TAC Committee

Role:

To provide input on the master planning analysis from the technical and operational perspectives.
Agenda

• Master Plan Process
  – Introduction
  – Goals and Objectives
  – Sequence of Study Tasks; Key Questions Addressed by the Master Planning Process

• Baseline Conditions / Today’s Environment
• Aviation Activity Forecasts
• Capacity & Operational Conditions
  – Airfield
  – Gates & Terminal Facilities
  – Landside
  – Cargo and General Aviation

• Short-Term Improvements
  – Landside
  – Terminal
• Master Plan Concepts for Serving Demand through 2035
  – Terminal
  – Landside

• Ongoing Analyses and Next Steps
Master Plan Process

Introduction, Goals, and Sequence of Study Tasks
• “An airport master plan is a comprehensive study of an airport and usually describes the short-, medium-, and long-term development plans to meet future aviation demand.” – FAA Advisory Circular 150/5070 – 6B Airport Master Plans

• Plans focus on addressing long-term (20+ years) needs by establishing a roadmap for incremental development to meet future demand

• Planning methods vary depending on the size and complexity of the airport but include the following key elements: inventory of existing conditions forecasting, demand/capacity, alternatives, environmental/sustainability and financial

• Other considerations may include the highest and best use of existing infrastructure given long term development plans
FLL Master Plan Goals and Objectives

BALANCE – Airfield/Terminal/Landside/Airspace

RESPOND – to Immediate and Near Term Needs

POSITION – for Future Growth and New Opportunities

ENHANCE – Customer Experience and Connectivity

OPTIMIZE – Land Assets and Recent Investments

PRESERVE – FLL’s Identity and Strengths

- Broward County’s Asset
- Economic Engine
- Easy In, Easy Out
- Low Cost, High Efficiency
Master Planning Goal: Landside/Terminal/Gates/Airfield & Airspace Balance

Representative Airport Layout

Landside/Terminal/Gates/Airfield & Airspace Balance

AIRSPACE (FAA Controlled)

LANDSIDE   TERMINAL   GATES   AIRFIELD
Sequence of Master Planning Tasks

INVENTORY

FORECASTS

COMPLETE

MARKET ASSESSMENT

INVENTORY

FORECASTS

COMPLETE

DEMAND/CAPACITY & REQUIREMENTS

ALTERNATIVES ANALYSIS

FAA APPROVAL

MAY 2017 – JUNE 2017

JULY 2017 – AUG 2017

OCT 2017 – NOV 2017

COMPLETE

ENVIRONMENTAL & SUSTAINABILITY

FAA APPROVAL

COMPLETE

CAPITAL IMPROVEMENT PROGRAM

MAY 2017 – JUNE 2017

DEC 2017 – JAN 2018

FINANCIAL FEASIBILITY

AIRPORT LAYOUT PLAN & AIRPORT GIS

JUNE 2018 – SEP 2018

FAA APPROVAL

SEPT 2018 – DEC 2018

FINAL REPORT

What are FLL’s current facilities and infrastructure assets? What are the existing conditions?

What is the projected future growth for FLL’s traffic and activity levels?

January 13, 2017

TBD

COMPLETE

JULY 2017 – AUG 2017

COMPLETE

JUNE 2018 – SEP 2018

COMPLETE

OCT 2017 – NOV 2017

MAY 2018 – JUNE 2018

MAY 2018 – JUNE 2018

DEC 2017 – JAN 2018

DEC 2017 – JAN 2018

COMPLETE

COMPLETE

What should the capacity gaps be addressed?

How can the Airport be improved?

What is the market potential for parcels not needed for aviation purposes?

Environmental implications of the proposed improvements?

What projects are needed to fulfill FLL’s future needs?

Is the proposed Capital Improvement Program affordable?

What is the future vision for FLL based on the Master Plan recommendations?

TBD

SUCCESSFUL COMPLETION OF THE MASTER PLANNING PROCESS
Baseline Conditions / Today’s Environment

Baseline Conditions assume completion of the current Capital Improvement Program between now and early 2020.
FLL Baseline Conditions – Land Assets & General Uses

Legend:
- Airport Owned Property with limited/restricted development opportunity
- On-Airport Parcels serving Aviation Uses
- Co-Owned Airport Parcel with Development Opportunity
- New Employee Parking Lot (Former Economy Lot)
- Parcels subject to sale or transfer per interlocal agreements

General Aviation / Cargo / Support Facilities
Co-Owned Parcel with PEV
Terminal Area as defined in Environmental Impact Statement for the new South Runway (December - 2008)
New Employee Parking Lot (former Economy Lot)
General Aviation & Business Aviation Development Area
FLL Baseline Conditions - Terminal Area

**T2**
Original Construction 1986
Modernization est. completion of 2020

**T1**
Original Construction 2001 - 2003
Expansion - Concourse A June 2017;
B/C Connector August 2017

**T3**
Original Construction 1986
Modernization est. completion of 2019

**T4**
Original Construction 1983
Expansion - est. completion 4Q2018

**CYPRESS GARAGE**
Rental Car Center & Public Parking
Opened 2005

**HIBISCUS GARAGE**
Opened 1998

**PALM GARAGE**
Opened 1985

Under Development
Baseline Conditions assume:

1) Runway 10L-28R improvements included as part of the North Airfield Pavement Geometry Evaluation.
FLL Baseline Conditions
Passenger Growth FY11 – FY16

NOTES: Data represents total passengers (enplaned & deplaned) at the U.S. Large Hub Airports.

SOURCES: Broward County Aviation Department; US DOT T100; Ricondo & Associates, Inc.
### FLL Baseline Conditions

#### Growth Since Completion of South Runway Program (Sept. 2014)

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Total Passengers</th>
<th>Total Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fiscal Year 2015</strong></td>
<td>FLL 10%</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>Combined Average Growth of All other Large Hubs 4.5%</td>
<td>0.5%</td>
</tr>
<tr>
<td><strong>Fiscal Year 2016</strong></td>
<td>FLL 9%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Combined Average Growth of All other Large Hubs 4.3%</td>
<td>1.6%</td>
</tr>
</tbody>
</table>

Fiscal Year (FY) represents October 1st – September 30th
Aviation Activity Forecasts

Approved by FAA: January 13, 2017
Activity Forecasts
Projected Growth – FY2016 - 2035

Per 2016 FAA Terminal Area Forecasts (TAF); growth is dependent upon available facilities

NOTES: Data represents revenue enplaned passengers at U.S. Large Hub Airports and is sorted (largest to smallest) based on compound annual growth rates for the period noted. The top 10 airports (as well as MIA and TPA) are shown.

SOURCES: Federal Aviation Administration, 2016 Terminal Area Forecast, Published January 2017; Ricondo & Associates, Inc.
Activity Forecasts - Enplaned Passengers
Baseline, Accelerated Baseline, and FAA 2016 TAF

NOTE: Accelerated growth is dependent upon available facilities (specifically gates).

Potential for Constrained Passenger Activity Resulting from North Runway Rehabilitation Project

FY 2015: 13.2m (Actual)

Baseline:
- 2016: 22.3m (2.7% CAGR)
- 2017 - Projected: 13.5m
- Historical: 13.2m

Accelerated:
- 2016: 26.2m (3.5% CAGR)
- 2017 - Projected: 26.2m

FAA 2016 TAF:
- 2016: 22.6m (2.9% CAGR)
- Historical: 22.7m

NOTES: CAGR = Compound Annual Growth Rate. Total passengers equals two times enplaned passengers. FY 2017 is based on four months of actual data and eight months of projected data.

Baseline forecasts estimate future airport activity predominantly based on trend analysis of historical activity, consideration of FLL’s existing share of South Florida’s demand for air service, socioeconomic data, and local/national trends.

The Accelerated Baseline forecasts reflect higher growth at the Airport, particularly in the short-term based on discussions with several airlines operating at FLL regarding their growth plans, and the potential for FLL securing a larger share of South Florida’s demand for air service.

SOURCES: Broward County Aviation Department (Historical); US DOT T100; Innovata; FAA Terminal Area Forecasts; Ricondo & Associates, Inc.
Activity Forecasts – Changing Passenger Demographic

Domestic vs. International

<table>
<thead>
<tr>
<th>Year</th>
<th>Enplaned Passengers (millions)</th>
<th>Domestic</th>
<th>International</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015 - Actual</td>
<td>80%</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>73%</td>
<td>27%</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>72%</td>
<td>28%</td>
<td></td>
</tr>
</tbody>
</table>

Originating vs. Connecting

<table>
<thead>
<tr>
<th>Year</th>
<th>Enplaned Passengers (millions)</th>
<th>O&amp;D</th>
<th>Connecting</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015 - Actual</td>
<td>90%</td>
<td>10%</td>
<td>82%</td>
</tr>
<tr>
<td>2020</td>
<td>82%</td>
<td>18%</td>
<td>81%</td>
</tr>
<tr>
<td>2025</td>
<td>81%</td>
<td>19%</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Percentages for 2015 represent actual data.

SOURCES: Broward County Aviation Department (historical); Innovata; US DOT O&D Survey (DB1B); Ricondo & Associates, Inc.
Activity Forecasts
Aircraft Operations - As Approved by FAA on January 13, 2017

An operation is defined as either an aircraft takeoff or landing

Potential for Constrained Operations Resulting from North Runway Rehabilitation Project

NOTES: CAGR = Compound Annual Growth Rate.
FY 2017 is based on four months of actual data and eight months of projected data.

Baseline forecasts estimate future airport activity predominantly based on trend analysis of historical activity, consideration of FLL’s existing share of South Florida’s demand for air service, socioeconomic data, and local/national trends.

The Accelerated Baseline forecasts reflect higher growth at the Airport, particularly in the short-term based on discussions with several airlines operating at FLL regarding their growth plans, and the potential for FLL securing a larger share of South Florida’s demand for air service.

SOURCES: Broward County Aviation Department (historical); Innovata; FAA Air Traffic Activity Systems; FAA Terminal Area Forecasts; Ricondo & Associates, Inc.
Capacity & Operational Conditions

Airfield, Terminal and Landside Systems
Airfield
FLL operates on a very small footprint compared to other large hubs.

DEN 33,920 acres
566,035 operations
17 operations per acre

DFW 18,076 acres
676,890 operations
37 operations per acre

IAH 10,000 acres
479,778 operations
48 operations per acre

ORD 7,700 acres
872,332 operations
113 operations per acre

ATL 4,700 acres
899,040 operations
191 operations per acre

LAX 3,586 acres
685,889 operations
191 operations per acre

LAS 2,853 acres
532,979 operations
187 operations per acre

FLL 1,400 acres
287,264 operations
205 operations per acre

SOURCE: FAA Air Traffic Activity System (ATADS), FFY2016 Operations Data
Future Demand
10-year baseline demand (Projected 2025 per forecast):
• 347,000 annual operations

20-year baseline demand (Projected 2035 per forecast):
• 400,000 annual operations

An airfield is considered to be reaching its capacity when the average annual delay per operation reaches 6-10 minutes.
Gates & Terminal Facilities
Gate Capacity & Future Needs

Baseline Gate Capacity: 66

FY2016: 28.7 MAP
CY2016: 29.2 MAP

Future gate requirements:
- 37 MAP (On or before 2020)
  - 70 - 72 gates
- 42 MAP (On or before 2025)
  - 75 - 77 gates
- 53 MAP (On or before 2035)
  - 83 - 85 gates

Notes:
MAP: Million Annual Passengers
New Gates Require Terminal Processing Support Functions

- ADDITIONAL GATES
  - SECURITY SCREENING
  - CHECK-IN
  - CBP/FIS
  - CONCESSIONS
  - HOLDROOM
  - BAGGAGE PROCESSING

- LANDSIDE FACILITIES & INFRASTRUCTURE
# Summary of Terminal Requirements

<table>
<thead>
<tr>
<th></th>
<th>Terminal 1 Requirements</th>
<th>Terminal 2 Requirements</th>
<th>Terminal 3 Requirements</th>
<th>Terminal 4 Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2025(\textsuperscript{1})</td>
<td>2035(\textsuperscript{2})</td>
<td>2025(\textsuperscript{1})</td>
<td>2035(\textsuperscript{2})</td>
</tr>
<tr>
<td><strong>Check-In</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In Line Bag Drop Positions</td>
<td>31</td>
<td>35</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Lobby Depth</td>
<td>56’</td>
<td>56’</td>
<td>56’</td>
<td>56’</td>
</tr>
<tr>
<td><strong>Screening Checkpoint</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Lanes</td>
<td>9</td>
<td>10</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Holdrooms</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Area</td>
<td>66,444</td>
<td>71,796</td>
<td>28,360</td>
<td>28,519</td>
</tr>
<tr>
<td><strong>Outbound Make-up</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak Carts Staged in Make-up by Airline</td>
<td>133</td>
<td>146</td>
<td>38</td>
<td>45</td>
</tr>
<tr>
<td><strong>Domestic Bag Claim</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claim Devices</td>
<td>6</td>
<td>6</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>EDS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSA Baggage Screening</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>CBP FIS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APC Kiosks</td>
<td>22</td>
<td>26</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>APC Queue Area</td>
<td>4,070</td>
<td>4,785</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bag Claim Active Capacity (sq ft)</td>
<td>5,430</td>
<td>7,740</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Officer Inspection</td>
<td>18</td>
<td>20</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Officer Inspection Queue Area</td>
<td>2,370</td>
<td>2,610</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Notes:**
- **Green shading:** indicates baseline inventory/adjusted capacity (check-in) exceeds requirements,
- **Red shading:** indicates requirements exceed baseline inventory/adjusted capacity (check-in)
- **Yellow shading:** indicates requirements are approaching capacity or could be met with little investment

**Planning Activity Levels = Million Annual Passengers (MAP):**
- 1/ 42 MAP (On or before 2025)
- 2/ 53 MAP (On or before 2035)
Landside Facilities & Infrastructure

- Public Parking
- Terminal Curb Front
- Terminal Roadway System
- Rental Car Facilities
Terminal Curbfront
Level of Service (LOS) Characteristics (Illustrative)

- **Free flow – no interference**
- **Relatively free flow – some double parking**
- **Double & sometimes triple parking – Planning Conditions**
- **Triple parking – Through lanes capacity impacted/reduced**
- **Gridlock – Consistent congestion & delay**

**Sources:** ACRP Report 25, *Airport Passenger Terminal Planning and Design*
Immediate/short-term improvements are necessary to address existing conditions
Existing Roadway Conditions (2015)
Even with the implementation of short-term improvements (to be defined), additional landside capacity enhancements will be required.
Arrivals Level Terminal Curbside LOS - Forecast

Even with the implementation of short-term improvements (to be defined), additional landside capacity enhancements will be required.

Note: 20-year horizon, per forecast, 42 MAP estimated to be on or before 2025 and 53 MAP estimated to be on or before 2035.
Public Parking Summary

FY 2016 MAP: 28.7
CY 2016 MAP: 29.2

Notes: MAP: Million Annual Passengers and Parking requirements include spaces for long-term parking, historically served through the economy parking product. Assumes accelerated forecast.
## Landside Summary Requirements

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Future Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FY2015</td>
</tr>
<tr>
<td>Originating Passengers (millions)</td>
<td>11.8</td>
</tr>
<tr>
<td><strong>Public Parking (R&amp;A MPU Design Day Requirements)</strong></td>
<td></td>
</tr>
<tr>
<td>Daily/Hourly Parking (spaces)</td>
<td>6,410</td>
</tr>
<tr>
<td>Economy Parking (spaces) 1/</td>
<td>4,010</td>
</tr>
<tr>
<td><strong>Subtotal: Public Parking (spaces)</strong></td>
<td>10,420</td>
</tr>
<tr>
<td>Valet Parking (spaces)</td>
<td>1,385</td>
</tr>
<tr>
<td>Employee Parking (spaces) 3/</td>
<td>3,200</td>
</tr>
<tr>
<td><strong>Rental Car (from 2015 LeighFisher Study, linearly adjusted to MPU Accelerated Baseline schedule)</strong></td>
<td></td>
</tr>
<tr>
<td>Rental Car QTA (ft²) 2/</td>
<td>327,000</td>
</tr>
<tr>
<td>Rental Car Ready/Return (ft²) 2/</td>
<td>814,100</td>
</tr>
<tr>
<td>Rental Car Staging/Storage (ft²)3/</td>
<td>280,200</td>
</tr>
</tbody>
</table>

**Notes:**
1/ Employee parking is currently occupying Levels 7-9 of the Cypress Garage, but is expected to move to the current 4,010 space Economy Lot in early 2017. Economy Parking requirements assume BCAD continues to provide an Economy product.
2/ Rental car requirements are based on a modification to the LeighFisher report to replace the 2013 TAF with the accelerated baseline schedule, thus projecting accelerated growth in requirements. The requirements are intended as approximate working planning/level numbers, not as formal master plan requirements. The expected requirements are expected to be a point of discussion in the rental car renegotiations for 2018.
3/ Usage of the Cypress Level 5 staging/storage area varies by company. It is dependent upon leasing rates and whether the company operates a “pass-through” QTA flow or a “reverse-staging” QTA flow. Many companies also utilize off-site storage. The storage/staging requirements presented here and accounted for in the preliminary concepts are dependent on how the rental car companies wish to use the space and what they’re willing to pay for storage proximity. Please refer to the LeighFisher report for full details. The expected requirements are expected to be a point of discussion in the rental car renegotiations for 2018.

Cargo and General Aviation
Cargo Warehouse Requirements

**Belly Cargo**

<table>
<thead>
<tr>
<th>Year</th>
<th>Requirements</th>
<th>Existing</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>20,000</td>
<td>0</td>
</tr>
<tr>
<td>2020</td>
<td>40,000</td>
<td>0</td>
</tr>
<tr>
<td>2025</td>
<td>60,000</td>
<td>0</td>
</tr>
<tr>
<td>2030</td>
<td>80,000</td>
<td>0</td>
</tr>
<tr>
<td>2035</td>
<td>100,000</td>
<td>0</td>
</tr>
</tbody>
</table>

**Integrated & All-Cargo Carrier**

<table>
<thead>
<tr>
<th>Year</th>
<th>Requirements</th>
<th>Existing</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>120,000</td>
<td>0</td>
</tr>
<tr>
<td>2020</td>
<td>120,000</td>
<td>0</td>
</tr>
<tr>
<td>2025</td>
<td>120,000</td>
<td>0</td>
</tr>
<tr>
<td>2030</td>
<td>120,000</td>
<td>0</td>
</tr>
<tr>
<td>2035</td>
<td>120,000</td>
<td>0</td>
</tr>
</tbody>
</table>

Requirements for Integrated and All-Cargo Apron and Cargo Ground Support Equipment Storage Space

Aircraft Parking Apron

GSE Storage Area

All-cargo Logistics Network

- Freight forwarder and 3rd party logistics providers are responsible for the routing decisions and operations of all-cargo freight volumes
- Special cargo handlers and handling facilities (refrigerated, fumigation) that are critical to the perishable market (e.g. MIA)
- Other specialized service companies like insurance providers, banks, etc.
South Florida Cargo Market Dynamics

2015 FLL Cargo Airline Market Share
81,322 Tons (105,000 sq. ft.)

- 79% All-Cargo
- 20% Integrated
- <1% Belly

FLL Constraints:
- The predominant narrowbody feet of FLL's Airlines have limited capacity to carry belly cargo
- Growth opportunities for integrators (UPS/FedEx) is typically tied to regional economic growth
- FLL lacks infrastructure, logistical & other support services for all-cargo (freight) operators

2015 MIA Cargo Airline Market Share
2,210,776 Tons

- 51% All-Cargo
- 17% Integrated
- 16% Mixed
- 16% Belly

Nearly all of South Florida all-cargo freighter operations occur at MIA
- Established logistical and support infrastructure
- 13,000 ft. runway
- Nearly 2 million sq. ft. of dedicated warehouse space on-airport
## 2035 General Aviation Projections – Baseline & Sensitivity Analysis

<table>
<thead>
<tr>
<th>Activity Metric</th>
<th>Accelerated Baseline 2035 Forecast</th>
<th>Sensitivity Analysis 2035 Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual GA Operations</td>
<td>37,704</td>
<td>54,135</td>
</tr>
<tr>
<td>Peak Month</td>
<td>4,130</td>
<td>5,414</td>
</tr>
<tr>
<td>Peak Month Average Day operations (PMAD)</td>
<td>133</td>
<td>175</td>
</tr>
<tr>
<td>Based Aircraft</td>
<td>94</td>
<td>135</td>
</tr>
</tbody>
</table>

GA Facilities – Summary

• Current and proposed apron area is anticipated to meet demand requirements over the forecast planning period under the accelerated baseline and sensitivity analysis scenario

• Based on FBO input, the majority (60%) of transient operations of larger aircraft (i.e. turboprops and jets) stay more than one day and seek to hangar their aircraft
  – Current and proposed GA hangar facilities do not meet the projected PMAD demand:
    • Baseline Forecast: 64,000 additional sq. ft. of hangar
    • Sensitivity Analysis (High GA Growth): 290,000 additional sq. ft. of hangar

Short-Term Improvements

Landside & Terminal
Landslide
Existing Roadway Congestion

- Limited weave distance (exiting garage and RCC)
- Roadway narrows from 4 to 3 lanes
- Departures level vehicles cause cross-weaving with arrivals traffic (to Perimeter Road)
- Roadway narrows from 4 to 3 lanes
- Merge point for arrivals and departures roadways
- Limited weave distance
- Roadway narrows from 4 to 3 lanes
Merging/Weaving & Exit Roadway Improvements

- Provides greater decision distance for vehicles exiting Cypress and merging onto outbound terminal roadway
- Channels northbound and southbound traffic to minimize weaving
- Adds a new lane to the outbound terminal roadway
- New connection to Perimeter Road minimized weaving
- Proposed Cell Phone Lot Area
Roadway Management Technology (Flexing) - Dynamic Messaging Signs (DMS)

- Locate DMS prior to Arrivals & Departures Signs
- DMS to show travel time on each level or congested level alert
- Continue with FDOT coordination to have DMS on US-1 and I-595 (If possible)
- New static signs proposed under separate project
Pedestrian Signalized Crosswalks

Illustrative Example

Photo Source: Google – John Wayne Airport
Arrivals Level Terminal Curbside LOS

Existing Conditions (2015) vs. 2020 Conditions with Short-term Improvements

**Legend**
- Terminal LOS – Peak Month Average Day (PMAD):
  - C or better
  - D
  - E
  - F
Departures Level Terminal Curbside LOS

Existing Conditions (2015)

2020 Conditions with Short-term Improvements

LEGEND
Terminal LOS – Peak Month Average Day (PMAD):
- C or better
- D
- E
- F
Curbside Roadway Modeling – Lower Level
With and Without Short-Term Improvements

From KHA-3/23/17

<table>
<thead>
<tr>
<th>2020 - Without Improvements</th>
<th>2020 - With Improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Level (Arrivals) Peak</td>
<td>Lower Level (Arrivals) Peak</td>
</tr>
<tr>
<td>2020 PMAD</td>
<td>2020 PMAD – Widened Exit Lanes</td>
</tr>
</tbody>
</table>

Source: Kimley Horn & Associates, Inc.
Post-Security Checkpoint Terminal Connection Plan

T3-T4 Connector completed November 2016
Terminal Connection Plan
Proposed T1-T2 Connector Concept
Terminal Connection Plan
Proposed T2-T3 Connector Concept
Additional Terminal Improvements under consideration

- Temporary terminal facility for additional gates
- Terminal 4 ticket lobby and baggage claim expansion / modernization
- Terminal 3 / Terminal 4 connector building (pre-security)
Master Plan Concepts for Serving Demand through 2035

Terminal & Landside
Terminal
Terminal Development Planning Guidelines

- Baseline conditions assume 66 gates
- The EIS Record of Decision for the South Runway Program includes consideration of the expansion of gates up to 77
- Terminal Development Alternatives propose the following incremental phasing:
  - Phase 1: 77 gate build out
  - Phase 2/3: 83-85 gate build out
  - Ultimate Phase: 95 gate build out
- Goal of each incremental phase is to provide additional gate capacity while replacing older facilities with minimal operational impacts
## Terminal Development Concepts

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2A</th>
<th>Phase 2B</th>
<th>Phase 3A</th>
<th>Phase 3B</th>
<th>Ultimate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Satellite Pier Opt 1</strong></td>
<td><img src="image1" alt="Phase 1 - Satellite Pier Opt 1" /></td>
<td><img src="image2" alt="Phase 2A - Satellite Pier Opt 1" /></td>
<td><img src="image3" alt="Phase 2B - Satellite Pier Opt 1" /></td>
<td><img src="image4" alt="Phase 3A - Satellite Pier Opt 1" /></td>
<td><img src="image5" alt="Phase 3B - Satellite Pier Opt 1" /></td>
</tr>
<tr>
<td><strong>Satellite Pier Opt 2</strong></td>
<td><img src="image7" alt="Phase 1 - Satellite Pier Opt 2" /></td>
<td><img src="image8" alt="Phase 2A - Satellite Pier Opt 2" /></td>
<td><img src="image9" alt="Phase 2B - Satellite Pier Opt 2" /></td>
<td><img src="image10" alt="Phase 3A - Satellite Pier Opt 2" /></td>
<td><img src="image11" alt="Phase 3B - Satellite Pier Opt 2" /></td>
</tr>
<tr>
<td><strong>Satellite Pier Opt 3</strong></td>
<td><img src="image13" alt="Phase 1 - Satellite Pier Opt 3" /></td>
<td><img src="image14" alt="Phase 2A - Satellite Pier Opt 3" /></td>
<td><img src="image15" alt="Phase 2B - Satellite Pier Opt 3" /></td>
<td><img src="image16" alt="Phase 3A - Satellite Pier Opt 3" /></td>
<td><img src="image17" alt="Phase 3B - Satellite Pier Opt 3" /></td>
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<tr>
<td><strong>Satellite Pier Opt 4</strong></td>
<td><img src="image19" alt="Phase 1 - Satellite Pier Opt 4" /></td>
<td><img src="image20" alt="Phase 2A - Satellite Pier Opt 4" /></td>
<td><img src="image21" alt="Phase 2B - Satellite Pier Opt 4" /></td>
<td><img src="image22" alt="Phase 3A - Satellite Pier Opt 4" /></td>
<td><img src="image23" alt="Phase 3B - Satellite Pier Opt 4" /></td>
</tr>
</tbody>
</table>
Terminal Development Concepts

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2A</th>
<th>Phase 2B</th>
<th>Phase 3A</th>
<th>Phase 3B</th>
<th>Ultimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satellite Pier Opt 5A</td>
<td>Satellite Pier Opt 5B</td>
<td>Satellite Pier Opt 6</td>
<td>T4 East Extension</td>
<td>T4 West Extension</td>
<td>Ultimate</td>
</tr>
</tbody>
</table>

Legend:
- Short-Listed Concepts
## Screening Matrix for Terminal Development Concepts

<table>
<thead>
<tr>
<th>Screening Criteria</th>
<th>Satellite Option 1</th>
<th>Satellite Option 2</th>
<th>Satellite Option 3</th>
<th>Satellite Option 4</th>
<th>Satellite Option 5</th>
<th>Satellite Option 6</th>
<th>T4 East Extension</th>
<th>T4 West Extension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity Benefits</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Operational Considerations and Flexibility</td>
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<tr>
<td>Incremental Development Potential</td>
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<td></td>
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<tr>
<td>Constructability</td>
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<td></td>
</tr>
<tr>
<td>Relative (to other Alternatives) Costs</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Future Expansion Potential</td>
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<td></td>
</tr>
</tbody>
</table>

**LEGEND:**
- **Meets Criteria**
- **Partly Meets Criteria**
- **Does not Meet Criteria**
- **Short-listed Concepts**
Short Listed Terminal Concepts
Phase 1 Development (77 Gate Complex)

Short-listed (from those considered):
Develop mid-field Concourse and/or Expand Concourse G to the west

Concept 1
Concept 6

Concept 5

Note: New south side gates in Concourse G West extension in Concepts 5 & 6 are anticipated to be NB/WB capable that would serve as domestic/international swing gates.

- Narrowbody Gate
- Widebody Gate
Short Listed Terminal Concepts
Phase 2/3 Development (83 - 85 Gate Complex)

Concept 1

Concept 6

Concept 5

Short-listed (from those considered):
Develop mid-field Concourse and/or Expand Concourse G to the west

Note: New south side gates in Concourse G West extension in Concepts 5 & 6 are anticipated to be NB/WB capable that would serve as domestic/international swing gates.

- Narrowbody Gate
- Widebody Gate
Short Listed Terminal Concepts
Ultimate Phase (Post 2035) Development (95 Gate Complex)

Short-listed (from those considered):
1. Develop mid-field Concourse and/or
2. Expand Concourse G to the west

Concept 1

Concept 5

Note: New south side gates in Concourse G West extension in Concepts 5 & 6 are anticipated to be NB/WB capable that would serve as domestic/international swing gates.

- Narrowbody Gate
- Widebody Gate

Targets balance with practical airfield capacity
Curbside Roadway Modeling - 2025 (with Short-Term Improvements)
Curbside Roadway Modeling – 2035 (with Short-Term Improvements)
Range of Landside Concepts Considered

- Ingress/Egress
- Terminal Roadway
- Terminal Curb
- Parking and Rental Car Facilities
Preliminary Terminal Curbside and Roadway Expansion Alternative

On-Airport Improvements

- Supplemental Curb
- Potential New Palm Garage and Other
- Cypress Garage Exit
- Realigned and expanded outbound roadway (Departures)
- Realigned and expanded outbound roadway (Arrivals)
- Development Area to meet future Airport Support Needs
- New Perimeter Road Connector
Preliminary Terminal Curbside and Roadway Expansion Alternative With Off-Airport Improvements

- Potential New Palm Garage and Other
- Off-airport road widening
- New Bridge over U.S. 1
- New NB U.S. 1 Flyover
- Development Area to meet future Airport Support Needs
Concept G:
- Construct a new, parallel exit bridge, instead of widening existing bridge
- Requires two new off-airport connection ramps to mitigate weaving

- Parking exit plaza rebuilt (with New Palm) at Dep. level to balance garage exits on Dep. and Arr. levels
- Dep. Level exit extended at elevation to maintain separation from Arr. exits for easier weave maneuvers
- Second exit bridge constructed (new crossing over FEC)
- Existing exit bridge returned to 3-lane, full shoulder configuration

- New Dep. and Arr. level exit configurations are the same as Concept F
- Short-Term Improvements removed at west end, retained at east end

Reconstruction of Dep. and Arr. level roadway east of T4
2035 Exit Roadway Capacity
Concept G DETAIL

- Existing Dep. Roadway
- New Arr. Roadway
- New Dep. Roadway
- Short-Term Improvements maintained
- Existing Arr. Roadway
- New Arr. Roadway
- New Dep. Roadway

- Crossover lanes take advantage of grade separation to reduce weaving movements
- Arrivals exits destined for US-1 south must cross under Dep. level to merge onto new exit bridge
- Dep. and Arr. roadways stay separated for streamlined exit
2035 Exit Roadway Capacity Concept G Off-Airport

Concept G:
- Construct a new, parallel exit bridge, instead of widening existing bridge
- Requires two new off-airport connection ramps to mitigate weaving

- Airport exit to I-595 widened by one lane
- New flyover allows traffic from US-1 north to the Port to avoid weaving across expanded Airport exit roadway
- New exit bridge merges into existing exit roadway, which is restriped for one additional lane
- New flyover allows vehicles on new exit bridge to access US-1 north
- Ramp G is reconnected to new exit bridge
2035 Exit Simulation Comparison
Concept G (assumes Downstream Widening), Lower Level, 6:40 PM

Exit Concept G

Exit Concept G
(Simulates Crosswalks Removed)

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Arrivals Travel Time Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Day</td>
<td>30% (3 min)</td>
</tr>
<tr>
<td>PM Peak</td>
<td>19% (2 min)</td>
</tr>
</tbody>
</table>

2035 Exit Simulation Comparison
Concept G (assumes Downstream Widening), Upper Level, 6:40 PM

Exit Concept G

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Departures Travel Time Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Day</td>
<td>0% (&lt;1 min)</td>
</tr>
<tr>
<td>PM Peak</td>
<td>4% (&lt;1 min)</td>
</tr>
</tbody>
</table>

Examples of Automated People Mover Systems (APM)

- Tampa International Airport
- Miami International Airport
- Orlando International Airport

(PRELIMINARY DRAFT) WORK IN PROGRESS - FOR DISCUSSION PURPOSES ONLY
Preliminary Automated People Mover (APM) Concept

Potential extension of APM

Bi-Directional Airport APM

New Palm Garage

Development Area to meet future Airport Support Needs

Potential Intermodal Station (Option 2) with Parking Facilities Adjacent or Above

Potential Intermodal Station (Option 1)

Potential extension of APM
Ongoing Analyses and Next Steps
Support Facilities Requirements

Legend
- Facilities Adequate to Serve 2035 Requirements
- Facilities Not Adequate to Serve 2035 Requirements

GSE: Ground Support Equipment

## Anticipated Future Facility Development Needs

<table>
<thead>
<tr>
<th>Function</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>2035</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Airfield</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Terminal Gates/Processing</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Terminal Curbfront/Roadways</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Public Parking/Cell Phone Lot 1/</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>General Aviation 2/</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Cargo</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Airport/Airline Support: 3/</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ATCT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fuel Farm</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Flight Kitchen</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Centralized Receiving/Distribution</strong></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Public Safety/ARFF</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes:

1/ Public parking amenities include cell phone waiting lot, transportation network companies (TNC) and taxi staging areas.

2/ Future general aviation facility development primarily consists of vehicular parking and aircraft storage hangars in replacement of aircraft parking apron.

3/ Future development of other support facilities, including airport maintenance, ARFF, and GSE storage and maintenance, is not anticipated during the 20-year planning horizon.
### FLL 2035 Facility Deficiencies (Acres)

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Existing Area</th>
<th>2035 Requirement</th>
<th>Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cargo</strong></td>
<td>34.2</td>
<td>15.5</td>
<td>0</td>
</tr>
<tr>
<td><strong>General Aviation</strong> 1/</td>
<td>91.7</td>
<td>102.0</td>
<td>10.3</td>
</tr>
<tr>
<td><strong>Airline/Airport Support</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Flight Kitchens</td>
<td>0.5</td>
<td>2.0</td>
<td>1.5</td>
</tr>
<tr>
<td>- Fuel Farm</td>
<td>3.3</td>
<td>4.3</td>
<td>1.0</td>
</tr>
<tr>
<td>- ARFF 2/</td>
<td>1.7</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>- Airport Maintenance</td>
<td>2.6</td>
<td>8.6</td>
<td>6</td>
</tr>
<tr>
<td>- GSE Storage and Maintenance 3/</td>
<td>-.3/</td>
<td>-.3/</td>
<td>-.3/</td>
</tr>
<tr>
<td>- GA Customs</td>
<td>1.0</td>
<td>1.7</td>
<td>0.7 2/</td>
</tr>
<tr>
<td>- Centralized Receiving/Distribution</td>
<td>0.0</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>- Public Safety Office</td>
<td>0.75</td>
<td>1.7</td>
<td>1.7 2/</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>135.75</td>
<td>34.2 4/5/</td>
<td></td>
</tr>
</tbody>
</table>

### Notes:
1/ General Aviation includes H Aviation, Bombardier and Embraer.
2/ Assumes full relocation of ARFF, GA Customs and Public Safety functions.
3/ GSE Storage and Maintenance facilities are embedded with other airline functions.
4/ The total for new facilities has been increased for the potential full replacement of ARFF, Public Safety Office and GA Customs facilities.
5/ To account for drainage requirements, the overall deficiency was increased to 34.2 acres which includes a 28% retention requirement for future development.
### Future Development Opportunities (Aeronautical Uses) – Option 3B

**Notes:**
- Available Land: 102.4 Acres
- Additional for 2035: 34.2 Acres
- Property Available for Other Use: 68.2 Acres
- Potential MRO: 11.7 Acres
- Potential “VIENNA”: 29.5 Acres
- Property Available for Other Use: 27 Acres
Next Steps

• Continue work on short-term improvements; return to Board for approval
• Stakeholder engagement and meetings
• Complete identification of Airport-wide needs (full Airport campus to include cargo, business/general aviation, ancillary/support facilities etc.)
• Further refinement to future development concepts
• Continuation with subsequent master planning tasks