Appendix F:
Public Participation

Appendix F.1

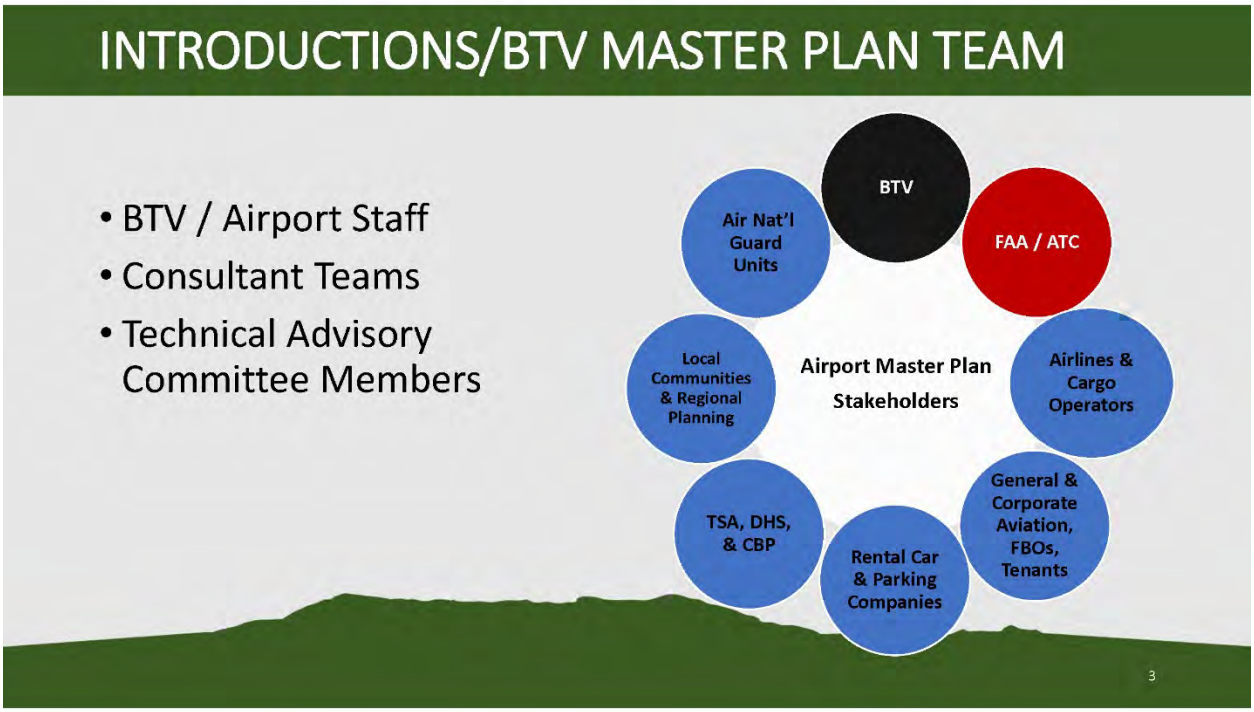
Technical Advisory Committee Documentation


Burlington International Airport
Airport Master Plan Update
Technical Advisory Committee Meeting # 1
August 28, 2018
BURLINGTON
INTERNATIONAL AIRPORT
PASSERO ASSOCIATES
engineering architecture
WOOLPERT
Stantec
McFarland Johnson
vhb
CHA
hmmh
Leibowitz&Horton
1

AGENDA

- Project Background
  - Introductions
  - Overview of Airport Master Plan Process
  - Define Role of Technical Advisory Committee (TAC)
- Get Your Input and Ideas
- Next Steps

2


INTRODUCTIONS/BTV MASTER PLAN TEAM
• BTV / Airport Staff
• Consultant Teams
• Technical Advisory Committee Members
BTV
Air Nat'l Guard Units
FAA / ATC
Local Communities & Regional Planning
Airport Master Plan Stakeholders
Airlines & Cargo Operators
TSA, DHS, & CBP
Rental Car & Parking Companies
General & Corporate Aviation, FBOs, Tenants
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WHAT IS AN AIRPORT MASTER PLAN

- Guides the airport's development and operational sustainability
- Two Parts
  - *Master Plan Report*
  - *Airport Layout Plan (ALP) (drawing set)*
- Covers 5, 10, and 20-year horizons
- Usually updated every 10 years
- Follows FAA guidance and standards

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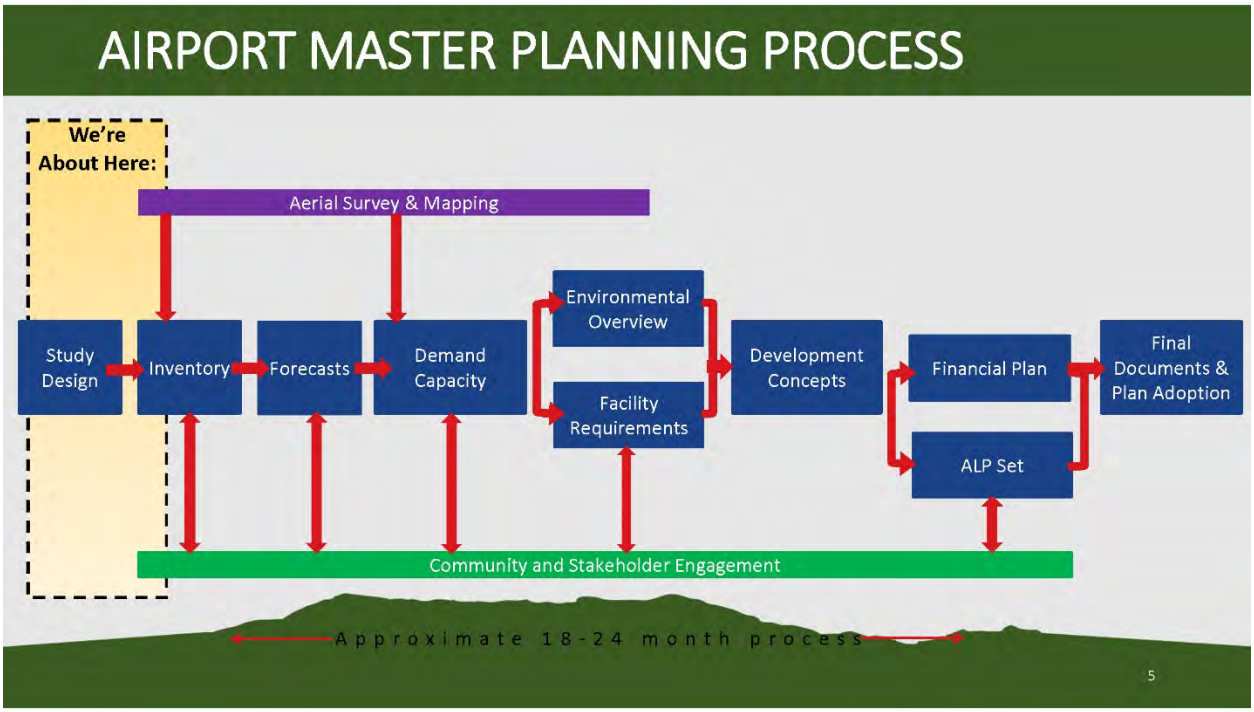
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Aerial Survey & Mapping
Study Design
Inventory
Forecasts
Demand Capacity
Environmental Overview
Facility Requirements
Development Concepts
Financial Plan
ALP Set
Final Documents & Plan Adoption
Community and Stakeholder Engagement
Approximate 18-24 month process
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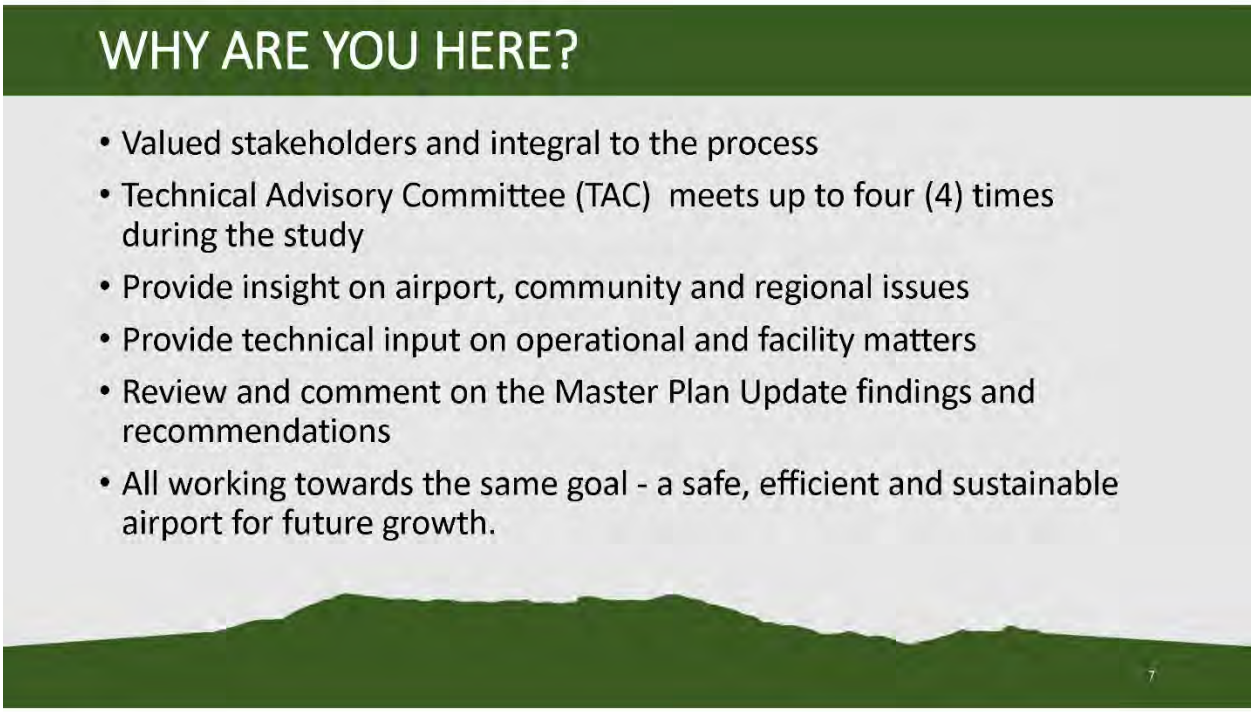
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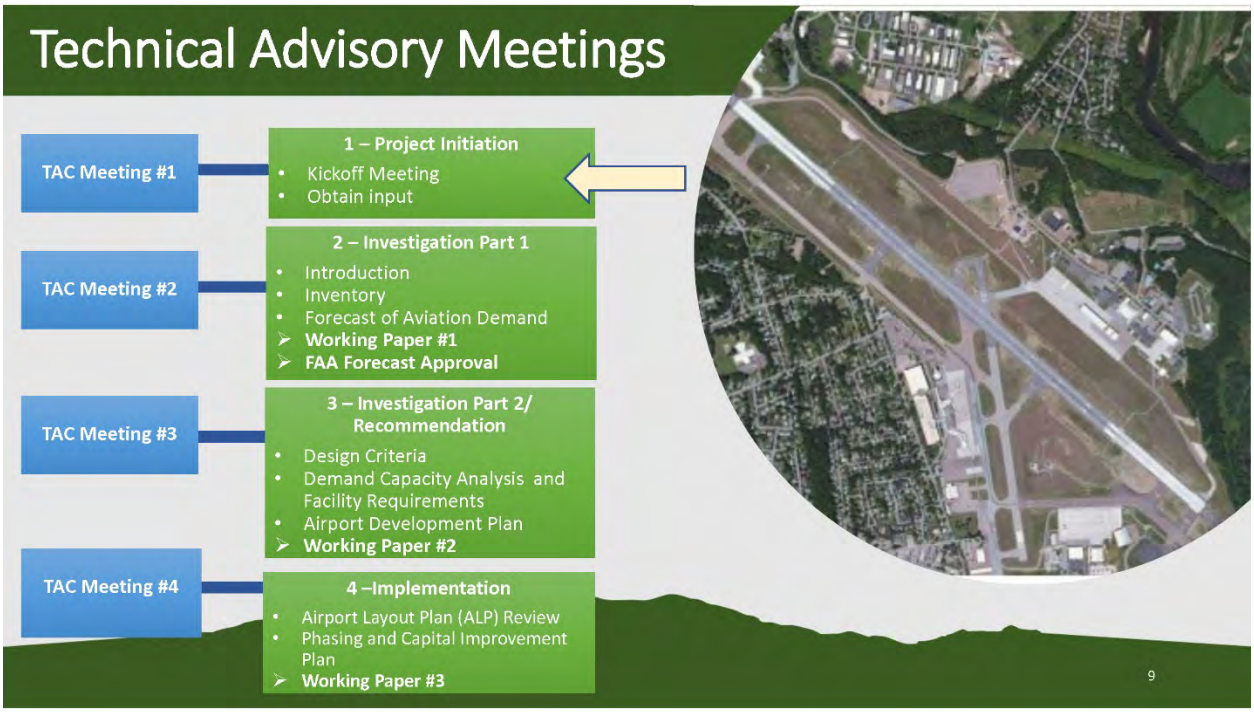
TAC MEMBERS
• Aerodyme
• American Airlines
• Army National Guard
• Avis/Budget
• Burlington International Airport
• CCRPC
• Enterprise
• FAA ATC
• FAA New England
• FAA Tech Ops
• FedEx
• Heritage
• Hertz
• Hudson Group
• JetBlue
• Skinny Pancake
• TSA
• United Airlines
• Vermont Air National Guard
• Vermont Flight Academy
• Vermont Honor Guard
• Vermont Agency of Transportation
• Wiggins-Air
8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KEY AIRPORT FEATURES

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- Currently served by five airlines
- Covers 942 acres
- Two Active Runways
  - Runway 15-33
  - Runway 1-19
- Air National Guard
- Cargo Operations
  - FedEx
  - Wiggins Airways

11

AIRPORT MASTER PLAN – SWOT Analysis

- Seek input to:
  - (S) Strengths – things BTV does well
  - (W) Weaknesses – resource limitations
  - (O) Opportunities – emerging need
  - (T) Threats – external forces/limitations
- Preliminary Findings
- Your preferences

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PRELIMINARY FINDINGS - STRENGTHS

- Convenience
  - Minimal Ground Transportation, close to Businesses and Individuals in VT
- Partnership with VTANG
  - For ARFF, cost Savings
- Well Maintained Facility
- Economic Development/Driver
- Air Service
  - Partnership, mainline carriers, additional routes added
- Infrastructure
  - Room to Grow, improvements underway

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PRELIMINARY FINDINGS - WEAKNESSES

- Flight Schedules/Destination
  - Limited, fares too high
- TSA
  - Congested
- Community Relations
- General Aviation
  - Fuel costs, aging infrastructure, collaboration with stakeholders
- Airfield
  - Terminal/Twy A too close, Noise, Traffic, Concourse too small, undeveloped real estate
- Ancillary
  - Hotel, customs, conference center, marketing, food vendors, baggage service

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- TSA Improvements
  - Consolidated
- Access Road Improvements

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- Plattsburgh
- Loss of tenants
- Terminal Congestion
  - Parking too close to building, no room in from of ticket counters, not enough waiting room
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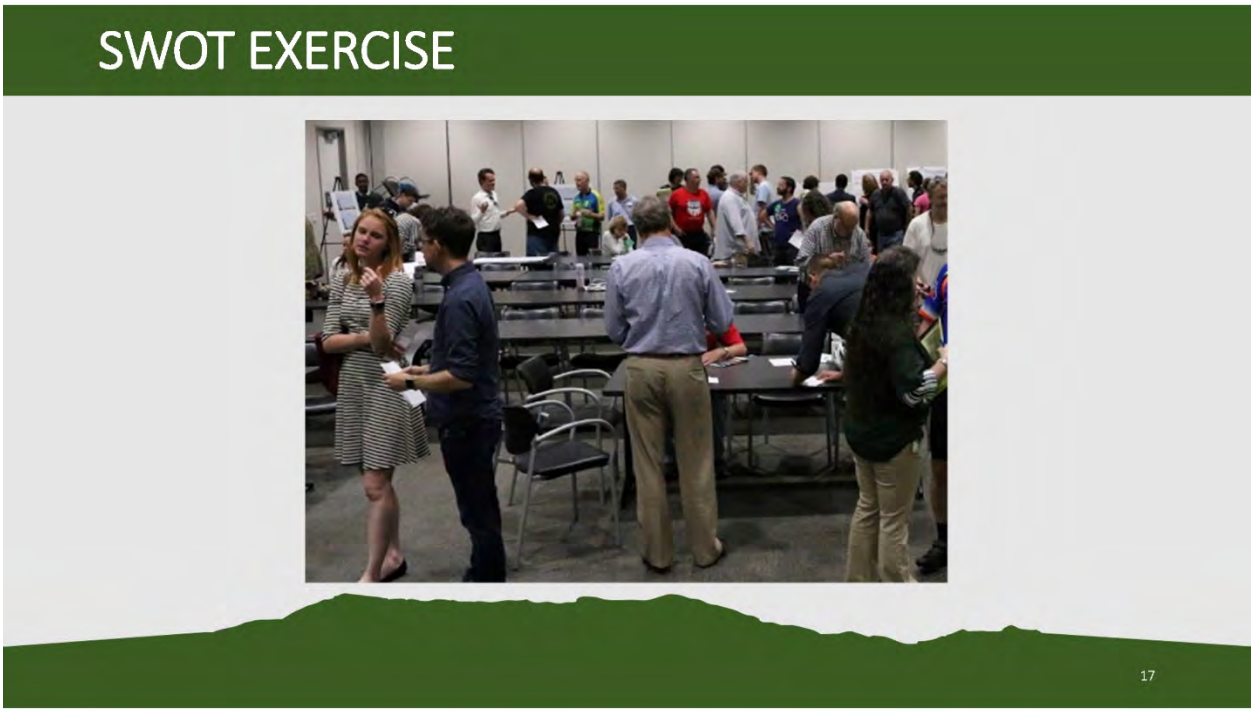
SWOT EXERCISE
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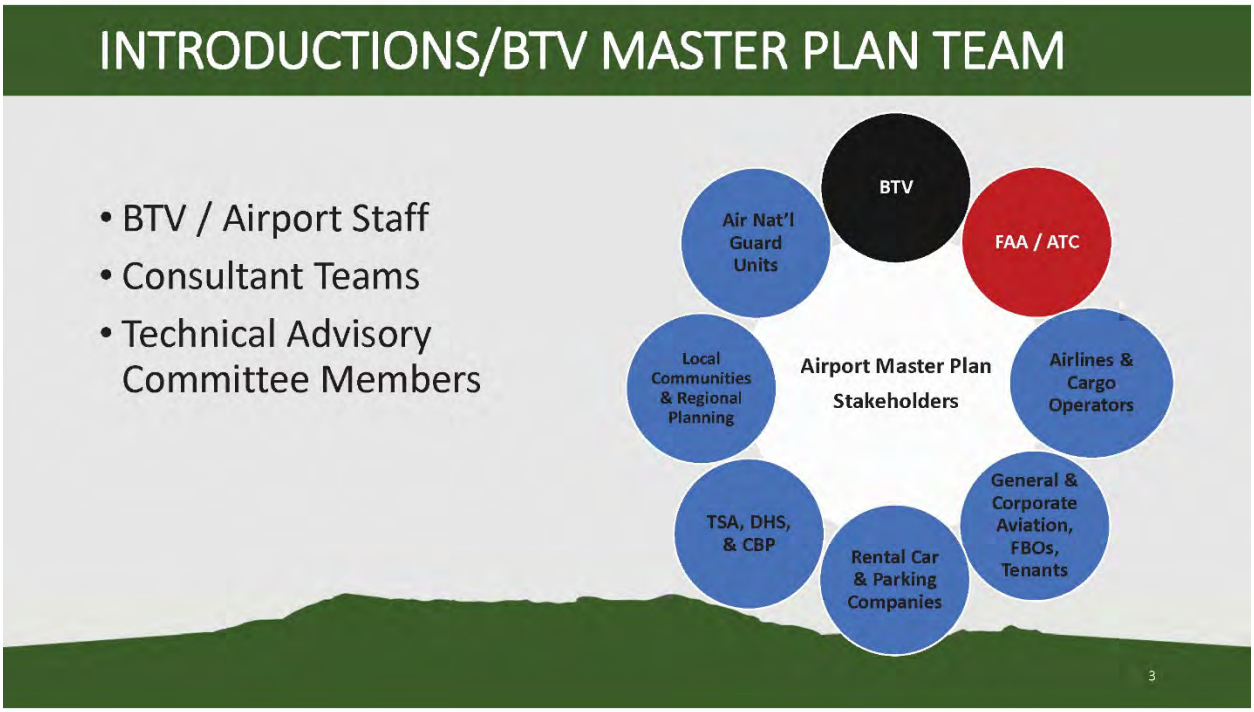
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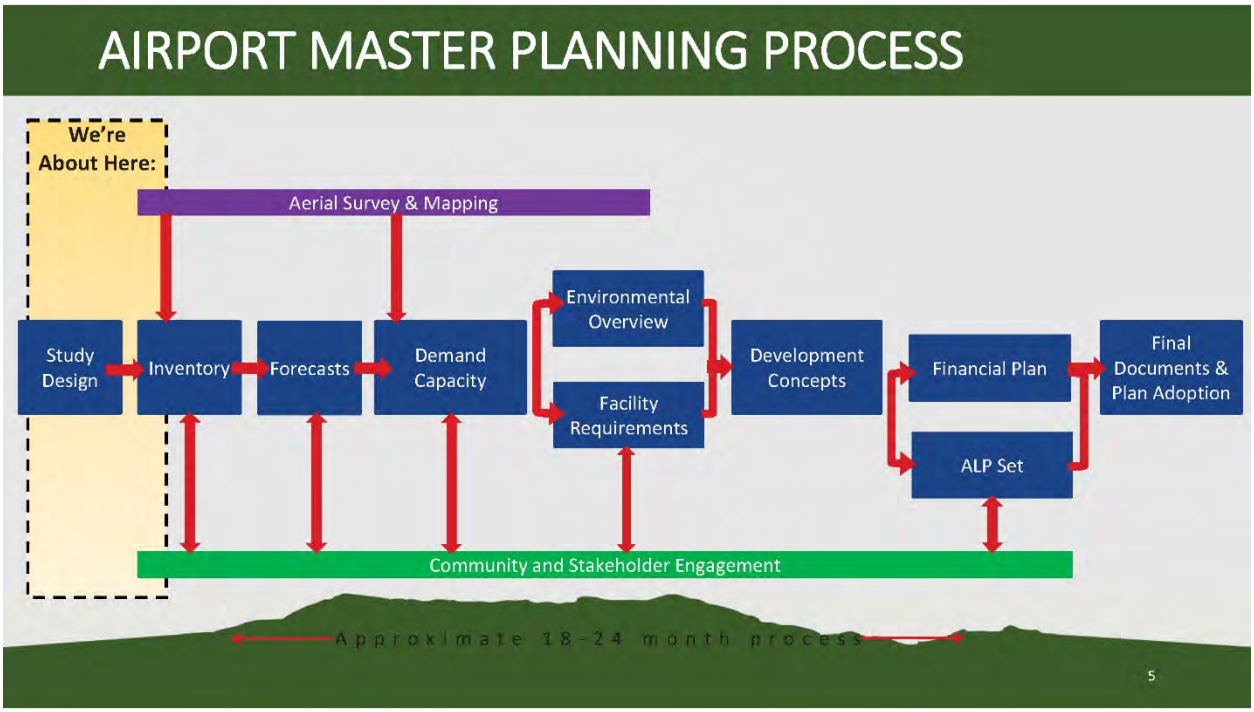
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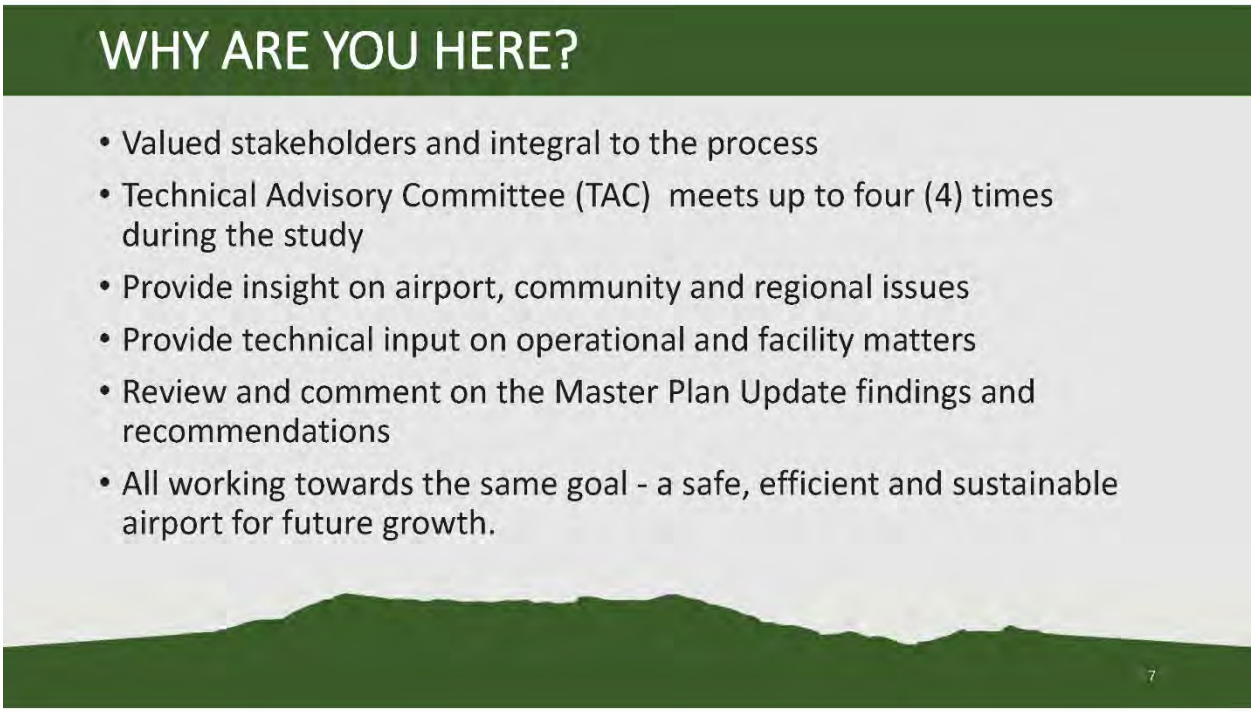
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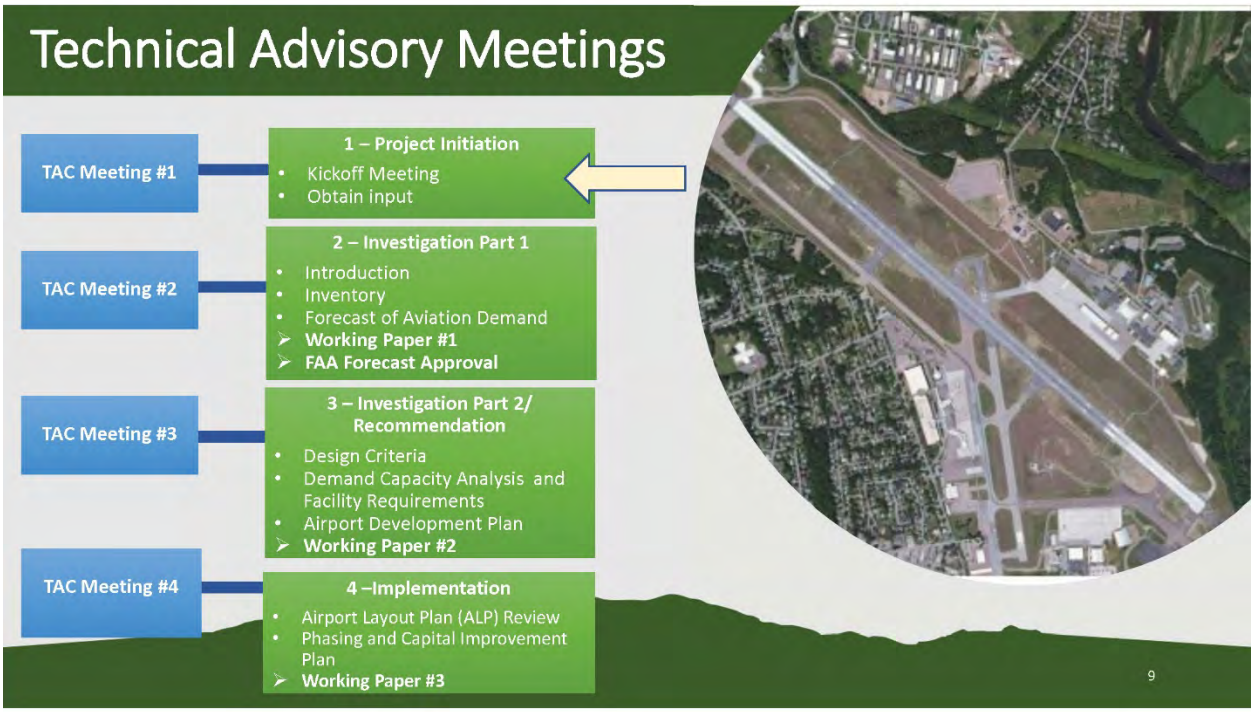
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Burlington International Airport

Airport Master Plan Update

Technical and Regional Advisory Committee Meeting # 3

March 26, 2019

BURLINGTON INTERNATIONAL AIRPORT

PASSERO ASSOCIATES engineering architecture

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AGENDA

- Introductions
- Status of the Master Plan Update
- Passenger/Tenant Experience
- Forecast Summary
- Demand/Capacity Summary
- Facility Summary
- Sustainability Summary
- Next Steps

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Passenger/Tenant Experience
• TAC/RAC Input
• Passenger Experience
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FORECAST SUMMARY
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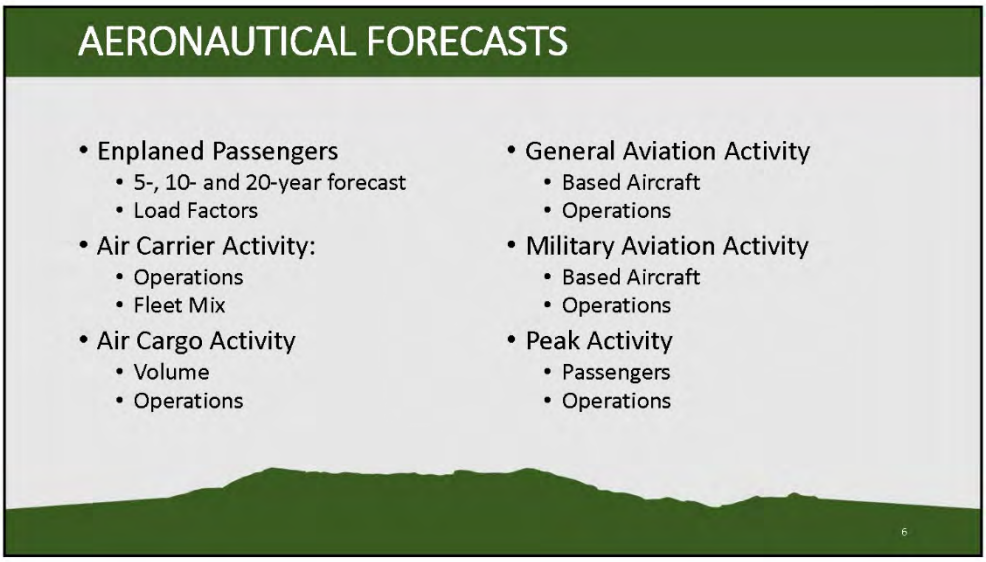

AERONAUTICAL FORECASTS
• Enplaned Passengers
• 5-, 10- and 20-year forecast
• Load Factors
• Air Carrier Activity:
• Operations
• Fleet Mix
• Air Cargo Activity
• Volume
• Operations
• General Aviation Activity
• Based Aircraft
• Operations
• Military Aviation Activity
• Based Aircraft
• Operations
• Peak Activity
• Passengers
• Operations
6

RECOMMENDED FORECAST

Year	Enplanements	Total Operations					Based Aircraft
		Air Carrier	GA	Cargo	Military	Total	
2017	591,558	21,467	37,332	1,396	8,567	**68,762**	92
2018	674,944	24,082	37,655	1,422	8,567	**71,727**	93
2023	695,171	24,480	39,449	1,563	5,954	**71,446**	97
2028	724,528	24,899	41,263	1,717	5,954	**73,832**	102
2033	755,124	25,340	43,101	1,886	5,954	**76,281**	106
2038	787,012	25,804	45,063	2,071	5,954	**78,892**	111
AAGR 2018-2038	**0.8%**	**0.3%**	**0.9%**	**1.9%**	**-1.8%**	**0.5%**	**0.9%**
Growth 2018-2038	**18.0%**	**7.1%**	**19.7%**	**45.6%**	**-30.5%**	**10.0%**	**19.7%**

7

DEMAND/CAPACITY SUMMARY

8

Demand/Capacity Summary

Airport Activity Forecast - Summary

Category	Activity	2017	Base	2023	2028	2033	2038
Commercial	Annual	21,467	24,082	24,480	24,899	25,340	25,804
GA	Annual	37,332	37,655	39,449	41,263	43,101	45,063
Military	Annual	8,567	8,567	5,954	5,954	5,954	5,954
Cargo	Annual	1,396	1,422	1,563	1,717	1,886	2,071
TOTAL Operations	Annual	68,762	71,727	71,446	73,832	76,281	78,892
	Peak Month	6,797	7,090	7,063	7,299	7,541	7,799
	Average Day	219	229	228	235	243	252
	Peak Hour	22	23	23	23	24	25

Demand/Capacity Summary

- **Hourly Capacity** – The maximum aircraft operations that can be accommodated in a one-hour period.
  - Visual Flight Rules (VFR)
  - Instrument Flight Rules (IFR)
- **Annual Service Volume (ASV)** – The maximum aircraft operations that can be accommodate in a one-year period, based on local activity .
- **Aircraft Delay** – The average number of minutes of aircraft delay and total hours of delay over a one-year period.

Demand/Capacity Summary

Factors that Affect Capacity

- Aircraft Fleet Mix Index
- Runway-Use Configuration
- Percentage of Aircraft Arrivals
- "Touch and Go" Factor
- Parallel & Exit Taxiways
- Meteorological Conditions (Percent VFR & IFR)

Factor	2017
Aircraft Fleet Mix Index	74.0
Runway-Use Configuration	Intersecting
Percentage of Aircraft Arrivals	50%
Touch and Go Factor (VFR / IFR)	1.0/1.0
Taxiway Exit Factor (VFR / IFR)	0.92 / 1.0
Meteorological Conditions (VFR / IFR)	72.3% / 27.6%

11

Demand/Capacity Summary

Airfield Hourly Capacity (Current Airfield Configuration)

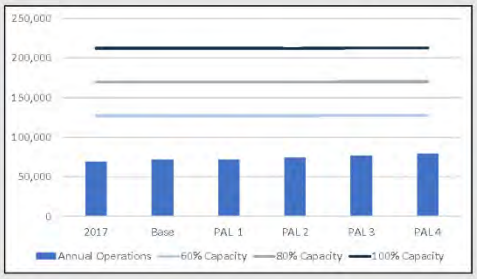
Factors	Base VFR / IFR	10 Years VFR / IFR	20 Years VFR / IFR
Hourly Capacity Base	80.0/56.5	79.5/57.0	79.5/57.5
Touch-and-Go Factor	1.0 / 1.0	1.0 / 1.0	1.0 / 1.0
Taxiway Exit Factor	0.92 / 1.00	0.92 / 1.00	0.92 / 1.00
Calculated Hourly Capacity	73.6/56.5	73.1/57.0	73.1/57.5
Peak Hour	23	23	25

12

Demand/Capacity Summary

Annual Service Volume (Current Airfield Configuration)

Factor	Base	10 Years	20 Years
Annual Operations	71,727	73,832	78,892
Annual Service Volume	212,345	212,073	212,691
Capacity Level	33.8%	34.8%	37.1%



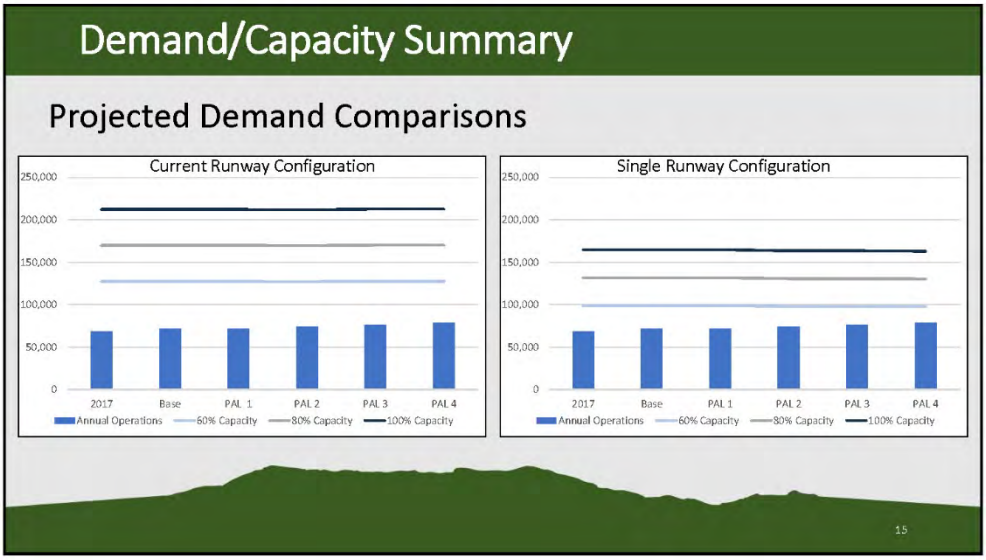
13

Demand/Capacity Summary

Annual Service Volume (Single Runway Configuration)

Factor	Base	10 Years	20 Years
Annual Operations	71,727	73,832	78,892
Annual Service Volume	164,943	163,499	162,937
Capacity Level	43.5%	45.2%	48.4%

14


Demand/Capacity Summary
Projected Demand Comparisons
Current Runway Configuration
250,000
200,000
150,000
100,000
50,000
0
2017
Base
PAL 1
PAL 2
PAL 3
PAL 4
Annual Operations
60% Capacity
80% Capacity
100% Capacity
Single Runway Configuration
250,000
200,000
150,000
100,000
50,000
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PAL 3
PAL 4
Annual Operations
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80% Capacity
100% Capacity
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AIRPORT FACILITY SUMMARY
16

Airport Facility Requirements

- Facility Requirements Elements:
  - Terminal, Airside, General Aviation/Support Facilities
- Derivative Forecast Scenario Considerations
  - Expanded Ultra-Low Cost Airline Service
  - New Low Cost Airline
  - Increased Canadian Demand
  - Loss of Low Cost Airline
  - Increased Upgauging (1:1)

Future Facility Requirements Analysis
=
Existing Conditions + Forecast

17

Terminal – Ticketing & Baggage Screening

Functional Area	Existing	Baseline Forecast				Surplus (Deficit)
		Base Year	+5	+10	+20	
Check-in and Ticketing						
Check-in/Ticketing Areas	7,460	7,402/ 9,384*	7,450/ 9,445	7,348/ 9,317	7,527/ 9,544	(67)/(2,084)
Outbound Baggage Screening and Make-Up						
Baggage Screening	1,099	4,254	4,316	4,316	4,471	(3,372)
Make-up Area	5,412	4,140	4,140	4,140	4,140	1,272

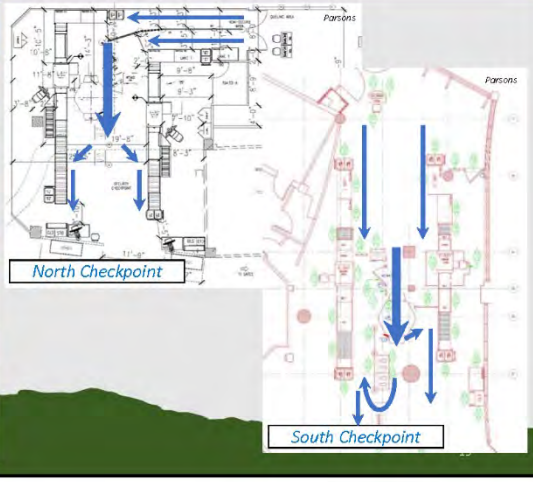
*/Secondary number indicates added consideration for shared circulation among various uses (concessions, vertical circulation, arriving passengers, etc.)

18

Photos by Stantec Consulting Services

Terminal - Security Checkpoint

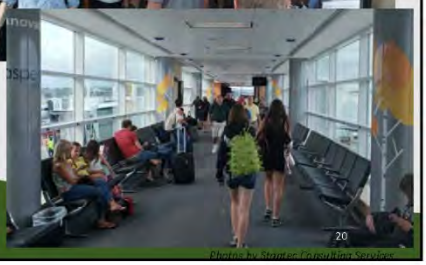
Functional Area	Existing	Baseline Forecast				Surplus (Deficit)
		Base Year	+5	+10	+20	
Passenger Screening Lanes (Including Precheck)						
North Checkpoint	2	5	5	5	5	(3)
South Checkpoint	2	3	3	3	3	(1)
Total (Existing Configuration)	4	8	8	8	8	(4)
Total Centralized Facilities	N/A	6	6	7	7	(3)
Checkpoint Area (SF)						
North Checkpoint	2,228	7,035	7,105	7,180	7,336	(5,108)
South Checkpoint	3,486	4,562	4,604	4,648	4,740	(1,254)
Total (Existing Configuration)	5,714	11,596	11,709	11,827	12,076	(6,362)
Total Centralized Configuration	N/A	9,810	9,923	10,041	10,289	(4,575)
TSA Support Space (SF)						
Total (Existing Configuration)	2,753	928	937	946	966	1,787
Total Centralized Configuration	N/A	785	794	803	823	1,930



Terminal – Gates & Holdrooms

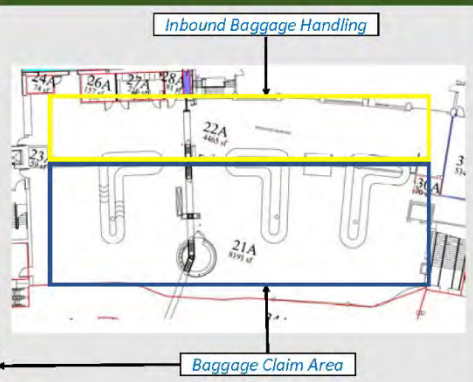
Functional Area	Existing	Baseline Forecast				Surplus (Deficit)
		Base Year	+5	+10	+20	
Passenger Gates						
Equivalent Narrowbody Gates*	10	10	10	11	11	(1)
Holdroom Space**						
North Concourse	6,124	5,553	5,670	5,794	6,052	72
South Concourse	4,174	4,418	4,487	4,820	4,947	(773)
Total	10,298	9,972	10,158	10,614	10,999	(701)

*Large Regional Position = 0.5 gate
Narrowbody Position = 1.0 gate
** Future demand based on optimal holdroom configuration



Terminal - Baggage Claim

Functional Area	Existing	Baseline Forecast				Surplus (Deficit)
		Base Year	+5	+10	+20	
Baggage Claim						
Claim Linear Frontage (ft.)	249	272	284	295	321	(72)
Baggage Claim Hall Area	8,191	6,859	6,966	7,073	7,317	874
Inbound Baggage Handling Area	4,465	2,312	2,312	2,312	2,312	2,153
Total	12,656	9,171	9,278	9,385	9,629	3,027



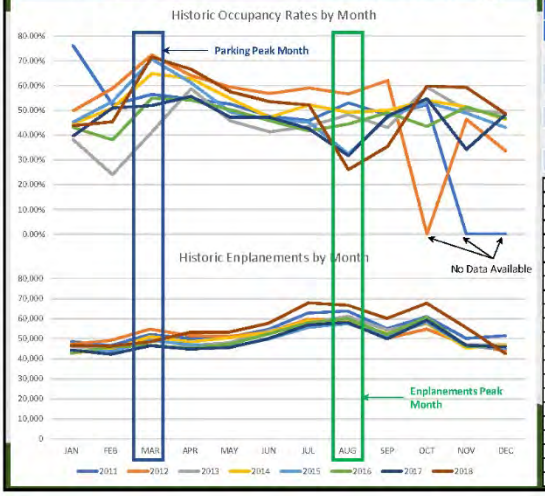
21

Terminal Summary – Baseline Requirements

Terminal Functional Area	Existing Terminal Area	Ultimate Requirement	Surplus (Deficit)	%
Passenger Boarding Gates	10	11	(1)	-10.7%
Terminal Curb / Drop-Off/Pick-Up	620	260	360	58.1%
Check-In / Ticketing	7,460	7,527/ 9,544	(67)/(2,084)	-0.9%/-27.9%
Outbound Baggage Screening & Makeup	1,099	8,611	(7,512)	-683.5%
Passenger Security Screening Checkpoint				
North Checkpoint	2,228	7,923	(5,695)	-255.6%
South Checkpoint	3,486	5,119	(1,633)	-46.8%
Security Total	5,714	13,042	(7,328)	-128.2%
Passenger Lounges / Holdrooms				
North Holdrooms	6,124	6,052	72	1.2%
South Holdrooms	4,174	4,947	(773)	-18.5%
Holdroom Total	10,298	10,999	(701)	-6.8%
Baggage Claim and Inbound Baggage Handling	12,656	9,629	3,027	23.9%
Concessions	9,891	14,934	(5,043)	-51.0%
Core Terminal Areas Subtotal	**47,118**	**64,743**	**(17,625)**	**-37.4%**
Other Functions/Tenants	92,482	25,648	66,834	72.3%
Total Passenger Terminal Area	**139,600**	**90,391***	**49,209***	**35.3%***

22

Landside – Auto Parking



Peak Occupancy (4-day Duration)

Forecast	2018	2023	2028	2038
Baseline	1,270	1,324	1,380	1,499
New ULCC	-	1,443	1,536	1,729
New LCC	-	1,553	1,681	1,944
Canadian	-	1,324	1,380	1,499
Loss of LCC	-	1,257	1,380	1,499
Upgauging	-	1,419	1,571	1,880

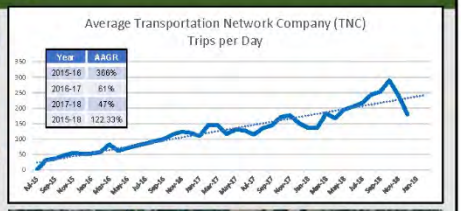
Peak Utilization Rates in Parking Garage

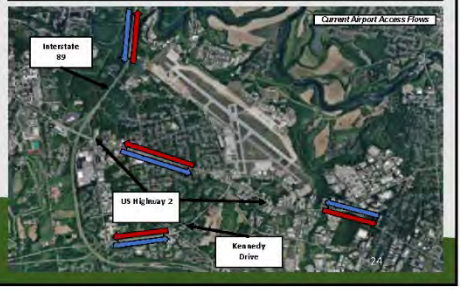
Forecast	Baseline	New ULCC	New LCC	Canadian	Loss of LCC	Upgauging
2019	57%	61%	67%	57%	54%	58%
2020	58%	62%	68%	58%	55%	59%
2021	58%	63%	68%	58%	55%	61%
2022	59%	64%	69%	59%	56%	62%
2023	59%	64%	69%	59%	56%	63%
2024	60%	65%	73%	60%	60%	65%
2025	60%	66%	74%	60%	60%	66%
2026	61%	67%	74%	61%	61%	67%
2027	61%	68%	75%	61%	61%	69%
2028	62%	69%	75%	62%	62%	70%
2029	62%	69%	78%	62%	62%	72%
2030	63%	70%	78%	63%	63%	73%
2031	63%	71%	80%	63%	63%	74%
2032	64%	72%	80%	64%	64%	76%
2033	64%	73%	81%	64%	64%	77%
2034	65%	74%	85%	65%	65%	78%
2035	65%	75%	85%	65%	65%	80%
2036	66%	75%	86%	66%	66%	81%
2037	66%	76%	86%	66%	66%	83%
2038	67%	77%	87%	67%	67%	84%

Landside – Curb & Roadway

Terminal Curb Requirements (Baseline)

Year	Length Required (LF)	Existing Length (LF)
2018	229	620
2023	230	620
2028	238	620
2038	260	620





Access Improvement Considerations

- Access Improvement Considerations
- Airport Share of Regional Traffic
- Direction of Origin (Canada and Downtown Burlington vs Points South and East)
- Airport Peak Hour vs Rush Hour
- Problems and Solutions are Off Airport, Regional Solutions Required

Airside Requirements - Runways

- Runway 15-33 – 8,319 x 150 (C/D IV)
  - Existing Length Scenario: FedEx Boeing 757 to Memphis
  - Future Length Scenario: Boeing 737/Airbus 320
    - Airbus 320 NEO 90% Range (Las Vegas/Denver): 6,500ft Hot Day, 7,475 Contaminated
  - Declared Distance Optimization
- Runway 1-19 – 4,112 x 75 (B-II)
  - Existing and Future: Embraer 110 Cargo Feeder

25

Airside Requirements - Taxiways

Name	Width	Use/Restrictions	Meets FAA Standards
Taxiway A	75'	Partial-length parallel taxiway for Runway 1-19	Yes
Taxiway B	Varies: 75' to 130'	Connector taxiway between Taxiway A, crossing Runway 1-19 to Runway 15-33	No: Taxiway B intersects Runway 1-19 at a non-standard 42 degree angle to provide a perpendicular angle to primary Runway 15-33.
Taxiway C	Varies: 93' to 117'	Crossover taxiway between the General Aviation (GA) parking apron and Runway 15-33, crossing Runway 1-19 and Taxiway K	Yes
Taxiway D	-	Closed to Civilian Operations	N/A
Taxiway E	-	Closed to Civilian Operations	N/A
Taxiway F	-	Closed to Civilian Operations	N/A
Taxiway G	75'	Partial-length parallel taxiway connecting Runway 15 threshold to Runway 1-19	Yes
Taxiway H	83'	Entrance/exit taxiway to Runway 15-33	Yes
Taxiway J	116'	Entrance/exit taxiway to Runway 33	Yes
Taxiway K	Varies: 75' to 80'	Partial-length parallel taxiway to Runway 15-33 between Taxiway B and past Taxiway J to the southern-most GA parking apron	Yes
Taxiway L	75'	Entrance/exit taxiway located at Runway 1 threshold (Closed to aircraft over 60,000 pounds)	Yes
Taxiway M	89'	Seasonal entrance/exit taxiway near Runway 15 threshold	Yes
Taxiway N	-	Closed to Civilian Operations	N/A

Note: FAA Approved Modification of Standards regarding non-movement area boundary line for Taxiways A and G near the air carrier ramp.

26

Airside Requirements - Geometry

Geometry Requirement	Taxiway/Taxiway Int.	Runway/Taxiway Int.
Three node concept	None	Hot Spot 1
Taxiway intersection angle	None	N/A
Wide expanse of pavement	Taxiway A and G Taxiways C and K	Hot Spot 1
Runway crossings	N/A	Runway 15-33: 3 Runway 1-19: 3
High energy intersection	N/A	Runway 15-33 and Taxiway A Runway 1-19 and Taxiway B
Increase visibility	N/A	Runway 15-33 and Taxiway A Runway 1-19 and Taxiway B -42"
Dual purpose pavement	N/A	None
Direct access	N/A	Runway 33 and Taxiway J Runway 1-19 and Taxiway G Runway 15-33 and Taxiway A Runway 1-19 and Taxiway C Runway 1 and Taxiway L
Multiple taxiway crossings	Taxiways A and E	N/A
Taxiway intersecting multiple runways	N/A	Taxiway A –Hot Spot 1 Taxiway E –Hot Spot 2
Aligned taxiway	N/A	None
Y-Shaped Runway Crossing	N/A	Taxiway E –Hot Spot 1
Multiple runway thresholds in close proximity	N/A	None
Short Taxi Distance	N/A	None
Taxiway Stubs	Taxiway A	None
Unexpected Holdline	None	None
Intersection Departure	N/A	Unknown

27

General Aviation Requirements

GA Aircraft Storage Additional Demand Over Existing*

Year	Conventional Hangar Space (SF)	T-Hangars/Box Units
2018	3,200	0
2023	6,400	1
2028	15,240	1
2038	25,760 (4-5 Conventional Hangars)	2

*Not including Military demand or facilities or aircraft on wait lists

GA Aircraft Apron Requirements*

Year	Itinerant Apron Demand (SY)	Existing FBO Ramp Space (SY)	Surplus (Deficit)
2018	11,484	5,333	(6,151)
2023	11,880	5,333	(6,547)
2028	11,880	5,333	(6,547)
2038	12,672	5,333	(7,339)

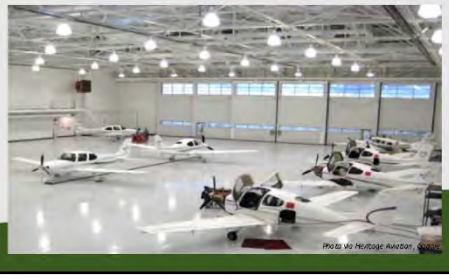


Photo via Heritage Aviation, Google


Photo via Heritage Aviation, Google

28

Support Facility Requirements

- Fuel Storage
  - Existing: 4-25,000 gallon Jet-A tanks and 1-12,000 gallon 100LL tank
  - Jet-A Fuel Usage (5-Year Average)
    - Average Month/Average Day: 21,518 gallons
    - Peak Month/Average Day: 26,310 gallons
    - Planning Recommends Maintaining 3-Day Supply
    - Consider Inverse Relationship Between Growth & Increased Fuel Efficiency
  - **Recommendation: Consider adding an additional Jet-A fuel tank**
- ARFF
  - Vermont Air National Guard (VTANG) provides ARFF – Index B
  - **Recommendation: None**
- SRE/Airfield Maintenance
  - Equipment stored in 3 locations totaling 46,505 SF
  - **Recommendation: Consolidate Facilities Away from GA/Cargo Areas – Full Consolidated Facility?**

29

SUSTAINABILITY SUMMARY

30

Sustainability Focus Areas

Five Sustainability Categories:

- Energy & Greenhouse Gas Emissions
- Waste Management
- Ground Transportation
- Water Resources
- Passenger Experience

Guided by the City of Burlington's 2030 vision, as laid out in its *Legacy Action Plan*, BTV strives to make a positive contribution in shaping the region's economic, environmental, and social vitality.

31

Energy & Greenhouse Gas Emissions

12.4%
Reduction in utility-sourced electricity consumption between 2013 and 2017

1,183,000 kWh per year
Avoided annual electricity use as a result of recent energy-efficiency upgrades at BTV

$147,750 in annual savings
Cost savings from the approximately 1.2 million kWh saved per year

BTV actively seeks to reduce its energy consumption, even as operations at the Airport expand, and it continues to demonstrate leadership in sustainable energy performance.

Pedestrian Bridge from the Parking Garage at BTV

32

Energy & Greenhouse Gas Emissions

Renewable energy systems at BTV:

- 500-kW roof-mounted PV (BTV Parking Garage)
- 100-kW small wind turbine (Heritage Aviation)
- 24-kW roof-mounted PV (Heritage Aviation)
- 1.5-MW ground-mounted and roof-mounted PV (Vermont ANG)

Utility-scale solar array on the BTV parking garage

Wind turbine at Heritage Aviation

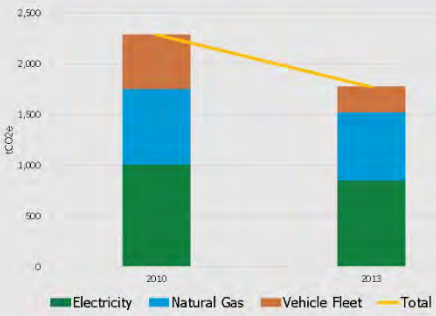
33

Energy & Greenhouse Gas Emissions

↓ 23%

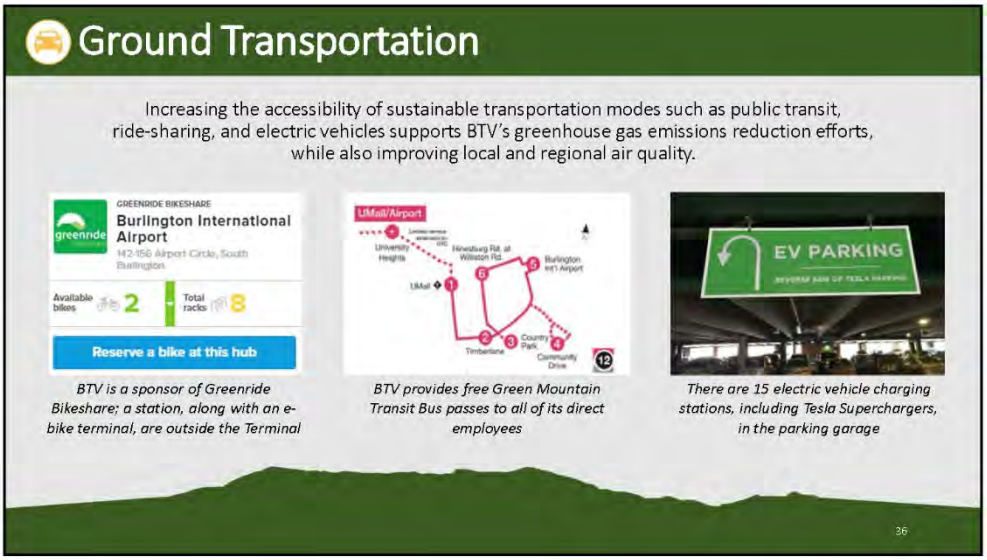
Reduction in GHG emissions between 2010 and 2013

Greenhouse gas emissions derive from electricity consumption, natural gas consumption, and vehicle fleet fuel consumption.



34


Waste Management
22%
The Airport's diversion rate in 2017
9%
13%
78%
MSW
Recycling
Composting
Highlights of Waste Management Practices:
• Instituted an office paper recycling program
• Co-located trash and recycling bins, with pictured-based signage, to encourage passengers to sort their waste properly
• Installed water bottle filling stations
• The Airport's waste contractor regularly works with the Airport and its tenants to reduce waste and increase the use of products that can be recycled, as well as provides training
35


Ground Transportation
Increasing the accessibility of sustainable transportation modes such as public transit, ride-sharing, and electric vehicles supports BTV's greenhouse gas emissions reduction efforts, while also improving local and regional air quality.
GREENRIDE BIKESHARE
Burlington International Airport
Available bikes 2
Total racks 8
Reserve a bike at this hub
BTV is a sponsor of Greenride Bikeshare; a station, along with an e-bike terminal, are outside the Terminal
UMall/Airport
BTV provides free Green Mountain Transit Bus passes to all of its direct employees
EV PARKING
There are 15 electric vehicle charging stations, including Tesla Superchargers, in the parking garage
36

Water Resources

22 Million gallons

Estimated amount of stormwater treated annually, through a new underground treatment system, to prevent contaminants from discharging into the Winooski River.

8,000 square feet

Size of the rooftop garden installed on top of the Airport's parking garage in 2011. In addition to providing a place for visitors to relax, this design feature also helps reduce and filter stormwater runoff.

In 2010, BTV won an Engineering Excellence Award from the American Council of Engineering Companies/Vermont Section for its runoff treatment system.

37

Passenger Experience

674,944 passengers

Number of passengers that departed from BTV in calendar year 2018

BTV's Wellness Committee supports a healthier Airport visit with walking trails inside and outside the terminal. This Committee is always looking for ideas on how to make traveling with BTV less stressful.

Educational exhibits and art installations by local artists can be found throughout the Airport.

BTV has a yoga studio as part of its passenger amenities

Visitors can take in the views from the Airport's Observation Tower

38

Regional Coordination

BTV has demonstrated a commitment to working with local and regional entities to advance common sustainability goals and initiatives, and as a large facility, has leverage to demonstrate leadership.

Local and Regional Sustainability Goals:

- Deriving 90 percent of the state's energy needs from renewable energy sources by 2050 (*Vermont Comprehensive Energy Plan)*
- Reducing greenhouse gas emissions in the state by 50 percent by 2028 and 75 percent by 2050 (10. V.S.A. §578)
- Reducing solid waste sent to landfills (Burlington's *Climate Action Plan*) and achieving a zero waste future (*Vermont Materials Management Plan*)
- Improving multi-modal transportation to/from and around the Airport (*ECOS Plan*)
- Educating residents of Chittenden County on ways to reduce stormwater pollution (Regional Stormwater Education Program)

ecos
A SUSTAINABLE FUTURE FOR CHITTENDEN COUNTY

39

Regional Value Assessment

$1.04 Billion
Overall value of the Airport to the region

BTV's economic impact includes the asset value of the airport and the economic impact that extends beyond the boundary of the airport.

4,935
Total jobs generated from the Airport

$170,427,100
Total payroll generated from the Airport

$ 34,527,500
Total State & Local Taxes

$562,000,000
Current asset value of the Airport

$481,464,900
Total economic output

Full regional value assessment to be available soon.

40

NEXT STEPS

- Working Paper – Inventory through Facilities
- Public Informational Workshop #1
- Prepare Development Concepts
- Prepare Environmental Overview

41

QUESTIONS/COMMENTS

Any questions or comments regarding the Airport Master Plan or any of the information discussed today?

Available for contact anytime:

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lcheung@passero.com

42


Burlington International Airport
Airport Master Plan Update
Technical Advisory Committee Meeting # 4
February 12, 2020
BTV
BURLINGTON
INTERNATIONAL AIRPORT
PA
PASSERO ASSOCIATES
engineering architecture
WOOLPERT
Stantec
McFarland Johnson
vhb
CHA
hmmh
Leibowitz&Horton
1

AGENDA

- Introductions
- Status of the Master Plan Update
- Passenger & Tenant Survey
- Forecast & Facility Requirement Summary
- Development Concepts
  - Runway 1-19/Hotspot Issues/Airfield Geometry
  - Terminal Aircraft Maintenance Relocation
  - GA Improvements
  - Access Roads
- Next Steps

2

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- Introductions
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- Passenger & Tenant Survey
- Forecast & Facility Requirement Summary
- Development Concepts
  - Runway 1-19/Hotspot Issues/Airfield Geometry
  - Passenger Terminal Building Concept
  - Airport Maintenance Building Relocation
  - GA and Air Cargo Improvements
  - Access Roads
- Next Steps

3


STATUS OF AIRPORT MASTER PLAN
We're About Here:
Aerial Survey & Mapping
Study Design
Inventory
Forecasts
Demand Capacity
Environmental Overview
Facility Requirements
Development Concepts
Financial Plan
ALP Set
Final Documents & Plan Adoption
Community and Stakeholder Engagement
Approximate 18-24 month process
4

Passenger/Tenant Experience

- TAC/RAC Input
- Passenger Experience
- Tenant Experience

Passenger & Tenant Survey Results

1,200 passengers responded to the survey. **Key findings:**

- Why did you choose BTV – "location"
- 97% passengers indicated that traffic was not an issue getting to the airport
- 40% passengers indicated TSA took longer than expected
- 55% indicated here is insufficient food vendors
- 52% indicated there were no delays exiting the airport

6

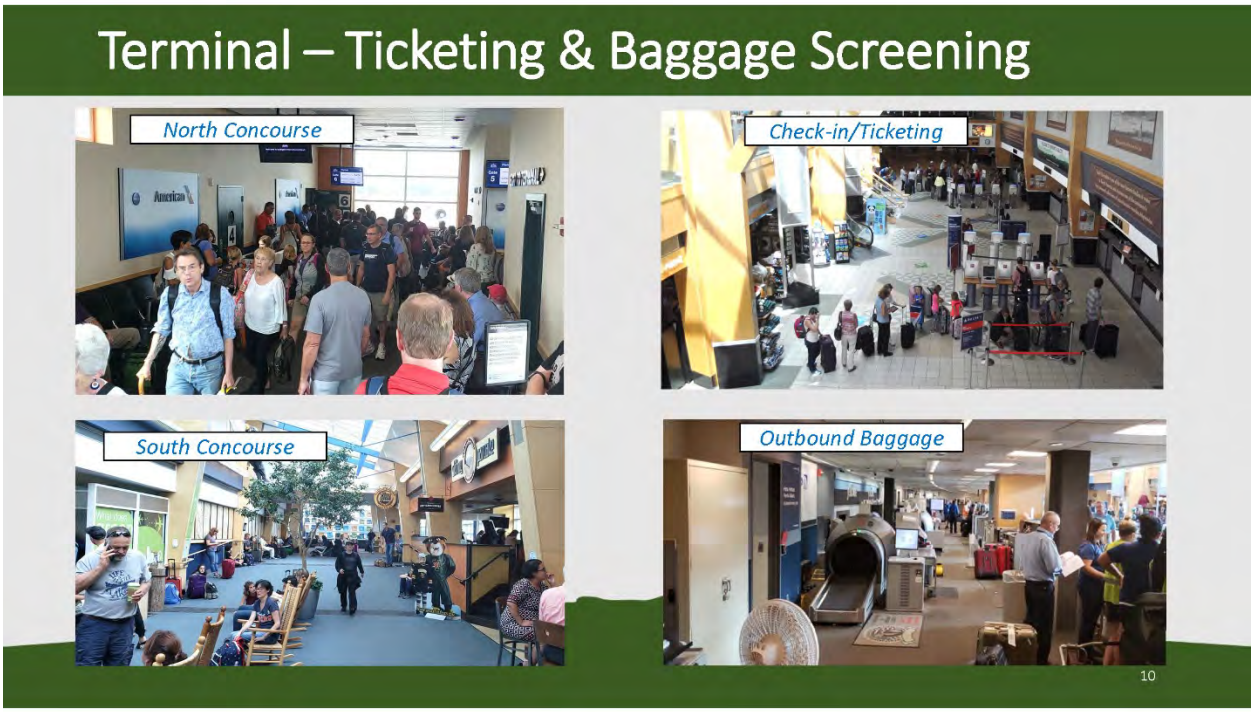
FORECAST SUMMARY

RECOMMENDED FORECAST

Year	Enplanements	Total Operations					Based Aircraft
		Air Carrier	GA	Cargo	Military	Total	
2017	591,558	21,467	37,332	1,396	8,567	**68,762**	92
2018	667,004	24,082	37,655	1,422	8,567	**71,727**	93
2023	695,171	24,480	39,449	1,563	5,954	**71,446**	97
2028	724,528	24,899	41,263	1,717	5,954	**73,832**	102
2033	755,124	25,340	43,101	1,886	5,954	**76,281**	106
2038	787,012	25,804	45,063	2,071	5,954	**78,892**	111
AAGR 2018-2038	**0.8%**	**0.3%**	**0.9%**	**1.9%**	**-1.8%**	**0.5%**	**0.9%**
Growth 2018-2038	**18.0%**	**7.1%**	**19.7%**	**45.6%**	**-30.5%**	**10.0%**	**19.7%**

8

AIRPORT FACILITY SUMMARY


Terminal – Ticketing & Baggage Screening
North Concourse
Check-in/Ticketing
South Concourse
Outbound Baggage
10

Terminal Summary – Baseline Requirements

Terminal Functional Area	Existing Terminal Area	Ultimate Requirement	Surplus (Deficit)	%
Passenger Boarding Gates	10	11	(1)	-11%
Check-In / Ticketing	7,460	9,544	(2,084)	-28%
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Passenger Screening Checkpoint	5,714	10,289	(4,575)	-56%
Passenger Lounges / Holdrooms				
Hold Rooms	10,298	10,999	(701)	-7%
Concessions	9,891	14,934	(5,043)	-51%
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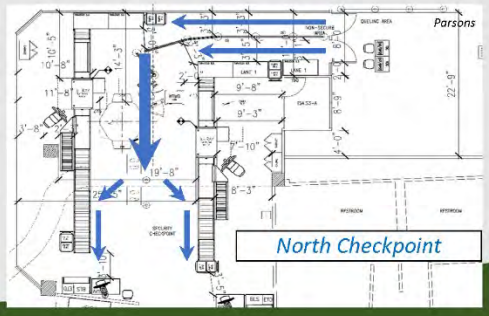
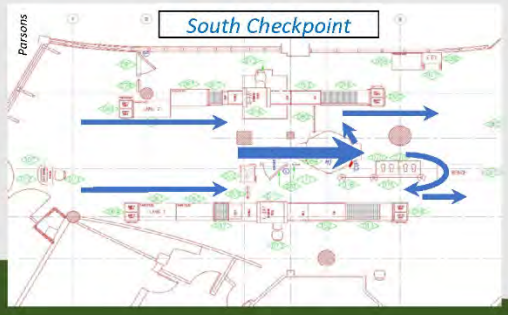
Total Passenger Terminal Area	**139,600**	**90,391**	**49,209**	**35.3%**

11

Terminal - Security Checkpoint

Passenger Screening Area	Existing Terminal Area	Ultimate Requirement	Surplus (Deficit)	%
Existing Screening Lanes (both checkpoints)	4 Lanes	6 Lanes (with consolidation)	(2)	-50%
Checkpoint Area (SF) - Combined	5,714 SF	10,289 SF	(4,575) SF	-56%





12

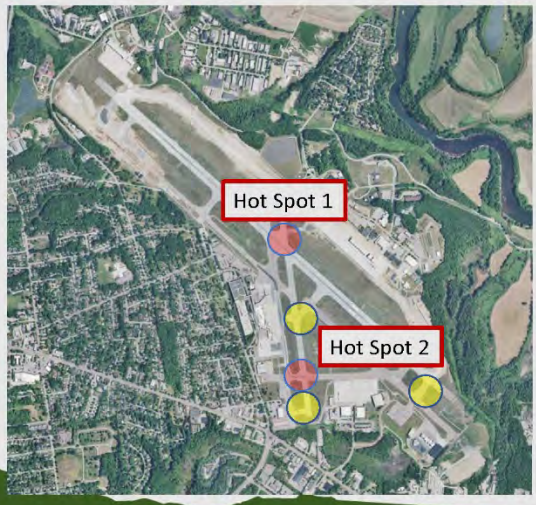
Airside Requirements - Runways

- Runway 15-33 – 8,319 x 150 (C/D IV) – Satisfies Requirements
  - Existing Length Scenario: FedEx Boeing 757 to Memphis
  - Future Length Scenario: Boeing 737/Airbus 320
- Runway 1-19 – 4,112 x 75 (B-I) – Satisfies Requirements
  - Existing and Future: Cessna 172

13

Taxiway Requirements / Geometry

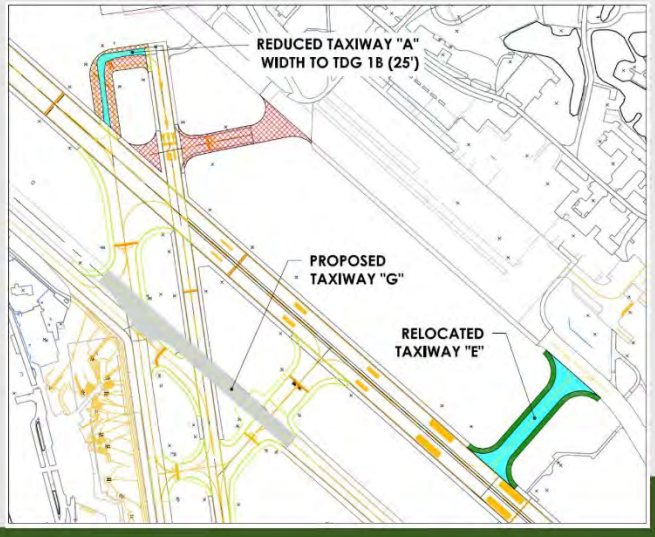
- Hot Spot 1: Wrong Runway Departure
  - Wide Expanse of Pavement
  - 3 Node Concept
- Hot Spot 2: Taxiway C Crossing Runway 1-19
- Direct Apron to Runway connections
  - Taxiway B, J, L



14


AIRFIELD DEVELOPMENT CONCEPTS
15

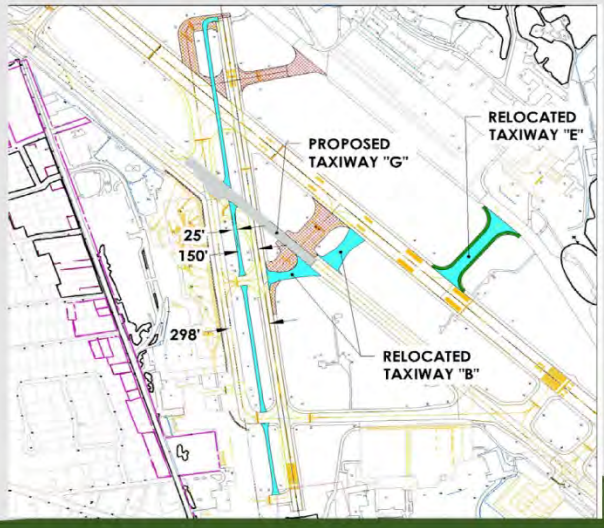
HOTSPOT 1 MITIGATION - CONCEPTS



- **Relocation of Taxiway E**
- Eliminates acute angle intersection with Runway 15-33
- Relocate to connect to Taxiway D
- Eliminates unneeded pavement
- Reduces width of Taxiway A north of Runway 15-33

16

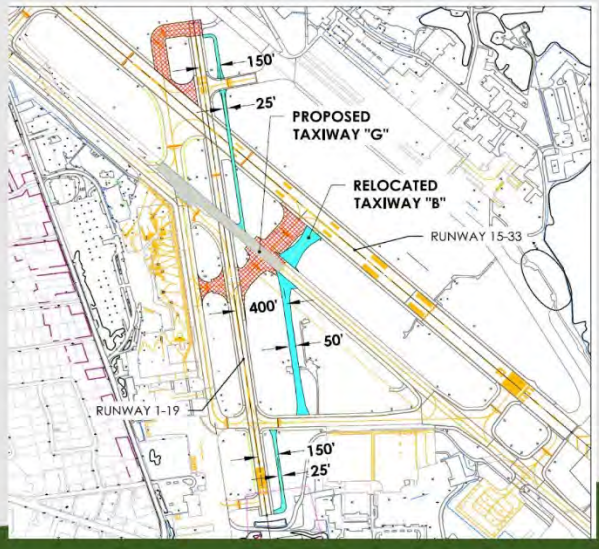
HOTSPOT 1 MITIGATION - CONCEPTS



- **New GA Parallel Taxiway (West of Runway 1-19)**
  - Reduces GA traffic on Taxiway A
  - Proximity of taxiways may created issues at Runway 15-33
  - Taxiway A would continue to be a 'movement area'
  - Requires Modification to Standards
- **Relocate Taxiway B**
  - Eliminates acute angle to Runway 1-19
  - Retains direct apron access

17

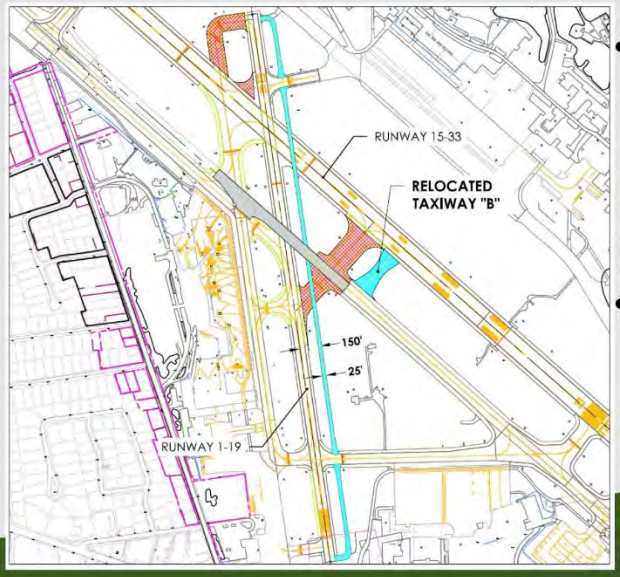
HOTSPOT 1 MITIGATION - CONCEPTS



- **New Parallel Taxiway (East of Runway 1-19)**
  - Reduces GA traffic on Taxiway A
  - Narrow GA Taxiway connecting to main runway
  - Staggered Taxiway may confuse pilots
  - Provide Terminal By-Pass Taxiway
  - Impacts ASR
- **Relocate Taxiway B**
  - Eliminates acute angle to Runway 1-19

18

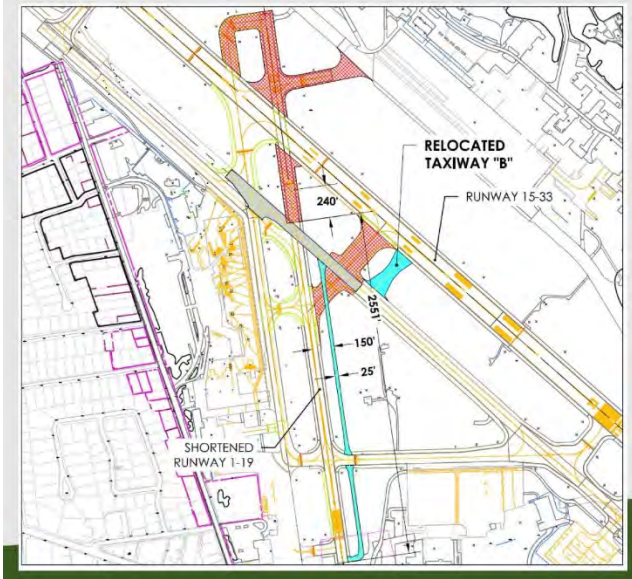
HOTSPOT 1 MITIGATION - CONCEPTS



- **New GA Parallel Taxiway (East of Runway 1-19)**
  - Reduces GA traffic on Taxiway A
  - May not eliminate Hotspot 1
  - Narrow GA Taxiway connecting to main runway
- **Relocate Taxiway B**
  - Eliminates acute angle to Runway 1-19
  - Increase taxiing distances

19

HOTSPOT 1 MITIGATION - CONCEPTS



- **Shorten Runway 1-19**
  - New GA taxiway reduces traffic on Taxiway A
  - Completely eliminates Hotspot 1
  - Removal of excess pavement
- **Relocate Taxiway B**
  - Eliminates acute angle to Runway 1-19
  - Increase taxiing distances

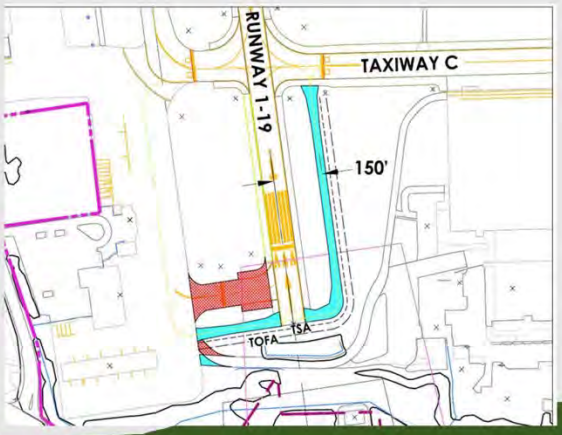
20

HOTSPOT 2 MITIGATION CONCEPTS

- **Add Guard Lights on Taxiway C**
  - Provides greater awareness for crossing Runway 1-19

21

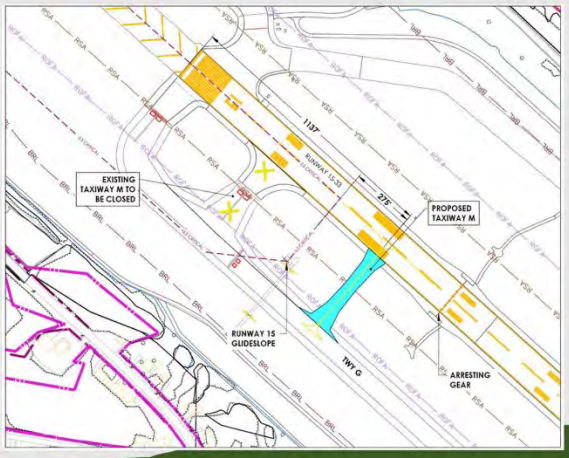
AIRFIELD GEOMETRY - CONCEPTS



- **Add GA Taxiway to Runway 1**
  - Avoid crossings of Runway 1-19
  - Provides access to/from south end of runway
- **Relocated Taxiway L**
  - Removes direct apron to runway access
  - Provides access to/from south end of runway

22

RELOCATED TAXIWAY M



- **Relocation Taxiway M**
  - Removes Taxiway L from ILS Critical Area
  - Add By-Pass for Intersection departures

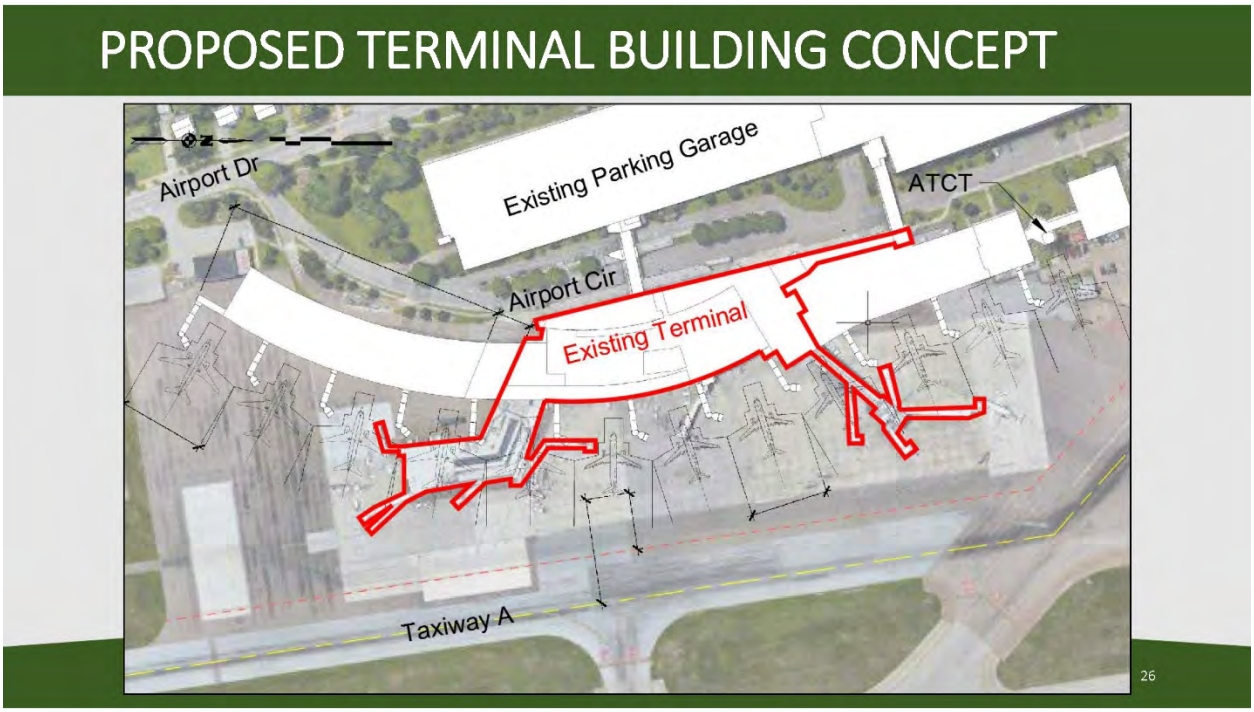
23


LANDSIDE DEVELOPMENT CONCEPTS
24

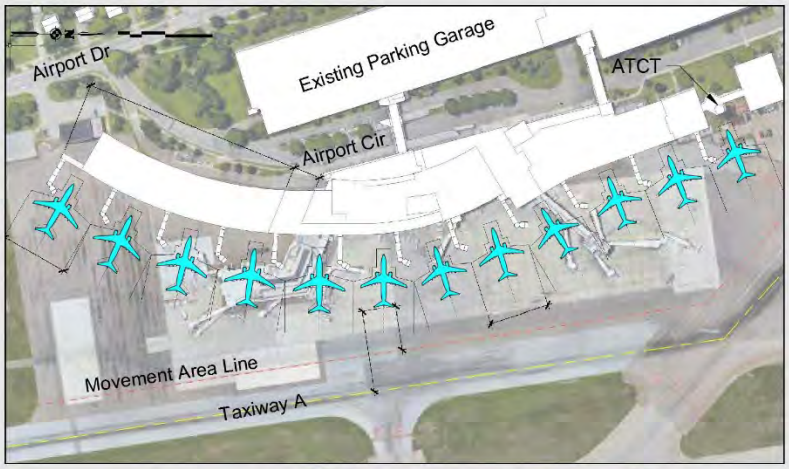
Existing Terminal Building

- Site restricted by
  - Taxiway A and Runway 1-19
  - Surrounding Roads
- Gate layout designed for Turboprops & Regional Jets
- Aircraft pushback enters Movement Area
- Internal Building Constraints
  - Split Passenger Screening Areas
  - Congestion in Holdrooms
  - Limited Concessions
- Inadequate holdroom size

25

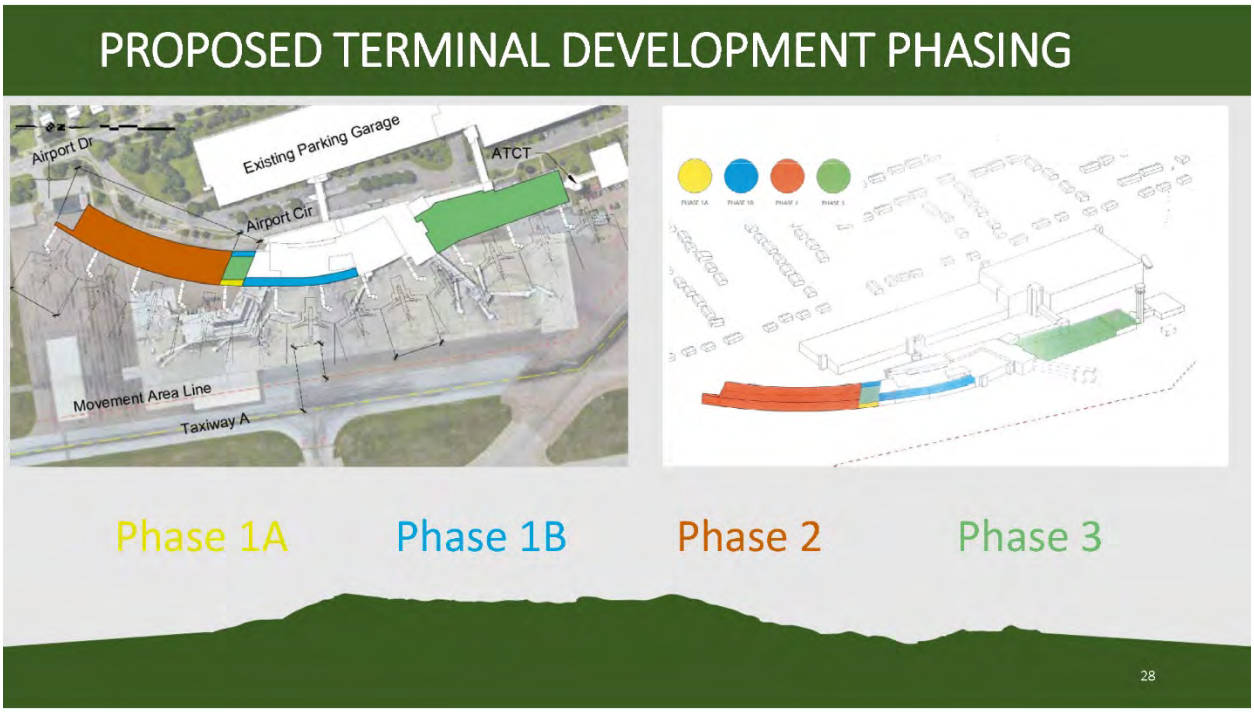

PROPOSED TERMINAL BUILDING CONCEPT
Airport Dr
Existing Parking Garage
ATCT
Airport Cir
Existing Terminal
Taxiway A
26

PROPOSED AIRCRAFT PARKING LAYOUT

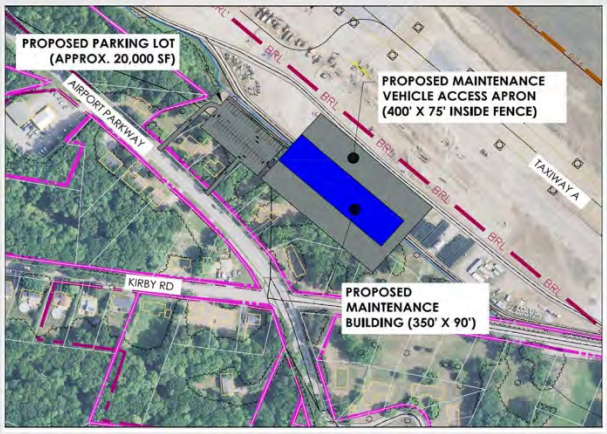


- Efficient Use of Apron Space with 12 Contact Gate Positions
- Additional Area Between Gates and Taxiway A
- Pushbacks Can Avoid Entering Movement Area

27

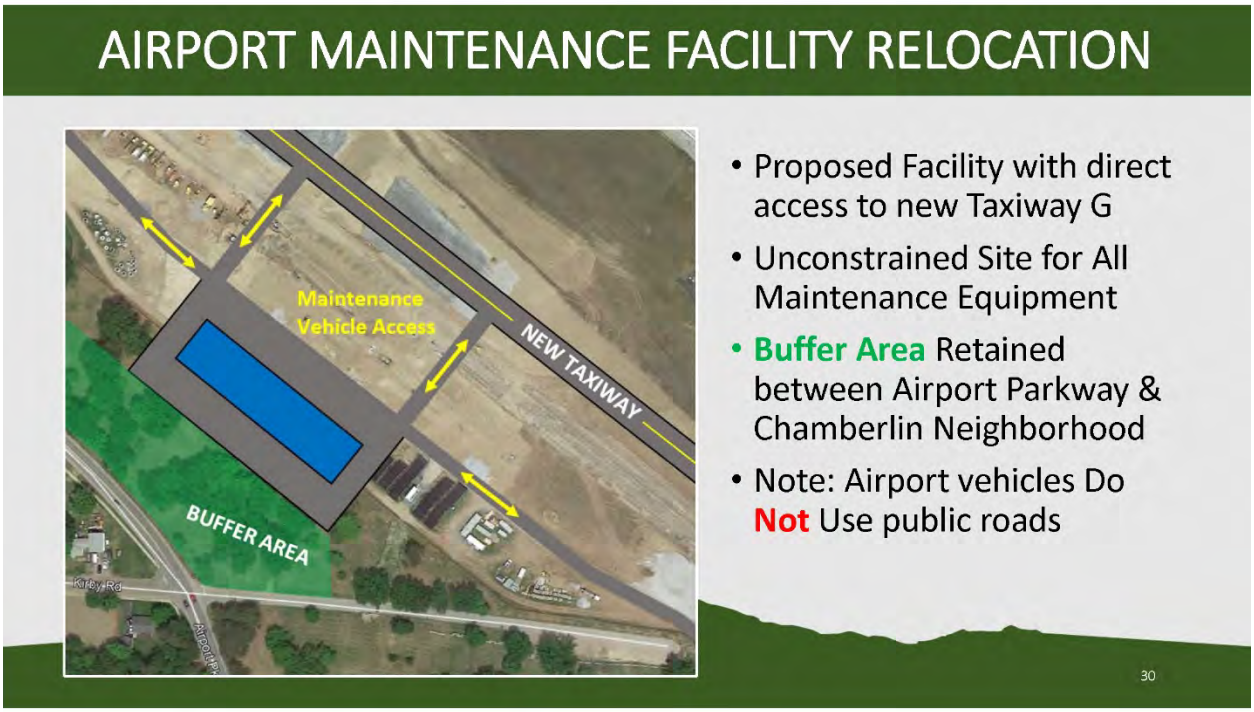

PROPOSED TERMINAL DEVELOPMENT PHASING
Airport Dr
Existing Parking Garage
ATCT
Airport Cir
Movement Area Line
Taxiway A
Phase 1A
Phase 1B
Phase 2
Phase 3
28

AIRPORT MAINTENANCE FACILITY RELOCATION



- Existing Facility is Undersized (some equipment stored outside)
- Existing location is constrained & distant from main runway

29


AIRPORT MAINTENANCE FACILITY RELOCATION
Maintenance Vehicle Access
NEW TAXIWAY
BUFFER AREA
Kirby Rd
• Proposed Facility with direct access to new Taxiway G
• Unconstrained Site for All Maintenance Equipment
• Buffer Area Retained between Airport Parkway & Chamberlin Neighborhood
• Note: Airport vehicles Do Not Use public roads
30

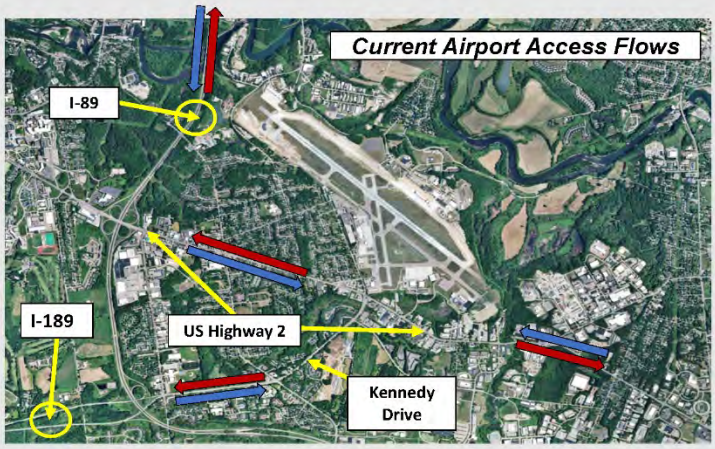
GA AND AIR CARGO IMPROVEMENTS

- General Aviation Hangar Development
- General Aviation Apron Expansion
- Air Cargo Expansion
- Provide Buffer Along Airport Dr

31


GROUND ACCESS IMPROVEMENTS CONCEPTS
32

GROUND ACCESS IMPROVEMENT CONCEPTS



- Airport Share of Regional Traffic is low
- Traffic problems & solutions are regional
- FAA and Airport funding can not be used for Off Airport Projects

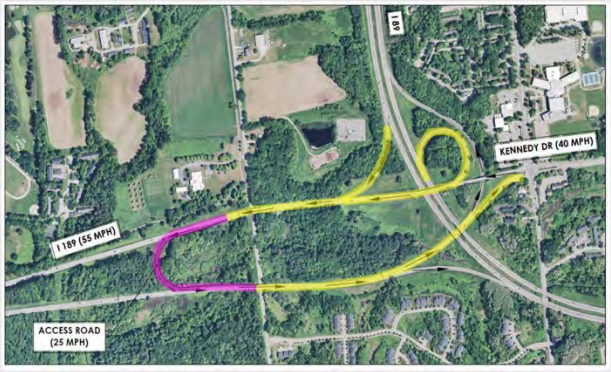
33

I-89 NEW INTERCHANGE 14B CONCEPT

- Construct new I-89 Interchange
- Provides new east/west access to airport
- Connects into Airport Parkway, to Terminal Building
- Avoids Route 2 and Kennedy Drive

34

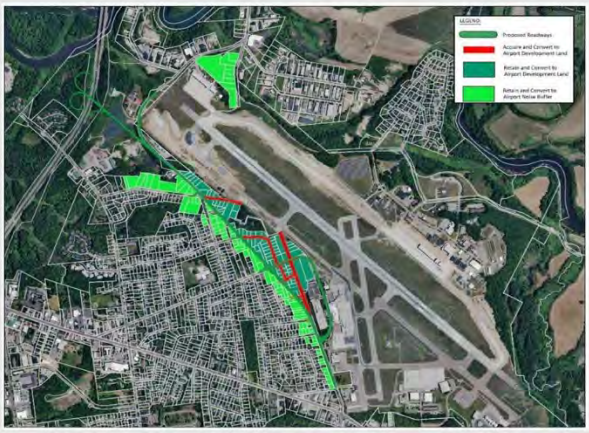
I-189 TURNAROUND CONCEPT



- Construct new I-189 U-turn ramp
- Provides east/west connection to I-89 N/S
- Tie into Kennedy Drive for direct access to Airport

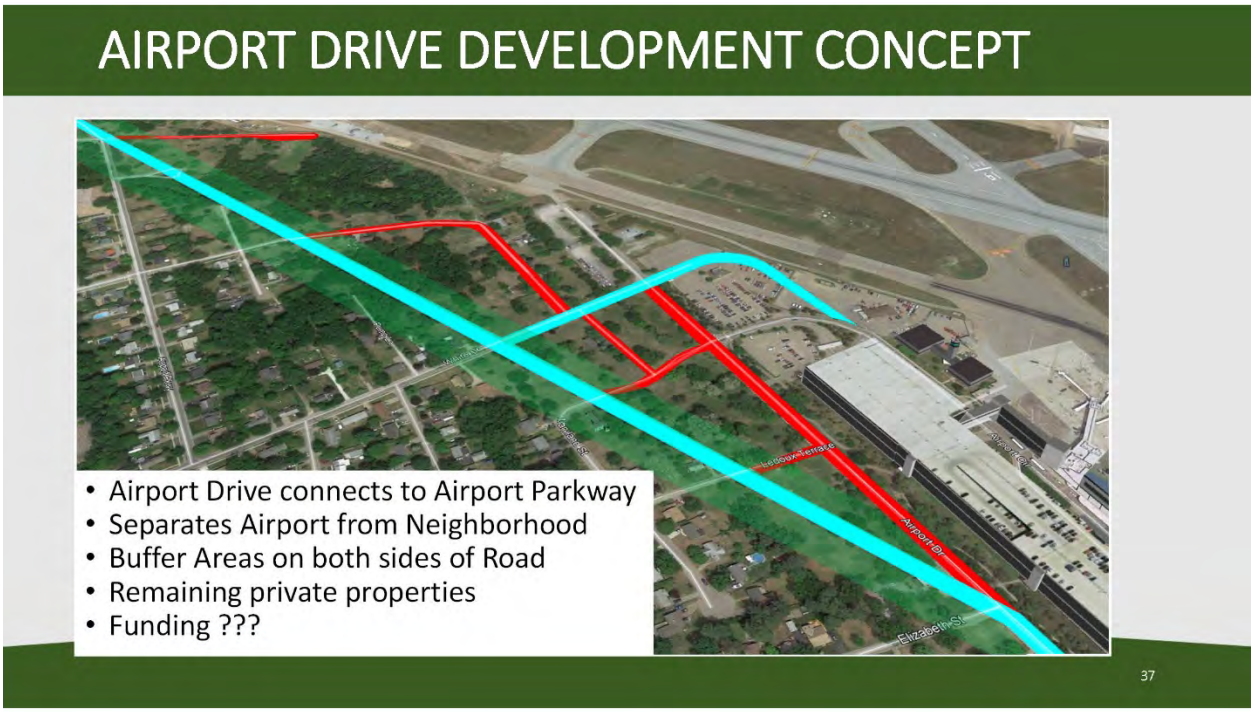
35

AIRPORT DRIVE DEVELOPMENT CONCEPT



- Improve & Relocate Airport Drive
- Create a "Boulevard Type" Roadway with Landscaping
- Uses property acquired through airport noise program
- Retain a buffer area between Chamberlin Neighborhood

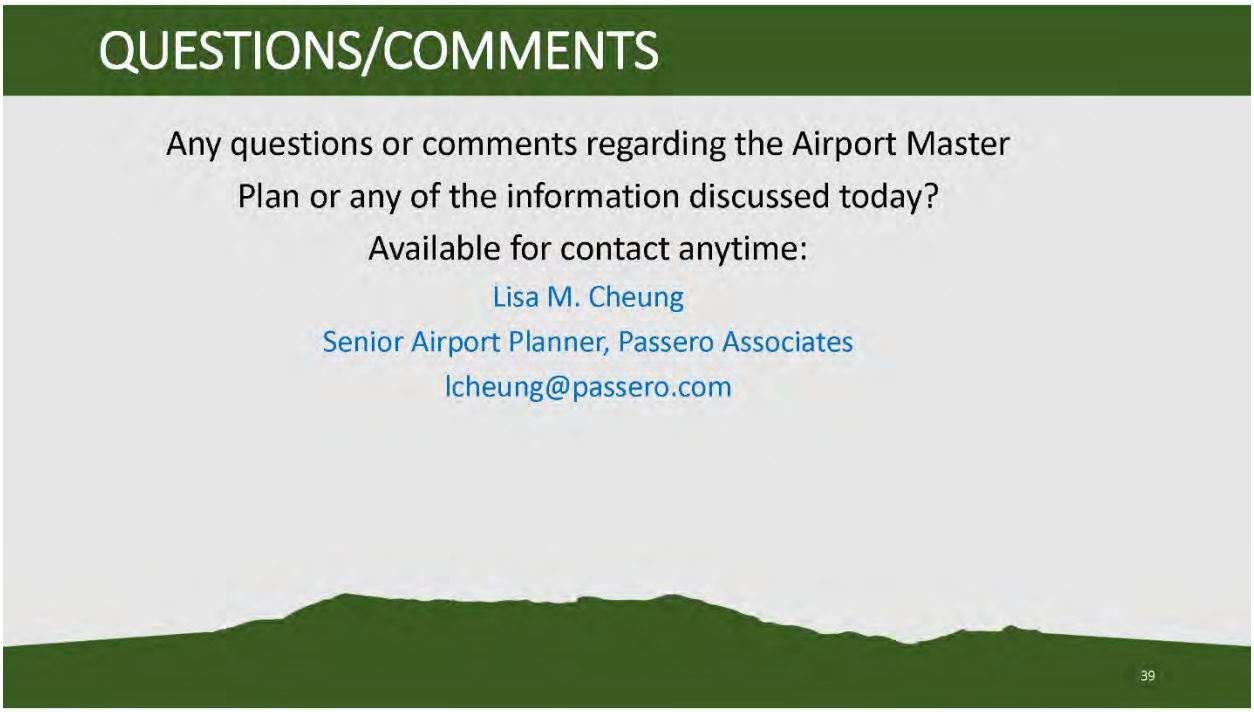
36


AIRPORT DRIVE DEVELOPMENT CONCEPT
• Airport Drive connects to Airport Parkway
• Separates Airport from Neighborhood
• Buffer Areas on both sides of Road
• Remaining private properties
• Funding ???
Airport Dr
Elizabeth St
37

NEXT STEPS

- Prepare Environmental Overview
- Prepare Development Concepts
- ALP Preparation

38


QUESTIONS/COMMENTS
Any questions or comments regarding the Airport Master Plan or any of the information discussed today?
Available for contact anytime:
Lisa M. Cheung
Senior Airport Planner, Passero Associates
lcheung@passero.com
39

Appendix F.2

Regional Advisory Committee Documentation

Burlington International Airport

Airport Master Plan Update

Regional Advisory Committee Meeting # 1

September 25, 2018

BURLINGTON INTERNATIONAL AIRPORT

PASSERO ASSOCIATES engineering architecture

WOOLPERT Stantec McFarland Johnson vhb

CHA mmm Leibowitz&Horton

1

AGENDA

- Project Background
  - Introductions
  - Overview of Airport Master Plan Process
  - Define Role of Regional Advisory Committee (RAC)
- Next Steps
- Get Your Input and Ideas (SWOT Exercise)

2

INTRODUCTIONS/BTV MASTER PLAN TEAM

- BTV / Airport Staff
- Consultant Teams
- Regional Advisory Committee Members

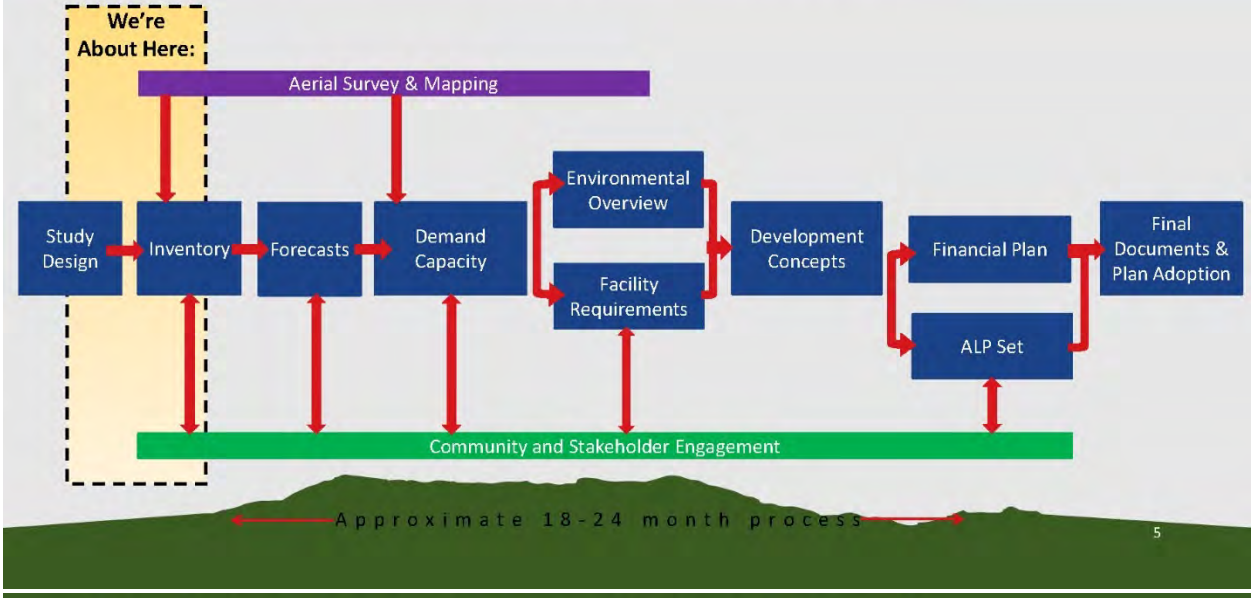
3

WHAT IS AN AIRPORT MASTER PLAN

- Guides the airport's development and operational sustainability
- Two Parts
  - *Master Plan Report*
  - *Airport Layout Plan (ALP) (drawing set)*
- Covers 5, 10, and 20-year horizons
- Usually updated every 10 years
- Follows FAA guidance and standards

4

AIRPORT MASTER PLANNING PROCESS



WHY DO AN AIRPORT MASTER PLAN

- Facilitate modernization and expansion
- Meet foreseeable aviation demand and customer needs
- Ensure that future development is:
  - Planned and logical
  - Feasible and flexible
  - Fiscally responsible
  - Environmentally compatible
  - Regionally supported
- Promote customer convenience and competitive advantage
- Allow for federal funding on eligible projects

6

WHY ARE YOU HERE?

- Valued stakeholders and integral to the process
- Regional Advisory Committee (RAC) meets up to three(3) times during the study
- Provide insight on airport, community and regional issues
- Provide technical input on operational and facility matters
- Review and comment on the Master Plan Update findings and recommendations
- All working towards the same goal - a safe, efficient and sustainable airport for future growth.

7

RAC MEMBERS

- Burlington Int'l Airport
- Burlington Leg Rep
- CCRPC
- City of Burlington
- City of South Burlington
- City of Winooski
- FAA New England
- GBIC
- Lake Champlain Chamber
- Rep. Welch Representative
- Senator Leahy Representative
- Senator Sanders Representative
- St. Michael's College
- State Legislature Representative
- State Travel
- Town of Colchester
- Town of Essex
- Town of Williston
- UVM
- VT Agency of Transportation
- Vermont National Guard
- Vermont State Chamber

8

Regional Advisory Meetings

RAC Meeting #1

1 – Project Initiation
- Kickoff Meeting
- Obtain input

RAC Meeting #2

2 – Investigation Part 1
- Introduction
- Inventory
- Forecast of Aviation Demand
- ➢ **Working Paper #1**
- ➢ **FAA Forecast Approval**

RAC Meeting #3

3 –Documentation
- Design Criteria
- Demand Capacity Analysis and Facility Requirements
- Airport Development Plan
- Airport Layout Plan (ALP) Review
- Phasing and Capital Improvement Plan
- ➢ **Draft Final report**

9

Brief History of Airport

- **1920** – Airport developers took a lease on a 72-acre cornfield to establish Burlington Municipal Airport
- **1946** – Vermont Air National Guard established
- **1969** – Name changed to Burlington International Airport
- **1970** – First jet service introduced
- **1973** – 40,000 sqf terminal building constructed
- **2000s** – Increase in growth and service led to $24 million in renovations and expansions

10

KEY AIRPORT FEATURES

- Largest airport in Vermont
- Currently served by five airlines
- Covers 942 acres
- Two Active Runways
  - Runway 15-33
  - Runway 1-19
- Air National Guard
- Cargo Operations
  - FedEx
  - Wiggins Airways

11

NEXT STEPS

- SWOT Exercise
- Working Paper #1 – Inventory
- Continue forecasting effort
- Public Informational Workshop #1
- Complete aerial survey and mapping efforts

12

AIRPORT MASTER PLAN – SWOT Analysis

- Seek input to:
  - (S) Strengths – things BTV does well
  - (W) Weaknesses – resource limitations
  - (O) Opportunities – emerging need
  - (T) Threats – external forces/limitations
- Preliminary Findings
- Your preferences

13

PRELIMINARY FINDINGS - STRENGTHS

- Convenience
  - Minimal Ground Transportation, close to Businesses and Individuals in VT
- Partnership with VTANG
  - For ARFF, cost Savings
- Well Maintained Facility
- Economic Development/Driver
- Air Service
  - Partnership, mainline carriers, additional routes added
- Infrastructure
  - Room to Grow, improvements underway

14

PRELIMINARY FINDINGS - WEAKNESSES

- Flight Schedules/Destination
  - Limited, fares too high
- TSA
  - Congested
- Community Relations
- General Aviation
  - Fuel costs, aging infrastructure, collaboration with stakeholders
- Airfield
  - Terminal/TWY A too close, Noise, Traffic, Concourse too small, undeveloped real estate
- Ancillary
  - Hotel, customs, conference center, marketing, food vendors, baggage service

15

PRELIMINARY FINDINGS - OPPORTUNITIES

- Infrastructure
  - Physical, operational, quarry land for development, new maintenance facility
- Expanded Service
  - BOS, mainline carriers, International, Curbside check-in
- General Aviation
  - Fuel costs, fresh facilities, growth, flight training
- Community Relations
  - Marketing, Sell VT, more public transportation
- TSA Improvements
  - Consolidated
- Access Road Improvements

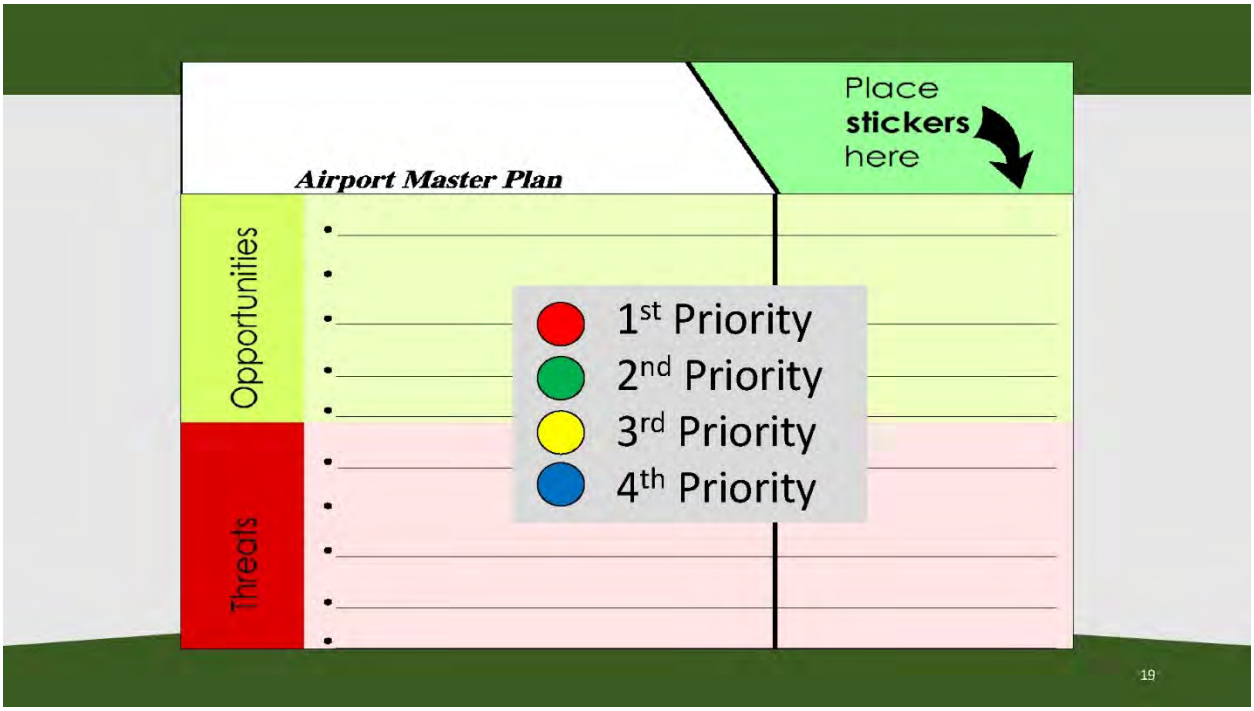
16

PRELIMINARY FINDINGS - THREATS

- Plattsburgh
- Loss of tenants
- Terminal Congestion
  - Parking too close to building, no room in from of ticket counters, not enough waiting room
- TSA Congestion
  - Inefficient space, not processing enough passengers
- Community Relations/Regionalization
  - Lack of local support

17

18


Place
stickers
here
Airport Master Plan
Opportunities
Threats
1st Priority
2nd Priority
3rd Priority
4th Priority
19


SWOT EXERCISE
20

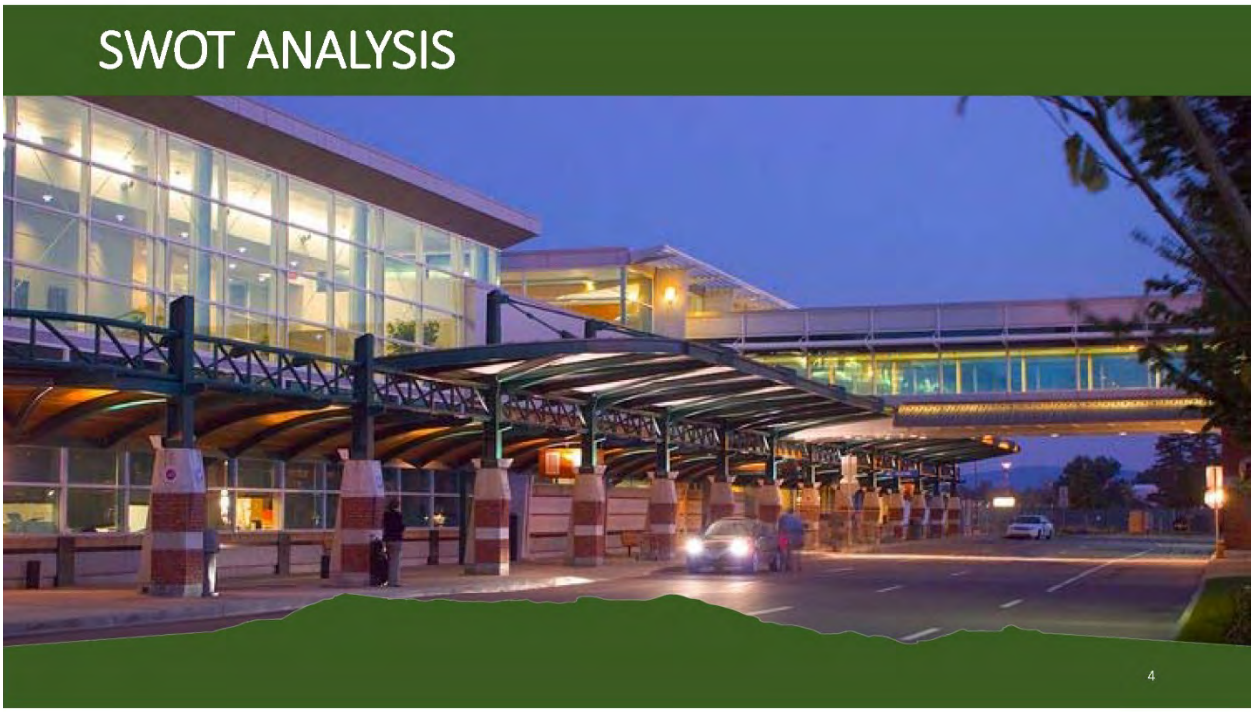

Burlington International Airport
Airport Master Plan Update
Regional Advisory Committee Meeting # 2
November 13, 2018
BURLINGTON
INTERNATIONAL AIRPORT
PASSERO ASSOCIATES
engineering architecture
WOOLPERT
Stantec
McFarland Johnson
vhb
CHA
hmmh
Leibowitz&Horton
1

AGENDA

- Introductions
- Status of the Master Plan Update
- SWOT Analysis
- Inventory Summary
- Forecast Summary
- Next Steps

2


STATUS OF AIRPORT MASTER PLAN
We're About Here:
Aerial Survey & Mapping
Study Design
Inventory
Forecasts
Demand Capacity
Environmental Overview
Facility Requirements
Development Concepts
Financial Plan
ALP Set
Final Documents & Plan Adoption
Community and Stakeholder Engagement
Approximate 18-24 month process
3


SWOT ANALYSIS
4

AIRPORT MASTER PLAN – SWOT Analysis

- Obtained Input to:
  - (S) Strengths – things BTV does well
  - (W) Weaknesses – resource limitations
  - (O) Opportunities – emerging need
  - (T) Threats – external forces/limitations
- Joint Findings

5

PRELIMINARY FINDINGS – STRENGTHS

- Partnership with Vermont Air National Guard (T/R)
- Existing Airline Service/Diversity (T/R)
- Convenience: Airport Location/Destination/ Travelers to Region (T/R)
- Operations: Snow Removal/Remaining Open (T)
- Training: ATC/Maintenance/Pilots (T)
- Business Economic Driver (R)
- Resources for Vermonter to Travel (R)

6

PRELIMINARY FINDINGS – WEAKNESSES

- Ground Access – Local/Highway (T/R)
- Terminal Congestion (T)
- Location of Tenants vs. Taxiway Configuration (T)
- Runway 1-19 Configuration (T)
- ATC Hours/Physical Taxiway (T)
- Governance/Skewed Ownership and Management Structure to Community Affairs (R)
- Community Relations (R)
- Single TSA – Disjointed Configuration (R)
- Location – Encroaching Proximity to Dense Population (R)

7

PRELIMINARY FINDINGS – OPPORTUNITIES

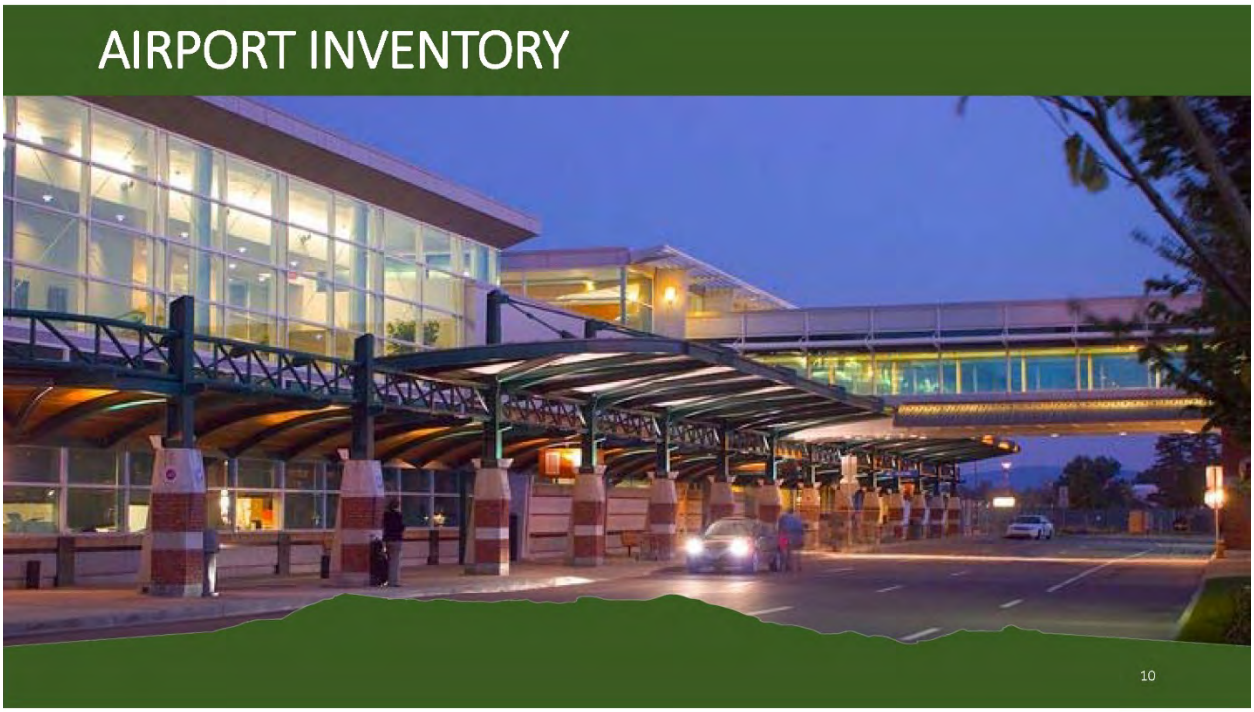
- Community Relations/Improve Communications (T/R)
- Access Road Improvements (T)
- Grow General Aviation (T)
- Separate Cargo Operations Area (T)
- TSA Central Location (T)
- Infrastructure Meeting FAA Design (T)
- Economic Driver for Growth (R)
- Governance (R)
- What Economic Impact Is and Local Resources from communities (R)
- Increase safety/Reduce Risk – e.g. additional flight hours for military jets before basing (R)

8

PRELIMINARY FINDINGS – THREATS

- Terminal Space/Congestion (T/R)
- Space for Tenants (T)
- Rehabilitate 15-33 (T)
- Parking (T)
- Security (T)
- Ground Access (T)
- Funding – Maintenance of Facility (R)
- Anything that Threatens VTANG Presence (R)
- International Changes - Exchange Rate, Border Customs, International Flight Rules (R)
- Increased Airline Fees (R)

9


AIRPORT INVENTORY
10


AIRPORT LOCATION & MUNICIPALITIES
Colchester
Essex
Winooski
Burlington International Airport
Burlington
Lake Champlain
South Burlington
Williston
89
189
2
11

KEY AIRPORT FEATURES

- Largest airport in Vermont
- Currently served by five airlines
- Covers 942 acres
- Two Active Runways
  - Runway 15-33
  - Runway 1-19
- Air National Guard
- Cargo Operations
  - FedEx
  - Wiggins Airways

12

Airport Service Area

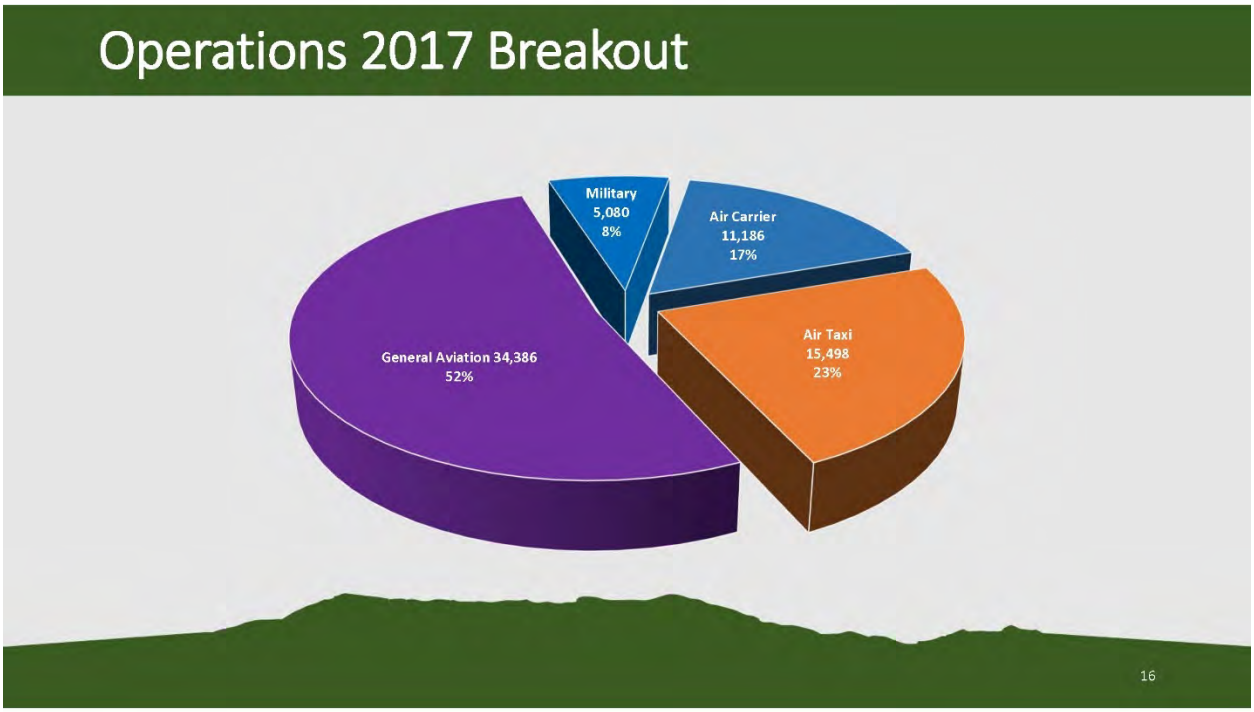
- Geographic area the airport can reasonably expect to draw commercial air service passengers.
- For BTV – Average 1.5 hour drive time
- Estimated Population in Service Area – 600,000 (442,000 in US)
- Four Airport's on the fringe of BTV Service Area

Airport	ID	Location	Distance Miles (Hours: Minutes)	Annual Enplanements (2017)	Airlines	Average Daily Commercial Departures
Burlington International	BTV	S. Burlington, VT	N/A	578,000	5	78
Plattsburgh International	PBG	Plattsburgh, NY	38 (1:26)	139,400	3	35
Montreal International	YUL	Montreal, QU	104 (2:00)	9,080,000	64	517
Lebanon Municipal	LEB	Lebanon, NH	89 (1:36)	10,400	1	6
Rutland-Southern Vermont	RUT	Rutland, VT	72 (1:50)	5,000	1	3

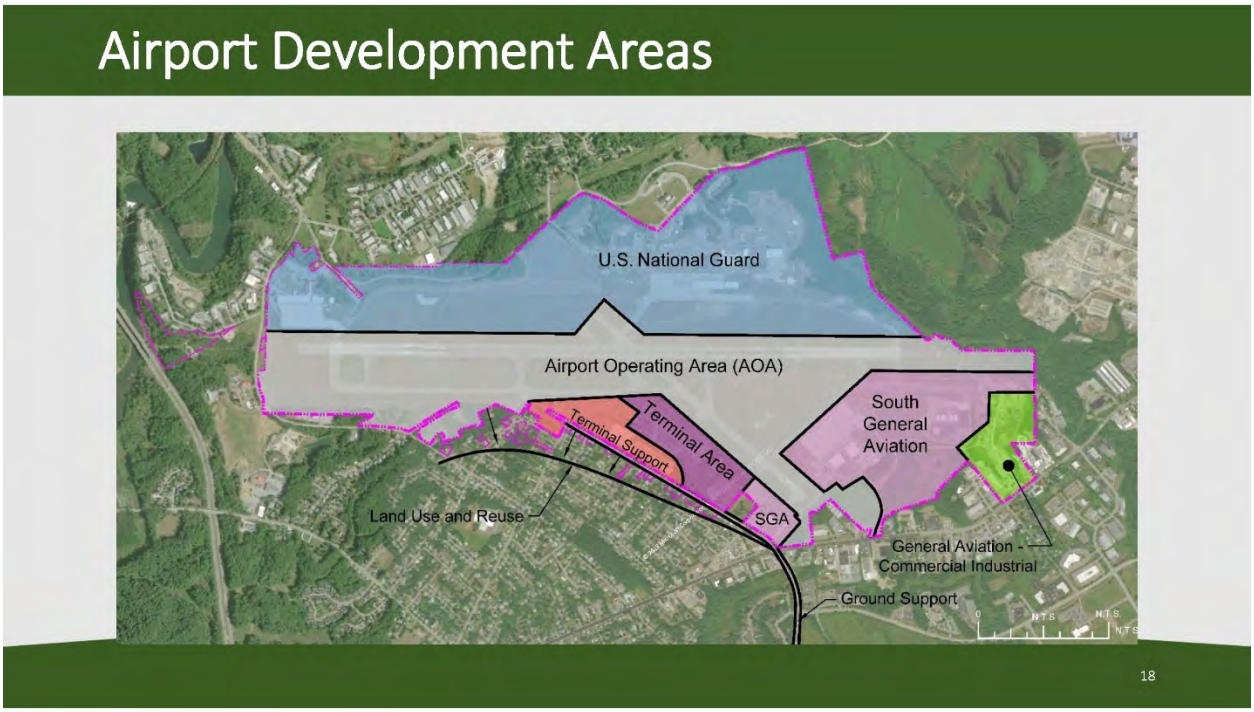
13


Aircraft Operations (takeoffs & landings)
90,000
80,000
70,000
60,000
50,000
40,000
10,000
0
2010
2011
2012
2013
2014
2015
2016
2017
Itinerant
Local
14


Revenue Passenger Enplanements
640,000
580,000
2010
2015
2016
2017
15

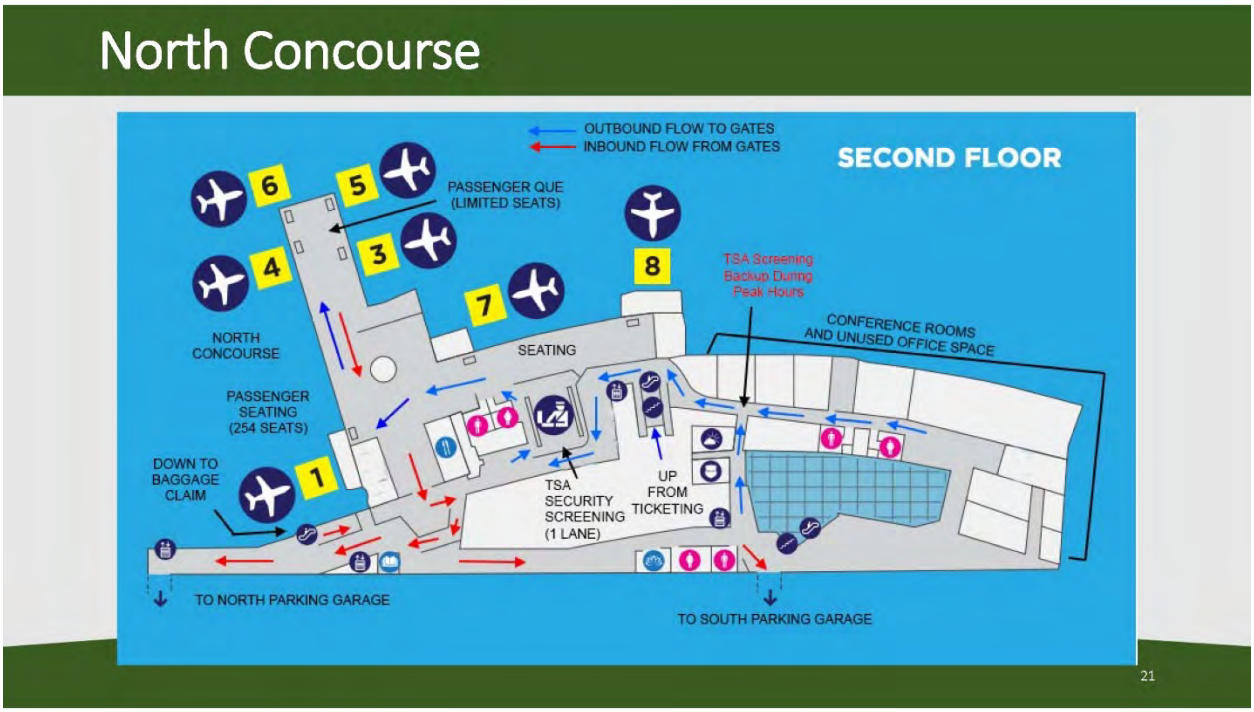

Operations 2017 Breakout
Military
5,080
8%
Air Carrier
11,186
17%
Air Taxi
15,498
23%
General Aviation 34,386
52%
16

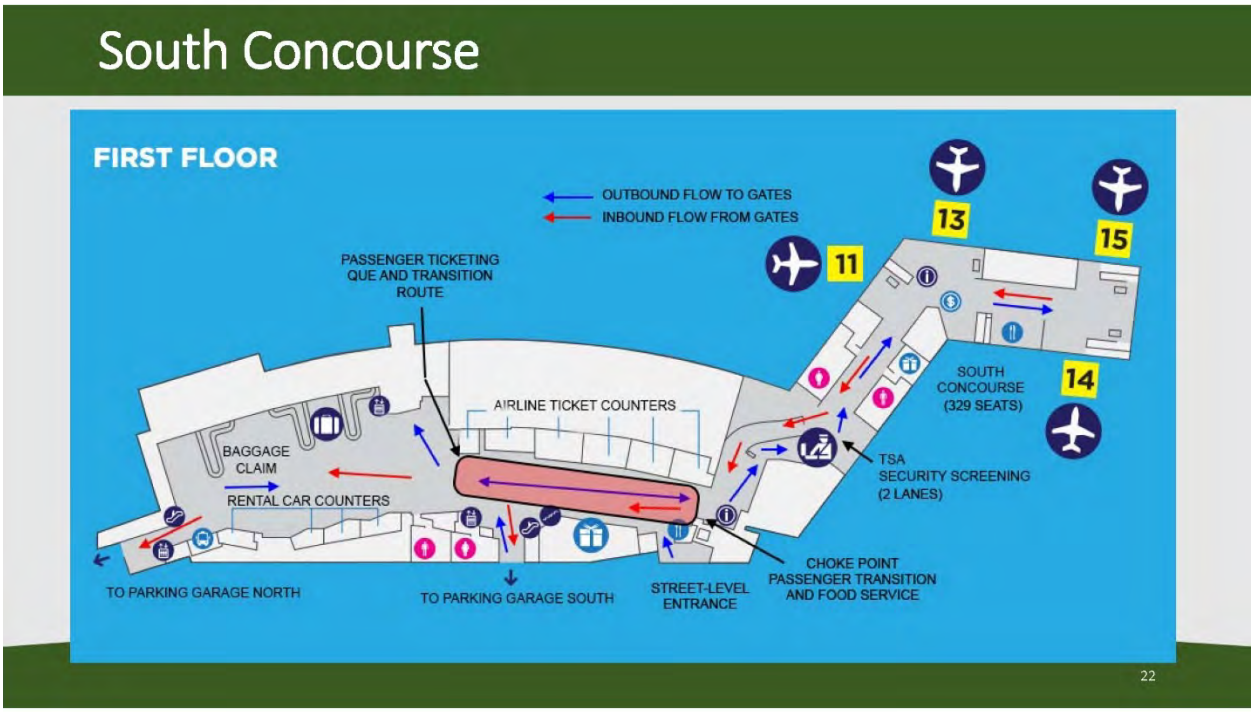

AIRPORT ACCESS
Burlington
89
Airport Parkway
White Street
Airport Drive
Passenger Terminal
Vermont Air National Guard
N
2
South Burlington
Kennedy Drive
Williston
17


Airport Development Areas
U.S. National Guard
Airport Operating Area (AOA)
South General Aviation
Terminal Area
Terminal Support
Land Use and Reuse
SGA
General Aviation - Commercial Industrial
Ground Support
0
N.T.S.
N.T.S.
N.T.S.
18


Airside Facilities
RUNWAY 15-33
• Primary Runway
• Commercial & Military
• 8,319' x 150'
• Displaced Threshold
• RWY 33 (500')
• Reduced Takeoff & Land RWY 15
• Reduced Landing RWY 33
• Approach Lighting
• IAP RWY 15 & 33
RUNWAY 1-19
• Secondary/Crosswind
• General Aviation
• 4,112' x 75'
• Displaced Threshold
• RWY 01 (225')
• RWY 19 (500')
• IAP RWY 01
19


Terminal Area
Control Tower
Parking Garage
Gate 1
4
6
7
3
5
Airport Drive
8
North Concourse
Airport & Airline Offices
11
Main Terminal
14
13
South Concourse
Taxiway A
15
20


North Concourse
OUTBOUND FLOW TO GATES
INBOUND FLOW FROM GATES
SECOND FLOOR
6
5
4
3
7
8
PASSENGER QUE
(LIMITED SEATS)
TSA Screening
Backup During
Peak Hours
CONFERENCE ROOMS
AND UNUSED OFFICE SPACE
NORTH
CONCOURSE
SEATING
PASSENGER
SEATING
(254 SEATS)
DOWN TO
BAGGAGE
CLAIM
1
TSA
SECURITY
SCREENING
(1 LANE)
UP
FROM
TICKETING
TO NORTH PARKING GARAGE
TO SOUTH PARKING GARAGE
21


South Concourse
FIRST FLOOR
OUTBOUND FLOW TO GATES
INBOUND FLOW FROM GATES
PASSENGER TICKETING QUE AND TRANSITION ROUTE
11
13
15
14
SOUTH CONCOURSE (329 SEATS)
AIRLINE TICKET COUNTERS
BAGGAGE CLAIM
RENTAL CAR COUNTERS
TSA SECURITY SCREENING (2 LANES)
TO PARKING GARAGE NORTH
TO PARKING GARAGE SOUTH
STREET-LEVEL ENTRANCE
CHOKE POINT PASSENGER TRANSITION AND FOOD SERVICE
22


Terminal Building
North Concourse
• Second Level
• 47,600 FT2
• United & American Airlines
• Airport and Airline Offices, Conference Rooms
• TSA Checkpoint
South Concourse
• Ground Level
• 92,000 FT2
• Delta, JetBlue & Porter Airlines
• TSA Checkpoint
23

Passenger Flow & Choke Points

- Peak Hours
  - Departures
    - 5:30 to 8:00 am
    - 11:00 am to 3:00 pm
    - 5:00 to 7:00 pm
  - Arrivals
    - 11:00 am to 1:00 pm
    - 5:00 to 6:00 pm
    - 10:00 pm to Midnight

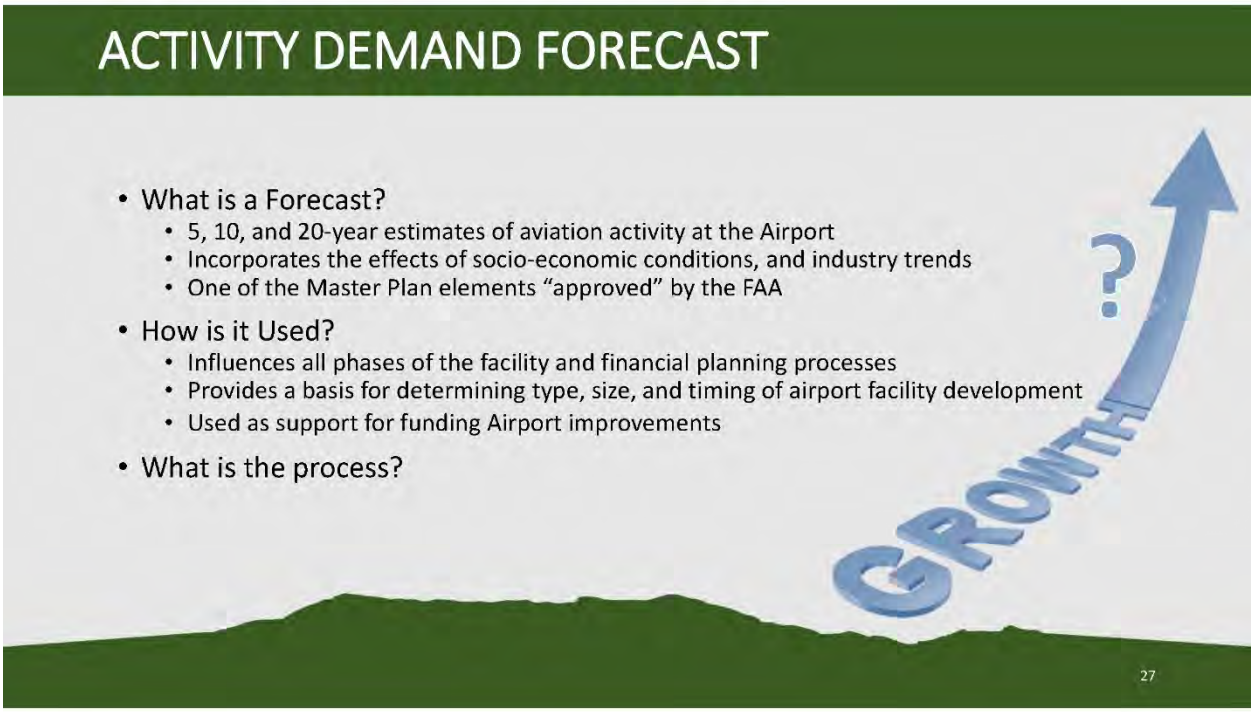
Peak Passenger Activity Between Noon and 7 pm

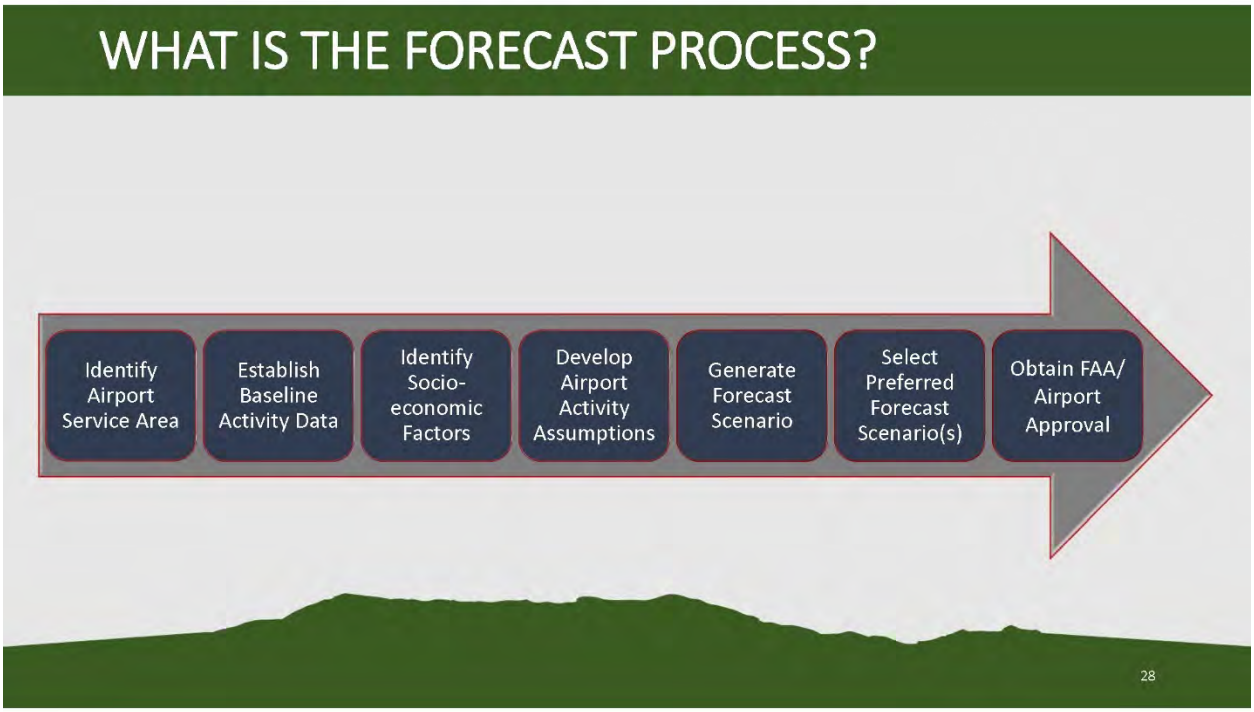
August 8, 2018 – 4:30 pm

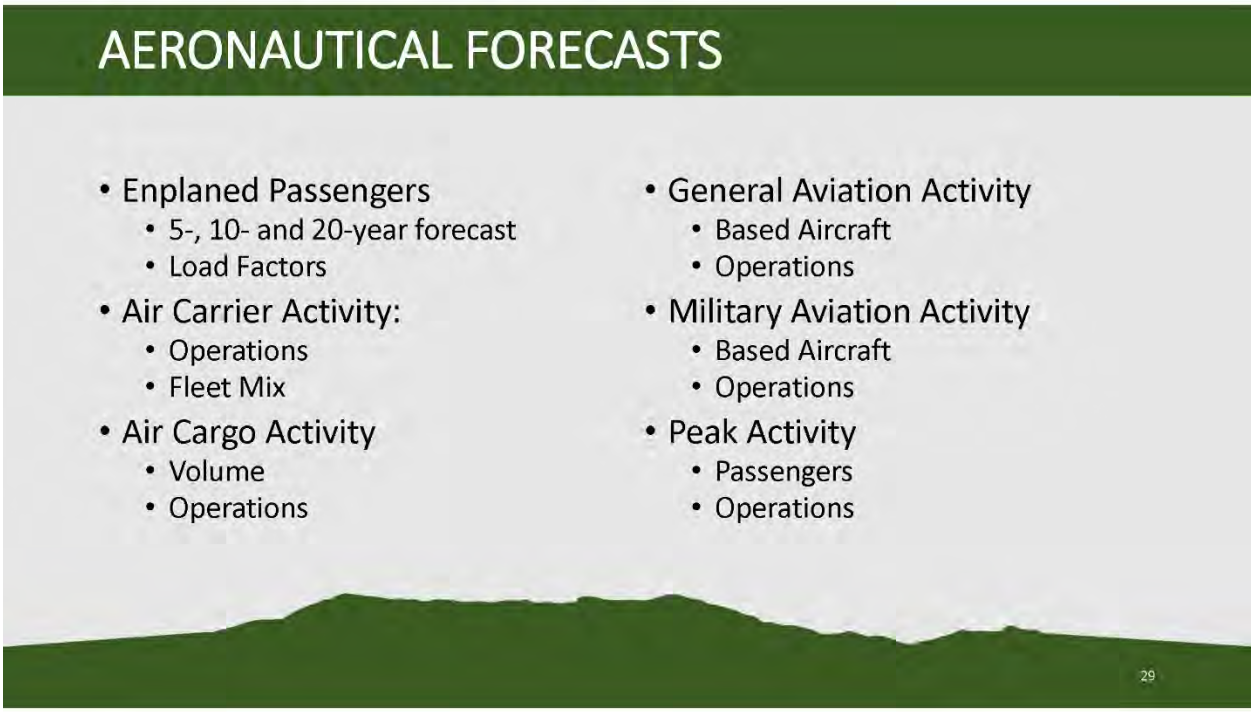
24

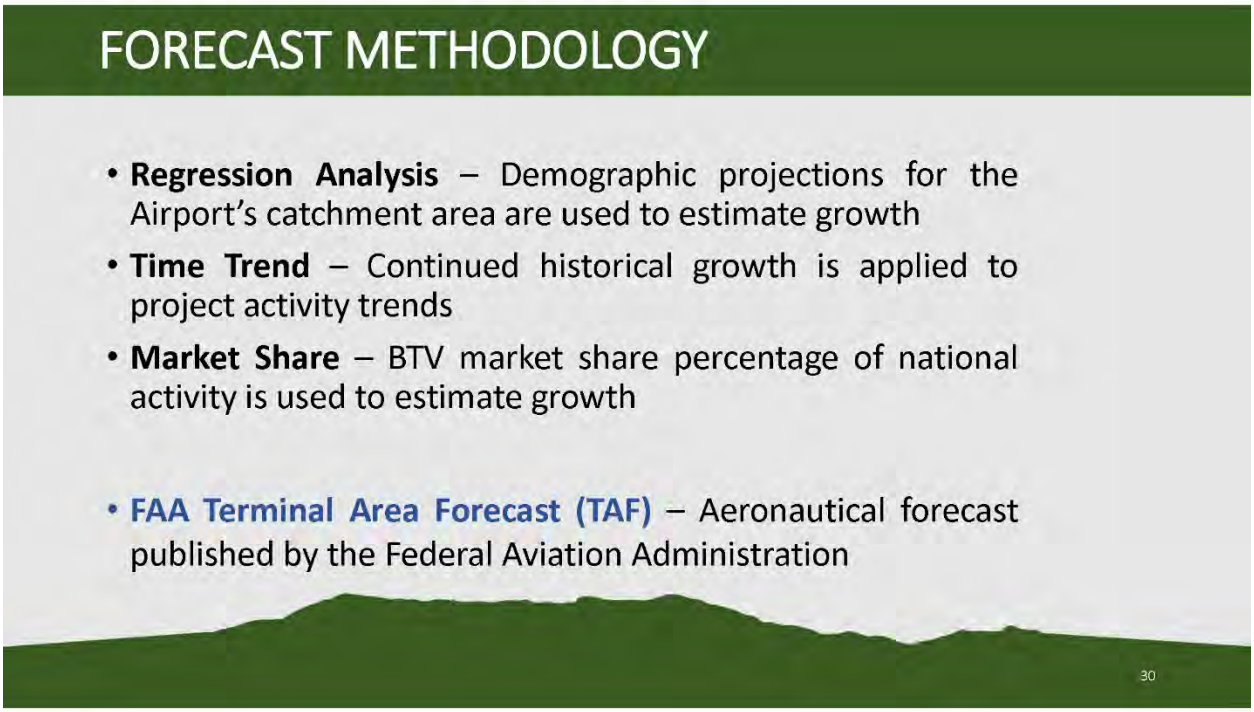

Ticketing Area
United
JetBlue
Gift Shop
Passenger's Queuing Up at Ticket Counters
Delta
Porter
2 ft. Clearance
To South Concourse
Porter
American
Delta
JetBlue
United
Approximately 9 feet Clearance
25


FORECAST SUMMARY
26


ACTIVITY DEMAND FORECAST
• What is a Forecast?
• 5, 10, and 20-year estimates of aviation activity at the Airport
• Incorporates the effects of socio-economic conditions, and industry trends
• One of the Master Plan elements "approved" by the FAA
• How is it Used?
• Influences all phases of the facility and financial planning processes
• Provides a basis for determining type, size, and timing of airport facility development
• Used as support for funding Airport improvements
• What is the process?
GROWTH?
27


WHAT IS THE FORECAST PROCESS?
Identify Airport Service Area
Establish Baseline Activity Data
Identify Socio-economic Factors
Develop Airport Activity Assumptions
Generate Forecast Scenario
Select Preferred Forecast Scenario(s)
Obtain FAA/ Airport Approval
28


AERONAUTICAL FORECASTS
• Enplaned Passengers
• 5-, 10- and 20-year forecast
• Load Factors
• Air Carrier Activity:
• Operations
• Fleet Mix
• Air Cargo Activity
• Volume
• Operations
• General Aviation Activity
• Based Aircraft
• Operations
• Military Aviation Activity
• Based Aircraft
• Operations
• Peak Activity
• Passengers
• Operations
29


FORECAST METHODOLOGY
• Regression Analysis – Demographic projections for the Airport's catchment area are used to estimate growth
• Time Trend – Continued historical growth is applied to project activity trends
• Market Share – BTV market share percentage of national activity is used to estimate growth
• FAA Terminal Area Forecast (TAF) – Aeronautical forecast published by the Federal Aviation Administration
30

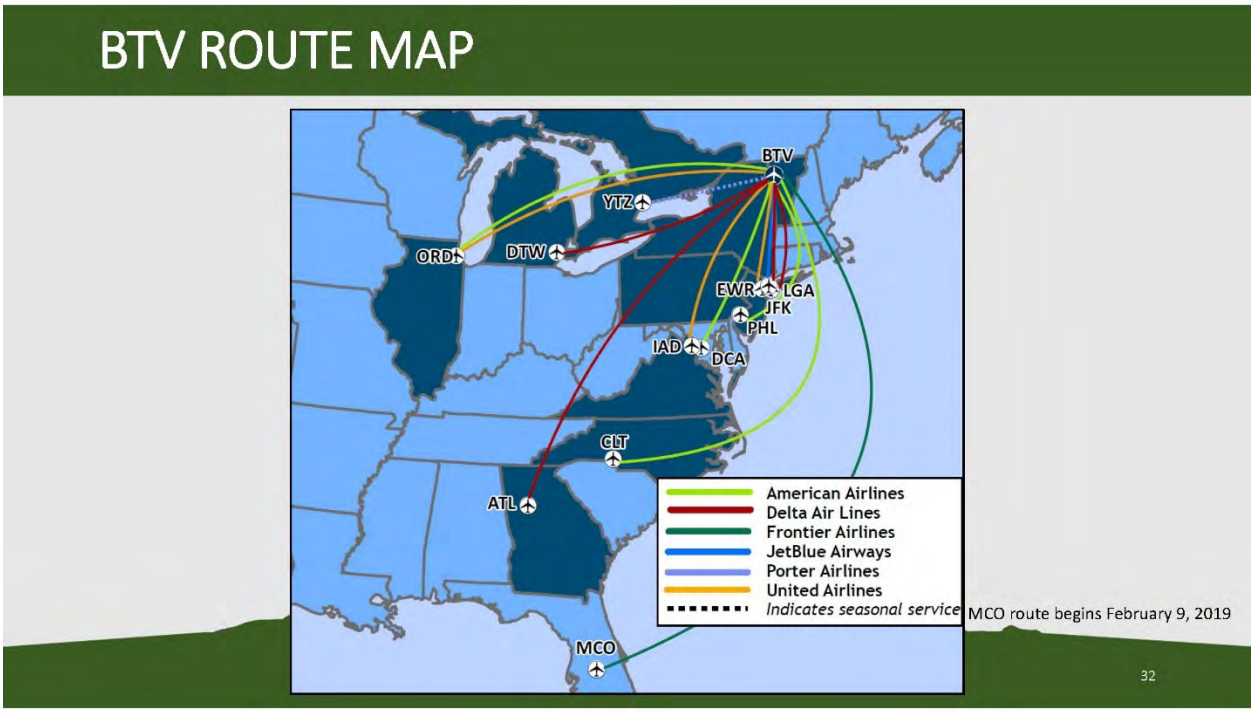
FAA TERMINAL AREA FORECAST

2018 FAA Terminal Area Forecast (TAF)

Year	Enplanements	Operations	Based Aircraft
2017	585,099	26,677	115
2018	635,407	28,371	116
2023	665,850	22,465	123
2028	693,485	23,278	133
2033	721,769	24,296	143
2038	749,730	25,321	153
AAGR	**0.8%**	**-2.8%**	**1.4%**
GROWTH	**18.0%**	**-8.1%**	**31.9%**

- Baseline year of the forecast is 2017
- The FAA TAF is considered to be the baseline metric that all Master Plan forecasts are compared with
- TAF considers socioeconomic and demographic factors, general industry trends, and regional commercial service growth

31


BTV ROUTE MAP
BTV
YTZ
ORD
DTW
EWR
LGA
JFK
PHL
IAD
DCA
CLT
ATL
MCO
American Airlines
Delta Air Lines
Frontier Airlines
JetBlue Airways
Porter Airlines
United Airlines
Indicates seasonal service
MCO route begins February 9, 2019
32

MASTER PLAN PROJECTED ENPLANEMENT SCENARIOS

Year	TAF	10-Year Historic Time Series	Static National Market Share	Population-Based Regression	Employment-Based Regression	Income-Based Regression	Extrapolated Population Econometric	Extrapolated TAF
RECOMMENDED								667,004
								695,171
								724,528
								755,124
								787,012
								0.8%
								18.0%

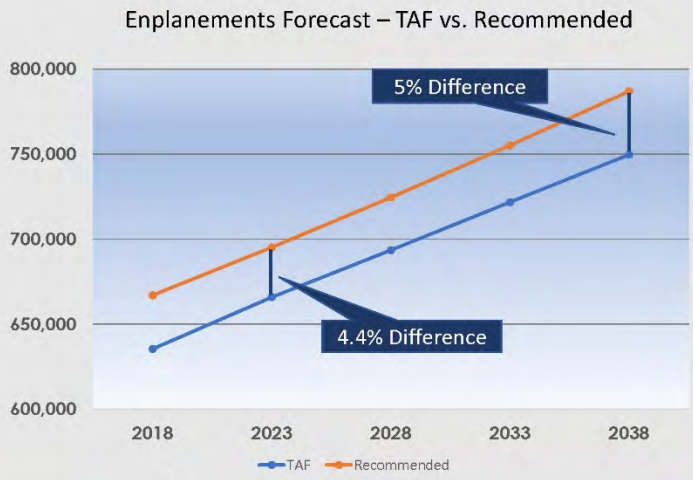
33

RECOMMENDED ENPLANEMENT FORECAST vs. TAF

Year	TAF	Recommended	Recommended vs. TAF
2017	585,099	591,558	1.1%
2018	635,407	667,004	5.0%
2023	665,850	695,171	4.4%
2028	693,485	724,528	4.5%
2033	721,769	755,124	4.6%
2038	749,730	787,012	5.0%
AAGR	**0.8%**	**0.8%**	-
GROWTH	**18.0%**	**18.0%**	-

34

RECOMMENDED FORECAST

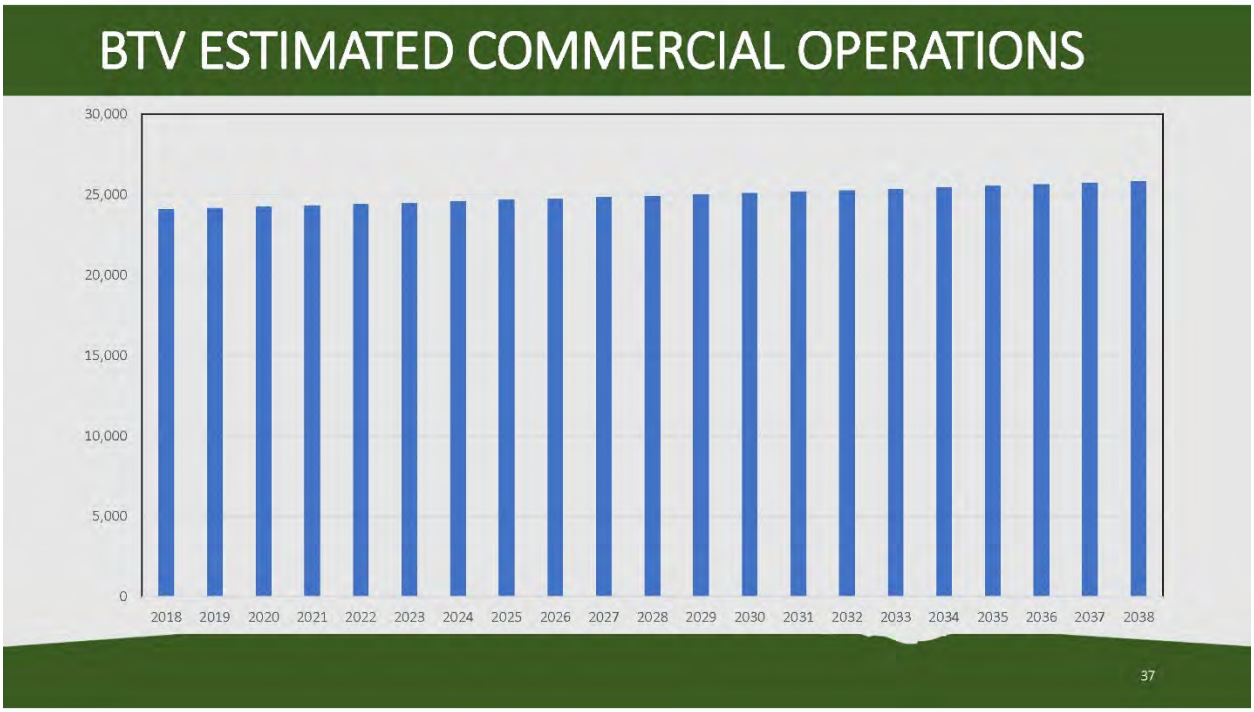


35

RECOMMENDED COMMERCIAL FORECAST

Year	Enplanements	Operations	Average Seats per Departure	Load Factor
2017	591,558	21,448	68.0	79.3%
2018	667,004	24,082	68.9	80.4%
2023	695,171	24,480	69.5	81.7%
2028	724,528	24,899	70.3	82.7%
2033	755,124	25,340	71.4	83.4%
2038	787,012	25,804	72.7	83.9%
AAGR	**0.8%**	**0.3%**	**0.3%**	**0.2%**
GROWTH	**18.0%**	**7.1%**	**5.5%**	**4.4%**

36


BTV ESTIMATED COMMERCIAL OPERATIONS
30,000
25,000
20,000
15,000
10,000
5,000
0
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
37

BTV AIR CARGO FORECASTS

Year	Air Cargo Volume (pounds)				
	National FAA	National Boeing	National Airbus	Recommended Average	Recommended Operations
2017	RECOMMENDED			10,726,000	525
2018				10,929,436	535
2023				12,005,976	588
2028				13,188,554	646
2033				14,487,616	709
2038				15,914,634	779
AAGR 2018-2038				1.9%	1.9%
Growth 2018-2038				45.6%	45.6%

38

BASED AIRCRAFT FORECAST COMPARISON

Year	FAA TAF	Adjusted TAF	FAA Aerospace	Market Share: Static National	Market Share: Static Regional	Market Share: Static State
2017					92	
2018					93	
2023					97	
2028					102	
2033					106	
2038					111	
AAGR 2018-2038					0.9%	
Growth 2018-2038					19.7%	

RECOMMENDED

39

GENERAL AVIATION OPERATIONS FORECAST COMPARISON

Year	FAA TAF	10-Year Historical	OPBA	Market Share		
				Static National	Static Regional	Static State
2017			38,671			
2018			39,005			
2023			40,864			
2028			42,743			
2033			44,647			
2038			46,679	RECOMMENDED		
AAGR 2018-2038			0.9%			
Growth 2018-2038			19.7%			

40

GENERAL AVIATION – LOCAL VS ITINERANT

Year	Operations		
	Itinerant	Local	Total GA
2017	26,833	11,838	38,671
2018	27,065	11,940	39,005
2023	28,355	12,509	40,864
2028	29,658	13,084	42,743
2033	30,979	13,667	44,647
2038	32,390	14,289	46,679
AAGR 2018-2038	**0.9%**	**0.9%**	**0.9%**
Growth 2018-2038	**19.7%**	**19.7%**	**19.7%**

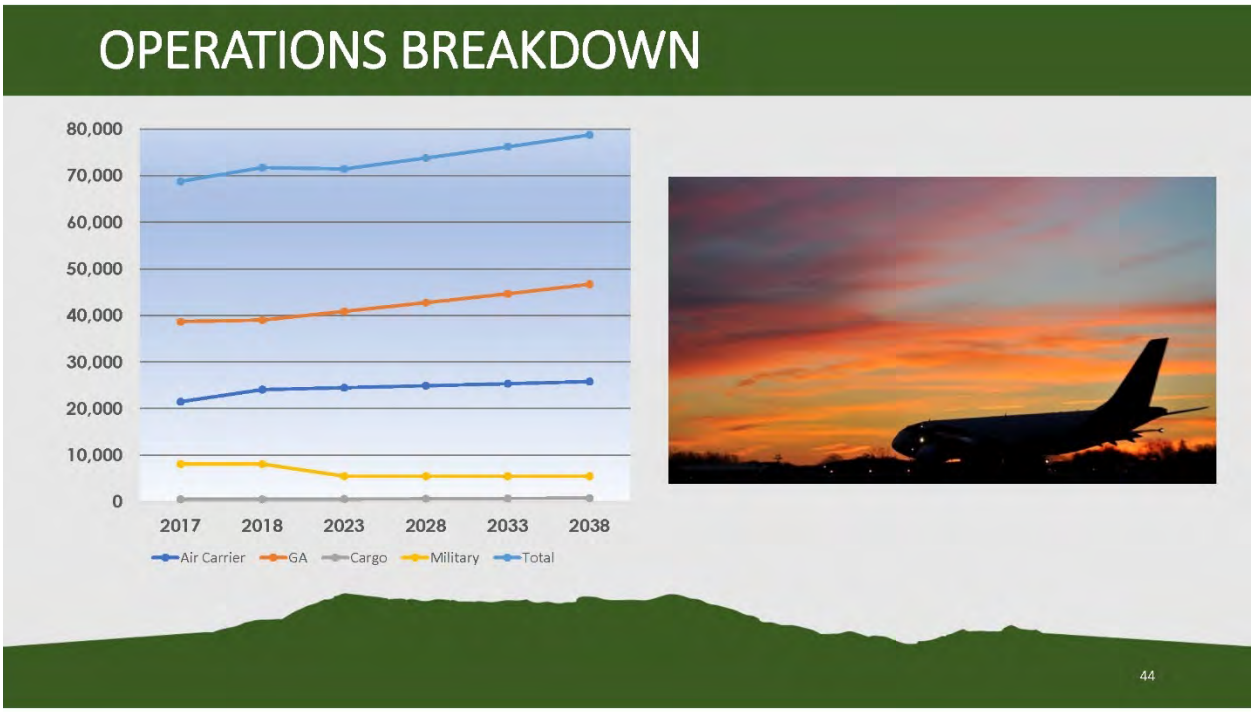
41


MILITARY OPERATIONS
• Burlington Air National Guard
• Changing from F-16 to F-35 jets
• Military operations forecast provided by US Air Force
Year
Operations
2017
8,099
2018
8,099
2023
5,486
2028
5,486
2033
5,486
2038
5,486
AAGR 2018-2038
-1.9%
Growth 2018-2038
-32.3%
42

RECOMMENDED FORECAST

Year	Enplanements	Total Operations					Based Aircraft
		Air Carrier	GA	Cargo	Military	Total	
2017	591,558	21,467	38,671	525	8,099	**68,762**	92
2018	667,004	24,082	39,005	535	8,099	**71,722**	93
2023	695,171	24,480	40,864	588	5,486	**71,418**	97
2028	724,528	24,899	42,743	646	5,486	**73,773**	102
2033	755,124	25,340	44,647	709	5,486	**76,182**	106
2038	787,012	25,804	46,679	779	5,486	**78,748**	111
AAGR 2018-2038	**0.8%**	**0.3%**	**0.9%**	**1.9%**	**-1.9%**	**0.5%**	**0.9%**
Growth 2018-2038	**18.0%**	**7.1%**	**19.7%**	**45.6%**	**-32.3%**	**9.8%**	**19.7%**

43


OPERATIONS BREAKDOWN
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2017
2018
2023
2028
2033
2038
Air Carrier
GA
Cargo
Military
Total
44

NEXT STEPS

- Working Paper #1 – Collect/Review Comments
- Public Informational Workshop #1
- Passenger Experience Survey
- Economic Impact Assessment
- Prepare Facility Requirement Evaluation – Working Paper #2

45


QUESTIONS/COMMENTS
Any questions or comments regarding the Airport Master Plan or any of the information discussed today?
PLEASE FILL OUT ONE OF OUR COMMENT FORMS!
Available for contact anytime:
Lisa Cheung
Passero Associates
LCheung@passero.com
46

Burlington International Airport

Airport Master Plan Update

Technical and Regional Advisory Committee Meeting # 3

March 26, 2019

BURLINGTON INTERNATIONAL AIRPORT

PASSERO ASSOCIATES engineering architecture

WOOLPERT Stantec McFarland Johnson vhb

CHA hmmh Leibowitz&Horton

1

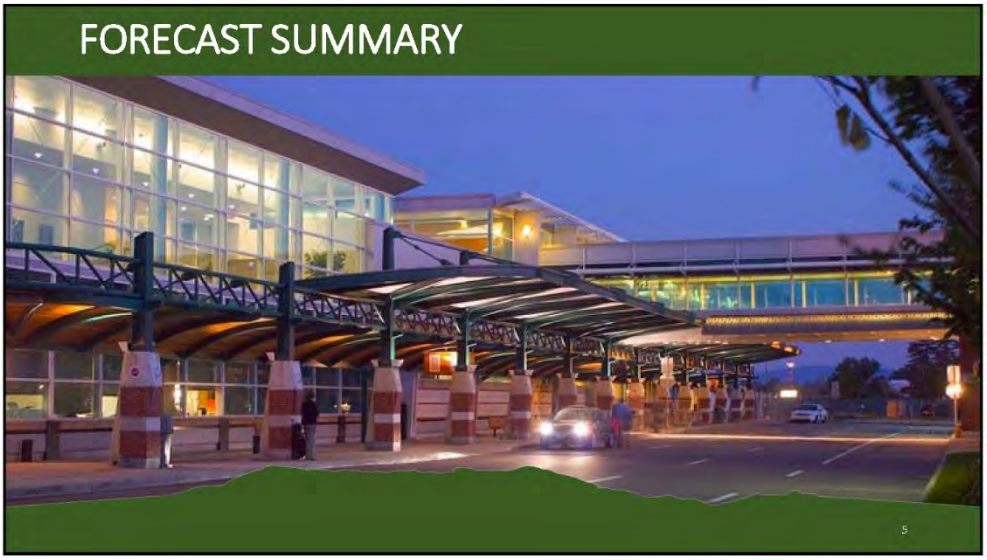
AGENDA

- Introductions
- Status of the Master Plan Update
- Passenger/Tenant Experience
- Forecast Summary
- Demand/Capacity Summary
- Facility Summary
- Sustainability Summary
- Next Steps

2


STATUS OF AIRPORT MASTER PLAN
We're About Here:
Aerial Survey & Mapping
Study Design
Inventory
Forecasts
Demand Capacity
Environmental Overview
Facility Requirements
Development Concepts
Financial Plan
ALP Set
Final Documents & Plan Adoption
Community and Stakeholder Engagement
Approximate 18-24 month process
3


Passenger/Tenant Experience
• TAC/RAC Input
• Passenger Experience
• Tenant Experience
4



AERONAUTICAL FORECASTS

- Enplaned Passengers
  - 5-, 10- and 20-year forecast
  - Load Factors
- Air Carrier Activity:
  - Operations
  - Fleet Mix
- Air Cargo Activity
  - Volume
  - Operations
- General Aviation Activity
  - Based Aircraft
  - Operations
- Military Aviation Activity
  - Based Aircraft
  - Operations
- Peak Activity
  - Passengers
  - Operations

6

RECOMMENDED FORECAST

Year	Enplanements	Total Operations					Based Aircraft
		Air Carrier	GA	Cargo	Military	Total	
2017	591,558	21,467	37,332	1,396	8,567	**68,762**	92
2018	674,944	24,082	37,655	1,422	8,567	**71,727**	93
2023	695,171	24,480	39,449	1,563	5,954	**71,446**	97
2028	724,528	24,899	41,263	1,717	5,954	**73,832**	102
2033	755,124	25,340	43,101	1,886	5,954	**76,281**	106
2038	787,012	25,804	45,063	2,071	5,954	**78,892**	111
AAGR 2018-2038	**0.8%**	**0.3%**	**0.9%**	**1.9%**	**-1.8%**	**0.5%**	**0.9%**
Growth 2018-2038	**18.0%**	**7.1%**	**19.7%**	**45.6%**	**-30.5%**	**10.0%**	**19.7%**

7

DEMAND/CAPACITY SUMMARY

8

Demand/Capacity Summary

Airport Activity Forecast - Summary

Category	Activity	2017	Base	2023	2028	2033	2038
Commercial	Annual	21,467	24,082	24,480	24,899	25,340	25,804
GA	Annual	37,332	37,655	39,449	41,263	43,101	45,063
Military	Annual	8,567	8,567	5,954	5,954	5,954	5,954
Cargo	Annual	1,396	1,422	1,563	1,717	1,886	2,071
TOTAL Operations	Annual	68,762	71,727	71,446	73,832	76,281	78,892
	Peak Month	6,797	7,090	7,063	7,299	7,541	7,799
	Average Day	219	229	228	235	243	252
	Peak Hour	22	23	23	23	24	25

Demand/Capacity Summary

- **Hourly Capacity** – The maximum aircraft operations that can be accommodated in a one-hour period.
  - Visual Flight Rules (VFR)
  - Instrument Flight Rules (IFR)
- **Annual Service Volume (ASV)** – The maximum aircraft operations that can be accommodate in a one-year period, based on local activity .
- **Aircraft Delay** – The average number of minutes of aircraft delay and total hours of delay over a one-year period.

Demand/Capacity Summary

Factors that Affect Capacity

- Aircraft Fleet Mix Index
- Runway-Use Configuration
- Percentage of Aircraft Arrivals
- "Touch and Go" Factor
- Parallel & Exit Taxiways
- Meteorological Conditions (Percent VFR & IFR)

Factor	2017
Aircraft Fleet Mix Index	74.0
Runway-Use Configuration	Intersecting
Percentage of Aircraft Arrivals	50%
Touch and Go Factor (VFR / IFR)	1.0/1.0
Taxiway Exit Factor (VFR / IFR)	0.92 / 1.0
Meteorological Conditions (VFR / IFR)	72.3% / 27.6%

11

Demand/Capacity Summary

Airfield Hourly Capacity (Current Airfield Configuration)

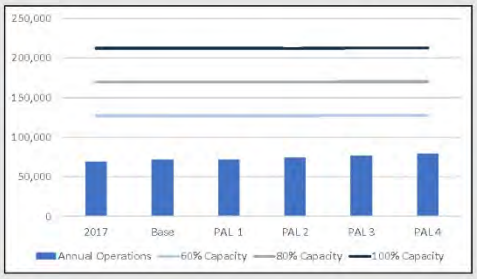
Factors	Base VFR / IFR	10 Years VFR / IFR	20 Years VFR / IFR
Hourly Capacity Base	80.0/56.5	79.5/57.0	79.5/57.5
Touch-and-Go Factor	1.0 / 1.0	1.0 / 1.0	1.0 / 1.0
Taxiway Exit Factor	0.92 / 1.00	0.92 / 1.00	0.92 / 1.00
Calculated Hourly Capacity	73.6/56.5	73.1/57.0	73.1/57.5
Peak Hour	23	23	25

12

Demand/Capacity Summary

Annual Service Volume (Current Airfield Configuration)

Factor	Base	10 Years	20 Years
Annual Operations	71,727	73,832	78,892
Annual Service Volume	212,345	212,073	212,691
Capacity Level	33.8%	34.8%	37.1%



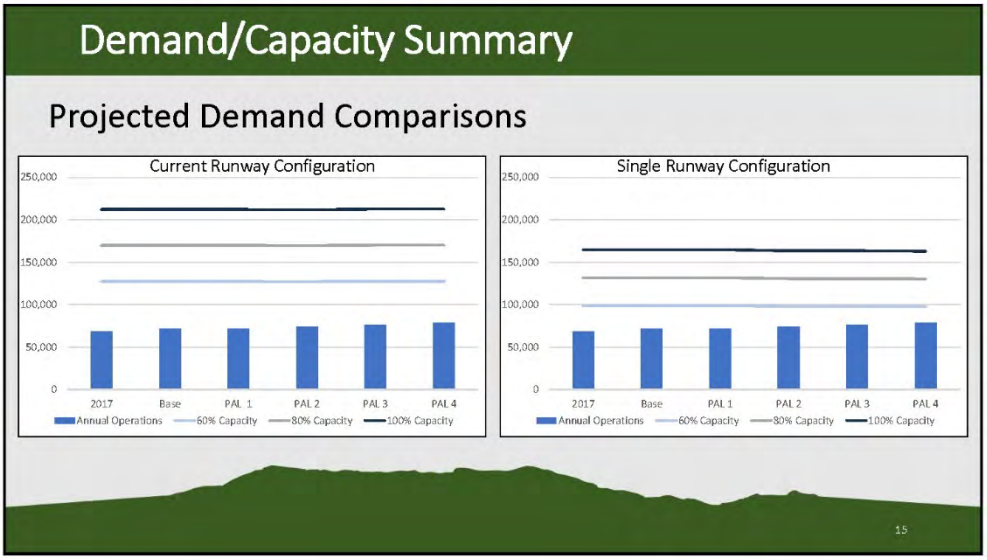
13

Demand/Capacity Summary

Annual Service Volume (Single Runway Configuration)

Factor	Base	10 Years	20 Years
Annual Operations	71,727	73,832	78,892
Annual Service Volume	164,943	163,499	162,937
Capacity Level	43.5%	45.2%	48.4%

14


Demand/Capacity Summary
Projected Demand Comparisons
Current Runway Configuration
Single Runway Configuration
250,000
200,000
150,000
100,000
50,000
0
2017
Base
PAL 1
PAL 2
PAL 3
PAL 4
Annual Operations
60% Capacity
80% Capacity
100% Capacity
15


AIRPORT FACILITY SUMMARY
16

Airport Facility Requirements

- Facility Requirements Elements:
  - Terminal, Airside, General Aviation/Support Facilities
- Derivative Forecast Scenario Considerations
  - Expanded Ultra-Low Cost Airline Service
  - New Low Cost Airline
  - Increased Canadian Demand
  - Loss of Low Cost Airline
  - Increased Upgauging (1:1)

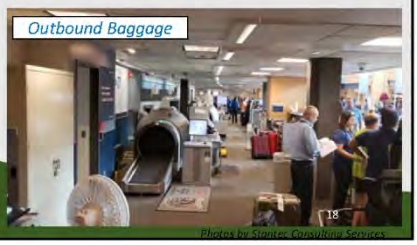
Future Facility Requirements Analysis
=
Existing Conditions + Forecast

17

Terminal – Ticketing & Baggage Screening

Functional Area	Existing	Baseline Forecast				Surplus (Deficit)
		Base Year	+5	+10	+20	
Check-in and Ticketing						
Check-In/Ticketing Areas	7,460	7,402/ 9,384*	7,450/ 9,445	7,348/ 9,317	7,527/ 9,544	(67)/(2,084)
Outbound Baggage Screening and Make-Up						
Baggage Screening	1,099	4,254	4,316	4,316	4,471	(3,372)
Make-up Area	5,412	4,140	4,140	4,140	4,140	1,272

*/Secondary number indicates added consideration for shared circulation among various uses (concessions, vertical circulation, arriving passengers, etc.)

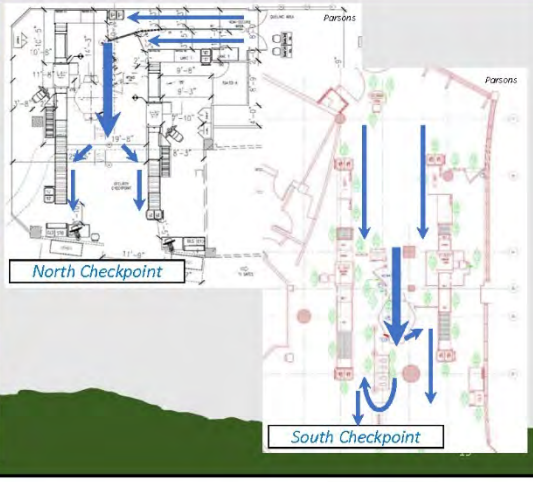


18

Photos by Stantec Consulting Services

Terminal - Security Checkpoint

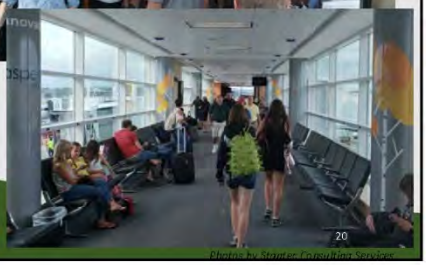
Functional Area	Existing	Baseline Forecast				Surplus (Deficit)
		Base Year	+5	+10	+20	
Passenger Screening Lanes (Including Precheck)						
North Checkpoint	2	5	5	5	5	(3)
South Checkpoint	2	3	3	3	3	(1)
Total (Existing Configuration)	4	8	8	8	8	(4)
Total Centralized Facilities	N/A	6	6	7	7	(3)
Checkpoint Area (SF)						
North Checkpoint	2,228	7,035	7,105	7,180	7,336	(5,108)
South Checkpoint	3,486	4,562	4,604	4,648	4,740	(1,254)
Total (Existing Configuration)	5,714	11,596	11,709	11,827	12,076	(6,362)
Total Centralized Configuration	N/A	9,810	9,923	10,041	10,289	(4,575)
TSA Support Space (SF)						
Total (Existing Configuration)	2,753	928	937	946	966	1,787
Total Centralized Configuration	N/A	785	794	803	823	1,930



Terminal – Gates & Holdrooms

Functional Area	Existing	Baseline Forecast				Surplus (Deficit)
		Base Year	+5	+10	+20	
Passenger Gates						
Equivalent Narrowbody Gates*	10	10	10	11	11	(1)
Holdroom Space**						
North Concourse	6,124	5,553	5,670	5,794	6,052	72
South Concourse	4,174	4,418	4,487	4,820	4,947	(773)
Total	10,298	9,972	10,158	10,614	10,999	(701)

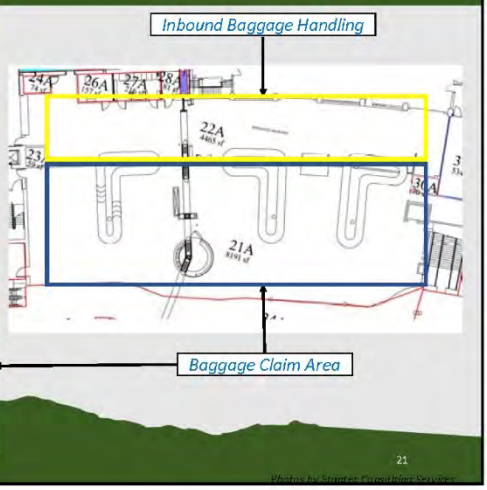
*Large Regional Position = 0.5 gate
Narrowbody Position = 1.0 gate
** Future demand based on optimal holdroom configuration



Photos by Stantec Consulting Services

Terminal - Baggage Claim

Functional Area	Existing	Baseline Forecast				Surplus (Deficit)
		Base Year	+5	+10	+20	
Baggage Claim						
Claim Linear Frontage (ft.)	249	272	284	295	321	(72)
Baggage Claim Hall Area	8,191	6,859	6,966	7,073	7,317	874
Inbound Baggage Handling Area	4,465	2,312	2,312	2,312	2,312	2,153
Total	12,656	9,171	9,278	9,385	9,629	3,027



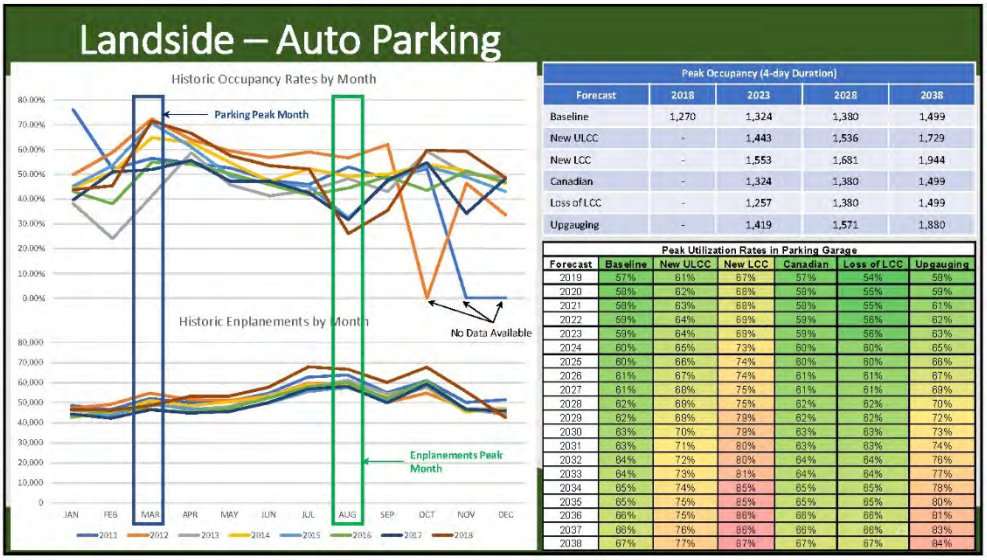
21

Photos by Stantec Consulting Services

Terminal Summary – Baseline Requirements

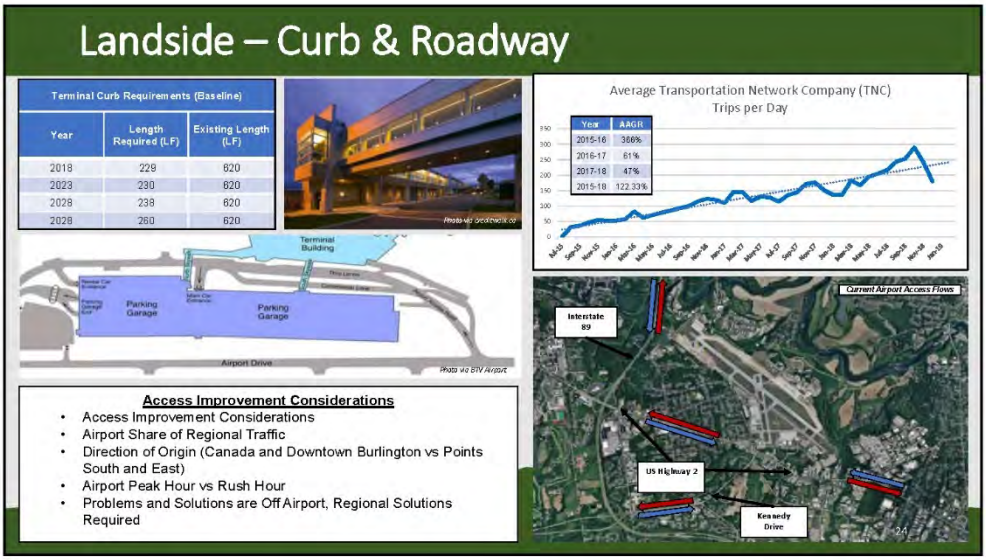
Terminal Functional Area	Existing Terminal Area	Ultimate Requirement	Surplus (Deficit)	%
Passenger Boarding Gates	10	11	(1)	-10.7%
Terminal Curb / Drop-Off/Pick-Up	620	260	360	58.1%
Check-In / Ticketing	7,460	7,527/ 9,544	(67)/(2,084)	-0.9%/-27.9%
Outbound Baggage Screening & Makeup	1,099	8,611	(7,512)	-683.5%
Passenger Security Screening Checkpoint				
North Checkpoint	2,228	7,923	(5,695)	-255.6%
South Checkpoint	3,486	5,119	(1,633)	-46.8%
Security Total	5,714	13,042	(7,328)	-128.2%
Passenger Lounges / Holdrooms				
North Holdrooms	6,124	6,052	72	1.2%
South Holdrooms	4,174	4,947	(773)	-18.5%
Holdroom Total	10,298	10,999	(701)	-6.8%
Baggage Claim and Inbound Baggage Handling	12,656	9,629	3,027	23.9%
Concessions	9,891	14,934	(5,043)	-51.0%
Core Terminal Areas Subtotal	**47,118**	**64,743**	**(17,625)**	**-37.4%**
Other Functions/Tenants	92,482	25,648	66,834	72.3%
Total Passenger Terminal Area	**139,600**	**90,391***	**49,209***	**35.3%***

22



Peak Occupancy (4-day Duration)				
Forecast	2018	2023	2028	2038
Baseline	1,270	1,324	1,380	1,499
New ULCC	-	1,443	1,536	1,729
New LCC	-	1,553	1,681	1,944
Canadian	-	1,324	1,380	1,499
Loss of LCC	-	1,257	1,380	1,499
Upgauging	-	1,419	1,571	1,880

Peak Utilization Rates in Parking Garage						
Forecast	Baseline	New ULCC	New LCC	Canadian	Loss of LCC	Upgauging
2019	57%	61%	67%	57%	54%	59%
2020	58%	62%	68%	58%	55%	59%
2021	58%	63%	68%	58%	55%	61%
2022	59%	64%	69%	59%	56%	62%
2023	59%	64%	69%	59%	56%	63%
2024	60%	65%	73%	60%	60%	65%
2025	60%	66%	74%	60%	60%	66%
2026	61%	67%	74%	61%	61%	67%
2027	61%	68%	75%	61%	61%	69%
2028	62%	69%	75%	62%	62%	70%
2029	62%	69%	78%	62%	62%	72%
2030	63%	70%	78%	63%	63%	73%
2031	63%	71%	80%	63%	63%	74%
2032	64%	72%	80%	64%	64%	76%
2033	64%	73%	81%	64%	64%	77%
2034	65%	74%	85%	65%	65%	78%
2035	65%	75%	85%	65%	65%	80%
2036	66%	75%	86%	66%	66%	81%
2037	66%	76%	86%	66%	66%	83%
2038	67%	77%	87%	67%	67%	84%



Airside Requirements - Runways

- Runway 15-33 – 8,319 x 150 (C/D IV)
  - Existing Length Scenario: FedEx Boeing 757 to Memphis
  - Future Length Scenario: Boeing 737/Airbus 320
    - Airbus 320 NEO 90% Range (Las Vegas/Denver): 6,500ft Hot Day, 7,475 Contaminated
  - Declared Distance Optimization
- Runway 1-19 – 4,112 x 75 (B-II)
  - Existing and Future: Embraer 110 Cargo Feeder

25

Airside Requirements - Taxiways

Name	Width	Use/Restrictions	Meets FAA Standards
Taxiway A	75'	Partial-length parallel taxiway for Runway 1-19	Yes
Taxiway B	Varies: 75' to 130'	Connector taxiway between Taxiway A, crossing Runway 1-19 to Runway 15-33	No: Taxiway B intersects Runway 1-19 at a non-standard 42 degree angle to provide a perpendicular angle to primary Runway 15-33.
Taxiway C	Varies: 93' to 117'	Crossover taxiway between the General Aviation (GA) parking apron and Runway 15-33, crossing Runway 1-19 and Taxiway K	Yes
Taxiway D	-	Closed to Civilian Operations	N/A
Taxiway E	-	Closed to Civilian Operations	N/A
Taxiway F	-	Closed to Civilian Operations	N/A
Taxiway G	75'	Partial-length parallel taxiway connecting Runway 15 threshold to Runway 1-19	Yes
Taxiway H	83'	Entrance/exit taxiway to Runway 15-33	Yes
Taxiway J	116'	Entrance/exit taxiway to Runway 33	Yes
Taxiway K	Varies: 75' to 80'	Partial-length parallel taxiway to Runway 15-33 between Taxiway B and past Taxiway J to the southern-most GA parking apron	Yes
Taxiway L	75'	Entrance/exit taxiway located at Runway 1 threshold (Closed to aircraft over 60,000 pounds)	Yes
Taxiway M	89'	Seasonal entrance/exit taxiway near Runway 15 threshold	Yes
Taxiway N	-	Closed to Civilian Operations	N/A

Note: FAA Approved Modification of Standards regarding non-movement area boundary line for Taxiways A and G near the air carrier ramp.

26

Airside Requirements - Geometry

Geometry Requirement	Taxiway/Taxiway Int.	Runway/Taxiway Int.
Three node concept	None	Hot Spot 1
Taxiway intersection angle	None	N/A
Wide expanse of pavement	Taxiway A and G Taxiways C and K	Hot Spot 1
Runway crossings	N/A	Runway 15-33: 3 Runway 1-19: 3
High energy intersection	N/A	Runway 15-33 and Taxiway A Runway 1-19 and Taxiway B
Increase visibility	N/A	Runway 15-33 and Taxiway A Runway 1-19 and Taxiway B -42"
Dual purpose pavement	N/A	None
Direct access	N/A	Runway 33 and Taxiway J Runway 1-19 and Taxiway G Runway 15-33 and Taxiway A Runway 1-19 and Taxiway C Runway 1 and Taxiway L
Multiple taxiway crossings	Taxiways A and E	N/A
Taxiway intersecting multiple runways	N/A	Taxiway A –Hot Spot 1 Taxiway E –Hot Spot 2
Aligned taxiway	N/A	None
Y-Shaped Runway Crossing	N/A	Taxiway E –Hot Spot 1
Multiple runway thresholds in close proximity	N/A	None
Short Taxi Distance	N/A	None
Taxiway Stubs	Taxiway A	None
Unexpected Holdline	None	None
Intersection Departure	N/A	Unknown

27

General Aviation Requirements

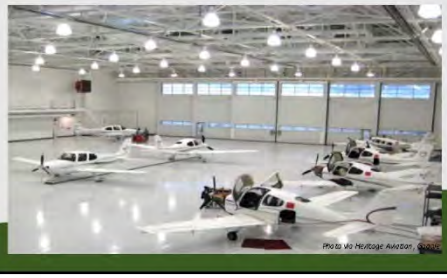
GA Aircraft Storage Additional Demand Over Existing*

Year	Conventional Hangar Space (SF)	T-Hangars/Box Units
2018	3,200	0
2023	6,400	1
2028	15,240	1
2038	25,760 (4-5 Conventional Hangars)	2

*Not including Military demand or facilities or aircraft on wait lists

GA Aircraft Apron Requirements*

Year	Itinerant Apron Demand (SY)	Existing FBO Ramp Space (SY)	Surplus (Deficit)
2018	11,484	5,333	(6,151)
2023	11,880	5,333	(6,547)
2028	11,880	5,333	(6,547)
2038	12,672	5,333	(7,339)



28

Support Facility Requirements

- Fuel Storage
  - Existing: 4-25,000 gallon Jet-A tanks and 1-12,000 gallon 100LL tank
  - Jet-A Fuel Usage (5-Year Average)
    - Average Month/Average Day: 21,518 gallons
    - Peak Month/Average Day: 26,310 gallons
    - Planning Recommends Maintaining 3-Day Supply
    - Consider Inverse Relationship Between Growth & Increased Fuel Efficiency
  - **Recommendation: Consider adding an additional Jet-A fuel tank**
- ARFF
  - Vermont Air National Guard (VTANG) provides ARFF – Index B
  - **Recommendation: None**
- SRE/Airfield Maintenance
  - Equipment stored in 3 locations totaling 46,505 SF
  - **Recommendation: Consolidate Facilities Away from GA/Cargo Areas – Full Consolidated Facility?**

29

SUSTAINABILITY SUMMARY

30

Sustainability Focus Areas

Five Sustainability Categories:

- Energy & Greenhouse Gas Emissions
- Waste Management
- Ground Transportation
- Water Resources
- Passenger Experience

Guided by the City of Burlington's 2030 vision, as laid out in its *Legacy Action Plan*, BTV strives to make a positive contribution in shaping the region's economic, environmental, and social vitality.

31

Energy & Greenhouse Gas Emissions

12.4%

Reduction in utility-sourced electricity consumption between 2013 and 2017

1,183,000 kWh per year

Avoided annual electricity use as a result of recent energy-efficiency upgrades at BTV

$147,750 in annual savings

Cost savings from the approximately 1.2 million kWh saved per year

BTV actively seeks to reduce its energy consumption, even as operations at the Airport expand, and it continues to demonstrate leadership in sustainable energy performance.

Pedestrian Bridge from the Parking Garage at BTV

32

Energy & Greenhouse Gas Emissions

Renewable energy systems at BTV:

- 500-kW roof-mounted PV (BTV Parking Garage)
- 100-kW small wind turbine (Heritage Aviation)
- 24-kW roof-mounted PV (Heritage Aviation)
- 1.5-MW ground-mounted and roof-mounted PV (Vermont ANG)

Utility-scale solar array on the BTV parking garage

Wind turbine at Heritage Aviation

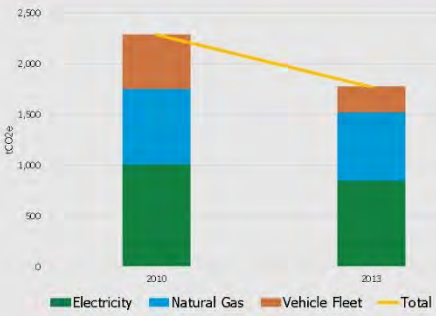
33

Energy & Greenhouse Gas Emissions

↓ 23%

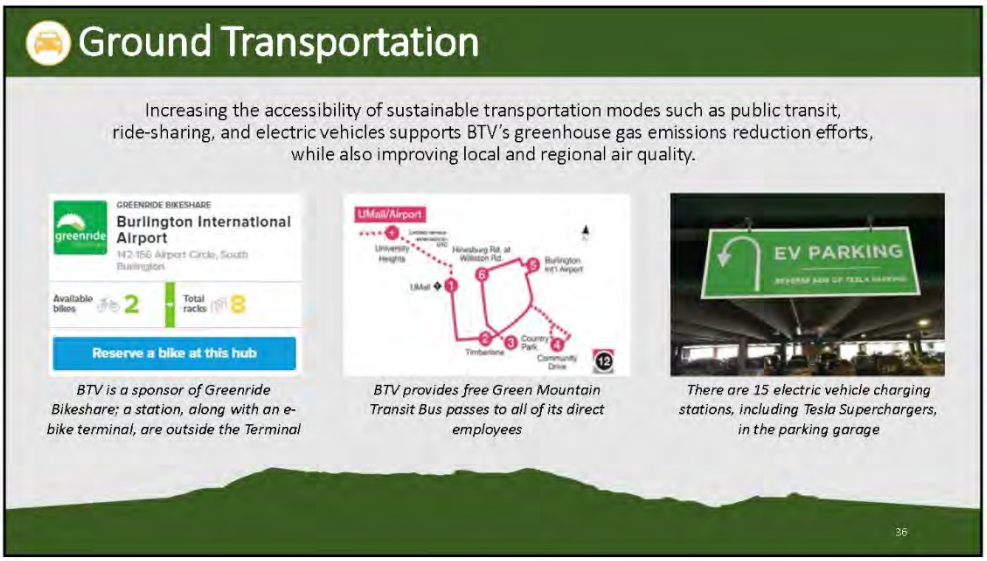
Reduction in GHG emissions between 2010 and 2013

Greenhouse gas emissions derive from electricity consumption, natural gas consumption, and vehicle fleet fuel consumption.



34


Waste Management
22%
The Airport's diversion rate in 2017
9%
13%
78%
MSW
Recycling
Composting
Highlights of Waste Management Practices:
• Instituted an office paper recycling program
• Co-located trash and recycling bins, with pictured-based signage, to encourage passengers to sort their waste properly
• Installed water bottle filling stations
• The Airport's waste contractor regularly works with the Airport and its tenants to reduce waste and increase the use of products that can be recycled, as well as provides training
35


Ground Transportation
Increasing the accessibility of sustainable transportation modes such as public transit, ride-sharing, and electric vehicles supports BTV's greenhouse gas emissions reduction efforts, while also improving local and regional air quality.
GREENRIDE BIKESHARE
Burlington International Airport
Available bikes 2
Total racks 8
Reserve a bike at this hub
BTV is a sponsor of Greenride Bikeshare; a station, along with an e-bike terminal, are outside the Terminal
UMall/Airport
BTV provides free Green Mountain Transit Bus passes to all of its direct employees
EV PARKING
There are 15 electric vehicle charging stations, including Tesla Superchargers, in the parking garage
36

Water Resources

22 Million gallons

Estimated amount of stormwater treated annually, through a new underground treatment system, to prevent contaminants from discharging into the Winooski River.

8,000 square feet

Size of the rooftop garden installed on top of the Airport's parking garage in 2011. In addition to providing a place for visitors to relax, this design feature also helps reduce and filter stormwater runoff.

In 2010, BTV won an Engineering Excellence Award from the American Council of Engineering Companies/Vermont Section for its runoff treatment system.

37

Passenger Experience

674,944 passengers

Number of passengers that departed from BTV in calendar year 2018

BTV's Wellness Committee supports a healthier Airport visit with walking trails inside and outside the terminal. This Committee is always looking for ideas on how to make traveling with BTV less stressful.

Educational exhibits and art installations by local artists can be found throughout the Airport.

BTV has a yoga studio as part of its passenger amenities

Visitors can take in the views from the Airport's Observation Tower

38

Regional Coordination

BTV has demonstrated a commitment to working with local and regional entities to advance common sustainability goals and initiatives, and as a large facility, has leverage to demonstrate leadership.

Local and Regional Sustainability Goals:

- Deriving 90 percent of the state's energy needs from renewable energy sources by 2050 (*Vermont Comprehensive Energy Plan)*
- Reducing greenhouse gas emissions in the state by 50 percent by 2028 and 75 percent by 2050 (10. V.S.A. §578)
- Reducing solid waste sent to landfills (Burlington's *Climate Action Plan*) and achieving a zero waste future (*Vermont Materials Management Plan*)
- Improving multi-modal transportation to/from and around the Airport (*ECOS Plan*)
- Educating residents of Chittenden County on ways to reduce stormwater pollution (Regional Stormwater Education Program)

ecos
A SUSTAINABLE FUTURE FOR CHITTENDEN COUNTY

39

Regional Value Assessment

$1.04 Billion
Overall value of the Airport to the region

BTV's economic impact includes the asset value of the airport and the economic impact that extends beyond the boundary of the airport.

4,935
Total jobs generated from the Airport

$170,427,100
Total payroll generated from the Airport

$ 34,527,500
Total State & Local Taxes

$562,000,000
Current asset value of the Airport

$481,464,900
Total economic output

Full regional value assessment to be available soon.

40

NEXT STEPS

- Working Paper – Inventory through Facilities
- Public Informational Workshop #1
- Prepare Development Concepts
- Prepare Environmental Overview

41

QUESTIONS/COMMENTS

Any questions or comments regarding the Airport Master Plan or any of the information discussed today?

Available for contact anytime:

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Senior Airport Planner, Passero Associates

lcheung@passero.com

42


Burlington International Airport
Airport Master Plan Update
Regional Advisory Committee Meeting # 4
February 12, 2020
BTV
BURLINGTON
INTERNATIONAL AIRPORT
PA
PASSERO ASSOCIATES
engineering architecture
WOOLPERT
Stantec
McFarland Johnson
vhb
CHA
hmmh
Leibowitz&Horton
1

AGENDA

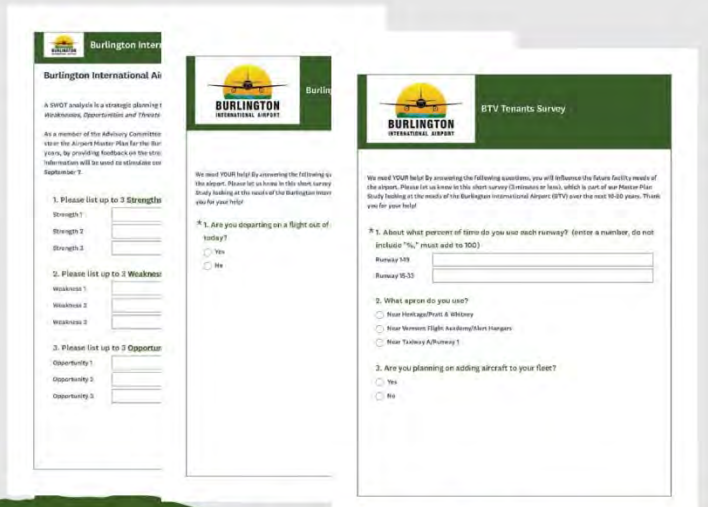
- Introductions
- Status of the Master Plan Update
- Passenger & Tenant Survey
- Forecast & Facility Requirement Summary
- Development Concepts
  - Access Roads
  - Passenger Terminal Building Concept
  - Airport Maintenance Building Relocation
  - GA and Air Cargo Improvements
  - Airfield Safety Improvements
- Next Steps

2


STATUS OF AIRPORT MASTER PLAN
We're About Here:
Aerial Survey & Mapping
Study Design
Inventory
Forecasts
Demand Capacity
Environmental Overview
Facility Requirements
Development Concepts
Financial Plan
ALP Set
Final Documents & Plan Adoption
Community and Stakeholder Engagement
Approximate 18-24 month process
3

Passenger/Tenant Experience

- TAC/RAC Input
- Passenger Experience
- Tenant Experience



4

Passenger & Tenant Survey Results

1,200 passengers responded to the survey. **Key findings:**

- Why did you choose BTV – "location"
- 97% passengers indicated that traffic was not an issue getting to the airport
- 40% passengers indicated TSA took longer than expected
- 55% indicated here is insufficient food vendors
- 52% indicated there were no delays exiting the airport

5

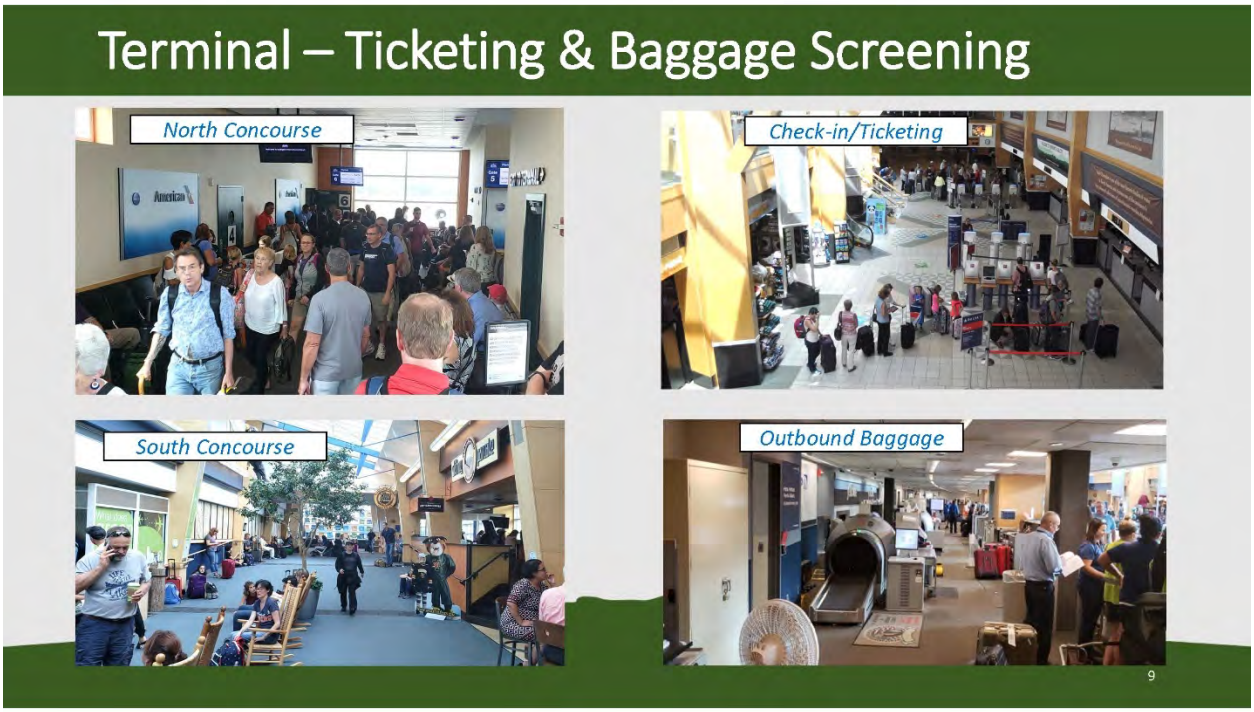

FORECAST SUMMARY
6

RECOMMENDED FORECAST

Year	Enplanements	Total Operations					Based Aircraft
		Air Carrier	GA	Cargo	Military	Total	
2017	591,558	21,467	37,332	1,396	8,567	**68,762**	92
2018	667,004	24,082	37,655	1,422	8,567	**71,727**	93
2023	695,171	24,480	39,449	1,563	5,954	**71,446**	97
2028	724,528	24,899	41,263	1,717	5,954	**73,832**	102
2033	755,124	25,340	43,101	1,886	5,954	**76,281**	106
2038	787,012	25,804	45,063	2,071	5,954	**78,892**	111
AAGR 2018-2038	**0.8%**	**0.3%**	**0.9%**	**1.9%**	**-1.8%**	**0.5%**	**0.9%**
Growth 2018-2038	**18.0%**	**7.1%**	**19.7%**	**45.6%**	**-30.5%**	**10.0%**	**19.7%**

7

AIRPORT FACILITY SUMMARY


Terminal – Ticketing & Baggage Screening
North Concourse
Check-in/Ticketing
South Concourse
Outbound Baggage
9

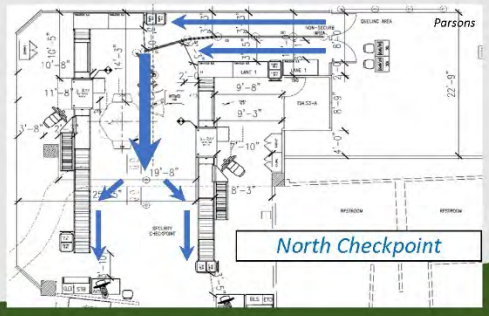
Terminal Summary – Baseline Requirements

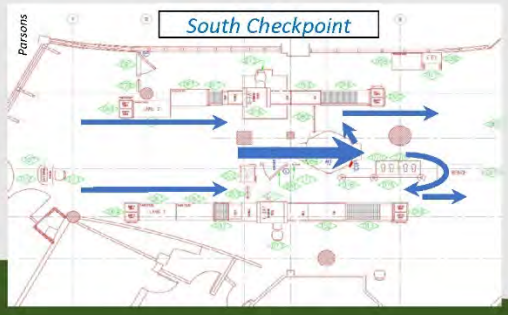
Terminal Functional Area	Existing Terminal Area	Ultimate Requirement	Surplus (Deficit)	%
Passenger Boarding Gates	10	11	(1)	-11%
Check-In / Ticketing	7,460	9,544	(2,084)	-28%
Outbound Baggage Screening & Makeup	1,099	8,611	(7,512)	-684%
Passenger Screening Checkpoint	5,714	10,289	(4,575)	-56%
Passenger Lounges / Holdrooms				
Hold Rooms	10,298	10,999	(701)	-7%
Concessions	9,891	14,934	(5,043)	-51%
Core Terminal Areas Subtotal	**47,118**	**64,743**	**(17,625)**	**-37%**
Other Functions/Tenants	92,482	25,648	66,834	72%
Total Passenger Terminal Area	**139,600**	**90,391**	**49,209**	**35.3%**

10

Terminal - Security Checkpoint

Passenger Screening Area	Existing Terminal Area	Ultimate Requirement	Surplus (Deficit)	%
Existing Screening Lanes (both checkpoints)	4 Lanes	6 Lanes (with consolidation)	(2)	-50%
Checkpoint Area (SF) - Combined	5,714 SF	10,289 SF	(4,575) SF	-56%





11

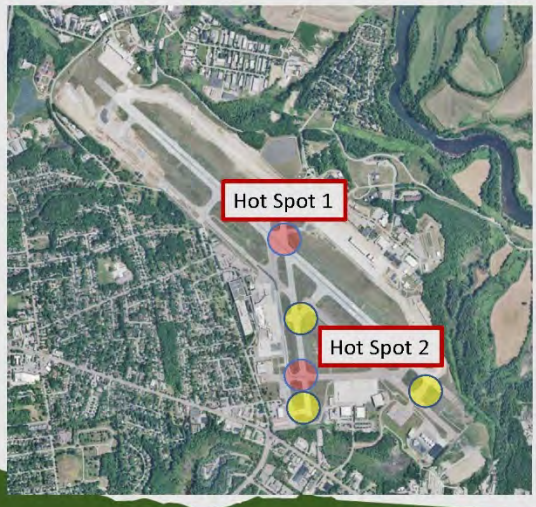
Airside Requirements - Runways

- Runway 15-33 – 8,319 x 150 (C/D IV) – Satisfies Requirements
  - Existing Length Scenario: FedEx Boeing 757 to Memphis
  - Future Length Scenario: Boeing 737/Airbus 320
- Runway 1-19 – 4,112 x 75 (B-I) – Satisfies Requirements
  - Existing and Future: Cessna 172

12

Taxiway Requirements / Geometry

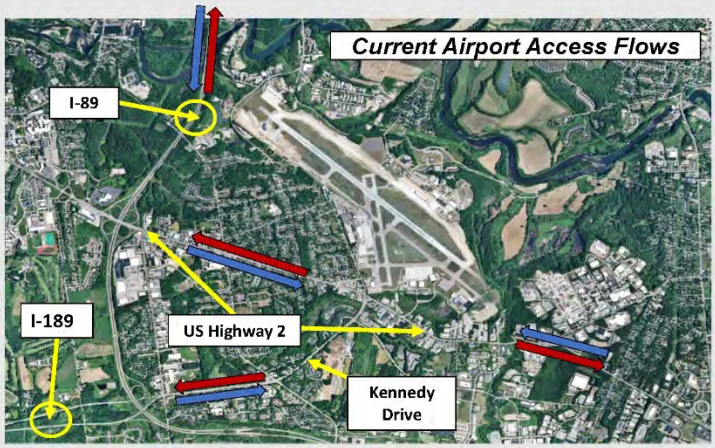
- Hot Spot 1: Wrong Runway Departure
  - Wide Expanse of Pavement
  - 3 Node Concept
- Hot Spot 2: Taxiway C Crossing Runway 1-19
- Direct Apron to Runway connections
  - Taxiway B, J, L



13


GROUND ACCESS IMPROVEMENTS CONCEPTS
14

GROUND ACCESS IMPROVEMENT CONCEPTS



- Airport Share of Regional Traffic is low
- Traffic problems & solutions are regional
- FAA and Airport funding can not be used for Off Airport Projects

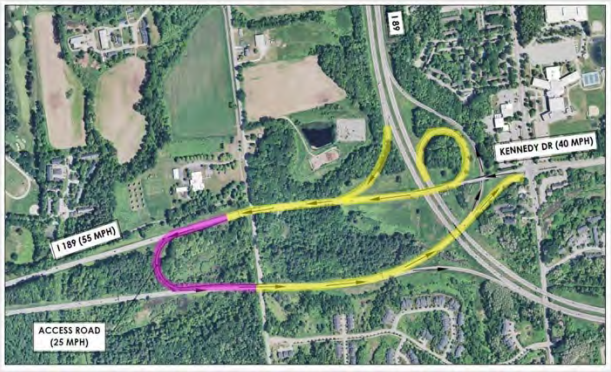
15

I-89 NEW INTERCHANGE 14B CONCEPT

- Construct new I-89 Interchange
- Provides new east/west access to airport
- Connects into Airport Parkway, to Terminal Building
- Avoids Route 2 and Kennedy Drive

16

I-189 TURNAROUND CONCEPT



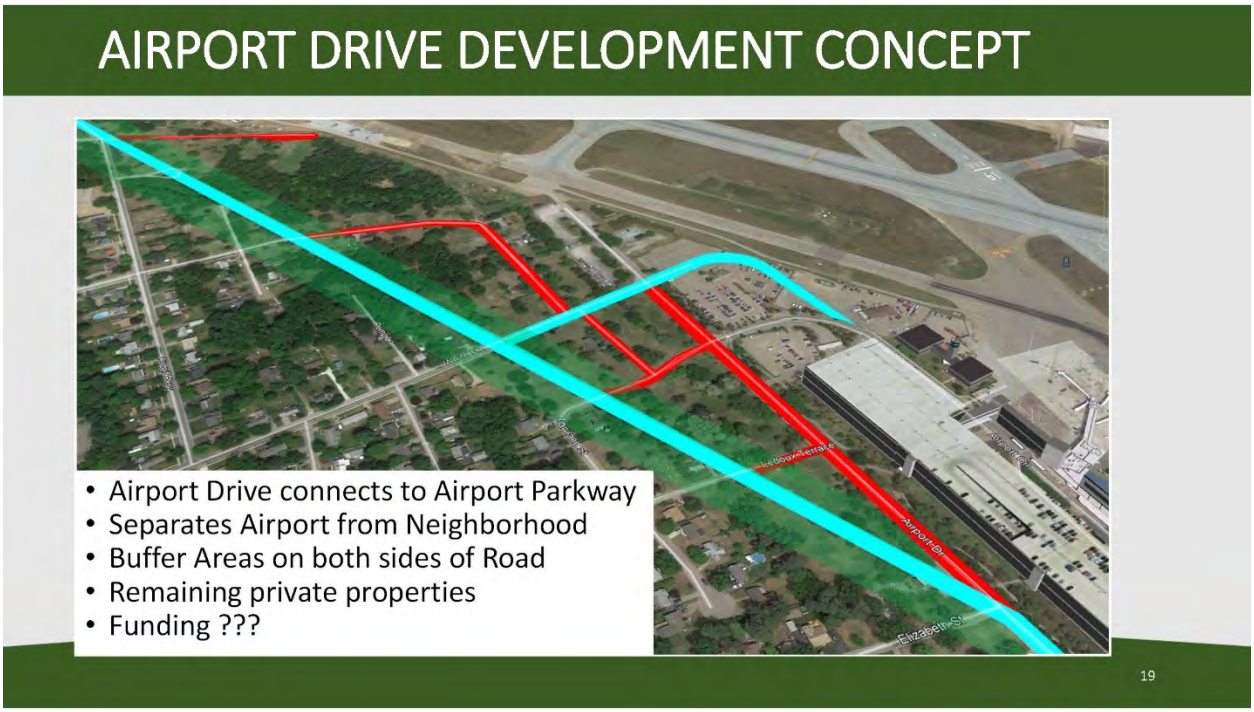
- Construct new I-189 U-turn ramp
- Provides east/west connection to I-89 N/S
- Tie into Kennedy Drive for direct access to Airport

17

AIRPORT DRIVE DEVELOPMENT CONCEPT

- Improve & Relocate Airport Drive
- Create a "Boulevard Type" Roadway with Landscaping
- Uses property acquired through airport noise program
- Retain a buffer area between Chamberlin Neighborhood

18

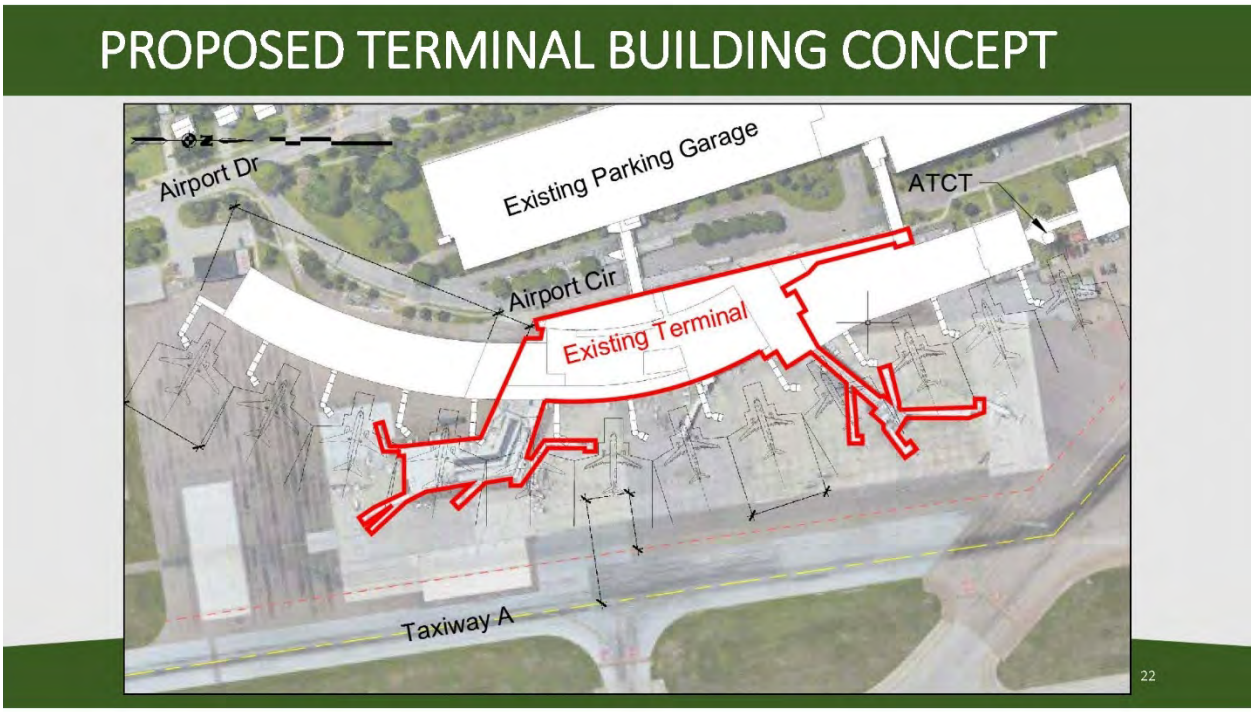

AIRPORT DRIVE DEVELOPMENT CONCEPT
• Airport Drive connects to Airport Parkway
• Separates Airport from Neighborhood
• Buffer Areas on both sides of Road
• Remaining private properties
• Funding ???
Airport Dr
Elizabeth St
19


PASSENGER TERMINAL BUILDING CONCEPT
20

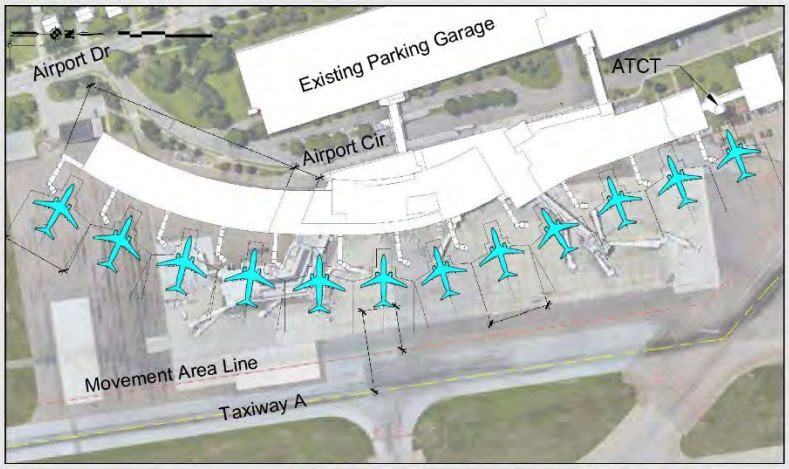
Existing Terminal Building

- Site restricted by
  - Taxiway A and Runway 1-19
  - Surrounding Roads
- Gate layout designed for Turboprops & Regional Jets
- Aircraft pushback enters Movement Area
- Internal Building Constraints
  - Split Passenger Screening Areas
  - Congestion in Holdrooms
  - Limited Concessions
- Inadequate holdroom size

21

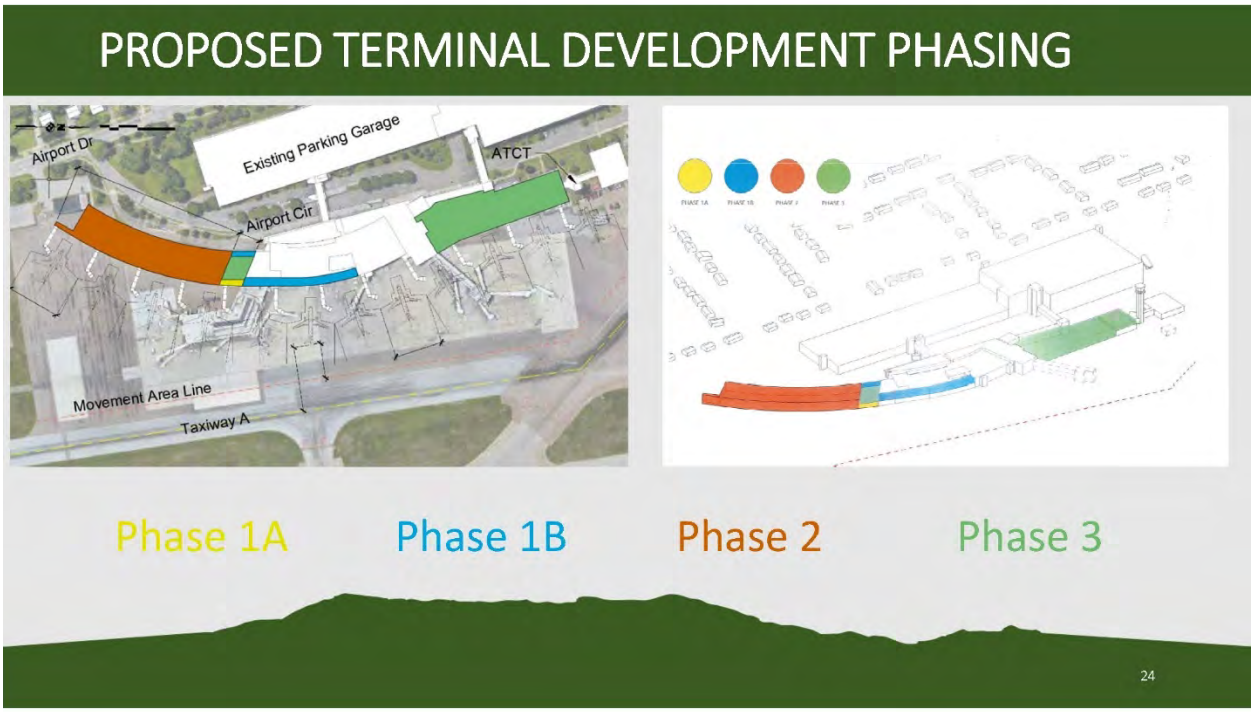

PROPOSED TERMINAL BUILDING CONCEPT
Airport Dr
Existing Parking Garage
ATCT
Airport Cir
Existing Terminal
Taxiway A
22

PROPOSED AIRCRAFT PARKING LAYOUT



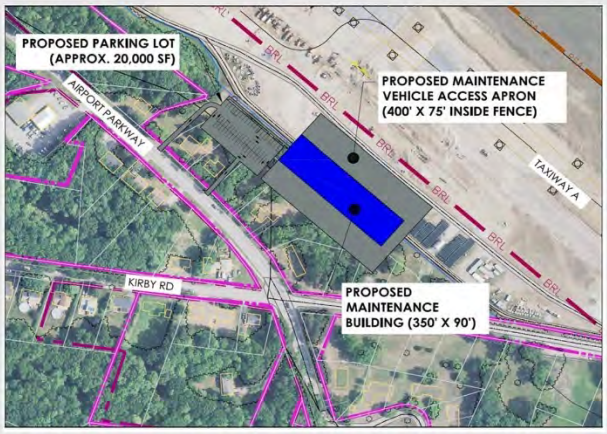
- Efficient Use of Apron Space with 12 Contact Gate Positions
- Additional Area Between Gates and Taxiway A
- Pushbacks Can Avoid Entering Movement Area

23


PROPOSED TERMINAL DEVELOPMENT PHASING
Airport Dr
Existing Parking Garage
ATCT
Airport Cir
Movement Area Line
Taxiway A
Phase 1A
Phase 1B
Phase 2
Phase 3
24


AIRPORT MAINTENANCE, GA, AND AIR CARGO CEONCEPTS
25

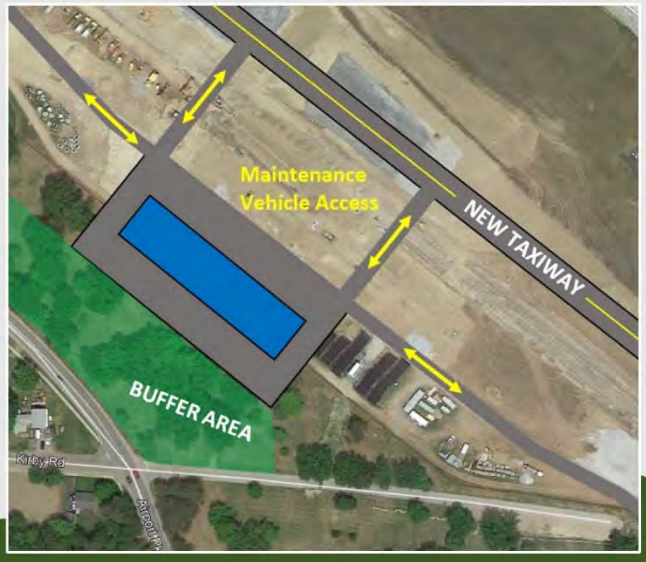
AIRPORT MAINTENANCE FACILITY RELOCATION



- Existing Facility is Undersized (some equipment stored outside)
- Existing location is constrained & distant from main runway

26

AIRPORT MAINTENANCE FACILITY RELOCATION



- Proposed Facility with direct access to new Taxiway G
- Unconstrained Site for All Maintenance Equipment
- **Buffer Area** Retained between Airport Parkway & Chamberlin Neighborhood
- Note: Airport vehicles Do **Not** Use public roads

27

GA AND AIR CARGO IMPROVEMENTS

- General Aviation Hangar Development
- General Aviation Apron Expansion
- Air Cargo Expansion
- Provide Buffer Along Airport Dr

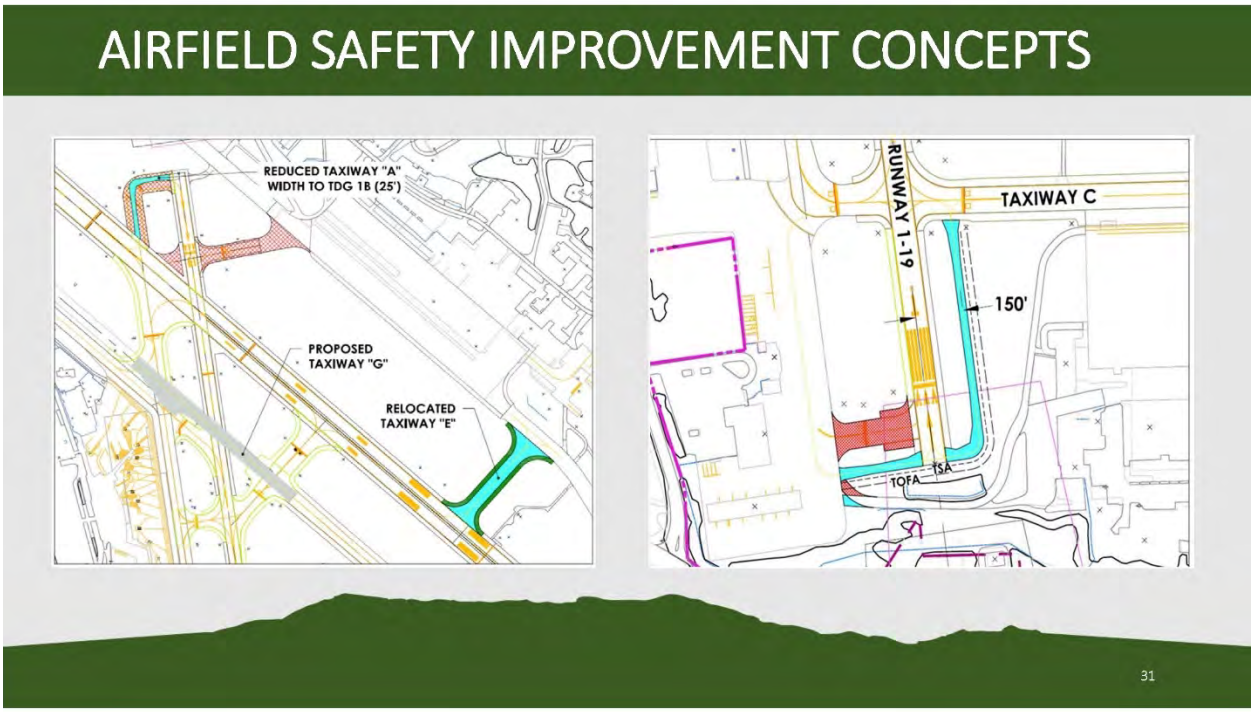
28


AIRFIELD DEVELOPMENT CONCEPTS
29

HOTSPOT MITIGATION

- Relocation of Taxiway E
- New GA Parallel Taxiway (West of Runway 1-19)
- Relocate Taxiway B
- New Parallel Taxiway (East of Runway 1-19)
- Shorten Runway 1-19
- Add Guard Lights on Taxiway C
- Add GA Taxiway to Runway 1
- Relocate Taxiway L
- Relocate Taxiway M

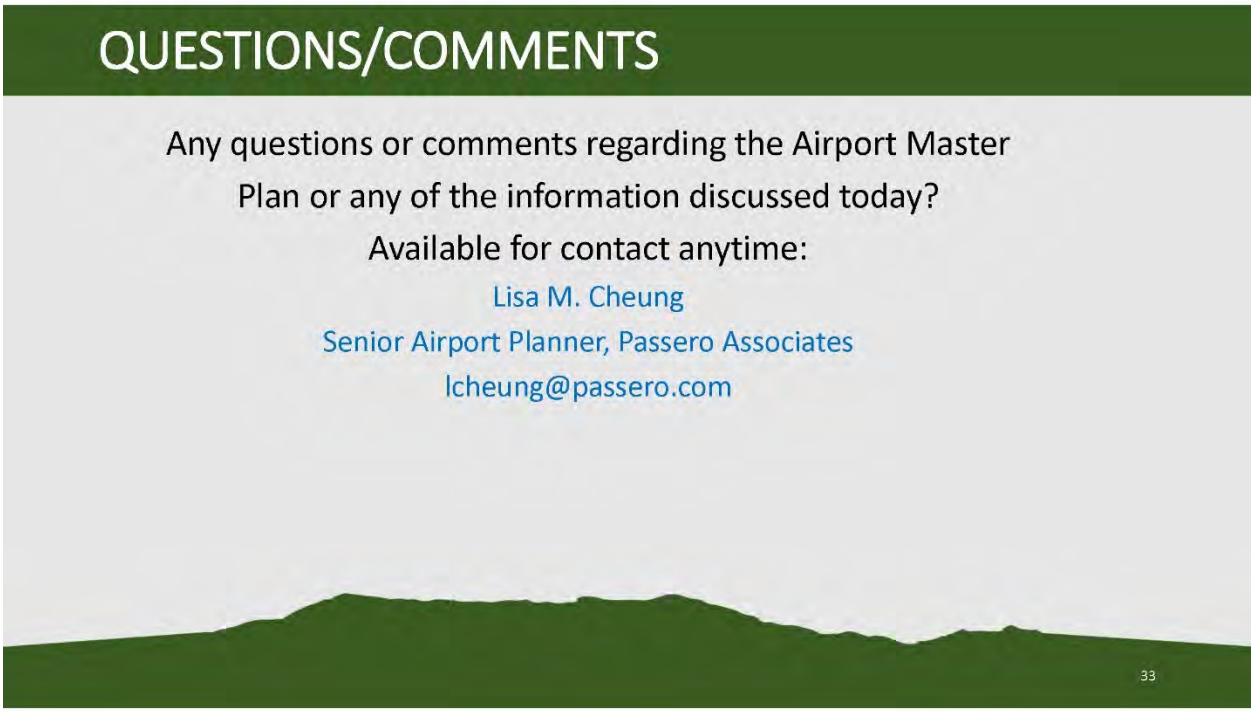
30


AIRFIELD SAFETY IMPROVEMENT CONCEPTS
REDUCED TAXIWAY "A" WIDTH TO TDG 1B (25')
PROPOSED TAXIWAY "G"
RELOCATED TAXIWAY "E"
RUNWAY 1-19
TAXIWAY C
150'
TOFA
TSA
31

NEXT STEPS

- Prepare Environmental Overview
- Prepare Development Concepts
- ALP Preparation

32


QUESTIONS/COMMENTS
Any questions or comments regarding the Airport Master Plan or any of the information discussed today?
Available for contact anytime:
Lisa M. Cheung
Senior Airport Planner, Passero Associates
lcheung@passero.com
33

Appendix F.3
Public Meetings Documentation

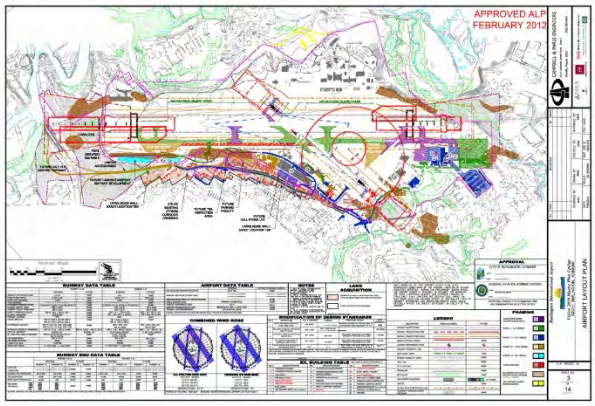
BURLINGTON INTERNATIONAL AIRPORT

The Master Plan

Burlington International Airport Master Plan

What is a Master Plan?

- Technical document from an airport management and operation perspective to guide future growth and development at the airport
- Provide framework needed to guide future airport development that will cost-effectively satisfy aviation demand, while considering potential environmental and socioeconomic impacts



Why do a Master Plan?

- To have a strategy for completing short-, medium-, and long-term development goals
- To include all stakeholders, including airport users and the public
- To prepare the airport for the future

BURLINGTON INTERNATIONAL AIRPORT

Existing Airline Service Diversity: The Airport currently serves four airlines, including American, Delta, JetBlue, and United. Frontier started operating in February 2019 bringing the total number of airlines to five and total number of nonstop destinations to 12.

SWOT Analysis

Burlington International Airport Master Plan

INPUT ON

Strengths	Weaknesses
Opportunities	Threats

SWOT Analysis Results

Strengths	Weaknesses
• Partnership with VTANG • Existing Airline Service Diversity • Airport Convenience	• Ground Access • Tenant Location vs. Taxiway Configuration • Terminal Congestion • Separate TSA Areas • Insufficient Passenger Amenities
Opportunities	**Threats**
• Community Relations and Communication • Separate Cargo Operations Area • Governance	• Terminal Space/Congestion • Rehabilitation of Runway 15-33 • Anything that threatens VTANG Presence

BURLINGTON INTERNATIONAL AIRPORT

Inventory

Burlington International Airport Master Plan

Largest Airport in Vermont
Two Runways
Runway 15-33: 8,319' x 150' – for Commercial/Cargo/VTANG operations
Runway 1-19: 4,112' x 75' – for General Aviation Operations
Serves 600,000+ Passengers
Diverse User Base
Commercial
Cargo
General Aviation
Vermont Air National Guard (VTANG) Partnership Saves Region Approximately $5 Million per year
Terminal Building
Two Concourses
Two TSA Checkpoints
5 Airlines
Parking Garage

Demand/ Capacity

Burlington International Airport Master Plan

Recommended Forecast Summary

Year	Enplanements	Total Operations					Based Aircraft
		Air Carrier	GA	Cargo	Military	Total	
2017	591,558	21,467	37,332	1,396	8,567	**68,762**	92
2018	674,944	24,082	37,655	1,422	8,567	**71,727**	93
2023	695,171	24,480	39,449	1,563	5,954	**71,446**	97
2028	724,528	24,899	41,263	1,717	5,954	**73,832**	102
2033	755,124	25,340	43,101	1,886	5,954	**76,281**	106
2038	787,012	25,804	45,063	2,071	5,954	**78,892**	111
AAGR 2018-2038	**0.8%**	**0.3%**	**0.9%**	**1.9%**	**-1.8%**	**0.5%**	**0.9%**
Growth 2018-2038	**18.0%**	**7.1%**	**19.7%**	**45.6%**	**-30.5%**	**10.0%**	**19.7%**

Demand/ Capacity

Burlington International Airport Master Plan

Airfield Hourly Capacity (Current Airfield Configuration)

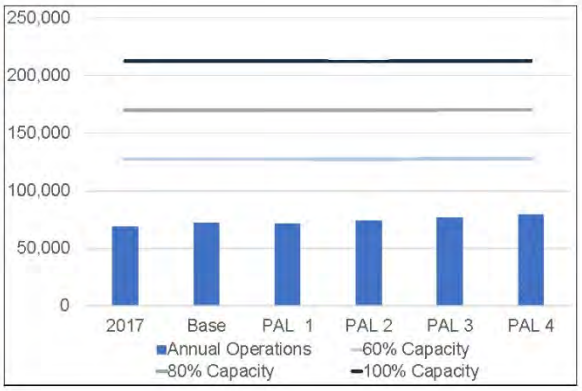
Factors	Base VFR / IFR	10 Years VFR / IFR	20 Years VFR / IFR
Hourly Capacity Base	80.0/56.5	79.5/57.0	79.5/57.5
Touch-and-Go Factor	1.0 / 1.0	1.0 / 1.0	1.0 / 1.0
Taxiway Exit Factor	0.92 / 1.00	0.92 / 1.00	0.92 / 1.00
Calculated Hourly Capacity	73.6/56.5	73.1/57.0	73.1/57.5
Peak Hour	23	23	25

Demand/ Capacity

Burlington International Airport Master Plan

Recommended Forecast Summary

Factor	Base	10 Years	20 Years
Annual Operations	71,727	73,832	78,892
Annual Service Volume	212,345	212,073	212,691
Capacity Level	33.8%	34.8%	37.1%



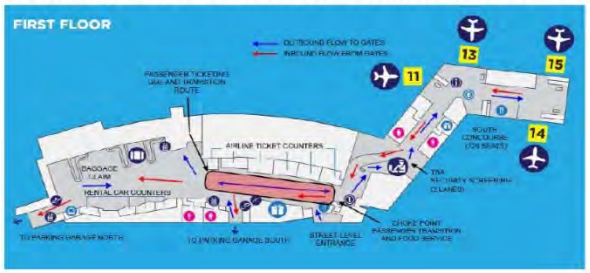
BURLINGTON INTERNATIONAL AIRPORT

Terminal Facility Requirements Overview

Burlington International Airport Master Plan

Terminal Functional Area	Existing Terminal Area	Ultimate Requirement	Surplus (Deficit)	%
Passenger Boarding Gates	10	11	(1)	-10.7%
Terminal Curb / Drop-Off/Pick-Up	620	260	360	58.1%
Check-In / Ticketing	7,460	7,527/ 9,544	(67)/(2,084)	-0.9%/-27.9%
Outbound Baggage Screening & Makeup	1,099	8,611	(7,512)	-683.5%
Passenger Security Screening Checkpoint				
North Checkpoint	2,228	7,923	(5,695)	-255.6%
South Checkpoint	3,486	5,119	(1,633)	-46.8%
Security Total	5,714	13,042	(7,328)	-128.2%
Passenger Lounges / Holdrooms				
North Holdrooms	6,124	6,052	72	1.2%
South Holdrooms	4,174	4,947	(773)	-18.5%
Holdroom Total	10,298	10,999	(701)	-6.8%
Baggage Claim and Inbound Baggage Handling	12,656	9,629	3,027	23.9%
Concessions	9,891	14,934	(5,043)	-51.0%
Core Terminal Areas Subtotal	**47,118**	**64,743**	**(17,625)**	**-37.4%**
Other Functions/Tenants	92,482	25,648	66,834	72.3%
Total Passenger Terminal Area	**139,600**	**90,391***	**49,209***	**35.3%***

*This tabulation does not include several non-departmental areas essential to the functioning of a terminal structure including circulation (horizontal and vertical), other support areas, and wall thickness. The actual cumulative tally of these areas will vary depending on the final layout and design intent, but can be assumed to compromise 40% or more of the total terminal gross square footage.



Key Points

- Circulation areas within the ticketing lobby space is shared by multiple passenger categories (departing/check-in, arriving/outflow, concessions etc.), which constrains the check-in area.
- Co-located baggage screening further constrains check-in ticketing space.
- Separate TSA passenger screening checkpoints are expected to require more total space combined than centralized over time.
- Available holdroom space is not optimized for comfortable use.
- The existing footprint of the terminal is expected to accommodate the majority of future demand, but will likely need to be reconfigured to better optimize core terminal functional areas.

Photos by Stantec Consulting Services

BURLINGTON INTERNATIONAL AIRPORT

Terminal Facility Requirements
Core Functional Areas

Burlington International Airport Master Plan

Check-in and Outbound Baggage

Functional Area	Existing	Baseline Forecast				Surplus (Deficit)
		Base Year	+5	+10	+20	
Check-in and Ticketing						
Check-In/Ticketing Areas	7,460	7,402/ 9,384	7,450/ 9,445	7,348/ 9,317	7,527/ 9,544	(67)/(2,084)
Outbound Baggage Screening and Make-Up						
Baggage Screening	1,099	4,254	4,316	4,316	4,471	(3,372)
Make-up Area	5,412	4,140	4,140	4,140	4,140	1,272

/Secondary number indicates added consideration for shared circulation among various uses (concessions, vertical circulation, arriving passengers, etc.)

Passenger Screening

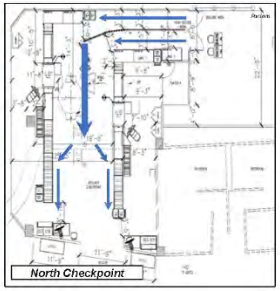
Functional Area	Existing	Baseline Forecast				Surplus (Deficit)
		Base Year	+5	+10	+20	
Passenger Screening Lanes (Including Precheck)						
North Checkpoint	2	5	5	5	5	(3)
South Checkpoint	2	3	3	3	3	(1)
Total (Existing Configuration)	4	8	8	8	8	(4)
Total Centralized Facilities	N/A	6	6	7	7	(3)
Checkpoint Area (SF)						
North Checkpoint	2,228	7,035	7,105	7,180	7,336	(5,108)
South Checkpoint	3,486	4,562	4,604	4,648	4,740	(1,254)
Total (Existing Configuration)	5,714	11,596	11,709	11,827	12,076	(6,362)
Total Centralized Configuration	N/A	9,810	9,923	10,041	10,289	(4,575)
TSA Support Space (SF)						
Total (Existing Configuration)	2,753	928	937	946	966	1,787
Total Centralized Configuration	N/A	785	794	803	823	1,930

Gates and Holdrooms

Functional Area	Existing	Baseline Forecast				Surplus (Deficit)
		Base Year	+5	+10	+20	
Passenger Gates						
Equivalent Narrowbody Gates*	10	10	10	11	11	(1)
Holdroom Space**						
North Concourse	6,124	5,553	5,670	5,794	6,052	72
South Concourse	4,174	4,418	4,487	4,820	4,947	(773)
Total	10,298	9,972	10,158	10,614	10,999	(701)

Baggage Claim and Handling

Functional Area	Existing	Baseline Forecast				Surplus (Deficit)
		Base Year	+5	+10	+20	
Baggage Claim						
Claim Linear Frontage (ft.)	249	272	284	295	321	(72)
Baggage Claim Hall Area	8,191	6,859	6,966	7,073	7,317	874
Inbound Baggage Handling Area	4,465	2,312	2,312	2,312	2,312	2,153
Total	12,656	9,171	9,278	9,385	9,629	3,027


North Checkpoint


South Checkpoint


Check-in/Ticketing


Outbound Baggage

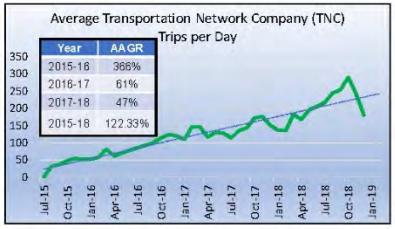

North Concourse

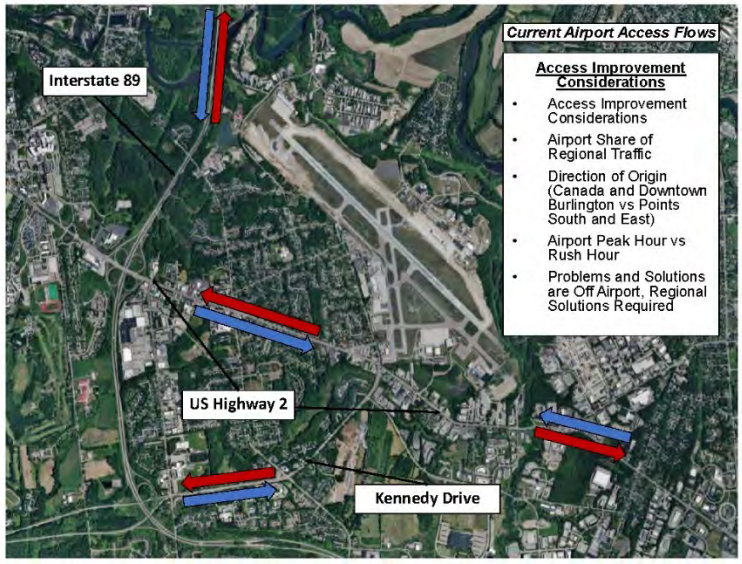

Baggage Claim

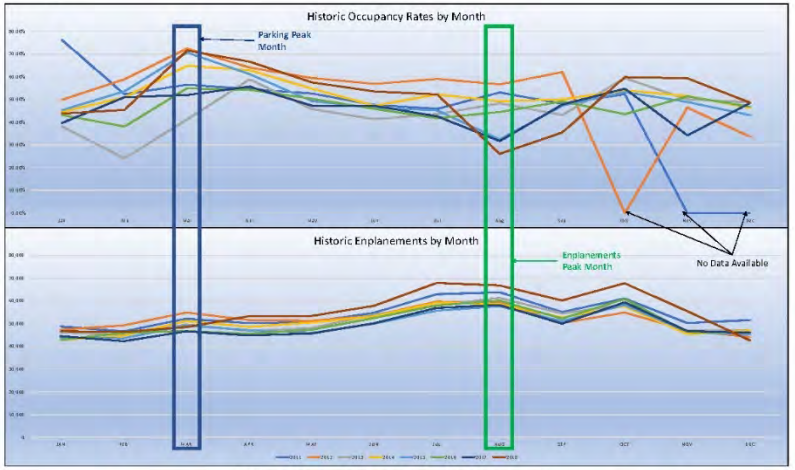
Landside Facility Requirements
Curb, Parking, and Access Roadways

Burlington International Airport Master Plan

Terminal Curb Requirements (Baseline)		
Year	Length Required (LF)	Existing Length (LF)
2018	229	620
2023	230	620
2028	238	620
2028	260	620







Estimated Future Utilization Rates in Parking Garage

Forecast	Baseline	New ULCC	New LCC	Canadian	Loss of LCC	Upgauging
2019	57%	61%	67%	57%	54%	58%
2020	58%	62%	68%	58%	55%	59%
2021	58%	63%	68%	58%	55%	61%
2022	59%	64%	69%	59%	56%	62%
2023	59%	64%	69%	59%	56%	63%
2024	60%	65%	73%	60%	60%	65%
2025	60%	66%	74%	60%	60%	66%
2026	61%	67%	74%	61%	61%	67%
2027	61%	68%	75%	61%	61%	69%
2028	62%	69%	75%	62%	62%	70%
2029	62%	69%	79%	62%	62%	72%
2030	63%	70%	79%	63%	63%	73%
2031	63%	71%	80%	63%	63%	74%
2032	64%	72%	80%	64%	64%	76%
2033	64%	73%	81%	64%	64%	77%
2034	65%	74%	85%	65%	65%	78%
2035	65%	75%	85%	65%	65%	80%
2036	66%	75%	86%	66%	66%	81%
2037	66%	76%	86%	66%	66%	83%
2038	67%	77%	87%	67%	67%	84%

BURLINGTON INTERNATIONAL AIRPORT

Airside Facilities

Burlington International Airport Master Plan

Runway Length

- **Runway 15-33:** 8,319' x 150' (C/D IV)
  - Existing Length Scenario: FedEx Boeing 757 to Memphis
  - Future Length Scenario: Airbus 320NEO
    - Airbus 320 NEO 90% Range (Las Vegas/Denver)" 6,500' Hot Day, 7,475' Contaminated
- **Runway 1-19:** 4,112' x 75' (B-II)
  - Existing and Future: Embraer 110 Cargo Feeder

Airfield Geometry

- **Hot Spot 1:** intersection of Runway 15-33 and 1-19 with Taxiways A and E.
  - Three node concept
  - Wide expanse of pavement
  - Taxiway intersecting multiple runways
- **Hot Spot 2:** intersection of Runway 1-19 and Taxiway C
  - Taxiway intersecting multiple runways
  - Y-shaped runway crossing
- **Other Non-Standard Geometry Issues:**
  - Runway crossings
  - High energy crossings
  - Increase visibility
  - Direct Access
  - Multiple taxiway crossings
  - Taxiway stubs

BURLINGTON INTERNATIONAL AIRPORT

General Aviation

Burlington International Airport Master Plan

GA Aircraft Storage Additional Demand Over Existing*		
Year	Conventional Hangar Space (SF)	T-Hangars/Box Units
2018	3,200	0
2023	6,400	1
2028	15,240	1
2038	25,760 (4-5 Conventional Hangars)	2

* Not including Military demand or facilities or aircraft on wait lists

GA Aircraft Apron Requirements*			
Year	Itinerant Apron Demand (SY)	Existing FBO Ramp Space (SY)	Surplus (Deficit)
2018	11,484	5,333	(6,151)
2023	11,880	5,333	(6,547)
2028	11,880	5,333	(6,547)
2038	12,672	5,333	(7,339)

BURLINGTON INTERNATIONAL AIRPORT

Support Facilities/Cargo

Burlington International Airport Master Plan

- **Fuel Storage**
  - Existing: 4-25,000 gallon Jet-A tanks and 1-12,000 gallon 100LL tank
  - Jet-A Fuel Usage (5-Year Average)
    - Average Month/Average Day: 21,518 gallons
    - Peak Month/Average Day: 26,310 gallons
    - Planning Recommends Maintaining 3-Day Supply
    - Consider inverse relationship between growth and increased fuel efficiency
  - **Recommendation: Consider adding an additional Jet-A fuel tank**

- **ARFF**
  - Vermont Air National Guard (VTANG) provides ARFF Services –Index B
  - **Recommendation: None**
- **SRE/Airfield Maintenance**
  - Equipment stored in 3 locations totaling 46,505 SF
  - **Recommendation: Consolidate Facilities Away from GA/Cargo Areas –Full Consolidated Facility?**
- **Cargo**
  - Plan for Additional Growth (Second Aircraft Position), Dedicated Facility not Shared with GA
  - **Recommendation: Identify New Location for Dedicated Air Cargo Operations for two Boeing 757 Sized Aircraft**

BURLINGTON INTERNATIONAL AIRPORT

Sustainability Efforts

Burlington International Airport Master Plan

Five Sustainability Categories

- Energy & Greenhouse Gas Emissions
- Waste Management
- Ground Transportation
- Water Resources
- Passenger Experience

Guided by the City of Burlington's 2030 vision, as laid out in its *Legacy Action Plan*, BTV strives to make a positive contribution in shaping the region's economic, environmental, and social vitality.

Energy & Greenhouse Gas Emissions

↓ 12.4%
Reduction in utility-sourced electricity consumption between 2013 and 2017

1,183,000 kWh per year
Avoided annual electricity use as a result of recent energy-efficiency upgrades at BTV

$147,750 annual cost savings
Cost savings from the approximately 1.2 million kWh saved per year

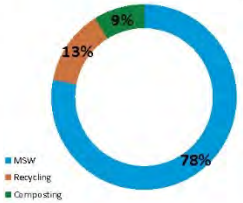
BTV continues to demonstrate leadership in sustainable energy performance by reducing energy consumption while the Airport's operations continue to expand.

↓ 23%
Reduction in GHG emissions between 2010 and 2013

Greenhouse gas emissions at the Airport derive from electricity consumption, natural gas consumption, and vehicle fleet fuel consumption.

Waste Management

22%
diversion rate in CY 2017



- Instituted an office paper recycling program
- Co-locates trash and recycling bins with pictured-based signage to encourage passengers to sort their waste properly
- Installed water bottle filling stations
- The Airport's waste contractor regularly works with the Airport and its tenants to reduce waste and increase the use of products that can be recycled, as well as provides training

Ground Transportation

- BTV sponsors **Greenride Bikeshare**. A station, along with an e-bike terminal, are outside the Terminal building
- BTV provides free **Green Mountain Transit Bus** passes to all of its direct employees
- The Airport boasts **15 electric vehicle charging stations**, including Tesla Superchargers, in the parking garage

Increasing access to sustainable transportation modes such as public transit and electric vehicles reduces greenhouse gas emissions and improves local/regional air quality.

Water Resources

22 Million gallons
Estimated amount of stormwater treated annually, through a new underground treatment system, to prevent contaminants from discharging into the Winooski River.

In 2010, BTV won an **Engineering Excellence Award** from the American Council of Engineering Companies/Vermont Section for its runoff treatment system.

8,000 square feet
Size of the rooftop garden installed on top of the Airport's parking garage in 2011. In addition to providing a place for visitors to relax, this design feature also helps reduce and filter stormwater runoff.

Passenger Experience

- BTV provides walking trails inside and outside the Terminal building
- Educational exhibits and art installations by local artists are located throughout the Airport
- Passenger amenities include a yoga studio, operated by Burlington-based Evolution Physical Therapy + Yoga
- Visitors can take in the views from the Airport's Observation Tower

674,944 passengers
Number of passengers that departed from BTV in CY 2018

BTV's Wellness Committee is always looking for new ideas to make traveling less stressful around the Airport!

Regional Coordination

Local and Regional Sustainability Goals

- Derive **90 percent** of the state's energy needs from renewable energy sources by 2050 (*Vermont Comprehensive Energy Plan*)
- Reduce greenhouse gas emissions in the state by **50 percent by 2028** and **75 percent by 2050** (10. V.S.A. §578)

As a large facility, BTV demonstrates leadership and a commitment to work with local and regional entities to advance common sustainability goals and initiatives.

- Reduce solid waste sent to landfills (Burlington's *Climate Action Plan*) and achieve **a zero waste future** (*Vermont Materials Management Plan*)
- Improve multi-modal transportation to/from and around the Airport (*2018 ECOS Plan*)
- Educate residents of Chittenden County on ways to reduce stormwater pollution (Regional Stormwater Education Program)

PASSERO ASSOCIATES engineering architecture

BURLINGTON INTERNATIONAL AIRPORT

Upcoming BTV Projects

Burlington International Airport Master Plan

Airport Hotel

Taxiway Gulf

Air Carrier Apron Project

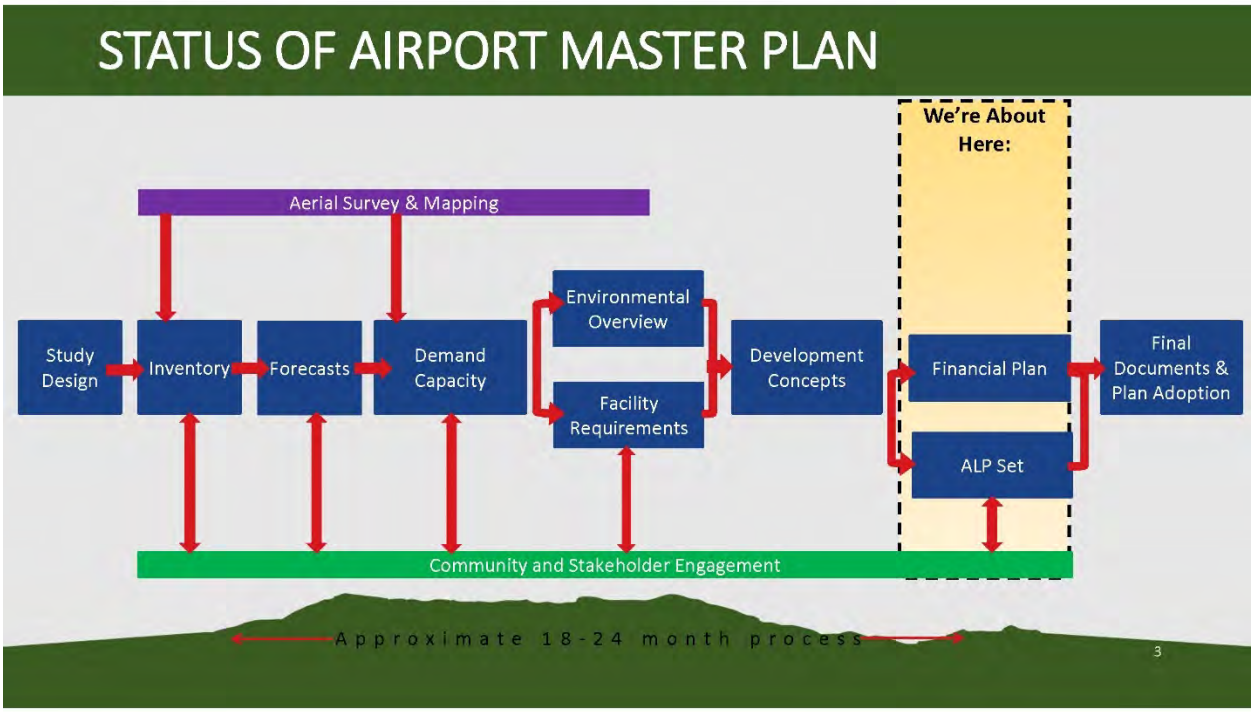
Car Rental Wash Facility


Burlington International Airport
Airport Master Plan Update
Public Information Meeting # 2
October 14, 2020
BTV
BURLINGTON
INTERNATIONAL AIRPORT
PA
PASSERO ASSOCIATES
engineering architecture
WOOLPERT
Stantec
McFarland Johnson
vhb
CHA
hmmh
Leibowitz&Horton
1

AGENDA

- Introductions
- Master Plan Update Status
- Facility Review
- Airport Layout Plan
  - Terminal Building
  - Hotel
  - Ground Support
- Environmental Impacts

2


STATUS OF AIRPORT MASTER PLAN
We're About Here:
Aerial Survey & Mapping
Study Design
Inventory
Forecasts
Demand Capacity
Environmental Overview
Facility Requirements
Development Concepts
Financial Plan
ALP Set
Final Documents & Plan Adoption
Community and Stakeholder Engagement
Approximate 18-24 month process
3

AIRPORT FACILITY SUMMARY

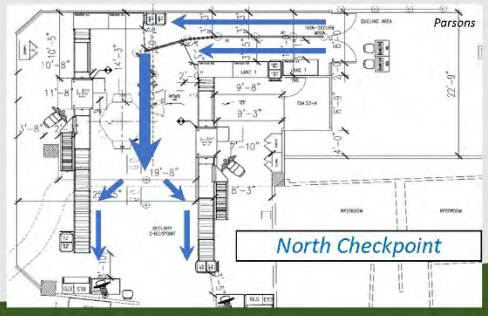
Terminal Summary – Baseline Requirements

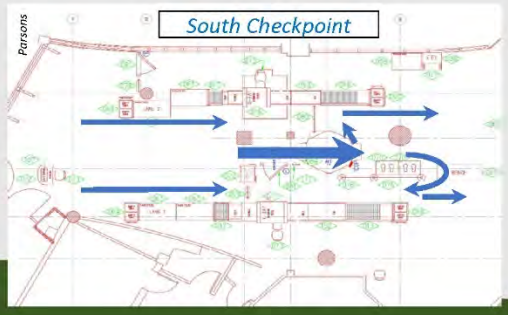
Terminal Functional Area	Existing Terminal Area	Ultimate Requirement	Surplus (Deficit)	%
Passenger Boarding Gates	10	11	(1)	-11%
Check-In / Ticketing	7,460	9,544	(2,084)	-28%
Outbound Baggage Screening & Makeup	1,099	8,611	(7,512)	-684%
Passenger Screening Checkpoint	5,714	10,289	(4,575)	-56%
Passenger Lounges / Holdrooms				
Hold Rooms	10,298	10,999	(701)	-7%
Concessions	9,891	14,934	(5,043)	-51%
Core Terminal Areas Subtotal	**47,118**	**64,743**	**(17,625)**	**-37%**
Other Functions/Tenants	92,482	25,648	66,834	72%
Total Passenger Terminal Area	**139,600**	**90,391**	**49,209**	**35.3%**

5

Terminal - Security Checkpoint

Passenger Screening Area	Existing Terminal Area	Ultimate Requirement	Surplus (Deficit)	%
Existing Screening Lanes (both checkpoints)	4 Lanes	6 Lanes (with consolidation)	(2)	-50%
Checkpoint Area (SF) - Combined	5,714 SF	10,289 SF	(4,575) SF	-56%





6


AIRFIELD LAYOUT PLANS
7

TERMINAL BUILDING

- Expand terminal building
  - Multiphase, linear approach
  - New integrated TSA
  - New outgoing and inbound baggage system
  - New holdrooms/gates
  - Demolish old concourses
  - Open up terminal apron

8

HOTEL

- Construct New Hotel
  - On airport property
  - Across from Terminal Building
  - Adjacent to the parking garage

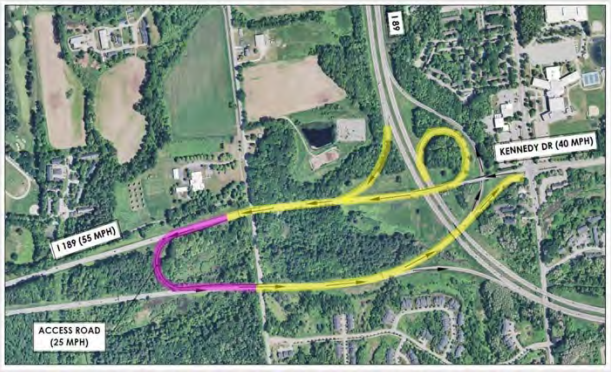
9

ACCESS ROAD SUPPORT: I-89 INTERCHANGE

- Airport supports community development to improved automobile circulation
  - Consider New I-89 Interchange
  - Provides new east/west access to airport
  - Connects into Airport Parkway, to Terminal Building
  - Avoids Route 2 and Kennedy Drive

10

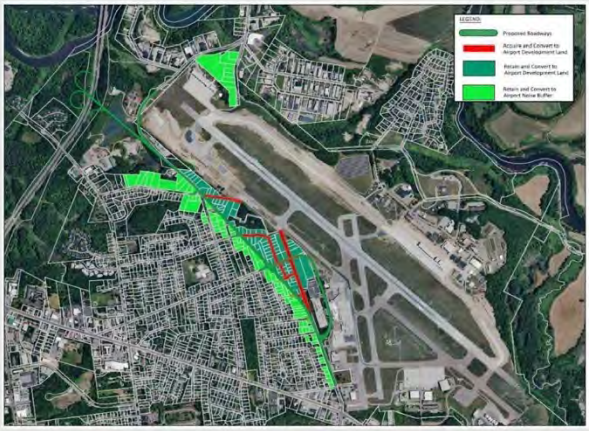
ACCESS ROAD SUPPORT: I-189 TURNAROUND



- Airport supports community development to improved automobile circulation
  - Consider new I-189 U-turn ramp
  - Provides east/west connection to I-89 N/S
  - Tie into Kennedy Drive for direct access to Airport

11

AIRPORT DRIVE DEVELOPMENT CONCEPT

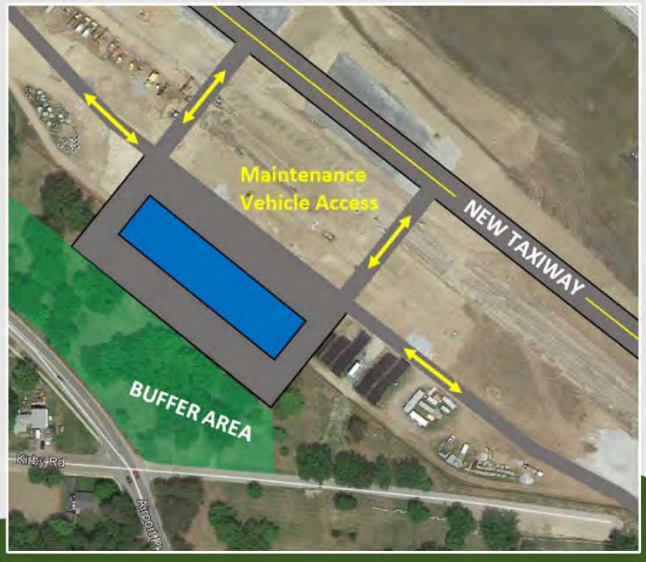


- Improve & Relocate Airport Drive
- Create a "Boulevard Type" Roadway with Landscaping
- Use property acquired through airport noise program
- Retain a buffer area between Chamberlin Neighborhood

South Burlington's Chamberlin Neighborhood
Credit: RSG

12

AIRPORT MAINTENANCE FACILITY RELOCATION



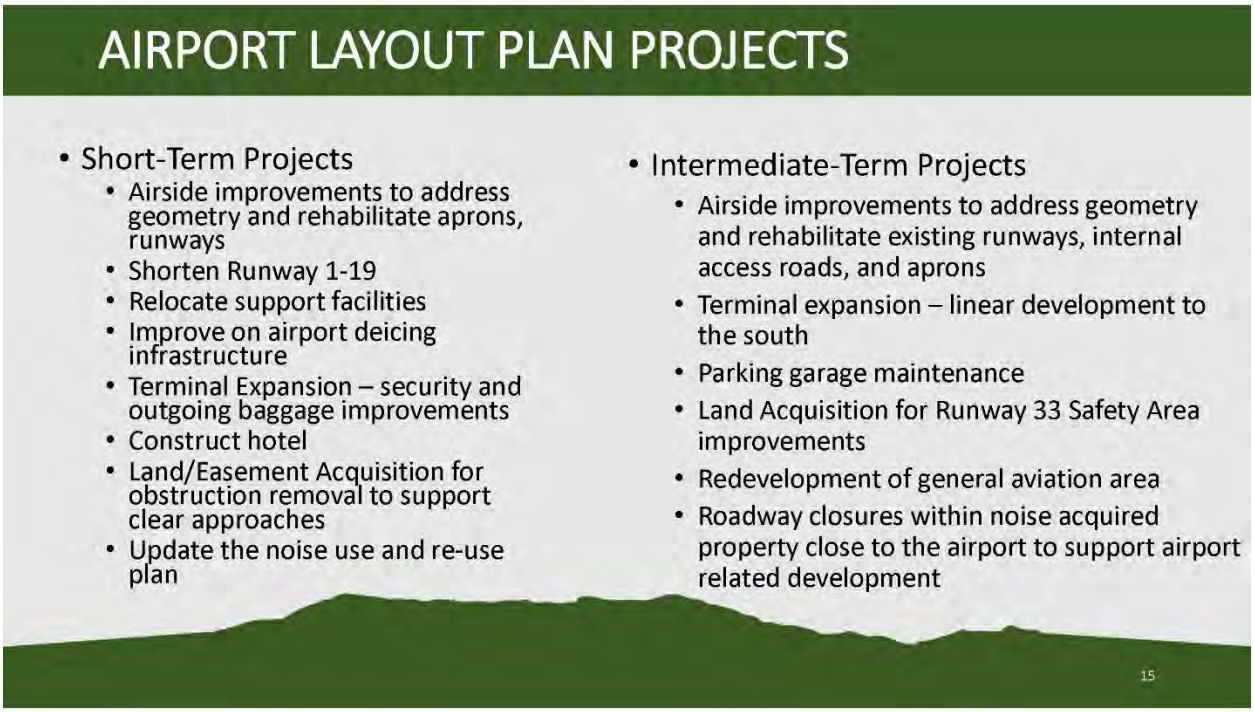
- Proposed Facility with direct access to new Taxiway G
- Unconstrained site for all maintenance equipment
- Retain **Buffer Area** between Airport Parkway & Chamberlin Neighborhood
- Note: Airport vehicles do **not** use public roads

13

AIRPORT LAYOUT PLAN

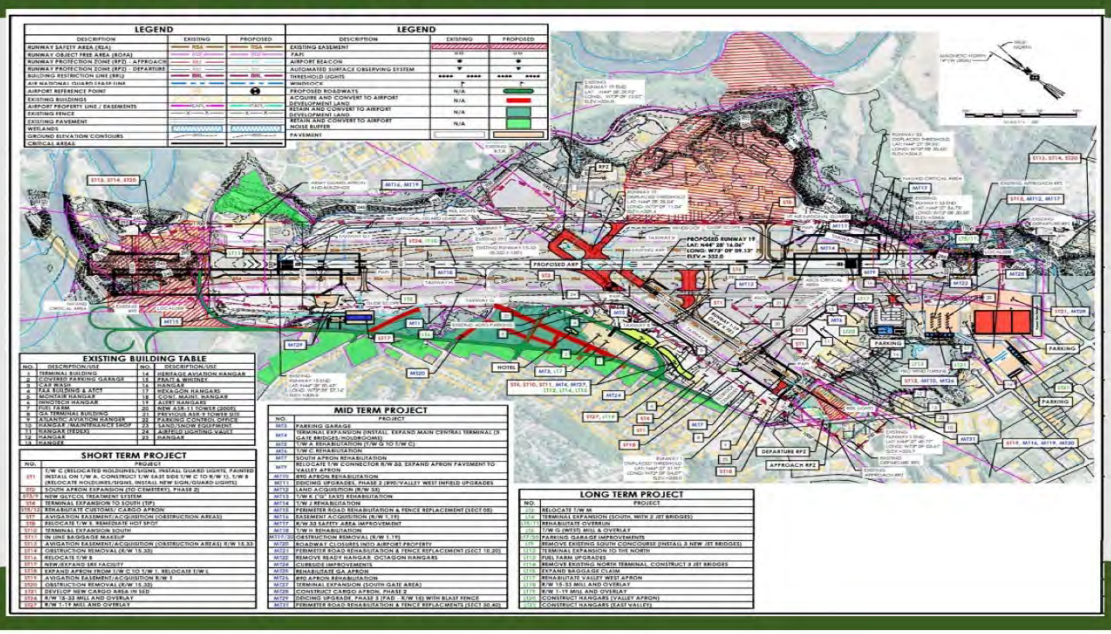
- Graphic depiction of overall development
- Requires approval from the FAA
- **Mechanism to provide future funding**
- Divided into three planning periods – Short-term, Mid-term, Long-Term

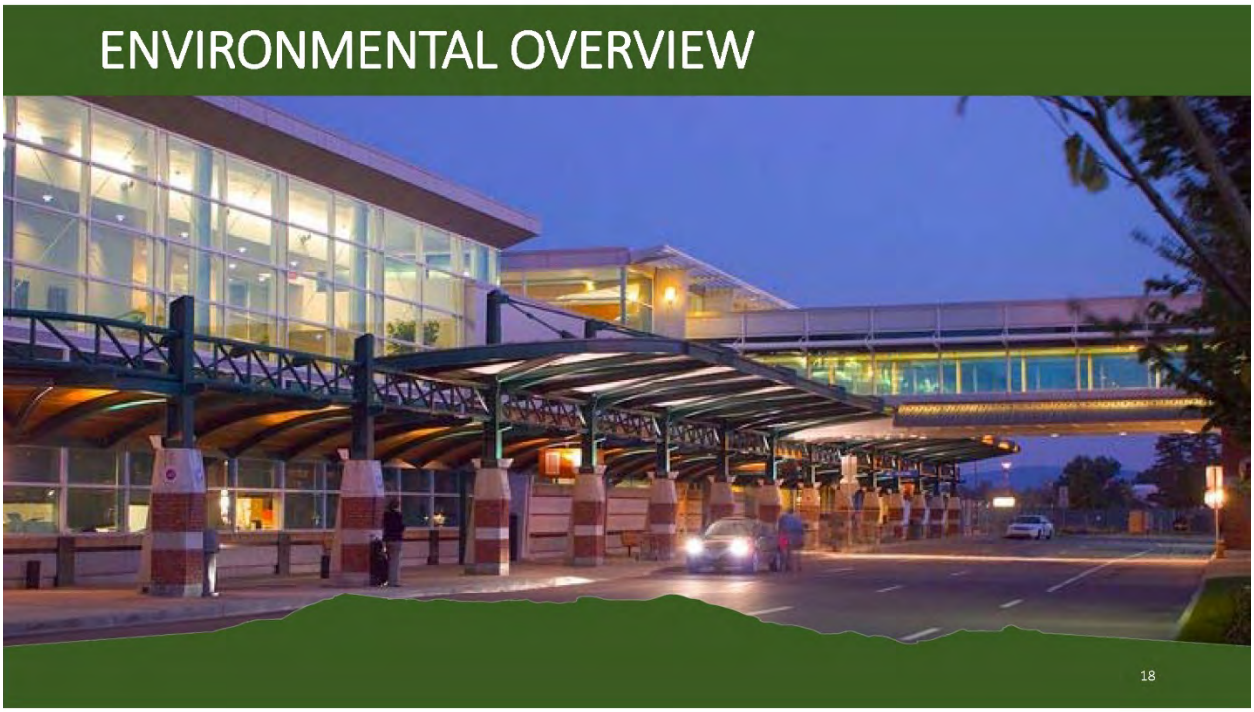
14


AIRPORT LAYOUT PLAN PROJECTS
• Short-Term Projects
• Airside improvements to address geometry and rehabilitate aprons, runways
• Shorten Runway 1-19
• Relocate support facilities
• Improve on airport deicing infrastructure
• Terminal Expansion – security and outgoing baggage improvements
• Construct hotel
• Land/Easement Acquisition for obstruction removal to support clear approaches
• Update the noise use and re-use plan
• Intermediate-Term Projects
• Airside improvements to address geometry and rehabilitate existing runways, internal access roads, and aprons
• Terminal expansion – linear development to the south
• Parking garage maintenance
• Land Acquisition for Runway 33 Safety Area improvements
• Redevelopment of general aviation area
• Roadway closures within noise acquired property close to the airport to support airport related development
15


AIRPORT LAYOUT PLAN PROJECTS
• Long-Term Projects
• Airside improvements to maintain pavement
• Relocate support facilities
• Improve on airport deicing infrastructure
• Terminal Expansion – linear to the south and north, expand inbound baggage
• Parking garage maintenance
• Redevelopment of general aviation area
• 2021 Projects
• Install guard lights/signs Taxiway C and B
• Expand the south terminal apron
• Deicing system upgrades
• Rehabilitate 890 apron
• Relocate Taxiway E, close excess pavement at Runway 19
• Terminal Expansion – TIP and outgoing baggage system
• Land/Easement Acquisition for obstruction removal to support clear approaches
16

AIRPORT LAYOUT PLAN




ENVIRONMENTAL OVERVIEW
18

Environmental Overview – Summary

- Biological Resources
  - Threatened/Endangered Species: 3 bat species, migratory birds
  - Ecological Communities: White Pine-Red Oak-Black Forest Northeast portion of National Guard property
  - Flora/Fauna
- Water Resources
  - Wetland: Three Class II wetlands
  - Surface Waters: Winooski River, Muddy, Centennial and Potash Brooks
- Climate/Resilience

Northern Long-Eared Bat (Myotis septentrionalis)
Credit: USFWS

19

Environmental Overview – Summary

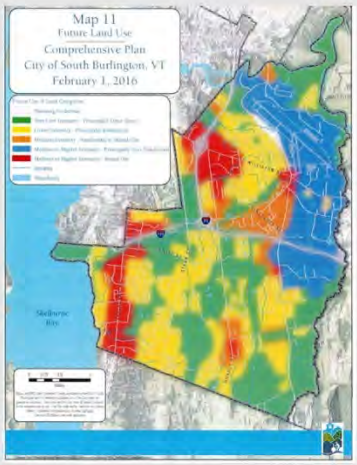
- Air Quality
  - Attainment
  - Permit from Vermont Air Pollution Control Division
- Energy
  - Roof mounted solar
  - Net energy reduction
- Hazardous Materials/Pollution Prevention
  - Three existing oil and hazardous materials facilities
  - UIC Permits for underground deicing fluid interceptions

Solar Photovoltaic System at BTV
Credit: Vermont ANG

20

Environmental Overview – Summary

- Land Use
  - South Burlington's "Airport District" facilitates the development and operation of BTV and associated facilities
  - Noise Land Inventory and Reuse Plan Update (2017) evaluates use of property acquired with AIP funds
  - South Burlington Comprehensive Plan (2016) call for:
    - Create a transition between BTV and parcels that are vacant in the Chamberlin neighborhood
    - Transportation and roadway projects to address mobility issues dur to existing and projected increased roadway traffic



Land Use Map
Credit: City of South Burlington Comprehensive Plan (2016)

21

Environmental Overview – Summary

- Noise and Compatible Land Use
  - Newly updated 2018 and forecast 2023 Noise Exposure Maps prepared approved in 2020
  - The area within the DNL 65 dB contour is expected to increase in all directions for the 2023 forecast year
  - The Noise Compatibility Program (NCP) is a list of actions BTV proposed to undertake to minimize existing and future noise/land use incompatibilities,
    - Focusing on community-based, voluntary noise mitigation program

2023 Forecast Condition, 75 DNL Properties
Credit: HMMH

22

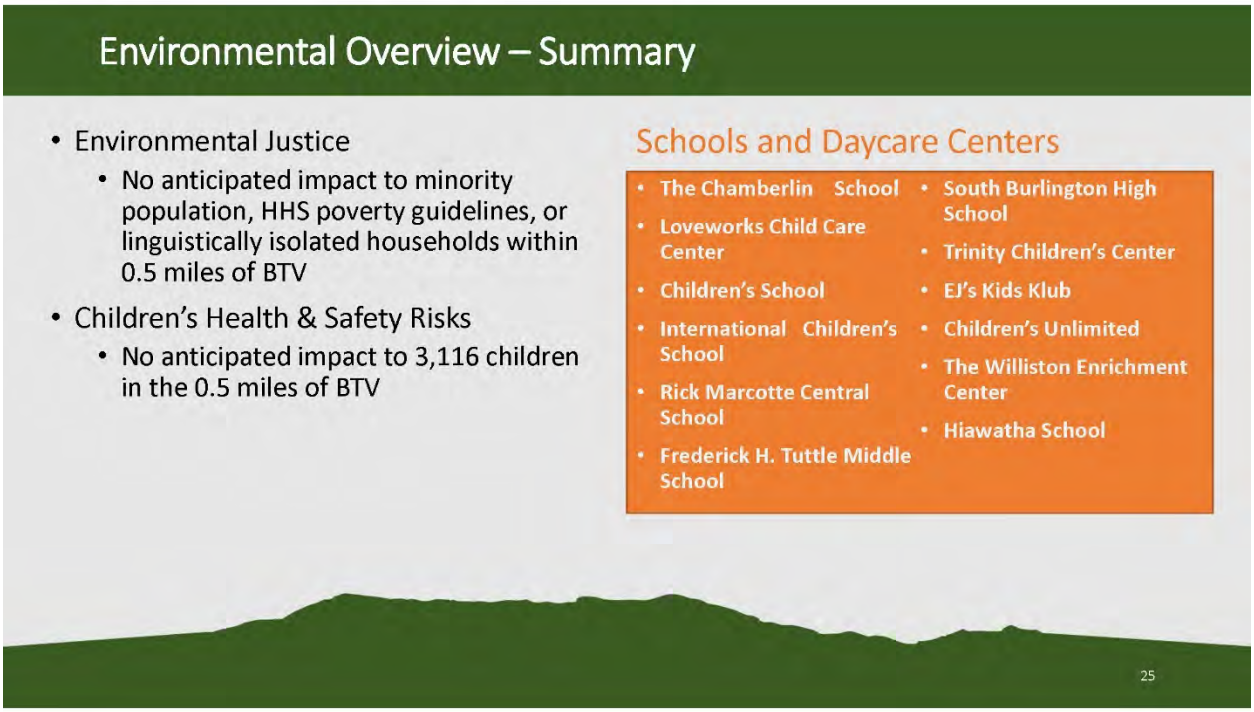
Environmental Overview – Summary

- Light Emissions
  - Examples of lighting at BTV include runway and taxiway lighting, an airport beacon, approach lighting, and obstruction lighting, as well as street and facility lighting
  - No new airfield lighting are proposed
- Visual Character
  - The Chamberlin neighborhood, is "one of the City's historic neighborhoods"
  - BTV sits against the backdrop of, but does not block views of, the Green Mountains
- Visual effects would be determined in consultation with jurisdictional agencies and the public

South Burlington's Chamberlin Neighborhood
Credit: RSG

23


Environmental Overview – Summary
• Socioeconomic
• Principal impacts to consider:
• Residential or commercial displacements
• Changes to neighborhood characteristic
• Disruption to local traffic patterns
• Changes to local employment and the community tax base
• Proposed Airport developments likely to have the benefit of increasing employment opportunities in the region and supporting state-wide economic development initiatives by attracting new businesses as well as allowing existing businesses to expand operations
24

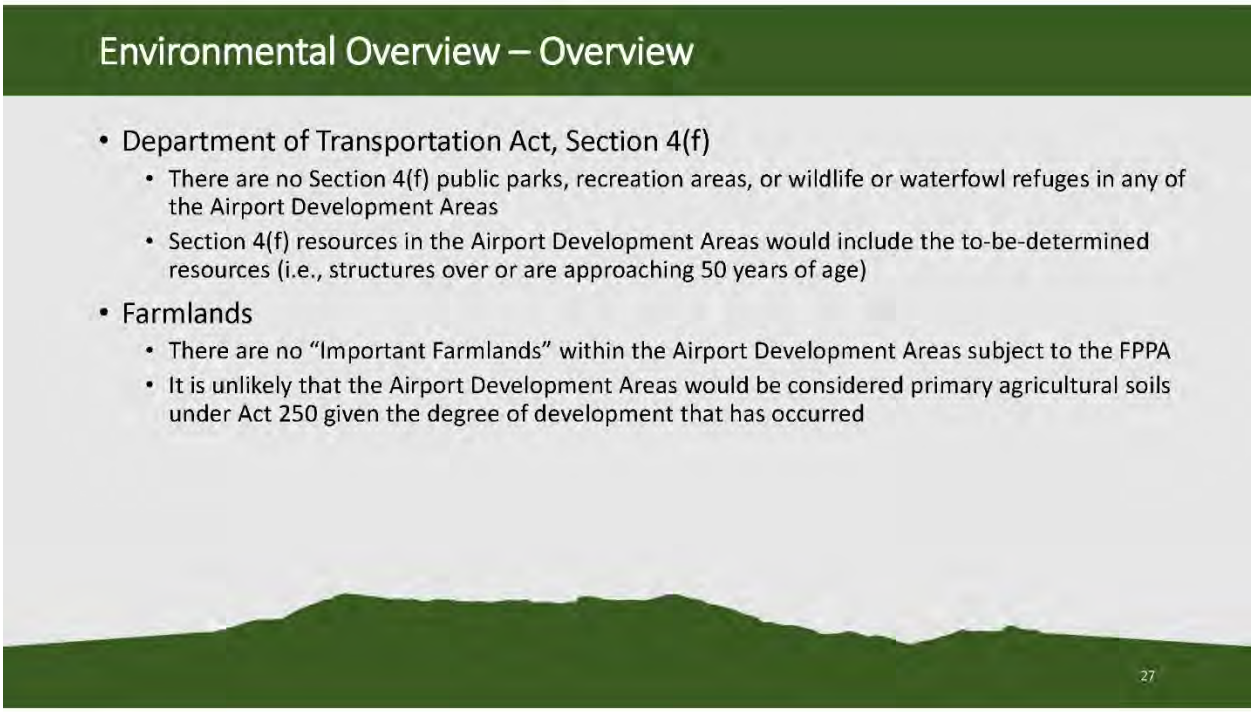

Environmental Overview – Summary
• Environmental Justice
• No anticipated impact to minority population, HHS poverty guidelines, or linguistically isolated households within 0.5 miles of BTV
• Children's Health & Safety Risks
• No anticipated impact to 3,116 children in the 0.5 miles of BTV
Schools and Daycare Centers
• The Chamberlin School
• Loveworks Child Care Center
• Children's School
• International Children's School
• Rick Marcotte Central School
• Frederick H. Tuttle Middle School
• South Burlington High School
• Trinity Children's Center
• EJ's Kids Klub
• Children's Unlimited
• The Williston Enrichment Center
• Hiawatha School
25

Environmental Overview – Overview

- Historic & Cultural Resources
  - There are no above-ground properties surveyed by Vermont Historic Sites and Structures Survey or listed in the State or National Registers within any of the Airport Development Areas
  - Certain structures of 50 years of age may be potentially historic
  - There are no recorded archaeological resources within the Airport property, though there are Precontact sensitivities
  - Potential historic district in Chamberlin neighborhood

Alert Hangar at BTV
Credit: VHB

26

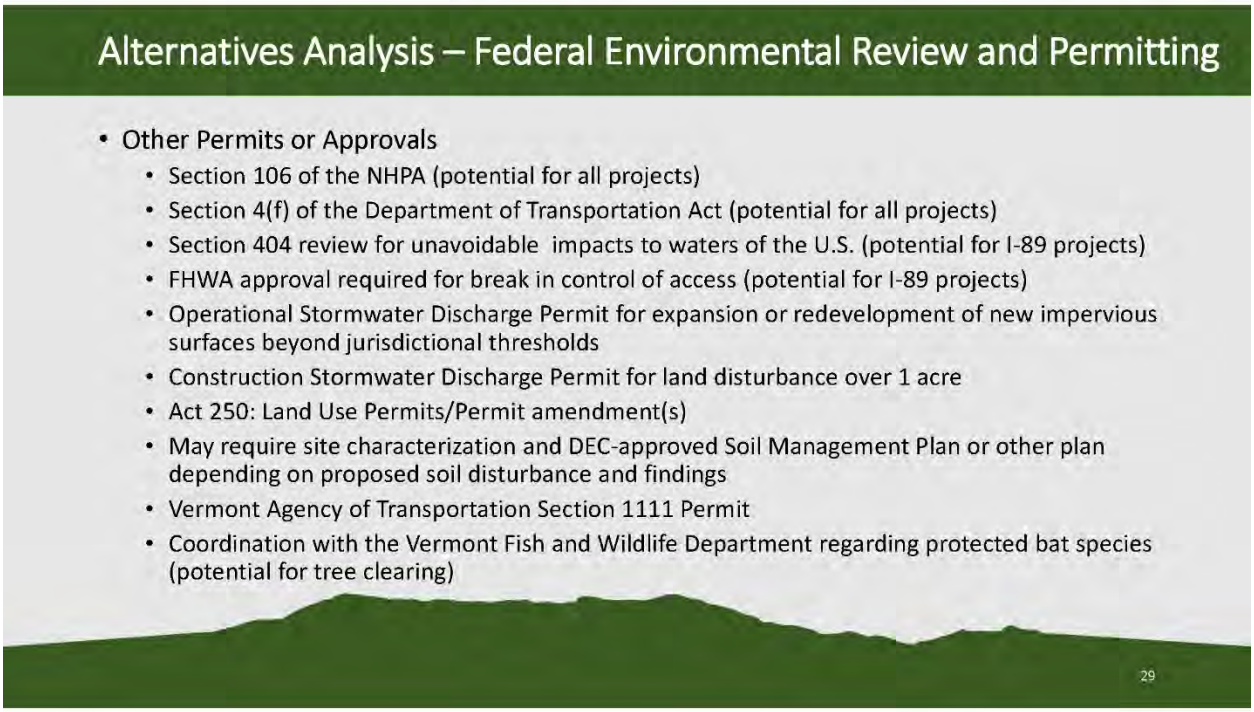

Environmental Overview – Overview
• Department of Transportation Act, Section 4(f)
• There are no Section 4(f) public parks, recreation areas, or wildlife or waterfowl refuges in any of the Airport Development Areas
• Section 4(f) resources in the Airport Development Areas would include the to-be-determined resources (i.e., structures over or are approaching 50 years of age)
• Farmlands
• There are no "Important Farmlands" within the Airport Development Areas subject to the FPPA
• It is unlikely that the Airport Development Areas would be considered primary agricultural soils under Act 250 given the degree of development that has occurred
27

Alternatives Analysis – Federal Environmental Review and Permitting

- National Environmental Policy Act (NEPA)
  - Categorical Exclusion (CATEX), Environmental Assessment, or Environmental Impact Statement
  - Depending on scale and phasing, all on-Airport projects - when taken individually - are anticipated to require a CATEX; project groupings may elevate reviews to an Environmental Assessment
  - I-89 projects are likely to involve an Environmental Assessment depending on US Army Corps of Engineering (USACE) permitting

APPENDIX A. DOCUMENTED CATEX

28


Alternatives Analysis – Federal Environmental Review and Permitting
• Other Permits or Approvals
• Section 106 of the NHPA (potential for all projects)
• Section 4(f) of the Department of Transportation Act (potential for all projects)
• Section 404 review for unavoidable impacts to waters of the U.S. (potential for I-89 projects)
• FHWA approval required for break in control of access (potential for I-89 projects)
• Operational Stormwater Discharge Permit for expansion or redevelopment of new impervious surfaces beyond jurisdictional thresholds
• Construction Stormwater Discharge Permit for land disturbance over 1 acre
• Act 250: Land Use Permits/Permit amendment(s)
• May require site characterization and DEC-approved Soil Management Plan or other plan depending on proposed soil disturbance and findings
• Vermont Agency of Transportation Section 1111 Permit
• Coordination with the Vermont Fish and Wildlife Department regarding protected bat species (potential for tree clearing)
29


QUESTIONS/COMMENTS
Any questions or comments regarding the Airport Master Plan or any of the information discussed today?
Submit comments by Oct 23, 2020
Available for contact anytime:
Lisa M. Cheung
Senior Airport Planner, Passero Associates
lcheung@passero.com
30