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Chapter Four

ALTERNATIVES ANALYSIS

INTRODUCTION

The overall methodology for the alternatives development effort included identifying existing non-standard and non-compliant conditions and evaluating general aviation development needs.

This chapter describes and evaluates the alternative development plans leading to the selection of the recommended, or preferred, airport development plan for the Eastern West Virginia Regional Airport (MRB). As discussed in Chapter One, the purpose of this Master Plan is to assess existing airport conditions, as well as identify the future general aviation activity needs of MRB. The forecast of future aviation activity anticipated over the next 20-year planning period is included in Chapter Two. The recommended facilities to accommodate the forecasted demand are presented in Chapter Three.

The overall methodology for the alternatives development effort included identifying existing non-standard and non-compliant conditions and evaluating general aviation development needs. Three facility layout alternatives were prepared for both the South Apron and the North Apron areas based on general aviation facility demand identified in Chapter Three, as well as direction received from Airport Management. Together, the six alternatives identified provide Eastern West Virginia Reginal Airport Authority (EWVRAA) with a basis to plan general aviation airport development in the most safe and efficient manner. The evaluation of these alternative concepts considered general aviation facility requirements, general aviation aircraft operational needs, public access, and future development capability, with the intent of selecting a preferred operational alternative.

The South Apron is the primary terminal area and includes the general aviation parking apron (areas for both transient and based aircraft). The North Apron is adjacent to the Shepherd Field Air National Guard (ANG) facility and includes the Northeast Civilian Apron and Howard Aircraft Maintenance (which is a Through-the-Fence (TTF) operation).

The existing non-standard and non-compliant conditions at MRB are depicted in Chapter One, Figure 1.21 and are summarized below:

1. A segment of Novak Drive, a public right-of-way, is located in the runway object-free area (ROFA);
2. A segment of the airport perimeter fence is located in the ROFA;
3. The Runway 8 Supplemental Wind Cone is located in the ROFA;
4. The Runway 26 Supplemental Wind Cone is located on the edge of the ROFA;
5. Taxilanes 1-9, located in both the South Apron and North Apron, do not meet Federal Aviation Administration (FAA) design standards for Group I or Group II aircraft for tie-down separation or object free area (OFA) separation;
6. The airport does not own full controlling interest in land within the Runway Protection Zones (RPZs) on either runway end;
7. Obstructions penetrate the existing approach surfaces to Runway 8 and Runway 26; and
8. There are four existing commercial TTF facility operations on the airport.

In addition to addressing the existing non-standard and non-compliant conditions at MRB, the evaluation of general aviation development alternatives also focused on the operational objectives of both Airport Management and EWVRAA, which include:

- Obstruction removal to Part 77 surfaces (primary/approach/transitional), Threshold Siting surface, and Vertical Guidance surface;
- Land acquisition for RPZ control and to address TTF operations;
- Airfield pavement maintenance;
- Reconfiguration of the aircraft parking/tie-down layout for the South and North Apron areas;
- Rehabilitation of the unnamed taxiway leading to the North Apron ;
- Hangar construction;
- Widening and extension of Taxiway E to a full, parallel taxiway;
- Rehabilitation and widening of Aviation Way;
- Development of an air cargo operations area; and
- Non-aeronautical development in the northwest quadrant of the airport.

Airport Management and EWVRAA have also identified key development objectives for long-range planning. These items are depicted on the preferred development plan in the Ultimate (beyond 20-years) development phase, and include:

- Continued development of air cargo operations;
- Extension of Runway 26 (2,685-feet), to achieve an 11,500-foot runway;
- Extension of Taxiway A to a full, parallel taxiway;
- Widening of Taxiway E to 75-feet to accommodate air cargo operations;
- Land acquisition for future aeronautical development;
- Construction of a new snow removal equipment (SRE) building;
- Installation of a self-serve pump facility for 100LL fuel;
- Construction of rental car facility; and
- Various future non-aeronautical development.

Funding for these long-term projects is subject to eligibility under federal and state guidelines at such time the project is justified for development. Additional detail on current sources and eligibility of projects for various sources of funding is highlighted in Chapter Six, Cost Estimates.

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Section 1 - Methodology And Evaluation Criteria

A set of evaluation criteria was established to review the advantages and disadvantages of the proposed development options.

In order to analyze the alternatives for each development need, a set of evaluation criteria was established to review the advantages and disadvantages of the proposed development options. Merits and deficiencies were then compared and ranked with other alternatives based on quantitative or qualitative factors. This methodology centered on four factors: Operational Performance, Best Planning Tenets, Environmental Factors, and Fiscal Factors.

4.1|Part 01 - Operational Performance

This evaluation criterion is based on each alternative's ability to meet the operational needs of the airport throughout the planning horizon. The most preferred alternatives based on this criterion are those that most closely meet the future operational needs of the airport.

4.1|Part 02 - Best Planning Tenets

Each alternative is revised based on its ability to meet future needs and objectives. The degree to which the alternative addresses forecasted growth, the degree to which it is aligned with the airport's strategic vision, and the ability to allow for future expansion are examples of factors that determine the most preferred alternative based on this criterion.

4.1|Part 03 - Environmental Factors

Environmental factors including impacts to natural, social, and cultural resources are evaluated under this criterion. Alternatives should strive to work positively with environmental factors; the most preferred alternative would create the least negative impact on environmental factors.

4.1|Part 04 - Fiscal Factors

Each alternative is reviewed for financial cost. An Engineer's opinion of probable cost has been prepared for the proposed construction through Phase III in each alternative. Due to the projected time-frame for the Ultimate Phase of development (beyond the 20-year planning horizon), no cost estimates were developed for this phase. The most preferred alternative according to this criterion would have the lowest financial cost.

Image by Delta Airport Consultants, Inc.

Section 2 - Common Aspects of the General Aviation Development Alternatives

As several of the development objectives and consultant recommendations are common to the build alternatives, they are presented in this section of the text and omitted from repetitive presentation within each alternative. Building numbers mentioned reference building designations in Figure 1.12.

4.2|Part 01 - Environmental Assessment

Environmental impacts were not formally reviewed as part of this Master Plan. ***It is recommended that an Environmental Assessment (EA) be conducted before each development phase.*** Preliminary findings from the Stormwater Management Study (see **Appendix G**) suggest the presence of wetlands in the South Apron area and east of the Runway 26 end, where the Taxiway E extension is proposed.

4.2|Part 02 - Obstruction Removal, Mitigation, and Prevention

The legislation found at 14 CFR Part 77, *Objects Affecting Navigable Airspace,* establishes standards for determining obstructions in navigable airspace. Any existing fixed or mobile objects are, and future objects may be, obstructions to air navigation if they are of greater height than any of the heights or surfaces outlined in 14 CFR Part 77.23. The determination of whether an 'obstruction' is actually a 'hazard to air navigation' is accomplished through an aeronautical study conducted by the FAA. The standards apply to all objects, whether manufactured, objects of natural growth, or terrain.

Existing obstruction data for MRB is based on an aerial survey conducted during fall 2016. An analysis of the survey data identified terrain, natural growth, and man-made objects that exist on and off-airport property and penetrate the 14 CFR Part 77 surfaces. As depicted in Chapter One, **Figure 1.21**, and as discussed in Chapter Three, existing tree obstructions to Part 77 approach surfaces on both runway ends have been identified.

It is recommended that obstructions to the Part 77 primary and Part 77 approach, Threshold Siting surface, and Vertical Guidance surfaces, be removed and/or mitigated in the immediate term as these are the most crucial airspace surfaces. On-airport obstructions to the Part 77 transitional surface should be removed and/or mitigated in the short term. Off-airport obstructions to the Part 77 transitional surface are ranked next in terms of priority and should be removed and/or mitigated in the short or mid-terms.

In addition, by removing the penetrations to the Runway 8 approach surface, the airport may be able to improve the localizer performance with vertical guidance (LPV) minima for Runway 8 to lower than ¾ mile.

Details of the obstruction data collected are presented in the Airport Layout Plan (ALP) drawing set and in Chapter Five of this Master Plan.

4.2|Part 03 - Land Acquisition to Eliminate TTF Operations

As indicated previously, there are four existing commercial-use TTF facility operations at MRB. Two of these operations are located in the South Apron Development Area and the other two are located in the North Apron Development Area. All four facilities are located outside of airport property. ***It is recommended that the Authority pursue fee simple acquisition of each property in the North Apron Development Area on which TTF operations are being conducted in Phase I, to ensure that no future land use conflicts may occur with the safe operation of the airport facility. For the South Apron Development Area, it is recommended to pursue fee simple acquisition in Phase II and Phase III of the property on which TTF operations are being conducted. This is recommended regardless what development alternative is selected for each development area. Phasing for acquisition is based on Authority guidance.***

4.2|Part 04 - Acquisition of Controlling Interest in RPZs

An RPZ is the area off the runway end meant to enhance the protection of people and property on the ground. Existing land survey information indicates that MRB does not currently control all property within the RPZ areas (see **Figure 1.21**). Fee simple acquisition is the preferred method of control, according to FAA guidance. ***Fee simple acquisition of approximately 41 acres for the existing RPZs of Runway 8 and Runway 26 is proposed in Phase I, regardless of the development alternative selected.***

4.2|Part 05 - Airfield Pavement Maintenance

Chapter Three recommends the pavement on the runway, taxiways, and apron areas be maintained in accordance with the airport's pavement maintenance plan throughout the planning period. As noted in Chapter Three, not all of the pavement areas have been formally evaluated. ***Therefore, it is recommended that a pavement condition analysis be completed for the general aviation apron (North and South), Taxiway B, and Taxiway E. This maintenance plan should be implemented regardless of the development alternative selected.***

Airport management reports the segment of Taxiway C that will serve as the apron area for future hangar development is anticipated to be designed and reconstructed in Phase I. The segment of Taxiway D is projected to deteriorate to a "Fair" condition by 2021 and is proposed for rehabilitation in Phase III.

4.2|Part 06 - Rehabilitate High Intensity Runway Lights (HIRLs) on Runway 8-26

As discussed in Chapter Three and the Airfield Electrical Assessment (see Appendix D) the runway edge lights are in poor condition and are at a measurable risk of failure. ***It is recommended that the runway edge lights for Runway 8-26 be rehabilitated in Phase I, regardless of the development alternative selected.***

4.2|Part 07 - Rehabilitate Medium-Intensity Taxiway Lights (MITLs) on Taxiways B, C, D, and E

As discussed in Chapter Three and Appendix D, the edge lights for Taxiways B, C, D, and E are in poor condition and are at a measurable risk of failure. ***It is recommended that the edge lights for Taxiways B, C, D, and E be rehabilitated in Phase I, regardless of the development alternative selected.***

4.2|Part 08 - Airfield Electrical Vault Improvements

As discussed in Chapter Three and Appendix D, the existing airfield wiring system to the electrical room in the terminal building is in a deteriorated state. The electrical room, runway, and taxiway systems do not have backup power. ***As recommended in Appendix D, installation of a stand-by generator, automatic transfer switch, and other safety improvements are proposed to be completed as part of the Rehabilitate MITLs and Rehabilitate HIRLs projects in Phase I, regardless of the development alternative selected.***

4.2|Part 09 - Replace Airfield Guidance Signs

As discussed in Chapter Three and Appendix D, there are 12 airfield guidance signs that need to be shifted from the existing taxiway circuits to the runway edge lighting circuit. ***This project is proposed to be completed as part of the Rehabilitate MITLs and Rehabilitate HIRLs projects in Phase I, regardless of the development alternative selected.***

4.2|Part 10 - Install Segmented Circle to Primary Wind Cone

As discussed in Chapter Three and Appendix D, there is no segmented circle located around the primary wind cone. ***It is recommended that a segmented circle be added to the primary wind cone in Phase I, regardless of the development alternative selected.***

4.2|Part 11 - Relocate Perimeter Fence

As discussed in Chapter Three, a segment of the existing perimeter fence is located in the ROFA southwest of the Runway 8 end. ***It is recommended that this segment be relocated outside of the ROFA in Phase II, regardless of the development alternative selected.***

4.2|Part 12 - Replace Visual Approach Slope Indicators (VASIs) with Precision Approach Path Indicators (PAPIs)

Runway 26 is equipped with a four-box VASI. ***Chapter Three recommends that this system be replaced with a 4-box unit Precision Approach Path Indicator (PAPI) for both Runway 8 and Runway 26. This project is proposed in Phase II regardless of the development alternative selected.***

4.2|Part 13 - Add Distance Measuring Equipment (DME) to Existing Localizer

Chapter Three recommends that DME be installed on the existing localizer to improve pilot situational awareness and to help establish a final approach fix to the airport. This project is proposed in Phase II, regardless of the development alternative selected.

4.2|Part 14 - Extend Taxiway E to Runway Ends 8 and 26

Taxiway E is 35-feet wide and is an existing, partial parallel taxiway along the south side of Runway 8-26 which is used primarily by general aviation aircraft. As discussed in Chapter Three, full length parallel taxiways are required when an airport has instrument approach procedures with visibility minimums below ¾ mile. Also, each runway end must be served by an entrance taxiway, which also serves as the final exit taxiway for operations in the opposite direction. ***Chapter Three recommends that Taxiway E be extended to both the Runway 8 and Runway 26 ends to serve as a full parallel taxiway. Per Authority preference, Chapter Three further proposes that Taxiway E be widened from its existing width of 35-feet to 50-feet to accommodate the larger, non-military aircraft that require access to the South Apron, with the understanding that the FAA may require rejustification in the future. This project is proposed in Phase II, regardless of the development alternative selected. It is proposed that the taxiway be widened to 75-feet to accommodate large aircraft in the Ultimate phase.***

4.2|Part 15 - Remove Connector Taxiways

The connector taxiways (B, C, D, and E3) are proposed to be closed to discourage runway incursions and prevent aircraft from directly accessing the runway from the apron. By closing the connector taxiways, the airport complies with current FAA design standards. ***To mitigate the closures of four connector taxiways, a new connector taxiway is proposed to connect Taxiway E to Runway 8-26. This project is proposed in Phase II, regardless of the development alternative selected. The removal of the connector taxiways is proposed in Phase III regardless of the development alternative selected.***

4.2|Part 16 - Relocate Runway 8 Supplemental Wind Cone

As discussed in Chapter Three, the Runway 8 Supplemental Wind Cone is located in the ROFA. ***It is recommended that this Supplemental Wind Cone be relocated outside of the Runway 8 ROFA in Phase III, regardless of the development alternative selected.***

4.2|Part 17 - Relocate Runway 26 Supplemental Wind Cone

As discussed in Chapter Three, the Runway 26 Supplemental Wind Cone is located on the edge of the ROFA. ***It is recommended that this Supplemental Wind Cone be relocated outside of the Runway 26 ROFA in Phase III, regardless of the development alternative selected.***

4.2|Part 18 - Air Cargo Operations

As discussed in Chapter Three, the Authority has expressed interest in pursuing the development of an intermodal transport facility at MRB. During the development of this Master Plan, the Authority reports private interest in developing this facility has come to fruition. Two general locations for air cargo facilities are noted in the ALP. ***Development of an air cargo operations area adjacent to Taxiway D is identified for Phase I, regardless of the development alternative selected. Construction of an air cargo apron and air cargo operations building adjacent to Taxiway E is identified for the Ultimate Phase, regardless of the development alternative selected.***

4.2|Part 19 - Non-Aeronautical Development

The Authority has expressed interest in identifying areas of airport property for non-aeronautical purposes to diversify the airport's revenue stream. Two general areas are identified on the ALP. The first area is located within the airport's business and industrial park. Development of this area is identified for the Ultimate Phase regardless of the development alternative selected. The second area is located north of the Runway 8 end and west of the Air National Guard facility. ***Development is depicted in Phase I regardless of the development alternative selected.***

Image by Delta Airport Consultants, Inc.

Section 3 - General Aviation Development Alternatives

Six development alternatives were prepared for the general aviation activity areas of MRB: three alternatives for the South Apron and three alternatives for the North Apron. The following sections discuss the development alternatives evaluated for each area.

4.3|Part 01 - South Apron Development Area Alternatives

The South Apron Development Area represents the primary area of general aviation activity at MRB. **Figures 4.1, 4.2, and 4.3** present the facility development alternatives. The primary difference between the three development alternatives is the location and orientation of the proposed new T-hangar building and the location of the proposed fuel truck parking bays. Due to the minimal difference between the three alternatives, the operational performance, best planning tenets, and environmental factors for the three alternatives are discussed below. Each development alternative includes its own fiscal evaluation.

OPERATIONAL PERFORMANCE

The three South Apron Development Area alternatives will allow MRB to accommodate the general aviation demand anticipated in the short and long-terms, including providing both the proper tie-down separation and taxilane object free area (OFA) separation for Group II aircraft. The layout of the future facilities allows aircraft of different sizes to have separate access and storage areas based on FAA design standards. The proposed hangar types separate corporate and general aviation uses. Reconfiguration of the taxiway connectors eliminates direct access to the runway, improving safety conditions in the area.

BEST PLANNING TENETS

The development proposed in each alternative allows for growth throughout and beyond the planning horizon to effectively accommodate the existing and forecasted demand. There is a balance in the space provided for both small and large or heavy aircraft. The proposed land acquisition addresses the existing TTF operations, which are discouraged by FAA, and provides ample space for future development, even beyond the 20-year timeframe.

ENVIRONMENTAL FACTORS

The field visit conducted for the Stormwater Management Study (see **Appendix G**) noted the possible presence of wetlands in a forested area south of Aviation Way, and in the undeveloped portion of the airfield east of the Runway 26 end. An EA, including field surveys for wetlands and cultural resources, should be conducted before construction begins. The EA could be facilitated cumulatively for proposed development in the South Apron and North Apron areas. It is recommended that an Environmental Due Diligence Audit (EDDA) be conducted before land is acquired, to confirm the absence of hazardous materials on the parcels. The Stormwater Management Study conducted during this planning effort recommends stormwater improvements to accommodate the proposed development.

SOUTH APRON DEVELOPMENT - ALTERNATIVE 1

Alternative 1 maintains and supplements the existing facilities located near and adjacent to the terminal building. In order to provide secondary containment for the fuel truck reloaders, parking bays are identified on the southeast corner of the existing terminal apron in Phase I. This location allows the parking bays to be located in an area that minimizes operational impact. A self-serve fuel pump is proposed in the area for the Ultimate Phase.

One T-hangar building and associated apron space, as well as several box hangars are proposed to be constructed east of the three existing T-hangar buildings in Phase II. This location allows the airport to retain the existing T-hangars in the area, and preserves the adjacent, vacant land for future hangar expansion on an as-needed basis (depicted in the Ultimate Phase). This alternative does not require hangar relocation and/or demolition. The hangars depicted in the Ultimate Phase could impact wetlands, should the presence of wetlands be confirmed in the forested area south of Aviation Way.

The acquisition of the parcel of land containing the Groves building is proposed in Phase II. The acquisition of the parcel of land containing the former Palencar Hangar is proposed in Phase III.

The existing Taxiway C, is proposed to be rehabilitated in Phase I, and re-developed with corporate box hangars and associated apron area of various sizes in the Ultimate Phase. The existing taxiway pavement is identified to serve as a taxilane to provide access to the proposed hangars, as well as provide Group II tiedown circulation for the tie-downs proposed adjacent to Taxiway B. Access to the future box hangars will be provided from an access road that will be extended east from the Triumph Property Group (TPG) hangar (Building 17). A large or heavy aircraft parking apron is also proposed for the Ultimate Phase, to connect Taxiway C to the general aviation apron.

Two, 60’ x 60’ box hangars are proposed in the far south of the apron area, in the Ultimate Phase.

Primary access to the terminal building and surrounding aeronautical services is via Aviation Way from Airport Road. Chapter Three noted the surrounding road network has capacity to provide adequate ground transportation to MRB through the planning period. Airport Management proposes to widen Aviation Way to two lanes, as well as rehabilitate the access road in Phase I in order to enhance accessibility and safety.

FISCAL FACTORS

The Engineer's opinion of probable cost for South Apron Development Alternative 1 is shown in **Table 4.1**. **Figure 4.1** illustrates this alternative.

Table 4.1- Engineer's Opinion of Probable Cost for South Apron Development Alternative 1

NO.	PROJECT	PHASE	20 YEAR PLANNING PERIOD ESTIMATED COSTS[1]
1	Environmental Assessment	I	$775,000
2	Land Acquisition for RPZ[1]	I	$4,110,000
3	Obstruction Removal on Airport[2]	I	$600,000
4	Rehabilitate Runway 8-26 HIRLs	I	$1,550,000
5	Rehabilitate Taxiways B, C, D, and E MITLs	I	$1,230,000
6	Construct Fuel Truck Parking Bays	I	$160,000
7	Install Segmented Circle to Primary Wind Cone	I	$40,000
8	Rehabilitate/Improve Aviation Way	I	$150,000
9	Non-Aeronautical Development - Land Release[3]	I	$100,000
10	Develop Air Cargo Operations Area	I	$65,000,000[7]
11	Taxiway C/Apron Rehabilitation[4]	I	UNDERWAY
12	Environmental Assessment	II	$775,000
13	Land Acquisition for TTF Operations[1]	II	$550,000
14	Construct One T-hangar Building with Apron	II	$1,800,000
15	Remove VASIs and Install PAPIs	II	$550,000
16	Relocate Perimeter Fence	II	$130,000

Table 4.1- Engineer's Opinion of Probable Cost for South Apron Development Alternative 1

NO.	PROJECT	PHASE	20 YEAR PLANNING PERIOD ESTIMATED COSTS[1]
17	Install DME to Existing Localizer	II	$300,000
18	Construct New Taxiway Connectors	II	$2,200,000
19	Extend and Widen Taxiway E	II	$15,200,000
20	Environmental Assessment	III	$775,000
21	Land Acquisition for TTF Operations[1]	III	$2,150,000
22	Remove Taxiways B,C,D, and E3	III	$1,000,000
23	Relocate Supplemental Wind Cone from Runway 8 ROFA	III	$35,000
24	Relocate Supplemental Wind Cone from Runway 26 ROFA	III	$35,000
25	Rehabilitate Taxiway D	III	$200,000
		ESTIMATED ALTERNATIVE 1 TOTAL[4,6]	**$99,415,000**

Notes:
1. Land costs are estimated based on 2018 Berkeley County, West Virginia Tax Assessments and include land services. Land costs are conservative estimates.
2. Removal of existing terrain and tree penetrations within designated areas.
3. Project estimate includes environmental assessment (EA), environmental due diligence audit (EDDA), and appraisal.
4. This project is underway in FY18 an overall projects costs will not be factored into the development plan.
5. All estimated costs include grading, drainage, pavement, markings and electrical plus estimated engineering fees, administration costs, and contingency.
6. Opinions of probable cost were not developed for the Ultimate Phase (beyond 20-years).
7. Cost estimates provided by the Authority.

Source: Delta Airport Consultants, Inc.

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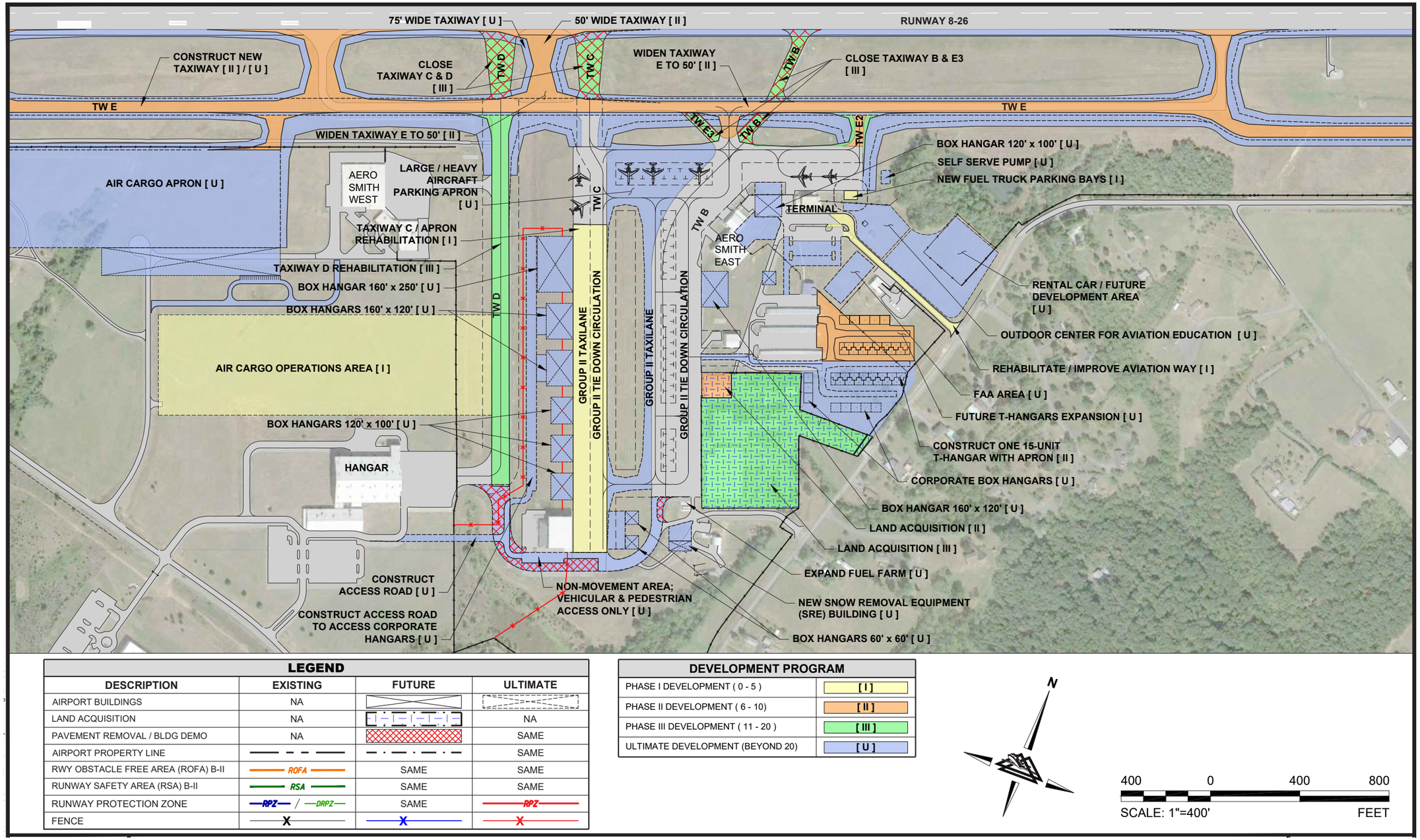
SOUTH APRON DEVELOPMENT ALTERNATIVE 1



LEGEND

DESCRIPTION	EXISTING	FUTURE	ULTIMATE
AIRPORT BUILDINGS	NA		
LAND ACQUISITION	NA		NA
PAVEMENT REMOVAL / BLDG DEMO	NA		SAME
AIRPORT PROPERTY LINE			SAME
RWY OBSTACLE FREE AREA (ROFA) B-II	ROFA	SAME	SAME
RUNWAY SAFETY AREA (RSA) B-II	RSA	SAME	SAME
RUNWAY PROTECTION ZONE	RPZ / DRPZ	SAME	RPZ
FENCE	X	X	X

DEVELOPMENT PROGRAM	
PHASE I DEVELOPMENT (0 - 5)	[I]
PHASE II DEVELOPMENT (6 - 10)	[II]
PHASE III DEVELOPMENT (11 - 20)	[III]
ULTIMATE DEVELOPMENT (BEYOND 20)	[U]

N

400 0 400 800
SCALE: 1"=400' FEET

Figure 4.1- South Apron Development Alternative 1
Source: Delta Airport Consultants, Inc.

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SOUTH APRON DEVELOPMENT - ALTERNATIVE 2

The list of proposed projects in Alternative 2 is similar to Alternative 1, with the only addition being the proposed acquisition of the EWVRAA box hangar (Building 8) to accommodate the T-hangar building proposed in Phase II. Three additional T-hangar buildings are proposed to be constructed parallel to the Phase II T-hangar in the Ultimate Phase (or, as demand dictates). To accommodate a fourth T-hangar in this area, the buildings should be installed perpendicular to the orientation of the existing T-hangars, necessitating the relocation of the EWVRAA box hangar. As it is in good condition, it is recommended that the box hangar be relocated in Phase II rather than demolished, perhaps serving as a temporary airport maintenance/SRE facility in the southern portion of the area, until a new building is constructed.

In addition to the location and orientation of the proposed T-hangar building, the major differences between Alternative 1 and Alternative 2 are the location of the fuel truck parking bays and the location of the access road to the future corporate hangar development area.

The proposed fuel truck parking bay is situated immediately south of, and adjacent to, the Aero-Smith East Hangar (Building 7 - see Chapter One, Figure 1.13), in Phase I. Placing the fuel truck parking bay in this location provides space for a future terminal building expansion, if the Fixed Base Operator (FBO) facility is relocated to the terminal building. This is depicted conceptually in the Ultimate Phase, in Alternative 2.

Another difference in Alternative 2 is the location of the access road to the future corporate hangar development area. Whereas Alternative 1 proposes an access road located south of the TPG Hangar, Alternative 2 proposes an access road to the corporate hangar development area which utilizes the existing access road that currently serves the fuel farm and maintenance storage area.

Similar to Alternative 1, Alternative 2 proposes the acquisition of the adjacent parcel of land containing the commercial TTF operations, in Phase I.

FISCAL FACTORS

The Engineer's opinion of probable cost for South Apron Development Alternative 2 is shown in **Table 4.2**. **Figure 4.2** illustrates this alternative.

Table 4.2- Engineer's Opinion of Probable Cost for South Apron Development Alternative 2

NO.	PROJECT	PHASE	20 YEAR PLANNING PERIOD ESTIMATED COSTS[1]
1	Environmental Assessment	I	$775,000
2	Land Acquisition for RPZ[1]	I	$4,110,000
3	Obstruction Removal on Airport[2]	I	$600,000
4	Rehabilitate Runway 8-26 HIRLs	I	$1,550,000
5	Rehabilitate Taxiways B, C, D, and E MITLs	I	$1,230,000
6	Construct Fuel Truck Parking Bays	I	$160,000
7	Install Segmented Circle to Primary Wind Cone	I	$40,000
8	Non-Aeronautical Development - Land Release[3]	I	$100,000
9	Develop Air Cargo Operations Area	I	$65,000,000[7]
10	Taxiway C/Apron Rehabilitation[4]	I	UNDERWAY
11	Environmental Assessment	II	$775,000
12	Land Acquisition for TTF Operations[1]	II	$550,000
13	Construct One T-hangar Building with Apron	II	$1,800,000
14	Remove VASIs and Install PAPIs	II	$550,000
15	Relocate Perimeter Fence	II	$130,000
16	Install DME to Existing Localizer	II	$300,000

Table 4.2- Engineer's Opinion of Probable Cost for South Apron Development Alternative 2

NO.	PROJECT	PHASE	20 YEAR PLANNING PERIOD ESTIMATED COSTS[1]
17	Construct New Taxiway Connectors	II	$2,200,000
18	Extend and Widen Taxiway E	II	$15,200,000
19	EWVRAA Box Hangar Relocation	II	$100,000
20	Environmental Assessment	III	$775,000
21	Land Acquisition for TTF Operations[1]	III	$2,150,000
22	Remove Taxiways B,C,D, and E3	III	$1,000,000
23	Relocate Supplemental Wind Cone from Runway 8 ROFA	III	$35,000
24	Relocate Supplemental Wind Cone from Runway 26 ROFA	III	$35,000
25	Taxiway D Rehabilitation	III	$200,000
		ESTIMATED ALTERNATIVE 2 TOTAL[5,6]	**$99,365,000**

Notes:
1. Land costs are estimated based on 2018 Berkeley County, West Virginia Tax Assessments and include land services. Land costs are conservative estimates.
2. Removal of existing terrain and tree penetrations within designated areas.
3. Project estimate includes environmental assessment (EA), environmental due diligence audit (EDDA), and appraisal.
4. This project is underway in FY18 an overall projects costs will not be factored into the development plan.
5. All estimated costs include grading, drainage, pavement, markings and electrical plus estimated engineering fees, administration costs, and contingency.
6. Opinions of probable cost were not developed for the Ultimate Phase (beyond 20-years).
7. Cost estimates provided by the Authority.

Source: Delta Airport Consultants, Inc.

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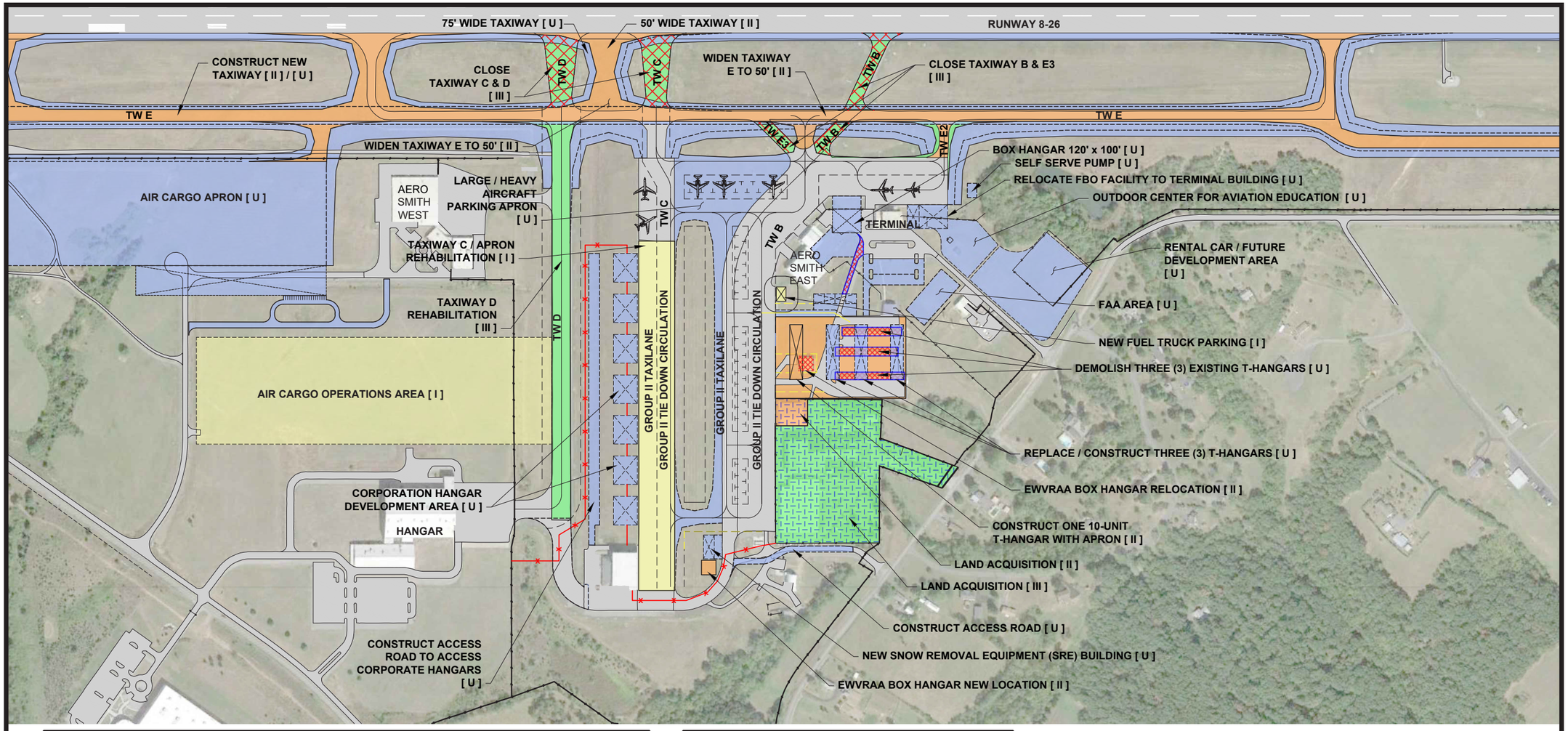
SOUTH APRON DEVELOPMENT ALTERNATIVE 2



LEGEND

DESCRIPTION	EXISTING	FUTURE	ULTIMATE
AIRPORT BUILDINGS	NA		
LAND ACQUISITION	NA		NA
PAVEMENT REMOVAL / BLDG DEMO	NA		SAME
AIRPORT PROPERTY LINE			SAME
RWY OBSTACLE FREE AREA (ROFA) B-II	ROFA	SAME	SAME
RUNWAY SAFETY AREA (RSA) B-II	RSA	SAME	SAME
RUNWAY PROTECTION ZONE	RPZ / DRPZ	SAME	RPZ
FENCE	X	X	X

DEVELOPMENT PROGRAM	
PHASE I DEVELOPMENT (0 - 5)	[I]
PHASE II DEVELOPMENT (6 - 10)	[II]
PHASE III DEVELOPMENT (11 - 20)	[III]
ULTIMATE DEVELOPMENT (BEYOND 20)	[U]

N

400 0 400 800

SCALE: 1"=400' FEET

Figure 4.2- South Apron Development Alternative 2
Source: Delta Airport Consultants, Inc.

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SOUTH APRON DEVELOPMENT - ALTERNATIVE 3

Alternative 3 proposes similar projects to Alternatives 1 and 2, but it suggests a new orientation for the proposed T-hangar building in Phase II, and the access road to the corporate hangar development area. The T-hangar building is proposed to be developed adjacent to the existing general aviation apron; however, the unit is proposed to be oriented perpendicular to the apron and in line with the existing T-hangars in this area. By placing the proposed T-hangar perpendicular to the general aviation apron, the relocation and/or demolition of the EWVRAA box hangar and the existing T-hangars can be avoided. In Alternative 3 the location of the access road to the future corporate hangar development area is proposed to be newly constructed off of Novak Road. Alternative 3 includes the proposed acquisition of the adjacent parcel of land containing two active, commercial TTF operations. As in Alternative 2, the proposed fuel truck parking bay is proposed immediately south of, and adjacent to, the Aero-Smith East hangar.

FISCAL FACTORS

The Engineer's opinion of probable cost for South Apron Development Alternative 3 is shown in **Table 4-3. Figure 4.3** illustrates this alternative.

Table 4.3- Engineer's Opinion of Probable Cost for South Apron Alternative 3

NO.	PROJECT	PHASE	20 YEAR PLANNING PERIOD ESTIMATED COSTS
1	Environmental Assessment	I	$775,000
2	Land Acquisition for RPZ[1]	I	$4,110,000
3	Obstruction Removal on Airport[2]	I	$600,000
4	Rehabilitate Runway 8-26 HIRLs	I	$1,550,000
5	Rehabilitate Taxiways B, C, D, and E MITLs	I	$1,230,000
6	Construct Fuel Truck Parking Bays	I	$160,000
7	Install Segmented Circle to Primary Wind Cone	I	$40,000
8	Non-Aeronautical Development - Land Release[3]	I	$100,000
9	Development Air Cargo Operations Area	I	$65,000,000[7]

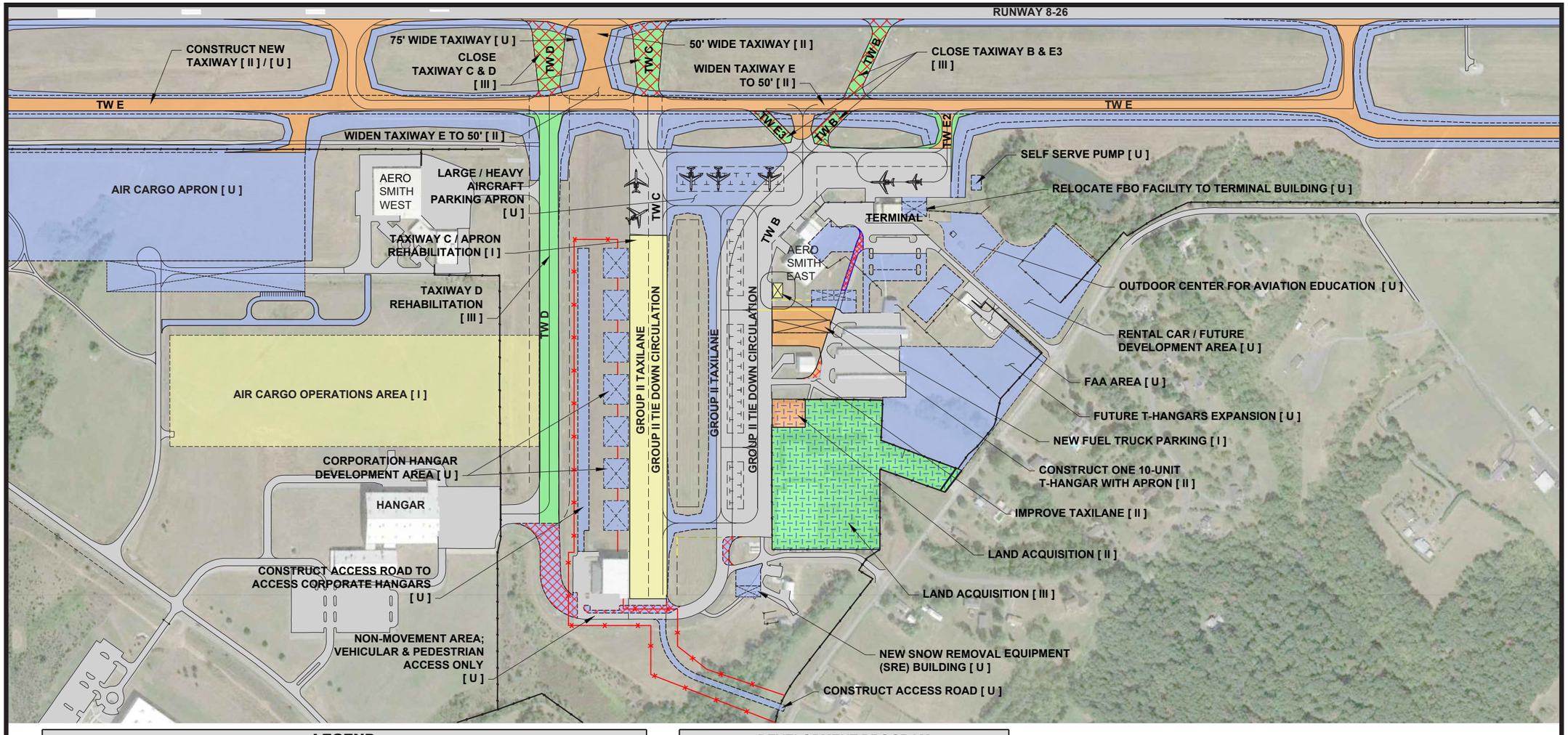
Table 4.3- Engineer's Opinion of Probable Cost for South Apron Alternative 3

NO.	PROJECT	PHASE	20 YEAR PLANNING PERIOD ESTIMATED COSTS
10	Taxiway C/Apron Rehabilitation[4]	I	UNDERWAY
11	Environmental Assessment	II	$775,000
12	Land Acquisition for TTF Operations[1]	II	$550,000
13	Construct One T-hangar Building with Apron	II	$1,800,000
14	Remove VASIs and Install PAPIs	II	$550,000
15	Relocate Perimeter Fence	II	$130,000
16	Install DME to Existing Localizer	II	$300,000
17	Construct New Taxiway Connectors	II	$2,200,000
18	Extend and Widen Taxiway E	II	$15,200,000
19	Environmental Assessment	III	$775,000
20	Land Acquisition for TTF Operations[1]	III	$2,150,000
21	Remove Taxiways B,C,D, and E3	III	$1,000,000
22	Relocate Supplemental Wind Cone from Runway 8 ROFA	III	$35,000
23	Relocate Supplemental Wind Cone from Runway 26 ROFA	III	$35,000
24	Taxiway D Rehabilitation	III	$200,000
		ESTIMATED ALTERNATIVE 3 TOTAL[5,6]	**$99,265,000**

Notes:
1. Land costs are estimated based on 2018 Berkeley County, West Virginia Tax Assessments and include land services. Land costs are conservative estimates.
2. Removal of existing terrain and tree penetrations within designated areas.
3. Project estimate includes environmental assessment (EA), environmental due diligence audit (EDDA), and appraisal.
4. This project is underway in FY18 an overall projects costs will not be factored into the development plan.
5. All estimated costs include grading, drainage, pavement, markings and electrical plus estimated engineering fees, administration costs, and contingency.
6. Opinions of probable cost were not developed for the Ultimate Phase (beyond 20-years).
7. Cost estimates provided by the Authority.

Source: Delta Airport Consultants, Inc.

SOUTH APRON DEVELOPMENT ALTERNATIVE 3



LEGEND			
DESCRIPTION	EXISTING	FUTURE	ULTIMATE
AIRPORT BUILDINGS	NA		
LAND ACQUISITION	NA		NA
PAVEMENT REMOVAL / BLDG DEMO	NA		SAME
AIRPORT PROPERTY LINE			SAME
RWY OBSTACLE FREE AREA (ROFA) B-II	ROFA	SAME	SAME
RUNWAY SAFETY AREA (RSA) B-II	RSA	SAME	SAME
RUNWAY PROTECTION ZONE	RPZ / DRPZ	SAME	RPZ
FENCE	X	X	X

DEVELOPMENT PROGRAM	
PHASE I DEVELOPMENT (0 - 5)	[I]
PHASE II DEVELOPMENT (6 - 10)	[II]
PHASE III DEVELOPMENT (11 - 20)	[III]
ULTIMATE DEVELOPMENT (BEYOND 20)	[U]

N

400 0 400 800
SCALE: 1"=400' FEET

Figure 4.3- South Apron Development Alternative 3
Source: Delta Airport Consultants, Inc.

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4.3|Part 02 - North Apron Development Area Alternatives

Three alternatives were developed to examine and evaluate feasible concepts for future general aviation facility development north of the runway, within a small area east of and adjacent to the ANG Facility (Building 27). **Figures 4.4, 4.5, and 4.6** present the facility development alternatives considered for the North Apron Development Area. Due to the minimal difference between the three alternatives, the operational performance, best planning tenets, and environmental factors for the three alternatives are discussed below. Each development alternative includes its own fiscal evaluation.

OPERATIONAL PERFORMANCE

The North Apron layouts meet the general aviation facility demand anticipated in the short and long-terms. Redevelopment of the North Apron Area will allow for both the tie-down separation and taxilane OFA separation to accommodate Group I or Group II aircraft. The layout of the future facilities provides for small aircraft based on FAA design standards. Improvements to the unnamed taxiway will bring the existing taxiway into compliance with FAA design standards.

BEST PLANNING TENETS

General aviation development in each alternative allows for growth throughout and beyond the planning horizon to effectively accommodate the existing and forecasted demand. The proposed land acquisition remedies the existing TTF operations as well as provides ample space for future development, even beyond the 20-year timeframe. As discussed in Chapter Three, TTF operations are discouraged by the FAA.

ENVIRONMENTAL FACTORS

An environmental overview was not part of the master plan effort for MRB. A full EA, including field surveys for wetlands and cultural resources, should be conducted before construction begins. The EA can be facilitated cumulatively for proposed development in the South Apron and North Apron areas. It is recommended that an EDDA be conducted before land is acquired, to confirm the absence of hazardous materials on the parcels. The Stormwater Management Study conducted during this planning effort recommends stormwater improvements to accommodate the proposed development (see Appendix G).

NORTH APRON DEVELOPMENT - ALTERNATIVE 1

Alternative 1 focuses primarily on land acquisition. The purpose of the land acquisition is to eliminate existing TTF operations (Air Photographics (Building 22) and Howard Aircraft Maintenance (Building 23)) as well as to secure an approximately nine-acre parcel of land for ultimate development, either for the military assault strip/crosswind runway considered during the planning effort (see **Appendix F**) or for future hangar development.

As discussed in Chapter Three, the Authority expressed interest in pursuing the development of a military assault strip with a secondary function of a crosswind runway for general aviation aircraft. As part of the planning consideration, the Authority reviewed a conceptual layout of the military assault strip/crosswind runway to be built in the Ultimate Phase, included in **Appendix F**. This conceptual layout illustrated that the acquisition of the nine-acre parcel of land could only be used for development of the military assault strip/crosswind runway as the design standards for this type of facility would prohibit the development of revenue-producing aeronautical facilities (e.g. the development of aircraft hangars).

FISCAL FACTORS

The Engineer's opinion of probable cost for North Apron Development Alternative 1 is shown in **Table 4-4. Figure 4.4** illustrates this alternative.

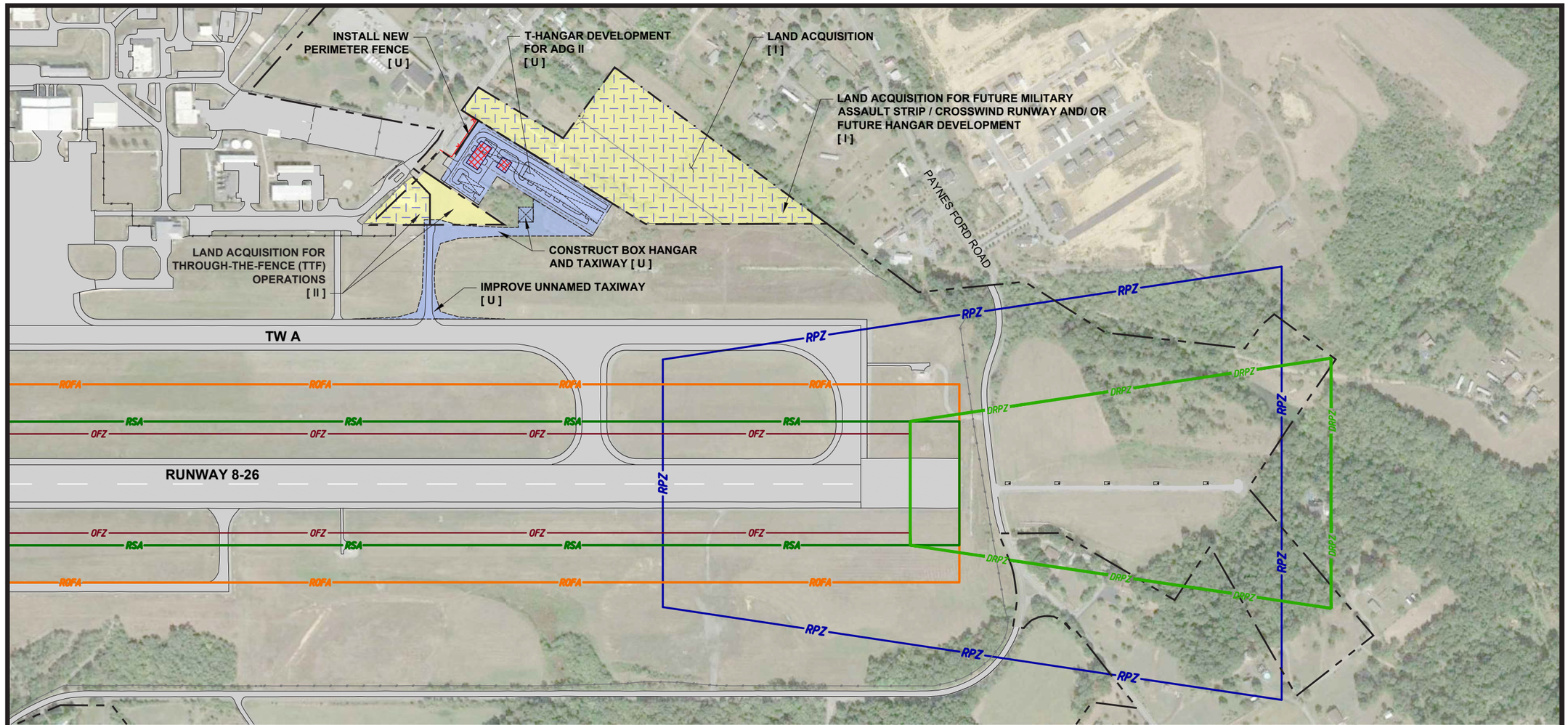
Table 4.4- Engineer's Opinion of Probable Cost for North Apron Development Alternative 1

NO.	PROJECT	PHASE	20 YEAR PLANNING PERIOD ESTIMATED COSTS[1]
1	Land Acquisition for TTF Operations[1]	I	$300,000
2	Land Acquisition for Future Military Assault Strip/Crosswind Runway and/or Future Hangar Development[1]	I	$175,000
	ESTIMATED ALTERNATIVE 1 TOTAL[2]		**$475,000**

Notes:
1. Land costs are estimated based on 2018 Berkeley County, West Virginia Tax Assessments and include land services. Land costs are conservative estimates.
2. Opinions of probable cost were not developed for the Ultimate Phase (beyond 20-years).

Source: Delta Airport Consultants, Inc.

NORTH APRON DEVELOPMENT ALTERNATIVE 1



LEGEND			
DESCRIPTION	EXISTING	FUTURE	ULTIMATE
AIRPORT BUILDINGS	NA		
LAND ACQUISITION	NA		NA
PAVEMENT REMOVAL / BLDG DEMO	NA		SAME
AIRPORT PROPERTY LINE			SAME
RWY OBSTACLE FREE AREA (ROFA) B-II	ROFA	SAME	SAME
RUNWAY SAFETY AREA (RSA) B-II	RSA	SAME	SAME
RUNWAY PROTECTION ZONES	RPZ / DRPZ	SAME	RPZ
FENCE	X	X	X

DEVELOPMENT PROGRAM	
PHASE I DEVELOPMENT (0 - 5)	[I]
PHASE II DEVELOPMENT (6 - 10)	[II]
PHASE III DEVELOPMENT (11 - 20)	[III]
ULTIMATE DEVELOPMENT (BEYOND 20)	[U]

N

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SCALE: 1"=400' FEET

Figure 4.4- North Apron Development Alternative 1
Source: Delta Airport Consultants, Inc.

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NORTH APRON DEVELOPMENT - ALTERNATIVE 2

Similar to Alternative 1, Alternative 2 involves land acquisition for both the elimination of existing TTF operations and for future hangar development. However, in addition to the land acquisition, Alternative 2 focuses on re-developing the area for aircraft that meet Airplane Design Group (ADG) I criteria. The existing unnamed taxiway is proposed to be improved to meet current FAA design standards. The existing grass apron is also proposed to be relocated to on-airport property and be improved from a grass surface to a paved surfaced that includes tiedown circulation for ADG I.

FISCAL FACTORS

The Engineer's opinion of probable cost for North Apron Development Alternative 2 is shown in **Table 4-5. Figure 4.5** illustrates this alternative.

Table 4.5- Engineer's Opinion of Probable Cost for North Apron Development Alternative 2

NO.	PROJECT	PHASE	20 YEAR PLANNING PERIOD ESTIMATED COSTS
1	Land Acquisition for TTF Operations[1]	I	$300,000
2	Land Acquisition for Future Hangar Development[1]	I	$175,000
3	Improve Unnamed Taxiway[2]	II	$900,000
4	Relocate Grass Apron to On-Airport Property and Add Tie-Down Circulation for ADG I	II	$1,200,000
	ESTIMATED TOTAL[3] ALTERNATIVE 2		**$2,575,000**

Notes:
1. Land costs are estimated based on 2018 Berkeley County, West Virginia Tax Assessments and include land services. Land costs are conservative estimates.
2. Estimated costs include grading, drainage, pavement, markings, and electrical plus estimated engineering fees, administration costs, and contingency.
3. Opinions of probable cost were not developed for the Ultimate Phase (beyond 20-years).

Source: Delta Airport Consultants, Inc.

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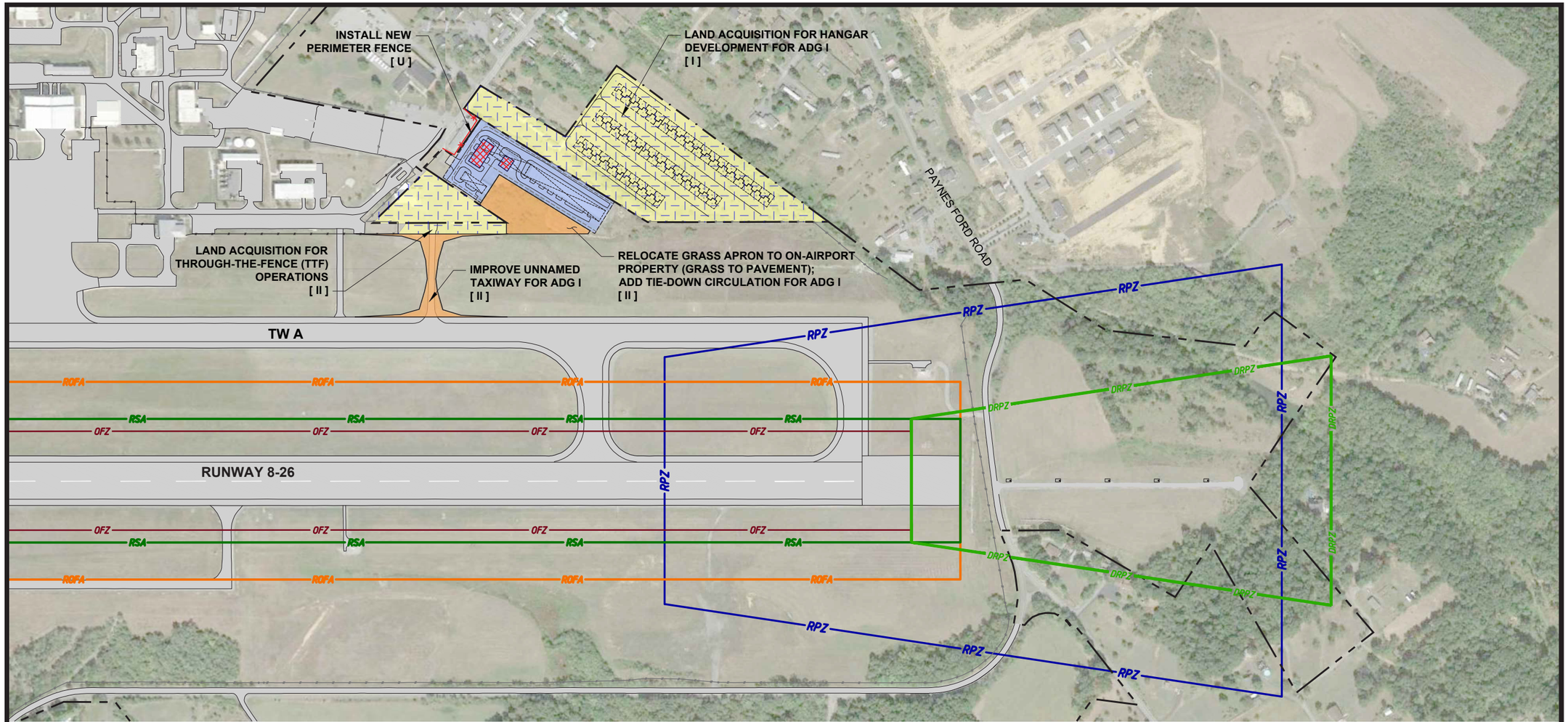
NORTH APRON DEVELOPMENT ALTERNATIVE 2



LEGEND			
DESCRIPTION	EXISTING	FUTURE	ULTIMATE
AIRPORT BUILDINGS	NA		
LAND ACQUISITION	NA		NA
PAVEMENT REMOVAL / BLDG DEMO	NA		SAME
AIRPORT PROPERTY LINE			SAME
RWY OBSTACLE FREE AREA (ROFA) B-II	ROFA	SAME	SAME
RUNWAY SAFETY AREA (RSA) B-II	RSA	SAME	SAME
RUNWAY PROTECTION ZONES	RPZ / DRPZ	SAME	RPZ
FENCE	X	X	X

DEVELOPMENT PROGRAM	
PHASE I DEVELOPMENT (0 - 5)	[I]
PHASE II DEVELOPMENT (6 - 10)	[II]
PHASE III DEVELOPMENT (11 - 20)	[III]
ULTIMATE DEVELOPMENT (BEYOND 20)	[U]

N

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SCALE: 1"=400' FEET

Figure 4.5- North Apron Development Alternative 2
Source: Delta Airport Consultants, Inc.

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NORTH APRON DEVELOPMENT - ALTERNATIVE 3

This alternative proposes land acquisition to eliminate the existing TTF operations and for hangar development. As Alternative 2 focused on redevelopment for aircraft in ADG I, Alternative 3 focuses on redevelopment for aircraft in ADG I and II. The existing unnamed taxiway is proposed to be reconstructed to meet FAA design standards for ADG II. The existing grass apron is also proposed to be reconstructed from a grass surface to a paved surface that includes tiedown circulation for ADG II.

In Alternative 3, Phase I depicts land acquisition of a 9.4 acre parcel of land for development of a T-hangar with associated apron that provides circulation for aircraft meeting ADG I criteria. Phase II development proposes the construction of two additional T-hangars with associated aprons for aircraft that meet ADG II criteria. To facilitate ingress/egress to this hangar development area, a new taxiway is depicted for Phase I.

FISCAL FACTORS

The Engineer's opinion of probable cost for North Apron Development Alternative 3 is shown in **Table 4-6. Figure 4.6** illustrates this alternative.

Table 4.6- Engineer's Opinion of Probable Cost for North Apron Development Alternative 3

NO.	PROJECT	PHASE	20 YEAR PLANNING PERIOD ESTIMATED COSTS
1	Land Acquisition for Hangar Development[1]	I	$175,000
2	Construct One T-hangar Building with Apron	I	$2,800,000
3	Construct New Taxiway	I	$1,100,000
4	Land Acquisition for TTF Operations[1]	II	$300,000
5	Reconstruct Unnamed Taxiway (to ADG II)	II	$900,000
6	Construct New Apron with Tie-Downs (for ADG II)	II	$1,500,000

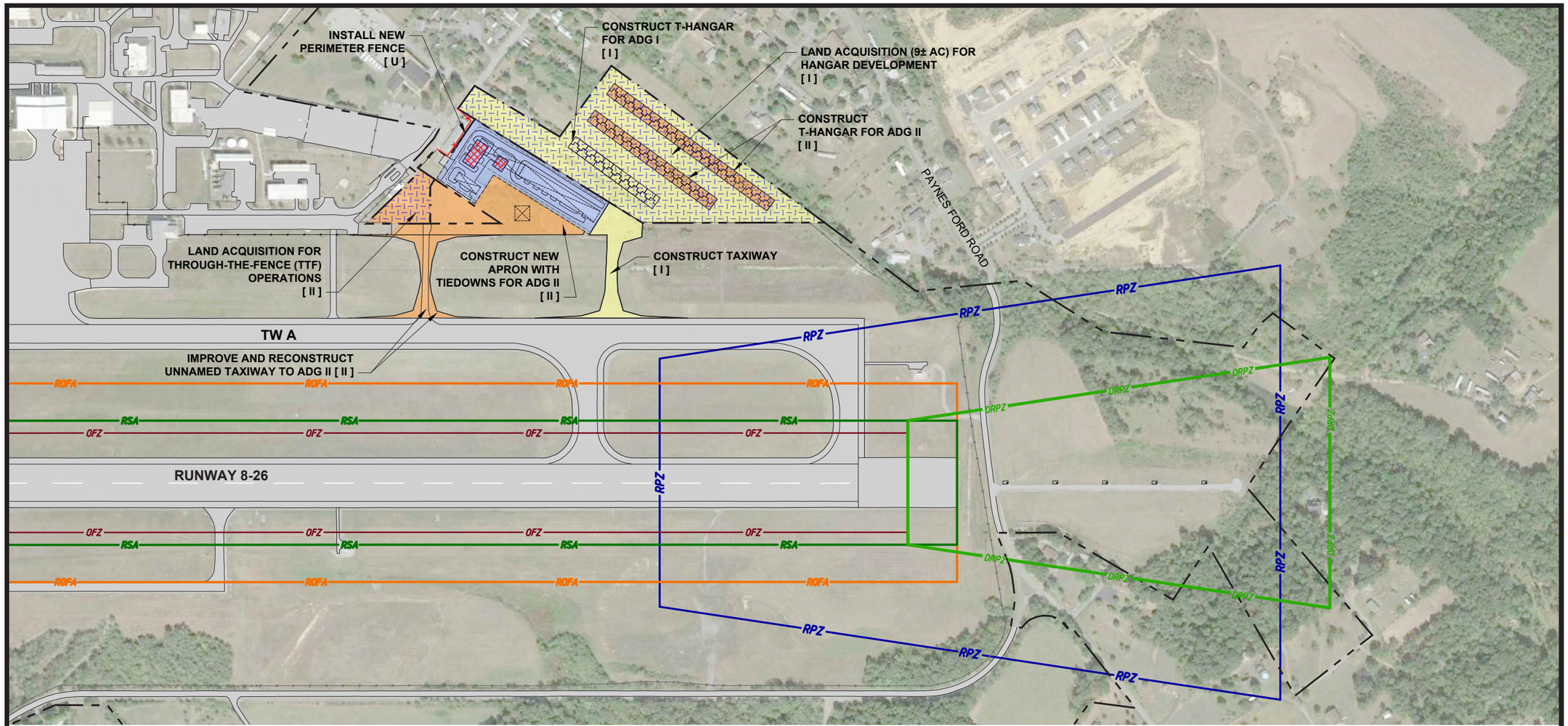
Table 4.6- Engineer's Opinion of Probable Cost for North Apron Development Alternative 3

NO.	PROJECT	PHASE	20 YEAR PLANNING PERIOD ESTIMATED COSTS
7	Construct Two T-hangar Buildings with Apron	II	$6,000,000
	ESTIMATED ALTERNATIVE 3 TOTAL[2,3]		**$12,775,000**

Notes:
1. Land costs are estimated based on 2018 Berkeley County, West Virginia Tax Assessments and include land services. Land costs are conservative estimates.
2. Estimated costs include grading, drainage, pavement, markings, and electrical plus estimated engineering fees, administration costs, and contingency.
3. Opinions of probable cost were not developed for the Ultimate Phase (beyond 20-years).

Source: Delta Airport Consultants, Inc.

NORTH APRON DEVELOPMENT ALTERNATIVE 3



LEGEND			
DESCRIPTION	EXISTING	FUTURE	ULTIMATE
AIRPORT BUILDINGS	NA		
LAND ACQUISITION	NA		NA
PAVEMENT REMOVAL / BLDG DEMO	NA		SAME
AIRPORT PROPERTY LINE			
RWY OBSTACLE FREE AREA (ROFA) B-II	ROFA	SAME	SAME
RUNWAY SAFETY AREA (RSA) B-II	RSA	SAME	SAME
RUNWAY PROTECTION ZONES	RPZ / DRPZ	SAME	RPZ
FENCE	X	X	X

DEVELOPMENT PROGRAM	
PHASE I DEVELOPMENT (0 - 5)	[I]
PHASE II DEVELOPMENT (6 - 10)	[II]
PHASE III DEVELOPMENT (11 - 20)	[III]
ULTIMATE DEVELOPMENT (BEYOND 20)	[U]

Figure 4.6- North Apron Development Alternative 3
Source: Delta Airport Consultants, Inc.

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4.3|Part 03 - Alternative Comparisons

The three alternatives analyzed are compared in a quantitative alternative evaluation matrix in **Table 4-7,** to create a basis for comparison.

Table 4.7- Quantitative Alternative Evaluation Matrix

	SOUTH APRON DEVELOPMENT			NORTH APRON DEVELOPMENT		
EVALUATION CRITERIA	**ALTERNATIVE 1**	**ALTERNATIVE 2**	**ALTERNATIVE 3**	**ALTERNATIVE 1**	**ALTERNATIVE 2**	**ALTERNATIVE 3**
Operational Performance	3	3	2	1	2	3
Best Planning Tenets	3	2	2	1	2	3
Environmental Factors	3	2	2	1	2	3
Fiscal Factors	1	2	3	3	2	1
TOTAL	**10**	**9**	**9**	**6**	**8**	**10**

Notes: Based on ability to achieve evaluation criteria:

3- Best

2- Moderate

1- Least

Image by Delta Airport Consultants, Inc.

Section 4 - Preferred Alternative

Part 01 | Preferred Airport Development – Future and Ultimate

4.4|Part 01 - Preferred Airport Development – Future and Ultimate

South Apron Development Alternative 1 and North Apron Development Alternative 3 were selected as the Preferred General Aviation Development Plan

Based on the quantitative alternative evaluation and input from the Airport Authority and its staff, South Apron Development Alternative 1 and North Apron Development Alternative 3 were selected as the Preferred General Aviation Development Plan. The proposed development from the selected South Apron and North Apron Development Alternatives is combined with the proposed improvements to create a comprehensive, Preferred Alternative Development Plan for the 20-year planning period at MRB, which is illustrated in **Figure 4.7**.

The Engineer's opinion of probable cost for the Preferred Airport Development Plan is shown in **Table 4.8**. Further discussion related to funding of the development program is contained in Chapter Six of this Master Plan.

At this stage of the study, the plan and corresponding cost estimates are conceptual in nature and subject to further refinement during preliminary engineering and final design. Funding is subject to eligibility under federal and state guidelines at such time the proposed projects are justified for development.

Table 4.8- Preferred Airport Development Plan

NO.	PROJECT	PHASE	20 YEAR PLANNING PERIOD ESTIMATED COSTS
1	Environmental Assessment	I	$775,000
2	Land Acquisition for RPZ[1]	I	$4,110,000
3	Land Acquisition for Hangar Development [1]	I	$175,000
4	Obstruction Removal on Airport[2]	I	$600,000
5	Rehabilitate Runway 8-26 HIRLs	I	$1,550,000
6	Rehabilitate Taxiway B, C, D, E MITLs	I	$1,230,000
7	Construct Fuel Truck Parking Bays	I	$160,000
8	Install Segmented Circle to Primary Wind Cone	I	$40,000
9	Rehabilitate/Improve Aviation Way	I	$150,000
10	Non-Aeronautical Development - Land Release[3]	I	$100,000
11	Develop Air Cargo Operations Area	I	$65,000,000
12	Taxiway C/Apron Rehabilitation[4]	I	UNDERWAY
13	Constuct One T-hangar Building with Apron (North Apron)	I	$2,800,000
14	Construct New Taxiway (North Apron)	I	$1,100,000
15	Environmental Assessment	II	$775,000
16	Land Acquisition for TTF Operations[1]	II	$850,000
17	Construct One T-hangar Building with Apron (South Apron)	II	$1,800,000
18	Construct Two T-hangar Buildings with Apron (North Apron)	II	$6,000,000
19	Remove VASIs and Install PAPIs	II	$550,000

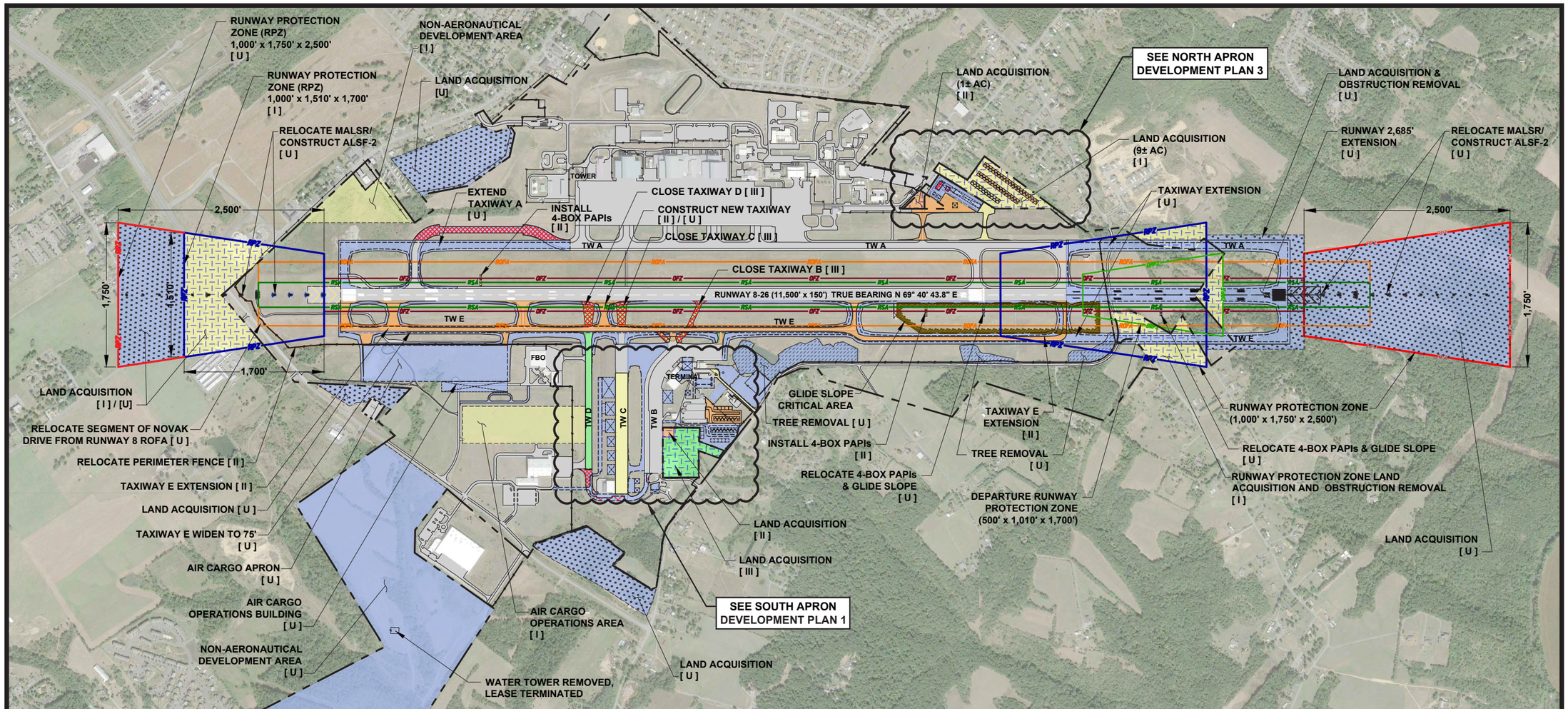
Table 4.8- Preferred Airport Development Plan

NO.	PROJECT	PHASE	20 YEAR PLANNING PERIOD ESTIMATED COSTS
20	Relocate Perimeter Fence	II	$130,000
21	Install DME to Existing Localizer	II	$300,000
22	Construct New Taxiway Connectors	II	$2,200,000
23	Extend and Widen Taxiway E	II	$15,200,000
24	Reconstruct Unnamed Taxiway (for ADG II)	II	$900,000
25	Construct New Apron with Tie-Downs (for ADG II)	II	$1,500,000
26	Environmental Assessment	III	$775,000
27	Land Acquisition for TTF Operations[1]	III	$2,150,000
28	Remove Taxiways B,C,D, and E3	III	$1,000,000
29	Relocate Supplemental Wind Cone from Runway 8 ROFA	III	$35,000
30	Relocate Supplemental Wind Cone from Runway 26 ROFA	III	$35,000
31	Rehabilitate Taxiway D	III	$200,000
		ESTIMATED TOTAL[5,6]	**$112,190,000**

Notes:
1. Land costs are estimated based on 2018 Berkeley County, West Virginia Tax Assessments and include land services. Land costs are conservative estimates.
2. Removal of existing terrain and tree penetrations within designated areas.
3. Project estimate includes environmental assessment (EA), environmental due diligence audit (EDDA), and appraisal.
4. This project is underway in FY18 an overall projects costs will not be factored into the development plan.
5. All estimated costs may include grading, drainage, pavement, markings and electrical plus estimated engineering fees, administration costs, and contingency.
6. Opinions of probable cost were not developed for the Ultimate Phase (beyond 20-years).

Source: Delta Airport Consultants, Inc.

PREFERRED AIRPORT DEVELOPMENT PLAN – FUTURE AND ULTIMATE



LEGEND			
DESCRIPTION	EXISTING	FUTURE	ULTIMATE
AIRPORT BUILDINGS	NA		
LAND ACQUISITION	NA		
PAVEMENT REMOVAL / BLDG DEMO	NA		SAME
AIRPORT PROPERTY LINE			SAME
RWY OBSTACLE FREE AREA (ROFA) B-II	ROFA	SAME	SAME
RUNWAY SAFETY AREA (RSA) B-II	RSA	SAME	SAME
RUNWAY PROTECTION ZONES	RPZ / DRPZ	SAME	RPZ
FENCE	X	X	X

DEVELOPMENT PROGRAM	
PHASE I DEVELOPMENT (0 - 5)	[I]
PHASE II DEVELOPMENT (6 - 10)	[II]
PHASE III DEVELOPMENT (11 - 20)	[III]
ULTIMATE DEVELOPMENT (BEYOND 20)	[U]

N

1200 0 1200 2400
SCALE: 1"=1200' FEET

Figure 4.7- Preferred Airport Development Plan – Future and Ultimate
Source: Delta Airport Consultants, Inc.

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