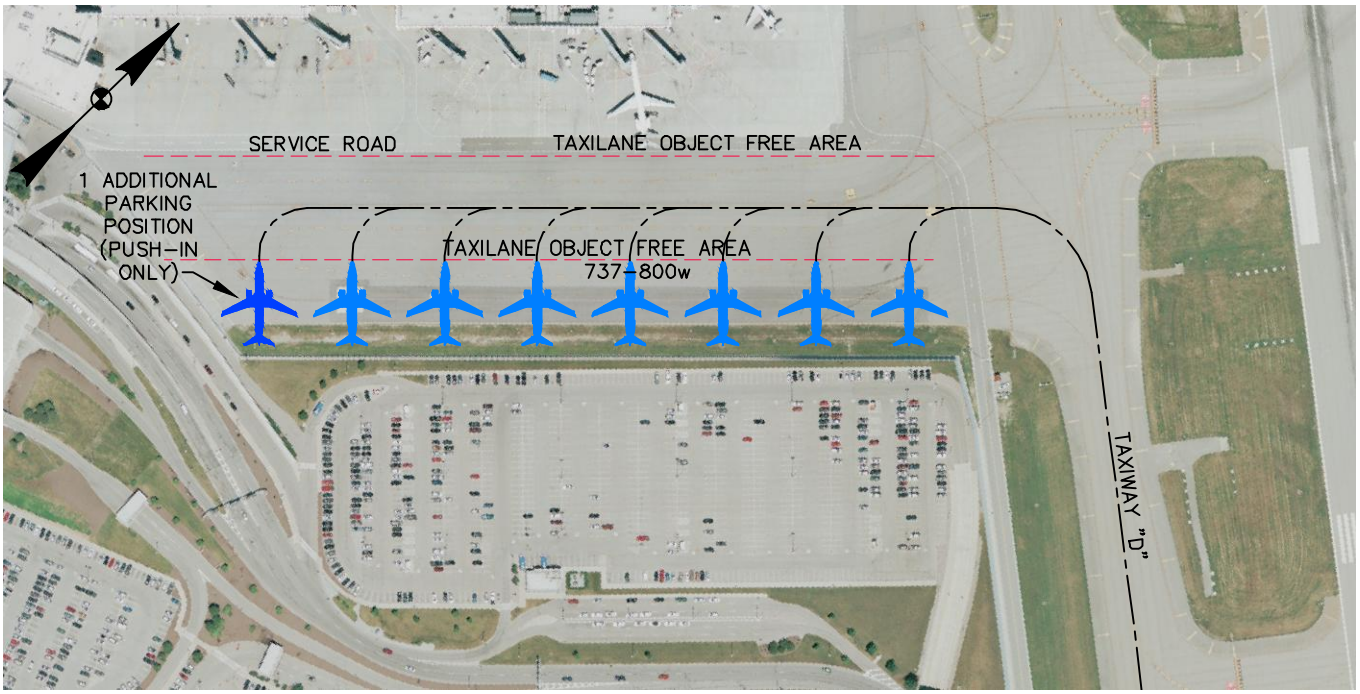
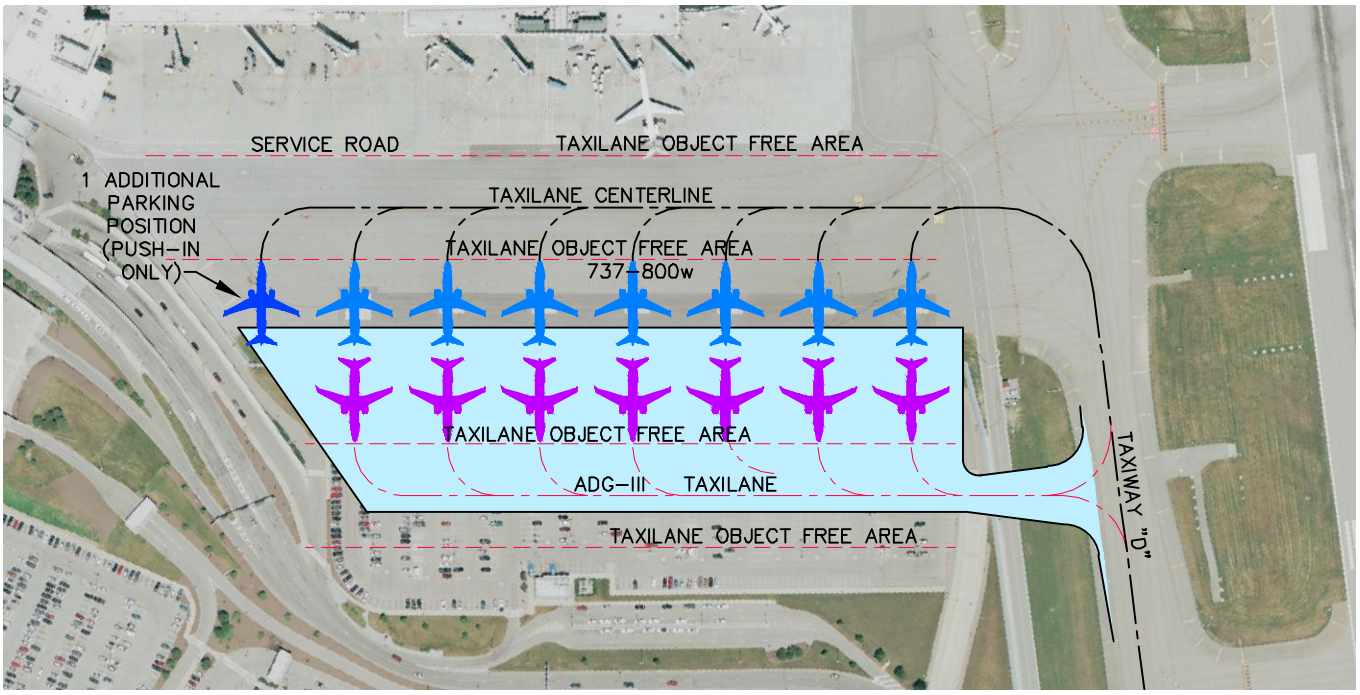
RON PARKING - ALTERNATIVE 1 & 2

FIGURE 6-6



RON PARKING ALTERNATIVE 1



RON PARKING ALTERNATIVE 2

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RON Alternative 2

Alternative 2 consists of constructing an additional RON parking area immediately south of the existing RON parking in the area currently used for the Long-Term A parking lot (see **Figure 6-6**). This alternative would provide seven additional RON parking positions for air carrier aircraft such as the Boeing 737-800 or Airbus A320. Access to and from this area would be provided via a combination of Taxilane K-1 and a new taxilane at the south end of the proposed RON parking area. The recent funding for the expansion of Long Term B parking with New York State monies to accommodate the eventual relocation of parking for the construction of a parking garage makes this option feasible.

Facility Requirements

This alternative, in conjunction Alternative 1 and the informal RON parking that occurs at the west end of the passenger terminal, would meet the facility requirements for up to 16 aircraft parking positions through the end of the study period.

Safety and Standards

The RON parking positions and the proposed taxilane would meet FAA standards for Design Group III aircraft.

NEPA

This alternative would be constructed in a currently developed area currently used for automobile parking. Therefore, the environmental processing required for this action may be limited to a documented Categorical Exclusion. However, close coordination with the FAA's Environmental Specialist at the time of the project would be needed to ensure that an EA is not required due to stormwater collection or other requirements.

Financial Feasibility

The estimate construction cost of this alternative is $9.7 million and is FAA eligible. The cost associated with this project is building new apron and taxilanes to allow for a new row of commercial aircraft parking. However, it displaces a significant amount of parking that may not be fully replaced in the main terminal parking areas, thus driving secondary costs up by the potential need for additional new parking to accommodate the displaced parking associated with this alternative.

Constructability

The primary issue associated with the construction of this alternative is the need to reconfigure or close the ramp to the tunnel that leads to the Long-Term A parking lot. An alternate use of remaining land in the Long-Term A parking lot could be considered if the ramp leading from the north end of the tunnel was reconfigured to curve west instead of heading north in its existing configuration.

Sustainability

Construction of additional RON parking in an area currently used for automobile parking would minimize impacts to the natural environment. Collection of stormwater from the additional ramp would need to be designed to capture glycol from aircraft parking at these positions.

RON Alternative 3

Alternative 3 consists of designating six formal RON parking spaces for regional jets at the west end of the passenger terminal, north of the existing glycol storage area (see **Figure 6-7**). These parking spaces would be limited to regional jets or turboprop aircraft due to the height restriction imposed by the Part 77 transitional surface from Runway 5-23. As the figure indicates, the Part 77 tail height clearance line would require that aircraft be parked with their nose pointing north in order to place their tails beneath the Part 77 restriction line. This alternative would also require that the existing glycol storage area be relocated southward to provide sufficient clearance around the RON parking positions. One possible location for the relocation of the glycol storage area is the existing employee parking lot on the north side of the airport exit road.

Facility Requirements

Six RON spaces at the west end of the passenger terminal, along with the seven existing spaces along Taxilane K-1 would provide a total of 13 spaces. This is three spaces short of the estimated 16 spaces required through the study period.

Safety and Standards

These parking positions would be designed to meet regional jet and turboprop aircraft standards as defined by the FAA.

NEPA

The environmental processing for this action would be limited to a Categorical Exclusion.

Financial Feasibility

The estimate construction cost of this alternative is approximately $207,000 and is eligible for FAA funding. Although this alternative has a low project cost, the limitation of the FAR Part 77 Transition Surface limits flexibility to park larger aircraft.

Constructability

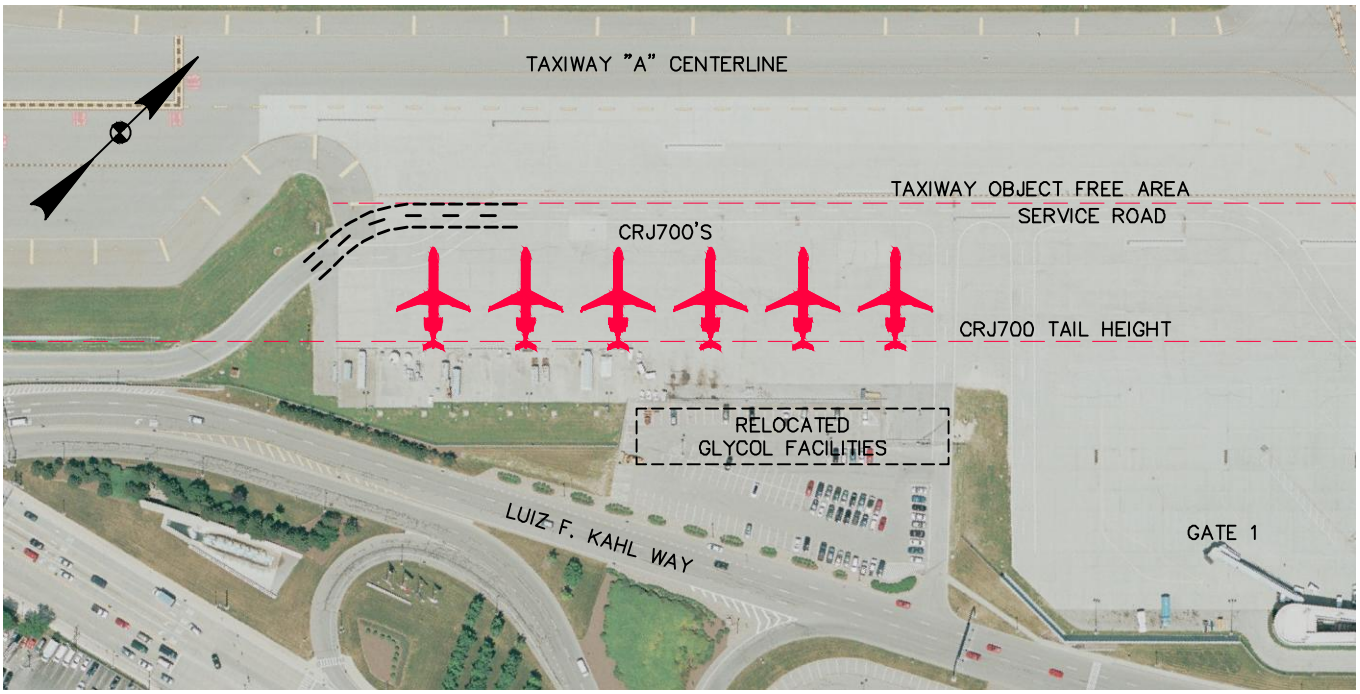
Construction associated with this alternative is minimal. It would consist of relocating a small portion of the ramp service road, relocating the glycol storage area, and stripping the pavement to formally designate aircraft parking positions.

Sustainability

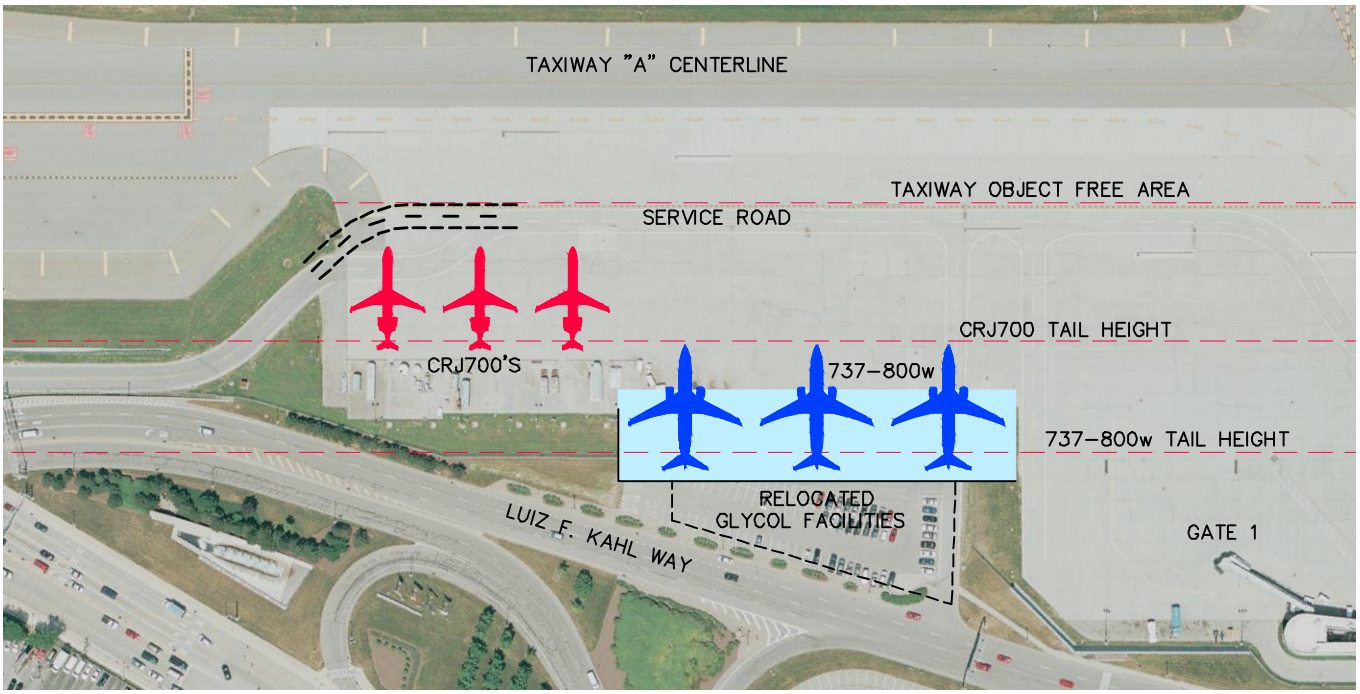
Construction associated with this alternative is also minimal. No significant sustainability issues would be associated with this alternative.

RON PARKING - ALTERNATIVE 3 & 4

FIGURE 6-7



RON PARKING ALTERNATIVE 3



RON PARKING ALTERNATIVE 4

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RON Alternative 4

Alternative 4 expands on the basic concept established in Alternative 3 by constructing additional ramp area at the west end of the passenger terminal (see **Figure 6-7**). The additional ramp area would allow three air carrier size aircraft (Boeing 737-800) to be parked in this area and still meet the tail height limitation imposed by Part 77 surfaces. Like Alternative 3, this alternative also proposes that the glycol storage area be relocated into the existing employee parking lot.

Facility Requirements

This alternative provides a total of 13 RON parking positions. Six spaces at the west end of the terminal and the existing seven spaces along Taxilane K-1. This number of spaces is midway between the estimated facility requirements of 10 to 16 spaces during the study period.

Safety and Standards

The three RON parking positions closest to the passenger terminal would be designed to Boeing 737-800 standards. The other three parking positions would be designed for regional jets such as the CRJ-700.

NEPA

The environmental processing for this action would be limited to a Categorical Exclusion.

Financial Feasibility

The estimate construction cost of this alternative is $2.4 million. Given that this layout provides the flexibility to park a mix of aircraft in this area as opposed to Alternative 3, and can provide the necessary parking needs without having to expand the RON parking along Taxiway K1, this alternative provides a significant benefit to meet RON needs.

Constructability

There does not appear to be any significant construction issues associated with this alternative. The existing glycol storage facility could be relocated to the employee parking lot and the existing area is fairly level and suitable for the construction of additional ramp. Additional blast fence may be required in this alternative due to the fact that the three air carrier positions would be closer to the airport exit road.

Sustainability

This alternative would minimize the amount of new apron construction when compared to Alternative 2. From an efficiency perspective, the ability to park air carrier size aircraft at the west end of the terminal would minimize the distance needed to move aircraft from passenger terminal gates. This may provide a beneficial reduction of air emissions.

Preferred Alternative

Alternative 4 is recommended as the preferred alternative due to its lower cost as compared to Alternative 2 and the better balance it offers between RON parking on the east and west ends of the passenger terminal. If, however, the demand for additional RON parking exceeds the number of spaces provided by Alternative 4, then Alternative 2 is recommended as a long-term solution.

6.3 PASSENGER TERMINAL

Alternatives for the passenger terminal were prepared, and are presented in this section in terms of the level they are located on rather than each function (i.e., concessions, ticketing, etc.). However, a separate discussion is provided at the end of this section for the ticket lobby and departure holdrooms. For purposes of this section, Level 1 is the ground level comprised of the baggage claim area, airline baggage offices and the departures roadway. Level 2 is the arrivals hall, airline ticket counters and offices, security checkpoint, and concourse and gate areas.

Level 1 is presented and discussed first, followed by Level 2. The primary item discussed on Level 1 is the need for expansion of baggage claim devices and public baggage claim area. Items discussed for Level 2 focus on the long-term need for further expansion of the passenger screening checkpoint, relocation of airport administration to have non-secure access, and alternate means of vertical access to Level 1.

6.3.1 Level 1

Facility Requirements and Key Considerations for Level 1

The facility requirements for baggage claim carousels and the public baggage claim areas that surround them were described in Chapter 5 *Facility Requirements*. The requirements can be summarized into a few categories as follows:

- Providing sufficient carousel capacity to accommodate peak hour baggage demand
- Improving tug road congestion issues
- Improving security associated with carousel operation, and
- Improving signage and operational control for the baggage carousels

These issues are briefly described in the following paragraphs.

Baggage Carousel Capacity

As defined in earlier sections of the report, the existing three flat-plate baggage claim carousels will not optimally serve peak hour demand throughout the study period. This is due to a combination of factors including congestion on the tug road that hinders baggage delivery and insufficient frontage for public claim.

An assessment of baggage claim carousels indicated that 200 linear feet of baggage claim perimeter should be provided on the carousels. This would allow two narrow-body aircraft to be processed simultaneously. Three claim carousels are needed to accommodate projected

passenger demand through 2025, while four claim carousels are needed to serve passenger demand through 2030.

To provide versatility, as well as provide sufficient off-load capacity for multiple cart-trains, it was determined that sloped-plate carousels would be a better solution. The flat-plate carousel is configured such that the conveyor system must transition through a wall from the secure area where baggage is loaded to the non-secure side where passengers retrieve their baggage. The conveyor system transitions back through the wall with any bags that have not been claimed. While flat-plate carousels can provide some useful configurations, they require a lot of floor space to configure and it is impractical to feed baggage onto them with more than one feed conveyor line which is needed to meet peak hour demand.

As a result, alternatives were developed with slope-plate carousels, except for some initial alternatives that were not further considered. The slope plate carousel is a stand-alone, oval shaped unit with a sloped plate conveyor that carries the baggage around the unit. Baggage is loaded remotely on the secure side of the terminal and a conveyor system transports the bags to the baggage unit and drops the baggage onto the sloped plate conveyor. Sloped plate carousels require much less floor space as compared to a flat-plate carousel.

Tug Road Congestion

In addition to the carousel claim frontage, the capacity of the baggage claim delivery at BNIA is also affected by the efficiency of the tug road and the ability of the tugs and carts to reach the baggage conveyors. To meet the existing peak-hour demand, three cart-trains must be accommodated in the same 10-minute period. However, congestion on the tug road sometimes prevents tug drivers from being able to maneuver their cart-trains to all three carousels simultaneously.

This congestion is caused by a series of factors. The first factor is that tug drivers tend to (or are directed to) drop-off their baggage on the claim device adjacent to their airline's BSO. There are logistical advantages to the airline to have their baggage delivered closest to their BSO. The existing west carousel appears to receive much more use than the other two carousels, and there is often a cart-train positioned at this carousel. This in itself is not a problem. However, when combined with additional factors described below, they can cause operational problems.

A second factor is that when the outbound baggage handling system was installed, the make-up carousel placement forced the staged carts (of the near carousels) to be partially in the airside tug roadway, thereby constricting bypass capability for additional tugs and carts to bypass a cart-train unloading at the first and second carousel. A third factor is insufficient spacing between the carousels' load belts to allow longer cart-trains to park parallel to and close to the curb.

The combination of these factors can lead to the following peak hour scenario. A cart-train will arrive at the first carousel and commence off-loading bags. A second cart-train will drive around the first cart-train to the second carousel to off-load bags (perhaps because the third carousel is in use). The second cart-train may not be able to fully pull into and adjacent to the load belt and the last cart of the train will protrude into the tug road. With this cart partially in the drive aisle and the carts at the make-up carousel, there is not quite a full drive width remaining at that point on the airside tug road. Once a next tug/cart/train arrives, it must wait, and any subsequent

cart-train must then also wait. Consultation with airline personnel indicated that that this scenario commonly occurs during peak conditions. The solution to this problem is to design alternatives that better position and space baggage delivery belts so blockages do not occur.

Security

Flat plate, through the wall baggage carousels present certain security concerns that are mitigated with other types of baggage delivery systems. There have been instances recorded at other airports where persons have attempted to ride on a carousel into the airside space, which is a violation of security regulations. Consequently, the Transportation Security Agency (TSA) prefers slope-plate carousels that are fed from a remotely-loaded feed conveyor line. This condition eliminates the recirculation of baggage from airside to landside and back to airside and mitigates this security concern.

Signage

An improvement to signage and operational controls is the last facility requirement identified for the baggage claim hall. Observations indicate that passengers arriving in the baggage claim hall often congregate at the west carousel. Yet for a percentage of passengers, the west carousel will not be the carousel where their baggage is delivered. Consequently, these passengers only move to the appropriate carousel when the signage displays the number of their arrival flight. This leads to unnecessary congestion on the west side of the hall.

Another factor is that flight information is displayed on baggage carousel signs when the tug driver enters the flight number into the baggage signage control station. Unfortunately, the button that starts the baggage claim carousels and the baggage signage control station are not located next to each other. This leads to tug drivers getting out of their tug, initiating start up control of the claim carousel, and then go back to the control station for the signage. In the baggage claim hall, this leads to situations where the baggage carousels begin to move but no flight information has yet been displayed on the signage, thereby further compounding the passenger congestion problem.

This condition could be alleviated through two actions. The first action is to install new signage that is more highly visible to passengers as they walk into the baggage claim hall from the elevator/escalator area. The second action would be to relocate the tug driver's signage control station so it is adjacent to where they exit the tug. This would facilitate an early display of flight information on the baggage carousel signs.

Alternatives Reviewed but not Considered

Initial alternatives were developed to determine how larger (200-foot perimeter) carousels could fit into the existing baggage claim hall. Alternatives developed for this assessment included Alternatives 1, 2, 3, 4 and Long Term. Several variations were also developed for several Alternatives and are designated with a letter following the Alternative number.

Alternative 2 consisted of two flat-plate carousels that would provide the required 200-feet public perimeter. This alternative could not be configured with multiple remote feed conveyors. It also could not be phased without a major impact to the existing operation, because two of the three existing carousels would have to be removed from service to install one new carousel. Alternative 2 was eliminated from consideration because of this phasing problem.

Alternative 2-A consisted of two 200-feet slope-plate carousels instead of the flat-plate carousels considered in Alternative 2. This alternative was also eliminated from consideration due to the same phasing problem identified for Alternative 2.

Alternative 2-B consisted of providing three smaller slope-plate carousels. In order to fit these three carousels in the existing terminal space, the existing baggage service offices would have to be relocated. Therefore, additional terminal space would need to be constructed accommodate this function. The only way to fit these three carousels in the remaining space between the restroom areas was to limit the carousels to 180-foot perimeters and reduce the amount of space allocated to passenger circulation. Consequently, Alternative 2-B was eliminated from further consideration.

Alternative 2-C consisted of relocating the baggage service offices and the adjacent restrooms to new terminal expansions, to allow for the installation of four carousels. This alternative would require that the carousels be limited to smaller perimeters and would have led to higher construction costs to relocate the baggage service offices and restrooms. This alternative was eliminated for not meeting the facility requirements.

Alternative 4 consisted of providing four slope-plate carousels. Two of the carousels would be located in the existing baggage claim hall and two would be located in new terminal expansions at the west and east end of the existing baggage claim hall. The eastern terminal expansion would adversely impact the truck movement area associated with the existing truck dock and would have required further study of associated roadway options. This alternative was eliminated from further consideration.

Alternatives Brought Forward for Review

Alternatives brought forward to assess include the following:

- Level 1 – Alternative 1 – Signage Improvements and Carousel Control Relocation
- Level 1 – Alternative 3 – Three Slope Plate Carousels
- Level 1 – Alternative 4A – Four Slope Plate Carousels
- Level 1 - Long-Term A Expansion

Level 1 - Alternative 1

Alternative 1 consists of a combination of signage improvements and changes to the placement carousel controls. Observations in the public baggage claim area revealed that existing signage is not highly visible by passengers as they enter the baggage claim area due to its existing orientation. This issue could be resolved by improving the signage placement and orientation.

Another element of Alternative 1 is to change the location of the control panel for entering flight information on the signage. As previously noted, the control panels are currently located in the middle of the non-public portion of the carousel. This leads to situations where a carousel begins moving, but no information has yet been conveyed to arriving passengers that informs them that their flight's baggage is available on a particular carousel. This problem could be reduced by moving the control panel for entering flight information next to each carousels start button. This would facilitate flight information being displayed earlier and would reduce passenger congestion that typically occurs at the western-most baggage carousel.

Facility Requirements

Alternative 1 would merely correct operational issues. It would not increase the capacity of the system to accommodate future passenger demands.

Safety and Standards

The control stations would be installed at ergonomic levels, out of the way of tugs in keeping with Air Transport Association standards.

NEPA

No environmental documentation would be required to implement this alternative.

Financial Feasibility

The estimated construction cost of Alternative 1 is $85,000 and FAA eligible. The low cost would enhance customer service by locating controls close to where tug drivers stop and also provide signage to ensure that passengers are guided to the baggage hall efficiently.

Constructability

This planning solution would be easily constructible. The modification of the signage and the control stations for the three existing claim devices could be accomplished without significantly disrupting existing operations.

Sustainability

This alternative offers an opportunity to replace existing signage with the latest energy saving models.

Level 1 - Alternative 3

Alternative 3 consists of providing three slope-plate carousels. Two carousels would be located in the existing claim hall replacing the three flat plate carousels and one would be located in a terminal expansion west of the existing baggage claim hall, as illustrated in **Figure 6-8**. These three slope-plate carousels could accommodate in excess of 12 narrow-body air carrier and three regional jet flights (or an equivalent mixture) during the peak hour.

The terminal expansion would include a claim carousel with two remote feed conveyors. An additional BSO would be constructed adjacent to the carousel in the newly expanded area. This alternative also provides space for a small concessions area and an airport administration meeting room between the new claim carousel and the existing claim hall. Restrooms would be relocated and modified to fit behind the concessions and meeting room area.

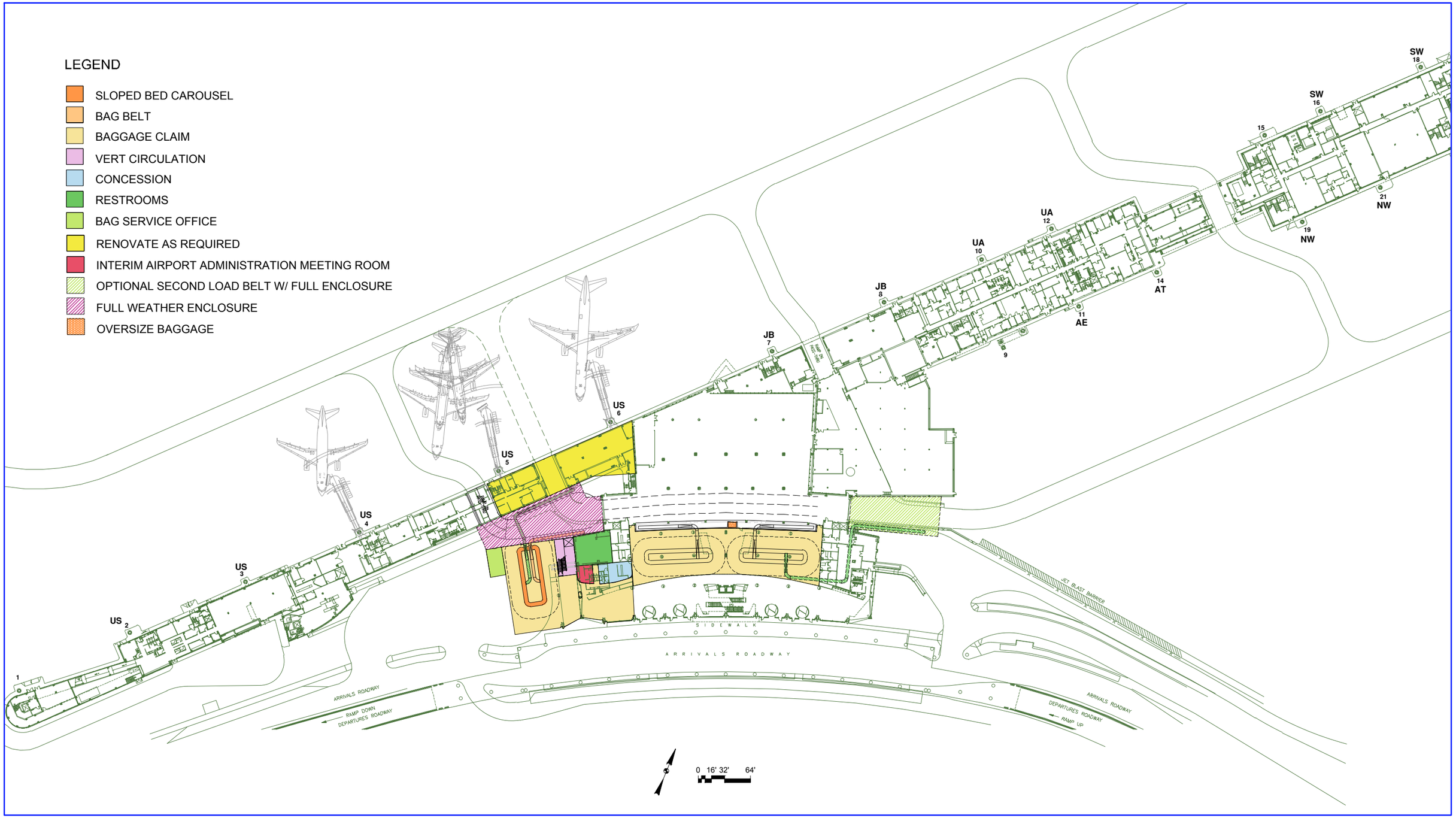
Vertical circulation into the newly expanded area would be located east of the proposed carousel and would connect in with a proposed expansion on Level 2 of the terminal (see Section 6.3.2).

LEVEL 1 - ALTERNATIVE 3

FIGURE 6-8

LEGEND

- SLOPED BED CAROUSEL
- BAG BELT
- BAGGAGE CLAIM
- VERT CIRCULATION
- CONCESSION
- RESTROOMS
- BAG SERVICE OFFICE
- RENOVATE AS REQUIRED
- INTERIM AIRPORT ADMINISTRATION MEETING ROOM
- OPTIONAL SECOND LOAD BELT W/ FULL ENCLOSURE
- FULL WEATHER ENCLOSURE
- OVERSIZE BAGGAGE



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To accommodate the movement of tug/cart operations, the airside tug roadway would be repositioned west of Gate 5. The Gate 5 aircraft position would be relocated slightly to the east. The repositioning of the airside tug roadway would require reconfiguration of some of the existing space on Level 1 of the concourse. This alternative would enable significant improvements to the airside tug road, thereby providing enough space to allow tug/cart trains to move through the space without causing congestion.

This alternative also includes expansion and enclosure of non-public terminal space along at the west and east end of the baggage roadway area where the remote feed conveyors would be located. Two remote feed conveyor lines would be provided for the west carousel and the east carousel. The middle carousel would be provided with one remote feed conveyor line.

Facility Requirements

Implementation of Alternative 3 would provide sufficient capacity to meet passenger demands through 2025.

Safety and Standards

The baggage handling system equipment would be designed/installed in keeping with Air Transport Association (ATA), National Electrical Code (NEC), National Fire Protection Association (NFPA), Conveyor Equipment Manufacturers Association (CEMA), and Occupational Safety and Health Administration (OSHA) standards.

NEPA

The environmental documentation required for this alternative would consist of an EA.

Financial Feasibility

The estimated construction cost for Alternative 3 is $21 million. The overall program cost including design and other soft costs is $30 million, however, it would only provide capacity through 2025, but not through the entire planning period in 2030 and thus, would require additional funds to meet the overall needs.

Constructability

As identified in the phasing plan above, the solution is constructible with few impacts to the existing operations.

Sustainability

Construction of the proposed terminal expansion could be designed to maximize the use of local resources, thereby minimizing transportation costs and impacts. Furthermore, the proposed terminal expansion and renovation provides an opportunity to invest in the latest energy efficiencies in terms of lighting, signage, and Heating, Ventilation, and Air Conditioning (HVAC).

Level 1 - Alternative 4A

Alternative 4A builds upon Alternative 3 and would provide four slope-plate carousels, as illustrated in **Figure 6-9**. Two of these carousels would be located in the existing claim hall and two would be located in a terminal expansion at the west end of the existing baggage claim hall. Alternative 4A could be constructed as a first time project, or could be a follow-on project after completion of Alternative 3. The remainder of this discussion will describe the project as if it is a first time project.

The west terminal expansion would include two claim carousels, one of which would have two remote feed conveyors. One of these feed conveyor lines could be configured to have a load position in the FIS hall. An enclosed connector is shown on the figure, which would lead terminating passengers from the Federal Inspection Station (FIS) hall to the claim hall. A Baggage Service Office (BSO) would be constructed adjacent to the western-most carousel on the west side of the terminal expansion. The alternative also provides space for concessions, a vertical circulation element and relocated restrooms between the new claim carousel, and the existing claim hall.

To accommodate the tug/cart operations, the airside tug roadway would be relocated west of Gate 5. The aircraft position at Gate 5 would be relocated slightly east. The repositioning of the airside tug roadway would require reconfiguration of some of the existing space on Level 1 of the concourse. This alternative would enable significant improvements to the airside tug road, thereby providing enough space to allow tug/cart trains to move through the space without causing congestion.

This alternative also includes expansion and enclosure of non-public terminal space along at the west and east ends of the baggage roadway area where the remote feed conveyors would be located. Two remote feed conveyor lines would be provided for the west and east carousels. The two middle carousels would be provided with one remote feed conveyor line.

Facility Requirements

With four slope-plate carousels, there would be sufficient capacity to accommodate up to 16 narrow-body air carrier aircraft and four regional jets arrivals (or an equivalent mixture) during the peak hour. With the planning layout of the carousels and the remote feeds as well as the increased spaces on the airside tug roadway, this alternative would provide sufficient capacity to meet projected passenger demands through 2030, which is the end of the study period.

Safety and Standards

The baggage handling system and terminal expansion would be designed/installed in accordance with FAA, ATA, NEC, NFPA, CEMA, and OSHA standards.

NEPA

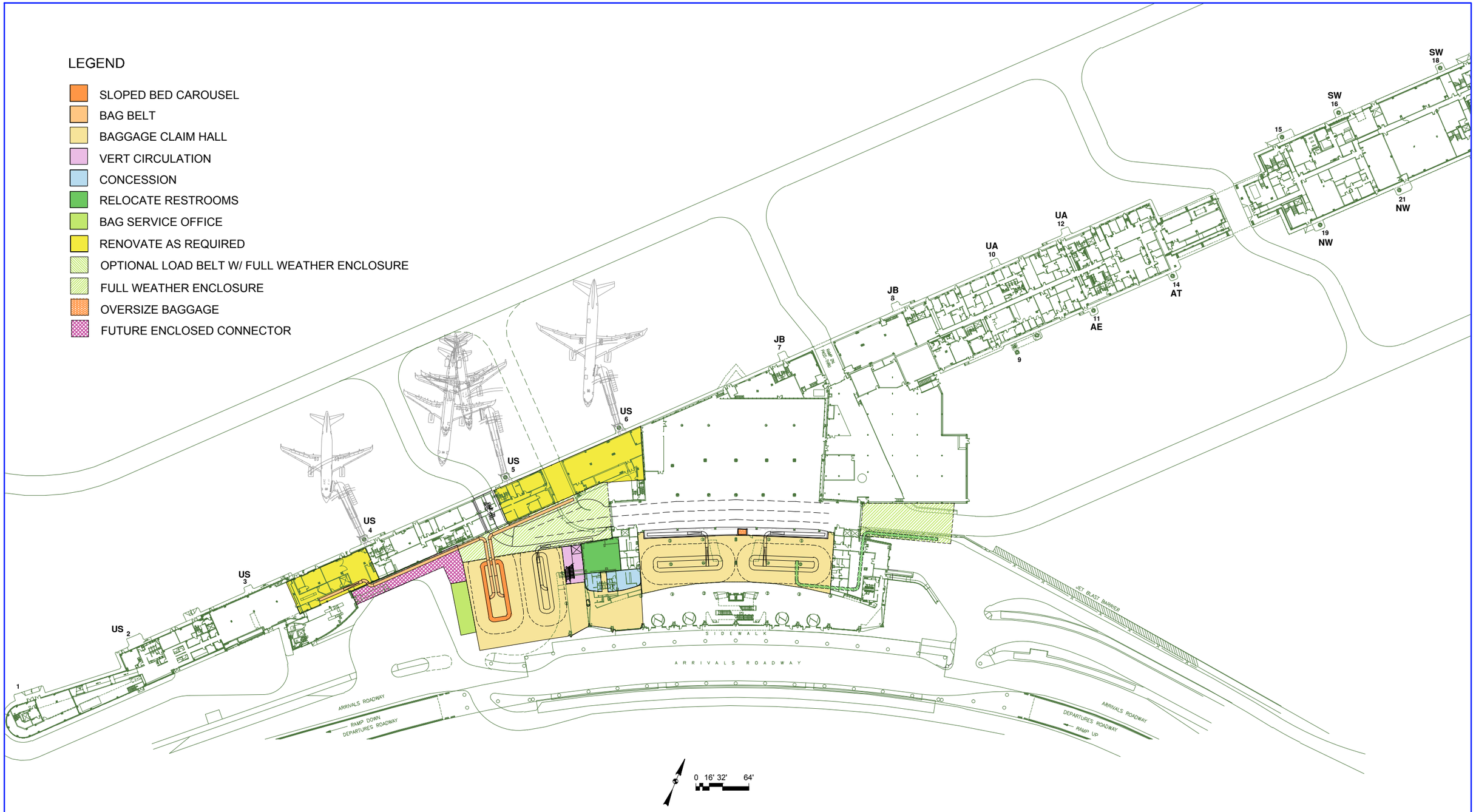
The environmental documentation requirements for implementation of Alternative 4A would be an EA.

LEVEL 1 - ALTERNATIVE 4A

FIGURE 6-9

LEGEND

- SLOPED BED CAROUSEL
- BAG BELT
- BAGGAGE CLAIM HALL
- VERT CIRCULATION
- CONCESSION
- RELOCATE RESTROOMS
- BAG SERVICE OFFICE
- RENOVATE AS REQUIRED
- OPTIONAL LOAD BELT W/ FULL WEATHER ENCLOSURE
- FULL WEATHER ENCLOSURE
- OVERSIZE BAGGAGE
- FUTURE ENCLOSED CONNECTOR



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Financial Feasibility

The estimated construction cost for Alternative 4A is $27 million. The overall program cost including design and other soft costs is estimated to be $37 million. Though the cost of this alternative is higher than Alternative 3, it meets the projected passenger demand through 2030 and would not require additional funding to meet future demand beyond the 2025 period.

Sustainability

Construction of the proposed terminal expansion could be designed to maximize the use of local resources, thereby minimizing transportation costs and impacts. Furthermore, the proposed terminal expansion and renovation provides an opportunity to invest in the latest energy efficiencies in terms of lighting, signage, and HVAC.

Level 1 - Long-Term A Expansion

Figure 6-10 illustrates a potential layout for long-term expansion of the baggage claim hall beyond the capacity provided with Alternative 4A and beyond what is projected as being required through the end of the study period. This alternative would connect with a proposed long-term expansion on Level 2, as described in Section 6.3.2.

This alternative builds upon Alternative 4A and would provide five slope-plate carousels. Two of these carousels would be located in the existing claim hall, two would be located in a building extension to the west of the existing claim hall (as proposed by Alternative 4A), and a fifth carousel would be provided in a building extension to the east. The primary issues associated with this alternative are the constraints it would impose on the loading dock and the tight maneuvering area for trucks accessing the loading dock. Further study would be required to resolve all issues associated with this terminal function.

Preferred Level 1 Alternative

Alternative 3 will meet projected demand for baggage claim carousels and public claim area through 2025. Alternative 4A will meet demand through 2030 by adding one more claim carousel. It may be more cost effective and less disruptive for Alternative 4A to be constructed in conjunction with a Level 2 alternative than to build Alternative 3 and then expand baggage claim a second time for one additional claim carousel.

Furthermore, there is the option of building the terminal space required for Alternative 4A, but initially installing only one additional carousel and then adding the second carousel when increased passenger demand dictates. A further assessment of the cost effectiveness of this approach should be undertaken when a terminal expansion is being considered. However, for the purpose of this master plan update Alternative 4A is the preferred Level 1 alternative.

6.3.2 Level 2

Facility Requirements and Key Considerations

Chapter 5 *Facility Requirements* presents the facility requirements for all of the various functions in the passenger terminal. With respect to functions on Level 2, Chapter 5 *Facility Requirements* projects that the existing passenger security screening checkpoint will not be

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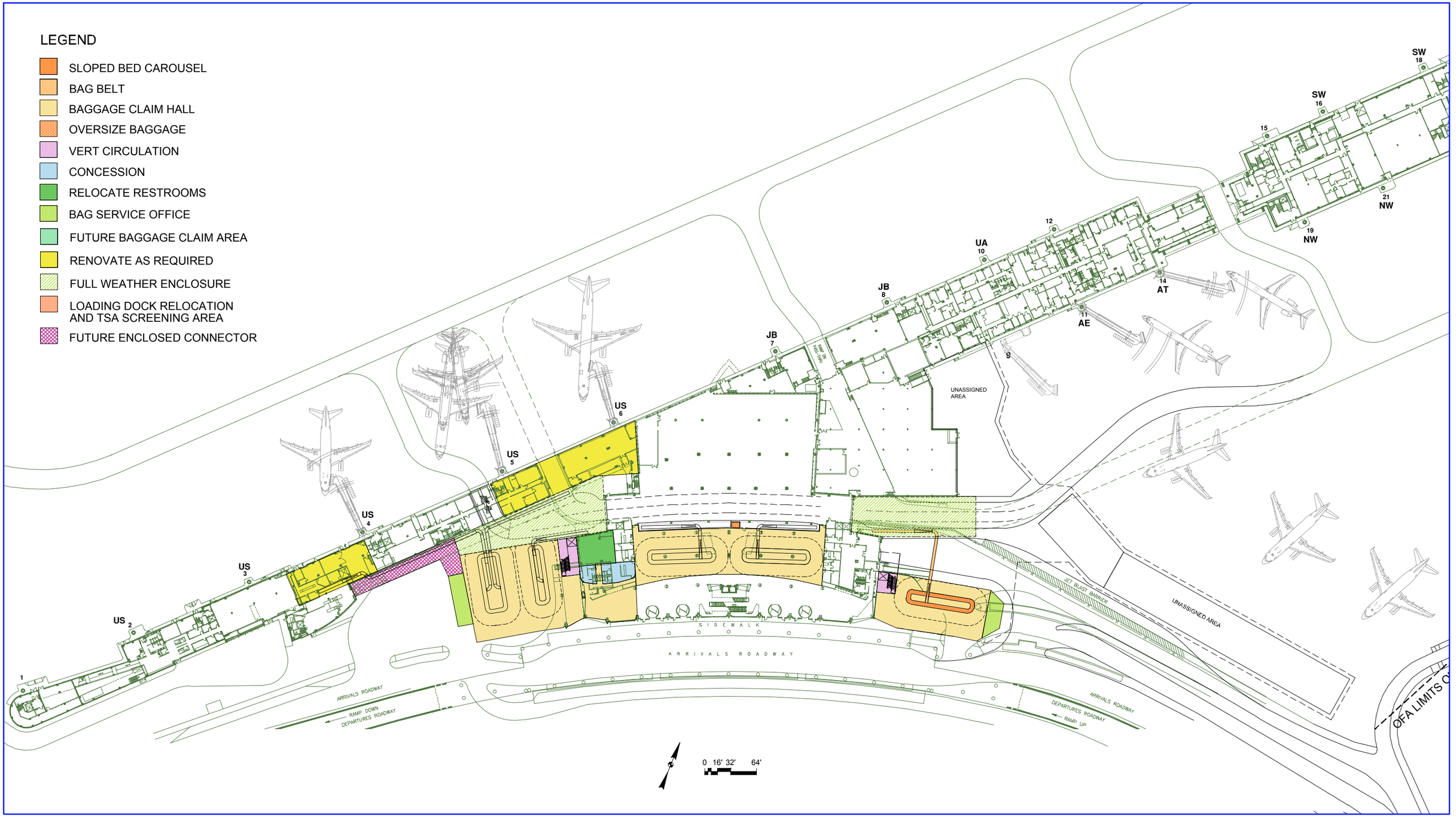
LEVEL 1 - LONG-TERM A EXPANSION

FIGURE 6-10

LEGEND

- SLOPED BED CAROUSEL
- BAG BELT
- BAGGAGE CLAIM HALL
- OVERSIZE BAGGAGE
- VERT CIRCULATION
- CONCESSION
- RELOCATE RESTROOMS
- BAG SERVICE OFFICE
- FUTURE BAGGAGE CLAIM AREA
- RENOVATE AS REQUIRED
- FULL WEATHER ENCLOSURE
- LOADING DOCK RELOCATION AND TSA SCREENING AREA
- FUTURE ENCLOSED CONNECTOR



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adequate to meet peak hour demand if the forecasted level of passengers is attained during the study period. The facility requirements identified a need for 12 security screening lanes by 2020 and 14 lanes by 2030. This represents an increase of two and four more additional lanes, respectively, over the 10 lanes that currently exist.

Another facility requirement identified on Level 2 was the desire to provide non-secure access to airport management offices and the ability to provide additional vertical transfer points to future expansions of baggage claim areas on Level 1. Other facility requirements identified were additional concessions space and additional restroom space. The need for additional concessions and/or restroom space will ultimately be determined by future passenger demand. A review of existing restroom facilities indicates that a shortage of facilities does not currently exist. Therefore, additional space created in alternatives for Level 2 focused on dedicating additional space to concessions use. This issue should be revisited when the planning and design process for specific projects has begun

Alternatives Reviewed but not Considered

A series of alternatives (Alternatives 1, 2 and several variations within each) were developed for Level 2 of the passenger terminal. These alternatives focused on locations and configurations for expansion of the passenger security screening and then provided potential expansions of other facilities in conjunction with the new space created for security screening. Alternatives that were created and reviewed with airport management, but not considered further include the following:

Level 2 - Alternative 1 proposed the expansion of the existing security screening checkpoint in its current location by expanding eastward into the adjoining gift shop area. Surrounding space including concessions and restrooms would be redesigned to accommodate this expansion. This alternative also proposed the relocation of airport administration space from its current location to a newly expanded area on the west side of the terminal extending from the front of the ticket lobby to the concourse. This would provide non-secure access to airport administrative offices and would allow the area currently occupied by airport administration to be redeveloped for additional concessions use.

Level 2 - Alternative 2 proposed that an expansion be constructed on the east side of the terminal to allow a new security screening checkpoint, with up to nine lanes, to be constructed in an orientation that places the security lanes adjacent to the existing east ticket lobby. A new circulation corridor would allow passengers exiting the security screening checkpoint to proceed to the concourse while passing by the existing food court. The new circulation corridor would use space currently occupied by the existing airport administration offices.

This alternative also included an additional vertical transfer adjacent to the Southwest Airlines ticket counter that would allow arriving passengers to use this corridor as an alternate route to the baggage claim lobby. The existing central security screening checkpoint would be reduced in size to the easternmost five lanes. The remainder of the existing security checkpoint would be redeveloped for airport administration offices and concessions. This alternative provided non-secure access to the relocated airport administration offices.

Level 2 – Alternative 2A proposed new security screening checkpoints on the east and west sides of the terminal. It also proposed that the existing central security checkpoint be redeveloped for a combination of concessions and airport administration offices. This

alternative is very similar to Alternative 2B, which is described and illustrated on the following pages. The primary difference between the two alternatives is that Alternative 2A proposed the security screening checkpoint on the east side of the ticket lobby in a north south orientation, while Alternative 2B proposed that the security screening checkpoint be configured in a northeast/southwest orientation to achieve passenger flow efficiencies with any future concourse expansion.

Alternatives Brought Forward for Review

Alternatives brought forward for review were Alternative 1A, 2B and 2B with long term expansion. Each is described below.

Level 2 - Alternative 1A

Figure 6-11 presents Alternative 1A. This alternative proposes an expansion on the west side of the terminal to accommodate a secondary passenger security screening checkpoint. The checkpoint would provide four additional lanes to meet facility requirements and is designed to accommodate passengers using the ticket counters on the west side of the ticket lobby. This would provide a quick and direct route for passengers using gates on the west end of the concourse and would improve the utilization of concessions at the west end of the concourse.

This alternative also provides an additional vertical transfer point that would provide arriving passengers with direct access to the expanded baggage claim area proposed by Alternatives 3 and 4A on Level 1. Finally, this alternative would provide additional space that could be used for future concessions.

Facility Requirements

This alternative meets the facility requirements for four additional security screening lanes and additional space for concessions in the long-term. This alternative does not provide non-secure access to airport administrative offices. However, this need can be alleviated when used in conjunction with the proposed airport administrative conference room proposed in all alternatives for Level 1.

Safety and Standards

Construction would be designed to building code standards and would maintain a high level-of-service standard for passengers by increasing the number of security screening lanes as the number of passengers increase in future years. No safety issues were identified with implementation of this alternative.

NEPA

The environmental processing required for this action will most likely be an EA and would be conducted in conjunction with the environmental clearance for Alternative 3 on Level 1.

Financial Feasibility

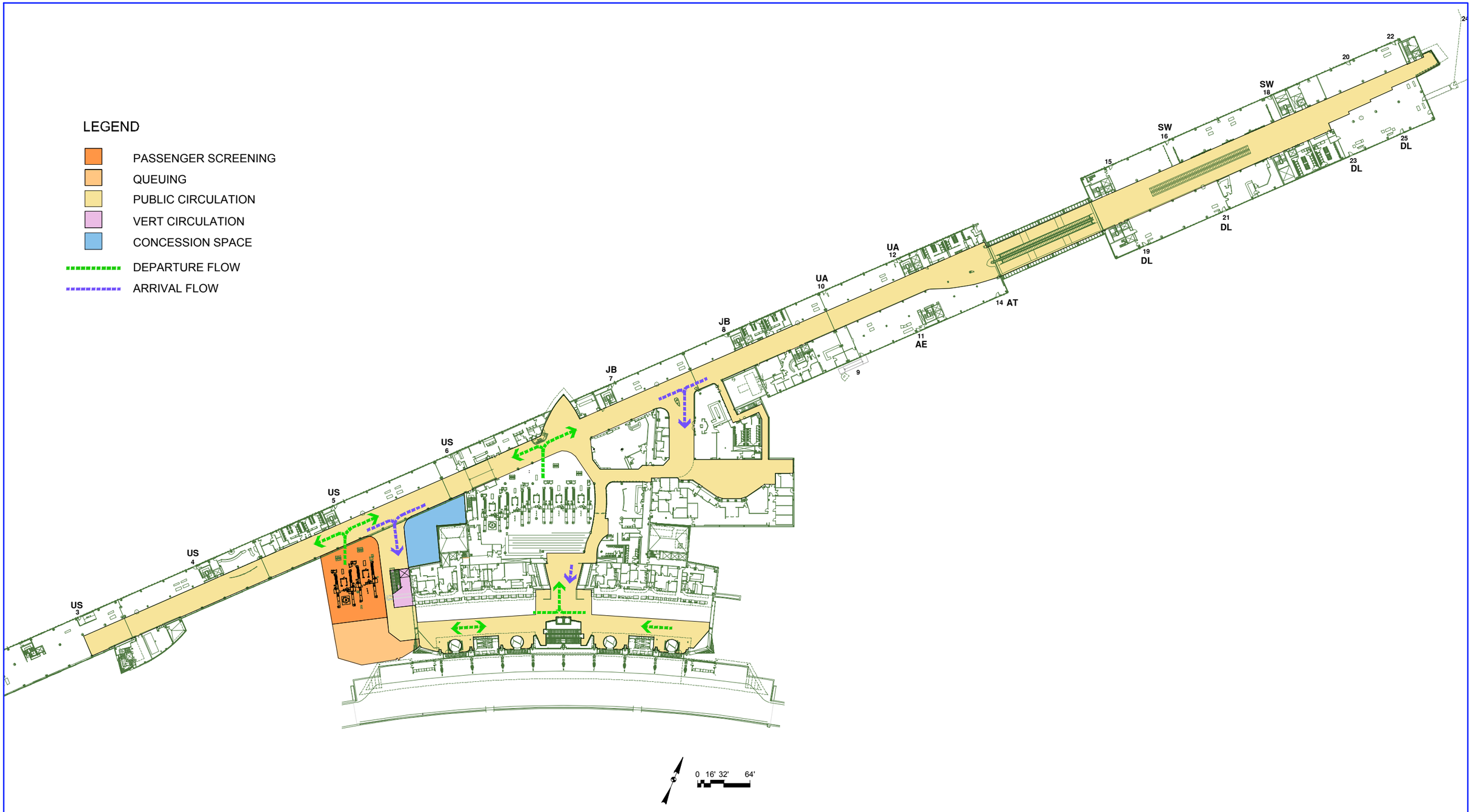
The estimated construction cost for Alternative 1A is approximately $10.4 million. With design and soft costs included, the estimated cost is approximately $14.3 million. It should be noted

LEVEL 2 - ALTERNATIVE 1A

FIGURE 6-11

LEGEND

- PASSENGER SCREENING
- QUEUING
- PUBLIC CIRCULATION
- VERT CIRCULATION
- CONCESSION SPACE
- DEPARTURE FLOW
- ARRIVAL FLOW



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that this cost would be reduced if designed and constructed in conjunction with Alternative 3 on Level 1.

Constructability

Construction of Alternative 1A would be fairly straightforward. The construction would not displace any current uses inside the terminal, thereby minimizing impacts on existing operations. The alternative would displace existing parking located on the west side of the terminal.

Sustainability

This terminal project would provide an opportunity to design refurbished areas to the latest standards for energy efficiency and to use sustainable building materials.

Level 2 - Alternative 2B

Figure 6-12 presents Alternative 2B. This alternative proposes expansion on the east and the west sides of the terminal to accommodate passenger security screening checkpoints. The checkpoint on the west side would provide six lanes, while the security checkpoint on the east side would provide eight lanes. The combination of both checkpoints would meet the long-term facility requirement for 14 lanes.

By relocating the security screening checkpoint to the outside of the ticket lobby from its current location beyond the center of the ticket lobby, departing passenger flows would be separated from arriving passenger flows. This would decrease congestion at the front and center of the terminal and would allow the center of the terminal to be redeveloped for non-secure airport administration space and concessions if, and when, needed.

This alternative would provide three possible vertical transfer points for arriving passengers heading to baggage claim. Arriving passengers could use new vertical transfer points at the east and west ends of the terminal in addition to the existing vertical transfer in the center of the terminal.

The primary advantage of this alternative is that it provides distinct arriving and departing passenger flows and provides significant flexibility regarding redevelopment options in the center of the terminal. The primary disadvantage of this alternative is that TSA staffing requirements would increase due to the multiple points of exiting secure areas.

Although not depicted in **Figure 6-12**, another option with this alternative would be to expand ticket frontage and close the existing corridor for arriving passenger in the center of the terminal. This provides another option for accommodating future growth if it deviates from the facility requirements identified by this master plan.

Facility Requirements

This alternative meets the facility requirements for four additional security screening lanes and additional space for concessions in the long-term. This alternative also provides non-secure access to airport administrative offices.

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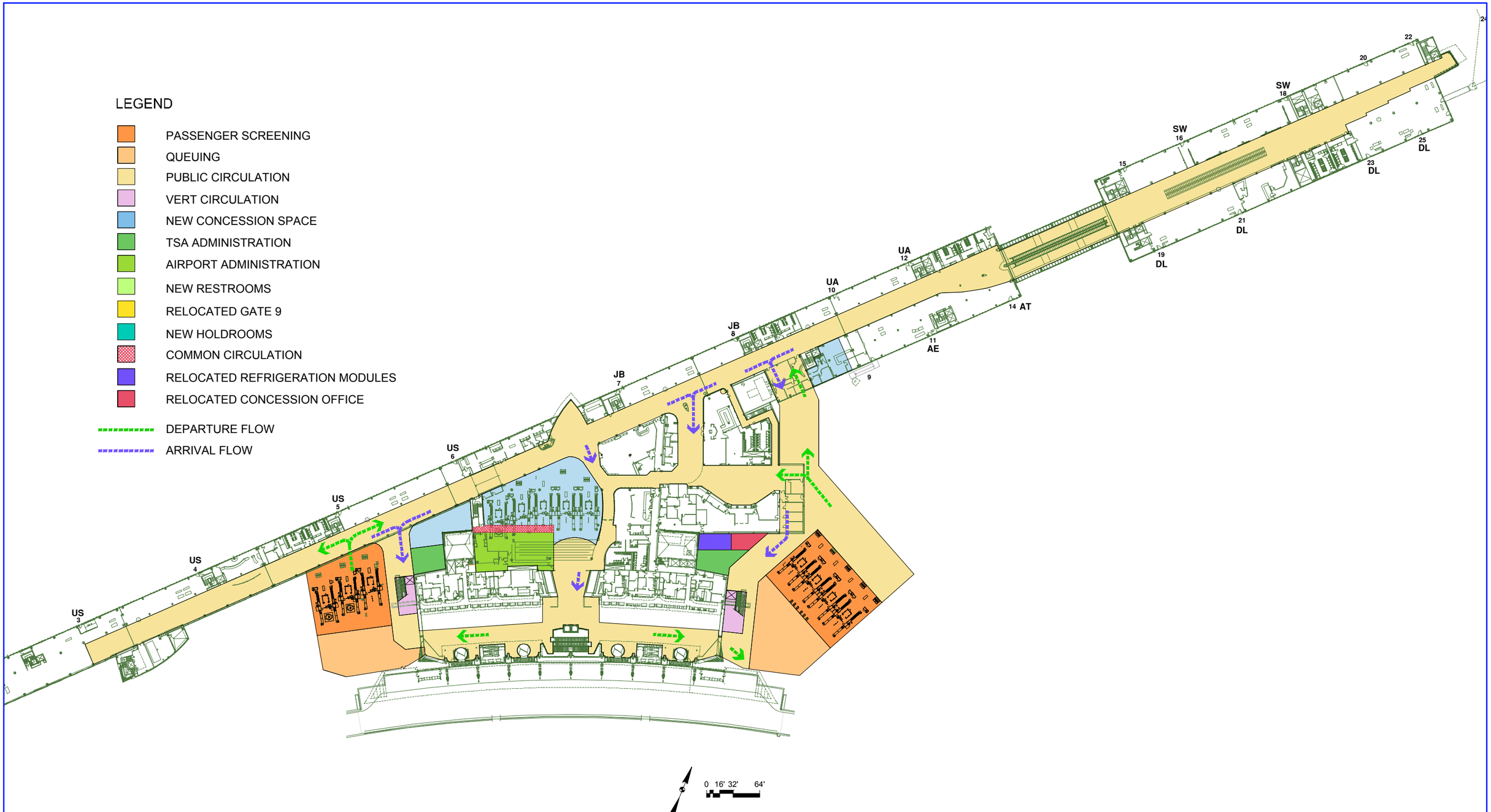
LEVEL 2 - ALTERNATIVE 2B

FIGURE 6-12

LEGEND

- PASSENGER SCREENING
- QUEUING
- PUBLIC CIRCULATION
- VERT CIRCULATION
- NEW CONCESSION SPACE
- TSA ADMINISTRATION
- AIRPORT ADMINISTRATION
- NEW RESTROOMS
- RELOCATED GATE 9
- NEW HOLDROOMS
- COMMON CIRCULATION
- RELOCATED REFRIGERATION MODULES
- RELOCATED CONCESSION OFFICE
- DEPARTURE FLOW
- ARRIVAL FLOW



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Safety and Standards

Construction would be designed to building code standards and would maintain the level of service standards for passengers by increasing the number of security screening lanes as the number of passengers increase in future years. No safety issues were identified with implementation of this alternative.

NEPA

The environmental processing required for this action will most likely be an EA and would be conducted in conjunction with the environmental clearance for Alternative 3 or 4A on Level 1.

Financial Feasibility

The estimated construction cost for Alternative 2B is approximately $41 million. With design and soft costs included, the estimated cost is approximately $56 million. It should be noted that this cost would be reduced if designed and constructed in conjunction with Alternative 4A on Level 1. Nonetheless, this project represents a significant financial commitment and would need to be evaluated from a financial feasibility perspective when passenger growth warrants its consideration.

Constructability

Alternative 2B entails construction of a significant amount of new space outside the footprint of the existing passenger terminal. Consequently, these new areas could be constructed without significant impacts to existing functions inside the terminal. A review of the aircraft parking position at Gate 9 confirmed that this alternative would not preclude the use of that gate by air carrier aircraft.

The primary impacts associated with the construction of this alternative would be on existing parking on the west side of the terminal and the loading dock area on the east side of the terminal. Construction on the east side would need to consider the maneuvering requirements of trucks at the loading dock. It should be noted that Alternative 2B could be constructed without associated development on Level 1, thereby maintaining most of the existing access to the loading dock. Development on Level 1 would only become a factor if long-term demand necessitated the development of the Long-Term A Alternative that proposes another baggage claim device on the east side of the terminal.

Sustainability

This terminal project would provide an opportunity to design refurbished areas to the latest standards for energy efficiency and to use sustainable building materials.

Level 2 - Alternative 2B with Long-Term Expansion

Figure 6-13 shows a potential long-term expansion of Alternative 2B with additional gates. While a requirement for additional gates is not forecasted within the study period, this alternative shows a basic concept for how they could be accommodated. Additional gates beyond those depicted in the figure would require that the proposed concourse eventually turn parallel to the existing east concourse.

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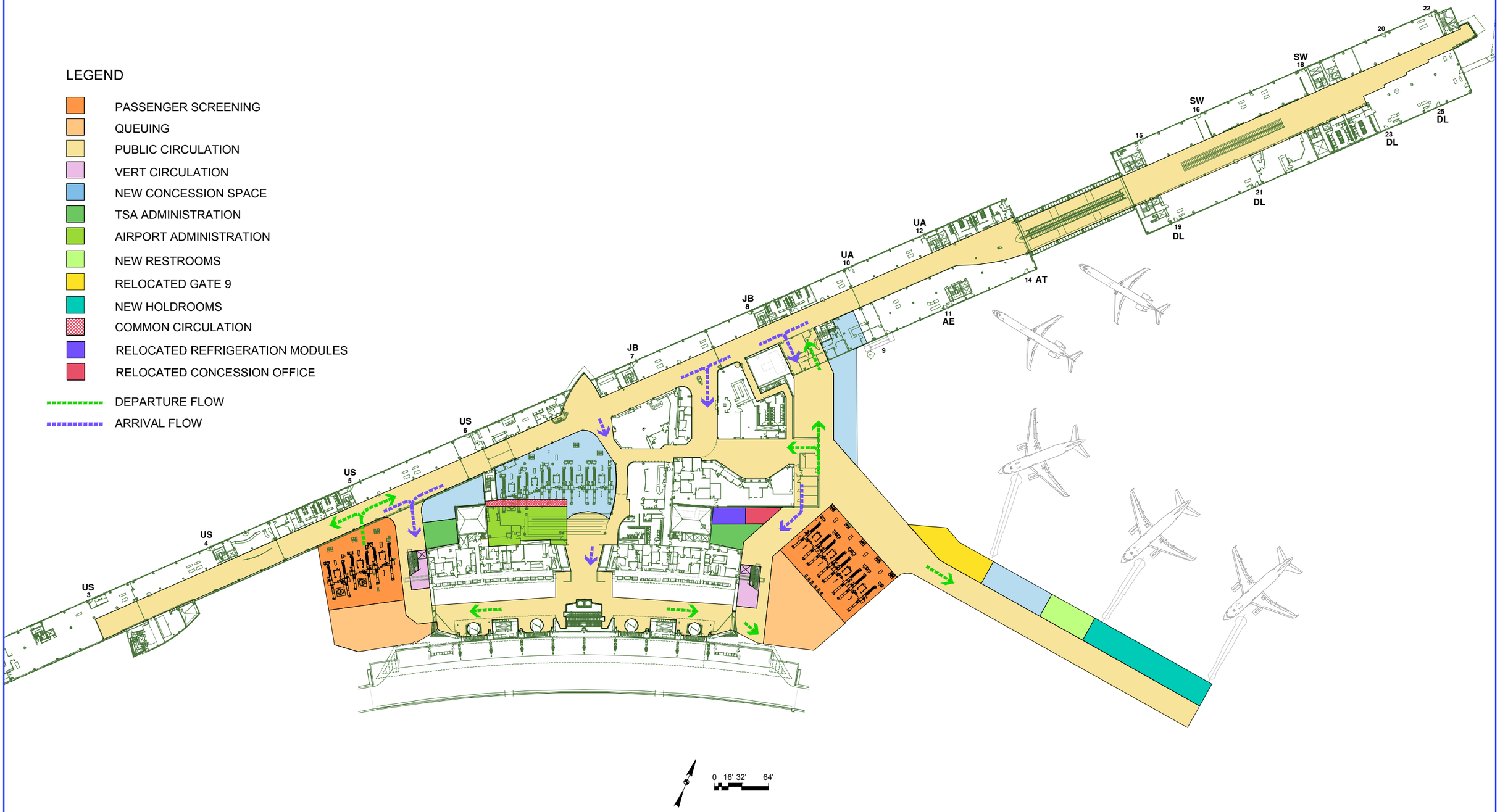
LEVEL 2 - ALTERNATIVE 2B - LONG-TERM EXPANSION

FIGURE 6-13

LEGEND

- PASSENGER SCREENING
- QUEUING
- PUBLIC CIRCULATION
- VERT CIRCULATION
- NEW CONCESSION SPACE
- TSA ADMINISTRATION
- AIRPORT ADMINISTRATION
- NEW RESTROOMS
- RELOCATED GATE 9
- NEW HOLDROOMS
- COMMON CIRCULATION
- RELOCATED REFRIGERATION MODULES
- RELOCATED CONCESSION OFFICE
- DEPARTURE FLOW
- ARRIVAL FLOW



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Preferred Level 2 Alternative

The preferred alternatives for Level 2 is Alternative 1A to meet mid-term demand and Alternative 2B to meet longer-term demand. While Alternative 1A meets the needs for additional security screening capability, Alternative 2B provides additional flexibility for accommodating other long-term needs such as non-secure access to airport administration and significant additional space for concession growth.

6.3.3 Ticket Lobby

Facility Requirements and Key Considerations

Chapter 5 *Facility Requirements* noted that demand for airline ticket offices and ticket counter queuing is not projected to exceed capacity of the existing terminal throughout the study period. However, congestion does occur in portions of the ticket lobby, especially in front of the Southwest Airlines counter due to the high percent of their passengers that check bags and peaking associated with bus operations. Consequently, alternatives were examined to provide additional space in the lobby for passenger circulation behind queuing areas and to accommodate the potential for self checking of baggage in the future. These alternatives assume that some consolidation of existing ticket counter space will occur as a result of the Continental/United merger and the acquisition of AirTran by Southwest Airlines.

Alternatives Reviewed but not Considered

There were no alternatives reviewed but not considered.

Alternatives Brought Forward for Review

Ticket Lobby alternatives assessed included Alternatives 1 and 2. Each is described in the following paragraphs.

Ticket Lobby – Alternative 1

Figure 6-14 presents Alternative 1. It consists of providing an area for self-checked baggage on the west side of the ticket lobby. This space would consist of an area for passenger queuing, two kiosks for obtaining/printing baggage tags, and a place where a customer agent or security personnel would check passenger photo identification before baggage is placed on a conveyor leading to outbound baggage make-up area. This alternative uses an existing oversize baggage belt for the transfer of self-checked baggage to the outbound baggage make-up area.

In addition to the area for self-checked baggage, this alternative also proposes the redesign of the existing ticket counter area on the east side of the ticket lobby to increase the depth between the ticket counter and the front of the passenger terminal, thereby increasing the area for passenger circulation and alleviating peak period congestion. This increase of space could be achieved through a trade-off of less space for airline ticket office.

The front of the ticket counters would be located where the wall behind the baggage conveyors is currently located. This would provide approximately 14 feet of additional depth on the east side of the ticket lobby. Airline ticket office space would decrease by 14 feet, although there is potential to replace a portion of this lost space toward the rear of the terminal. This alternative

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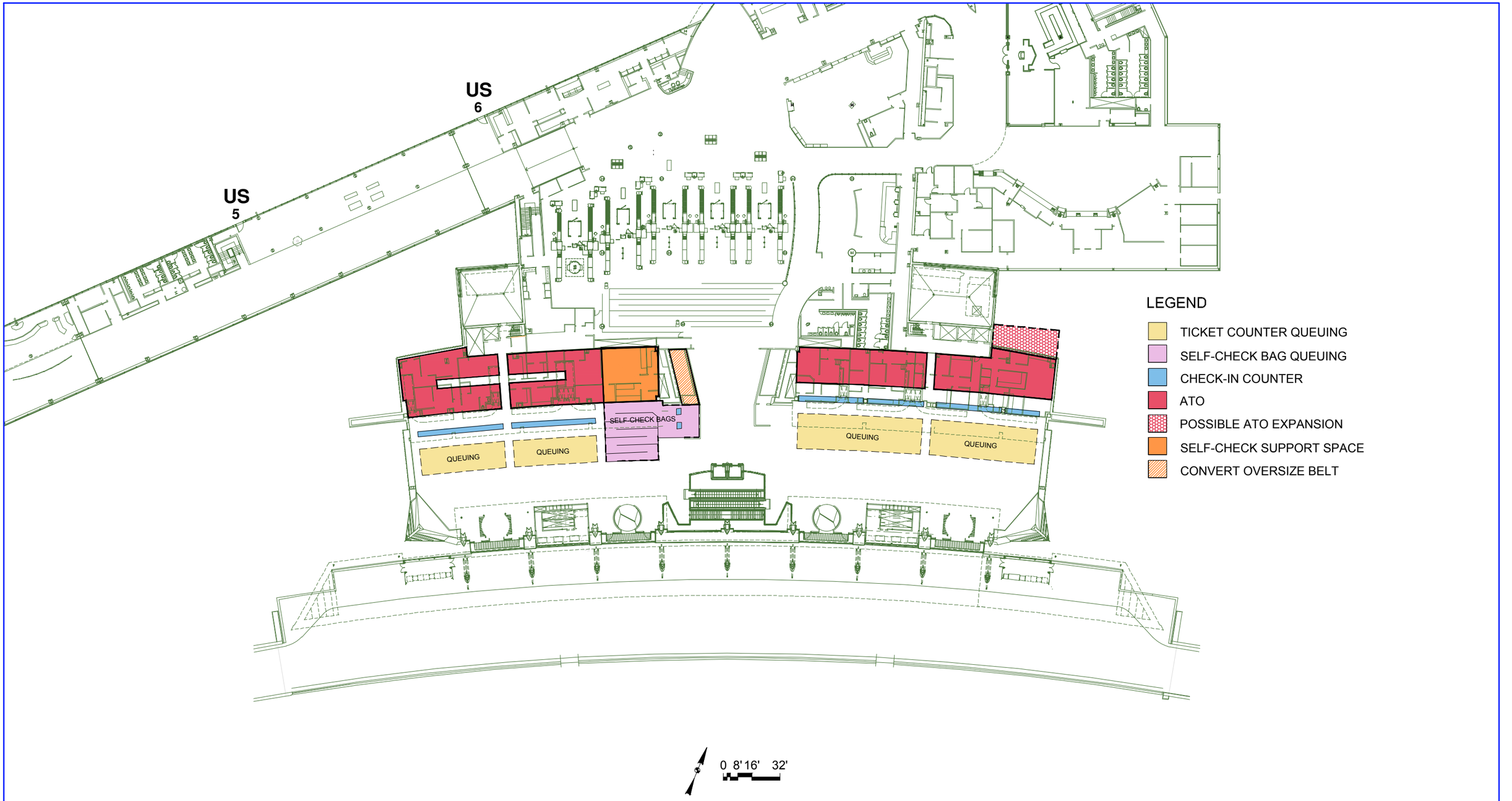
LEVEL 2 - TICKET LOBBY - ALTERNATIVE 1

FIGURE 6-14



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is more viable and cost effective when considered in conjunction with the previously described expansions for Level 2.

Ticket Lobby – Alternative 2

Figure 6-15 presents Alternative 2. Alternative 2 proposes the same changes as Alternative 1 except that the area for self checked baggage would be on the east side of the terminal instead of the west side. The benefits of placing the self-checked baggage area on one side of the lobby versus the other will ultimately depend on the individual airline space requirements and the arrangement of airline ticket offices. Nonetheless, these two alternatives present potential configurations for accommodating this function and increasing circulation area in the ticket lobby.

Facility Requirements

A requirement for self-checked baggage was not identified as a facility requirement in Chapter 5 *Facility Requirements*. Consequently, the proposed alternatives exceed currently identified needs. With regard to the relocation of ticket counters, both alternatives would help reduce congestion inside the ticket lobby. While the proposed action provides a modest amount of additional circulation area, a more significant increase of public circulation area could only be achieved through a more extensive and expensive redesign of the ticketing function. Such a program would exceed the needs identified at this time.

Safety and Standards

The construction of a self-checked baggage area and ticket counter relocation would be designed to building code standards and would increase the level of service standards for passengers by increasing the amount of circulation space. Standards established by the FAA and TSA in the future would be followed for the construction of the self-checked baggage areas.

NEPA

The environmental processing required for this action will depend on whether the project is undertaken as part of a larger terminal improvement program or as a standalone project. If it is conducted as part of a larger terminal program it may require an EA. If it is conducted as a standalone project, it would likely be a Categorical Exclusion.

Financial Feasibility

The estimated construction cost for Alternative 1 is $4.2 million. The estimated construction cost for Alternative 2 is $6.1 million. Alternative 1 has greater financial viability not because of the lower cost, but its compatibility with the recommended Level 2 development option.

Constructability

The primary issues associated with construction of either Alternative 1 or Alternative 2 would be phasing and the need to keep existing ticketing functions operational while construction occurs. Depending on the time of year that construction is scheduled, it may be possible to use the curbside check-in areas to obtain the additional space needed during the construction process.

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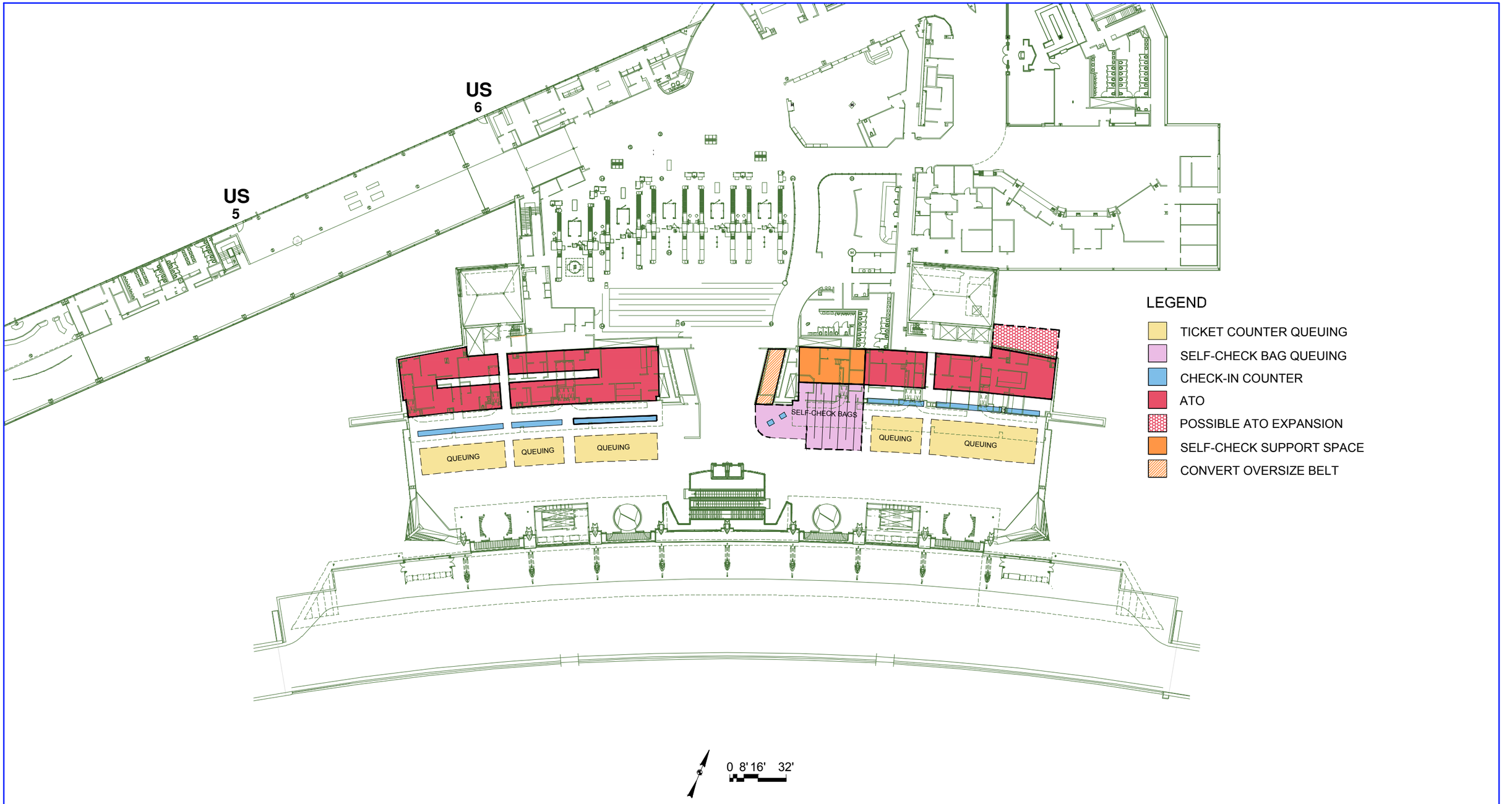
LEVEL 2 - TICKET LOBBY - ALTERNATIVE 2

FIGURE 6-15



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Sustainability

This terminal project would provide an opportunity to design refurbished areas to the latest standards for energy efficiency and to use sustainable building materials.

Preferred Alternative

A preferred alternative was not identified for this terminal function. The need for self-checked baggage function has not yet been determined in the industry. Pilot projects are currently being evaluated at a few airports, but final standards for self-checked baggage have not yet been established by the FAA or the TSA. Consequently, the two alternatives presented here can be considered further once final standards have been established and a consensus developed regarding the desirability of establishing a self-checked baggage are at BNIA.

6.3.4 Holdrooms

Facility Requirements and Key Considerations

Chapter 5 *Facility Requirements* examined and presented the facility requirements for departure holdrooms for key years throughout the study period. The analysis concluded that although there is currently excess holdroom space and several holdrooms are currently unoccupied, the excess space will decrease throughout the planning period as average aircraft size increases and more passengers must depart from the same size holdrooms. By 2030, the deficiency of holdroom space is estimated to exceed 4,000 square feet. The amount of the deficiency will vary from holdroom to holdroom, with certain holdrooms experiencing deficiencies of up to 35 percent.

Table 6-2 presents a breakdown of the holdroom space requirements and their deficiencies by gate. The table also presents the proposed addition to resolve these deficiencies. In cases where the space deficiency is 10 percent or less, no additional space is recommended. In certain cases, the deficiency can be handled by using space in adjoining areas. This is true for Gates 2 and 3, which can use excess space in the Gate 1 holdroom.

Table 6-2 PROPOSED CORRECTION OF DEFICIENT HOLDROOM AREAS

Gates	Forecast Aircraft[1]	Existing Area (SF)	Required Area (SF)	Difference (SF)	% (+-)	Proposed Addition (SF)	Revised Area (SF)	% (+-)	Notes
1	763	4,871	3,792	1,079	22	0	0	0	--
2	CR7	1,005	1,355	-350	-34	0	0	0	[2]
3, 4	E190 & 320	3,472	4,170	-698	-20	0	0	0	[2]
5, 6	321 & 319	3,784	5,106	-1,322	-35	860	4,644	-9	--
7, 8	E190 & 320	3,799	4,282	-483	-13	860	4,659	8	--
9, 11	737 & CR7	3,790	3,950	-160	4	0	0	0	--
10, 12	320 & 319	3,802	4,472	-670	-18	860	4,622	4	--
14	CJ9	1,613	1,644	-31	-2	0	0	0	[3]
15, 16, 18	738, 73G & ERJ 145	5,704	6,365	-661	-12	1,320	7,024	10	--
19, 21	738 & CR9	4,540	4,033	507	22	0	0	0	--
20, 22	737 & CR7	3,405	3,950	-545	-16	644	4,049	4	--
23, 24, 25, 26	738, CR9 & 2-Q400	6,232	6,991	-759	-12	800	7,032	1	--

Notes: [1] *Based on recommended future aircraft gate assignments from Chapter 5 Facility Requirements, Table 5-25.*
[2] *Gates 2, 3, and 4 holdrooms can share excess area available in the Gate 1 holdroom.*
[3] *Correction of holdroom area deficiencies is not recommended for areas 10 percent or less deficient.*

Holdroom Expansion Alternative

Only one alternative was prepared for resolving holdroom space deficiencies. It is shown in **Figure 6-16**. The figure depicts potential expansions of the holdrooms along most gates on the north side of the concourse. No expansions are recommended on the south side of the concourse, because those holdrooms are deeper and larger. However, one additional holdroom expansion is recommended on the east end near Gate 25.

Facility Requirements

This alternative provides a way of meeting the facility requirements for holdrooms that have a space deficiency of more than 10 percent.

Safety and Standards

The holdrooms expansions would be designed to building code standards and would increase the level of service to passengers by increasing the amount of space per passenger.

NEPA

The environmental processing for this action would likely be a Categorical Exclusion. The purpose of the proposed project will be to address existing space deficiencies rather than facilities to accommodate additional flights.

Financial Feasibility

The estimate construction cost of this alternative is $5.2 million.

Constructability

The primary issues associated with construction of holdroom expansions will be phasing expansion and the need to accommodate flights at another gate while construction is occurring. This may necessitate use of additional areas, such as Gate 1 during construction. Another factor to consider is the need to contain work areas between active gates and ramp operations.

Sustainability

Expansion of departure holdrooms will offer opportunities to meet building efficiency requirements through high efficiency lighting, as well as glazing that meet heat and solar efficiency standards.

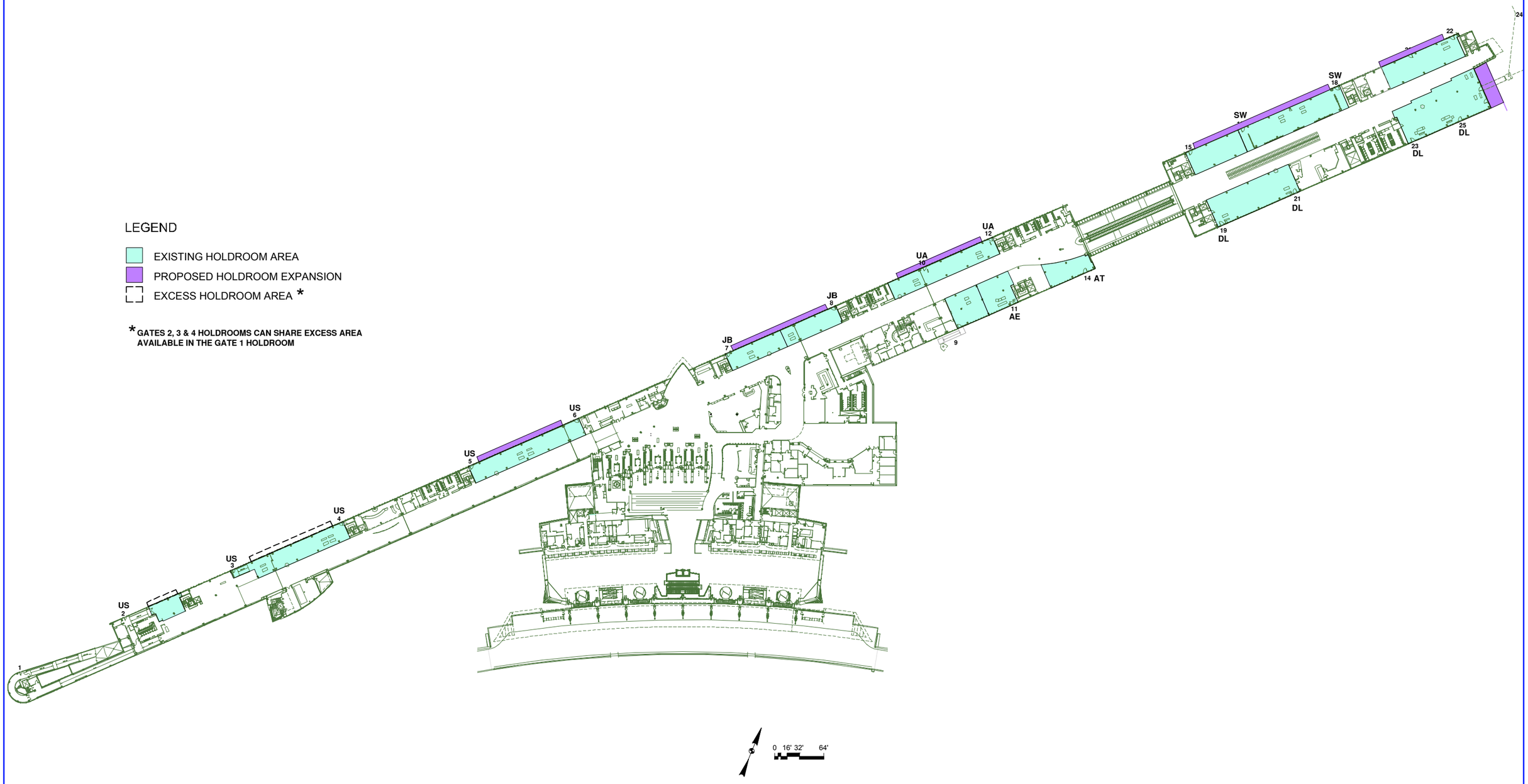
LEVEL 2 - HOLDROOM EXPANSION

FIGURE 6-16

LEGEND

- EXISTING HOLDROOM AREA
- PROPOSED HOLDROOM EXPANSION
- EXCESS HOLDROOM AREA *

* GATES 2, 3 & 4 HOLDROOMS CAN SHARE EXCESS AREA AVAILABLE IN THE GATE 1 HOLDROOM



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6.4 TERMINAL ROADWAY AND PARKING

This section discusses options to improve internal roadway circulation and to address parking needs over the next twenty years. In the case of BNIA, the two elements are interdependent as the existing areas used for parking and automobile circulation is small. As a result, the alternatives developed for this section combine both roadway and parking improvements.

6.4.1 Terminal Roadway and Parking Considerations

Evaluating both roadway and parking options was complicated due to their interdependencies, however, several key issues arose for each element that addressed separately, provided a clear understanding of the limited options available to address both. This section outlines the facility requirements for each element and development options that were considered, but not brought forward for this analysis.

Terminal Roadway Facility Requirements and Key Considerations

Facility requirements and key considerations for the roadways are focused on two areas; the circulation loop road traffic, and the entering and exiting traffic between the terminal road system and public roads (Kensington Expressway and Genesee Street)

With increased vehicle traffic in addition to the capacity constraints at the entrances and exits of the terminal roadway system, this analysis explores options to enhance the capacity as well as improve the functionality of the terminal loop roadway system. Key requirements addressed in the terminal loop roadway alternatives included:

- Protect or improve customer experience
- Reduce vehicle circulation
- Limit decision points
- Minimize areas of merging/converging/weaving traffic
- Enhance safety and keep vehicles traveling at safe speeds

To ensure a positive customer experience, the goal for the entrances and exits to the airport is to provide safe and efficient ingress/egress at all times. The primary intersection for airport traffic is the west entrance/exit which connects to the Kensington Expressway. While this intersection is the primary intersection for exiting vehicles at the airport, airport traffic does not comprise a majority of the traffic volume at this intersection. In fact, traffic counts conducted in 2011 revealed that 80% of the traffic flowed between the Kensington and points east on Genesee Street. As this intersection has a marginal level of service today, the facility requirements identified this intersection as receiving a level of service grade of “F” by the 2030 planning year; much of this attributed to the non-airport traffic.

Terminal Roadway Alternatives Reviewed but not Considered

In addition to the constrained terminal area, significant development has occurred along Genesee Street, options for alternate access points are limited along the street. Consideration was given to potentially utilize an abandoned rail bed just south of Genesee Street, behind the various businesses. Two options were initially considered for this route, the first being an extension of the Kensington to an intersection at Holtz Road, the other being an airport exclusive access road extending from the Kensington Expressway.

There were several issues related to diverting traffic from the Kensington Expressway along this abandoned rail bed. First, it would divert the majority of the traffic currently using Genesee Street onto the new extension. This would significantly reduce traffic along Genesee Street and could have a negative economic impact on the numerous businesses along Genesee Street. The second issue is that the new expressway would be located immediately adjacent to a residential neighborhood, which would create concerns for light, noise, and compatible land use.

Following the evaluation of the Kensington Expressway extension, a concept for an airport exclusive access road in the same corridor was considered. An airport exclusive road would have less of an impact than the expressway because the traffic volumes are significantly less and would thus require less infrastructure. An airport exclusive access road would require some business relocations in order to connect from the abandoned rail bed to the terminal. The amount of airport vehicle traffic related to the overall traffic volume is relatively low, making this a costly venture for the airport.

Automobile Parking Facility Requirements and Key Considerations

Planning for future auto parking needs was based on the busiest three months of the year for parking demand. By year 2030, the demand for auto parking is expected to be near 9,700 vehicles, just under 3,200 additional spaces from existing levels. Maximum peak conditions, which persist for up to 30 days during a given year, could require as much as 4,500 additional spaces. For purposes of this assessment, constructing 3,200 spaces is considered the minimum objective. It is assumed the maximum peak demand will continue to be met with overflow or seasonal lots as is the current practice.

A benchmark analysis was conducted for garage parking spaces at comparable airports in the Northeast. Based on that analysis, the result suggested that nearly 4,400 spaces of the 9,676 required by 2030 should be in the form of garage parking.

Automobile Parking Alternatives Reviewed but not Considered

Available land near the terminal is being developed at a rapid pace. If the 3,200 additional parking spaces were constructed as a surface lot, 22 acres of land would be required. As a result, structured garage parking minimizes area requirements and thus, was included in each of the build alternatives based on land constraints and level of service objectives.

Structured parking is a costly investment and a premium is associated with the rates and charges for the convenience of covered parking. Airport parking typically places a premium of spaces closest to the terminal. Having structured parking located further from the terminal is not viable because the revenue premium required to pay for the investment would not be achieved. Therefore, a parking structure in close proximity to the terminal and with a pedestrian friendly layout would be much more viable and appropriate.

6.4.2 Terminal Roadway and Parking Alternatives

Three alternatives were developed for this assessment. Each of the alternatives is discussed in the next sections.

Signage and Striping Improvements (No-Build)

The No-Build alternative involves no physical construction or improvements to the configuration of the existing terminal loop roadway system and is shown in **Figure 6-17**. Differing from a traditional no-build alternative, this alternative does include near-term upgrades to existing signage and pavement striping to enhance driver decision making and vehicle safety on the roadway system.

As with the roadway system, passenger auto parking consists of maintaining each of the existing auto parking lots in the existing space allotment and configuration. While off airport parking lots could potentially be constructed by private parties, this alternative considers the existing capacity of approximately 6,760 NFTA owned spaces, combined with the off-airport parking options, resulting in approximately 8,100 parking spaces.

Facility Requirements

Operational enhancements to the roadway system will provide a slight improvement in the customer experience by enhancing safety in the form of minor tweaks to the roadway system. While these enhancements will help to mitigate some of the areas of merging and weaving traffic, they will not remove them. The number of decision points along the roadway system will also remain at existing levels.

Auto parking also does not meet the facility requirements. Airport parking is already constrained during peak times. The No-Build scenario would have a significant adverse affect on the airport as forecasted demand would not be accommodated within the existing available parking.

Financial Feasibility

There are no major costs associated with this alternative, with the exception of adding signs and additional roadway marking which would have a minimal cost. Despite there being no cost associated with this alternative, there would be a significant cost in the form of lost revenue.

Passenger parking is typically one of the greatest revenue generators for an airport, and forecasts confirm a steady increase in passenger demand. Existing parking facilities are not able to accommodate future demand, particularly in the 2020-2030 timeframe. From a customer service perspective, a shortage of parking could deter passengers from using the airport, resulting in additional revenue loss.

Safety and Standards

Existing intersections and weaving issues present today would not be addressed under the No-Build alternative.

NEPA

With no construction or expansion of any airport facilities, there is no action nor any impacts related to NEPA in this alternative.

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LANDSIDE NO-BUILD ALTERNATIVE

FIGURE 6-17

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Constructability

This alternative involves no physical construction. Pavement markings and signage could be installed with minimal effort and difficulty.

Alternative 1

Landside Alternative 1, shown in **Figure 6-18**, represents an integrated alternative that addresses not only the airport traffic flows, but achieves significant improvements in the traffic flows in the vicinity of the airport. During peak times, the predominant traffic flow is from Genesee Street to/from the Kensington Expressway. The reduction in vehicle turning movements significantly improves the level of service for vehicles traveling between the Kensington and Genesee Street; however, as a result there is no longer a direct flow to/from the airport.

The internal roadway system is modified and abbreviated in Alternative 1. The Long Term A lot is reunited and combined into one lot with the elimination of the tunnel. There are two entrances and exits from the New Long Term A lot allowing customers to access/exit the lot to/from the terminal or Genesee Street to best accommodate all potential vehicle movements. This alternative consolidates traffic into a single central entrance near the terminal; a modified west exit and the existing east exit are maintained. Taxi and shuttle queuing is relocated as a result of the modified roadway system; the new area is located in a similar area on the approach to the passenger terminal. Changes in the roadway and parking facilities also accommodate a larger rental car quick turnaround (QTA) facility. The alternative provides for over 10,000 on-airport parking spaces with the construction of a 4,000 space parking garage and improvements to the Long Term A and B lots.

Facility Requirements

Changes proposed to the roadway system both internal and external meet the prescribed facility requirements previously stated. Alternative 1 improves vehicle flow and circulation while minimizing merges and decision points. While external, non-airport traffic was not a key consideration in this project, this alternative reconfigures the roadway to better meet the requirements of the majority of the drivers currently using the roads near the terminal. However, in this alternative, while the roadway system better serves airport terminal patrons, the ingress and egress from the terminal complex is less direct and less convenient than the existing configuration. Rental car requirements are met by facilitating an expansion of the QTA facility and additional auto parking will allow for an expanded rental car presence in the short term garage. Capacity in front of the terminal will be enhanced by constructing a commercial departure curb on the upper level between the existing roadway and the short term garage.

The additional parking spaces constructed as part of this alternative exceed the facility requirements required to meet the peak season of parking demand. Facility requirements are exceeded due to phasing requirements to facilitate construction. Long Term B must be expanded to facilitate garage construction and roadway modifications within the terminal area. The proposed improvements near the terminal area meet facility requirements resulting in the excess spaces in Long Term B being available to accommodate the maximum demand periods that exist several weeks during the year, typically occurring in March spring break weeks.

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LANDSIDE ALTERNATIVE 1

FIGURE 6-18

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Safety and Standards

All roadway and parking elements (lanes, space width turning radii, signalization etc) in this alternative are designed to the required roadway standards. This alternative enhances safety by offering a significant reduction of vehicle turning movements, weave lanes and by realigning the road with the primary flow of traffic.

NEPA

While offering enhancements to the traffic flow in the surrounding area, there are several elements covered by NEPA that will require and extensive review in an environmental assessment. Primary NEPA elements to be closely evaluated include social impacts, vehicle traffic, construction impacts, air quality and cumulative impacts.

Financial Feasibility

Total project cost for the roadway portion of this alternative was estimated at $25,740,000. On-airport elements of the roadway improvements would be eligible for FAA grants and Passenger Facility Charges (PFC). Off airport improvements would likely be funded through the New York State Department of Transportation.

In order to initiate roadway and garage parking, the Long Term B lot needs to be expanded by approximately 1,000 spaces, which was estimated at $7,500,000. Although the parking will be relocated back to the main garage once it is complete, the investment is not lost as this area can be used for several other uses including overflow parking, lease area for car rental companies to store cars during peak periods, or used by BNIA for storage, materials lay down, etc.

The estimated cost to build a 4,000 car parking garage was estimated at $100,0000,000. FAA does not fund parking garages, thus the cost will be borne by the NFTA. The financial feasibility of the parking garage is contingent upon charging an appropriate premium for the benefit of covered parking. While structured parking typically costs between two and three times as much as surface parking, for airports similar in size to BNIA, a 50% premium over surface parking could be considered reasonable. While the cost to revenue ratio may favor surface parking, it has been noted previously that there is not sufficient land in the vicinity of the terminal to adequately meet facility requirements.

Constructability

The realignment of Genesee Street will require the relocation of Budget Rental Car. While this relocation will add to the project cost, it is not anticipated to significantly increase the cost, complexity or schedule of a project of this magnitude. The internal roadway system construction is somewhat disruptive to the auto parking lots and a detailed phasing plan will be required to ensure minimal passenger inconvenience and that proper auto parking facilities are maintained.

Construction of the new parking garage will require the closure of the majority of the 1,439 space Preferred Long Term lot. To accommodate this construction, it is recommended that a minimum of 1,000 spaces be added onto Long Term B prior to construction. Done in this sequence, disruptions to passengers should be kept to a minimum.

Alternative 2

Unlike Alternative 1, Alternative 2 (shown in **Figure 6-19**) focuses specifically on the vehicle traffic flows related to the ingress/egress of the passenger terminal and associated parking lots. The east portion of the terminal road system and auto parking has only minor changes in the form of signage and striping improvements in advance of the east exit and relocating the Long Term A exit booth further back to allow for more decision time to exiting drivers.

On the west side of the terminal, there are several improvements targeted at improving the flow, efficiency and safety of the terminal roadway system. Traffic entering and exiting the terminal complex for the Kensington will have a direct and isolated traffic flow with no yielding or lane changing (weaving) required. A roundabout is proposed to better facilitate terminal recirculating traffic and parking exiting traffic. Roundabouts are commonly used as traffic-calming features in areas with circulating and merging traffic; this roundabout will also serve inbound terminal traffic from Genesee Street from the west entrance.

The primary feature of this alternative is the flyover from the Kensington allowing for a signal-free drive from surrounding highways and Kensington directly to the passenger terminal. While the through movement from the Kensington into the airport is not the primary traffic flow from the west intersection, the flyover does alleviate some pressure from the constrained intersection in the future. Changes in the roadway and parking facilities also accommodate a larger rental car quick turnaround (QTA) facility. Construction of a 4,000 space parking garage, along with improvements to Long Term B, the alternative provides for over 10,000 on-airport parking spaces.

Facility Requirements

The changes to the roadway system in Alternative 2 focus on improving the customer experience and enhancing the access to the passenger terminal and associated parking lots. Areas of merging and weaving are alleviated with the roundabout, and other adjustments on the east side allow for improvements in all areas of prescribed facility requirements for the terminal roadway system. Rental car requirements are met by facilitating an expansion of the QTA facility and additional auto parking will allow for an expanded rental car presence in the short term garage. Capacity in front of the terminal will be enhanced by constructing a commercial departure curb on the upper level between the existing roadway and the short term garage.

The additional parking spaces constructed as part of this alternative exceed the facility requirements required to meet the peak season of parking demand. Facility requirements are exceeded due to phasing requirements to facilitate construction. Long Term B must be expanded to facilitate garage construction and roadway modifications within the terminal area. The proposed improvements near the terminal area meet facility requirements resulting in the excess spaces in Long Term B being available to accommodate the maximum demand periods that exist several weeks during the year, typically occurring in March spring break weeks.

LANDSIDE ALTERNATIVE 2

FIGURE 6-19

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Safety and Standards

All roadway and parking elements (lanes, space width turning radii, signalization etc) in this alternative are designed to the required roadway standards. This alternative provides a more direct route to/from the terminal helping to reduce merging and weaving. The roundabout also helps to calm traffic and better facilitates recirculating traffic by reducing yield locations and merges.

NEPA

While the off airport changes to the roadway system are not as significant as Alternative 1, the construction of the flyover will likely require an environmental assessment to evaluate the potential NEPA impacts, particularly those related to vehicle traffic. The improvements within the terminal complex can likely meet NEPA requirements through a categorical exclusion.

Financial Feasibility

Total project cost for the roadway portion of this alternative was estimated at $13,640,000, a significant reduction in cost as compared to Alternative 1. The main reason for the reduction is that the alternative addresses circulation and roadway issues at the west entrance that does not require off airport roadway improvements. While the flyover construction will be more expensive and complex than the bridge included in Alternative 1, this alternative maintains a larger portion of the existing roadway system, thus reducing the overall costs of the alternative. As with Alternative 1, the roadway is eligible for FAA and PFC funding.

Costs associated with the expansion of Long Term B and development of the 4,000 car garage remains the same as in Alternative 1. Long Term B expansion is estimated at $7,500,000 and the garage is estimated at $100,000,000.

Constructability

Alternative 2 maintains a larger portion of the existing roadway requiring less construction impacts to the roadway system and parking lots. The primary constructability issue is associated with the construction of the flyover at the west entrance. Aside from the purchase of the required right-of-way, NYSDOT coordination is required for the addition of a new connection with the Kensington Expressway as it is a controlled-access highway.

Construction of the new parking garage will require the closure of the majority of the 1,439 space Preferred Long Term lot. To accommodate this construction, it is recommended that a minimum of 1,000 spaces be added onto Long Term B prior to construction. Done in this sequence, disruptions to passengers should be kept to a minimum.

Preferred Alternative

The preferred alternative is Alternative 2. This alternative is less costly and has fewer impacts to automobile parking during the construction phases. It meets all facility requirements for roadway improvements as well as the construction of a 4,000 space parking garage for covered parking. Added benefits also include the expansion of Long Term B that will ultimately provide a multitude of uses beyond the need for temporary replacement parking and will serve BNIA as a

potential new source of lease revenue or as additional space for storage or construction lay down area.

6.4.3 External and Long Range Considerations

Conceptual plans exist for an extension of the light rail system to the airport. This light rail station would be located along the former rail bed that parallels Genesee Street on the south side of the airport. These plans are conceptual and no timeframe has been established. A bus facility for both local and intercity busses could also be constructed in conjunction with this facility. This bus facility could serve as a regional hub and connecting point for the NFTA bus services.

While the preferred alternative identifies a flyover for the terminal bound traffic only, dual direction flyovers have been explored in the past. The addition of an outbound flyover was reviewed but not considered due to the complexity of integrating it into the existing intersection. Further, airspace limitations associated with Runway 5-23 also significantly affects the location of a bridge in the area of the Kensington/Genesee intersection. The outbound flyover should be reassessed at the time that this option may be further considered in the future.

External Considerations

There are several long term projects currently in the planning phase involving the New York Thruway that could affect the way passengers get to/from the airport.

Plans are currently being developed for improvements and possible reconfiguration to the I-190 (Thruway) and I-290 interchange. Presently traffic backs up in this area at peak times. The stretch of road between this interchange and the Kensington Expressway is used by most of the Canadian passengers using the airport. Congestion from this interchange also has the potential to divert drivers off at the Kensington and use side roads such as Cayuga to access areas like Amherst and Williamsville just north of the airport.

The Thruway does not collect tolls in the Buffalo area, with toll plazas located on the Thruway east and south of the city. Development in the Amherst and Williamsville areas has resulted in an idea to relocate the Williamsville toll plaza several miles to the east to provide for a better flow of traffic on the Thruway area just north of the airport between I-290 and Transit Road.

With these improvements and the goal of improving traffic flows between Buffalo and Amherst/Williamsville, the idea of an interchange with the Thruway and Young Road has been discussed. This project has been discussed but no timeframe established, however the previous two projects would need to occur first. If constructed, this would have the potential to change traffic patterns for users from the east wishing to access the terminal or Long Term B lots. These vehicles would now be utilizing Aero Drive to Holtz Rd compared to Transit Road to Genesee St as they do now. This project should be monitored should it move from the conceptual to the planning phase.

6.5 Support Facility Alternatives

Support facility alternatives pertain to the other operational areas of the airport that serve the airport on a daily basis. Support facilities include Aircraft Rescue and Fire Fighting (ARFF),

airfield maintenance/snow removal, air cargo, general aviation and the fuel farm. These facilities were assessed and the analysis is presented in the following sections.

6.5.1 Aircraft Rescue and Fire Fighting

Facility Requirements and Key Considerations

The existing ARFF station at BNIA was originally constructed in 1970, with five apparatus bays and 8,000 square feet of floor space. The building was expanded in 1984 to approximately 10,400 square feet. The facility is now over 40 years old and suffers from a number of deficiencies including a lack of storage space for equipment and materials, lack of drive-through bays for vehicles, vehicle bays that cannot accommodate newer and larger ARFF equipment, and inadequate space for staff needs, including male/female specific areas. Other noted deficiencies include sleeping quarters directly adjacent to the loading area for air cargo aircraft, undersized workout facilities and office space, and lack of dedicated training facilities.

Alternatives Reviewed but not Considered

Four sites were initially identified for the ARFF station. Of these four sites, two sites were initially reviewed but were withdrawn from future consideration. Approximately 80% of the calls for the ARFF personnel are incidents within the passenger terminal. A facility located adjacent to the passenger terminal on the site of the employee parking lot near Terminal Gate 1 was reviewed but withdrawn due to uncertainty in the ultimate expansion of the passenger concourse and terminal roadway system. The other area considered was near the fuel farm on the north side of the runway intersection. This facility site was not considered due to poor taxiway access to Runway 5-23 and increased response time to the terminal.

Alternatives Brought Forward for Review

Two remaining sites were assessed, the current location of the ARFF facility and a site immediately south of the Mercy Flight facility.

No-Build Alternative

The No-Build alternative retains the current location and building, making no changes to meet current demand or new space to accommodate ARFF personnel.

Facility Requirements

The existing facility meets Index D requirements.

Safety and Standards

No changes to safety or standards are required.

NEPA

As there is no development proposed for this alterative, there are no NEPA issues associated with this alternative.

Financial Feasibility

There would be no costs associated with this alterative.

Constructability

There are no constructability issues related to this alternative.

Alternative 1 – Existing Site

Alternative 1 consists of an extensive renovation and expansion of the existing ARFF building and is shown **Figure 6-20**. The expansion provides for an additional vehicle bay and expanded square footage for gender specific dormitory areas, dedicated training rooms, storage and other facilities that are currently deficient.

Facility Requirements

Retaining the same location for a new ARFF facility, the emergency response times for both the airfield and the passenger terminal would continue to meet requirements as they do today. The key facility requirement not met under this alternative is the provision of public access. ARFF personnel would still be required to escort visitors on/off of the secure area as the site is within the Airport Operations Area.

Financial Feasibility

The cost to expand the ARFF facility was estimated at $999,376 by the NFTA. The renovation would improve the facility, but would not fully meet all needs. The cost of the renovation is eligible for federal funding by the FAA.

Safety and Standards

The existing ARFF facility provides enough equipment and personnel to satisfy FAA requirements for ARFF Index D. While standards will continue to be met, some operational issues will still persist; providing additional and drive-through vehicle bays will encroach on the air cargo taxiway and apron, dormitories and rest areas will still be located adjacent to air cargo activity which is busiest at night, and public escorts will still be required to and from the perimeter access gate.

NEPA

Being a significant renovation of the existing facility, there are no notable NEPA related issues associated with this project. It is anticipated that NEPA requirements can be achieved with a categorical exclusion or a Short Form Environmental Assessment.

Constructability

Renovating and expanding the ARFF facility while operating the existing facility would pose some complications during the construction process and may require temporary facilities to ensure compliance with required response times and personnel rest requirements.

ARFF - ALTERNATIVE 1

FIGURE 6-20

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Alternative 2 – Southeast Quadrant

Alternative 2 consists of constructing a new ARFF station on a new site located adjacent to the Mercy Flight facility and is shown in **Figure 6-21**. The facility design will conform to AC 150/5210-15A, *Aircraft Rescue and Firefighting Station Building Design*. This facility will contain six full size, drive through vehicle bays, capable of accommodating all ARFF equipment on the market today including the existing vehicle fleet at BNIA. In addition to the vehicle bays, there will be over 4,000 SF of space to accommodate dedicated training facilities and improved dormitory and co-ed facilities. Public access would be available via Amherst Villa Road and security escorts would no longer be required for public guests and vendors.

It should be noted from a federal funding standpoint that the number of vehicles bays and space within the building will be defined per AC 150/5201 noted above. Should additional bays or space be required, funding for those areas will be the responsibility of the NFTA.

Facility Requirements

This new site allows for the construction of an all new ARFF facility properly sized for existing and future vehicle requirements including drive through bays and adequate dormitory facilities. This location allows for public access which is not available in the exiting location in Alternative 1. Though airside and terminal access facility requirements are met in Alternative 1, this alternative provides superior access to both elements further exceeding the facility requirement for emergency response.

Located on the south side of Runway 5-23, ARFF vehicles would now be able to stage along Taxiway A without having to cross the primary runway; this reduces runway crossings and improves the staging capability for ARFF vehicles along the primary runway. This location is also closer in proximity to the fuel farm and remote fueling facility.

Safety and Standards

The location for the ARFF station in Alternative 2 allows for improved access to the airfield with the use of Taxiway A. Emergency responses to the passenger terminal will also have a shorter response time and when necessary would only require crossing the crosswind runway as opposed to Runway 5-23.

NEPA

Located on top of an area presently used for overflow vehicle parking, there are no notable NEPA related issues associated with this site. It is anticipated that NEPA requirements can be achieved with a categorical exclusion.

Financial Feasibility

A new ARFF facility providing for staff space, ready rooms, overnight facilities, gender specific restroom/showers/lockers/overnight rooms and 6 vehicle bays. The estimated cost was $4,001,100 which is eligible for FAA funding. With the several expansion and additions made to the existing facility and the fact that it still does not provide adequate facilities, the development of a new “state-of-the-art” facility that can accommodate existing and well as future needs is a significant benefit to BNIA.

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ARFF - ALTERNATIVE 2

FIGURE 6-21

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Constructability

A "Greenfield" site for a new ARFF facility allows for construction of the new building without disrupting the existing facility. Road access and site preparation will pose minimal difficulty for construction.

Preferred Alternative

Alternative 2, the site adjacent to Mercy Flight was selected as the preferred alternative due to the improved airfield and terminal response times and public access. In addition, some synergies with being located adjacent to Mercy Flight such as medical training and other cooperative enterprises could be explored.

6.5.2 Airfield Maintenance/Operations/Snow Removal Equipment Facilities

Facility Requirements and Key Considerations

Many of the buildings involved in the airfield maintenance and snow removal operation have exceeded or are approaching their useful life and will need to be replaced or significantly renovated. A variety of separate buildings currently comprise the airfield maintenance facility. For BNIA, FAA guidance recommends a well-organized facility ranging approximately 60,000-70,000 SF in size compared to the existing complex which is just over 45,000 SF. Guidance from the FAA also recommends discrete facilities for materials storage, equipment storage and equipment maintenance.

The future design of facilities will conform to AC 150/5220-18A - *Buildings For Storage And Maintenance Of Airport Snow And Ice Control Equipment And Material.* Equipment above and beyond the requirement of the AC will be funded by non-FAA funding.

Alternatives Reviewed but not Considered

Four sites were initially identified for the Maintenance/Operations/Snow Removal Equipment facility. Two sites also identified for the location for Aircraft Rescue and fire fighting were initially reviewed but were withdrawn from future consideration. An airfield maintenance facility was considered for the parcel between Mercy Flight and the Long Term B parking lot, this parcel was dismissed due to the future airport parking requirements. The other site option not considered is near the center of the airfield on the north side of Runway 5-23 between Taxiways M, E and D. This site was not considered due to the lack of public access and potential complications from the ASR critical area.

Alternatives Brought Forward for Review

Two alternatives were brought forward, Alternative 1 which is the existing site, and Alternative 2 which is located in the northeast quadrant of the airport.

No-Build Alternative

The No-Build alternative involves no action and accounts for only maintaining existing buildings in their present conditions. Deficiencies in facility requirements that exist today would remain and key considerations would not be addressed.

Facility Requirements

The existing facility meets requirements and allows for a safe operation. Having a smaller than desired building square footage, some vehicles are currently stored outdoors which is less than desirable.

Safety and Standards

The existing site meets FAA standards and allows for a safe airfield maintenance operation.

NEPA

There would be no NEPA issues related to this alternative.

Financial Feasibility

There are no costs for this alternative.

Constructability

There are no constructability issues related to this alternative.

Alternative 1 – Existing Site

Alternative 1 consists of renovations to existing facilities in deficient condition as well as the construction of a new building to service snow removal equipment (SRE) and is shown in **Figure 6-22**. This new SRE building will be located within the existing maintenance complex and replaces some existing buildings within the complex.

Facility Requirements

The existing facility meets requirements and allows for a safe and efficient operation. Having a smaller than desired building square footage, some vehicles are currently stored outdoors which is less than desirable.

Safety and Standards

The existing site meets FAA standards and allows for a safe airfield maintenance operation.

NEPA

Involving improvements and construction in the existing airfield maintenance and snow removal equipment area, no significant environmental impacts expected and it is anticipated that NEPA requirements can be achieved with a categorical exclusion.

AIRFIELD MAINTENANCE / SNOW REMOVAL BUILDING - ALTERNATIVE 1

FIGURE 6-22

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Financial Feasibility

Costs associated with the renovation of several of the old buildings and the development of a new building to store SRE equipment would cost approximately $21,600,000. The renovation of several of the buildings will provide updated faculties, however, the inefficiency of spreading the operation over several buildings remains.

Constructability

Renovating and expanding the airfield maintenance facility while operating the existing facility would pose some complications during the construction process and may require temporary facilities to ensure a safe and efficient operation.

Alternative 2 – North Airside

Alternative 2 shown in **Figure 6-23** consists of constructing a new consolidated airfield maintenance facility on the north east quadrant of the airfield on a site along the internal perimeter road. The proposed site is located in near Runway 5-23 however, due to a lower elevation; the single story maintenance facility is possible. The building is located outside of the RSA and ROFA in addition to being below the FAR Part 77 transitional surface. The consolidated facility will serve both traditional airfield maintenance as well as the airports extensive snow removal operation.

Facility Requirements

The new airfield maintenance facility in Alternative Two is planned to meet all of the requirements for the safe and efficient operation of the airfield. Though not a direct facility requirement, operational efficiency for the airfield maintenance facility and improved vehicle storage and servicing areas has the potential to increase the useful life of equipment.

Safety and Standards

The new airfield maintenance site meets FAA standards and allows for a safe airfield maintenance operation.

NEPA

Located on top of an area presently used for occasional construction staging, there are no notable NEPA related issues associated with this site. It is anticipated that NEPA requirements can be achieved with a categorical exclusion.

Financial Feasibility

The cost to build a new facility was estimated at $24,026,800. The new facility would combine several buildings that now provide what can be placed in once facility. The new facility the needs to store vehicles and also accommodates the needed maintenance, wash areas, and storage that the existing faculties combined do not adequately provide. Additionally, the area of the existing maintenance complex can now be used for other uses including aviation or non-aviation development that can provide additional lease revenue to the airport.

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AIRFIELD MAINTENANCE / SNOW REMOVAL BUILDING - ALTERNATIVE 2

FIGURE 6-23

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Constructability

A "Greenfield" site for a new airfield maintenance facility allows for construction of the new building without disrupting the existing facility. Road access and site preparation will pose minimal difficulty for construction, with nearby land available for construction staging. As previously indicated, construction has the ability to be phased due to the seasonal nature of the airfield maintenance operation.

Preferred Alternative

Alternative 2, the north airfield alternative, was selected as the preferred alternative for future airfield maintenance and airfield operations facilities. With new/replacement facilities being required in the near term, the green field site allows for a new facility tailored to the specific needs of the modern day operation and equipment.

Several additional factors beyond those prescribed in the screening criteria also contributed to this alternative being selected. Other airport support facilities are located along the airport service road adjacent to the proposed site; NFTA police, the terminal facilities and maintenance department, and the fuel farm personnel are all located along this service road and airfield maintenance would be a compatible and complementary fit for this area. In addition, with the relocation, the large parcel of land along Cayuga Road would be available for development or lease as a revenue generating parcel for the NFTA as it is a high traffic area with numerous other businesses.

6.5.3 Air Cargo

Facility Requirements and Key Considerations

Chapter 5 *Facility Requirements* concluded that the existing air cargo facility is sufficient and capable of accommodating the projected demand levels. However, for future planning purposes, unexpected demand or business decisions that require future development, a basic expansion of the existing air cargo facility was developed for this assessment.

It should be noted that the proposed areas shown on the Airport Layout Plan will be excluded from approval as the existing facilities should meet future demand.

Alternatives Reviewed but not Considered

In the past, relocating air cargo operations to the Niagara Falls International Airport was considered. However, for purposes of this alternatives assessment, current air cargo activity is expected to remain throughout the planning period.

Preferred Development

The Preferred development option for air cargo development reserves area that can be developed for unforeseen air cargo growth and is shown in **Figure 6-24**. This alternative provides for an additional 100,000 SF processing facility located on the north side of the air cargo apron and an apron expansion of 43,600 SY to the east. The estimated cost is approximately $25,500,000 and would be paid for through private funding sources.

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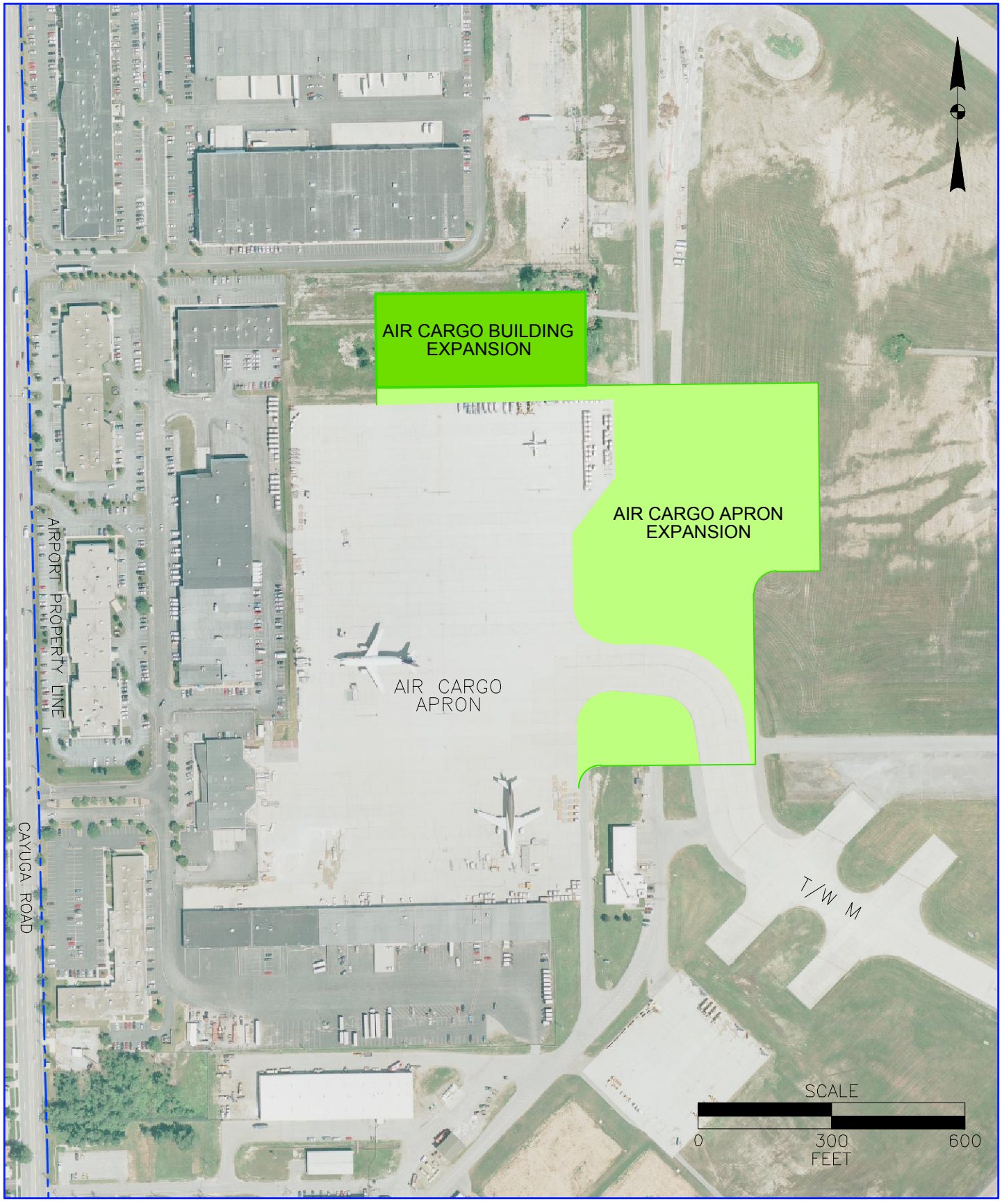
AIR CARGO - PREFERRED ALTERNATIVE

FIGURE 6-24



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6.5.4 General Aviation

Facility Requirements and Key Considerations

Chapter 5 Facility Requirements identified the need for some minor expansion in the general aviation area, primarily in the form of additional hangar space. While the facility requirements for general aviation were minimal, ensuring that adequate general aviation facilities are available is crucial for the Buffalo business community. The primary facility requirement for general aviation is for additional hangar space generated by Rich Products and Delaware North, whose corporate flight departments are currently using hangar space. Barring any major obstacles to construction, providing for general aviation growth will provide for regional businesses and allow the airport to be a community partner in their success.

Development Options Reviewed but not Considered

In the consideration of both the airport management and FBO goals, facilities designed for small single engine aircraft including T-hangars were not considered in the general aviation development alternatives. With most facility requirements being met with the existing facility and land available for expansion, general aviation development is confined to expanding the existing GA area.

Preferred Development Option

The preferred development option for general aviation, shown in **Figure 6-25**, contains a new hangar that is currently being planned by Prior Aviation which will satisfy the prescribed facility requirements for additional hangar space. In addition to the required hangar space, the preferred general aviation alternative identifies additional hangar space as well as an apron expansion to ensure the general aviation facilities are positioned to accommodate unforeseen growth to support the business aviation needs of the region.

Facility Requirements

The facility requirements chapter identified hangar facilities as the primary development need. To properly plan for future growth and the accommodation of ultimate general aviation facilities, the preferred alternative shows additional development beyond the prescribed facility requirements.

Safety and Standards

Access to and from the general aviation area maintains the existing Group III design standards which allows for aircraft as large as the Boeing 737 and Airbus A320 to continue accessing the general aviation area. Specific facilities within the general aviation area and FBO will have varying design groups based on demand. Improved taxiway access contained in the preferred airside alternative will help to support airfield efficiency and safety for general aviation users.

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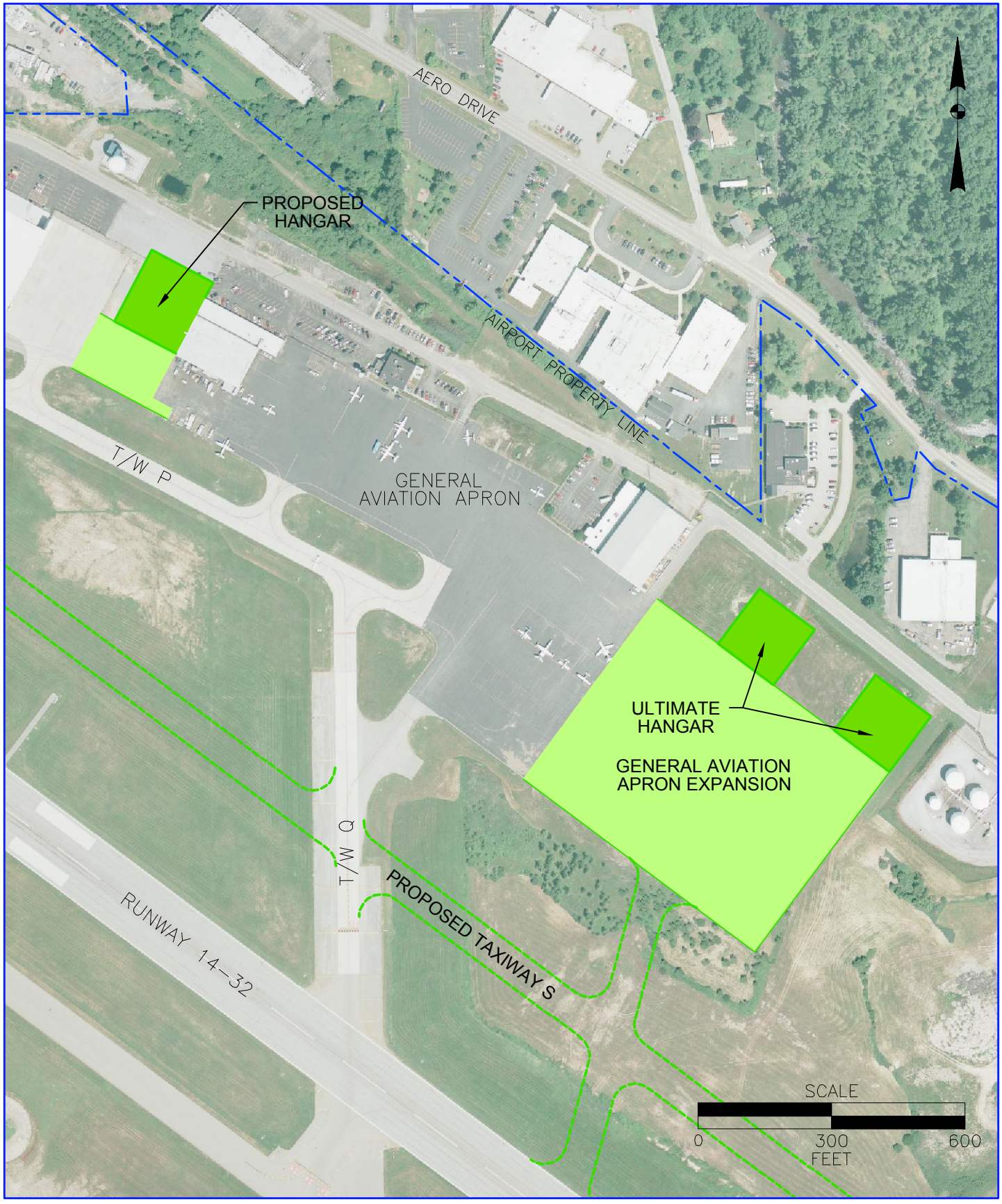
GENERAL AVIATION - PREFERRED ALTERNATIVE

FIGURE 6-25



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NEPA

Construction of the additional hangar on airport can meet NEPA requirements through a categorical exclusion. Should construction of the additional apron space and hangars occur during the planning period, it is anticipated that NEPA requirements could also be met with a categorical exclusion.

Financial Feasibility

Construction and development of hangars and buildings within the general aviation area is at the discretion of the FBO and represents private investment in the airport. Prior has presented plans to BNIA to rehabilitate and build a new hangar and rehabilitate apron area at a cost of $6,250,000 that will be financed exclusively by Prior. In addition to this development, area was reserved for future GA development should Prior expand in the future or other entrants decide to use BNIA as a base of operation. Area was reserved for additional aircraft apron and two 30,000 sf hangars and the cost was estimated at $21,000,000. As noted above, this cost would be capitalized by private investment.

Constructability

The general aviation area has ample room for development in addition to the additional hangar shown. Construction of additional hangars, apron space and auto parking can be accommodated without with minimal disruption to existing facilities or significant site preparation.

6.5.5 Fuel Farm

Facility Requirements and Key Considerations

Chapter 5 Facility Requirements indicated that the existing fuel farm was sufficient for future demand. As with the Air Cargo facility, area was reserved for future development should unexpected demand occur in the future. As such, a preferred development option was created to identify future development potential for the Fuel Farm.

Preferred Development Option

The preferred development option in **Figure 6-26**, shows expansion area to the south of the existing Fuel Farm facilities. This additional area can be used for additional tanks and associated piping for the additional facilities.

Facility Requirements

Existing facilities meet current needs. The additional area shown is for future development beyond the planning period or facility needs for unexpected growth.

Safety and Standards

There are no issues related to safety and standards, the facilities would be built in accordance with industry standards.

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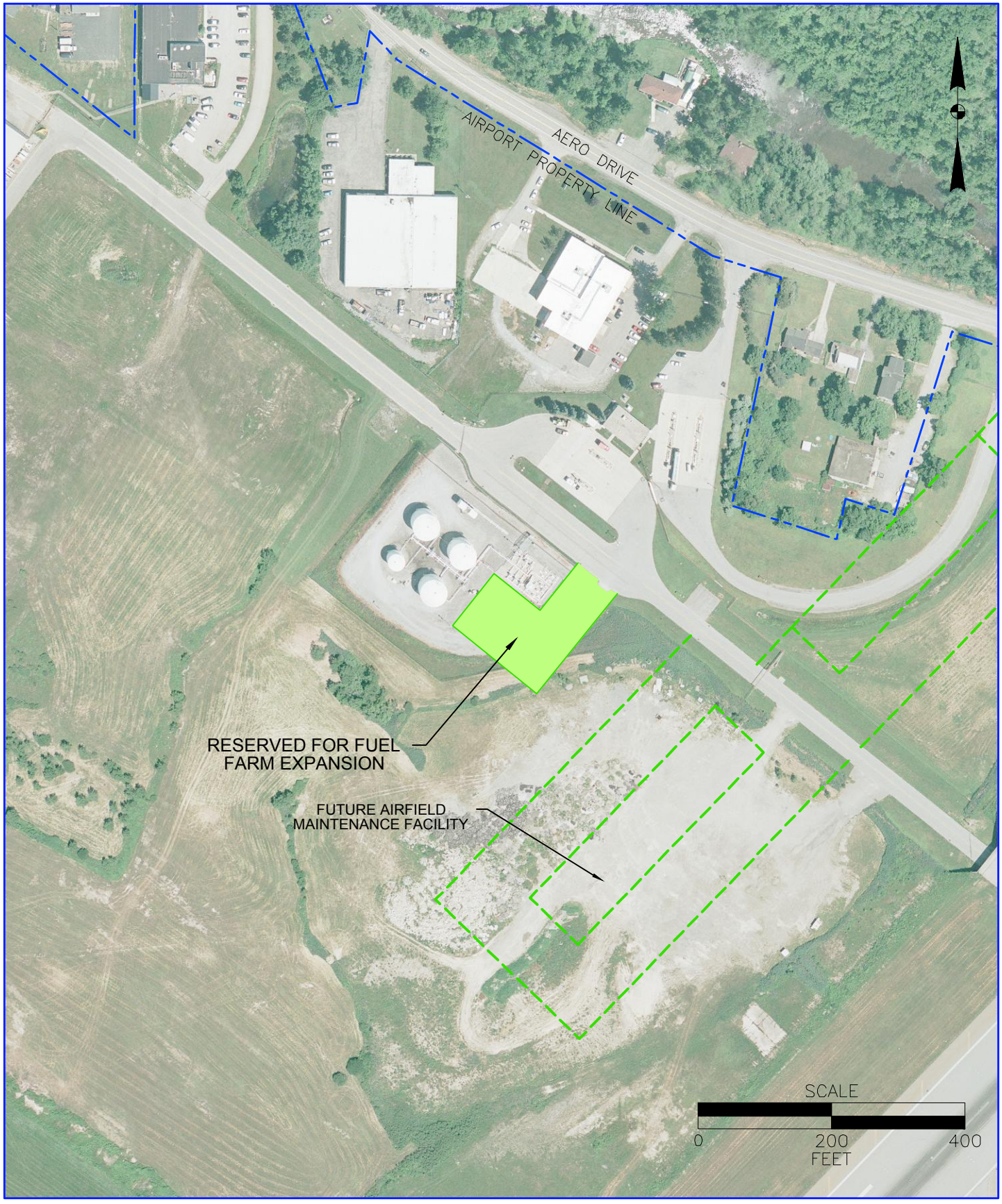
FUEL FARM PREFERRED DEVELOPMENT OPTION

FIGURE 6-26



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NEPA

It is anticipated that expansion of the Fuel Farm would be met with either a categorical exclusion or EA, depending upon future action being considered.

Financial Feasibility

Costs for the Fuel Farm would be borne by the fuel consortium which owns and operates the facility.

Constructability

There are no impediments to expanding the current Fuel Farm.

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