COMPREHENSIVE REGIONAL AIR SYSTEM PLAN – 2019
PHASE 2 REPORT – WORKING DRAFT

NOVEMBER 2019

I. INTRODUCTION

Following Phase 1 of the comprehensive Regional Air System Plan (RASP) update, which focused on a review of previous and existing RASPs, airport master plans, state aviation plans, and a national literature review to determine the state of the practice in regional airport system planning, Phase 2 of the comprehensive RASP update reviewed existing conditions in the regional airport system and conducted a needs assessment based on the existing conditions of each airport, combined with overarching air system policy issues. The results of Phase 2 will be documented in a report that will provide initial guidance for the discussion of forecasts and future recommendations in Phase 3. Note: all growth projections provided throughout this report assume a two percent annual growth rate, unless otherwise indicated.

Phase 2 addresses the following areas of assessment:

Supply Analysis
Conduct a supply analysis for the region's commercial airports covering passenger and cargo facilities and other uses within the airport boundaries, using an approach similar to that performed for the Ground Access Element Update in previous Airports Capital Improvement Plan (ACIP) documents.

Demand Analysis
Conduct a demand analysis for the region's commercial airports covering passenger and cargo facilities and other uses within the airport boundaries, using an approach similar to that performed for the Ground Access Element Update in previous ACIP documents and including a review of outputs from regional and statewide travel demand forecasting models, where available. The analysis will cover demand for air travel and surface transportation for the airports.

Needs Assessment
Conduct a needs assessment for the commercial service airports based on the results of the supply and demand analysis. The assessment will cover short, medium, and long-term needs and corresponding projects for the airports to function normally, with the long-term time horizon likely to correspond with the horizon for Visualize 2045.

Issue Identifications
Identify major policy issues facing the regional air system and discuss how these issues may impact implementation of the system plan. Specific recommendations to address these issues and consideration of how these issues are being addressed nationally and in other metropolitan regions will be developed during Phase 3 of the RASP update.

II. SUPPLY ANALYSIS

Informed by an iterative series of in-person interviews and phone calls conducted by TPB staff with airport planning staff from each of the region's three major commercial airports – Baltimore/Washington International Thurgood Marshall Airport (BWI), Ronald Reagan Washington National Airport (DCA), and Washington Dulles International Airport (IAD) – the following supply-based metrics were established to guide the supply analysis:

AIR SERVICE

The total number of aircraft gates, including both wide body gates and narrow body gates.

CARGO

Air cargo consists of four elements: warehouse space, aircraft cargo capacity, parking, and intermodal connectivity. Warehouse space consists of the square footage of existing cargo warehouse space. Aircraft cargo capacity concerns international wide-body flights and air cargo carrier capacity. Parking involves runway length, aircraft parking ramps, and the infrastructure necessary for truck maneuvering. Intermodal connectivity includes factors that impact access to the interstate highway system and cargo rail.

GROUND ACCESS

Ground access consists of eight elements: automobile, rental car, Metrorail, Metrobus or other local bus, commuter bus, commuter rail, intercity bus, and intercity rail. Automobile is broken down by private vehicles used for personal use, rental cars, taxicabs, and transportation network companies (TNCs, such as Uber and Lyft). Rental car consists of the square footage of the rental car parking facility. Metrorail, Metrobus/local bus, commuter bus, commuter rail, intercity bus, and intercity rail are each described by the number of routes, capacity, and frequency of service.

CURBSIDE ACCESS

Curbside access is defined by lane area and lane capacity, where lane area consists of the linear footage of lanes, and lane capacity involves the curbside capacity of lines, which represents the number of cars and/or passengers that the lanes can accommodate over the course of a year. Should this include specifications for TNCs and Taxis?

PARKING

Parking is defined by the number of parking spaces and the bus shuttle fleet size. Should this include specifications for TNCs and Taxis?

GENERAL AVIATION ACTIVITY

General aviation activity consists of four elements: ramp space area, square footage of general aviation operations, the number of parking spaces that support general aviation aircraft, and apron type.

SUPPLY ANALYSIS FOR BALTIMORE/WASHINGTON INTERNATIONAL THURGOOD MARSHALL AIRPORT (BWI)

AIR SERVICE

Air service infrastructure at BWI Airport consists of 12 wide body gates and 62 narrow body gates.

CARGO

Warehouse Space

412,125 SF of existing cargo warehouse space.

Aircraft Cargo Capacity

26 freight-based carriers totaling 428.3 million tons; 5 mail-based carriers totaling 11.6 million tons. (Are we sure this is tons and not pounds? Numbers between BWI and IAD vary tremendously)

Parking

Aircraft Parking Spaces	Midfield cargo	**6**	North cargo	**20**	Total	**26**
Runway Length	RW10-28	**10,502' x 150'**	RW15R-33L	**9,500'x150'**	RW15L-33R	**5,000'x100'**
Ramp Area	Midfield cargo	**785,000 SF**	North cargo	**1,317,000 SF**		
Truck Maneuvering	Landside frontage	**4,182 LF**	Maneuvering	**527,856 SF**		
Truck Parking	Dock positions	**251**	Storage	**459,000 SF**		

Source: *Comprehensive RASP Update, BWI Airport, 2019*

Intermodal Connectivity

Primary access to the interstate highway system from the north, northwest, and northeast by Interstates 95, 695, 195, MD 295. Access via Interstates 70 and 695, MD Route 100 and the Intercounty Connector / MD 200. From the east by Highway 50/301 to I-97.

GROUND ACCESS

Automobile

See below for curbside access and parking.

Rental Car

2,054,741 SF of rental car parking facility.

Metrobus / Local Bus

Routes	B-30 Greenbelt-BWI Airport Express Line
Capacity	50 passengers per bus
Frequency	Hourly Monday-Friday; 6 AM - 10:38 PM

Source: *Comprehensive RASP Update, BWI Airport, 2019*

Commuter Bus

Routes	201 Gaithersburg Park to BWI
Capacity	50 passengers per bus
Frequency	Hourly 4 AM - 12:20 AM

Source: *Comprehensive RASP Update, BWI Airport, 2019*

Commuter Rail

Routes	MARC Penn Line
Capacity	Sitting Load: 875; Crush Load: 1,155
Frequency	
Weekday: Southbound	4 AM – 9:25 PM; 27 daily trips
Weekday: Northbound	5:30 AM – 10:45 PM; 24 daily trips
Saturday: Southbound	7 AM – 9:15 PM; 9 daily trips
Saturday: Northbound	9 AM – 10:45 PM; 9 daily trips
Sunday: Southbound	8:45 AM – 5:55 PM; 6 daily trips
Sunday: Northbound	10:30 AM – 7:30 PM; 6 daily trips

Source: *Comprehensive RASP Update, BWI Airport, 2019*

Intercity Bus

Routes	LocalLink 75 & Express BusLink 107
Capacity	50 passengers per bus
Frequency	
LocalLink 75	Daily; 24 hours per day
Express BusLink 107	
Weekday	6:20 AM - 9:01 AM
Weekend	3:50 PM - 6:31 PM

Source: *Comprehensive RASP Update, BWI Airport, 2019*

Intercity Rail

Routes	Baltimore Light RailLink
Capacity	250 passengers per car; 2-car train
Frequency	
Weekday	4:01 AM-1:23 AM; every 10-30 minutes
Saturday	4:21 AM-1:23 AM; every 15-30 minutes
Sunday	9:51 AM-10:06 PM; every 15-30 minutes

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CURBSIDE ACCESS

Lane Area

Arrivals	
Outer Curb	2,300 linear feet
Inner Curb	2,600 linear feet
Departures	
Outer Curb	2,200 linear feet
Inner Curb	2,600 linear feet

Source: *Comprehensive RASP Update, BWI Airport, 2019*

Lane Capacity

Annual Curbside Usage		**Approximately 30,000 cars**					
Departure Lanes (Total)	6	**Permitted Vehicle Lanes**	2	**Drop-off Lanes**	4		
Arrival Lanes (Total)	7	**Permitted Vehicle Lanes**	2	**Pick-up Lanes**	4	**Bypass Lane**	1

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PARKING

Parking Spaces	24,804
Shuttle Fleet Size	50 buses (29-seat, 40-foot length)
Shuttle Fleet Frequency	Daily (24/7), 5-minute headways
Shuttle Fleet Capacity	fleet seating capacity **x** service frequency
Shuttle Fleet Capacity	29 seats per bus **x** 5-minute frequency
Shuttle Fleet Capacity	8,352 passengers per day

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GENERAL AVIATION ACTIVITY

Ramp Space

Transient Aircraft Overflow Parking	10,000 square yards
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Transient Aircraft Parking	66,500 square yards
Based Aircraft Parking Apron	40,500 square yards

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Square Footage

General Aviation Aircraft	70
T Hangars	30
Corporate Hangars	10
Automobile	326

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Apron Type

Pavement Type	Flexible
Pavement Surface	Asphalt Concrete
Pavement Thickness	2-4 inches
	Hot mix asphalt over 6-9 inch base

Source: *Comprehensive RASP Update, BWI Airport, 2019*

SUPPLY ANALYSIS RONALD REAGAN WASHINGTON NATIONAL AIRPORT (DCA)

AIR SERVICE

Air service infrastructure at BWI Airport consists of 12 wide body gates and 62 narrow body gates.

CARGO

Warehouse Space

412,125 SF of existing cargo warehouse space.

Aircraft Cargo Capacity

2,100 tons of freight; 75 tons of mail. (2016 numbers – do we have 2018 available?)

Parking

Aircraft Parking Spaces	Midfield cargo	6	North cargo	20	Total	26
Runway Length	RW10-28	**10,502' x 150'**	RW15R-33L	**9,500'x150'**	RW15L-33R	**5,000'x100'**
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680,000 SF of rental car parking facility.

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Pavement Type	Flexible
Pavement Surface	Asphalt Concrete
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SUPPLY ANALYSIS FOR WASHINGTON DULLES INTERNATIONAL AIRPORT (IAD)

AIR SERVICE

Air service infrastructure at BWI Airport consists of 12 wide body gates and 62 narrow body gates.

CARGO

Warehouse Space

533,982 SF of existing cargo warehouse space. (Based on 2010 MWAA study – pages 6 and 12. Are there more recently updated numbers? On page 18 it has 540,000 listed as the total area – but the number I have listed here is the specific total of pages 6 and 12 – please advise.)

Aircraft Cargo Capacity

277,145 tons of freight; 15,709 tons of mail. (2016 numbers – do we have 2018 available?)

Parking

Aircraft Parking Spaces	Midfield cargo	6	North cargo	20	Total	26
Runway Length	RW10-28	**10,502' x 150'**	RW15R-33L	**9,500'x150'**	RW15L-33R	**5,000'x100'**
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GROUND ACCESS

Automobile

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Rental Car

1,350,700 SF of rental car parking facility.

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Pavement Type	Flexible
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Pavement Thickness	2-4 inches
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III. DEMAND ANALYSIS

Informed by an iterative series of in-person interviews and phone calls conducted by TPB staff with airport planning staff from each of the region's three major commercial airports – Baltimore/Washington International Thurgood Marshall Airport (BWI), Ronald Reagan Washington National Airport (DCA), and Washington Dulles International Airport (IAD) – the following demand-based metrics were established to guide the demand analysis:

- Air Service
  - **Carrier:** flights by carrier
  - **Enplanements by type:** wide/narrow body aircraft; international/domestic airlines
  - **Gate turns:** average number of gate turns, multiplied by plane seating capacity

- Cargo
  - **Tonnage:** total annual cargo tonnage
  - **Commentary on factors that influence tonnage:** include changes in economy/business and available infrastructure/space -- likely remove

- Ground Access
  - **Automobiles:** ridership, broken down by sub-categories of private vehicle personal use, taxicabs, and transportation network companies (TNCs, such as Uber and Lyft)
  - **Rental car:** ridership
  - **Metro bus:** ridership
  - **Commuter rail:** ridership
  - **Intercity bus:** ridership
  - **Intercity rail:** ridership

- Curbside Access
  - **Levels of Service:** frequency with which curbs reach range of levels of service (A-F)

- Parking
  - **People per car:** number of people per car
  - **Shuttle ridership:** annual ridership of shuttle fleet
  - **Frequency of lot closures:** how often parking lots reach capacity

- General Aviation Activity
  - **Annual operations:** as available, statistics on annual operations
  - **Carriers:** number of carriers/clients

DEMAND ANALYSIS FOR BALTIMORE/WASHINGTON INTERNATIONAL THURGOOD MARSHALL AIRPORT (BWI)

AIR SERVICE

Flights by Carrier

Domestic Carriers (Including Affiliates)	2018 Flights	2045 Forecast
Alaska	1,513	2,583
Allegiant	391	667
American	8,369	14,285
Boutique	236	403
Contour	634	1,082
Delta	9,646	16,465
JetBlue	2,807	4,791
Southern Airways Express	3,922	6,694
Southwest	73,294	125,105
Spirit	8,787	14,998
United	4,633	7,908
Via Air	0	0
DOMESTIC TOTAL		194,981
International Carriers (Including Affiliates)	**2018 Flights**	**2045 Forecast**
Air Canada	1,360	2,321
British Airways	357	609
Condor	60	102
Iceland Air	116	198
Norwegian	0	0
Sunwing	0	0
WOW Air	432	737
INTERNATIONAL TOTAL		3,967
TOTAL	**116,557**	**198,948**

Source: *Comprehensive RASP Update, BWI Airport, 2019*

Current Enplanements

Aircraft Type	2018 Flights	2045 Forecast
Wide Body (Condor & British Airways)	78,254	133,571
Narrow Body	13,542,427	23,115,386
International	668,117	1,140,400
Domestic	12,952,564	22,108,556
TOTAL	**13,620,681**	**23,248,957**

Source: *Comprehensive RASP Update, BWI Airport, 2019*

Gate Turns Multiplied by Average Seating Capacity -- what would be a better title?

In 2018, the average number of turns per gate was 4.77 multiplied by an average seating capacity of 177 per aircraft, totaling 846 gate turns. With the projected growth of averaging seating capacity of 191 by 2045, the projected total is 912 passengers per _what is the unit here?_.

CARGO

Company Name	2018 Tonnage	Company Name	2018 Tonnage
Antonov Design Bureau	229,838	British Airways	8,952,915
Atlas Air	0	Condor	659,807
DHL - ABX	0	WOW Air	254,132
DHL - ATI	16,378,623		
DHL - Atlas Air	482,568	Alaska	618,679
DHL - Kalitta Charters II	0	American	1,162,906
DHL - Southern	0	American - Air Wisconsin	120
Egyptian AF	270,188	American - Envoy	17,647
FedEx	123,052,318	American - Piedmont	2,472
Kalitta	0	American - PSA	981
Kalitta Charter II	0	American - Republic	0
LGSTX - ABX Air	76,982,059	American - SkyWest	798
LGSTX - ATI	1,329,033	Delta	1,307,090
LGSTX - Atlas Air	104,197,725	Southwest	33,139,108
Mountain Air	2,862,712	United - ExpressJet	0
National Airlines	38,986	United	1,099,481
UPS	55,272,441		
		TOTAL	**428,312,627**

Source: *Comprehensive RASP Update, BWI Airport, 2019*

Influences on Local Cargo Tonnage

Air cargo has increased by 80 percent over the last five years at BWI. Ecommerce is creating a demand for intermodal air freight facilities and services in Maryland and at BWI Airport in particular. Amazon opened four fulfillment centers in Maryland and Under Armor is expected to open a large distribution center in Baltimore as well. The Governor's position that Maryland is "Open for Business" is also contributing to encouraging economic and industry growth. BWI provides competitively convenient road access for air freight handlers.

GROUND ACCESS

Automobile: Annual use total and modal percent share.

Private Car	**5,299,000**	63%
Rental Car	**1,193,000**	14%
TNC (Uber/Lyft)	**633,000**	8%
Taxi	**303,000**	4%

Source: *Washington-Baltimore Regional Air Passenger Survey, 2017*

Rental Car

962,773 total rentals in 2018. There is no forecasted growth, and conservative estimates are considering a 0.5-1 percent annual decrease.

Metrobus / Local Bus: B-30

Less than one percent, or less than 192,735, of air passengers traveled to BWI by bus in 2018. MTA does not officially produce ridership projections.

Commuter Bus: 201

While precise alighting numbers at BWI Airport are unknown, in FY18, the 201's total ridership was 11,568. MTA does not officially produce ridership projections.

Commuter Rail: MARC Penn Line

MARC daily boarding at the BWI rail station exceeds 2,200 trips on weekdays, 500 on Saturdays and 300 on Sundays. Total MARC boarding at the BWI rail station in 2018 exceeded 600,000 trips. Three percent, or roughly 217,000 of total passengers traveled by commuter rail in 2018. Note: Ridership numbers based on boarding, but no way to capture how many of those individuals are air passengers or employees / individuals affiliated with the airport – how much does this matter and is there a better way to capture/estimate this information?

Intercity Bus: LocalLink 75 and Express BusLink 107

Average ridership for Route 75, between all four BWI-related stops, on weekdays in 2018 was 256. On Saturdays it was 193 and on Sundays it was 321. Information appears to be incomplete for Route 107 and it is unclear whether the numbers provided for both routes are the average daily ridership or average individual trip ridership.

Intercity Rail: Light Rail and Amtrak

In 2018 the average Light Rail weekday station boarding was 1,030 at BWI Airport and 212 at BWI Business Park, for a total ridership of 192,735. Amtrak MARC Station ridership for 2018 was 748,540.

CURBSIDE ACCESS

Levels of Service

Data is not available for the frequency with which curbs reach range of levels of service (A-F).

PARKING

People Per Car:

Data is not available for the number of people per car.

Shuttle Ridership

Annual shuttle fleet ridership was approximately six million in 2018. Assuming a two percent annual growth rate, shuttle ridership is projected to reach 10.2 million by 2045.

Frequency of Lot Closures

	# of Lot Closures 2018	Avg # of Hours Closed	Closure Rate			
Express	244	7:50	0.66849	per day	20.33333	per month
Long Term	51	6:20	0.13973	per day	4.25000	per month
Daily	5	217:26	0.01370	per day	0.41667	per month
Hourly	1	6:55	0.00274	per day	0.08333	per month

Source: *Comprehensive RASP Update, BWI Airport, 2019*

GENERAL AVIATION ACTIVITY

Annual Operations

In 2018 general aviation operations totaled 10,022. Assuming a two percent growth rate, by 2045 this number is projected to reach 17,106.

Carriers

In 2018 there were 45 based tenants. Transient clients are not tracked.

DEMAND ANALYSIS FOR RONALD REAGAN WASHINGTON NATIONAL AIRPORT (DCA)

Air Service

- **Carrier:** flights by carrier
- **Enplanements by type:** wide/narrow body aircraft; international/domestic airlines
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Cargo

- **Tonnage:** total annual cargo tonnage
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Ground Access

- **Automobiles:** ridership, broken down by sub-categories of private vehicle personal use, taxicabs, and transportation network companies (TNCs, such as Uber and Lyft)
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- **Commuter rail:** ridership
- **Intercity bus:** ridership
- **Intercity rail:** ridership

Curbside Access

- **Levels of Service:** frequency with which curbs reach range of levels of service (A-F)

Parking

- **People per car:** number of people per car
- **Shuttle ridership:** annual ridership of shuttle fleet
- **Frequency of lot closures:** how often parking lots reach capacity

General Aviation Activity

- **Annual operations:** as available, statistics on annual operations
- **Carriers:** number of carries/clients

IV. NEEDS ASSESSMENT

Resulting directly from the supply and demand analyses conducted in RASP Phase 2, all three participating airports have identified the overarching need for future, more detailed and dynamic ground access studies for their respective facilities. Planning staff from each airport emphasized that the exercise of reporting key supply and demand-based metrics covering the range of their facility's operations has served incredibly helpful in reaching the conclusion that further studies will be crucial in improving their overall system performance.

BALTIMORE/WASHINGTON INTERNATIONAL THURGOOD MARSHALL AIRPORT (BWI)

Air Service

- **Gate totals:** number of wide body gates and number of narrow body gates

Cargo

- **Warehouse space:** square footage of existing cargo warehouse space
- **Aircraft cargo capacity:** international wide-body flights and air cargo carrier capacity
- **Aircraft parking space:** for runway length, aircraft parking ramps, truck maneuvering
- **Intermodal connectivity:** access to the interstate highway system and cargo rail

Ground Access

- **Automobiles:** broken down by sub-categories of private vehicle personal use, taxicabs, and transportation network companies (TNCs, such as Uber and Lyft)
- **Rental car:** square footage of parking facility
- **Metro bus:** number of routes, capacity, frequency of service
- **Commuter rail:** number of routes, capacity, frequency of service
- **Intercity bus:** number of routes, capacity, frequency of service
- **Intercity rail:** number of routes, capacity, frequency of service

Curbside Access

- **Lane area:** linear footage of lanes
- **Lane capacity:** curbside capacity of lines, which represents the number of cars and/or passengers that the lanes can accommodate over the course of a year

Parking

- **Parking spaces:** number of parking spaces
- **Fleet size:** bus shuttle fleet size

General Aviation Activity

- **Ramp space:** area of ramp space for general aviation activity
- **Square footage:** total area of general aviation operations
- **Parking spaces:** number of parking spaces that support general aviation aircraft
- **Apron type**

RONALD REAGAN WASHINGTON NATIONAL AIRPORT (DCA)

Staff indicated that more curb access in general is needed.

Air Service

- **Gate totals:** number of wide body gates and number of narrow body gates

Cargo

- **Warehouse space:** square footage of existing cargo warehouse space
- **Aircraft cargo capacity:** international wide-body flights and air cargo carrier capacity
- **Aircraft parking space:** for runway length, aircraft parking ramps, truck maneuvering
- **Intermodal connectivity:** access to the interstate highway system and cargo rail

Ground Access

- **Automobiles:** broken down by sub-categories of private vehicle personal use, taxicabs, and transportation network companies (TNCs, such as Uber and Lyft)
- **Rental car:** square footage of parking facility
- **Metro bus:** number of routes, capacity, frequency of service
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Curbside Access

- **Lane area:** linear footage of lanes
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General Aviation Activity

- **Ramp space:** area of ramp space for general aviation activity
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- **Parking spaces:** number of parking spaces that support general aviation aircraft
- **Apron type**

WASHINGTON DULLES INTERNATIONAL AIRPORT (IAD)

Staff indicated capacity issues with baggage sorting, and there being out-bound challenges in terms of screening due to the peak volumes of travel that occur at IAD. The solution must be one that does not require a significant expansion of the footprint of the baggage handling facilities.

With the forthcoming arrival of the Silver Line and other surrounding developments that will result in IAD's growth, there are a range of considerations underway regarding the ways in which to grow the number and/or capacity of gates. IAD would benefit from studies and other efforts to further inform how best to decide between the range of options.

Air Service

- **Gate totals:** number of wide body gates and number of narrow body gates

Cargo

- **Warehouse space:** square footage of existing cargo warehouse space
- **Aircraft cargo capacity:** international wide-body flights and air cargo carrier capacity
- **Aircraft parking space:** for runway length, aircraft parking ramps, truck maneuvering
- **Intermodal connectivity:** access to the interstate highway system and cargo rail

Ground Access

- **Automobiles:** broken down by sub-categories of private vehicle personal use, taxicabs, and transportation network companies (TNCs, such as Uber and Lyft)
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Curbside Access

- **Lane area:** linear footage of lanes
- **Lane capacity:** curbside capacity of lines, which represents the number of cars and/or passengers that the lanes can accommodate over the course of a year

Parking

- **Parking spaces:** number of parking spaces
- **Fleet size:** bus shuttle fleet size

General Aviation Activity

- **Ramp space:** area of ramp space for general aviation activity
- **Square footage:** total area of general aviation operations
- **Parking spaces:** number of parking spaces that support general aviation aircraft
- **Apron type**

V. SYSTEM-WIDE POLICY ISSUES

REVENUE

The region – and industry as a whole – is experiencing a major shift away from the traditional sources of revenue, including parking revenue, that the airport industry has relied on for the past several decades. As the region's ground access landscape continues to evolve, airports must continue thinking creatively and reacting nimbly to the changes underway. Given each airport's (proposed or actual) major future transportation infrastructure projects underway, revenue-generating opportunity abounds for the increased posturing of BWI, DCA, and IAD as the gateways to the region.

GROUND ACCESS

Growing traffic congestion and surface transportation disruptors throughout the region continues to necessitate a greater amount of resources and strategic consideration be dedicated to each airport's individual ground access facilities, as well as the system-wide infrastructure that connects the region's air passengers and airport employees to the region's airports.

UNKNOWNS

From autonomous vehicles to major transportation investments like MAGLEV and the pedestrian bridge connecting Amazon HQ2 in Crystal City to DCA, a range of unknowns will have significant implications for how the region's airports continue to expand, contract, and differentiate their facilities and services.

CAPACITY

REGIONAL AIRPORT BALANCE

REGULATION

NEXTGEN

LAND USE COMPATIBILITY

UNMANNED AIRCRAFT SYSTEMS