5. Alternatives Definition and Evaluation

A key objective of the master planning process is to identify projects (e.g., facilities and infrastructure) to accommodate forecast aviation activity and to support planning priorities for the Airport. In this section, the results of prior tasks serve to identify, develop, and screen a range of integrated alternatives for FLL's various functional areas (airside, terminal, landside, tenant, and support facilities). These analyses culminate with the selection of a preferred development plan for FLL. The recommendations prescribed herein will be incorporated into the Airport's Future Airport Layout Plan and will provide a basis for the Airport's Capital Improvement Program (CIP).

5.1 Planning Considerations

At the onset of the master plan, a visioning charrette was conducted that established several key themes to guide the master planning process:

- Engage key stakeholder partners, particularly FLL's signatory airlines.
- Keep the easy-in/easy-out experience and preserve the hometown feel.
- Maintain a capacity "balance" among all facilities.
- Address the unique operational and infrastructure needs associated with the emergence of new international service opportunities.
- Explore opportunities to expand cargo, with careful consideration for potential noise impacts.
- Resolve capacity deficiencies in FLL's roadway system and parking facilities in a safe and efficient manner.
- Leverage multimodal opportunities to Port Everglades, the Broward County Convention Center, and beyond.
- Ensure seamless connectivity for passengers (and their baggage) between transportation modes, regardless of transportation mode.
- Avoid or minimize building throw-away investments.
- Identify the highest and best value use of scarce Airport property, including assessing facility needs as tenant leases expire; explore opportunities to optimize real estate holdings through either acquisition or disposals.
- The terminal, landside and automated people mover (APM) and Palm Garage redevelopment were all considered concurrently through the alternative's analyses process due to their overlapping features and facility interfacing. The preferred APM alignment is illustrated in the exhibits contained within **Section 5.3**. Refer to **Section 5.4.3** for a detailed description of the process undertaken to determine the preferred APM.

In accordance with these themes, a set of goals and objectives was established, and a customized planning approach was derived to undertake the alternatives identification, evaluation, and selection process described herein.

5.1.1 GOALS AND OBJECTIVES

The identification and evaluation of alternatives focuses on accommodating the forecast demand over the 20-year planning horizon in a responsive and efficient manner, with a level of flexibility to accommodate industry changes and evolution. More specific goals were used to guide the alternatives analysis:

- Accommodate demand levels associated with PAL 3 (54.2 Million Annual Passengers (MAP) and 432,600 annual operations per the Accelerated Baseline Forecast), prioritizing safety and efficiency in the Airport's operations.
- Consider long-range flexibility and expandability to serve aeronautical needs through and beyond the master plan's 20-year planning horizon.
- Maintain a balance among the airside, airspace, terminal, landside, and support facilities.
- Optimize the utilization of existing facilities and infrastructure and other resources.
- Recognize nonaeronautical development opportunities, while prioritizing aviation-related requirements.
- Consider the impacts of anticipated or potential technology and regulatory changes.
- Prioritize incremental expansion capability, while minimizing operational disruptions and the need for facility relocations or demolition.
- Avoid constructing temporary facilities that would not leverage the full extent of their useful life.
- Recognize the needs for infrastructure renewal as the Airport matures, while accommodating activity growth.
- Emphasize fiscal stability and competitive operating costs.
- Facilitate the efficient movement of passengers.
- Integrate intermodal opportunities into overall concepts.
- Explore opportunities to enhance nonaeronautical revenue.

Given FLL's land constraints, the development of future facilities and infrastructure should optimize the Airport's ability to serve Broward County's current and future aeronautical needs. With a gross area of 1,810 acres, FLL is one of the smallest large-hub airports in terms of land mass. Furthermore, approximately 400 acres of the Airport's property are not contiguous to the airfield, thereby further constraining opportunities to develop facilities that directly serve aeronautical purposes. Therefore, other objectives of the alternatives analyses focus on:

- Establishing an airport systems approach that would encourage the use of aeronautical facilities and infrastructure at nearby reliever airports for light GA and recreational uses, thereby enhancing FLL's ability to serve corporate GA, cargo, and air carrier needs.
- Maximizing the Airport's ability to serve Broward County's aeronautical needs by prioritizing mission-critical facilities on Airport property that are adjacent to the airfield infrastructure. These mission-critical facilities

include the passenger terminals, aeronautical tenants, and aviation support functions that require adjacency to the airfield.

- Locating other aviation support facilities and nonessential infrastructure for parcels that are not contiguous to the airfield.
- Identifying potential land acquisition opportunities to optimize aeronautical uses and/or maximize revenue generation to offset other operating costs.

These goals and objectives reflect Broward County's priorities for establishing a long-range development framework for the Airport that provides flexibility; optimizes land available for passenger terminal and aeronautical tenant facilities; enhances revenue-generating opportunities; and recognizes the critical importance of financial feasibility. Evaluation criteria was developed and used, incorporating BCAD's priorities and goals, to screen and shortlist Airport development concepts, and ultimately to identify a preferred airport development plan.

5.1.2 APPROACH AND METHODOLOGY

The planning approach applied to each functional area was customized to meet the unique operational needs of each area. FLL's airfield and passenger terminal facilities (terminal buildings, landside, and vehicular parking products) were assessed, followed by aeronautical tenants, airline and Airport support facilities, and other critical infrastructure. In summary, the planning process involved the following major efforts:

- Stakeholder work sessions were conducted to gain input on terminal-related facility issues, operating parameters, and requirements.
- The Accelerated Baseline Forecast was analyzed to correlate facility requirements with future activity levels.
- Stakeholder ideas emanating from "visioning" work sessions were refined to illustrate alternative terminal development concepts.
- Biweekly executive briefings were conducted with the Airport Director/Chief Executive Officer (CEO) and senior BCAD staff to analyze alternatives and the progress of MPU tasks.
- Work sessions with stakeholders and BCAD staff were conducted to refine qualitative and financial evaluations of the alternatives and to reach a consensus for the preferred airport development plan. This included a series of public workshops and advisory committee meetings to receive feedback from stakeholders.
- The Broward County Board of County Commissioners (BOCC) was engaged through a series of briefings/workshops at critical decision-making milestones throughout the master planning process.

5.2 Airfield Enhancements

The existing airfield has sufficient capacity to serve the 20-year projected growth in aircraft operations, per the demand/capacity analyses as previously presented in Section 4. As such, the MPU did not identify new runway concepts or alternate runway configurations. The Baseline airfield configuration considers the pavement geometry modifications associated with the pavement rehabilitation and certain taxiway geometry reconfiguration within the

north airfield at FLL. These airfield geometry modifications are to be completed in calendar year 2019. The Baseline airfield will maintain the airfield's current dual parallel runway system, thereby providing adequate runway capacity to serve the operational demand levels forecast through PAL 3. The ultimate airfield pavement geometry will also ensure compliance with current FAA airfield design standards for Airplane Design Group (ADG) V and Taxiway Design Group (TDG) 6.

5.2.1 AIRFIELD ENHANCEMENT CONSIDERATIONS

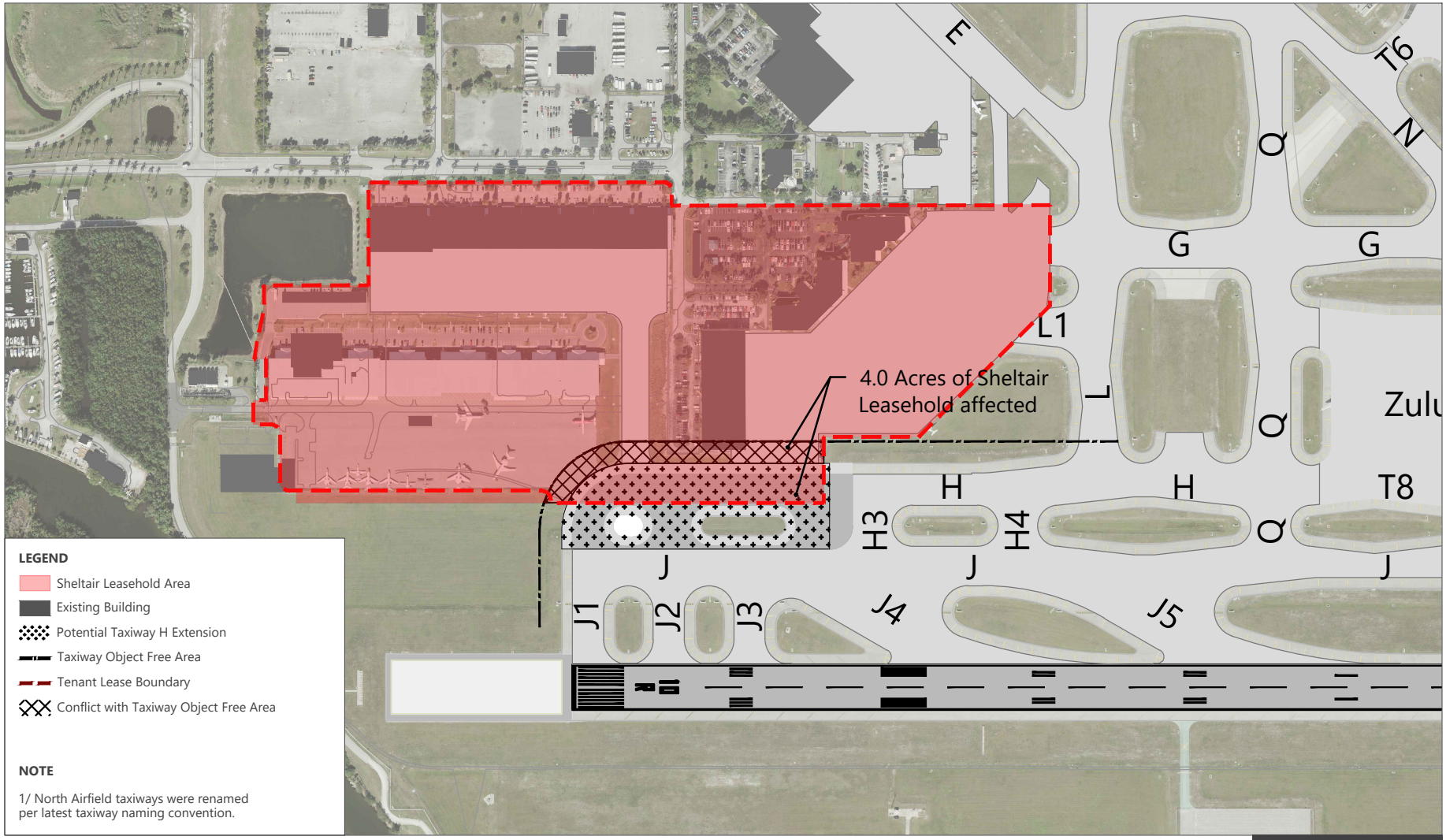
As aircraft operational demand at FLL continues to grow, and new passenger terminal and tenant facilities are constructed, future taxiway enhancements are anticipated to optimize operational efficiency. In consultation with BCAD staff and FLL ATC personnel, the following airfield enhancements were identified to improve airfield operations at FLL:

- West Extension of Taxiway H – During the reconstruction and extension of the South Runway (10R-28L) at FLL, the construction of a dual parallel taxiway system was partly constrained due to existing tenant facilities. Therefore, the outer parallel Taxiway H does not extend for the entire length of Runway 10R-28L, while the inner parallel Taxiway J does. The lack of a dual parallel taxiway system limits ATC's ability to sequence aircraft departures from this runway.

  Due to the upward sloping elevation of the east end of the South Runway, further extension of Taxiway H to the east is not feasible. During the reconstruction and extension of Runway 10R-28L, the configuration of Taxiway H to the west end of Runway 10R-28L was not feasible due to the direct impacts to the Sheltair leasehold area. As show on **Exhibit 5.2-1**, the extension of Taxiway H to the west would encroach on Sheltair's existing aircraft parking apron and aircraft storage hangar. However, the demolition and potential replacement of the hangar to facilitate the west extension of Taxiway H is likely to become feasible during the 20-year planning horizon.

- Reconfiguration of Crossfield Taxiways – To serve the aircraft operational demands forecast through 2035 and beyond, FLL's passenger terminal area will need to be expanded. The expansion of the passenger terminal complex to the west, including both aircraft gates and remote aircraft parking, is inevitable given the current constraints of the terminal area. This westerly expansion will require the relocation of the existing crossfield taxiway system to the west. The crossfield taxiways would be configured to maintain compliance with ADG V and TDG 6 design standards.

- Dedicated Taxilane to Serve West Parcel Development – The future development of aeronautical tenant facilities immediately south of Taxiway C will induce additional operational demands on the taxiway system associated with the north airfield. While the airfield is operated during East Flow, ATC utilizes Taxiways B and C for aircraft departure sequencing. During peak demand periods, this can cause extensive departure queues to build on Taxiways B and C. These departure queues would obstruct taxi flows to/from future tenant facilities that are anticipated immediately south of Taxiway C, particularly those located to the west. Therefore, the construction of a dedicated apron edge taxilane parallel to and immediately south of Taxiway C is proposed. Since these tenant facilities are anticipated to primarily serve GA or small air carrier aircraft, this taxilane is proposed to be configured to serve ADG III and smaller aircraft.



SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan,* February 2011; Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., *North Airfield Geometry and Operational Analysis*, February 2016; FLL Air Traffic Control Tower Personnel, February 10, 2017.
PREPARED BY: NOVA Consulting, March 2017.

EXHIBIT 5.2-1

NORTH 0 500 ft.

Taxiway H Extension
Sheltair Leasehold and Facility Impacts

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.2-01 - 5.2-02 - Airfield_2019_1218.dwgLayout: Ex 5.2-01 Plotted: Oct 30, 2020, 10:05AM

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5.2.2 PREFERRED AIRFIELD ENHANCEMENT

Exhibit 5.2-2 illustrates the preferred airfield enhancements. Currently, Sheltair operates two hangars that are immediately adjacent to each other and oriented in a north/south direction. These hangars will be impacted by the west extension of Taxiway H therefore requiring relocation. Exhibit 5.2-2 illustrates the location of two new hangars that are a like in-kind replacement. It should also be noted that ultimate alignment of the reconfigured crossfield taxiways would be dependent on the preferred passenger terminal expansion option. The identification, evaluation, and selection of a preferred terminal expansion option is presented in the following subsection.

5.3 Terminal Alternatives

Passenger enplanements and air carrier aircraft activity at FLL are rapidly growing. In FY 2018, FLL served 35.2 million annual passengers (MAP). According to the Accelerated Baseline Forecast, passenger volumes at FLL will reach 42.0 MAP by PAL 2 and 53.0 MAP by PAL 3. Consequently, BCAD is experiencing significant operational challenges and terminal area infrastructure constraints, which were considered during the terminal alternatives analysis and the identification, evaluation, and selection of a preferred terminal expansion concept. The following growth considerations were included in the terminal alternatives analyses:

- Maximize gate development by constructing up to 77 gates, as outlined in the Record of Decision associated with the Environmental Impact Statement (EIS) for the South Runway program, in the initial phases of terminal buildout
- Forecasts show FLL is growing at one of the fastest rates in the country, while the Airport is on a comparably small footprint of land. The forecasts predict a Compound Annual Growth Rate (CAGR) of 3.5 percent for enplaned passengers at FLL through 2035.
- Anticipated growth in international markets will increase the need for Customs and Border Protection (CBP) personnel and screening requirements for arriving passengers and baggage. This could also result in the upgauging of air carrier aircraft; therefore, future terminal facilities should provide adequate apron depths and taxilane infrastructure to accommodate widebody ADG V aircraft.
- The projected growth in international service at FLL is also expected to further induce connecting passenger demand levels at FLL. To improve service levels for connecting passengers, the integration of FLL's four unit terminals is desired. It is not anticipated, however, that any of the airlines serving FLL would establish a significant hubbing operation as part of a hub and spoke route network at FLL.
- The Airport's terminal roadway system and curbfront are reaching critical levels of congestion, which will only be exasperated by the continued passenger growth. Near- and long-term capacity enhancements to the terminal's entrance and exit roadway system, as well as the departures and arrivals level terminal curbfronts are necessary.
- To achieve the long-term terminal roadway and curbfront capacity requirements, the demolition and replacement of Terminal 3 to the west is warranted. However, the ongoing modernization of Terminals 3 is set to be completed in 2021. As a result, the planning process should preserve the operation of existing Terminal 3 through 2030.

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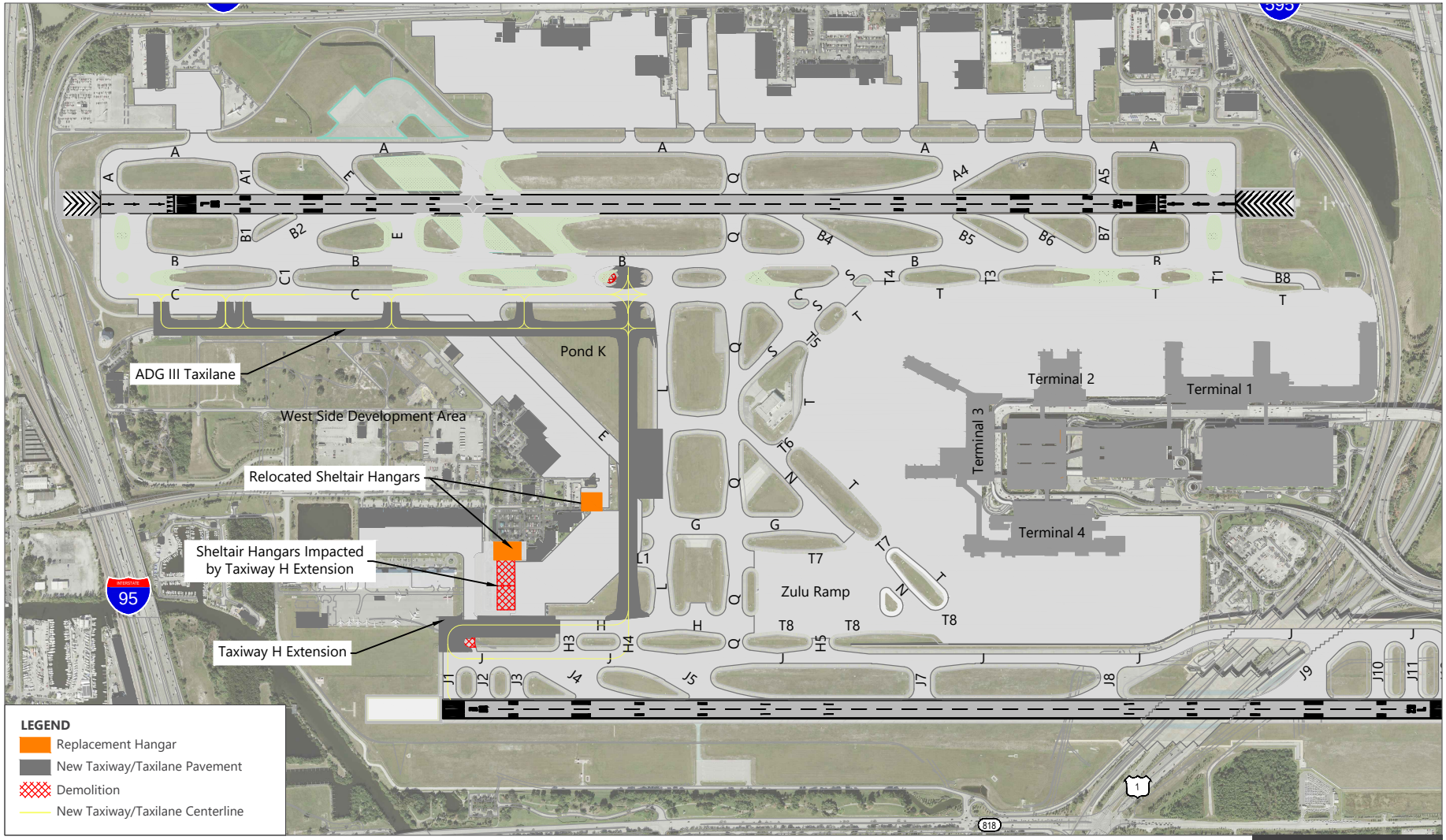

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.2-2

NORTH 0 1,200 ft.

Preferred Airfield Enhancements

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.2-01 - 5.2-02 - Airfield_2019_1218.dwgLayout: Ex 5.2-02 Plotted: Oct 30, 2020, 10:08AM

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- The other three terminals (Terminals 1, 2, and 4) should be maintained beyond the 20-year planning horizon. However, the portions of Terminal 4 dedicated to passenger processing functions will require a significant renovation in the near-term to address operational deficiencies, as well as code compliance issues.
- Recent facility and infrastructure development initiatives have caused the displacement of GSE staging and storage areas within the terminal area. Furthermore, existing deficiencies in remote aircraft parking and hardstand positions could be exasperated as aircraft parking and staging requirements continue to grow.
- FLL experiences extreme surges in departing passengers and baggage due to cruise ship passengers. With passengers arriving at the terminal hours prior to their departure, FLL's terminal facilities become extremely congested and have limited early bag storage capabilities. While this presents a unique challenge, it also provides an opportunity to improve passenger amenity operating revenues for BCAD.
- BCAD has identified a long-term need to establish a centralized chiller plant to serve the terminals more efficiently.
- The airline representatives identified an immediate need for additional gate capacity. The development of a five-gate concourse was evaluated as part of the master plan; it is currently being programmed as a unit terminal immediately east of Terminal 4.

The assessment of these alternative concepts occurred in two stages: (1) the first stage evaluated the initial range of concepts and eliminated six from further consideration based on cost and operational effectiveness/efficiency; (2) in the second stage, the remaining three concepts were refined, and more detailed analyses were conducted to select a single preferred concept. Refinements made to the three shortlisted concepts included, but was not limited to gate configurations, size of the additional terminal spaces, and BHS configuration to refine cost estimates.

5.3.1 TERMINAL PLANNING CONSIDERATIONS

This section summarizes the key planning considerations that guide the formulation of passenger terminal expansion concepts during the master planning process. This summary includes a review of the terminal gate and apron requirements that were identified as part of the demand/capacity analysis and the quantification of facility requirements presented in Section 4. It also defines some general planning criteria for the terminal apron areas, considers other MPU projects, and describes other ongoing terminal and landside planning initiatives that are currently being undertaken by BCAD. These ongoing planning initiatives include:

- planned construction of a 5-gate concourse
- establishment of additional remote aircraft parking positions south of Terminal 4
- pedestrian connectors between Terminals 1, 2, and 3
- short-term terminal roadway and curbfront enhancements
- Palm Garage redevelopment
- APM system

5.3.1.1 Terminal Gates and Apron Requirements

The initial range of terminal expansion concepts focused on establishing a terminal building and aircraft parking apron envelop that would accommodate the aircraft parking needs projected through PAL 3. It also considered the practical number of aircraft gates to balance terminals and airfield capacities. This ensures each concept is expandable to enable the passenger terminal complex to also serve the passenger demand level upon reaching the practical maximum capacity of the baseline airfield.

Upon completion of the redevelopment of Concourse G on Terminal 4 in 2020, FLL's passenger terminal complex will provide a total of 66 contact gate positions. In accordance with the terminal gate requirements derived under the demand/capacity analysis, an additional 17 contact gates would be required to accommodate PAL 3. This would increase the overall contact gate requirements to 83. In addition to the contact gates, 19 remote aircraft parking positions are also projected for PAL 3. Ultimately, the passenger terminal could be expanded to 95 gates, which is the estimated gate capacity required should FLL's airfield reach its annual service volume (ASV) of 475,000 operations. However, this is not expected to occur during the MPU's 20-year planning horizon. **Table 5.3-1** summarizes the future aircraft parking requirements based on the Accelerated Baseline Forecast.

Table 5.3-1: Aircraft Gate and Hardstand Requirements

		ACCELERATED BASELINE FORECAST		
	CURRENT (2015)	PAL 1 (2020)	PAL 2 (2025)	PAL 3 (2035)
Annual Enplanements	13.2 million	18.4 million	21.0 million	26.2 million
Annual Aircraft Operations (Airline)	215,192	287,400	318,100	369,500
Design Day Aircraft Operations (Airline)	708	928	1,022	1,182
Aircraft Gate and Remote Aircraft Parking Requirements: 1/				
Gate Requirements	58	66	71	83
Remote Aircraft Parking Requirements	18	18	20	19
Gate Utilization (Average Turns/Gate)	6.1	7.0	7.2	7.2

NOTES: PAL = Planning Activity Level

1/ These requirements are demand driven; they exclude spare gates, BCAD-controlled gates, and new entrant gates.

SOURCES: Broward County Aviation Department, 2016 (Actuals for FY 2015); Ricondo & Associates, Inc., 2016.
PREPARED BY: Ricondo & Associates, Inc., February 2017.

In addition to meeting the aircraft gate and remote aircraft parking requirements, the terminal expansion concepts will meet the following apron planning criteria:

- To provide operational flexibility, the terminal expansion concepts will be configured to optimize the aircraft gate mix.
  - An apron depth of 275-420 feet will be provided for widebody gates. A minimum apron depth of 215 feet will be provided for narrowbody gates. These apron depths will ensure adequate storage and staging of GSE, passenger loading bridge stowing, and apron edge vehicular service roads behind parked aircraft.
- The B777-300 and A321 aircraft will serve as the widebody and narrowbody design aircraft, respectively, for future contact gates; therefore, ADG III and ADG V design standards will be applied to the terminal area access taxilanes.
- Aircraft pushback operations are recommended in nonmovement areas; therefore, dedicated taxilanes or pushback area will be provided.

5.3.1.2 Near-Term Passenger Terminal Modifications

Since the inception of the master planning process, BCAD has initiated several independent initiatives to further enhance terminal connectivity and expand the operation of FLL's passenger terminals through the introduction of new gates and remote aircraft parking positions. This section describes these initiatives, as each is incorporated into the initial range of terminal expansion concepts described herein.

5-Gate Concourse

Upon completion of the ongoing terminal modernization and expansion program in 2021 FLL's passenger terminal complex will be operating near its gate capacity. At the demand levels forecasted for PAL 1 (for 2020 under the Accelerated Baseline Forecast), peak gate demands are projected to surpass the 66 gates that will be available. Therefore, BCAD has undertaken a separate planning effort to address the immediate gate requirements necessary to serve additional growth. This independent planning effort assessed a range of alternatives to construct five additional narrowbody gates that could be served through Terminals 3 and/or 4.

An initial siting study for the 5-gate concourse explored six facility locations in close proximity to the Terminals 3 and/or 4 area. These six locations and concourse alternatives are generally described below:

- a single-loaded remote concourse facility located immediately east of the existing ARFF station
- a dual-loaded remote concourse facility located immediately north of the existing ARFF station
- a single-loaded remote concourse facility located immediately west of Concourse F
- a single-loaded remote concourse facility located east of Terminal 4
- a single-loaded remote concourse facility located on Zulu Ramp
- a dual-loaded remote concourse facility with a hard connection to Concourse E

The initial siting study concluded that constructing a remote concourse west of Terminal 3 is not desirable due to the complexity of constructing a facility on the airside that would produce higher construction costs. The lack of utility infrastructure and the potential interference with the long-term expansion needs of the passenger terminal were also a concern. While known environmental concerns exist within the site east of Terminal 4, including soil contamination resulting from prior rental car operations at the Airport, this site was identified to be preferable to construct the new 5-gate concourse. Having adjacency to the landside, which includes the contractor staging areas associated with the ongoing terminal modernization program, would simplify construction activities and logistics, minimize disruption to existing airfield and terminal operations, and provide an opportunity for direct (fixed structure) connectivity to Terminal 4.

A total of 10 alternatives were identified for the construction of a 5-gate concourse on the preferred site east of Terminal 4. Each alternative considers the concourse to be operated as either a remote structure or a structure configured with a passenger walkway connected to Terminal 4. The 5-gate concourse would function as a two-level domestic facility without international arrivals capability. Passenger processing functions were not considered, initially, as it was concluded that existing passenger processing functions in Terminals 3 and 4 would be adequate to support the additional five gates. Should the 5-gate concourse be operated as a remote structure, a shuttle bus operation would convey passengers between Terminal 4 and the remote 5-gate concourse. Therefore, this would require the construction of a ground level bus station at the east end of Terminal 4. **Exhibits 5.3-1** and **5.3-2** illustrate the 10 alternatives that were considered for the 5-gate concourse. Through consultation with BCAD staff and airline representatives, the Baseline Alternative was identified as the preferred configuration for the 5-gate concourse.

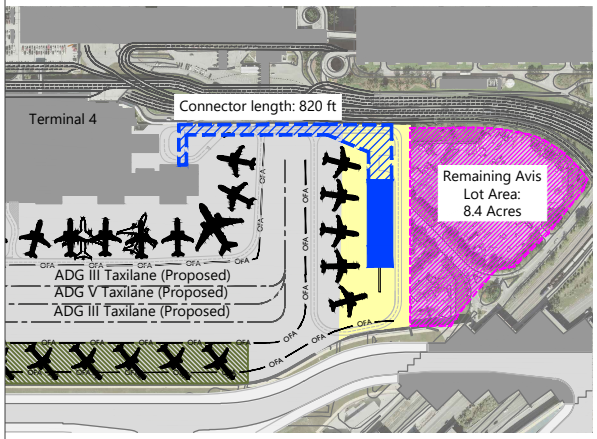
After further analysis the preferred Baseline Alternative was refined to include:

- Reconfigured elevated pedestrian connector that would provide a dedicated secured walkway between Concourse G and the Remote Facility.
- Establishment of airside service road east of the Remote Concourse to serve both shuttle buses and other service vehicles.

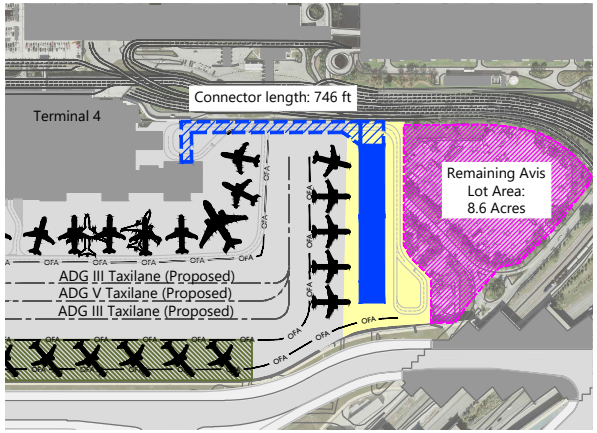
As illustrated on **Exhibit 5.3-3**, the refined Baseline Alternative would initially be constructed as a remote standalone structure, which may ultimately be connected to Terminal 4 with an elevated, fixed (enclosed) structure corridor. The aircraft parking apron would be configured on the west side of the building, thereby allowing aircraft to utilize the existing taxilanes that serve the Terminal 4 gates. The apron could accommodate five A321-200 with sharklets or B737-800 with winglets aircraft simultaneously. Each gate would be served with passenger boarding bridges. GSE staging and storage areas would also be provided immediately north and south of the remote concourse. A dedicated shuttle bus road would be constructed on the east side of the building, along with a bus station on the northeast corner of Terminal 4.

The remote 5-gate concourse building would consist of a two-level structure, with passenger amenities and holdrooms located on the second level. The lower ramp level would house the building's support spaces, concessions storage, and airline operations functions. **Exhibits 5.3-4** and **5.3-5** illustrate the preliminary conceptual floor plan for each level.

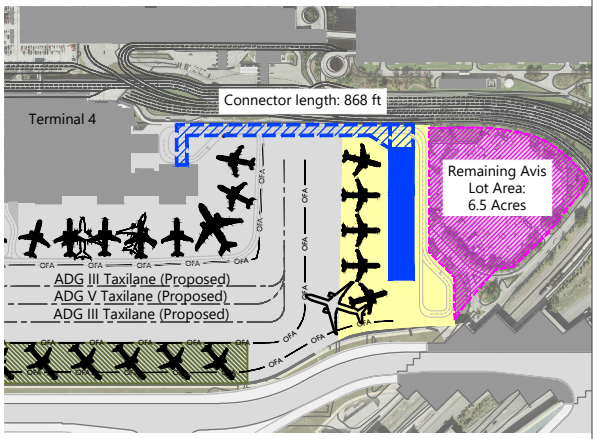
Baseline Alternative (Preferred)



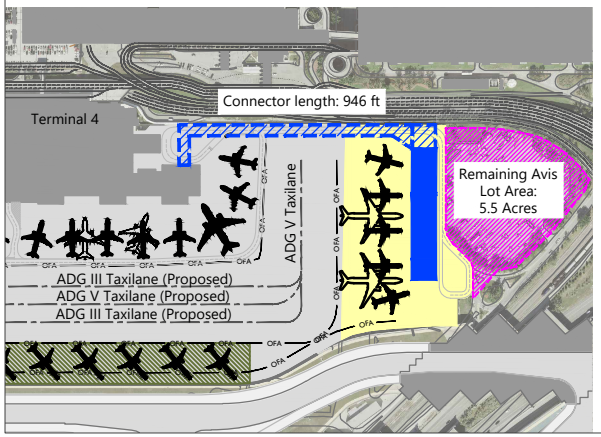
Alternative 1



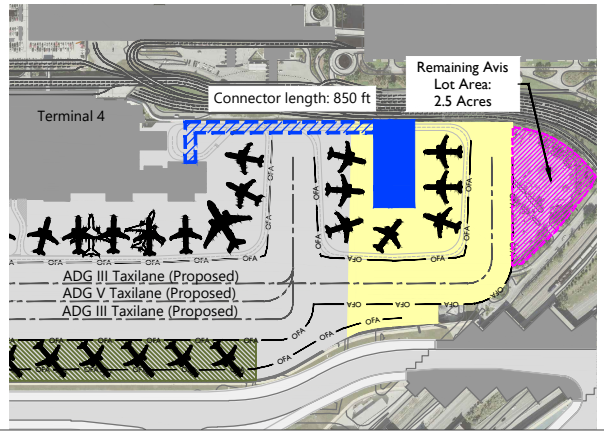
Alternative 2



Alternative 2 (Airplane Design Group V)



Alternative 3



LEGEND

- Phase 1 Building
- Phase 2 Building
- Existing Buildings/Structures
- Remote Aircraft Parking Area
- Pavement Expansion
- Remaining Avis Lot

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-1

NORTH 0 750 ft.

Initial Range of Alternatives
5-Gate Concourse (Baseline Alternative & Alternatives 1 through 3)

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.3-01 - 5.3-03 - Remote Facility Alts_2019_1218.dwgLayout: Ex 5.3-01 Plotted: Oct 30, 2020, 10:10AM

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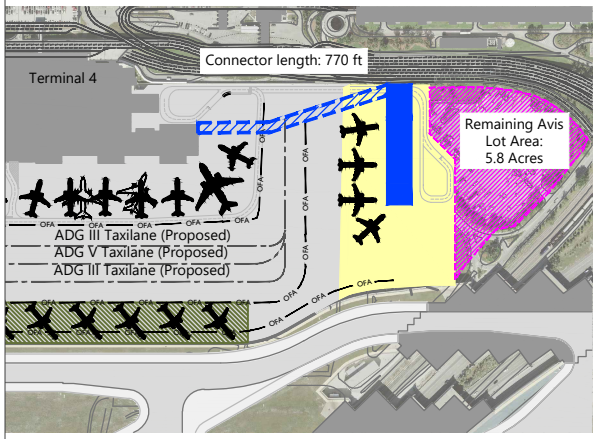
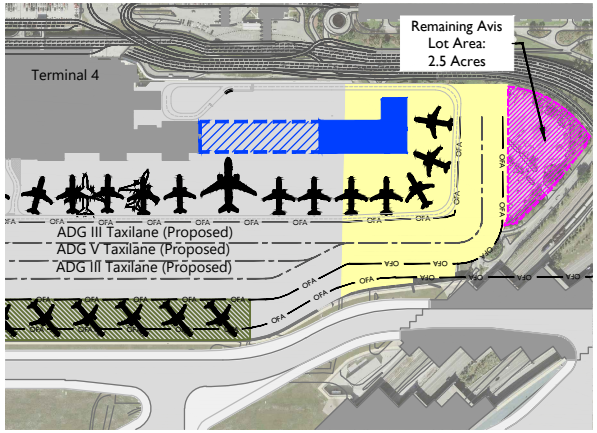
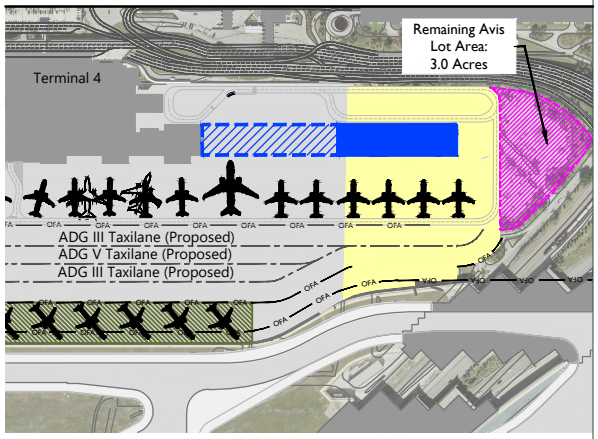
Alternative 4



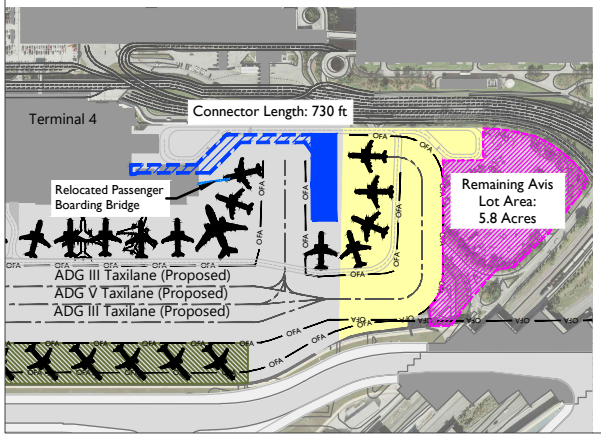
Alternative 5



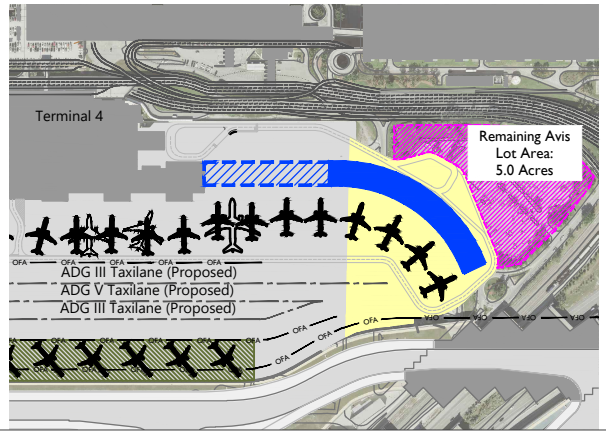
Alternative 6



Alternative 7



Alternative 8



LEGEND

- Phase 1 Building
- Phase 2 Building
- Existing Buildings/Structures
- Remote Aircraft Parking Area
- Pavement Expansion
- Remaining Avis Lot

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-2

NORTH 0 750 ft.

Initial Range of Alternatives
5-Gate Concourse (Alternatives 4 through 8)

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.3-01 - 5.3-03 - Remote Facility Alts_2019_1218.dwgLayout: Ex 5.3-02 Plotted: Oct 30, 2020, 10:11AM

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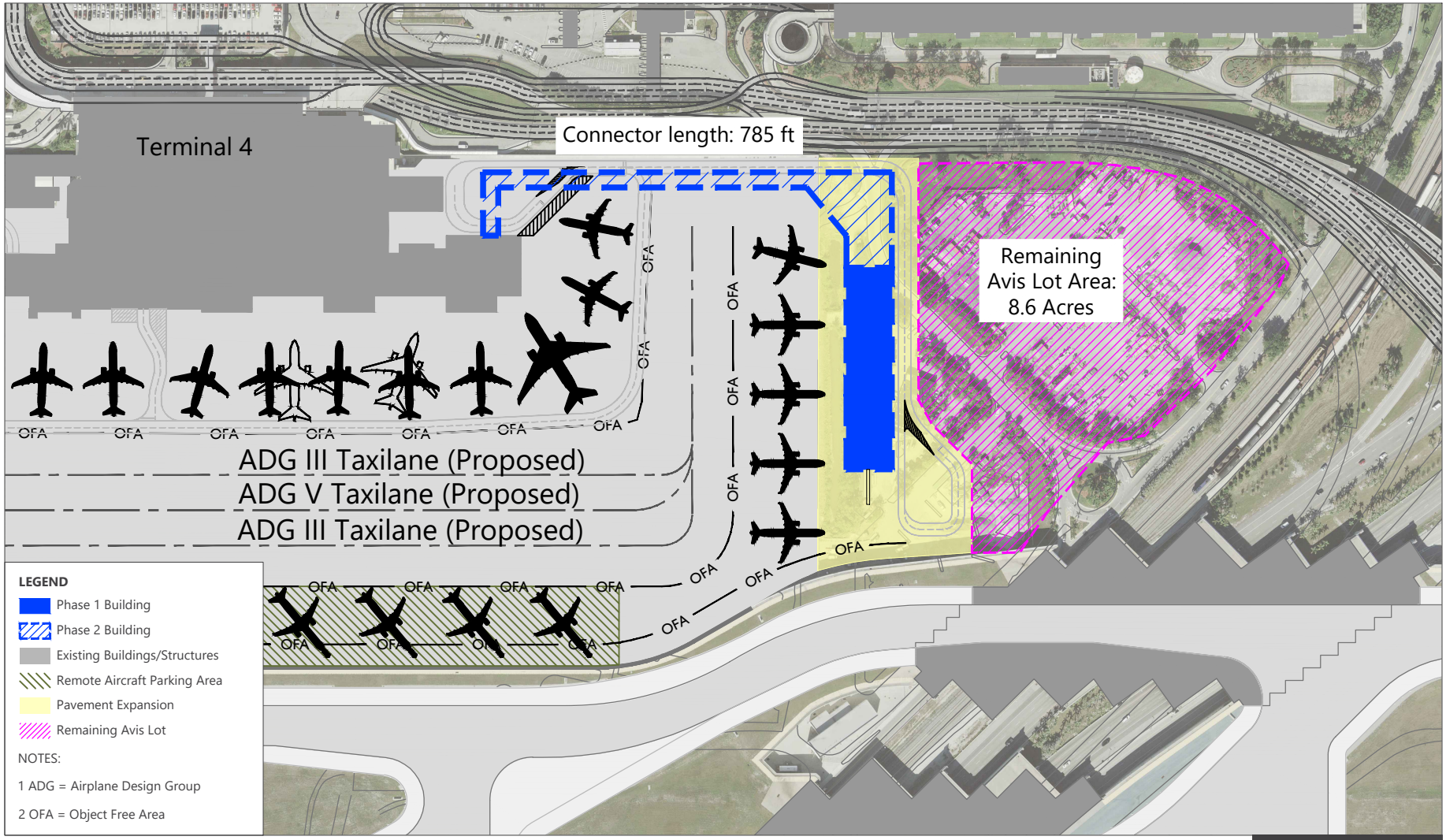

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-3

NORTH 0 300 ft.

Preferred Alternative
5-Gate Concourse

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.3-01 - 5.3-03 - Remote Facility Alts_2019_1218.dwgLayout: Ex 5.3-03 Plotted: Oct 30, 2020, 10:12AM

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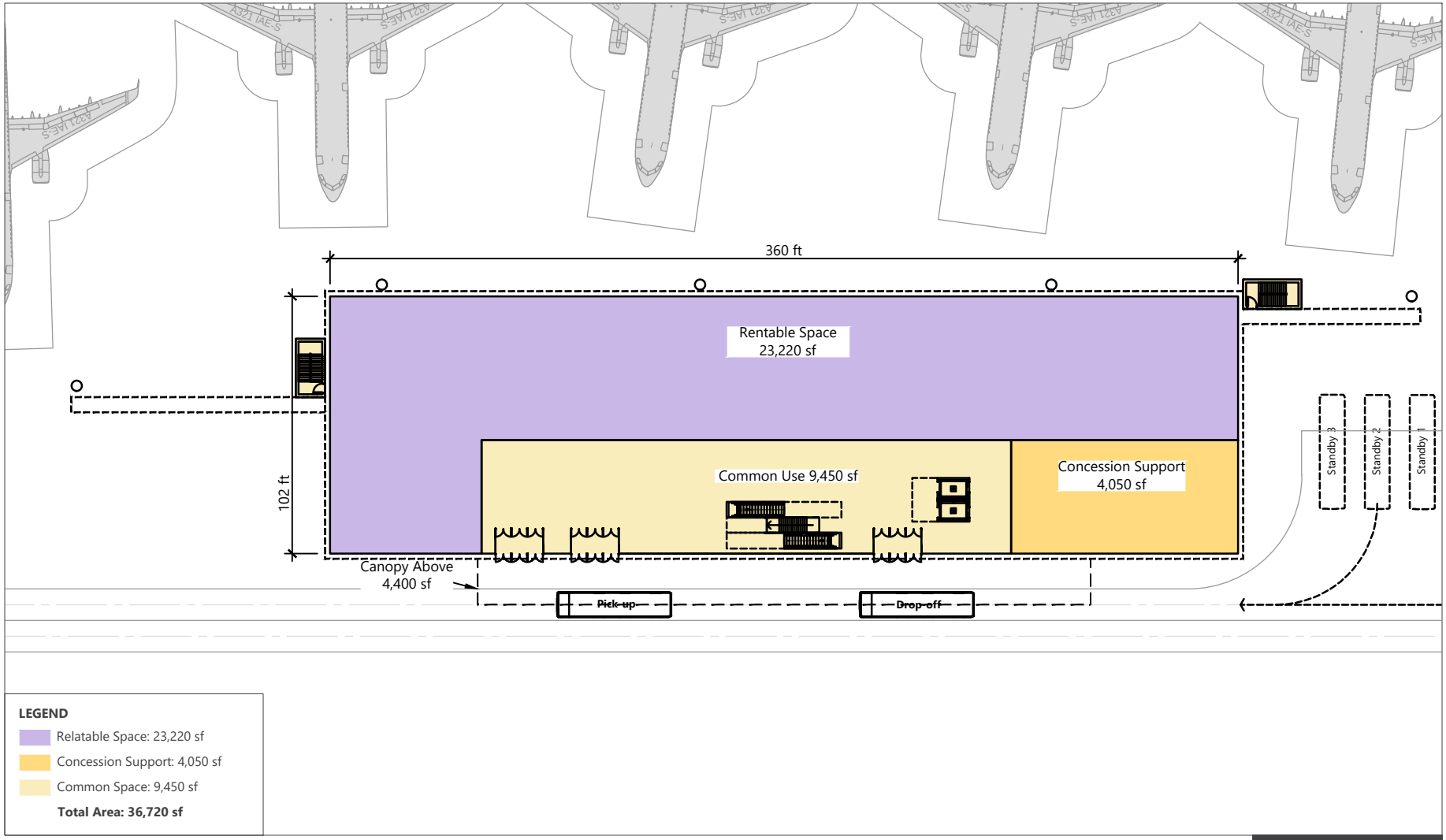

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-4

NORTH 0 60 ft.

Conceptual Floor Plan
5-Gate Concourse (Ramp Level)

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.3-04 - 5.3-05 - Remote Facility Interiors_2019_1218.dwgLayout: Ex 5.3-04 Plotted: Oct 30, 2020, 10:15AM

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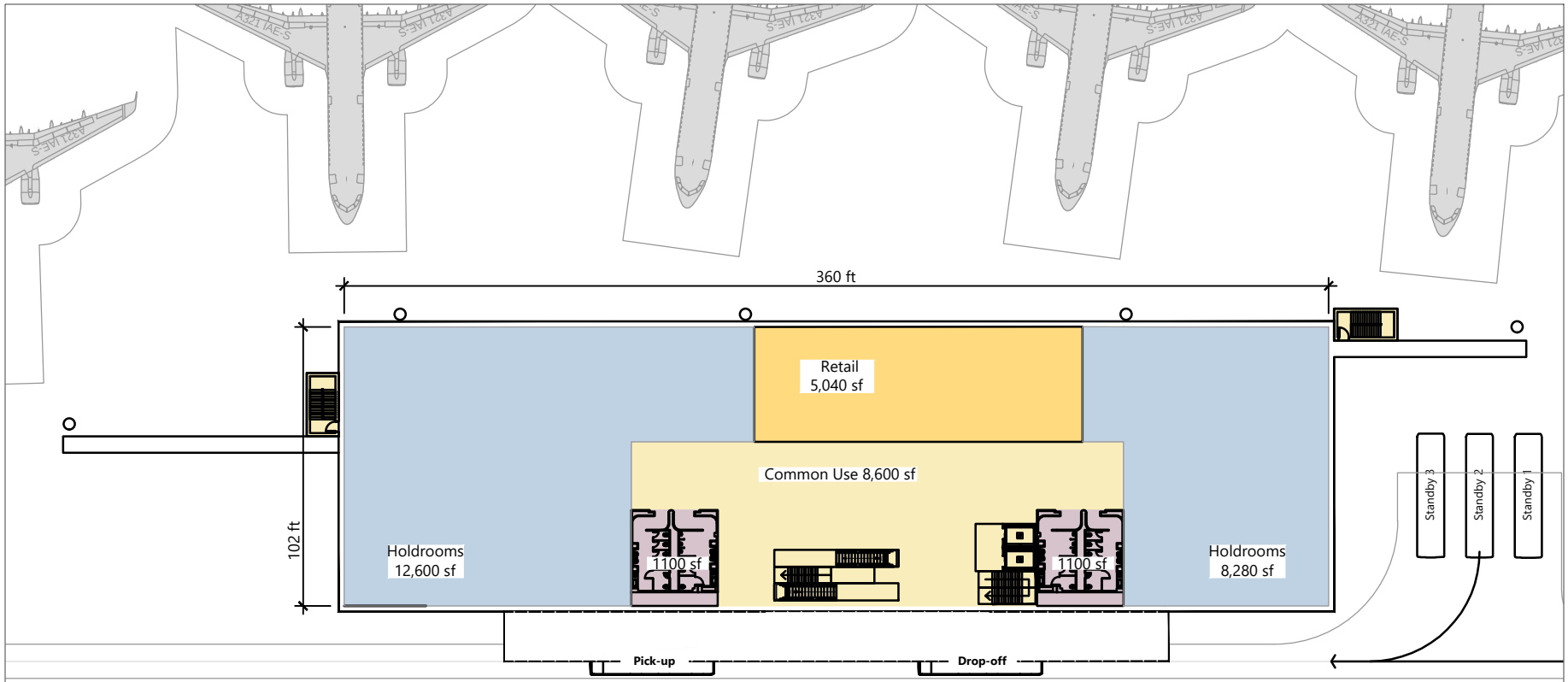

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-5

NORTH 0 1,500 ft.

Conceptual Floor Plan
5-Gate Concourse (Concourse Level)

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.3-04 - 5.3-05 - Remote Facility Interiors_2019_1218.dwgLayout: Ex 5.3-05 Plotted: Oct 30, 2020, 10:16AM

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Terminal 5

Prior to initiating the advanced planning and programming associated with the refined baseline alternative, BCAD engaged the Airport and Airlines Affairs Advisory Committee (AAAC), which is made up of airline representatives that operate at FLL, to initiate the discussion of converting the 5-gate remote concourse into a unit terminal with dedicated landside and passenger processing capabilities which is referred to as Terminal 5. An initial alternative was developed for review and circulation to the AAAC. The following items were considered when developing the Terminal 5 layout:

- A multi-level pedestrian connector providing pre- and post-security connections from Terminal 5 to Terminal 4 and Concourse G. The post-security connection from Concourse G to Terminal 5 would occur on the concourse level. A non-secure connection from Terminal 4, the parking garages and an APM station to Terminal 5 would occur on the mezzanine level. The pedestrian connector was planned for a 30-foot width to provide the option for moving walkways to assist passenger travel.
- An apron depth to support five narrowbody aircraft or three narrowbody aircraft and a single ADG V widebody position.
- Airfield Access Gate 504 was considered to provide a more direct airside access to the south airfield.
- A landside roadway system including curbside for passenger pick-up, drop-off and commercial vehicle operations.

As a result, **Exhibit 5.3-6** depicts the preferred Terminal 5 alternative and is included in the remaining alternatives exhibits as the final preferred facility layout. **Exhibits 5.3-7** and **5.3-8** depict preliminary conceptual floor plans for the ramp and concourse level. **Exhibits 5.3-9** and **5.3-10** depict a representative 3D rendering of Terminal 5 from the landside and airside view point, respectively.

Remote Aircraft Parking Positions

The planned construction of Terminal 5 would displace four existing remote aircraft parking positions and the GSE storage areas immediately east of Terminal 4. Therefore, an analysis was conducted to explore the opportunity to establish a remote aircraft parking apron adjacent to Terminal 4. In addition to replacing the four remote parking positions, opportunities to increase the overall capacity of remote aircraft parking within the terminal area were also assessed.

Exhibit 5.3-11 illustrates the proposed location of eight remote aircraft parking positions, including four replacement positions for the impacted existing positions east of Concourse G and four new positions, immediately south of Terminal 4. As shown, this would require the realignment of the dual taxilanes immediately south of the Terminal 4. In lieu of having a single ADG III and a single ADG V that currently operate independent of one another, the taxilanes would be reconfigured with dual independent ADG III taxilanes, with a single ADG V taxilane down the middle. This reconfiguration creates approximately 158 feet of available pavement at the southern edge of the apron adjacent to the retaining wall supporting Taxiway J to accommodate the proposed RON parking positions.

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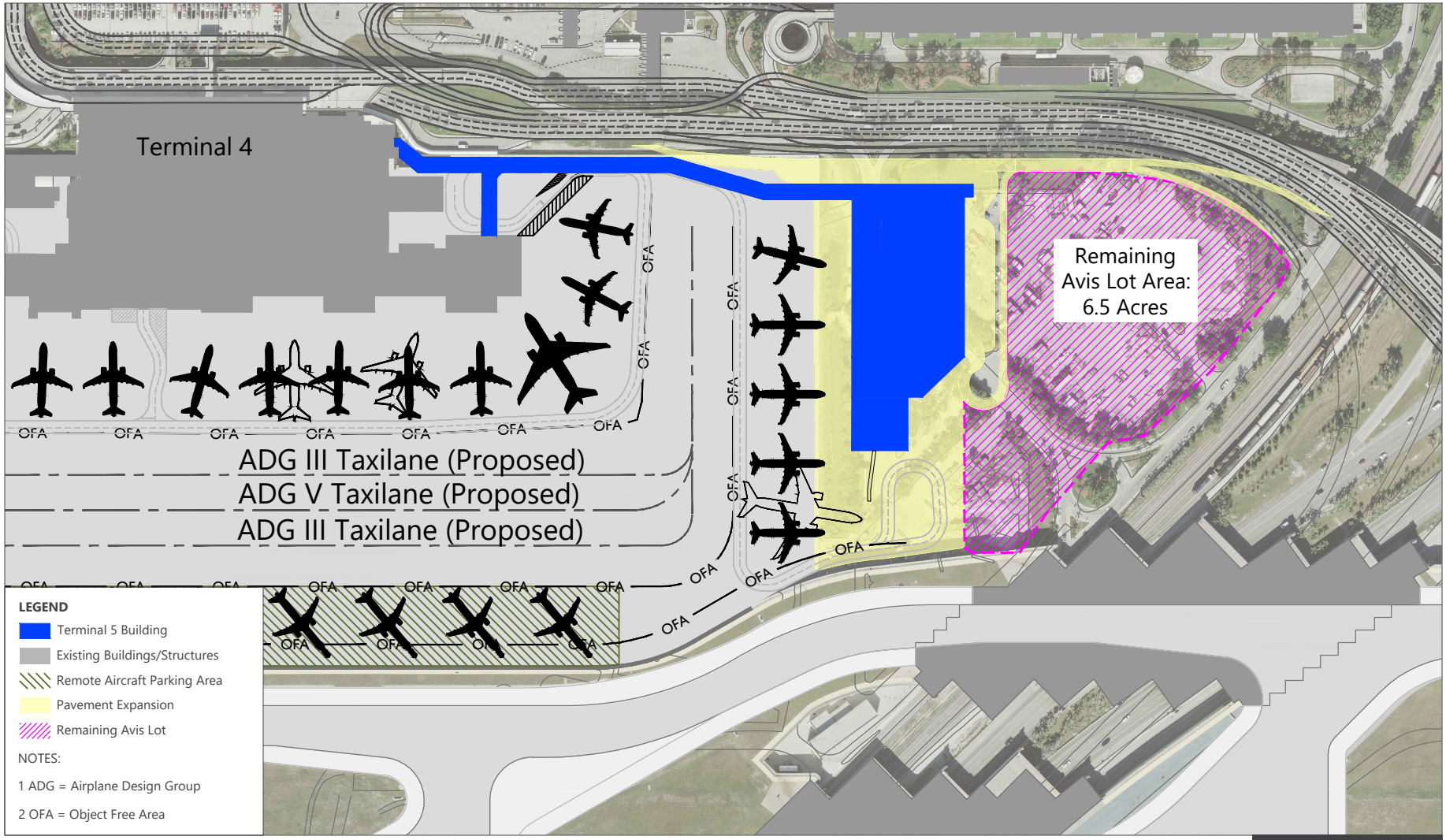

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-6

NORTH 0 300 ft.

Preferred Alternative Terminal 5

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.3-01 - 5.3-03 - Remote Facility Alts_2019_1218.dwgLayout: Ex 5.3-06 Plotted: Oct 30, 2020, 10:14AM

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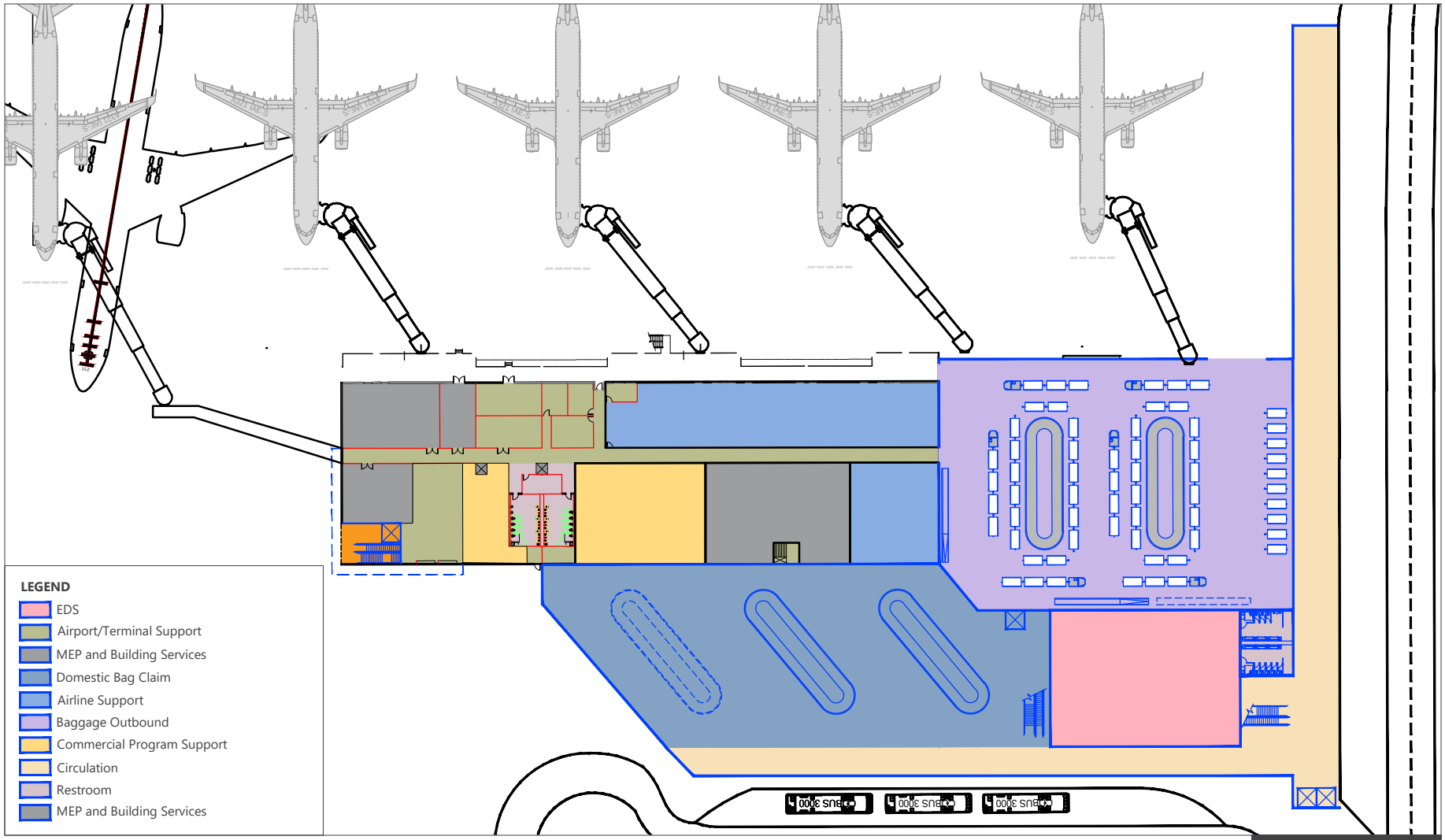

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-7

NORTH 0 80 ft.

Conceptual Floor Plan
Terminal 5 (Ramp Level)

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.3-04 - 5.3-05 - Remote Facility Interiors_2019_1218.dwgLayout: Ex 5.3-07 Plotted: Oct 30, 2020, 10:16AM

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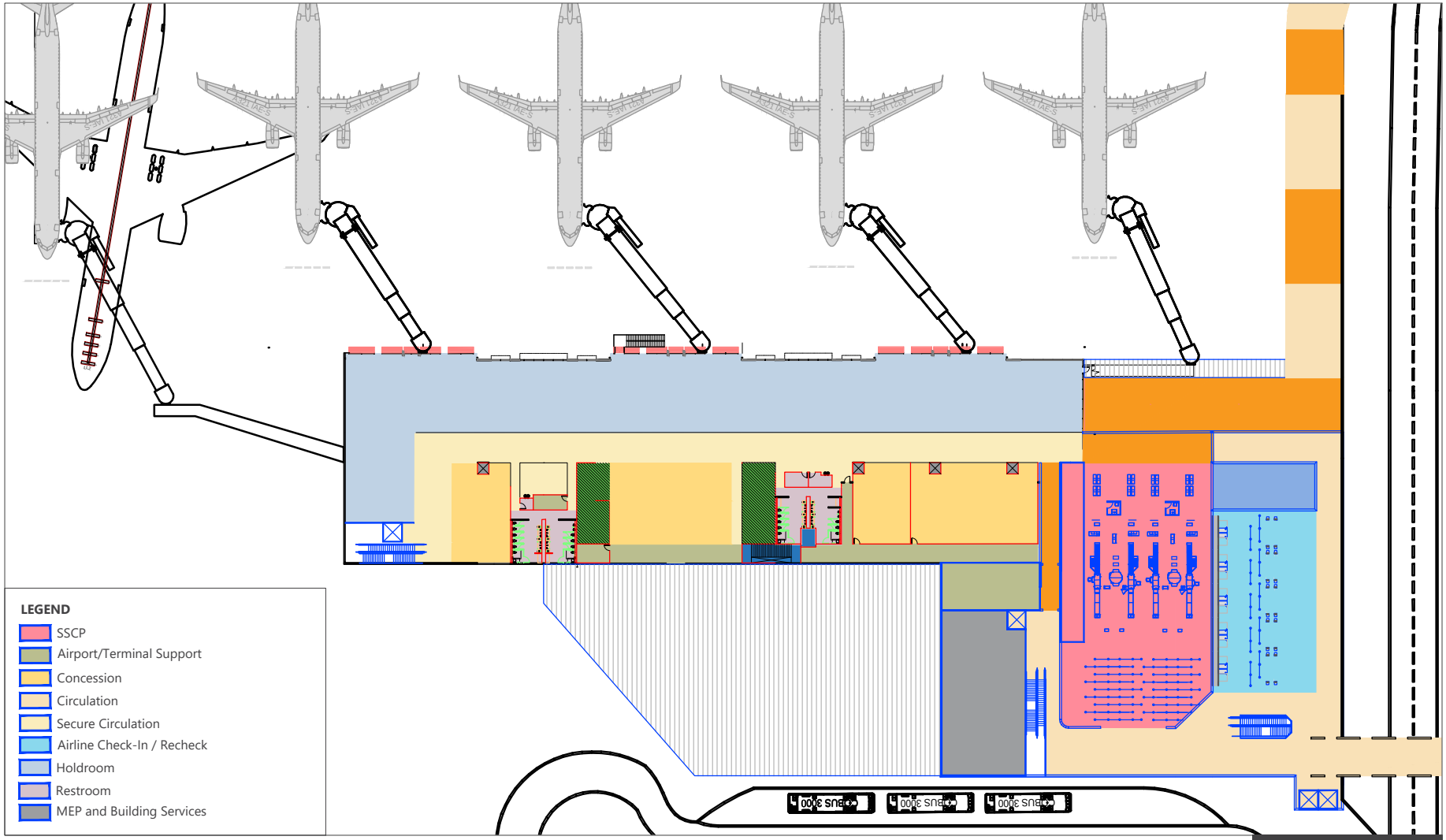

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-8

NORTH 0 80 ft.

Conceptual Floor Plan
Terminal 5 (Concourse Level)

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.3-04 - 5.3-05 - Remote Facility Interiors_2019_1218.dwgLayout: Ex 5.3-08 Plotted: Oct 30, 2020, 10:17AM

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SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-9

NORTH 0 Not To Scale

Representative Rendering
Terminal 5 (Landside Point of View)

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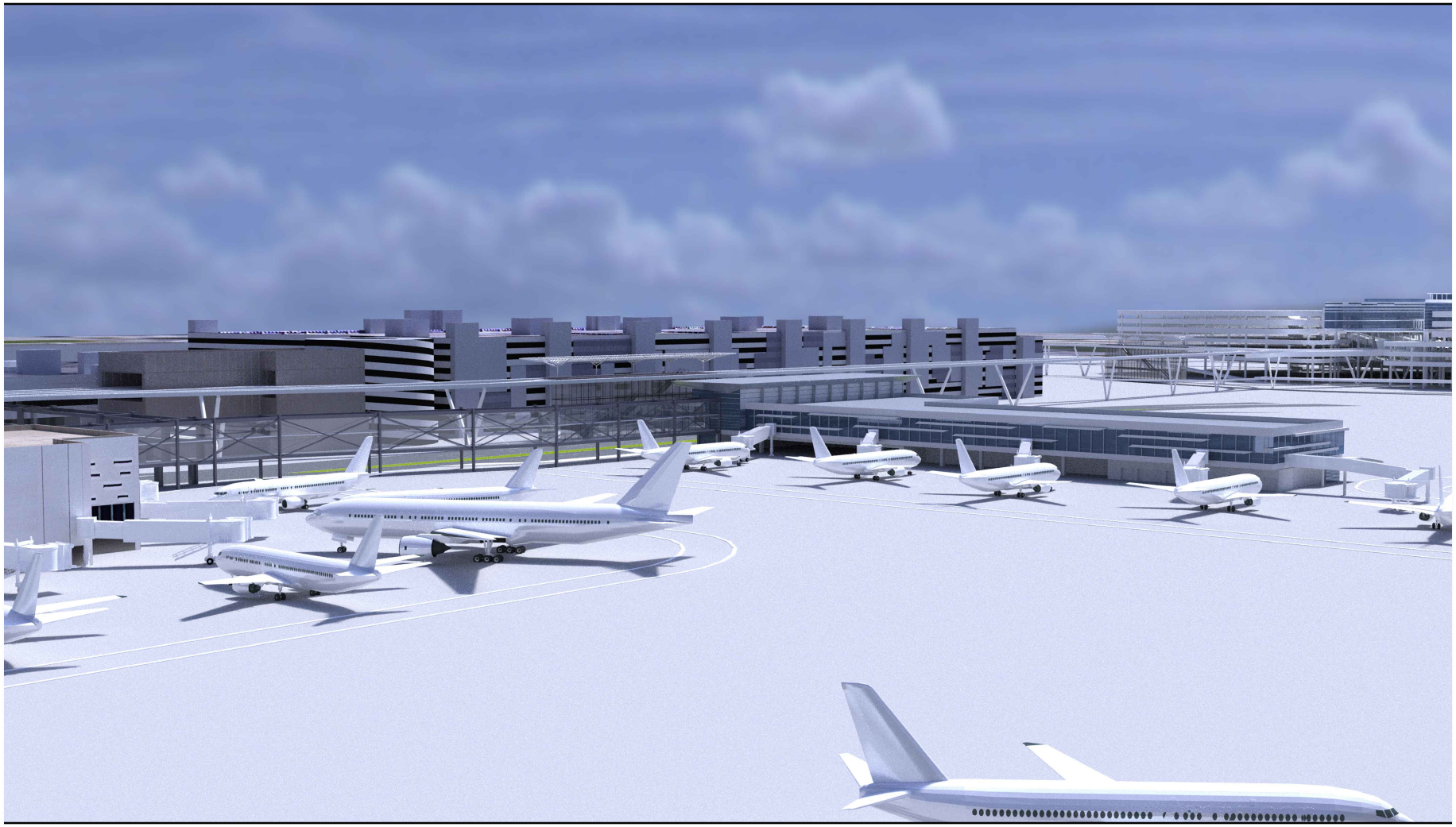

SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-10

NORTH 0 Not To Scale

Representative Rendering
Terminal 5 (Airside Point of View)

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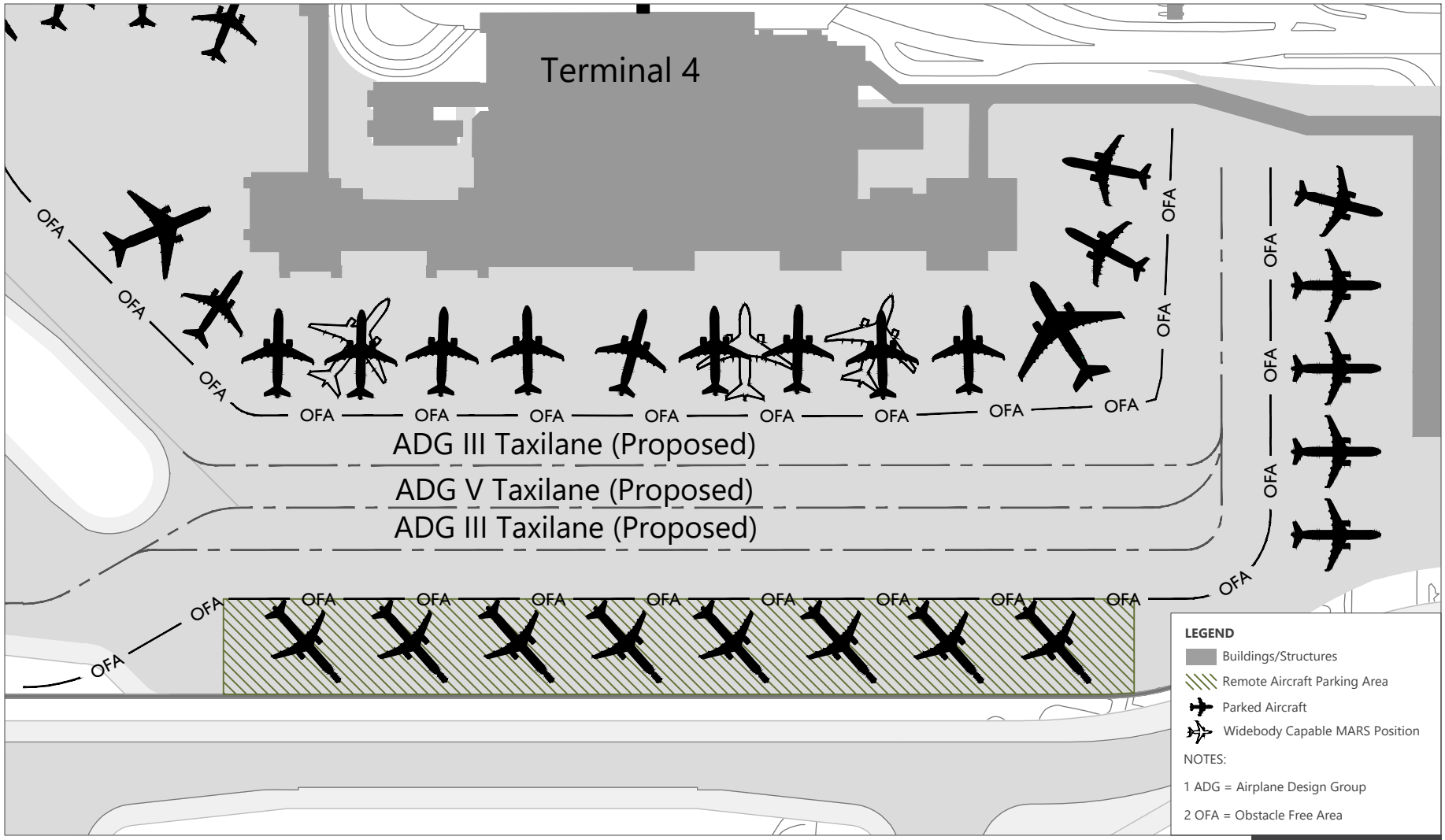

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-11

NORTH 0 250 ft.

Proposed Remote Aircraft Parking Area South of Terminal 4

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.3-11-5.3-14 - Enabling Alts_2019_1218.dwgLayout: Ex 5.3.11 Plotted: Oct 30, 2020, 10:29AM

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To maximize the size of aircraft that could utilize the apron, the parking positions are oriented at a 30-degree angle. This would allow aircraft with a length of 146 feet to be parked on the apron, which would be able to be used by ADG III aircraft generally representing A321 and B737-800 aircraft or smaller. The tug equipment is provided 25 feet in front of the aircraft for staging.

In addition, a portion of the apron is located within the lateral limits of the object free area (OFA) associated with Taxiway J. However, given that the elevation of Taxiway J is higher than the apron elevation, it may be permissible to encroach the OFA, if the parked aircraft and associated GSE remain below the elevation of Taxiway J. To do so, parked aircraft would need to be configured nose-in to the south. Further coordination with FAA on this operational condition is ongoing.

Given that the elevation of Taxiway J gradually slopes up from west to east, the western extent of the parking apron is restricted by the Taxiway J OFA. Exhibit 5.3-12 provides a section view of the aircraft and aircraft tug that could be parked at the westernmost aircraft parking position. As shown, both the aircraft fuselage and aircraft tug would remain below the elevation of the adjacent pavement associated with Taxiway J. Therefore, the capacity of the proposed remote aircraft parking apron south of Terminal 4 is eight narrowbody aircraft.

Pedestrian Connectors – Terminals 1, 2, and 3

The modernization and expansion of Terminals 3 and 4 included the construction of a pedestrian connector that connects the level two secured areas of these two terminals. With the anticipated continued growth in connecting passenger levels at FLL, it would be beneficial to also connect the secured areas of Terminals 1, 2, and 3. BCAD is currently in the design phase of implementing these pedestrian connectors, which are to become fully operational by the end of calendar year 2021. Exhibit 5.3-13 illustrates the proposed configuration of the pedestrian connectors for Terminals 1, 2, and 3.

5.3.1.3 Terminal Landside Planning Considerations

The identification and evaluation of the passenger terminal expansion concepts was not conducted in isolation. Due to the interrelation with the terminal's landside functions, the following were also considered: future modifications to the terminal's entrance/exit roadway system, curbfronts, public/employee parking facilities, rental car operations, and intermodal connectivity. Although the planning analyses associated with these landside improvements are presented in subsequent sections, it is important to review these landside improvements, as they are integrated into the range of passenger terminal expansion concepts presented herein.

Exhibit 5.3-14 illustrates the various terminal landside improvements that will be integrated into the passenger terminal expansion concepts for FLL. These improvements include:

- Replacement of the existing Palm Garage with a new seven-level to nine-level garage. This will include a dedicated ground transportation center (GTC) at the lower level that will serve all commercial vehicle pick-up and drop-off operations. It is envisioned that the replacement garage will also include a commercial/retail center and hotel/conference center above.
- Establishment of a new bypass arrivals roadway (lower level only) with a supplemental outer curbfront to serve Terminals 2, 3, and 4.

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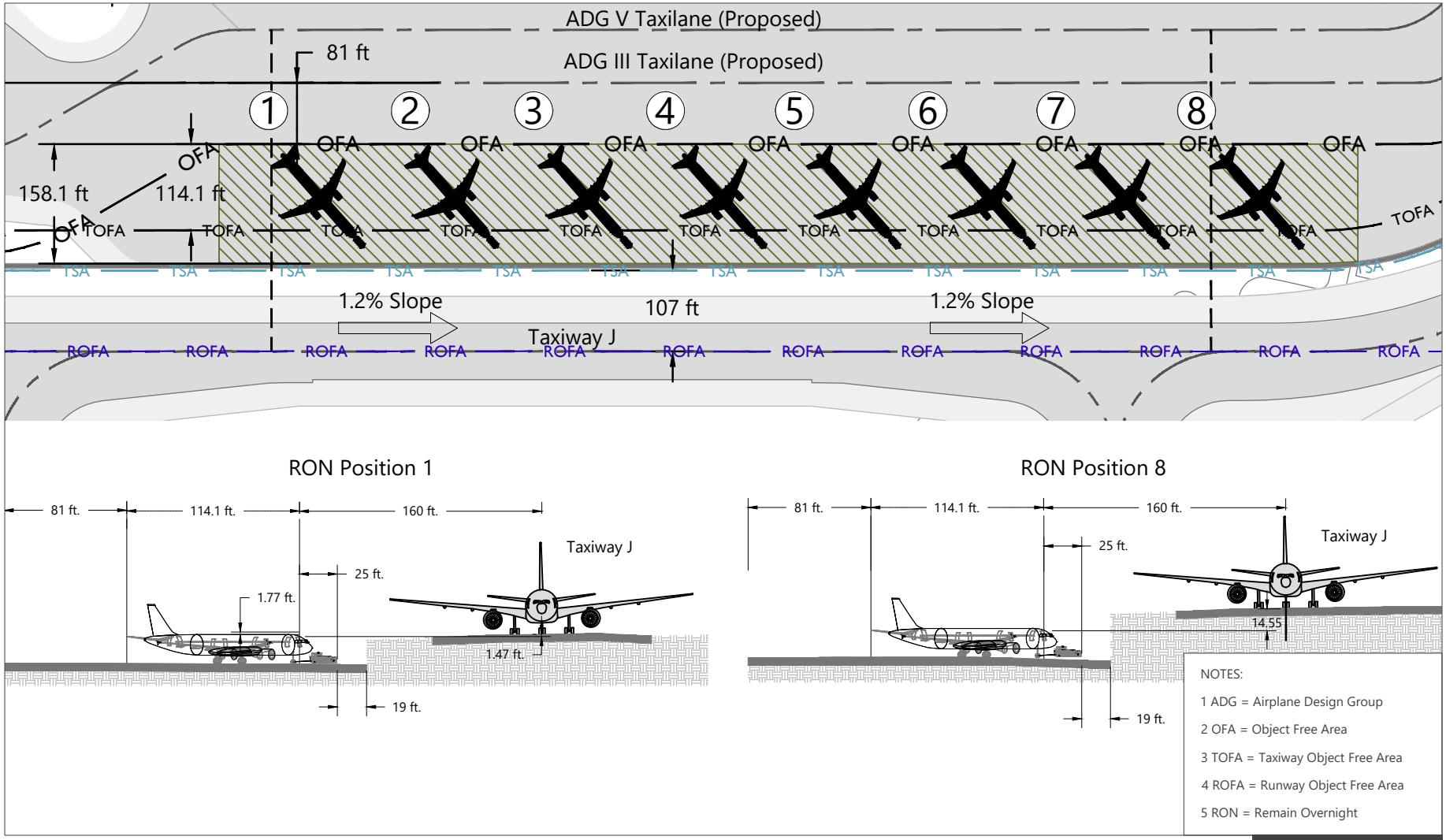

NOTES:

1 ADG = Airplane Design Group

2 OFA = Object Free Area

3 TOFA = Taxiway Object Free Area

4 ROFA = Runway Object Free Area

5 RON = Remain Overnight

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-12

NORTH 0 1,500 ft.

Section View of Remote Aircraft Parking Area South of Terminal 4

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.3-11-5.3-14 - Enabling Alts_2019_1218.dwgLayout: Ex 5.3.12 Plotted: Oct 30, 2020, 10:30AM

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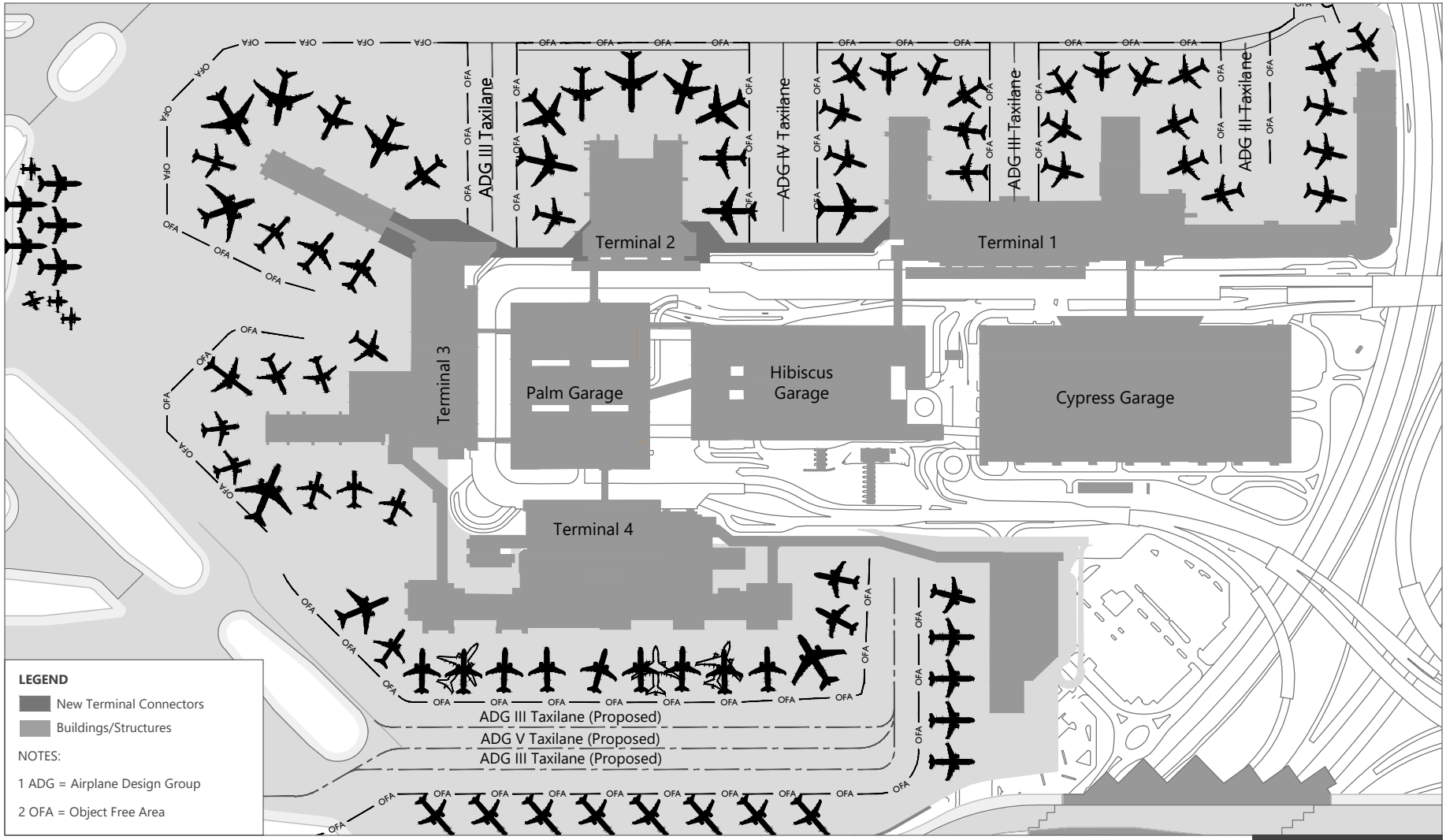

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-13

NORTH 0 500 ft.

Proposed Pedestrian Connectors Terminals 1, 2, and 3

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.3-11-5.3-14 - Enabling Alts_2019_1218.dwgLayout: Ex 5.3.13 Plotted: Oct 30, 2020, 10:31AM

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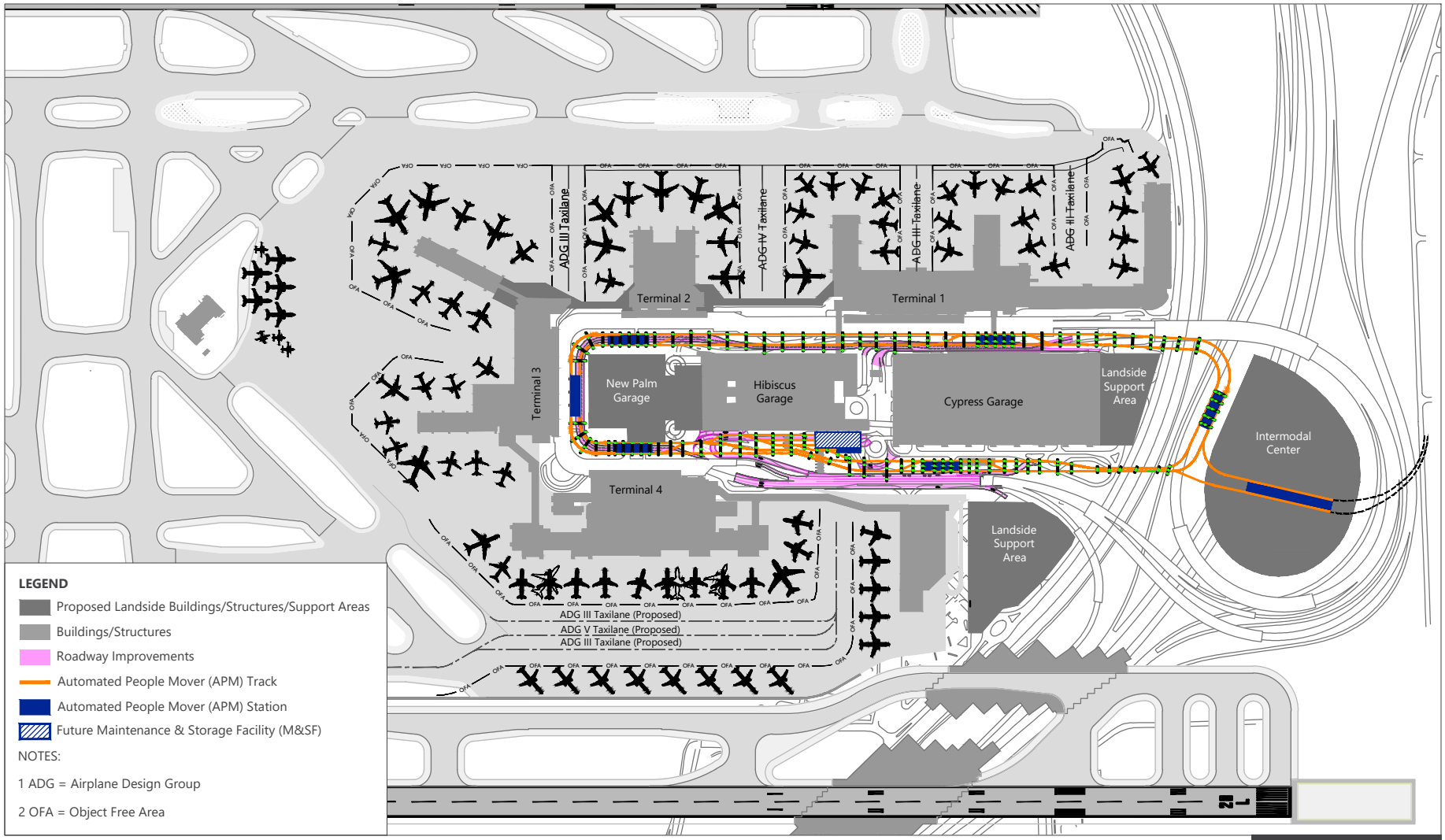

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-14

NORTH 0 750 ft.

Proposed Terminal Landside Improvements

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.3-11-5.3-14 - Enabling Alts_2019_1218.dwgLayout: Ex 5.3.14 Plotted: Oct 30, 2020, 10:32AM

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- Ultimate redevelopment of Terminal 3 west of the existing facility enables the western extension of the terminal roadway and curbfront to further increase the capacities of the upper and lower level roadways and curbfronts serving Terminals 2 and 4.
- Construction of an on-Airport Automated People Mover (APM) circulator that would connect the unit terminals, while also providing connectivity with a future off-Airport Intermodal Center. The APM could also be extended to other off-Airport locations, such as Port Everglades and/or the Broward County Convention Center. Additional details on the APM are provided in Section 5.4.
- Construction of an Intermodal Center immediately east of the Airport, within the roadway interchange associated with the terminal entrance/exit roadways and U.S. Highway 1. The Intermodal Center is also envisioned to include a multilevel parking garage to provide employee parking, as well as other potential uses.
- Reconfiguration of the exit roadways east of Terminal 4 to include:
  - Reconfiguration of the Cypress Garage exit roadways to increase weaving distances. This would include a new flyover ramp to further reduce vehicle weaving movement on the exit roadway.
  - Construction of a secondary Perimeter Road access ramp on the north side of the exit roadway to further reduce vehicle weaving movements on the exit roadway.
  - Widening of the I-595 access road beyond Ramp G of the exit roadway (to be performed by others).

5.3.2 INITIAL RANGE OF TERMINAL EXPANSION CONCEPTS

This section describes the initial range of terminal expansion concepts that were identified for evaluation during the master planning process. The terminal alternatives analysis considered nine terminal expansion concepts that were created, screened, evaluated, and shortlisted. The concepts consist of either satellite pier or linear pier concourses. The following subsections briefly describe the nine passenger terminal expansion concepts.

5.3.2.1 Satellite Pier Concourse Concepts

Five of the initial concepts propose constructing a remote satellite concourse west of Terminal 3. The satellite concourse would be dual loaded, meaning that it would provide aircraft parking positions on both sides of the concourse, as well as around the ends. The remote satellite concourse could be connected to the passenger terminal with either an underground walkway or elevated enclosed skybridges that may possess moving walkways or an APM system(s). The primary differences among the various satellite pier concepts are the following:

- configuration of the terminal buildings that house the terminal processing functions, including FIS facilities associated with Terminals 3 and 4
- the size and configuration of the airside apron area, thereby resulting in differing alignments of the satellite concourse pier, as well as varying aircraft gate compatibility
- means of connectivity between the satellite concourse and Terminal 3 (above ground skybridge/APM versus underground walkway)

The satellite concourse would require displacement of the existing ARFF facility, as well as remote aircraft parking positions on the Zulu Ramp and immediately south of the ARFF facility. It would also require realignment of the crossfield Taxiways L and Q. **Exhibit 5.3-15** illustrates the initial range of terminal expansion concepts that consider a satellite pier concourse. The following subsections describe each satellite pier concourse concept.

Terminal Expansion – Concept 1 (Total Buildout: 95 Gates)

Terminal Expansion Concept 1 consists of a redeveloped terminal area that connects to a dual loaded satellite pier, located west of Terminal 3. The satellite concourse could serve up to 32 domestic narrowbody aircraft. An enclosed passenger skybridge would be constructed to provide connectivity between Terminal 3 and the satellite concourse. The length of the passenger skybridge would be approximately 1,000 feet. In addition to the satellite concourse, Concept 1 would include the following terminal modifications:

- Redevelopment of Terminal 3 to the west with frontal gates along its western façade. The frontal gates would be configured to accommodate up to five ADG V (widebody) aircraft. The frontal gates would have both international and domestic arrivals capability.
- Demolition of the existing Terminal 3 including Concourses E and F.
- Construction of a new pier concourse extending from the north of Terminal 3 that could support eight domestic narrowbody aircraft.
- Extension of Concourse G to the west to accommodate up to two additional widebody gates and one narrowbody gate with international arrivals capability.
- Western expansion of Terminal 4 to accommodate a larger FIS facility that would serve international arrivals on Terminals 3 and 4.

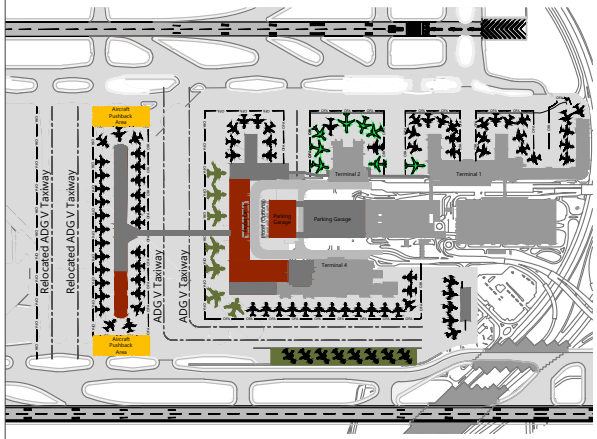
To minimize impacts to the existing tenant facilities on the west side of the crossfield taxiways, the apron associated with the satellite concourse would be restricted to ADG III (narrowbody) aircraft. However, dual ADG V taxilanes would be established between Terminal 3 and the newly constructed satellite pier to serve Terminal 3's widebody frontal gates. Therefore, the passenger skybridge would need to be elevated approximately 80 feet above ground level (AGL) to provide adequate clearance for ADG V aircraft to taxi beneath. Also, aircraft departing from the gates on the west side of the satellite concourse would be required to push back directly onto the crossfield taxiways. Aircraft pushback operations onto an active taxiway are discouraged by ATC, as these operations increase controller workload and constrain the capacity of the airfield's taxiway system.

Terminal Expansion – Concept 2 (Total Buildout: 95 Gates)

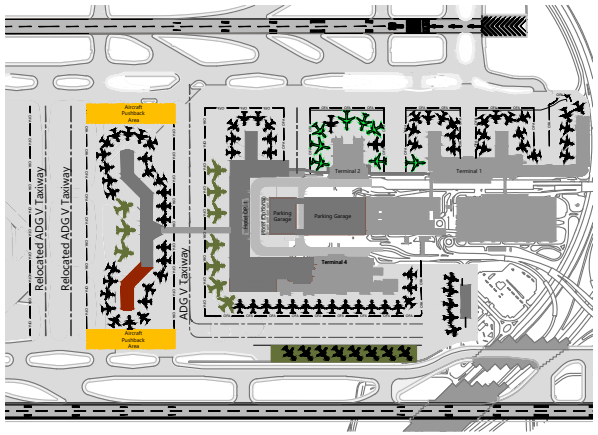
Similar to Concept 1, Terminal Expansion Concept 2 would:

- Redevelop Terminal 3 to the west with frontal gates to serve ADG V (widebody) aircraft.
- Demolition of the existing Terminal 3 including Concourses E and F.
- Construct a new concourse pier to the north of Terminal 3.
- Expand Terminal 4 and Concourse G to the west.

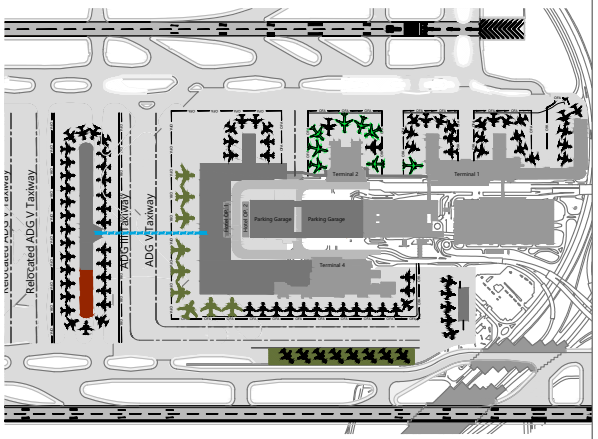
Concept 1
(Satellite Concourse Pier)



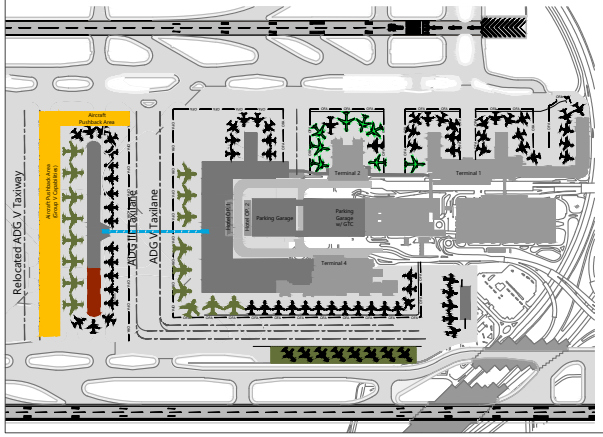
Concept 2
(Satellite Concourse Pier)



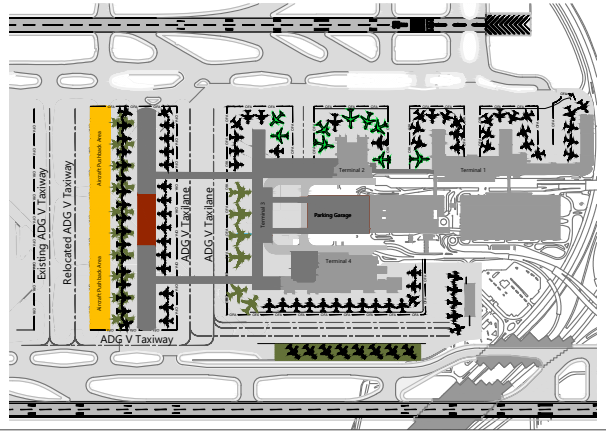
Concept 3
(Satellite Concourse Pier)



Concept 4
(Satellite Concourse Pier)



Concept 5A
(Satellite Concourse Pier)



LEGEND

- Existing Terminal/Buildings/Structure
- Proposed Terminal/Buildings/Structures - Planning Activity Level 3
- Proposed Terminal/Buildings/Structures - Ultimate
- Dedicated Aircraft Pushback Area
- Remote Aircraft Parking Area
- Jumbo Aircraft
- Widebody Aircraft
- Narrowbody Aircraft
- Automated People Mover

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-15

NORTH 0 1,500 ft.

Initial Range of Ultimate Terminal Expansion Concepts
Satellite Concourse Pier Concepts

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.3-15 - 5.3-19 - Initial Term Dev Alts_2019_1218.dwgLayout: Ex 5.3-15 Plotted: Oct 30, 2020, 10:35AM

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However, to minimize the length of the passenger skybridge, a single ADG V taxilane would be provided between the midsection of the satellite concourse and Terminal 3. This would reduce the overall length of the passenger skybridge to approximately 725 feet. The northern and southern portions of the satellite concourse jog to the west. The bend in the alignment of the satellite concourse allows ADG V aircraft to be served on the west side of the satellite concourse center section. The satellite concourse could serve up to 32 domestic narrowbody aircraft; although, five of these gates could be configured to simultaneously serve up to three widebody aircraft. Similar to Concept 1, aircraft departing from the gates on the west side of the satellite concourse, on the north and south extents, would be required to push back directly onto the crossfield taxiways.

Terminal Expansion – Concept 3 (Total Buildout: 100 Gates)

Similar to Concept 1, Terminal Expansion Concept 3 consists of a redeveloped terminal area that connects to a dual loaded satellite pier, located west of Terminal 3. The satellite concourse could serve up to 32 domestic narrowbody aircraft. However, in lieu of an enclosed elevated skybridge, an underground tunnel would also be constructed to provide connectivity between Terminal 3 and the satellite concourse. The length of the tunnel would be approximately 1,100 feet and include moving walkways. In addition to the satellite concourse, Concept 3 would include the following terminal modifications:

- Redevelopment of Terminal 3 to the west with frontal gates along its western façade. The frontal gates would be configured to accommodate up to nine ADG V (widebody) aircraft. The frontal gates would have both international and domestic arrivals capability.
- Demolition of the existing Terminal 3 including Concourses E and F.
- Construction of a new concourse pier extending from the north end of Terminal 3 that could support eight domestic narrowbody aircraft.
- Western expansion of Terminal 4 to accommodate a larger FIS facility that would serve international arrivals on Terminals 3 and 4.
- In comparison to Concepts 1 and 2, the reconfigured Terminal 3 would be located 175 feet further to the west. This would not affect the gate count associated with Terminal 3, but it would allow for Terminal 4 and the concourse to be extended to provide additional gates.

To minimize impacts to the existing tenant facilities on the west side of the crossfield taxiways, the apron associated with the satellite concourse would be restricted to ADG III (narrowbody) aircraft. Furthermore, dual ADG V taxilanes would be established west of the satellite concourse. A parallel ADG V taxiway and an ADG III taxiway would be constructed to allow Terminal 3 to serve widebody frontal gates.

Terminal Expansion – Concept 4 (Total Buildout: 95 Gates)

The terminal building envelope and gate configuration for Terminal Expansion Concept 4 is identical to Concept 3. Concept 4 reduced the parallel ADG V and ADG III taxiways in Concept 3 to parallel ADG V and an ADG III taxilanes. The parallel taxilane layout allows the satellite pier to be located 56 feet further to the east. Additionally, Concept 4 would provide a dedicated aircraft pushback area for the gates on the west side of the satellite building. This would eliminate the need for aircraft to push back onto an active taxiway. However, the pushback area results in an additional 144-foot impact to the westside development area.

Terminal Expansion – Concept 5A (Total Buildout: 97 Gates)

Terminal Expansion Concept 5A consists of a redeveloped terminal area, including the demolition of existing Terminal 3, Concourses E, and Concourse F, that connects to a dual loaded satellite pier, located west of Terminal 3. Rather than being restricted to narrowbody aircraft, the western gates on the satellite concourse would be configured to accommodate ADG V aircraft with a dedicated pushback area to avoid impacts to the crossfield taxiways during pushback maneuvers. The satellite concourse could serve up to 34 narrowbody aircraft, while the west gates could accommodate 10 widebody aircraft in lieu of the 17 narrowbody gates.

To minimize the impacts to the westside development area, Concept 5A would include minimal passenger processing functions and passenger amenities functions within the central portion of Terminal 3. This would also limit the western expansion needs for Terminal 4 and Concourse G. Passenger processing for the satellite gates and Terminal 3's frontal gates would be located at the north end of Terminal 3 and within the expanded Terminal 4. In an effort to minimize passenger walking distances to the satellite pier, two sets of passenger skybridges would be constructed. The length of each passenger skybridge would be approximately 1,100 feet and may include APM systems.

In addition to the satellite concourse, Concept 5A would include the following features:

- Addition of four widebody frontal gates associated with Terminal 3 to support international arrivals capability.
- Construction of a new pier concourse from the north side of Terminal 3 with dedicated passenger processing functions that could support seven domestic narrowbody and two widebody aircraft.
- Extension of Concourse G to the west to accommodate up to two additional widebody aircraft with international arrivals capability.
- Western expansion of Terminal 4 to accommodate additional passenger processing functions.

Dual ADG V taxilanes would be established between Terminal 3 and the newly constructed satellite pier to serve Terminals 3's widebody frontal gates. Therefore, the passenger skybridges would need to be elevated approximately 80 feet AGL to provide adequate clearance for ADG V aircraft to taxi beneath.

5.3.2.2 Linear Concourse Piers

The four remaining concepts consider constructing either one of two linear concourse piers that are contiguous with one of the unit terminals. Therefore, the construction of a passenger skybridge or underground tunnel would not be required. The concourse piers would be either single or dual loaded, meaning they would provide aircraft parking positions on one or both sides of the concourse. Consideration was given to assisted walking systems (i.e. moving walkways). The primary differences among the various linear pier concepts are the following:

- configuration of the terminal buildings that possess the terminal processing functions, including FIS facilities associated with Terminals 3 and 4
- concourse linear piers that would extend either to the east or west of Terminals 3 and/or 4. (Some concepts also include smaller piers that extend perpendicular to the primary linear concourse piers.)

- size and configuration of the airside apron area, thereby resulting in differing alignments of the concourse pier(s), as well as varying aircraft gate compatibility

The linear concourse piers on the north side of Terminal 3 could require displacement of the existing ARFF facility, as well as remote aircraft parking positions on the Zulu Ramp and immediately south of the ARFF facility. The concourse piers on the west side of Terminal 3 would also require realignment of the crossfield Taxiways L and Q. **Exhibit 5.3-16** illustrates the initial range of terminal expansion concepts that consider a linear concourse pier. The following subsections briefly describe each linear pier concourse concept.

Terminal Expansion – Concept 5B (Total Buildout: 95 Gates)

Terminal Expansion Concept 5B features a northern and southern extended concourse pier in lieu of the satellite buildings connected to the terminal area via skybridges. The new concourse piers replace the existing Concourse E and F while providing greater gate capacity. The extended concourse piers eliminate the need for the baggage system to cross active taxilanes. Also, the two concourse piers could connect with an optional skybridge. The length of the passenger skybridge would be approximately 1,100 feet.

Concept 5B also includes the following:

- The redevelopment of Terminal 3 would provide frontal gates with international arrivals capability.
- The north concourse pier would be constructed with two new piers extending from the north façade which would replace and expand on the gate capacity of existing Concourses E and F. The northern concourse pier provides 28 domestic narrowbody gates.
- The south concourse pier essentially serves as an extension of existing Concourse G, but it would also have a single concourse pier extending from its southern façade. The southern concourse would provide 14 additional gates including 7 dedicated widebody gates, each with international arrivals capability.
- The western expansion of Terminal 4 would accommodate a larger FIS facility, as a replacement of the existing facility in Terminal 4, that would serve international arrivals on Terminals 3 and 4.
- The lateral separation between the two concourse piers would allow dual ADG V taxilanes to be established, thereby allowing the proposed Terminal 3 gates and the adjacent gates associated with the south pier to be widebody capable gates.
- Due to constraints associated with their proximity to the south runway, the widebody gates located along the south side of the southern concourse pier would be served with a single ADG taxilane.
- Ten remote aircraft parking positions could be provided beyond the western end of the concourse piers.

Terminal Expansion – Concept 6 (Total Buildout: 95 Gates)

Similar to Concept 5B, Terminal Expansion Concept 6 includes the proposed development of two concourse piers extended to the west of Terminal 3. This concept also includes a smaller pier concourse immediately north of Terminal 3. The new concourse piers replace the existing Concourse E and F while providing greater gate capacity. Additionally, the concept includes the construction of hammerheads at the end of each proposed east to west concourse pier.

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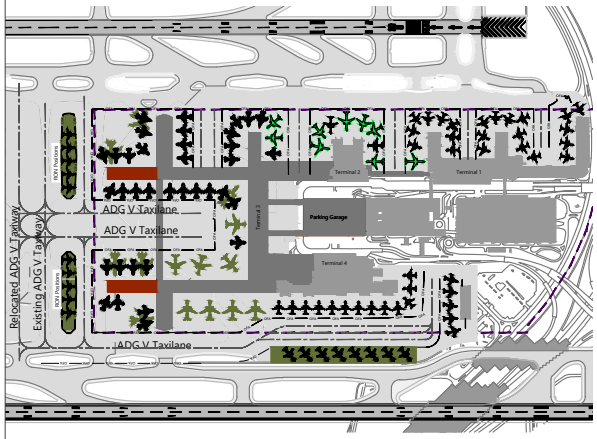
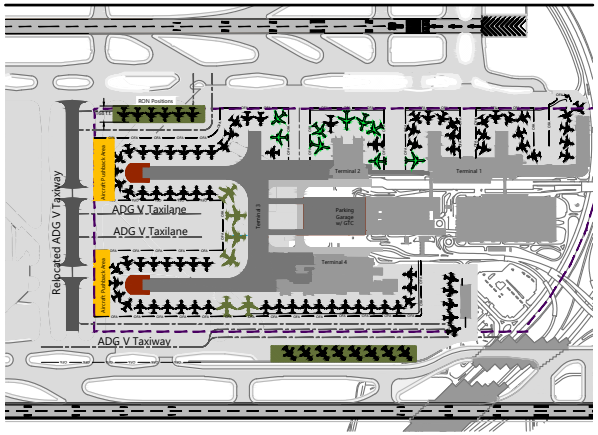
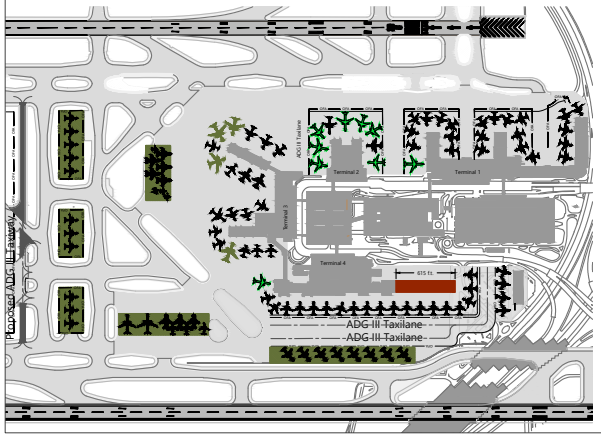
Concept 5B
(Dual Concourse Piers)



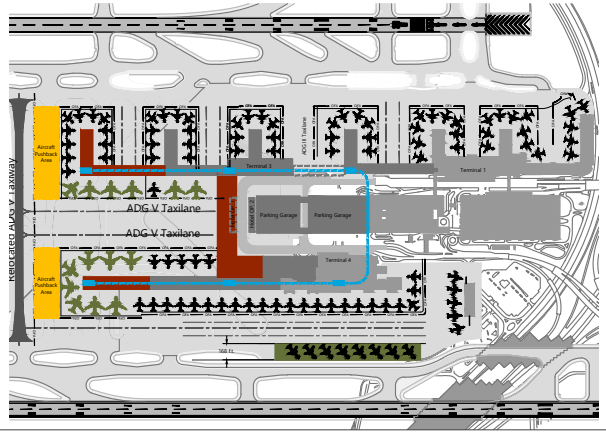
Concept 6
(Dual Concourse Piers)



Concept 7
(Single Concourse Pier)



Concept 8
(Dual Concourse Piers)



LEGEND

- Existing Terminal/Buildings/Structure
- Proposed Terminal/Buildings/Structures - Planning Activity Level 3
- Proposed Terminal/Buildings/Structures - Ultimate
- Aircraft Pushback Area
- Remote Aircraft Parking Area
- Jumbo Aircraft
- Widebody Aircraft
- Narrowbody Aircraft
- Automated People Mover

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-16

NORTH 0 1,500 ft.

Initial Range of Ultimate Terminal Expansion Concepts
Linear Concourse Pier Concepts

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Other characteristics of Concept 6 include the following:

- The redevelopment of Terminal 3 would provide four widebody frontal gates with international arrivals capability.
- A smaller pier concourse would be constructed; it would extend from the north façade of the northern concourse pier. Combined, the northern concourse pier and smaller pier concourse would provide 25 domestic narrowbody gates.
- The southern concourse pier essentially serves as an extension of existing Concourse G. This extension would provide 17 additional narrowbody gates and 2 dedicated widebody gates.
- The western expansion of Terminal 4 would accommodate a larger FIS facility, as a replacement to the existing international arrivals facility in Terminal 4, that would serve international arrivals on Terminals 3 and 4.
- The lateral separation between the two concourse piers would allow dual ADG V taxilanes to be established, thereby allowing the proposed Terminal 3 frontal gates to be widebody gates.
- Six remote aircraft parking positions could be provided immediately north of the northern concourse pier.

Terminal Expansion – Concept 7 (Total Buildout: 76 Gates)

Terminal Expansion Concept 7 proposes a single linear concourse pier extended to the east of Terminal 4 representing the maximum eastward expansion of Concourse G while preserving the necessary space to extend the associated taxilanes to the east. The linear concourse pier extends into the existing Avis Lot located east of Ramp G.

Other characteristics of Concept 7 include the following:

- The linear concourse pier serves as an extension of existing Concourse G. This extension would provide 6 additional narrowbody gates.
- 11 remote aircraft parking positions could be provided between the existing crossfield taxiways. By maintaining the existing dual crossfield taxiway geometry which contains area that may be captured for aeronautical use such as aircraft parking.
- Relocation of the existing 4 remote aircraft parking positions on Ramp G and establishment of 4 new remote aircraft parking positions south of Terminal 4.
- By itself, Concept 7 does not satisfy the 20-year gate requirements. It would need to be combined with some of the gate expansion ideas from the other concepts to serve as a 20-year horizon solution.

Terminal Expansion – Concept 8 (Total Buildout: 108 Gates)

Terminal Expansion Concept 8 consists of a redeveloped terminal area, including concourse piers extended to the west, as well as a redeveloped Terminal 2 with connection to Terminal 1. This concept shifts the north/south crossfield taxiways the furthest west, and it is the most impactful to the westside developments. It also considers an APM system (approximately 7,000 linear feet) to interconnect Terminals 2, 3, and 4. Two parallel ADG V taxilanes serve the interior gates.

Concept 8 would also include the following features:

- The redevelopment of Terminal 3 would provide passenger processing functions, but no frontal gates would be provided.
- The redevelopment of Terminal 2 would result in a concourse pier with eight domestic narrowbody gates.
- Three additional concourse piers would be constructed; they would extend from the north façade of the northern concourse pier. Combined, the north linear concourse pier and the associated concourses would provide 30 domestic narrowbody and 6 widebody gates.
- The south linear concourse pier essentially serves as an extension of the existing Concourse G. This would provide 14 additional narrowbody gates and 8 widebody gates, each with international arrivals capability.
- The western expansion of Terminal 4 would accommodate a larger FIS facility that would serve international arrivals on Terminals 3 and 4.
- The lateral separation between the two concourse piers would allow dual ADG V taxilanes to be established, thereby allowing each of the gates between the two piers to be converted to widebody gates, as needed.

5.3.2.3 Initial Screening of Concepts

The various Terminal Expansion Concepts were evaluated to establish a shortlist of concepts that would be subject to further refinement and evaluation. For this purpose, the following screening criteria were established:

- Capacity Balance – This criterion is used to assess whether the alternative would provide adequate aircraft parking capacity within the terminal area (gates and remote parking) to serve the PAL 3 and ultimate gate needs for FLL to be in balance with the practical capacity of the airfield. Concepts that provide aircraft parking capacity to meet or exceed the ultimate gate and remote aircraft parking demands projected to provide a balance with the airfield capacity are considered to meet the criteria. Concepts that would either not provide adequate aircraft parking or gate capacity are deemed to not meet this screening criteria.
- Operational Considerations and Flexibility – Each terminal concept would require reconfiguration of the crossfield taxiways to accommodate the terminal configurations proposed for PAL 3 and the ultimate condition. This resulted in varying levels of impact to the westside tenant facilities. In addition, the terminal development area for each concept provided different mixes of taxilane capabilities serving the gate areas, from dual ADG V to an ADG V with parallel ADG III, down to a single ADG V. These differentiators provided distinct quantifiable tabulations for the following items:
  - amount of terminal apron frontage capable of serving ADG V aircraft
  - number of gates being served by a single taxilane
- Incremental Development Capability – This criterion evaluates each concept's ability to build upon a previous phase and to provide incremental, demand-driven capacity with little or no throw-away investments. Consideration was also given to the anticipated incremental costs associated with each phase of development, particularly with the concepts that would require the construction of a skybridge.

- Constructability – This criterion provided a relative comparison of the concepts as it relates to the construction complexity of each increment of construction. Key factors considered were:
  - the estimated construction timeline for each incremental phase of development
  - potential impacts to existing aircraft circulation and gate availability during construction
  - the level of construction activities required in the air operations area (AOA), as the transportation of construction materials and equipment to contractor staging areas would be complex
- Relative Total Costs to Other Concepts – This criterion considers the relative costs associated with each Terminal Expansion Concept. Although cost estimates were not prepared for the initial range of concepts, a qualitative comparison of development costs was performed based on:
  - overall square footage of terminal building being added
  - amount of new apron area
  - additional connectivity components such as underground APMs/tunnels, elevated people movers, and skybridges
  - impacts to existing facilities

Table 5.3-2 summarizes the conclusions of the screening of the initial terminal expansion concepts. During the evaluation process, three concepts were shortlisted as candidates to be carried forward for further refinement and evaluation. The three concepts carried forward for further refinement were the following:

- Terminal Expansion Concept 1 – satellite pier concourse with dual ADG V taxiways and taxilanes
- Terminal Expansion Concept 5B – dual east-west linear pier concourses, with three smaller north-south pier concourse extensions
- Terminal Expansion Concept 6 – dual east-west linear pier concourses with a single, smaller finger pier concourse extension (west of Terminal 2)

To facilitate the evaluation of the Incremental Development Capability and Constructability criteria, preliminary construction phasing plates were developed. Illustrations of the construction phasing plates can be found in Appendix H.

Table 5.3-2: Screening Evaluation Summary – Initial Range of Terminal Expansion Concepts

SCREENING CRITERIA	TERMINAL EXPANSION CONCEPT								
	SATELLITE CONCEPT 1	SATELLITE CONCEPT 2	SATELLITE CONCEPT 3	SATELLITE CONCEPT 4	SATELLITE CONCEPT 5A	LINEAR PIER CONCEPT 5B	LINEAR PIER CONCEPT 6	LINEAR PIER CONCEPT 7	LINEAR PIER CONCEPT 8
1. Balance of Aircraft Parking Capacity with PAL 3 and Ultimate Parking Demand	✈	✈	✈	✈	✈	✈	✈		
2. Operational Consideration and Flexibility	✈					✈	✈		✈
3. Incremental Development Capability			✈	✈	✈	✈	✈	✈	✈
4. Constructability	=	=	=	=	=	=	=	=	=
5. Relative Total Costs to Other Concepts	=	=			=	✈	✈		
Conclusion	Selected as Shortlisted Concepts	Eliminated from Further Consideration	Eliminated from Further Consideration	Eliminated from Further Consideration	Eliminated from Further Consideration	Selected as Shortlisted Concept	Selected as Shortlisted Concept	Eliminated from Further Consideration	Eliminated from Further Consideration

NOTES:
✈ Exceeds Screening Criteria
= Meets Screening Criteria
Does Not Meet Screening Criteria
PAL = Planning Activity Level
SOURCE: Ricondo & Associates, Inc., February 5, 2019.
PREPARED BY: Ricondo & Associates, Inc., August 2019.

5.3.3 REFINEMENT OF SHORTLISTED TERMINAL EXPANSION CONCEPTS

The three shortlisted Terminal Expansion Concepts were further refined to provide a more detailed understanding of the operational characteristics and the basis for capital, operating, and maintenance costs used to update the financial analysis. Each concept was refined in terms of the size of facilities and spaces, passenger flows, aesthetic features, baggage handling systems, and the disposition of aircraft gate positions. Various ADG V aircraft were analyzed to determine apron depth needs and capabilities throughout the new terminal development. **Table 5.3-3** shows two ADG V types that were established, based on the available apron depth and the aircraft length, to provide varying gate capabilities and levels of impacts. As shown, Type 1 provides limited ADG V capabilities being designed for a max aircraft of B777-200LR/A350-900. Each aircraft has a length below 219 feet. Type 2 gates provide operational capabilities for larger widebody aircraft such as A350-1000/B777-9X. The B777-9X is the most demanding aircraft analyzed with an aircraft length of 251 feet. During the refinement process, the depth of the proposed terminal processing spaces was increased to allow greater flexibility of terminal functions, such as check-in counters, concessions area, support space, and general circulation. Each concept includes a new FIS facility, as a replacement to the existing Terminal 4 FIS facility, to provide greater capacity to serve increased international capability. The FIS area would be connected to the international gates through a mezzanine-level sterile corridor. The FIS consists of the Automated Passport Control (APC) area, international bag claim hall, customs, exit control, and FIS support space. Each shortlisted terminal expansion concept was also refined to include the landside improvements previously noted.

Table 5.3-3: ADG V Gate Capability – Aircraft Types Based on Representative Mix

AIRCRAFT	AIRCRAFT LENGTH	ADG V TYPE 1	ADG V TYPE 2
B787-8	186 ft	X	X
A330-200	193 ft	X	X
B787-9	206 ft	X	X
A330-300	209 ft	X	X
B777-200ER	209 ft	X	X
B777-200LR	209 ft	X	X
A350-900	219 ft	X	X
B787-10	224 ft		X
B777-8X	229 ft		X
B777-300ER	242 ft		X
A350-1000	242 ft		X
B777-9X	251 ft		X

SOURCES: AviPlan Airside Pro, Aircraft Data Viewer and Parking Details, December 2017; Ricondo & Associates, Inc., December 2017.
PREPARED BY: Ricondo & Associates, Inc., August 2019.

5.3.3.1 Refined Terminal Expansion Concept 1

Exhibit 5.3-17 illustrates the physical elements comprising the ultimate 95-gate buildout for Refined Terminal Expansion Concept 1. The refinements to Concept 1 include:

- Addition of a second skybridge to optimize passenger flow.
- Modification to the redeveloped Terminal 3 to provide adequate building area to accommodate future passenger processing functions, concessions, and building systems. This ultimately resulted in the future Terminal 3 curbfront to be extended to the west. It also includes the reconfiguration of the concourse pier extending to the north of the redeveloped Terminal 3 to serve widebody aircraft.
- Relocation of the crossfield taxiways to the west to allow the establishment of an ADG III taxilane west of the satellite concourse and the creation of 11 remote aircraft parking positions. This helps mitigate the need to conduct aircraft pushback operations on the crossfield taxiways. The creation of a new taxilane and remote aircraft parking positions would further encroach into the Sheltair and Signature leasehold area within the westside development area.
- Incorporation of the on-Airport APM circulator that would interconnect the unit terminals and the intermodal facility east of the Airport.
- Refinements to the aircraft parking plan to optimize flexibility for swing gates and anticipated operational flows.

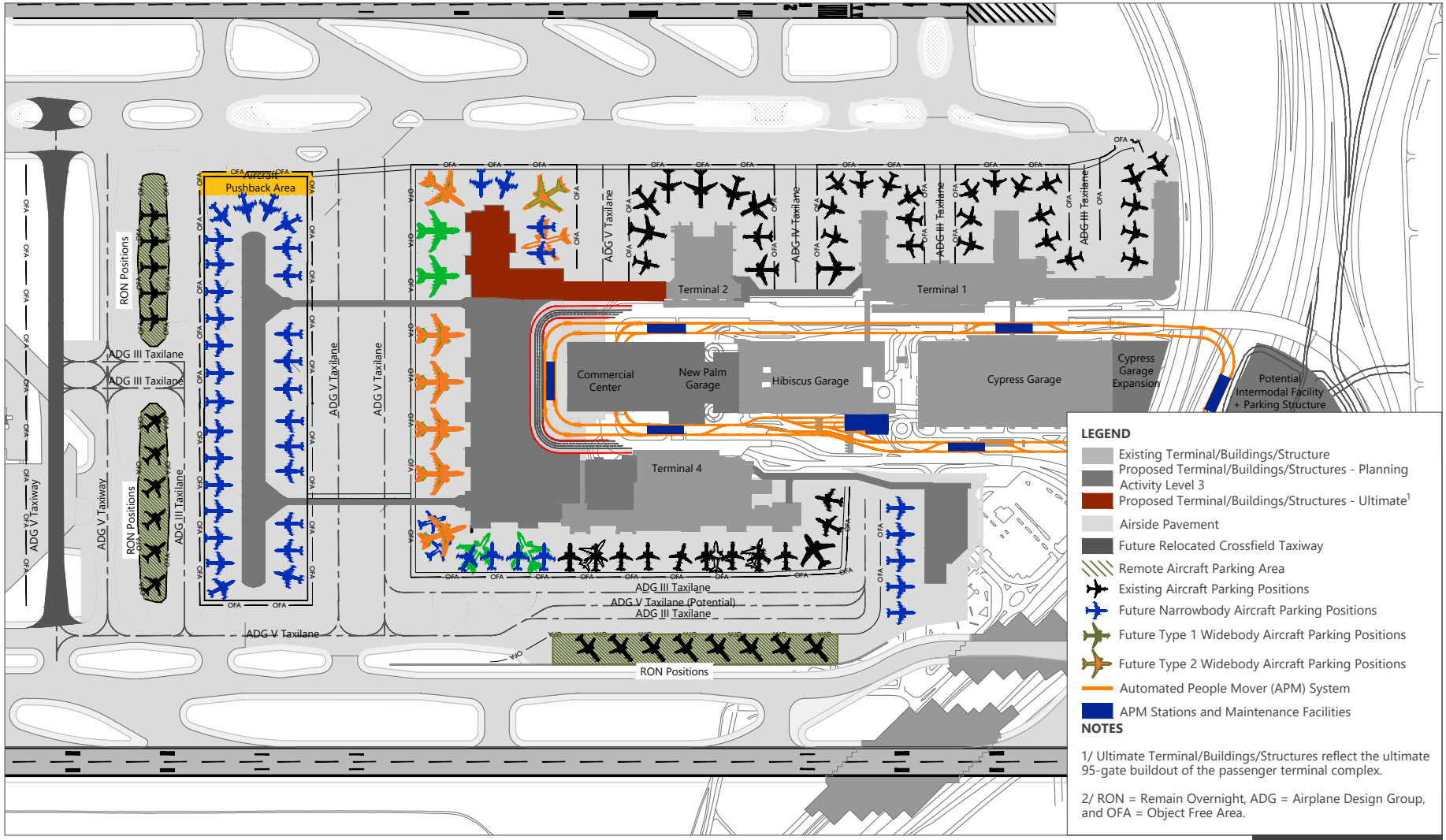
It is improbable that any new gates on the satellite concourse would be international-capable due to the cost and operational complexities associated with maintaining sterilization across the skybridge. Therefore, international gates would be limited to the frontal gates associated with new Terminal 3 and the extended Concourse G.

5.3.3.2 Refined Terminal Expansion Concept 5B

Exhibit 5.3-18 illustrates the physical elements comprising the ultimate 95-gate buildout for Refined Terminal Expansion Concept 5B. The refinements to Concept 5B include:

- Modifications to the redeveloped Terminal 3 to provide adequate building area to accommodate passenger processing functions, concessions, and building systems. This ultimately resulted in the future Terminal 3 curbfront to be extended to the west.
- Incorporation of the on-Airport APM circulator that would interconnect the unit terminals and the intermodal facility east of the Airport.
- Relocation of the crossfield taxiways to the west to allow for the creation of 10 remote aircraft parking positions.
- Refinements to the aircraft parking plan to optimize flexibility for swing gates and anticipated operational flows.

The potential reconfiguration of the taxilanes south of Concourse G was also explored. However, due to the physical constraints of the South Runway, the ability to establish a full-length dual taxilane was not achievable. In addition, terminal gate capacity cannot be maintained during construction and provides the fewest gates capable of accommodating aircraft configured to carry at least 225 passengers. On that basis, Concept 5B was eliminated from further consideration.



SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-17

NORTH 0 800 ft.

Refinement of Shortlisted Terminal Expansion Concepts
Concept 1

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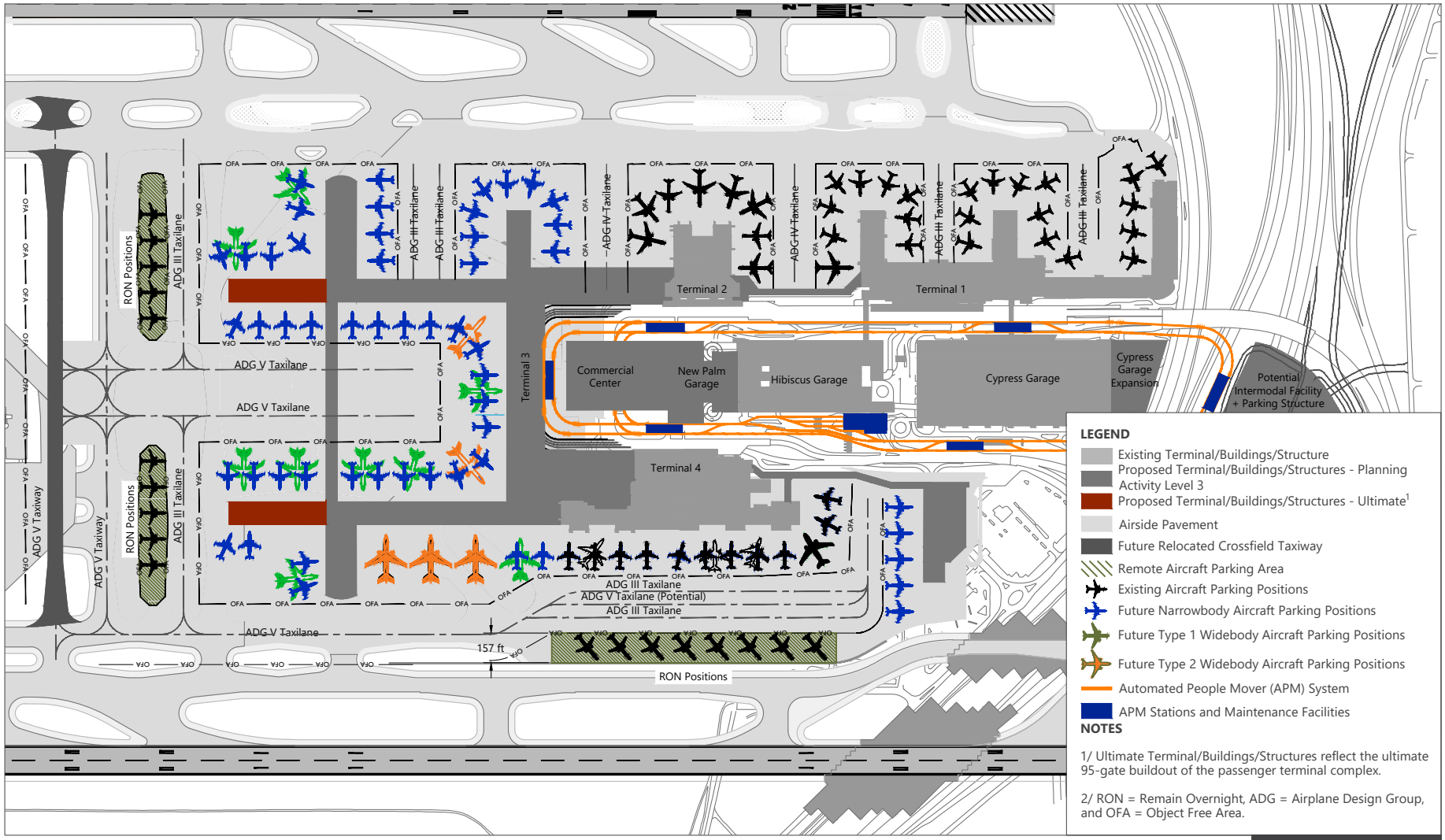

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-18

NORTH 0 800 ft.

Refinement of Shortlisted Terminal Expansion Concepts
Concept 5B

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5.3.3.3 Refined Terminal Expansion Concept 6

Exhibit 5.3-19 illustrates the physical elements comprising the ultimate 95-gate buildout for Refined Terminal Expansion Concept 6. The refinements to Concept 6 include:

- Modification to the new, redeveloped Terminal 3 to provide adequate building area to accommodate passenger processing functions, concessions, and building systems. This ultimately caused the future Terminal 3 curbfront to be relocated to the west.
- Conversion of the aircraft pushback areas west of the concourse piers into a single ADG III taxilane.
- Relocation of the crossfield taxiways to the west to allow for the creation of 11 remote aircraft parking positions, which help mitigate the need to conduct aircraft pushback operations on the crossfield taxiways.
- Incorporation of the on-Airport APM circulator that would interconnect the unit terminals and the intermodal facility east of the Airport.
- Refinements to the aircraft parking plan to optimize flexibility for swing gates and anticipated operational flows.

The creation of new remote aircraft parking positions to the west of the concourse piers would further encroach into the Sheltair and Signature leasehold area within the westside development area.

5.3.4 SELECTION OF PREFERRED TERMINAL EXPANSION CONCEPT

The evaluation of the refined terminal expansion concepts was particularly focused on addressing the operational challenges and infrastructure constraints listed in Section 5.3. The additional studies conducted to develop a deeper understanding of the operational and qualitative characteristics of Concepts 1 and 6 helped further assess the initial concepts. In summary, the findings favored Concept 6 for the following reasons:

- Concept 1 conclusions:
  - A satellite concourse is more appropriate at airports with a significant level of connecting passengers. Although FLL's share of connecting passengers is forecast to increase, the majority of FLL's activity is anticipated to remain as Origin and Destination (O&D) throughout the planning horizon.
  - The conveyance of baggage to the satellite concourse creates significant operational challenges. Outbound and inbound baggage would either need to be transported through the passenger skybridge, through underground tunnels, or via ground service vehicles. Baggage conveyance via the skybridges would be costly and would result in significant conveyance times. Transportation of baggage via ground service vehicles would increase ramp congestion, and possibly increase airline operating costs.
  - The average passenger travel and baggage conveyance distances would be greater for O&D passengers, thereby having a lower LOS.
  - The overall cost associated with Concept 1 would be greater due to the construction of two passenger skybridges.
  - The incremental construction costs associated with the initial phases associated with Concept 1 would be greater. Integration with the existing Terminal 3, while also planning for integration with the future redevelopment of Terminal 3, would add complexity to design and construction efforts.

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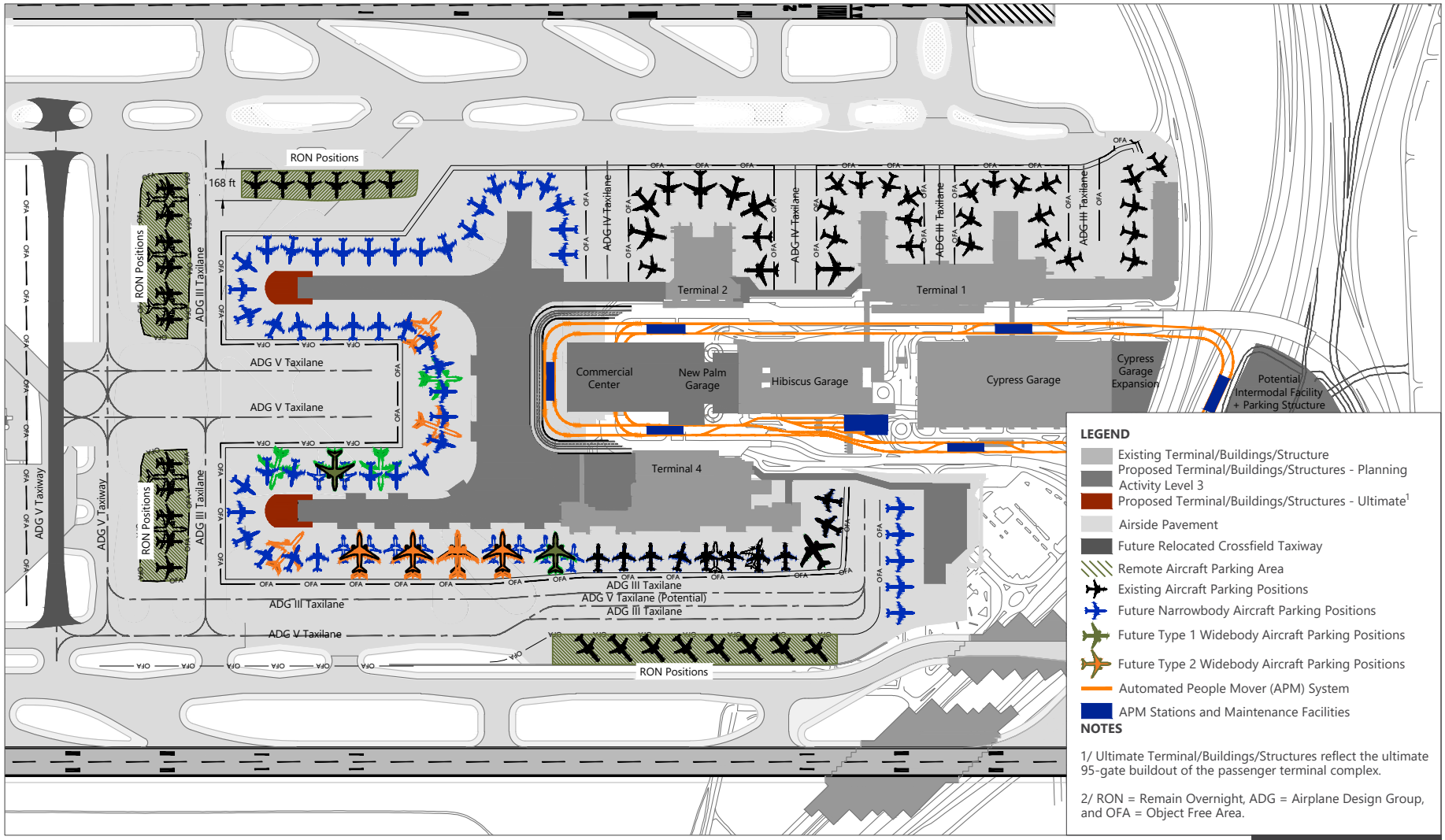

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-19

NORTH 0 800 ft.

Refinement of Shortlisted Terminal Expansion Concepts
Concept 6

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- Concept 6 conclusions:
  - Unlike Concept 1, the baggage conveyance system can operate without extraneous considerations, such as crossing dual ADG V taxilanes.
  - Concept 6 provides 25 remote aircraft parking positions, whereas Concept 1 would only provide 19 remote aircraft parking positions.
  - Concept 6 provides a greater opportunity to expand the quantity of international arrival gates.
  - There is greater concessions/retail availability.
  - The construction period for Concept 6 would be shorter compared with Concept 1, translating into lower cost escalation and capitalized interest.

The shortlisted concepts were presented to the Airline and Airports Affairs Committee (AAAC) on May 9th, 2018 and to the Broward County Board of County Commissioners (BOCC) on May 15th, 2018. The preference for Concept 6 was unanimously confirmed by both the AAAC and the BOCC.

To ensure the building envelop associated with the preferred concept (Concept 6) would provide adequate space to house the various processing and building functions, a preliminary space program was developed for each level of the building. The space program reflects the terminal space requirements projected to serve the PAL 3 and the 95-gate buildout. **Exhibit 5.3-20** through **Exhibit 5.3-22** illustrate the resulting preliminary space programs.

5.4 Terminal Roadway Access and Curbfronts

Roadway and curbfront level of service (LOS) were determined and were summarized in Chapter 4. Corresponding facility requirements were identified after an evaluation of the existing and forecast demand and the capacity of the Airport's landside facilities. Several roadway and curbfront alternatives are summarized herein. The goal was to identify alternatives that meet future requirements and improve the LOS. Efforts to define and assess the alternatives included the following:

- Identified alternatives that integrate terminal area development, landside/regional access improvements, and commercial/nonaeronautical development.
- Conducted planning charrettes with stakeholders.
- Evaluated alternatives for conformity to design standards, facilitation of operations, implementation phasing, and cost.
- Selected a preferred alternative that meets BCAD's goals, objectives, and future demand requirements.

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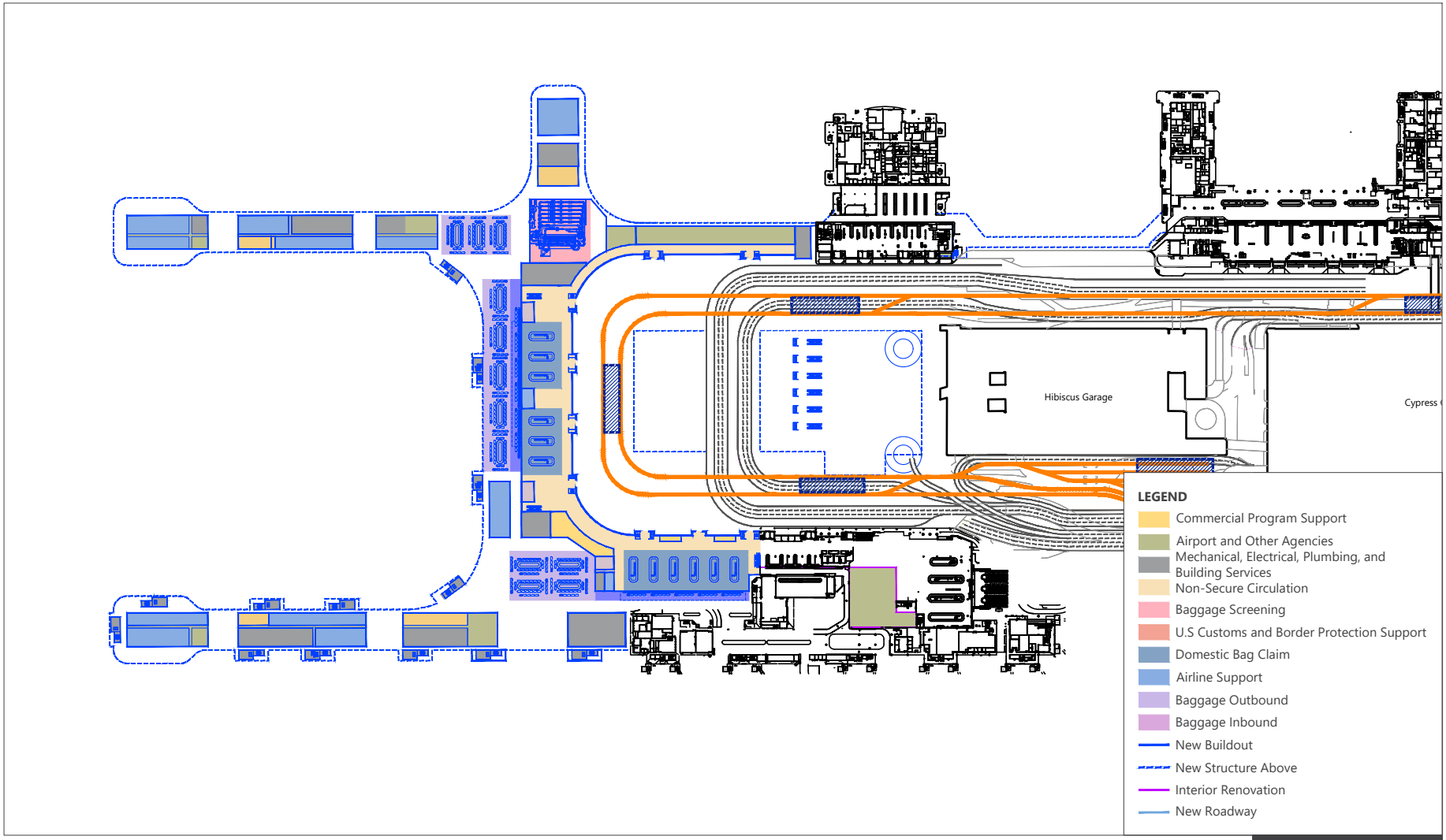

SOURCES: Broward County Aviation Department, February 2016; ACAI Associates, Inc., *Terminal Facilities Inventory*, April 2016; Ricondo & Associates, Inc., May 2016.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-20

NORTH 0 450 ft.

Preferred Terminal Expansion Concept 6
Ramp Level

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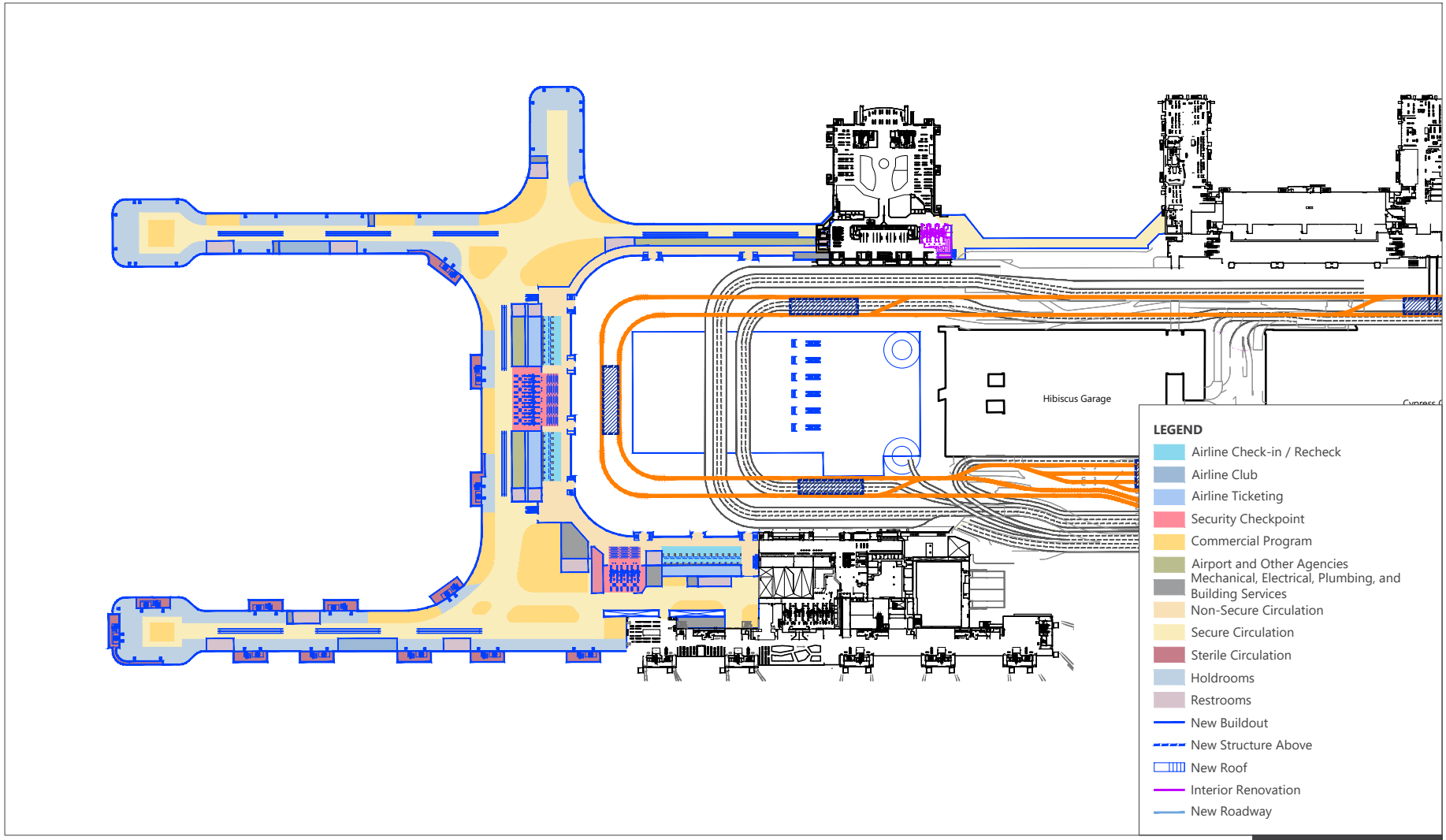

SOURCES: Broward County Aviation Department, February 2016; ACAI Associates, Inc., *Terminal Facilities Inventory*, April 2016; Ricondo & Associates, Inc., May 2016.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-21

NORTH 0 450 ft.

Preferred Terminal Expansion Concept 6
Concourse Level

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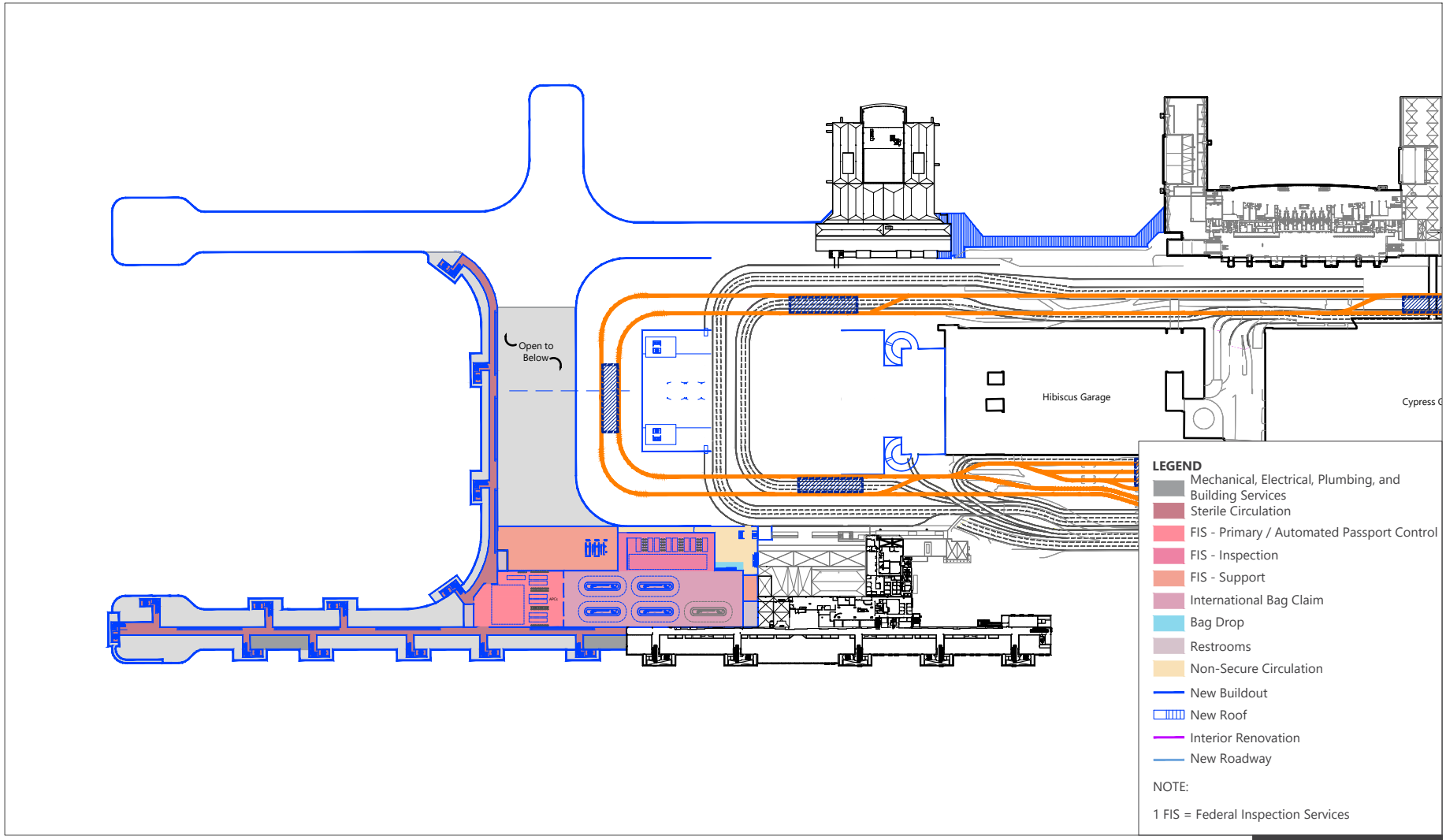

SOURCES: Broward County Aviation Department, February 2016; ACAI Associates, Inc., *Terminal Facilities Inventory,* April 2016; Ricondo & Associates, Inc., May 2016.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.3-22

NORTH 0 450 ft.

Preferred Terminal Expansion Concept 6
Mezzanine Level

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The following subsections summarize the definition, screening, evaluation, and selection of preferred alternatives and associated improvements for the Airport. The alternatives build upon early concepts reported in the ***Landside Analysis – Terminal Access Roadways, Curb Front, and Parking Short-Term Improvement Study***. Refer to Section 5.4.1.2 for a summary of the roadway modifications and improvements recommended within this study.

5.4.1 ALTERNATIVES DEVELOPMENT: STRATEGY AND ASSUMPTIONS

The landside system and regional roadway network surrounding the Airport serves a variety of modes, including personal automobiles, taxis, buses, limos, and mass transit. Ground access to and from the Airport's landside system is an important focus for BCAD as passenger and visitor demand increases.

To develop integrated alternatives that satisfy the Airport's long-range needs, facility requirements were considered while assessing each of the Airport's primary functional needs. Three Planning Activity Level (PAL) scenarios were developed to evaluate forecasted demands and LOS for planning years 2020, 2025, and 2035. The baseline conditions were based on demands and LOS from year 2015. **Table 5.4-1** summarizes the representative planning year, Million Annual Passengers (MAP) projections, and daily terminal roadway vehicle demands for each PAL. The daily vehicle demands reference the daily vehicles entering the upper level curbfront, the lower level curbfront, and the combination of both curbfronts. It should be noted that many additional factors beyond daily vehicle demands contribute to the analysis, such as peaking characteristics, curbing demands, curbfront operations, commercial vehicle operations, and recirculation. While the summarized daily vehicle demands provide a sense of activity growth, they are not intended to represent volume thresholds for implementation of the various alternatives.

Table 5.4-1: Planning Activity Level Comparisons, Daily Vehicle Demands

DEMAND LEVEL	YEAR	MAP	LOWER LEVEL	UPPER LEVEL	CURBFRONT VEHICLE DEMAND (COMBINED)
Existing	2015	26.4	17,989	16,281	34,270
PAL 1	2020	36.7	24,591	20,681	45,272
PAL 2	2025	41.9	26,558	22,620	49,178
PAL 3	2035	52.4	31,661	26,938	58,599

NOTES:

1/ MAP = Million Annual Passengers

2/ The daily vehicle demands correspond to the total vehicles entering the applicable curbfront for the respective passenger activity demand level (e.g. PAL 1)

SOURCE: Kimley-Horn and Associates, Inc., August 2017.
PREPARED BY: Kimley-Horn and Associates, Inc., July 2019.

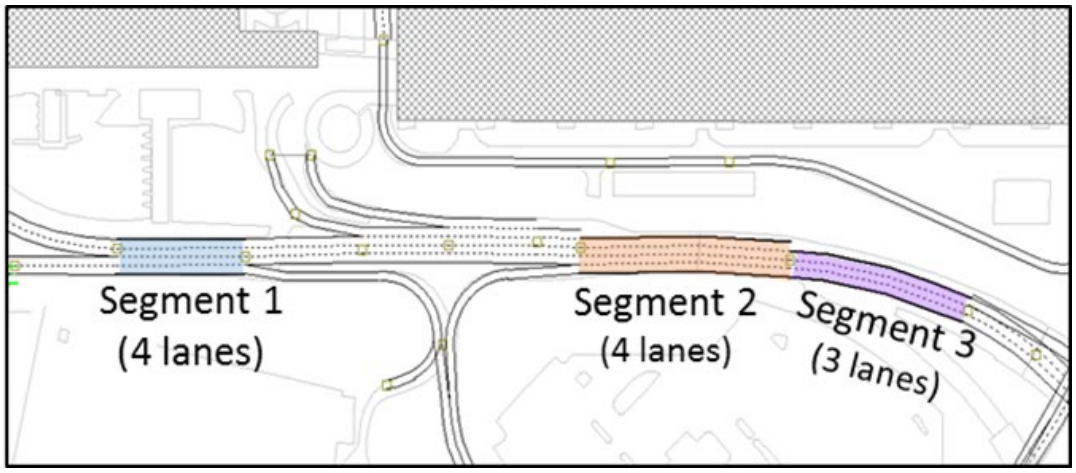
Identification of requirements and potential areas for improvement are documented in Section 4.

5.4.1.1 No Action Alternative

A No Action Alternative for the forecast conditions was evaluated and reported in the ***Landside Analysis – Terminal Access Roadways, Curb Front, and Parking Short-Term Improvement Study***. The No Action Alternative assumed forecast growth without modification to the existing landside facilities. The option resulted in failing landside conditions by PAL 1.

Exhibit 5.4-1 depicts the three segments of the Terminal Drive exit roadway that are expected to reach LOS F under the No Action Alternative in PAL 1. Using the Advanced Land-Transportation Performance Simulation (ALPS), modeling results show that by late morning there is more demand by PAL 1 than the roadway can serve. Merging from a four-lane section to a three-lane section (traveling from Segment 2 to Segment 3) contributes to the delay and congestion. Additionally, the combined distance of Segment 2 and Segment 3 is relatively short, and weaving occurs in this combined section where vehicles align to access the terminal recirculation lane, the northbound exit to U.S. 1 and I-595, or Ramp G to southbound U.S. 1.

Exhibit 5.4-1: Terminal Drive Exit Roadways Failing in PAL 1 (No Action Alternative)



SOURCE: Kimley-Horn and Associates, Inc., August 2017 (ALPS Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Short-term improvements, summarized in the following subsection, were developed to mitigate the projected failing conditions as documented in the Demand/Capacity chapter.

5.4.1.2 Short-Term Baseline Improvements

The following short-term improvements recommended in the ***Landside Analysis – Terminal Access Roadways, Curb Front, and Parking Short-Term Improvement Study*** are assumed to be implemented and finalized by 2020:

- exit roadway enhancements (e.g., Cypress helix exit lanes removal, widening, and mitigating weave issues)
- technology improvements to flex the use of the upper and lower levels
- removal of curbfront access impediments (e.g., extensive cone usage)
- relocated BCAD/Broward County Sherriff's Office (BSO) designated parking areas across the terminal roadway
- temporary cell phone lot relocation to old Avis lot on Perimeter Road
- enforcement of lower level crosswalks with crossing guards
- relocation of employee parking to former Remote Economy Lot
- valet relocation and new valet slip ramp from main exit roadway

All alternatives assessed herein are assumed to include these short-term improvements.

5.4.1.3 Strategies for the Airport's Functional Needs

Landside alternatives targeted capacity and weaving issues in the terminal and nonterminal roadways. Terminal roadway congestion and curbfront operations may be improved by (a) lengthening available curbing areas, (b) reducing (or relocating) curbfront vehicular demand, and/or (c) minimizing vehicular conflicts and traffic control devices, such as pedestrian crossings. Nonterminal roadway congestion may be improved by removing rental cars, which comprise about 25 percent of the traffic that utilizes these roadways, and reconfiguring ramps to add capacity and to reduce weaving movements.

The alternatives considered include recommendations for modifying entry/exit roadways, increasing curbside capacity, and enhancing the LOS for ground transportation providers. The goal was to refine and upgrade the existing landside configuration and its facilities to serve increased demand. The potential for new travel modes and means of accessing curb lanes was considered.

Improvements to the regional roadways that are outside of FLL's boundaries were not considered, since they serve a mix of network traffic and are beyond direct influence of Airport activity. Targeted traffic engineering studies may be performed for intersections and roadways outside the Airport boundary separate from this Master Plan Update.

5.4.2 IDENTIFICATION OF POTENTIAL ALTERNATIVES

The alternatives presented herein were developed with the goal of serving future demand while allowing passengers and vehicles to efficiently and conveniently move between the terminals and the landside facilities without experiencing unacceptable queue times, congestion, and/or diminished LOS. The alternatives may be implemented independently; although, some may affect other improvements. This section summarizes enhancement alternatives for terminal roadway safety, terminal and curbfront roadways, nonterminal roadways, and public parking.

5.4.2.1 Terminal Roadway Safety

Following a review of existing pedestrian and roadway facilities along the terminal roadways, a review of comparable facilities at other airports, and the latest industry standards, several roadway safety improvements were recommended for the short- and long-term planning horizons. Alternatives for roadway safety enhancements were coordinated with BCAD. The following summarizes the independent improvements proposed.

Short-Term Improvements

Short-term roadway safety improvements are additional enhancements to meet PAL 1 requirements and to improve the safety and operation of the terminal roadway. They are organized into three primary categories: lighting conditions, enforcement needs, and crosswalk enhancements.

Poor lighting conditions along the lower level were observed during both day and nighttime hours. The lighting between the girders is recessed and shielded from distributing fully onto the roadway. There is a noticeable difference in lighting conditions between the lower level and the upper level, where newly installed canopies propagate improved lighting throughout the terminal curbfronts. Enhanced lighting provides drivers with an improved ability to identify parties they are picking up, to see and read signs, and to be aware of surrounding vehicles and pedestrians. As a pedestrian-sensitive area, potential remedies based on FDOT standards include underdeck lighting

and pier-mounted shoebox lights, rather than lighting within the girders. To enhance customer service and pedestrian safety, detailed lighting studies are recommended to identify possible solutions for increasing visibility on the lower level.

Enforcement is also a key element for roadway safety and improved LOS. It is recommended that more crossing guards overseeing dwell time enforcement be provided. Communication with the BSO is also advised for stricter enforcement and to issue warnings and citations appropriately. Both can be supplemented with implementation of an outreach educational program for passengers and visitors.

Recommended crosswalk enhancements include the following, with examples illustrated on **Exhibit 5.4-2**:

- reflective pavement markings
- advanced pavement markings
- Rectangular Rapid Flash Beacons
- in-road signage

Mid- to Long-Term Improvements

The mid- to long-term (PAL 2–PAL 3) roadway safety improvements consist of the following: additional crosswalk enhancements, signalized crosswalks, and vertical circulation.

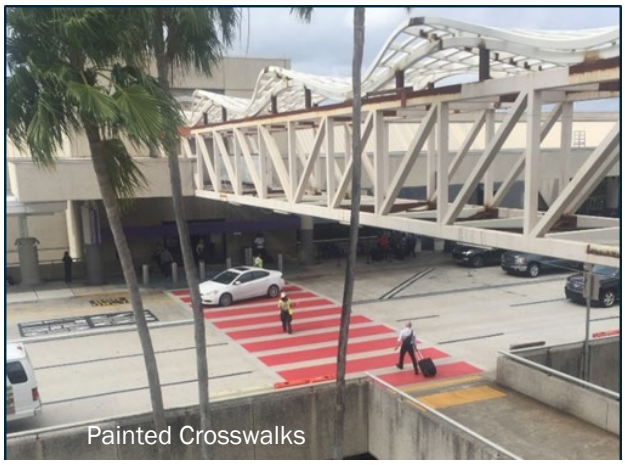
The implementation of pedestrian-activated in-pavement flashing LED lights and raised crosswalks in the mid-term planning horizon (PAL 2) can further enhance pedestrian safety. Implementing raised colored crosswalks in addition to the advanced stopping markings enhances visibility for drivers. In-pavement flashing LED lights accompanied by pedestrian detection devices rapidly identifies the presence of pedestrians. **Exhibit 5.4-3** provides examples of these crosswalk enhancements.

In addition, signalized crosswalks are also proposed as mid-term (PAL 2) enhancements to improve pedestrian safety, while also reducing vehicular travel times. Signalized crosswalks are proposed at Terminals 2, 3, and 4 at the lower level to control and reduce vehicle-pedestrian interactions. This enables "platooning" of pedestrians, allowing more efficient use of the crosswalk to reduce vehicular delay. The crosswalk would be controlled by pedestrian call buttons and would be supplemented by visual and audio response of the time remaining for crossing, as illustrated on **Exhibit 5.4-4**.

The following scenarios were modeled using ALPS to understand the terminal roadway operations and the impacts associated with three different crosswalk treatment scenarios along the terminal roadways under PAL 2 forecast conditions:

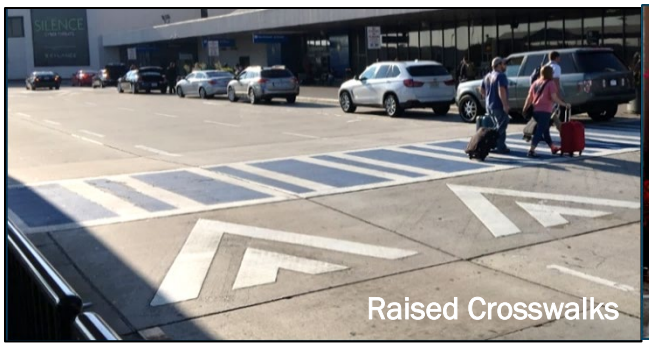
- No Crosswalk Enforcement
- Simulated Crossing Guards on Crosswalks at Terminals 2, 3, and 4
- Signalized Crosswalk at Terminals 2, 3, and 4

Exhibit 5.4-2: Short-Term Crosswalk Enhancements



SOURCE: Google Images, obtained August 2017.
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Exhibit 5.4-3: Mid-Term Crosswalk Enhancements



SOURCES: Hartsfield-Jackson Atlanta International Airport, Kimley-Horn and Associates, Inc. Photo, April 27, 2016; San Diego International Airport Google Street View Photo, obtained August 2017.
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Exhibit 5.4-4: Mid-Term Crosswalk Signalization

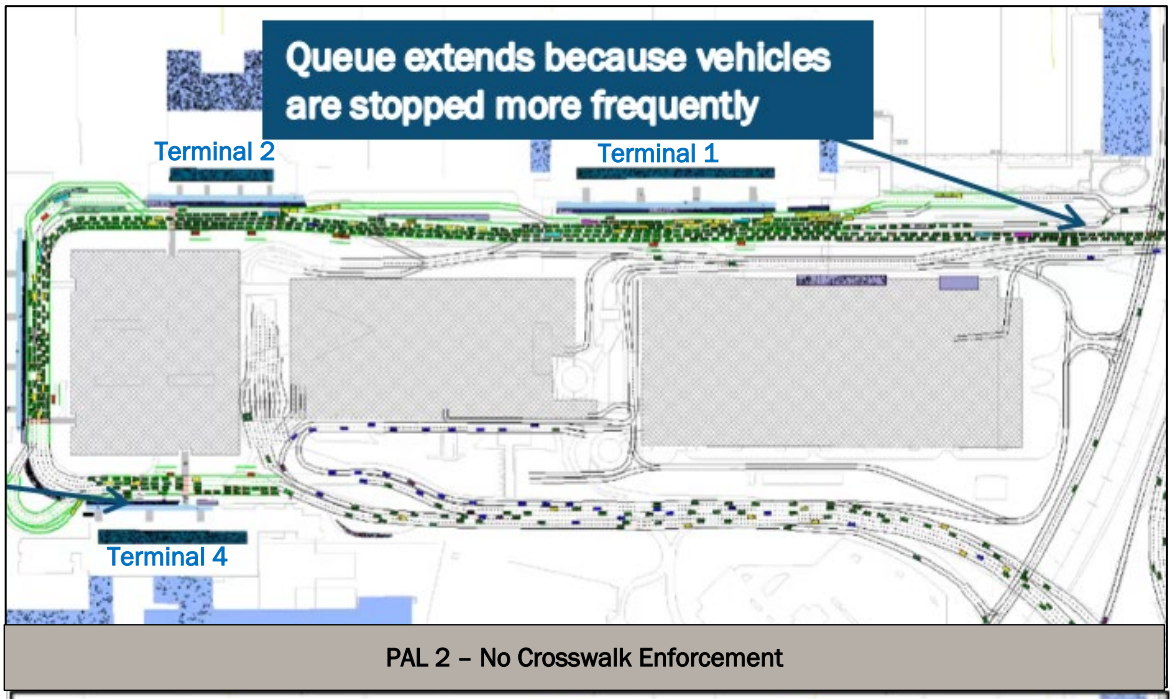
SOURCE: Broward County Aviation Department., February 2018
PREPARED BY: Kimley-Horn and Associates, Inc., February 2018.

Exhibit 5.4-5 illustrates a comparison between the No Crosswalk Enforcement and the Simulated Crossing Guards scenarios (screenshots from the ALPS simulation). As shown, the queue extends back to the terminal entry ramps at Terminal 1 under the No Crosswalk Enforcement scenario because vehicles are stopped more frequently at the crosswalk due to nonmetered pedestrian flow. Terminal 4 improves under the Simulated Crossing Guards scenario since vehicles are metered to curb. Overall, the travel time savings by implementing crossing guards was estimated to be approximately 25 percent (3 minutes) during the midday peak. During the afternoon peak, the terminal roadways are significantly congested or gridlocked if no crossing guards are implemented in the PAL 2 conditions.

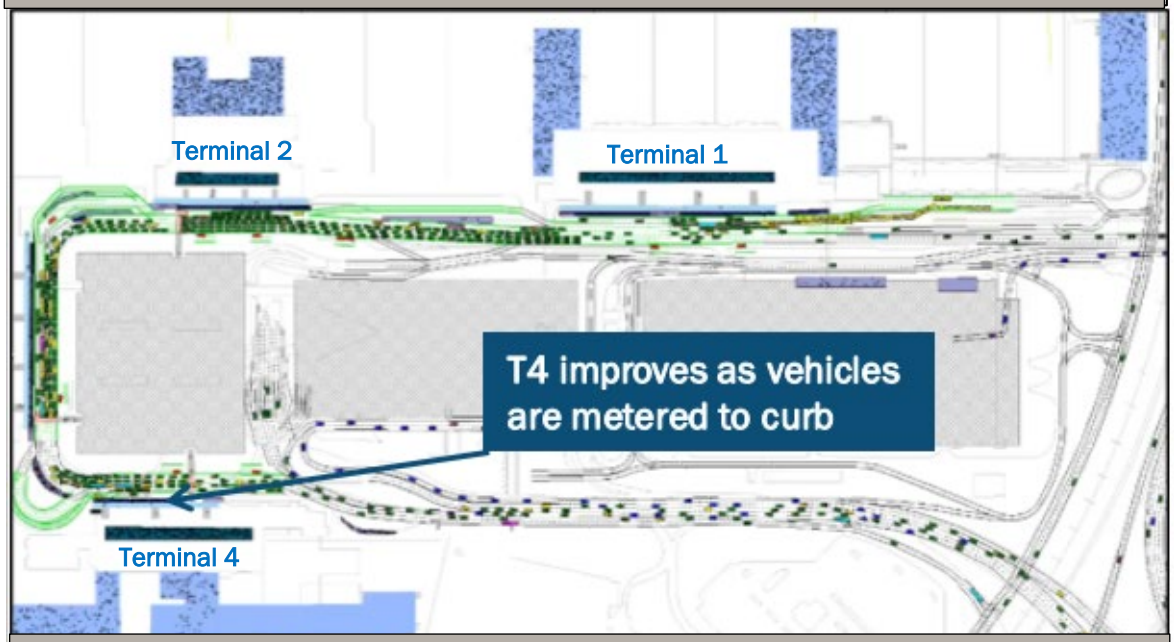
Exhibit 5.4-6 illustrates a similar comparison between the Simulated Crossing Guards and the Signalized Crosswalk scenarios (screenshots from the ALPS simulation). As shown, signalization decreases queue length. Overall, the travel time savings by implementing signalized crosswalks at the lower level of Terminals 2, 3, and 4 was estimated to be 22 percent (3 minutes) during the mid-day and 67 percent (12 minutes) during the afternoon peak. The maximum average hourly travel time was estimated to be approximately 23 minutes with crossing guards and approximately 11 minutes with the lower level signalized crosswalks.

Exhibit 5.4-7 illustrates the travel time comparison for the three different crosswalk treatment scenarios under PAL 2 conditions. As shown, the traffic model gridlocks shortly after 11:00 a.m. in the No Crosswalk Enforcement scenario due to excessive delays, queuing, and compounding congestion. Implementing signalized crosswalks decreases travel time by approximately 67 percent (afternoon peak) and 22 percent (midday peak) compared to the implementation of only crossing guard enforcement at Terminals 2, 3, and 4. Removing enforcement increases travel time by approximately 25 percent (midday peak) compared to implementing crossing guard enforcement. In summary, the simulation modeling shows that signalized crosswalks have short- and long-term benefits for pedestrian safety and vehicle travel times and thus are recommended for implementation.

Exhibit 5.4-5: Simulated Crossing Guards Versus No Enforcement Scenario (PAL 2 Conditions)



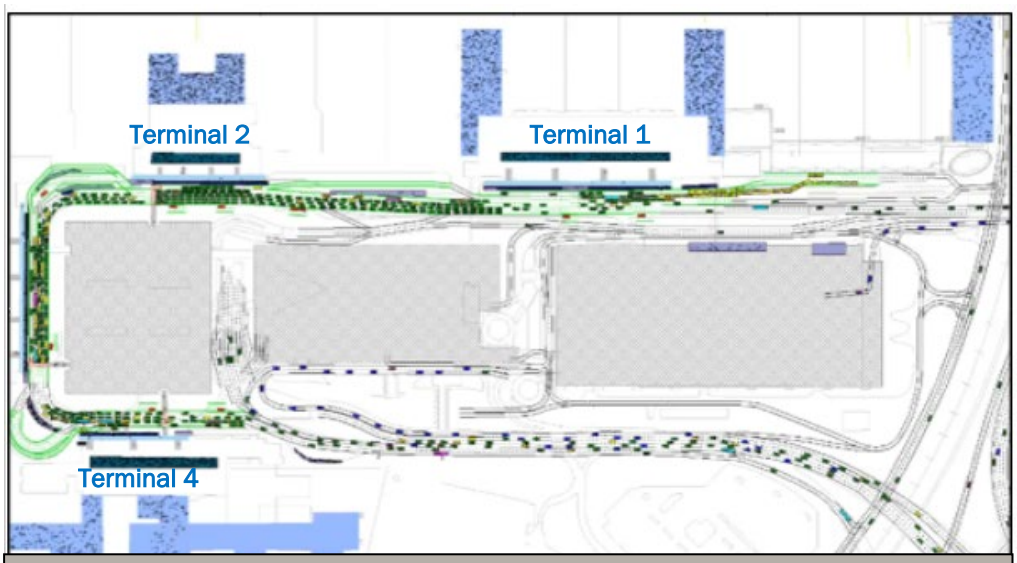
PAL 2 – No Crosswalk Enforcement



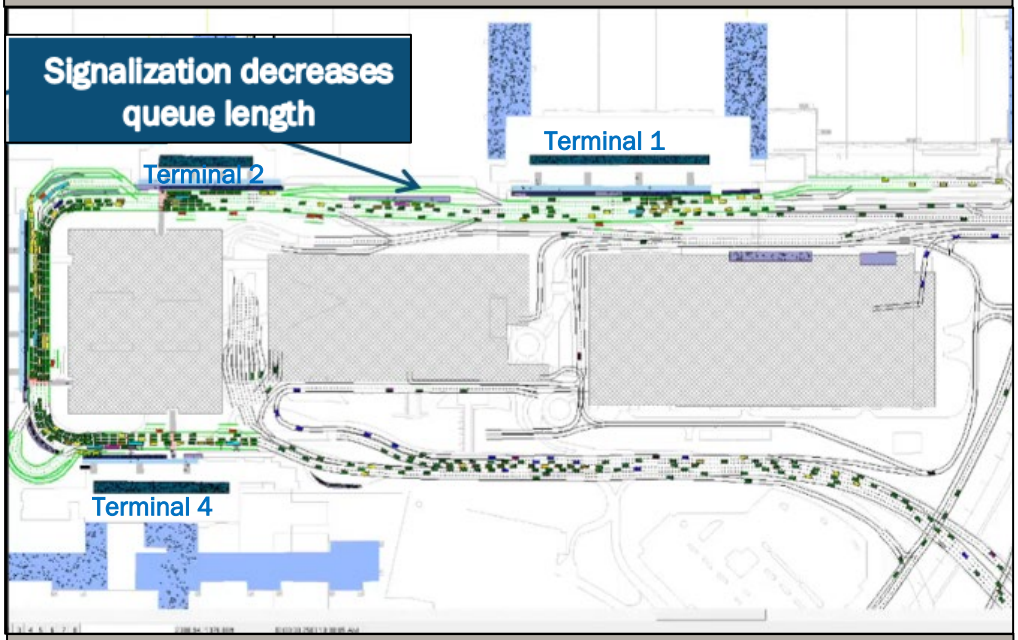
PAL 2 – Simulated Crossing Guards

SOURCE: Kimley-Horn and Associates, Inc., August 2017 (ALPS Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Exhibit 5.4-6: Simulated Crossing Guards Versus Signalized Crosswalk Scenario (PAL 2 Conditions)



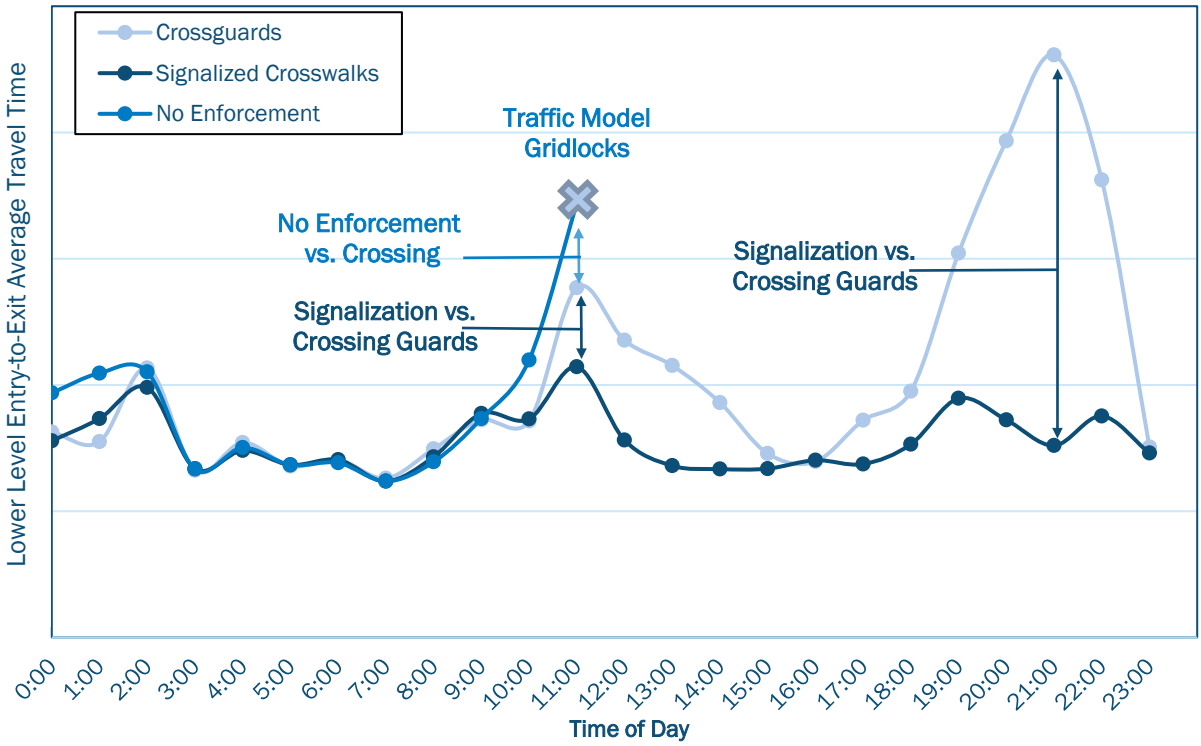
PAL 2 – Simulated Crossing Guards



PAL 2 – Signalized Crosswalks

SOURCE: Kimley-Horn and Associates, Inc., August 2017 (ALPS Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Exhibit 5.4-7: Travel Time Comparison – PAL 2 Crosswalk Scenarios



SOURCE: Kimley-Horn and Associates, Inc., August 2017 (ALPS Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

5.4.3 RECOMMENDED TERMINAL ROADWAY SAFETY IMPROVEMENTS

To enhance terminal roadway safety, crosswalk enhancements for improved visibility, such as advanced markings and signage, are recommended in the short-term. Signalized crosswalks are also recommended by PAL 2 to improve pedestrian safety and reduce vehicle travel times.

A long-term roadway safety improvement that utilizes vertical circulation of pedestrians through elevators/escalators and pedestrian bridges crossing the terminal roadways, and thereby removing all potential pedestrian conflicts, was considered. Modeling for this alternative is further described in the following subsection, where terminal and curbfront roadway alternatives are discussed.

5.4.4 TERMINAL AND CURBFRONT ROADWAY ALTERNATIVES

Several alternatives of terminal and curbfront improvements were conceptualized and explored. In addition to the alternatives presented in detail below, other explored alternatives included a bypass road between the Hibiscus and Palm Garages, crosswalk closures, and various operational plans for the proposed Supplemental Arrivals Curb. Shortlisted and recommended terminal and curbfront roadway alternatives for meeting PAL 2 and PAL 3 requirements are described below.

Three alternatives were considered to meet the PAL 2 requirements:

- Supplemental Arrivals Curb
- Ground Transportation Center (GTC)/Bypass Lane
- Palm Garage Redevelopment and GTC

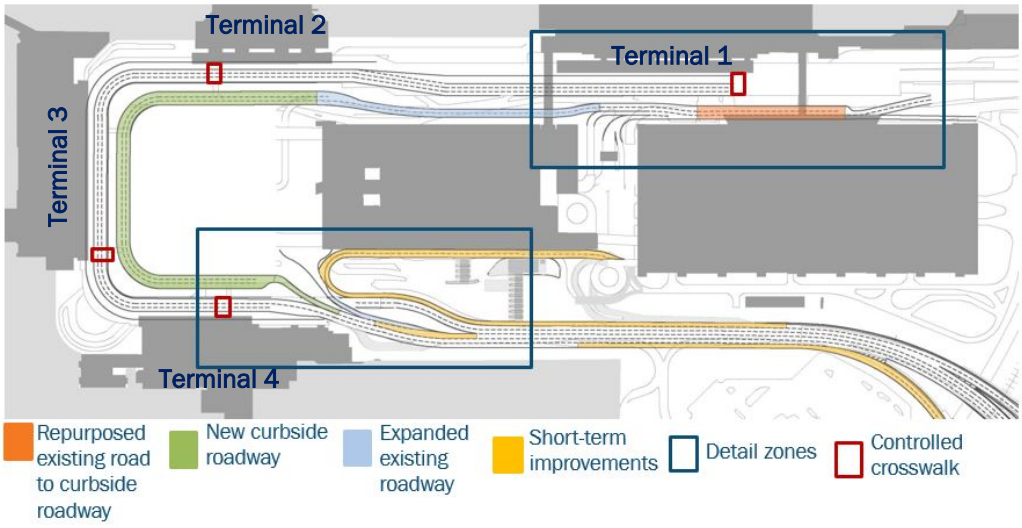
The Supplemental Arrivals Curb and Palm Garage Redevelopment and GTC alternatives can be classified as Phase 1 and Phase 2 of a joint improvement alternative, since they are intended to be implemented in unison.

A Terminal 3 Westward Expansion alternative was considered to meet PAL 3 requirements.

Supplemental Arrivals Curb (PAL 2 Requirements)

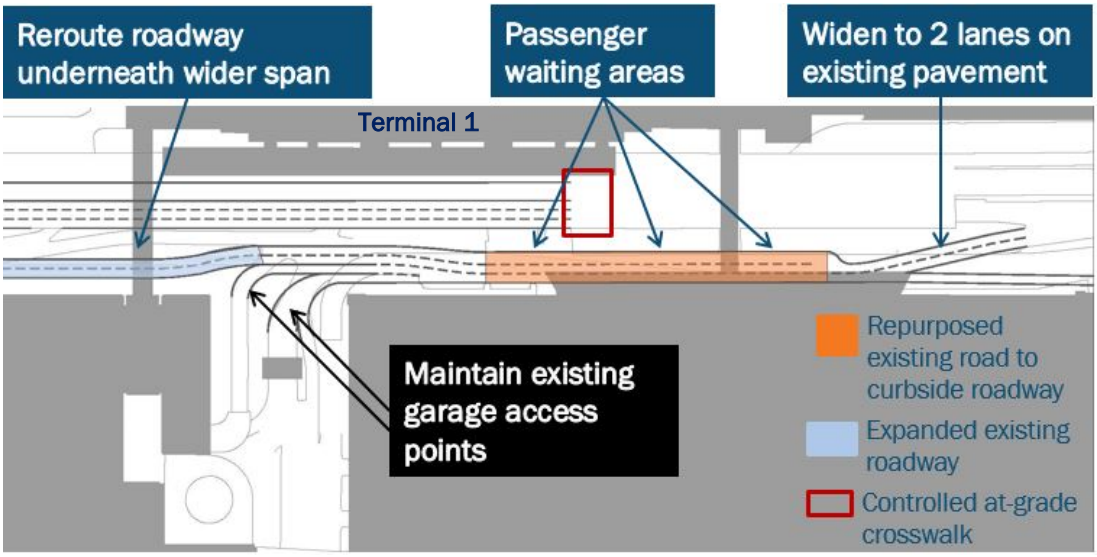
This alternative was developed to reduce vehicular volumes and congestion on the lower level of the terminal roadway. As illustrated on **Exhibit 5.4-8**, this alternative features a three-lane supplemental curbfront roadway for commercial vehicles parallel to the existing lower level curbfront. **Exhibit 5.4-9** details the supplemental curbfront's function for Terminal 1 and shows where travel lanes access the parking garages. A raised curb and sidewalk, similar to what is found at the existing terminals, will be implemented at the supplemental curb passenger waiting areas. Through capacity analysis and simulation modeling, it was determined that the curbfront's function can also support parking entry traffic without additional lanes. **Exhibit 5.4-10** illustrates the merging exit area. This alternative, and the benefits that it provides, is planned to be further assessed and refined as part of a separate advanced planning and programming study.

Exhibit 5.4-8: Supplemental Arrivals Curb Alternative



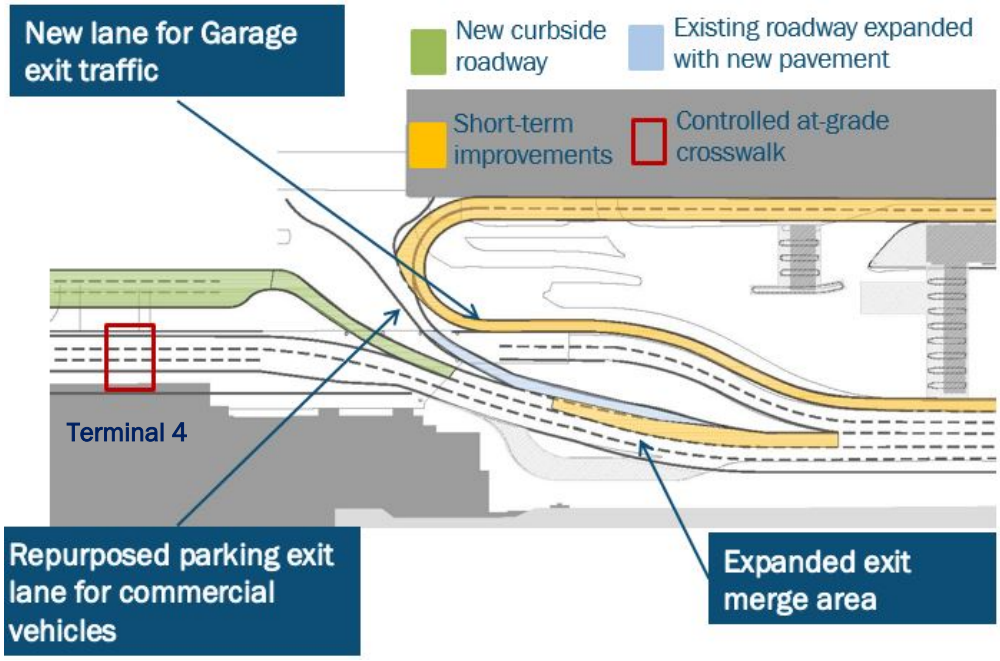
SOURCE: Ricondo & Associates, Inc., August 2017 (AutoCAD Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Exhibit 5.4-9: Supplemental Arrivals Curb: Detail 1 (Curbfront + Parking Access)



SOURCE: Ricondo & Associates, Inc., August 2017 (AutoCAD Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Exhibit 5.4-10: Supplemental Arrivals Curb: Detail 2 (Merging Exit Area)



SOURCE: Ricondo & Associates, Inc., August 2017 (AutoCAD Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Benefits

This alternative provides the following benefits:

- Supplemental curbfront allows additional pick-up zones at all four terminals.
- Shuttles and large vehicles use their own dedicated curbfront.
- Shuttles and large vehicles have their own exit and are not forced to merge with existing terminal traffic.
- There is potential to add vertical circulation to serve garage and supplemental curbfront, including moving walkways.
- There is potential to include signalized crosswalks.

This alternative requires further refinements to address the following:

- The departures level exit ramp structural support columns may need to be relocated.

Modeling Assumptions and Results

The ALPS modeling considered the following:

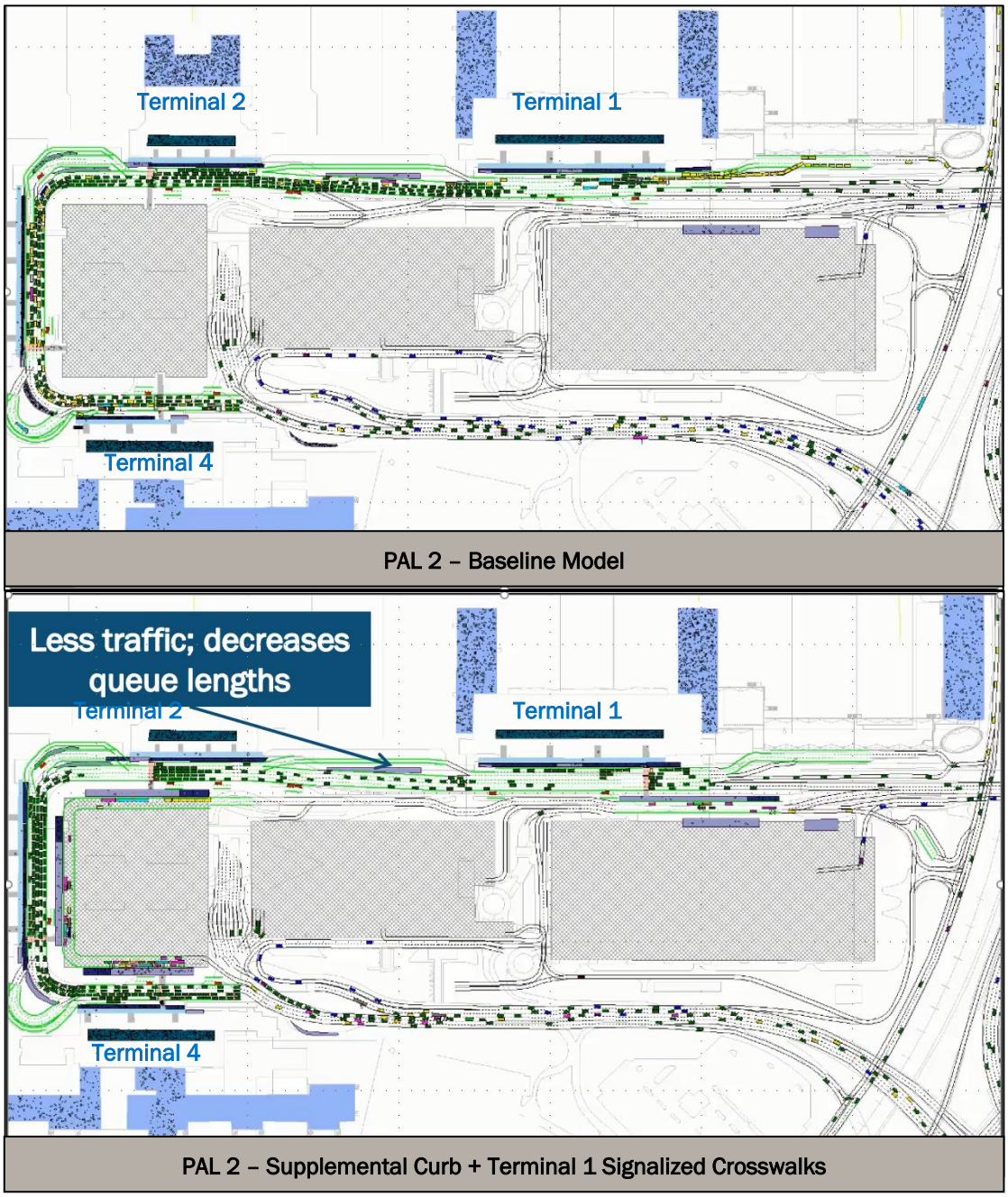
- Pedestrians were assumed to use at-grade controlled crosswalks.
- A signalized crosswalk was added at Terminal 1 to connect to the supplemental curb.
- The following commercial modes were assumed to use the supplemental curb: shared-ride vans, Airport shuttles, off-Airport shuttles, cruise buses, transportation network companies (TNCs), and taxis.
- An assumed reduction in taxi and private vehicle mode share with a corresponding assumed increase in TNC mode share. For this analysis, a taxi mode share reduction of approximately 2-3% was assumed and a private vehicle mode share reduction of approximately 1-2% was assumed, which was based on limited data availability at the time of the analysis.

The modeling performed for the Supplemental Arrivals Curb alternative, illustrated on **Exhibit 5.4-11** (screenshots from the ALPS simulation), resulted in a 45 percent (6 minute) time savings during the midday peak and a 55 percent (13 minute) time savings during the afternoon peak compared to the baseline PAL 2 alternative (simulated crossing guards and short-term improvements).

Exhibit 5.4-12 (screenshots from the ALPS simulation) illustrates how the Supplemental Arrivals Curb alternative meets forecast PAL 2 conditions but does not accommodate forecast PAL 3 conditions. The PAL 3 model shows significant congestion and queuing due to inadequate terminal road capacity and a constrained exit roadway. It should be noted that the PAL 3 model assumed ramp from I-595 eastbound into the airport is widened from two to three lanes to avoid underestimating demand due to the metering of inbound flow.

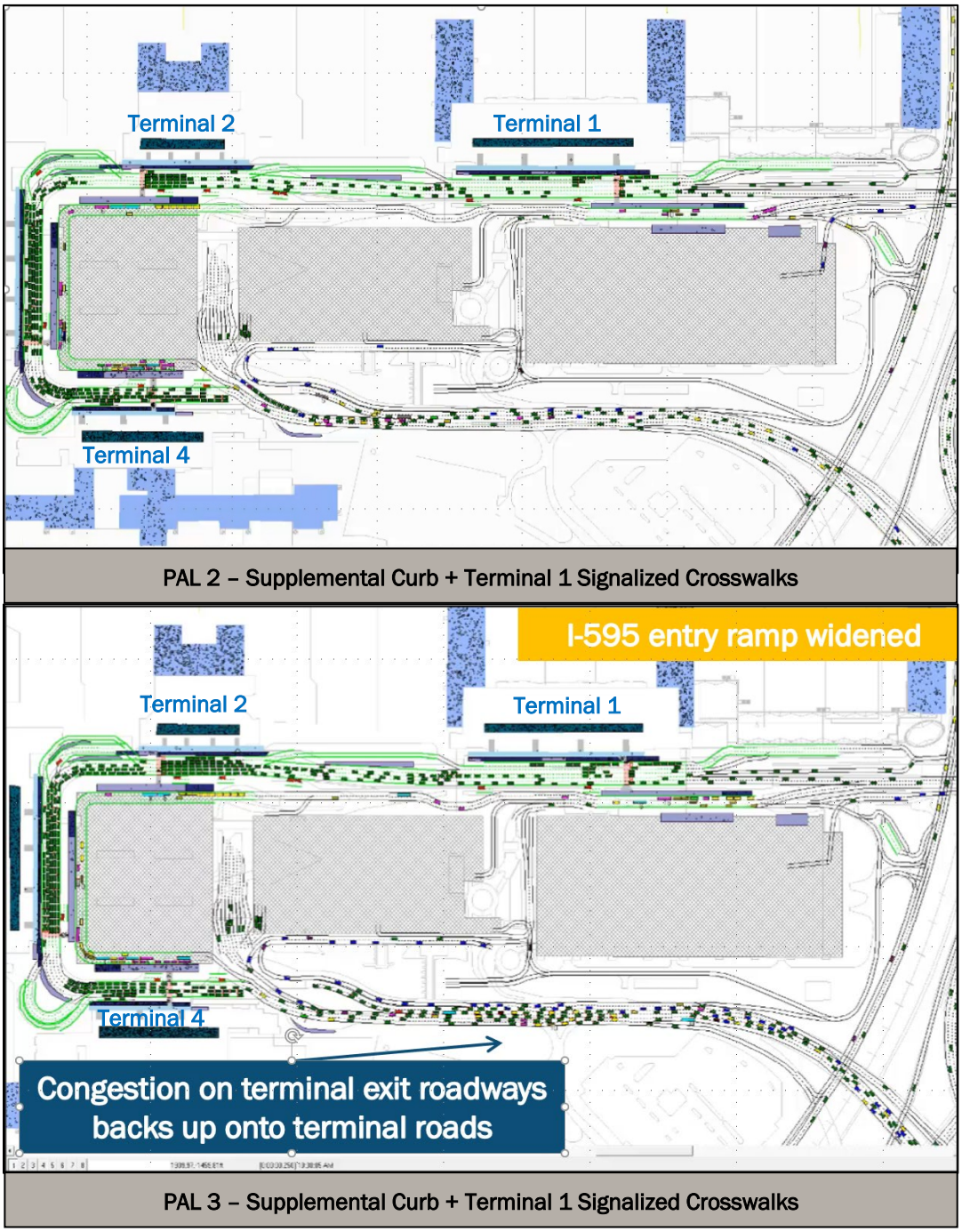
Exhibit 5.4-13 and **Exhibit 5.4-14** compare the volumes and LOS for each terminal's lower level curbfront, with and without the Supplemental Arrivals Curb alternative proposed for implementation by PAL 2, respectively. LOS exhibits are only shown for the lower level since the upper level curbfronts were not projected to fail under PAL 2 conditions. As portrayed by these two exhibits, the Supplemental Arrivals Curb alternative is expected to improve LOS along the lower level curbfronts and is recommended for implementation.

Exhibit 5.4-11: Baseline Model Versus Supplemental Arrivals Curb Alternative Model (PAL 2 Conditions)



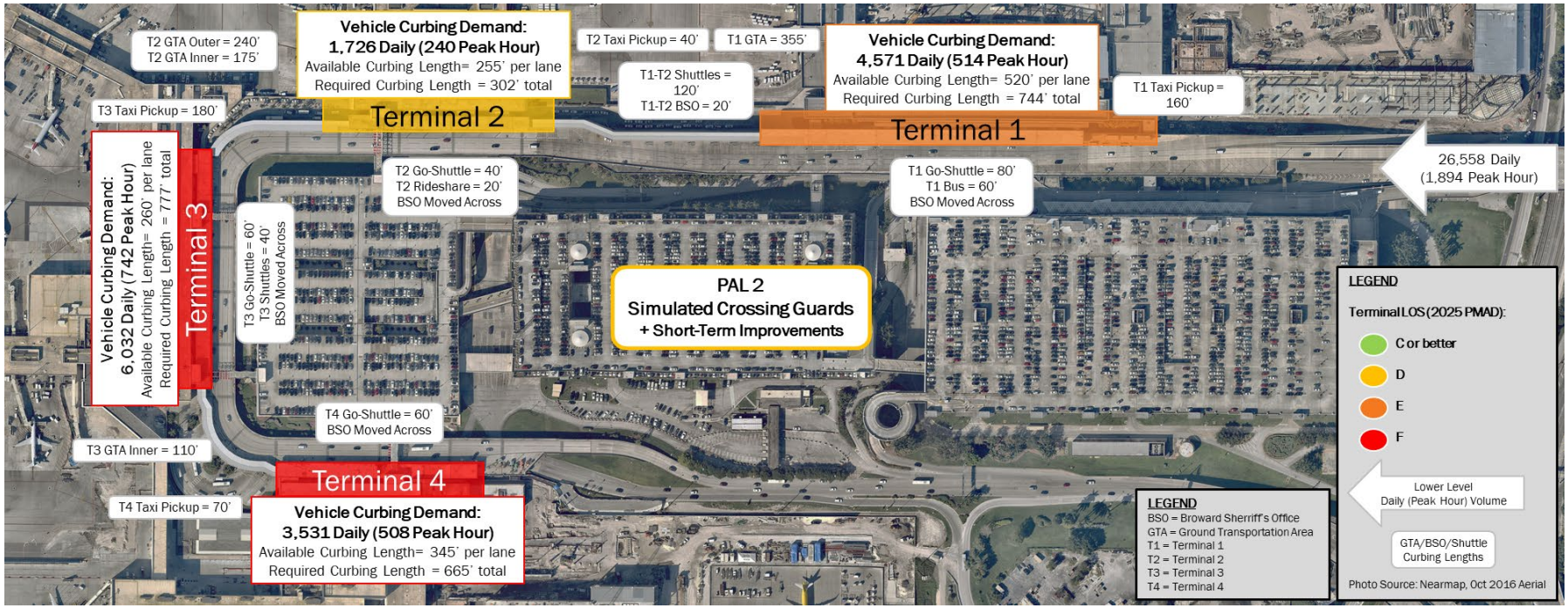
SOURCE: Kimley-Horn and Associates, Inc., August 2017 (ALPS Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Exhibit 5.4-12: PAL 2 Supplemental Arrivals Curb Model Versus PAL 3 Supplemental Arrivals Curb Model



SOURCE: Kimley-Horn and Associates, Inc., August 2017 (ALPS Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Exhibit 5.4-13: Baseline Results (PAL 2 Conditions) – Lower Level 1/



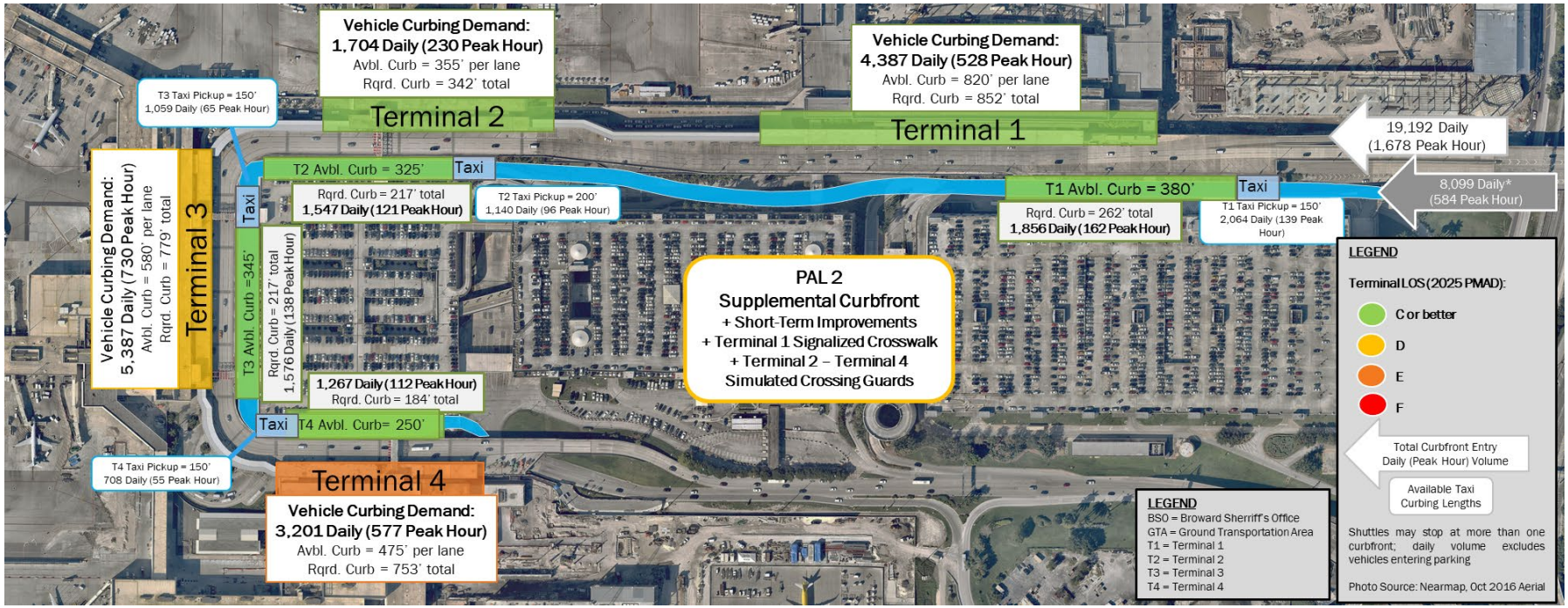
NOTE:

1/ Only Lower Level is shown since the Upper Level curbfronts were not projected to fail under PAL 2 conditions.

SOURCE: Kimley-Horn and Associates, Inc., August 2017 (ALPS Software).

PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Exhibit 5.4-14: Supplemental Arrivals Curb Alternative Results (PAL 2 Conditions) – Lower Level 1/



NOTE:

1/ Only Lower Level is shown since the Upper Level curbfronts were not projected to fail under PAL 2 conditions.

SOURCE: Kimley-Horn and Associates, Inc., August 2017 (ALPS Software).

PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Ground Transportation Center / Bypass Lane (PAL 2 Requirements)

This early alternative was initially developed to reduce vehicular volume on the lower level of the terminal roadway and capitalize on the proposal to redevelop the Palm Garage. It included a bypass lane surrounding the Palm Garage and featured three GTC curbfronts under the Palm Garage. Vertical circulation cores were proposed at the end of each curbfront parallel to Terminal 3.

Benefits

This alternative provided the following benefits:

- Dedicated curbfront for shuttles and large vehicles.
- The bypass lanes allow drivers that have curbed at Terminal 1 to bypass the terminal roadway traffic for Terminal 2 to Terminal 4 and reach the terminal exit with shorter travel time.
- There is an opportunity to include signalized crosswalks.

This alternative required further refinement to address the following:

- There is indirect pedestrian access to Terminal 2 and Terminal 4 since the commercial curbs face Terminal 3.
- Pedestrian circulation between all GTC curbsides is disconnected.
- Bypass lane traffic merges with multiple GTC exits and traffic exiting from all three garages.
- This GTC/Bypass Lane alternative and the Palm Garage Redevelopment alternative (documented later in this section) are inextricably linked.

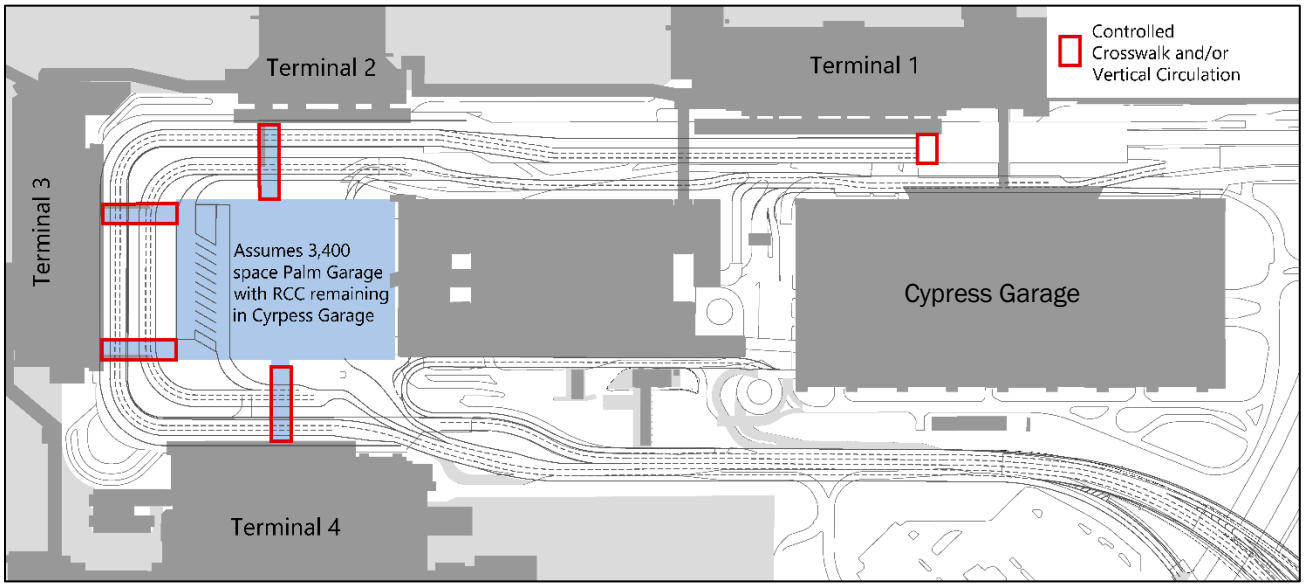
Findings and Re-Envisioning

A geometric assessment showed that space was limited for a bypass roadway and an operational assessment showed insufficient capacity for the GTC with three curbfronts. Due to these shortcomings, this GTC/Bypass Lane alternative was re-envisioned into the Supplemental Arrivals Curb (described above) and the new GTC (described below) with the Palm Garage Redevelopment.

Palm Garage Redevelopment and Ground Transportation Center (GTC)

This alternative was developed to accommodate forecast parking demand and reduce vehicular volume on the lower level terminal roadway. It features a new Palm Garage with approximately 3,400 to 3,700 parking spaces, as illustrated on **Exhibit 5.4-15**. By capitalizing on the demolition and redevelopment of the garage, it also features a new GTC on the ground floor, as illustrated on **Exhibit 5.4-16** and **Exhibit 5.4-17**. The new GTC plans to serve commercial vehicle pick-up (and possibly drop-off) activity for taxis, limos, TNCs, and courtesy shuttles. The new GTC is centrally-located to Terminals 2, 3, and 4 with passenger connectivity between the GTC and adjacent terminals. This alternative can occur while the Supplemental Arrivals Curb alternative is being installed, but it is not required. The intent of the new GTC underneath the redeveloped Palm Garage is to supplement, rather than replace, the new Supplemental Arrivals Curb.

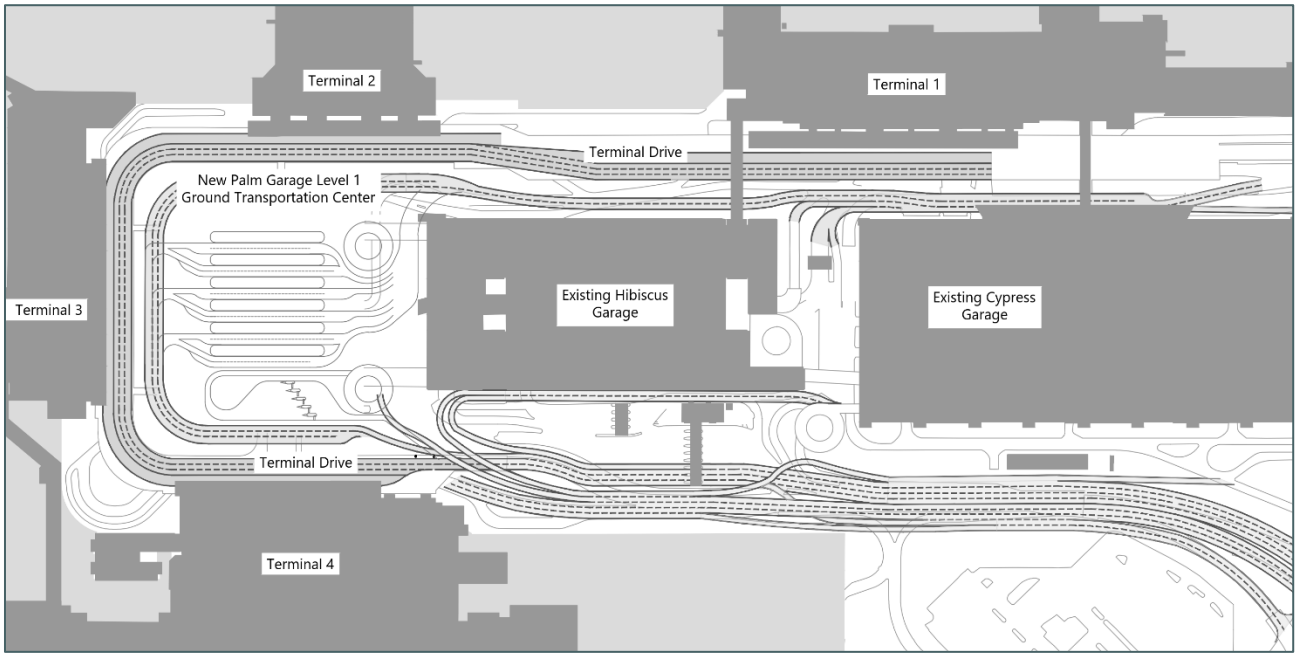
Exhibit 5.4-15: Redeveloped Palm Garage Alternative



NOTE: RCC = Rental Car Center

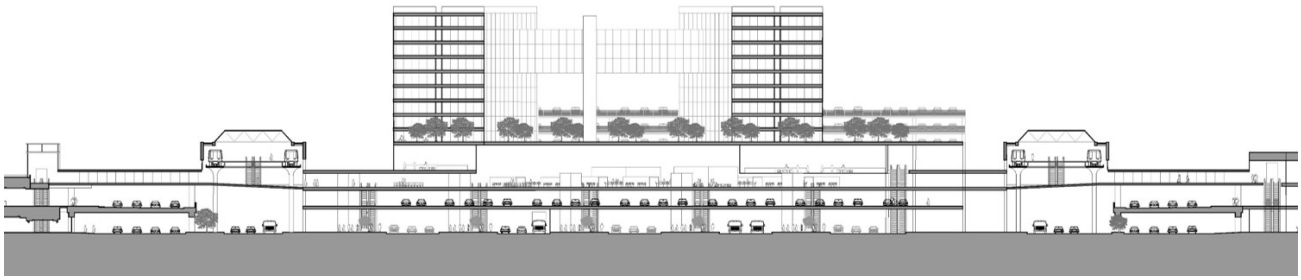
SOURCE: Ricondo & Associates, Inc., August 2017 (AutoCAD Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Exhibit 5.4-16: New Palm Garage Level 1 – GTC Configuration



SOURCE: Ricondo & Associates, Inc., August 2017.
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Exhibit 5.4-17: Cross-Sectional Palm Garage View (Looking East from T3)



SOURCE: Ricondo & Associates, Inc., August 2017.
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Benefits

This alternative provides the following benefits:

- additional parking spaces
- potential integration with commercial pick-up system
- centralized commercial vehicle curbfronts for Terminals 2, 3, and 4
- additional commercial vehicle curbfront capacity
- allowances for waiting space on either side of supplemental curbfront
- ability to be rebuilt without disruption to the Supplemental Arrivals Curb alternative

This alternative requires future refinements to address the following:

- construction phasing
- walking distances for personal or commercial vehicle riders to/from Terminals 2, 3, and 4
- pedestrian circulation between the GTC curbfronts and terminals.
- merging of traffic exiting the new GTC, Supplemental Arrivals Curb, and parking garage

Modeling Assumptions and Results

The ALPS modeling of the proposed new GTC layout assumed the following commercial modes: shared-ride vans, airport shuttles, off-Airport shuttles, TNCs, and taxis. The modeling assessment showed overall benefit with the additional commercial curbfront capacity by alleviating existing GTAs and the Supplemental Arrivals Curb, and thus is a recommended alternative.

Terminal 3 Westward Expansion (PAL 3 Requirements)

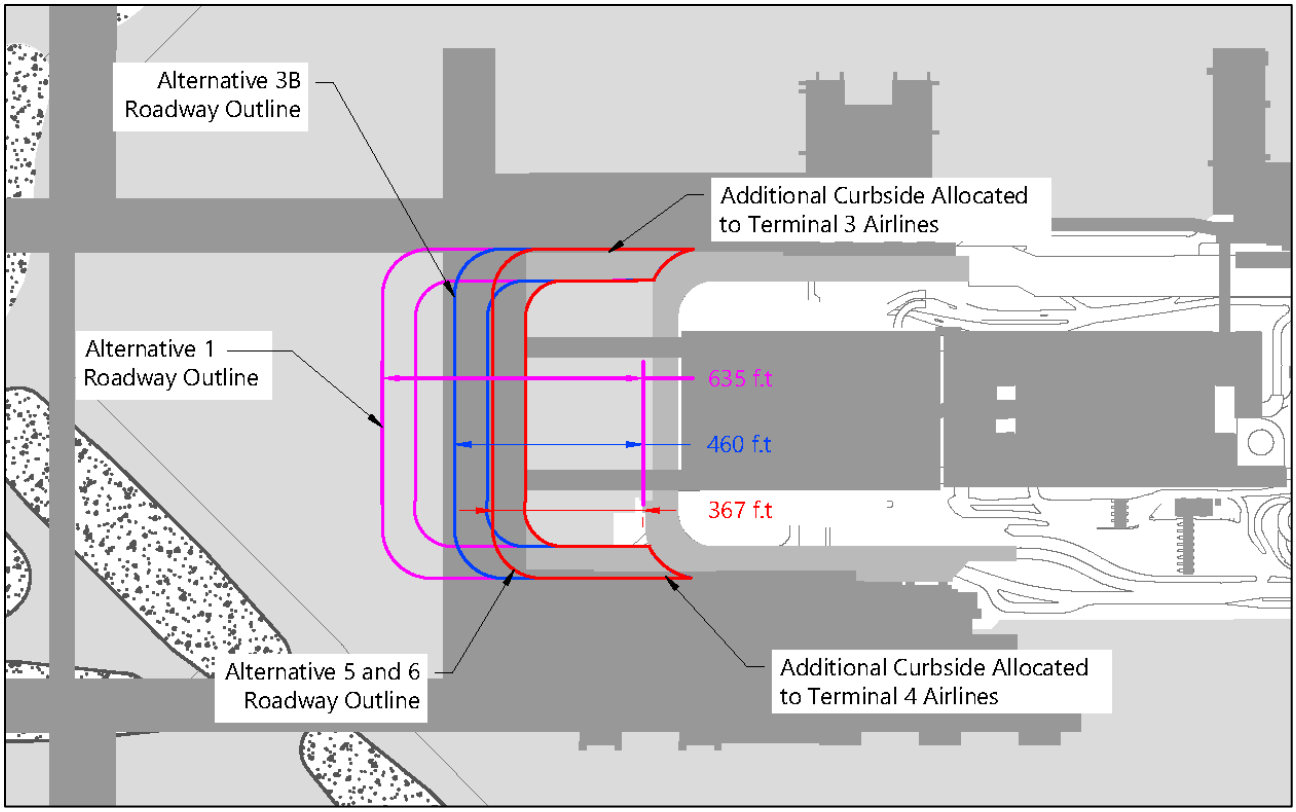
This alternative was developed to provide additional curbfront capacity and to accommodate future terminal building requirements for PAL 3. The alternative includes a terminal roadway expansion to the west. Terminals 2, 3, and 4 would benefit from lengthened curbfronts on the upper and lower levels. As illustrated on **Exhibit 5.4-18**, the terminal roadway outline for "Alternatives 5 and 6" (367 feet) was assumed for the purposes of conservative modeling and analysis, because this alternative provides the least increase in curbfront length. Should Terminal 3 Redevelopment "Alternative 1" or "Alternative 3B" be implemented, the longer extension would yield improved curbside operations and LOS.

Benefits

This alternative provides the following benefits:

- There is additional curbfront length (capacity) for Terminals 2, 3, and 4.
- The existing Terminal 3 curbfront roadway becomes a bypass roadway that allows drivers dropping of passengers and exiting from Terminal 1 to bypass the terminal roadway traffic for Terminal 2 to Terminal 4 and to reach the terminal exit with shorter travel time.
- There is an ability to rebuild without disruption to the Supplemental Arrivals Curb alternative.

Exhibit 5.4-18: Terminal 3 Westward Expansion Alternative



SOURCE: Ricondo & Associates, Inc., August 2017 (AutoCAD Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

This alternative requires further refinements to address the following:

- The intersection of the existing Terminal 3 roadway with the new terminal roadway may add vehicular delay and may warrant signalization.
- There is increased walking distance between Terminal 3 and Redeveloped Palm Garage.
- The construction phasing may impact existing curbfront operations.

Modeling Assumptions and Results

The following were considered for the ALPS modeling:

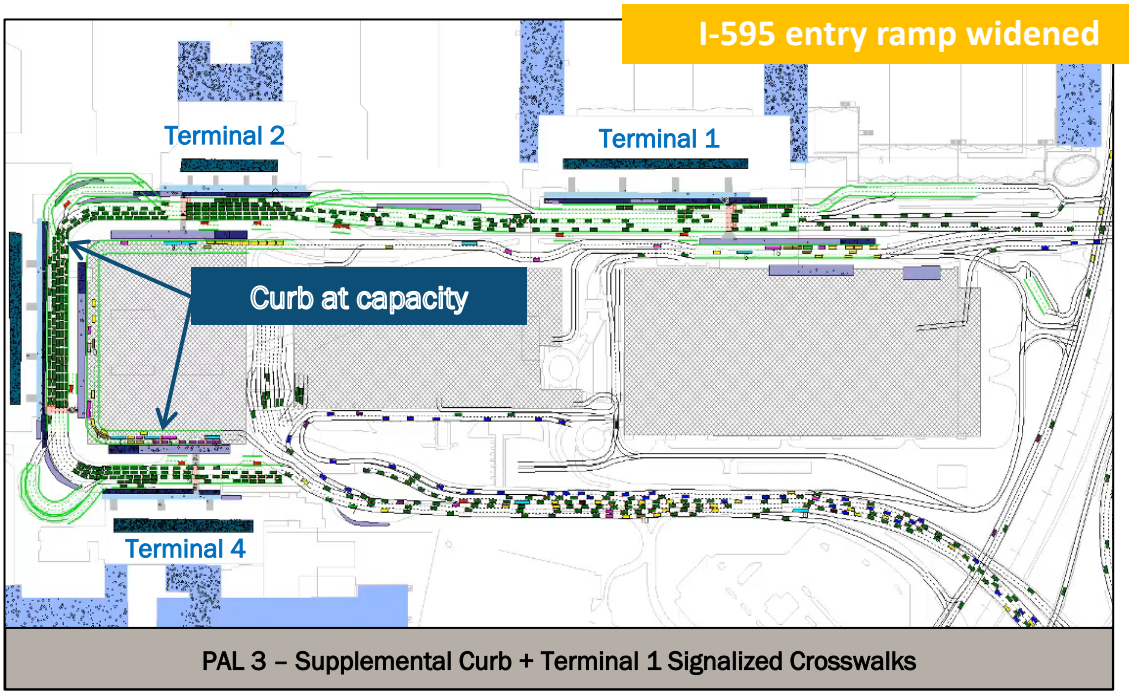
- There is a widened I-595 entry ramp for unmetered flow of inbound vehicular traffic. The assumed widening converted the 2-lane section to 3 lanes from where the ramp diverges from I-595 to the U.S. 1 South diverge point.
- The existing Terminal 3 curbfront roadways become bypass roadways (upper and lower level).
- As proposed, the supplemental curb is maintained adjacent to the Redeveloped Palm Garage (for conservative modeling).
- At-grade signalized pedestrian crossings are assumed (for conservative modeling); new vertical circulation may be implemented to eliminate some terminal roadway crosswalks.
- The Supplemental Arrivals Curb alternative is assumed to be implemented:
  - The following commercial modes are assumed to use the supplemental curb: shared-ride vans, Airport shuttles, off-Airport shuttles, cruise buses, TNCs, and taxis.
  - A reduction in taxi mode share and an increase in TNC mode share were assumed, per observed usage since the authorization of TNCs at the Airport.

Exhibit 5.4-19 (screenshots from the ALPS simulation) illustrates a comparison between the Supplemental Arrivals Curb alternative and the Terminal 3 Westward Expansion alternative during the forecast PAL 3 morning peak (10:30 a.m.). The new intersection of the existing Terminal 3 roadway with the new terminal roadway introduces some vehicular delay, as shown in the simulations. The simulations confirm that merging along the terminal exit roadway causes congestion and backup into the terminal complex, even with the Terminal 3 Westward Expansion alternative. The hotspots located on the terminal exit roadway are described in Section 5.4.2

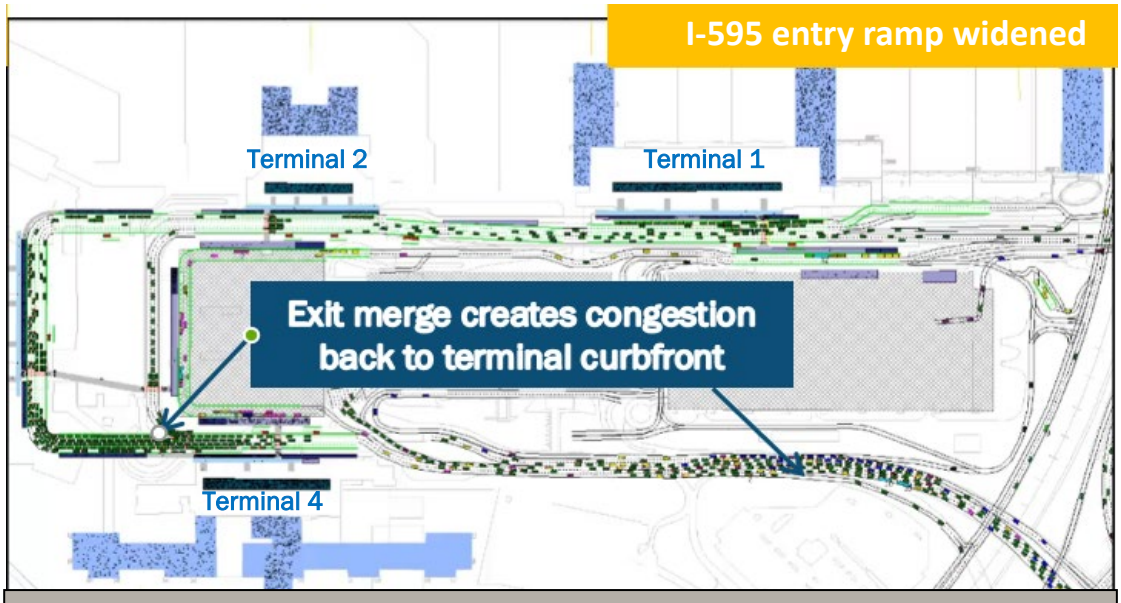
Exhibit 5.4-20 (screenshots from the ALPS video simulation) illustrates a comparison between the Terminal 3 Westward Expansion alternative and the Supplemental Arrivals Curb alternative during the PAL 3 afternoon peak (7:15 p.m.). The simulation shows the mitigation strategy applied at the exit of the Terminal 3 Westward Expansion alternative. As illustrated, results show an improved exit with less congestion on both the terminal roadways and the exit roadways.

Exhibit 5.4-21 illustrates the lower level volumes and LOS results for each terminal, with both the Supplemental Arrivals Curb alternative and the Terminal 3 Westward Expansion alternative implemented in year 2035. The data table conveys the LOS improvements for Terminals 2, 3, and 4 by implementing the Terminal 3 Westward Expansion alternative, with the Supplemental Arrivals Curb alternative in place under PAL 3 conditions. Note that Terminal 1 does not directly experience improved LOS by implementing the Terminal 3 Westward Expansion alternative. The exhibit and table only show LOS results for the lower level since the upper level curbfronts were not projected to fail under PAL 3 conditions.

Exhibit 5.4-19: Morning Peak Supplemental Arrivals Curb Alternative Model Versus Terminal 3 Westward Expansion



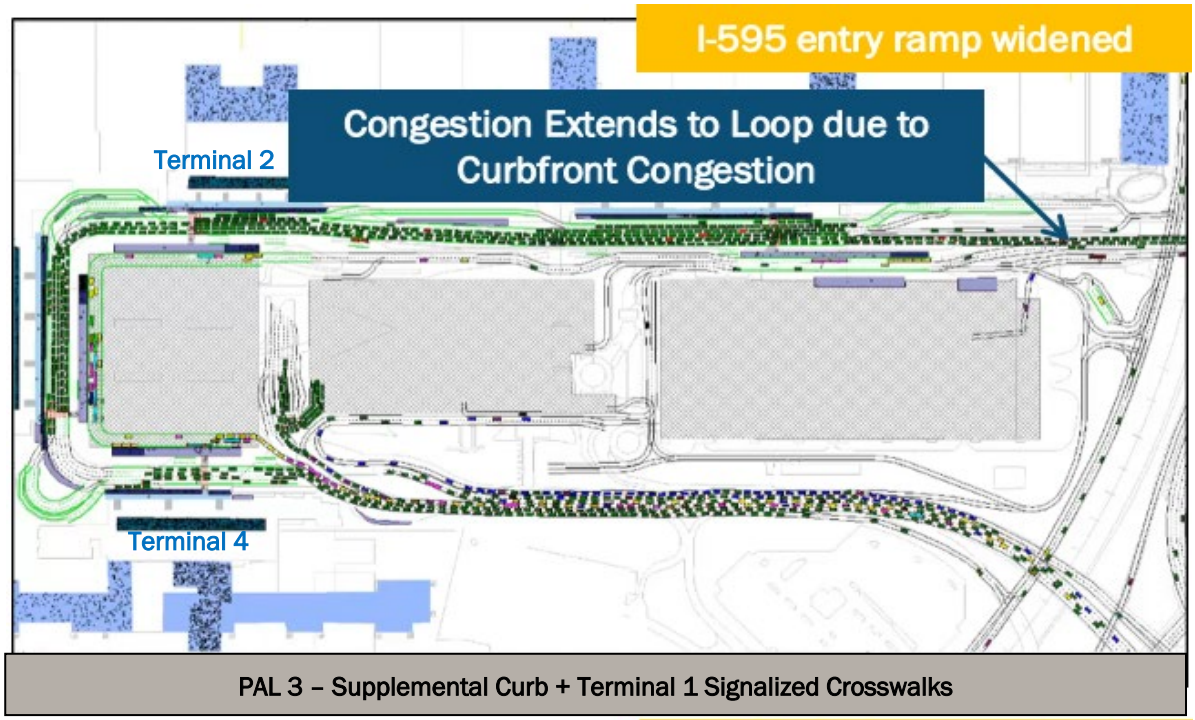
PAL 3 – Supplemental Curb + Terminal 1 Signalized Crosswalks



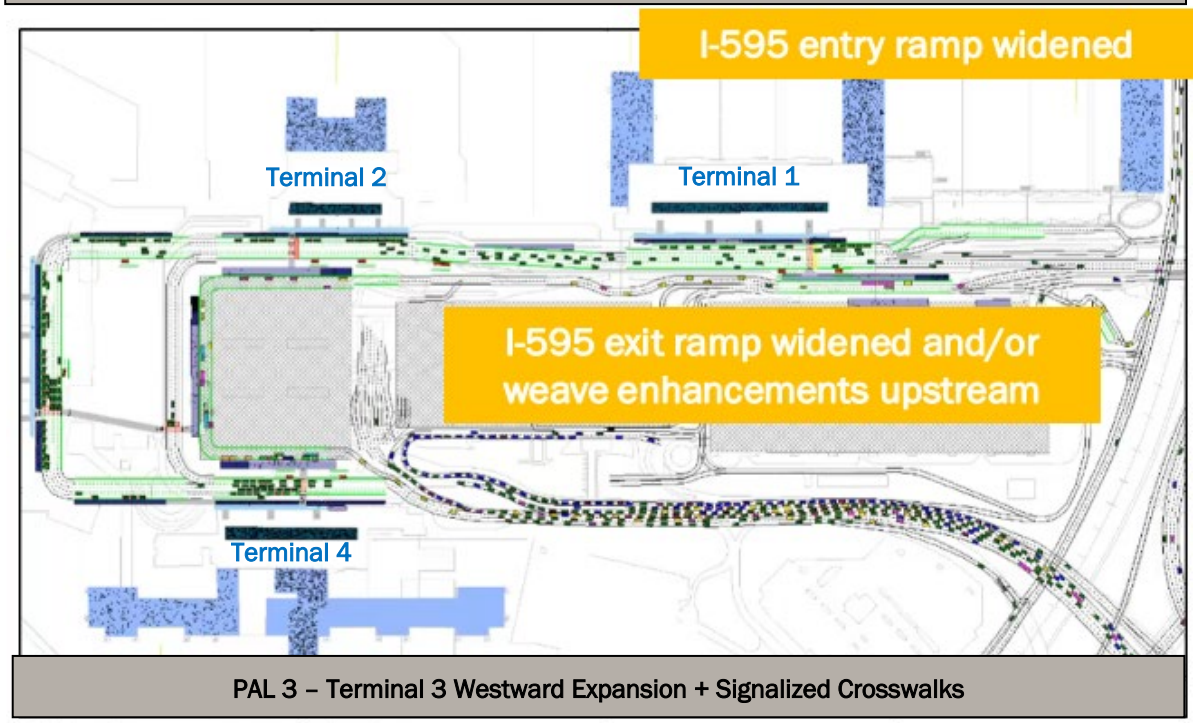
PAL 3 – Terminal 3 Westward Expansion + Signalized Crosswalks

SOURCE: Kimley-Horn and Associates, Inc., August 2017 (ALPS Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Exhibit 5.4-20: Afternoon Peak Supplemental Arrivals Curb Alternative Model Versus Terminal 3 Westward Expansion



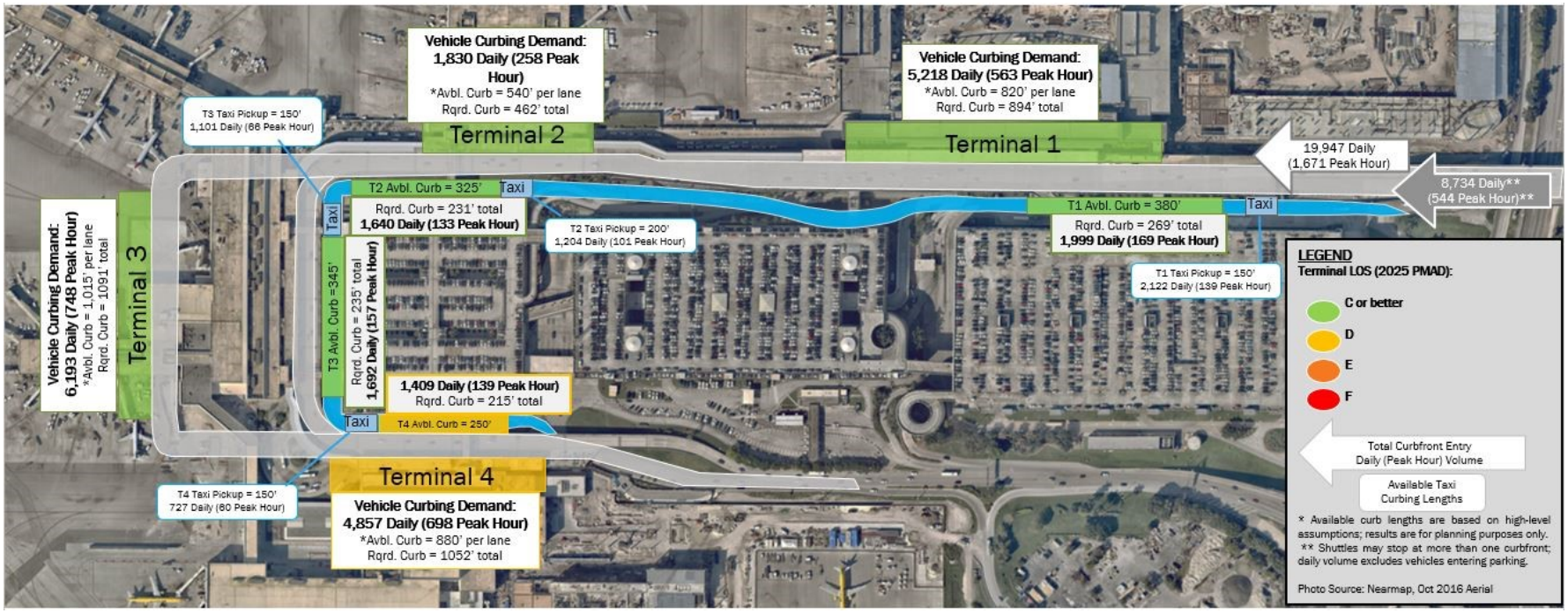
PAL 3 – Supplemental Curb + Terminal 1 Signalized Crosswalks



PAL 3 – Terminal 3 Westward Expansion + Signalized Crosswalks

SOURCE: Kimley-Horn and Associates, Inc., August 2017 (ALPS Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Exhibit 5.4-21: Terminal 3 Westward Expansion PAL 3 Conditions (Lower Level) 1/



Terminal Curbfront	PAL 3 Lower Level + Supplemental Curb	PAL 3 Lower Level + Supplemental Curb + Terminal 3 Westward Expansion
Terminal 2	C	B
Terminal 3	E	C
Terminal 4	F	D

NOTE:

1/ Only Lower Level is shown since the Upper Level curbfronts were not projected to fail under PAL 3 conditions.

SOURCE: Kimley-Horn and Associates, Inc., August 2017 (ALPS Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

5.4.5 PREFERRED TERMINAL CURBFRONT ROADWAY DEVELOPMENT PLAN

The following is recommended as the preferred development plan for the terminal roadways and curbfronts:

- **Supplemental Arrivals Curb**: The new supplemental curbfront roadway will complement the existing lower level curbfronts and is necessary to meet PAL 2 requirements for arrivals/pickup activity.
- **Palm Garage Redevelopment and GTC**: Redevelopment of the Palm Garage will help meet future parking demands while also providing space for a new GTC on the ground floor for commercial vehicle activity. The new Palm Garage with the ground floor GTC is envisioned to be constructed in addition to the new Supplemental Arrivals Curb.
- **Terminal 3 Westward Expansion**: The additional curbing frontage gained by expanding Terminal 3 and the curbfront roadways to the west will help meet PAL 3 curbfront requirements. This phase of the preferred development plan follows completion of the Supplemental Arrivals Curb and Palm Garage Redevelopment.

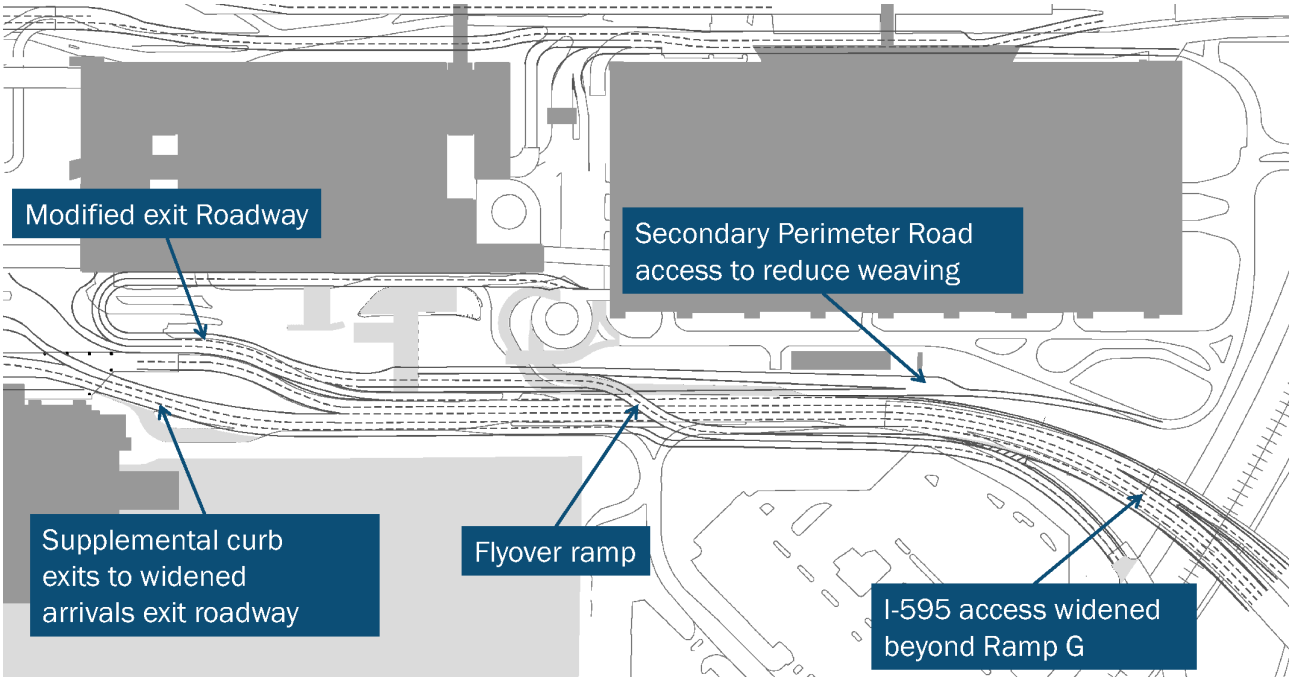
5.4.6 NONTERMINAL ROADWAY ALTERNATIVES

Several iterations of nonterminal roadway alternatives were conceptualized and explored. Nonterminal roadway alternatives targeted access/egress roadway "hotspots" to alleviate terminal congestion and reduce vehicular delay. In addition to the alternatives presented in detail below, other explored options included alternate locations for the cell phone waiting lot, various locations of strategic roadway widening, and multiple configurations for the terminal exit roadway system with various flyover ramps and lane balancing. Recommended nonterminal roadway alternatives for meeting PAL 3 requirements are described below. The following three alternatives were considered for implementation: Exit Roadway Enhancements, Bridge Widening, and Removal of Rental Cars. The following summarizes each proposed alternative.

Exit Roadway Enhancements

This alternative was developed to reduce merging and weaving movements of egressing traffic, while serving the complex network of O&D possibilities. This alternative supplements the Terminal 3 Westward Expansion alternative and the Supplemental Arrivals Curb alternative by mitigating the terminal's exit roadway congestion. Following preliminary testing of several terminal exit roadway configurations, the layout illustrated on **Exhibit 5.4-22** demonstrated the best performance. Other exit roadway configurations considered different flyover connections, merge/diverge spacing, and number of through lanes. Through origin-destination demand assessment and simulation modeling of the various configurations, the recommended layout alleviated lane change maneuvers for the heaviest weaving movements, provided sufficient through capacity for each roadway segment in the exit roadway system, and showed the best relative performance in terms of congestion and travel time. It includes a flyover ramp that serves the parking garage egress traffic bound for I-595, U.S. 1 South, and Perimeter Road, and it reduces merging/weaving movements. The I-595 access is widened by one lane downstream of Ramp G for the flyover lanes to merge. This alternative also provides vehicles exiting the departures level roadway and parking garages with a secondary Perimeter Road access to reduce merging/weaving movements. The Supplemental Arrivals Curb exit joins with the widened arrivals level exit (widened from two to three lanes to reduce merging), and the departures level exit remains unchanged.

Exhibit 5.4-22: Exit Roadway Enhancements Alternative



SOURCE: Ricondo & Associates, Inc., August 2017 (AutoCAD Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Benefits

This alternative provides the following benefits:

- Improves the lower level exit.
- Alleviates weaving friction between traffic exiting the parking garages and traffic exiting the terminal roadways.
- Separates traffic streams exiting the parking garages.
- Can be implemented in conjunction with the short-term improvements and any of the terminal and curbfront roadway alternatives.
- Leverages the short-term improvements to further manage merging/weaving movements and to mitigate congestion.
- Mitigates exit congestion and subsequent backup into terminal roadways.

This alternative requires further refinements to address the following:

- The exit roadway and bridge between the garage exits and Ramp G (ramp to U.S. 1 South) may show congestion during periods of peak demand due to capacity constraints and downstream weaving section delays.

Modeling Assumptions and Results

The ALPS modeling considered the following assumptions:

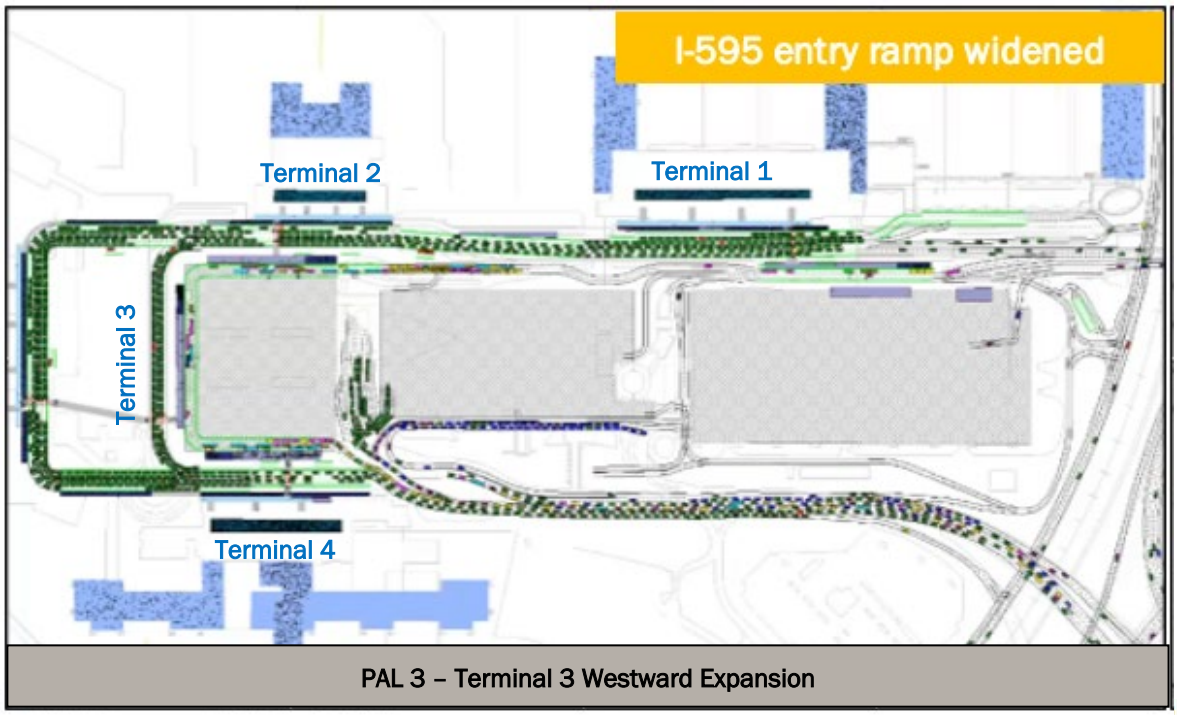
- An exit lane was added past Ramp G to merge the flyover traffic.
- The modeling assumes the following Supplemental Arrivals Curb alternative assumptions are implemented:
  - Short-term improvements are included.
  - The following commercial modes are assumed to use the supplemental curb: shared-ride vans, Airport shuttles, off-Airport shuttles, cruise buses, TNCs, and taxis.
  - A reduction in taxi mode share and an increase in TNC mode share were assumed, per observed usage since the authorization of TNCs at the Airport.
- The modeling assumes the following Terminal 3 Westward Expansion alternative assumptions are implemented:
  - There is a widened I-595 entry ramp for the unmetered flow of inbound vehicular traffic. The assumed widening converted the 2-lane section to 3 lanes from where the ramp diverges from I-595 to the U.S. 1 South diverge point.
  - The existing Terminal 3 curbfront roadways become bypass roadways (upper and lower level).
  - As proposed, the supplemental curb is maintained adjacent to the Palm Garage (for conservative modeling).
  - At-grade signalized pedestrian crossings are assumed; new vertical circulation may be implemented to eliminate some terminal roadway crosswalks.

As illustrated on **Exhibit 5.4-23** (screenshots from the ALPS simulations), implementing the Exit Roadway Enhancements alternative improves the flow of egressing traffic and mitigates congestion and subsequent backup into the terminal complex. The simulation model depicts the reduced weaving activity, primarily because of the new flyover ramps and the secondary Perimeter Road access.

Bridge Widening

The Bridge Widening alternative features the widening (and possible reconstruction) of the terminal exit bridge from the Perimeter Road exit to Ramp G. This alternative was developed to mitigate the capacity constraints of the terminal exit roadways of the garage exits. Significant construction of the bridge passing over U.S. 1 and the rail line is expected. **Exhibit 5.4-24** illustrates the proposed one-lane roadway widening of four lanes to five lanes at the bridge. The Bridge Widening alternative assumes geometric compatibility with the Exit Roadway Enhancements alternative. This is identified to be further assessed and refined as part of a separate study.

Exhibit 5.4-23: Terminal 3 Westward Expansion Plus Exit Roadway Enhancements Modeling

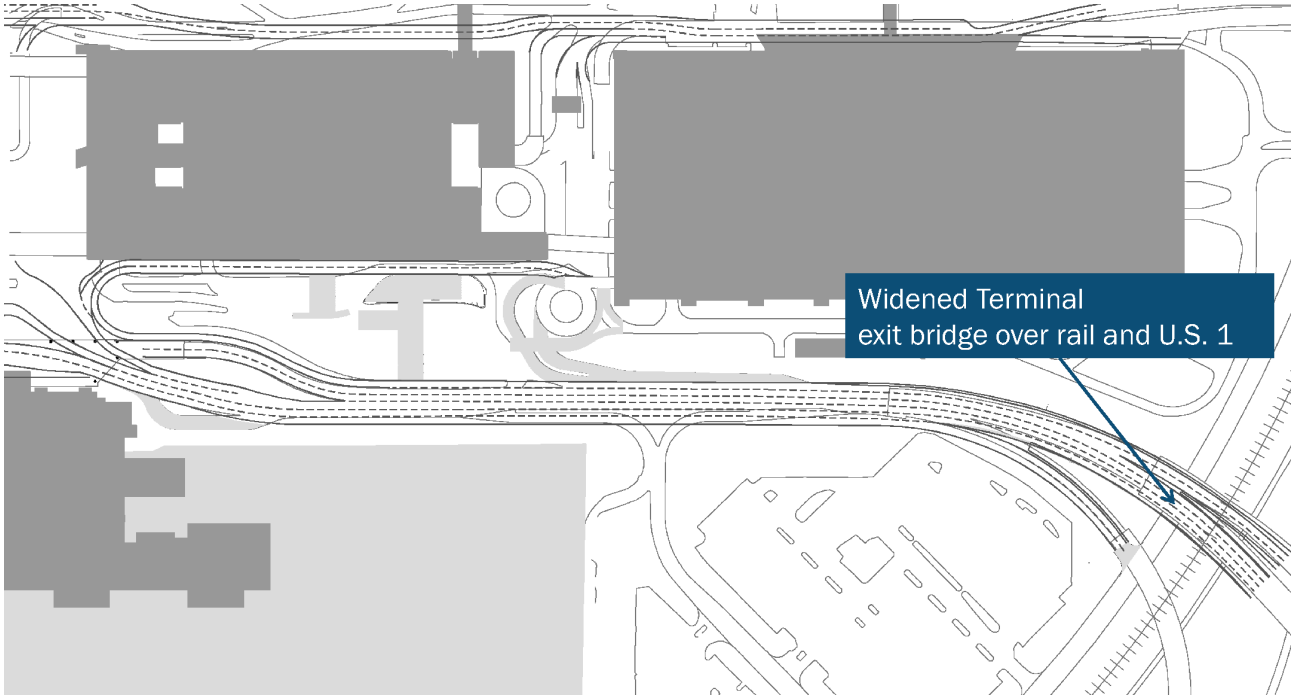


PAL 3 – Terminal 3 Westward Expansion

PAL 3 – Terminal 3 Westward Expansion + Exit Enhancements

SOURCE: Kimley-Horn and Associates, Inc., August 2017 (AutoCAD Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Exhibit 5.4-24: Bridge Widening Alternative



SOURCE: Ricondo & Associates, Inc., August 2017 (AutoCAD Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Benefits

This alternative provides the following benefits:

- This alternative can be implemented in conjunction with the short-term improvements and any of the terminal and curbfront roadway alternatives.
- It leverages the short-term improvements and provides additional exit capacity on the bridge.
- It reduces exit roadway congestion and delay with added capacity.
- An additional lane at the recirculation exit reduces friction caused by diverging vehicles.

This alternative requires further refinements to address the following:

- Costs involved in modifying/reconstructing a curved-segmental type bridge.
- Weaving friction between the multiple streams of exiting traffic.

Modeling Assumptions and Results

The ALPS modeling considered the following assumptions:

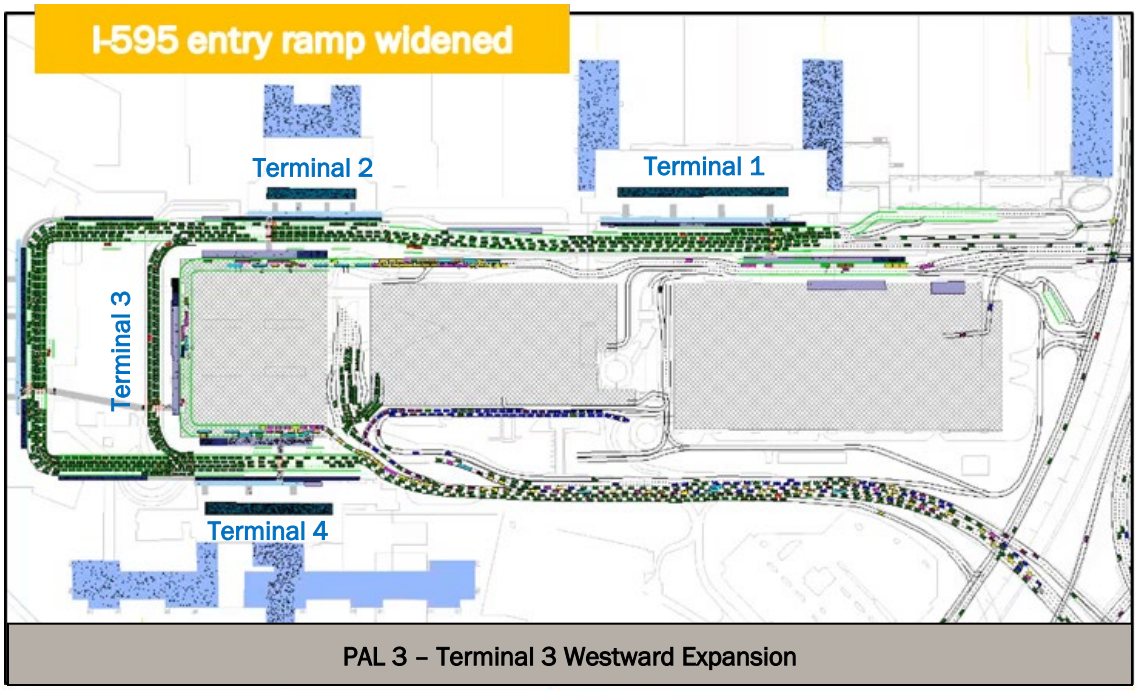
- An exit lane was added past Ramp G through the downstream weave section to test the performance of this alternative without downstream congestion interference.
- The modeling assumes the following Supplemental Arrivals Curb alternative assumptions are implemented:
  - Short-term improvements are included.
  - Employees are relocated from Cypress Garage.
  - The following commercial modes are assumed to use the supplemental curb: shared-ride vans, Airport shuttles, off-Airport shuttles, cruise buses, TNCs, and taxis.
  - A reduction in taxi mode share and an increase in TNC mode share were assumed, per observed usage since the authorization of TNCs at the Airport.
- The modeling assumes the following Terminal 3 Westward Expansion alternative assumptions are implemented:
  - There is a widened I-595 entry ramp for the unmetered flow of inbound vehicular traffic. The assumed widening converted the 2-lane section to 3 lanes from where the ramp diverges from I-595 to the U.S. 1 South diverge point.
  - Existing Terminal 3 curbfront roadways become bypass roadways (upper and lower level).
  - As proposed, the supplemental curb is maintained adjacent to Palm Garage (for conservative modeling).
  - At-grade signalized pedestrian crossings are assumed (for conservative modeling); new vertical circulation may be implemented to eliminate some terminal roadway crosswalks.

As illustrated on **Exhibit 5.4-25** (screenshots from the ALPS simulations), implementing the Bridge Widening alternative improves the flow of egressing traffic along the bridge, particularly at the recirculation roadway diverge point. The simulation model depicts a higher flow rate and reduced congestion and subsequent backup into the terminal complex because of the fifth lane on the exit bridge.

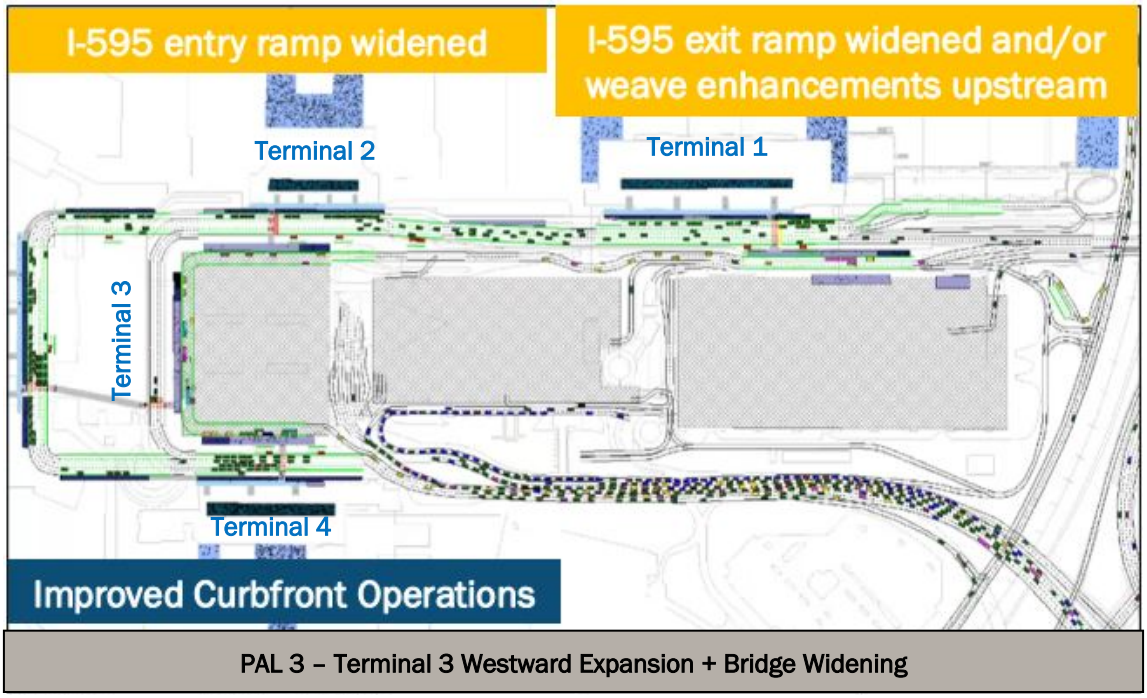
Removal of Rental Cars

This alternative assessed reduced vehicular demand on the terminal and nonterminal roadway system near the Airport by assuming RCC relocation and removal of rental cars. The relocation of the RCC to an off-site location, and the subsequent removal of rental cars from the nonterminal roadways near the Airport, can be implemented with or without the Exit Roadway Enhancements or Bridge Widening alternatives. Since rental cars can enter and exit the existing RCC without driving by the terminal curbfronts, the relocation of rental car activity would reduce demand on the access and egress roadway while also reducing delays and congestion on the terminal roadways. The relocation of the RCC to an off-Airport location requires multiple decisions regarding cost and the potential for an APM connection between the off-site RCC and the Airport. Alternatives related to public parking and the RCC are further addressed in Section 5.5.

Exhibit 5.4-25: Terminal 3 Westward Expansion Plus Bridge Widening Modeling



PAL 3 – Terminal 3 Westward Expansion



PAL 3 – Terminal 3 Westward Expansion + Bridge Widening

SOURCE: Kimley-Horn and Associates, Inc., August 2017 (ALPS Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Benefits

This alternative provides the following benefits:

- This alternative can be implemented in conjunction with the short-term improvements and any of the terminal curbfront roadway alternatives, as well as the nonterminal alternatives.
- It reduces vehicular demand on the nonterminal roadways near the Airport.
- It reduces vehicular congestion on the terminal roadways.
- The Cypress Garage is reassigned to increase the parking supply for additional passenger parking or other needs.

This alternative requires further analysis to address the following:

- There is increased travel time between the RCC and terminal complex.
- RCC shuttles are required to utilize the nonterminal roadway network (beyond Perimeter Road and the recirculation roadway).
- It may require a larger RCC shuttle fleet.

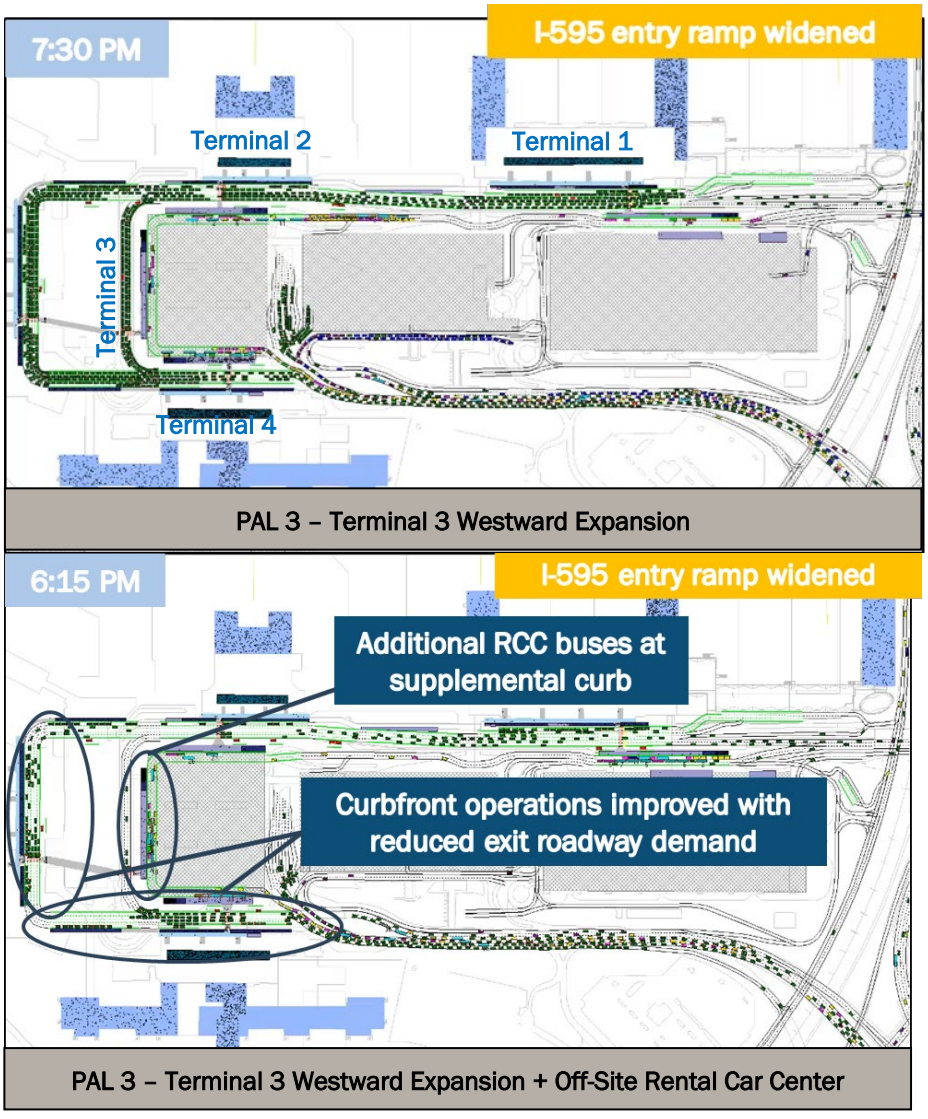
Modeling Assumptions and Results

The ALPS modeling considered the following assumptions:

- Rental car traffic was removed from nonterminal roadways.
- Additional RCC buses were added to the supplemental curb to portray larger fleet to serve the off-site connection RCC shuttle route.
- The modeling assumes the following Supplemental Arrivals Curb alternative assumptions are implemented:
  - Short-term improvements are included.
  - The following commercial modes are assumed to use the supplemental curb: shared-ride vans, Airport shuttles, off-Airport shuttles, cruise buses, TNCs, and taxis.
  - A reduction in taxi mode share and an increase in TNC mode share were assumed, per observed usage since the authorization of TNCs at the Airport.
- The modeling assumes the following Terminal 3 Westward Expansion alternative assumptions are implemented:
  - There is a widened I-595 entry ramp for the unmetered flow of inbound vehicular traffic. The assumed widening converted the 2-lane section to 3 lanes from where the ramp diverges from I-595 to the U.S. 1 South diverge point.
  - Existing Terminal 3 curbfront roadways become bypass roadways (upper and lower level).
  - As proposed, the supplemental curb is maintained adjacent to Palm Garage (for conservative modeling).
  - At-grade signalized pedestrian crossings are assumed (for conservative modeling); new vertical circulation may be implemented to eliminate some terminal roadway crosswalks.

As illustrated on **Exhibit 5.4-26** (screenshots from the ALPS simulations), removing rental cars from the Cypress Garage directly improves the terminal roadways and nonterminal roadways near the Airport by reducing vehicular demand. Congestion on the terminal exit roadway, and subsequent backup into the terminal complex, is reduced, as observed in the simulation model. **Exhibit 5.4-27** shows the peak-hour demand/capacity analysis results under forecast PAL 3 conditions, where the two study segments projected to operate at LOS F improve to LOS E with the improvements.

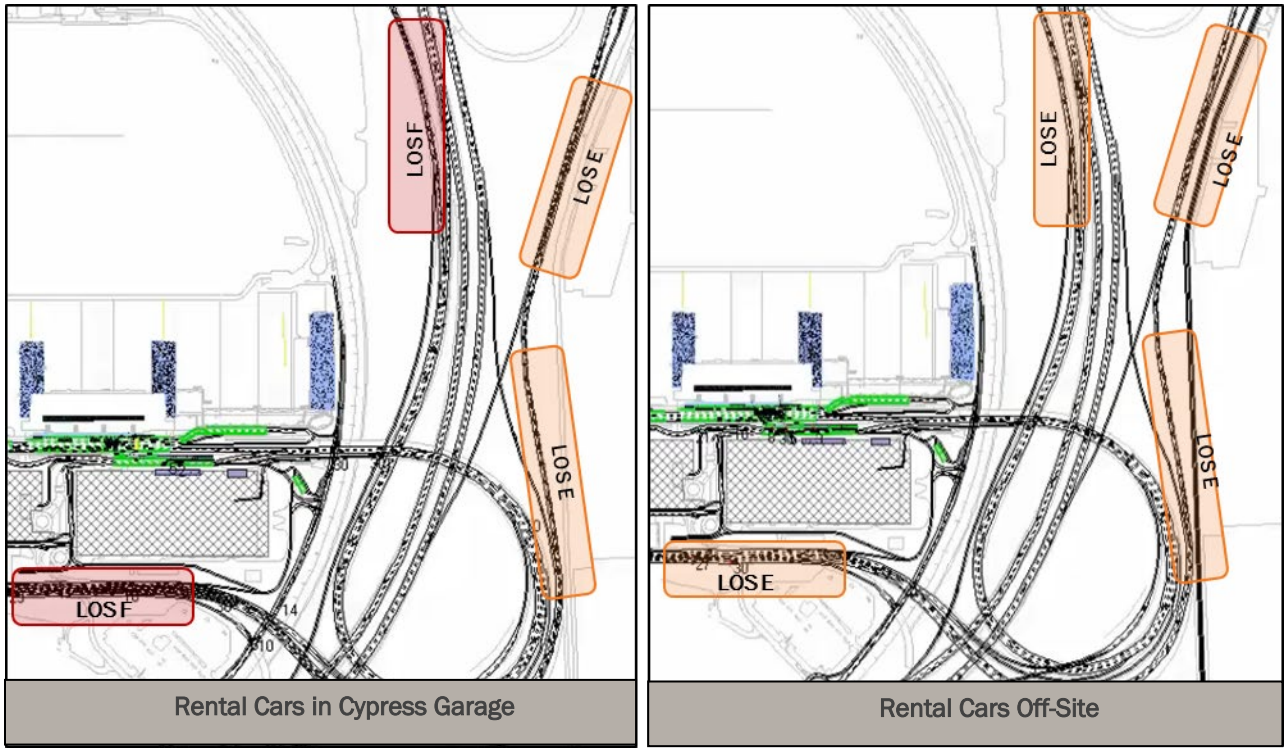
Exhibit 5.4-26: Terminal 3 Westward Expansion Plus Off-Site Rental Car Center (Exit Roadways, PAL 3 Conditions)



NOTE: RCC = Rental Car Center

SOURCE: Kimley-Horn and Associates, Inc., August 2017 (ALPS Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

Exhibit 5.4-27: Terminal 3 Westward Expansion Plus Rental Car Center Off-Site (Nonterminal Roadways, PAL 3 Conditions)



NOTE: LOS = Level of Service

SOURCE: Kimley-Horn and Associates, Inc., August 2017 (ALPS Software).
PREPARED BY: Kimley-Horn and Associates, Inc., August 2017.

5.4.7 PREFERRED NONTERMINAL ROADWAY DEVELOPMENT PLAN

Following evaluation of potential nonterminal roadway alternatives, the following is recommended as the preferred development plan for the nonterminal roadways:

- **Exit Roadway Enhancements**: The recommended exit roadway configuration reduces delays caused by merging and weaving movements, improving roadway performance for both private and commercial vehicles egressing the terminal curbfronts and parking garages.
- **Bridge Widening**: As an extension of the Exit Roadway Enhancements alternative, widening and/or reconstruction of the exit roadway bridge over U.S. 1 alleviates the capacity bottleneck through the planning horizon.
- **Removal of Rental Cars**: BCAD should continuously monitor and explore opportunities for future landside development such as an off-site rental car center that could be located along an automated people mover line to enhance landside connectivity for passengers while reducing vehicular traffic. Relocating the RCC would result in reduced demand on the terminal and nonterminal (access/egress) roadways.

5.4.8 AUTOMATED PEOPLE MOVER (APM) PLANNING CONSIDERATIONS

The construction of an Automated People Mover (APM) was identified as a project to provide an improved level of service and to serve increased landside demand. The APM system promotes airport wide connectivity through stations located along the terminals and parking garages. Potential connectivity to off-airport sites including the Intermodal Center and Port Everglades will alleviate vehicular traffic within the terminal roadway system. There are on-going discussions regarding opportunities to connect the Airport and Port Everglades. A preliminary ridership projection was conducted for the APM system which estimated Peak Passengers Per Hour Per Direction (pphpd) for the Peak Month Average Day (PMAD) to be 1,920 in2025 and 2,480 in 2035. The APM proposal may accomplish a variety of goals for the Airport, including:

- Providing improved passenger connectivity throughout the Airport including terminals, parking garages and potentially the Port
- Reducing airport roadway congestion by encouraging off-airport parking located at the Intermodal Center (IMC) or other future off-airport parking products along the APM line
- Minimizes passenger walking distances

5.4.9 PRELIMINARY AUTOMATED PEOPLE MOVER (APM) ALTERNATIVE

The preliminary APM alternative was identified for evaluation during the master planning process. **Exhibit 5.4-28** depicts the preliminary alternative. The preliminary concept plan features the following criteria:

- Approximately 9,000 feet of elevated dual lane guideway
- Six passenger station within the Central Terminal Area (CTA)
  - Terminal 1
  - Terminal 2
  - Terminal 3
  - Terminal 4
  - Potential station south of Cypress garage
  - Potential FEC Rail station/On-site IMC
- One off-airport passenger station at the terminal access road or IMC site as the connection to potential off-site facilities (i.e. remote parking and/or rental car facilities), regional transit and a link to Port Everglades.
- An off-line Maintenance and Storage Facility (M&SF)
- Provisions for future extension to west should Terminal 3 be reconstructed in the future

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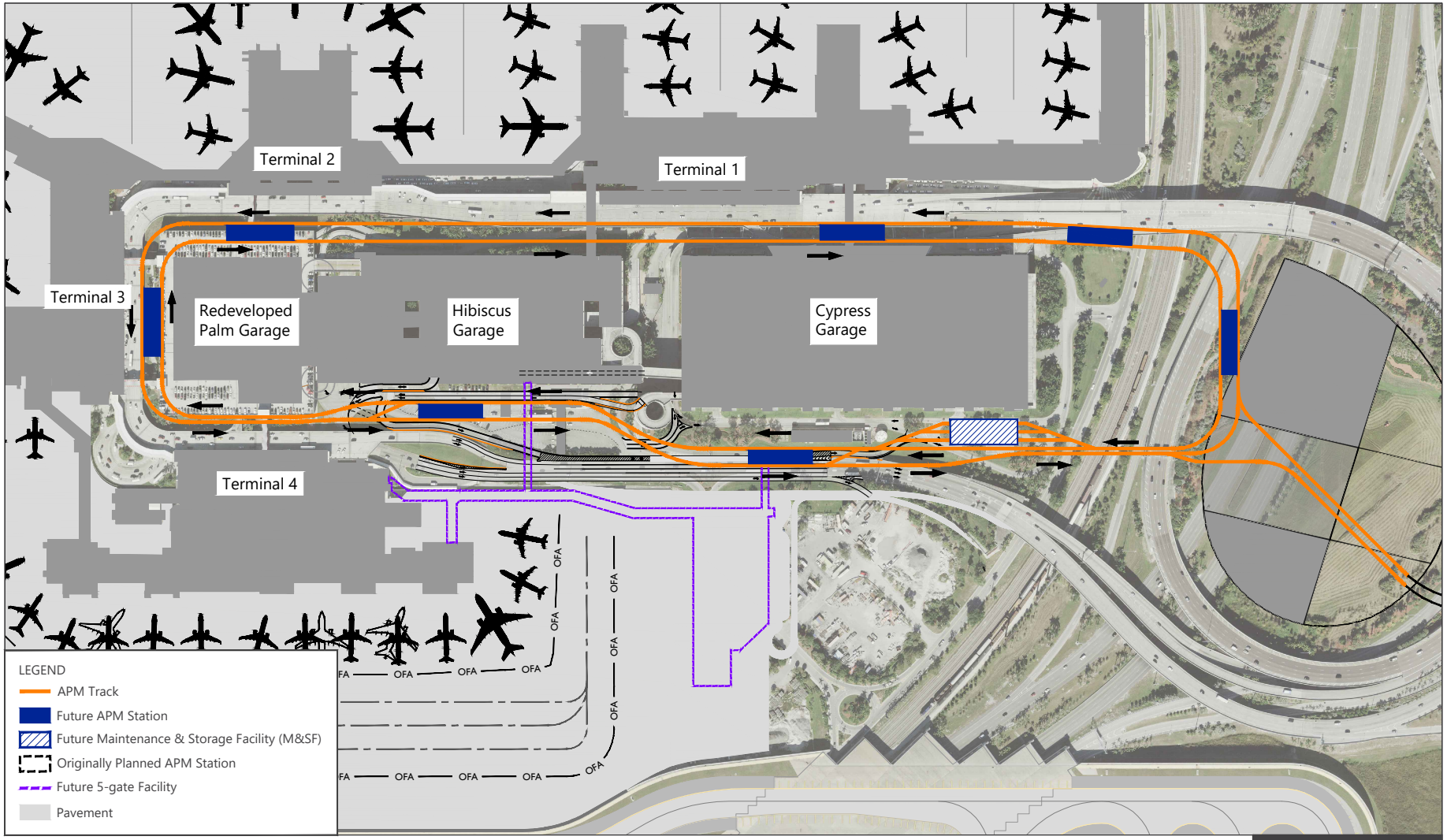

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Lea + Elliot, Inc., Airport Master Plan Update Conceptual Cost Estimate APM System, May 2017; Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., August 2019.

EXHIBIT 5.4-28

NORTH 0 450 ft.

Automated People Mover (APM) Preliminary Alternative

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.4-28 - 5.4-30 - APM_2019_1218.dwgLayout: 5.4-28 Plotted: Oct 30, 2020, 10:47AM

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Operations would flow in two directions through the APM system. A fleet size of sixteen cars was assumed. The station platforms would accommodate the maximum length train (up to four typical APM cars). The M&SF will house the APM System maintenance functions, the APM System Central Control Facility (CCF) and APM System administration offices. The M&SF has been sized to accommodate an on-airport operation as described above.

5.4.10 PREFERRED AUTOMATED PEOPLE MOVER (APM) ALTERNATIVE

The preliminary APM alternative was refined to provide a more detailed understanding of the operational characteristics and system connectivity. The alternative was refined in terms of implementation phasing, passenger connectivity, APM station and M&SF location, and preliminary off-airport connectivity. During the refinement process, it was determined that the APM system would be implemented in three sequences.

Sequence 1A constructs the initial segment of the APM which operates a pinched loop system with passenger loading and unloading stations along the terminals and in the IMC. The initial segment would provide pedestrian connector bridges from the existing Palm Garage to the existing vertical cores in Terminal 3. This sequence requires the demolition of a northern and southern parking bay within the existing Palm Garage to provide the required corridor for the APM pinched-loop system. The pinched-loop system operates in a "U" travel pattern whereas cars reverse direction once they have completed the pick-up and drop-off of passengers at the last station instead of continuing in a looping alignment. The pedestrian connector bridges provide increased connectivity to Terminal 3 prior to the completion of the APM loop. **Exhibit 5.4-29** depicts the construction of the initial APM pinched-loop layout.

Sequence 1B completes the APM loop system by constructing the additional guideway and associated APM station at Terminal 3. This sequence is enabled by the demolition of the remaining existing Palm Garage. **Exhibit 5.4-30** depicts the completed construction of the preferred closed loop APM circulator layout. **Exhibit 5.4-31** depicts an alternate closed loop APM circulator that provides an APM station and its associated guideway east of Cypress Garage and to the west of the FEC tracks. **Exhibit 5.4-32** depicts a representative 3D rendering of an APM station.

If future demand dictates the reconstruction of Terminal 3 to the west, a Sequence 1C buildout of the APM would be necessary. This buildout includes a westward expansion to serve reconstructed Terminal 3 and the expanded commercial center.

A long-term, off-Airport expansion is recognized and illustrated in the master plan to promote a larger connectivity plan between FLL, PEV and the Broward County Convention Center. This extension would require coordination with other Broward County departments and stakeholders given it is developed completely off Airport owned property.

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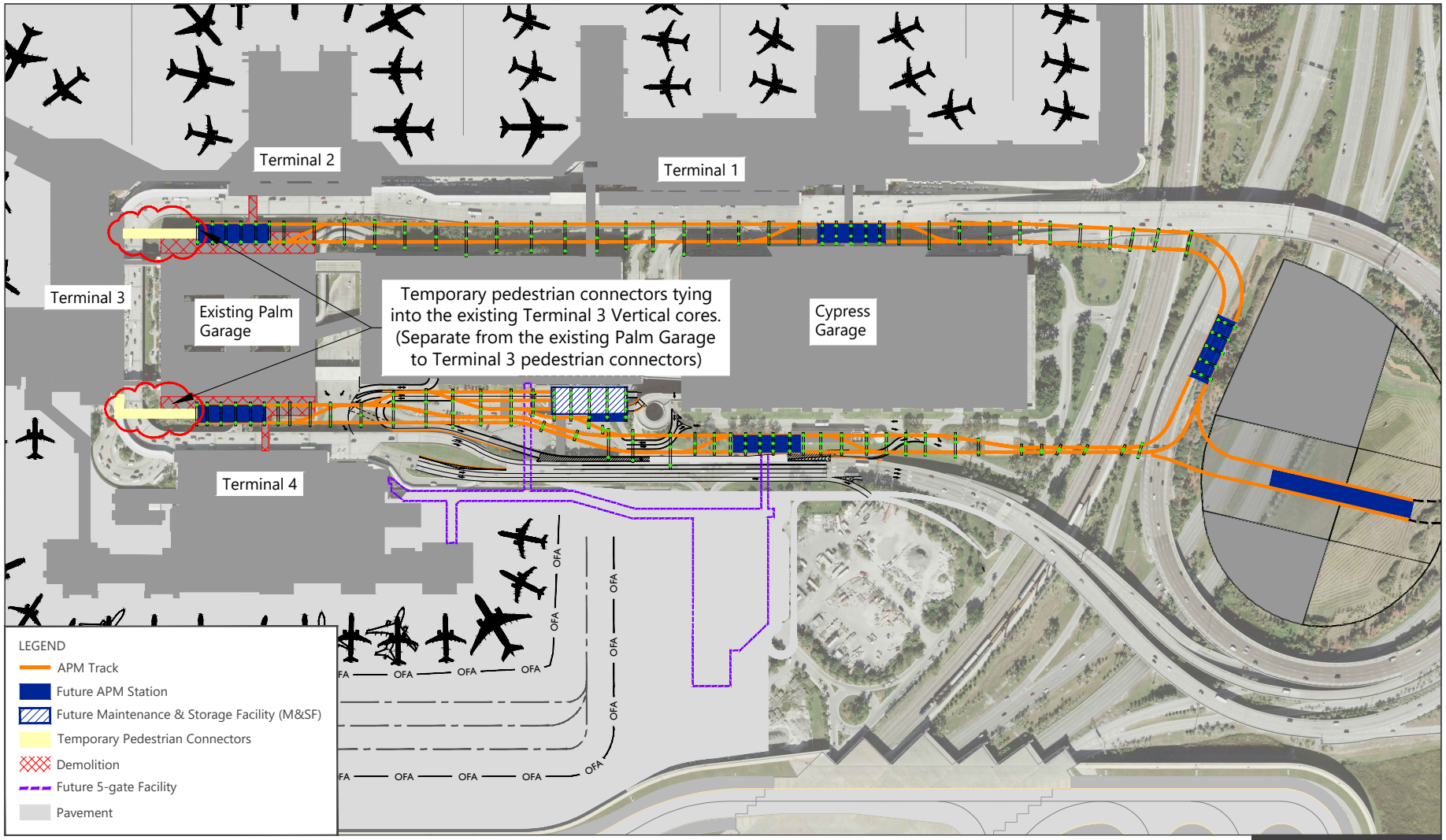

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Lea + Elliot, Inc., 2019; Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., August 2019.

EXHIBIT 5.4-29

NORTH 0 450 ft.

Automated People Mover (APM) Preferred Alternative
Initial Pinched-Loop Layout

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.4-28 - 5.4-30 - APM_2019_1218.dwgLayout: 5.4-29 Plotted: Nov 3, 2020, 03:34PM

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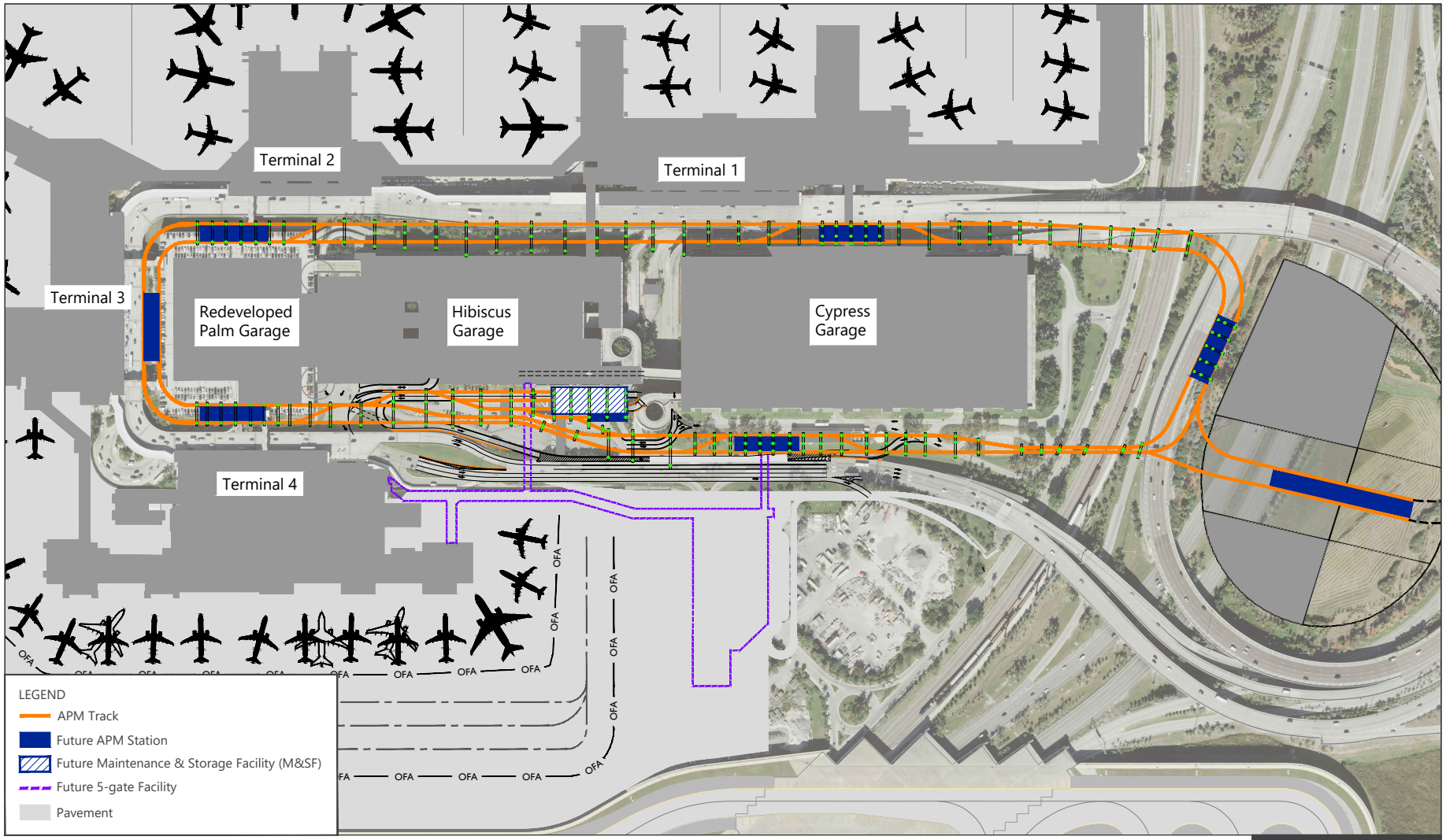

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Lea + Elliot, Inc., 2019; Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., August 2019.

EXHIBIT 5.4-30

NORTH 0 450 ft.

Automated People Mover (APM) Preferred Alternative
Completed Closed-Loop Circulator Layout

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.4-28 - 5.4-30 - APM_2019_1218.dwgLayout: 5.4-30 Plotted: Nov 3, 2020, 03:34PM

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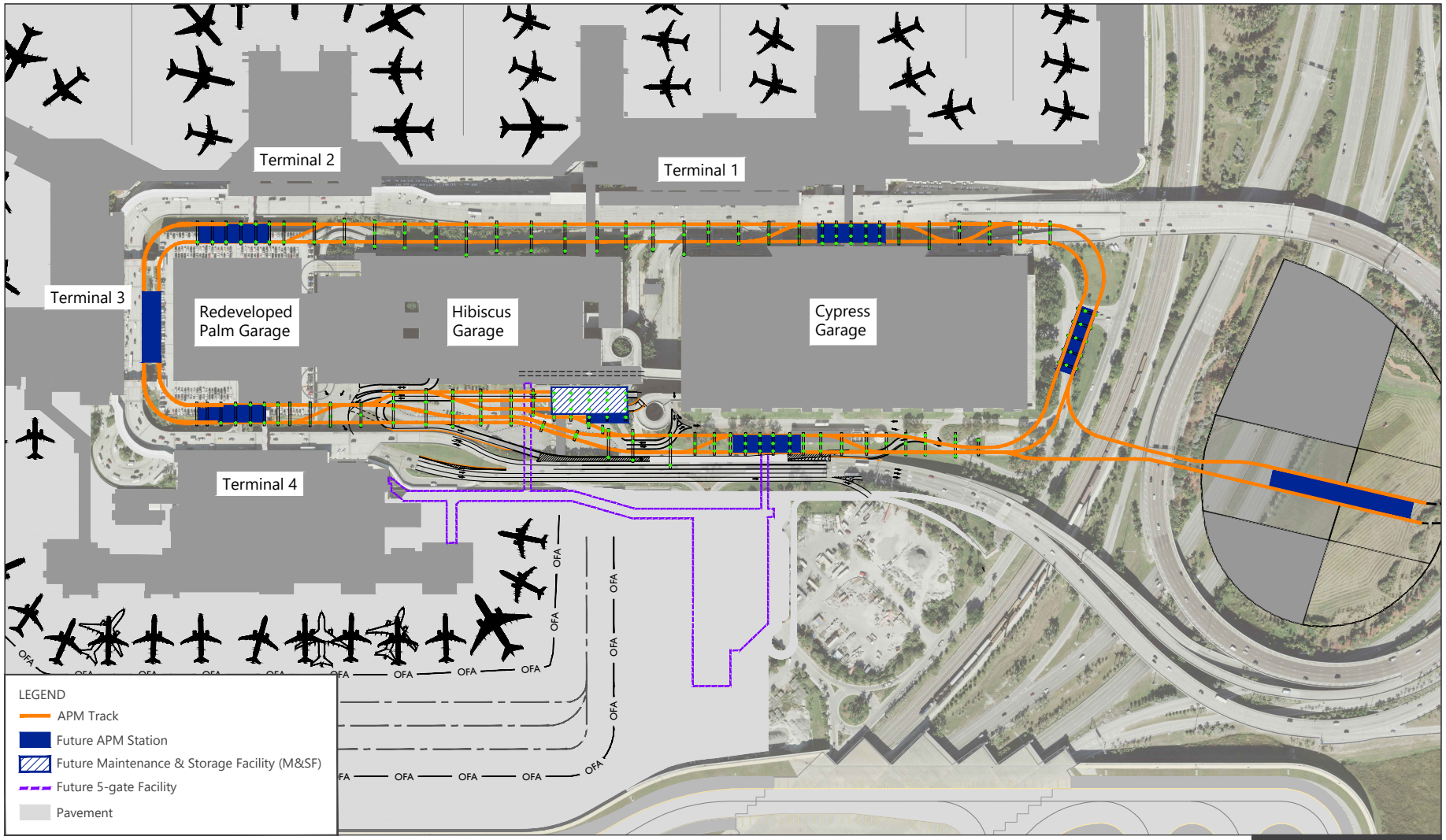

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Lea + Elliot, Inc., Airport Master Plan Update Conceptual Cost Estimate APM System, May 2017; Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., August 2019.

EXHIBIT 5.4-31

NORTH 0 450 ft.

Automated People Mover (APM) Alternative
Completed Closed-Loop Circulator Layout (Alternate)

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.4-28 - 5.4-30 - APM_2019_1218.dwgLayout: 5.4-31 Plotted: Nov 3, 2020, 03:35PM

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SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.4-32

NORTH 0 Not To Scale

Representative Rendering
Automated People Mover (APM) Station

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5.5 Automobile Parking and Staging

The automobile parking and vehicular staging alternatives include development scenarios to accommodate public parking, employee parking, rental car facilities and other ground transportation needs through PAL 3. These alternatives include the following:

- Redevelopment of the Palm Garage with the potential development of an adjacent commercial center and hotel
- Establishment of a centralized ground transportation center (GTC) on the ground floor of the redeveloped Palm Garage that would alleviate demand on the terminals' roadway and curbfront
- Relocation of the employee parking to the east side of the airport with connectivity to the passenger terminal via an on-Airport APM circulator
- Optimization of the consolidated rental car facility to maximize its useful life
- Ensuring adequate capacity to serve project parking needs during incremental passenger growth
- Construction of adequate height clearance between parking levels (e.g. 15-17 feet) to accommodate future repurposing if necessary

5.5.1 CANDIDATE SITES

To accommodate public parking, employee parking, and rental car facility development and expansion through the planning period, a variety of sites were considered for their potential suitability for these purposes. **Exhibit 5.5-1** highlights the parcels and locations considered. The sites are:

- The Palm Garage site – the site of the existing Palm Garage and adjacent spaces was identified for redevelopment for public parking, ground transportation, and commercial development.
- The Former "Avis Lot" site – this site, located south of the Cypress Garage and east of Terminal 4, was identified for potential landside uses. However, access to and from the site is limited.
- The East Cypress Garage site – the small parcel to the east of the Cypress Garage was identified as land that can serve for the Rental Car Center (RCC), should it remain in the Cypress Garage beyond the 20-year planning horizon.
- The FDOT Right-of-Way (ROW) site (referred to as Intermodal Center site) – this parcel was identified as a potential site for substantial landside development with a focus on Airport and regional transportation integration, though the Airport does not currently own the land. This site was previously identified by FDOT for an Intermodal Facility (IMC) (termed "The Sunport Project").

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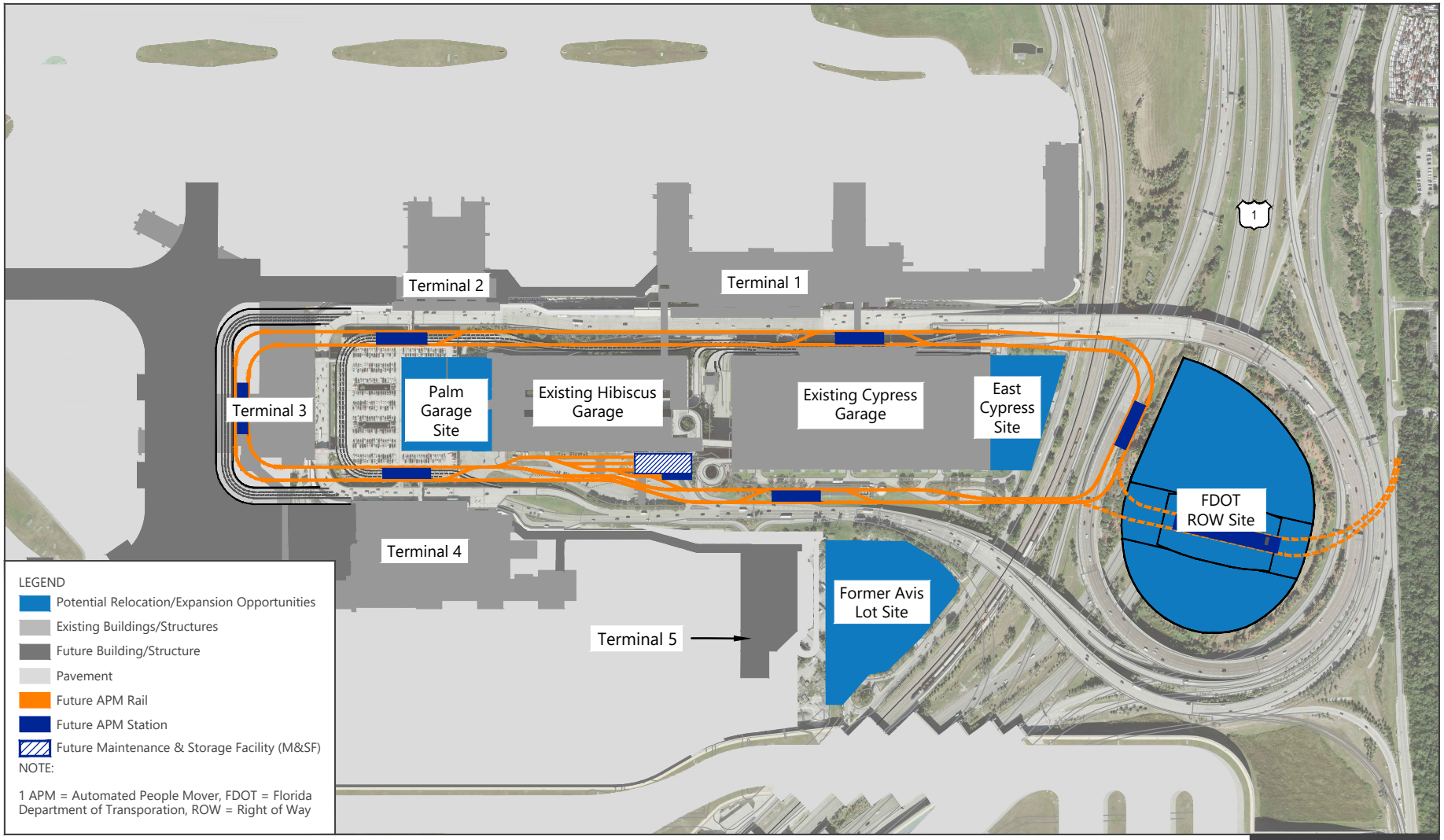

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.5-1

NORTH 0 600 ft.

Potential Employee, Passenger, and Rental Car Parking Relocation/Expansion Opportunities

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.5-1 - 5.5-17 - Parking Exhibits_2019_1218.dwgLayout: 5.5-1-Expansion Options Plotted: Oct 30, 2020, 10:55AM

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5.5.2 PALM GARAGE REDEVELOPMENT PLANNING CONSIDERATIONS

As previously discussed, the existing Palm Garage is a four-level facility with approximately 2,500 spaces and a spatial configuration that restricts the expansion of the terminal roadway system and curbs. The site also offers opportunities for additional parking capacity by optimizing vertical development. Therefore, the Palm Garage redevelopment is a key component to satisfying long-term parking demand while also creating space to serve curbside and roadway needs on the arrivals level. In addition to those functions, a commercial center that provides dwelling space for early arriving passengers is included within this redevelopment. The redeveloped Palm Garage will serve as a passenger transfer center connecting new landside facilities to all terminals utilizing the proposed APM system while also providing enhanced commercial development opportunities.

The Airport parking market share is anticipated to be uncertain going forward due to ongoing changes in mode of access to the Airport spurred primarily by TNCs and often emerging modes of transportation. Rather than allocating certain parcels or lots specifically to a fixed amount of public parking, sites such as the former Avis Lot site are protected for future landside development that may be needed in different forms. In addition, it is anticipated that by PAL 3 the current employee parking lot (former Economy public parking) may be returned to the public parking supply if needed.

5.5.3 PREFERRED PALM GARAGE REDEVELOPMENT ALTERNATIVE

The Palm Garage could be expanded in two phases: the first phase occurring prior to any westward extension of the curbside roadways, and the second phase to fill in the central space made available by the westward relocation and redevelopment of Terminal 3 (to serve PAL 3). **Exhibit 5.5-2** illustrates a representative Phase 1 Palm Garage redevelopment, commercial center and hotel.

To meet the public parking needs projected through PAL 3, the redeveloped Palm Garage is proposed to have 7 to 9 levels dedicated to vehicular parking, thereby providing approximately 3,400-3,700 parking stalls. This would provide a total public parking capacity within the Palm, Hibiscus, and Cypress Garages of approximately 10,500 public parking stalls.

It is also envisioned that the Palm Garage would have a GTC on the lower level, as described in Section 5.4. The third level would also serve as a transfer level between the redeveloped Palm Garage and Terminals 2, 3 and 4. **Exhibits 5.5-3** through **5.5-6** illustrate the preliminary configuration of each level of the redeveloped Palm Garage.

As shown, each level of the redeveloped Palm Garage would consist of the following:

- **Level 1 – Ground Transportation Center:** This level is planned to be a GTC for taxi, limo, TNC, and courtesy shuttle uses. The passenger transfer level connectivity to Terminals 2, 3, and 4 allows the vehicles to consolidate their pick-up operations to one central location.
- **Level 2 – Public Parking**: this level of public parking encompasses the entire floor plate. On the levels above level 2, parking is contained within the eastern portion of the floor plate to allow space for the passenger transfer level and associated open space and the commercial development on the western portion of the site, closer to Terminal 3.

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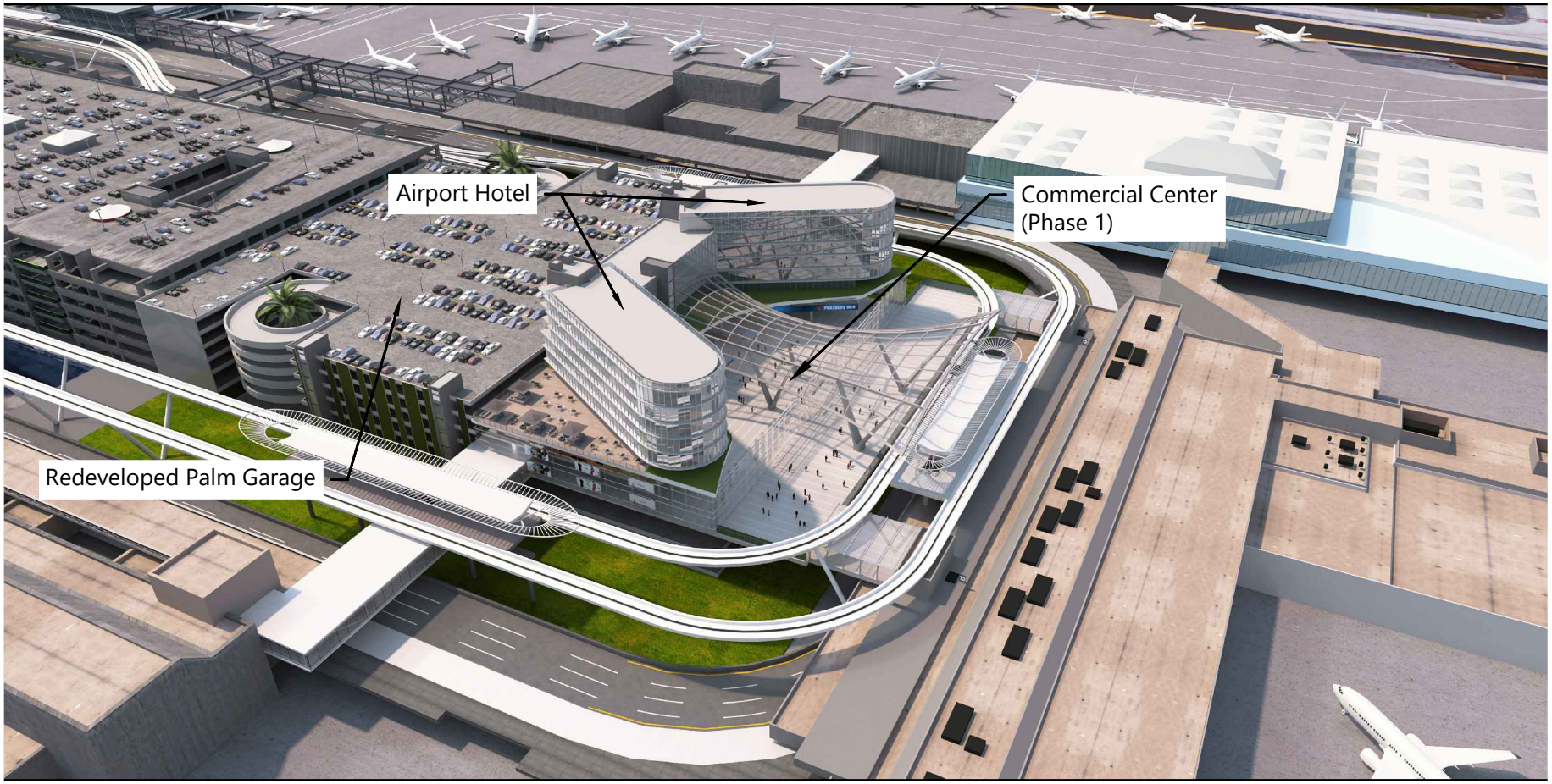

SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.5-2

NORTH 0 Not To Scale

Representative Rendering
Redeveloped Palm Garage, Commercial Center & Airport Hotel

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.7 - Final Refinement Renderings_2019_0822.dwgLayout: 5.5-2 Plotted: Oct 30, 2020, 10:56AM

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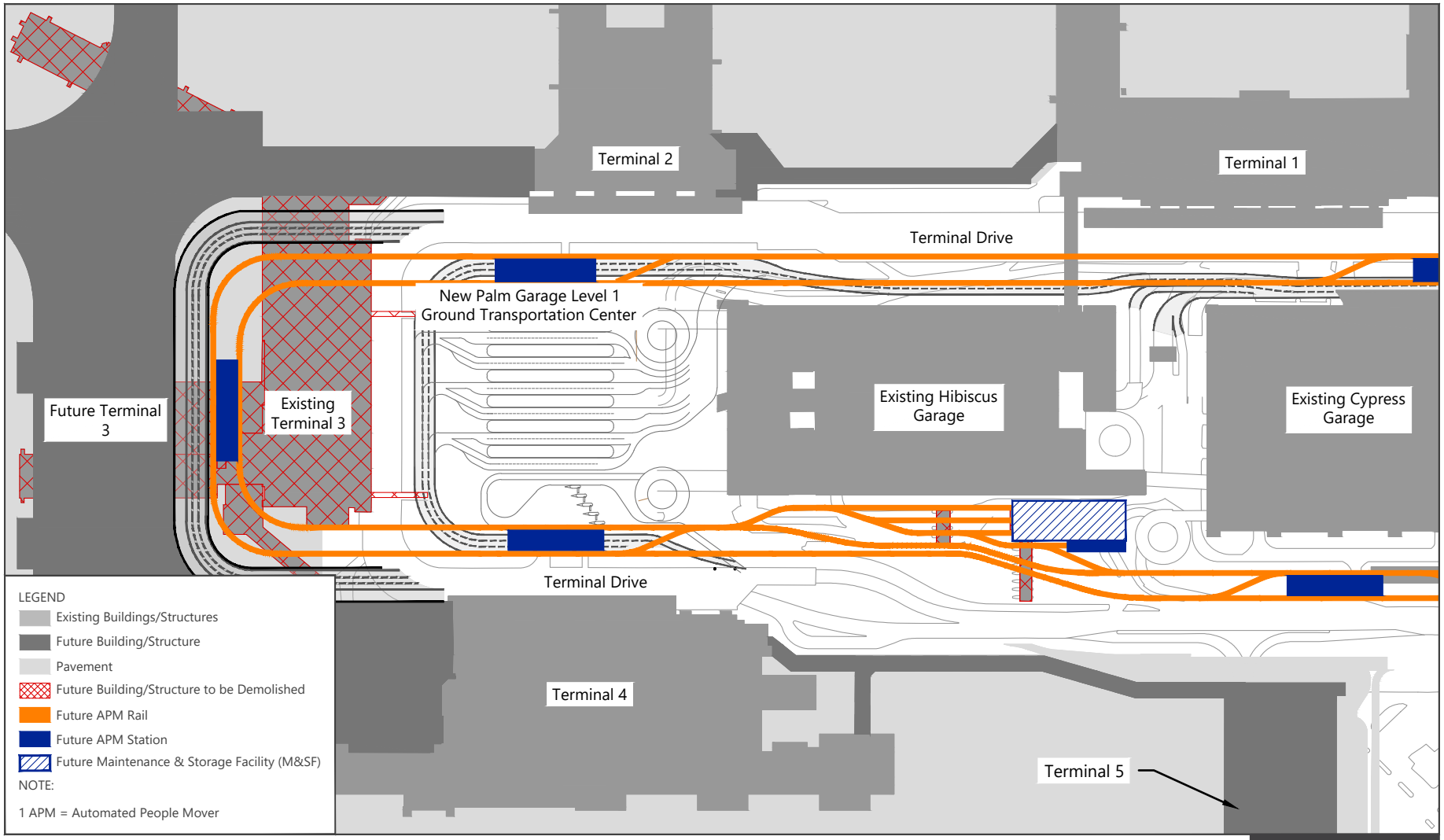

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Quantum Spatial, Inc., 2016 (Basemap); Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.5-3

NORTH 0 300 ft.

Palm Garage Redevelopment Conceptual Floor Plan
Level 1 – Ground Transportation Center

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.5-1 - 5.5-17 - Parking Exhibits_2019_1218.dwgLayout: 5.5-3-Palm Level 1 Plotted: Oct 30, 2020, 10:57AM

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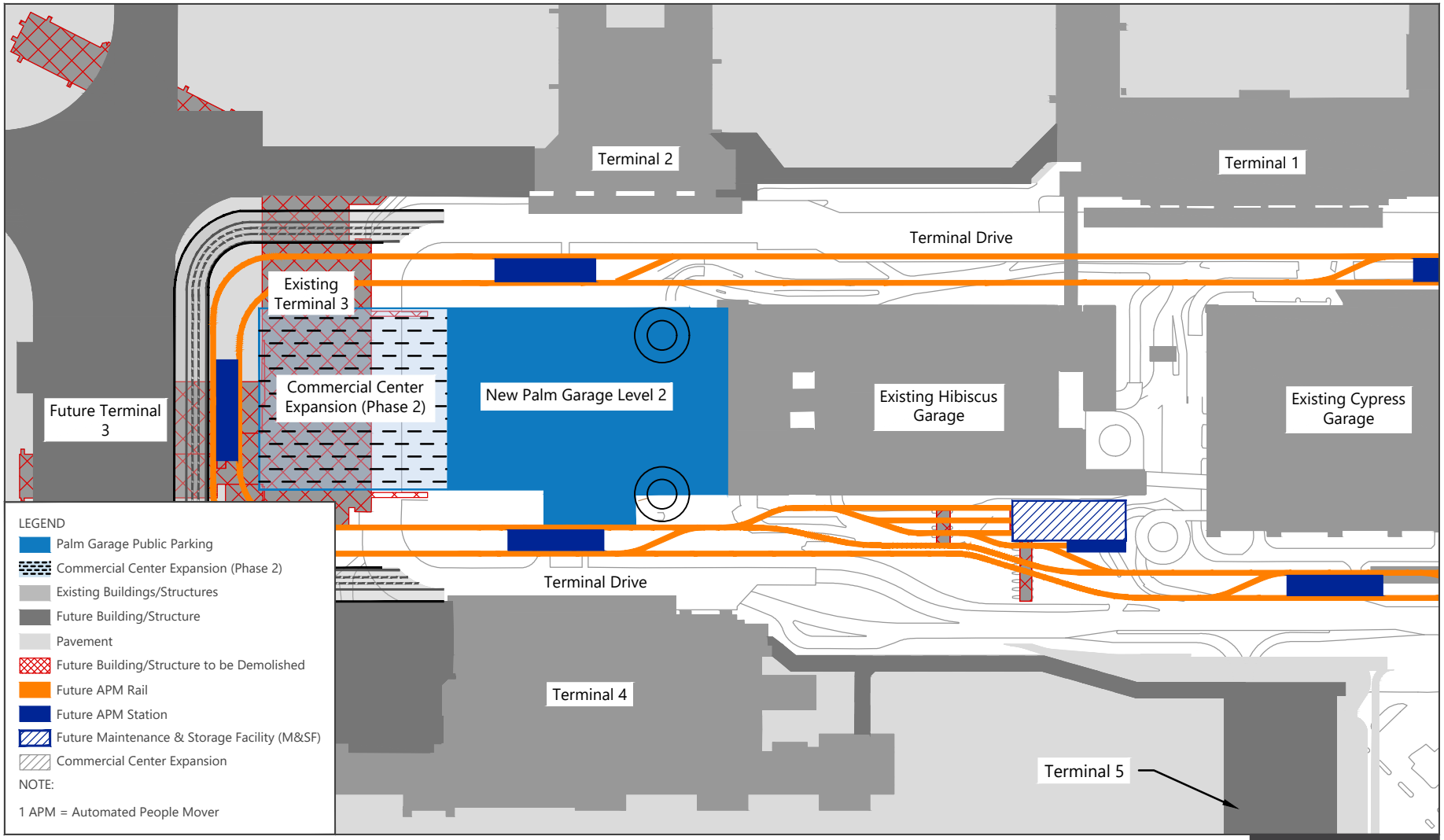

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Quantum Spatial, Inc., 2016 (Basemap); Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.5-4

NORTH 0 300 ft.

Palm Garage Redevelopment Conceptual Floor Plan
Level 2 – Public Parking

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.5-1 - 5.5-17 - Parking Exhibits_2019_1218.dwgLayout: 5.5-4-Palm Level 2 Plotted: Oct 30, 2020, 10:58AM

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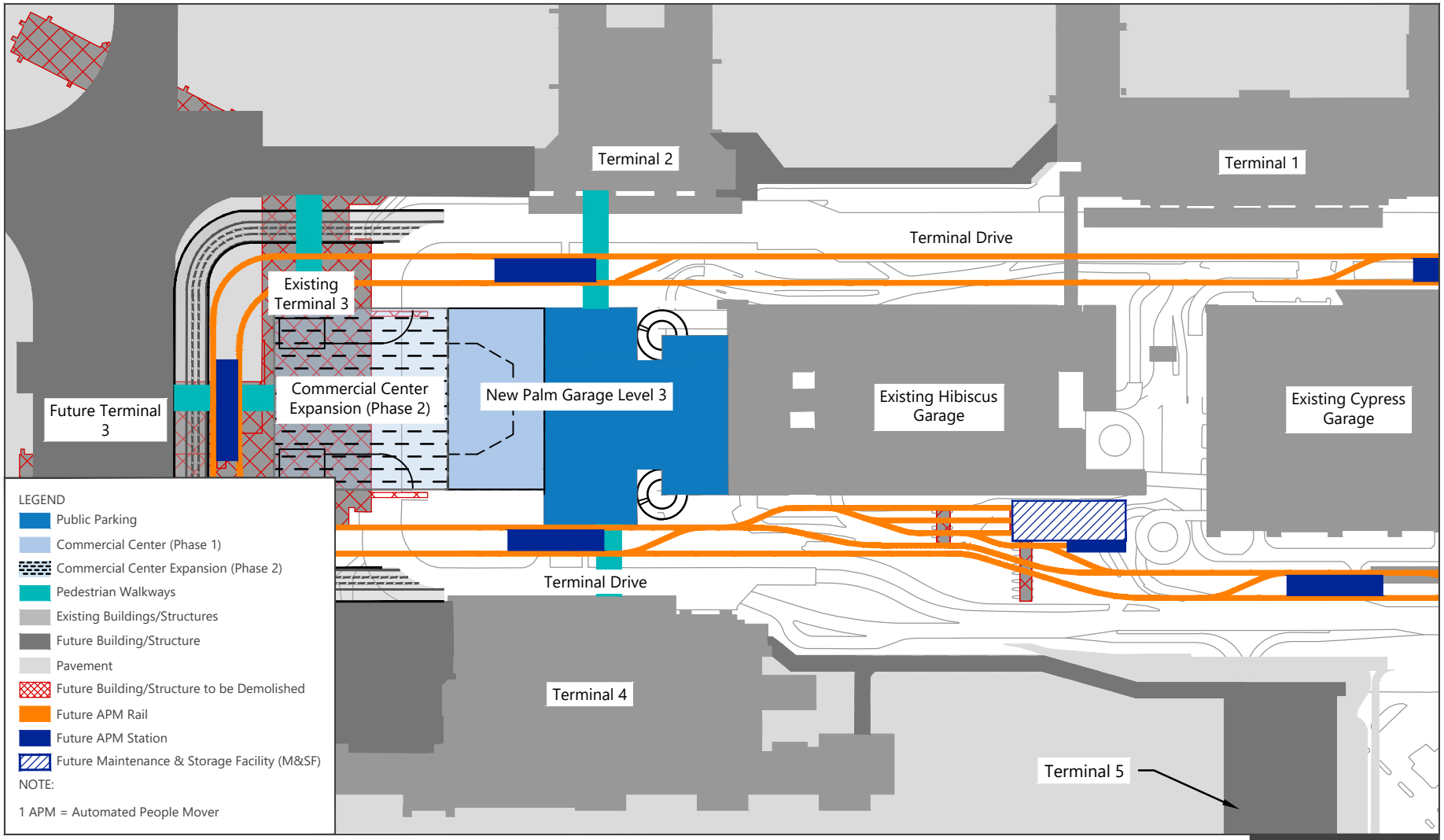

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Quantum Spatial, Inc., 2016 (Basemap); Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.5-5

NORTH 0 300 ft.

Palm Garage Redevelopment Conceptual Floor Plan
Level 3 – Public Parking, Transfer Level and Commercial Center

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.5-1 - 5.5-17 - Parking Exhibits_2019_1218.dwgLayout: 5.5-5-Palm Level 3 Plotted: Oct 30, 2020, 11:09AM

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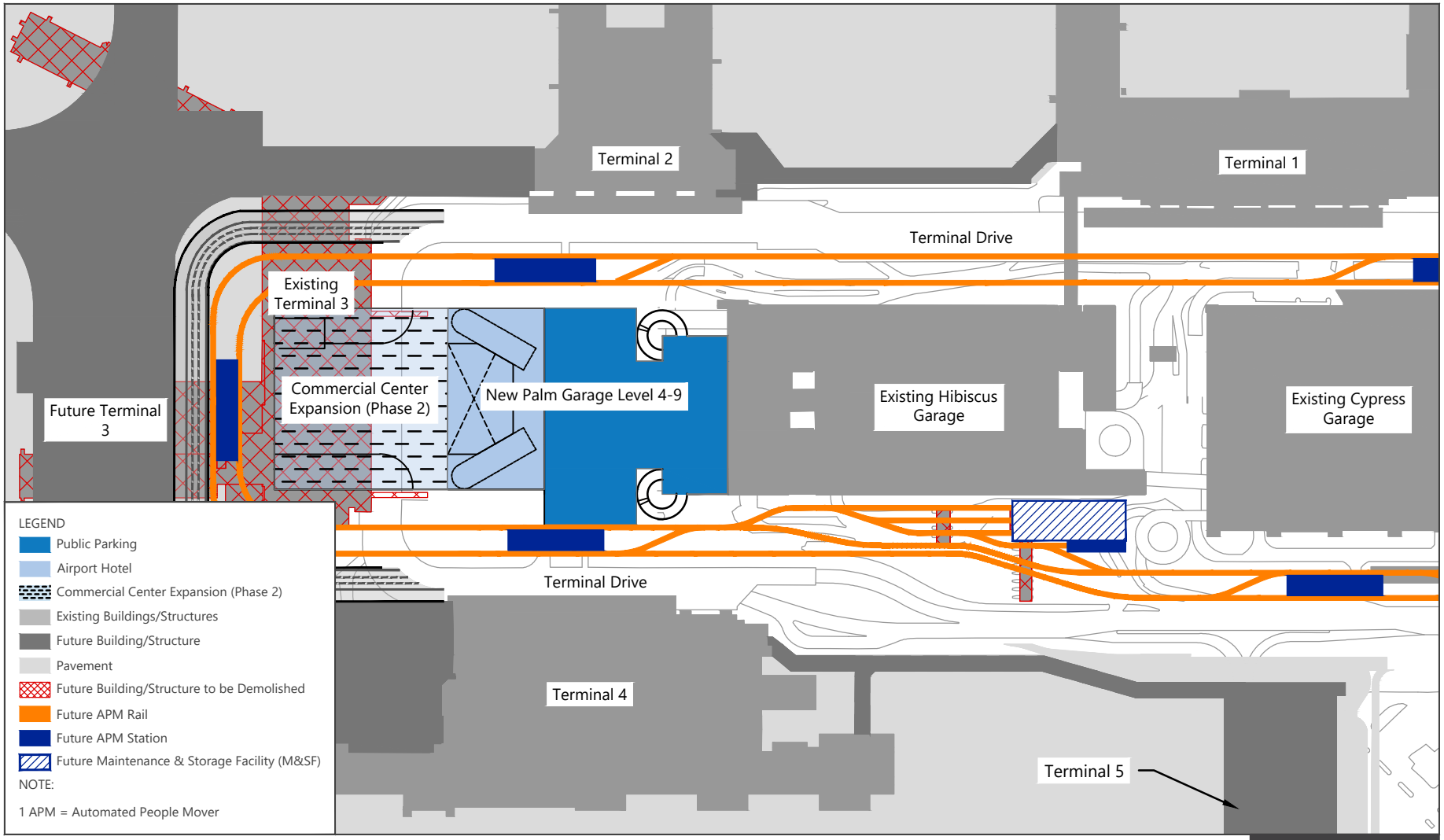

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Quantum Spatial, Inc., 2016 (Basemap); Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.5-6

NORTH 0 300 ft.

Palm Garage Redevelopment Conceptual Floor Plan Levels 4 through 9 - Public Parking and Airport Hotel

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.5-1 - 5.5-17 - Parking Exhibits_2019_1218.dwgLayout: 5.5-6-Palm Level 4 Plotted: Oct 30, 2020, 11:10AM

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- Level 3 – Public Parking, Passenger Transfer and Commercial Center: This level of the Palm Garage would serve as the passenger transfer level and commercial center. Vertical circulation from the GTC and other levels of the parking deck would lead directly to this level for passengers to make their way to each Terminal. The transfer level is the third level, as opposed to the second, to make the passenger connections to the Terminals more seamless and eliminating passenger crosswalks on the terminal roadway system. Additional vertical circulation at the interface with Terminals 2, 3 and 4 would be provided to accommodate this passenger flow.
- Levels 4 through 9 – Public Parking and Airport Hotel: The upper levels of the Palm Garage serve as public parking. On the western side, open space and further vertical commercial developments are planned for the area above the passenger transfer level which include the proposed 300-room hotel with on-site conference center space. On the eastern side, the public parking garage continues upwards with each floor plate matching the existing Hibiscus Garage to the east.

5.5.4 INTERMODAL CENTER PLANNING CONSIDERATIONS

The Broward County Intermodal Center and People Mover System (Sunport PD&E, 2009) study identified the desire to construct an IMC immediately east of FLL. Both BCAD and the FDOT have identified the vacant FDOT ROW parcel within the Airport entrance roadway loop as the preferred site for the IMC. The IMC development proposal may accomplish a variety of goals for the Airport, including:

- Promotion of multi-modal travel by integrating public transit modes including, rail transit modes, the proposed Airport landside APM, and other commercial ground access modes in one location outside of the central terminal area, thereby reducing vehicle trips into the terminal area and creating a regional transportation hub directly connected to the Airport.
- Encouraging the use of mass transit and increased ridership through various transportation methods and amenities. The opportunities within the IMC support various airport users including air travelers, airport employees, and other airport visitors.
- Serving as a long-term capacity solution to the growing employee parking requirement and removing the need for ongoing busing operations to transport employees from parking facilities to the terminal area.
- Other commercial development opportunities, such as office, retail and/or entertainment.

It was determined the IMC would be developed in two phases totaling approximately 6,700-6,900 parking spaces and a level 1 Regional Transportation and Transit Center. Phase 1 would provide approximately 4,500 parking spaces. Phase 2 would provide an additional 2,200 – 2,400 parking spaces. Two phasing alternatives were analyzed to throughout the planning process. Alternative 1 builds the IMC in a north to south phasing plan. The northern portion is constructed in Phase 1 and the southern portion is constructed in Phase 2. The second alternative builds the IMC in a west to east phasing plan. In Alternative 2, the western portion over U.S. 1 is constructed in Phase 1 and the remaining eastern portion is constructed in Phase 2. It was determined that Alternative 2 was the preferred development since the construction over U.S. 1 would be completed in one phase. At this stage, the access and egress plan developed in the Sunport PD&E study for the IMC was incorporated into the master plan analysis. Any modifications to this access plan would be made during future advanced planning studies.

5.5.5 PREFERRED INTERMODAL CENTER ALTERNATIVE

Like the Palm Garage redevelopment, the IMC is envisioned to be a multi-level structure that integrates public transportation, vehicular parking and commercial development. To gain a perspective of how much parking capacity could be incorporated into the IMC, a preliminary site plan for each level was developed. **Exhibit 5.5-7** illustrates the preliminary configuration of Phase 1 of the IMC. **Exhibit 5.5-8** depicts the potential Phase 2 IMC eastern buildout. As shown, each level of the IMC would consist of the following:

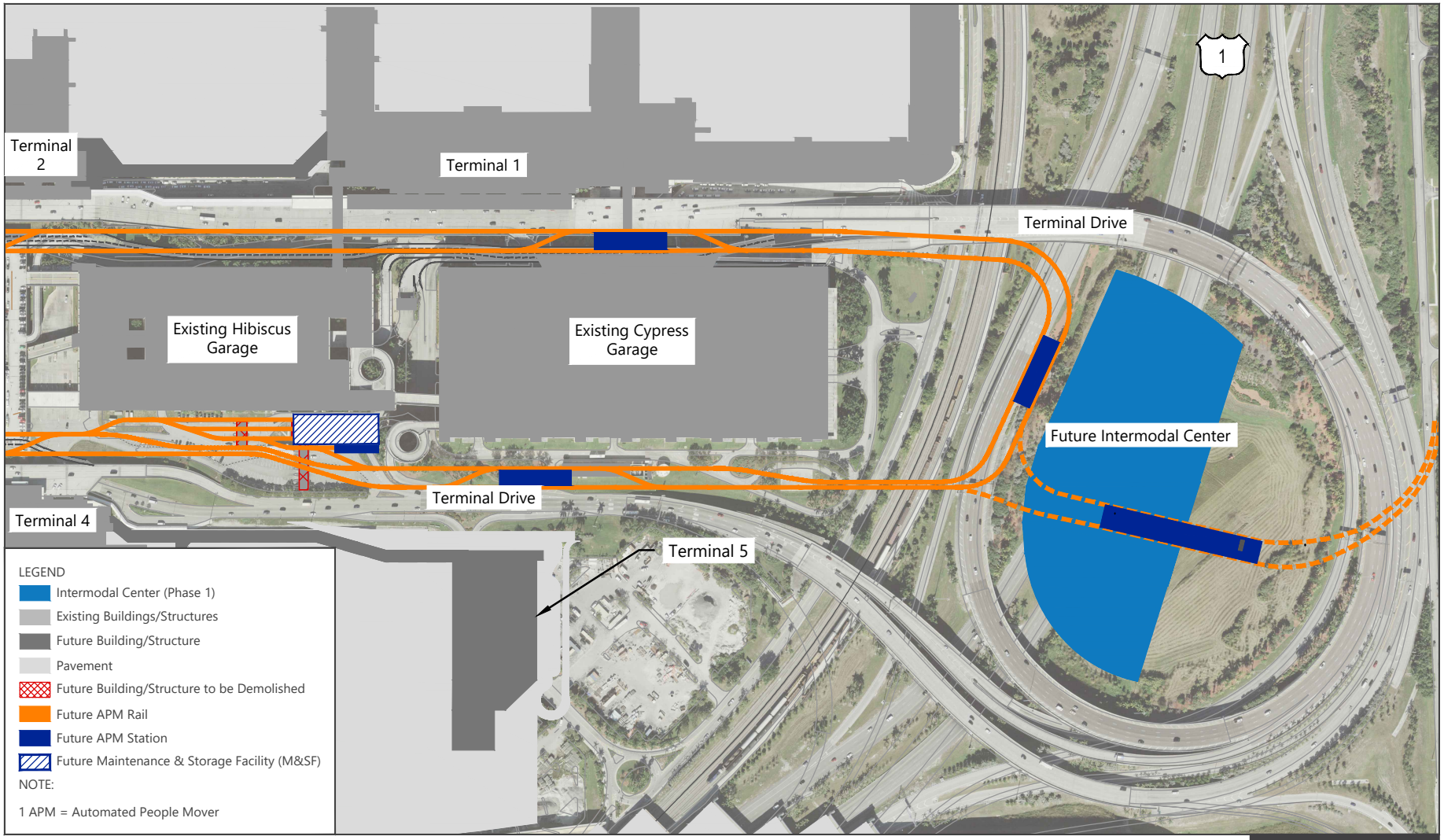
- Level 1 – Regional Transportation and Transit Center: This level is planned to be a regional transportation and transit center for commercial vehicle modes and connections to public bus and other potential mass transit modes.
- Level 2 – Vehicular Parking: This level would be primarily dedicated to vehicular parking and includes passenger vertical circulation located in the central zone to facilitate passenger access to the Regional Transportation and Transit Center and the Upper level amenities including concessions, parking, and leasable space.
- Levels 3 through 5 – Vehicular Parking, Concessions and APM Platform: The parking areas on each of these levels are identical, while the central passenger areas vary. Level 3 would contain concessions areas for passenger convenience, level 4 contains open-air space, and level 5 contains an APM platform. There is passenger vertical circulation located in the central zone to facilitate passenger access to these levels.
- Levels 6 through 8 – Vehicular Parking and Leasable Space: These levels each include parking areas. The interior of level 6 includes a courtyard with an open area. Between the courtyard and the parking areas are levels of leasable space for potential office space or other amenities to be determined in future programming.

Exhibit 5.5-9 depicts a level by level section view of the fully built IMC. **Exhibit 5.5-10** depicts a representative 3D rendering of Phase 1 of the IMC.

5.5.6 POTENTIAL TERMINAL LANDSIDE DEVELOPMENT SCENARIOS

Three development scenarios were considered to accommodate future needs for public parking, employee parking, and rental car capacity. As illustrated on **Exhibits 5.5-11** through **5.5-13,** each of the scenarios reflected the various opportunities for accommodating an expanded rental car facility. All three scenarios provide consideration for the redevelopment of the Palm Garage for public parking and the IMC would accommodate employee parking. The following is a brief summary of the three terminal landside development scenarios:

- Scenario 1 – Maintain/Expand Existing RCC within Cypress Garage: In this scenario, the RCC remains in the Cypress Garage and expands as needed, either onto the public parking levels above, or with a new facility to the east of the Garage. Displaced public parking is accommodated through a redeveloped Palm Garage. The former Avis lot site is protected for further landside development as needed and is not specifically programmed at this time. The IMC is programmed for employee parking and regional transportation integration.
- Scenario 2 – Expand Existing RCC into the Former Avis Lot: In this scenario, the RCC operation is split between the Cypress Garage and the former Avis lot site. Public parking is accommodated in the redeveloped Palm Garage, the Cypress Garage, and on the former Avis lot site as needed. The IMC programming is the same as Scenario 1.



SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Quantum Spatial, Inc., 2016 (Basemap); Zyscovich Architects, *AAF STL2*, July 19, 2018; Kimley-Horn & Associates, Proposed Bus Stop, Pedestrian Bridge and Roadway Alignment, April 9, 2018; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.5-7

NORTH 0 400 ft.

Intermodal Center Phase 1 Overview

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.5-1 - 5.5-17 - Parking Exhibits_2019_1218.dwgLayout: 5.5-7-IMC Phase 1 Plotted: Oct 30, 2020, 11:14AM

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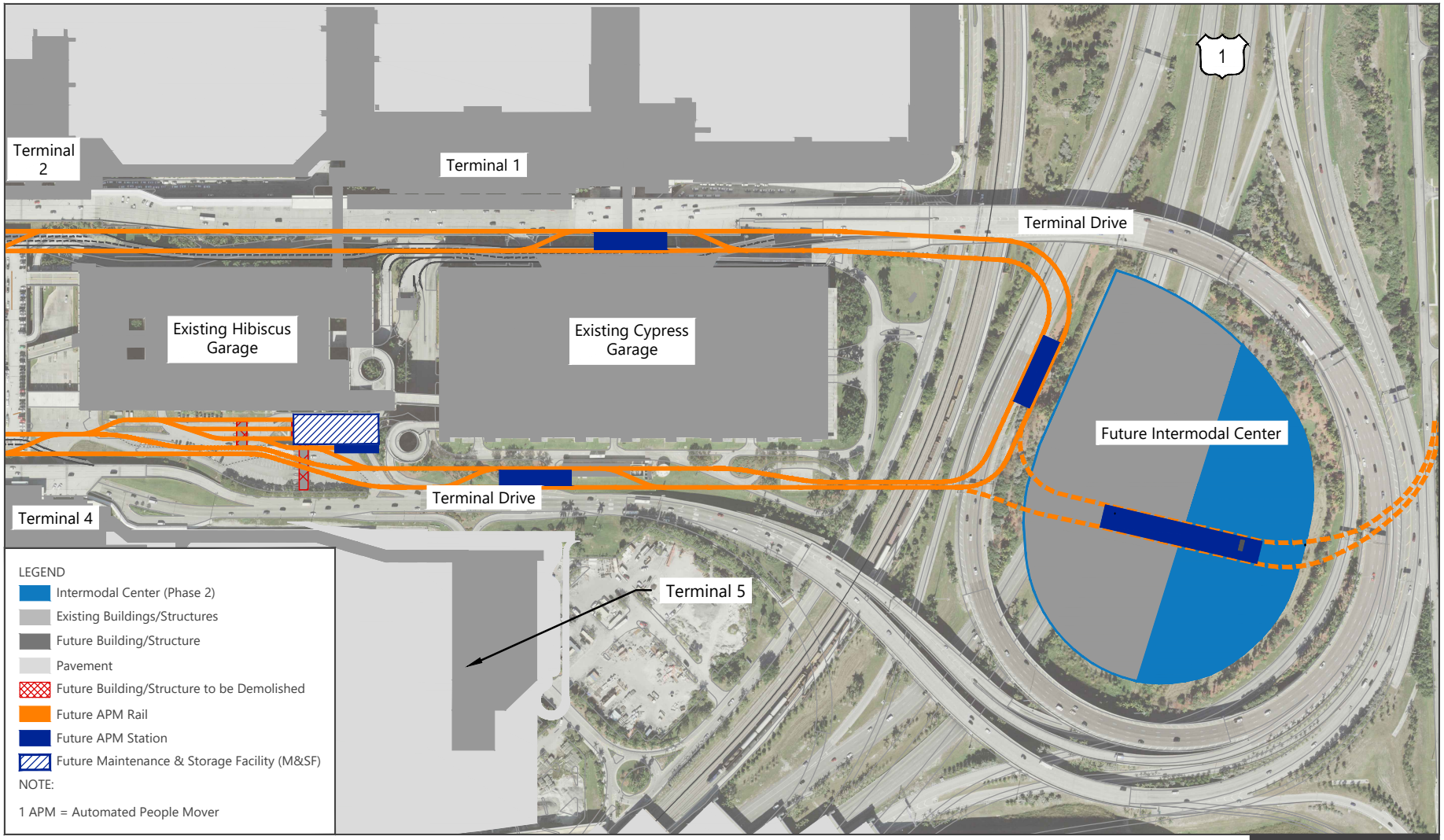

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Quantum Spatial, Inc., 2016 (Basemap); Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.5-8

NORTH 0 400 ft.

Intermodal Center Phase 2 Overview

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.5-1 - 5.5-17 - Parking Exhibits_2019_1218.dwgLayout: 5.5-8-IMC Phase 2 Plotted: Oct 30, 2020, 11:15AM

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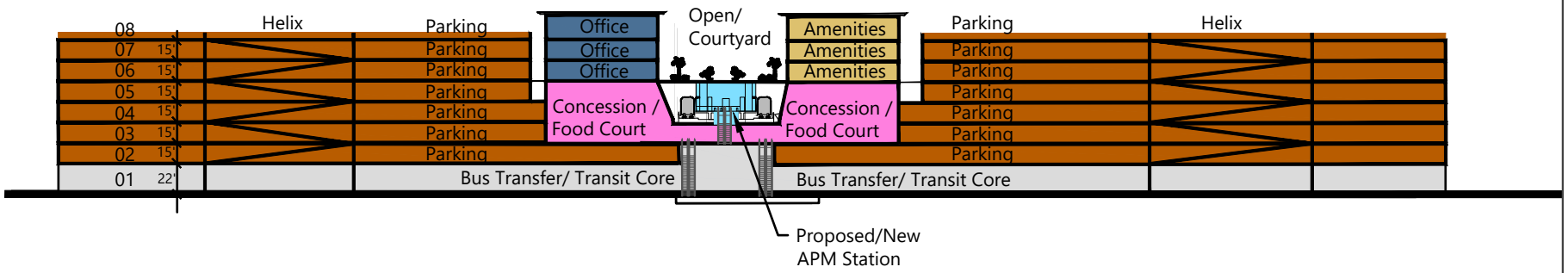

SOURCES: Zyscovich Architects, *AAF STL2,* July 19, 2018; Kimley-Horn & Associates, Proposed Bus Stop, Pedestrian Bridge and Roadway Alignment, April 9, 2018; Ricondo & Associates, Inc., August 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.5-9

NORTH 0 120 ft.

Intermodal Center
Illustrative Section View

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.5-1 - 5.5-17 - Parking Exhibits_2019_1218.dwgLayout: 5.5-9-IMC Section View Plotted: Oct 30, 2020, 11:16AM

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SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.5-10

Representative Rendering
Intermodal Center (Phase 1)

NORTH 0 Not To Scale

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.7 - Final Refinement Renderings_2019_0822.dwgLayout: 5.5-10 Plotted: Oct 30, 2020, 11:16AM

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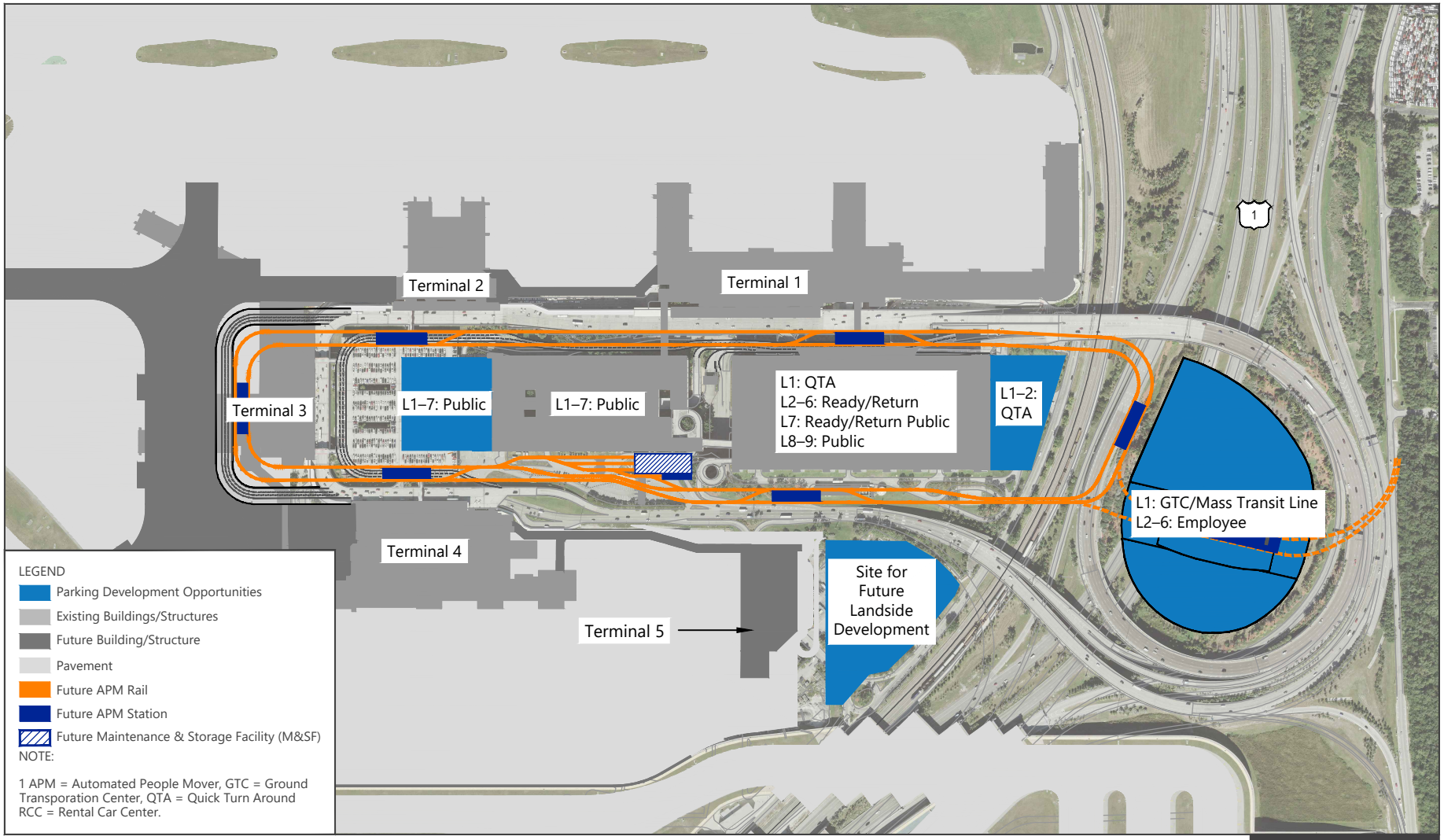

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.5-11

NORTH 0 600 ft.

Parking Development Scenario 1
Maintain/Expand Existing Rental Car Center within Cypress Garage

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.5-1 - 5.5-17 - Parking Exhibits_2019_1218.dwgLayout: 5.5-11-Scenario 1 Plotted: Oct 30, 2020, 11:23AM

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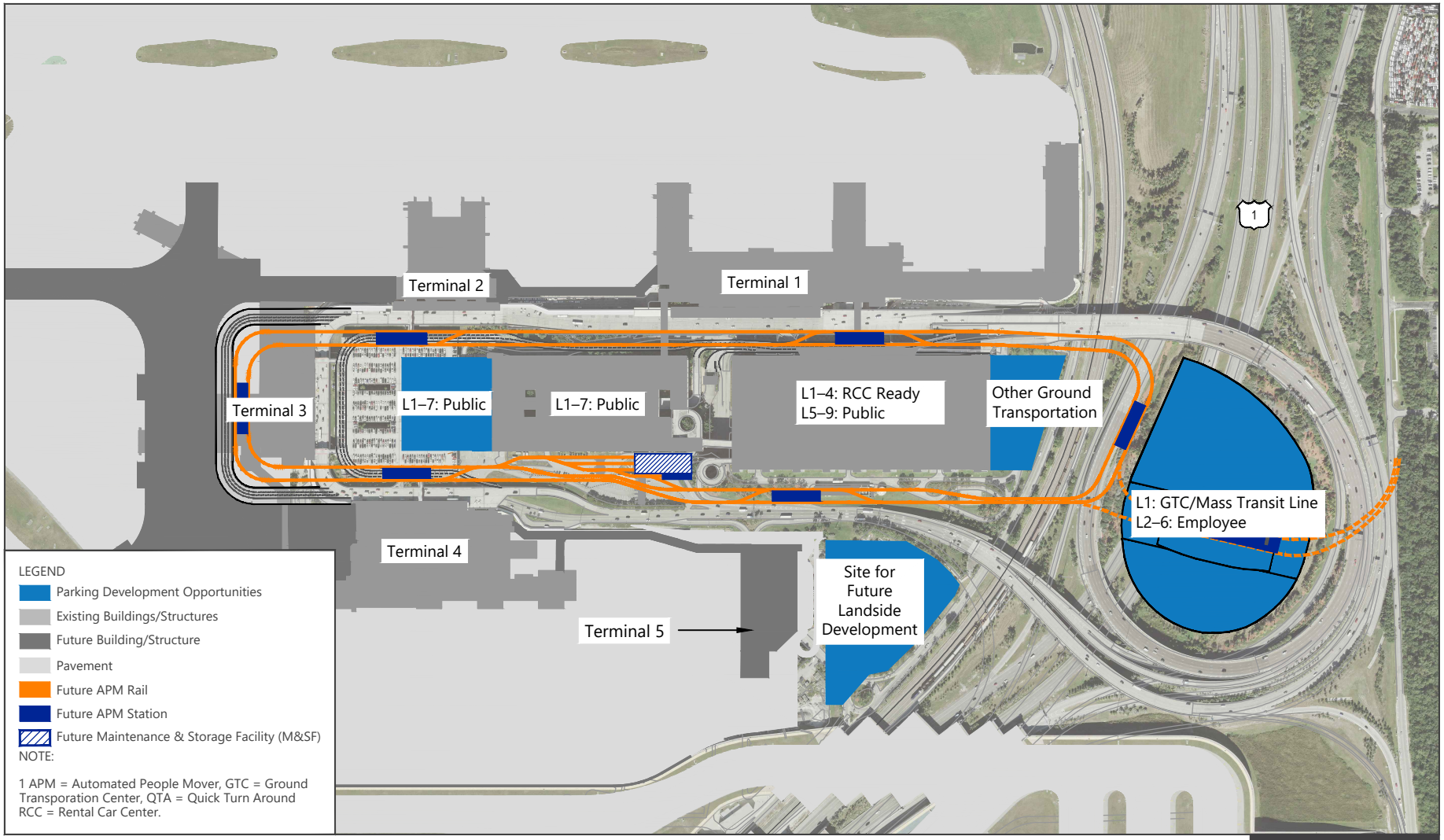

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.5-12

NORTH 0 600 ft.

Parking Development Scenario 2
Expand Existing Rental Car Center into the Former Avis Lot

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.5-1 - 5.5-17 - Parking Exhibits_2019_1218.dwgLayout: 5.5-12-Scenario 2 Plotted: Oct 30, 2020, 11:22AM

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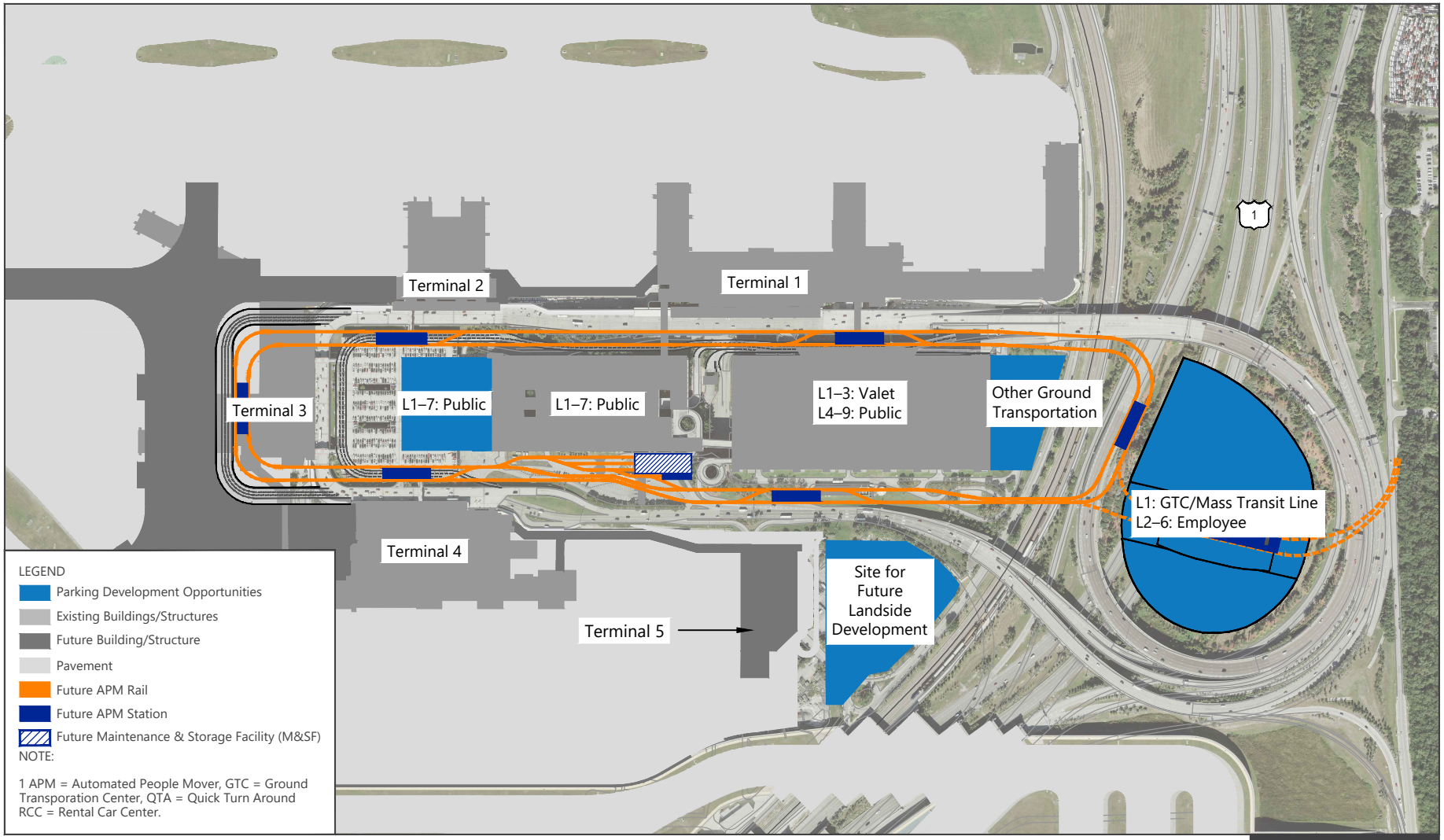

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.5-13

NORTH 0 600 ft.

Parking Development Scenario 3
Relocate Rental Car Center to Former Avis Lot

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.5-1 - 5.5-17 - Parking Exhibits_2019_1218.dwgLayout: 5.5-13-Scenario 3 Plotted: Oct 30, 2020, 11:22AM

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- Scenario 3 - Relocate Entire RCC to Former Avis Lot: In this scenario, the RCC operation is relocated to a new facility on the former Avis lot site. The Cypress Garage then has substantial available capacity to accommodate public parking growth as needed. The IMC programming is the same as in previous scenarios.

A fourth scenario that considered the potential relocation of the RCC out of the terminal area was also considered. Due to the land constraints on and near the Airport, however, a suitable site to relocate the RCC out of the terminal area could not be identified.

5.5.7 PREFERRED TERMINAL LANDSIDE DEVELOPMENT SCENARIO

It was concluded that the former Avis Lot site was not a cost-effective means to accommodate future RCC expansion. Splitting the operation between two sites would create operational inefficiencies for the operators. Full relocation to the former Avis Lot is also not desirable, as the limited size of the site would produce excess parking capacity within the terminal area. Therefore, Scenario 1 was identified as the preferred alternative for expansion for the terminal area's public, employee and RCC needs.

Exhibit 5.5-14 shows the preferred alternative. The former Avis lot site is protected for flexible landside support uses as changing landside needs may dictate. The land to the east of the Cypress Garage is protected for potential RCC expansion. Public parking is accommodated in the redeveloped Palm Garage as well as existing facilities, and the IMC programming remains employee parking, regional ground transportation and rail integration.

5.6 Nonterminal Area Development Alternatives

The alternatives presented in this section were created to accommodate the future Airport demand for the 20-year planning horizon to support Airport/Airline operations and aeronautical/nonaeronautical activities. They are intended to complement the airfield, terminal, landside, and parking alternatives previously discussed. To determine the areas available for nonterminal area development, an evaluation of existing FLL properties was conducted. Three areas, identified as North Airfield, West Airfield, and Remote Airfield, were established for potential nonterminal area development. An analysis of nonterminal development compatibility within each parcel, located within the established areas, culminated in a Preferred Nonterminal Development Plan which depicts the preferred alternatives of various ancillary and airport support development layouts. Parcel Identification depicted on each exhibit remains consistent throughout the section. Areas not needed for terminal development, landside activities, parking, and drainage have been identified as potential sites for various support facilities including but not limited to the following:

- GA / FBO development
- cargo expansion
- AOA access improvements
- fuel farm expansion and/or relocation
- Airport maintenance facilities
- Aircraft Rescue and Firefighting (ARFF) station and Consolidated BCAD Operations Facility
- flight kitchens

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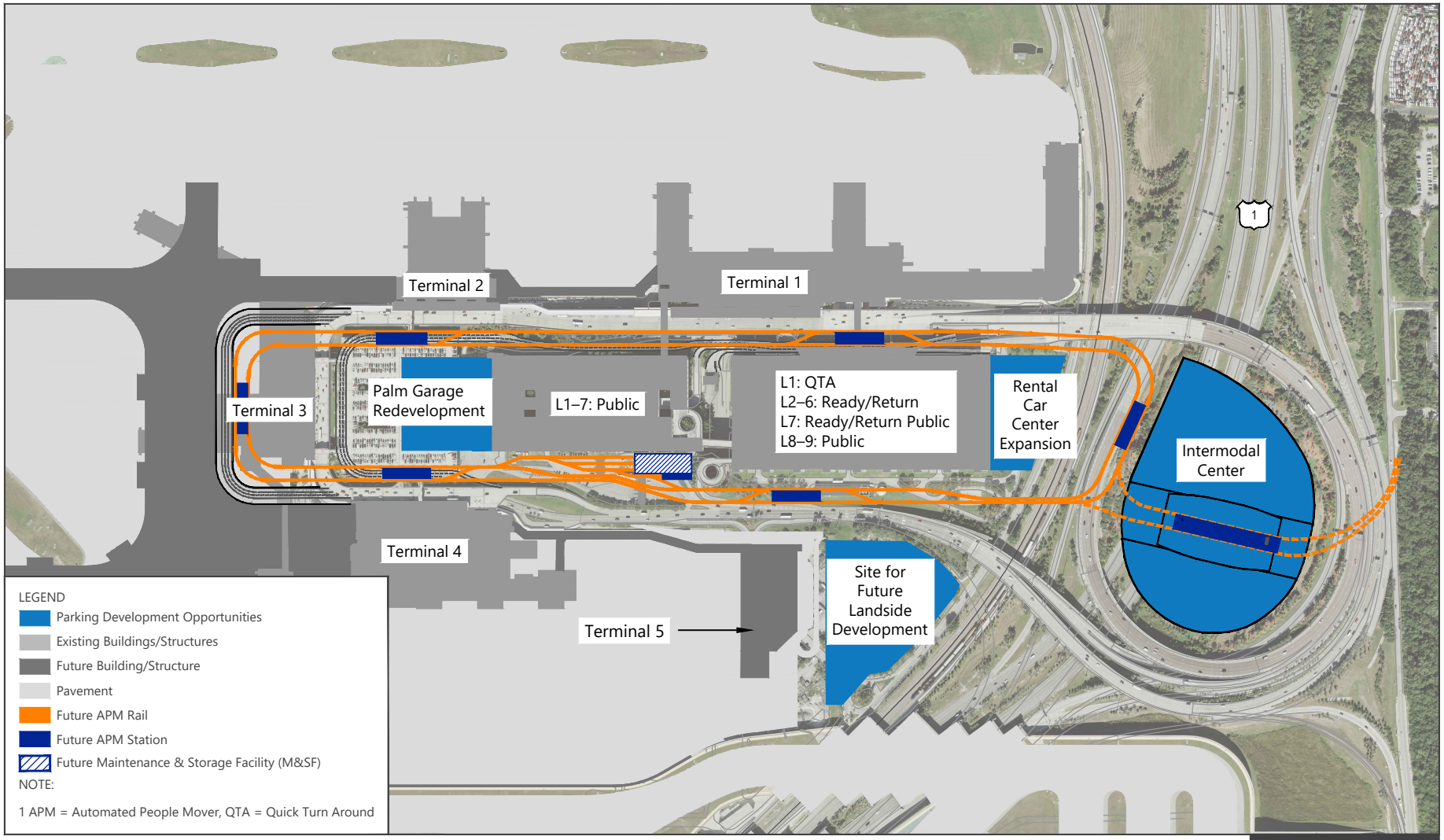

SOURCES: Broward County Aviation Department, *Fort Lauderdale-Hollywood International Airport, Airport Layout Plan*, 2017; Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.5-14

NORTH 0 600 ft.

Preferred Long-Term Parking Scenario

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.5-1 - 5.5-17 - Parking Exhibits_2019_1218.dwgLayout: 5.5-14-Pref Long Term Plotted: Oct 30, 2020, 11:21AM

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5.6.1 AIRPORT DEVELOPMENT AREAS

Approximately 213 acres of Airport property are either currently vacant or have been identified for potential redevelopment. For discussion purposes, the land has been separated into three distinct development areas:

- North Airfield Parcels (68 acres) – north of Runway 10L-28R
- West Airfield Parcels (54 acres) – west of the existing terminal facility and crossover taxiways, between Runway 10L-28 and Runway 10R-28L
- Remote Airport Parcels (91 acres) – areas located east and west of FLL, separated from the Airport by a public road or canal

The areas that are contiguous to the airfield (North and West Airfield Parcels) would be prioritized for aeronautical uses that require direct access to the airfield, while the Remote Airport Parcels would be prioritized for aviation support functions or for nonaeronautical uses that do not require direct airfield access and/or nonaeronautical development. **Exhibit 5.6-1** presents the areas suitable for nonterminal area development.

In addition to areas currently owned by Broward County, one property adjacent to existing Airport property is being considered for acquisition. **Exhibit 5.6-2** illustrates the location of this property, which is identified as Parcel A and is approximately 2 acres. The acquisition of this property would provide BCAD with additional developable land to support future nonaeronautical development.

To provide the optimum use of Airport property, it is important to evaluate a property's physical characteristics and constraints. Various alternative developments were considered, but the preferred alternatives are shown below. The preferred alternative developments were selected following discussions and working meetings with BCAD staff. The following considerations have been applied to the preferred alternatives discussed in the following subsections.

- airside access and proximity to the taxiway and runway system
- landside access
- proximity to compatible support functions
- potential future expansion opportunities
- environmental considerations
- zoning and land use regulations
- utility and drainage considerations

Alternative development took into consideration the preservation of existing drainage areas and potential future drainage requirements for future development. **Exhibit 5.6-3** illustrates the area reserved for future stormwater drainage.

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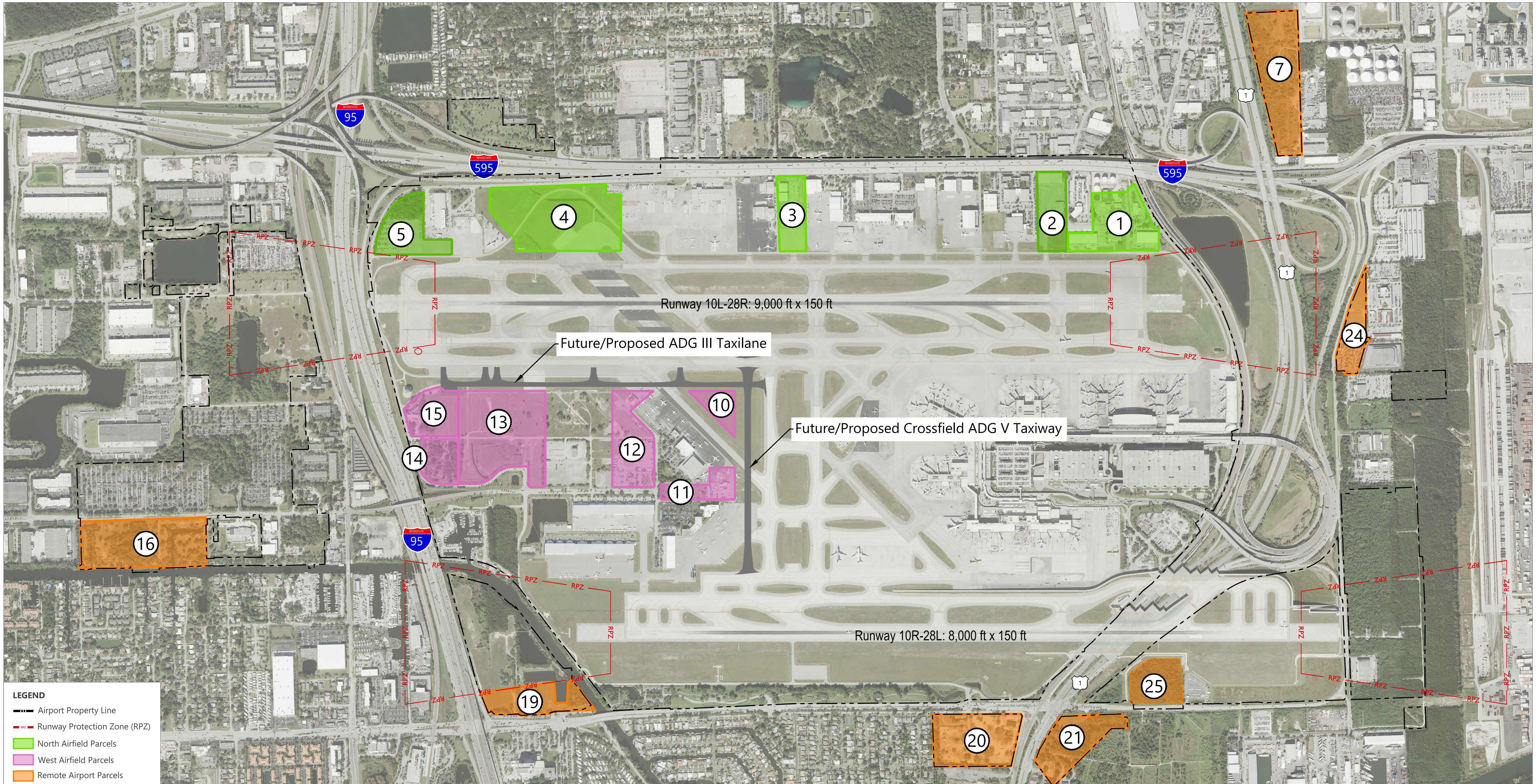

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-1

NORTH 0 1,200 ft.

Airfield Development Areas (North Airfield, West Airfield, Remote Airport Parcels)

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-01 Airfield Develop Parcels Plotted: Oct 30, 2020, 11:39AM

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SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-2

NORTH 0 1,200 ft.

Potential Property Acquisition Opportunities

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-02 Property Acquisitions Plotted: Oct 30, 2020, 11:40AM

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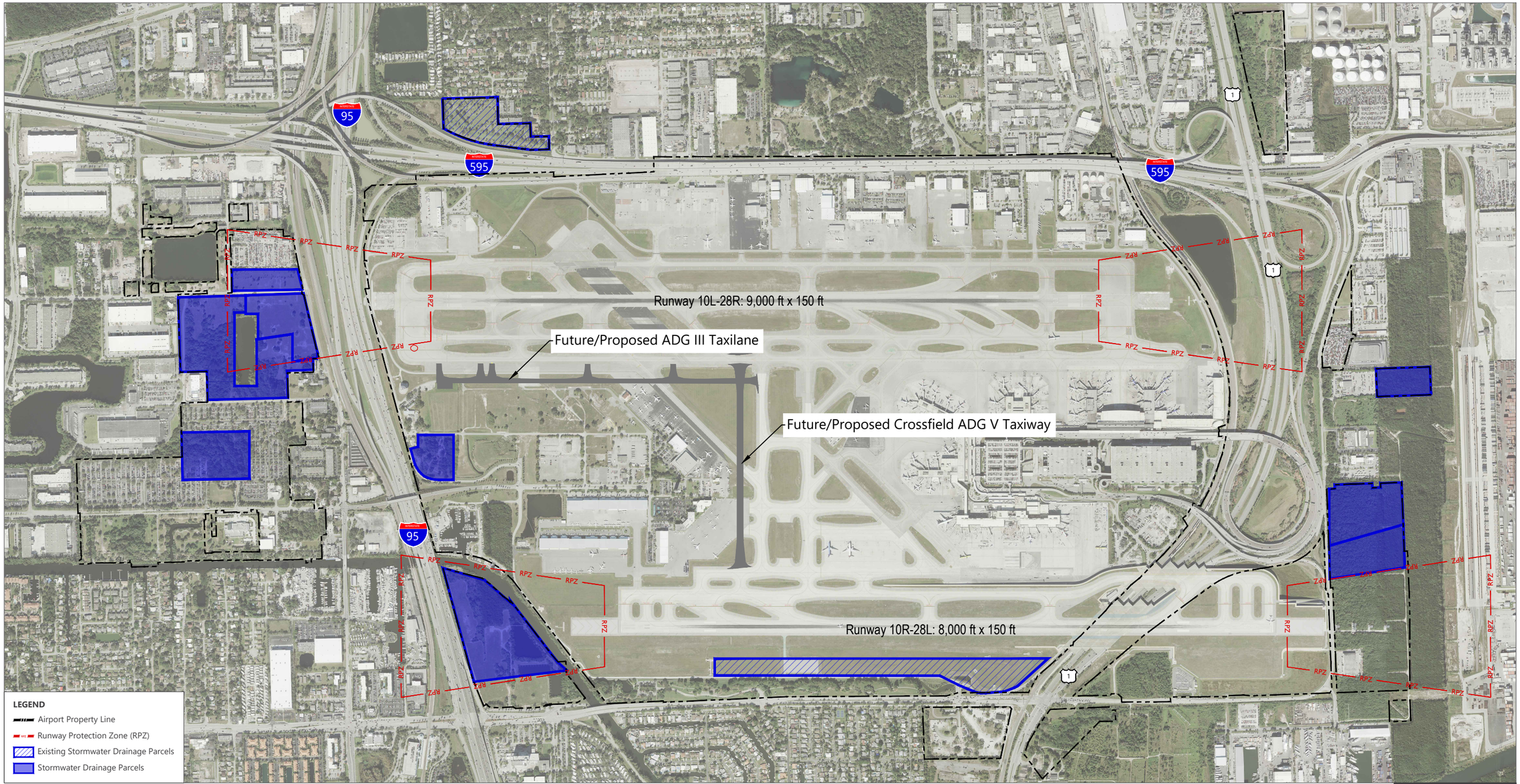

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-3

NORTH 0 1,200 ft.

Stormwater Drainage Considerations

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-03 Stormwater Plotted: Oct 30, 2020, 11:41AM

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Those areas available for future nonterminal area development alternatives are detailed in the following subsections. An overview of the three areas of the Airport (North Airfield, West Airfield, and Remote Airport Parcels) containing developable space is presented first. Each parcel's preferred use based upon multiple planning charettes with BCAD staff and stakeholders is further discussed in subsequent sections (e.g., GA/FBO, cargo, Airport maintenance).

5.6.1.1 North Airfield Parcels

The North Airfield Parcels 1 through 5 are located between I-595 and Runway 10L-28R, as illustrated on **Exhibit 5.6-4**. These parcels have direct airfield access and are suitable for tenant-driven aeronautical development, such as GA development, air cargo activity, and Airport/Airline support facilities development. Throughout the planning process, alternativities were developed and evaluated for Parcels 1 through 5. **Table 5.6-1** presents each parcel's acreage and a list of potential uses, as well as the preferred use based upon BCAD and stakeholder input.

Table 5.6-1: North Airfield Parcels Alternatives Analysis

	AIRPORT PARCEL				
POTENTIAL USE	**1 (12 ACRES)**	**2 (8 ACRES)**	**3 (7 ACRES)**	**4 (31 ACRES)**	**5 (9 ACRES)**
Aeronautical Demand-Driven Development	X			X	X
BCAD Maintenance		X			X
Air Cargo	X	X			X
Fuel Farm Expansion	X				X
GA Development		X	X		
Vehicular AOA Airside Access Improvements	X	X			X

NOTES: X = Parcel Can Support Use; X = Preferred Use

GA = General Aviation; AOA = Airport Operations Area

SOURCE: Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., August 2019.

Depending on the ultimate use of Parcels 2 and 5, airfield improvements may be necessary to provide adequate taxiway design standards for the size of aircraft utilizing the facilities. As an example, cargo operators could necessitate the increase in access taxiway width and associated design surfaces to ADG IV. This scenario was evaluated as part of the alternatives evaluation; it is illustrated on **Exhibit 5.6-5**. The creation of an access taxilane to support Parcel 2 may require the relocation of existing Taxiway connector A5 to prevent a direct aircraft access route from a future tenant's apron to Runway 10L-28R. A replacement ADG-V compatible connector is depicted on Exhibit 5.6-5 which is relocated to the east by 407'.

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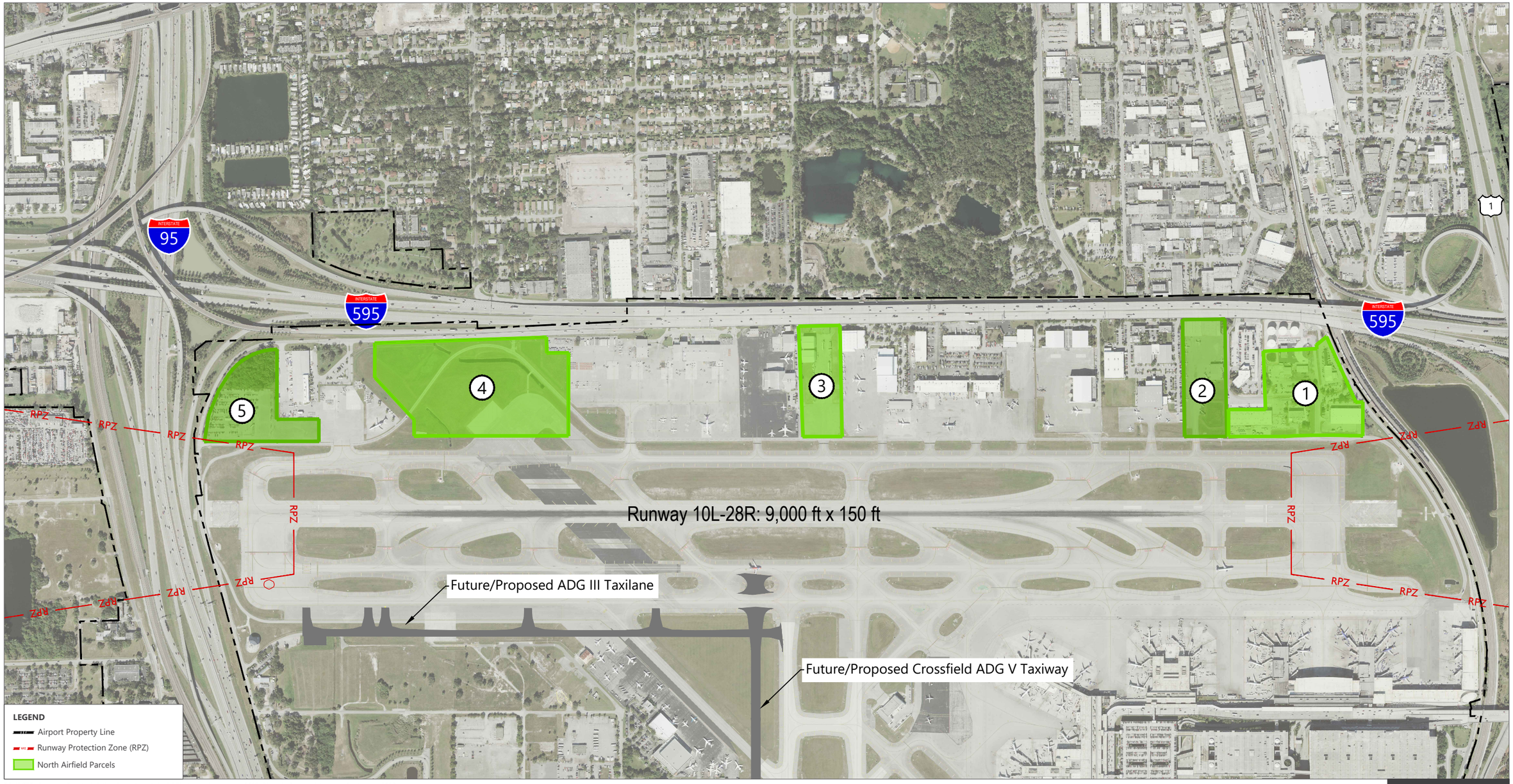

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-4

NORTH 0 800 ft.

Potential Aviation Tenant and Support Facility Locations
North Airfield Parcels

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-04 North Airfield Plotted: Oct 30, 2020, 11:42AM

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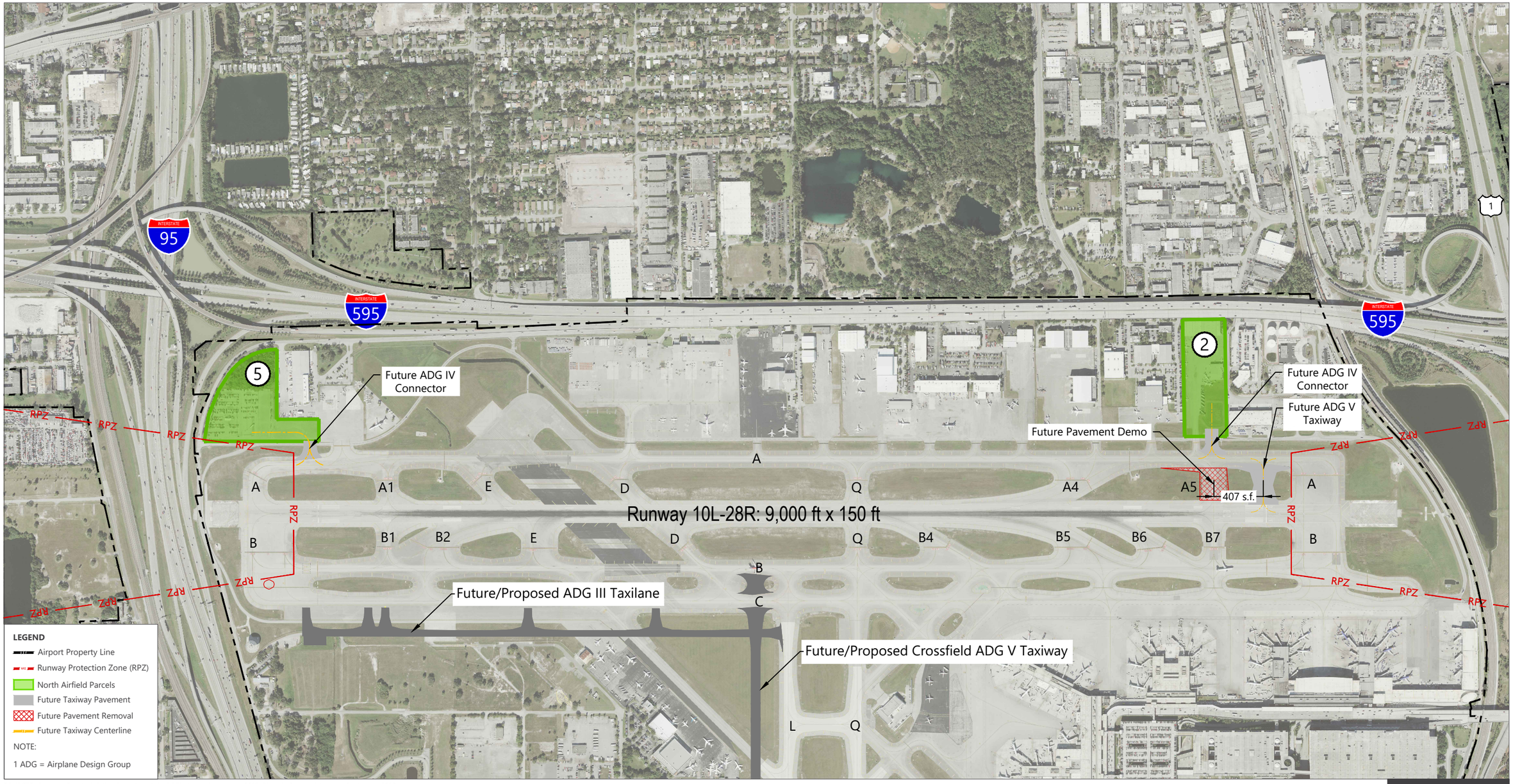

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-5

NORTH 0 800 ft.

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-05 Parcel 2 and 5 Plotted: Oct 30, 2020, 11:43AM

Airside Accessibility Considerations
North Airfield Parcels (Parcels 2 and 5)

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5.6.1.2 West Airfield Parcels

The West Airfield Parcels are located between Runway 10L-28R and Runway 10R-28L on the west side of the airfield, as illustrated on **Exhibit 5.6-6**. Parcels 10 and 13 are vacant greenspaces with airfield access to the north and mid airfield. Parcels 11, 12, and 15 have existing structures, but they could be repurposed for a better use to serve future tenant-driven development needs. Based upon BCAD and stakeholder input, these west airfield parcels were recommended for future GA development, aeronautical-driven demand, future ATCT tower relocation, an ARFF station, and Consolidated BCAD Operations Facility). Parcel 14 was originally contemplated for support facility development but was ultimately identified by BCAD as the optimum drainage site to provide stormwater mitigation in order to enable development within the west airfield area. Therefore, Parcel 14 was not considered for any additional support facility development. As discussed in **Section 5.2**, an ADG III taxilane is recommended to reduce airfield congestion in the west airfield area. The ADG III taxilane will connect the relocated crossfield taxiway and will also provide access to the new relocated and expanded U.S. Customs and Border Protection facility apron, as discussed in Section 5.6.3. **Table 5.6-2** lists each parcel's acreage, along with the supported and preferred development.

Table 5.6-2: West Airfield Parcels Alternatives Analysis

	AIRPORT PARCEL				
POTENTIAL USE	10 (4 ACRES)	11 (5 ACRES)	12 (12 ACRES)	13 (25 ACRES)	15 (8 ACRES)
Aeronautical Demand-Driven Development			X		
ARFF and Consolidated BCAD Operations Facility	X	X			
U.S. Customs and Border Protection (GA aircraft processing)	X				X
Fuel Farm Expansion					X
GA Development	X	X		X	X

NOTES: X = Parcel Can Support Use; X =Preferred Use

ARFF = Aircraft Rescue and Firefighting; GA = General Aviation

SOURCE: Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., March 2019.

5.6.1.3 Remote Airport Parcels

Airport-owned parcels that fall outside the contiguous Airport boundary are reserved for support facilities or functions that do not require direct airfield or terminal access and/or nonaeronautical development. Seven parcels are designated as Remote Airport Parcels; these parcels are illustrated on **Exhibit 5.6-7**. Parcel seven is co-owned with Port Everglades (Port) and future development would require prior coordination between BCAD and the Port. It should be noted that this section does not include those remote parcels identified in the MPU as being required for stormwater management or those parcels that are currently occupied. **Table 5.6-3** presents the preferred usage for these parcels, which is based on BCAD and stakeholder input.

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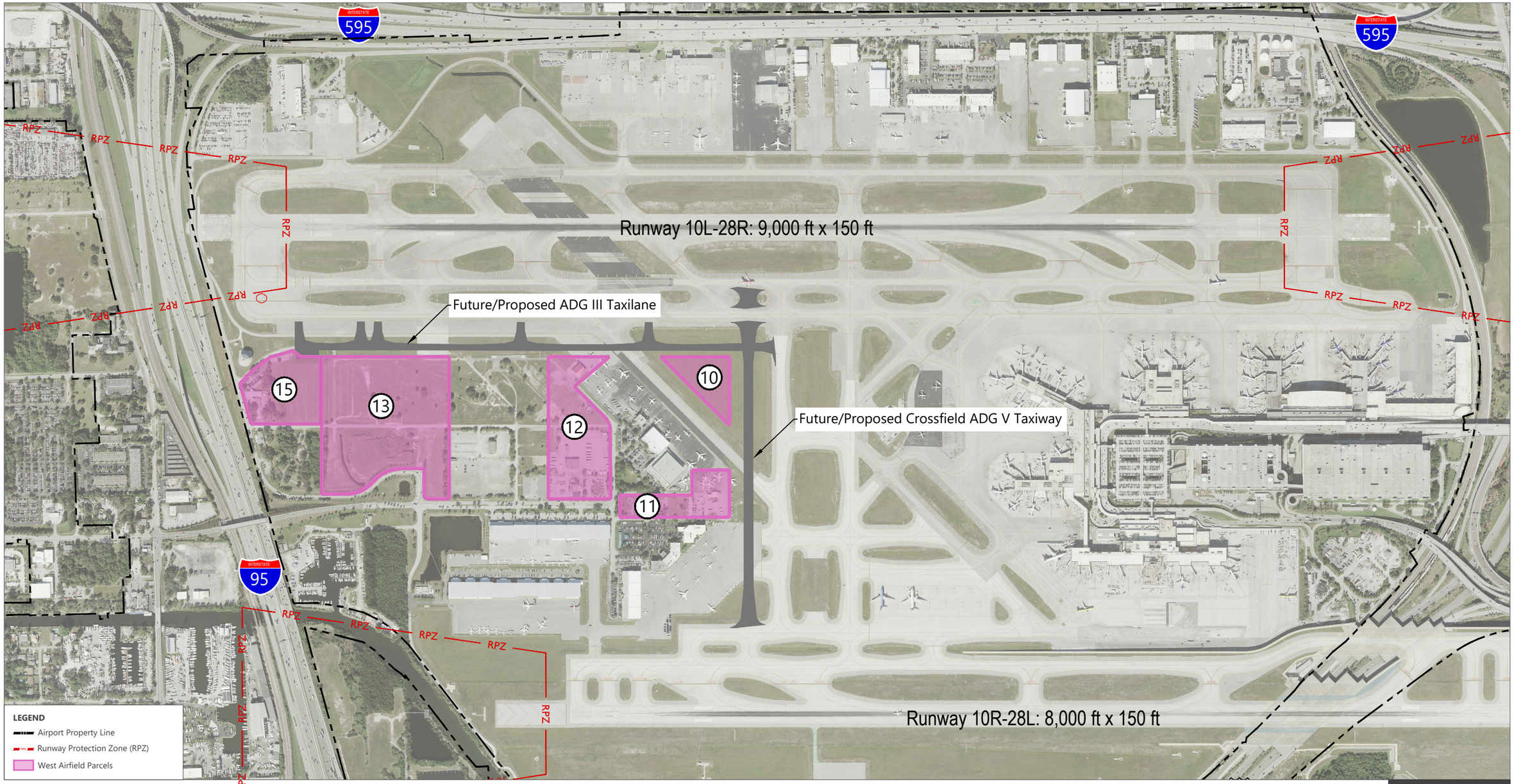

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-6

NORTH 0 800 ft.

Potential Aviation Tenant and Support Facility Locations
West Airfield Parcels

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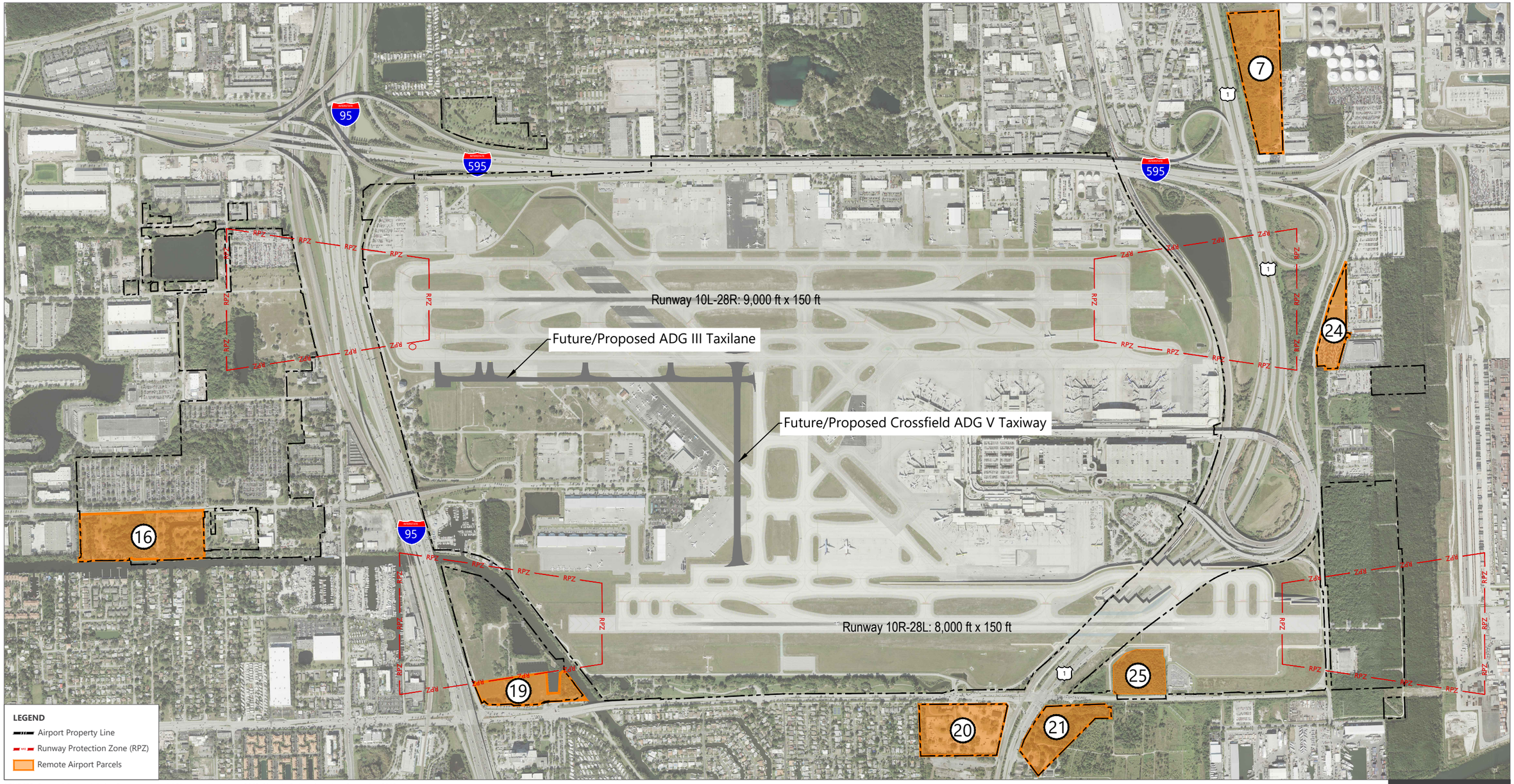

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-7

NORTH 0 1,200 ft.

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-07 Remote Parcels Plotted: Oct 30, 2020, 11:45AM

Potential Aviation Tenant and Support Facility Locations
Remote Airport Parcels

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Table 5.6-3: Remote Airport Parcels Alternatives Analysis

POTENTIAL USE	AIRPORT PARCEL 7 (19 ACRES)	16 (23 ACRES)	19 (8 ACRES)	20 (16 ACRES)	21 (12 ACRES)	24 (6 ACRES)	25 (7 ACRES)
BCAD Maintenance		X					
Flight Kitchen		X					
Nonaeronautical	X		X	X	X	X	X
Ground Transportation/Landside Support				X	X		X
Retention			X				

NOTES: X = Parcel Can Support Use; X = Preferred Use

SOURCE: Ricondo & Associates, Inc., March 2019.

PREPARED BY: Ricondo & Associates, Inc., August 2019.

5.6.2 GENERAL AVIATION (GA) / FIXED-BASE OPERATOR (FBO)

The existing GA areas support a variety of aircraft activity and storage needs, including FBO facilities, corporate aviation storage, and maintenance hangars. This section discusses future demand requirements and the proposed alternatives for GA/FBO development. GA demand is forecasted to be 41,300 operations and 94 based aircraft in PAL 3. The space requirement for additional GA/FBO development is forecast to be 11 acres by PAL 3 and is anticipated to require the following facilities:

- 290,400 square feet for hangar development
- 154,000 square feet for vehicular parking
- 25,700 square feet for CBP parking apron

Five parcels are identified as suitable sites for GA/FBO development, as illustrated on **Exhibit 5.6-8**. The proposed locations have been identified due to their adjacency to the airfield and their available landside access. Preferred alternative refinement found the best parcels for GA/FBO facilities and infrastructure were Parcels 3, 13, and 15.

Two alternatives were developed to conceptualize GA/FBO development for West Airfield parcels 12, 13 and 15.

- Alternative 1, presented on **Exhibit 5.6-9**, depicts an expansion of an existing leasehold to the northeast, with the addition of two corporate hangars and an expansion of the existing parking lot. The existing apron will be expanded to encompass portions of Pond K to provide additional aircraft parking.
- Alternative 2, presented on **Exhibit 5.6-10**, presents a larger parcel to meet the existing and future business needs. This parcel, east of I-95 and south of Taxiway C, would provide the opportunity for a greenfield development site to meet their long-term needs. Aircraft would utilize the planned ADG III taxilane serving the westside parcels for primary site access.

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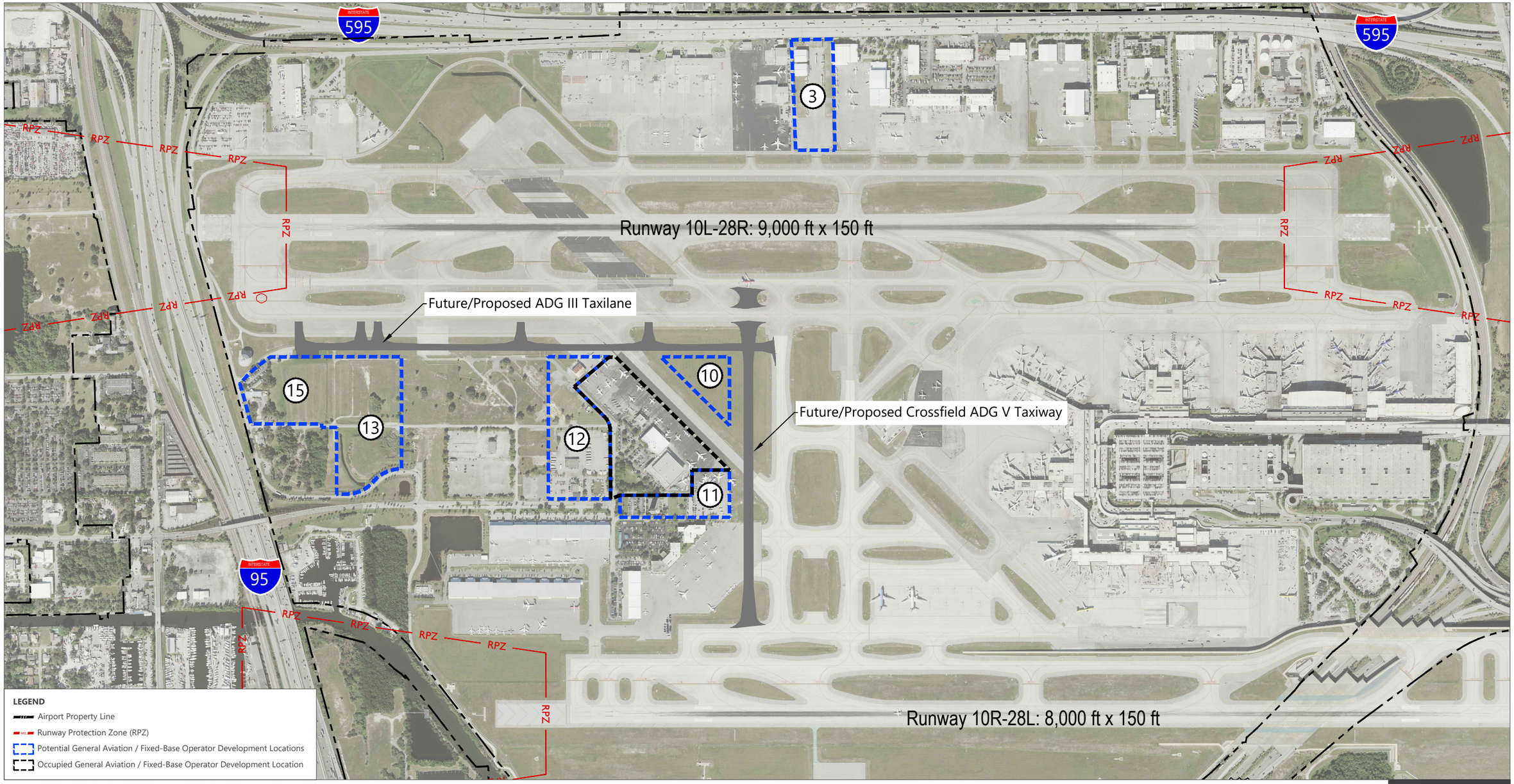

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-8

NORTH 0 800 ft.

General Aviation / Fixed-Base Operator Development Location Alternatives

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-08 GA Parcels Plotted: Oct 30, 2020, 11:45AM

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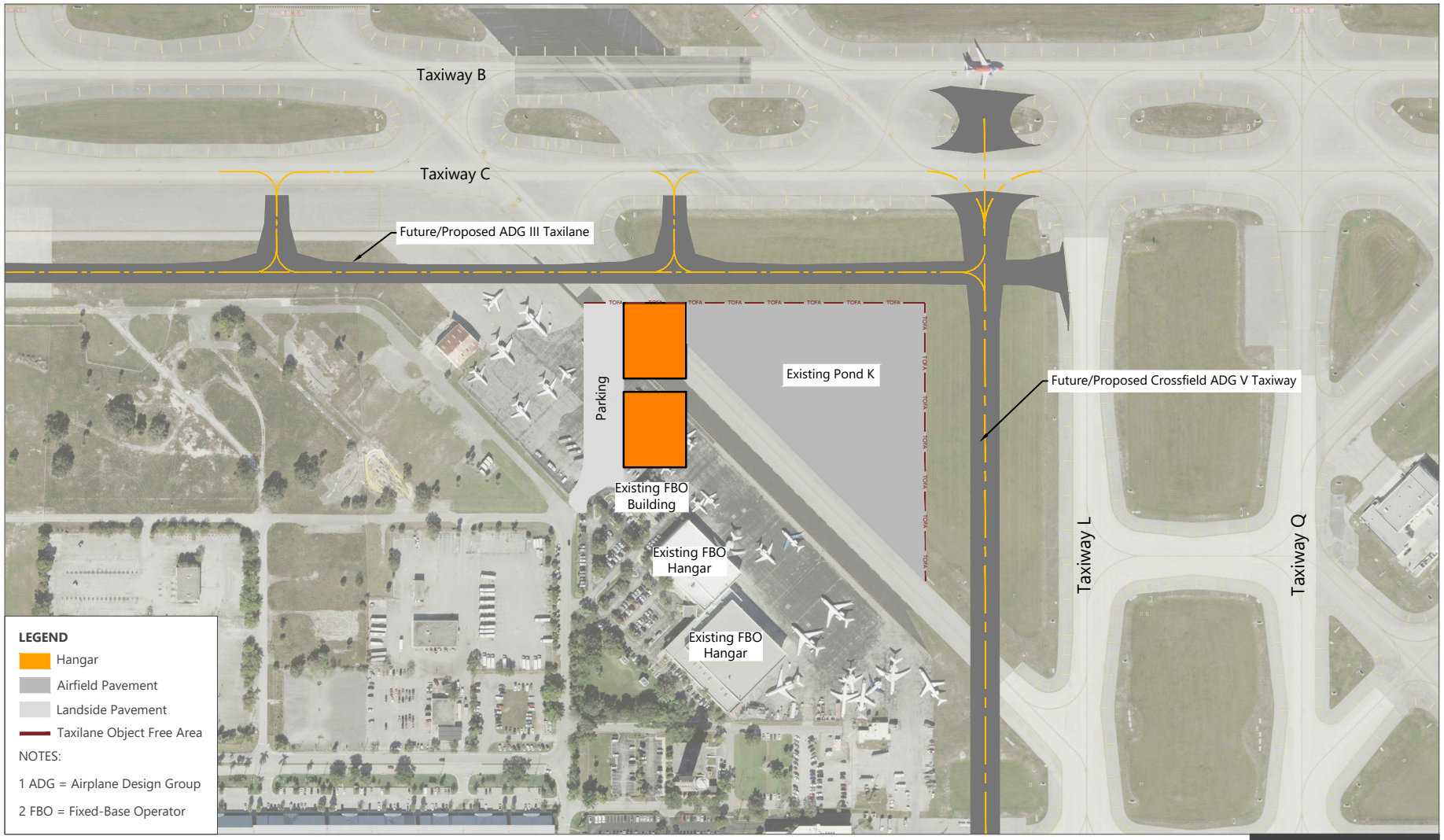

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-9

NORTH 0 400 ft.

Fixed-Base Operator Facility Expansion/Redevelopment
Alternative 1 - Signature Redevelopment

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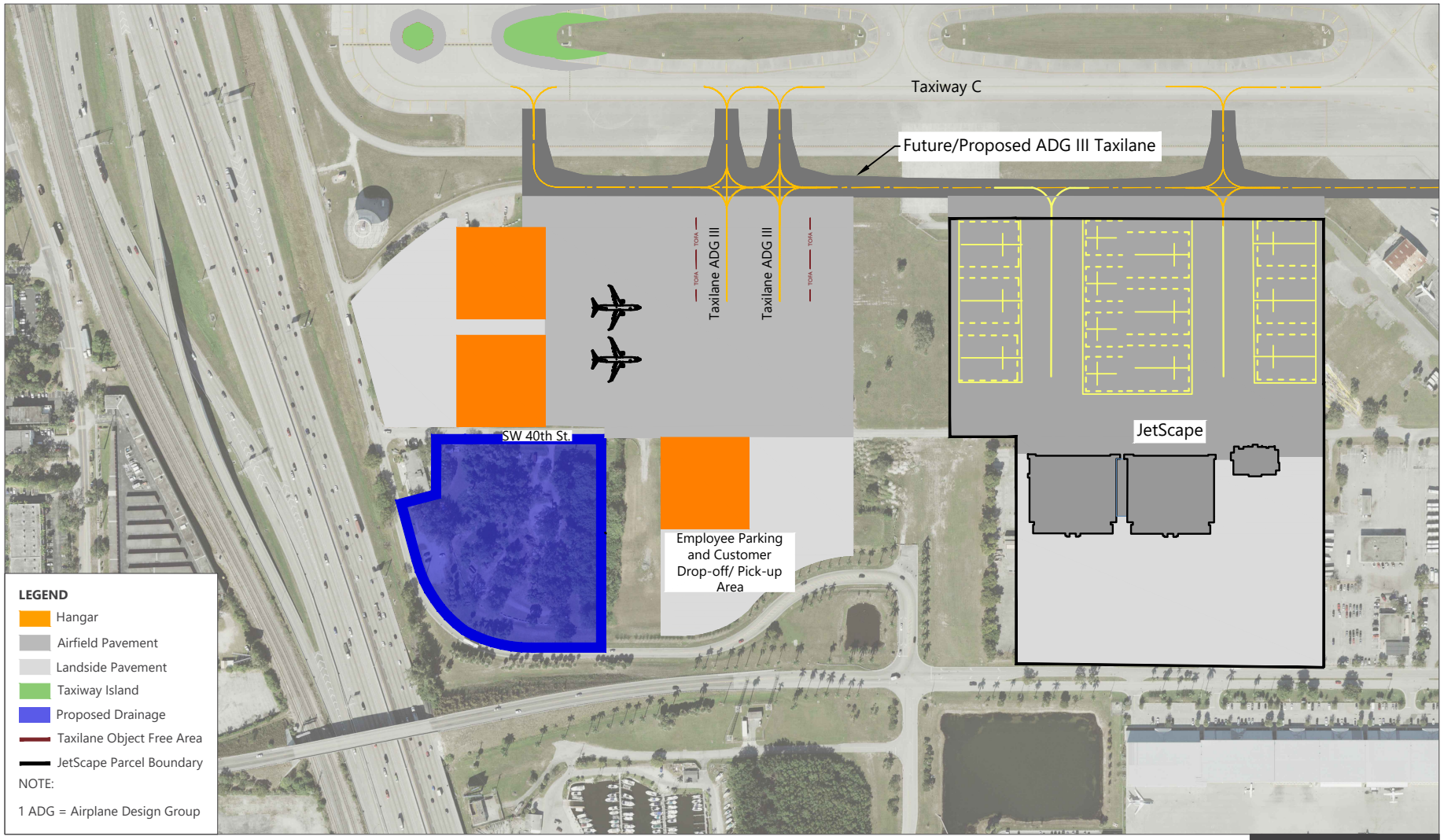

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-10

NORTH 0 400 ft.

Fixed-Base Operator Facility Expansion/Redevelopment
Alternative 2 - Signature Relocation

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-10 Sig Relo Plotted: Nov 6, 2020, 12:55PM

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Alternative 2 is the preferred alternative given it allows BCAD the flexibility to repurpose the areas in Alterative 1 (including Parcel 10) for the U.S. Customs and Border Protection (CBP) facility, a new ARFF and Consolidated BCAD Operations facility. Further, the remaining facilities not impacted from future development could be repurposed and leased to a new and/or existing GA/FBO tenant. **Exhibit 5.6-11** depicts a representative 3D rendering of the Alternative 2 development.

5.6.3 U.S. CUSTOMS AND BORDER PROTECTION (CBP)

The existing CBP facility and apron will be displaced by the future crossfield taxiway needed to support the Master Plan's terminal development program. The space requirement for a relocated CBP apron and passenger processing facility is forecast to be 3 to 4 acres and include the following facility elements:

- 10,000-square-foot building
- 75,000 square feet for apron, vehicular parking, and support space
- aircraft parking to include up to a Boeing BBJ (737 variant) and three Gulfstream G-550 aircraft

Two sites were identified as suitable for accommodating a proposed CBP facility, West Airfield Parcels 10 and 15, as illustrated on **Exhibit 5.6.-12.** Based on its site configuration and centralized location, Parcel 10 was selected as the preferred site for the relocated CBP facility. Users will access the facility by the proposed ADG III taxilane from the north. Once processed, the taxiing aircraft will exit the CBP apron onto the relocated crossfield taxiway. **Exhibit 5.6-13** illustrates the preferred CBP relocation alternative. **Exhibit 5.6-14** depicts a representative 3D rendering of the preferred development.

5.6.4 CARGO EXPANSION AND OTHER AERONAUTICAL DEVELOPMENT ALTERNATIVES

The existing air cargo facilities at the Airport are located north of Runway 10L-28R. These facilities were determined to be adequate to meet future demand over the 20-year planning horizon in terms of cargo tonnage and operations. However, the existing belly cargo facility is currently serving other airline functions. Therefore, the existing belly cargo building, located in the Northeast quadrant of the Airport, is fully occupied by Delta Air Lines, Southwest Airlines, and a cargo handling company, and is not able to serve future growth in belly cargo facility needs. Since this existing facility cannot accommodate additional belly cargo activity due to its limited facility space; an expansion of this facility to the east is possible to provide additional square footage. **Exhibit 5.6-15** depicts a representative 3D rendering of the belly cargo expansion.

The development of cargo alternatives focused on site redevelopment and contingency plans for a new entrant or greater cargo activity than forecasted. **Exhibit 5.6-16** illustrates four locations, North Airfield Parcels 1, 2, and 4, that may be utilized to support future cargo operations and could provide adequate airside and landside access. The preferred use for Parcel 5 is cargo development. It should be noted that a cargo tenant utilizing aircraft with wingspans greater than ADG III will trigger the additional taxiway improvements previously detailed on Exhibit 5.6-5.

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SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-11

NORTH 0 Not To Scale

Representative Rendering
General Aviation/Fixed-Base Operator Development Parcel

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.7 - Final Refinement Renderings_2019_0822.dwgLayout: 5.6-11 Plotted: Oct 30, 2020, 11:31AM

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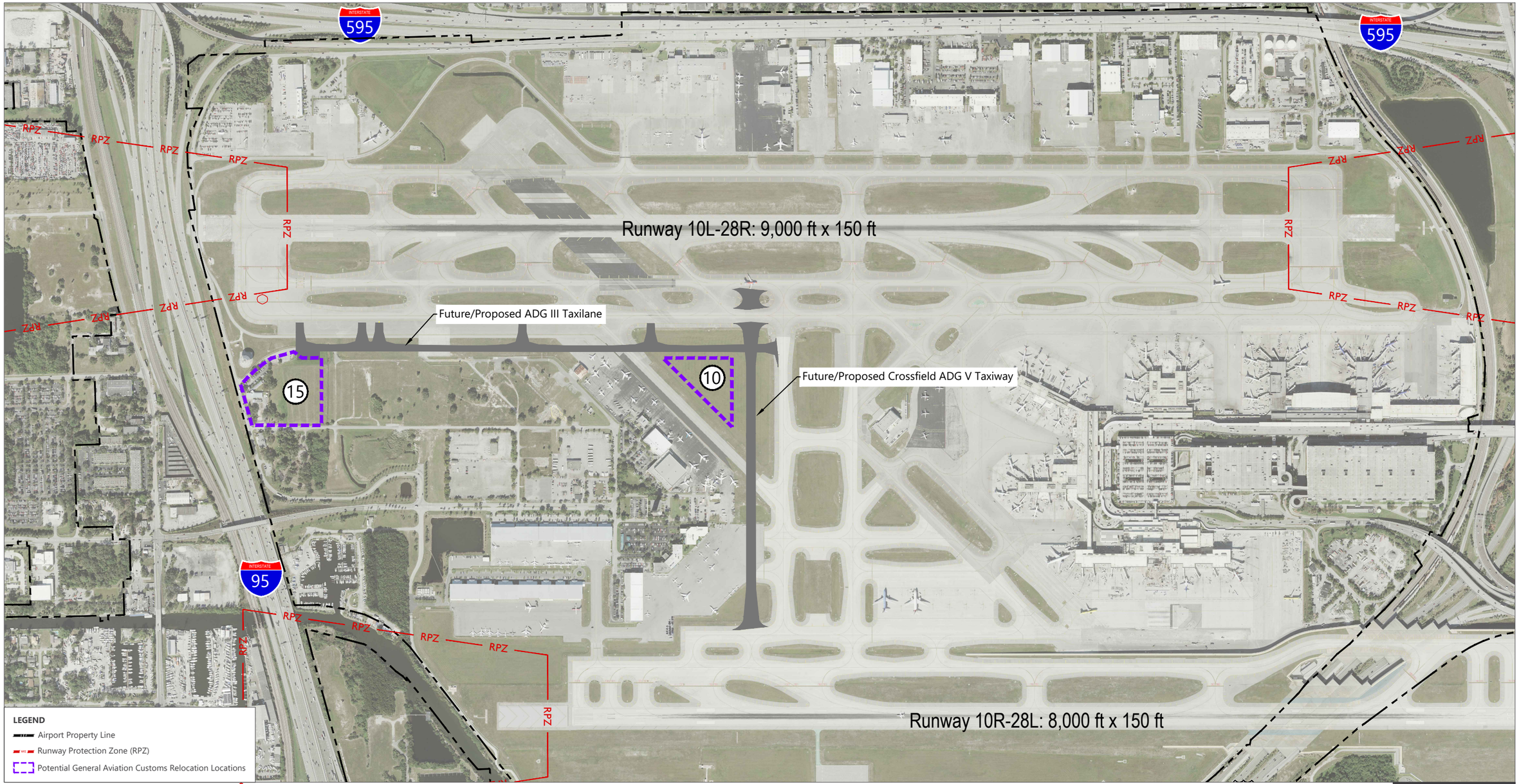

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-12

NORTH 0 800 ft.

U.S. Customs and Border Protection Relocation Sites

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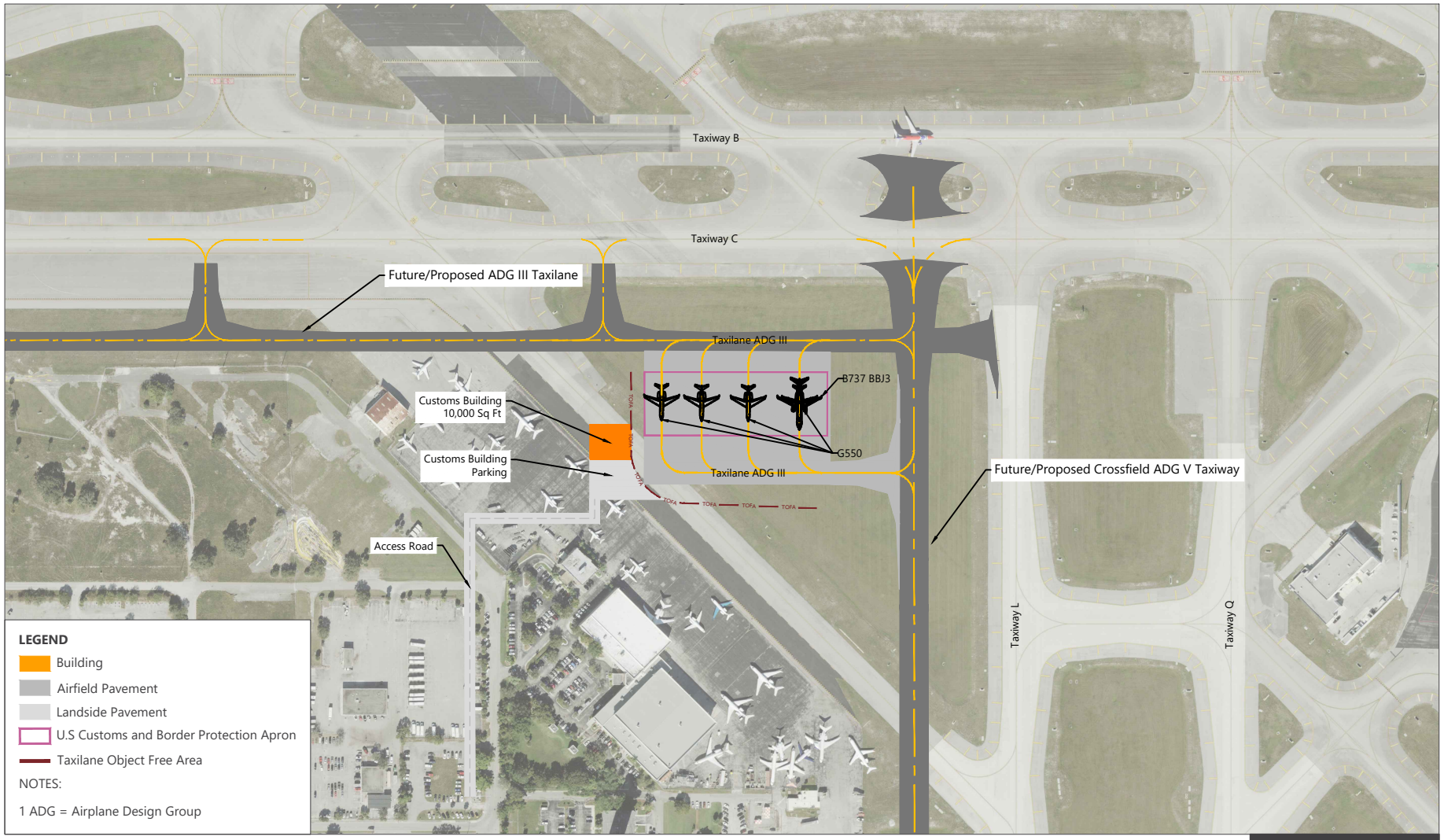

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-13

NORTH 0 400 ft.

Preferred U.S. Customs and Border Protection Relocation Alternative

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SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-14

NORTH 0 Not To Scale

Representative Rendering
U.S. Customs & Border Patrol (General Aviation Facility)

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SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-15

NORTH 0 Not To Scale

Representative Rendering
Belly Cargo Facility Expansion

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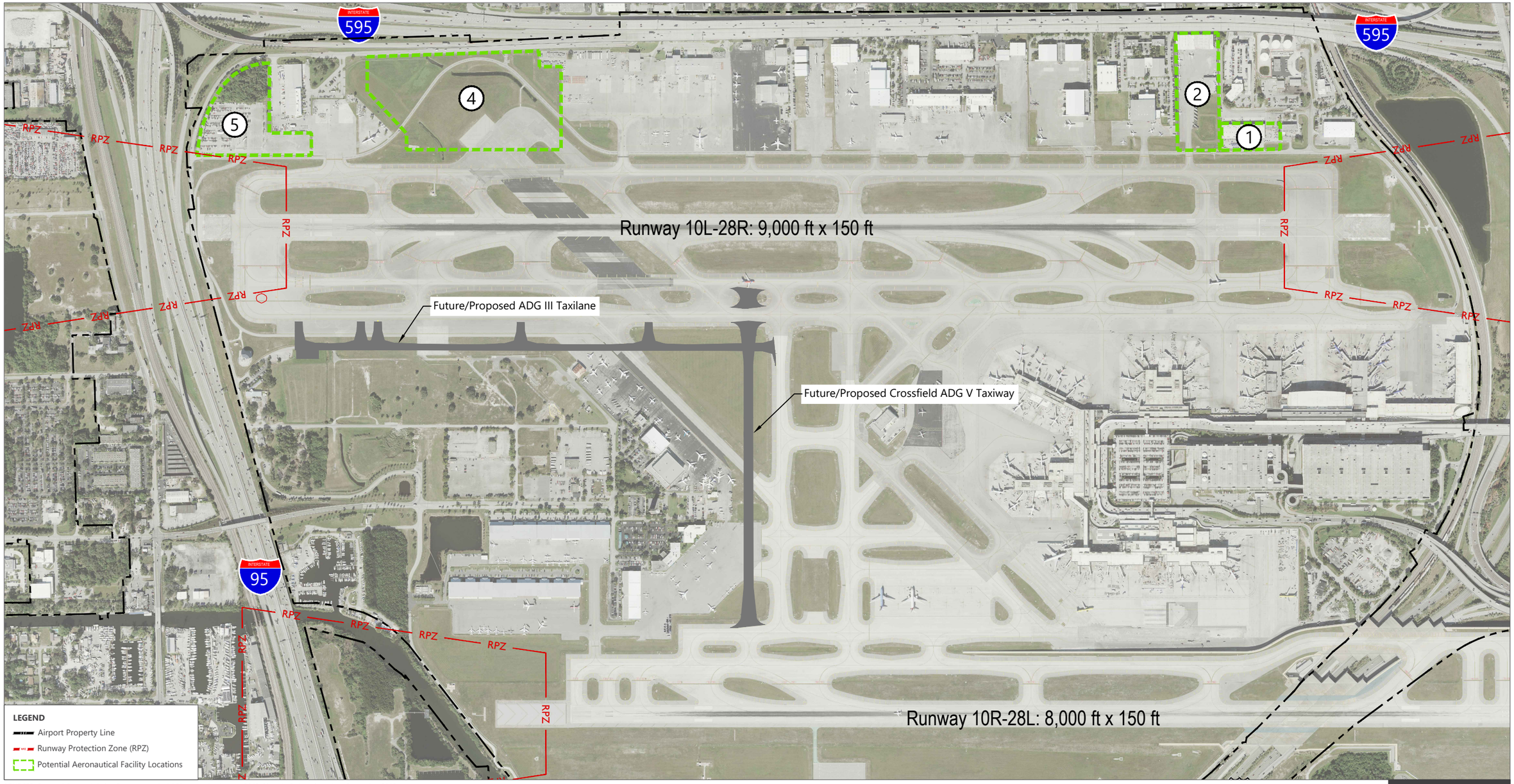

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-16

NORTH 0 800 ft.

Aeronautical Development Site Alternatives
Potential Cargo Development Sites

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5.6.5 AIR OPERATIONS AREA (AOA) – ACCESS IMPROVEMENTS

Access to the AOA is provided through two main gates at the Airport: Gate 100 located in the northeast quadrant and a construction gate, Gate 504 located in the southeast quadrant. To provide permanent access to the southern areas of the AOA an expanded Gate 504 is proposed to reduce congestion once development of Terminal 5 is initiated. Both vehicular access gates will provide access to badge holders or visitors after an identification and vehicle inspection. Gates 100 and 504 get congested at times throughout the day, leading to long queues affecting traffic flows at the nonterminal roadway areas close to these access gates. **Exhibit 5.6-17** illustrates a representative expanded airfield inspection and access gate. This layout may be constructed at any airfield access point.

5.6.5.1 Gate 100

In 2016, Kimley-Horn and Associates, Inc. conducted the Northeast Quadrant Facility and Access Planning Study (NE Quadrant Study), which analyzed traffic flows and recommended a proposed relocation of Gate 100 east of the existing fuel farm. However, due to the immediate need of traffic relief at this gate, and based on discussions with BCAD staff, a new preferred site has been identified for the relocated Gate 100 which does not require the relocation of any existing facilities or tenants. This site, located on North Airfield Parcel 1, is west of the existing belly cargo building on an existing general aviation parcel. The relocated Gate 100 will provide five drive through lanes with separate queues for badge holders and vehicles requiring inspection/escort. Separate queues will provide traffic relief as the existing Gate 100 forces badge holders to wait in queue with non-badge holders awaiting inspection/escort. This area is currently green space and includes a dry retention basin immediately adjacent to the existing airfield service road. Depending on the final layout of Gate 100, the basin may still be able to be accommodated within the site in the interior loop roadway created by the Gate 100 concept plan. **Exhibit 5.6-18** illustrates the proposed area and conceptual Gate 100 layout.

5.6.5.2 Gate 504

Due to the planned development of the Airport, it is anticipated that Gate 504 will remain a construction access gate for the foreseeable future. However, an area on the south side of the former Avis lot, adjacent to the south runway retaining wall, is being preserved for the eventual construction of second AOA access point, Gate 504. Similar to Gate 100 on the northside of the Airport, Gate 504 will include an inspection building, covered vehicular inspection lanes and a dedicated rejection lane. **Exhibit 5.6-19** illustrates the proposed Gate 504 expansion and improvement area.

5.6.6 CENTRALIZED RECEIVING AND DISTRIBUTION FACILITY

The TSA has requested that the Airport direct all terminal concessions to one facility for security screening and distribution, known as a centralized receiving and distribution facility. This facility will provide streamlined concessions screening, increased security, enhanced safety by reducing the amount of movements on the AOA with the consolidation of concession transportation, and reduced congestion at the security checkpoints. Based upon a benchmarking analysis of similar facilities, the following space requirements and considerations were developed to guide the alternative analysis:

- 1.5-acre to 2.0-acre parcel
- 20,000 to 30,000 square feet of warehouse space

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SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-17

NORTH 0 Not To Scale

Representative Rendering
Airfield Security Access Gate Relocation & Enhancement

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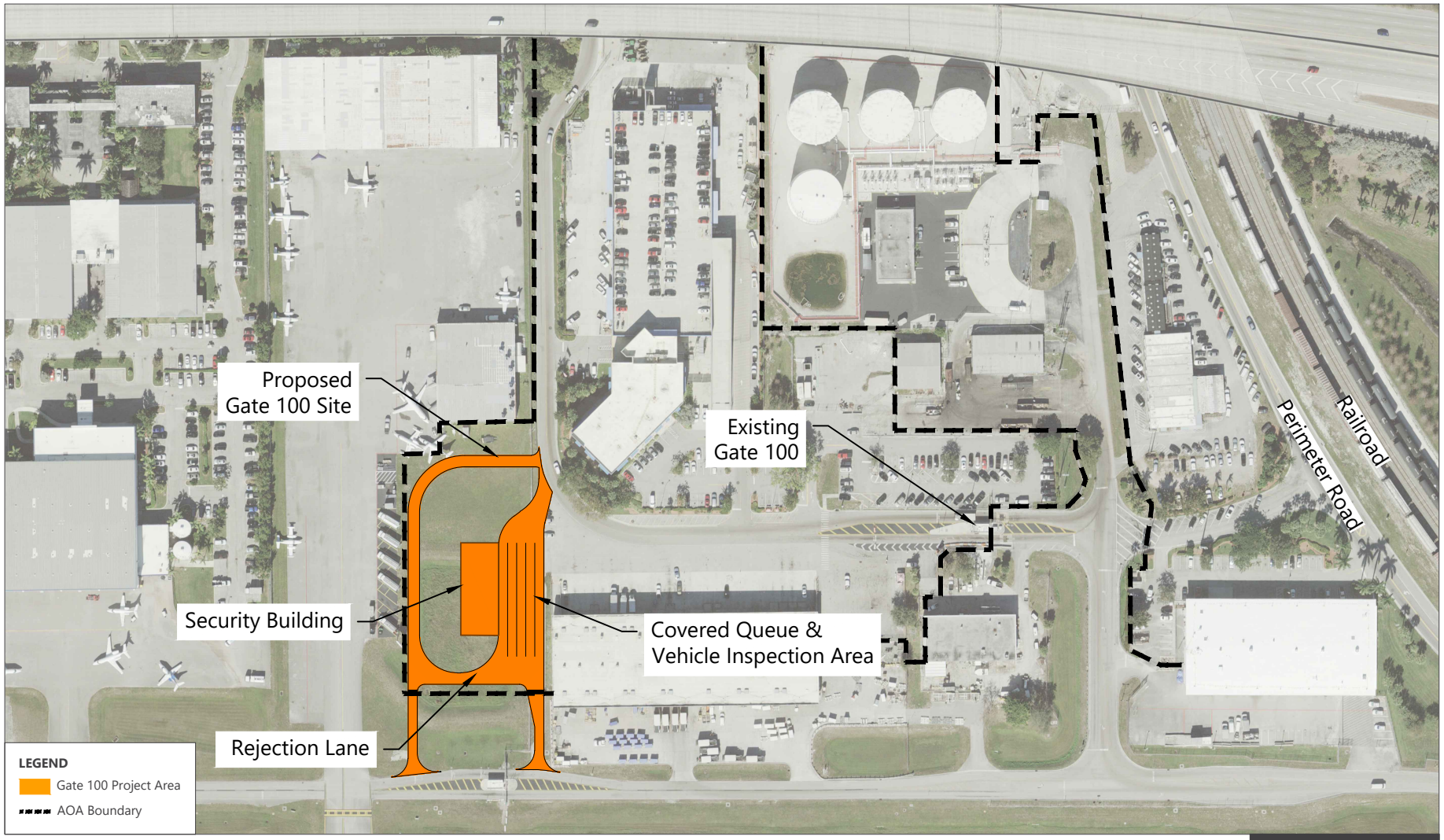

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-18

NORTH 0 200 ft.

Vehicular Airport Operations Area Airside Access Improvements
Gate 100 Modifications

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-18 Gate 100 Pref Plotted: Oct 30, 2020, 11:52AM

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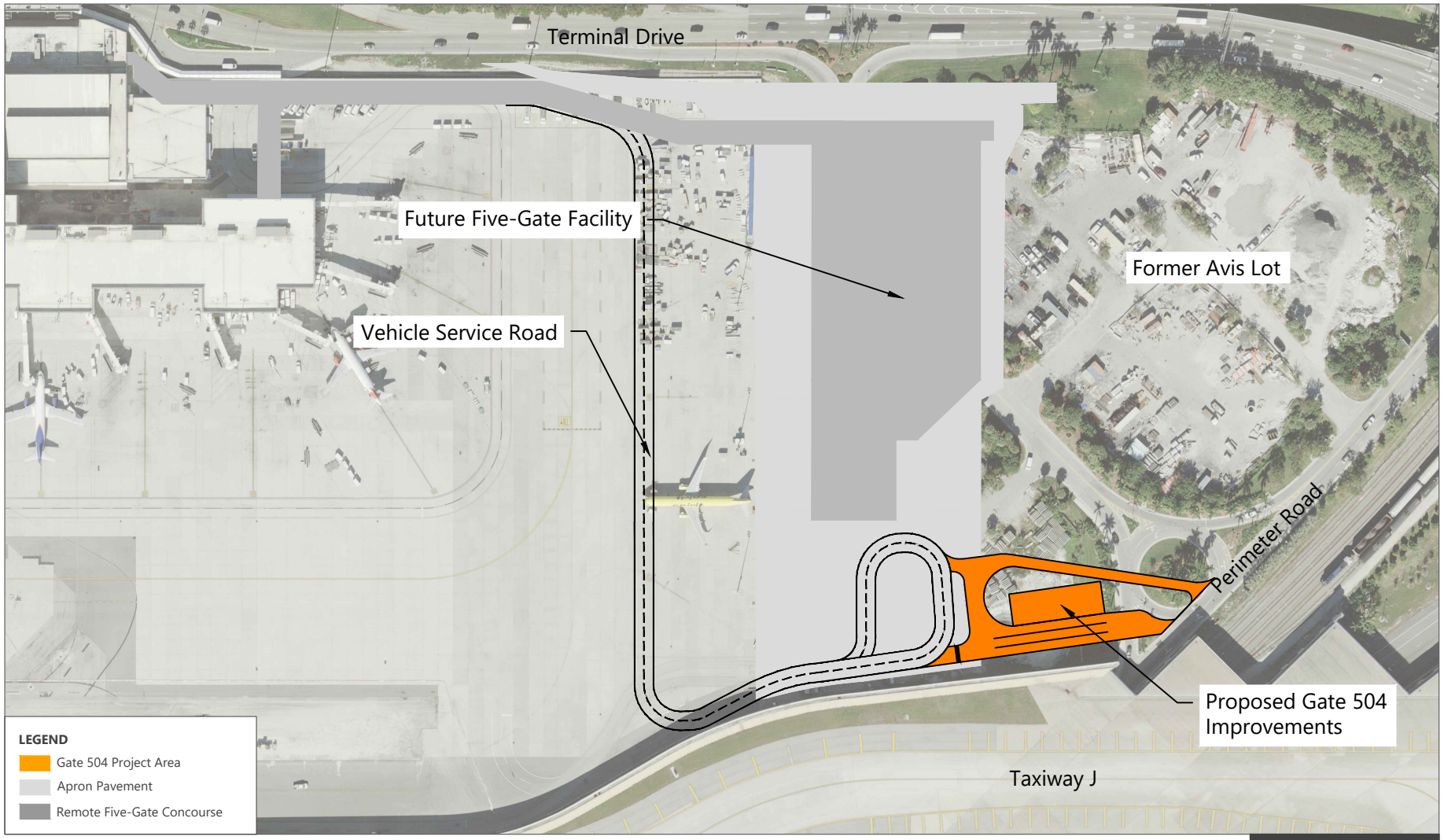

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-19

NORTH 0 200 ft.

Vehicular Airport Operations Area Airside Access Improvements
Conversion of Gate 504

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-19 Gate 504 Plotted: Oct 30, 2020, 11:53AM

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- 15 to 30 vehicular parking spaces
- 6 airside and 5 landside loading dock spaces
- direct landside access
- direct airside access and in close proximity to the terminal environment

Six alternative sites, located within North Airfield Parcels 1, 2, 3 and 5 and the former Avis Lot. were evaluated for the proposed facility, as illustrated on **Exhibit 5.6-20**. North Airfield Parcel 1 was identified as the preferred location due to its proximity to the terminal environment and its landside accessibility. The preferred alternative utilizes a parcel currently occupied by BCAD Security which would be relocated to the Consolidated BCAD Operations Facility described in Section 5.6.9. This parcel is located along perimeter road with direct access to the airside access road. This parcel contains the necessary infrastructure for a centralized receiving and distribution facility, including utilities and existing pavement that could potentially be repurposed. **Exhibit 5.6-21** presents a representative conceptual layout of the proposed centralized receiving and distribution facility. **Exhibit 5.6-22** depicts a representative 3D rendering of the centralized receiving and distribution facility development.

5.6.7 FUEL FARM EXPANSION

The Fuel Consortium at FLL operates the fuel farm located in the northeast quadrant of the Airport. The fuel farm consists of four 1.15-million-gallon fuel tanks totaling 4.6 million gallons. During meetings and discussions with the Fuel Consortium and BCAD staff, it was determined that an increase in fuel storage capacity and upgrades to outdated equipment were needed.

Based on forecast aircraft operations, fuel storage totaling 9.8 million gallons is required to meet future demand and to accommodate an increase in fuel reserve from 3 days to 7 days. The increase in fuel reserve is to account for possible disruptions in the fuel supply chain from the lack of nearby fuel storage or refineries and/or disruptions due to weather.

To meet these requirements, the Airport needs five additional fuel storage tanks (for a total of nine fuel tanks) with a capacity of 1.5 million gallons each. Five alternative sites were evaluated to provide additional fuel storage capacity. **Exhibit 5.6-23** illustrates the sites that were evaluated, including North Airfield Parcels 1 and 5, West Airfield Parcel 15 and two parcels not owned by BCAD.

Challenges and constraints considered during the fuel farm expansion/relocation alternatives analysis included the following:

- constraints of expanding the existing fuel farm location
- constructability and associated costs
- fuel farm accessibility
- security
- benefits of a consolidated fuel farm versus multiple fuel farm locations

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SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-20

NORTH 0 800 ft.

Vehicular Airport Operations Area Airside Access Improvements
Centralized Receiving and Distribution Warehouse Site Alternatives

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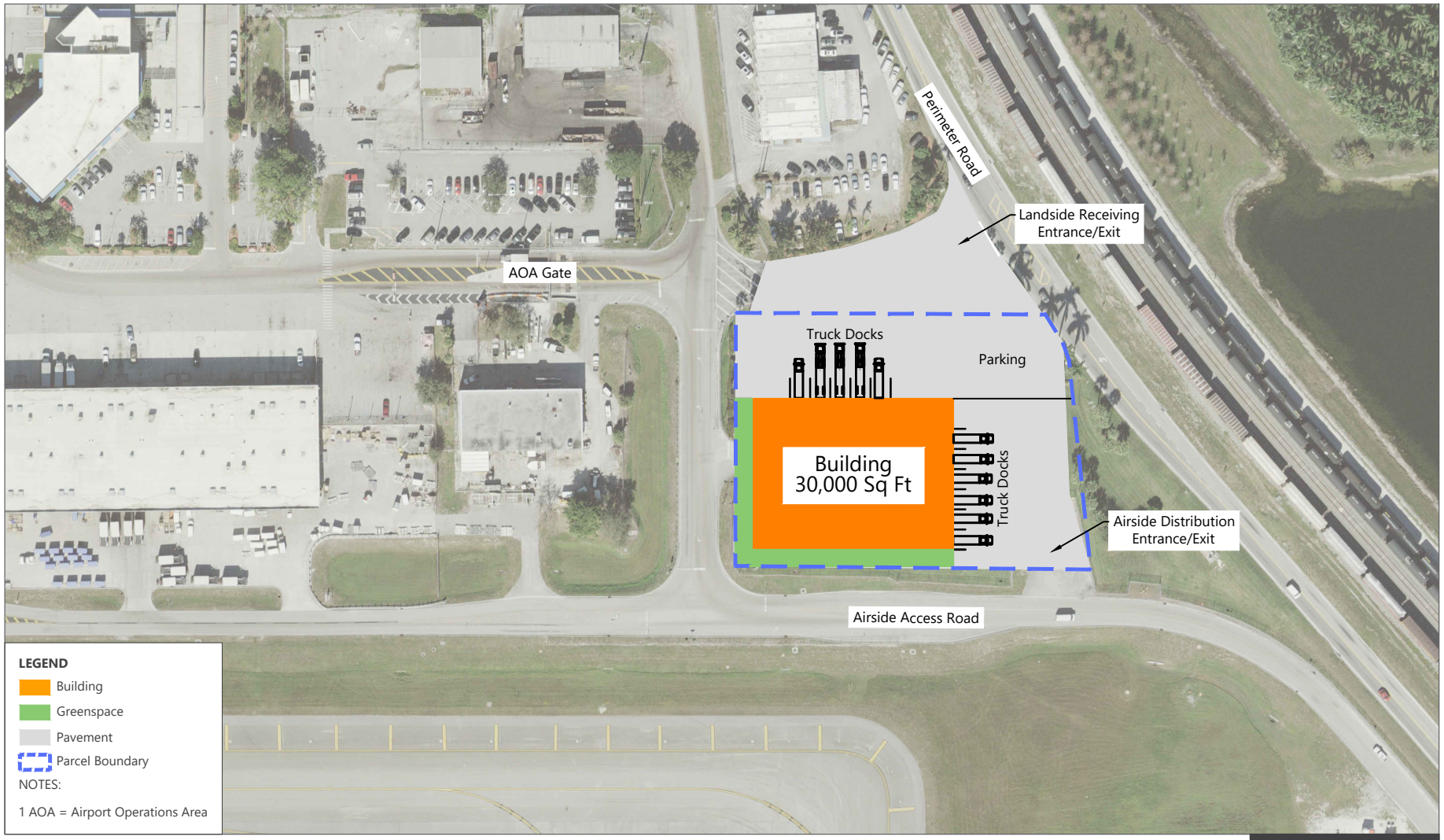

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-21

NORTH 0 150 ft.

Vehicular Airport Operations Area Airside Access Improvements
Centralized Receiving and Distribution Warehouse (Representative Layout)

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-21 Central R&D Pref Plotted: Oct 30, 2020, 11:55AM

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SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-22

NORTH 0 Not To Scale

Representative Rendering
Centralized Receiving and Distribution Facility (Consumable Goods)

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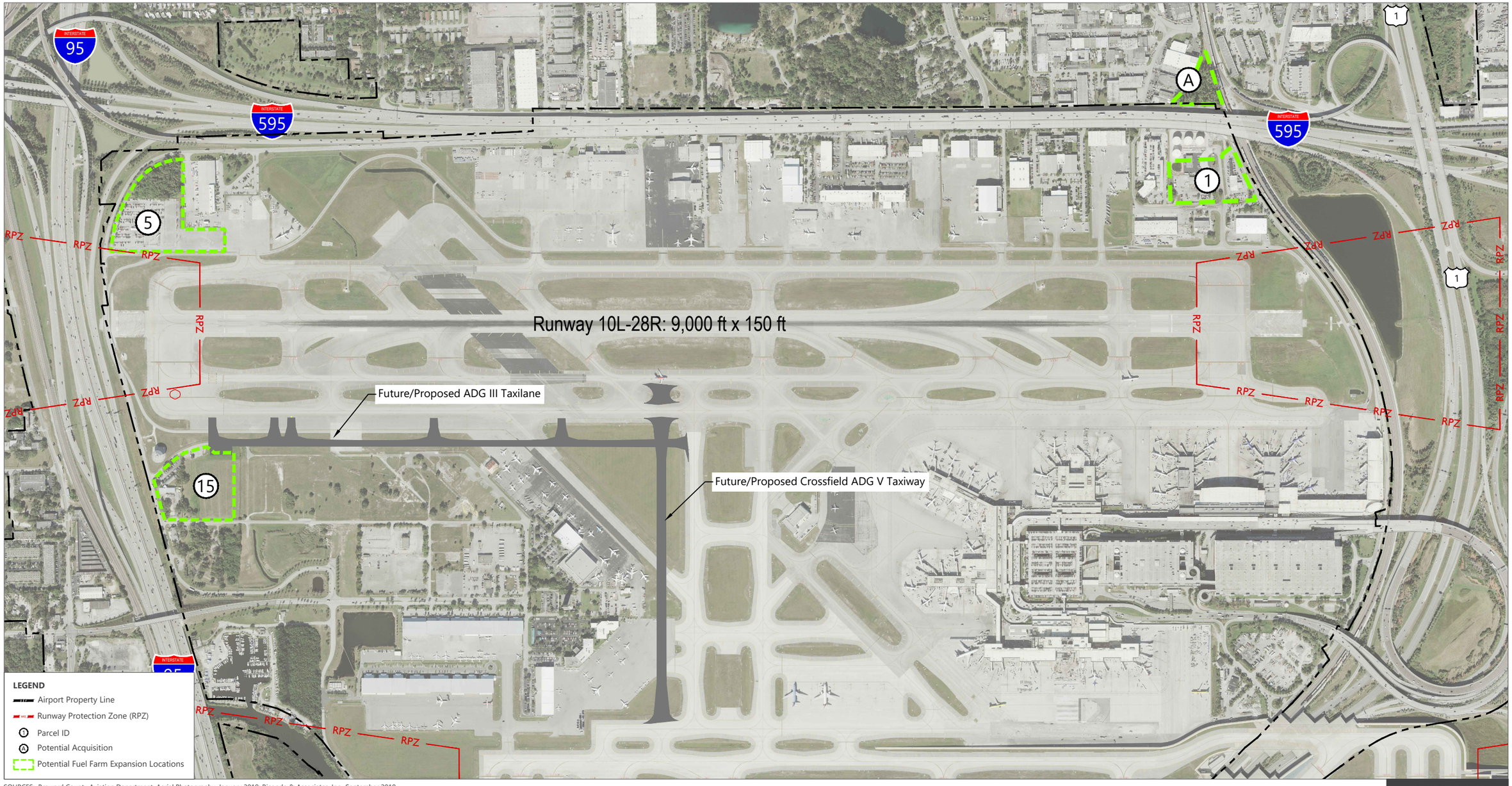

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-23

NORTH 0 800 ft.

Fuel Farm Expansion/Relocation Site Alternatives

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After discussions with BCAD staff and the Fuel Consortium, the preferred alternative involves expanding the existing fuel farm, located in North Airfield Parcel 1, by adding two 1.5-million-gallon tanks and constructing a supplemental fuel storage area on a nearby property, referred to as Potential Acquisition Parcel A. The supplemental fuel storage will contain three 1.5-million-gallon fuel tanks and will be connected to the existing fuel farm via fuel pipeline. The property previously illustrated and referenced as Parcel A, is currently owned by Broward County, but it is not controlled by the BCAD. **Exhibit 5.6-24** illustrates the preferred alternative**.** This alternative was chosen due to its proximity to the existing fuel farm and the fuel connection lines, and it enables BCAD to preserve the other sites evaluated for future development. If rezoning of the triangular parcel to allow above ground fuel storage is not possible, future long-term expansion may take place south of the existing fuel farm parcel with the relocation of existing maintenance storage facilities. **Exhibit 5.6-25** depicts a representative 3D rendering of the short-term two 1.5-million-gallon tank fuel farm expansion.

5.6.8 AIRPORT MAINTENANCE

The existing Airport maintenance storage building is located adjacent to the fuel farm in the northeast quadrant of the Airport property. The facility is in good condition; however, due to size constraints, additional locations are used to house maintenance equipment and to store supplies not accommodated at the facility. BCAD has expressed interest in constructing an additional maintenance facility with the following space requirements to consolidate and accommodate the current and future maintenance-related functions:

- 50,000 square feet of building space for the replacement of E-29 (G&G building)
- 22,000 square feet of additional shop, warehousing, and storage space
- 87,000 square feet of landscaping storage (2 Acres)
- 87,000 square feet of outdoor storage (2 Acres)
- 70 vehicular parking spaces
- potential for long-term expansion

Four parcels, including North Airfield Parcels 2 and 5, West Airfield Parcel 15, Remote Parcel 16, were identified as potential sites for a future Airport maintenance facility location, as illustrated on **Exhibit 5.6-26**. After discussions with BCAD staff, Parcel 16 was chosen as the preferred site, because it provides easy access from SW 42nd Street, it has the potential for expansion on 7 acres to the east, it is currently owned by Broward County, and it preserves existing Airport property for tenant demand driven development. **Exhibit 5.6-27** presents a conceptual layout of the preferred maintenance facility alternative located on Parcel 16**.** It should be noted that a preferred development site for the materials recovery facility (MRF) has not been identified. BCAD will need to assess potential property acquisition opportunities to support this function.

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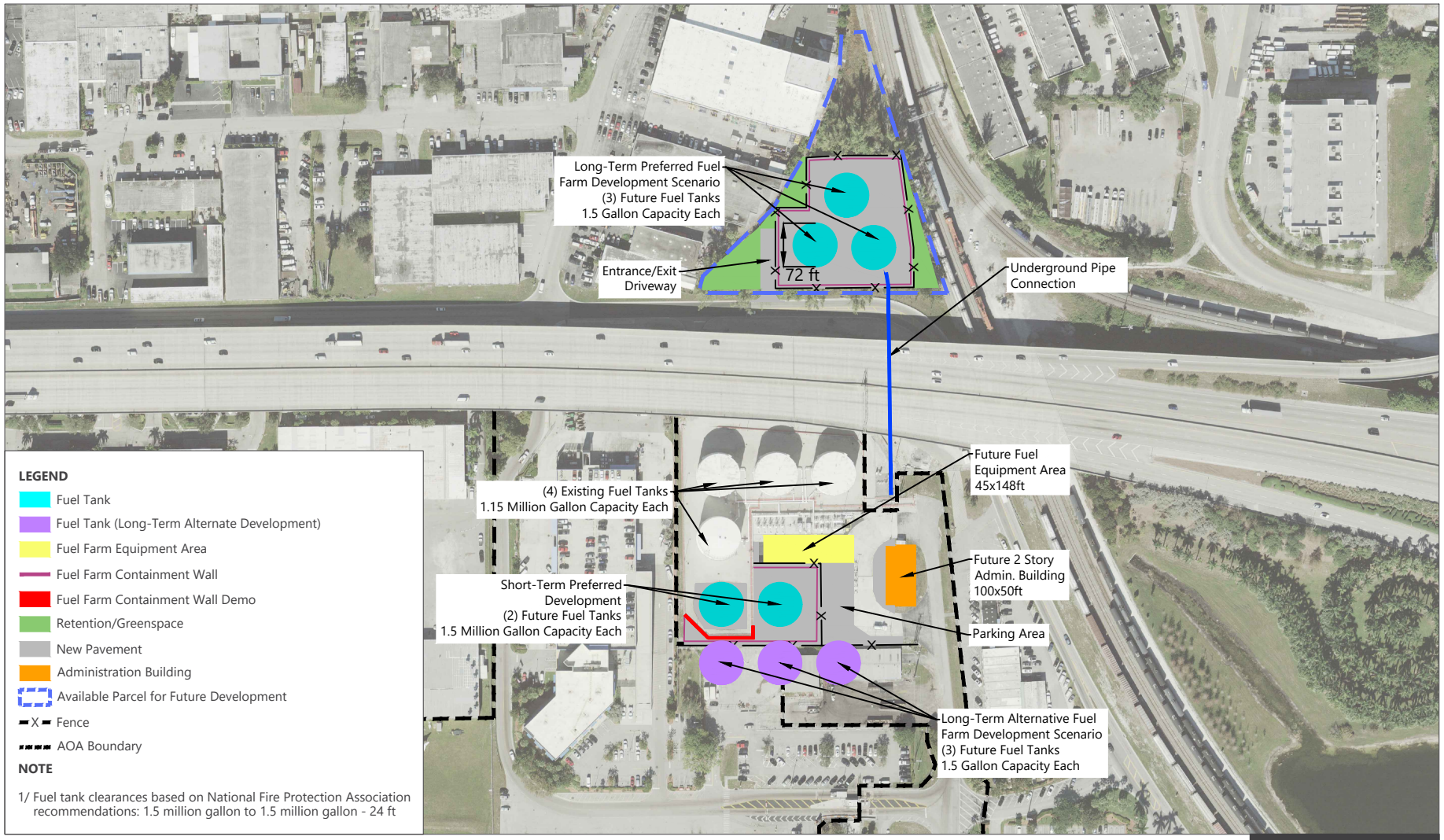

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-24

NORTH 0 250 ft.

Preferred Fuel Farm Development Alternative

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-24 Fuel Farm Pref Plotted: Oct 30, 2020, 12:00PM

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SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-25

NORTH 0 Not To Scale

Representative Rendering
Fuel Farm Expansion

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SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-26

NORTH 0 800 ft.

BCAD Airport Maintenance Expansion Site Alternatives

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-26 Airport Main. Plotted: Oct 30, 2020, 12:01PM

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SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-27

NORTH 0 300 ft.

Preferred BCAD Airport Maintenance Expansion Alternative

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5.6.9 AIRCRAFT RESCUE AND FIREFIGHTING AND CONSOLIDATED BCAD OPERATIONS FACILITY

The credentialing office, Broward County Sheriff's Office (BSO), and the BCAD security offices are currently located in three different facilities on Airport property. To improve the efficiency and ease of operations, these functions will be ultimately consolidated into a shared-use consolidated BCAD Operations Facility. The proposed site, according to a 2013 Study, was determined and confirmed during the Master Plan Update to be 1.70 acres consisting of the following space requirements (including provisions for drainage and vehicular parking):

- 10,400 square feet for Airport security
- 32,000 square feet for Airport credentialing
- 19,700 square feet for BSO
- 12,000 square feet for common-use shared space

The existing ARFF facility will be displaced to accommodate Phase 2 of the preferred terminal alternative discussed in Section 5.3. According to ARFF leadership, the existing facility is undersized for the number of personnel working there and for equipment storage. It is estimated that an additional 6,700 square feet of building space would be adequate for future ARFF needs. The future ARFF facility space requirements and considerations are as follows:

- 27,100 square feet for ARFF facility
- 7 drive-through bays for ARFF vehicles
- response times to the midpoint of the furthest runway: 3:00 minutes or less

Two locations near the central portion of the Airport provided the best ARFF response time to the midpoint of each runway. **Exhibit 5.6-28** illustrates the proposed locations, West Airfield Parcels 10 and 11, for both the consolidated BCAD Operations and ARFF facilities. Parcel 11 was selected as the preferred site. Based on preliminary modeling, this site provides a vehicle response time of approximately 2:52 to the midpoint of Runway 10R-28L (the furthest runway) and provides suitable landside access to the public and suitable airside access to the facilities, which are essential elements for both facilities. **Exhibit 5.6-29** presents a representative conceptual layout of the consolidated BCAD Operations and ARFF facilities. It should be noted that a current GA tenant actively uses this site and would need to be relocated to an available west side development parcel to enable this development. West Airfield Parcels 13 and 15 were combined to create a larger contiguous development site that provides direct airside access and would serve as a greenfield development. **Exhibit 5.6-30** and **Exhibit 5.6-31** depict a representative 3D rendering of the consolidated BCAD Operations facility and ARFF station, respectively.

5.6.10 FLIGHT KITCHENS

Flight kitchens are utilized to provide food and beverage concessions to airlines. It was previously determined that an additional 20,000 square feet of flight kitchen space was needed to accommodate future passenger demand. The alternatives analysis also considered relocating one of the off-Airport flight kitchens to Airport property. Since the flight kitchens do not require adjacency to the airfield the relocation of these facilities to Remote Parcel 16 is recommended. However, the aviation department may also consider potential property acquisition opportunities should they arise.

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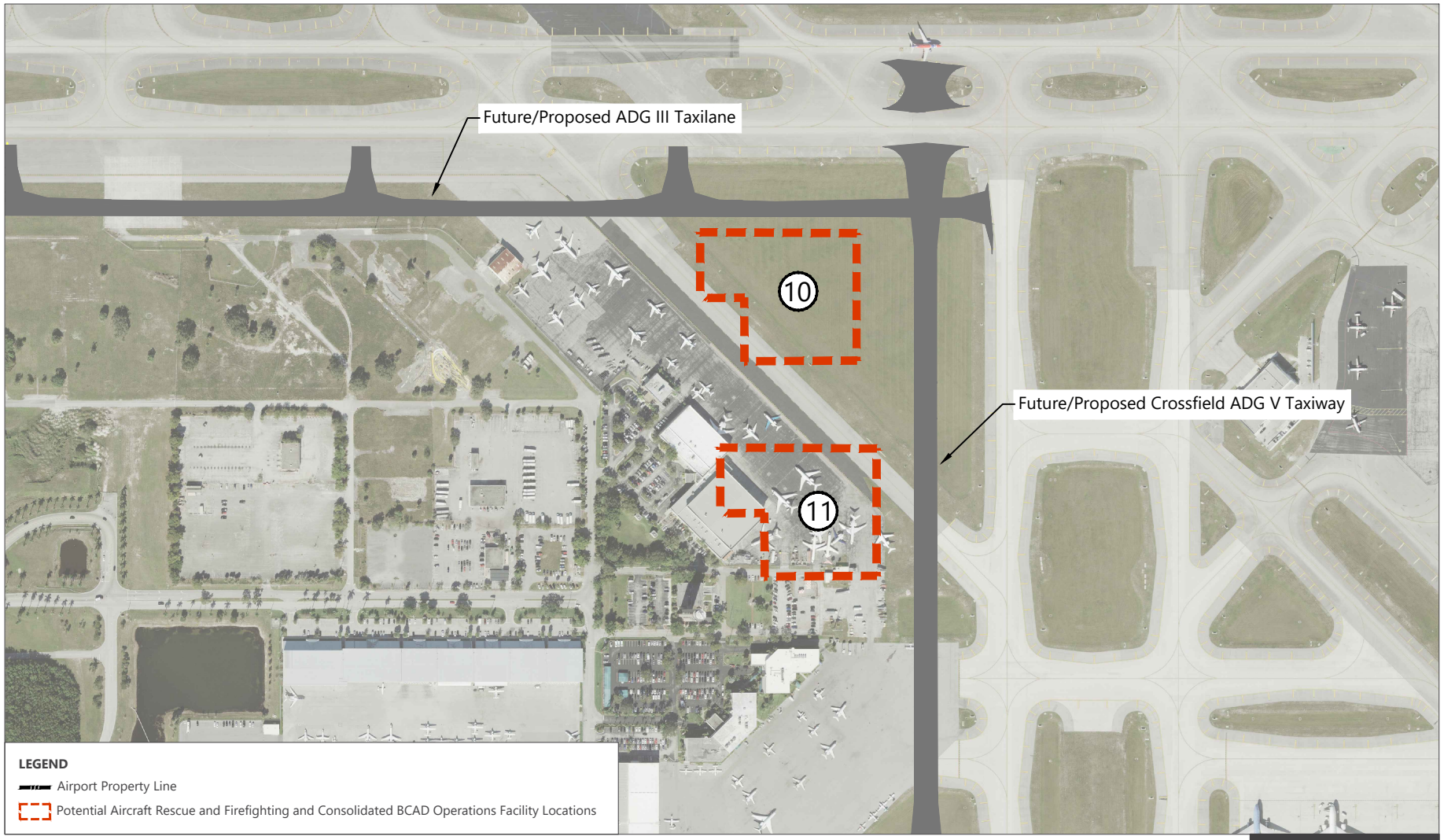

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-28

NORTH 0 500 ft.

Aircraft Rescue and Firefighting (ARFF) Station and Consolidated BCAD Operations Facility Site Alternatives

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-28 ARFF & BCAD Ops Plotted: Oct 30, 2020, 12:04PM

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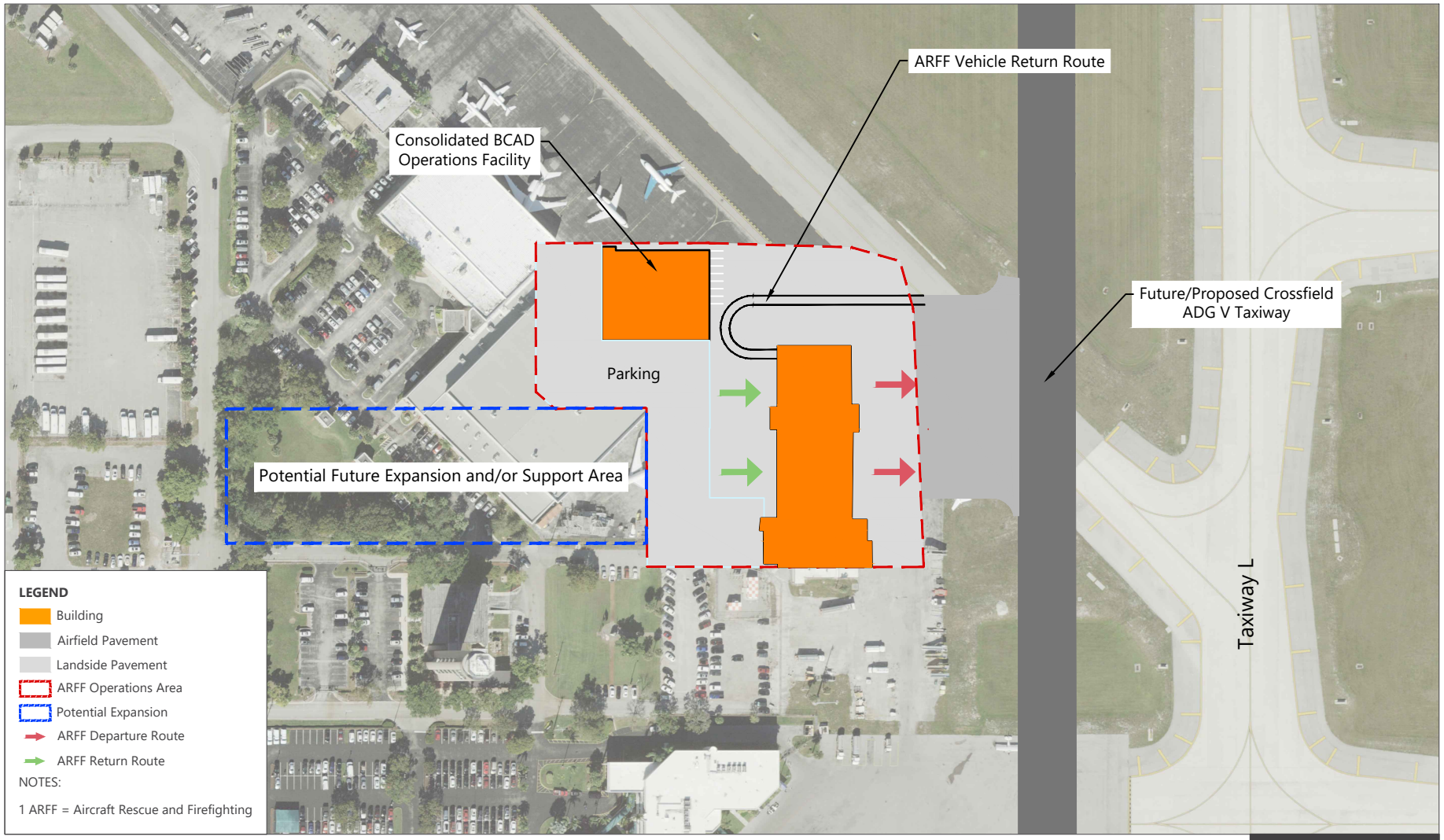

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-29

NORTH 0 200 ft.

Preferred Aircraft Rescue and Firefighting (ARFF) Station and Consolidated BCAD Operations Facility

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-29 ARFF & BCAD Ops Pref Plotted: Oct 30, 2020, 12:05PM

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SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-30

NORTH 0 Not To Scale

Representative Rendering
Consolidated BCAD Operations Facility

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SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-31

NORTH 0 Not To Scale

Representative Rendering
Aircraft Rescue and Firefighting (ARFF) Station

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.7 - Final Refinement Renderings_2019_0822.dwgLayout: 5.6-31 Plotted: Oct 30, 2020, 11:34AM

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The preferred site for two flight kitchens was determined to be Parcel 16, west of the proposed maintenance facility, as illustrated on **Exhibit 5.6-32**. **Exhibit 5.6-33** presents a conceptual layout of the flight kitchens. Each individual flight kitchen parcel is estimated to be approximately 1.15 acres, depending on future tenant needs.

5.6.11 TRANSPORTATION NETWORK COMPANY, CELL PHONE LOT, AND TAXI HOLD LOT

The three parcels, Remote Parcels 20, 21, and 25, illustrated in **Exhibit 5.6-34** were identified for landside support due to their location in relation to the terminal area for convenient vehicular access and shortened response times. Three landside support functions were identified as candidates for development on these parcels; transportation network companies (TNCs) such as Uber and Lyft, the construction of a new and expanded cell phone lot, and the potential relocation of the existing taxi hold lot west of U.S. 1. Each of the identified areas provide a maximum buildout depending on which of the three operations are developed on the parcels identified. This maximum buildout also provides consideration for on-site stormwater retention at approximately 30-percent of the total site area for Remote Parcels 20 and 25 since this will be new development on these parcels. Based on this approach and for conceptualization purposes, it was assumed that the following programmatic elements should be considered as guiding requirements:

- 400 ready spaces for TNCs
- 200 spaces for a new cell phone lot. This development should also include patron amenities such as restrooms, FIDS displays, and a pet relief area.
- If relocated, the taxi hold lot should provide at least a like-in-kind space replacement but consider an expanded bullpen queue to avoid taxi backups onto Griffin Road.

Through coordination with BCAD staff, it was determined that each of these parcels would be illustrated on the future ALP as landside support and ground transportation development areas to maintain flexibility while detailed programming is undertaken in the upcoming PDD processes.

5.6.12 PREFERRED NONTERMINAL DEVELOPMENT PLAN

The preferred development plan for nonterminal areas was chosen after considering future terminal development, landside development, and the best use of parcels, as discussed in Section 5.6.1. **Exhibit 5.6-35** depicts the preferred nonterminal development plan. The MPU development projects are recommended based on timing and need, such as, demand level and facility need. All MPU projects have been organized based on the activity levels found in Table 5.3-1. Exhibit 5.6-34 depicts the preferred alternative for each of the following nonterminal facilities:

- General Aviation/Fixed-base Operator
- U.S. Customs and Border Protection
- Belly Cargo Expansion
- Other Aeronautical Developments
- Air Operations Area – Access
- Centralized Receiving & Distribution
- Fuel Farm Expansion

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SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-32

NORTH 0 800 ft.

Flight Kitchen Site Alternatives

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-1 - 5.6-33 - Support Facility Exhibits_2020_0922.dwgLayout: 5.6-32 Flight Kitchen Plotted: Oct 30, 2020, 12:07PM

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SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-33

NORTH 0 200 ft.

Preferred Flight Kitchen Alternative

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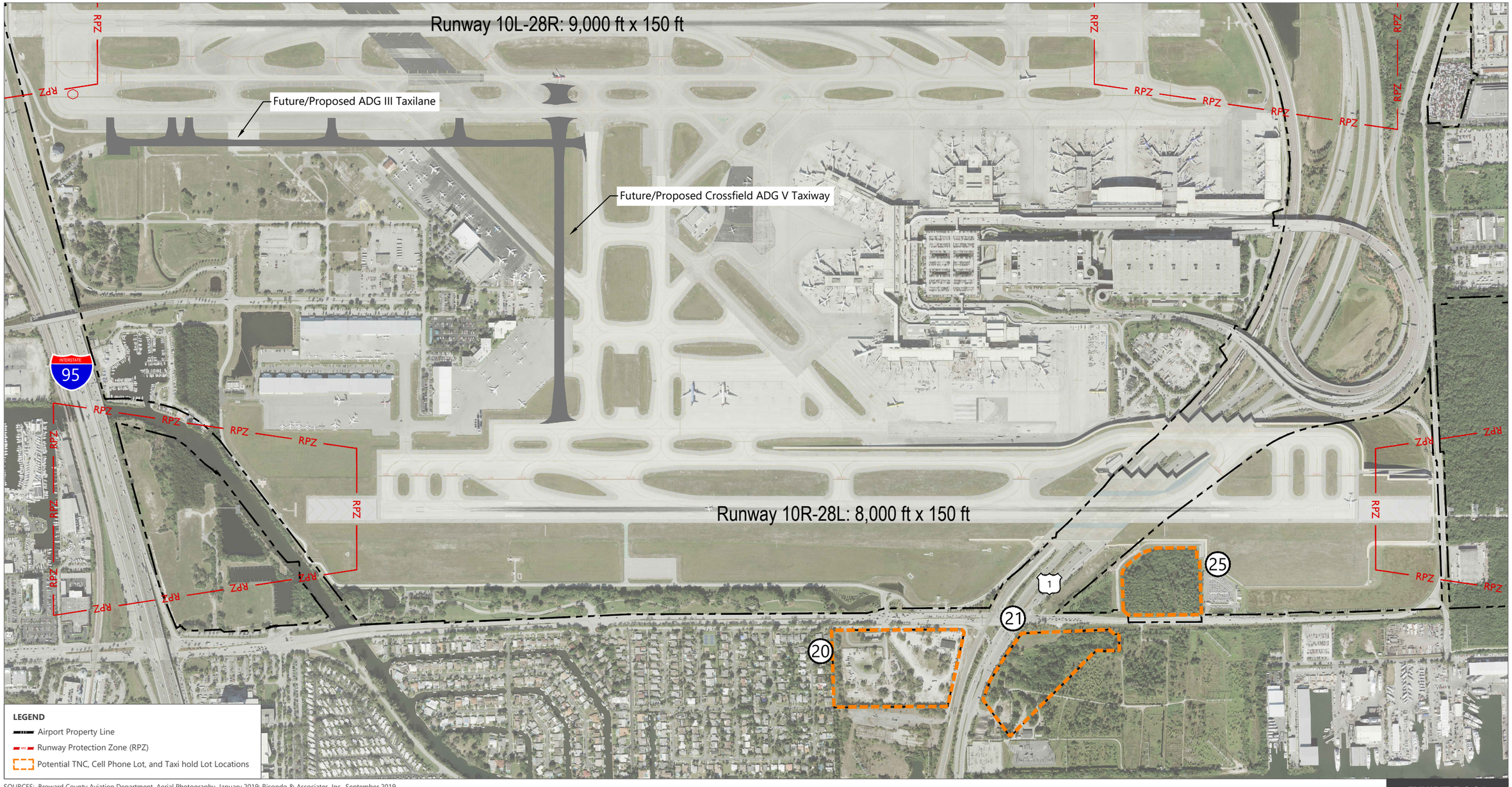

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-34

NORTH 0 800 ft.

Transportation Network Company, Cell Phone Lot, and Taxi Hold Lot Site Alternatives

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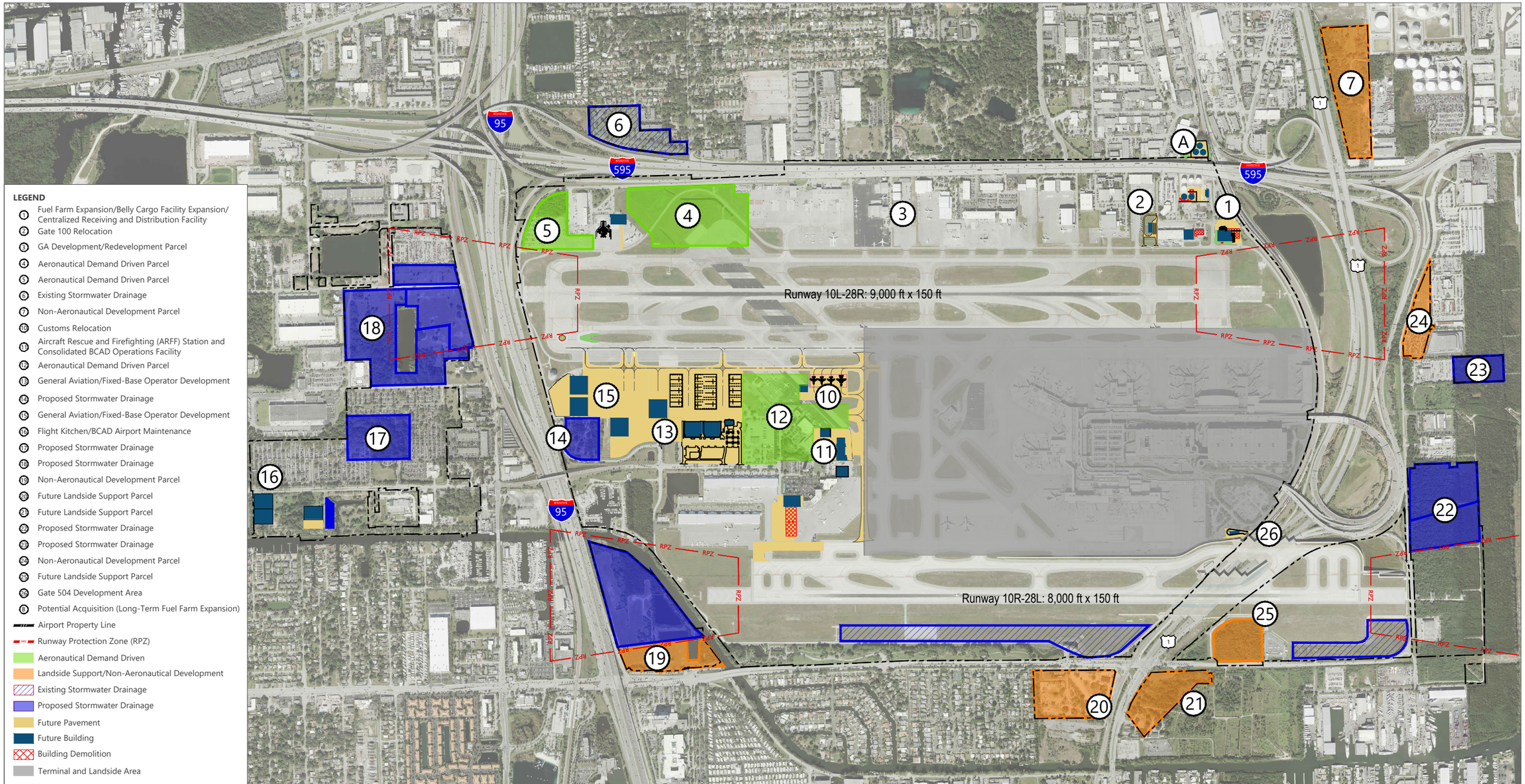

LEGEND

- ① Fuel Farm Expansion/Belly Cargo Facility Expansion/ Centralized Receiving and Distribution Facility
- ② Gate 100 Relocation
- ③ GA Development/Redevelopment Parcel
- ④ Aeronautical Demand Driven Parcel
- ⑤ Aeronautical Demand Driven Parcel
- ⑥ Existing Stormwater Drainage
- ⑦ Non-Aeronautical Development Parcel
- ⑩ Customs Relocation
- ⑪ Aircraft Rescue and Firefighting (ARFF) Station and Consolidated BCAD Operations Facility
- ⑫ Aeronautical Demand Driven Parcel
- ⑬ General Aviation/Fixed-Base Operator Development
- ⑭ Proposed Stormwater Drainage
- ⑮ General Aviation/Fixed-Base Operator Development
- ⑯ Flight Kitchen/BCAD Airport Maintenance
- ⑰ Proposed Stormwater Drainage
- ⑱ Proposed Stormwater Drainage
- ⑲ Non-Aeronautical Development Parcel
- ⑳ Future Landside Support Parcel
- ㉑ Future Landside Support Parcel
- ㉒ Proposed Stormwater Drainage
- ㉓ Proposed Stormwater Drainage
- ㉔ Non-Aeronautical Development Parcel
- ㉕ Future Landside Support Parcel
- ㉖ Gate 504 Development Area
- Ⓐ Potential Acquisition (Long-Term Fuel Farm Expansion)
- Airport Property Line
- Runway Protection Zone (RPZ)
- Aeronautical Demand Driven
- Landside Support/Non-Aeronautical Development
- Existing Stormwater Drainage
- Proposed Stormwater Drainage
- Future Pavement
- Future Building
- Building Demolition
- Terminal and Landside Area

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.6-35

NORTH 0 1,300 ft.

Preferred Nonterminal Development Plan

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-35 - 5.7-1 - Campus Drawing_2019_1218.dwgLayout: 5.6-35 Pref NonTerm Alts Plotted: Oct 30, 2020, 12:13PM

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- Airport Maintenance
- Consolidated BCAD Operations Facility
- Aircraft Rescue and Firefighting
- Flight Kitchens

Additional alternatives for the nonterminal development areas can be found in **Appendix I**.

5.7 Airport Development Plan

The Master Plan's alternative analysis culminates with the preferred Airport development plan which was identified after considering preferred airfield, terminal, landside, and nonterminal support facility development alternatives. **Exhibit 5.7-1** depicts the preferred Airport development plan. These MPU development projects are demand driven and provide incremental capacity benefits that could be accelerated at BCAD's discretion to meet future needs. All MPU projects have been organized based on the activity levels found in Table 5.3-1.

PAL 1 and PAL 2, as illustrated on **Exhibit 5.7-2**, include projects in the Airport's current ACIP and projects identified in the MPU to meet demand associated with the near-term and mid-term. These projects, tentatively implemented between fiscal year (FY) 2019 and FY 2034, are included in the financial analysis section and are discussed throughout the remainder of this document. In addition to the capital development projects included in PAL 1 and 2, there are various enabling and Airport driven projects. **Exhibit 5.7-3** depicts these projects which can generally be classified by the following key characteristics:

- Support and Airport facilities
- Enabling projects for demand driven or necessary expansion
- Renew and/or replacement of aging facilities

Exhibits 5.7-4 through **5.7-6** depict representative 3D renderings of various PAL 1 and PAL 2 airside projects, landside projects, northeast quadrant projects, and westside development projects.

PAL 3, as illustrated in **Exhibit 5.7-7**, includes projects necessary to meet the demand associated with long-term development. The PAL 3 projects have been tentatively deferred to beyond FY 2034 due to project need and cost. The long-term projects are conceptually identified on the Airport Layout Plan to protect the required development area and surrounding airspace to accommodate demand associated with PAL 3.

A preliminary phasing plan is discussed in Section 8, Capital Improvement Program and Financial Analysis, that considers the overall Capital Improvement Program, implementation parameters, and financial analyses.

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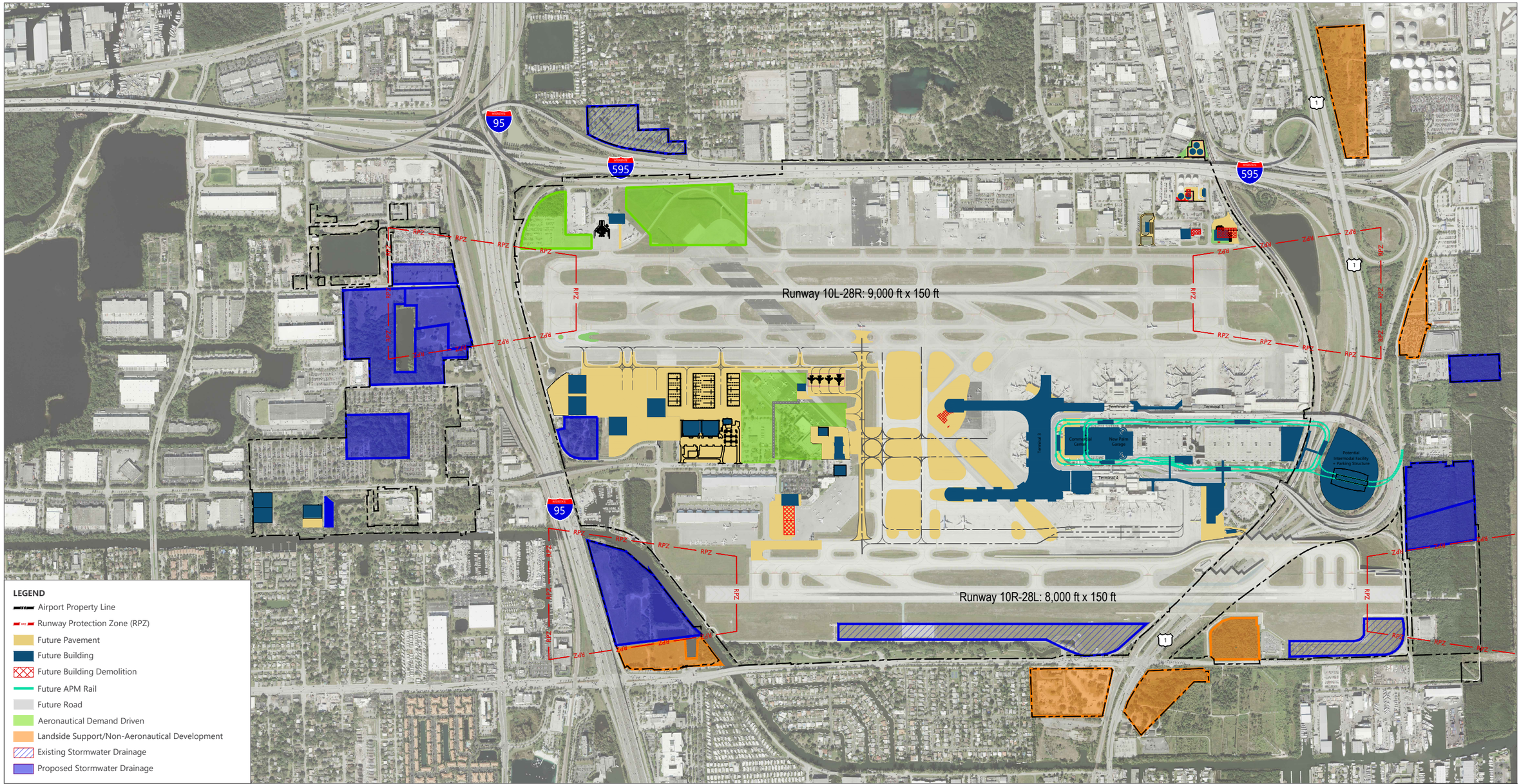

SOURCES: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.7-1

NORTH 0 1,300 ft.

Airport Campus Drawing
Preferred Airport Development Plan

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\Support Facility Alternatives\FLL MP - Ex_5.6-35 - 5.7-1 - Campus Drawing_2019_1218.dwgLayout: 5.7-1 Pref Develop Plan Plotted: Oct 30, 2020, 12:14PM

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Planning Activity Level 1 Projects

A5: Taxilane (ADG III) Serving Westside Parcels
A6: Taxiway H Extension
A8: Crossfield Taxiway
G12: Intermodal Center - Phase 1
G14: Supplemental Curb (Includes Demolition of Palm Garage)
M12: Fuel Farm Expansion (Short-Term) & Oil/Water Separator
M13: Fuel Farm Expansion (Long-Term)
P5: Palm Garage Redevelopment
S3: South AOA Gate (Gate 504)
T5: 5-Gate Terminal
T7: Automated People Mover (APM) Circulator
T18: Airfield Improvements associated with Terminal Development Phase 1
T20: Terminal Expansion Phase 1 (Concourse G West Expansion)

NOTES:

1. A - Airfield, G - General and Administrative, M - Machinery, Equipment, Vehicles, and Other, P - Parking, S - Security, T - Terminal.

2. Planning activity level 1 forecast metrics: 346,500 annual aircraft operations, 18.4 million annual passenger enplanements, 94 based aircraft, and 86,000 tons of cargo.

3. Planning activity level 2 forecast metrics: 377,500 annual aircraft operations, 21 million annual passenger enplanements, 94 based aircraft, and 88,916 tons of cargo.

LEGEND

- Airport Property Boundary
- Building Demolition or Pavement Removal
- Planning Activity Level 1 Projects
- Planning Activity Level 2 Projects

SOURCE: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.7-2

NORTH 0 1,200 ft.

Planning Activity Level (PAL) 1 and 2 Projects

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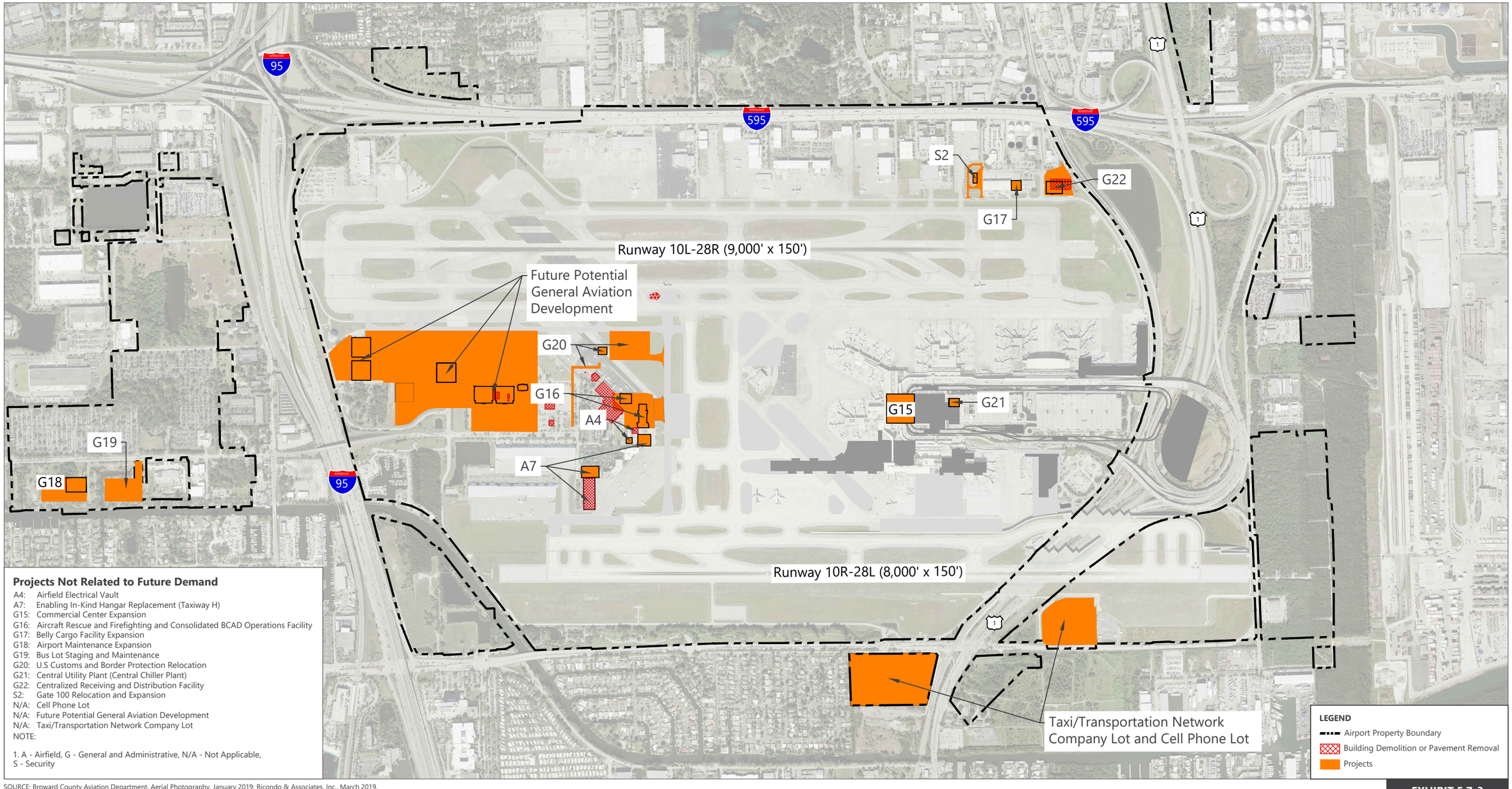

Projects Not Related to Future Demand

A4: Airfield Electrical Vault
A7: Enabling In-Kind Hangar Replacement (Taxiway H)
G15: Commercial Center Expansion
G16: Aircraft Rescue and Firefighting and Consolidated BCAD Operations Facility
G17: Belly Cargo Facility Expansion
G18: Airport Maintenance Expansion
G19: Bus Lot Staging and Maintenance
G20: U.S Customs and Border Protection Relocation
G21: Central Utility Plant (Central Chiller Plant)
G22: Centralized Receiving and Distribution Facility
S2: Gate 100 Relocation and Expansion
N/A: Cell Phone Lot
N/A: Future Potential General Aviation Development
N/A: Taxi/Transportation Network Company Lot

NOTE:

1. A - Airfield, G - General and Administrative, N/A - Not Applicable, S - Security

SOURCE: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.7-3

NORTH 0 1,200 ft.

Enabling and/or Development Dependent Capital Projects

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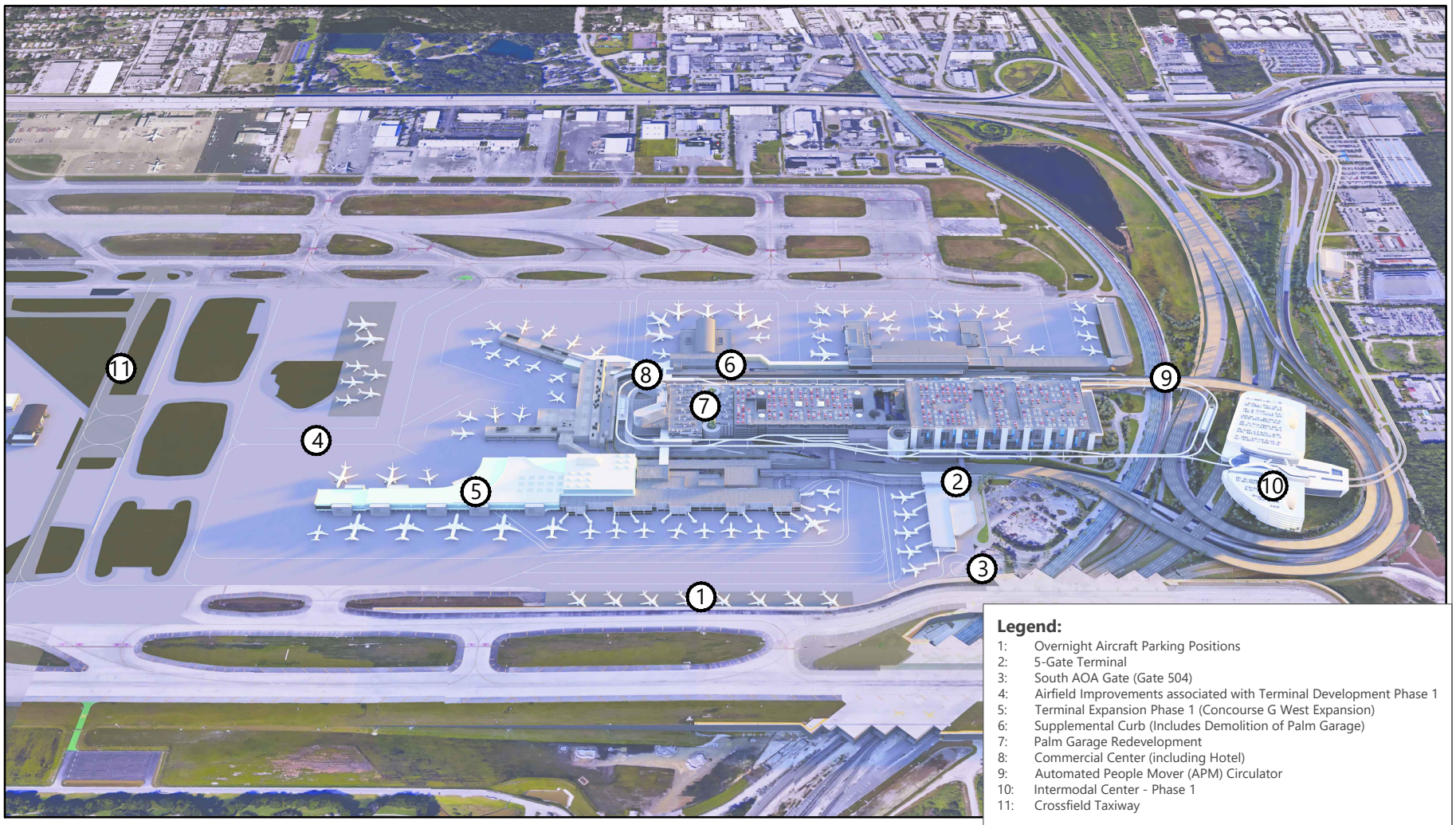

Legend:

1: Overnight Aircraft Parking Positions
2: 5-Gate Terminal
3: South AOA Gate (Gate 504)
4: Airfield Improvements associated with Terminal Development Phase 1
5: Terminal Expansion Phase 1 (Concourse G West Expansion)
6: Supplemental Curb (Includes Demolition of Palm Garage)
7: Palm Garage Redevelopment
8: Commercial Center (including Hotel)
9: Automated People Mover (APM) Circulator
10: Intermodal Center - Phase 1
11: Crossfield Taxiway

SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.7-4

NORTH 0 1,500 ft.

Representative Rendering
Phase 1 Airside and Landside Projects

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.7 - Final Refinement Renderings_2019_0822.dwgLayout: 5.7-4 Plotted: Oct 30, 2020, 11:34AM

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4 Airfield Security Access Gate Relocation & Enhancement (Gate 100)

1 Fuel Farm Expansion

2 Centralized Receiving and Distribution Facility (Consumable Goods)

3 Belly Cargo Facility Expansion

SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.7-5

NORTH 0 60 ft.

Representative Rendering
Northeast Quadrant Development Area

Drawing: P:\Project-Miami\BCAD\2015 Master Plan Updates\01 - FLL Tasks\II-3 Alternatives\CAD\FLL MPU - Ex_5.7 - Final Refinement Renderings_2019_0822.dwgLayout: 5.7-5 Plotted: Oct 30, 2020, 11:35AM

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4 Demand Driven Aeronautical Development Parcel

1 Aircraft Rescue and Firefighting (ARFF)

2 Consolidated BCAD Operations Facility

3 U.S. Customs & Border Patrol (General Aviation Facility)

SOURCES: Illustrate My Design, Conceptual Facility Renderings, May 2019; Ricondo & Associates, Inc., September 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.7-6

NORTH 0 60 ft.

Representative Rendering
Westside Development Area

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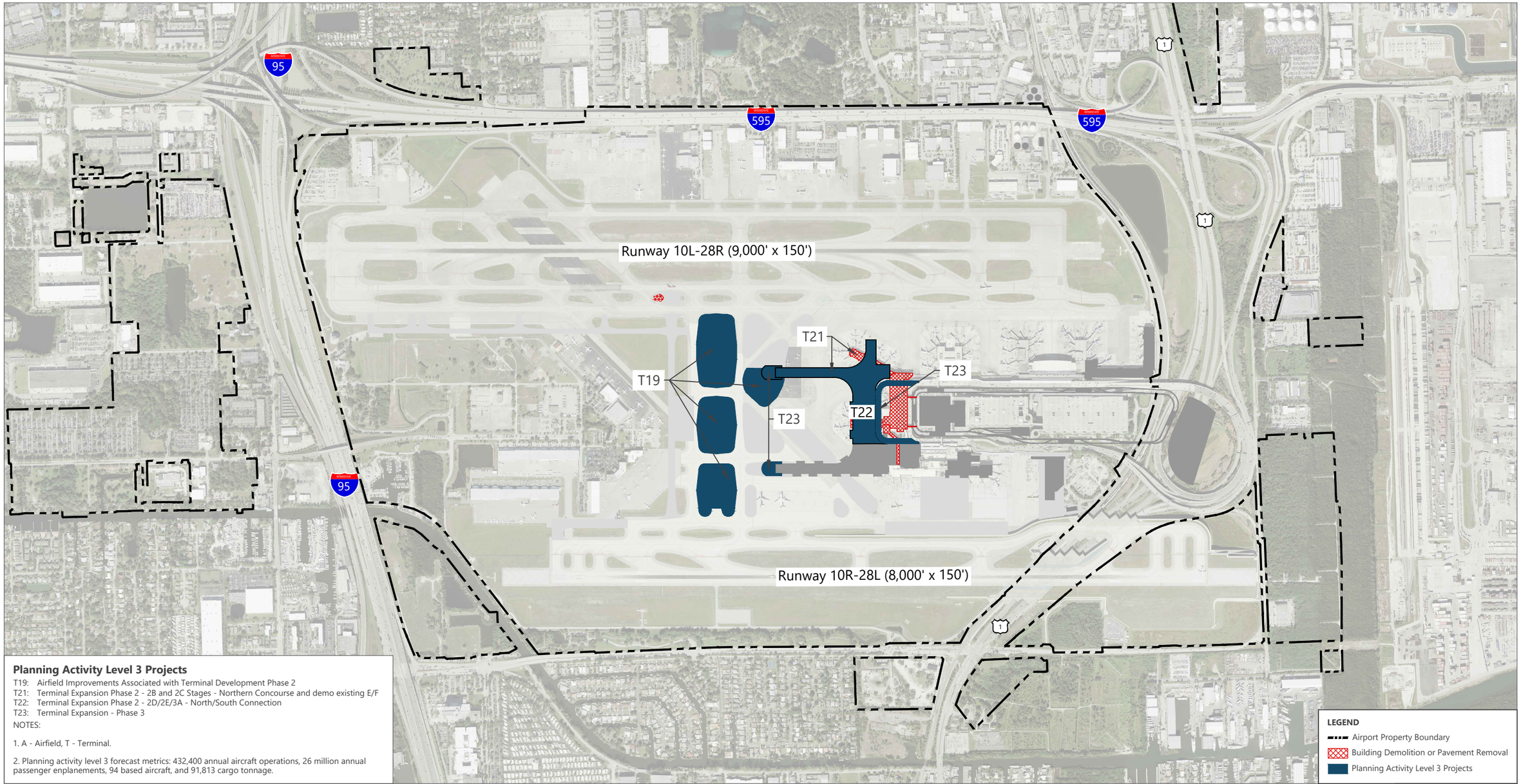

Planning Activity Level 3 Projects

T19: Airfield Improvements Associated with Terminal Development Phase 2
T21: Terminal Expansion Phase 2 - 2B and 2C Stages - Northern Concourse and demo existing E/F
T22: Terminal Expansion Phase 2 - 2D/2E/3A - North/South Connection
T23: Terminal Expansion - Phase 3

NOTES:

1. A - Airfield, T - Terminal.

2. Planning activity level 3 forecast metrics: 432,400 annual aircraft operations, 26 million annual passenger enplanements, 94 based aircraft, and 91,813 cargo tonnage.

SOURCE: Broward County Aviation Department, Aerial Photography, January 2019; Ricondo & Associates, Inc., March 2019.
PREPARED BY: Ricondo & Associates, Inc., September 2019.

EXHIBIT 5.7-7

NORTH 0 1,200 ft.

Planning Activity Level (PAL) 3 Projects

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