APPENDIX E

Community and Stakeholder Engagement

E.16 | TRANSPORTATION AND PUBLIC WORKS (TPW) COMMITTEE MEETING #1

E.17 | TRANSPORTATION AND PUBLIC WORKS (TPW) COMMITTEE MEETING #2

E.18 | PROJECT WEBPAGE

STAKEHOLDER ADVISORY GROUP (SAG)

Metropolitan Milwaukee Association of Commerce (MMAC)

Milwaukee 7 Economic Development Partnership

Gateway to Milwaukee

Southeastern Wisconsin Regional Planning Commission (SEWRPC)

City of Oak Creek

City of South Milwaukee

City of Cudahy

City of St Francis

City of Milwaukee

Wisconsin Economic Development Corporation

Milwaukee County

Travel Wisconsin

Commercial Association of REALTORS Wisconsin

APPENDIX E.1

Stakeholder Advisory Group (SAG) Meeting #1

Stakeholder Advisory Group

Meeting #1

MASTER PLAN **2040**

MKE

GENERAL MITCHELL INTERNATIONAL AIRPORT

Agenda

- Introductions
- Master Plan Overview
- Project Website
- Inventory Overview
- Forecast Summary
- Questions/Discussion
- Next Steps

Introductions

- Stakeholder Advisory Group (SAG)

  SAG Role: Provide input and feedback on factors that influence the role of the Airport in the region, the relationship of the Airport to the community, and serve as a conduit for Master Plan information throughout the community.

- Master Plan Team

Introductions

Colleen E. Quinn, Ricondo
Project Manager

Michael D. Truskoski, Ricondo
Deputy Project Manager

Max Braun, Ricondo
Forecast

Jeffrey D. Stanley, Ricondo
Forecast

Ken Bukauskis, Ricondo
Cargo Forecast (phone)

Internationally Recognized Aviation Consultancy

Ricondo is an internationally recognized aviation consultancy specializing in planning, programming, and business advisory services for airport owners, operators, government agencies, and airlines

Master Plan Team

RICONDO®	Project Management, Forecasting, Airfield Planning; Terminal Planning; Landside Planning (Terminal Roadway); Parking Planning; Rental Car Planning; Sustainability Integration; Implementation Planning; Agency Coordination; Business Strategy Planning; ALP Preparation; Documentation; Community Outreach and Stakeholder Engagement
CONNICO INCORPORATED	Cost Estimating
MTZ MARTINEZ GEOSPATIAL	Aerial Photography and Photogrammetry
Mead & Hunt	Data Collection/Existing Conditions; Engineering Support; Environmental Overview; Noise Analysis; Landside (Access) Planning; Terminal Planning Support; Facility Condition Index
SB Friedman Development Advisors	Market Analysis; Land Use Strategy/Planning
20 TWO HUNDRED	Graphic and Visual Communications; Community Outreach and Stakeholder Engagement Support
TranSmart	Traffic and Intersection Counts
UNISON CONSULTING	Financial Analysis

Master Plan Overview

Master Plan Process

- FAA-guided process

The goal of a master plan is to provide the framework needed to guide future airport development that will cost effectively satisfy aviation demand, while considering potential environmental and socioeconomic impacts.

FAA AC 150/5070-6B, Airport Master Plans

- Unique to the issues and challenges faced by MKE
- Objectives
  - Forecast activity
  - Define and justify proposed development
  - Provide effective graphic representation of development (ALP Drawing)
  - Establish realistic implementation schedule
  - Propose an achievable financial plan
  - Establish a flexible framework for continued planning and decision-making

Master Plan Process

ENGAGE
- Project Initiation
- Define Vision, Priorities, Critical Issues
- Define and Initiate Communication and Outreach

UNDERSTAND
- Existing Conditions
- Data Collection and Analysis
- Operational
- Physical
- Environmental
- Financial
- Planning Foundation

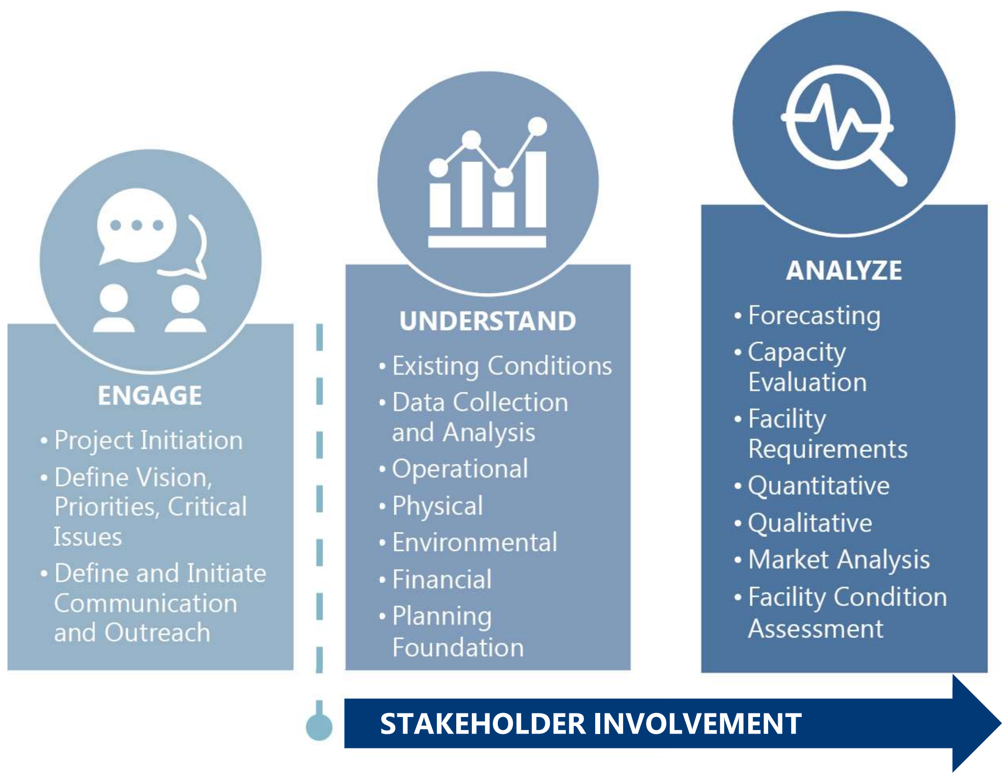
ANALYZE
- Forecasting
- Capacity Evaluation
- Facility Requirements
- Quantitative
- Qualitative
- Market Analysis
- Facility Condition Assessment

CRAFT
- Alternatives Analysis
- Alternatives
- Evaluation
- Selection
- Refinement

DELIVER
- Airport Layout Plan
- CIP
- Financial Plan
- Implementation Plan
- Documentation

STAKEHOLDER INVOLVEMENT

Master Plan Process



- Project Initiation
  - Kick-off presentation
  - Stakeholder Committees
  - Project Website
- Inventory / Data Collection
  - 22 categories of information
  - Airport / Region / Industry
  - Quantitative / Qualitative
- Forecast

Master Plan Scope

- Stakeholder engagement (throughout Master Plan Update)
- Meetings
  - 4 public involvement meetings
  - 5 SAG meetings
  - 5 TAG meetings
  - Ancillary meetings
- Microsite/webpage
- Inventory / Aerial Photogrammetry & Mapping
- Forecast activity:
  - Magnitude and characteristics
  - Peaking metrics / Design Day Flight Schedule
  - Baseline and High Scenario alternative

Master Plan Scope

- Demand/Capacity → Facility Requirements

Airside (airfield, air traffic, operational)

Landside (roadway, access, curbside, parking, rental car, other)

Terminal (functional areas and processors)

Support Facilities (cargo, general aviation/FBO, FAA, other)

Land use planning

Master Plan Scope

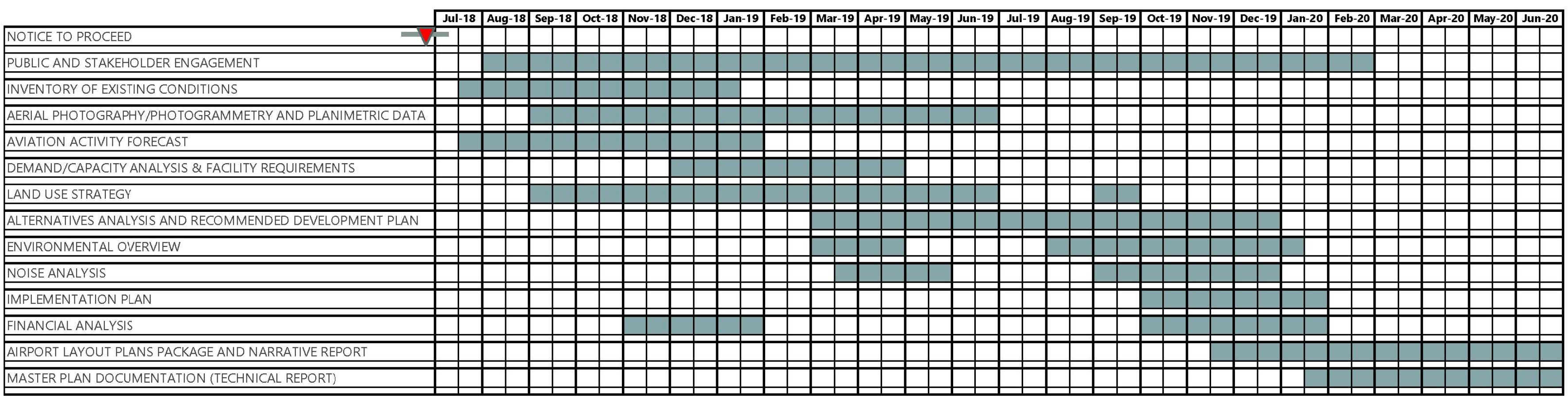
- Alternatives Development and Evaluation

- Identify Recommended/Preferred Alternative
- Develop Implementation Plan
- Prepare Financial Plan
- Airport Layout Drawing Set
- Documentation

The FAA will approve two specific elements of the Master Plan Update: Baseline Forecast and Airport Layout Plan drawing set.

Master Plan Schedule

- Overall 24-month study
  - Inventory efforts complete by end of year
  - Aerial photography (Fall, leaf-on conditions) → mapping underway
  - Forecast submittal to FAA before end of year (target)
  - Initial stakeholder engagement
    - SAG and TAG meetings
    - Initial public meeting
- Master Plan Completion: Summer 2020



Project Website

Project Website

www.mkeupdate.com

- Public communication tool
- Public and stakeholder feedback opportunity
- Evolving content over course of Master Plan Study
- Links to MKE website and Milwaukee County website

www.mkeupdate.com outline

- What is a Master Plan Update?
  - Plan Schedule
  - The Planning Process
  - History of MKE
- FAQs
- Engage with MKE's Future
- Project Materials & News

Inventory Overview

Inventory Overview

- Develop a thorough understanding of MKE
  - Physical
  - Operational
  - Environmental
  - Financial
- Methods
  - Site visits
  - Interviews
  - Data analysis
  - Research (e.g., lease documents, utility companies, etc.)
  - Traffic counts
  - Tenant survey (qualitative)
- Identify high priority challenges → Early Action Plan
- Document conclusions in a Technical Working Paper

Forecast of Aviation Activity

Forecast Overview

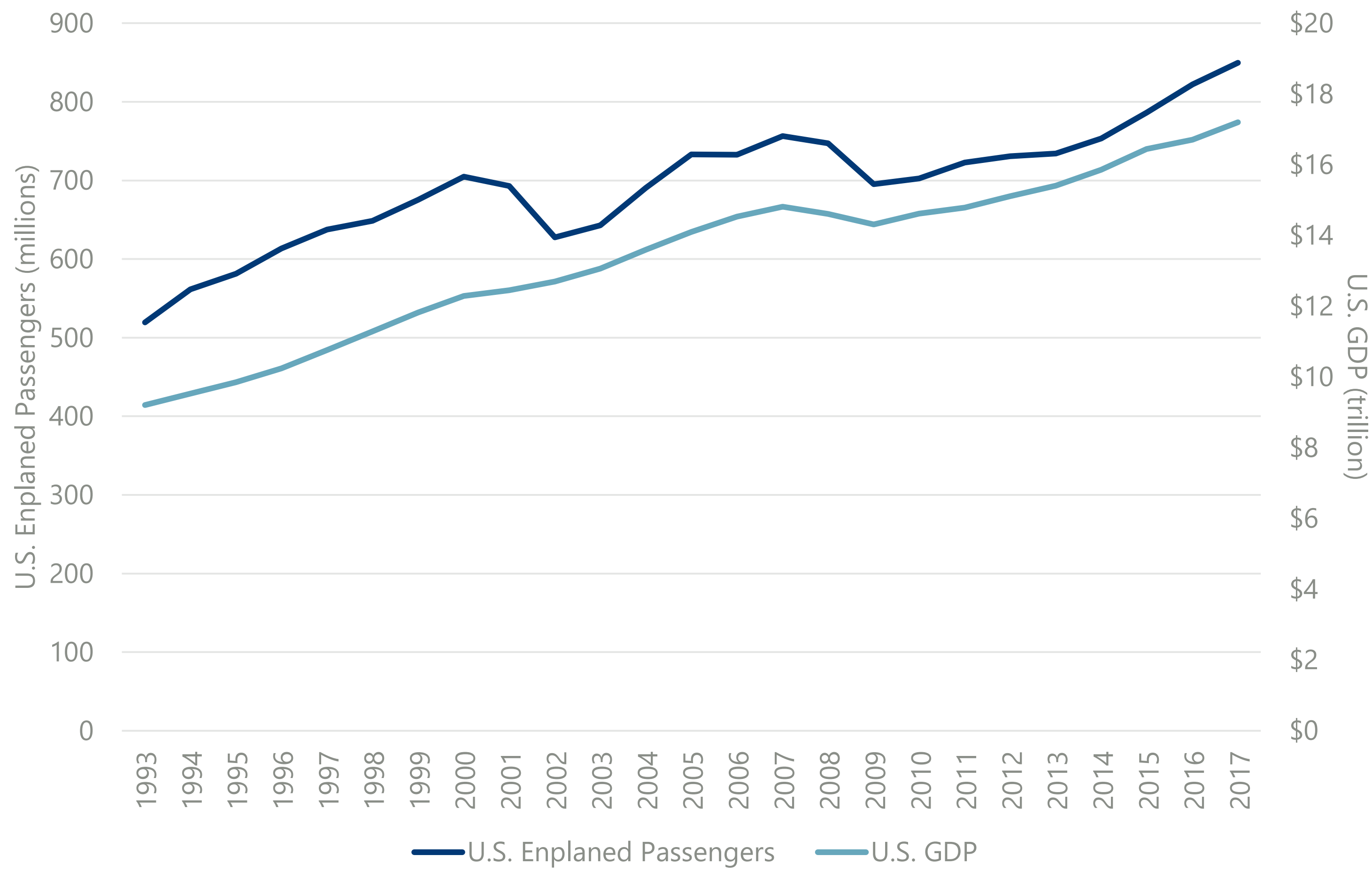
- Forecast of aviation activity: foundation for effective decision-making in MP
- Planning horizon: 2040 (2018E base year data)
- Two forecasts for planning
  - **Baseline forecast**
    - Most likely activity scenario
    - Basis for phasing/implementation, CIP, financial analysis
    - Reviewed/approved by FAA
  - **Alternate scenario forecast (high scenario)**
    - Addresses uncertainties in forecasting methodologies, assumptions, socioeconomics, influencing events, other factors
    - Considers realistic potential influences
    - Ensures flexibility to accommodate more robust growth

Role of Forecasts

- Determine future facility needs → alternative development concepts
- Timing of specific improvements
- Environmental analyses
- Financial analyses

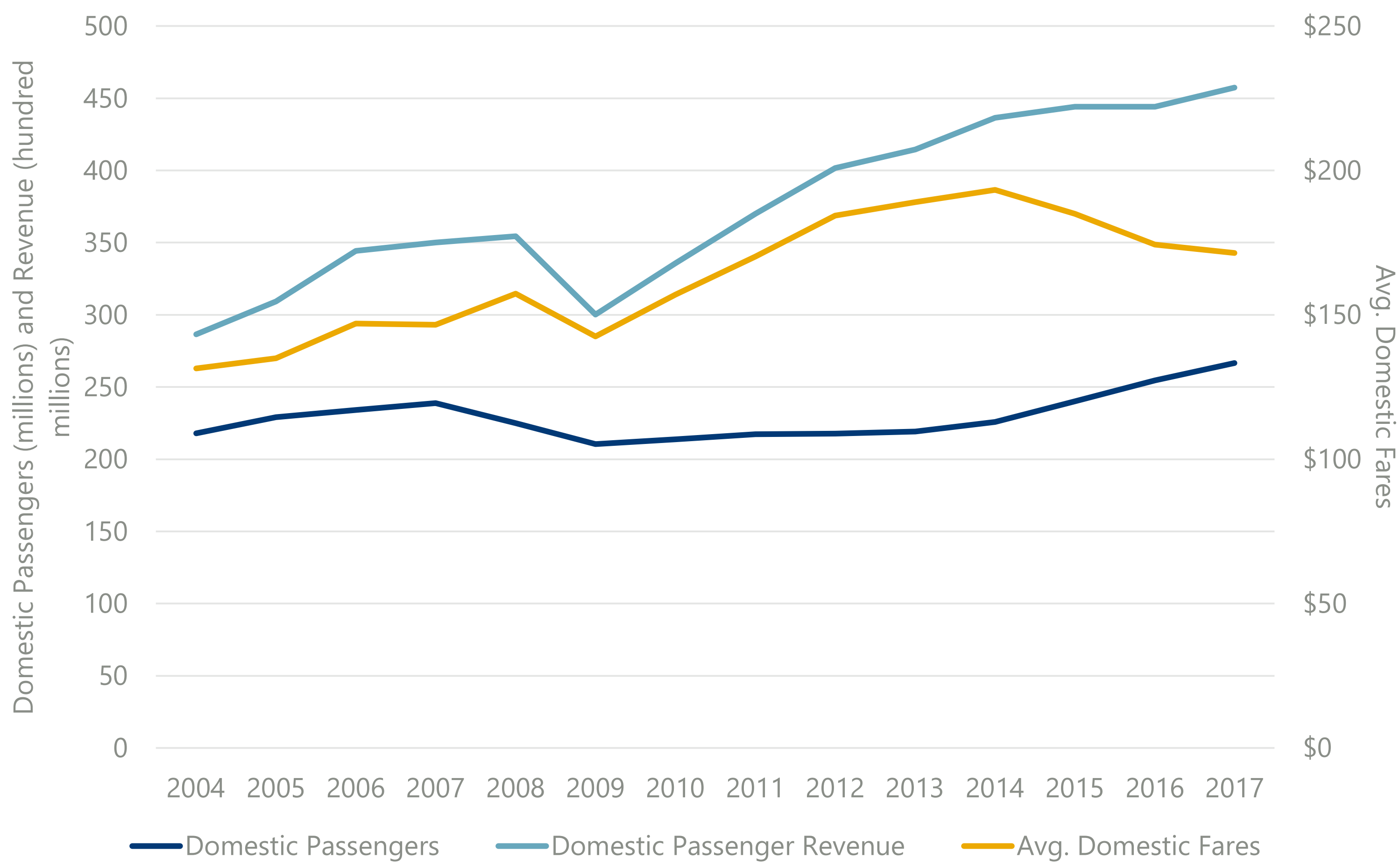
Market Background

Over the Longer Horizon, Industry Passenger Growth Has Followed GDP Trends



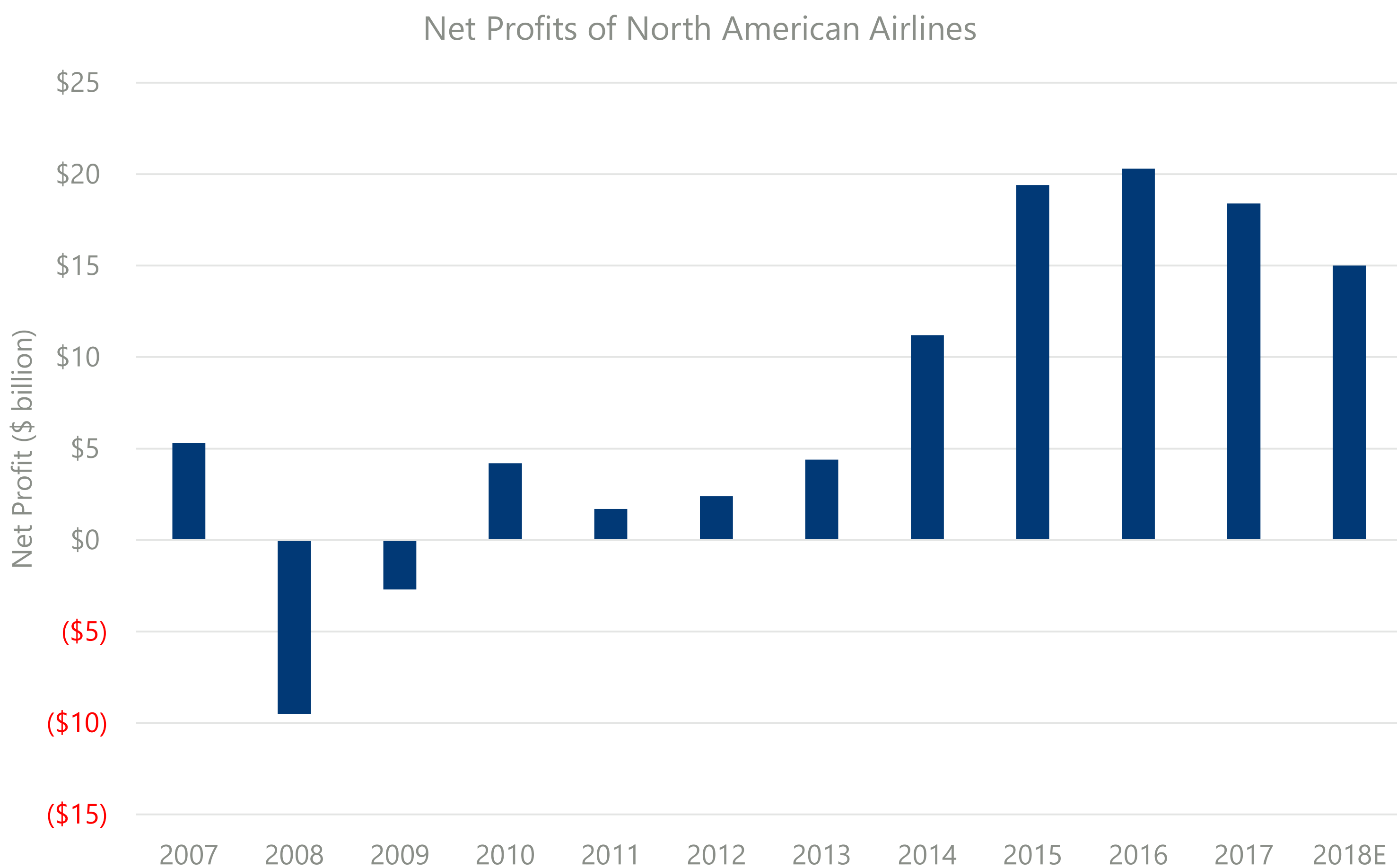
Source: Woods & Poole Economics, Inc.; U.S. DOT T-100, September 2018.

Airlines Kept Passenger Volumes Flat While Increasing Fares – Until Recently



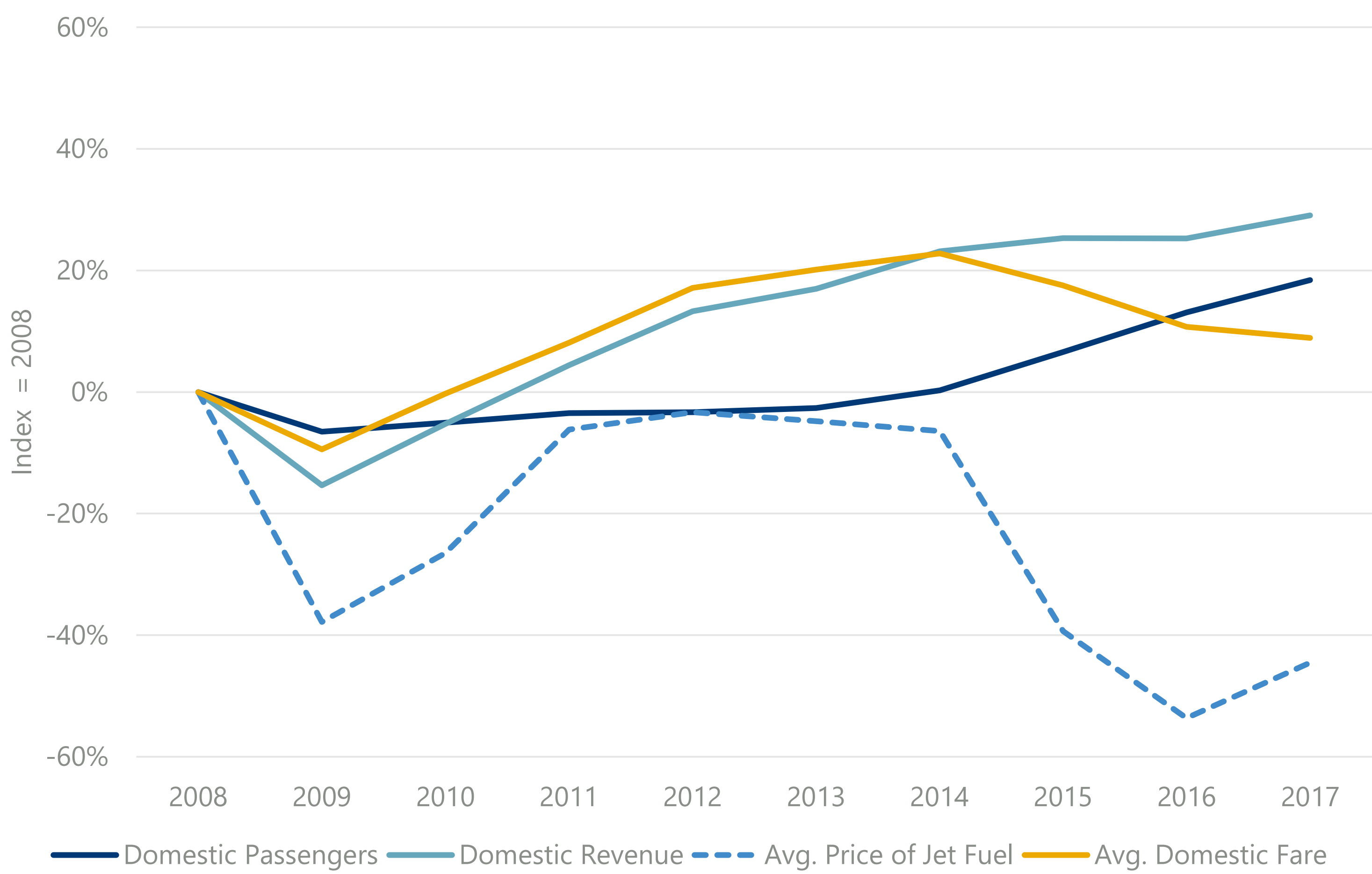
Source: U.S. DOT Form 41, September 2018.

Airlines Are Consistently Operating Profitably And Increasingly Focused On Managing Profits



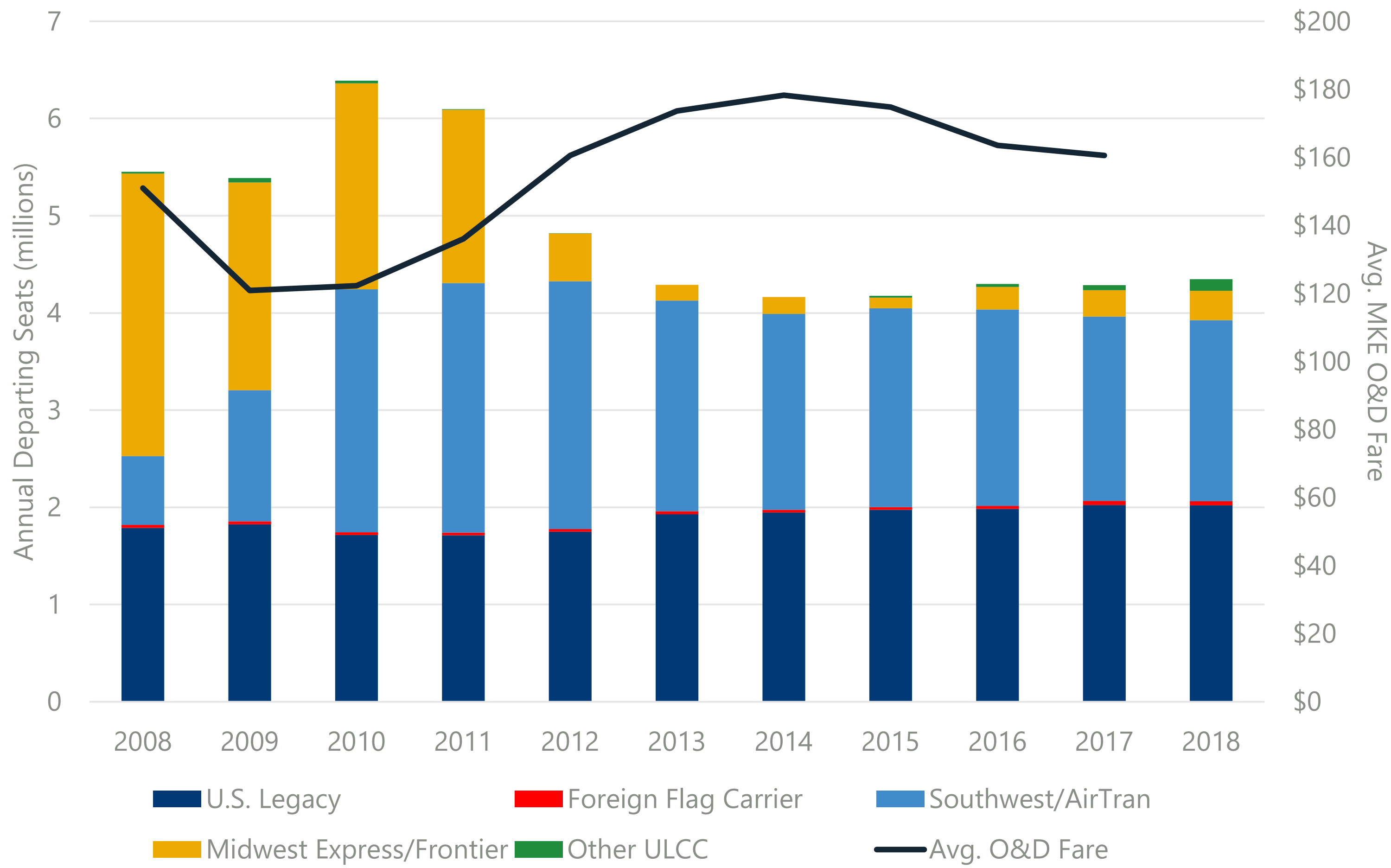
Source: IATA, October 2018.

Recent Low Fuel Prices Have Enabled Airlines To Carry More Passengers, But at Lower Fares



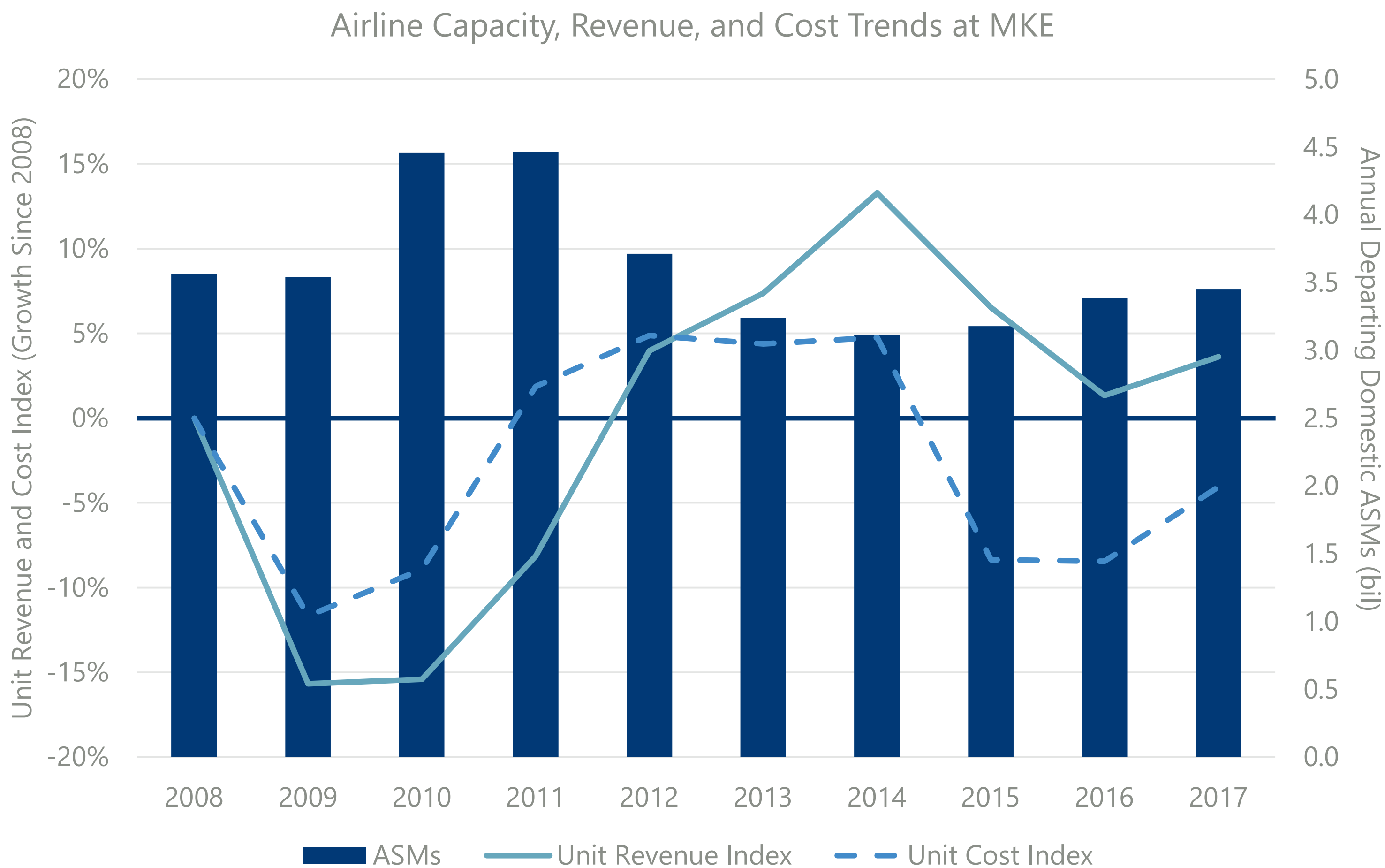
Sources: U.S. DOT Form 41; Ricondo & Associates (analysis), September 2018.

Seat Capacity Peaked in 2010 During A Period of Competition Between Frontier and Southwest



Source: Innovata, September 2018.

Unit Revenue Growth Has Outpaced Cost Growth Placing Airlines on Firmer Financial Footing

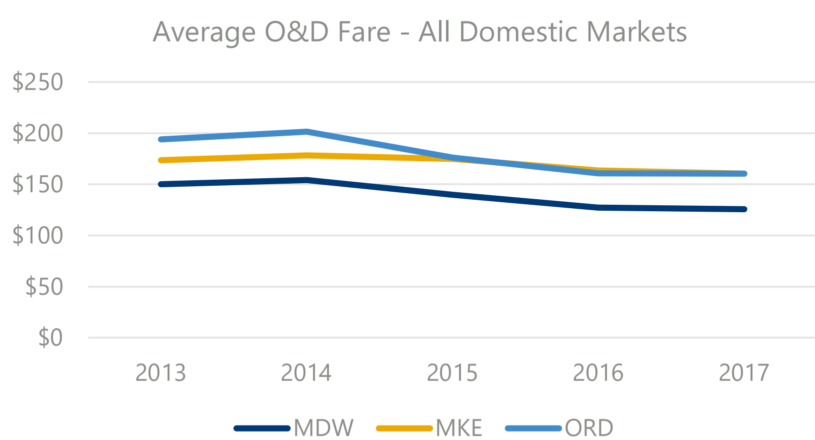


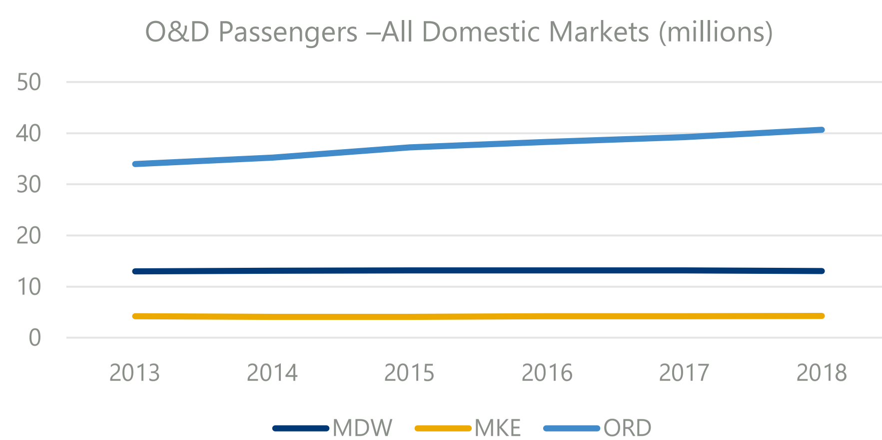
Source: U.S. DOT DB1b Survey and Form 41, October 2018.

Passenger Choice Is Influenced by Price, Availability of Seats, and Nonstop Service

Competition in MKE's Top 50 Domestic O&D Markets (2017)

	Markets With Nonstop Service	Avg. Daily Domestic Seats	Avg. Daily Flights	Avg. Fare	Markets Served by Multiple Airlines
MDW	46	33,263	224	$124	3
MKE	**34**	**11,070**	**89**	**$154**	**16**
ORD	50	84,623	638	$152	49



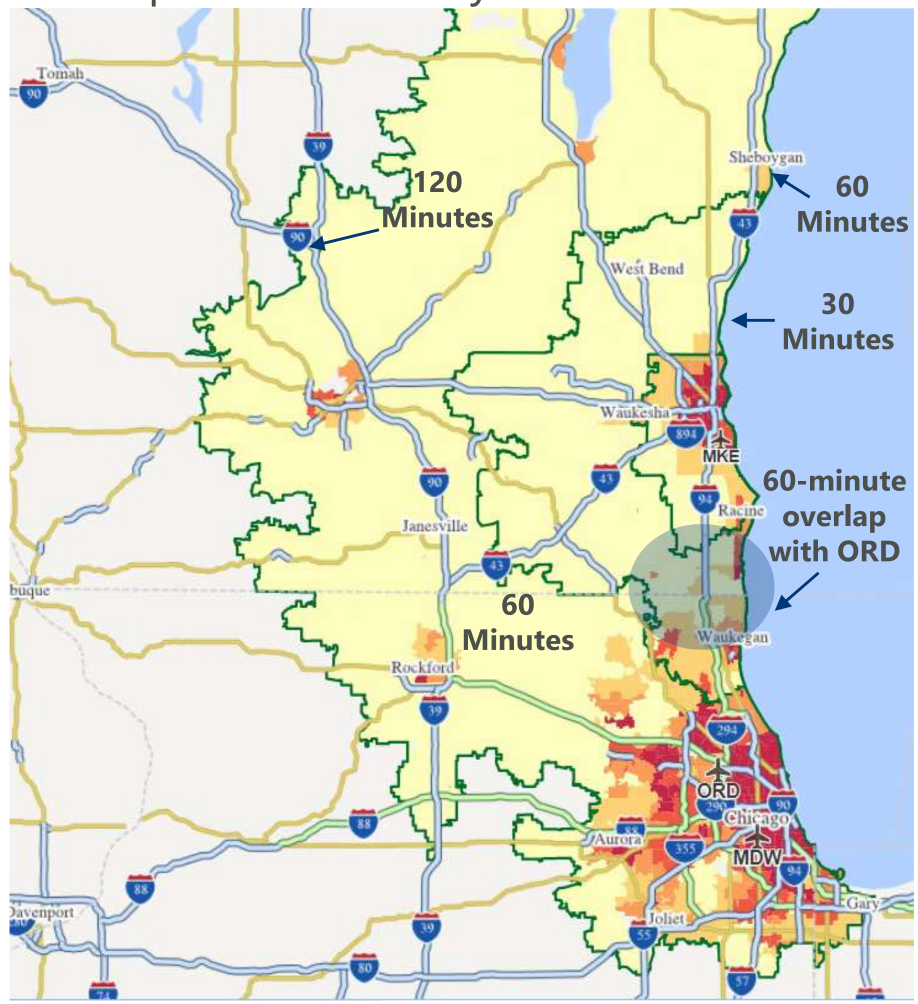


Source: Innovata; U.S. DOT DB1b Survey, September 2018.

Passenger Choice is Also Influenced By Accessibility and Ease of Access

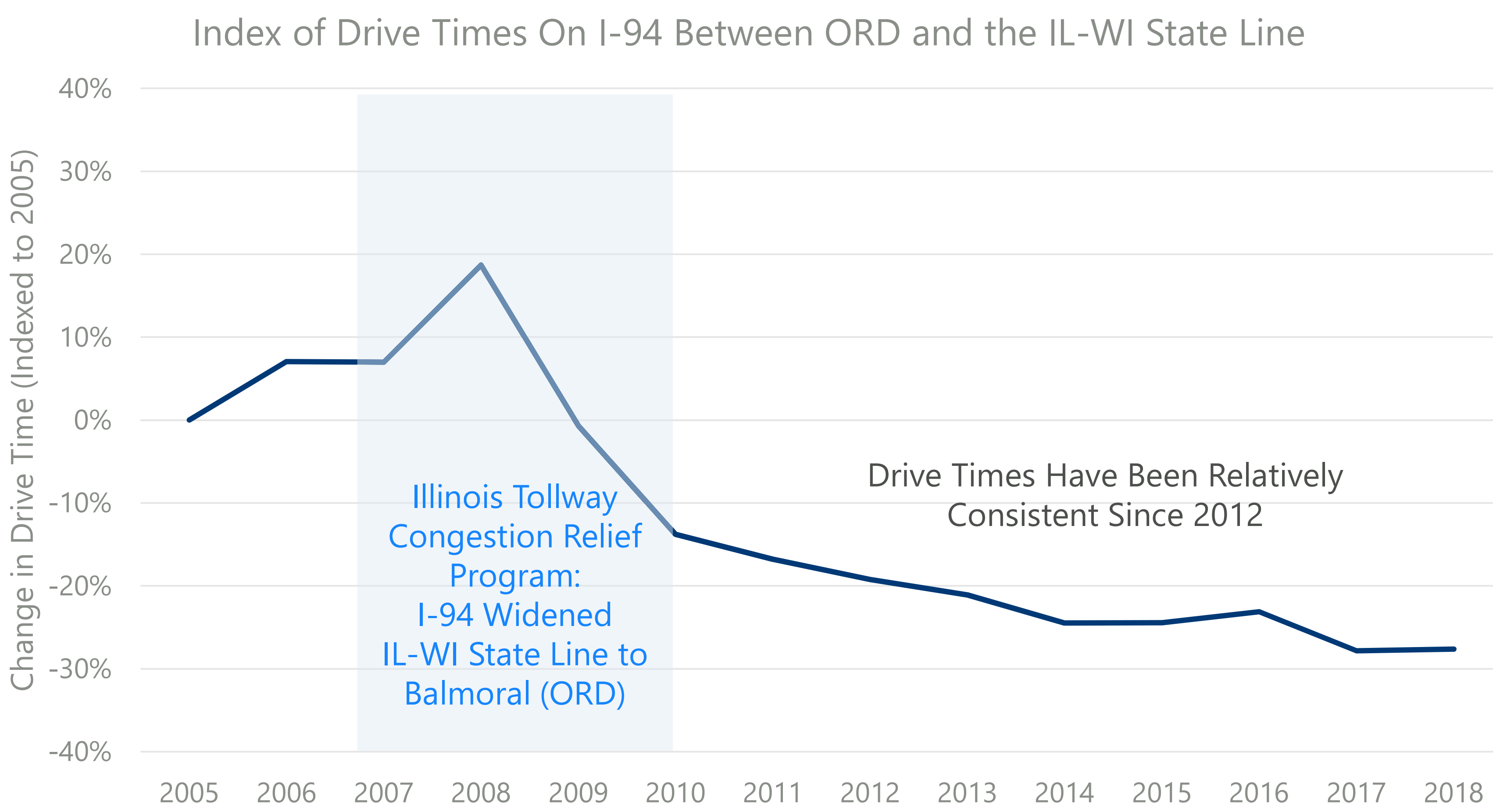
- The majority of Chicagoland population lives within a 60-120 minute drive time of MKE (without traffic)
- The area around Waukegan/Northwest Illinois falls within the 60 minute drive time of both ORD and MKE
- This area contains nearly 1 million people, most are currently using ORD
- Continued growth along the Illinois portion of I-94 could increase the area of overlap within a 60 minute drive time and make road travel to MKE more appealing

Population Density and Drive Time



Source: Diio Mi Catchment Mapper, September 2018.

Improvements Made to I-94 Between O'Hare and the IL-WI State Line Have Reduced Travel Times



Note: I-94 in Wisconsin is currently being widened, which may lessen drive times to and from MKE.

Source: Illinois Tollway *Congestion Relief Program Summary, 2011;* Travel Midwest Stats.

Major Structural Changes Have the Potential To Impact the Underlying Demand Base

- In 2017 Foxconn announced it will build a $10 billion factory in Wisconsin
  - Mount Pleasant, WI was selected for its location in October 2017
  - Builders formally broke ground at the Wisconsin Valley Science and Technology Park in June 2018
- Foxconn and its related developments may provide additional economic impact of:
  - Up to 13,000 additional jobs directly related to Foxconn operations by 2022 (0.3% of Wisconsin employment)
  - Between 24,000 and 41,600 additional jobs from the indirect impacts of Foxconn's investment (Between 0.6% and 1.0% of Wisconsin employment)
  - Incremental labor income of $955 million for the state of Wisconsin by 2023 (0.5% of Wisconsin labor income
  - Incremental GDP growth of $3.361 billion for the state of Wisconsin by 2025 (1.0% of Wisconsin GDP)
- The exact timing of Foxconn's investments and the ultimate magnitude of their impacts are still unknown

Source:. EY *Quantifying Project Flying Eagles Potential Economic Impacts on Wisconsin*, July 2017; *An Evaluation of the Economic Impact of the Foxconn Proposal*, Noah Williams Center for Research on the Wisconsin Economy (CROWE) Univ. of Wisconsin-Madison, August 2017.

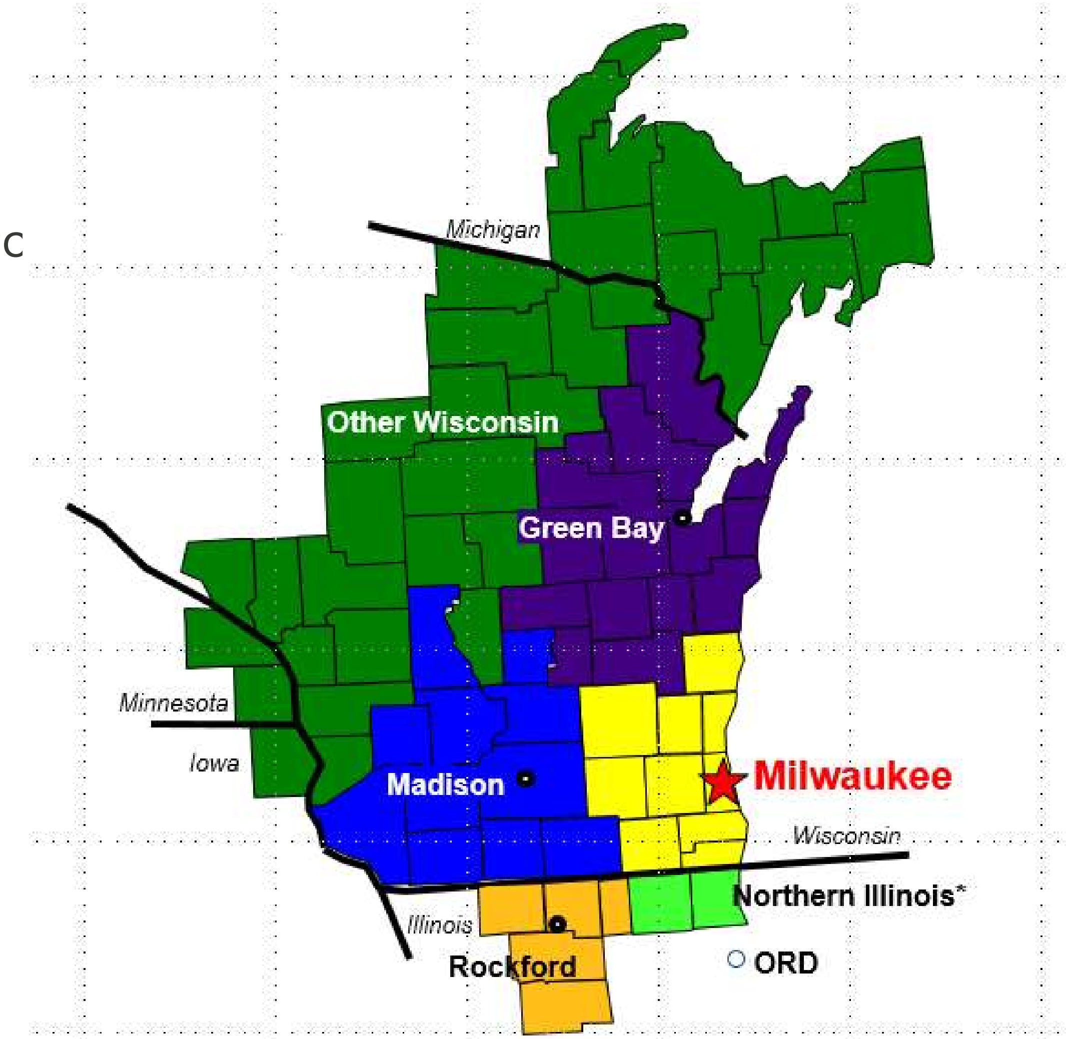
Passenger Airline Activity Forecasts

Enplaned Passenger Forecast Methodology

- Single variable regression analysis was selected for use in the baseline forecast
- Dependent variable – Historical MKE O&D passenger volumes
- Independent variables – Local (Airport Service Area) and national socioeconomics
  - The Airport Service Area was defined as a six region grouping of counties in Wisconsin and adjacent parts of Illinois, Iowa, Michigan and Minnesota (map provided on following slide)
  - For both the Airport Service Area and United States, six socioeconomic factors were evaluated (Population, Employment, Earnings, Personal Income, Per Capita Personal Income, and GDP/GRP)
- Connecting passenger volumes are expected to be limited throughout the forecast period, but will grow as additional capacity is introduced providing new connecting opportunities
- Near-term (2019) forecasts were refined based on published airline schedules and anticipated load factors and completion factors
- Other specific factors identified in the market assessment were incorporated to support both near-term and longer-term activity including
  - Economic and population growth in the Southeastern Wisconsin region
  - Current airline and passenger mix
  - Growth of ultra low-cost carriers

Airport Service Area - Six Zone Region

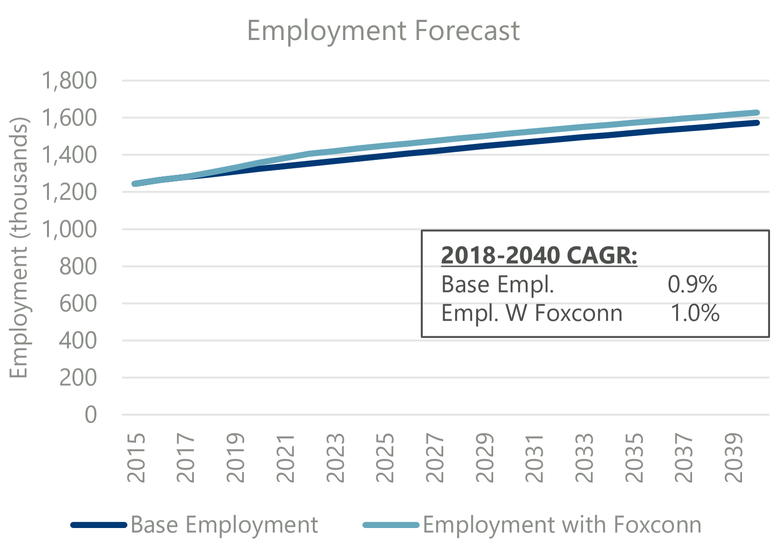
- Milwaukee Area
- Madison Area
- Green Bay Area
- Other Wisconsin (includes cc
- Northern Illinois
- Rockford Area

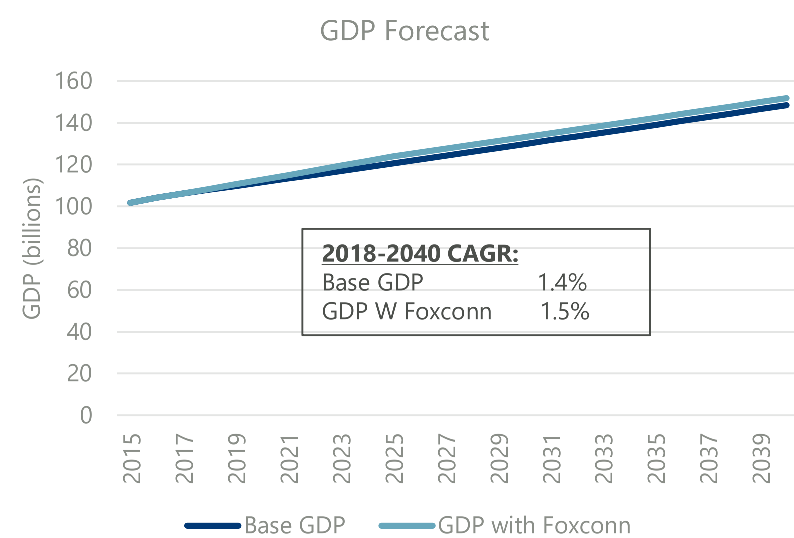


Source: *Milwaukee General Mitchell International Airport Leakage Study*, September 2018.

Enplaned Passenger Forecast Methodology

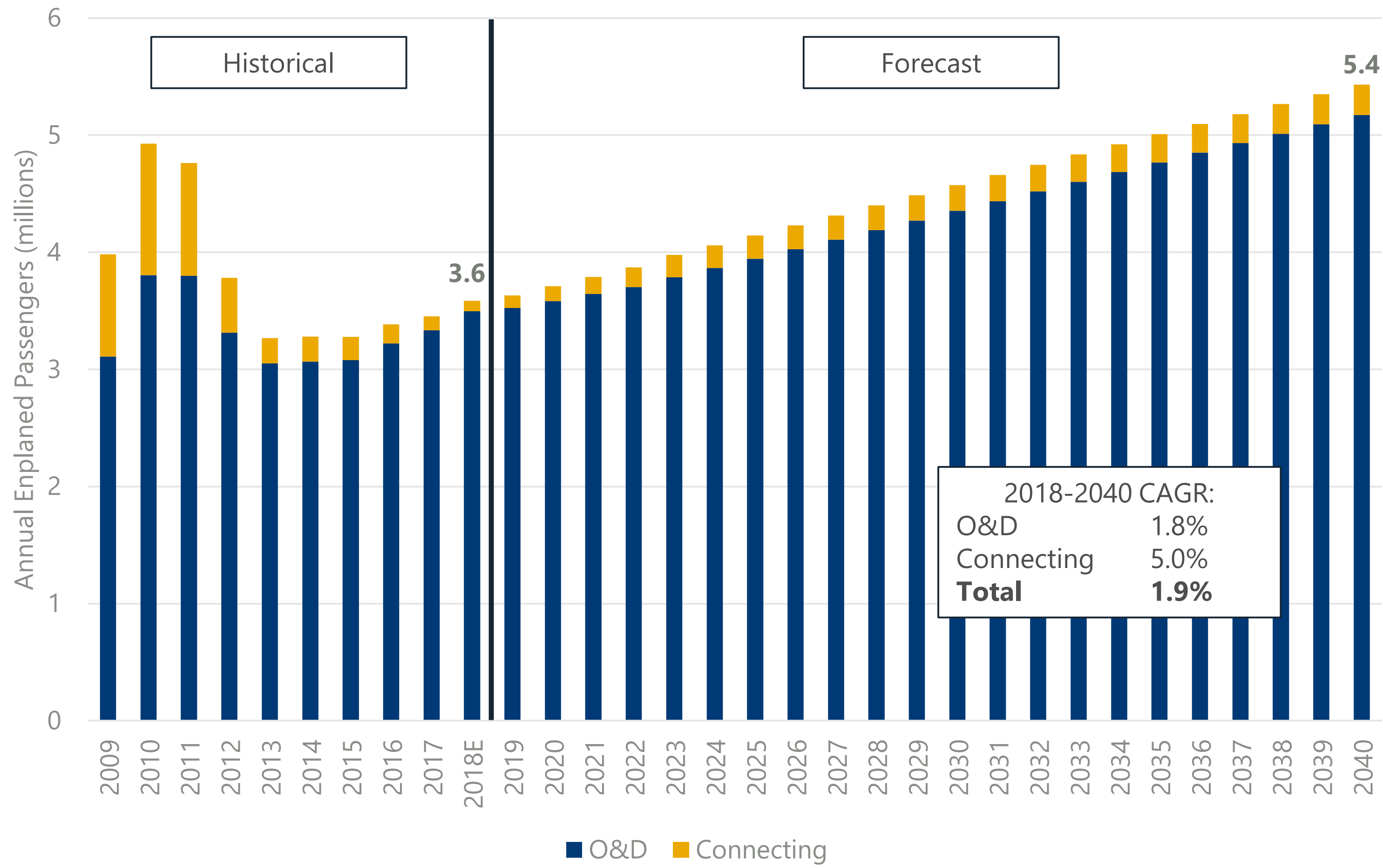
- The independent forecasts of socioeconomics were adjusted to account for the estimated impact of Foxconn developments and other growth drivers in Southeastern Wisconsin
- Projections of economic impact were sourced from various studies commissioned by both Foxconn and the State of Wisconsin
- The baseline forecast assumes an incremental benefit of 50 percent of the estimated maximum economic impact per these studies





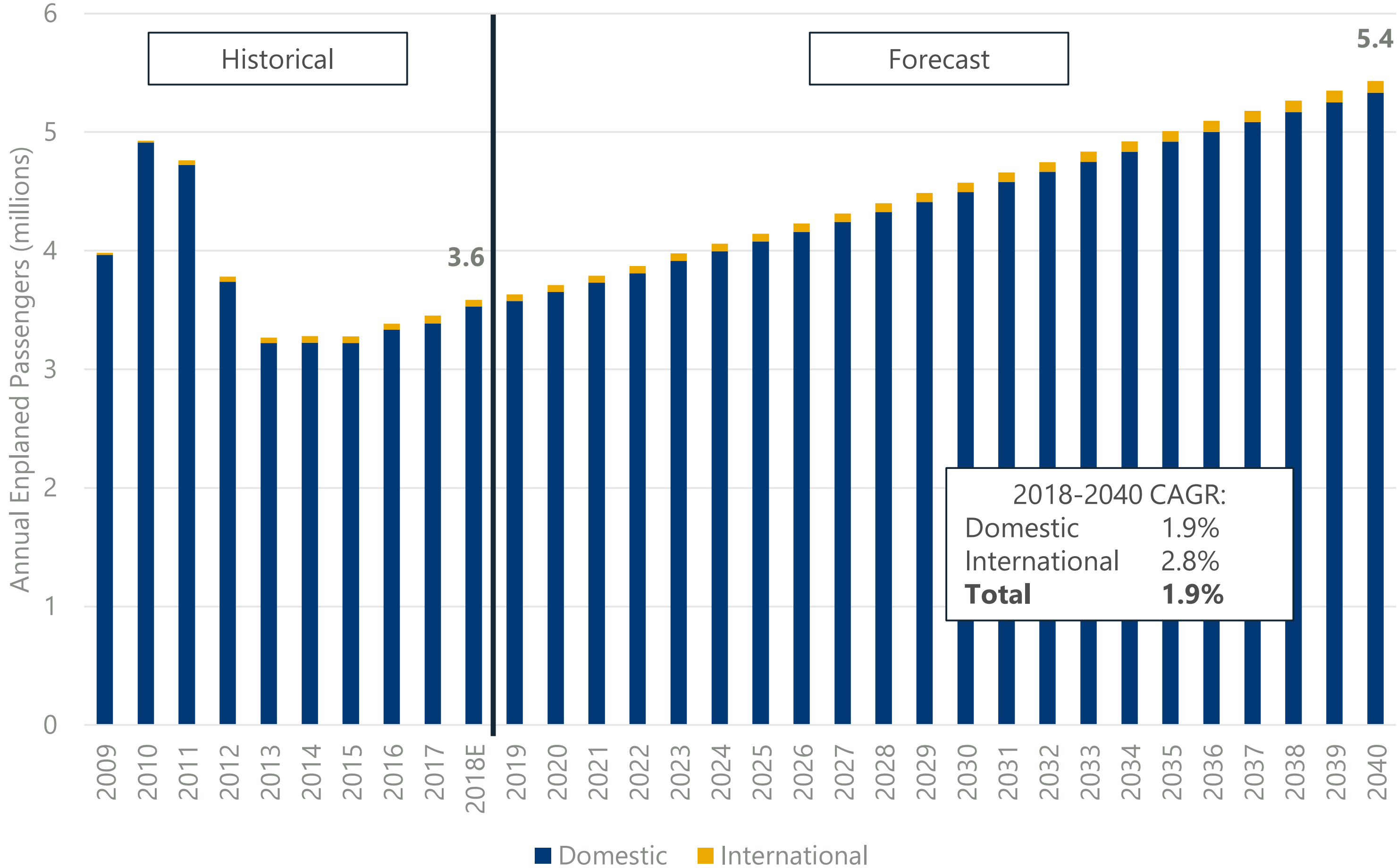
Source:. EY *Quantifying Project Flying Eagles Potential Economic Impacts on Wisconsin*, July 2017; *An Evaluation of the Economic Impact of the Foxconn Proposal*, Noah Williams Center for Research on the Wisconsin Economy (CROWE) Univ. of Wisconsin-Madison, August 2017; Woods & Poole Economics, Inc. 2018.

Enplaned Passenger Forecast Results – O&D vs. Connecting



Source: Milwaukee General Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), November 2018.

Enplaned Passenger Forecast Results – Domestic vs International

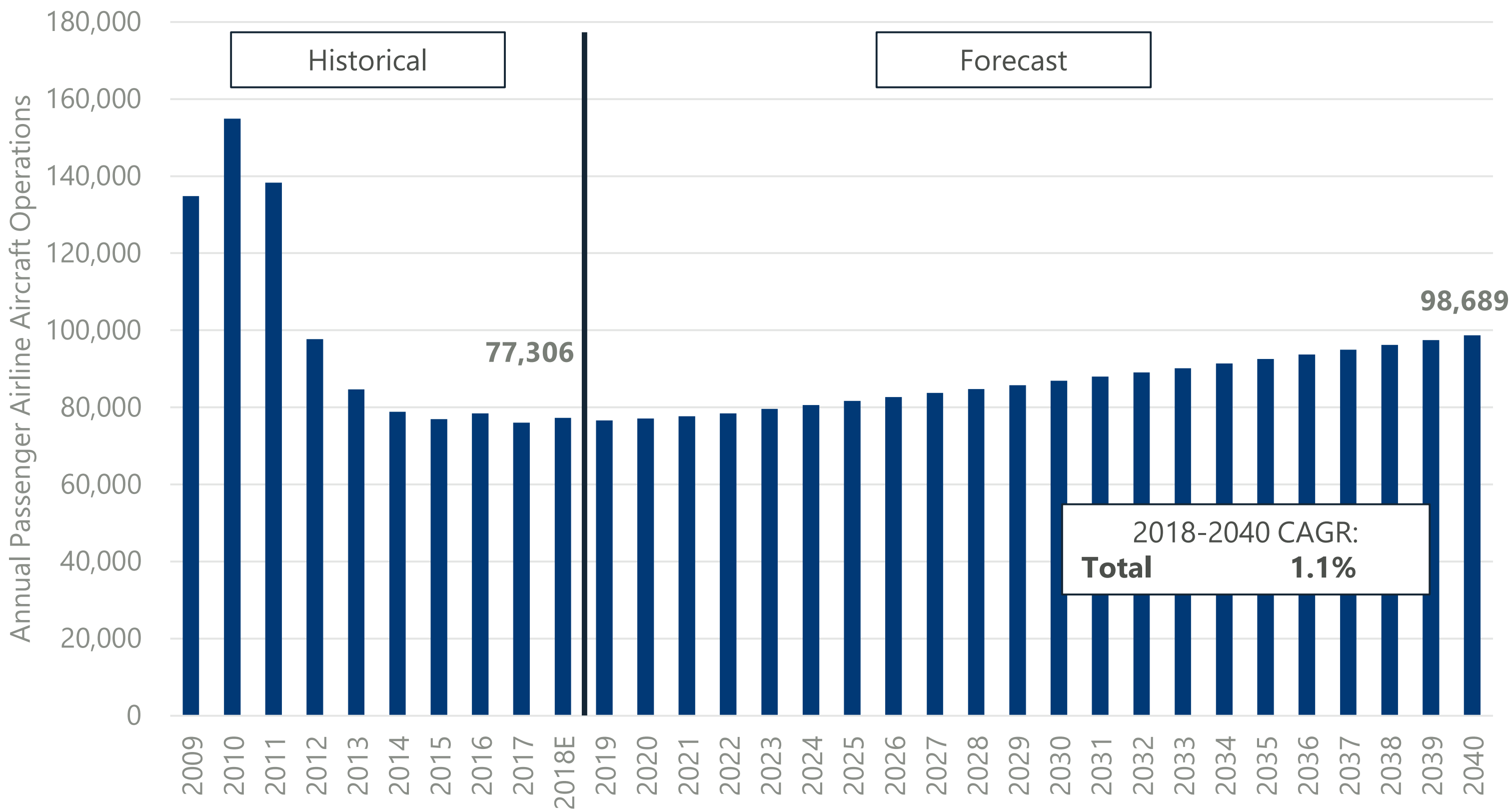


Source: Milwaukee General Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), November 2018.

Passenger Airline Operations Forecast Methodology

- Passenger growth was accommodated in a combination of three ways
  - New flights
  - Larger aircraft
  - Increased load factors
- Future fleet mixes were developed for the airlines operating at the Airport based on published aircraft orders and airline-specific aircraft retirement schedules where available
- Operations were grown using average seats per departure and load factor assumptions
- Future average seats per departure were informed by:
  - Fleet mixes
  - Expectations of airline capacity deployment at the Airport
  - Recent trends of carriers operating at the Airport

Passenger Airline Operations Forecast Results

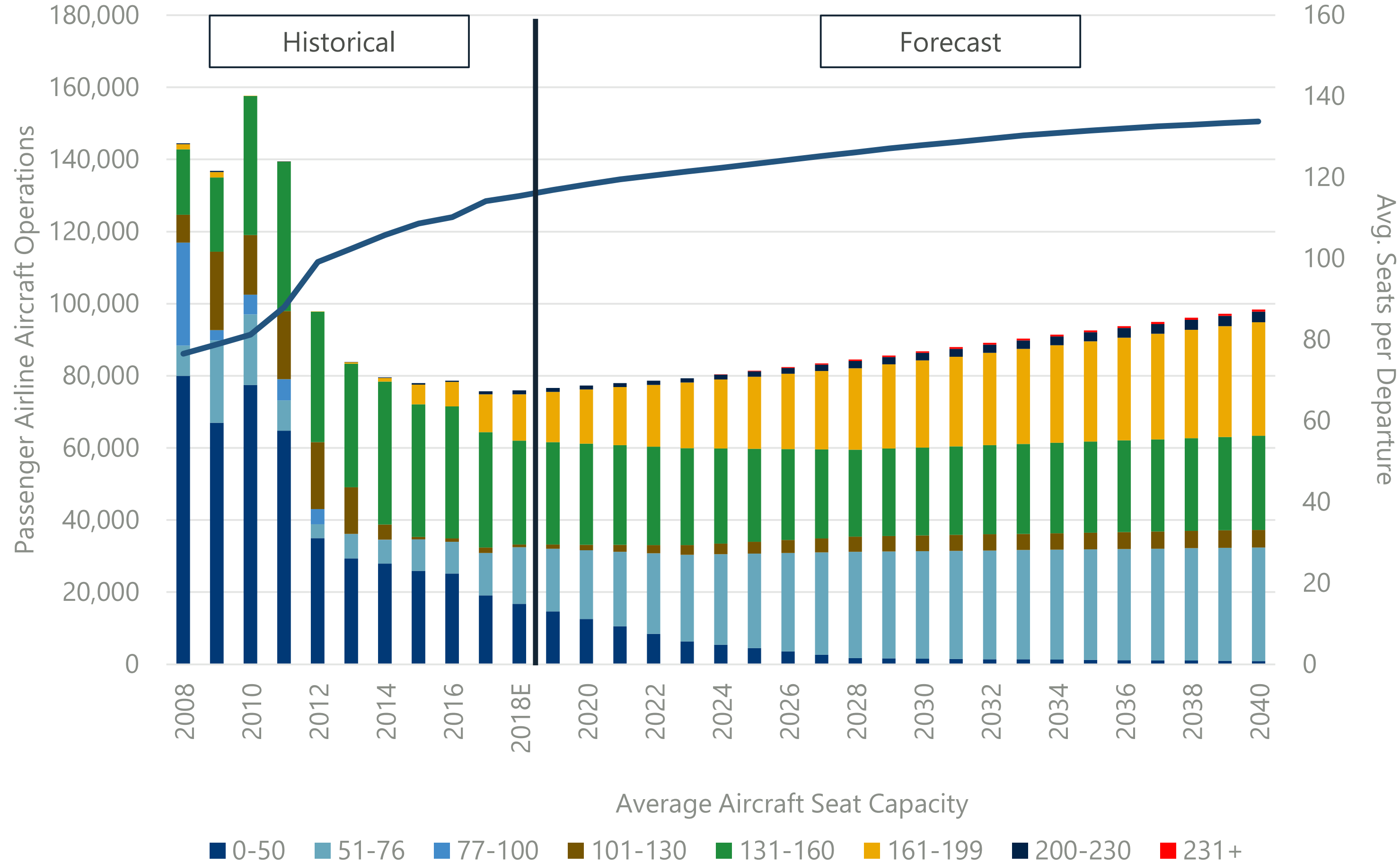


Source: Milwaukee General Mitchell International Airport (Historical); U.S. DOT T-100; Ricondo & Associates, Inc. (Forecast), November 2018.

Passenger Airline Fleet Mix Methodology and Assumptions

- Future fleet mixes were informed by known aircraft orders, and airline-specific aircraft retirements, when available
- The use of 50-seat regional aircraft will continue to decline throughout the forecast period as these aircraft are replaced with larger regional jets and small mainline aircraft
- In general, carriers will continue to upgauge their fleets through the use of higher capacity aircraft
  - Southwest's fleet orders are comprised almost entirely of 175-seat 737 MAX 8 aircraft
  - American and United are each in the process of or have recently completed densifying their narrow body fleets
- Use of high density narrowbody aircraft by ULCCs will increase over the forecast period

Passenger Airline Fleet Mix Results

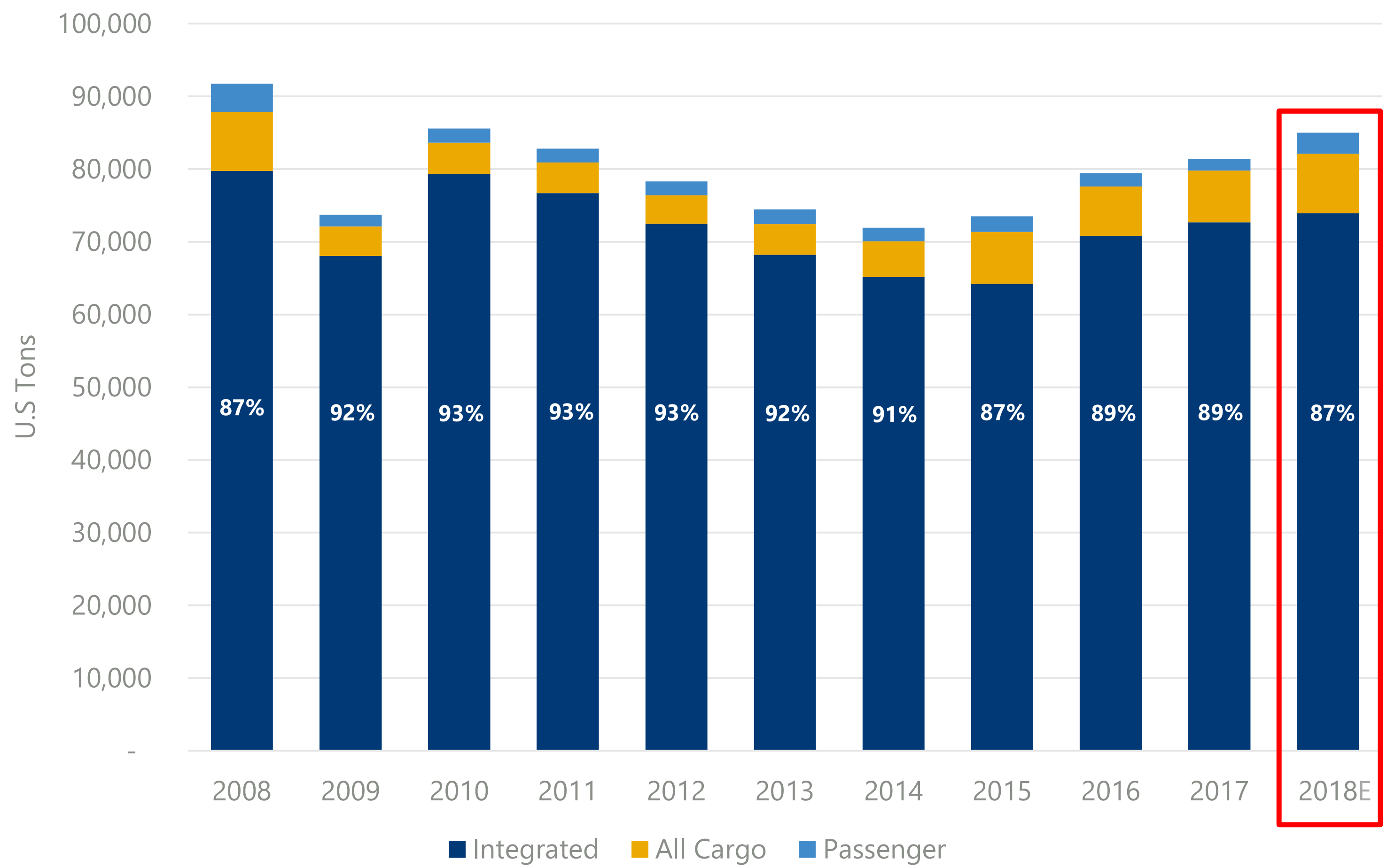


Source: Milwaukee General Mitchell International Airport (Historical); U.S. DOT T-100; Ricondo & Associates, Inc. (Forecast), November 2018.

Air Cargo Forecasts

MKE
GENERAL MITCHELL INTERNATIONAL AIRPORT

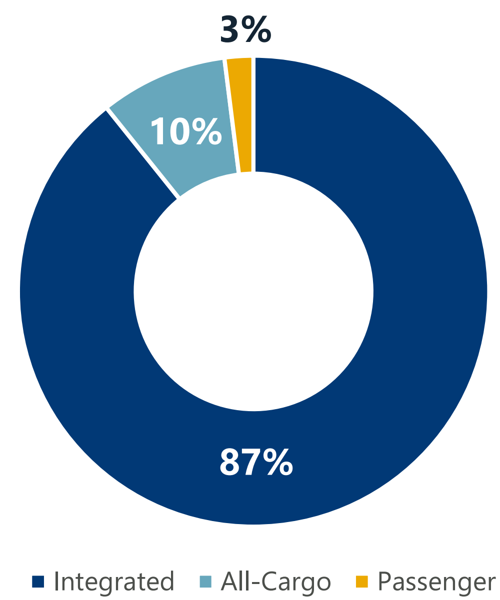
MKE Cargo Market Experienced Recent Increase in Tonnage After Period of Steady Decline



Source: Milwaukee General Mitchell International Airport, October 2018; US DOT T-100, June 2018.

MKE Cargo: Market Share by Carrier Group (2018E)

- The integrated carriers (FedEx and UPS) account for 87% of the total cargo handled at MKE in 2018E
  - This market share is down from 92% in 2013
- The all-cargo carrier group has grown from 5% of total tonnage in 2013 to 10% in 2018E
  - DHL is considered an all-cargo carrier in the U.S. market as it outsources local delivery and pickup operations to partner companies
- The passenger carriers have maintained a relatively minor market share of the MKE cargo tonnage



Source: Milwaukee General Mitchell International Airport (Historical), October 2018; U.S. DOT T-100, June 2018.

MKE Cargo: Historical Data (Top Carriers)

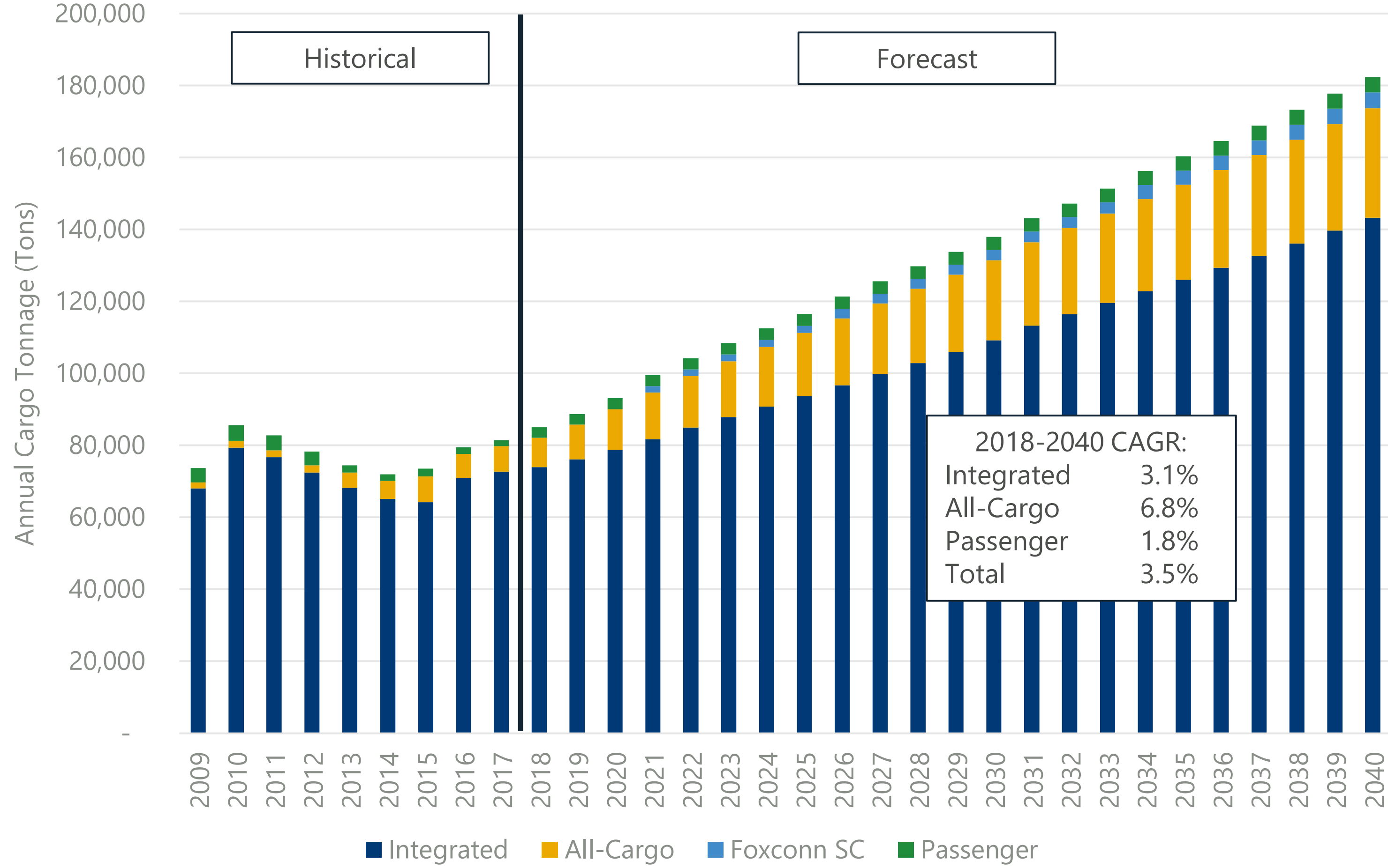
- FedEx is the largest cargo carrier, accounting for over 56% of the total cargo handled at MKE in 2018E; a steady market share since 2013
- UPS' tonnage has been steady, with an estimated slight decline from 2017 to 2018, largely due to the company's use of trucking and facility issues at the Airport
- DHL has experienced strong year over year percentage growth since initiating service at the Airport in 2014
  - Amazon is rapidly expanding its U.S. network and outsources significant capacity to DHL and other carriers (Atlas, ATI, etc.)
- Southwest is the largest passenger carrier but its aircraft fleet and route network produces limited cargo capacity

	HISTORICAL TONNAGE (TONS)					CAGR
TOP AIRLINES	2014	2015	2016	2017	2018E	2014-2018E
FedEx	37,461	37,127	43,779	45,390	49,298	7.1%
UPS	27,682	27,071	27,035	27,264	24,625	(2.9)
DHL	691	2,734	3,082	3,405	4,599	60.6
Freight Runners	2,374	2,618	2,247	2,372	2,032	(3.8)
CSA Air	1,660	1,694	1,317	1,268	1,561	(1.5)
Southwest	1,464	1,661	1,470	1,227	1,172	(5.4)
Delta	266	337	268	274	1,172	44.8
American	76	76	98	111	494	59.8
Ameriflight	147	126	119	75	39	(66.8)
Others *	119	51	15	4	2	(96.7)
TOTAL MKE CARGO	**71,942**	**73,496**	**79,430**	**81,391**	**84,998**	**3.4%**

Source: Milwaukee General Mitchell International Airport (Historical), October 2018; U.S. DOT T-100, June 2018.

* -- Others include Alaska, Frontier, Mountain Air Cargo, US Airways, US Checks-Airnet

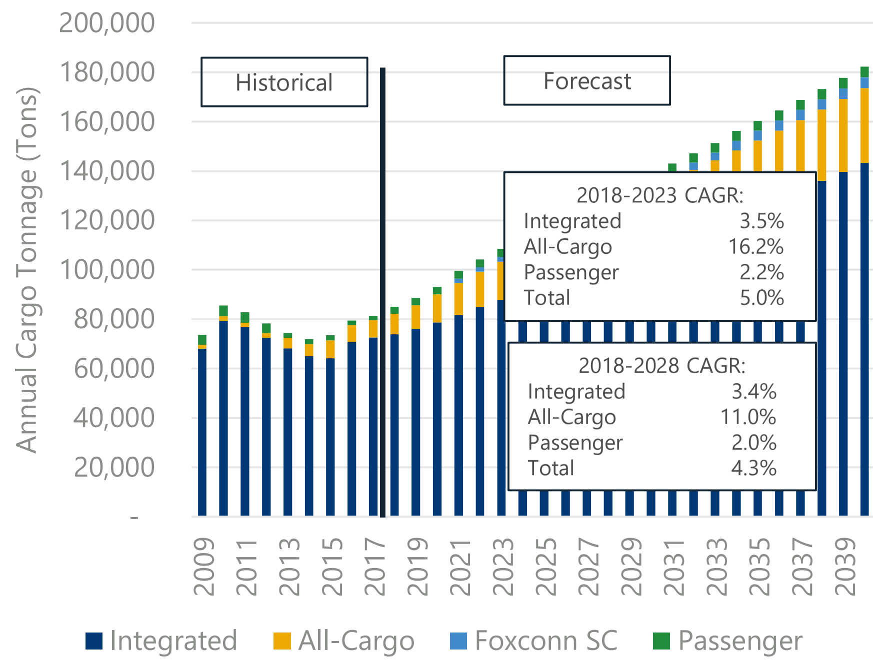
Air Cargo Forecast Results – Integrated, All-Cargo, and Passenger



Source: Milwaukee General Mitchell International Airport (Historical); U.S. DOT T-100; Ricondo & Associates, Inc. (Forecast), November 2018.

Air Cargo Forecast Results – Detailed Outlook by Carrier Group

- Near-term (5 years), it is expected that the integrated carrier group will get a slight boost from Foxconn economic activity and UPS facility (re)development at MKE
- All-cargo group will continue to surge both from Amazon/DHL (2nd fulfillment center) and expected Foxconn activity (from a traditional international forwarding/logistics strategy that largely utilizes ORD and direct freighter flights into MKE when supply chain disruptions occur)
- Longer timeframe (10 years), integrated carriers slows slightly to more regional economic growth and the all-cargo group continues to experience robust growth, albeit down from first 5 years of planning horizon
- Passenger airlines' cargo tonnage totals keep pace with the fleet growth and forecast outlook



Source: Milwaukee General Mitchell International Airport (Historical); U.S. DOT T-100; Ricondo & Associates, Inc. (Forecast), November 2018.

Cargo Forecast – Freighter Operations Forecast

YEAR	FREIGHTER OPERATIONS
2015	13,236
2016	13,498
2017	13,354
2018E	13,477

Source: FAA Form 108, October 2018

	FREIGHTER VOLUME (TONS)	FREIGHTER AIRCRAFT OPERATIONS	PAYLOAD PER OPERATION (TONS)
HISTORICAL			
2018E	82,120	13,477	6.1
FORECAST			
2023	105,214	16,108	6.5
2028	126,218	18,386	6.9
2040	178,045	23,017	7.7

Source: FAA Form 108, October 2018

	2018E	2023	2028	2040
FORECAST FREIGHTER OPERATIONS	13,477	16,108	18,386	23,017
Piston/Turboprop	9,628	11,276	12,870	16,112
Narrowbody	1,270	1,611	1,839	2,302
Widebody	2,580	3,222	3,677	4,603

Source: FAA Form 108, October 2018

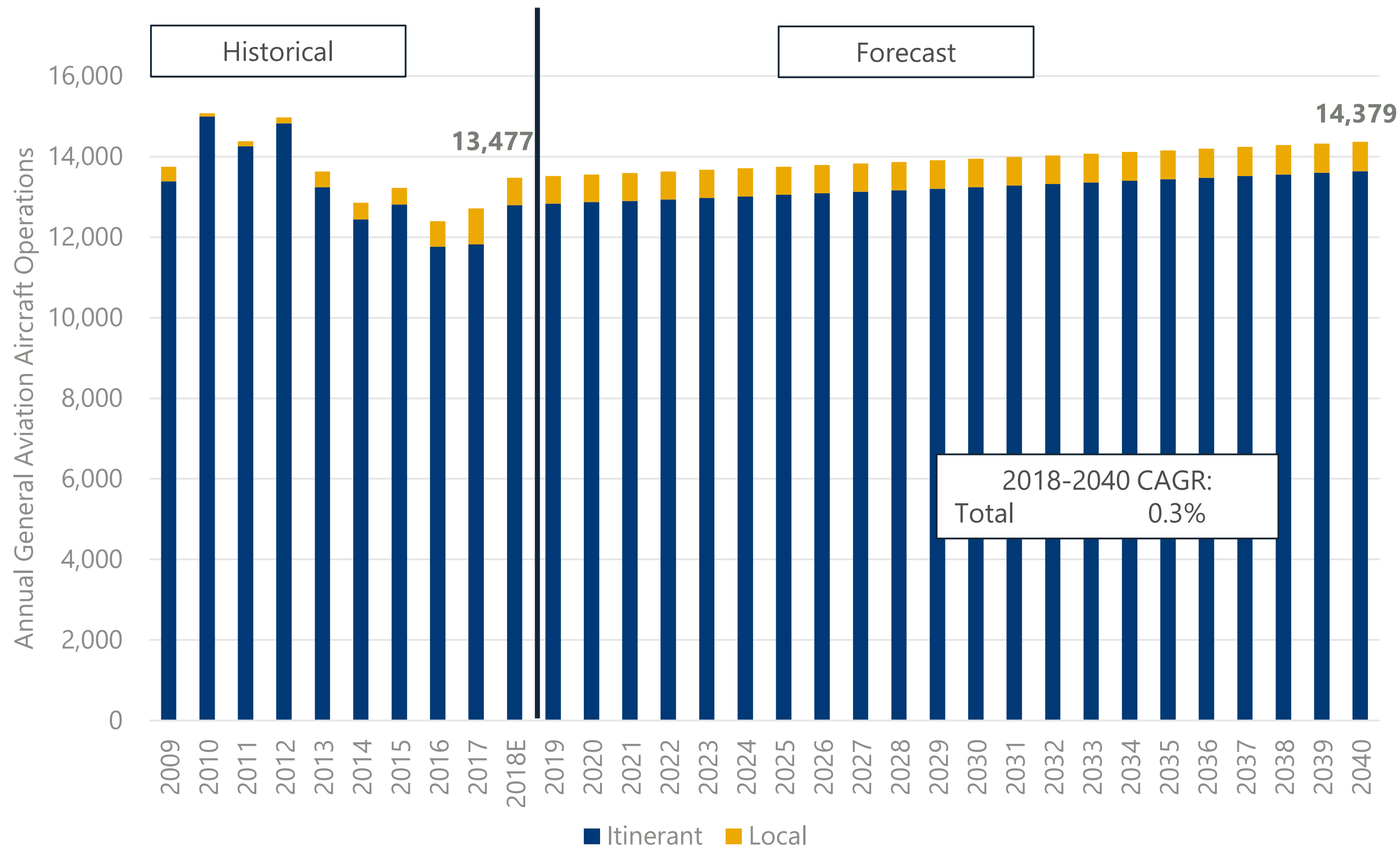
- Freighter operations have remained steady over the past several years
- A preponderance (71%) of the freighters are regional turboprop aircraft from airlines such as Freight Runners and CSA
- UPS, FedEx, and DHL operate a mix of freighter aircraft with widebody (MD-11 and A-300) and narrowbody (757 and 737) utilized
- In the most recent Boeing Outlook Forecast, it is expected that growth narrowbody freighter aircraft will outpace that of widebody and especially at MKE with Amazon's intended 737 increase within their growing fleet

General Aviation and Military Forecasts

General Aviation Operations Forecast Methodology

- Similar to the passenger activity forecasts, multiple approaches were used to forecast general aviation (GA) activity
- MKE GA operations are not meaningfully correlated with socioeconomic variables
  - Total GA operations decreased at a compound annual growth rate (CAGR) of 11.1% from 1990 to 2008 while socioeconomic variables increased at an average CAGR of 3.1%
  - From 2009 to 2017, total GA operations were generally flat while socioeconomic variables increased at an average CAGR of 1.2%
- Since 2010, GA operations have represented a stable share of total regional and national GA operations
  - Approximately 0.87% of total GA operations in Wisconsin
  - Approximately 0.05% of total GA operations in the United States
- The share of 0.05% was applied to the forecast of national GA operations in the Federal Aviation Administration (FAA) National Aerospace Forecast
- The future share of itinerant and local operations were assumed to be the average respective shares from 2015 to 2017

General Aviation Operations Forecast Results

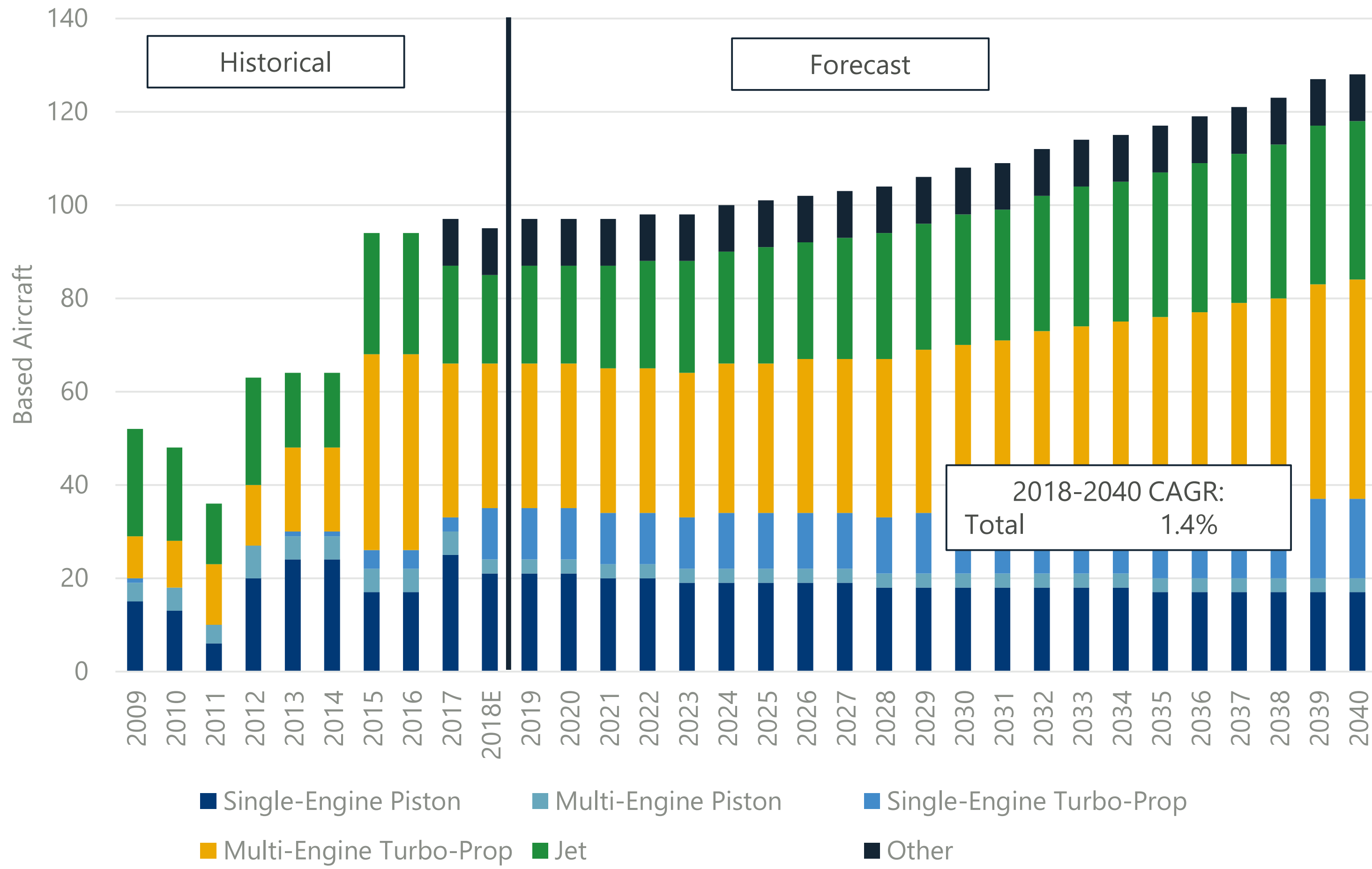


Source: Milwaukee General Mitchell International Airport, FAA Operations Network (OPSNET), (Historical); Ricondo & Associates, Inc. (Forecast), November 2018.

General Aviation Based Aircraft Forecast Methodology

- From 2015 to 2018E, based aircraft at the Airport have represented a generally stable share of active GA hours flown, as reported in the *FAA National Aerospace Forecast*
  - Based on engine type (e.g., single-engine piston based aircraft relative to single-engine piston active GA hours flown)
- Conversations with Airport stakeholders indicate that there is demand for hangar space that cannot be accommodated currently, primarily jet aircraft
- The average based aircraft at the Airport per GA hours flown from 2015 to 2018 was applied to the *FAA National Aerospace Forecast* of GA hours flown for the respective engine type

General Aviation Based Aircraft Forecast

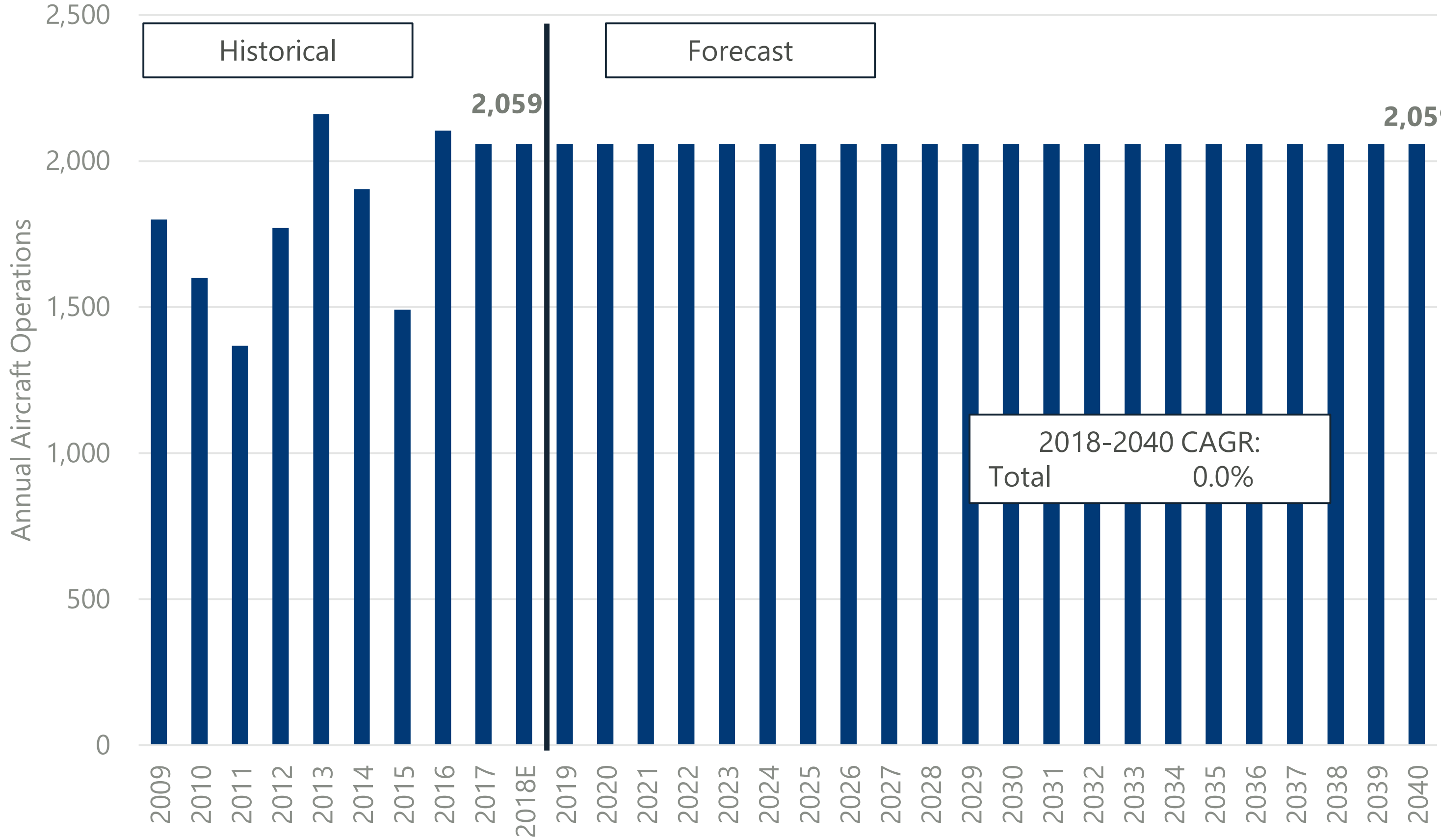


Source: Milwaukee General Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), November 2018.

Military Aircraft Operations Forecast

- The 128^{th} Air Refueling Wing (ARW) is a unit of the Wisconsin Air National Guard located at MKE operating KC-135 Stratotanker aerial refueling (tanker) aircraft
- The KC-135 is scheduled to be gradually replaced by KC-46 Pegasus aircraft (the first aircraft are expected to be operational in the USAF by 2019)
- It is assumed that the unit will eventually transition to the KC-46
  - The exact timeline is uncertain, but ANG units may receive new aircraft after active duty units
  - The forecast assumes that the Air Force will not change the unit's mission over the forecast period
- The Department of Defense does not provide guidance for future activity levels
- The FAA's TAF forecasts military operations to remain constant based on the last year of actual at civilian airports with military operations
- The 128^{th} ARW is not currently listed as a candidate for Base Realignment and Closure action
- Based on these supporting factors, we have used the TAF forecast methodology of military aircraft operations at MKE, with calendar year 2017 as the baseline

Military Aircraft Operations Forecast Results



Source: FAA Operations Network (OPSNET); November 2018.

Comparison to the 2017 Terminal Area Forecast

FAA Terminal Area Forecast

- Official FAA forecast of aviation activity for U.S. airports
- Includes active airports in the National Plan of Integrated Airport Systems (NPIAS)
- Prepared to meet budgeting and planning needs of the FAA
- Updated annually by the FAA

APO TAF Quick Data Summary Report - Facility

For National Forecast 2017 -- 2017 Scenario

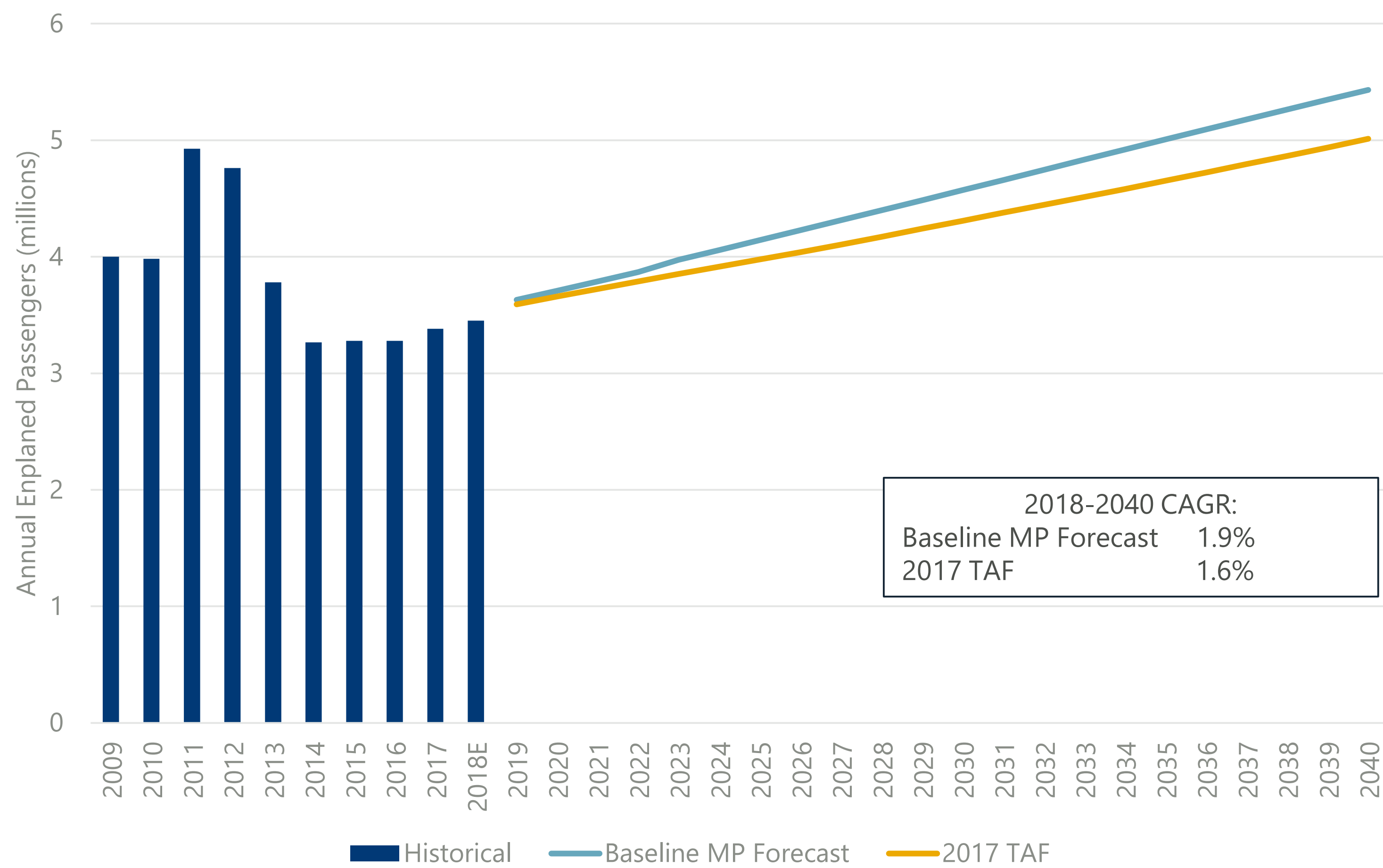
Region State: AGL-WI
City: MILWAUKEE

LOCID: MKE Combined TRACON &Tower with Radar
Airport: GENERAL MITCHELL INTL

2016 Based Aircraft: 100

	--ENPLANEMENTS--			--AIRPORT OPERATIONS--									--TRACON--
				Itinerant Operations					Local Operations				
Fiscal Year	Air Carrier	Commuter	Total	Air Carrier	AT & Commuter	GA	Military	Total	Civil	Military	Total	Total OPS	Total OPS
2013	2,450,598	777,254	3,227,852	59,413	44,942	13,364	1,996	119,715	332	430	762	120,477	231,566
2014	2,512,352	743,569	3,255,921	55,877	43,949	12,751	1,987	114,564	467	448	915	115,479	228,344
2015	2,486,541	735,260	3,221,801	55,940	40,752	12,376	1,699	110,767	346	129	475	111,242	224,925
2016	2,556,261	742,160	3,298,421	57,674	41,346	12,253	1,840	113,113	563	226	789	113,902	227,363
2017 *	2,714,838	669,036	3,383,874	60,861	35,792	11,685	2,136	110,474	896	173	1,069	111,543	226,323
2018 *	2,774,554	740,589	3,515,143	64,580	34,852	11,935	2,136	113,503	989	173	1,162	114,665	231,515
2019 *	2,836,111	755,987	3,592,098	67,946	32,657	11,935	2,136	114,674	989	173	1,162	115,836	233,151
2020 *	2,891,317	769,721	3,661,038	71,480	30,012	11,935	2,136	115,563	989	173	1,162	116,725	234,331
2021 *	2,942,758	782,208	3,724,966	75,713	26,300	11,935	2,136	116,084	989	173	1,162	117,246	234,892
2022 *	2,995,065	794,967	3,790,032	80,173	22,313	11,935	2,136	116,557	989	173	1,162	117,719	235,352
2023 *	3,046,218	807,504	3,853,722	83,088	20,378	11,935	2,136	117,537	989	173	1,162	118,699	236,727
2024 *	3,096,773	819,937	3,916,710	84,668	20,249	11,935	2,136	118,988	989	173	1,162	120,150	238,941
2025 *	3,145,895	832,035	3,977,930	85,963	20,467	11,935	2,136	120,501	989	173	1,162	121,663	241,290
2026 *	3,196,570	844,501	4,041,071	87,298	20,688	11,935	2,136	122,057	989	173	1,162	123,219	243,700
2027 *	3,249,049	857,228	4,106,277	88,675	20,912	11,935	2,136	123,658	989	173	1,162	124,820	246,178
2028 *	3,303,095	870,319	4,173,414	90,091	21,138	11,935	2,136	125,300	989	173	1,162	126,462	248,719
2029 *	3,358,808	883,844	4,242,652	91,552	21,367	11,935	2,136	126,990	989	173	1,162	128,152	251,329
2030 *	3,413,780	897,217	4,310,997	92,996	21,597	11,935	2,136	128,664	989	173	1,162	129,826	253,925
2031 *	3,468,595	910,380	4,378,975	94,431	21,830	11,935	2,136	130,332	989	173	1,162	131,494	256,521
2032 *	3,523,218	923,361	4,446,579	95,856	22,066	11,935	2,136	131,993	989	173	1,162	133,155	259,109
2033 *	3,576,951	936,129	4,513,080	97,258	22,305	11,935	2,136	133,634	989	173	1,162	134,796	261,670
2034 *	3,632,694	949,449	4,582,143	98,714	22,546	11,935	2,136	135,331	989	173	1,162	136,493	264,314
2035 *	3,689,691	963,083	4,652,774	100,203	22,790	11,935	2,136	137,064	989	173	1,162	138,226	267,018
2036 *	3,747,574	976,851	4,724,425	101,712	23,037	11,935	2,136	138,820	989	173	1,162	139,982	269,758
2037 *	3,804,557	990,449	4,795,006	103,201	23,287	11,935	2,136	140,559	989	173	1,162	141,721	272,477
2038 *	3,861,822	1,004,026	4,865,848	104,696	23,540	11,935	2,136	142,307	989	173	1,162	143,469	275,217
2039 *	3,920,912	1,018,039	4,938,951	106,238	23,796	11,935	2,136	144,105	989	173	1,162	145,267	278,023
2040 *	3,980,499	1,032,243	5,012,742	107,795	24,054	11,935	2,136	145,920	989	173	1,162	147,082	280,859
2041 *	4,040,936	1,046,518	5,087,454	109,369	24,315	11,935	2,136	147,755	989	173	1,162	148,917	283,729
2042 *	4,100,981	1,060,695	5,161,676	110,934	24,579	11,935	2,136	149,584	989	173	1,162	150,746	286,595
2043 *	4,162,524	1,075,185	5,237,709	112,536	24,846	11,935	2,136	151,453	989	173	1,162	152,615	289,519
2044 *	4,224,878	1,089,777	5,314,655	114,155	25,116	11,935	2,136	153,342	989	173	1,162	154,504	292,483
2045 *	4,287,769	1,104,464	5,392,233	115,788	25,389	11,935	2,136	155,248	989	173	1,162	156,410	295,480
GR1	1.80	1.38	1.71	2.43	-1.67	-0.09	0.52	1.10	1.96	-0.92	1.34	1.10	0.91
GR2	1.65	1.81	1.68	2.32	-1.22	0.08	0.00	1.22	0.35	0.00	0.30	1.21	0.96

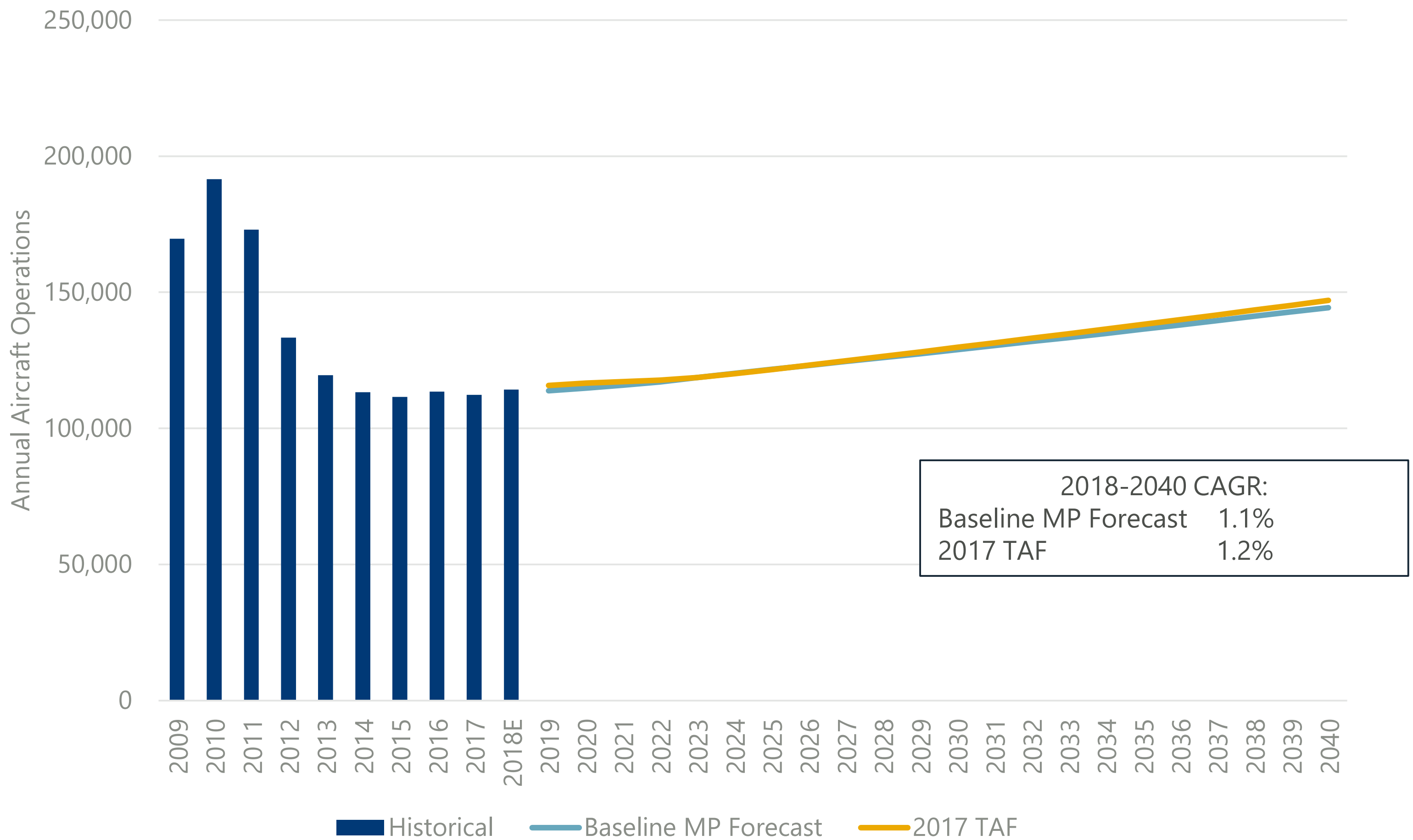
Comparison of Enplaned Passenger Forecasts



Note: The TAF excludes nonrevenue passengers and is presented in federal fiscal years. The master plan forecast includes nonrevenue passengers and is presented in calendar years

Source: Milwaukee General Mitchell International Airport (Historical); FAA *2017 Terminal Area Forecast*; Ricondo & Associates, Inc. (Forecast), November 2018.

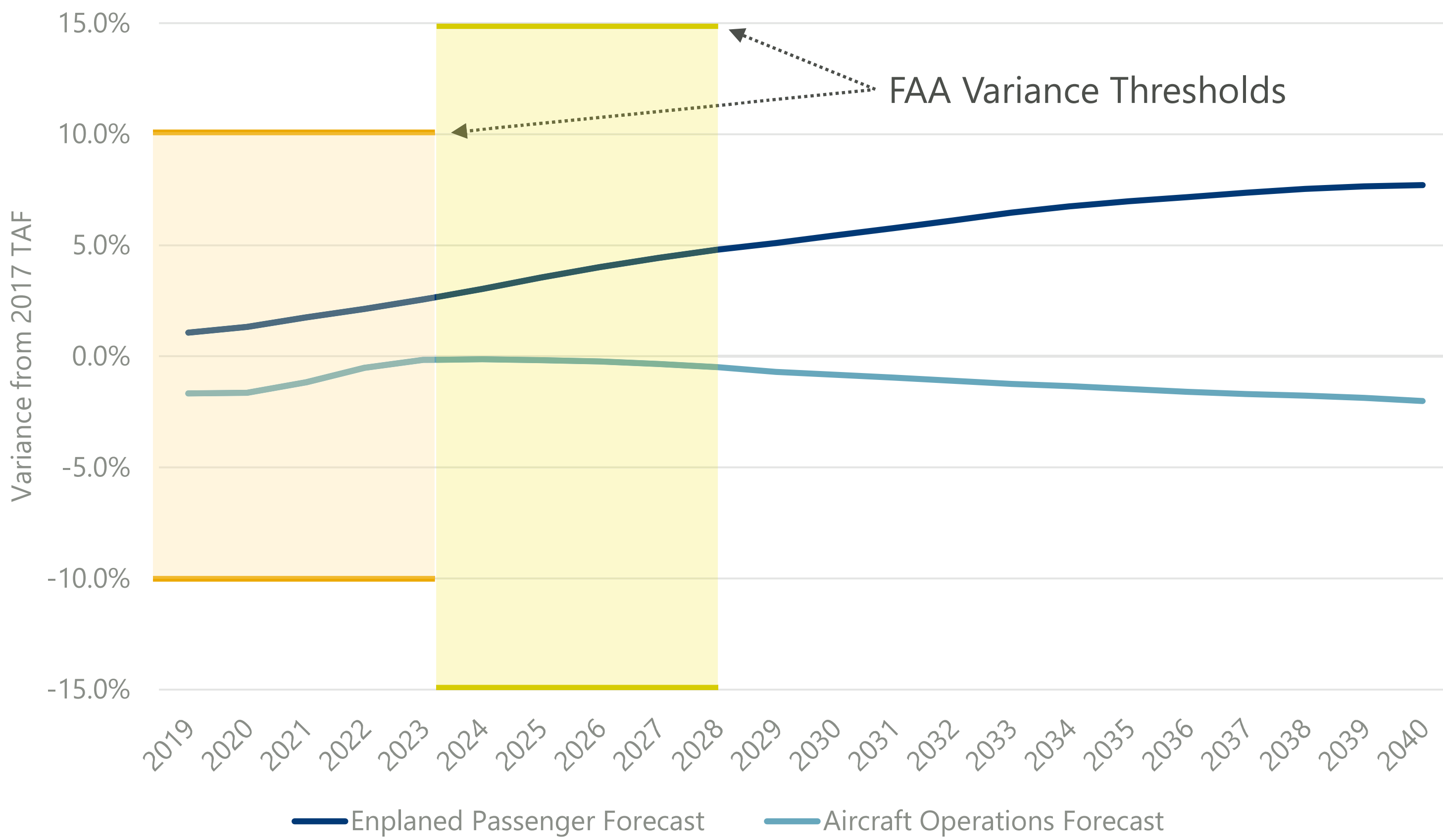
Comparison of Aircraft Operations Forecasts



Note: The TAF is presented in federal fiscal years, the master plan forecast is presented in calendar years.

Source: Milwaukee General Mitchell International Airport (Historical); FAA 2017 Terminal Area Forecast; Ricondo & Associates, Inc. (Forecast), November 2018.

Master Plan Forecast Variance from 2017 Terminal Area Forecast



Note: The TAF is presented in federal fiscal years, the master plan forecast is presented in calendar years.

Source: FAA 2017 Terminal Area Forecast; Ricondo & Associates, Inc. (Forecast), November 2018.

High Scenario Forecast (Modular Approach)

- **Commercial Passenger / General Aviation / Military**
  - Increased WN connecting activity (as MDW reaches capacity)
  - Full impact of Foxconn and related socioeconomic developments
  - Increased capture from counties between MKE and ORD (Kenosha, Lake, McHenry)
- **Cargo**
  - New bi-directional demand to accommodate Foxconn manufacturing activities
    - direct freighter flights from Asia (with component parts)
    - potential freighter flights to Europe/Asia (with finished goods)
  - Additional DHL activity to accommodate e-commerce/Amazon recent cargo demand patterns and to support new sort center in Oak Creek
  - Additional FedEx/UPS flights to support expanding e-commerce activity

High Scenario Forecast: Adjustment to Baseline Forecast to accommodate uncertainties and incorporate flexibility into the planning conclusions and recommendations

Next Steps

Next Steps

- Finalize Inventory
  - Terminal observations
  - Tenant survey
- Forecast
  - Baseline Forecast submittal to FAA
  - High scenario forecast
  - Design Day Flight Schedule
- Public Meeting – January 16, 2019
- Early Action Plan
- Demand/Capacity analysis
- Determination of operational and facility needs

APPENDIX E.2

Stakeholder Advisory Group (SAG) Meeting #2

Stakeholder Advisory Group

Meeting #2




MASTER PLAN **2040**

MKE MILWAUKEE

Agenda

- Introductions
- Master Plan Status
- Forecast of Activity
  - High Passenger and Cargo Activity Scenario
  - Design Day Flight Schedule (DDFS)
- Facility Requirements Overview
  - Airfield Facilities
  - Terminal Facilities
  - Landside Facilities
  - Support Facilities (cargo, general aviation, other)
- Next Steps

Introductions

- Stakeholder Advisory Group (SAG)

  SAG Role: Provide input and feedback on factors that influence the role of the Airport in the region, the relationship of the Airprot to the community, and serve as a conduit for Master Plan information throughout the community.

- Master Plan Team

Introductions

Colleen E. Quinn, Ricondo
Project Manager

Michael D. Truskoski, Ricondo
Deputy Project Manager

Erik Wilkins, Ricondo
Airfield & Airspace

Greg Stern, Mead & Hunt
Support Facilities

Bart Gover, Mead & Hunt
Support Facilities

Master Plan Process

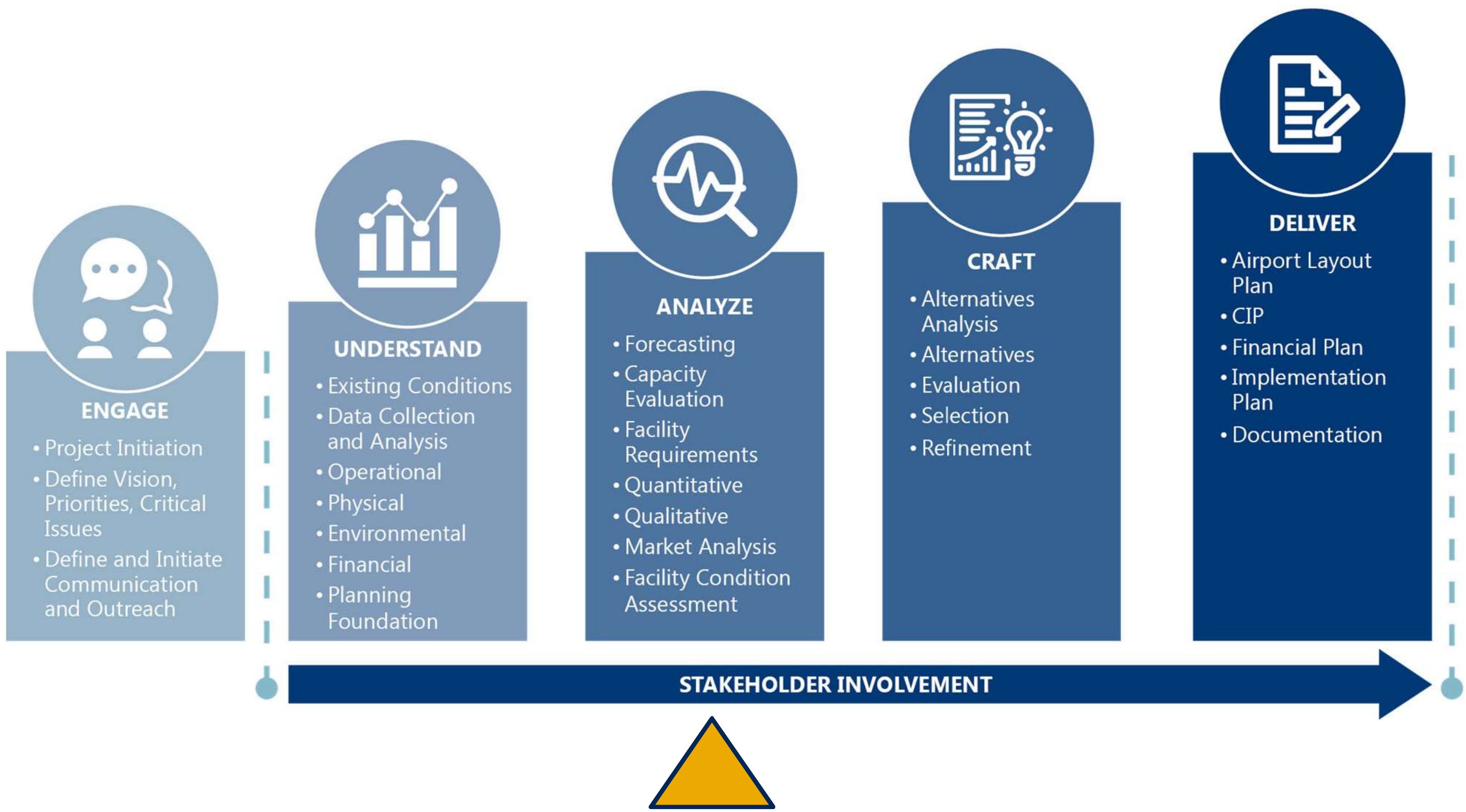
- FAA-guided process

The goal of a master plan is to provide the framework needed to guide future airport development that will cost effectively satisfy aviation demand, while considering potential environmental and socioeconomic impacts.

FAA AC 150/5070-6B, Airport Master Plans

- Unique to the issues and challenges faced by MKE
- Objectives
  - Forecast activity
  - Define and justify proposed development
  - Provide effective graphic representation of development (ALP Drawing)
  - Establish realistic implementation schedule
  - Propose an achievable financial plan
  - Establish a flexible framework for continued planning and decision-making

Master Plan Process



Aviation Activity Forecast

Forecast Overview

Baseline Forecast

- Subject to FAA review; approval is required
- Comparison is made to then-current Terminal Area Forecast
- Basis for Airport Layout Plan (ALP) facility depiction
- Basis for Financial Feasibility Analysis (cost estimates)
- Basis for Implementation Plan
  - CIP
  - Triggered development
- Forecast presented on calendar basis but serves as future "planning activity levels" (PALs)
- FAA has approved Baseline Forecast

High Scenario Forecast

- Ensures master plan recommendations are sufficiently flexible to accommodate variation in activity from changes to competitive and socioeconomic environments assumed in Baseline Forecast
- Reflects changes in magnitude and/or characteristics
- Used to define future facility expansion or development areas on ALP (protects the capacity for organized expansion if needed)

High Forecast Elements

Passenger Component – three elements (modeled independently)

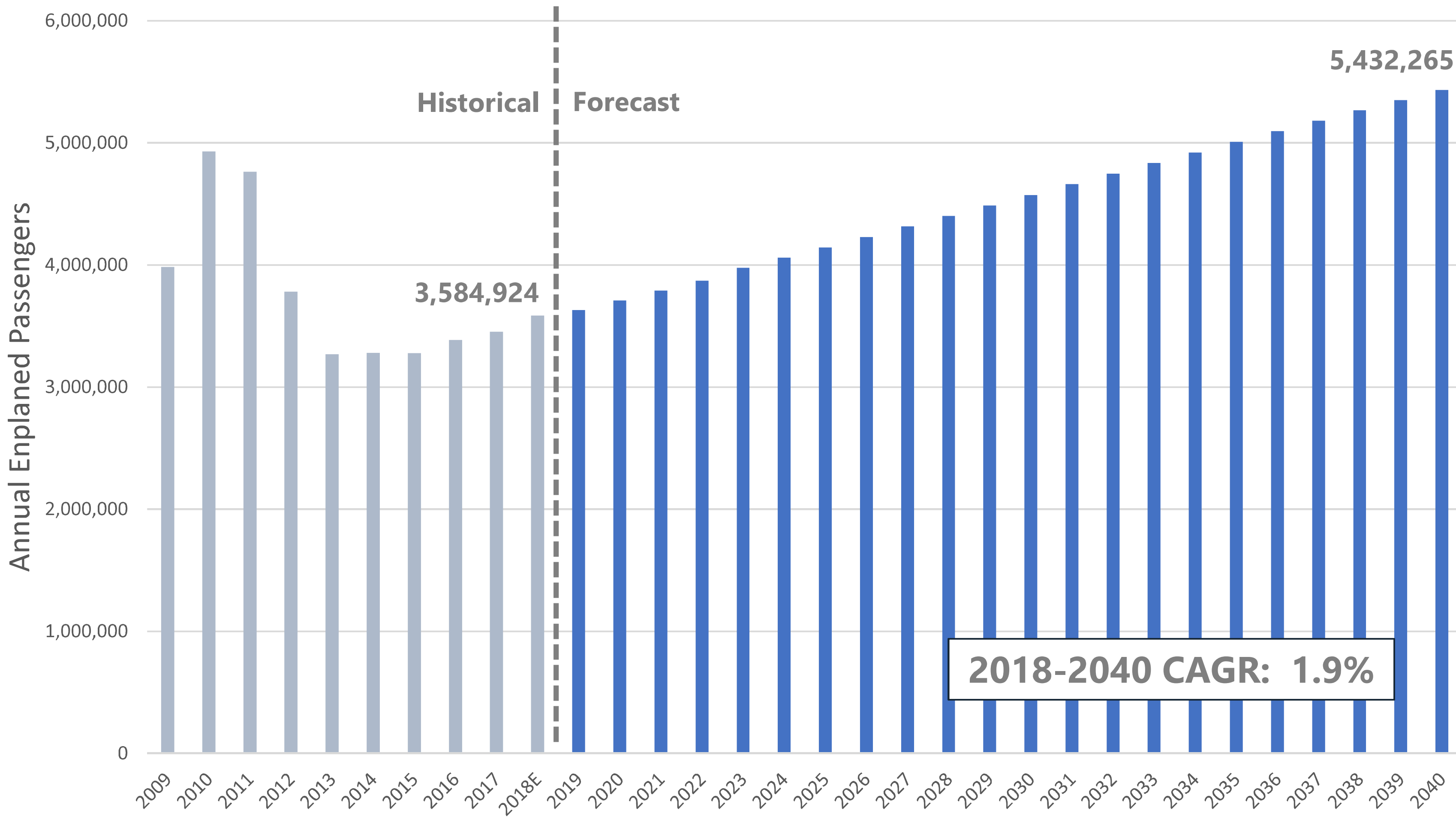
- Increased connecting activity
- Increased economic activity in Southeastern Wisconsin
- Greater capture of passengers residing in counties between Milwaukee and Chicago (Kenosha and Racine Counties, Wisconsin; Lake and McHenry Counties, Illinois)

Cargo Component

- Three Cargo High Forecast elements
- New bidirectional demand to accommodate regional manufacturing
- Additional DHL activity to accommodate e-commerce and recent Amazon demand patterns and to support new Oak Creek fulfillment center
- Additional FedEx/UPS activity to support expanding e-commerce

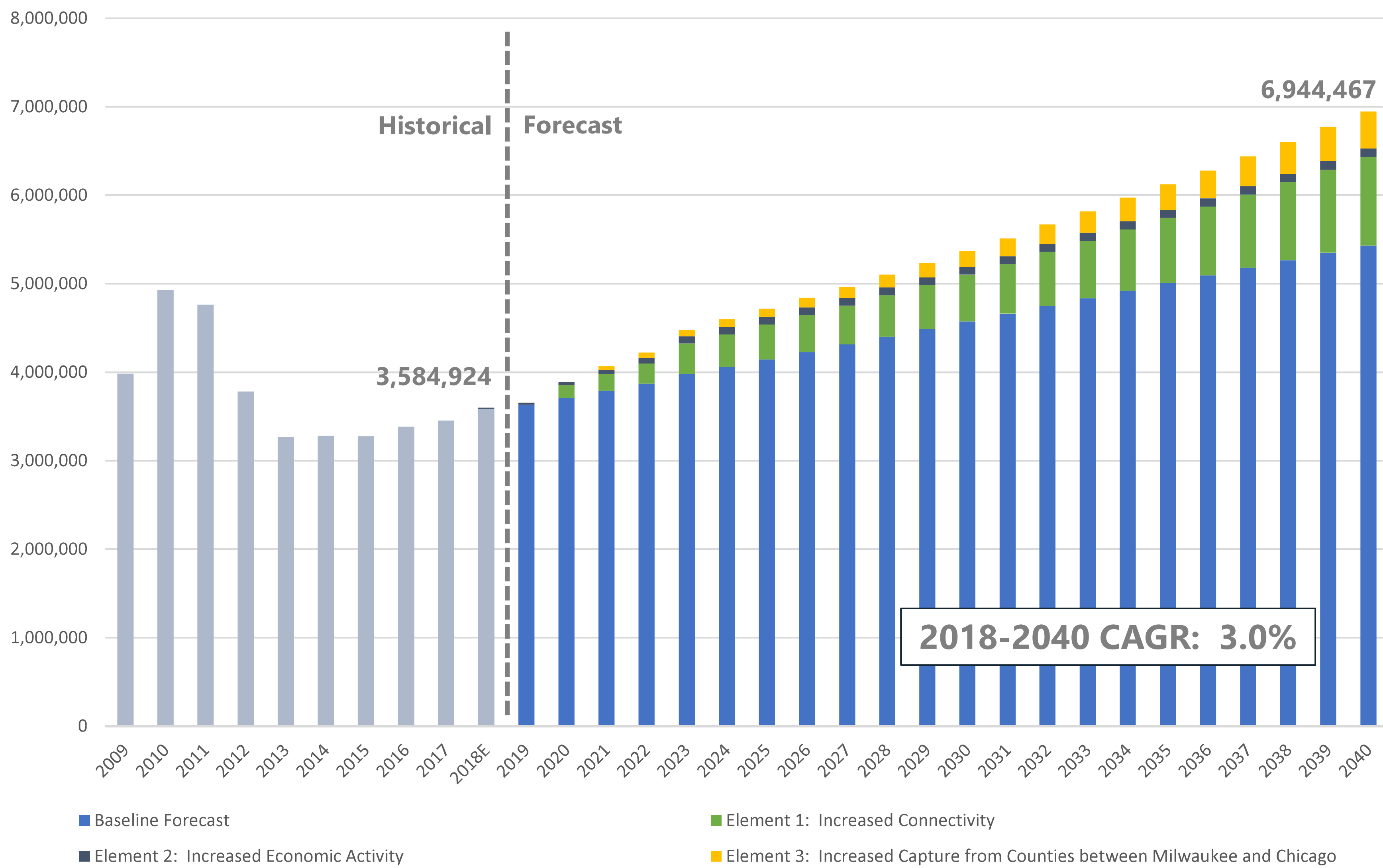
General Aviation and military activity held constant

Baseline Enplaned Passenger Forecast



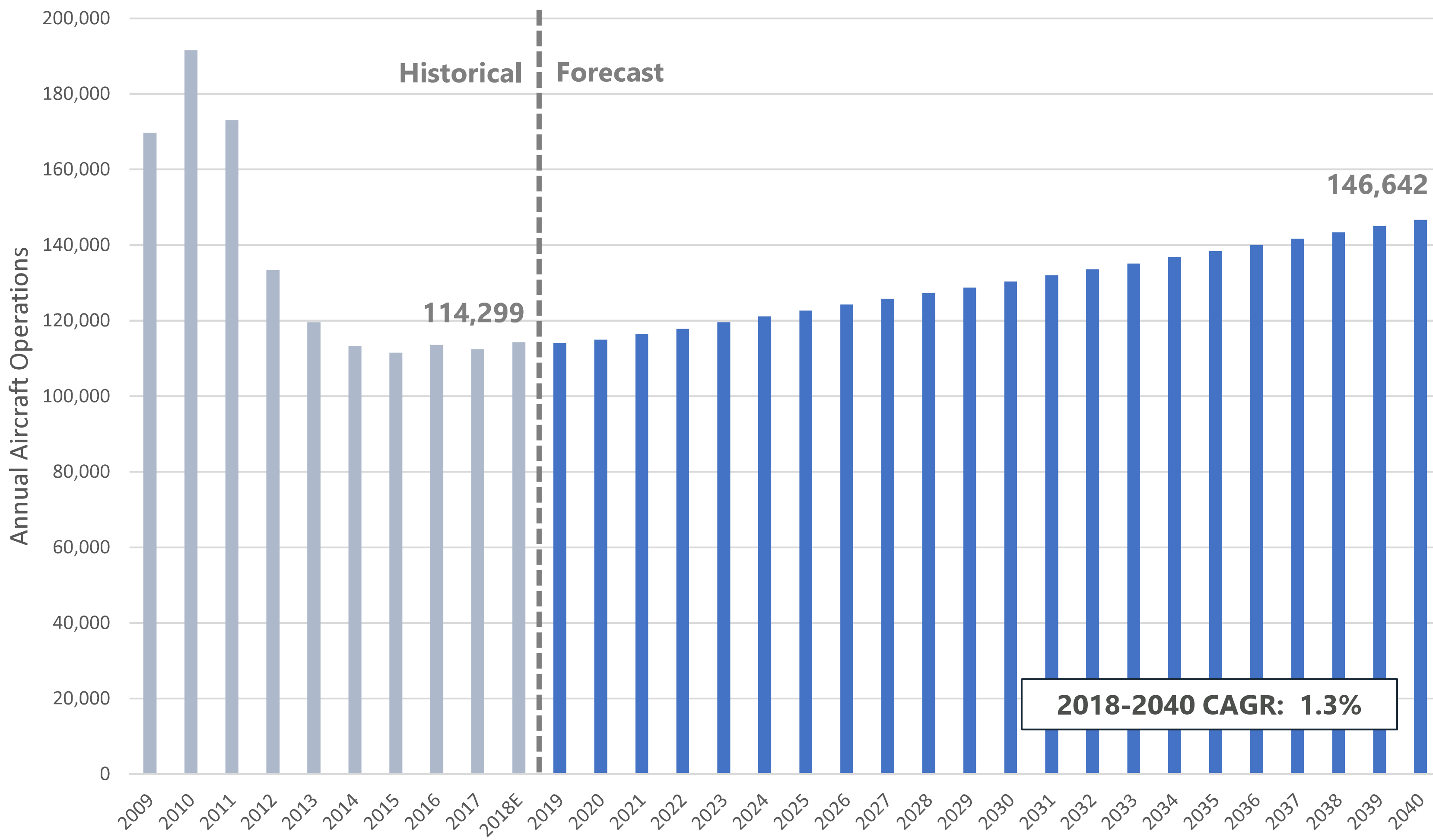
SOURCE: Milwaukee Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), November 2018.

High Scenario Passenger Forecast



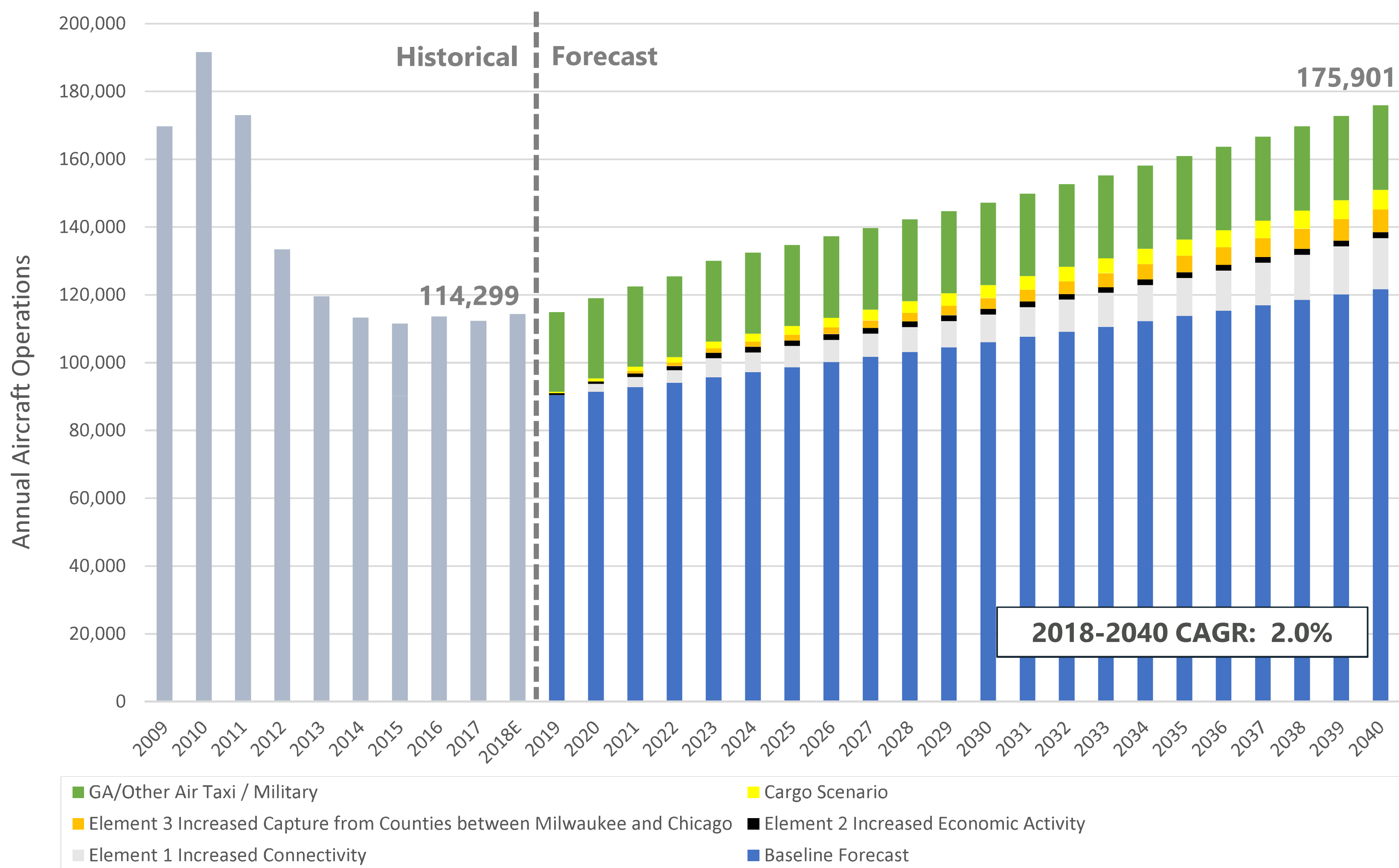
SOURCE: Milwaukee Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), March 2019.

Baseline Aircraft Operations Forecast



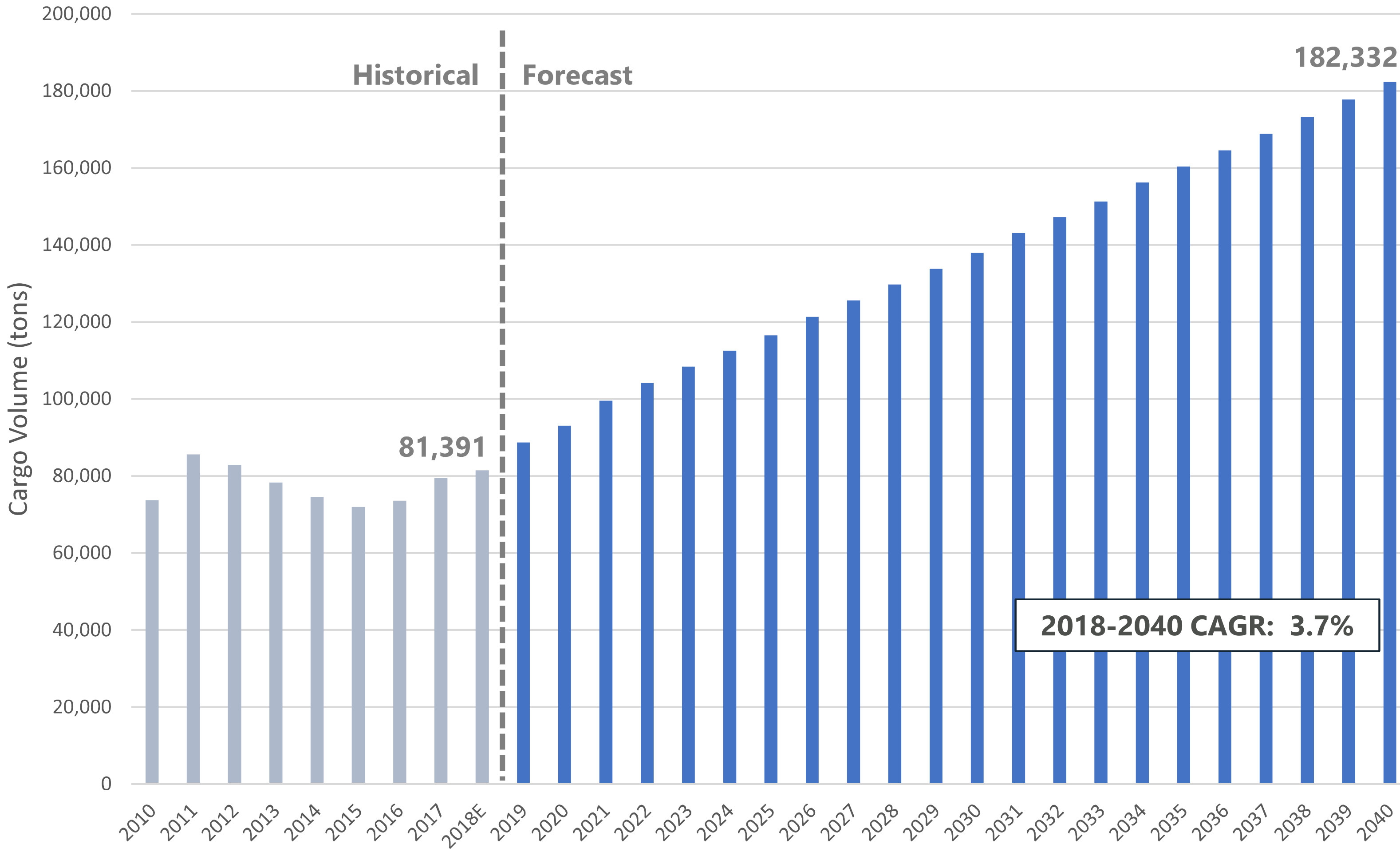
SOURCE: Milwaukee Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), November 2018.

High Scenario Aircraft Operations Forecast



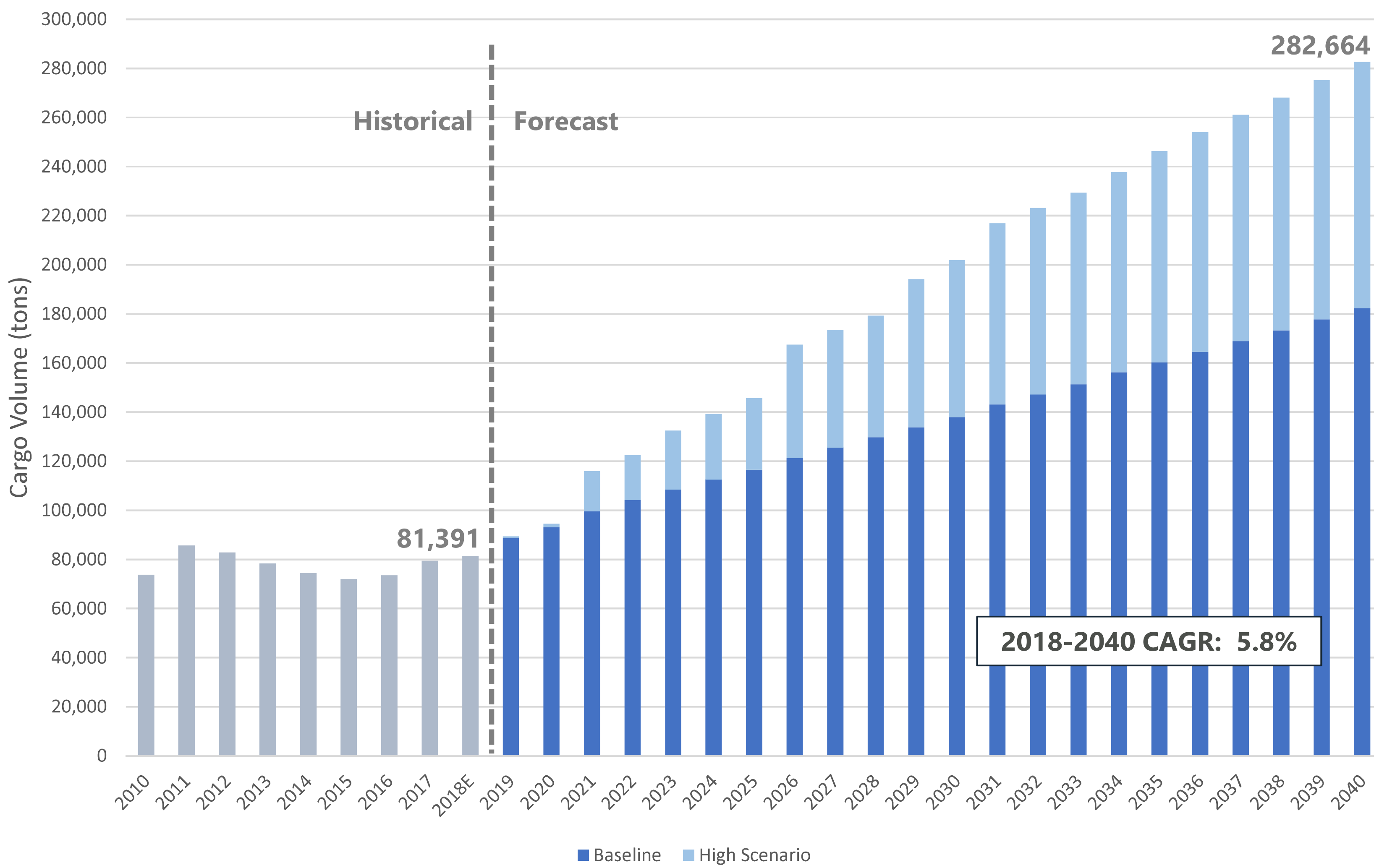
SOURCE: Milwaukee Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), March 2019.

Baseline Cargo Volume Forecast



SOURCE: Milwaukee Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), November 2018.

High Scenario Cargo Volume Forecast



SOURCE: Milwaukee Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), March 2019.

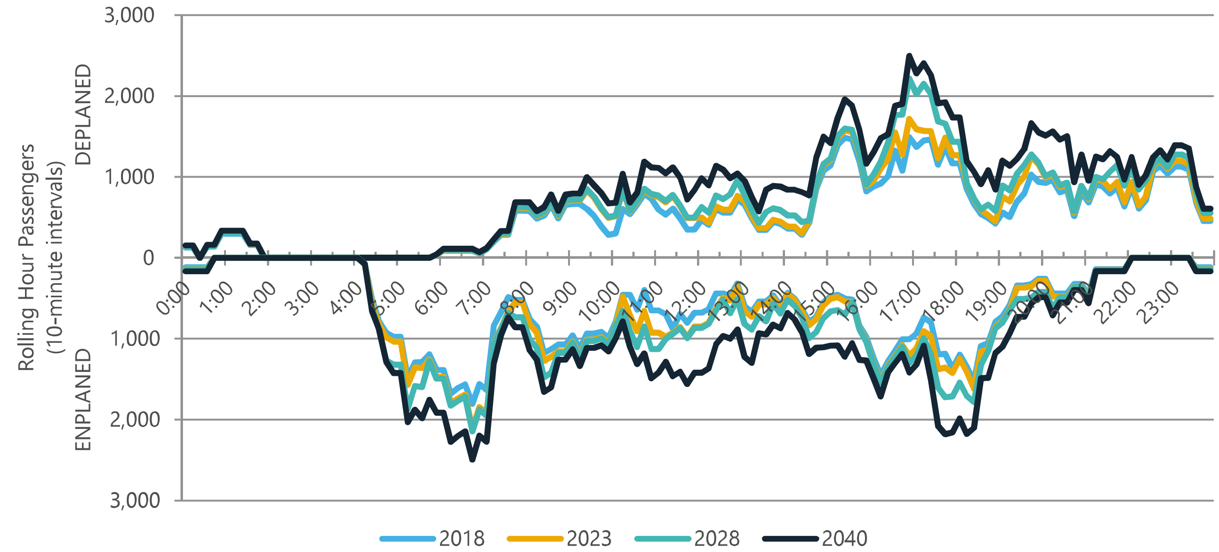
Design Day Flight Schedule

Design Day Flight Schedule (DDFS)

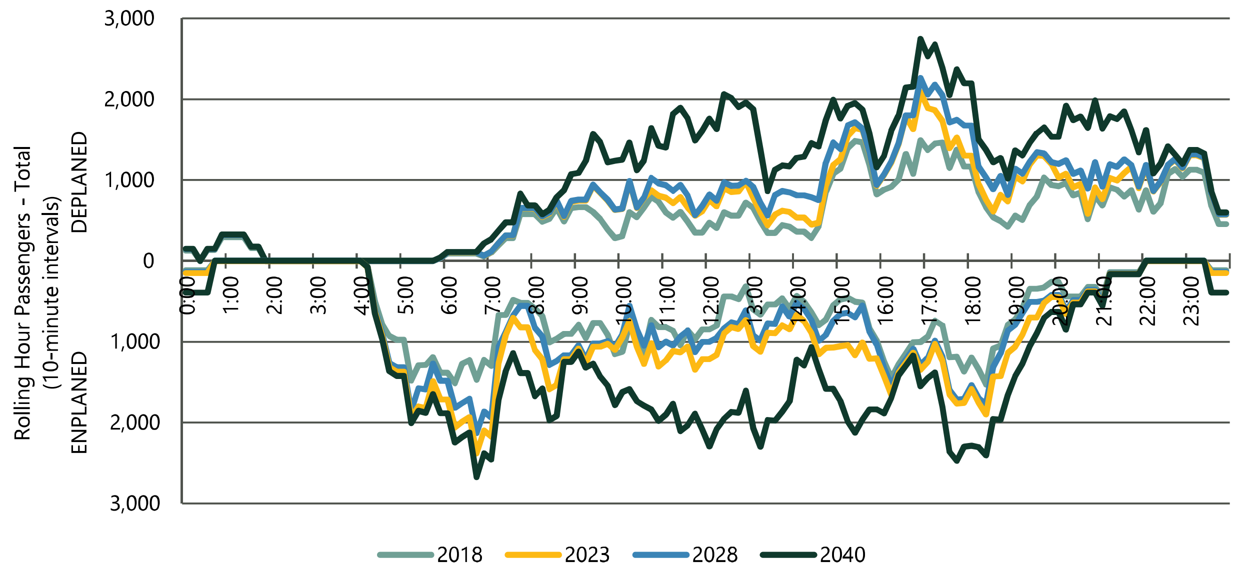
- Represents aircraft movements and the distribution of passengers throughout the hours of the average weekday of the peak month (PMAWD) at MKE
  - Foremost: representation of activity that could be experienced at MKE at future PMAWD activity levels
  - Secondarily: indication of future individual airline activity levels and market service patterns
- DDFS activity is used in determining facility requirements
  - Airfield
  - Terminal → Gating
  - Landside

DDFS – Rolling Peak Hour Passengers

Baseline Forecast

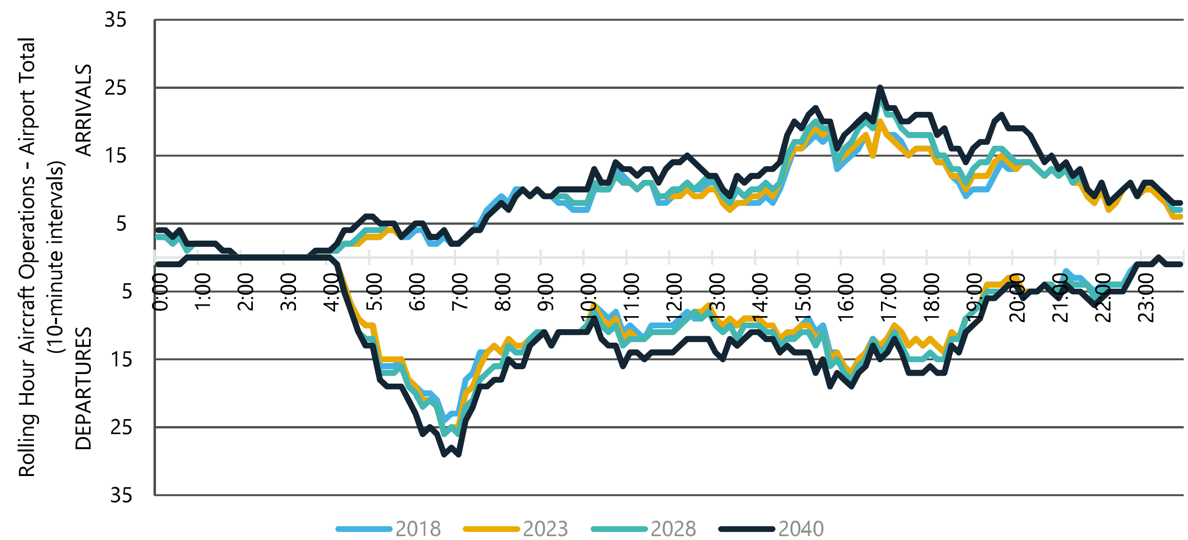


High Scenario Forecast

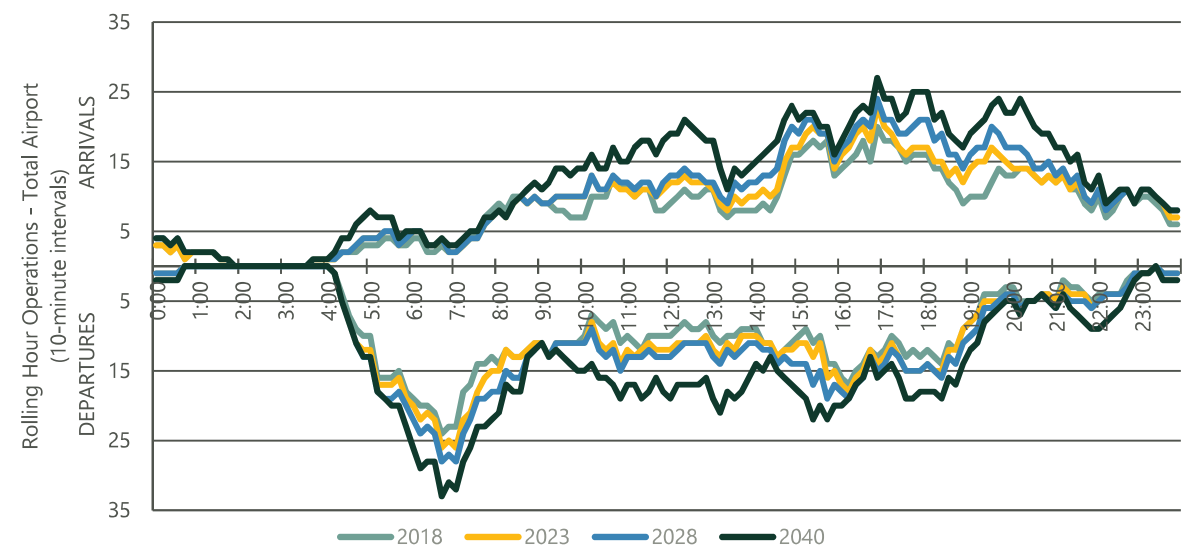


DDFS – Rolling Peak Hour Airport Operations

Baseline Forecast

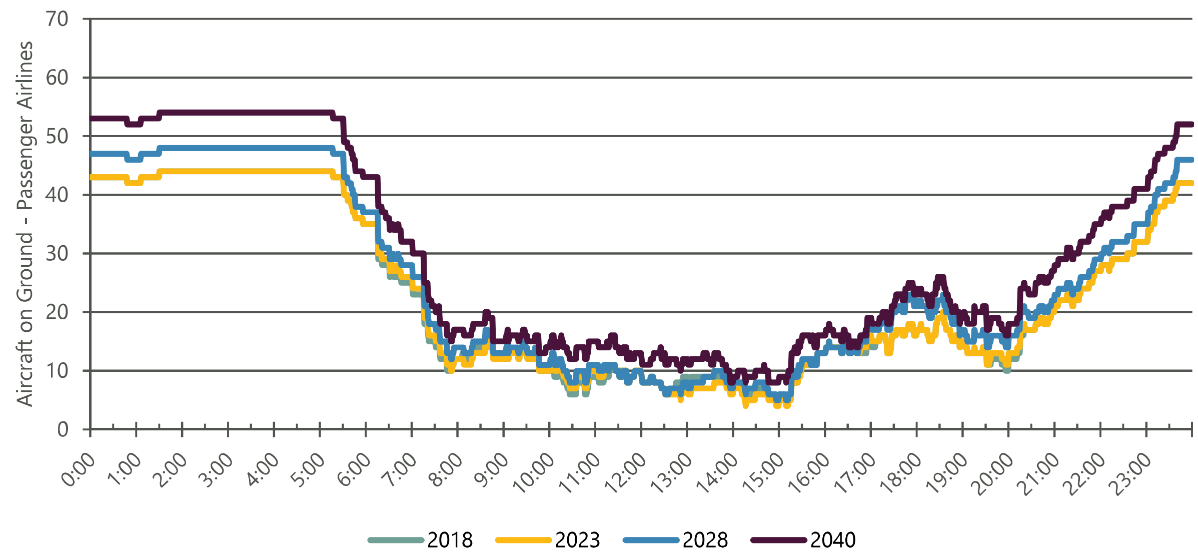


High Scenario Forecast

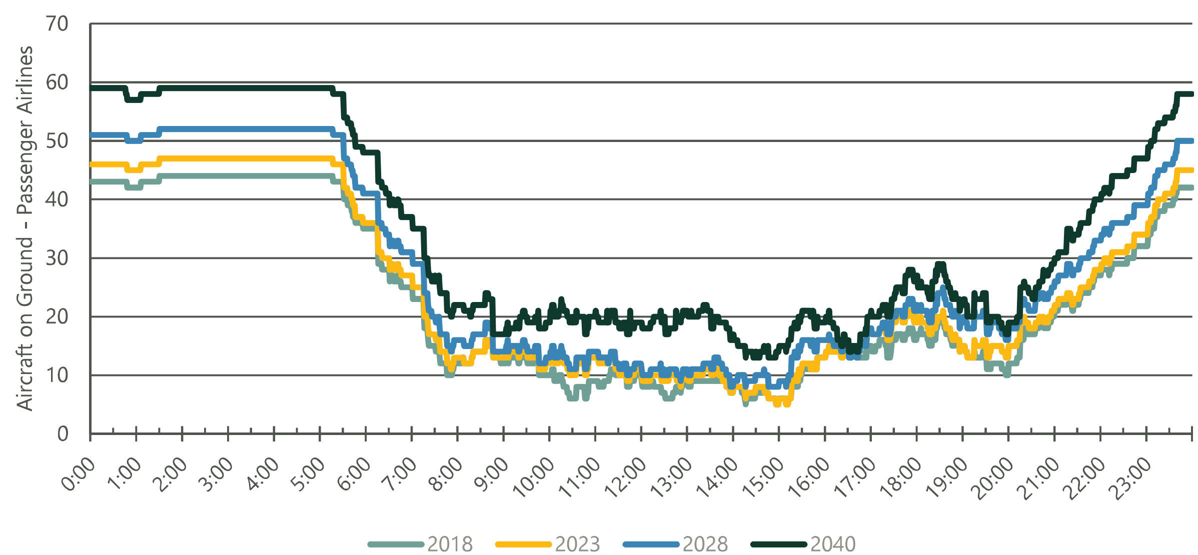


DDFS – Passenger Aircraft on the Ground

Baseline Forecast



High Scenario Forecast



Facility Requirements

Airfield and Airspace

Airfield Requirements

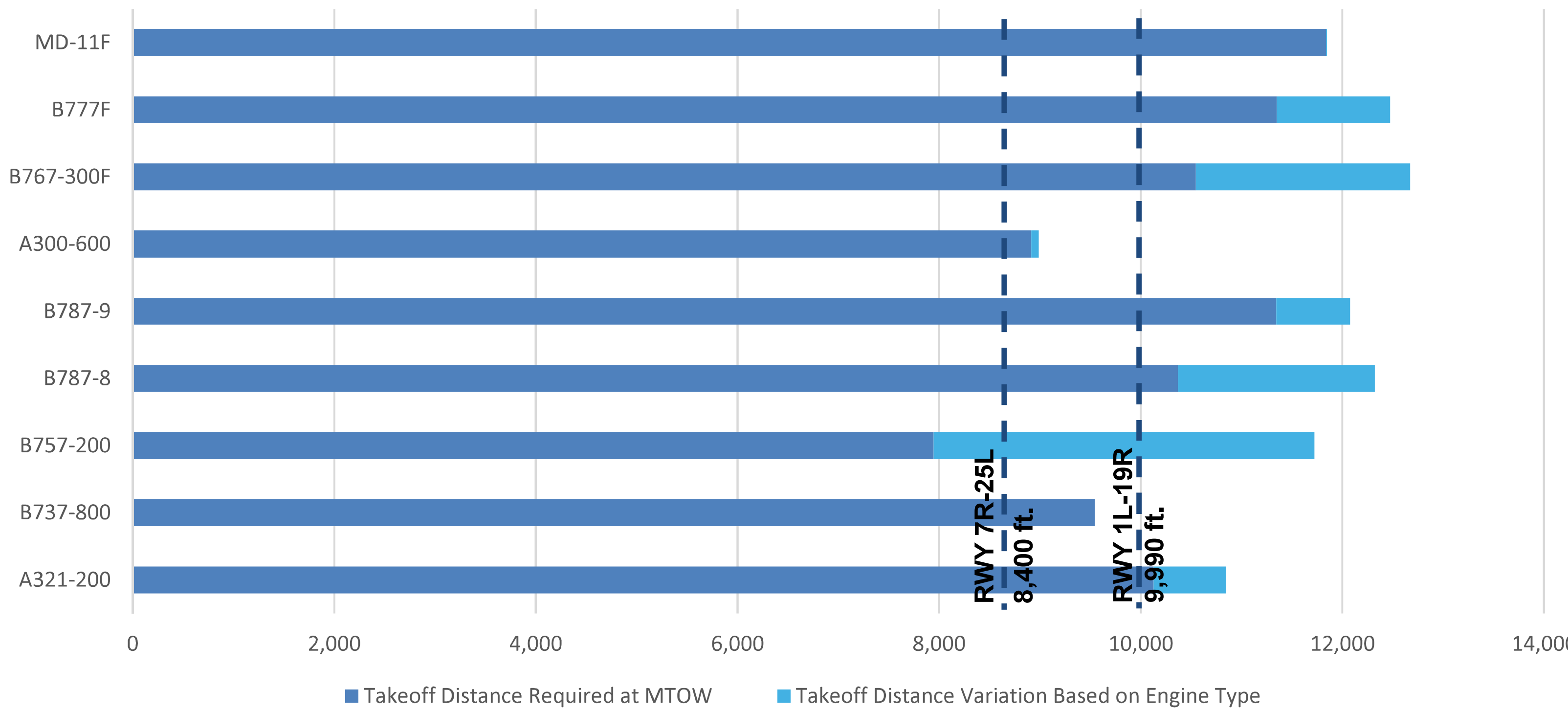
- Review airfield for compliance with current FAA standards
- Runway length analysis
- Airfield Capacity
  - Peak Hour
  - Annual

Compliance with FAA Standards

- Designation of Critical Aircraft
  - Aircraft with characteristics that determine airport design standards
  - Specific aircraft or Composite aircraft
  - Runway-specific
- Evaluation of airfield elements
  - Airplane Design Group (ADG)
  - Runway Design Group (RDG)
  - Taxiway Design Group (TDG)
- Resolution of identified areas of non-compliance
  - Define compliant geometry as part of Airport Layout Plan (reflect preferred alternative)
  - Request Modification of Standards (MOS) – subject to FAA review and approval

Runway Length Analysis

Maximum Certified Takeoff Weight Length Requirements



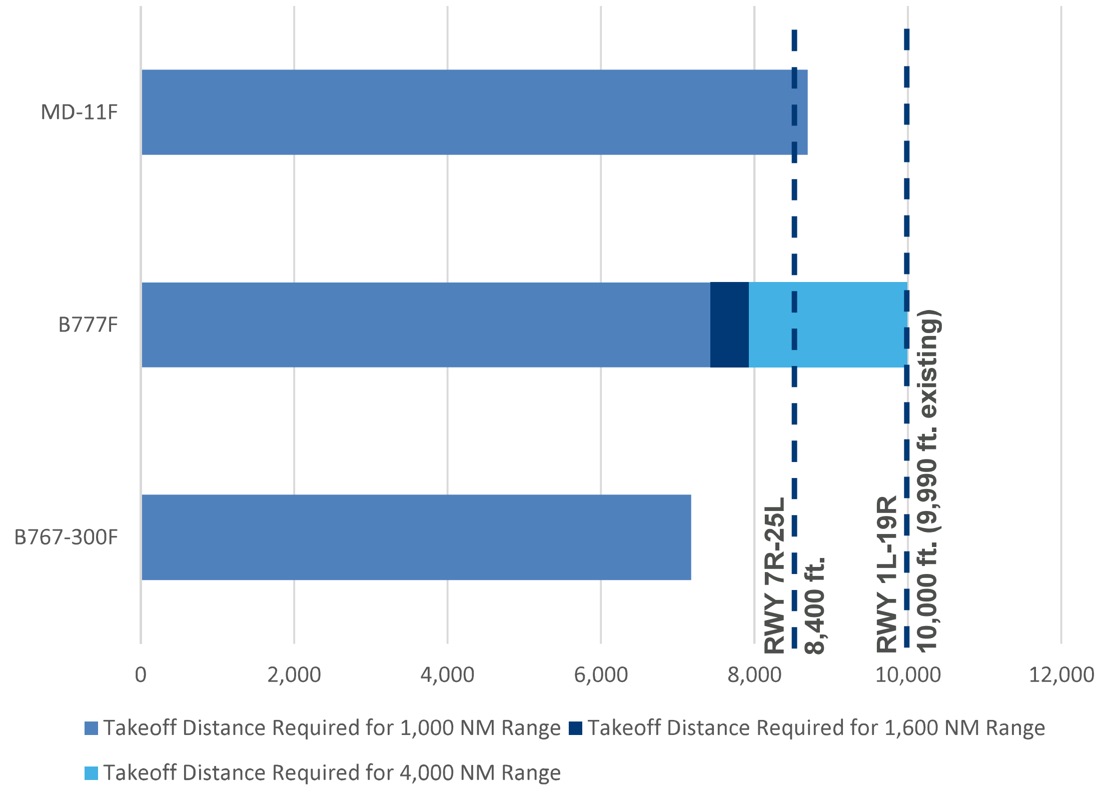
In addition, WI ANG has determined that a 10,000-foot runway is critical to mission-driven fleet changes.

NOTES:
1 Representative of the most demanding passenger and cargo aircraft in terms of maximum certified takeoff weight (MTOW) projected to operate at MKE through the planning horizon.
2 Runway length requirements increased by 360 feet to adjust for differences in runway centerline elevations, per Federal Aviation Administration Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design*.
3 Hot day temperature is the maximum average temperature at MKE (81°F), according to the National Oceanic and Atmospheric Administration.

SOURCES: Various Aircraft Characteristics for Airport Planning Manuals, February 2019; Ricondo & Associates, Inc., February 2019.

Runway Length Analysis

Domestic Cargo Stage Length Requirements



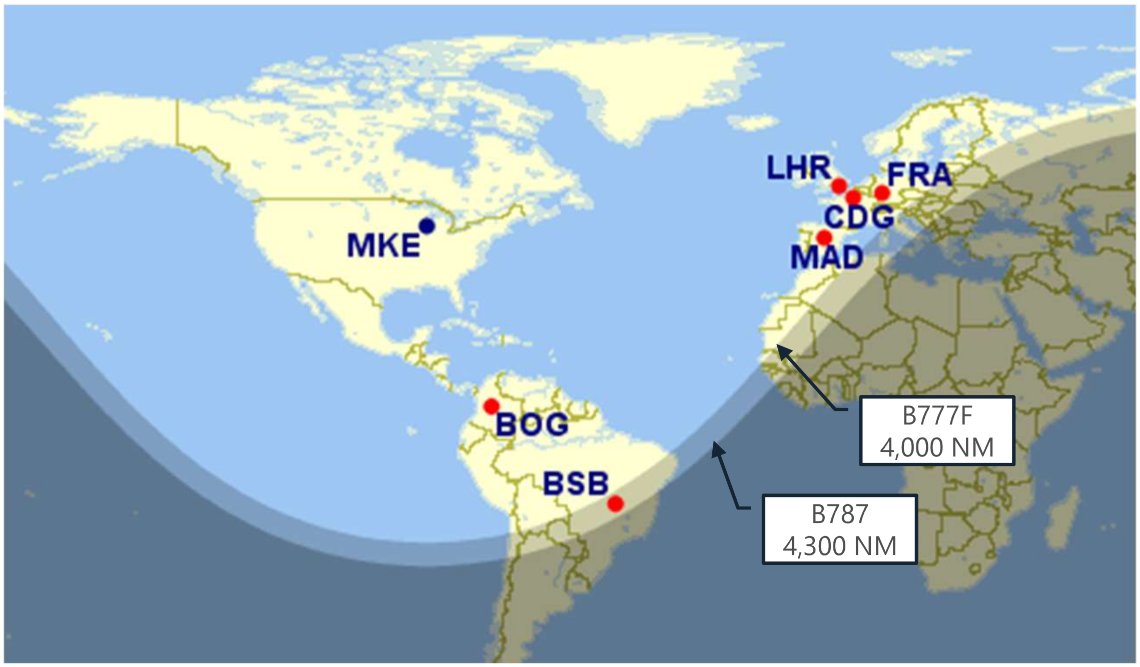
NOTES:
1/ Runway length requirements increased by 360 feet to adjust for differences in runway centerline elevations, per Federal Aviation Administration Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design*.
2/ Hot day temperature is the maximum average temperature at MKE (81°F), according to the National Oceanic and Atmospheric Administration.

- Based on existing and future nonstop domestic cargo markets including:
  - IND (206 NM)
  - SDF (302 NM)
  - MEM (484 NM)
  - EWR (630 NM)
  - AFW (750 NM)
- Under current conditions at MKE, B777F can also serve destinations within 4,000 NM without payload restrictions, including:
  - LAX (1,600 NM)
  - ANC (2,600 NM)

SOURCES: Various Aircraft Characteristics for Airport Planning Manuals, February 2019; Ricondo & Associates, Inc., February 2019.

Runway Length Analysis

Potential International Passenger and Cargo Markets



NOTES:
BOG – El Dorado International Airport
BSB – International Airport of Brasilia
CDG – Charles de Gaulle Airport
FRA – Frankfurt Airport
LHR – London Heathrow
MAD – Madrid-Barajas Airport

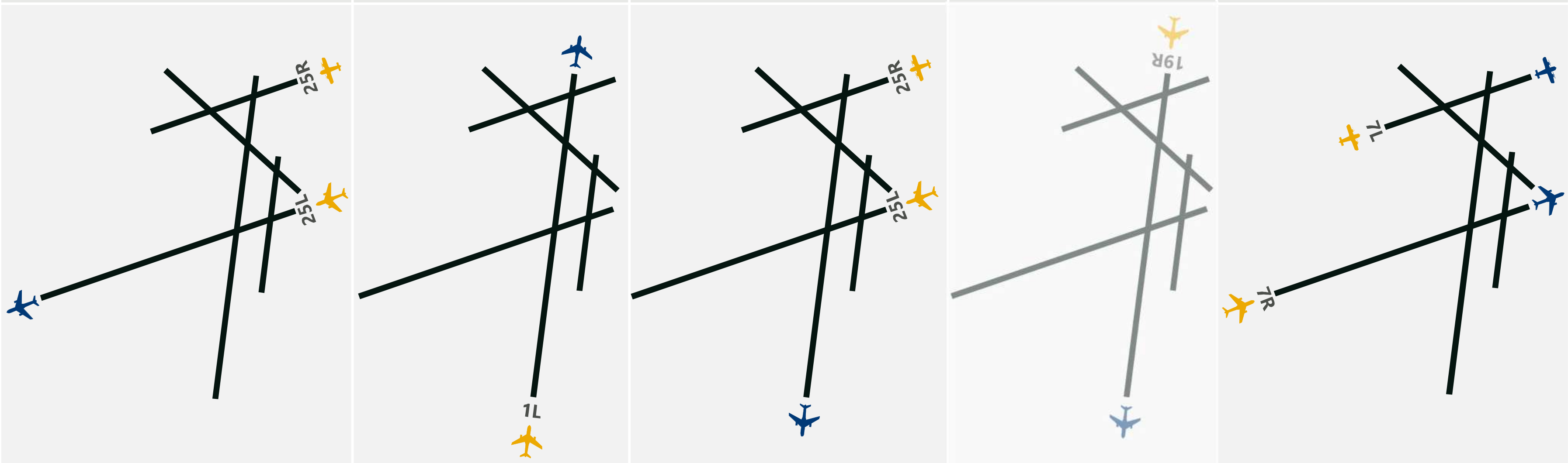
SOURCES: Various Aircraft Characteristics for Airport Planning Manuals, February 2019; Great Circle Mapper (www.gcmap.com) , June 2019; Ricondo & Associates, Inc., June 2019.

- Maximum range based on available runway length of 10,000 feet (~1L-19R).
- Capable of serving European and South American international markets within 4,000 NM (B777F) and 4,300 NM (B787).

Modeled Airfield Operating Configurations

Peak Hour Capacities

West Flow	North Flow	Southwest Flow	South Flow	East Flow
21.1 % VMC	19.6% VMC	16.2% VMC	13.5% VMC	11.2% VMC
2.4% IMC	6.2% IMC	2.0% IMC	4.4% IMC	3.4% IMC



West Flow	North Flow	Southwest Flow	South Flow	East Flow
68-71 VMC ops/hr	66-67 VMC ops/hr	71-74 VMC ops/hr	66-67 VMC ops/hr	68-74 VMC ops/hr
53-55 IMC ops/hr	54-55 IMC ops/hr	46-47 IMC ops/hr	54-55 IMC ops/hr	54-55 IMC ops/hr

65-67 annualized peak hour aircraft operations

NOTES:
1/ Airfield operating configurations were modeled in runwaySimulator to determine VMC/IMC hourly capacities and Annual Service Volume.
2/ Hourly capacities associated with South Flow and North Flow are identical, therefore only the North Flow was modeled. The North Flow hourly capacities were then applied to the South Flow configuration.

Legend

- Primary Arrivals
- Primary Departures
- Prop Arrivals
- Prop Departures

N

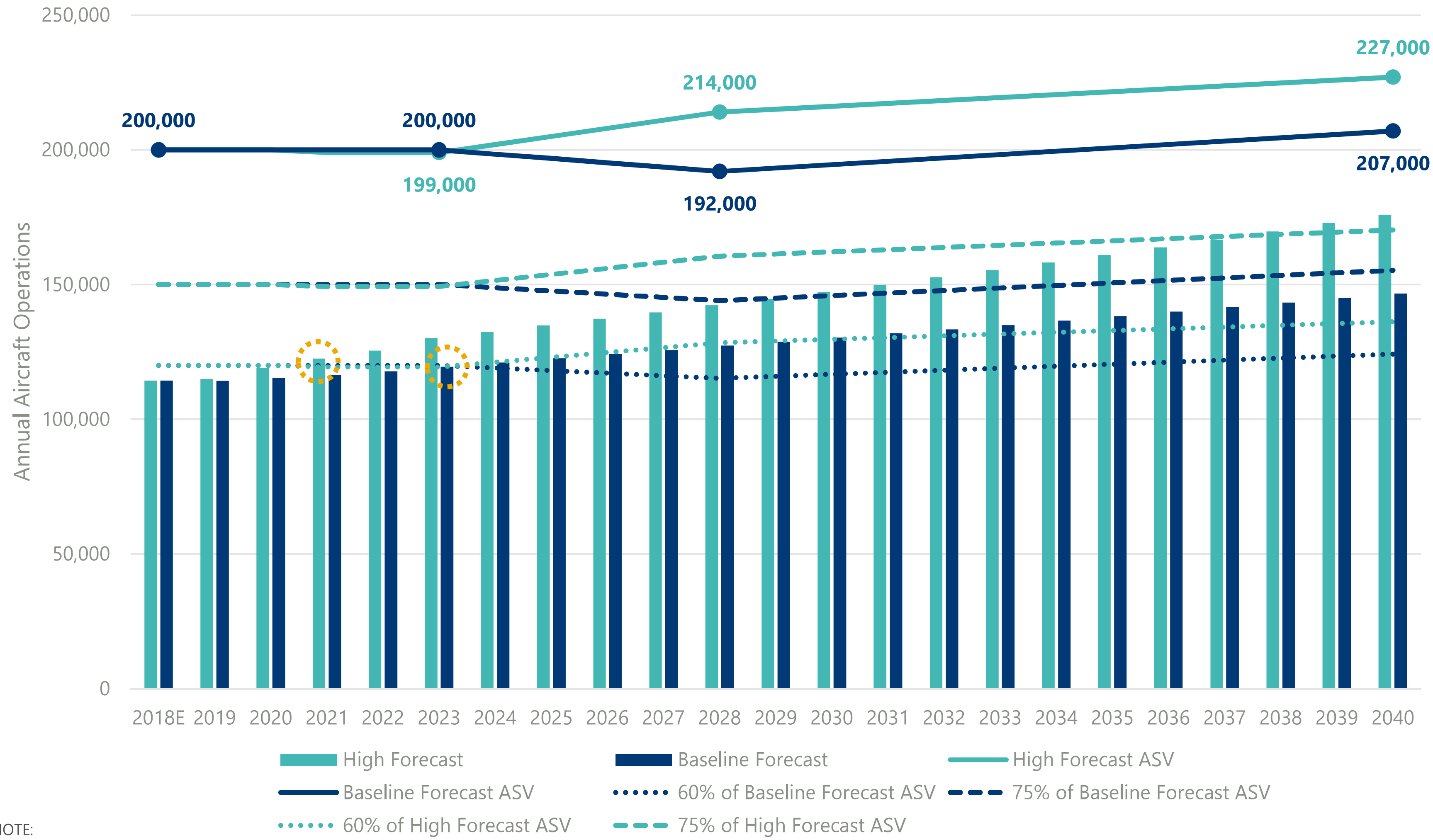
not to scale

SOURCES: Federal Aviation Administration, Aviation System Performance Metrics, Airport Efficiency, MKE Daily Weather by Hour Report, January 1, 2008 through December 31, 2017; Ricondo & Associates, Inc., December 2018.

Annual Airfield Capacity – Mix Index

- Aircraft fleet mix is important factor in airfield capacity
- Increasing aircraft diversity (approach speeds and aircraft weight) reduces capacity
  - Increased in-trail separation to avoid wake vortices/wake turbulence
  - Heavier aircraft produce more severe wake vortices than lighter aircraft
  - More prevalent during departures
- Aircraft Mix Index reflects aircraft fleet composition; represents the share of heavy aircraft in the fleet
- Annual Service Volume: reasonable estimate of an airport's annual capacity
  - Accounts for hourly, daily and seasonal fluctuations in airfield demand
  - Considers the occurrence of low visibility conditions and/or cloud ceiling heights that require modified Air Traffic Control procedures
  - Reflects aircraft fleet mix (Mix Index)
  - Considers frequency of touch-and-go operations
  - Based on hourly airfield capacity

Annual Airfield Capacity



NOTE:
ASV = Annual Service Volume
1 FAA recommends capacity development when activity approaches 60 to 75 percent of annual capacity. Capacity development could be in the form of a new runway, runway extension, additional exit taxiways, aircraft parking aprons, and replacement/supplemental airports.

SOURCES: Federal Aviation Administration Advisory Circular 150/5060-5 Change 2, Airport Capacity and Delay, December 1995; Federal Aviation Administration Order 5090.3C, Field Formulation of the National Plan of Integrated Airport Systems (NPIAS), December 2000; Ricondo & Associates, Inc., June 2019.

Facility Requirements

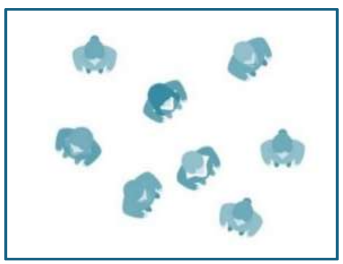
Terminal

Terminal Space Analysis

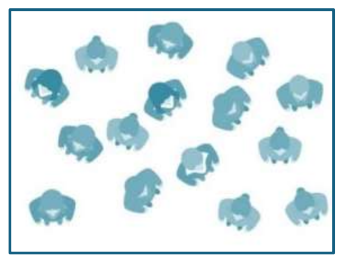
- Reflects current industry planning standards for Level of Service and process
  - Air Transport Association (IATA), *Airport Development Reference Manual (11th edition)*
  - Airport Cooperative Research Program, *Report 25: Air Passenger Terminal Planning and Design, Volume 1: Guidebook, 2010*
  - TSA published planning and design guidance
- Main functional areas/space types
  - Check-In (dynamic modeling)
  - Passenger screening (dynamic modeling)
  - Baggage screening (static analysis based on check-in output)
  - Outbound Baggage Makeup (static analysis based on flight schedule)
  - Holdrooms (based on gates)
  - Baggage Claim and Inbound offload (static analysis based on flight schedule)
- Functional area requirement based on planning templates and existing facilities
- Space requirements other areas based on factoring existing areas (activity forecast)

Terminal Space Analysis – Level of Service

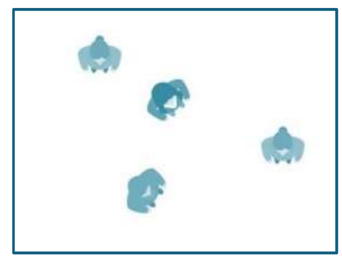
ADRM 11th Edition	ARDM 9th Edition	FLOWS	DELAYS	COMFORT
OVER DESIGN	A - EXCELLENT	Free	None	Excellent
OVER DESIGN	B - HIGH	Stable	Very Few	High
OPTIMUM	C - GOOD	Stable	Acceptable	Good
SUBOPTIMUM	D - ADEQUATE	Unstable	Passable	Adequate
SUBOPTIMUM	E - INADEQUATE	Unstable	Unacceptable	Inadequate
UNDER-PROVIDED	F - FAILURE	System Breakdown	System Breakdown	Unacceptable



OPTIMUM: Acceptable level of service; conditions of adequate to above-average space and reasonable to very few delays; good level of comfort.



SUBOPTIMUM: Unsatisfactory level of service; conditions that provide crowded and uncomfortable spaces and present unacceptable processing and wait times; inadequate level of comfort.

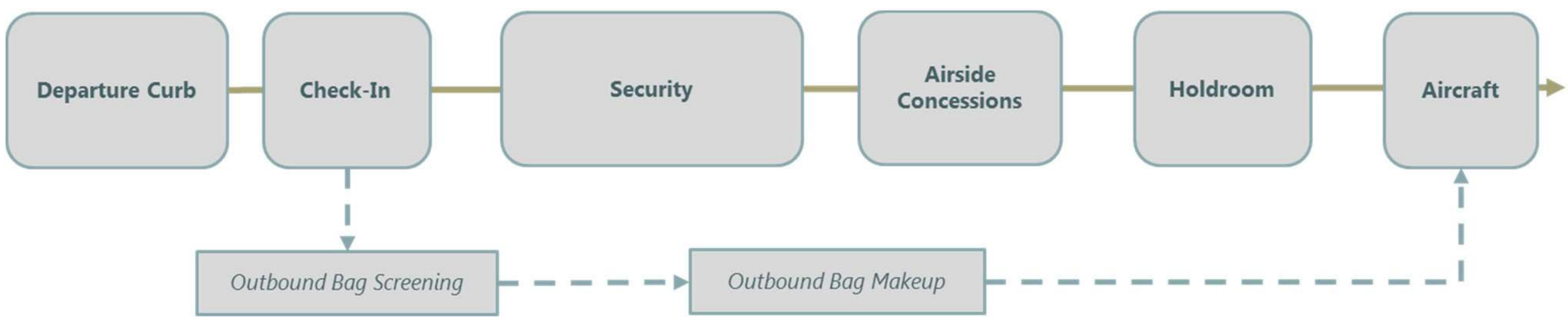


OVERDESIGN: Poor level of service; conditions of either excessive or empty space and over provision of resources; immoderate or unacceptable level of comfort.

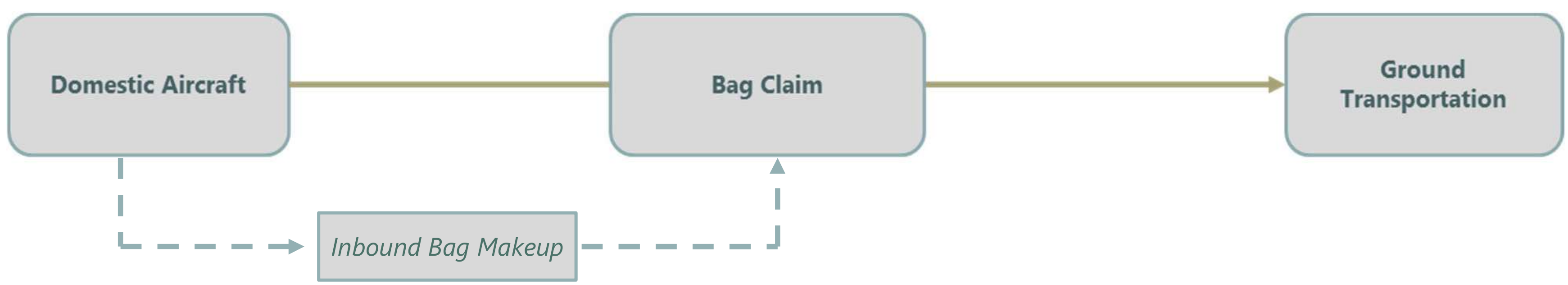
SOURCE: International Air Transport Association, Airport Development Reference Manual, 11th Edition, Effective March 2019.

Terminal Space Analysis – Passenger Flow

Departing Passenger Flow

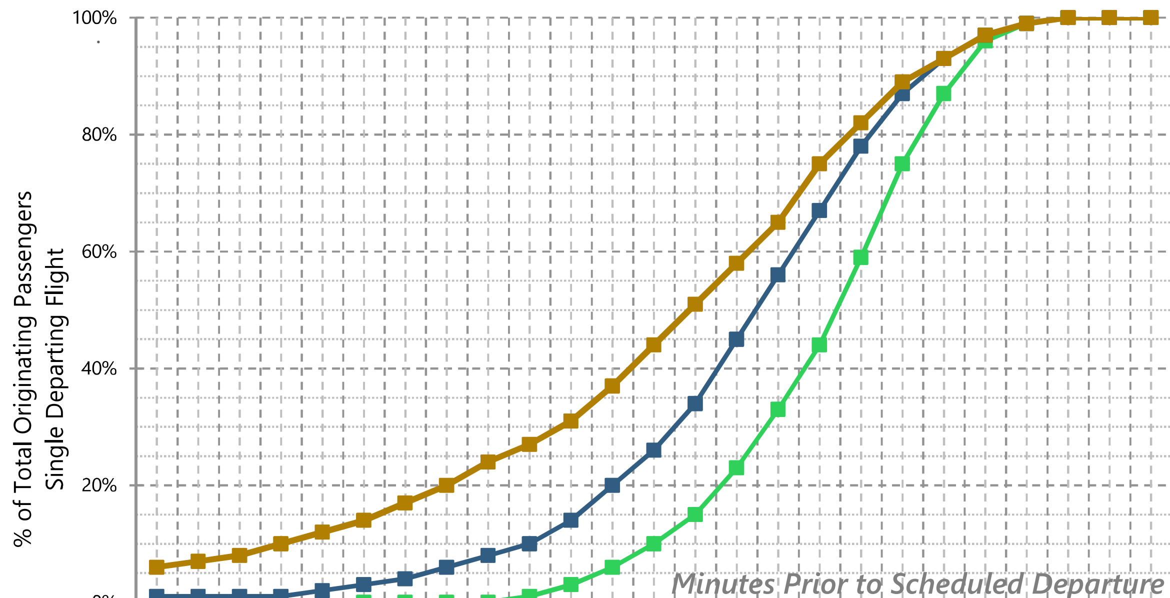


Arriving Passenger Flow



Passenger Arrival Distribution

- Arrival distribution: O&D passenger arrival at airport prior to scheduled departure
- Displays metrics quantified against check-in/baggage induction and screening



	240	230	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	10	0
Before 8:30 a.m.	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	6%	10%	15%	23%	33%	44%	59%	75%	87%	96%	99%	100	100	100
Peak Domestic	1%	1%	1%	1%	2%	3%	4%	6%	8%	10%	14%	20%	26%	34%	45%	56%	67%	78%	87%	93%	97%	99%	100	100	100
Off-peak Domestic	6%	7%	8%	10%	12%	14%	17%	20%	24%	27%	31%	37%	44%	51%	58%	65%	75%	82%	89%	93%	97%	99%	100	100	100

TSA Earliness Distribution

- **Before 8:30** → departure between 4 a.m. and 8:30 a.m.
- **Peak Domestic** → departure between 8:30 a.m. and 5:00 p.m.
- **Off-Peak Domestic** → departure between 5:00 p.m. and 4:00 a.m.

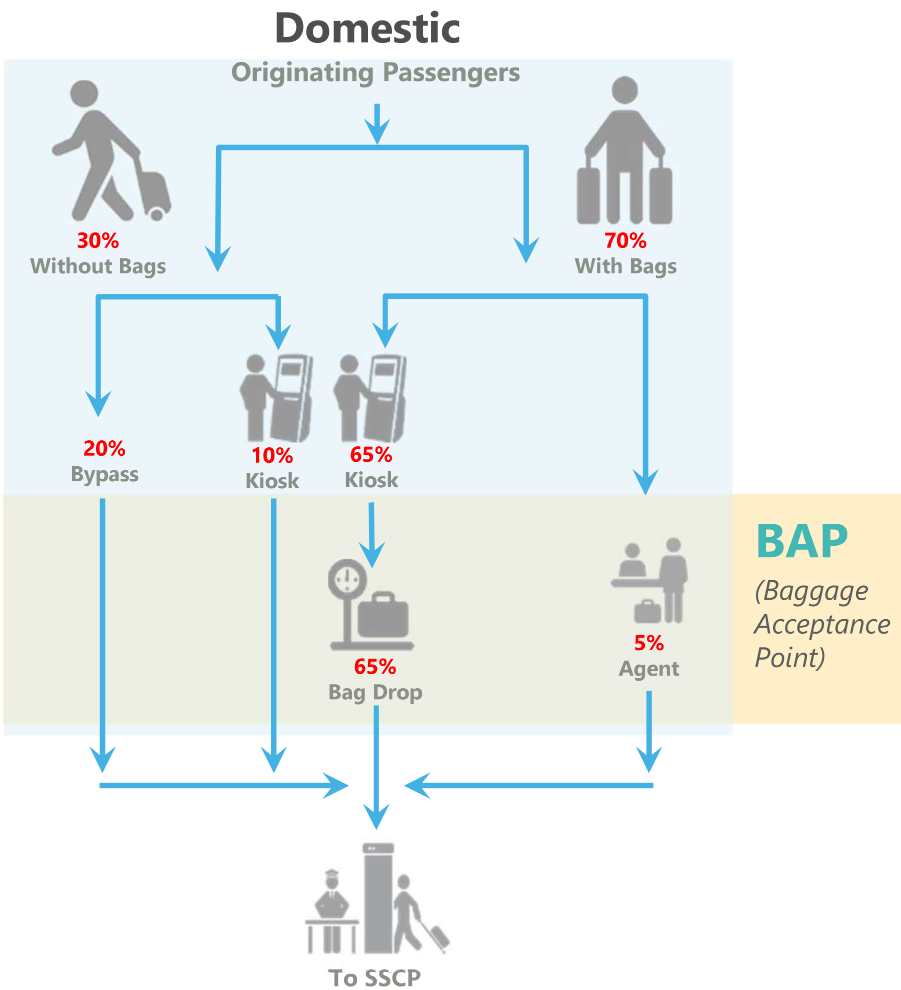
AVERAGE BAGS per originating passenger is the overall number of checked bags including passengers who do not check baggage.

	Units	Southwest (WN)[1/]	All Other Domestic	International
Average Bags per Passenger	Bags	0.9	0.6	1.2

NOTE: WN number developed by Ricondo and Associates, Inc. March 2019.

SOURCE: Transportation Security Administration, Planning Guidelines and Design Standards for Checked Baggage Inspection Systems, Version 6.0, September 29, 2017.

Passenger Check-in Operating Assumptions



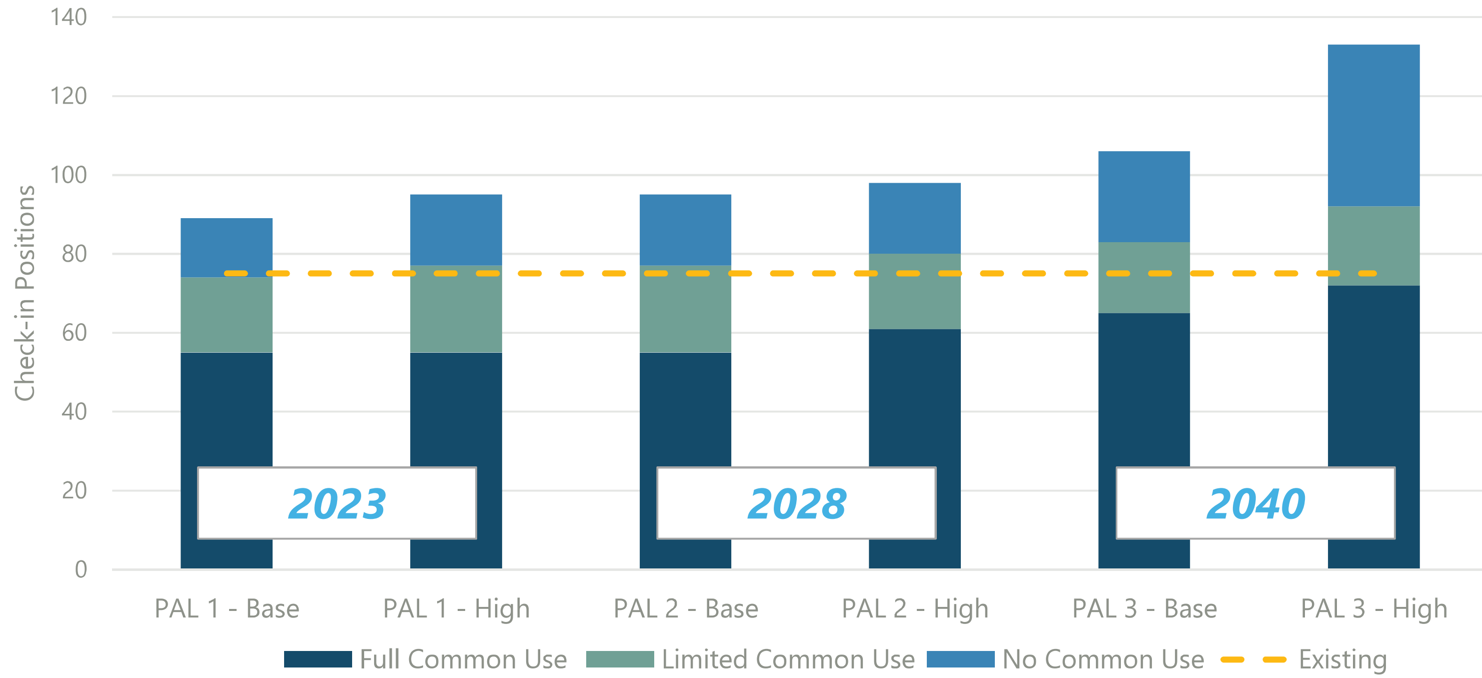
NOTE: Diagram represents daily average of each channel during the peak period.

NO CHECKED BAGS		
	WAIT TIME	TRANSACTION TIME
BYPASS	N/A	N/A
KIOSK	2 minutes	3 minutes

CHECKED BAGS		
	WAIT TIME	TRANSACTION TIME
KIOSK	2 minutes	3.5 minutes
BAG INDUCTION	4 minutes	1 minute
AGENT	15 minutes	3 minutes

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

Passenger Check-In (Ticket Hall)



- Three methodologies (range of requirements)
  - Full common use: each position can fluctuate by airline throughout the day
  - Limited common use - Some airlines preferentially use positions, other airlines utilize common positions (similar to current operation)
  - No Common Use- Preferential counter use by airlines
- No additional check-in positions required through 2028 with some common use

Passenger Screening Operating Assumptions

- Standard security lane space template used for requirements analysis (1,890 sq ft)

PROCESSING RATES

Lane Type	Unit	Traditional Lanes	ASL Lanes
Standard Lanes	passengers/hr/lane	150	200
Pre✓® Lanes	passengers/hr/lane	220	300

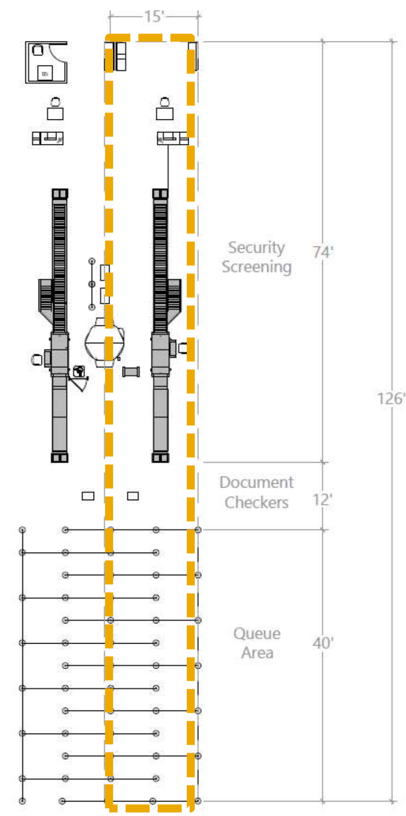
PRE✓® UTILIZATION

Airline	Pre✓® Passengers
US Flag Carriers	40%
Other Airlines	0%

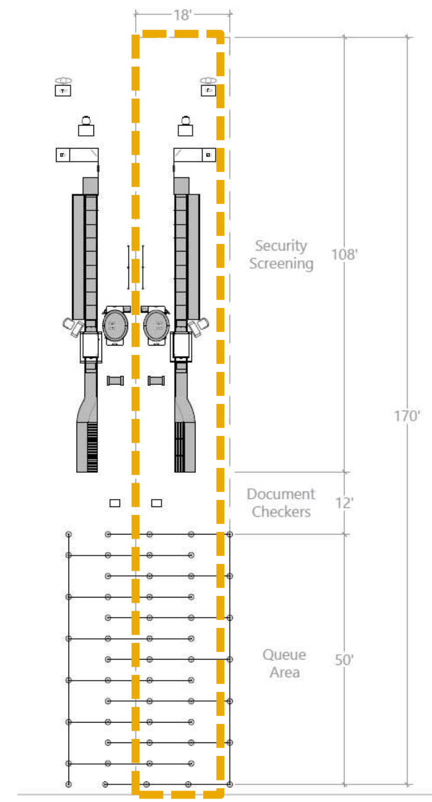
WAIT TIME GOALS

Wait Time Category	Standard Wait Time	Pre✓® Wait Time
Meets TSA Wait Time	20 minutes	5 minutes
Within TSA Buffer	30 minutes	15 minutes
Exceeds Wait Time Goal	>30 minutes	>15 minutes

STANDARD SECURITY LANE (1,890 sq ft)



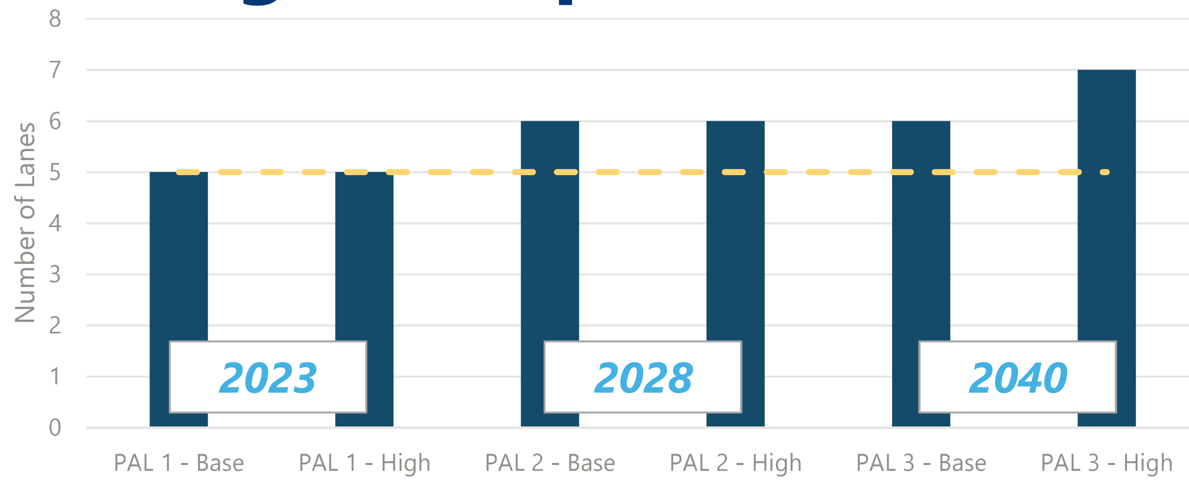
AUTOMATED SECURITY LANE (3,060 sq ft)



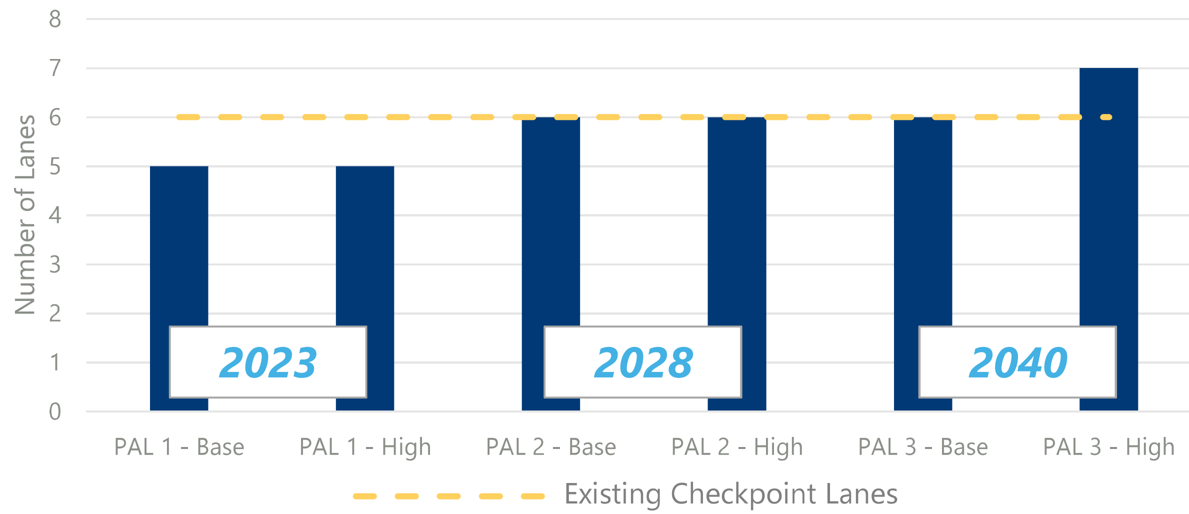
SOURCE: Meeting with Transportation Security Administration, March 2018.

Passenger Screening Checkpoints

Concourse C
(current airline gate assignments, standard screening lanes)



Concourse D
(current airline gate assignments, standard screening lanes)



- Concourse C: +1 lane by 2028 / +2 lanes by 2040 (high forecast scenario)
- Concourse D: +1 lane by 2040 (high forecast scenario)

Passenger Check-in: Operating Assumptions

- Standard security lane space template used for requirements analysis (1,890 sq ft)
- Passengers departing from Concourse E planned to use D checkpoint
- Redeveloped Concourse E security checkpoint need and size planned to be defined during design.

			BASELINE			HIGH GROWTH		
	UNITS	EXISTING	PAL 1 (2023)	PAL 2 (2028)	PAL 3 (2040)	PAL 1 (2023)	PAL 2 (2028)	PAL 3 (2040)
Concourse C Total Checkpoint								
Checkpoint Lanes	Lanes	5	5	6	6	5	6	7
Total Passenger Processing Area	Square Feet	10,481	9,450	11,340	11,340	9,450	11,340	13,230
Concourse D Total Checkpoint								
Checkpoint Lanes	Lanes	6	5	6	6	5	6	7
Total Passenger Processing Area	Square Feet	11,166	9,450	11,340	11,340	9,450	11,340	13,230
Consolidated Total Checkpoint Area								
Checkpoint Lanes	Lanes	n/a	9	9	11	9	9	11
Total Passenger Processing Area	Square Feet	n/a	17,010	17,010	20,790	17,010	17,010	20,790

NOTE: Passenger processing square footage includes queue area.

SOURCES: *Transportation Security Administration, March 2018; Ricondo & Associates, Inc., March 2019.*

Baggage Claim: Operating Parameters and Space Template

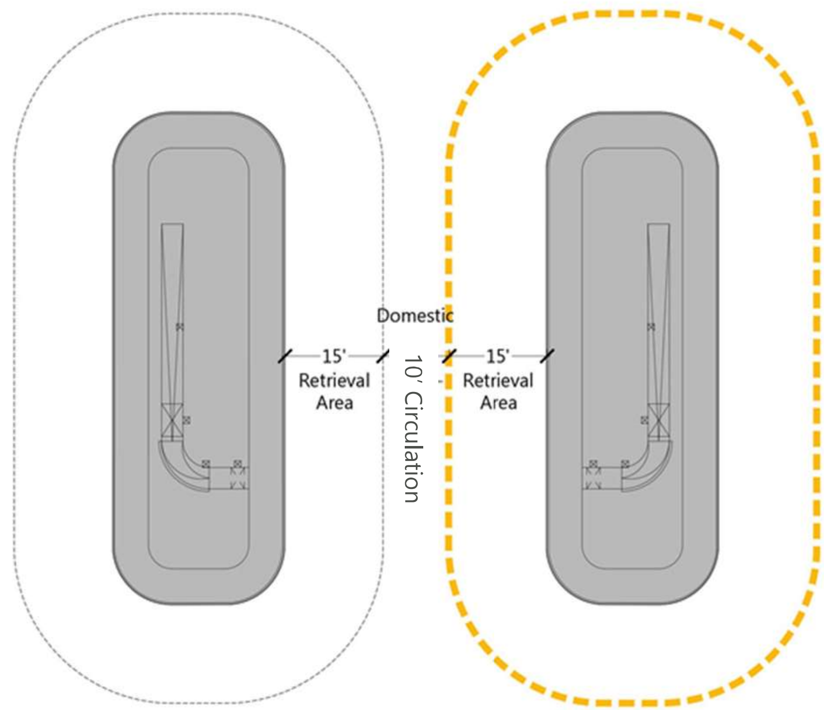
- Passenger accumulation represents peak number of passengers in the active retrieval area at any point in time

FUTURE DESIGN METRIC:
Approximately 4,680 sq ft per unit

Baggage Claim Assumptions

	UNITS	DOMESTIC
Area per Passenger	sq ft	18
Typical Claim Device Length	Feet	170

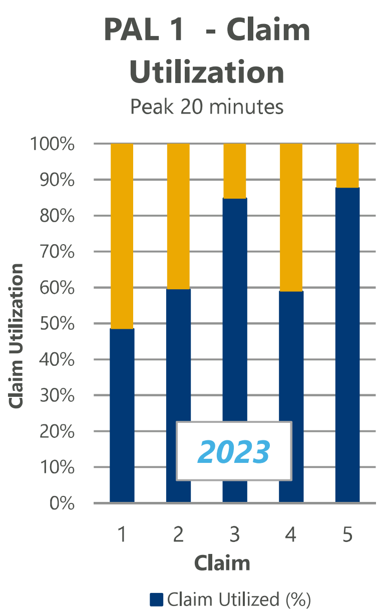
NOTES:
1 Based on adequate space and acceptable level-of-service

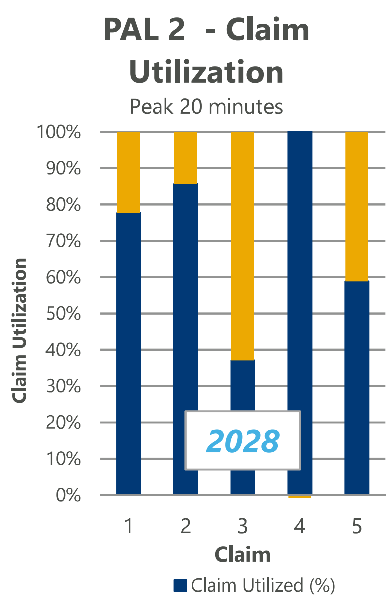


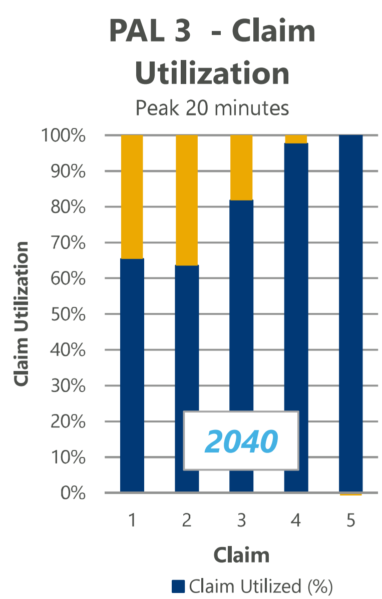
SOURCES: Airport Cooperative Research Program. Report 25, Airport Passenger Terminal Planning and Design, Volume 1: Guidebook. 2010 (critical dimensions); International Air Transportation Association, Airport Development Reference Manual, 11th Edition, Effective April 2019 (LOS); Ricondo, February 2018 (space template).

Baggage Claim Devices

	Units	EXISTING	BASELINE			HIGH GROWTH		
			PAL 1 (2023)	PAL 2 (2028)	PAL 3 (2040)	PAL 1 (2023)	PAL 2 (2028)	PAL 3 (2040)
Rolling 20-minute Operations	Operations	7	8	8	9	8	8	9
Rolling 20-minute Passengers	Passengers	480	550	560	740	660	570	760
Baggage Claim Devices	Units	5	5	5	5	5	5	5
Baggage Claim Area	Square Feet	19,468	19,500	19,500	19,500	19,500	19,500	19,500







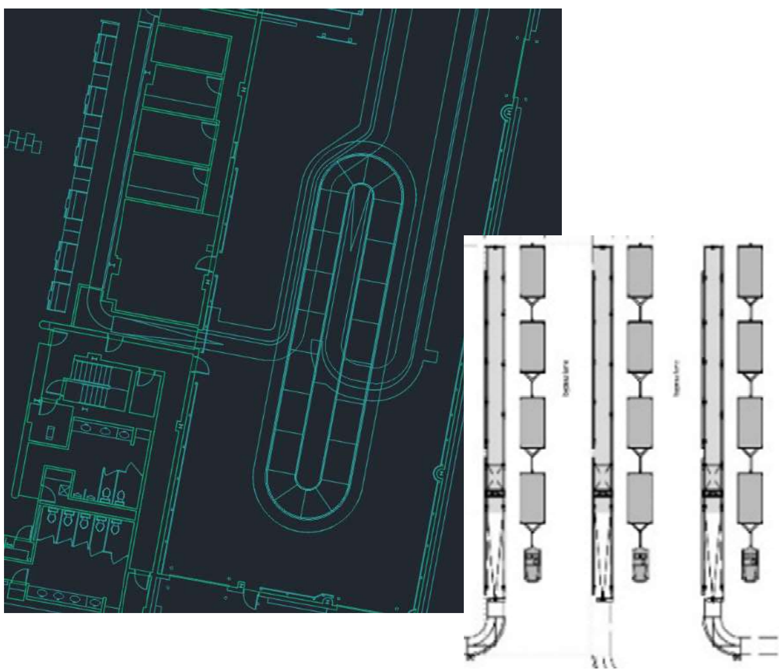
Baggage Claim Area

- Space requirement evaluated based on the accumulation of waiting passengers
- Airlines do not share devices during peak period
- No additional space required through planning horizon

Baggage Make-Up: Operating Parameters

- Device requirements were analyzed on a common-use basis
- Preferential use requirements would increase the overall cart demand and area need

MINUTES PRIOR TO SCHEDULED TIME OF DEPARTURE	PERCENT OF TOTAL CARTS STAGED
120-100	50%
90-30	100%



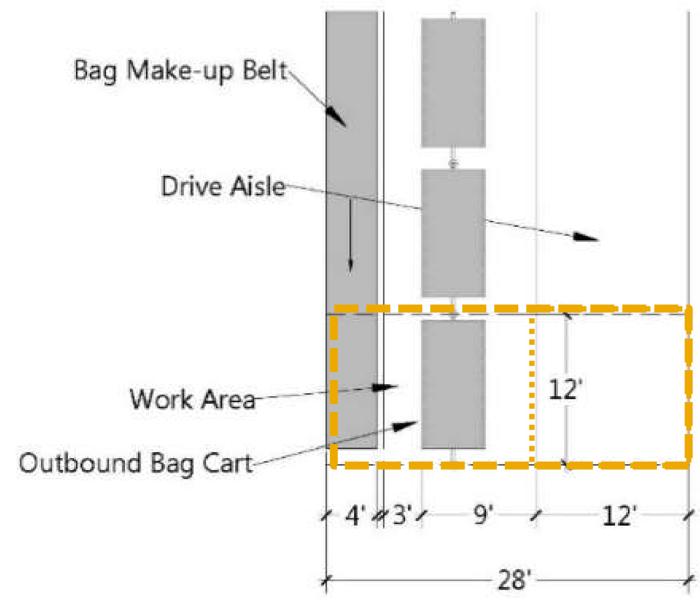
PARALLEL CART STAGING

EXAMPLE AIRCRAFT TYPE	MAX CARTS/ULDs STAGED
Airbus 319	3
Airbus 320/321	4
Boeing 737-300/400/500	3
Boeing 737-700/800/900	4
Boeing 757-200	5
Boeing 767-300	6
McDonnell Douglas MD82/83/88	4
Canadair Regional Jet CRJ700/900	2
Embraer 170/190	2

Baggage Make-Up Requirements

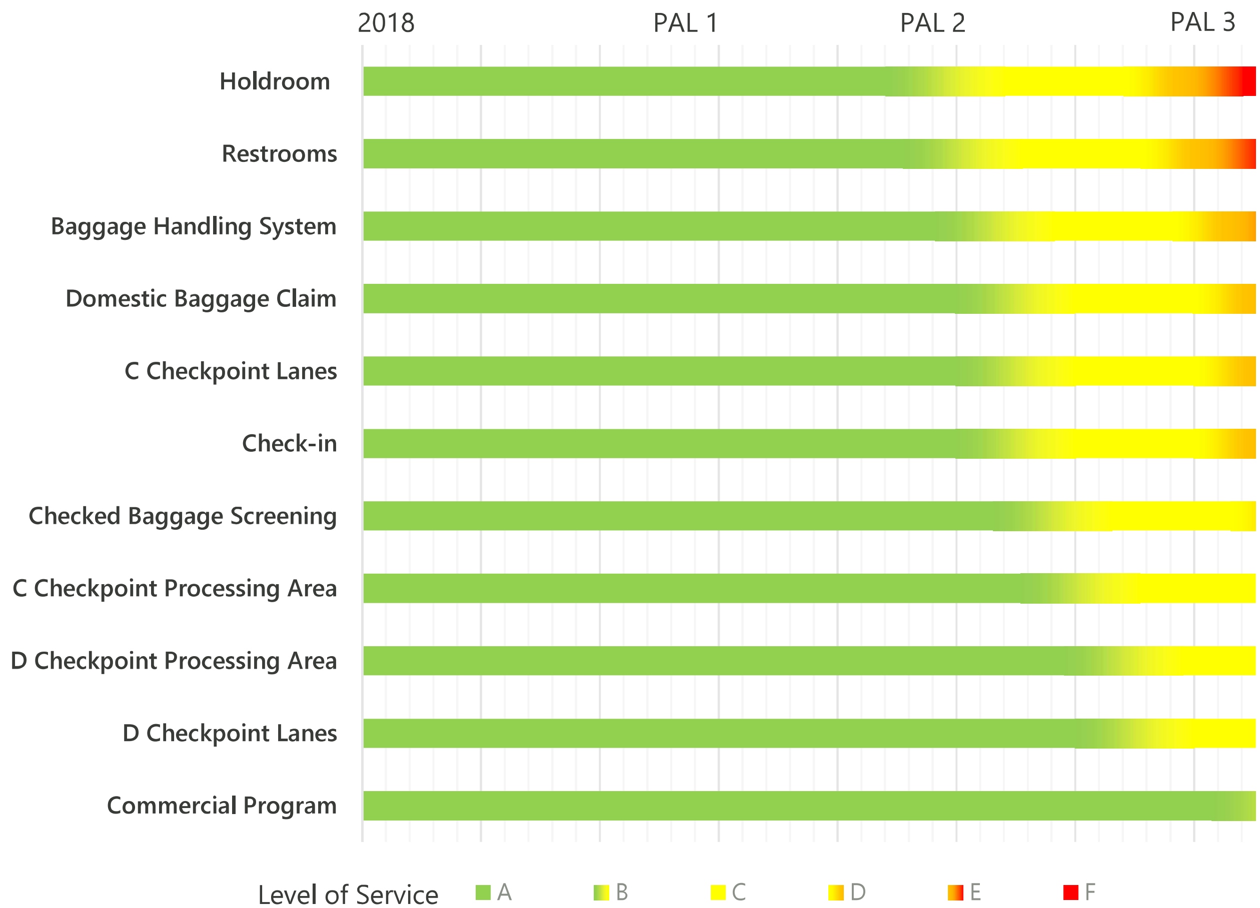
- Requirements analyzed based on DDFS and aircraft fleet – cart staging
- Current area is constrained
- Additional 10,000 to 15,000 sq ft of space required through planning period

Baggage Make-up Area



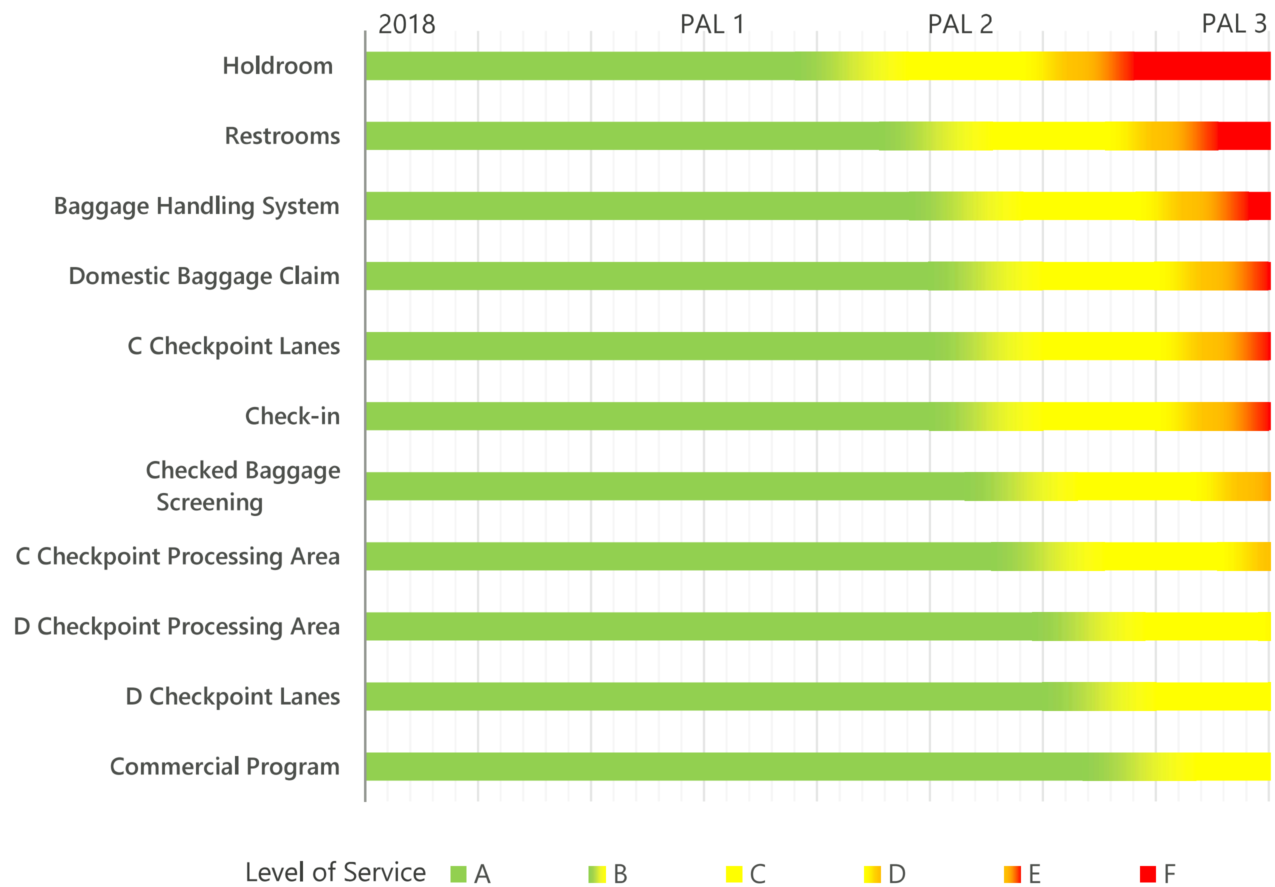
DESIGN METRIC: approximately 400 sq ft per cart (including drive aisle)

Terminal Requirements Summary
Baseline LOS



LOS reflects facility capacity relative to space required to meet demand.

Terminal Requirements Summary High Scenario LOS



LOS reflects facility capacity relative to space required to meet demand.

Terminal Requirements Summary

FUNCTIONAL AREA	UNITS	EXISTING	BASELINE			HIGH GROWTH		
			PAL 1 (2023)	PAL 2 (2028)	PAL 3 (2040)	PAL 1 (2023)	PAL 2 (2028)	PAL 3 (2040)
AIRLINE FACILITIES								
Check-in	sq ft	13,884	18,500	19,250	20,750	19,250	20,000	23,000
Baggage Handling System	sq ft	92,397	95,800	100,600	104,600	95,800	101,800	107,400
Domestic Baggage Claim	sq ft	19,468	19,500	19,500	19,500	19,500	19,500	19,500
Airline Support	sq ft	50,516	49,130	50,640	51,360	49,490	51,000	52,440
Holdroom	sq ft	56,392	63,950	66,470	66,470	63,950	66,470	66,470
Airline Club	sq ft	5,002	5,000	5,000	5,000	5,000	5,000	5,000
DEPARTMENT OF HOMELAND SECURITY								
Transportation Security Administration								
Checkpoint Total Area [1]	sq ft	21,647	18,900	22,680	22,680	18,900	22,680	26,460
Checked Baggage Screening	sq ft	22,942	21,600	21,600	27,000	21,600	21,600	27,000
Customs and Border Protection [2]	sq ft	26,000	26,000	26,000	26,000	26,000	26,000	26,000
OTHER AREAS								
Commercial Program	sq ft	57,203	40,000	44,000	54,000	45,000	51,000	69,000
Airport Admin / Support	sq ft	53,769	54,000	54,000	54,000	54,000	54,000	54,000
Restrooms	sq ft	23,908	26,250	27,000	27,000	26,250	27,000	27,000
Building Services	sq ft	85,708	84,840	88,340	92,520	86,020	90,140	97,340
Circulation	sq ft	225,700	223,410	232,630	243,650	226,520	237,380	256,330
Amenities	sq ft	8,149	8,100	8,100	16,200	8,100	16,200	16,200
Sheriff Station	sq ft	9,271	4,300	4,300	4,300	4,300	4,300	4,300
UNASSIGNED	sq ft	56,778						
Design Configuration Contingency (10%)	sq ft	n/a	75,930	79,010	83,500	76,970	81,410	87,740
TOTAL	**sq ft**	**809,266**	**701,400**	**729,800**	**773,700**	**712,100**	**754,200**	**815,300**

NOTES:
1 Based on concourse-specific checkpoints
2 Placeholder until definition of Concourse E Redevelopment Program
Numbers are rounded.

Facility Requirements

Aircraft Gates

Gating Analysis Assumptions

- Concourse E not currently in operation
- International flight activity will have priority for gate assignment on Redeveloped Concourse E
- No assumption was made regarding the future number of gates on Concourse E
- Airline-specific gate utilization does not span multiple concourses
- Gate assignment source: Gate Utilization Study Survey (M&H) – 2018, confirmed January 2019

Airline Gate Allocation

Gate assignment source: Gate Utilization Study Survey (M&H) – 2018, confirmed January 2019.

Gate Requirements Summary

- Gate requirements presented as a range reflecting the needs under the various operating scenarios

REQUIREMENT	GATING SCENARIO 1		GATING SCENARIO 2		GATING SCENARIO 3	
	Baseline Forecast	High Growth	Baseline Forecast	High Growth	Baseline Forecast	High Growth
PAL 1 (2023) TOTAL GATES	35	35	33	33	35	35
PAL 2 (2028) TOTAL GATES	36	37	35	35	36	36
PAL 3 (2040) TOTAL GATES	39	42	35	35	36	36
TOTAL NEW GATES REQUIRED	**+7**	**+10**	**+4**	**+4**	**+4**	**+4**
TOTAL TOWS (ARR + DEP)	27	26	27	36	27	30

Note: Each counted Aircraft Tow represents either an Arrival Tow (relocate aircraft to allow subsequent use of gate) or a Departure Tow (position aircraft from a remote location for loading and departure). In some instances an Arrival Tow can be positioned to avoid a subsequent Departure Tow.

- Summary Gate Requirements
  - 2023 (PAL 1): 3 additional gates (over existing)
  - 2028 (PAL 2): 4 to 5 additional gates (over existing)
  - 2040 (PAL 3): 4 to 10 additional gates (over existing)

Concourse E Redevelopment will meet a portion of this gate need

Landside Access Roadway and Curbside

Landside (On- and Off-Airport) Roadways, Parking, Rental Car Facilities

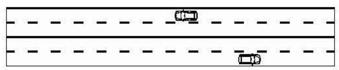
On- and Off-Airport Roadways

On- and Off-Airport Requirements Methodology

- On-Airport Roadways
  - Spreadsheet model-based analysis of roadway volumes
  - Demand growth based on O&D Aviation Activity Forecast
  - Considers peak-hour passenger and operations forecasts
  - Morning (AM Peak) and afternoon (PM Peak) peaks assessed
  - Considers a balanced roadway network
- Non-terminal Area Roadways
  - WisDOT Planning Level Forecast Data serves as basis for projections
  - Morning and evening peaks assessed
  - Based on O&D Aviation Activity Forecast

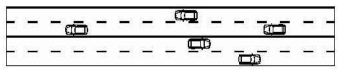
Curbside and Roadway – Level of Service

Terminal Roadway LOS



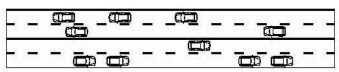
LOS A

LOS A represents operations where free-flow speeds prevail. The ability of each driver to maneuver within the traffic stream, change lanes, merge, or weave is almost completely unimpeded by other vehicles because of low traffic densities. The effects of transient blockages or incidents are easily absorbed at this level of service.



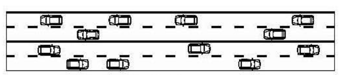
LOS B

LOS B represents conditions in which free-flow speeds are maintained. The ability of each driver to maneuver within the traffic stream, change lanes, or weave is only slightly restricted by the presence of other vehicles. The general physical and psychological comfort of drivers is still high. The effects of minor incidents and point breakdowns are still easily absorbed.



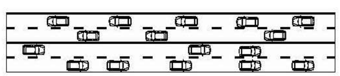
LOS C

LOS C represents traffic flow with speeds at or near the free-flow speeds of the roadway. Freedom to maneuver within the traffic stream is noticeably restricted and lane changes may require more care and vigilance on the part of the driver because of high traffic densities. Minor blockages or incidents may still be absorbed, but the local deterioration in service will be substantial. Queues may be expected to form behind any significant blockage.



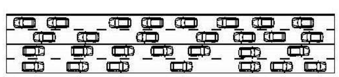
LOS D

LOS D represents the level at which speeds begin to decline slightly with increasing flows, and density begins to increase somewhat more quickly. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort. Even minor blockages or incidents can be expected to quickly create queues because the traffic stream has little space to absorb disruptions.



LOS E

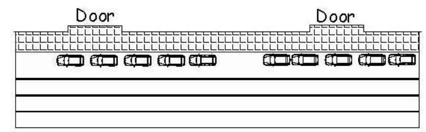
LOS E represents operations at or near capacity. Operations at this level are volatile because there are virtually no usable gaps in the traffic stream. Vehicles are closely spaced, leaving little room to maneuver with the traffic stream. Any disruption of the traffic stream, such as vehicles entering from a ramp or a vehicle changing lanes, can disrupt upstream traffic flows. At capacity, the traffic stream has no ability to absorb even the most minor disruptions, and any incident can be expected to produce a serious breakdown with extensive queuing. Maneuverability with the traffic stream is extremely limited and the level of physical and psychological comfort afforded the driver is poor.



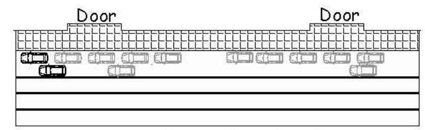
LOS F

LOS F represents breakdowns in vehicular flow. Such conditions generally exist within queues forming behind bottleneck points. Bottlenecks occur as a result of (1) traffic accidents, (2) typical traffic congestion areas, such as lane drops, weaving segments, or merges, (3) parking maneuvers, or (4) traffic conditions when the projected hourly flow exceeds the estimated capacity of the roadway segment.

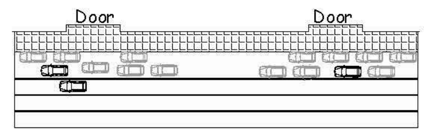
Curbside Roadway LOS



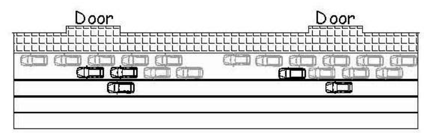
LOS A, 0%-90% Curb Utilization



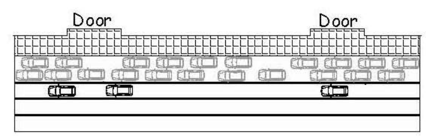
LOS B, 91% - 110% Curb Utilization



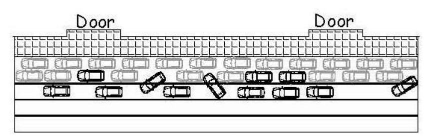
LOS C, 111%-130% Curb Utilization



LOS D, 131%-170% Curb Utilization



LOS E, 171%-200% Curb Utilization



LOS F, >200% Curb Utilization

Legend

Utilization Lower Range

Utilization Upper Range

SOURCE: Airport Cooperative Research Program, ACRP Report 40, Airport Curbside and Terminal Area Roadway Operations, July 2010.

On-Airport Roadway Link Analysis

BASELINE

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

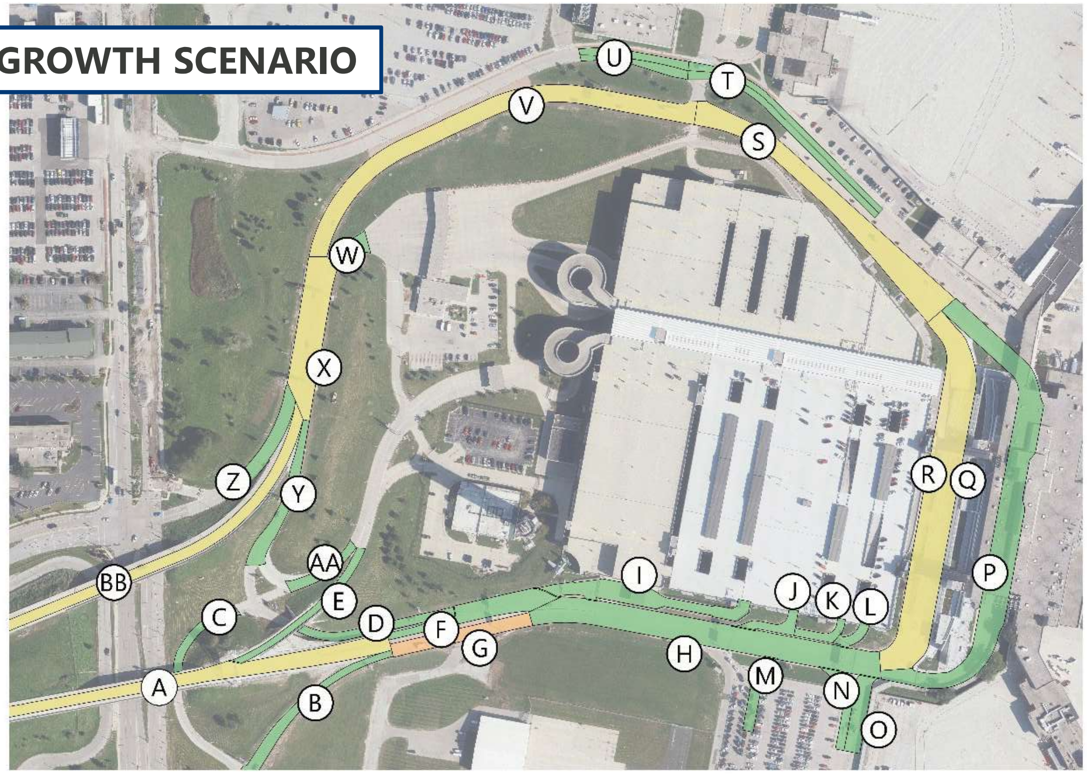
Summary

- AM Peak: All links operate at LOS C or better
- PM Peak : All links operate at LOS C or better (except where noted)

Link	Description	PM 2023	PM 2028	PM 2040
G	Inbound Roadway to Terminal after ramp from Howell Road	C	C	D
Q	Arrivals Inner Curb	C	C	D
S	Outbound Roadway Leaving Curb	C	C	D
V	Outbound Roadway after IAB Enter/Exit	C	C	D

On-Airport Roadway Link Analysis (con't)

HIGH GROWTH SCENARIO



LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Summary

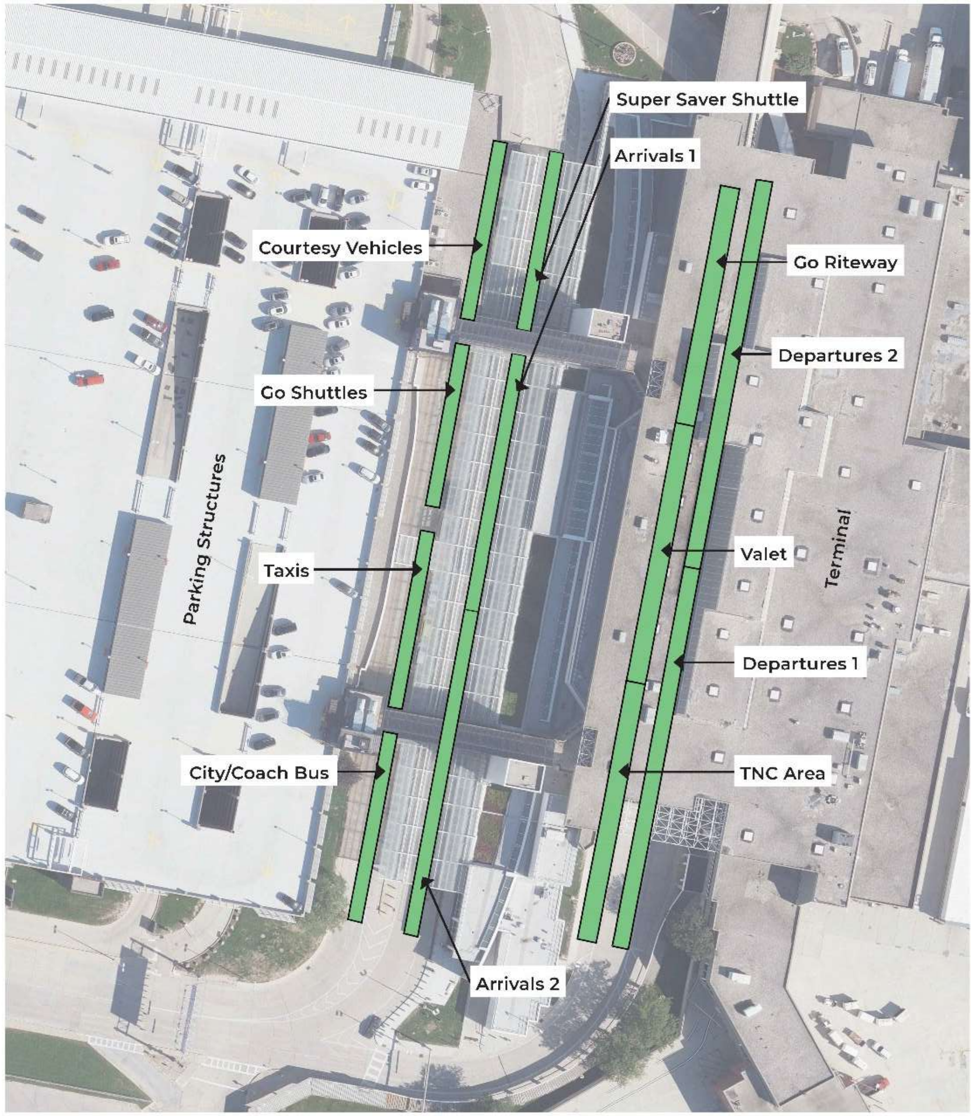
- AM Peak: All links operate at LOS C or better
- PM Peak: All links operate at LOS C or better (except where noted)

Link	Description	PM 2023	PM 2028	PM 2040
A	Airport Spur EB Inbound	C	C	D
G	Inbound Roadway to Terminal after ramp from Howell Road	C	D	E
Q	Arrivals Inner Curb	C	C	D
S	Outbound Roadway Leaving Curb	C	C	D
V	Outbound Roadway after IAB Enter/Exit	C	C	D
X	Outbound Roadway after Parking Exit	C	C	D
BB	Airport Spur Outbound Split Towards I-94	C	C	D

Curbside Utilization

AM: Morning Peak

PM: Afternoon Peak



Courtesy Vehicles

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

Go Shuttles

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

Taxis

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

Bus/Charters

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040			D	

Arrivals 1

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

Arrivals 2

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

Departures 1

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

Departures 2

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

TNC Area

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

Curbside performs at LOS C or better

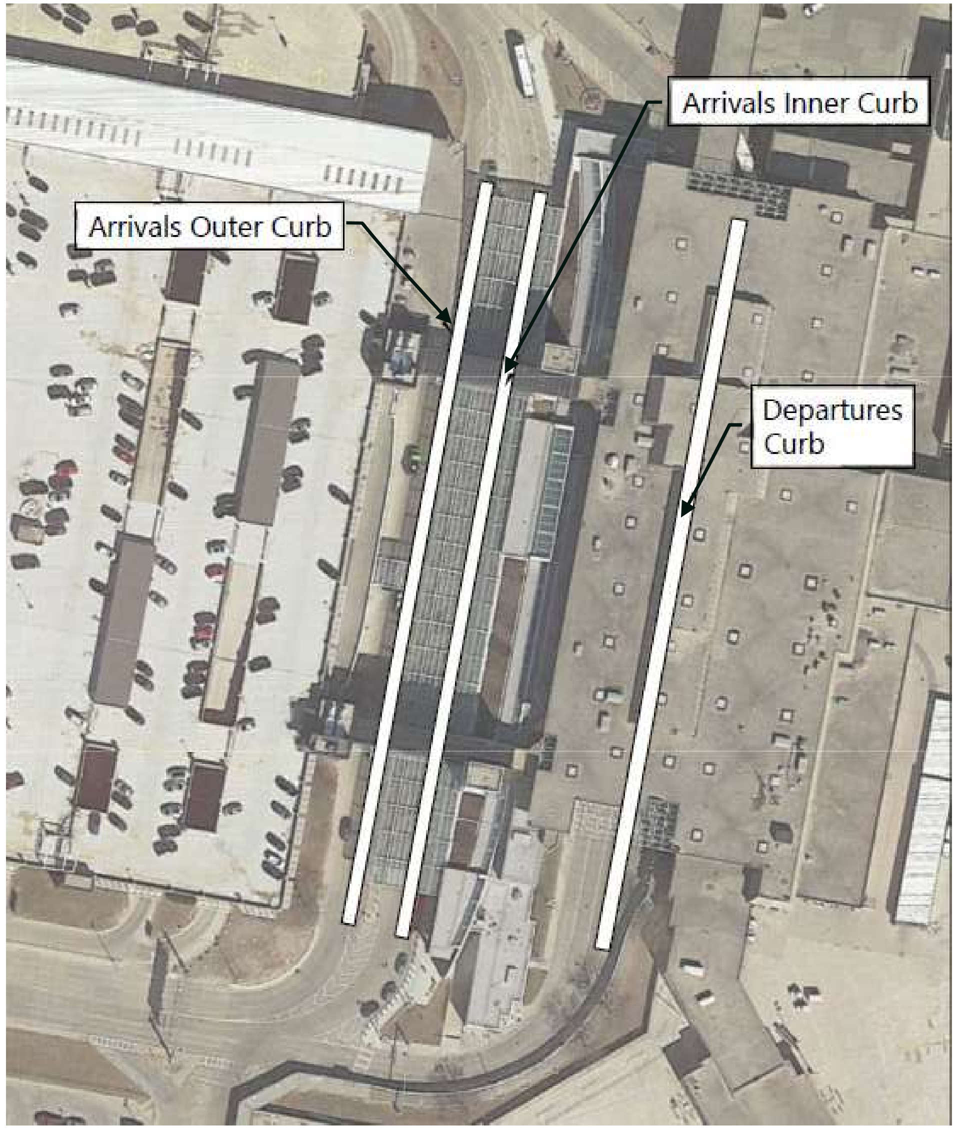
Terminal Roadway Throughput

Arrivals Outer Roadway

	Baseline		High	
	AM	PM	AM	PM
Existing	A	A	A	A
2023	A	A	A	A
2028	A	A	A	A
2040	A	A	A	A

AM: Morning Peak

PM: Afternoon Peak



Arrivals Inner Roadway

	Baseline		High	
	AM	PM	AM	PM
Existing	A	A	A	A
2023	A	A	A	B
2028	A	C	A	D
2040	A	F	A	F

Departures Roadway

	Baseline		High	
	AM	PM	AM	PM
Existing	A	A	A	A
2023	A	A	A	A
2028	A	A	A	B
2040	A	C	A	F

Non-Terminal Roadways

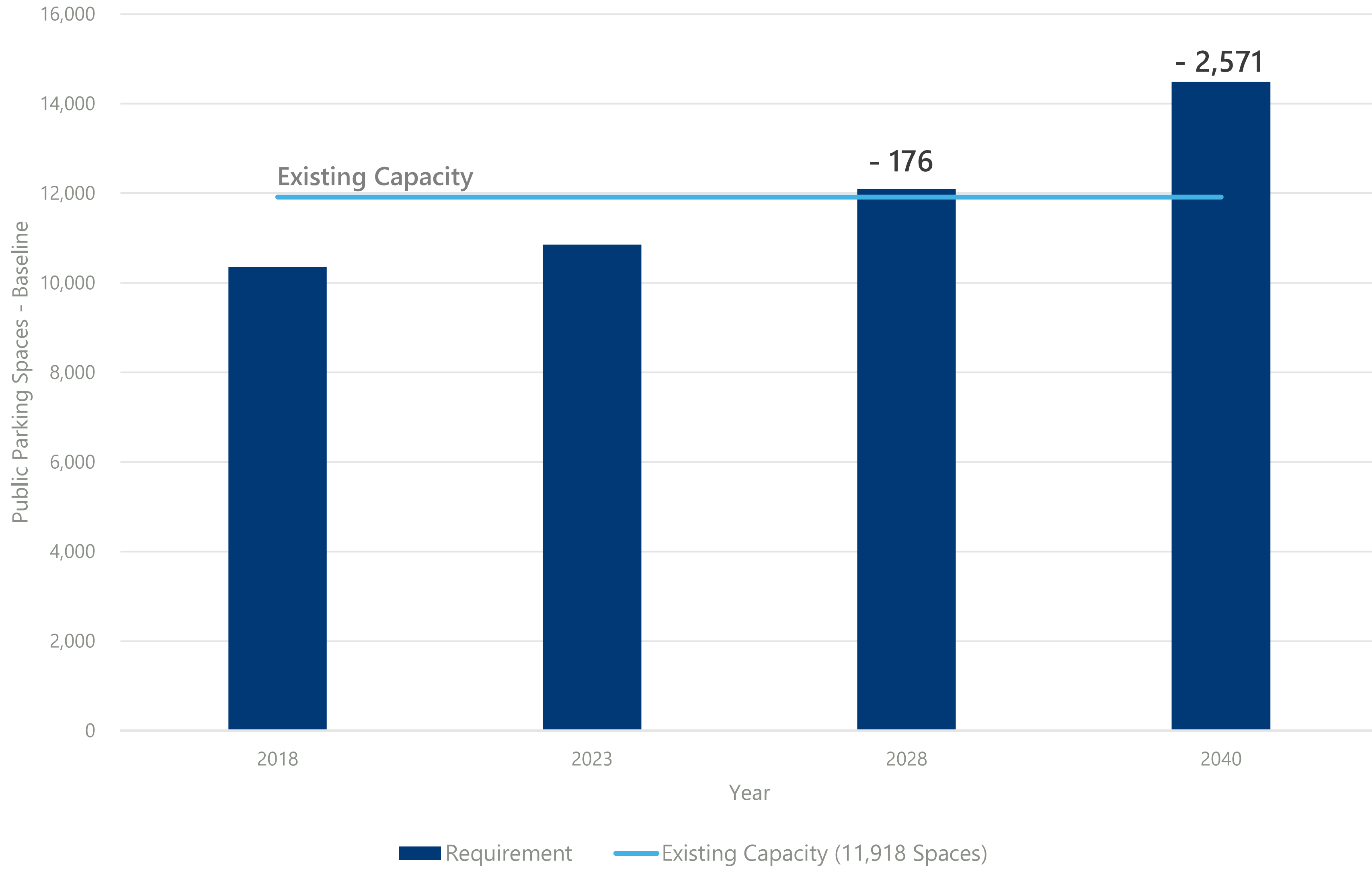
- Intersections assessed in vicinity of MKE
  - Howell Ave. and Layton Ave.
  - Howell Ave. and Grange Ave.
  - Howell Ave. and Airport Spur
  - Howell Ave. and College Ave.
  - Airport Spur and Air Cargo Way
- Traffic Growth
  - 0.4% regional roadway growth assumed by WisDOT (background traffic)
  - Baseline forecast assumes 1.9% annual growth (airport traffic)
  - High scenario forecast adds 2.7% annual growth (airport traffic)
  - Most Airport traffic enters via the Airport Spur (I-94), less growth assumed on surface streets
- Projected (future) LOS reflects overall intersection average, individual turning movements are higher or lower
- Some intersections had signal timing optimized to improve future operations
- All intersections operate at LOS D or better through 2040 (complies with National Highway System standards)

Public and Employee Parking Facilities

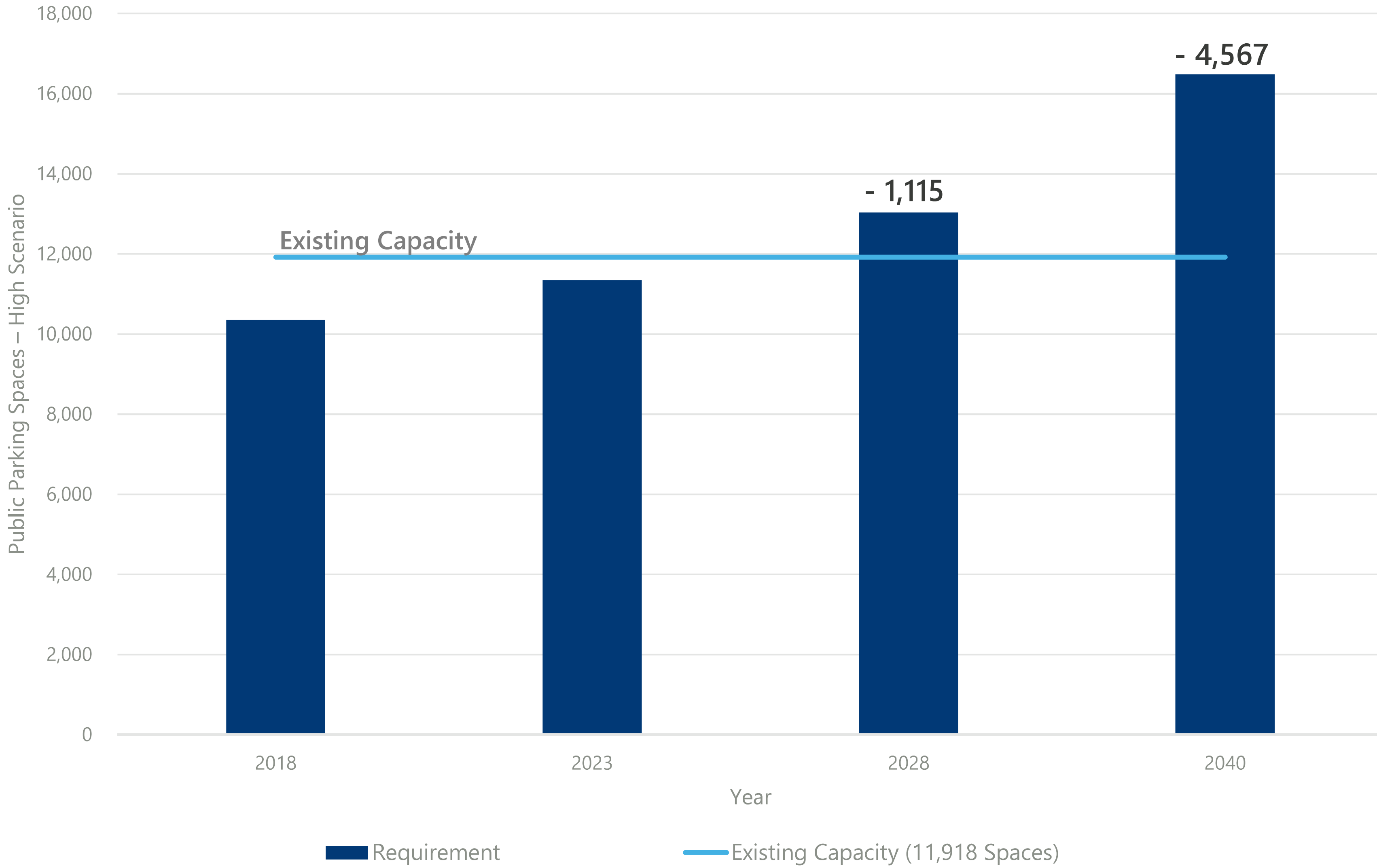
Public and Employee Parking Methodology

- Public Parking Requirements
  - 95 percentile (day) of parking demand used to determine space needs
  - No diversion to other available lots (determines deficiency)
  - Capacity buffer assumed: 5 percent (surface) | 10 percent (garage)
  - Requirements grown relative to O&D Aviation Activity Forecast
- Employee Parking Requirements
  - Entry and exit data supported by camera counts
  - Overnight counts recorded to assess peak periods
  - Aviation Activity Forecast serves as basis

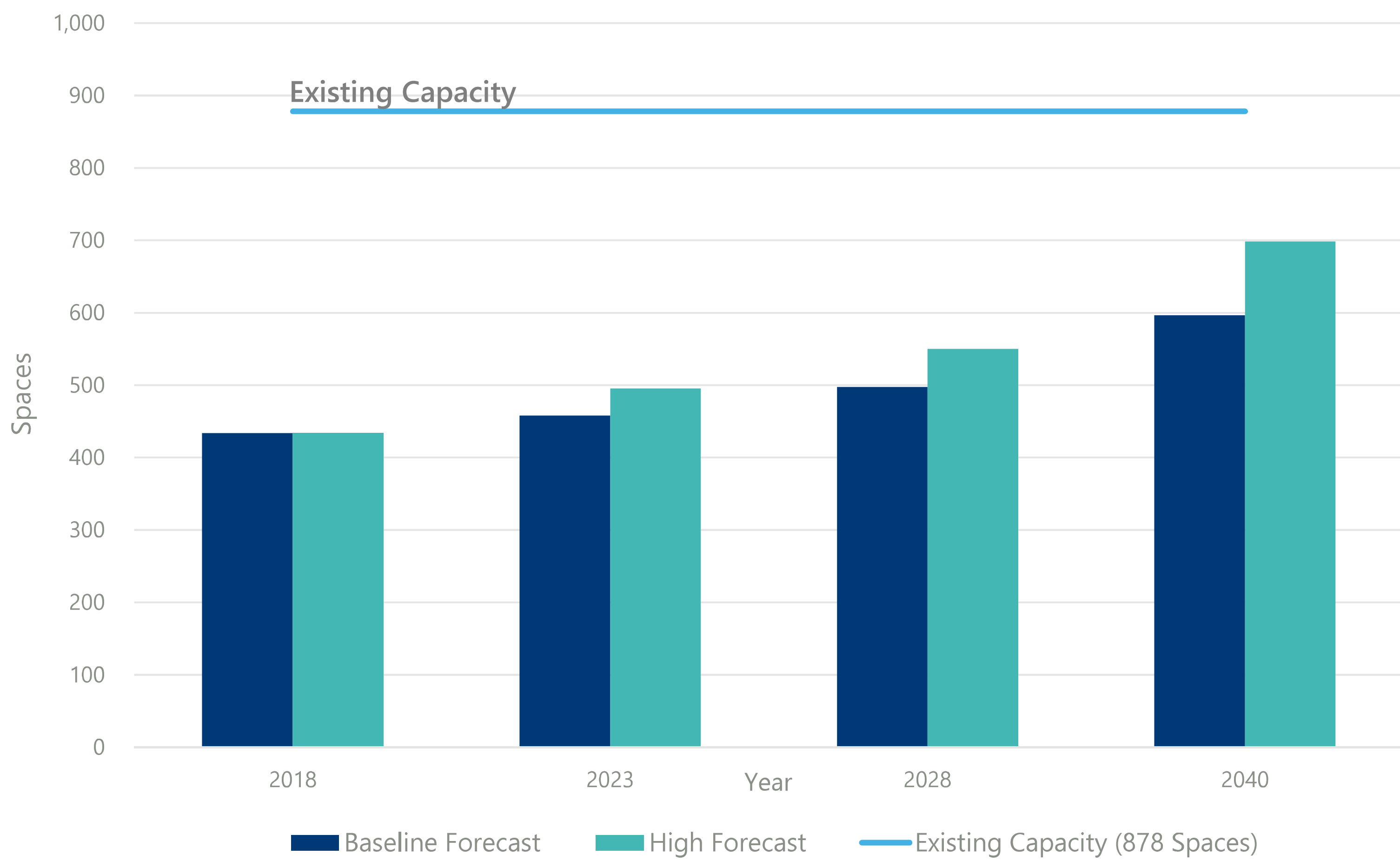
Baseline Public Parking Requirements



High Scenario Public Parking



Employee Parking Requirements



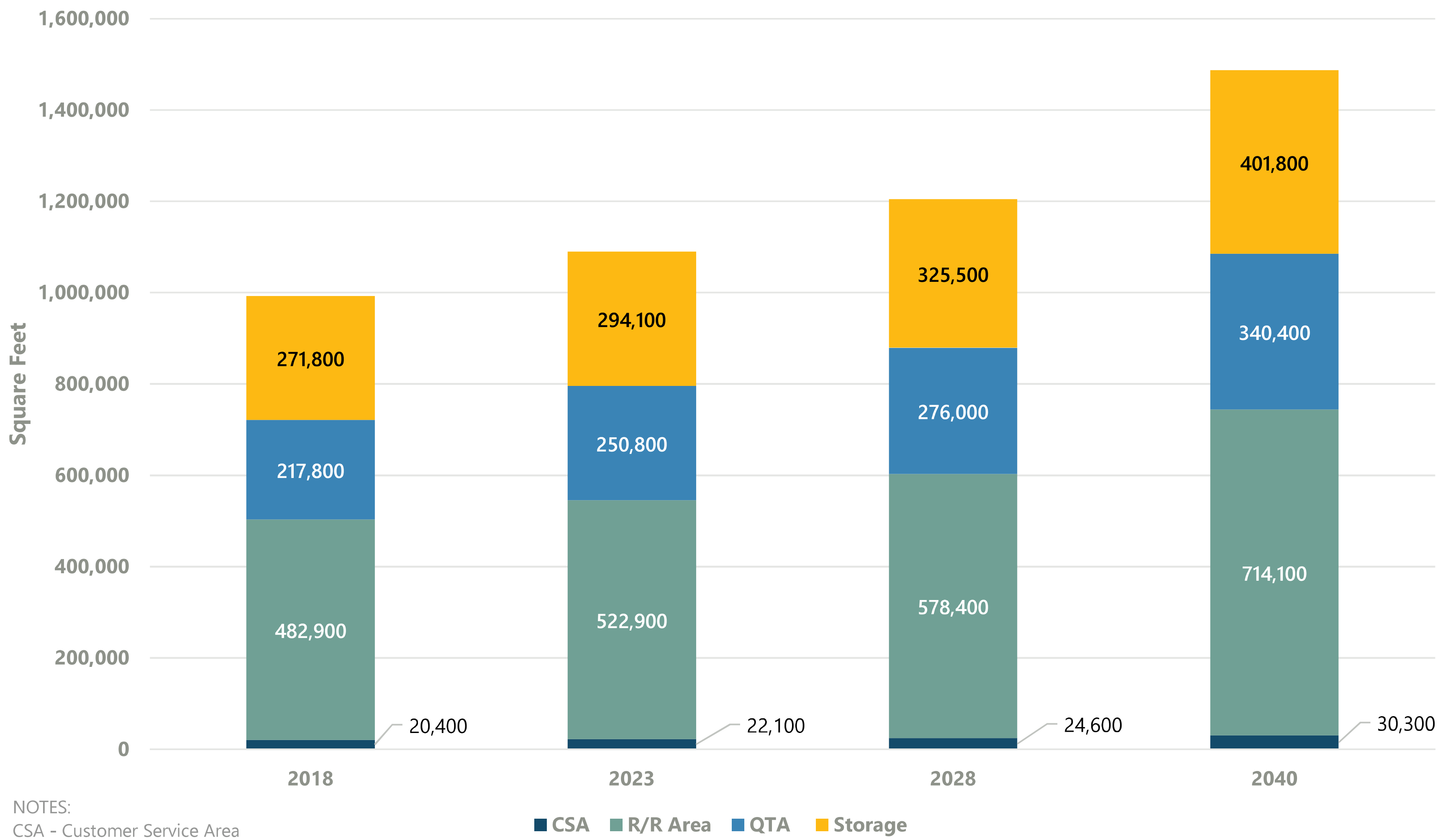
- Requirements based on a blend of passenger enplanements and operations
- Approximately 880 existing employee spaces expected to accommodate employees in both the baseline and high-growth scenario through 2040

Rental Car Facilities

Rental Car Facility Requirements Methodology

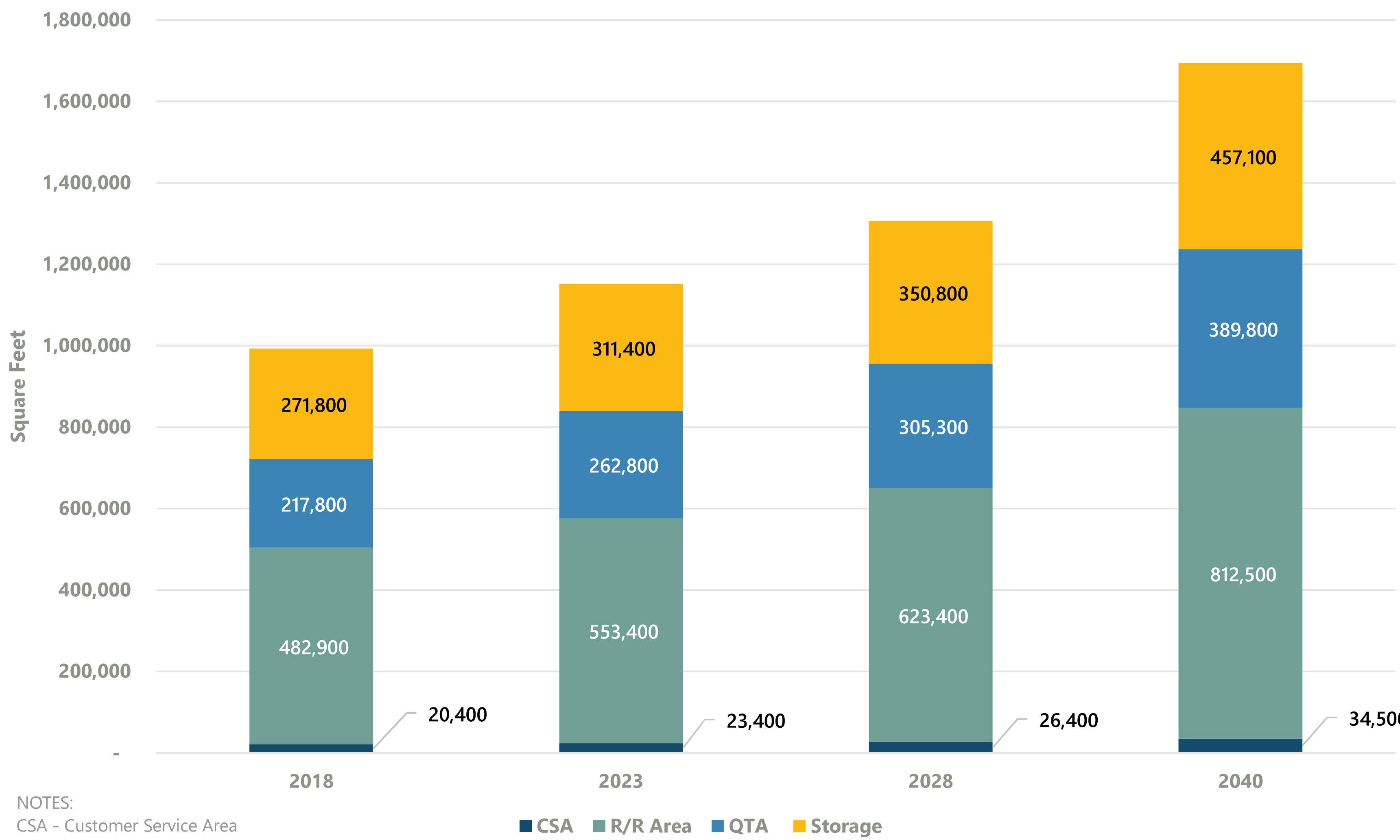
- A “planning hour” (15th busiest hour) was calculated from a full year of hourly transaction data (August 2017 – July 2018)
- Standard industry utilization factors used to define facility requirements
- Facility requirements were projected using the O&D Aviation Activity Forecast
- Major Rental Car Components
  - Customer Service Areas (CSA)
  - Ready/Return Areas (R/R Area)
  - Quick Turnaround Areas (QTA)
  - Staging and Storage Areas

Baseline Rental Car Facility Requirements



NOTES:
CSA - Customer Service Area
R/R – Ready/Return Area
QTA – Quick Turnaround Area
Storage – Storage and Staging

High Growth Rental Car Requirements



NOTES:
CSA - Customer Service Area
R/R – Ready/Return Area
QTA – Quick Turnaround Area
Storage – Storage and Staging

Support Facilities

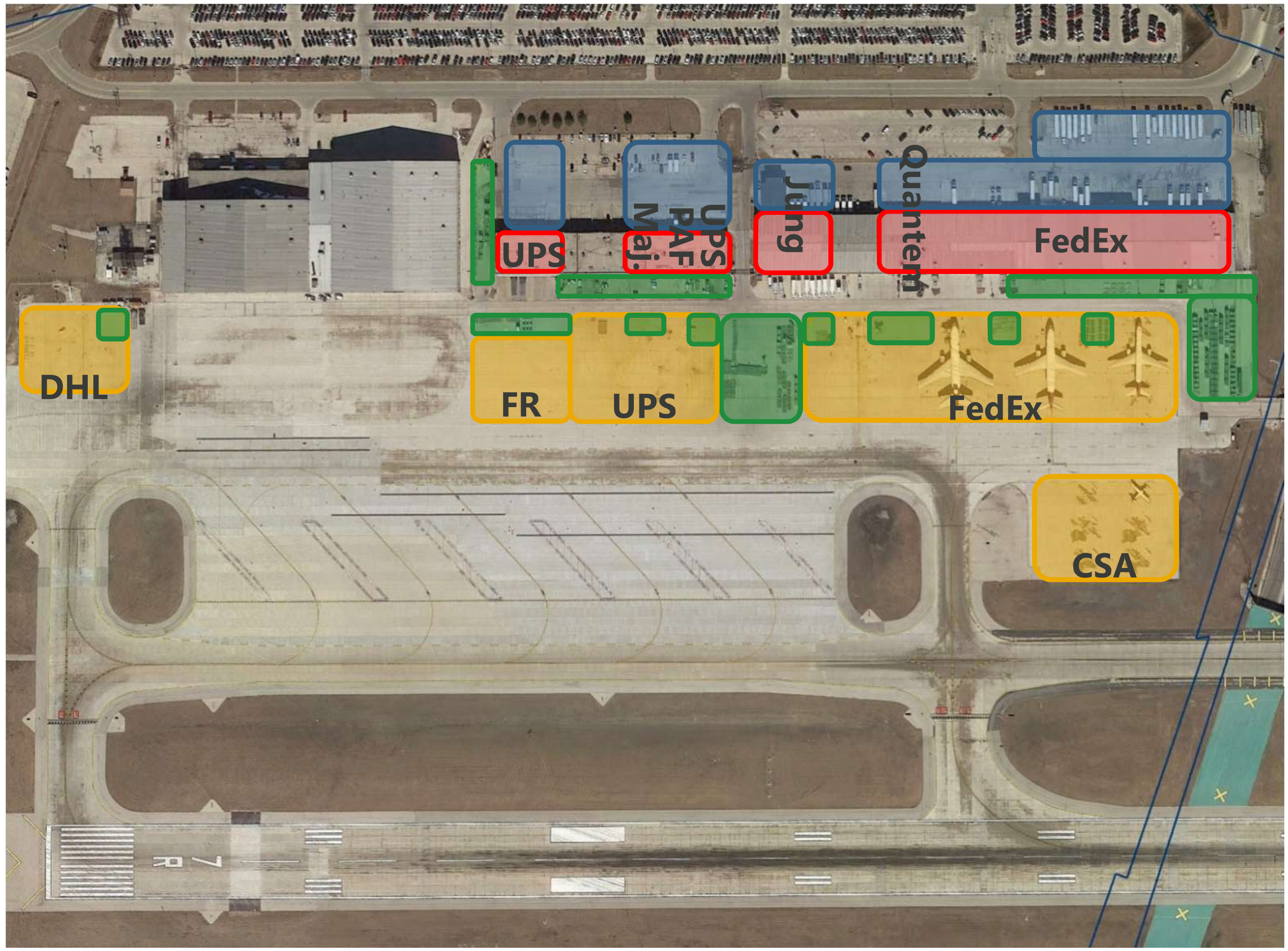
Existing Cargo Facilities

Cargo Facility Areas

- Landside
- Warehouse
- GSE
- Apron

Cargo Carrier Types

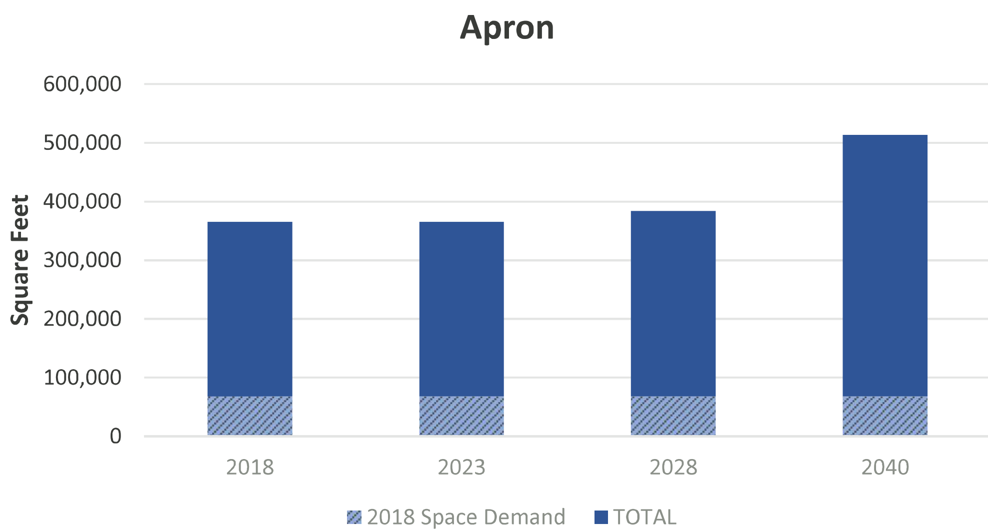
- Integrated (UPS, FedEx)
- All Cargo (Feeders/Third Parties)
- Belly (Airlines)

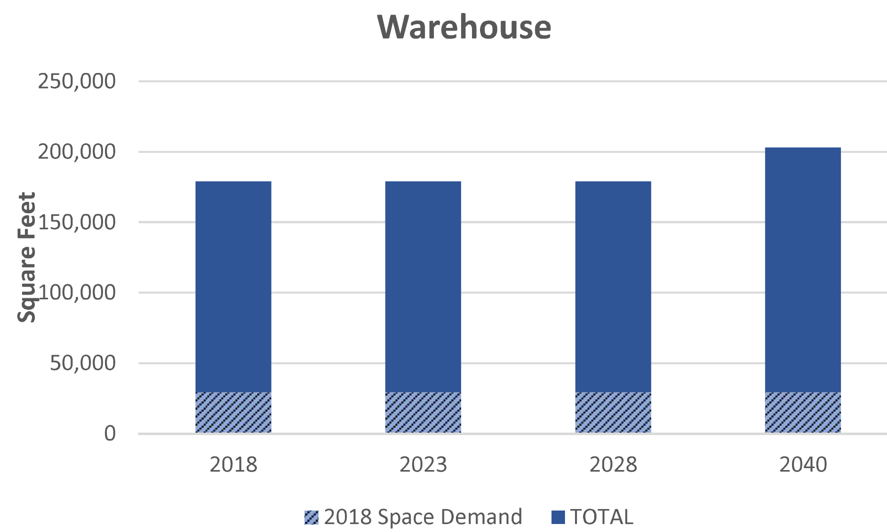


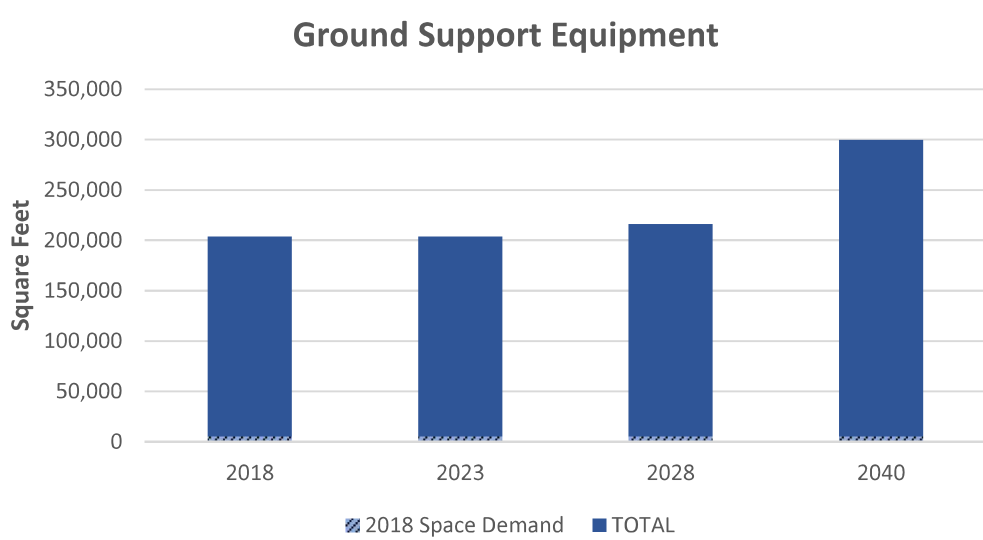
Cargo Facility Planning Methodology

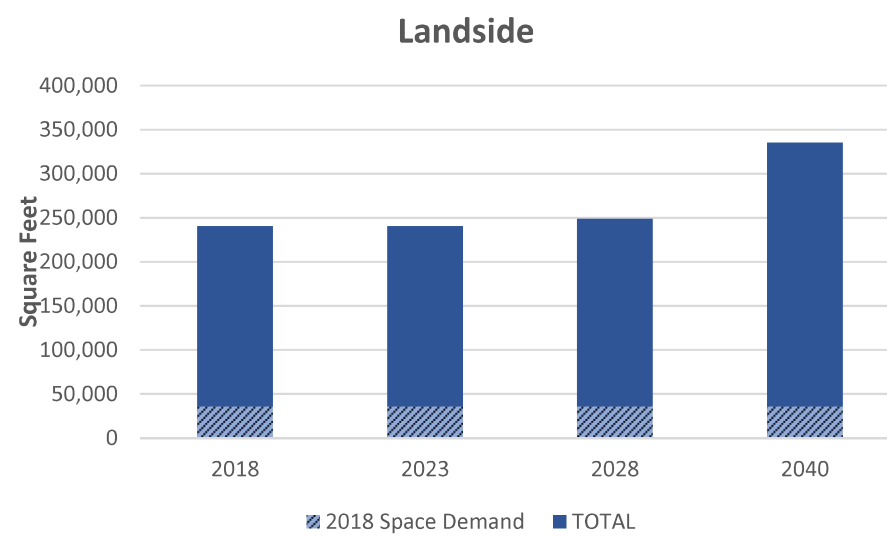
- Industry Standards for Cargo Planning
  - Previous Standard: 1 square foot of warehouse per 1 ton of annual cargo moved
  - ACRP Report 143, *Guidebook for Air Cargo Facility Planning and Development*
  - Refined ratios per tonnage to determine apron, GSE and building areas
- Cargo Trends and Needs
  - Existing (2018) demand for space
  - Consolidation
  - Amazon
- Technology, automation, building layout can increase efficiency
  - As efficiency increases, required cargo areas decrease
- Apron area based on cargo tonnage OR fleet mix
  - Fleet mix from DDFS used (more accurate projection)

Cargo Facility – Base Requirements

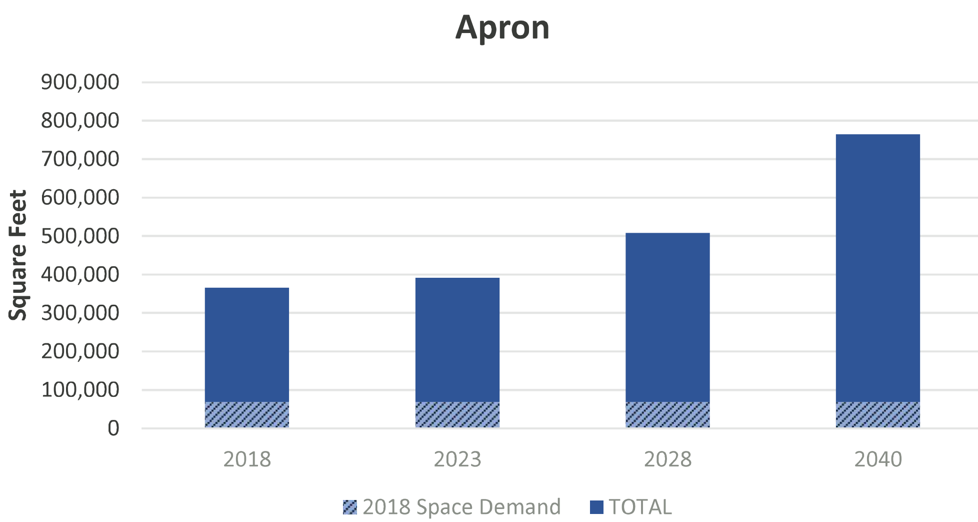


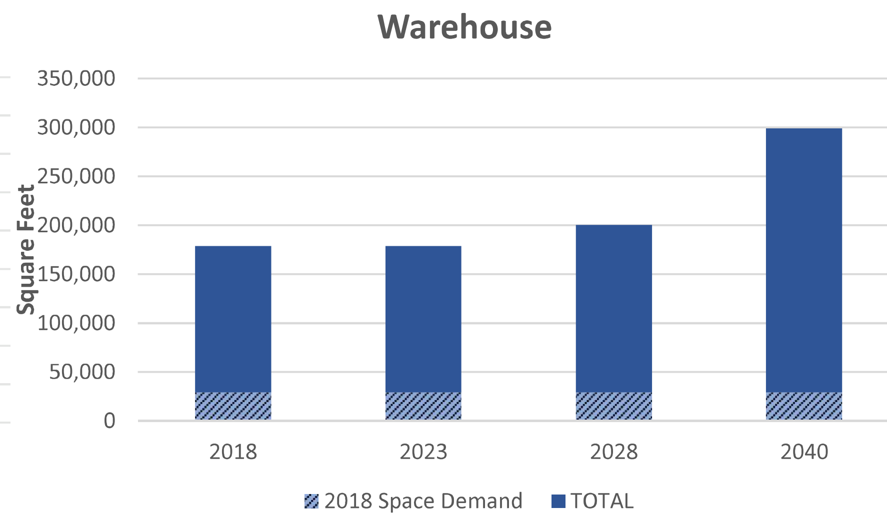


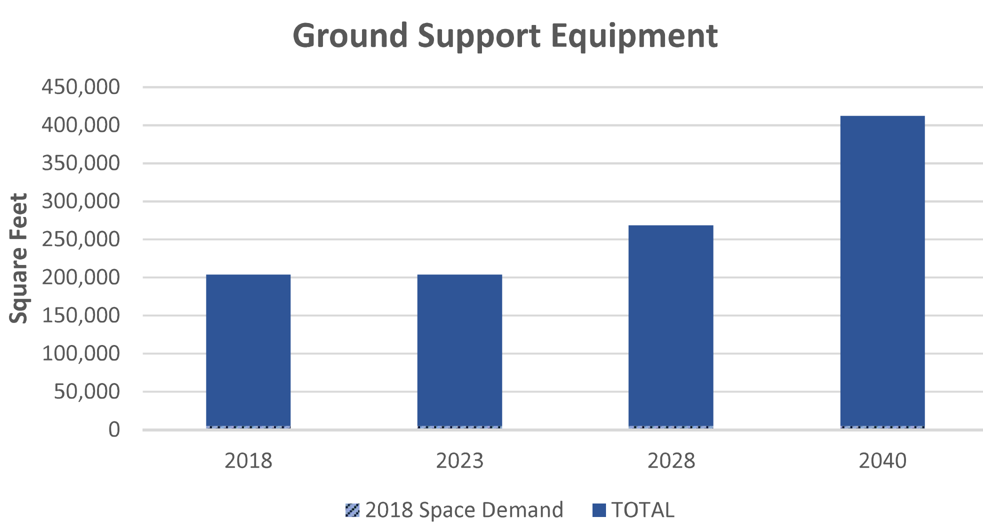


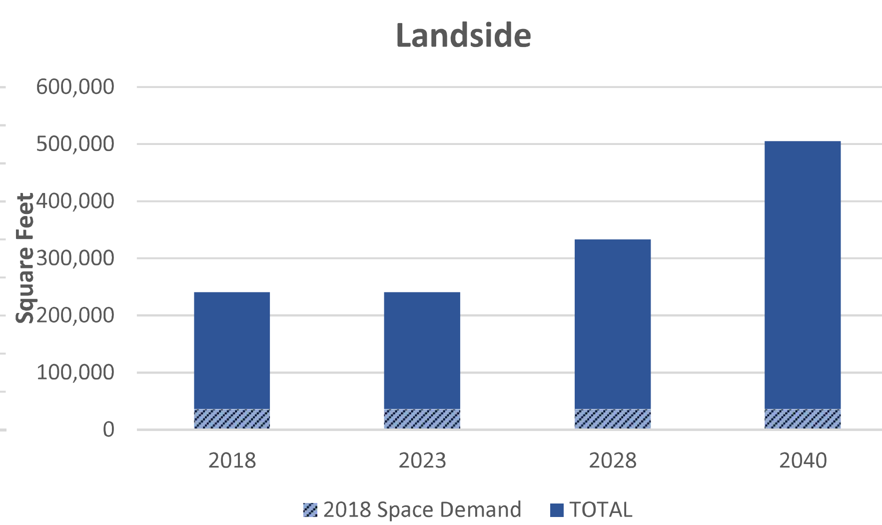


High Growth Cargo Facility Requirements





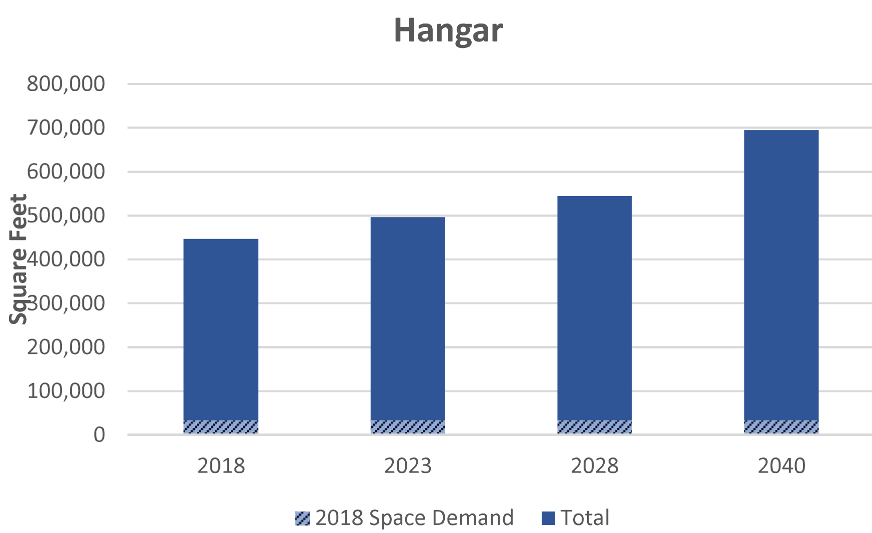


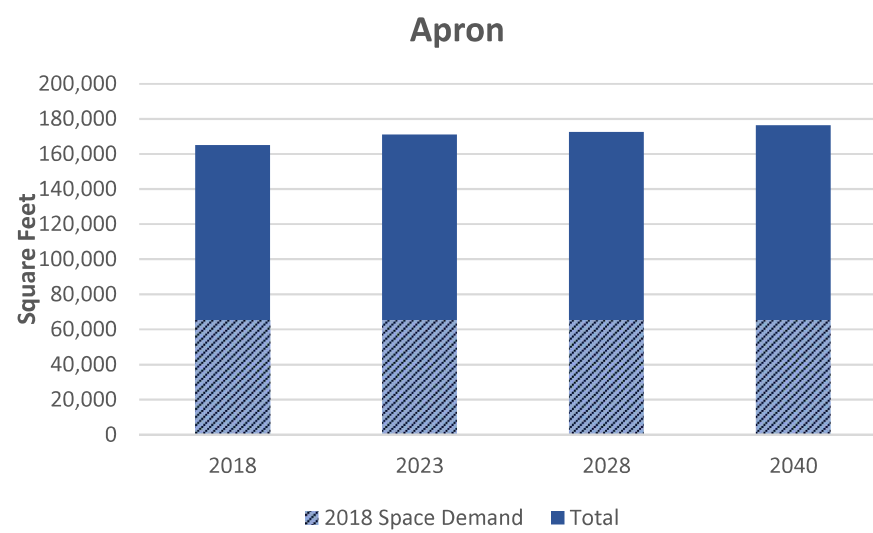


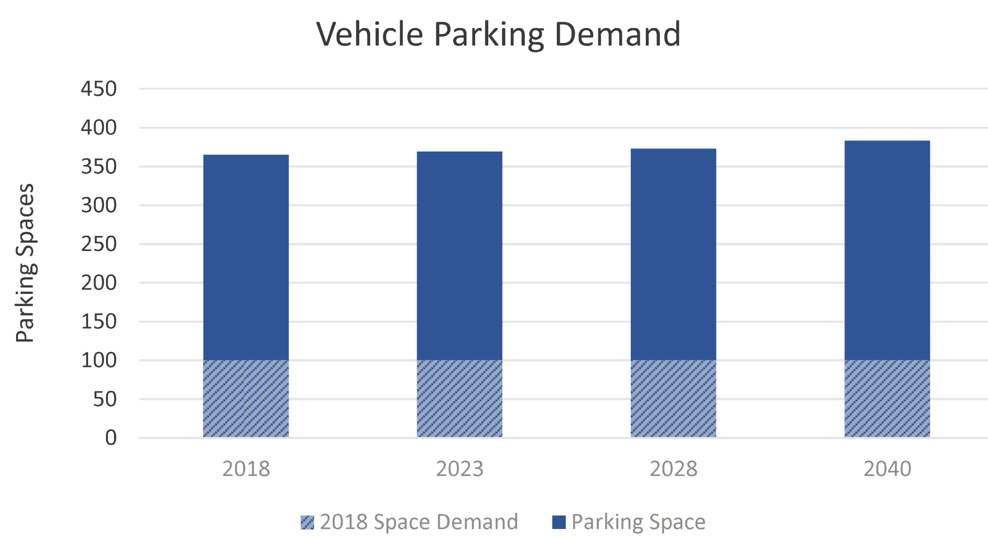
General Aviation Area Requirements

- Hangars
  - Based aircraft assigned square footage to determine hangar area
- Fixed-base Operator (FBO)
  - Based on square feet (SF) per type of operation
- Transient Apron
  - Itinerant operations used to determine apron areas
- Vehicle parking
  - Parking stalls determined by ratio to operations
  - No change to requirements in high growth Scenario

Baseline & High Growth GA Requirements

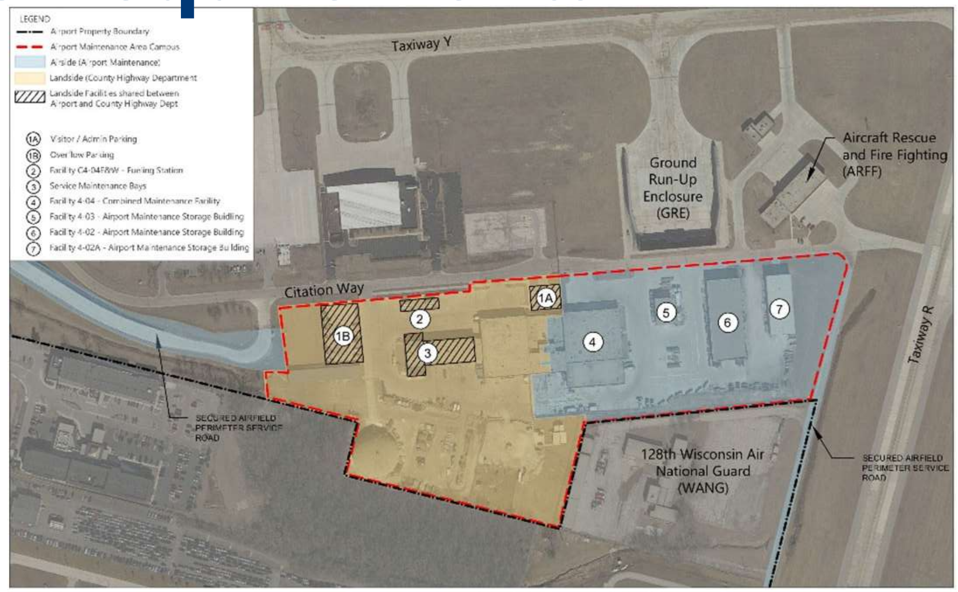


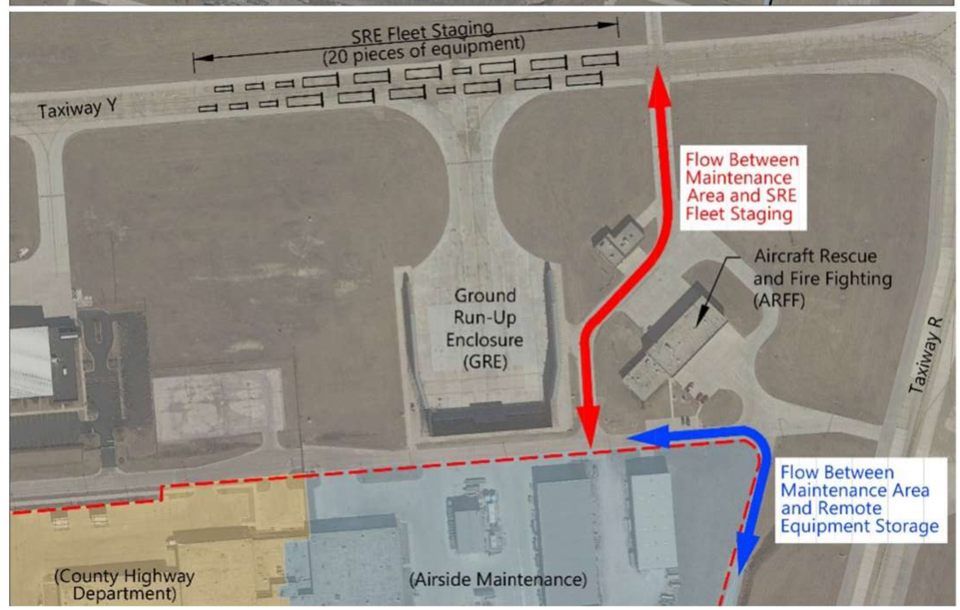




Airport Maintenance Requirements

- Area Needs: +200,000 to 250,000 SF
- Establish new snow removal equipment (SRE) building (57,000 SF)
- Store all airport maintenance equipment in same building/ area (12,000 SF)
- Improve depth and overall size of maintenance bays (5,000 SF)
- Minimize outdoor storage (18,000 SF)
- Provide sufficient exterior circulation space (1:1 ratio with structures)
- Install fueling system (25,000 SF)
- Improve dry chemical storage
- Upgrade west parking area
- Improve flow of snow removal operations



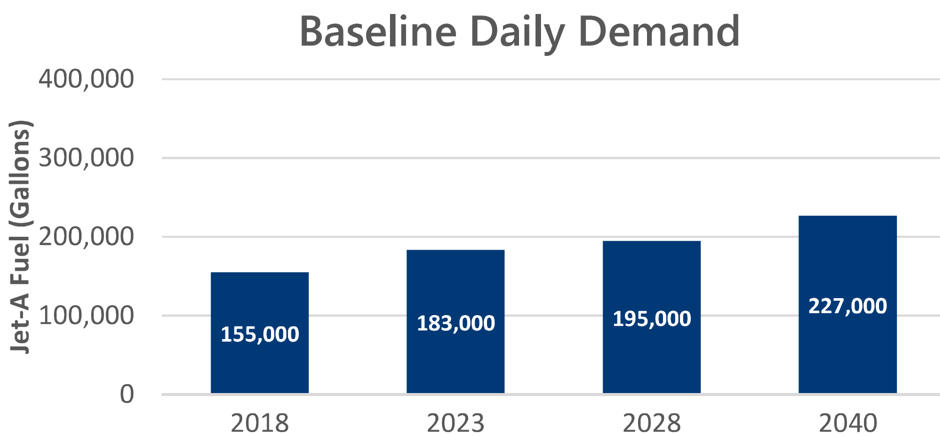


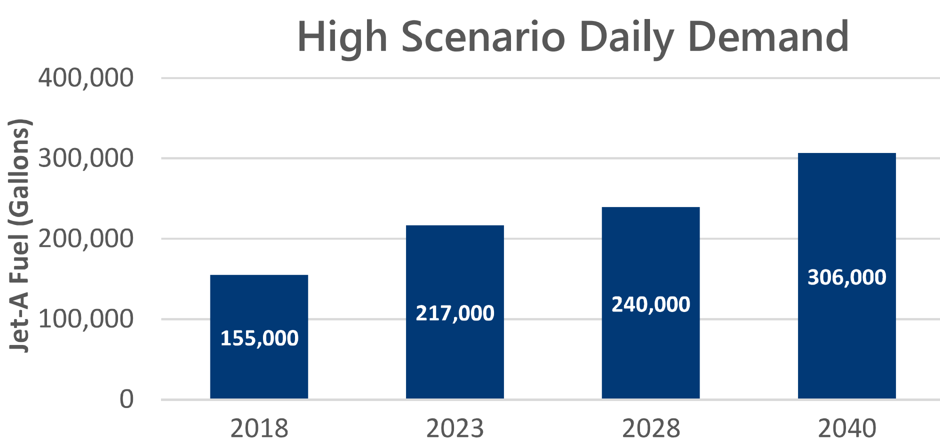
Aircraft Maintenance Requirements

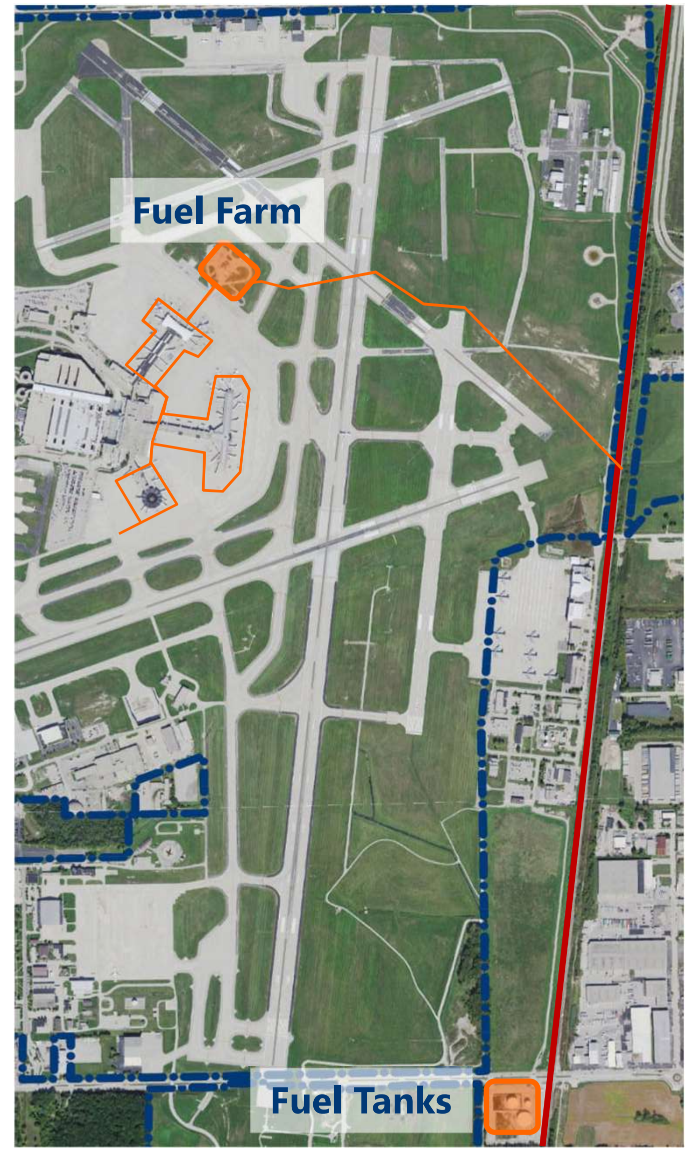
- Potential to consolidate airline maintenance facilities
- Typically, airlines and users determine expansion needs of airline maintenance facilities
- Individual tenants expressed specific needs and requirements
  - Apron area
  - Hangar Space
  - Building/office space
  - Service road management

Fuel Storage Requirements

- Current Jet-A fuel storage capacity: 8M gallons
- Conveyance: 2,400 GPM (meets current demand)







Next Steps

Master Plan Scope

- Demand/Capacity Input → Finalize Facility Requirements
  - Airside (airfield, air traffic, operational)
  - Landside (roadway, access, curbside, parking, rental car, other)
  - Terminal (functional areas and processors)
  - Support Facilities (cargo, general aviation/FBO, FAA, other)
- Alternatives Development and Evaluation

  MKE MILWAUKEE Mitchell International Airport + RICONDO®
- Meet with Advisory Groups to present development alternatives

APPENDIX E.3

Stakeholder Advisory Group (SAG) Meeting #3

Stakeholder Advisory Group

Meeting #3

MASTER PLAN **2040**

Agenda

- Introductions
- Master Plan Status
- Master Plan Goals
- Alternatives Analysis
  - Component Alternatives
  - Screening
  - Integrated Alternatives
- Break
- Input and Feedback
- Next Steps

Introductions

- *Colleen Quinn, Ricondo*
  Project Manager
- *Michael Truskoski*
  Deputy Project Manager

Introductions

- Technical Advisory Group (TAG)

  TAG Role: Provide input and feedback on technical aspects of the master planning analyses and conclusions.

Meeting Objective

- *Share conceptual development alternatives*
- *Gather specific feedback to inform eventual identification of preferred alternative*

Master Plan Process

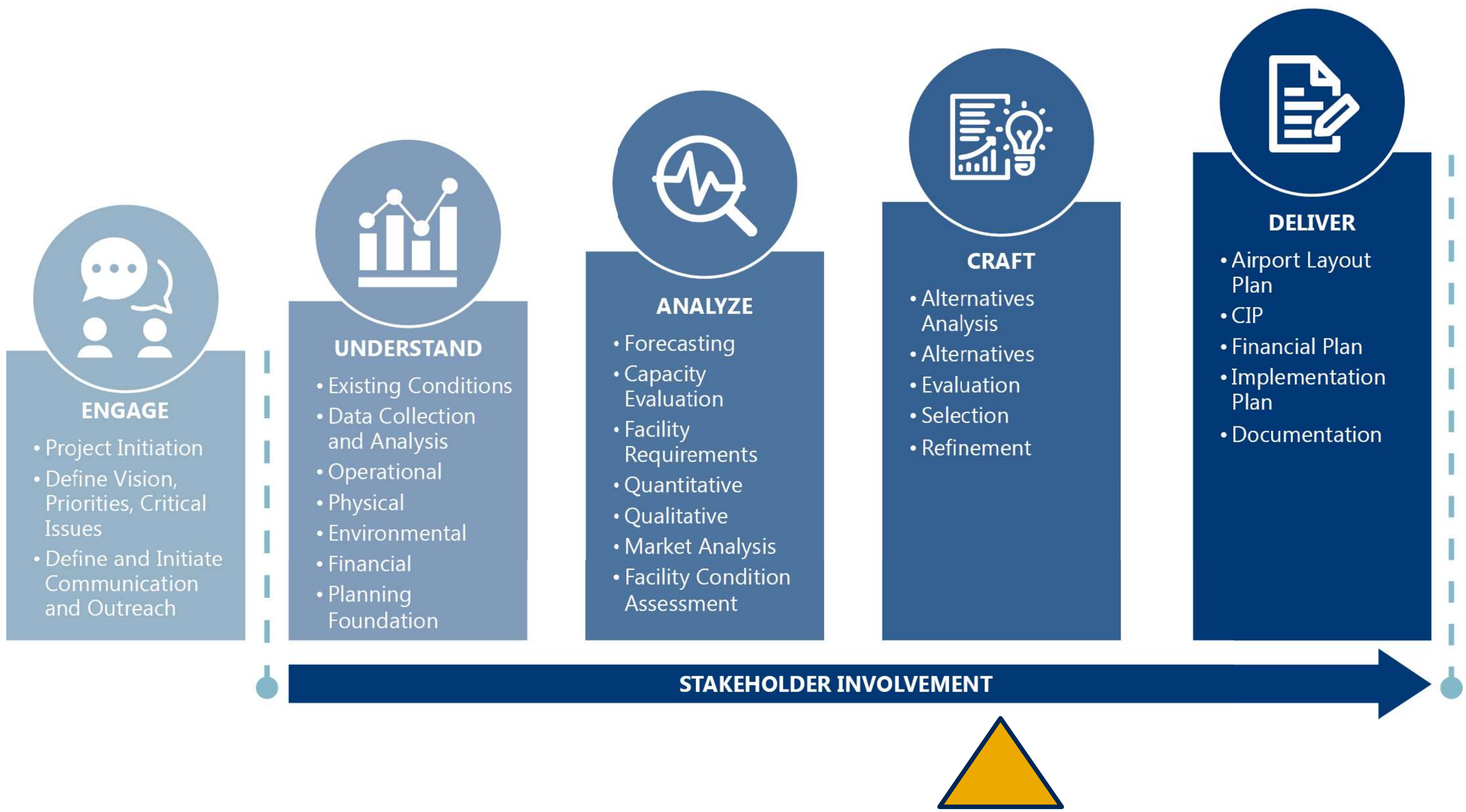
- FAA-guided process

The goal of a master plan is to provide the framework needed to guide future airport development that will cost effectively satisfy aviation demand, while considering potential environmental and socioeconomic impacts.

FAA AC 150/5070-6B, Airport Master Plans

- Unique to the issues and challenges faced by MKE
- Objectives
  - Forecast activity
  - Define and justify proposed development
  - Provide effective graphic representation of development (ALP Drawing)
  - Establish realistic implementation schedule
  - Propose an achievable financial plan
  - Establish a flexible framework for continued planning and decision-making

Master Plan Status



Master Plan Goals

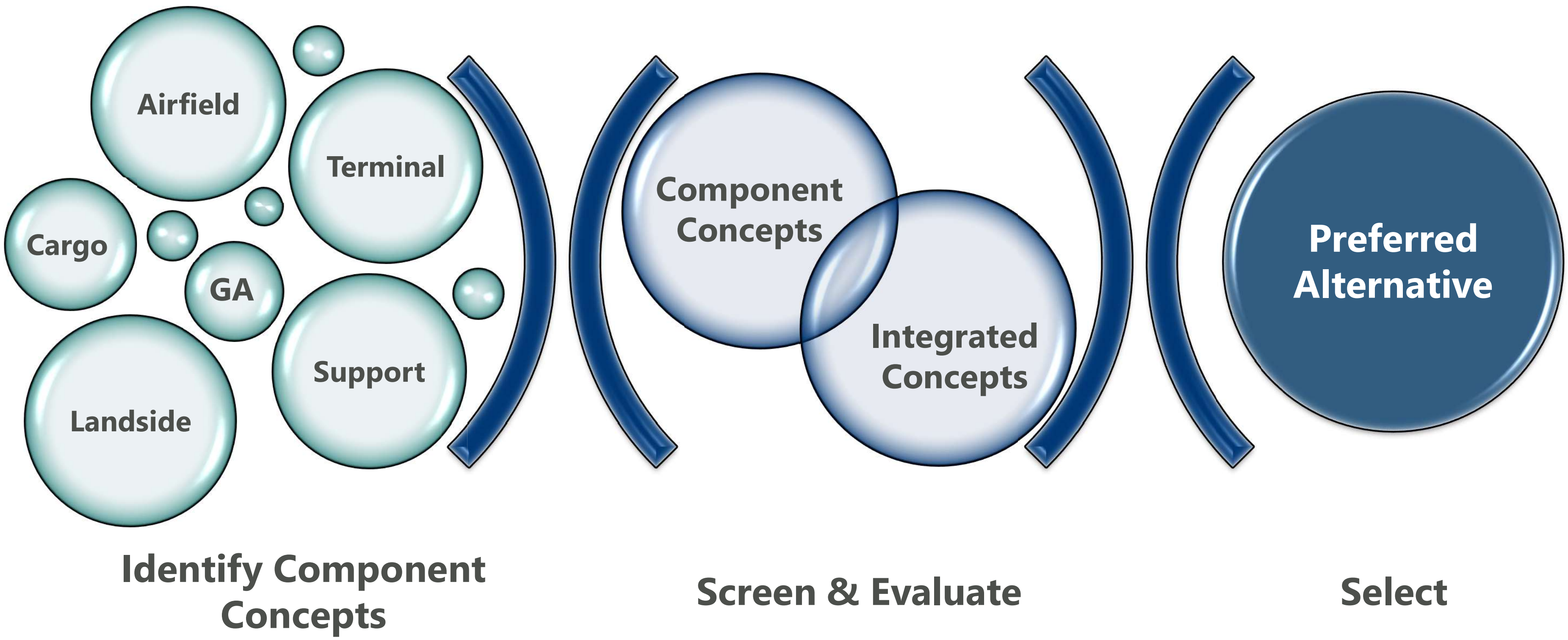
Master Plan Goals - DRAFT

- Affirm a **future-focused airport** that supports aviation growth in a safe, efficient, and cost-effective manner through an organized and synergistic long-range development plan.
- Recognize opportunities to **enhance the sustainability, resiliency, and environmental sensitivity** with continued growth of MKE.
- Seek opportunities for **enhanced customer and passenger experience**.
- **Optimize infrastructure and resources** in an operationally, financially, and sustainable manner.
- Adopt **scalable development plans** that flexibly accommodate variations in demand and technology over the planning horizon.
- Protect **long range utility** of the Airport (post-2040).
- Recognize opportunities for enhanced **non-aeronautical revenue generation** in the utilization of MKE property and amplify the revenue-generating potential of Airport property.
- Define a long-range development plan that **reflects MKE's role in the community** and recognizes diversity in community stakeholder priorities.

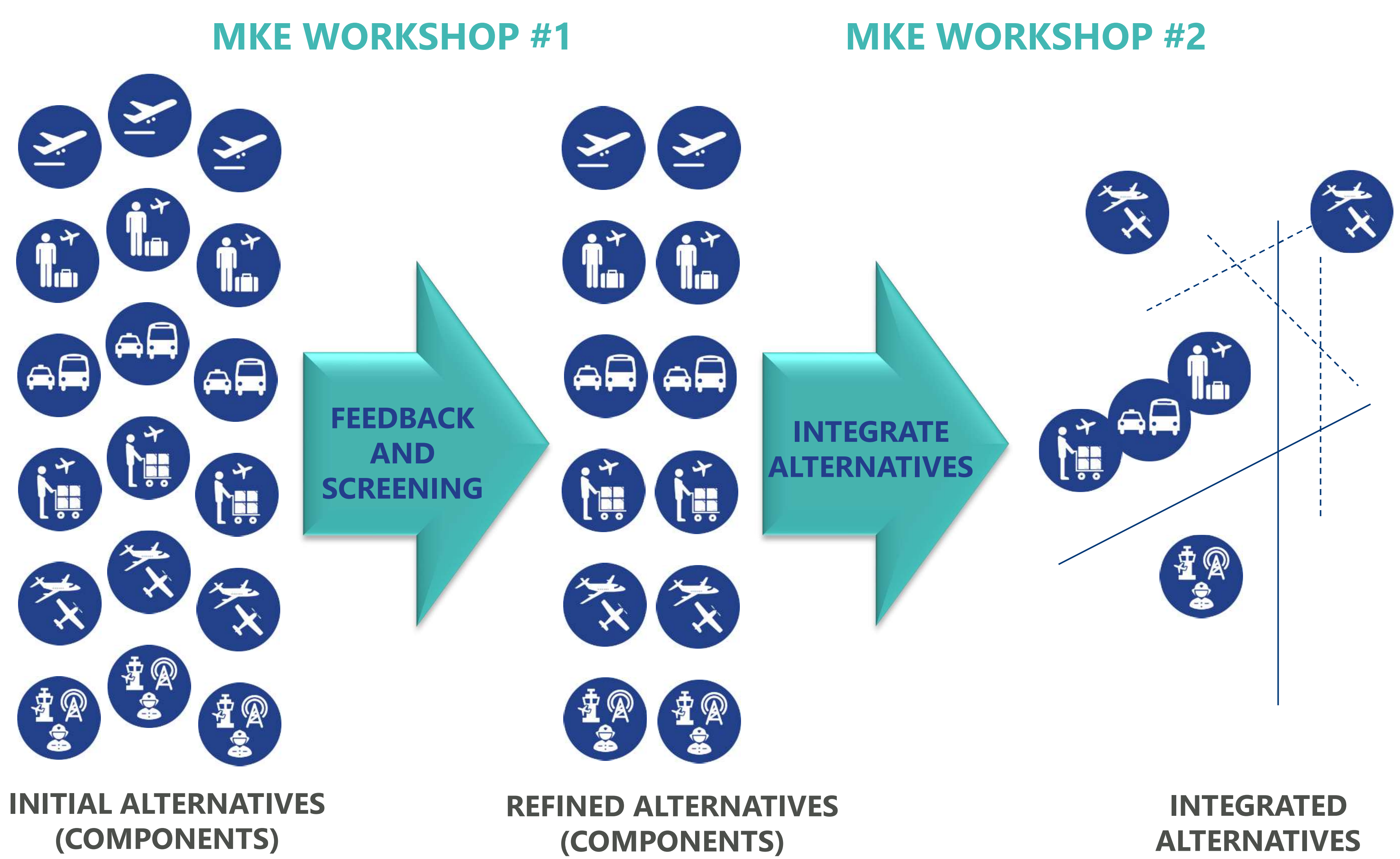
Alternatives Analysis

Alternatives Analysis Process

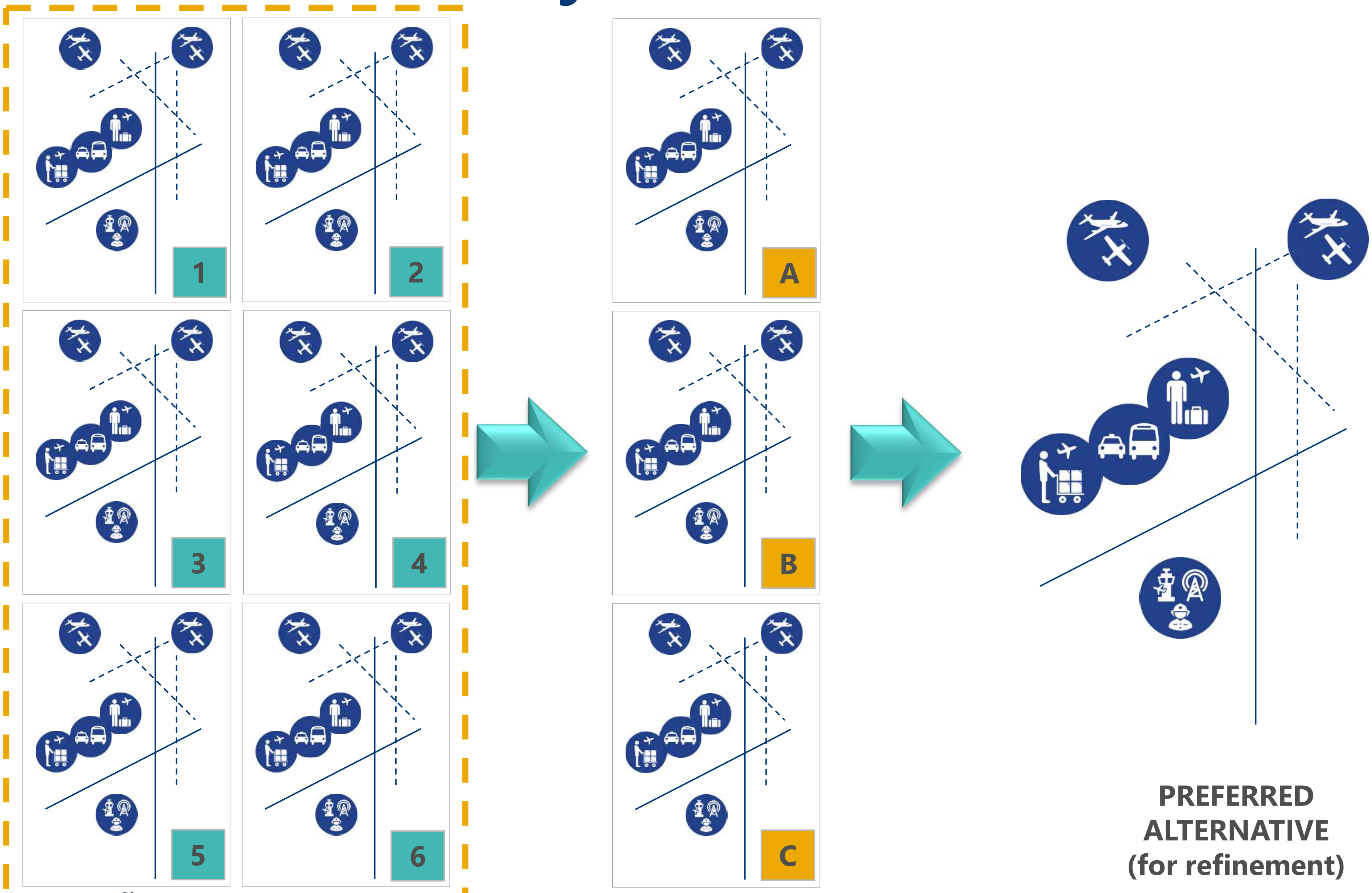
- Iterative and collaborative process
- Meet MKE's development needs, improving the airport as a system
- Align with Master Plan Goals



Alternatives Analysis Process

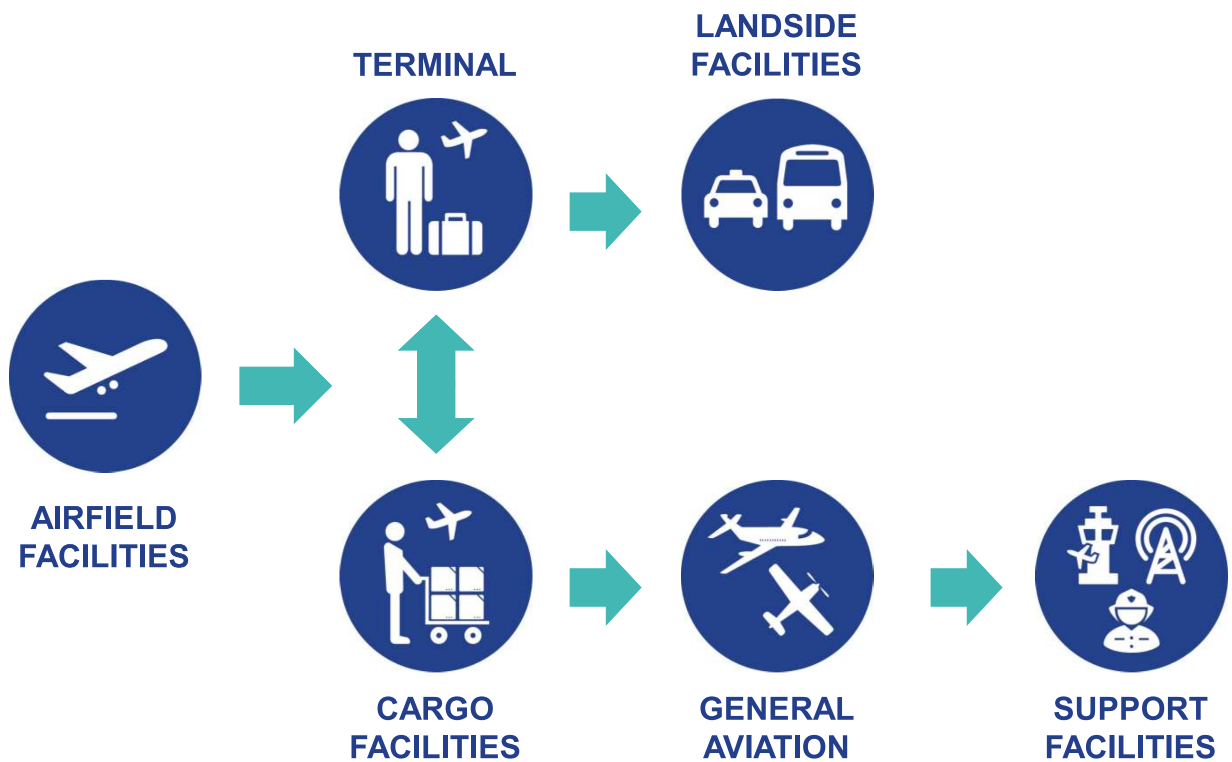


Alternatives Analysis Process



Alternatives Analysis Process

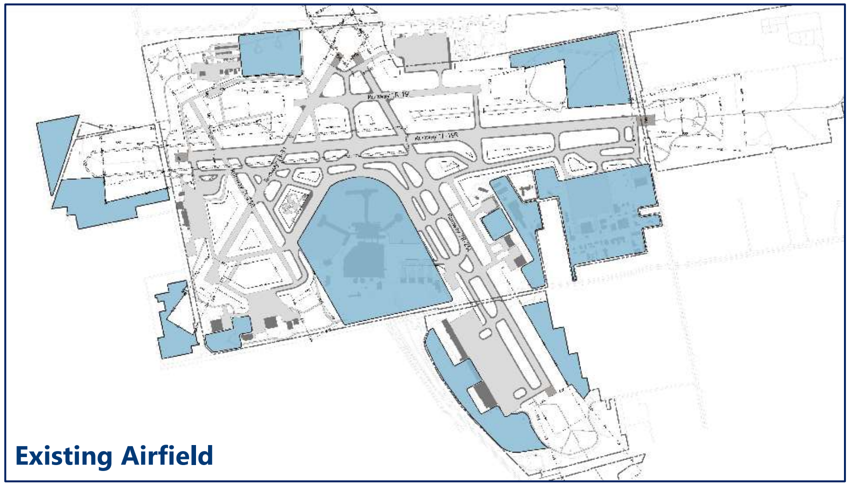
- Meet defined aeronautical needs and Airport development priorities
- Comply with FAA criteria
- Consider operational safety and efficiency
- Recognize hierarchy among facilities

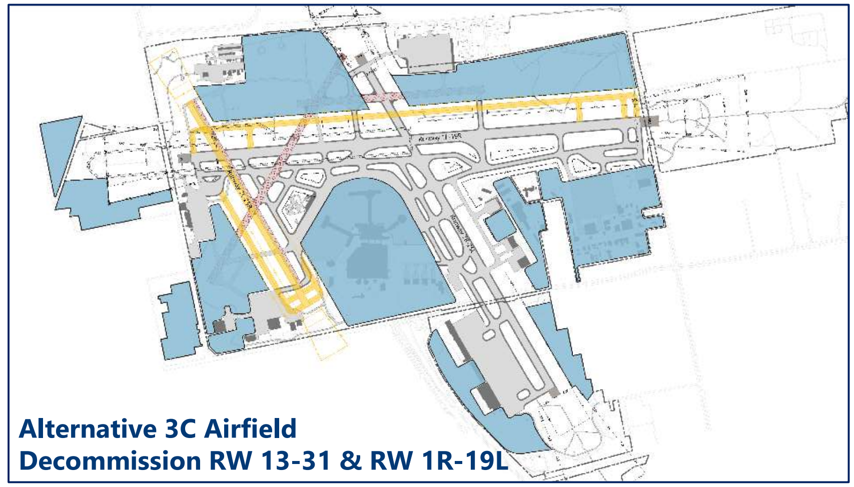


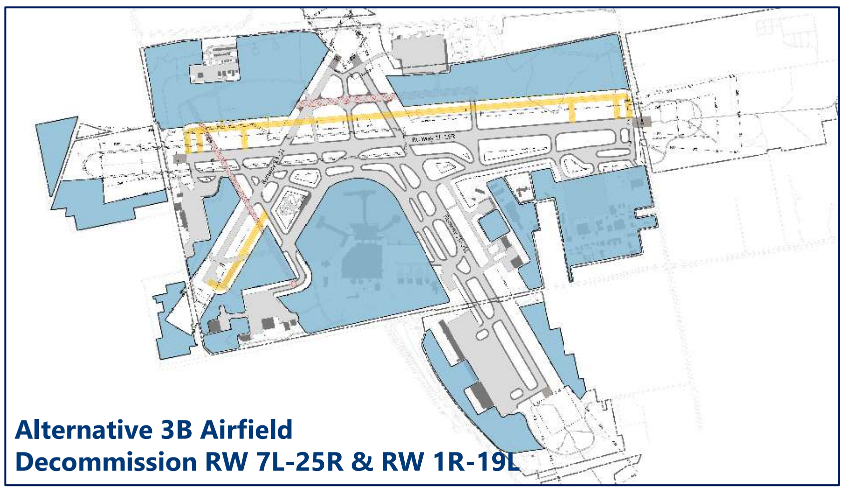
Alternatives Analysis: Facility Development Considerations

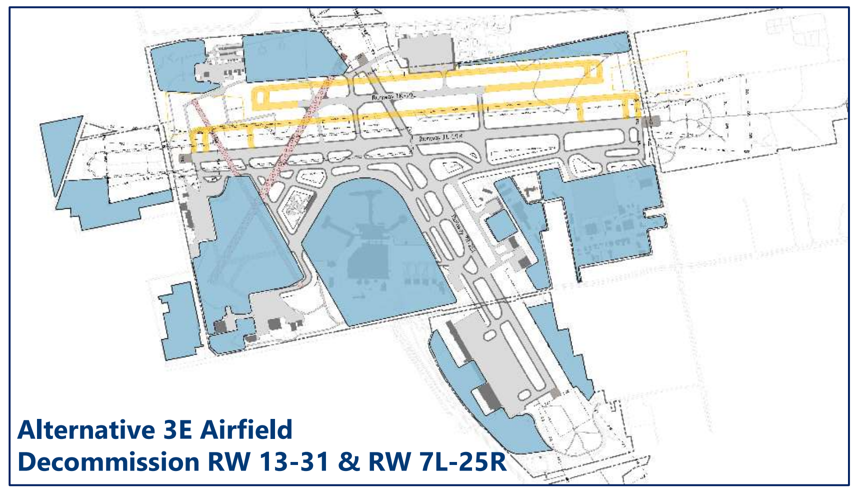
- Right-sizing facilities
- Critical dimensions, zones, and clearances (FAA guidance)
- Airspace protection (height restriction)
- Aircraft access and circulation
- Customer journey / experience
- Vehicular access
  - Secure / non-secure areas
  - Elevation and grade differences
- Highest and best use
- Operational characteristics / environment (similar/dissimilar)
- Implementation
- Other

Alternatives Analysis: Candidate Development Zones


Existing Airfield


Alternative 3C Airfield
Decommission RW 13-31 & RW 1R-19L


Alternative 3B Airfield
Decommission RW 7L-25R & RW 1R-19L


Alternative 3E Airfield
Decommission RW 13-31 & RW 7L-25R

Component Alternatives

Airfield, Terminal, Landside, and Support Facilities

Airfield Challenges

- Right size airfield
- Wind coverage (FAA guidance: 95%)
- Align airfield capacity with forecast of activity
- Protect ability to increase capacity post-2040, based on Annual Service Volume
  - Airfield configuration
  - Airspace protection
- Compliance with current FAA standards
- 10,000 foot runway length
- Off-gate aircraft deicing operation

Annual Airfield Utilization (2017)

Category	1L-19R		7R-25L		7L-25R		13-31		1R-19L		Total	
Heavy [1]	1,407	1.30%	850	0.80%	0	0.00%	1	0.00%	0	0.00%	2,260	2.10%
Large Jet	48,938	44.90%	30,402	27.90%	16	0.00%	50	0.00%	25	0.00%	79,431	72.90%
Large Prop	220	0.20%	178	0.20%	48	0.00%	11	0.00%	1	0.00%	458	0.40%
Small+ Jet	5,819	5.30%	3,397	3.10%	10	0.00%	212	0.20%	5	0.00%	9,443	8.70%
Small+ Prop	3,408	3.10%	3,034	2.80%	839	0.80%	178	0.20%	45	0.00%	7,504	6.90%
Small Prop	2,670	2.50%	2,272	2.10%	1,525	1.40%	255	0.20%	110	0.10%	6,830	6.30%
Other [2]	1,362	1.30%	697	0.60%	652	0.60%	136	0.10%	145	0.10%	2,992	2.70%
TOTAL	**63,824**	**58.60%**	**40,830**	**37.50%**	**3,090**	**2.80%**	**843**	**0.80%**	**331**	**0.30%**	**108,918**	**100.00%**

NOTES:

1 Includes large military aircraft such as the Boeing C-135 Stratolifter or comparable aircraft type.

2 Includes other military aircraft and helicopters.

SOURCES: Milwaukee County, General Mitchell International Airport Noise Program Office, L3Harris EnvironmentalVue, calendar year 2017; Ricondo & Associates, Inc., July 2019.

Aircraft Weight Category	Aircraft Weight Range	Representative Aircraft Types
Heavy	MTOW ≥ 300,000 lbs	Wide body
Large	41,000 lbs < MTOW < 300,000 lbs	Narrow body, regional jet, large prop, large private jet
Small+	12,500 lbs < MTOW < 41,000 lbs	Small private jet, large private prop
Small	MTOW ≤ 12,500 lbs	Small private prop

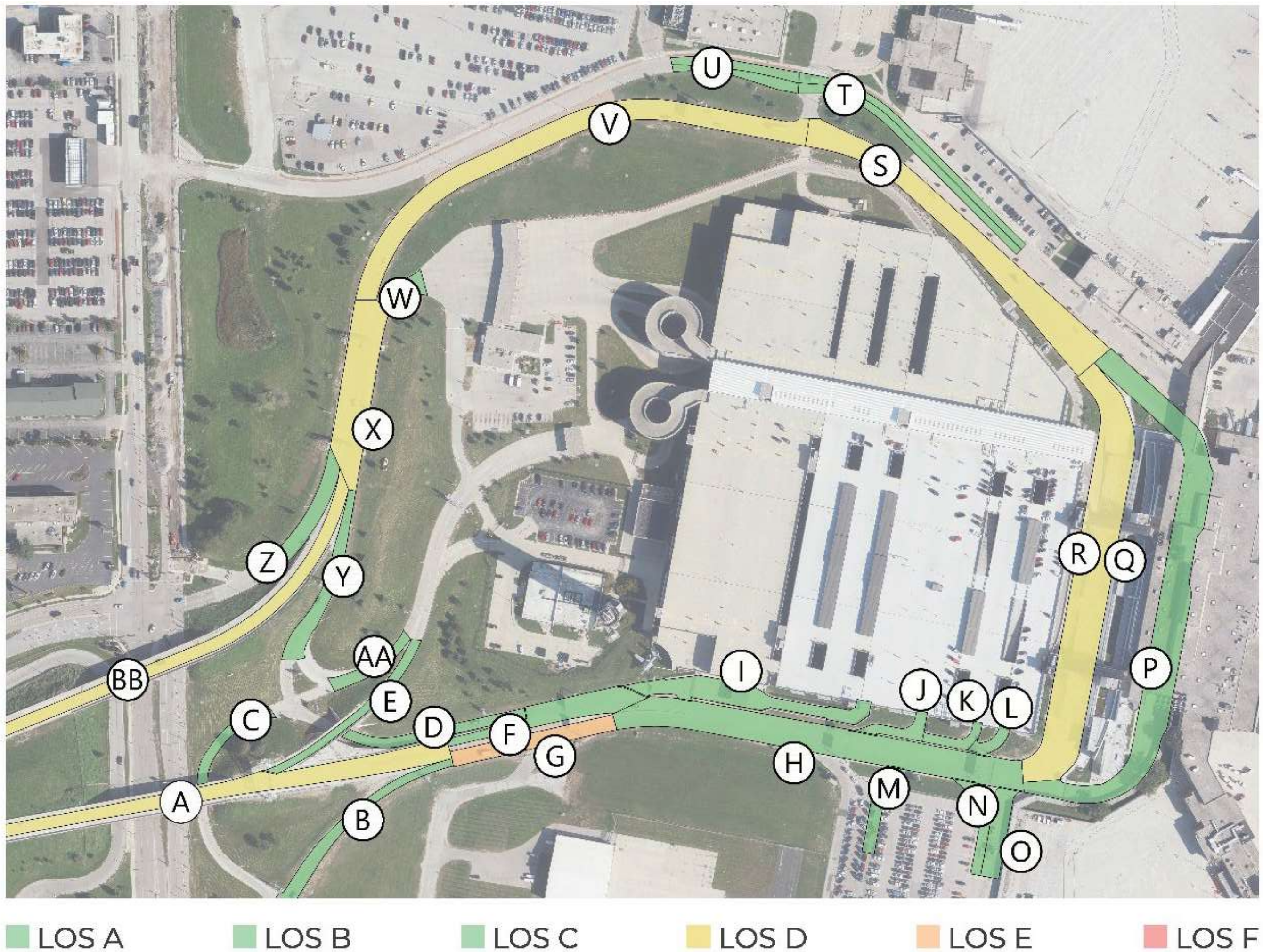
Terminal Area Challenges

- Concourse E integration (project in design)
- Security Checkpoint (SSCP) Consolidation potential
- Additional gates: +4 to +10 gates, depending on operational assumptions (portion of gate need will be met by Concourse E)
- Integration of near-term gating considerations
- Aircraft parking flexibility
- Defined 2040 space needs
  - Holdroom and passenger amenities spaces/dimensions
  - Additional check-in positions required after 2028
  - Additional SSCP lanes required by 2028 (Concourse C, if no consolidation)
  - Additional 10,000-15,000 sq ft baggage make-up space required (through 2040)
- Long-term balance of airfield, terminal and landside capacity

Landside Challenges

- Qualitative
  - Create “front-door” visibility at MKE entrance
  - Existing parking structure constructed in 3 separate projects
  - Driver experience and ease of wayfinding (complexity of navigation)
  - Simplify access along Howell Ave. and Airport Spur
  - Airport Spur presents horizontal and vertical constraints
  - Long-term balance of airfield, terminal and landside capacity
- Quantitative
  - Curbside and on-airport roadway congestion during peak periods
  - Potential for consolidation of facilities (CONRAC and/or Ground Transportation Center [GTC])
  - Potential for changes access in modes utilizing terminal roadway and curbfront
  - Limited sight distances and vehicle weave distances
  - Additional public parking required (2,600-4,600 spaces by 2040)

Landside Challenges



Note: Roadway segment LOS reflects high scenario forecast activity.

General Aviation Challenges

- Qualitative
  - Flexibility and scalability
  - Consolidation – operational similarity and efficiency
  - Runway access
  - Tenant-driven development
  - Long-range growth opportunities/capabilities
  - Landside (non-secure) access
- Quantitative
  - Future demand concentrates around large general aviation aircraft
  - Existing unmet demand

Cargo Facilities Challenges

- Qualitative
  - Flexibility and scalability
  - Physically constrained environment
  - Inefficient facility configuration for some tenants
  - Long-range expansion opportunity/capability
  - Ramp congestion and facility adjacency challenges
- Quantitative
  - Planned cargo ramp expansion
  - Landside adequacy for larger transportation vehicles (truck maneuvering)
  - Existing unmet demand

Support Facilities Challenges

- Qualitative
  - Preserve flexibility for demand-based expansion
  - Flexibility and scalability
  - Snow removal vehicle staging on taxiway
  - Jointly utilized airport maintenance facilities (County Highway Department)
  - Tenant-driven development (airline maintenance)
- Quantitative
  - Maintenance area expansion and consolidation of facilities

Support Facilities include:

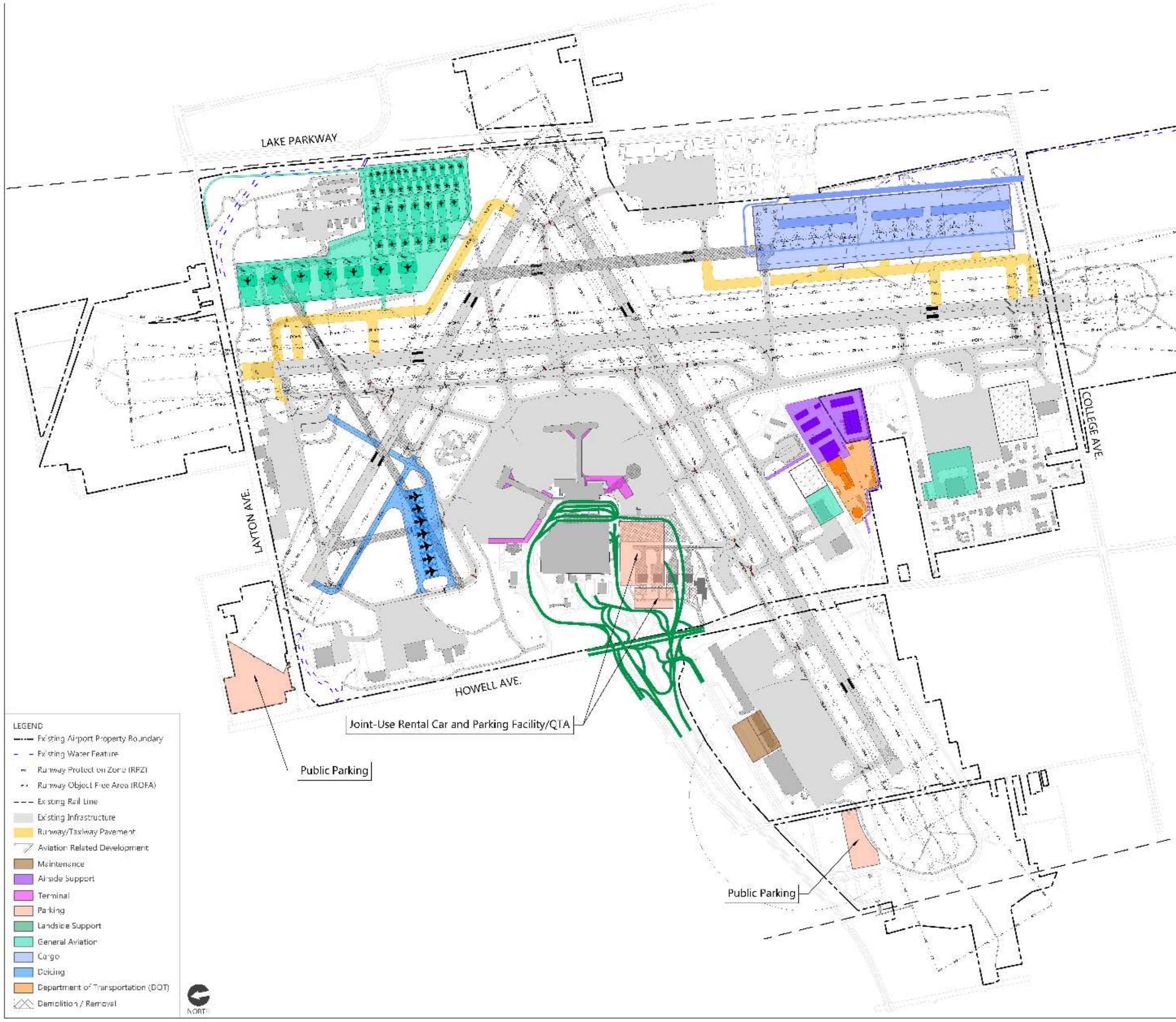
- *Airport Maintenance*
- *Aircraft Maintenance*
- *Airport Operations*
- *Airport Administration*
- *Aircraft Rescue & Fire Fighting*
- *FAA/TSA/CBP*
- *Other*

Representative Component Alternatives Screening Criteria

- Identify component ideas that have limited utility or are not sufficiently strong to carry forward into broader alternatives
- Recognize that not all components are compatible with other ideas and components
- Alternatives that cannot meet the identified requirements are typically eliminated from further consideration
- Consider how component ideas support Master Plan Goals or lack alignment
- Qualitative and comparative consideration of capital investment
- Potential for environmental consequence
- Community interface/compatibility
- Phasing/implementation
- Required adjacencies and dependencies (including enabling work)
- Connection to Existing Infrastructure
- Customer journey/experience

Integrated Alternatives

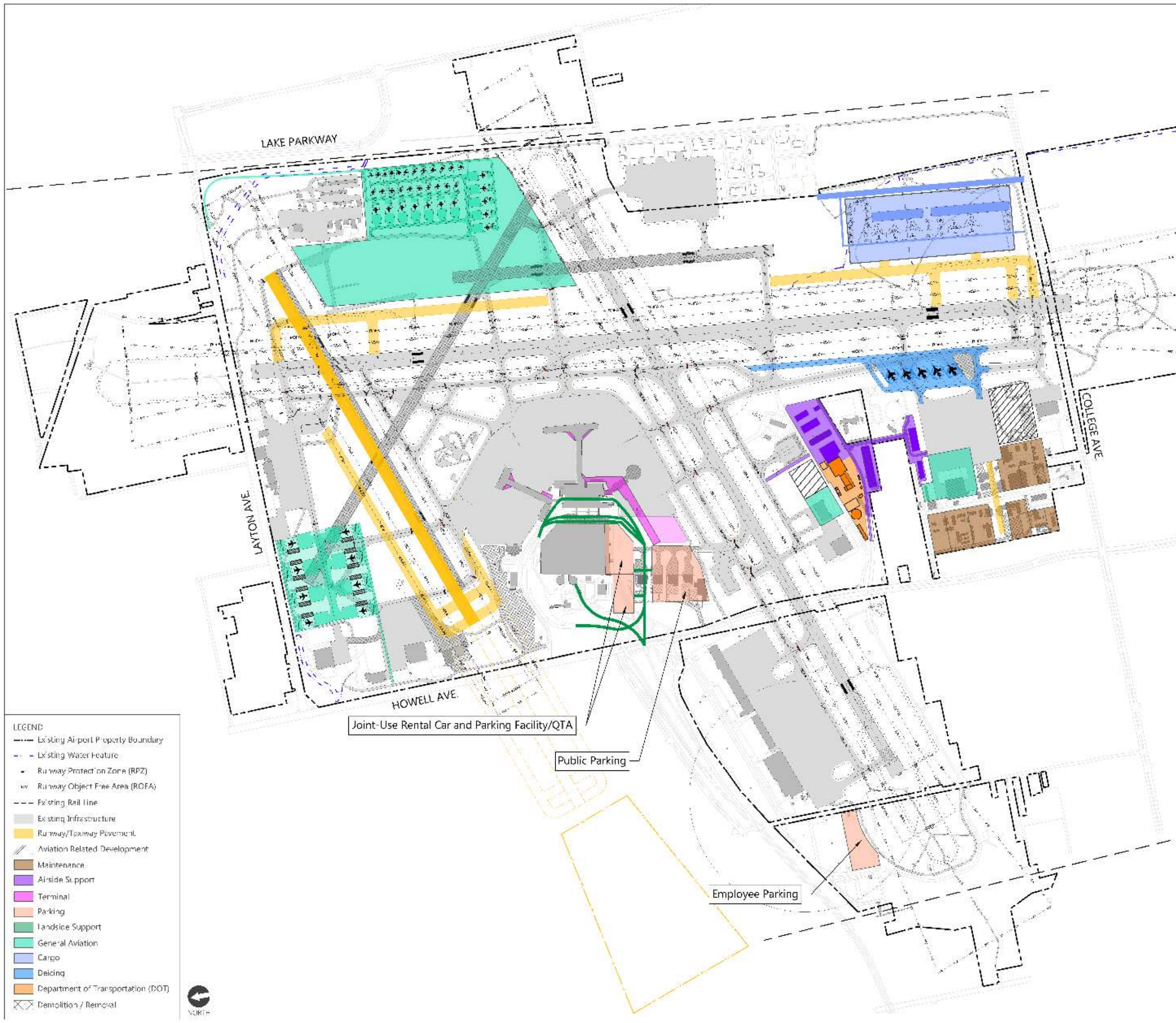
Integrated Alternative 1



PROS
- Centralized Deicing operation (near terminal)
- GA development located with existing
- Partial consolidation of airline maintenance activity
- Convenient parking and rental car expansion
- Improved segregation of traffic
- Terminal area expansion to the north
- Shifts cargo truck traffic from Howell/Airport Spur.
- Significant area of former 440th (MKE Business Park) available for development.
- No land acquisition required

CONS
- Constrained long-term airfield capacity
- Requires use of Guard West
- 13-31 active leaves northwest corner with limited future development
- Constrained long-term expansion of Concourse E
- Runway crossing required for cargo aircraft pad deicing

Integrated Alternative 2



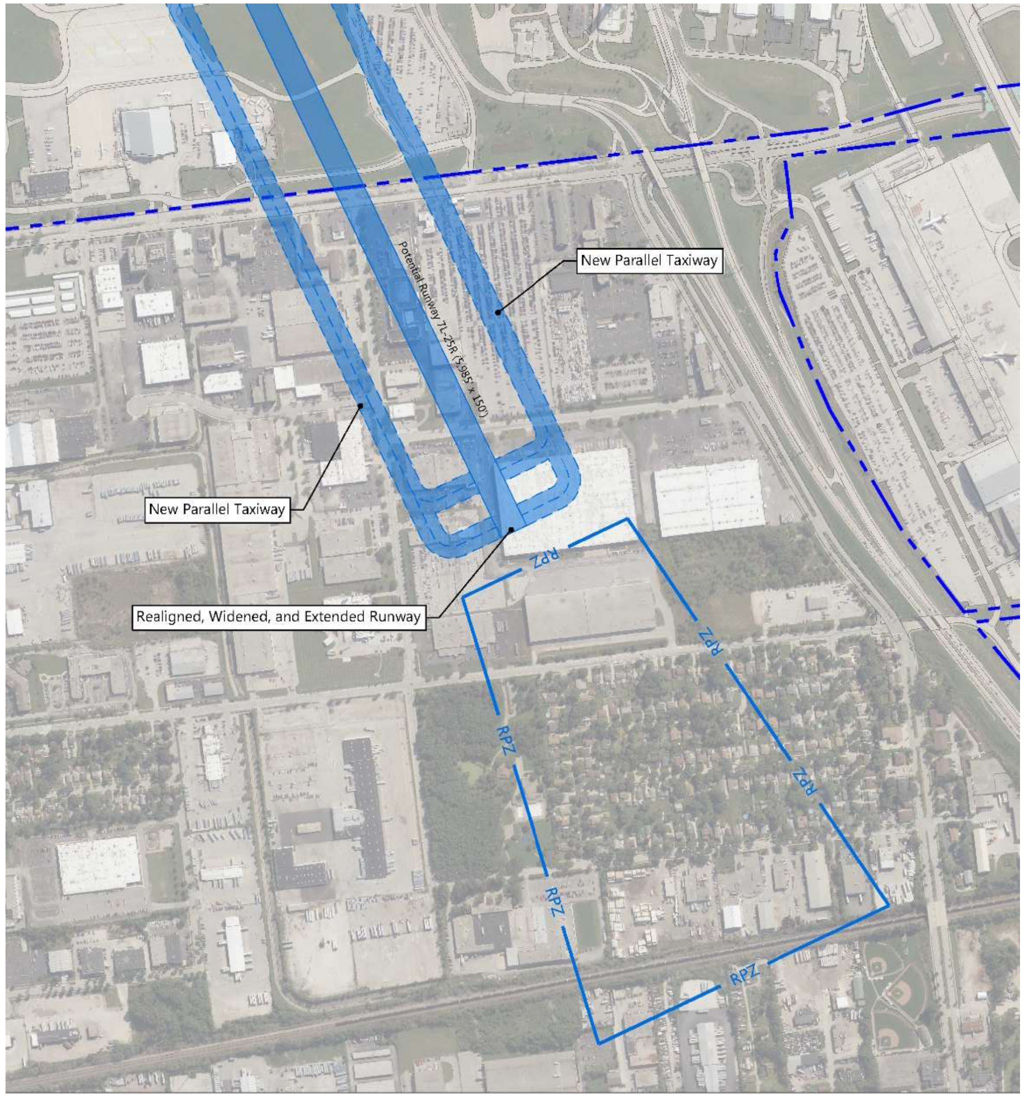
PROS

- Northwest corner developable
- Expanded east-side development potential
- Property north of Layton/Howell available for development
- Deicing near most-utilized runway in winter ops
- Convenient parking and rental car expansion.
- Efficient roadway operation
- Consolidated aircraft maintenance facilities (south ramp)
- Shifts cargo truck traffic from Howell/Airport Spur.
- GA development located with existing
- Increased flexibility and operational utility of 7L-25R (with shift).

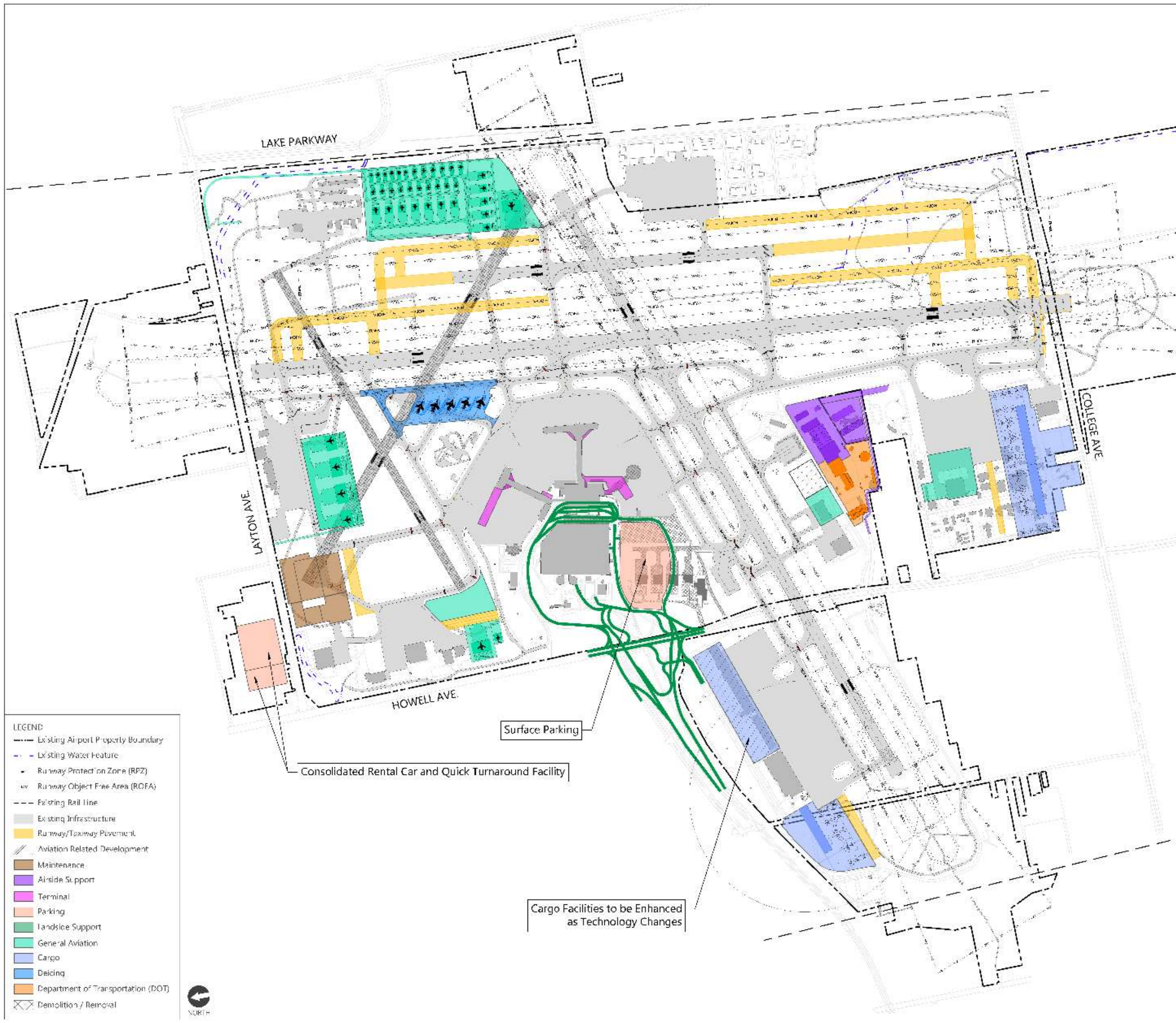
CONS

- Limited long-term gate expansion
- Fully utilizes former 440th (MKE Business Park) development
- Displaces employee parking.

Integrated Alternative 2 – 7L-25R Ultimate



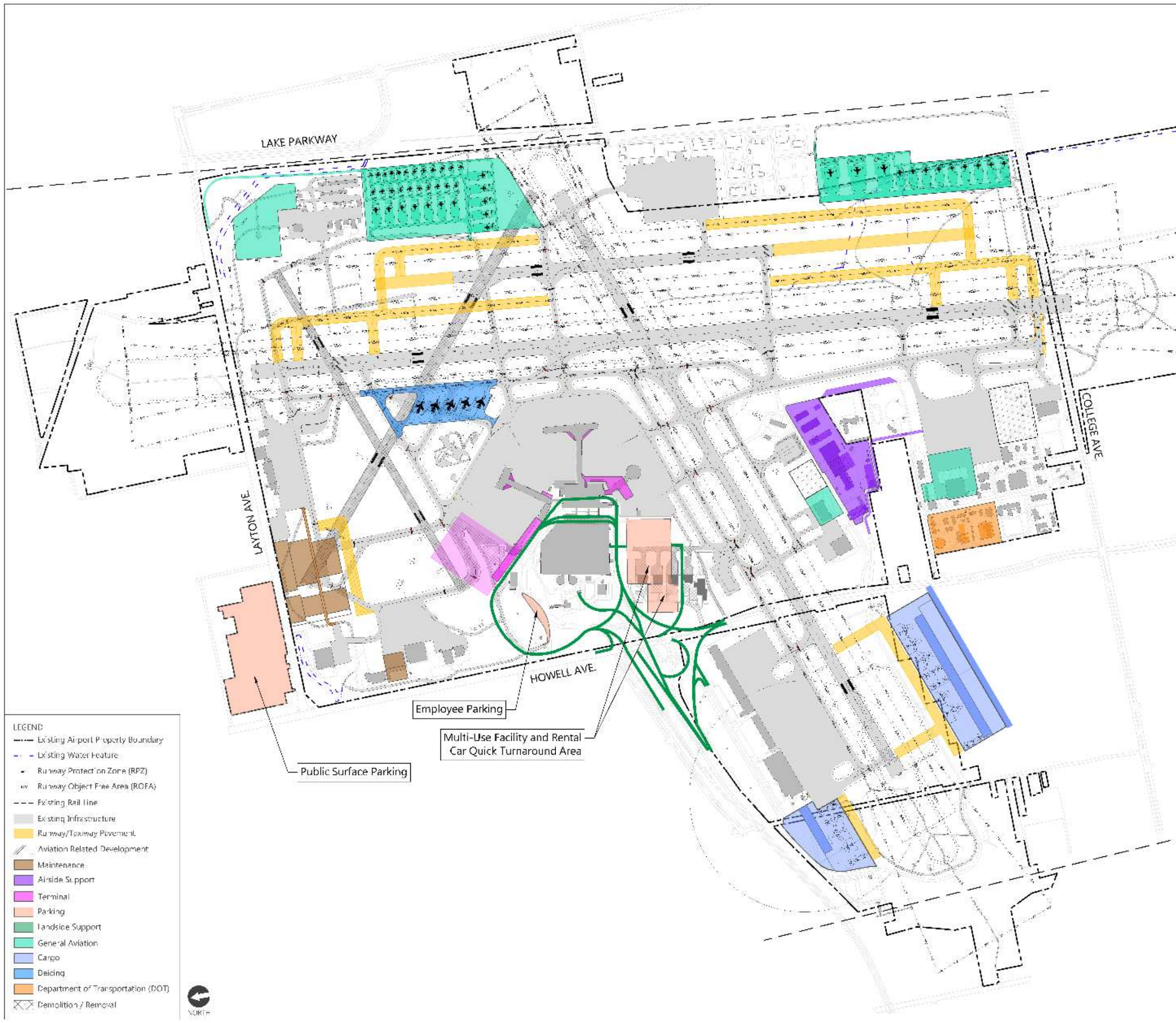
Integrated Alternative 3



PROS
- Northwest corner developable
- Property north of Layton/Howell available for development
- Centralized Deicing operation (near terminal)
- GA development located with existing
- Consolidated aircraft maintenance facilities
- Improved segregation of traffic
- Terminal area expansion to the north

CONS
- Requires use of Guard West
- Rental car facilities located outside core area
- Limits former 440th (MKE Business Park) development.

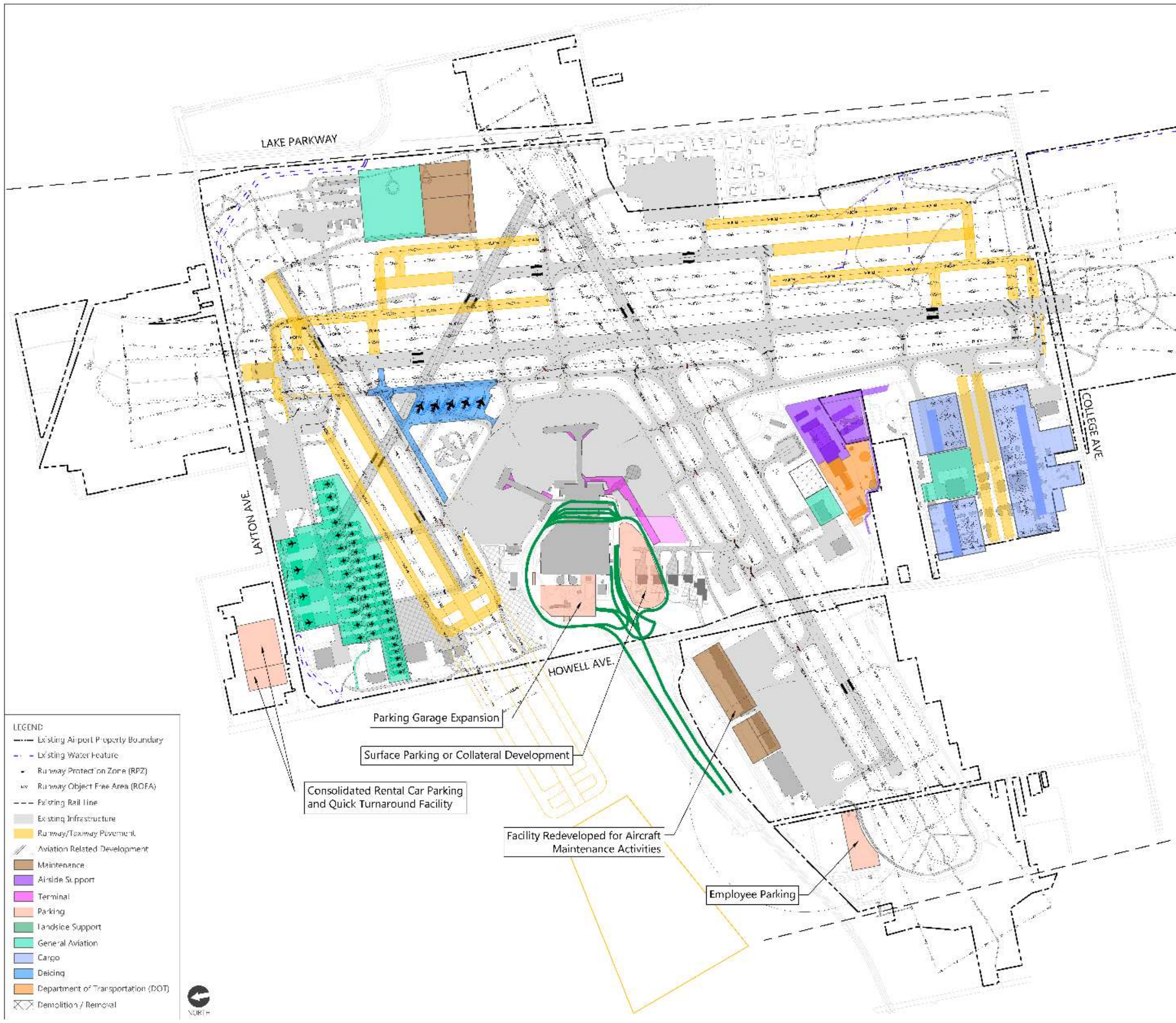
Integrated Alternative 4



PROS
- Northwest corner developable
- Property north of Layton/Howell available for development
- Terminal area expansion to the north
- Centralized Deicing operation (near terminal)
- Consolidated aircraft maintenance facilities
- Convenient Rental Car expansion
- Optimizes airport maintenance campus
- Simplifies traffic flow and wayfinding

CONS
- Fragmented GA development
- Land acquisition required for cargo (southwest) and GA (south east)
- Remote parking expansion
- Limits former 440th (MKE Business Park) development.

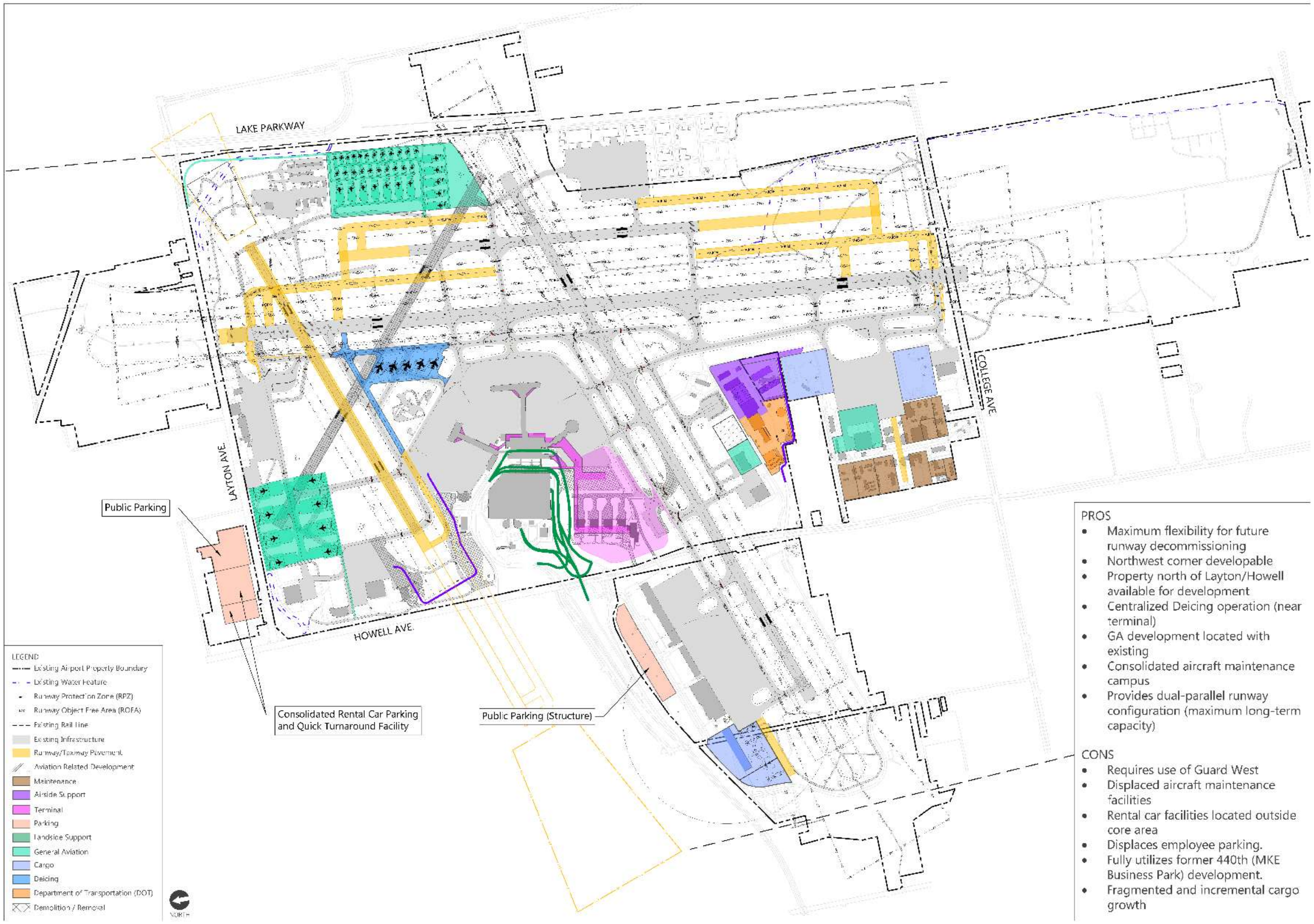
Integrated Alternative 5A



PROS
- Maximum flexibility for future runway decommissioning
- Northwest corner developable
- Property north of Layton/Howell available for development
- Centralized Deicing operation (near terminal)
- GA development located with existing
- Consolidated cargo operations (southwest)
- Provides dual-parallel runway configuration (maximum long-term capacity)
- Shifts cargo truck traffic from Howell/Airport Spur.
- Consolidated aircraft maintenance campus

CONS
- Rental car facilities located outside core area
- Requires use of Guard West
- Restricted long-term development areas
- Displaced aircraft maintenance facilities
- Fully utilizes former 440th (MKE Business Park) development.
- Displaces employee parking.

Integrated Alternative 5B



PROS
- Maximum flexibility for future runway decommissioning
- Northwest corner developable
- Property north of Layton/Howell available for development
- Centralized Deicing operation (near terminal)
- GA development located with existing
- Consolidated aircraft maintenance campus
- Provides dual-parallel runway configuration (maximum long-term capacity)

CONS
- Requires use of Guard West
- Displaced aircraft maintenance facilities
- Rental car facilities located outside core area
- Displaces employee parking.
- Fully utilizes former 440th (MKE Business Park) development.
- Fragmented and incremental cargo growth

Integrated Alternatives Discussion

- Which elements of the alternatives align with your priorities?
- What aspects of the alternatives/elements are considered to be strengths?
- What aspects of the alternatives/elements are considered to be challenging?
- Are there elements of specific alternatives that could be combined more productively?
- Are there concerns with anticipated stakeholder and community response?
- Is there any alternative/element perceived to be missing?
- Other?

Discussion Objective: Gather advisory group input and feedback on alternatives and priorities → consider this input and feedback in the shortlisting and evaluation of alternatives.

Break

Integrated Alternatives Discussion

- Which elements of the alternatives align with your priorities?
- What aspects of the alternatives/elements are considered to be strengths?
- What aspects of the alternatives/elements are considered to be challenging?
- Are there elements of specific alternatives that could be combined more productively?
- Are there concerns with anticipated stakeholder and community response?
- Is there any alternative/element perceived to be missing?

Your input is critical – feedback strengthens MP outcomes.

Discussion Objective: Gather advisory group input and feedback on alternatives and priorities → consider this input and feedback in the shortlisting and evaluation of alternatives.

Next Steps

Next Steps

- Public Open House (est. January 2020)
- Shortlist Alternatives

MKE MILWAUKEE Mitchell International Airport + RICONDO® → 3rd Workshop

- Select Preferred Alternative
- Refine Preferred Alternative

TECHNICAL ADVISORY GROUP (TAG)

Wisconsin Department of Transportation (WiDOT)

Federal Aviation Administration (FAA)

United States Transportation Security Administration (TSA)

United States Customs and Border Protection (CBP)

128th Air Refueling Wing

Delta Airlines

Southwest Airlines

Alaska Airlines

United Parcel Service

DHL

Federal Express (FedEx)

Skywest

Signature Flight Support

AvFlight

Air Cargo Carriers

Airline Consortium

Freight Runners/Air Cargo Express

APPENDIX E.4

Technical Advisory Group (TAG)

Meeting #1

Technical Advisory Group

Meeting #1




MASTER PLAN **2040**

MKE

GENERAL MITCHELL INTERNATIONAL AIRPORT

Agenda

- Introductions
- Master Plan Overview
- Project Website
- Inventory Overview
- Forecast Summary
- Questions/Discussion
- Next Steps

Introductions

- Technical Advisory Group (TAG)

  TAG Role: Provide input and feedback on technical aspects of the master planning analyses and conclusions.

- Master Plan Team

Introductions

Colleen E. Quinn, Ricondo
Project Manager

Michael D. Truskoski, Ricondo
Deputy Project Manager

Max Braun, Ricondo
Forecast

Jeffrey D. Stanley, Ricondo
Forecast

Ken Bukauskis, Ricondo
Cargo Forecast (phone)

Internationally Recognized Aviation Consultancy

Ricondo is an internationally recognized aviation consultancy specializing in planning, programming, and business advisory services for airport owners, operators, government agencies, and airlines

Master Plan Team

RICONDO®	Project Management, Forecasting, Airfield Planning; Terminal Planning; Landside Planning (Terminal Roadway); Parking Planning; Rental Car Planning; Sustainability Integration; Implementation Planning; Agency Coordination; Business Strategy Planning; ALP Preparation; Documentation; Community Outreach and Stakeholder Engagement
CONNICO INCORPORATED	Cost Estimating
MTZ MARTINEZ GEOSPATIAL	Aerial Photography and Photogrammetry
Mead & Hunt	Data Collection/Existing Conditions; Engineering Support; Environmental Overview; Noise Analysis; Landside (Access) Planning; Terminal Planning Support; Facility Condition Index
SB Friedman Development Advisors	Market Analysis; Land Use Strategy/Planning
20 TWO HUNDRED	Graphic and Visual Communications; Community Outreach and Stakeholder Engagement Support
TranSmart	Traffic and Intersection Counts
UNISON CONSULTING	Financial Analysis

Master Plan Overview

Master Plan Process

- FAA-guided process

The goal of a master plan is to provide the framework needed to guide future airport development that will cost effectively satisfy aviation demand, while considering potential environmental and socioeconomic impacts.

FAA AC 150/5070-6B, Airport Master Plans

- Unique to the issues and challenges faced by MKE
- Objectives
  - Forecast activity
  - Define and justify proposed development
  - Provide effective graphic representation of development (ALP Drawing)
  - Establish realistic implementation schedule
  - Propose an achievable financial plan
  - Establish a flexible framework for continued planning and decision-making

Master Plan Process

ENGAGE

- Project Initiation
- Define Vision, Priorities, Critical Issues
- Define and Initiate Communication and Outreach

UNDERSTAND

- Existing Conditions
- Data Collection and Analysis
- Operational
- Physical
- Environmental
- Financial
- Planning Foundation

ANALYZE

- Forecasting
- Capacity Evaluation
- Facility Requirements
- Quantitative
- Qualitative
- Market Analysis
- Facility Condition Assessment

CRAFT

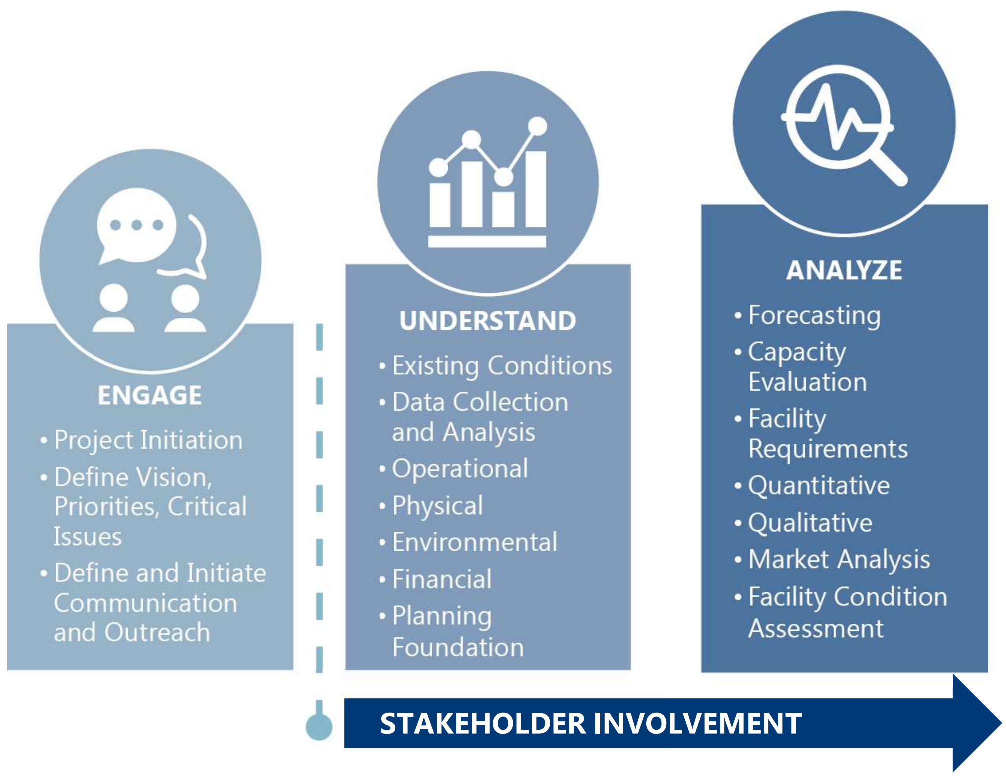
- Alternatives Analysis
- Alternatives
- Evaluation
- Selection
- Refinement

DELIVER

- Airport Layout Plan
- CIP
- Financial Plan
- Implementation Plan
- Documentation

STAKEHOLDER INVOLVEMENT

Master Plan Process



- Project Initiation
  - Kick-off presentation
  - Stakeholder Committees
  - Project Website
- Inventory / Data Collection
  - 22 categories of information
  - Airport / Region / Industry
  - Quantitative / Qualitative
- Forecast

Master Plan Scope

- Stakeholder engagement (throughout Master Plan Update)
- Meetings
  - 4 public involvement meetings
  - 5 SAG meetings
  - 5 TAG meetings
  - Ancillary meetings
- Microsite/webpage
- Inventory / Aerial Photogrammetry & Mapping
- Forecast activity:
  - Magnitude and characteristics
  - Peaking metrics / Design Day Flight Schedule
  - Baseline and High Scenario alternative

Master Plan Scope

- Demand/Capacity → Facility Requirements

Airside (airfield, air traffic, operational)

Landside (roadway, access, curbside, parking, rental car, other)

Terminal (functional areas and processors)

Support Facilities (cargo, general aviation/FBO, FAA, other)

Land use planning

Master Plan Scope

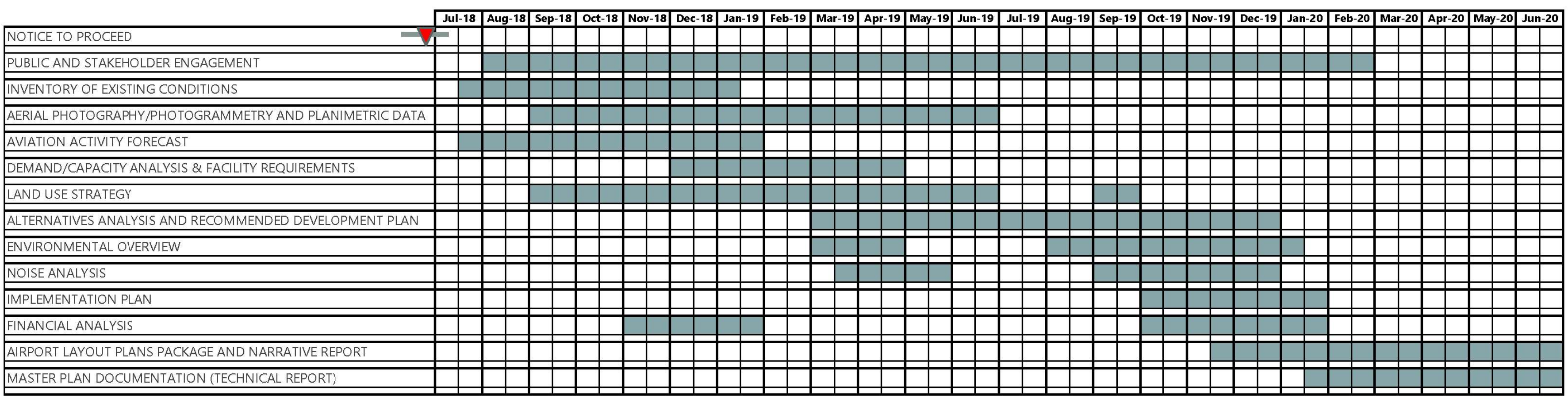
- Alternatives Development and Evaluation

- Identify Recommended/Preferred Alternative
- Develop Implementation Plan
- Prepare Financial Plan
- Airport Layout Drawing Set
- Documentation

The FAA will approve two specific elements of the Master Plan Update: Baseline Forecast and Airport Layout Plan drawing set.

Master Plan Schedule

- Overall 24-month study
  - Inventory efforts complete by end of year
  - Aerial photography (Fall, leaf-on conditions) → mapping underway
  - Forecast submittal to FAA before end of year (target)
  - Initial stakeholder engagement
    - SAG and TAG meetings
    - Initial public meeting
- Master Plan Completion: Summer 2020



Project Website

Project Website

www.mkeupdate.com

- Public communication tool
- Public and stakeholder feedback opportunity
- Evolving content over course of Master Plan Study
- Links to MKE website and Milwaukee County website

www.mkeupdate.com outline

- What is a Master Plan Update?
    - Plan Schedule
    - The Planning Process
    - History of MKE
- FAQs
- Engage with MKE's Future
- Project Materials & News

Inventory Overview

Inventory Overview

- Develop a thorough understanding of MKE
  - Physical
  - Operational
  - Environmental
  - Financial
- Methods
  - Site visits
  - Interviews
  - Data analysis
  - Research (e.g., lease documents, utility companies, etc.)
  - Traffic counts
  - Tenant survey (qualitative)
- Identify high priority challenges → Early Action Plan
- Document conclusions in a Technical Working Paper

Forecast of Aviation Activity

Forecast Overview

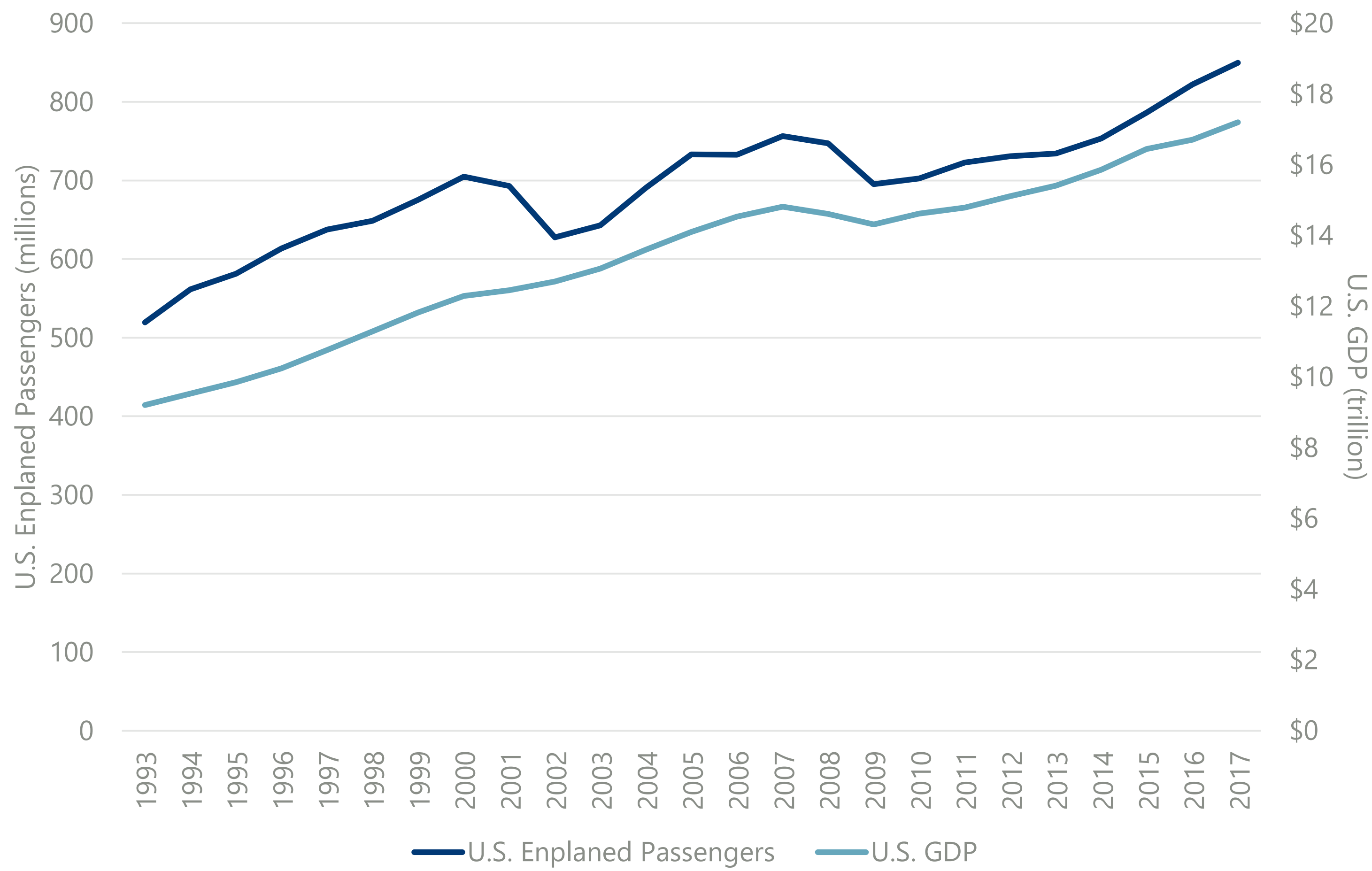
- Forecast of aviation activity: foundation for effective decision-making in MP
- Planning horizon: 2040 (2018E base year data)
- Two forecasts for planning
  - **Baseline forecast**
    - Most likely activity scenario
    - Basis for phasing/implementation, CIP, financial analysis
    - Reviewed/approved by FAA
  - **Alternate scenario forecast (high scenario)**
    - Addresses uncertainties in forecasting methodologies, assumptions, socioeconomics, influencing events, other factors
    - Considers realistic potential influences
    - Ensures flexibility to accommodate more robust growth

Role of Forecasts

- Determine future facility needs → alternative development concepts
- Timing of specific improvements
- Environmental analyses
- Financial analyses

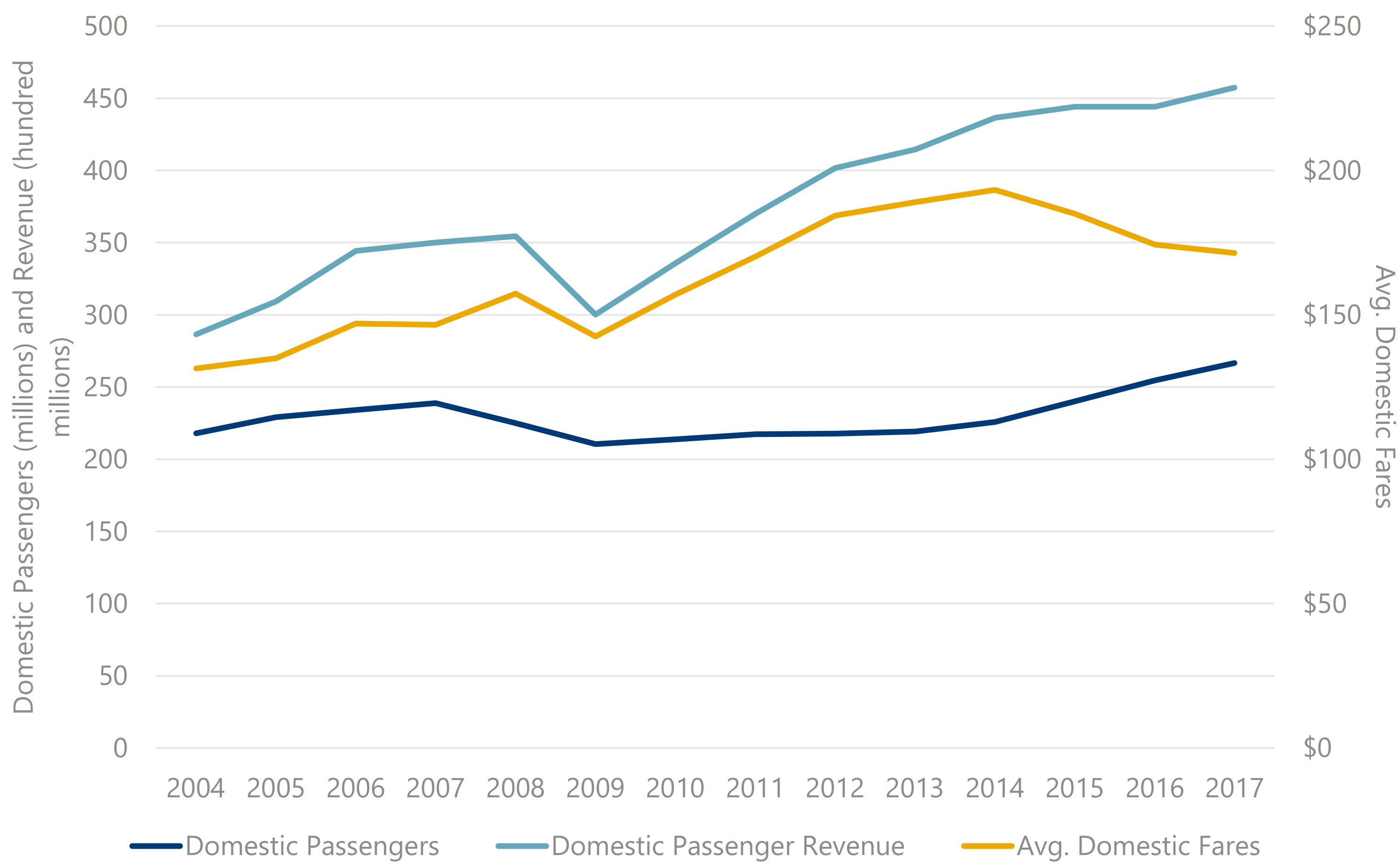
Market Background

Over the Longer Horizon, Industry Passenger Growth Has Followed GDP Trends



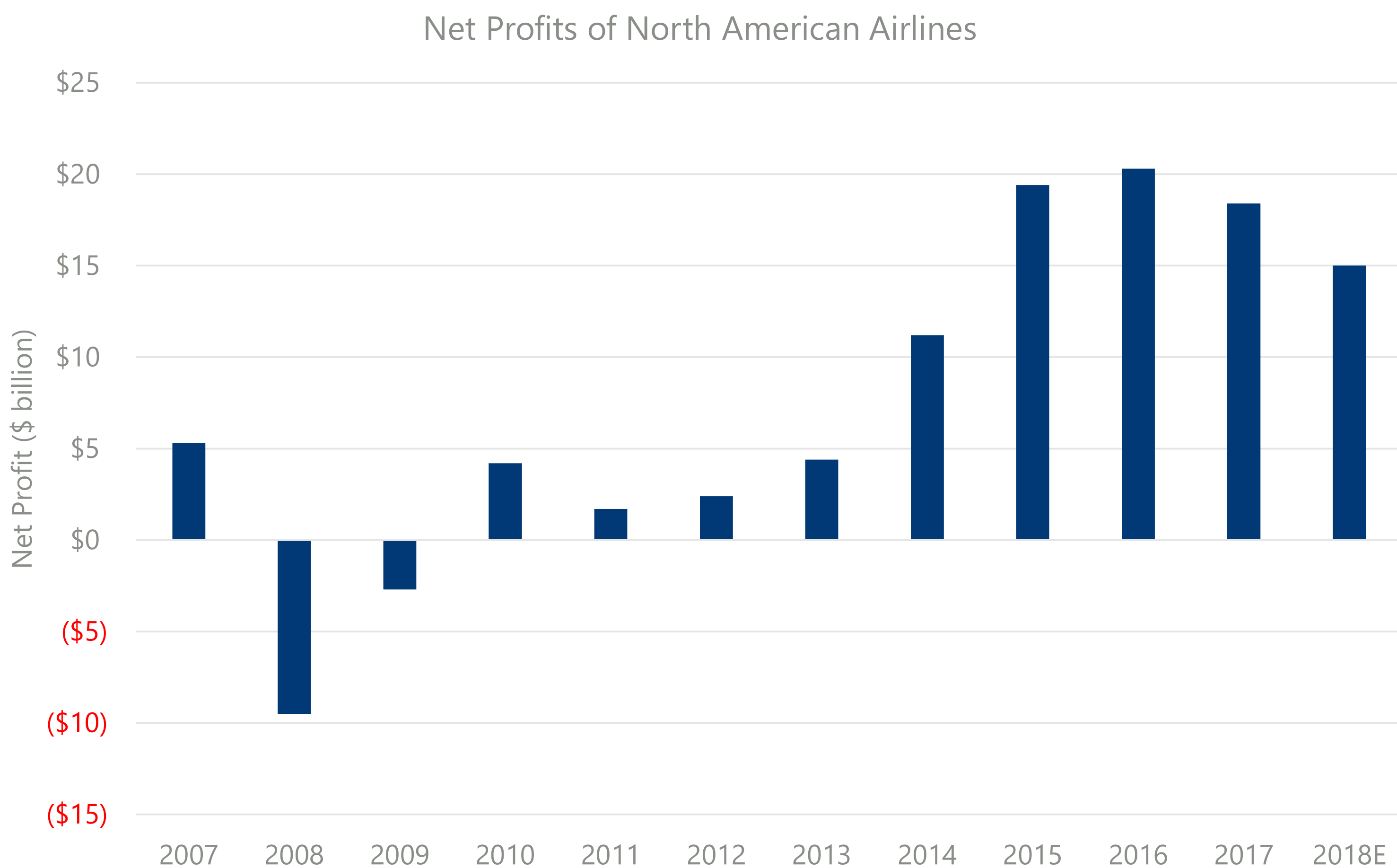
Source: Woods & Poole Economics, Inc.; U.S. DOT T-100, September 2018.

Airlines Kept Passenger Volumes Flat While Increasing Fares – Until Recently



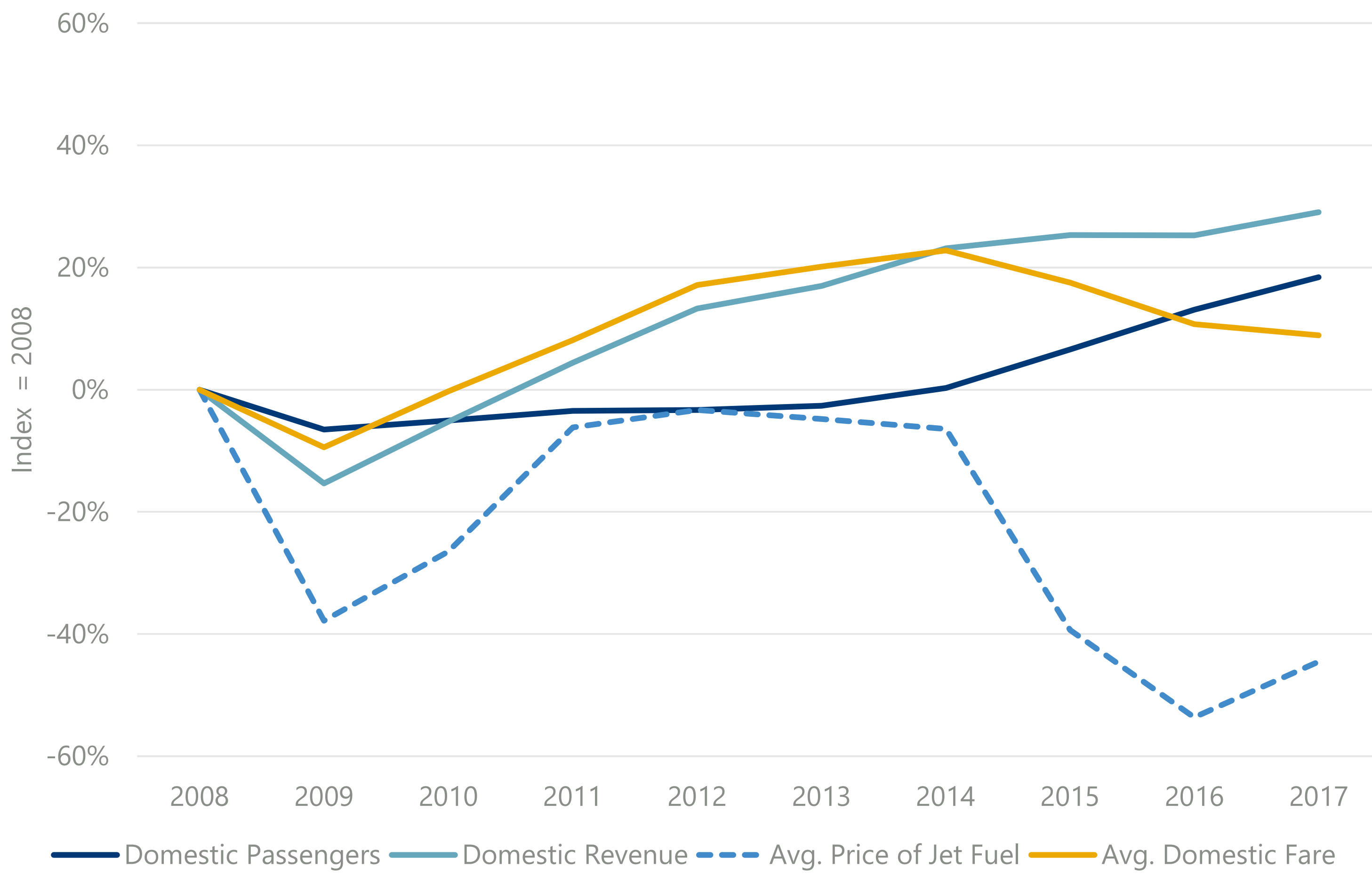
Source: U.S. DOT Form 41, September 2018.

Airlines Are Consistently Operating Profitably And Increasingly Focused On Managing Profits



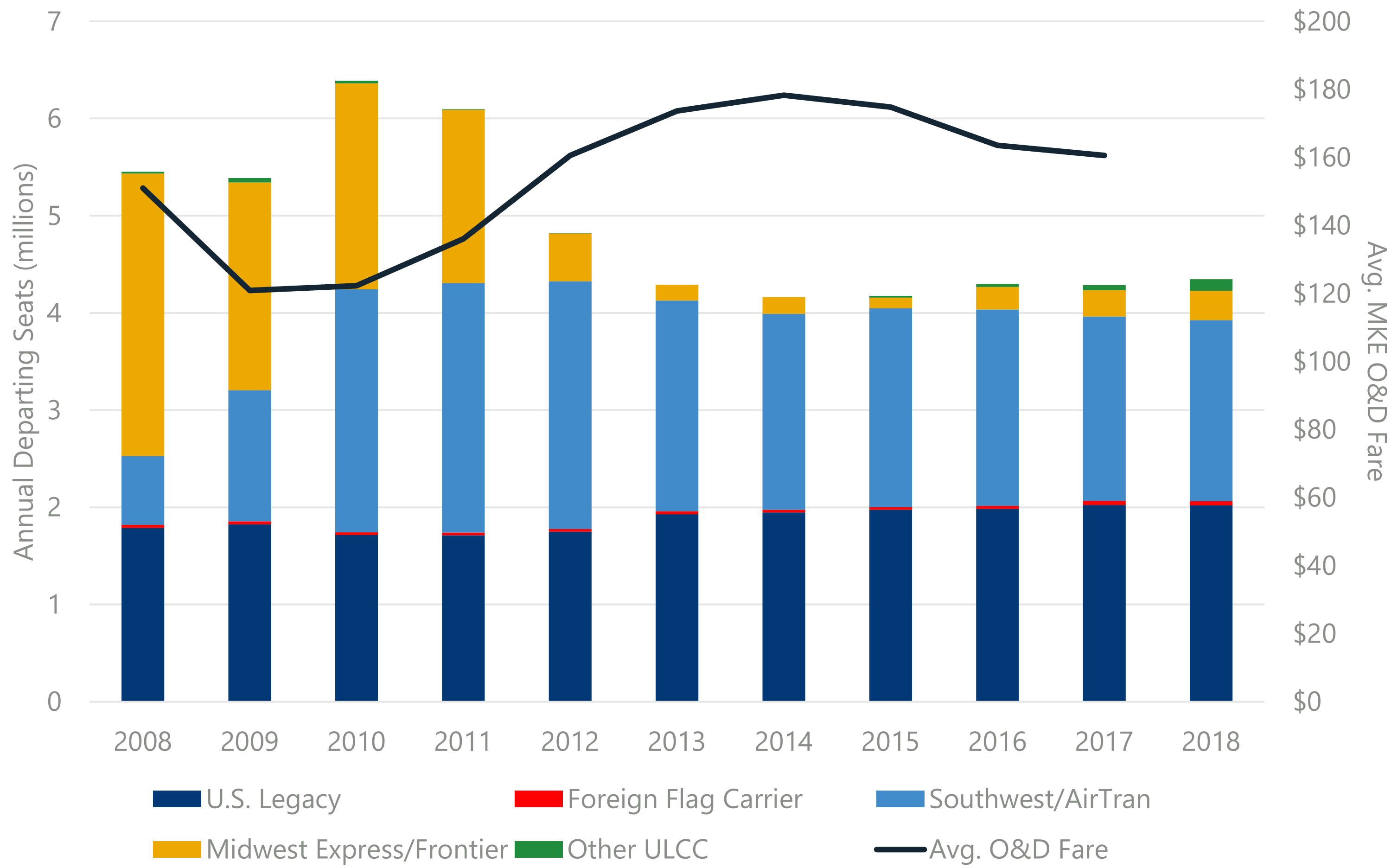
Source: IATA, October 2018.

Recent Low Fuel Prices Have Enabled Airlines To Carry More Passengers, But at Lower Fares



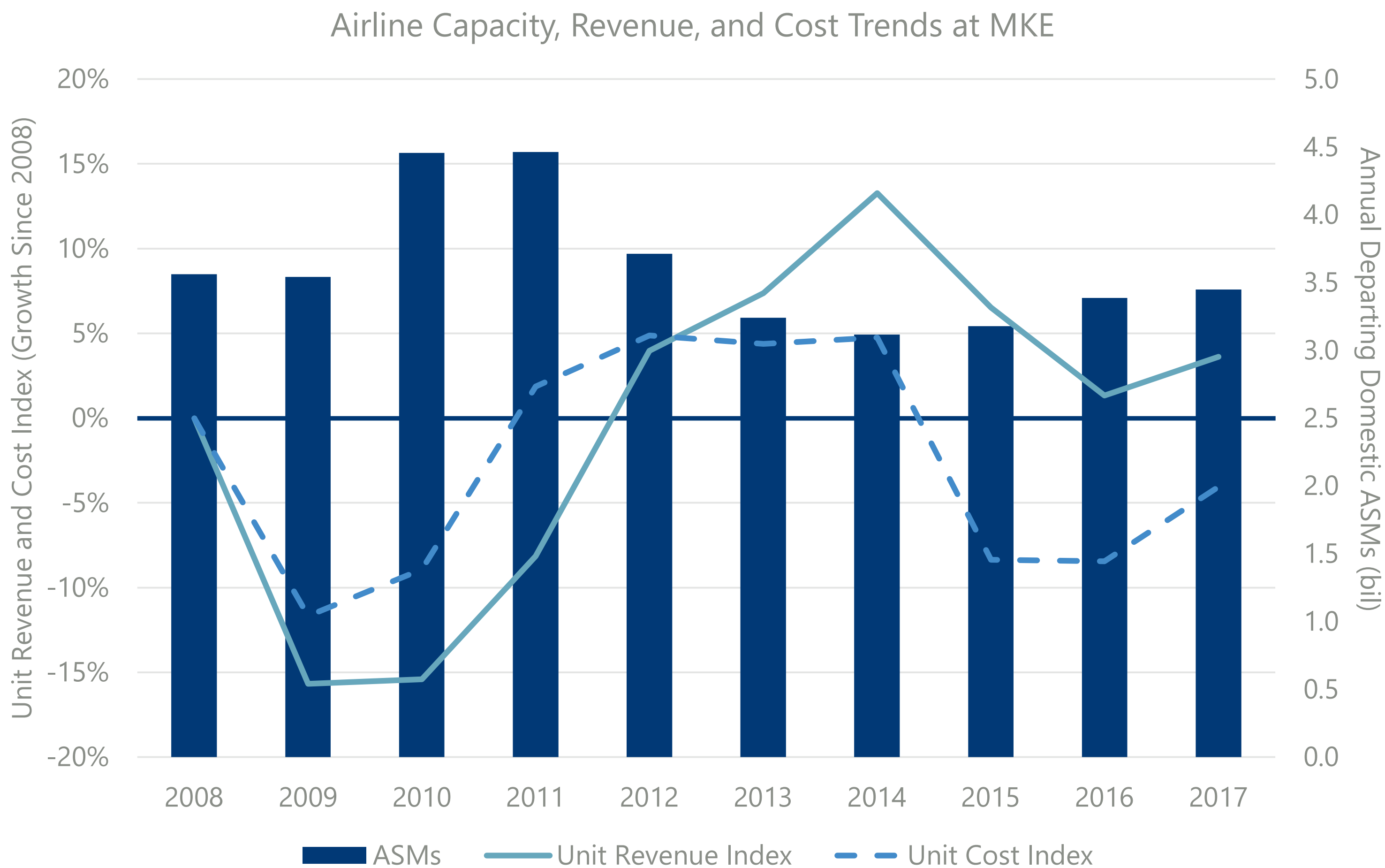
Sources: U.S. DOT Form 41; Ricondo & Associates (analysis), September 2018.

Seat Capacity Peaked in 2010 During A Period of Competition Between Frontier and Southwest



Source: Innovata, September 2018.

Unit Revenue Growth Has Outpaced Cost Growth Placing Airlines on Firmer Financial Footing

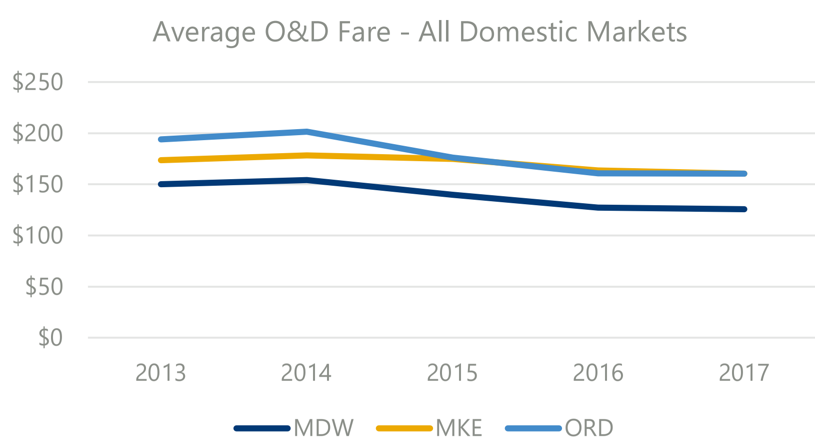


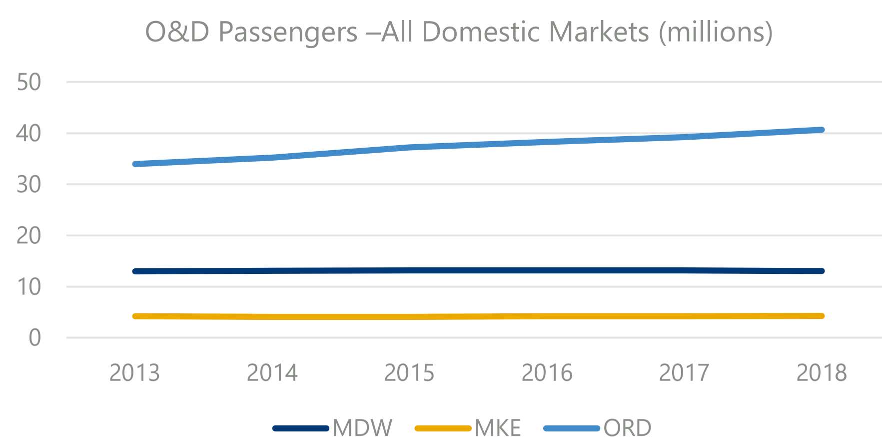
Source: U.S. DOT DB1b Survey and Form 41, October 2018.

Passenger Choice Is Influenced by Price, Availability of Seats, and Nonstop Service

Competition in MKE's Top 50 Domestic O&D Markets (2017)

	Markets With Nonstop Service	Avg. Daily Domestic Seats	Avg. Daily Flights	Avg. Fare	Markets Served by Multiple Airlines
MDW	46	33,263	224	$124	3
MKE	**34**	**11,070**	**89**	**$154**	**16**
ORD	50	84,623	638	$152	49



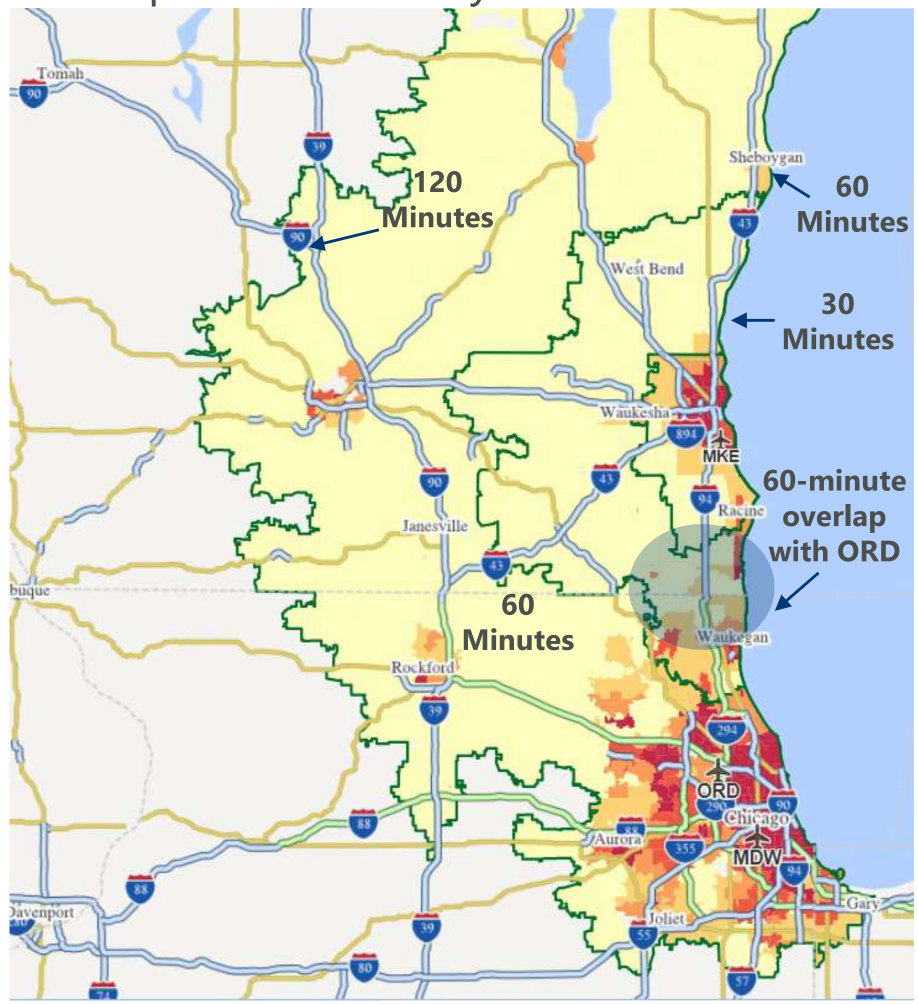


Source: Innovata; U.S. DOT DB1b Survey, September 2018.

Passenger Choice is Also Influenced By Accessibility and Ease of Access

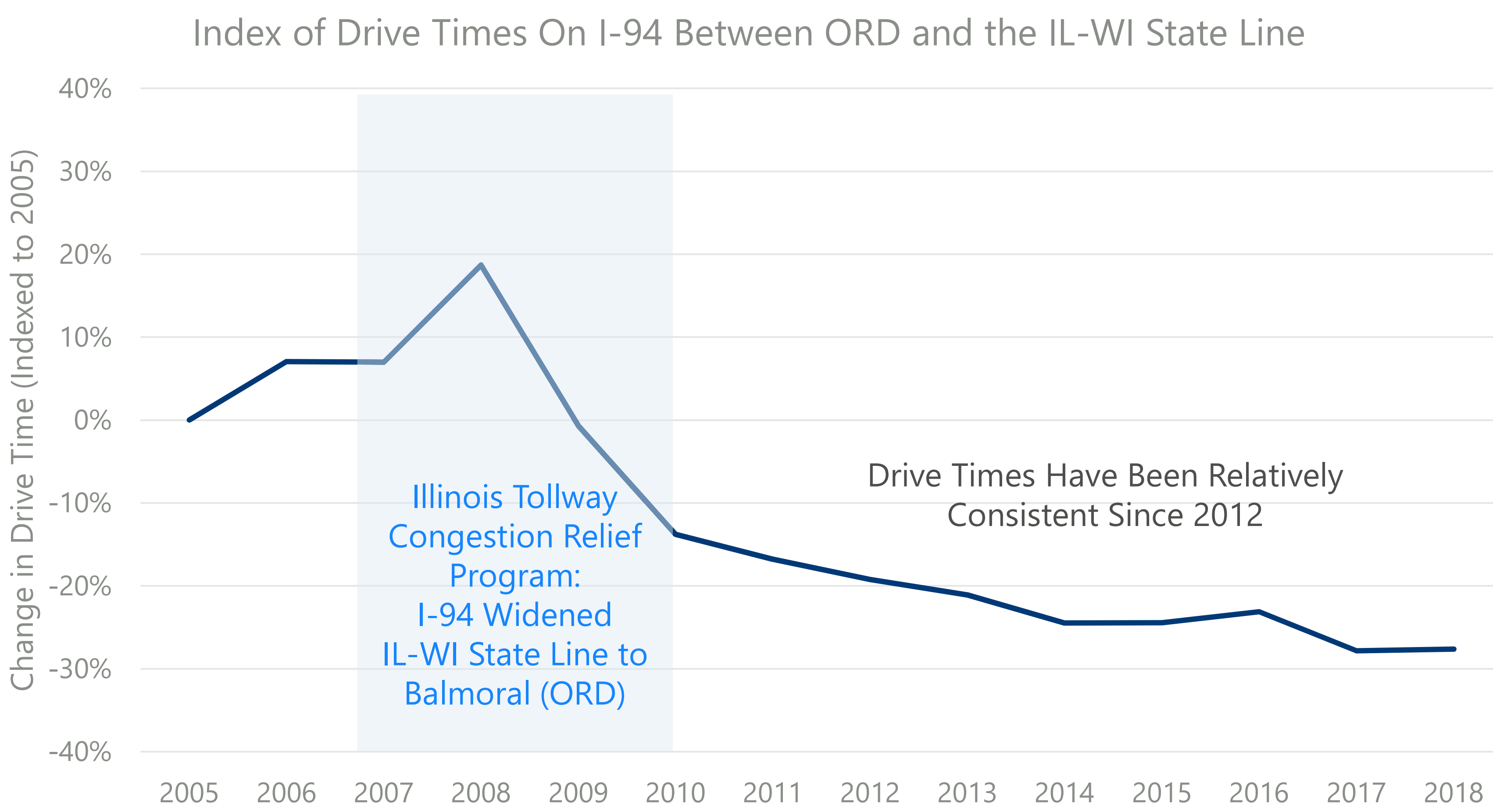
- The majority of Chicagoland population lives within a 60-120 minute drive time of MKE (without traffic)
- The area around Waukegan/Northwest Illinois falls within the 60 minute drive time of both ORD and MKE
- This area contains nearly 1 million people, most are currently using ORD
- Continued growth along the Illinois portion of I-94 could increase the area of overlap within a 60 minute drive time and make road travel to MKE more appealing

Population Density and Drive Time



Source: Diio Mi Catchment Mapper, September 2018.

Improvements Made to I-94 Between O'Hare and the IL-WI State Line Have Reduced Travel Times



Note: I-94 in Wisconsin is currently being widened, which may lessen drive times to and from MKE.

Source: Illinois Tollway *Congestion Relief Program Summary, 2011;* Travel Midwest Stats.

Major Structural Changes Have the Potential To Impact the Underlying Demand Base

- In 2017 Foxconn announced it will build a $10 billion factory in Wisconsin
  - Mount Pleasant, WI was selected for its location in October 2017
  - Builders formally broke ground at the Wisconsin Valley Science and Technology Park in June 2018
- Foxconn and its related developments may provide additional economic impact of:
  - Up to 13,000 additional jobs directly related to Foxconn operations by 2022 (0.3% of Wisconsin employment)
  - Between 24,000 and 41,600 additional jobs from the indirect impacts of Foxconn's investment (Between 0.6% and 1.0% of Wisconsin employment)
  - Incremental labor income of $955 million for the state of Wisconsin by 2023 (0.5% of Wisconsin labor income
  - Incremental GDP growth of $3.361 billion for the state of Wisconsin by 2025 (1.0% of Wisconsin GDP)
- The exact timing of Foxconn's investments and the ultimate magnitude of their impacts are still unknown

Source:. EY *Quantifying Project Flying Eagles Potential Economic Impacts on Wisconsin*, July 2017; *An Evaluation of the Economic Impact of the Foxconn Proposal*, Noah Williams Center for Research on the Wisconsin Economy (CROWE) Univ. of Wisconsin-Madison, August 2017.

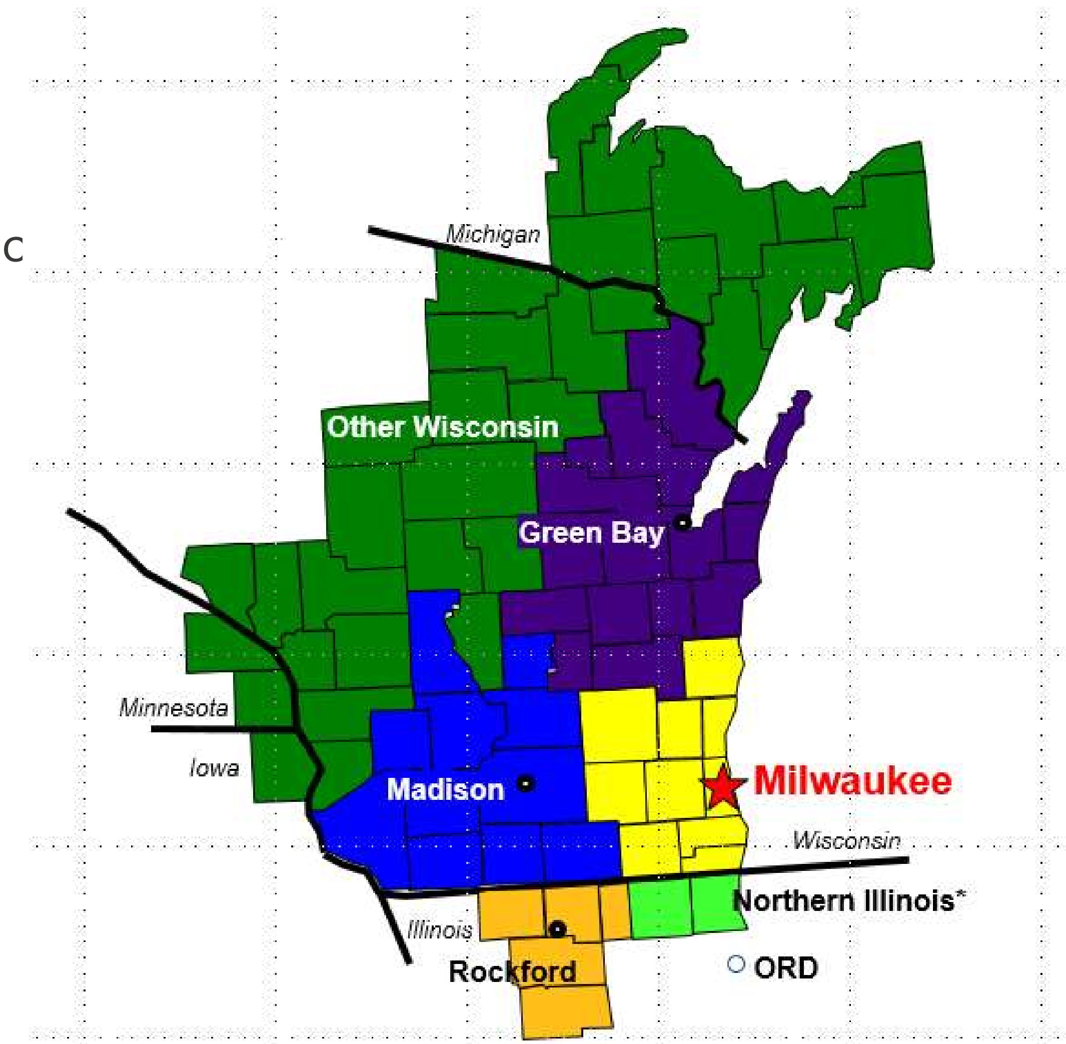
Passenger Airline Activity Forecasts

Enplaned Passenger Forecast Methodology

- Single variable regression analysis was selected for use in the baseline forecast
- Dependent variable – Historical MKE O&D passenger volumes
- Independent variables – Local (Airport Service Area) and national socioeconomics
  - The Airport Service Area was defined as a six region grouping of counties in Wisconsin and adjacent parts of Illinois, Iowa, Michigan and Minnesota (map provided on following slide)
  - For both the Airport Service Area and United States, six socioeconomic factors were evaluated (Population, Employment, Earnings, Personal Income, Per Capita Personal Income, and GDP/GRP)
- Connecting passenger volumes are expected to be limited throughout the forecast period, but will grow as additional capacity is introduced providing new connecting opportunities
- Near-term (2019) forecasts were refined based on published airline schedules and anticipated load factors and completion factors
- Other specific factors identified in the market assessment were incorporated to support both near-term and longer-term activity including
  - Economic and population growth in the Southeastern Wisconsin region
  - Current airline and passenger mix
  - Growth of ultra low-cost carriers

Airport Service Area - Six Zone Region

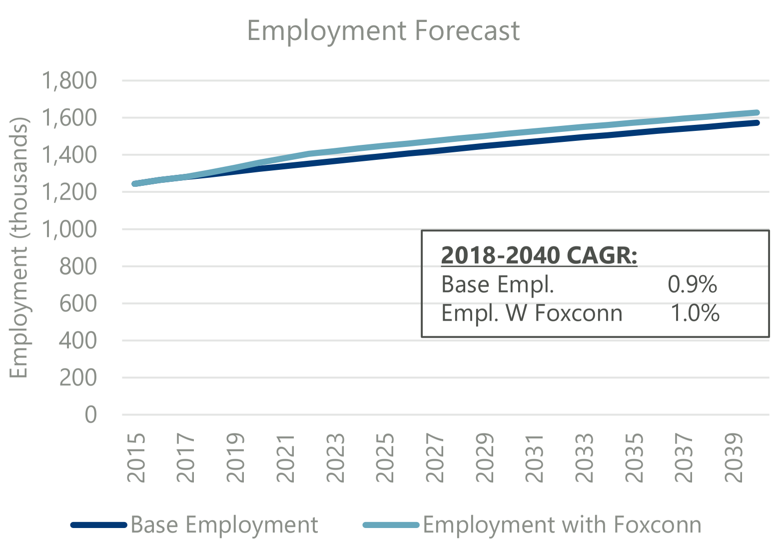
- Milwaukee Area
- Madison Area
- Green Bay Area
- Other Wisconsin (includes cc
- Northern Illinois
- Rockford Area

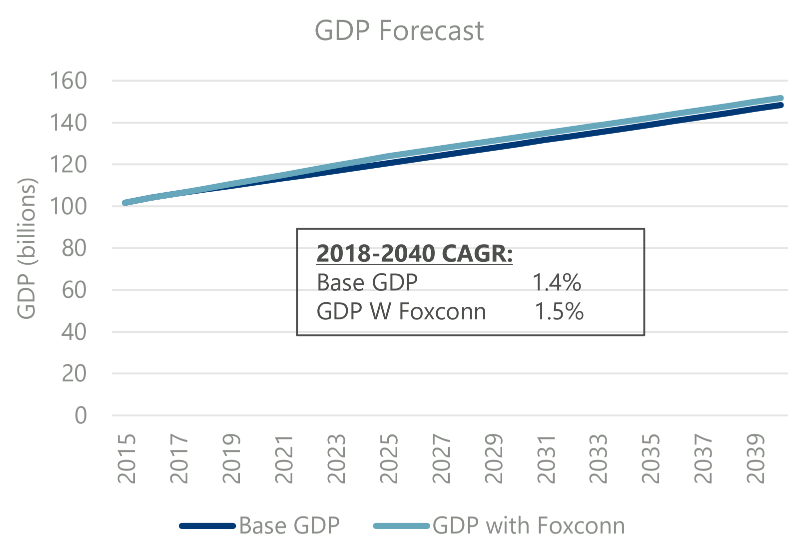


Source: *Milwaukee General Mitchell International Airport Leakage Study*, September 2018.

Enplaned Passenger Forecast Methodology

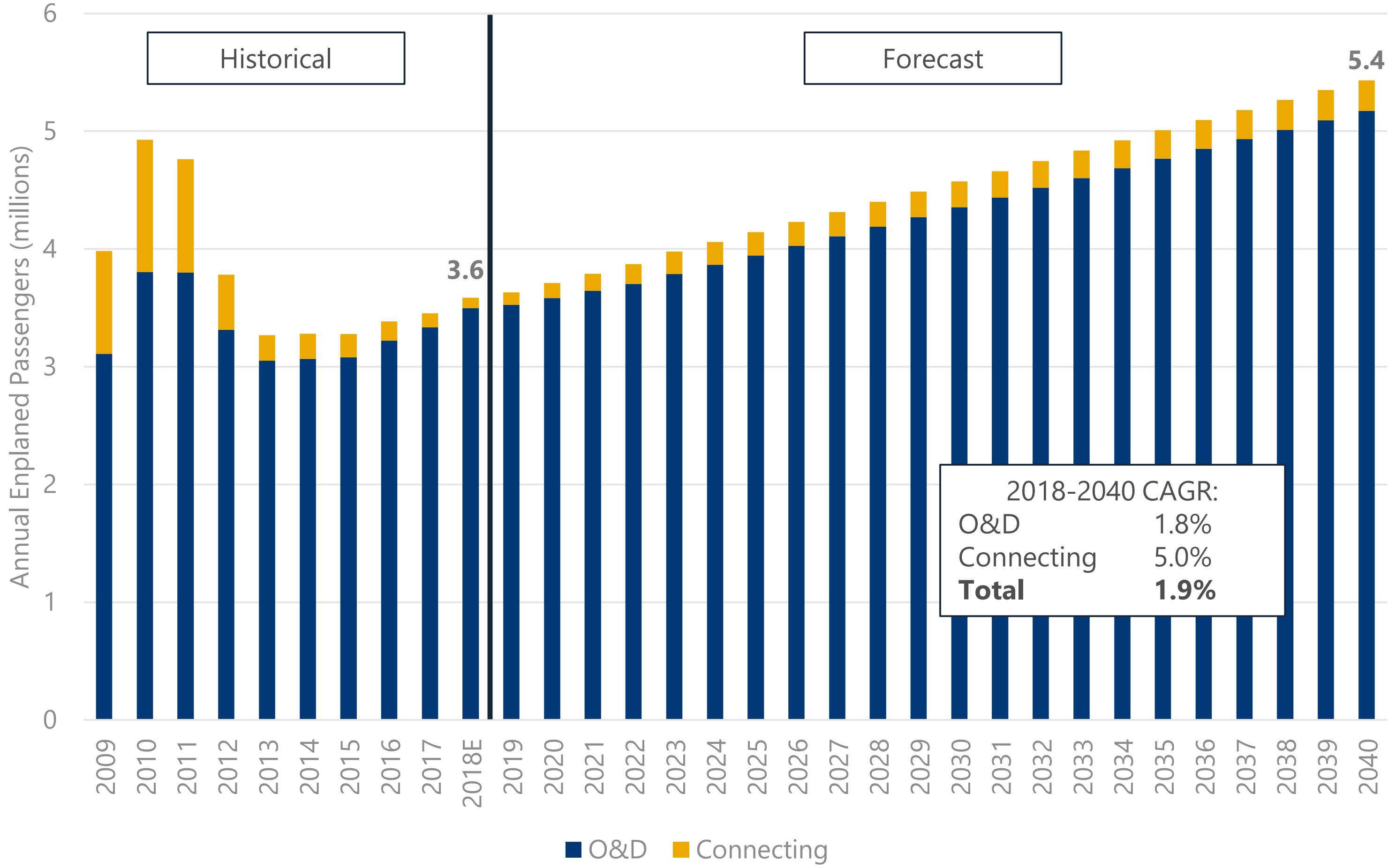
- The independent forecasts of socioeconomics were adjusted to account for the estimated impact of Foxconn developments and other growth drivers in Southeastern Wisconsin
- Projections of economic impact were sourced from various studies commissioned by both Foxconn and the State of Wisconsin
- The baseline forecast assumes an incremental benefit of 50 percent of the estimated maximum economic impact per these studies





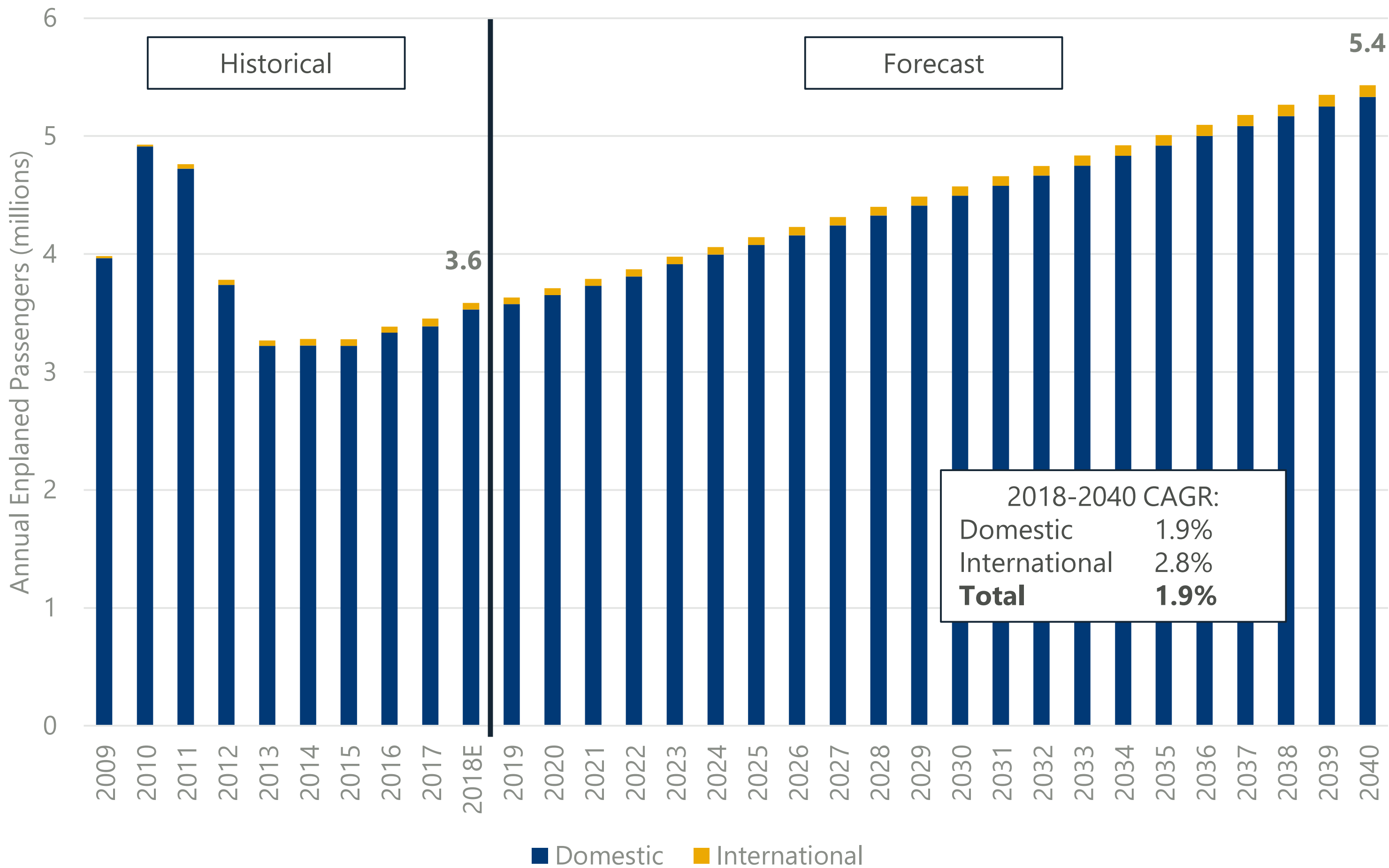
Source:. EY *Quantifying Project Flying Eagles Potential Economic Impacts on Wisconsin*, July 2017; *An Evaluation of the Economic Impact of the Foxconn Proposal*, Noah Williams Center for Research on the Wisconsin Economy (CROWE) Univ. of Wisconsin-Madison, August 2017; Woods & Poole Economics, Inc. 2018.

Enplaned Passenger Forecast Results – O&D vs. Connecting



Source: Milwaukee General Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), November 2018.

Enplaned Passenger Forecast Results – Domestic vs International

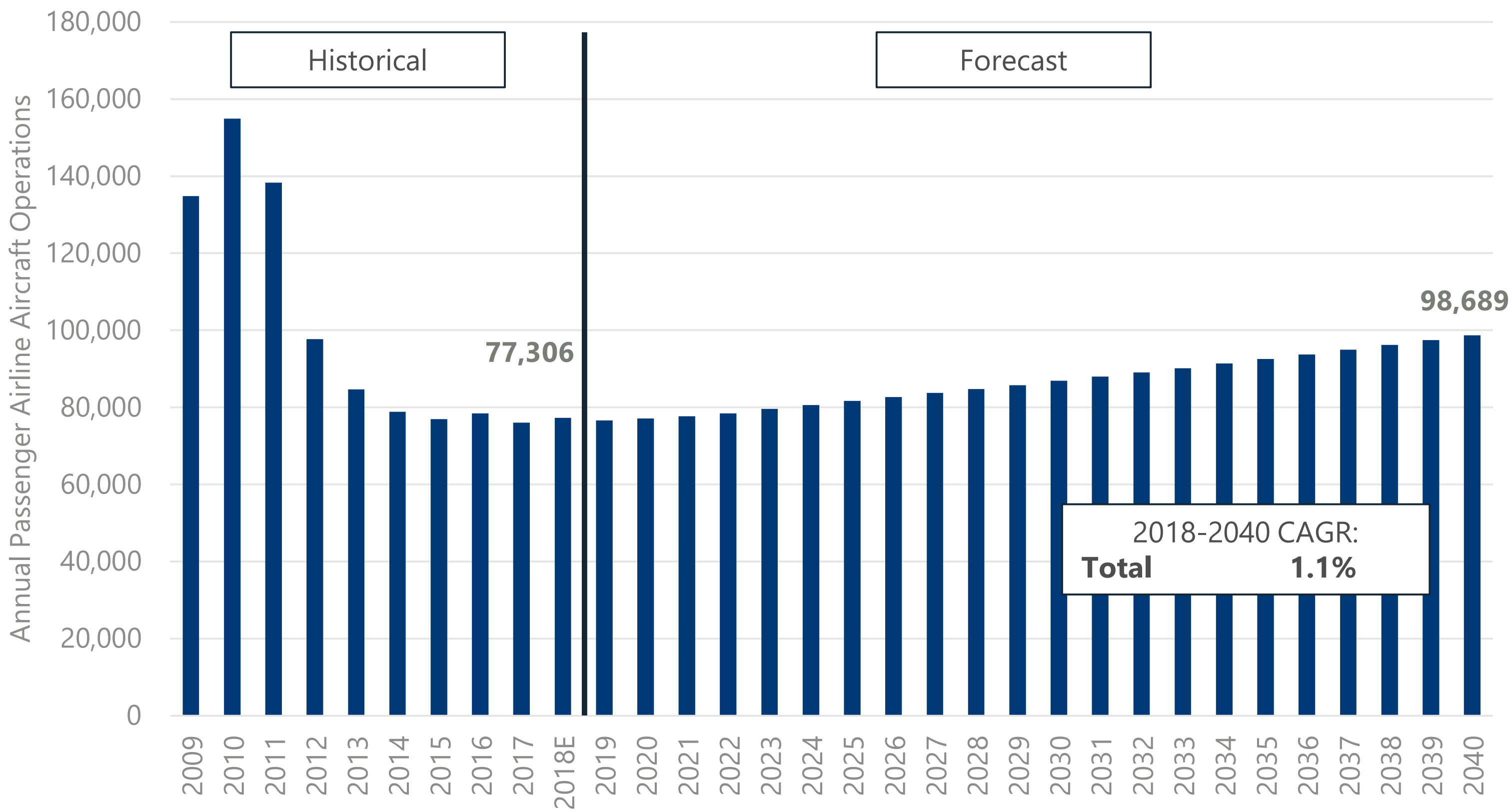


Source: Milwaukee General Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), November 2018.

Passenger Airline Operations Forecast Methodology

- Passenger growth was accommodated in a combination of three ways
  - New flights
  - Larger aircraft
  - Increased load factors
- Future fleet mixes were developed for the airlines operating at the Airport based on published aircraft orders and airline-specific aircraft retirement schedules where available
- Operations were grown using average seats per departure and load factor assumptions
- Future average seats per departure were informed by:
  - Fleet mixes
  - Expectations of airline capacity deployment at the Airport
  - Recent trends of carriers operating at the Airport

Passenger Airline Operations Forecast Results

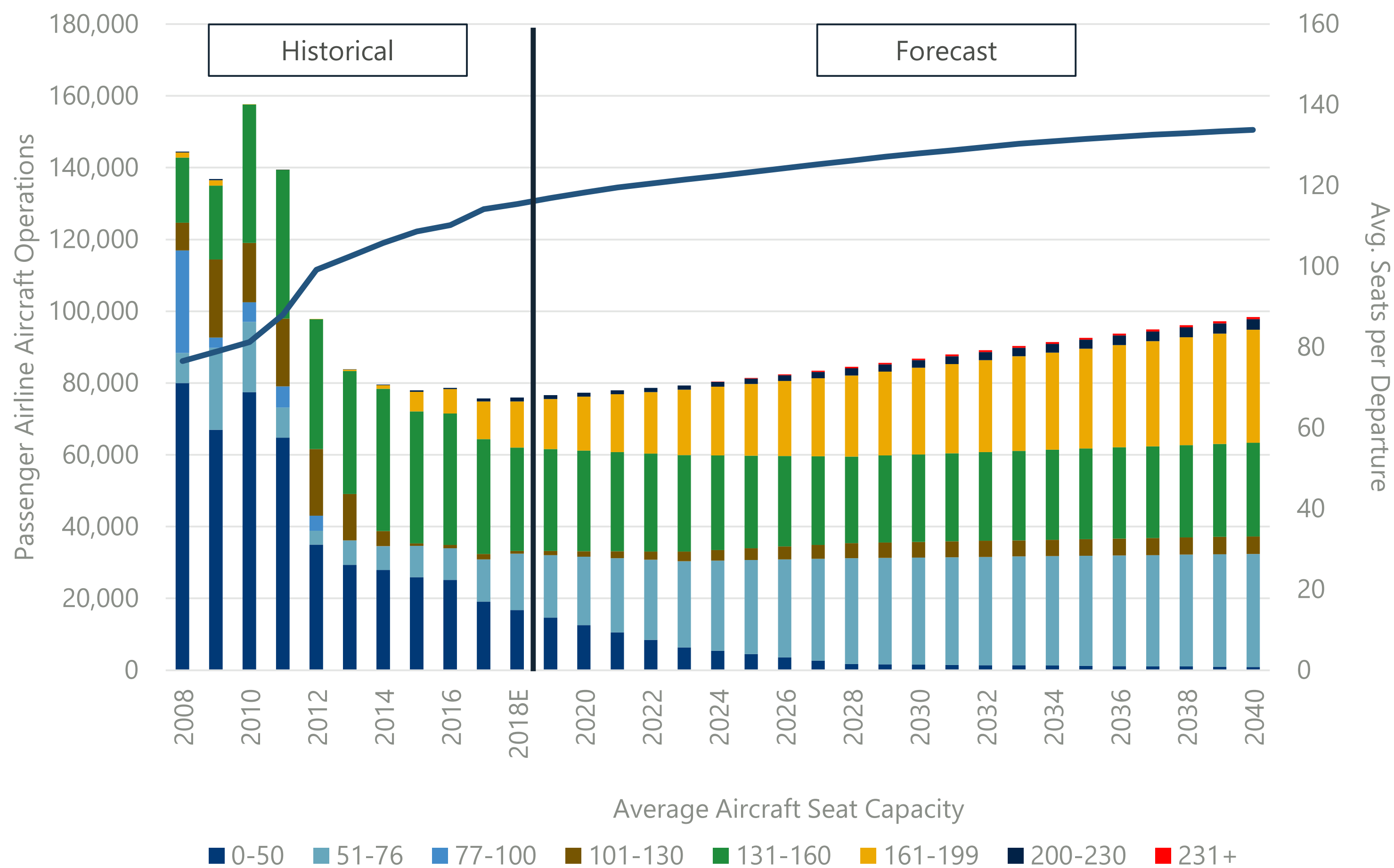


Source: Milwaukee General Mitchell International Airport (Historical); U.S. DOT T-100; Ricondo & Associates, Inc. (Forecast), November 2018.

Passenger Airline Fleet Mix Methodology and Assumptions

- Future fleet mixes were informed by known aircraft orders, and airline-specific aircraft retirements, when available
- The use of 50-seat regional aircraft will continue to decline throughout the forecast period as these aircraft are replaced with larger regional jets and small mainline aircraft
- In general, carriers will continue to upgauge their fleets through the use of higher capacity aircraft
  - Southwest's fleet orders are comprised almost entirely of 175-seat 737 MAX 8 aircraft
  - American and United are each in the process of or have recently completed densifying their narrow body fleets
- Use of high density narrowbody aircraft by ULCCs will increase over the forecast period

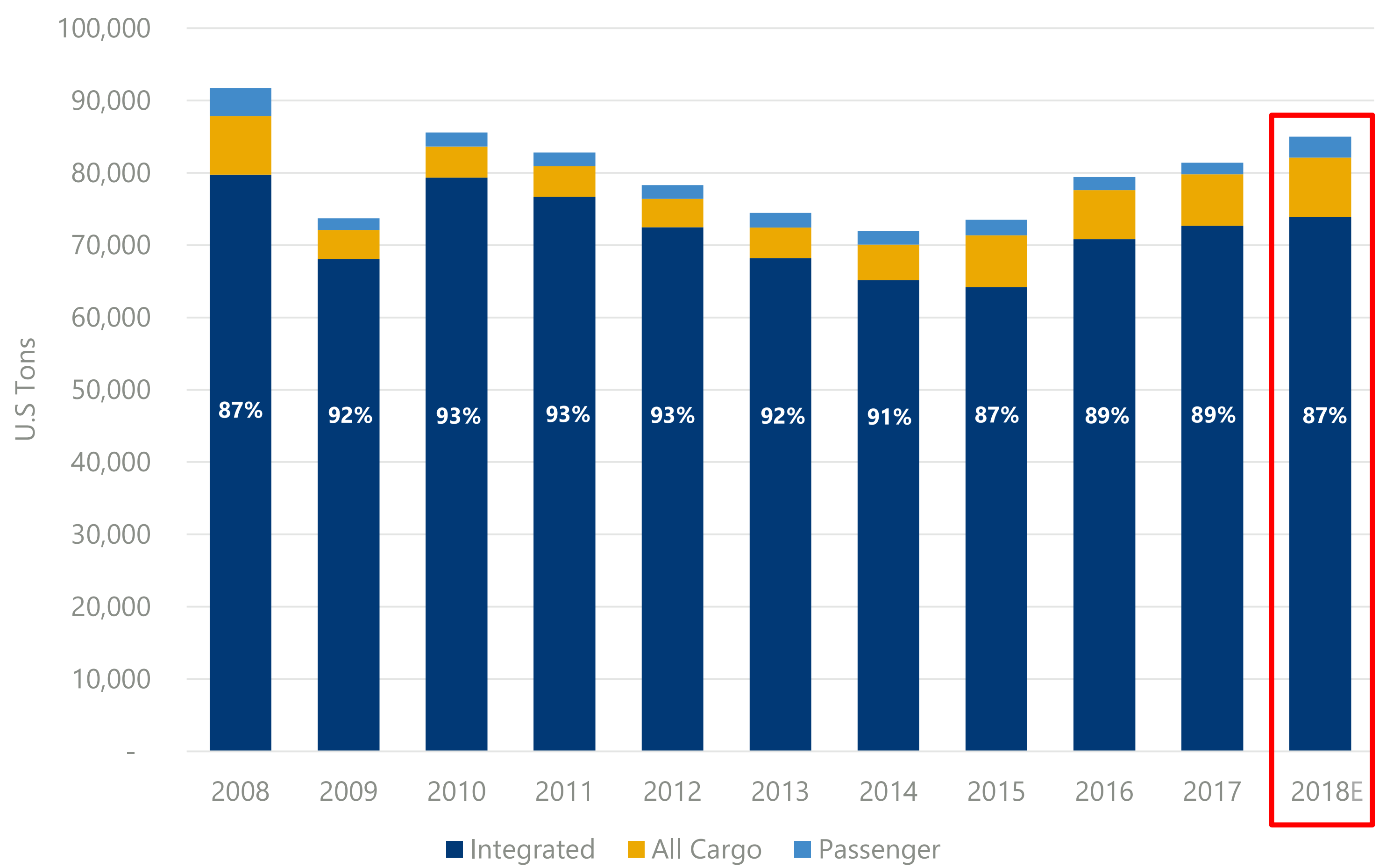
Passenger Airline Fleet Mix Results



Source: Milwaukee General Mitchell International Airport (Historical); U.S. DOT T-100; Ricondo & Associates, Inc. (Forecast), November 2018.

Air Cargo Forecasts

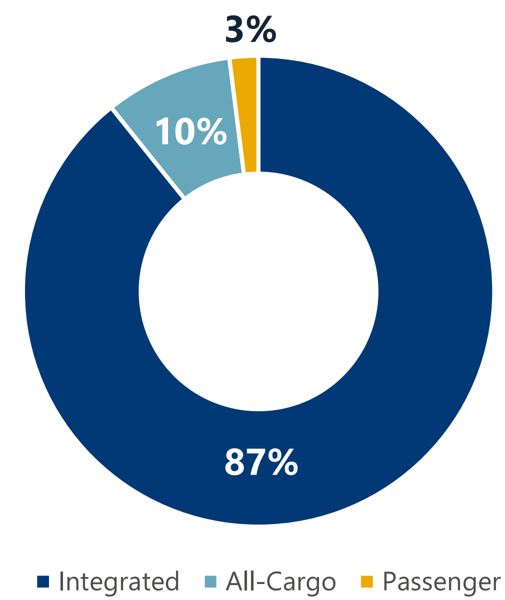
MKE Cargo Market Experienced Recent Increase in Tonnage After Period of Steady Decline



Source: Milwaukee General Mitchell International Airport, October 2018; US DOT T-100, June 2018.

MKE Cargo: Market Share by Carrier Group (2018E)

- The integrated carriers (FedEx and UPS) account for 87% of the total cargo handled at MKE in 2018E
  - This market share is down from 92% in 2013
- The all-cargo carrier group has grown from 5% of total tonnage in 2013 to 10% in 2018E
  - DHL is considered an all-cargo carrier in the U.S. market as it outsources local delivery and pickup operations to partner companies
- The passenger carriers have maintained a relatively minor market share of the MKE cargo tonnage



Source: Milwaukee General Mitchell International Airport (Historical), October 2018; U.S. DOT T-100, June 2018.

MKE Cargo: Historical Data (Top Carriers)

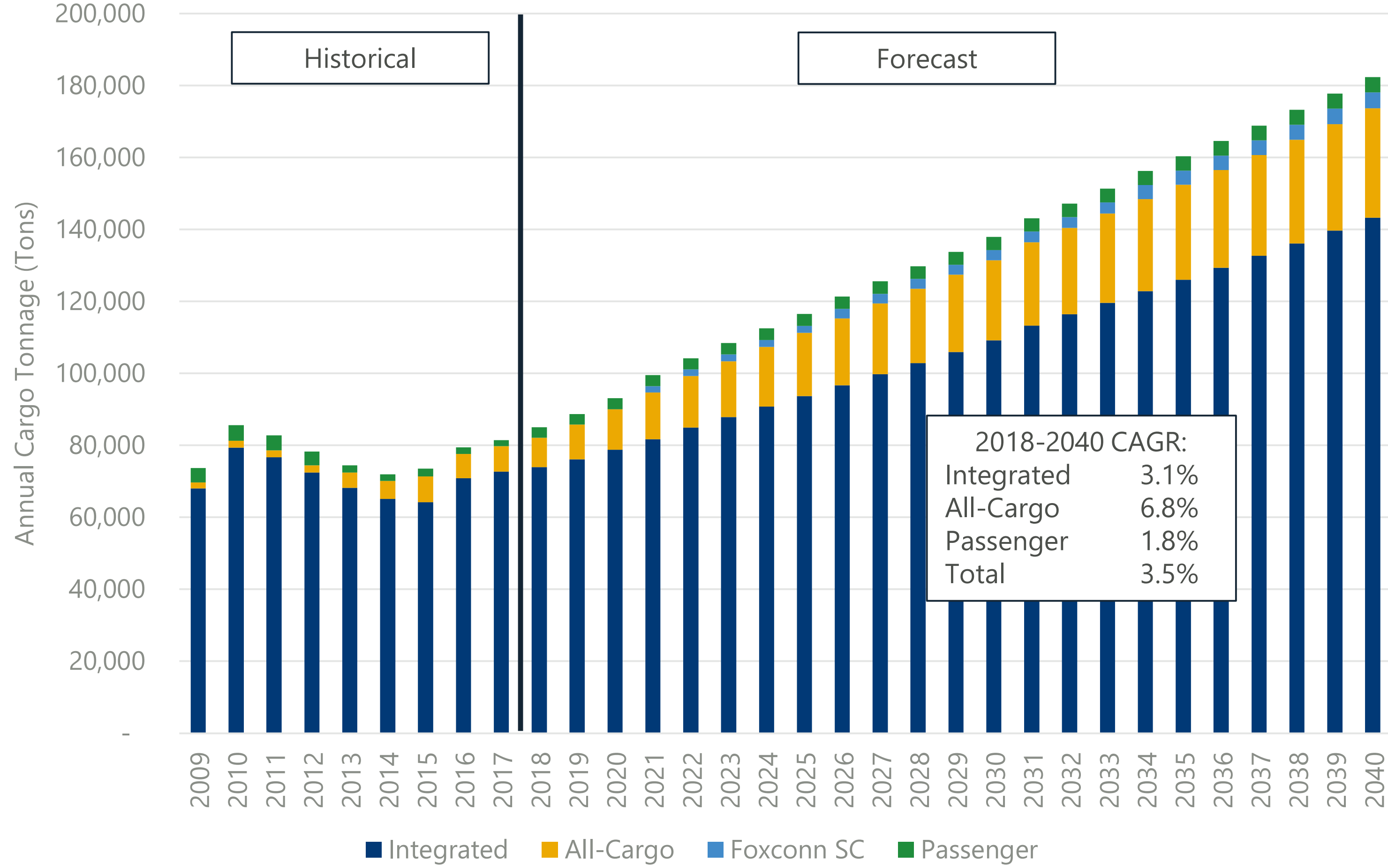
- FedEx is the largest cargo carrier, accounting for over 56% of the total cargo handled at MKE in 2018E; a steady market share since 2013
- UPS' tonnage has been steady, with an estimated slight decline from 2017 to 2018, largely due to the company's use of trucking and facility issues at the Airport
- DHL has experienced strong year over year percentage growth since initiating service at the Airport in 2014
  - Amazon is rapidly expanding its U.S. network and outsources significant capacity to DHL and other carriers (Atlas, ATI, etc.)
- Southwest is the largest passenger carrier but its aircraft fleet and route network produces limited cargo capacity

	HISTORICAL TONNAGE (TONS)					CAGR
TOP AIRLINES	2014	2015	2016	2017	2018E	2014-2018E
FedEx	37,461	37,127	43,779	45,390	49,298	7.1%
UPS	27,682	27,071	27,035	27,264	24,625	(2.9)
DHL	691	2,734	3,082	3,405	4,599	60.6
Freight Runners	2,374	2,618	2,247	2,372	2,032	(3.8)
CSA Air	1,660	1,694	1,317	1,268	1,561	(1.5)
Southwest	1,464	1,661	1,470	1,227	1,172	(5.4)
Delta	266	337	268	274	1,172	44.8
American	76	76	98	111	494	59.8
Ameriflight	147	126	119	75	39	(66.8)
Others *	119	51	15	4	2	(96.7)
TOTAL MKE CARGO	**71,942**	**73,496**	**79,430**	**81,391**	**84,998**	**3.4%**

Source: Milwaukee General Mitchell International Airport (Historical), October 2018; U.S. DOT T-100, June 2018.

* -- Others include Alaska, Frontier, Mountain Air Cargo, US Airways, US Checks-Airnet

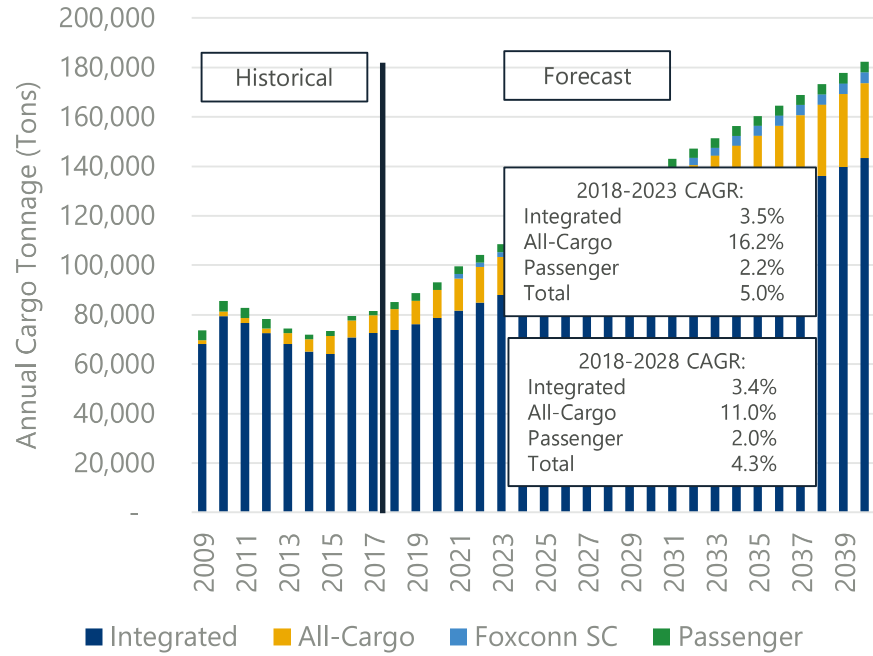
Air Cargo Forecast Results – Integrated, All-Cargo, and Passenger



Source: Milwaukee General Mitchell International Airport (Historical); U.S. DOT T-100; Ricondo & Associates, Inc. (Forecast), November 2018.

Air Cargo Forecast Results – Detailed Outlook by Carrier Group

- Near-term (5 years), it is expected that the integrated carrier group will get a slight boost from Foxconn economic activity and UPS facility (re)development at MKE
- All-cargo group will continue to surge both from Amazon/DHL (2nd fulfillment center) and expected Foxconn activity (from a traditional international forwarding/logistics strategy that largely utilizes ORD and direct freighter flights into MKE when supply chain disruptions occur)
- Longer timeframe (10 years), integrated carriers slows slightly to more regional economic growth and the all-cargo group continues to experience robust growth, albeit down from first 5 years of planning horizon
- Passenger airlines' cargo tonnage totals keep pace with the fleet growth and forecast outlook



Source: Milwaukee General Mitchell International Airport (Historical); U.S. DOT T-100; Ricondo & Associates, Inc. (Forecast), November 2018.

Cargo Forecast – Freighter Operations Forecast

YEAR	FREIGHTER OPERATIONS
2015	13,236
2016	13,498
2017	13,354
2018E	13,477

Source: FAA Form 108, October 2018

	FREIGHTER VOLUME (TONS)	FREIGHTER AIRCRAFT OPERATIONS	PAYLOAD PER OPERATION (TONS)
HISTORICAL			
2018E	82,120	13,477	6.1
FORECAST			
2023	105,214	16,108	6.5
2028	126,218	18,386	6.9
2040	178,045	23,017	7.7

Source: FAA Form 108, October 2018

	2018E	2023	2028	2040
FORECAST FREIGHTER OPERATIONS	13,477	16,108	18,386	23,017
Piston/Turboprop	9,628	11,276	12,870	16,112
Narrowbody	1,270	1,611	1,839	2,302
Widebody	2,580	3,222	3,677	4,603

Source: FAA Form 108, October 2018

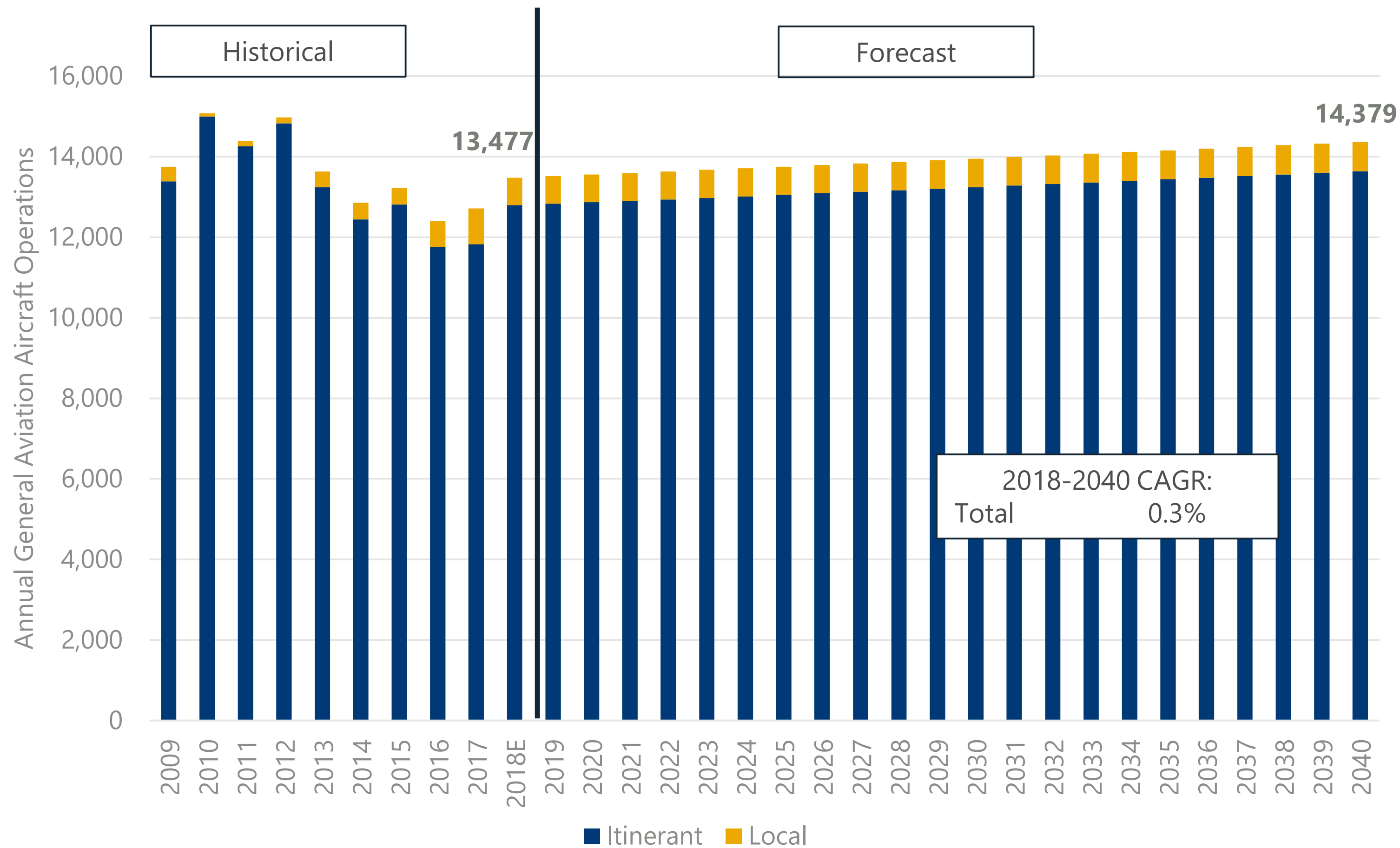
- Freighter operations have remained steady over the past several years
- A preponderance (71%) of the freighters are regional turboprop aircraft from airlines such as Freight Runners and CSA
- UPS, FedEx, and DHL operate a mix of freighter aircraft with widebody (MD-11 and A-300) and narrowbody (757 and 737) utilized
- In the most recent Boeing Outlook Forecast, it is expected that growth narrowbody freighter aircraft will outpace that of widebody and especially at MKE with Amazon's intended 737 increase within their growing fleet

General Aviation and Military Forecasts

General Aviation Operations Forecast Methodology

- Similar to the passenger activity forecasts, multiple approaches were used to forecast general aviation (GA) activity
- MKE GA operations are not meaningfully correlated with socioeconomic variables
  - Total GA operations decreased at a compound annual growth rate (CAGR) of 11.1% from 1990 to 2008 while socioeconomic variables increased at an average CAGR of 3.1%
  - From 2009 to 2017, total GA operations were generally flat while socioeconomic variables increased at an average CAGR of 1.2%
- Since 2010, GA operations have represented a stable share of total regional and national GA operations
  - Approximately 0.87% of total GA operations in Wisconsin
  - Approximately 0.05% of total GA operations in the United States
- The share of 0.05% was applied to the forecast of national GA operations in the Federal Aviation Administration (FAA) National Aerospace Forecast
- The future share of itinerant and local operations were assumed to be the average respective shares from 2015 to 2017

General Aviation Operations Forecast Results

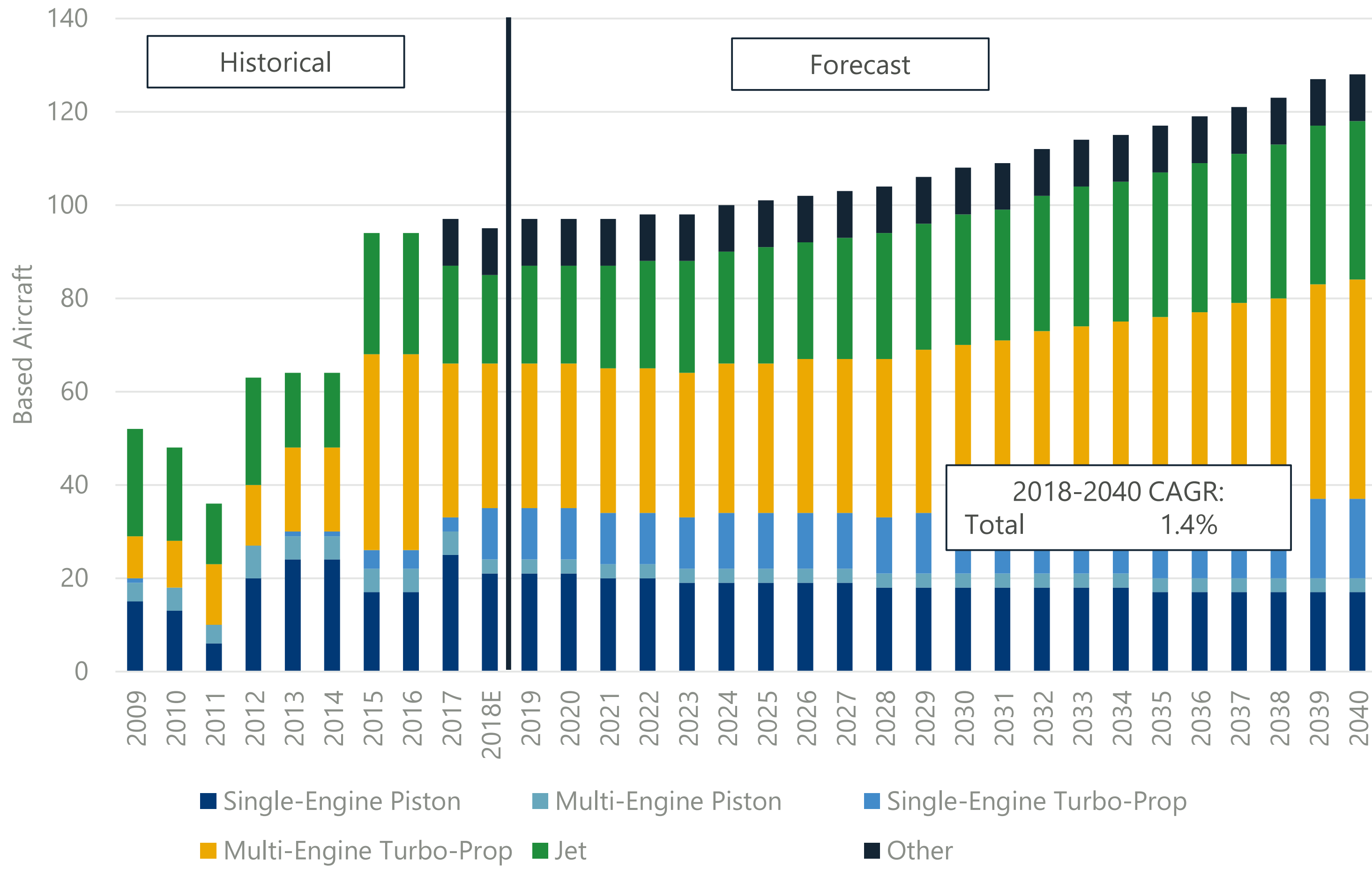


Source: Milwaukee General Mitchell International Airport, FAA Operations Network (OPSNET), (Historical); Ricondo & Associates, Inc. (Forecast), November 2018.

General Aviation Based Aircraft Forecast Methodology

- From 2015 to 2018E, based aircraft at the Airport have represented a generally stable share of active GA hours flown, as reported in the *FAA National Aerospace Forecast*
  - Based on engine type (e.g., single-engine piston based aircraft relative to single-engine piston active GA hours flown)
- Conversations with Airport stakeholders indicate that there is demand for hangar space that cannot be accommodated currently, primarily jet aircraft
- The average based aircraft at the Airport per GA hours flown from 2015 to 2018 was applied to the *FAA National Aerospace Forecast* of GA hours flown for the respective engine type

General Aviation Based Aircraft Forecast

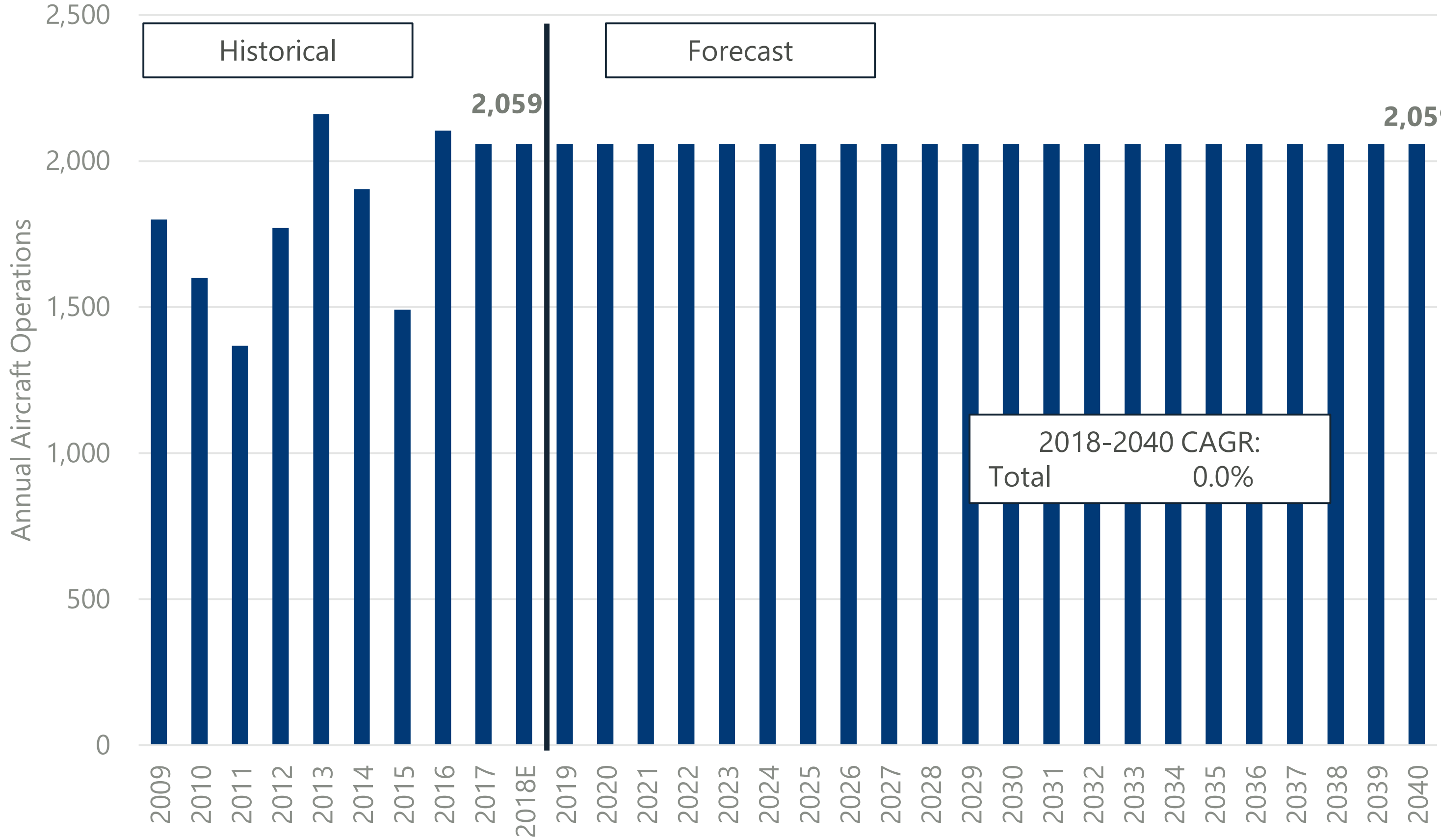


Source: Milwaukee General Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), November 2018.

Military Aircraft Operations Forecast

- The 128th Air Refueling Wing (ARW) is a unit of the Wisconsin Air National Guard located at MKE operating KC-135 Stratotanker aerial refueling (tanker) aircraft
- The KC-135 is scheduled to be gradually replaced by KC-46 Pegasus aircraft (the first aircraft are expected to be operational in the USAF by 2019)
- It is assumed that the unit will eventually transition to the KC-46
  - The exact timeline is uncertain, but ANG units may receive new aircraft after active duty units
  - The forecast assumes that the Air Force will not change the unit's mission over the forecast period
- The Department of Defense does not provide guidance for future activity levels
- The FAA's TAF forecasts military operations to remain constant based on the last year of actual at civilian airports with military operations
- The 128th ARW is not currently listed as a candidate for Base Realignment and Closure action
- Based on these supporting factors, we have used the TAF forecast methodology of military aircraft operations at MKE, with calendar year 2017 as the baseline

Military Aircraft Operations Forecast Results



Source: FAA Operations Network (OPSNET); November 2018.

Comparison to the 2017 Terminal Area Forecast

FAA Terminal Area Forecast

- Official FAA forecast of aviation activity for U.S. airports
- Includes active airports in the National Plan of Integrated Airport Systems (NPIAS)
- Prepared to meet budgeting and planning needs of the FAA
- Updated annually by the FAA

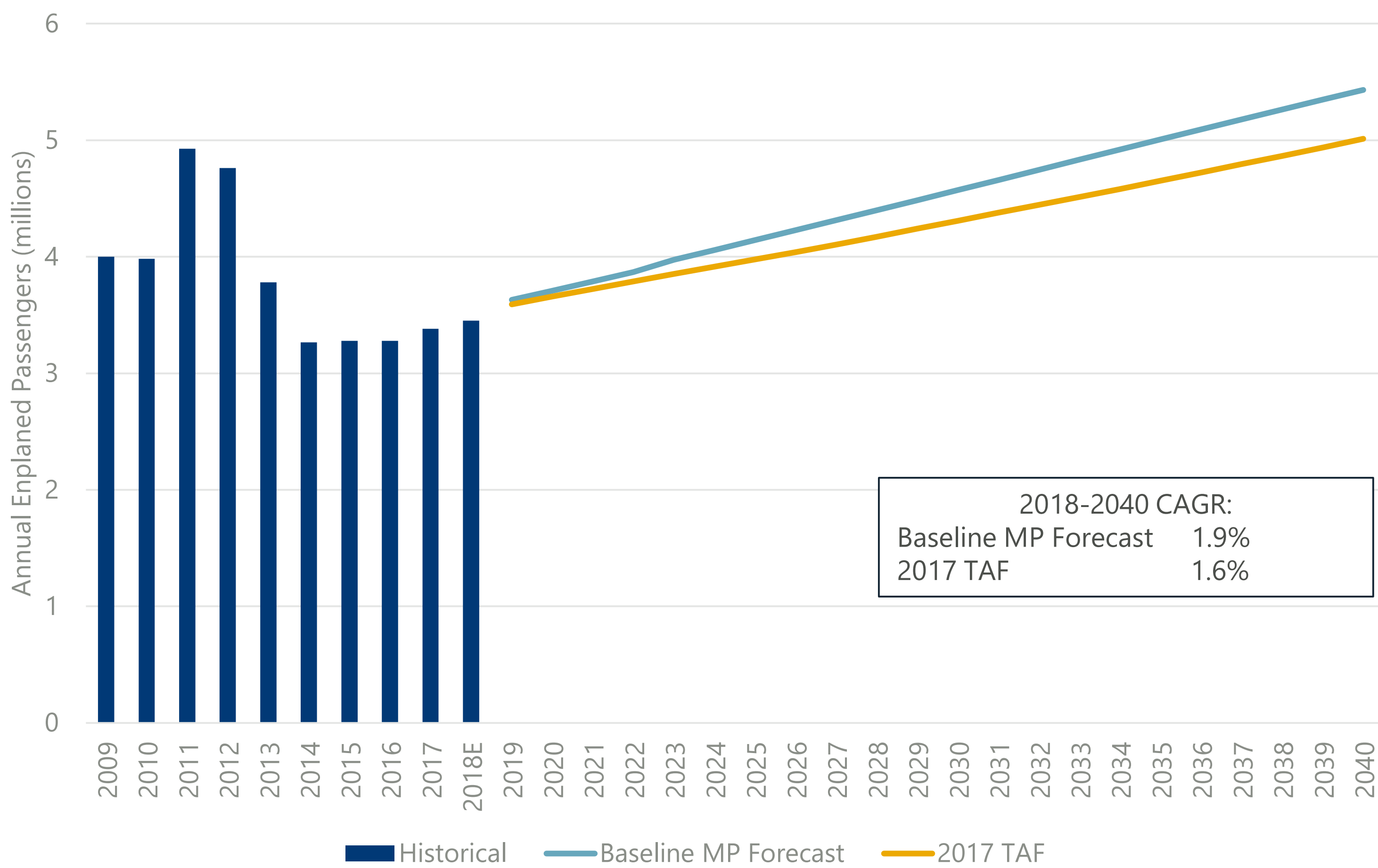
APO TAF Quick Data Summary Report - Facility

For National Forecast 2017 -- 2017 Scenario

Region State: AGL-WI
City: MILWAUKEE
LOCID: MKE Combined TRACON &Tower with Radar
Airport: GENERAL MITCHELL INTL
2016 Based Aircraft: 100

	--ENPLANEMENTS--			--AIRPORT OPERATIONS--									--TRACON--
				Itinerant Operations					Local Operations				
Fiscal Year	Air Carrier	Commuter	Total	Air Carrier	AT & Commuter	GA	Military	Total	Civil	Military	Total	Total OPS	Total OPS
2013	2,450,598	777,254	3,227,852	59,413	44,942	13,364	1,996	119,715	332	430	762	120,477	231,566
2014	2,512,352	743,569	3,255,921	55,877	43,949	12,751	1,987	114,564	467	448	915	115,479	228,344
2015	2,486,541	735,260	3,221,801	55,940	40,752	12,376	1,699	110,767	346	129	475	111,242	224,925
2016	2,556,261	742,160	3,298,421	57,674	41,346	12,253	1,840	113,113	563	226	789	113,902	227,363
2017 *	2,714,838	669,036	3,383,874	60,861	35,792	11,685	2,136	110,474	896	173	1,069	111,543	226,323
2018 *	2,774,554	740,589	3,515,143	64,580	34,852	11,935	2,136	113,503	989	173	1,162	114,665	231,515
2019 *	2,836,111	755,987	3,592,098	67,946	32,657	11,935	2,136	114,674	989	173	1,162	115,836	233,151
2020 *	2,891,317	769,721	3,661,038	71,480	30,012	11,935	2,136	115,563	989	173	1,162	116,725	234,331
2021 *	2,942,758	782,208	3,724,966	75,713	26,300	11,935	2,136	116,084	989	173	1,162	117,246	234,892
2022 *	2,995,065	794,967	3,790,032	80,173	22,313	11,935	2,136	116,557	989	173	1,162	117,719	235,352
2023 *	3,046,218	807,504	3,853,722	83,088	20,378	11,935	2,136	117,537	989	173	1,162	118,699	236,727
2024 *	3,096,773	819,937	3,916,710	84,668	20,249	11,935	2,136	118,988	989	173	1,162	120,150	238,941
2025 *	3,145,895	832,035	3,977,930	85,963	20,467	11,935	2,136	120,501	989	173	1,162	121,663	241,290
2026 *	3,196,570	844,501	4,041,071	87,298	20,688	11,935	2,136	122,057	989	173	1,162	123,219	243,700
2027 *	3,249,049	857,228	4,106,277	88,675	20,912	11,935	2,136	123,658	989	173	1,162	124,820	246,178
2028 *	3,303,095	870,319	4,173,414	90,091	21,138	11,935	2,136	125,300	989	173	1,162	126,462	248,719
2029 *	3,358,808	883,844	4,242,652	91,552	21,367	11,935	2,136	126,990	989	173	1,162	128,152	251,329
2030 *	3,413,780	897,217	4,310,997	92,996	21,597	11,935	2,136	128,664	989	173	1,162	129,826	253,925
2031 *	3,468,595	910,380	4,378,975	94,431	21,830	11,935	2,136	130,332	989	173	1,162	131,494	256,521
2032 *	3,523,218	923,361	4,446,579	95,856	22,066	11,935	2,136	131,993	989	173	1,162	133,155	259,109
2033 *	3,576,951	936,129	4,513,080	97,258	22,305	11,935	2,136	133,634	989	173	1,162	134,796	261,670
2034 *	3,632,694	949,449	4,582,143	98,714	22,546	11,935	2,136	135,331	989	173	1,162	136,493	264,314
2035 *	3,689,691	963,083	4,652,774	100,203	22,790	11,935	2,136	137,064	989	173	1,162	138,226	267,018
2036 *	3,747,574	976,851	4,724,425	101,712	23,037	11,935	2,136	138,820	989	173	1,162	139,982	269,758
2037 *	3,804,557	990,449	4,795,006	103,201	23,287	11,935	2,136	140,559	989	173	1,162	141,721	272,477
2038 *	3,861,822	1,004,026	4,865,848	104,696	23,540	11,935	2,136	142,307	989	173	1,162	143,469	275,217
2039 *	3,920,912	1,018,039	4,938,951	106,238	23,796	11,935	2,136	144,105	989	173	1,162	145,267	278,023
2040 *	3,980,499	1,032,243	5,012,742	107,795	24,054	11,935	2,136	145,920	989	173	1,162	147,082	280,859
2041 *	4,040,936	1,046,518	5,087,454	109,369	24,315	11,935	2,136	147,755	989	173	1,162	148,917	283,729
2042 *	4,100,981	1,060,695	5,161,676	110,934	24,579	11,935	2,136	149,584	989	173	1,162	150,746	286,595
2043 *	4,162,524	1,075,185	5,237,709	112,536	24,846	11,935	2,136	151,453	989	173	1,162	152,615	289,519
2044 *	4,224,878	1,089,777	5,314,655	114,155	25,116	11,935	2,136	153,342	989	173	1,162	154,504	292,483
2045 *	4,287,769	1,104,464	5,392,233	115,788	25,389	11,935	2,136	155,248	989	173	1,162	156,410	295,480
GR1	1.80	1.38	1.71	2.43	-1.67	-0.09	0.52	1.10	1.96	-0.92	1.34	1.10	0.91
GR2	1.65	1.81	1.68	2.32	-1.22	0.08	0.00	1.22	0.35	0.00	0.30	1.21	0.96

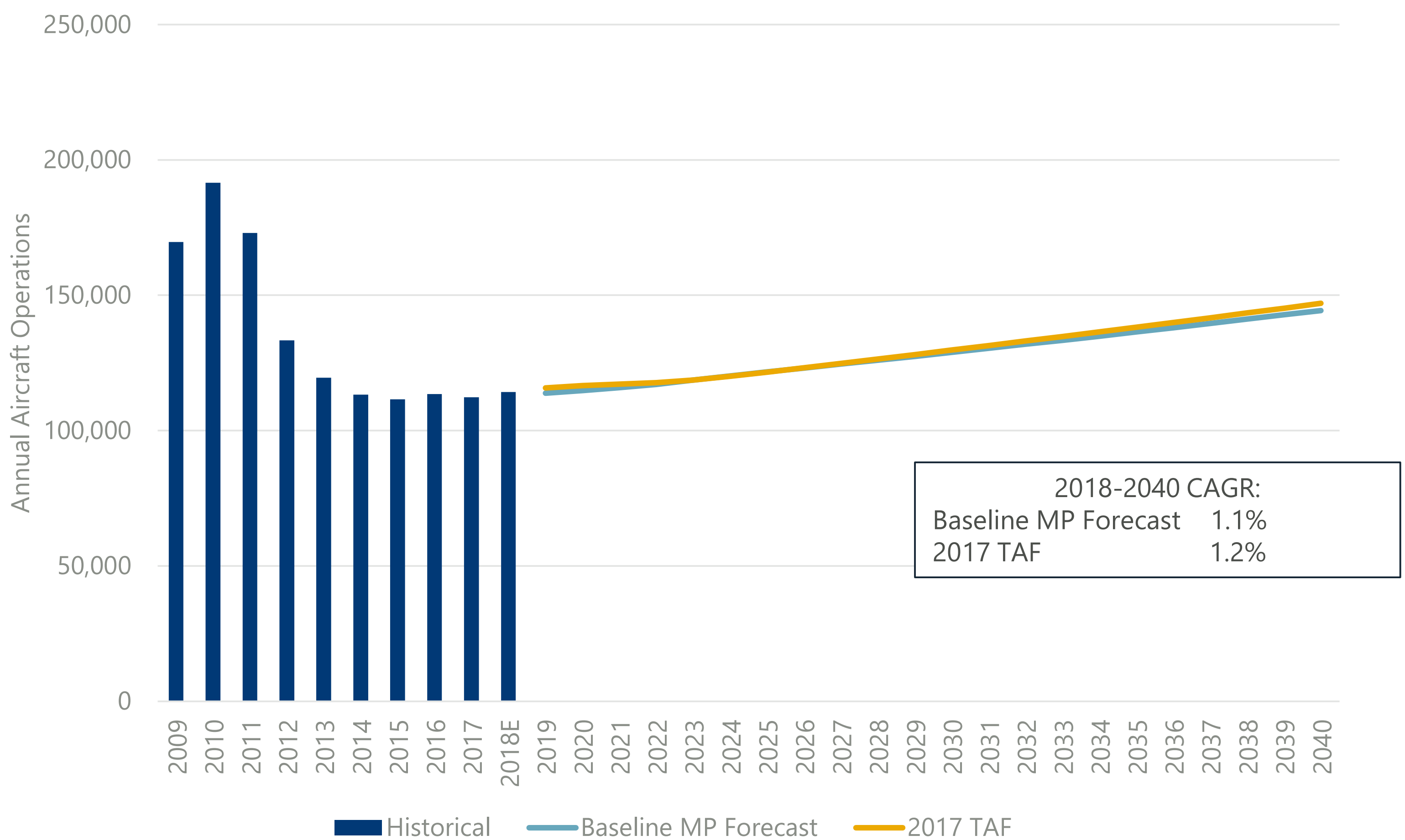
Comparison of Enplaned Passenger Forecasts



Note: The TAF excludes nonrevenue passengers and is presented in federal fiscal years. The master plan forecast includes nonrevenue passengers and is presented in calendar years

Source: Milwaukee General Mitchell International Airport (Historical); FAA *2017 Terminal Area Forecast*; Ricondo & Associates, Inc. (Forecast), November 2018.

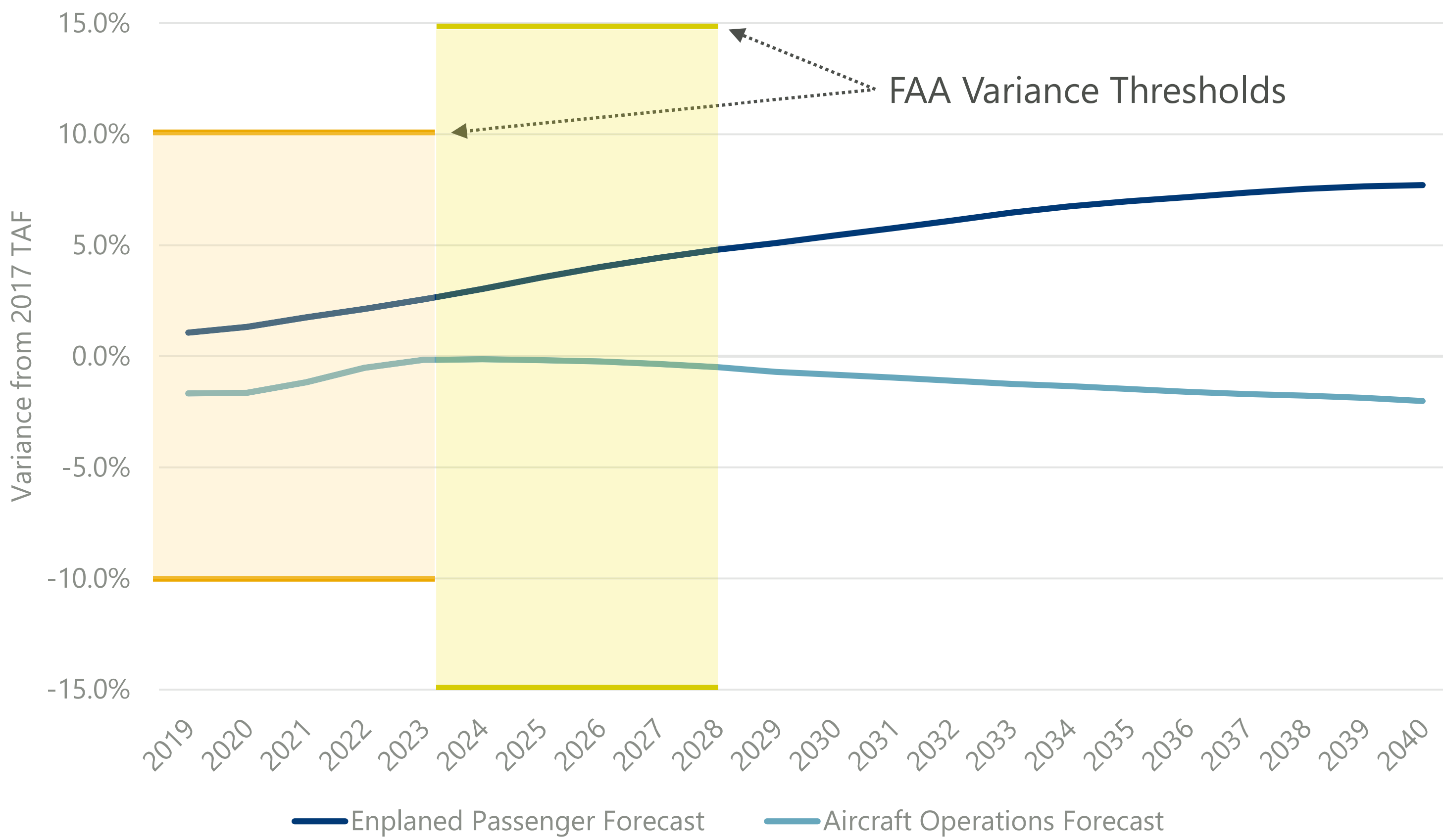
Comparison of Aircraft Operations Forecasts



Note: The TAF is presented in federal fiscal years, the master plan forecast is presented in calendar years.

Source: Milwaukee General Mitchell International Airport (Historical); FAA 2017 Terminal Area Forecast; Ricondo & Associates, Inc. (Forecast), November 2018.

Master Plan Forecast Variance from 2017 Terminal Area Forecast



Note: The TAF is presented in federal fiscal years, the master plan forecast is presented in calendar years.

Source: FAA 2017 Terminal Area Forecast; Ricondo & Associates, Inc. (Forecast), November 2018.

High Scenario Forecast (Modular Approach)

- **Commercial Passenger / General Aviation / Military**
  - Increased WN connecting activity (as MDW reaches capacity)
  - Full impact of Foxconn and related socioeconomic developments
  - Increased capture from counties between MKE and ORD (Kenosha, Lake, McHenry)
- **Cargo**
  - New bi-directional demand to accommodate Foxconn manufacturing activities
    - direct freighter flights from Asia (with component parts)
    - potential freighter flights to Europe/Asia (with finished goods)
  - Additional DHL activity to accommodate e-commerce/Amazon recent cargo demand patterns and to support new sort center in Oak Creek
  - Additional FedEx/UPS flights to support expanding e-commerce activity

High Scenario Forecast: Adjustment to Baseline Forecast to accommodate uncertainties and incorporate flexibility into the planning conclusions and recommendations

Next Steps

Next Steps

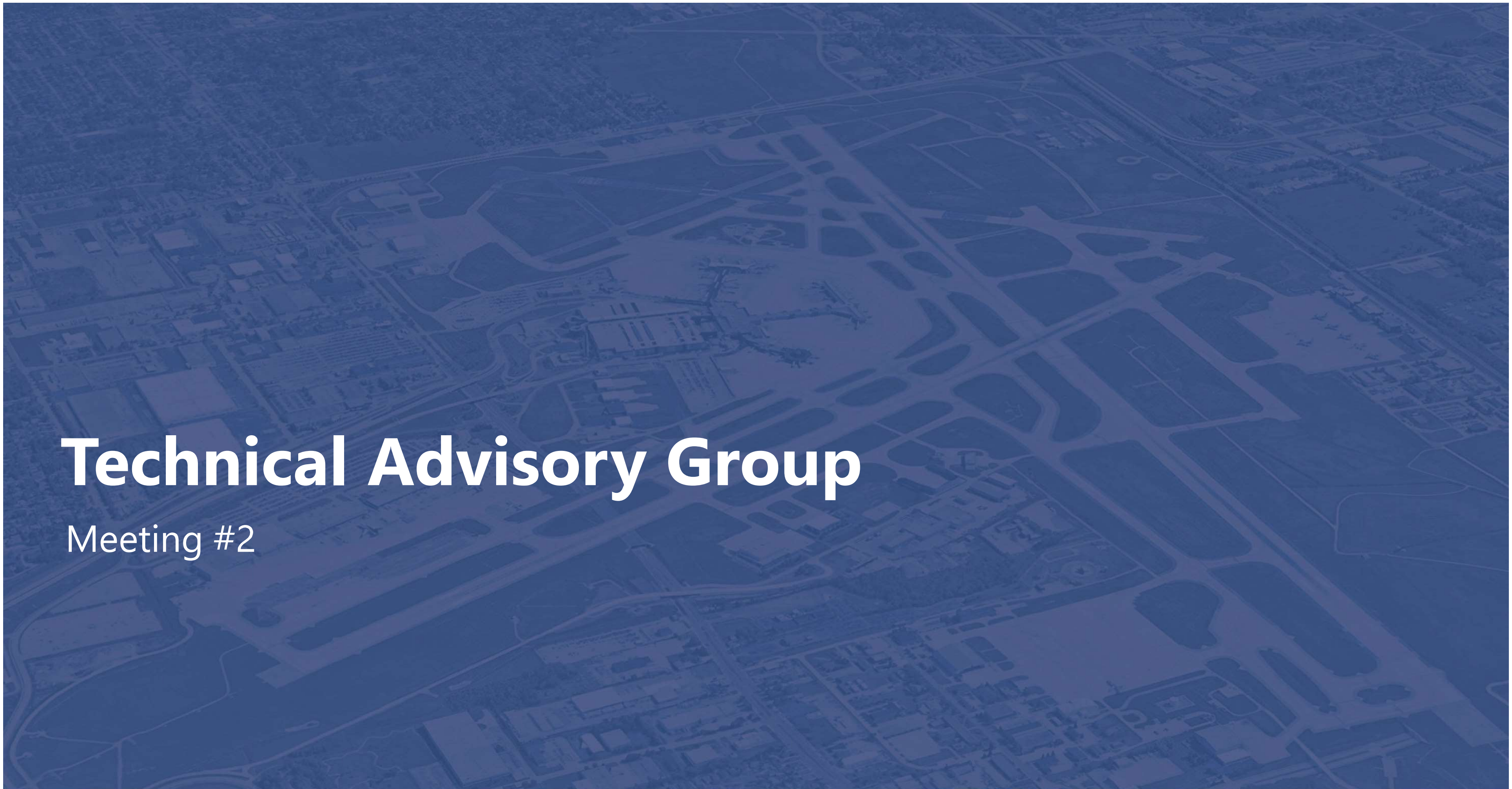
- Finalize Inventory
  - Terminal observations
  - Tenant survey
- Forecast
  - Baseline Forecast submittal to FAA
  - High scenario forecast
  - Design Day Flight Schedule
- Public Meeting – January 16, 2019
- Early Action Plan
- Demand/Capacity analysis
- Determination of operational and facility needs

APPENDIX E.5

Technical Advisory Group (TAG) Meeting #2

Technical Advisory Group

Meeting #2



MASTER PLAN **2040**

MKE MILWAUKEE

Agenda

- Introductions
- Master Plan Status
- Forecast of Activity
  - High Passenger and Cargo Activity Scenario
  - Design Day Flight Schedule (DDFS)
- Facility Requirements Overview
  - Airfield Facilities
  - Terminal Facilities
  - Landside Facilities
  - Support Facilities (cargo, general aviation, other)
- Next Steps

Introductions

- Technical Advisory Group (TAG)

  TAG Role: Provide input and feedback on technical aspects of the master planning analyses and conclusions.

- Master Plan Team

Introductions

Colleen E. Quinn, Ricondo
Project Manager

Michael D. Truskoski, Ricondo
Deputy Project Manager

Erik Wilkins, Ricondo
Airfield & Airspace

Greg Stern, Mead & Hunt
Support Facilities

Bart Gover, Mead & Hunt
Support Facilities

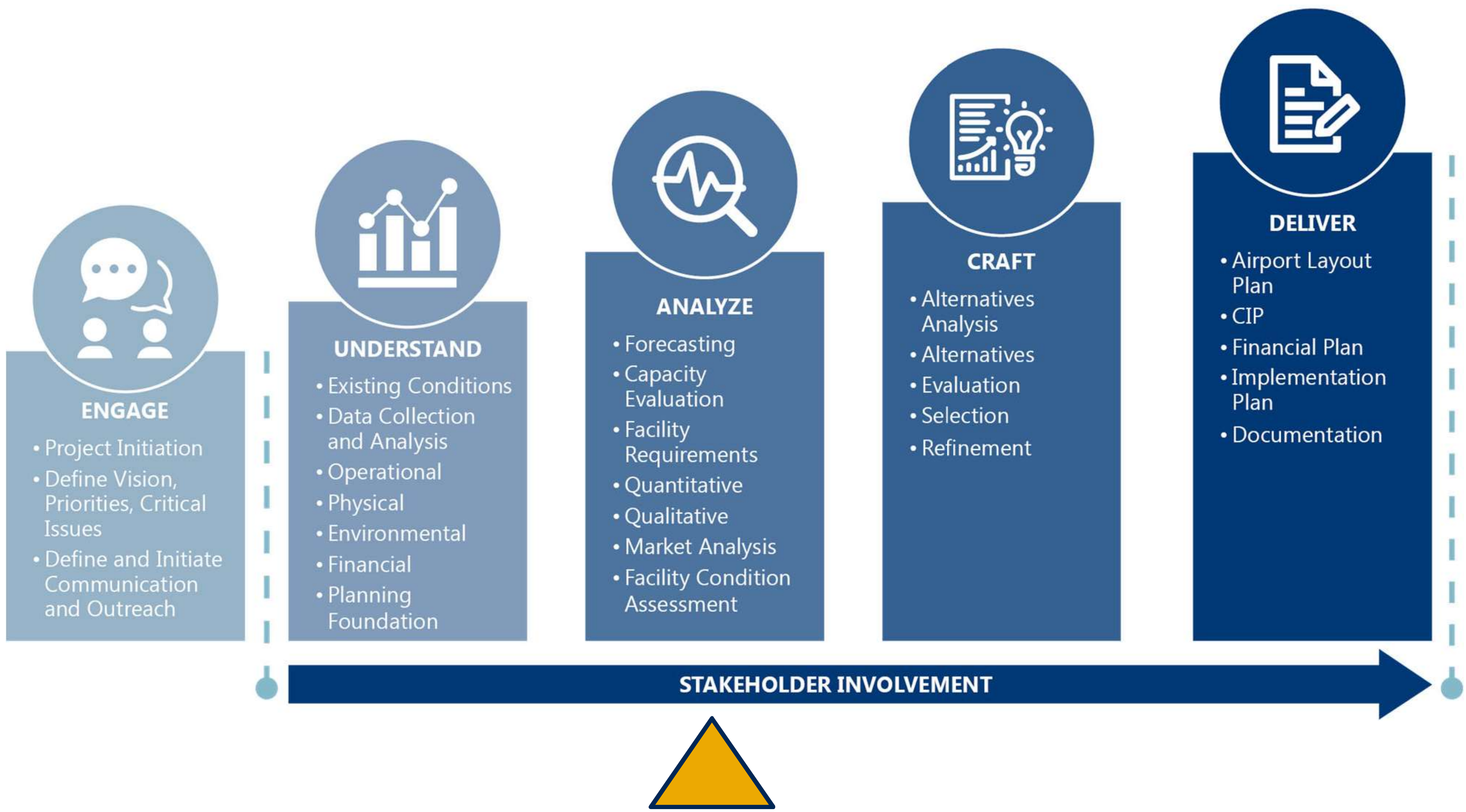
Master Plan Process

- FAA-guided process

> *The goal of a master plan is to provide the framework needed to guide future airport development that will cost effectively satisfy aviation demand, while considering potential environmental and socioeconomic impacts.*
>
> FAA AC 150/5070-6B, Airport Master Plans

- Unique to the issues and challenges faced by MKE
- Objectives
  - Forecast activity
  - Define and justify proposed development
  - Provide effective graphic representation of development (ALP Drawing)
  - Establish realistic implementation schedule
  - Propose an achievable financial plan
  - Establish a flexible framework for continued planning and decision-making

Master Plan Process



Aviation Activity Forecast

Forecast Overview

Baseline Forecast

- Subject to FAA review; approval is required
- Comparison is made to then-current Terminal Area Forecast
- Basis for Airport Layout Plan (ALP) facility depiction
- Basis for Financial Feasibility Analysis (cost estimates)
- Basis for Implementation Plan
  - CIP
  - Triggered development
- Forecast presented on calendar basis but serves as future "planning activity levels" (PALs)
- FAA has approved Baseline Forecast

High Scenario Forecast

- Ensures master plan recommendations are sufficiently flexible to accommodate variation in activity from changes to competitive and socioeconomic environments assumed in Baseline Forecast
- Reflects changes in magnitude and/or characteristics
- Used to define future facility expansion or development areas on ALP (protects the capacity for organized expansion if needed)

High Forecast Elements

Passenger Component – three elements (modeled independently)

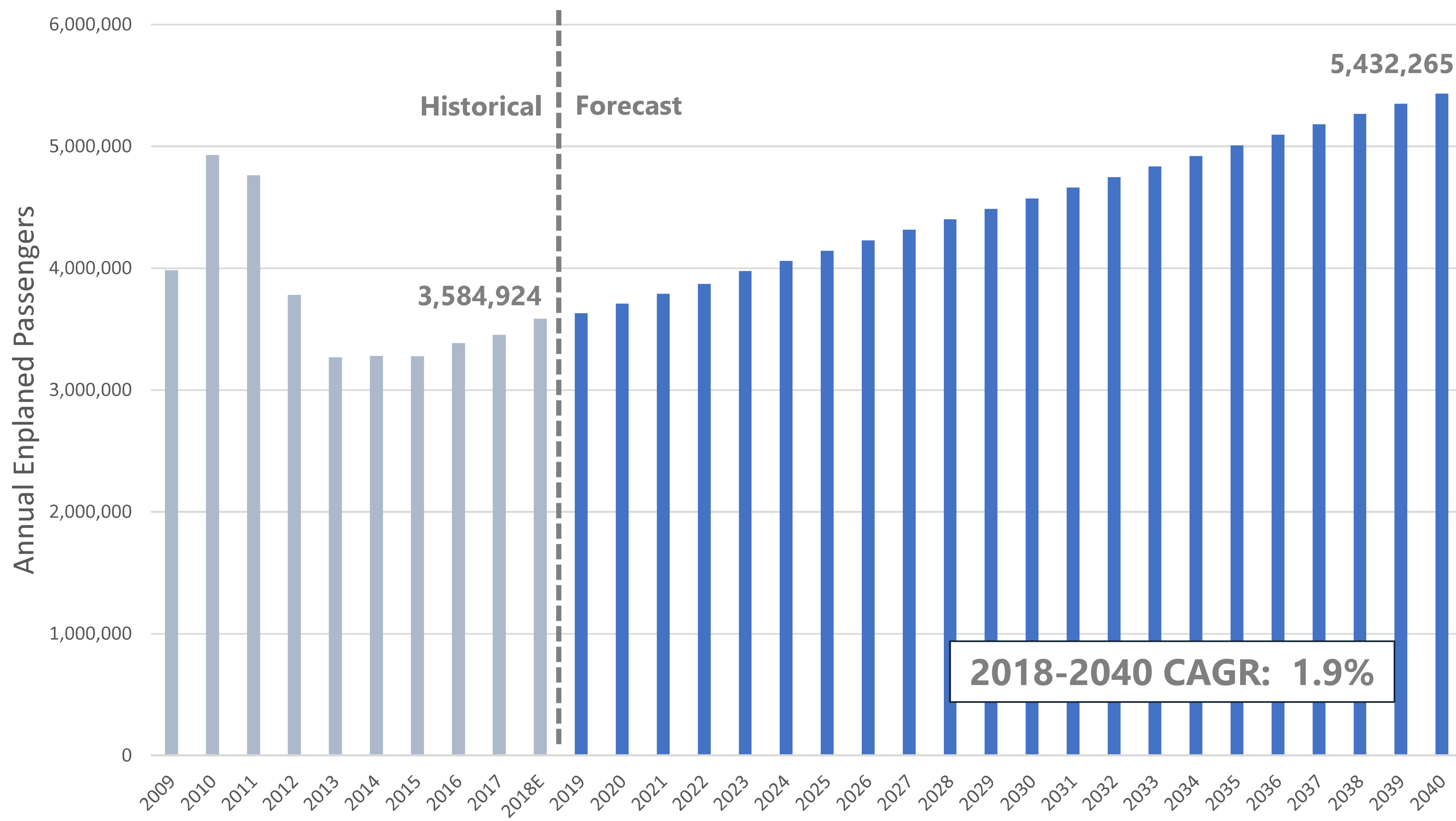
- Increased connecting activity
- Increased economic activity in Southeastern Wisconsin
- Greater capture of passengers residing in counties between Milwaukee and Chicago (Kenosha and Racine Counties, Wisconsin; Lake and McHenry Counties, Illinois)

Cargo Component

- Three Cargo High Forecast elements
- New bidirectional demand to accommodate regional manufacturing
- Additional DHL activity to accommodate e-commerce and recent Amazon demand patterns and to support new Oak Creek fulfillment center
- Additional FedEx/UPS activity to support expanding e-commerce

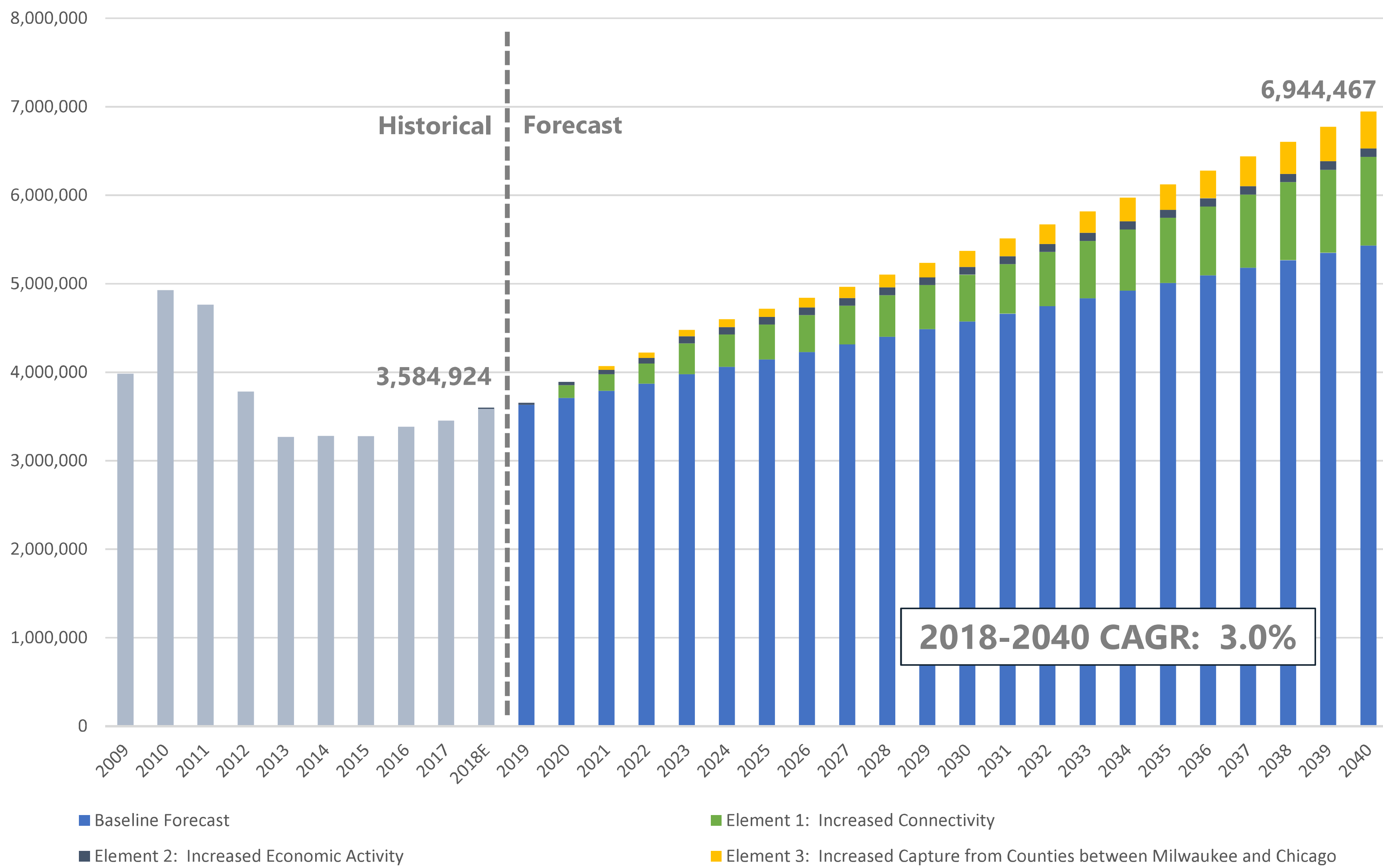
General Aviation and military activity held constant

Baseline Enplaned Passenger Forecast



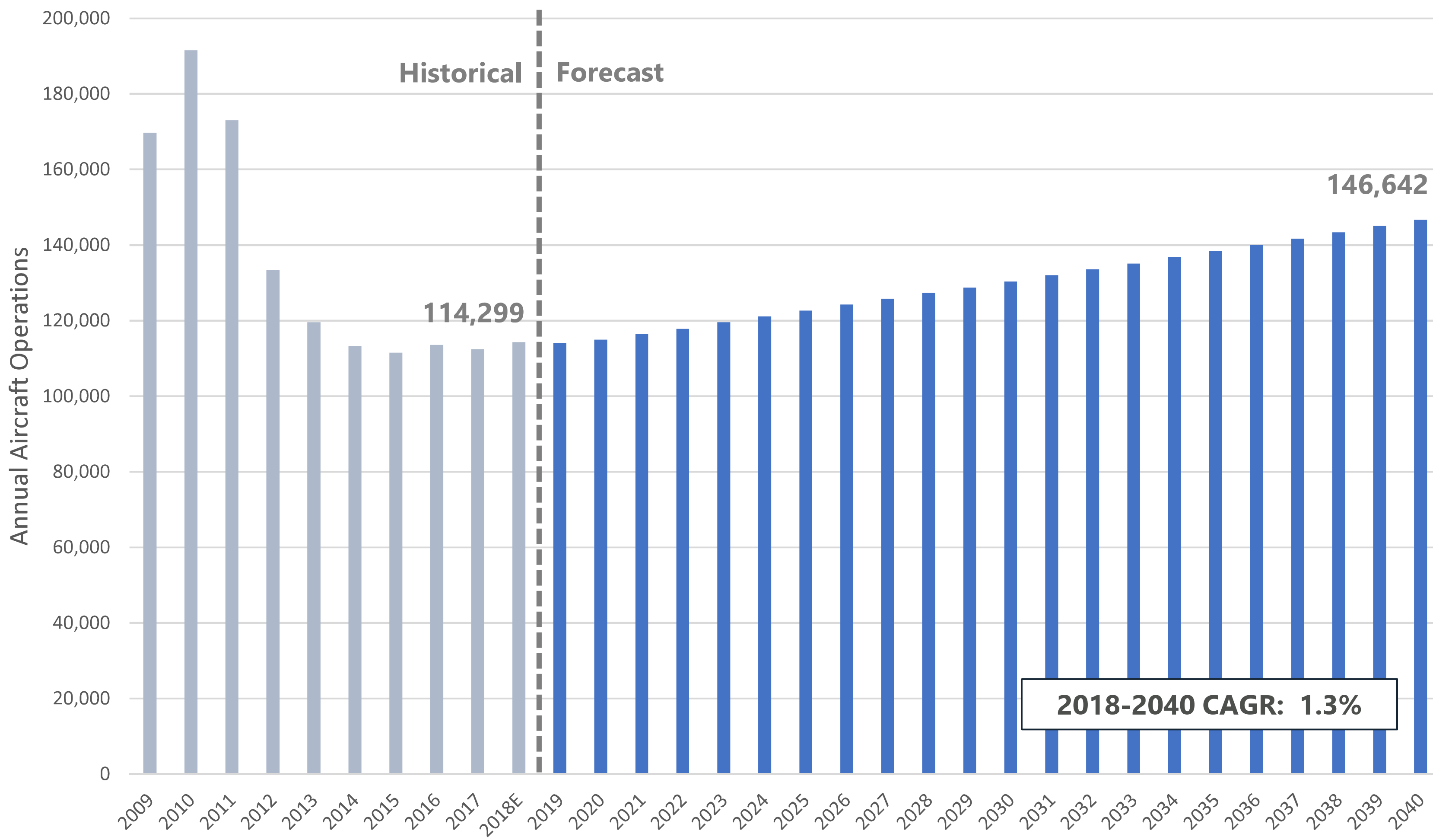
SOURCE: Milwaukee Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), November 2018.

High Scenario Passenger Forecast



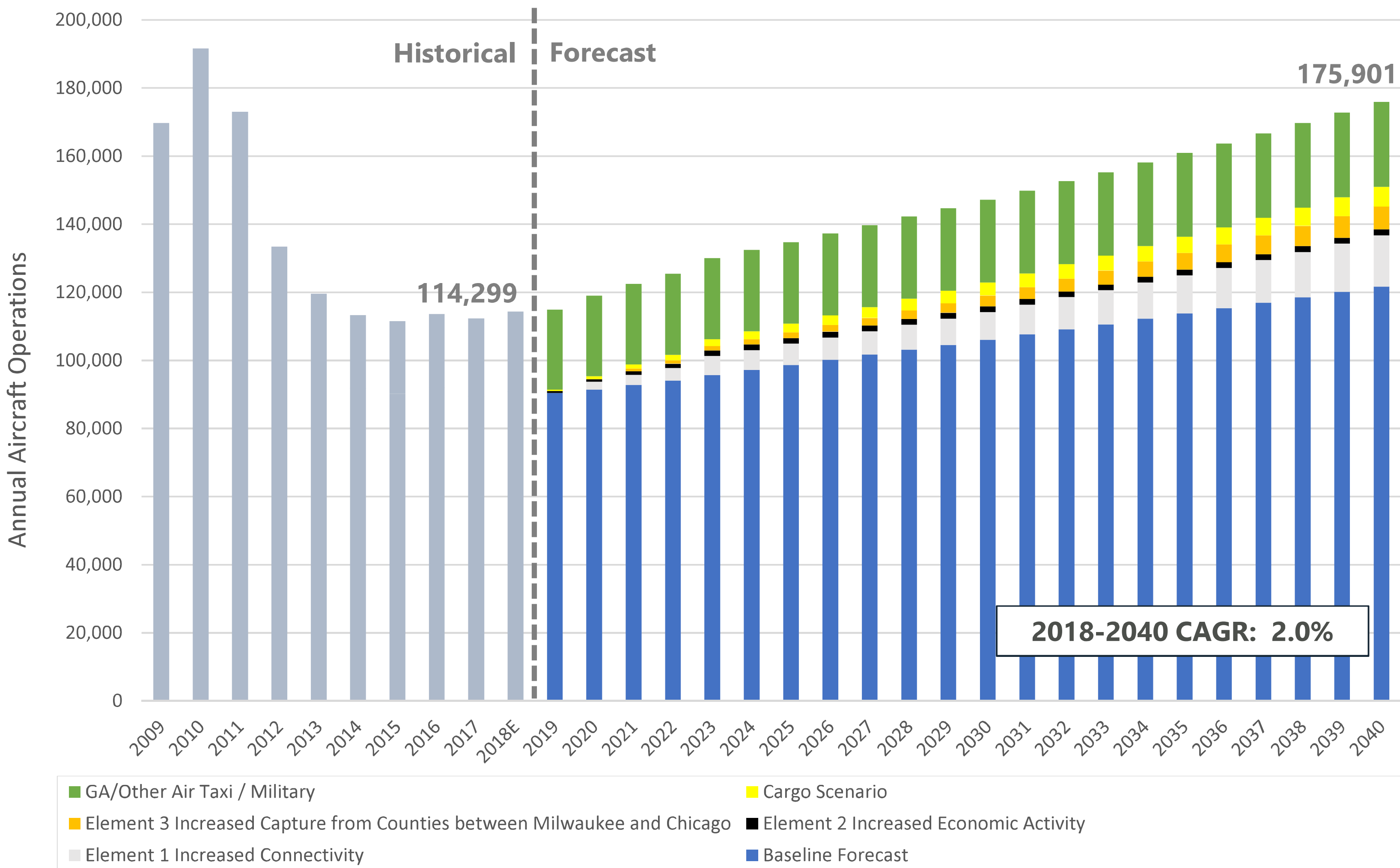
SOURCE: Milwaukee Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), March 2019.

Baseline Aircraft Operations Forecast



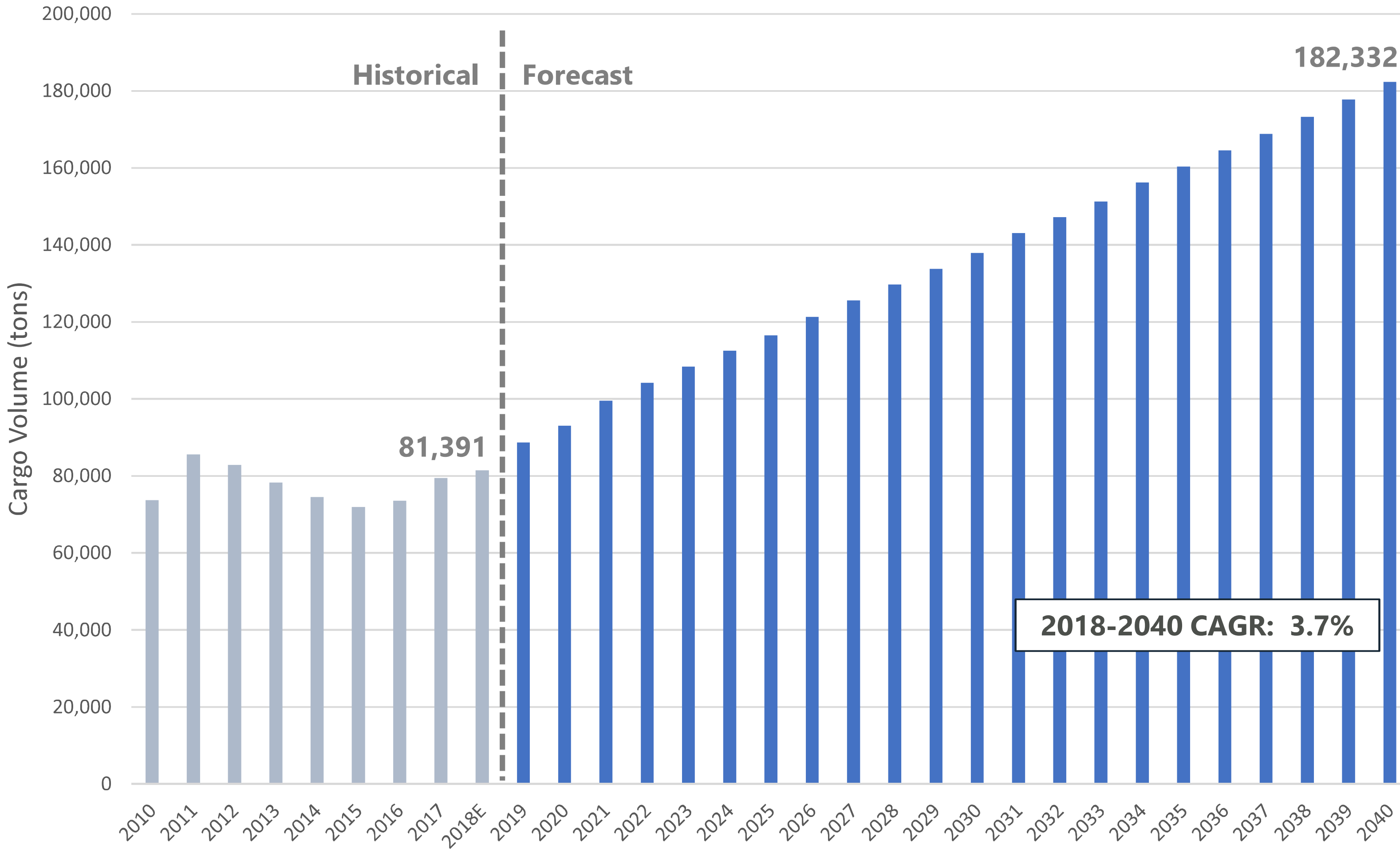
SOURCE: Milwaukee Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), November 2018.

High Scenario Aircraft Operations Forecast



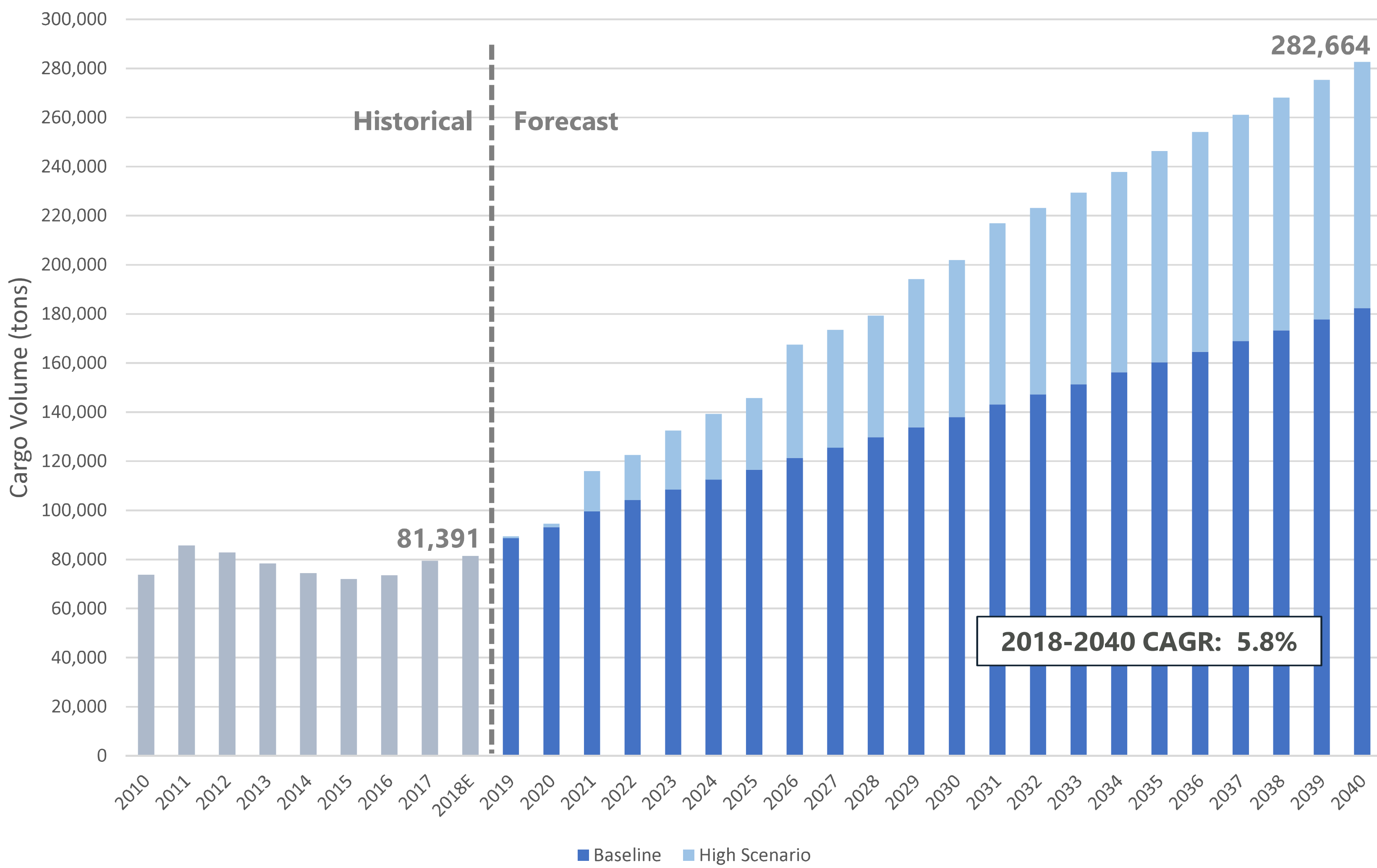
SOURCE: Milwaukee Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), March 2019.

Baseline Cargo Volume Forecast



SOURCE: Milwaukee Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), November 2018.

High Scenario Cargo Volume Forecast



SOURCE: Milwaukee Mitchell International Airport (Historical); Ricondo & Associates, Inc. (Forecast), March 2019.

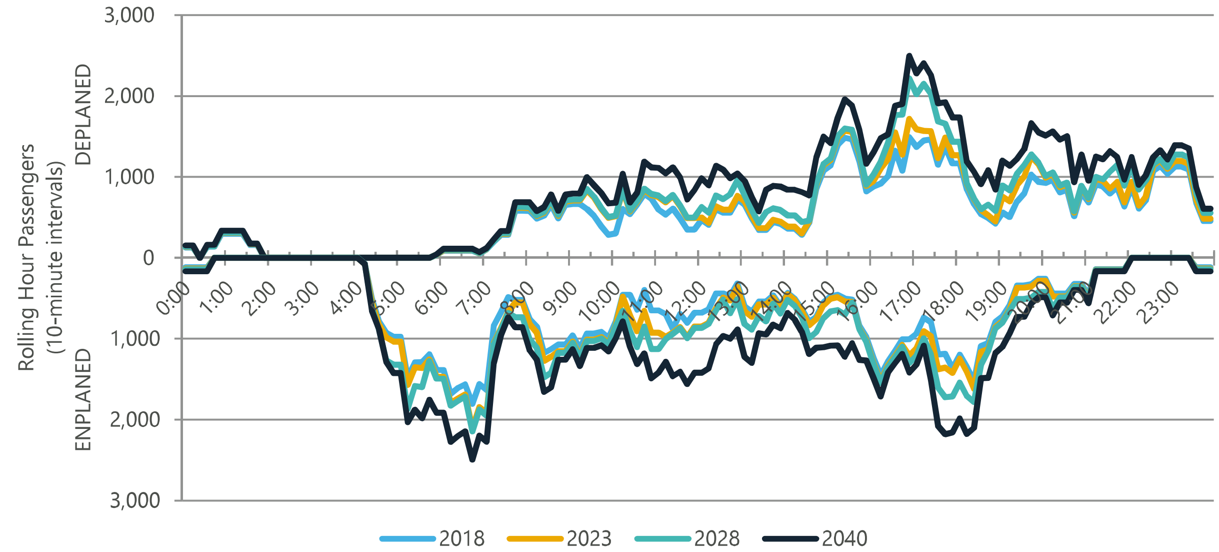
Design Day Flight Schedule

Design Day Flight Schedule (DDFS)

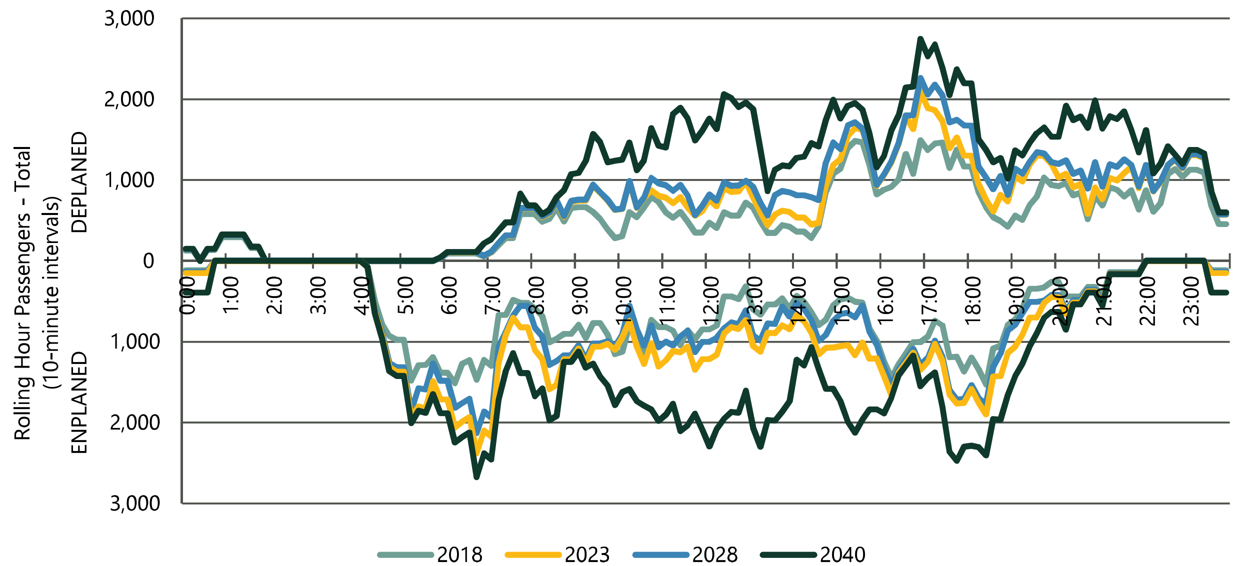
- Represents aircraft movements and the distribution of passengers throughout the hours of the average weekday of the peak month (PMAWD) at MKE
  - Foremost: representation of activity that could be experienced at MKE at future PMAWD activity levels
  - Secondarily: indication of future individual airline activity levels and market service patterns
- DDFS activity is used in determining facility requirements
  - Airfield
  - Terminal → Gating
  - Landside

DDFS – Rolling Peak Hour Passengers

Baseline Forecast

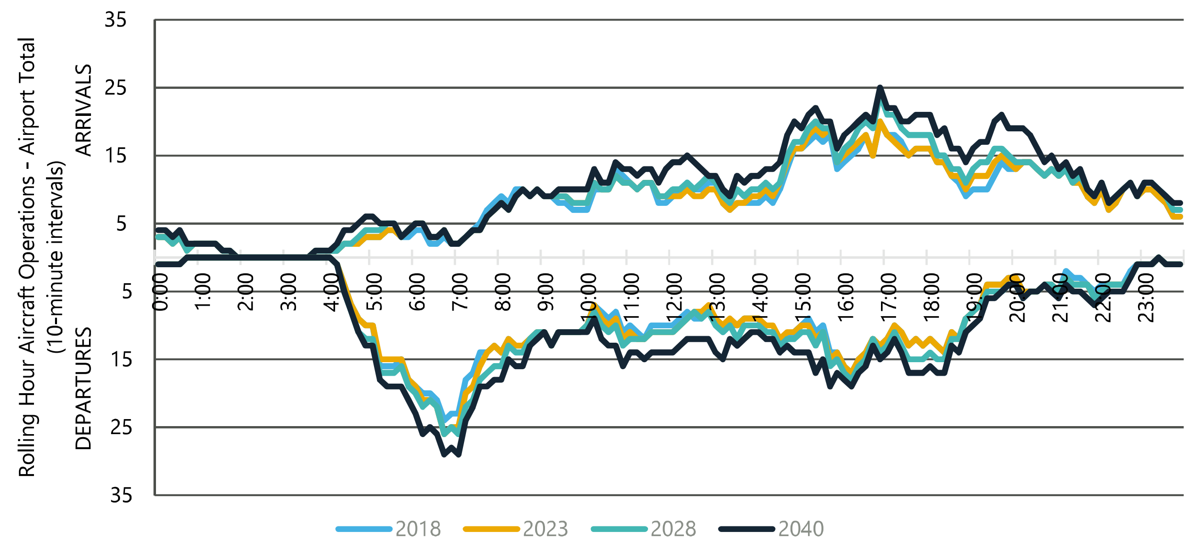


High Scenario Forecast

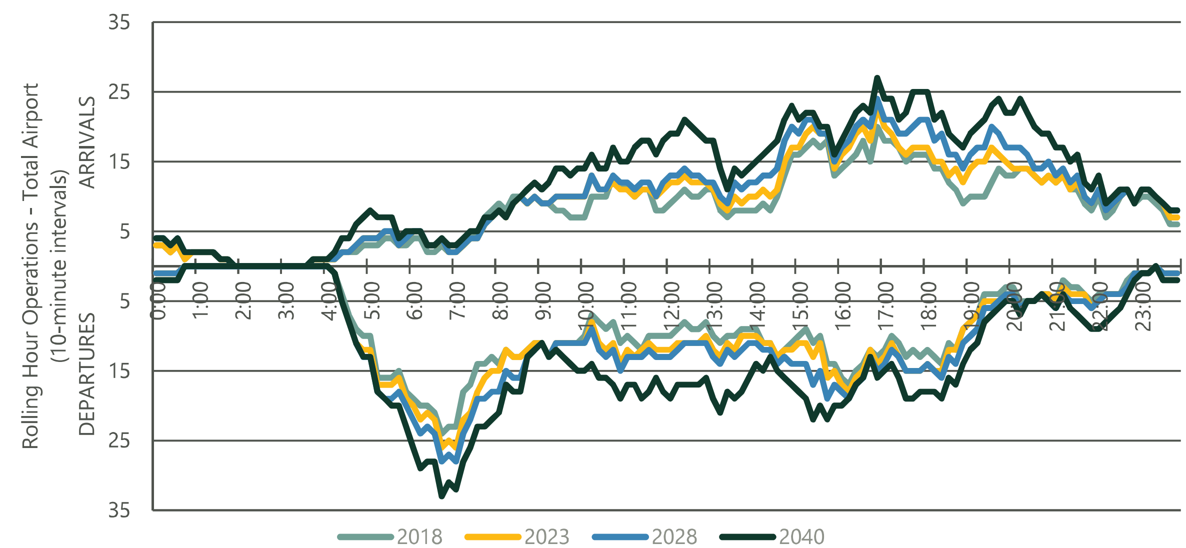


DDFS – Rolling Peak Hour Airport Operations

Baseline Forecast

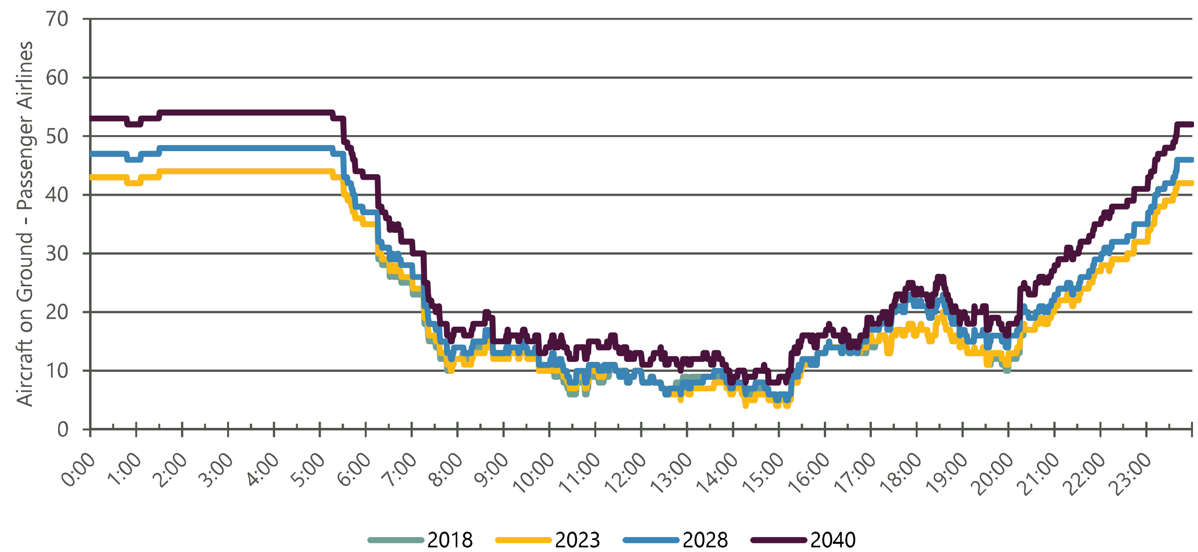


High Scenario Forecast

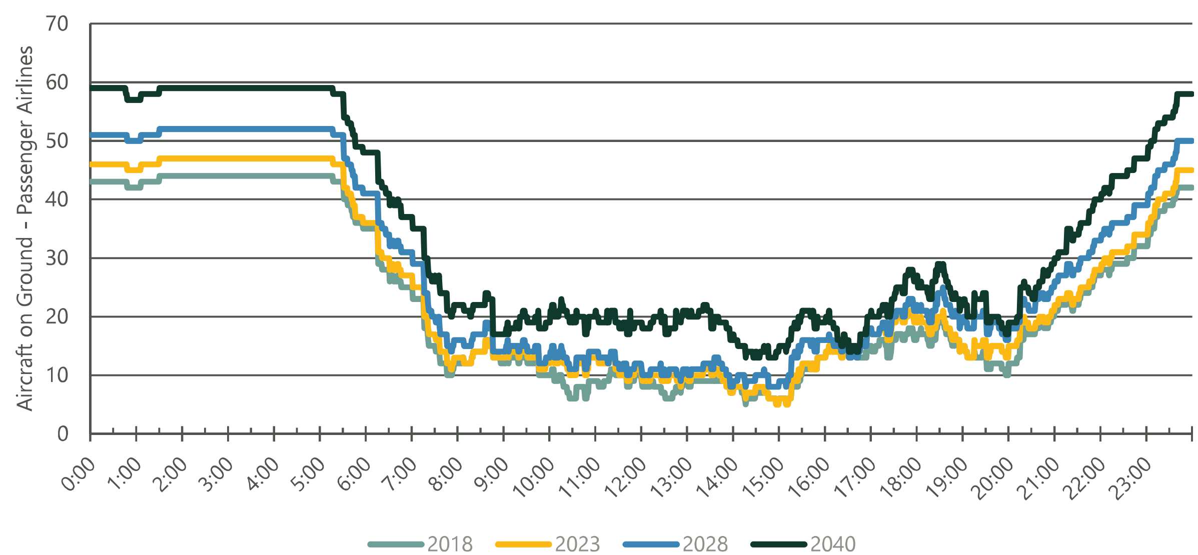


DDFS – Passenger Aircraft on the Ground

Baseline Forecast



High Scenario Forecast



Facility Requirements

Airfield and Airspace

Airfield Requirements

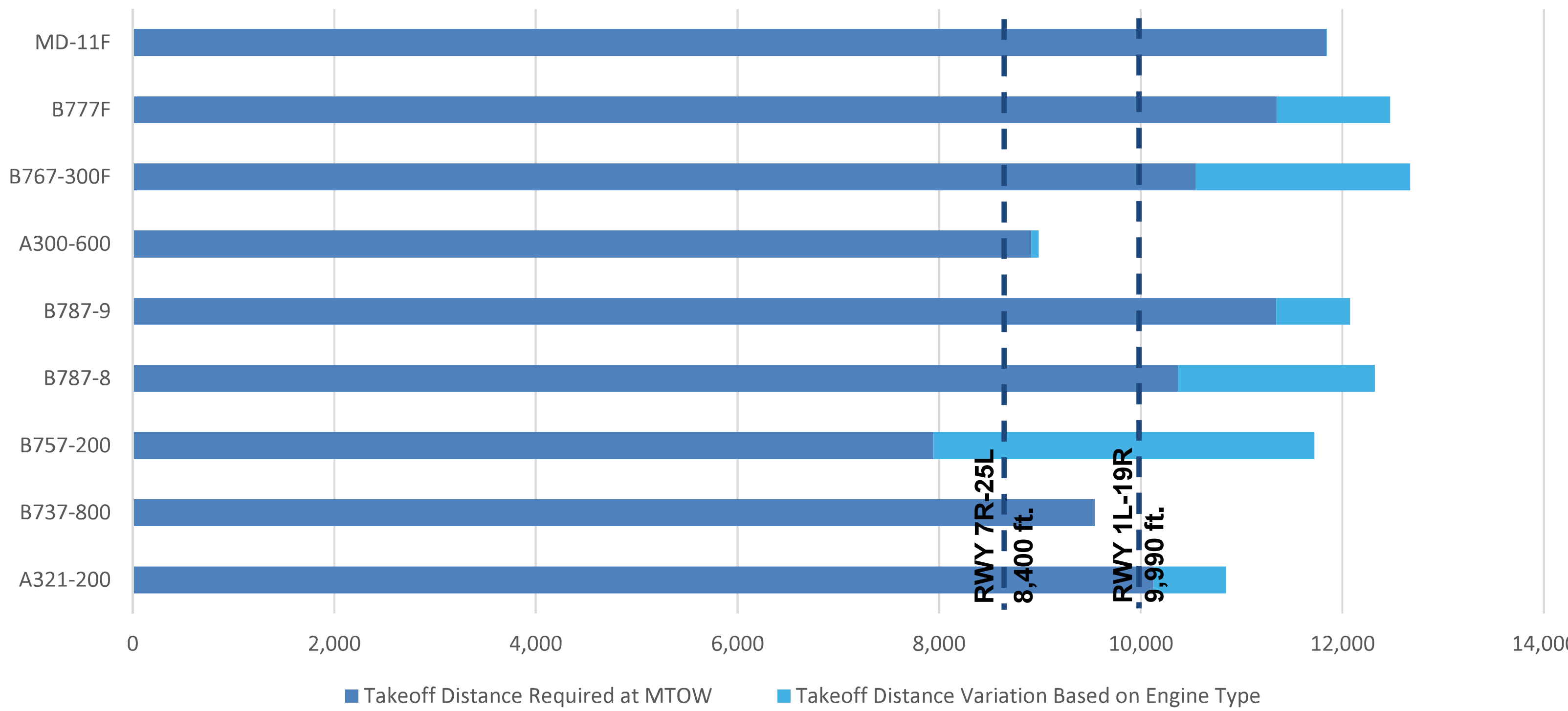
- Review airfield for compliance with current FAA standards
- Runway length analysis
- Airfield Capacity
  - Peak Hour
  - Annual

Compliance with FAA Standards

- Designation of Critical Aircraft
  - Aircraft with characteristics that determine airport design standards
  - Specific aircraft or Composite aircraft
  - Runway-specific
- Evaluation of airfield elements
  - Airplane Design Group (ADG)
  - Runway Design Group (RDG)
  - Taxiway Design Group (TDG)
- Resolution of identified areas of non-compliance
  - Define compliant geometry as part of Airport Layout Plan (reflect preferred alternative)
  - Request Modification of Standards (MOS) – subject to FAA review and approval

Runway Length Analysis

Maximum Certified Takeoff Weight Length Requirements



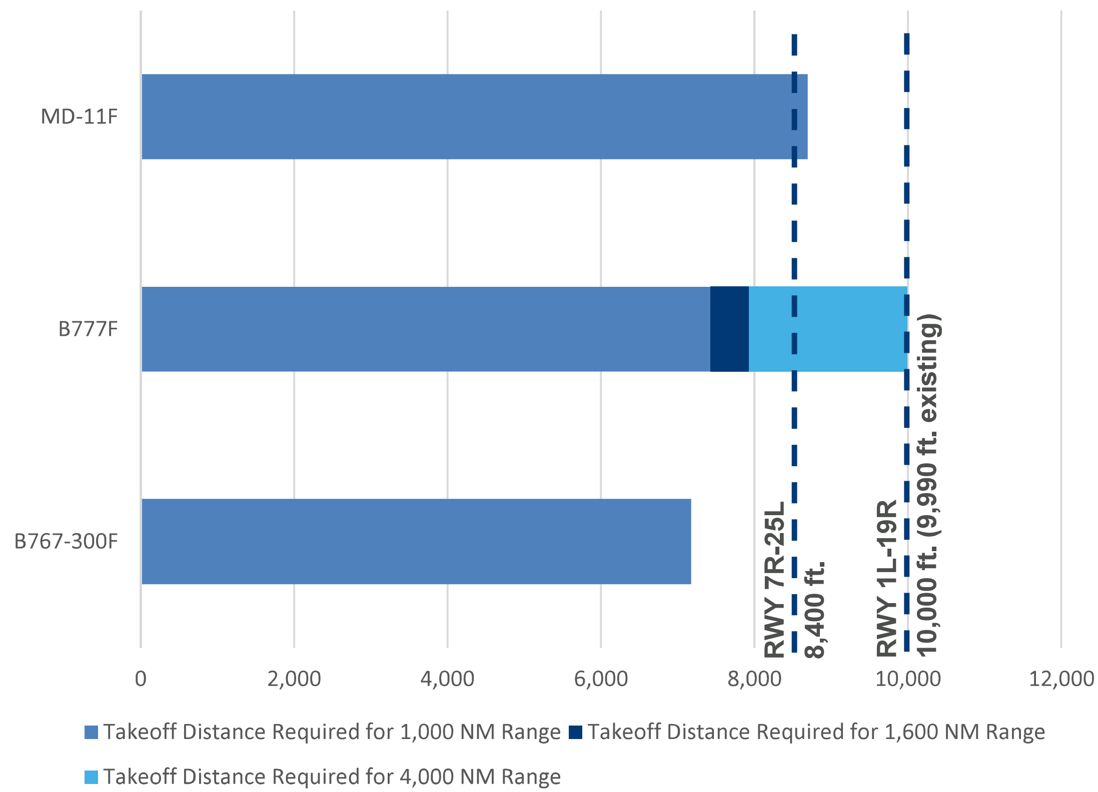
In addition, WI ANG has determined that a 10,000-foot runway is critical to mission-driven fleet changes.

NOTES:
1 Representative of the most demanding passenger and cargo aircraft in terms of maximum certified takeoff weight (MTOW) projected to operate at MKE through the planning horizon.
2 Runway length requirements increased by 360 feet to adjust for differences in runway centerline elevations, per Federal Aviation Administration Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design*.
3 Hot day temperature is the maximum average temperature at MKE (81°F), according to the National Oceanic and Atmospheric Administration.

SOURCES: Various Aircraft Characteristics for Airport Planning Manuals, February 2019; Ricondo & Associates, Inc., February 2019.

Runway Length Analysis

Domestic Cargo Stage Length Requirements

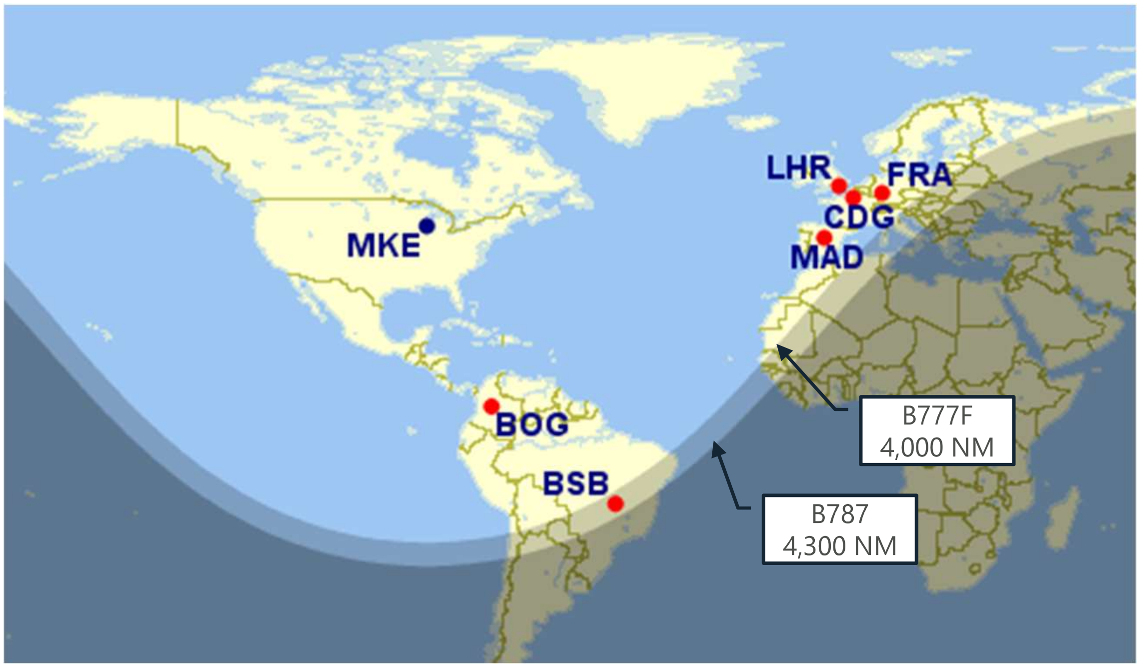


NOTES:
1/ Runway length requirements increased by 360 feet to adjust for differences in runway centerline elevations, per Federal Aviation Administration Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design*.
2/ Hot day temperature is the maximum average temperature at MKE (81°F), according to the National Oceanic and Atmospheric Administration.

- Based on existing and future nonstop domestic cargo markets including:
  - IND (206 NM)
  - SDF (302 NM)
  - MEM (484 NM)
  - EWR (630 NM)
  - AFW (750 NM)
- Under current conditions at MKE, B777F can also serve destinations within 4,000 NM without payload restrictions, including:
  - LAX (1,600 NM)
  - ANC (2,600 NM)

SOURCES: Various Aircraft Characteristics for Airport Planning Manuals, February 2019; Ricondo & Associates, Inc., February 2019.

Runway Length Analysis
Potential International Passenger and Cargo Markets



NOTES:
BOG – El Dorado International Airport
BSB – International Airport of Brasilia
CDG – Charles de Gaulle Airport
FRA – Frankfurt Airport
LHR – London Heathrow
MAD – Madrid-Barajas Airport

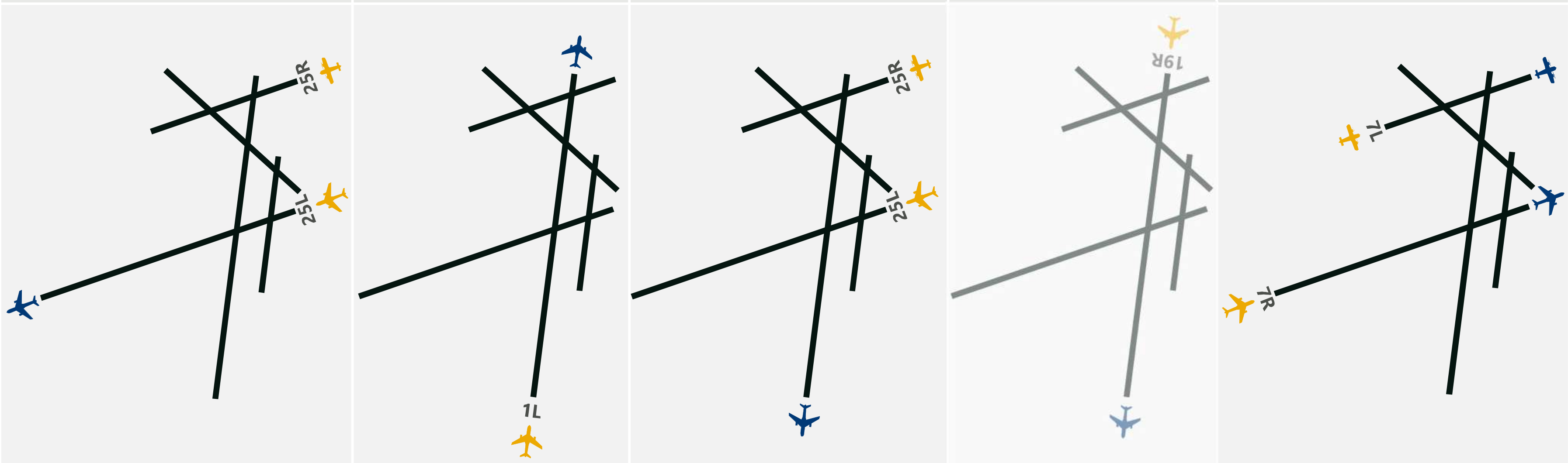
SOURCES: Various Aircraft Characteristics for Airport Planning Manuals, February 2019; Great Circle Mapper (www.gcmap.com) , June 2019; Ricondo & Associates, Inc., June 2019.

- Maximum range based on available runway length of 10,000 feet (~1L-19R).
- Capable of serving European and South American international markets within 4,000 NM (B777F) and 4,300 NM (B787).

Modeled Airfield Operating Configurations

Peak Hour Capacities

West Flow	North Flow	Southwest Flow	South Flow	East Flow
21.1 % VMC	19.6% VMC	16.2% VMC	13.5% VMC	11.2% VMC
2.4% IMC	6.2% IMC	2.0% IMC	4.4% IMC	3.4% IMC



West Flow	North Flow	Southwest Flow	South Flow	East Flow
68-71 VMC ops/hr	66-67 VMC ops/hr	71-74 VMC ops/hr	66-67 VMC ops/hr	68-74 VMC ops/hr
53-55 IMC ops/hr	54-55 IMC ops/hr	46-47 IMC ops/hr	54-55 IMC ops/hr	54-55 IMC ops/hr

65-67 annualized peak hour aircraft operations

NOTES:
1/ Airfield operating configurations were modeled in runwaySimulator to determine VMC/IMC hourly capacities and Annual Service Volume.
2/ Hourly capacities associated with South Flow and North Flow are identical, therefore only the North Flow was modeled. The North Flow hourly capacities were then applied to the South Flow configuration.

Legend

Primary Arrivals
Prop Arrivals
Primary Departures
Prop Departures

N

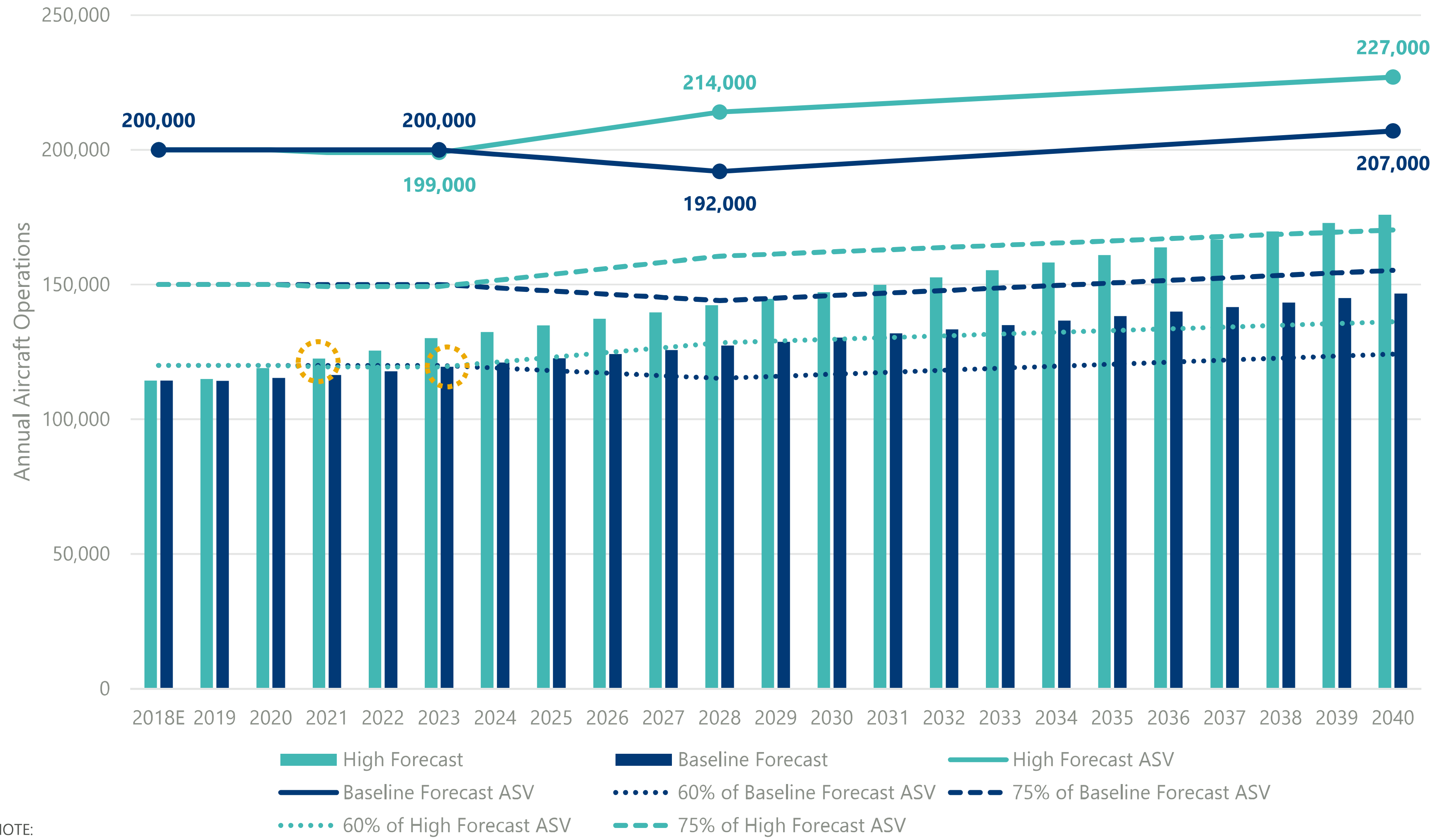
not to scale

SOURCES: Federal Aviation Administration, Aviation System Performance Metrics, Airport Efficiency, MKE Daily Weather by Hour Report, January 1, 2008 through December 31, 2017; Ricondo & Associates, Inc., December 2018.

Annual Airfield Capacity – Mix Index

- Aircraft fleet mix is important factor in airfield capacity
- Increasing aircraft diversity (approach speeds and aircraft weight) reduces capacity
  - Increased in-trail separation to avoid wake vortices/wake turbulence
  - Heavier aircraft produce more severe wake vortices than lighter aircraft
  - More prevalent during departures
- Aircraft Mix Index reflects aircraft fleet composition; represents the share of heavy aircraft in the fleet
- Annual Service Volume: reasonable estimate of an airport's annual capacity
  - Accounts for hourly, daily and seasonal fluctuations in airfield demand
  - Considers the occurrence of low visibility conditions and/or cloud ceiling heights that require modified Air Traffic Control procedures
  - Reflects aircraft fleet mix (Mix Index)
  - Considers frequency of touch-and-go operations
  - Based on hourly airfield capacity

Annual Airfield Capacity



NOTE:
ASV = Annual Service Volume
1 FAA recommends capacity development when activity approaches 60 to 75 percent of annual capacity. Capacity development could be in the form of a new runway, runway extension, additional exit taxiways, aircraft parking aprons, and replacement/supplemental airports.

SOURCES: Federal Aviation Administration Advisory Circular 150/5060-5 Change 2, Airport Capacity and Delay, December 1995; Federal Aviation Administration Order 5090.3C, Field Formulation of the National Plan of Integrated Airport Systems (NPIAS), December 2000; Ricondo & Associates, Inc., June 2019.

Facility Requirements

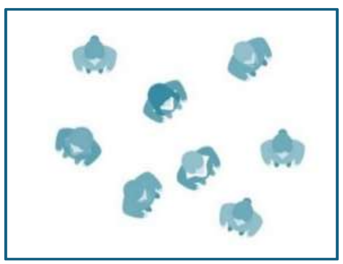
Terminal

Terminal Space Analysis

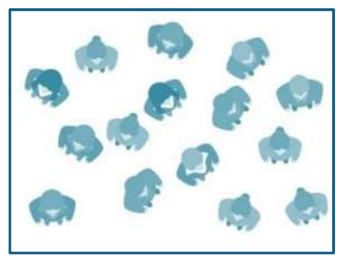
- Reflects current industry planning standards for Level of Service and process
  - Air Transport Association (IATA), *Airport Development Reference Manual (11th edition)*
  - Airport Cooperative Research Program, *Report 25: Air Passenger Terminal Planning and Design, Volume 1: Guidebook, 2010*
  - TSA published planning and design guidance
- Main functional areas/space types
  - Check-In (dynamic modeling)
  - Passenger screening (dynamic modeling)
  - Baggage screening (static analysis based on check-in output)
  - Outbound Baggage Makeup (static analysis based on flight schedule)
  - Holdrooms (based on gates)
  - Baggage Claim and Inbound offload (static analysis based on flight schedule)
- Functional area requirement based on planning templates and existing facilities
- Space requirements other areas based on factoring existing areas (activity forecast)

Terminal Space Analysis – Level of Service

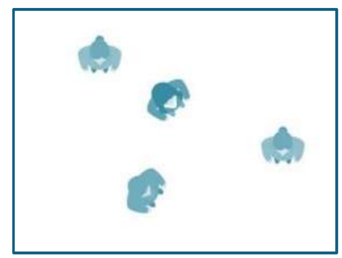
ADRM 11th Edition	ARDM 9th Edition	FLOWS	DELAYS	COMFORT
OVER DESIGN	A - EXCELLENT	Free	None	Excellent
OVER DESIGN	B - HIGH	Stable	Very Few	High
OPTIMUM	C - GOOD	Stable	Acceptable	Good
SUBOPTIMUM	D - ADEQUATE	Unstable	Passable	Adequate
SUBOPTIMUM	E - INADEQUATE	Unstable	Unacceptable	Inadequate
UNDER-PROVIDED	F - FAILURE	System Breakdown	System Breakdown	Unacceptable



OPTIMUM: Acceptable level of service; conditions of adequate to above-average space and reasonable to very few delays; good level of comfort.



SUBOPTIMUM: Unsatisfactory level of service; conditions that provide crowded and uncomfortable spaces and present unacceptable processing and wait times; inadequate level of comfort.

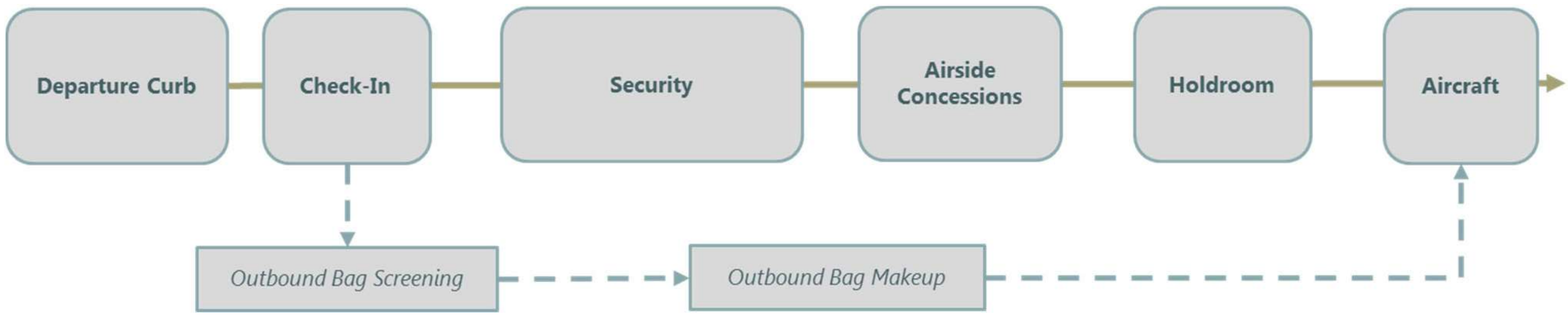


OVERDESIGN: Poor level of service; conditions of either excessive or empty space and over provision of resources; immoderate or unacceptable level of comfort.

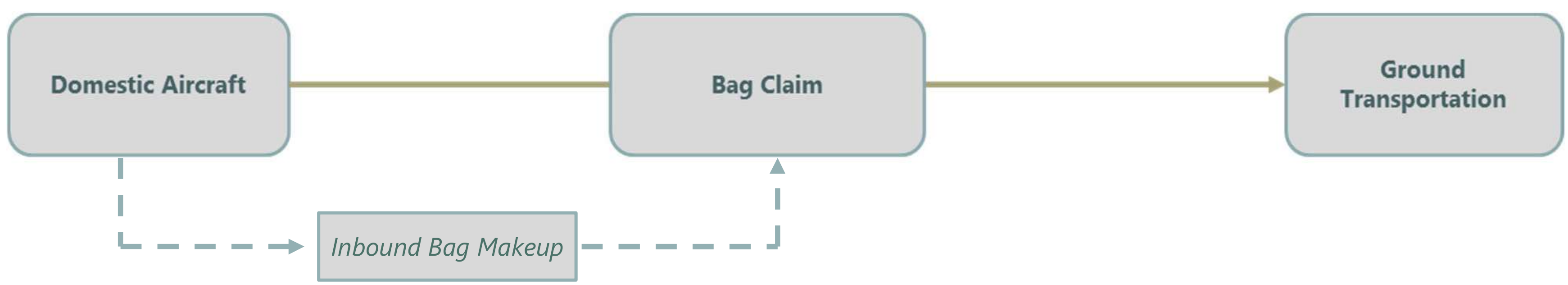
SOURCE: International Air Transport Association, Airport Development Reference Manual, 11th Edition, Effective March 2019.

Terminal Space Analysis – Passenger Flow

Departing Passenger Flow

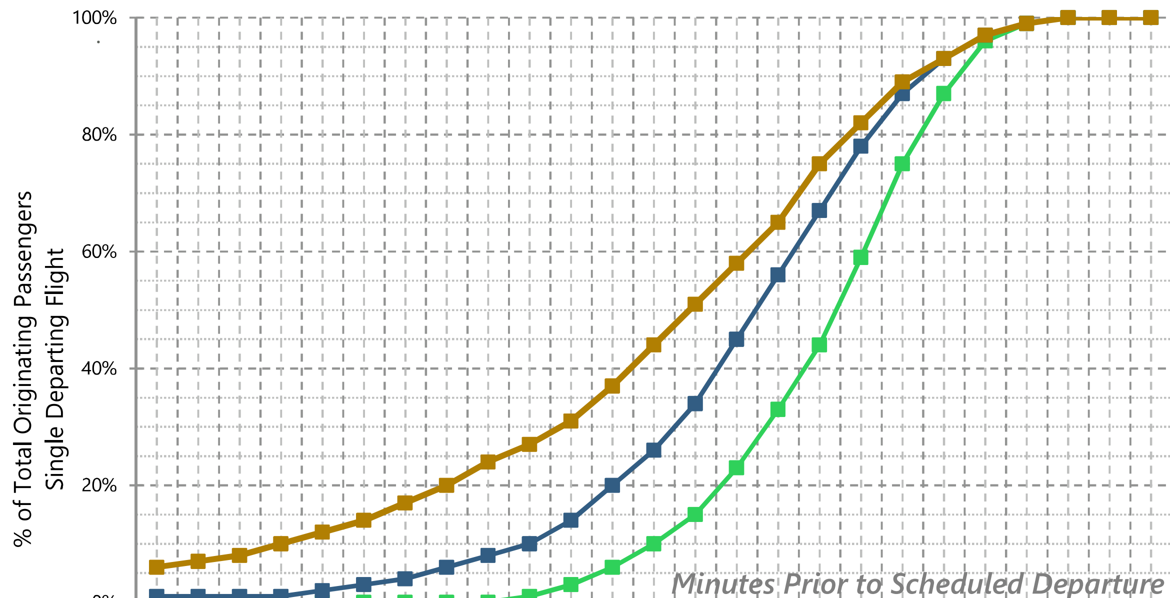


Arriving Passenger Flow



Passenger Arrival Distribution

- Arrival distribution: O&D passenger arrival at airport prior to scheduled departure
- Displays metrics quantified against check-in/baggage induction and screening



	240	230	220	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	10	0
Before 8:30 a.m.	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	6%	10%	15%	23%	33%	44%	59%	75%	87%	96%	99%	100	100	100
Peak Domestic	1%	1%	1%	1%	2%	3%	4%	6%	8%	10%	14%	20%	26%	34%	45%	56%	67%	78%	87%	93%	97%	99%	100	100	100
Off-peak Domestic	6%	7%	8%	10%	12%	14%	17%	20%	24%	27%	31%	37%	44%	51%	58%	65%	75%	82%	89%	93%	97%	99%	100	100	100

TSA Earliness Distribution

- **Before 8:30** → departure between 4 a.m. and 8:30 a.m.
- **Peak Domestic** → departure between 8:30 a.m. and 5:00 p.m.
- **Off-Peak Domestic** → departure between 5:00 p.m. and 4:00 a.m.

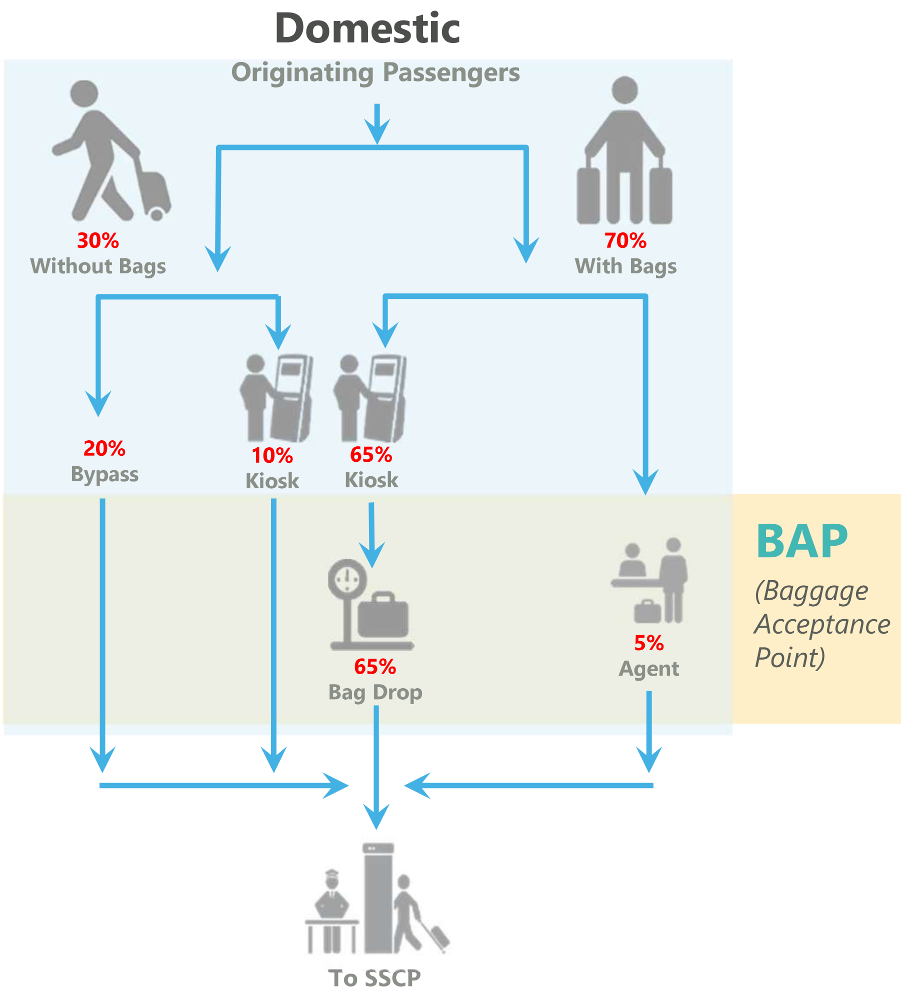
AVERAGE BAGS per originating passenger is the overall number of checked bags including passengers who do not check baggage.

	Units	Southwest (WN)[1/]	All Other Domestic	International
Average Bags per Passenger	Bags	0.9	0.6	1.2

NOTE: WN number developed by Ricondo and Associates, Inc. March 2019.

SOURCE: Transportation Security Administration, Planning Guidelines and Design Standards for Checked Baggage Inspection Systems, Version 6.0, September 29, 2017.

Passenger Check-in Operating Assumptions

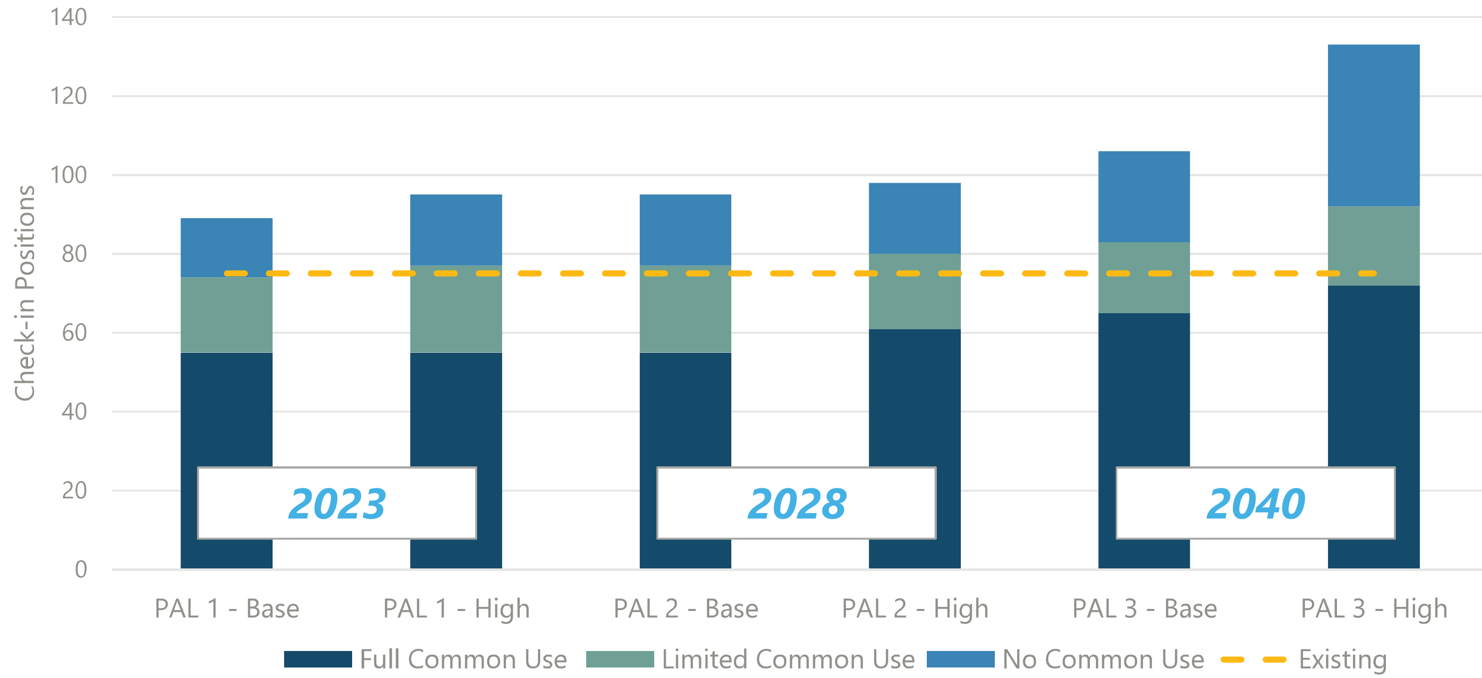


NO CHECKED BAGS		
	WAIT TIME	**TRANSACTION TIME**
BYPASS	N/A	N/A
KIOSK	2 minutes	3 minutes
CHECKED BAGS		
	WAIT TIME	**TRANSACTION TIME**
KIOSK	2 minutes	3.5 minutes
BAG INDUCTION	4 minutes	1 minute
AGENT	15 minutes	3 minutes

NOTE: Diagram represents daily average of each channel during the peak period.

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

Passenger Check-In (Ticket Hall)



- Three methodologies (range of requirements)
  - Full common use: each position can fluctuate by airline throughout the day
  - Limited common use - Some airlines preferentially use positions, other airlines utilize common positions (similar to current operation)
  - No Common Use- Preferential counter use by airlines
- No additional check-in positions required through 2028 with some common use

Passenger Screening Operating Assumptions

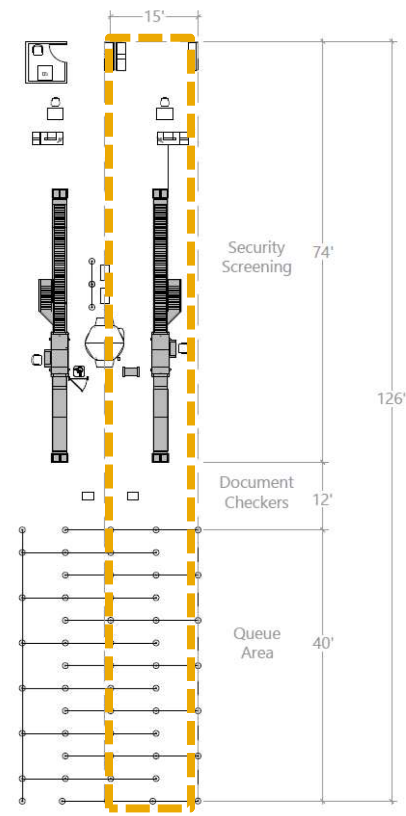
- Standard security lane space template used for requirements analysis (1,890 sq ft)

PROCESSING RATES			
Lane Type	Unit	Traditional Lanes	ASL Lanes
Standard Lanes	passengers/hr/lane	150	200
Pre✓® Lanes	passengers/hr/lane	220	300

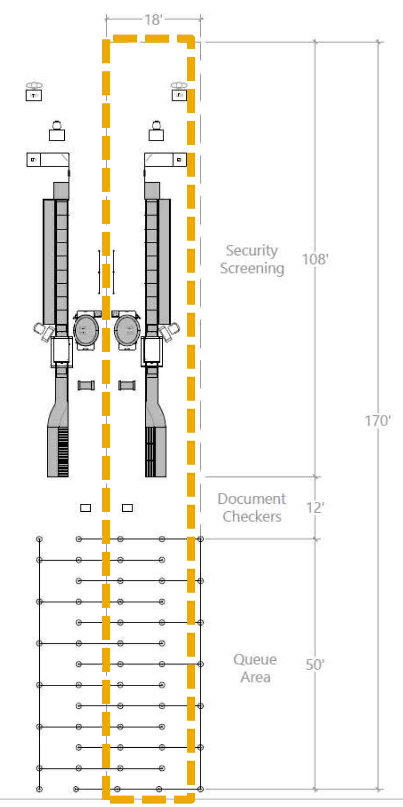
PRE✓® UTILIZATION	
Airline	Pre✓® Passengers
US Flag Carriers	40%
Other Airlines	0%

WAIT TIME GOALS		
Wait Time Category	Standard Wait Time	Pre✓® Wait Time
Meets TSA Wait Time	20 minutes	5 minutes
Within TSA Buffer	30 minutes	15 minutes
Exceeds Wait Time Goal	>30 minutes	>15 minutes

STANDARD SECURITY LANE (1,890 sq ft)



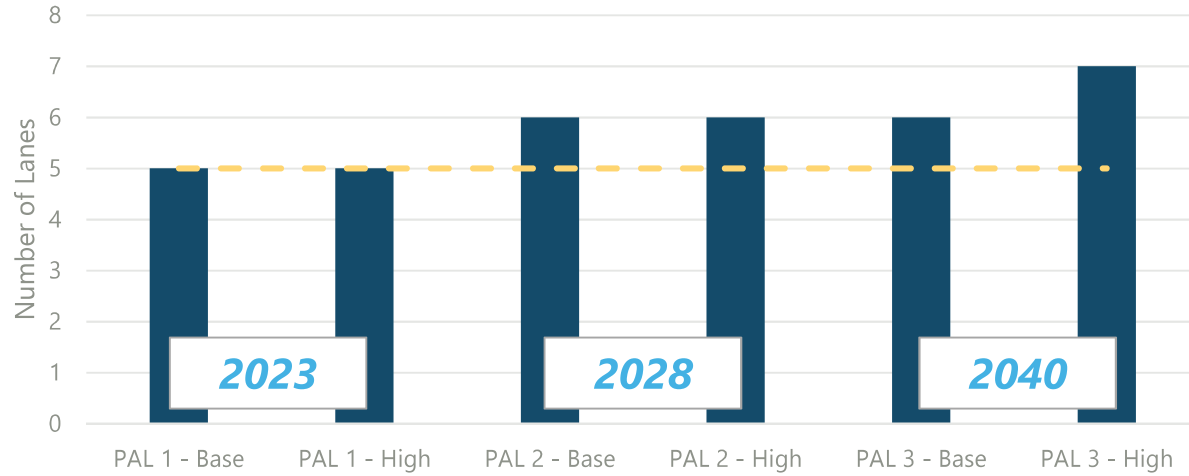
AUTOMATED SECURITY LANE (3,060 sq ft)



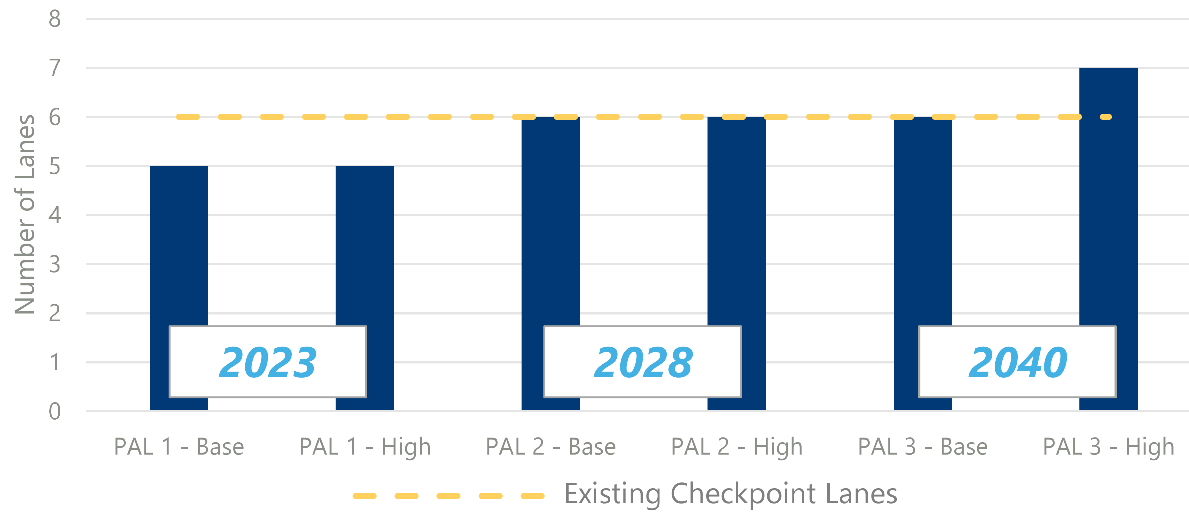
SOURCE: Meeting with Transportation Security Administration, March 2018.

Passenger Screening Checkpoints

Concourse C
(current airline gate assignments, standard screening lanes)



Concourse D
(current airline gate assignments, standard screening lanes)



- Concourse C: +1 lane by 2028 / +2 lanes by 2040 (high forecast scenario)
- Concourse D: +1 lane by 2040 (high forecast scenario)

Passenger Check-in: Operating Assumptions

- Standard security lane space template used for requirements analysis (1,890 sq ft)
- Passengers departing from Concourse E planned to use D checkpoint
- Redeveloped Concourse E security checkpoint need and size planned to be defined during design.

			BASELINE			HIGH GROWTH		
	UNITS	EXISTING	PAL 1 (2023)	PAL 2 (2028)	PAL 3 (2040)	PAL 1 (2023)	PAL 2 (2028)	PAL 3 (2040)
Concourse C Total Checkpoint								
Checkpoint Lanes	**Lanes**	**5**	**5**	**6**	**6**	**5**	**6**	**7**
Total Passenger Processing Area	Square Feet	10,481	9,450	11,340	11,340	9,450	11,340	13,230
Concourse D Total Checkpoint								
Checkpoint Lanes	**Lanes**	**6**	**5**	**6**	**6**	**5**	**6**	**7**
Total Passenger Processing Area	Square Feet	11,166	9,450	11,340	11,340	9,450	11,340	13,230
Consolidated Total Checkpoint Area								
Checkpoint Lanes	**Lanes**	**n/a**	**9**	**9**	**11**	**9**	**9**	**11**
Total Passenger Processing Area	Square Feet	n/a	17,010	17,010	20,790	17,010	17,010	20,790

NOTE: Passenger processing square footage includes queue area.

SOURCES: Transportation Security Administration, March 2018; Ricondo & Associates, Inc., March 2019.

Baggage Claim: Operating Parameters and Space Template

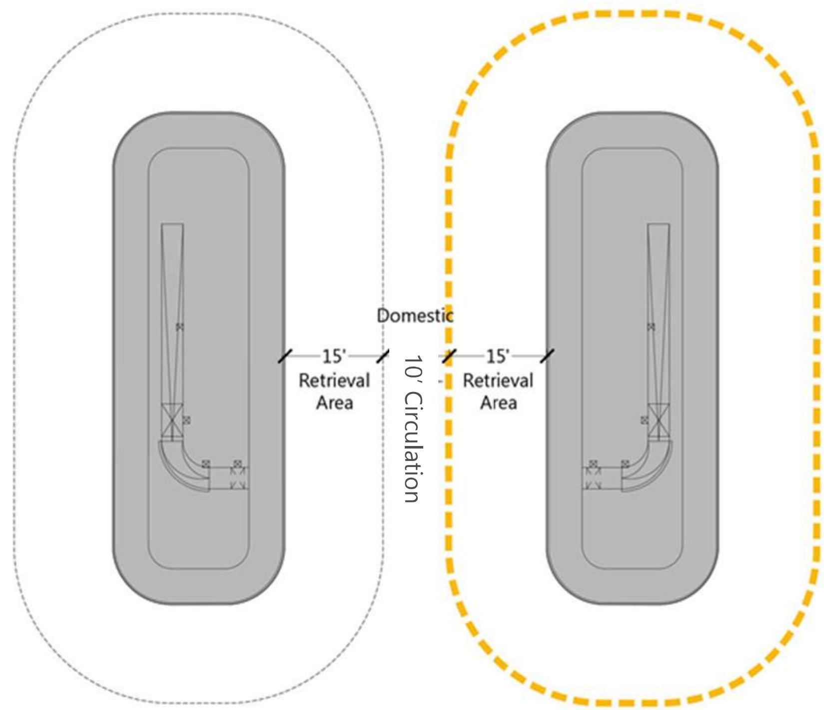
- Passenger accumulation represents peak number of passengers in the active retrieval area at any point in time

FUTURE DESIGN METRIC:
Approximately 4,680 sq ft per unit

Baggage Claim Assumptions

	UNITS	DOMESTIC
Area per Passenger	sq ft	18
Typical Claim Device Length	Feet	170

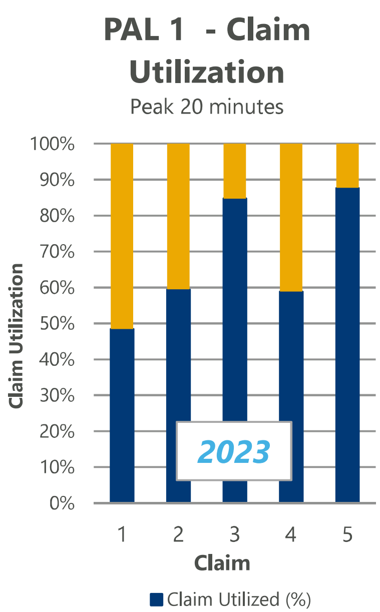
NOTES:
1 Based on adequate space and acceptable level-of-service

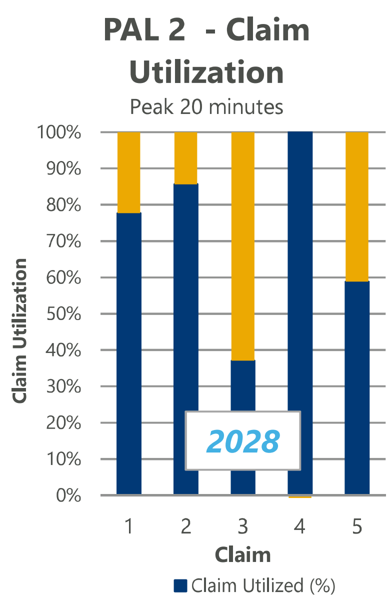


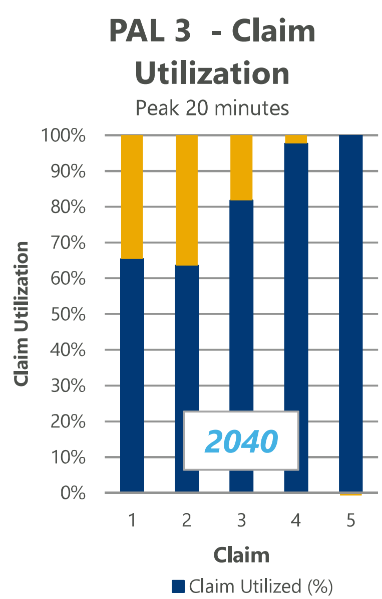
SOURCES: Airport Cooperative Research Program. Report 25, Airport Passenger Terminal Planning and Design, Volume 1: Guidebook. 2010 (critical dimensions); International Air Transportation Association, Airport Development Reference Manual, 11th Edition, Effective April 2019 (LOS); Ricondo, February 2018 (space template).

Baggage Claim Devices

	Units	EXISTING	BASELINE PAL 1 (2023)	BASELINE PAL 2 (2028)	BASELINE PAL 3 (2040)	HIGH GROWTH PAL 1 (2023)	HIGH GROWTH PAL 2 (2028)	HIGH GROWTH PAL 3 (2040)
Rolling 20-minute Operations	Operations	7	8	8	9	8	8	9
Rolling 20-minute Passengers	Passengers	480	550	560	740	660	570	760
Baggage Claim Devices	Units	5	5	5	5	5	5	5
Baggage Claim Area	Square Feet	19,468	19,500	19,500	19,500	19,500	19,500	19,500







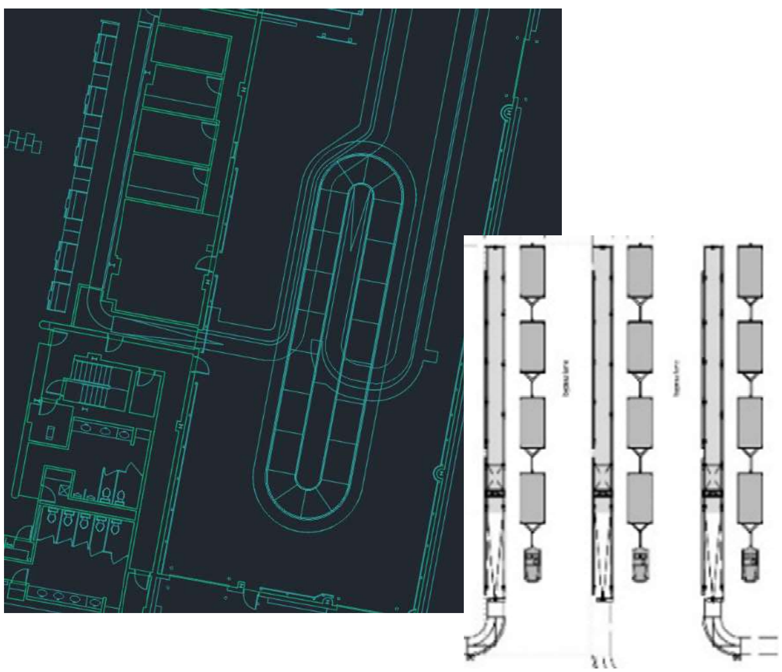
Baggage Claim Area

- Space requirement evaluated based on the accumulation of waiting passengers
- Airlines do not share devices during peak period
- No additional space required through planning horizon

Baggage Make-Up: Operating Parameters

- Device requirements were analyzed on a common-use basis
- Preferential use requirements would increase the overall cart demand and area need

MINUTES PRIOR TO SCHEDULED TIME OF DEPARTURE	PERCENT OF TOTAL CARTS STAGED
120-100	50%
90-30	100%

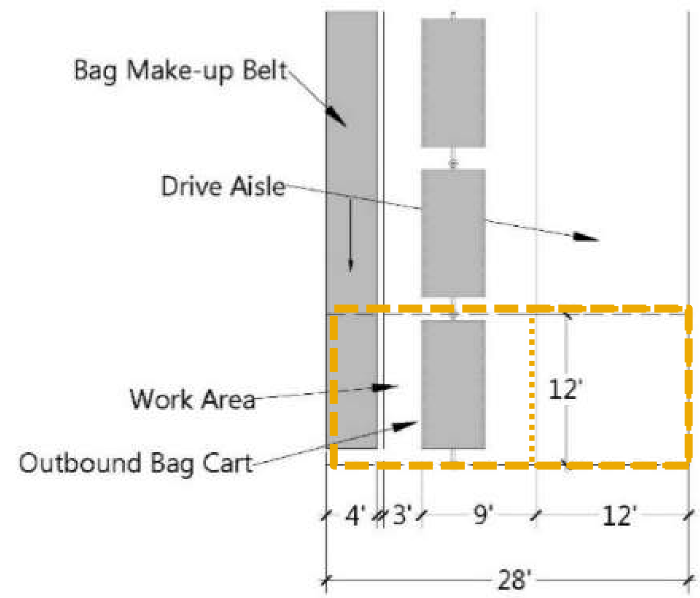


PARALLEL CART STAGING

EXAMPLE AIRCRAFT TYPE	MAX CARTS/ULDs STAGED
Airbus 319	3
Airbus 320/321	4
Boeing 737-300/400/500	3
Boeing 737-700/800/900	4
Boeing 757-200	5
Boeing 767-300	6
McDonnell Douglas MD82/83/88	4
Canadair Regional Jet CRJ700/900	2
Embraer 170/190	2

Baggage Make-Up Requirements

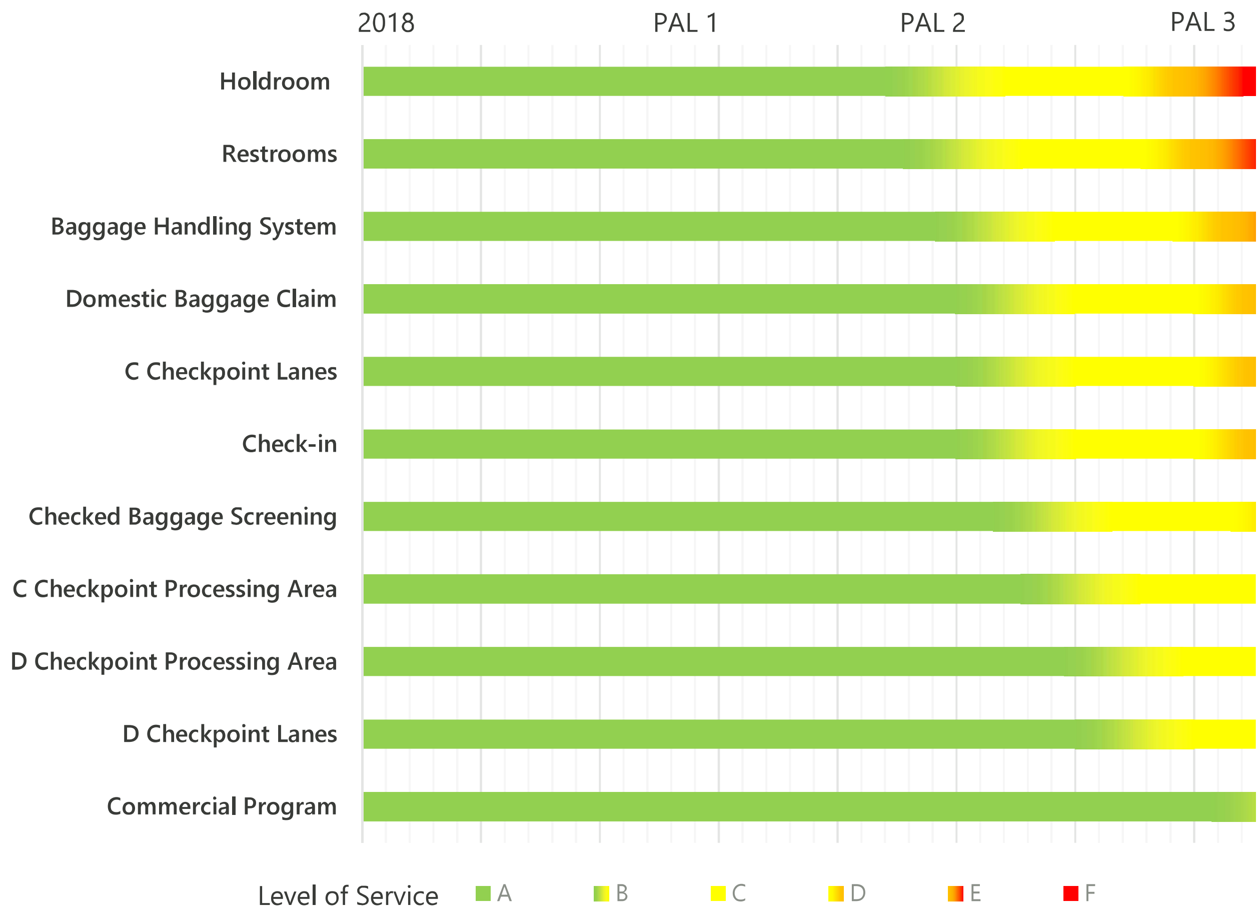
- Requirements analyzed based on DDFS and aircraft fleet – cart staging
- Current area is constrained
- Additional 10,000 to 15,000 sq ft of space required through planning period



Baggage Make-up Area

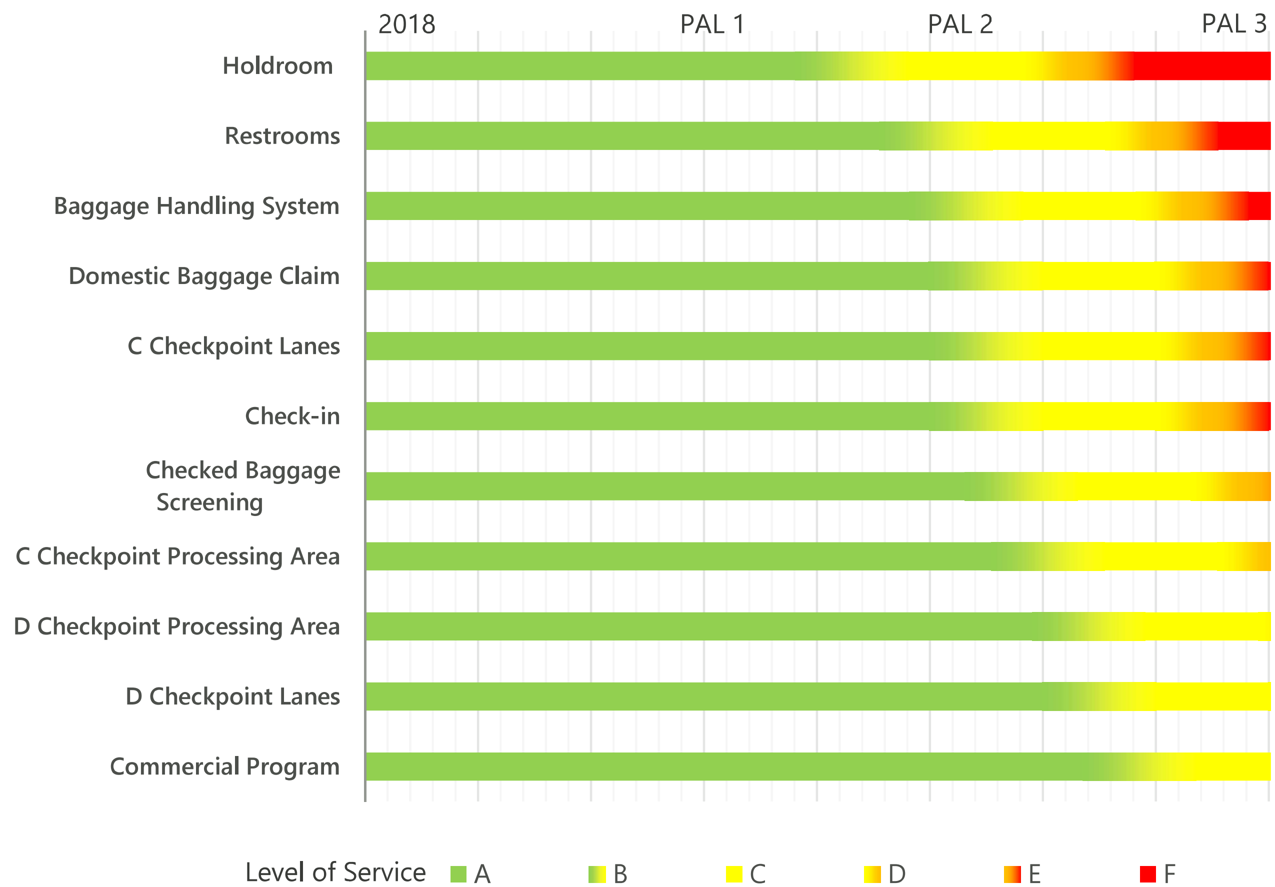
DESIGN METRIC: approximately 400 sq ft per cart (including drive aisle)

Terminal Requirements Summary
Baseline LOS



LOS reflects facility capacity relative to space required to meet demand.

Terminal Requirements Summary High Scenario LOS



LOS reflects facility capacity relative to space required to meet demand.

Terminal Requirements Summary

FUNCTIONAL AREA	UNITS	EXISTING	BASELINE			HIGH GROWTH		
			PAL 1 (2023)	PAL 2 (2028)	PAL 3 (2040)	PAL 1 (2023)	PAL 2 (2028)	PAL 3 (2040)
AIRLINE FACILITIES								
Check-in	sq ft	13,884	18,500	19,250	20,750	19,250	20,000	23,000
Baggage Handling System	sq ft	92,397	95,800	100,600	104,600	95,800	101,800	107,400
Domestic Baggage Claim	sq ft	19,468	19,500	19,500	19,500	19,500	19,500	19,500
Airline Support	sq ft	50,516	49,130	50,640	51,360	49,490	51,000	52,440
Holdroom	sq ft	56,392	63,950	66,470	66,470	63,950	66,470	66,470
Airline Club	sq ft	5,002	5,000	5,000	5,000	5,000	5,000	5,000
DEPARTMENT OF HOMELAND SECURITY								
Transportation Security Administration								
Checkpoint Total Area [1]	sq ft	21,647	18,900	22,680	22,680	18,900	22,680	26,460
Checked Baggage Screening	sq ft	22,942	21,600	21,600	27,000	21,600	21,600	27,000
Customs and Border Protection [2]	sq ft	26,000	26,000	26,000	26,000	26,000	26,000	26,000
OTHER AREAS								
Commercial Program	sq ft	57,203	40,000	44,000	54,000	45,000	51,000	69,000
Airport Admin / Support	sq ft	53,769	54,000	54,000	54,000	54,000	54,000	54,000
Restrooms	sq ft	23,908	26,250	27,000	27,000	26,250	27,000	27,000
Building Services	sq ft	85,708	84,840	88,340	92,520	86,020	90,140	97,340
Circulation	sq ft	225,700	223,410	232,630	243,650	226,520	237,380	256,330
Amenities	sq ft	8,149	8,100	8,100	16,200	8,100	16,200	16,200
Sheriff Station	sq ft	4,286	4,300	4,300	4,300	4,300	4,300	4,300
UNASSIGNED	sq ft	56,778						
Design Configuration Contingency (10%)	sq ft	n/a	75,930	79,010	83,500	76,970	81,410	87,740
TOTAL	**sq ft**	**809,266**	**701,400**	**729,800**	**773,700**	**712,100**	**754,200**	**815,300**

NOTES:
1 Based on concourse-specific checkpoints
2 Placeholder until definition of Concourse E Redevelopment Program
Numbers are rounded.

Facility Requirements

Aircraft Gates

Gating Analysis Assumptions

- Concourse E not currently in operation
- International flight activity will have priority for gate assignment on Redeveloped Concourse E
- No assumption was made regarding the future number of gates on Concourse E
- Airline-specific gate utilization does not span multiple concourses
- Gate assignment source: Gate Utilization Study Survey (M&H) – 2018, confirmed January 2019

Airline Gate Allocation

Gate assignment source: Gate Utilization Study Survey (M&H) – 2018, confirmed January 2019.

Gate Requirements Summary

- Gate requirements presented as a range reflecting the needs under the various operating scenarios

REQUIREMENT	GATING SCENARIO 1		GATING SCENARIO 2		GATING SCENARIO 3	
	Baseline Forecast	High Growth	Baseline Forecast	High Growth	Baseline Forecast	High Growth
PAL 1 (2023) TOTAL GATES	35	35	33	33	35	35
PAL 2 (2028) TOTAL GATES	36	37	35	35	36	36
PAL 3 (2040) TOTAL GATES	39	42	35	35	36	36
TOTAL NEW GATES REQUIRED	**+7**	**+10**	**+4**	**+4**	**+4**	**+4**
TOTAL TOWS (ARR + DEP)	27	26	27	36	27	30

Note: Each counted Aircraft Tow represents either an Arrival Tow (relocate aircraft to allow subsequent use of gate) or a Departure Tow (position aircraft from a remote location for loading and departure). In some instances an Arrival Tow can be positioned to avoid a subsequent Departure Tow.

- Summary Gate Requirements
  - 2023 (PAL 1): 3 additional gates (over existing)
  - 2028 (PAL 2): 4 to 5 additional gates (over existing)
  - 2040 (PAL 3): 4 to 10 additional gates (over existing)

Concourse E Redevelopment will meet a portion of this gate need

Landside Access Roadway and Curbside

Landside (On- and Off-Airport) Roadways, Parking, Rental Car Facilities

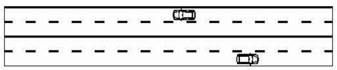
On- and Off-Airport Roadways

On- and Off-Airport Requirements Methodology

- On-Airport Roadways
  - Spreadsheet model-based analysis of roadway volumes
  - Demand growth based on O&D Aviation Activity Forecast
  - Considers peak-hour passenger and operations forecasts
  - Morning (AM Peak) and afternoon (PM Peak) peaks assessed
  - Considers a balanced roadway network
- Non-terminal Area Roadways
  - WisDOT Planning Level Forecast Data serves as basis for projections
  - Morning and evening peaks assessed
  - Based on O&D Aviation Activity Forecast

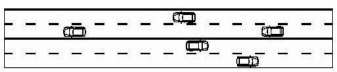
Curbside and Roadway – Level of Service

Terminal Roadway LOS



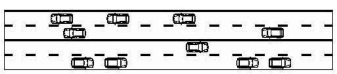
LOS A

LOS A represents operations where free-flow speeds prevail. The ability of each driver to maneuver within the traffic stream, change lanes, merge, or weave is almost completely unimpeded by other vehicles because of low traffic densities. The effects of transient blockages or incidents are easily absorbed at this level of service.



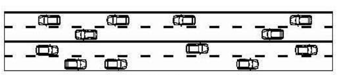
LOS B

LOS B represents conditions in which free-flow speeds are maintained. The ability of each driver to maneuver within the traffic stream, change lanes, or weave is only slightly restricted by the presence of other vehicles. The general physical and psychological comfort of drivers is still high. The effects of minor incidents and point breakdowns are still easily absorbed.



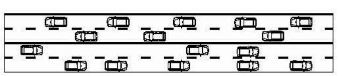
LOS C

LOS C represents traffic flow with speeds at or near the free-flow speeds of the roadway. Freedom to maneuver within the traffic stream is noticeably restricted and lane changes may require more care and vigilance on the part of the driver because of high traffic densities. Minor blockages or incidents may still be absorbed, but the local deterioration in service will be substantial. Queues may be expected to form behind any significant blockage.



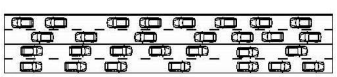
LOS D

LOS D represents the level at which speeds begin to decline slightly with increasing flows, and density begins to increase somewhat more quickly. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort. Even minor blockages or incidents can be expected to quickly create queues because the traffic stream has little space to absorb disruptions.



LOS E

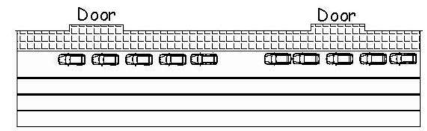
LOS E represents operations at or near capacity. Operations at this level are volatile because there are virtually no usable gaps in the traffic stream. Vehicles are closely spaced, leaving little room to maneuver with the traffic stream. Any disruption of the traffic stream, such as vehicles entering from a ramp or a vehicle changing lanes, can disrupt upstream traffic flows. At capacity, the traffic stream has no ability to absorb even the most minor disruptions, and any incident can be expected to produce a serious breakdown with extensive queuing. Maneuverability with the traffic stream is extremely limited and the level of physical and psychological comfort afforded the driver is poor.



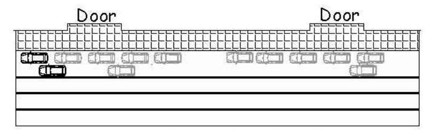
LOS F

LOS F represents breakdowns in vehicular flow. Such conditions generally exist within queues forming behind bottleneck points. Bottlenecks occur as a result of (1) traffic accidents, (2) typical traffic congestion areas, such as lane drops, weaving segments, or merges, (3) parking maneuvers, or (4) traffic conditions when the projected hourly flow exceeds the estimated capacity of the roadway segment.

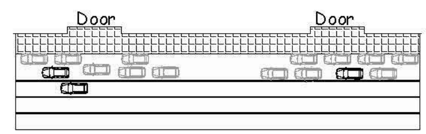
Curbside Roadway LOS



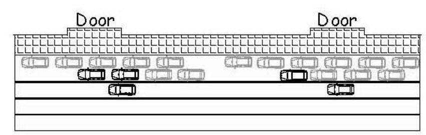
LOS A, 0%-90% Curb Utilization



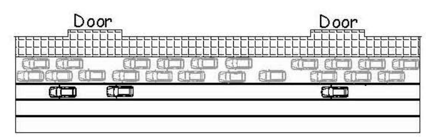
LOS B, 91% - 110% Curb Utilization



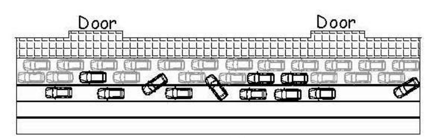
LOS C, 111%-130% Curb Utilization



LOS D, 131%-170% Curb Utilization



LOS E, 171%-200% Curb Utilization



LOS F, >200% Curb Utilization

SOURCE: Airport Cooperative Research Program, ACRP Report 40, Airport Curbside and Terminal Area Roadway Operations, July 2010.

On-Airport Roadway Link Analysis

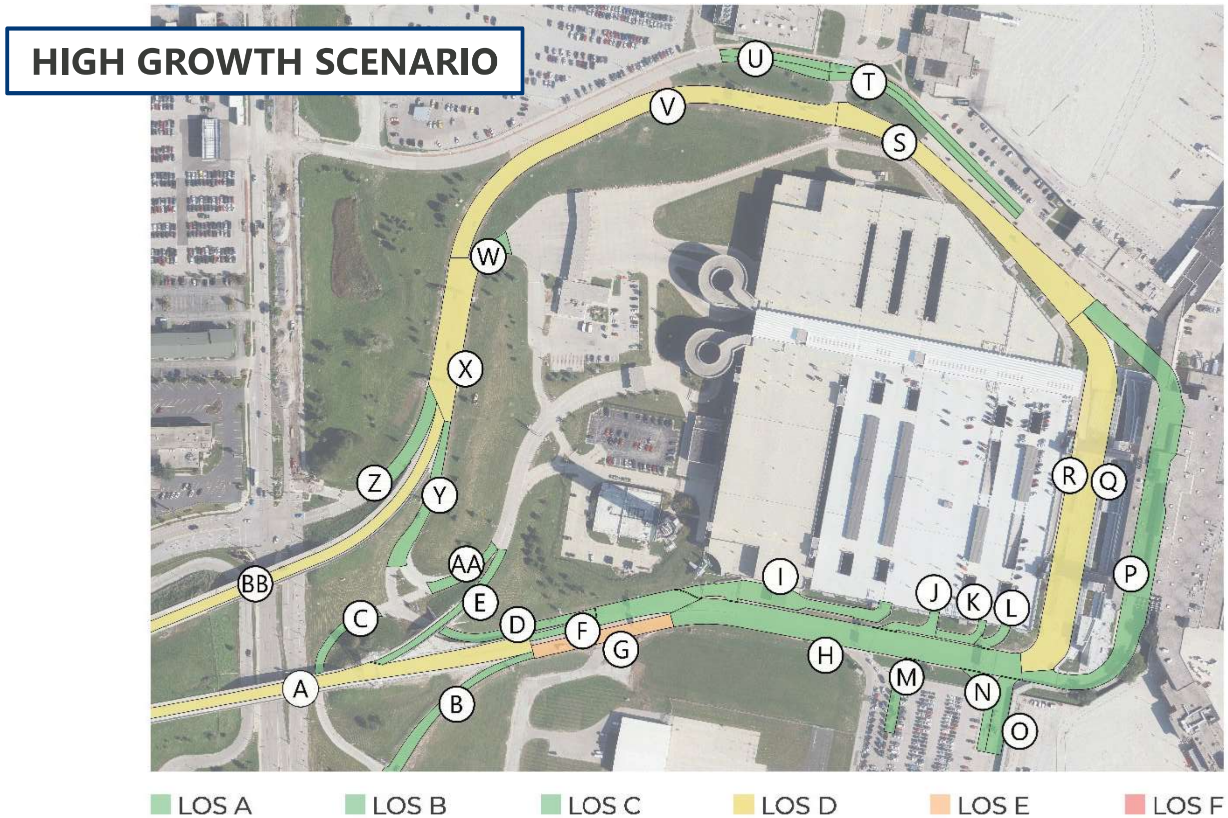
BASELINE

Summary

- AM Peak: All links operate at LOS C or better
- PM Peak : All links operate at LOS C or better (except where noted)

Link	Description	PM 2023	PM 2028	PM 2040
G	Inbound Roadway to Terminal after ramp from Howell Road	C	C	D
Q	Arrivals Inner Curb	C	C	D
S	Outbound Roadway Leaving Curb	C	C	D
V	Outbound Roadway after IAB Enter/Exit	C	C	D

On-Airport Roadway Link Analysis (con't)



Summary

- AM Peak: All links operate at LOS C or better
- PM Peak: All links operate at LOS C or better (except where noted)

Link	Description	PM 2023	PM 2028	PM 2040
A	Airport Spur EB Inbound	C	C	D
G	Inbound Roadway to Terminal after ramp from Howell Road	C	D	E
Q	Arrivals Inner Curb	C	C	D
S	Outbound Roadway Leaving Curb	C	C	D
V	Outbound Roadway after IAB Enter/Exit	C	C	D
X	Outbound Roadway after Parking Exit	C	C	D
BB	Airport Spur Outbound Split Towards I-94	C	C	D

Curbside Utilization

AM: Morning Peak

PM: Afternoon Peak

Courtesy Vehicles

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

Go Shuttles

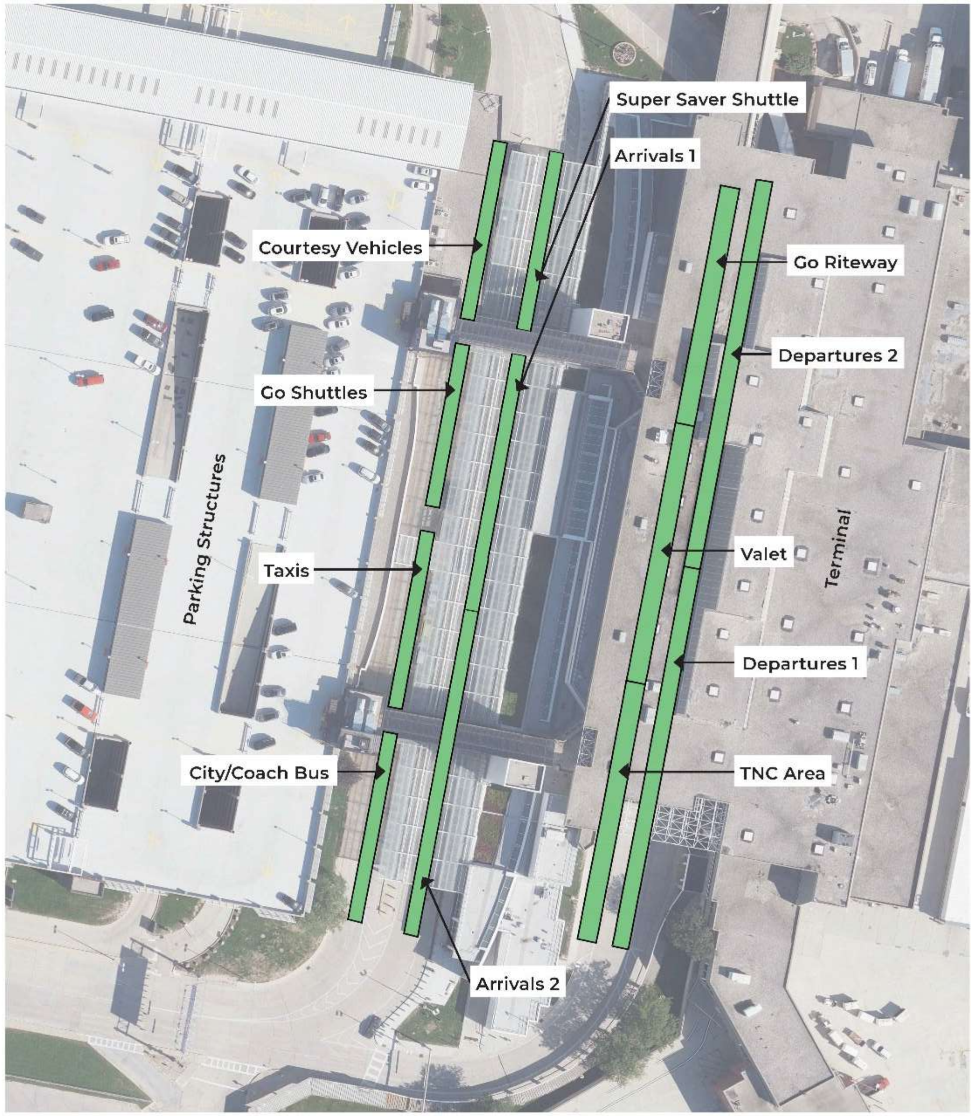
	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

Taxis

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

Bus/Charters

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040			D	



Curbside performs at LOS C or better

Arrivals 1

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

Arrivals 2

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

Departures 1

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

Departures 2

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

TNC Area

	Baseline		High	
	AM	PM	AM	PM
Existing				
2023				
2028				
2040				

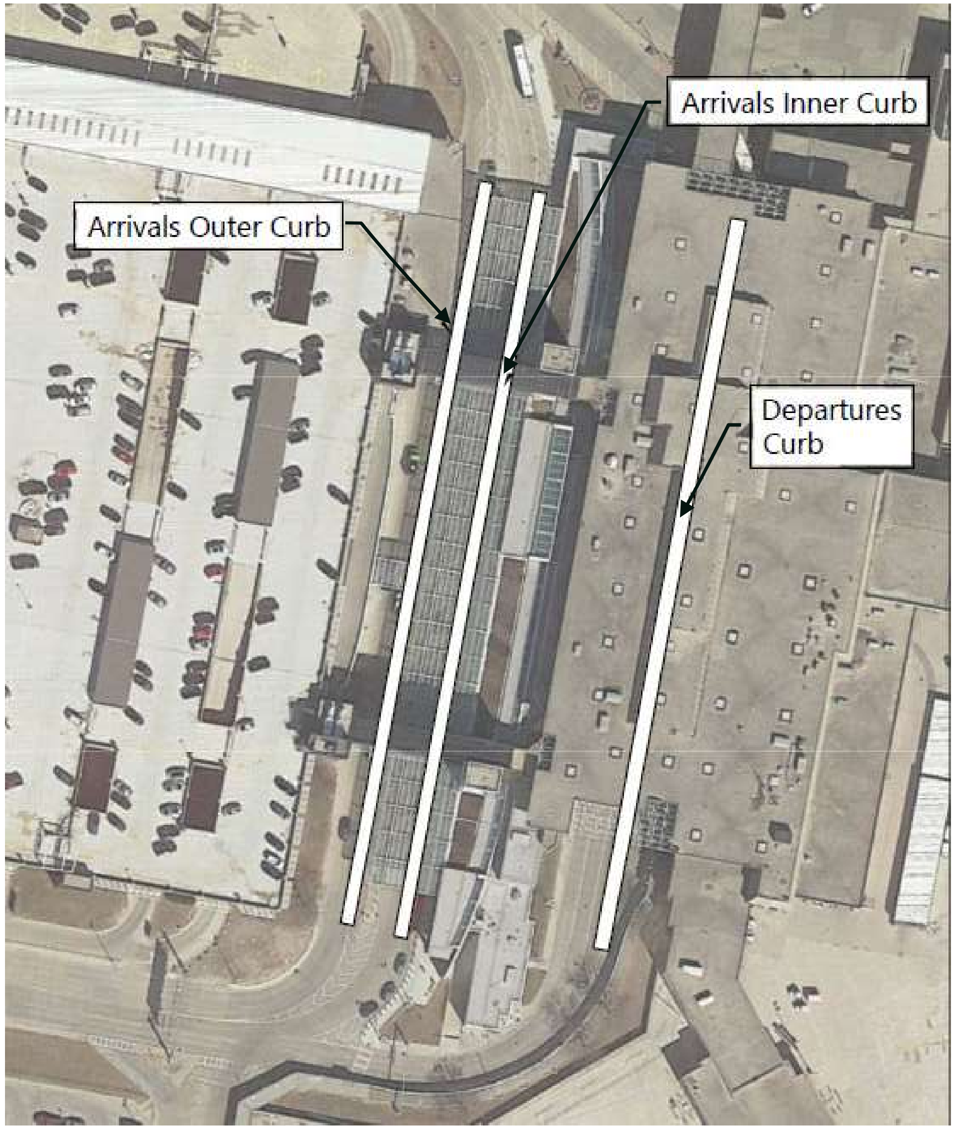
Terminal Roadway Throughput

Arrivals Outer Roadway

	Baseline		High	
	AM	PM	AM	PM
Existing	A	A	A	A
2023	A	A	A	A
2028	A	A	A	A
2040	A	A	A	A

AM: Morning Peak

PM: Afternoon Peak



Arrivals Inner Roadway

	Baseline		High	
	AM	PM	AM	PM
Existing	A	A	A	A
2023	A	A	A	B
2028	A	C	A	D
2040	A	F	A	F

Departures Roadway

	Baseline		High	
	AM	PM	AM	PM
Existing	A	A	A	A
2023	A	A	A	A
2028	A	A	A	B
2040	A	C	A	F

Non-Terminal Roadways

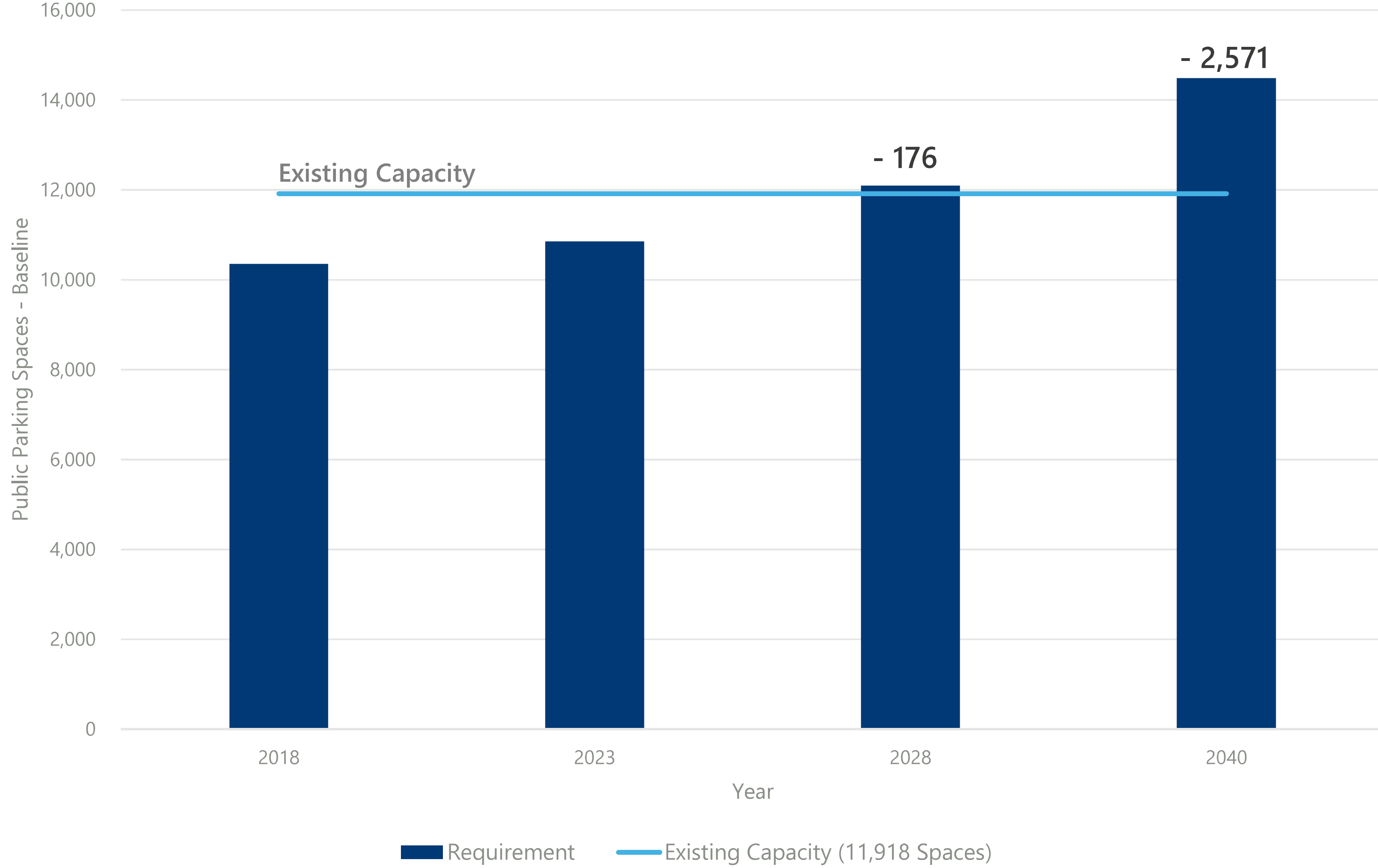
- Intersections assessed in vicinity of MKE
  - Howell Ave. and Layton Ave.
  - Howell Ave. and Grange Ave.
  - Howell Ave. and Airport Spur
  - Howell Ave. and College Ave.
  - Airport Spur and Air Cargo Way
- Traffic Growth
  - 0.4% regional roadway growth assumed by WisDOT (background traffic)
  - Baseline forecast assumes 1.9% annual growth (airport traffic)
  - High scenario forecast adds 2.7% annual growth (airport traffic)
  - Most Airport traffic enters via the Airport Spur (I-94), less growth assumed on surface streets
- Projected (future) LOS reflects overall intersection average, individual turning movements are higher or lower
- Some intersections had signal timing optimized to improve future operations
- All intersections operate at LOS D or better through 2040 (complies with National Highway System standards)

Public and Employee Parking Facilities

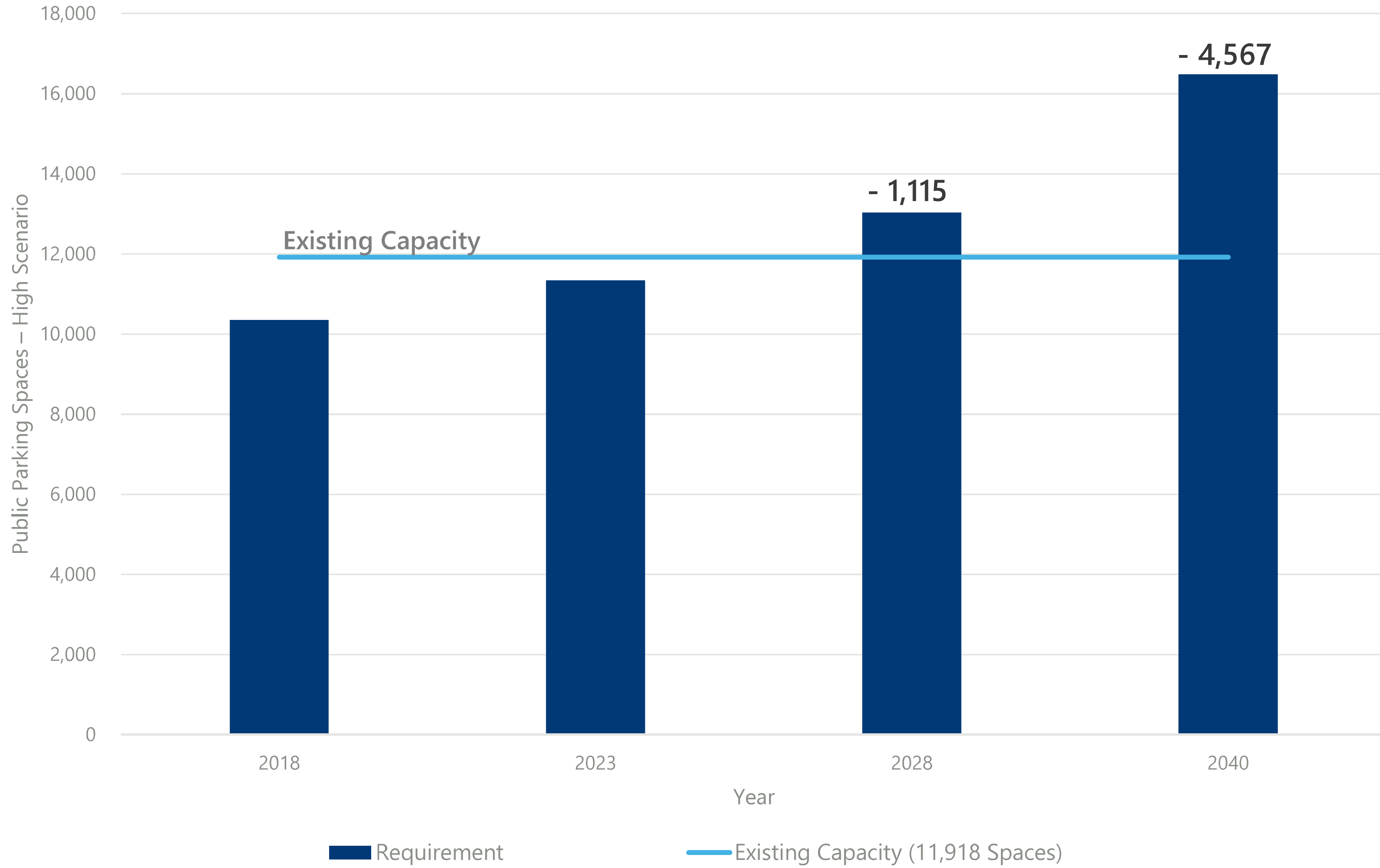
Public and Employee Parking Methodology

- Public Parking Requirements
  - 95 percentile (day) of parking demand used to determine space needs
  - No diversion to other available lots (determines deficiency)
  - Capacity buffer assumed: 5 percent (surface) | 10 percent (garage)
  - Requirements grown relative to O&D Aviation Activity Forecast
- Employee Parking Requirements
  - Entry and exit data supported by camera counts
  - Overnight counts recorded to assess peak periods
  - Aviation Activity Forecast serves as basis

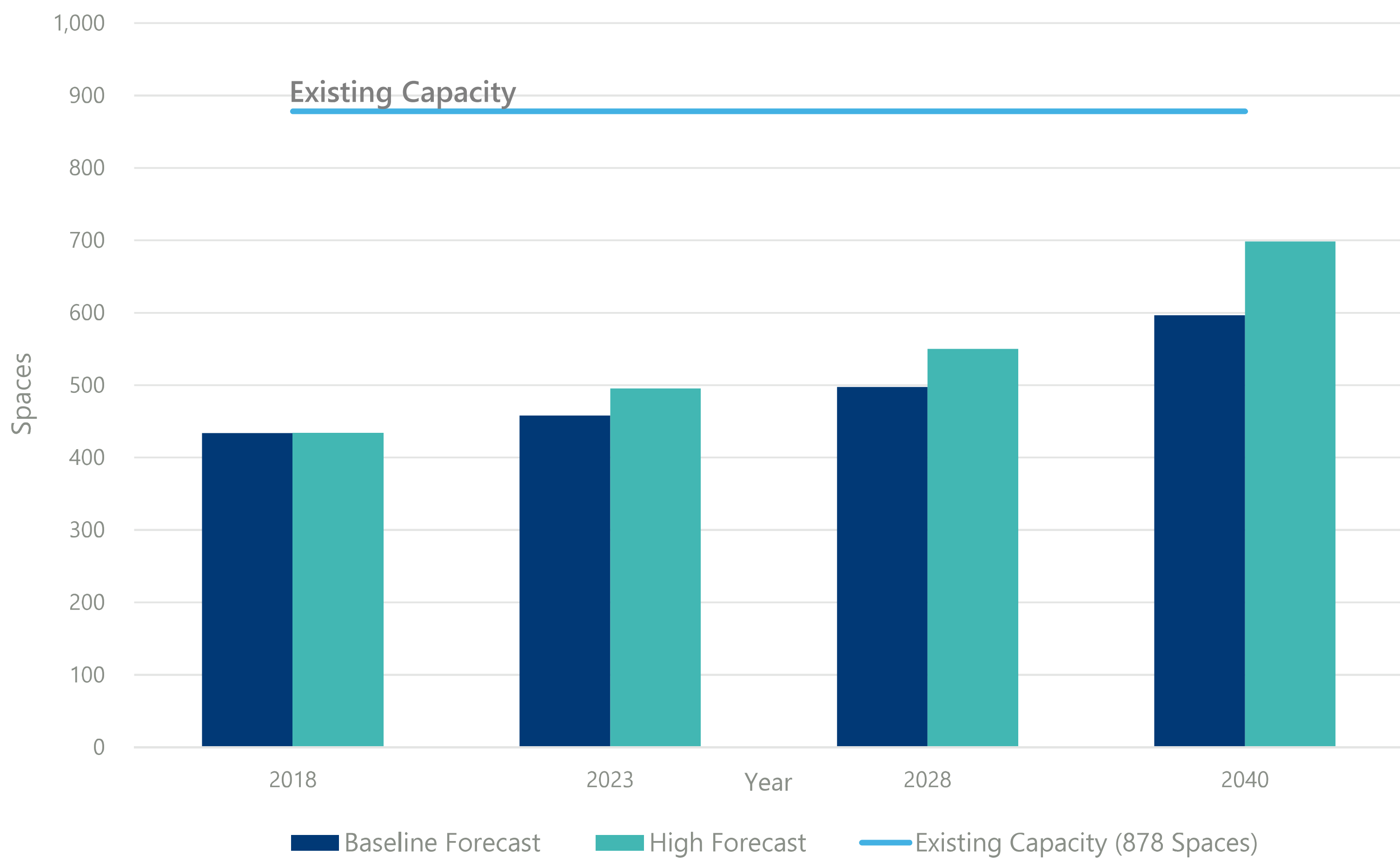
Baseline Public Parking Requirements



High Scenario Public Parking



Employee Parking Requirements



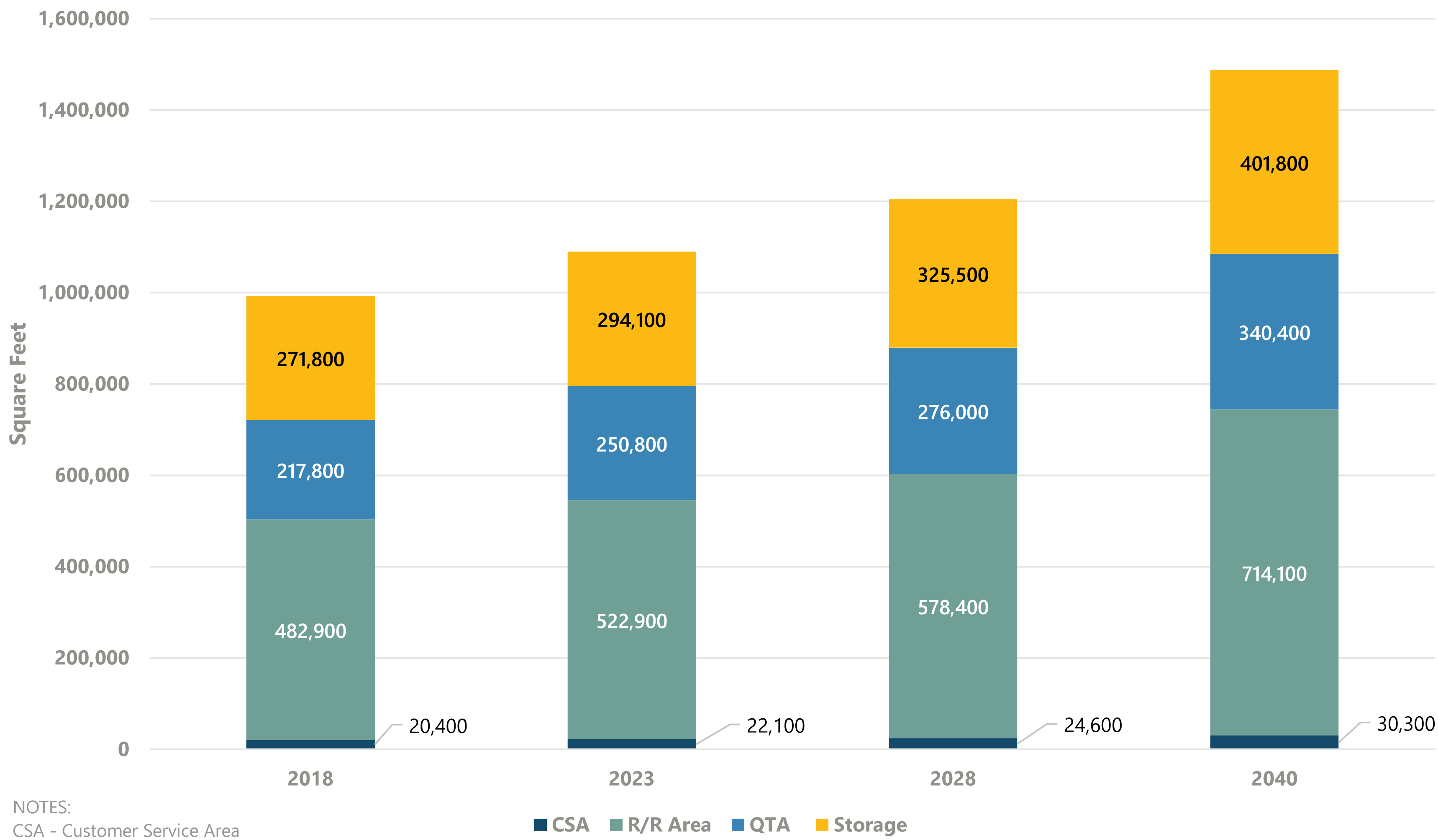
- Requirements based on a blend of passenger enplanements and operations
- Approximately 880 existing employee spaces expected to accommodate employees in both the baseline and high-growth scenario through 2040

Rental Car Facilities

Rental Car Facility Requirements Methodology

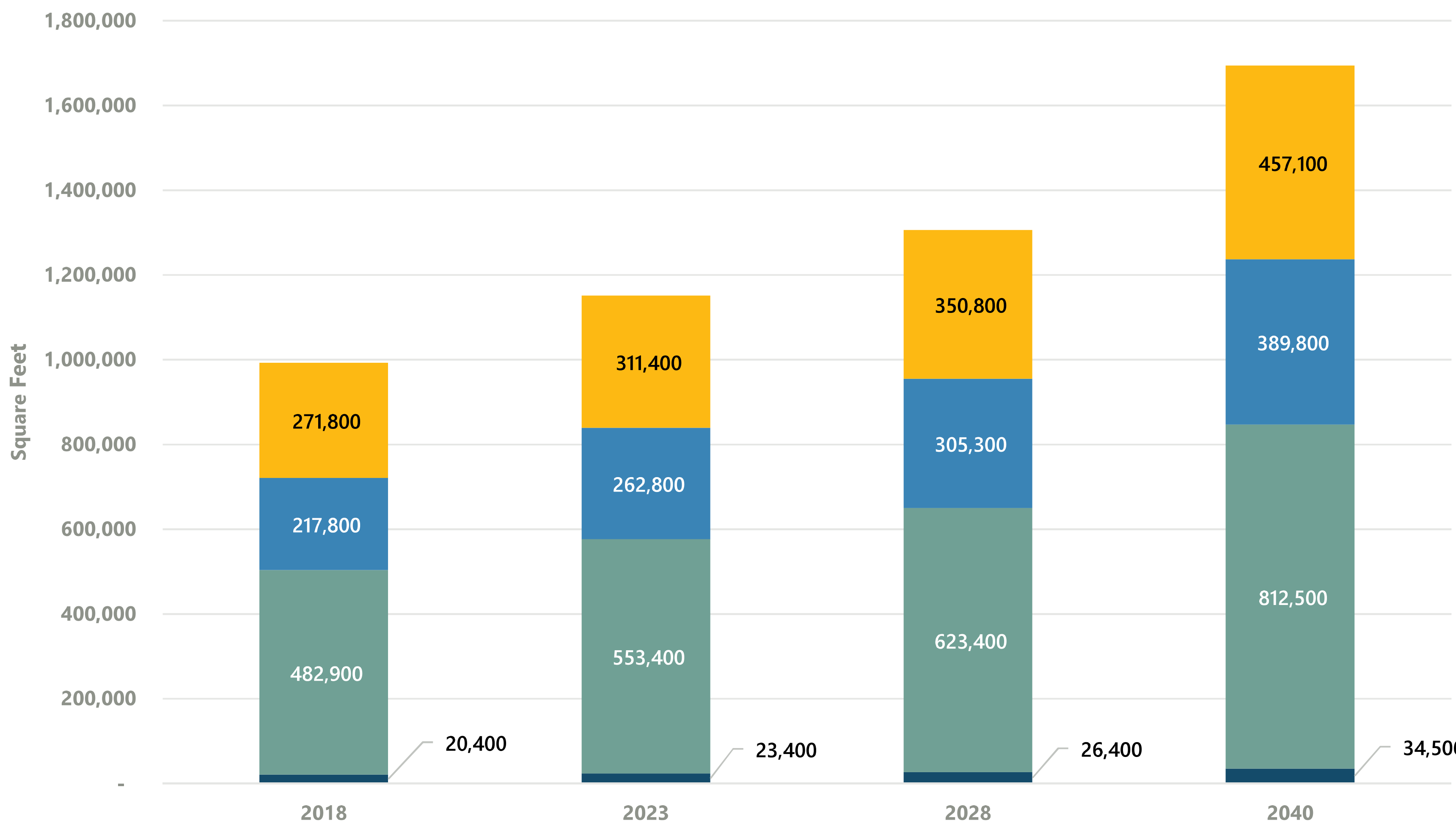
- A "planning hour" (15th busiest hour) was calculated from a full year of hourly transaction data (August 2017 – July 2018)
- Standard industry utilization factors used to define facility requirements
- Facility requirements were projected using the O&D Aviation Activity Forecast
- Major Rental Car Components
  - Customer Service Areas (CSA)
  - Ready/Return Areas (R/R Area)
  - Quick Turnaround Areas (QTA)
  - Staging and Storage Areas

Baseline Rental Car Facility Requirements



NOTES:
CSA - Customer Service Area
R/R – Ready/Return Area
QTA – Quick Turnaround Area
Storage – Storage and Staging

High Growth Rental Car Requirements



NOTES:
CSA - Customer Service Area
R/R – Ready/Return Area
QTA – Quick Turnaround Area
Storage – Storage and Staging

Support Facilities

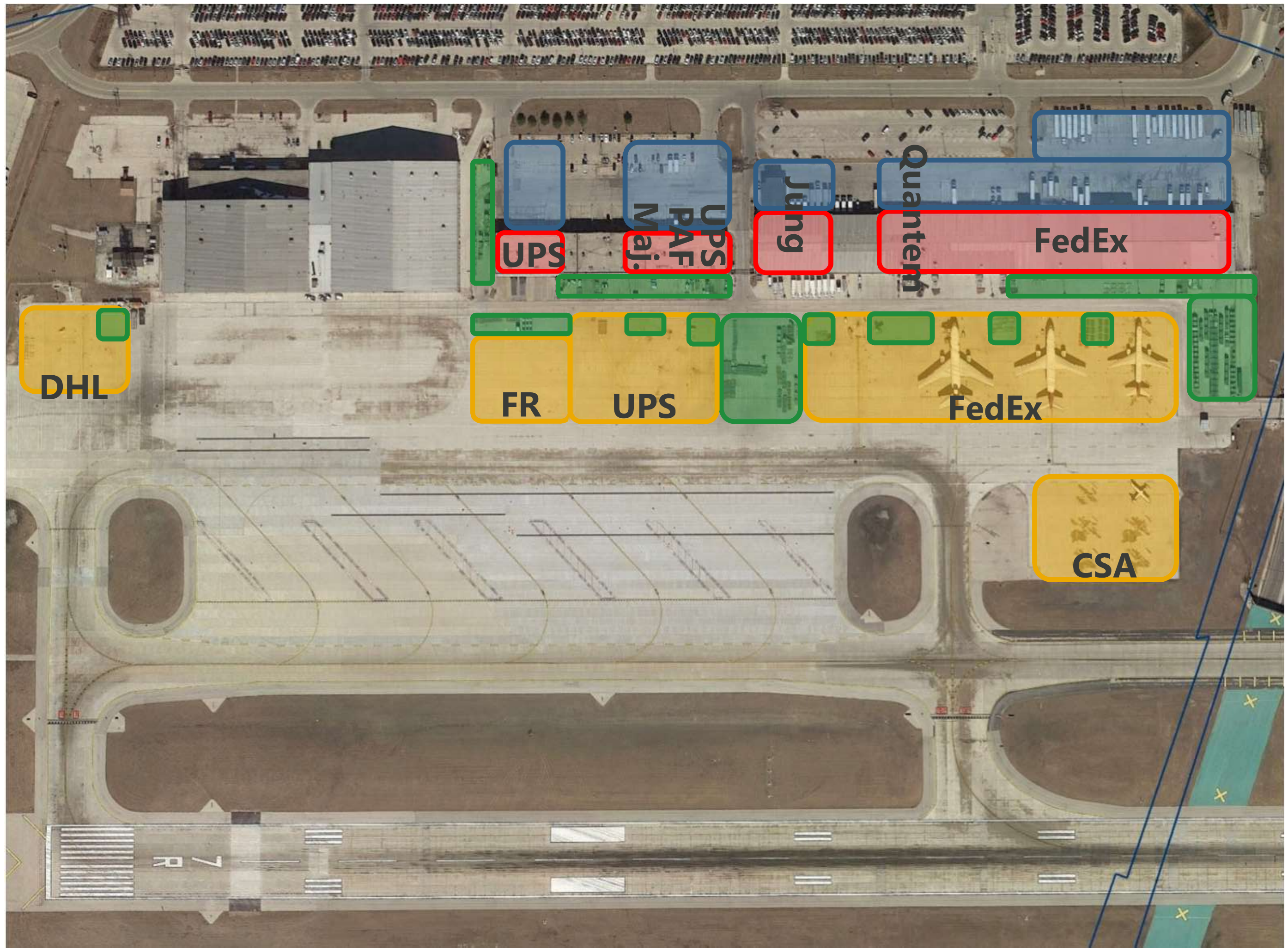
Existing Cargo Facilities

Cargo Facility Areas

- Landside
- Warehouse
- GSE
- Apron

Cargo Carrier Types

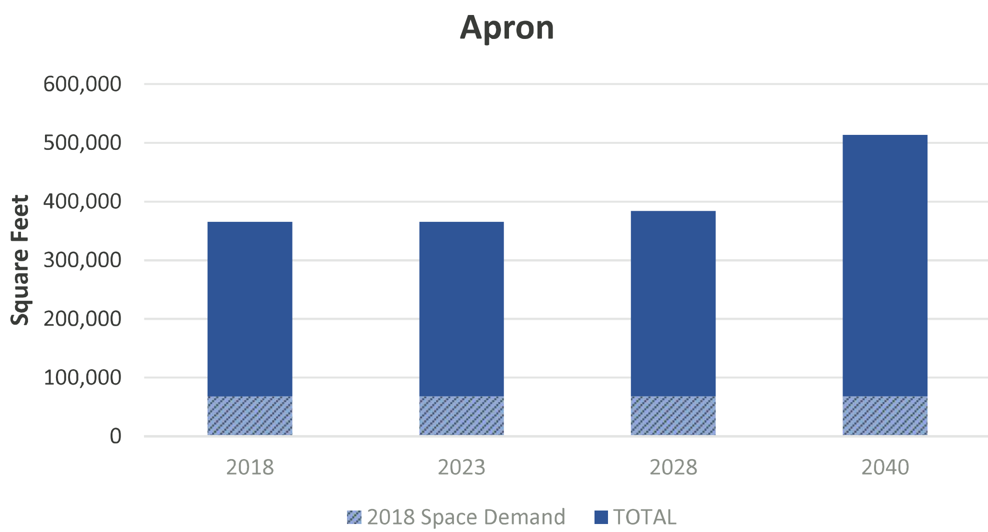
- Integrated (UPS, FedEx)
- All Cargo (Feeders/Third Parties)
- Belly (Airlines)

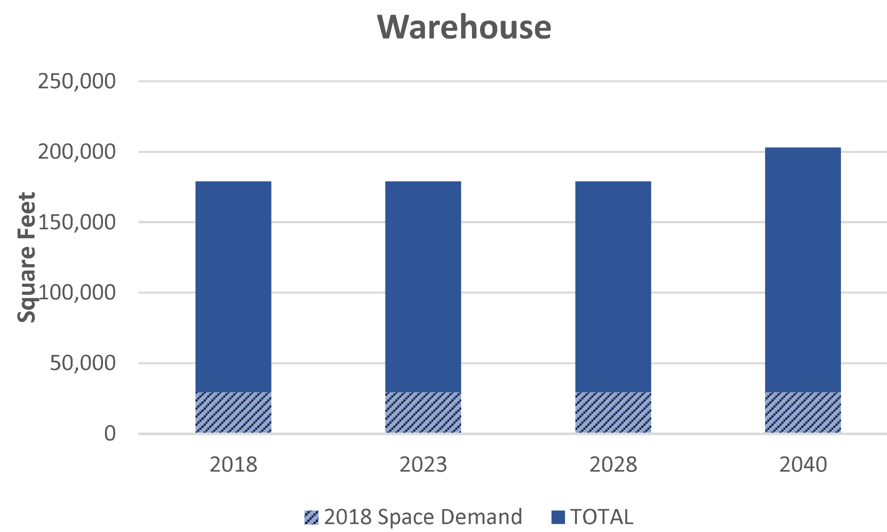


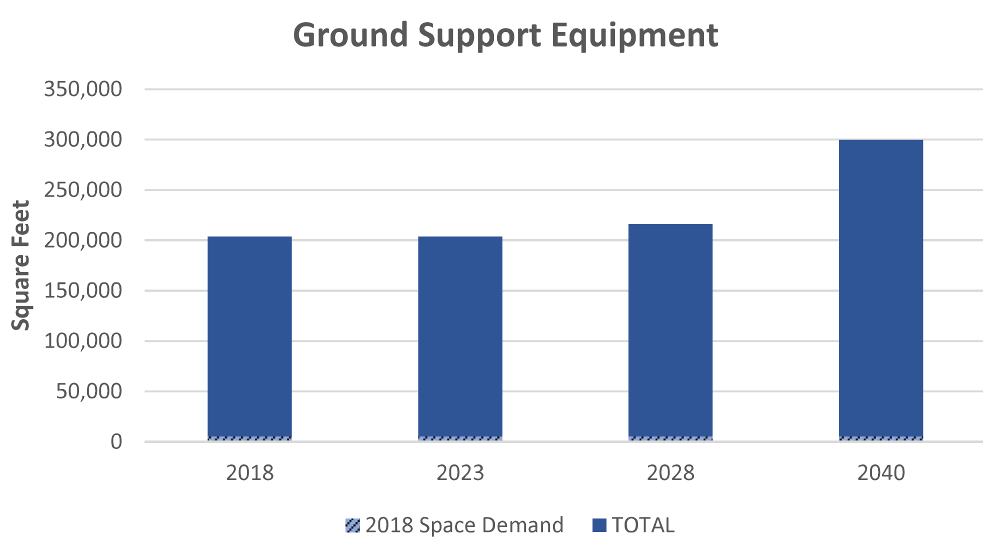
Cargo Facility Planning Methodology

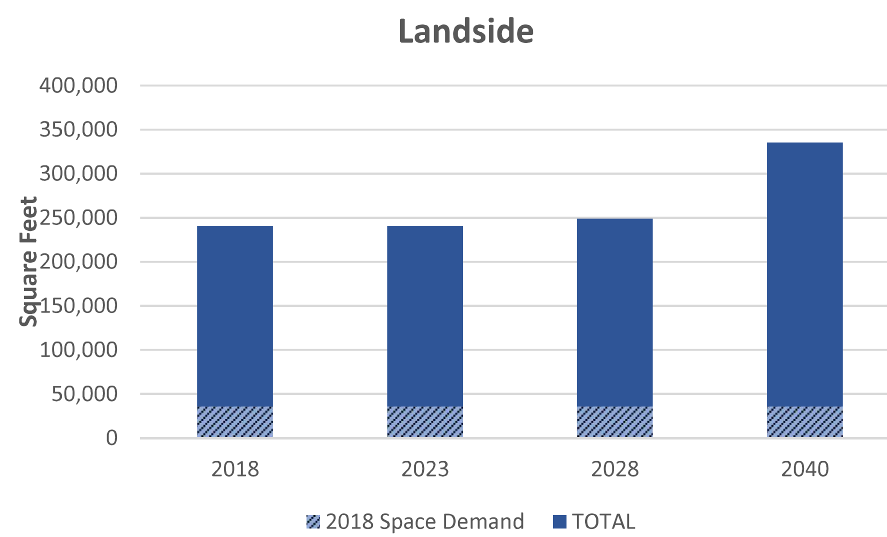
- Industry Standards for Cargo Planning
  - Previous Standard: 1 square foot of warehouse per 1 ton of annual cargo moved
  - ACRP Report 143, *Guidebook for Air Cargo Facility Planning and Development*
  - Refined ratios per tonnage to determine apron, GSE and building areas
- Cargo Trends and Needs
  - Existing (2018) demand for space
  - Consolidation
  - Amazon
- Technology, automation, building layout can increase efficiency
  - As efficiency increases, required cargo areas decrease
- Apron area based on cargo tonnage OR fleet mix
  - Fleet mix from DDFS used (more accurate projection)

Cargo Facility – Base Requirements

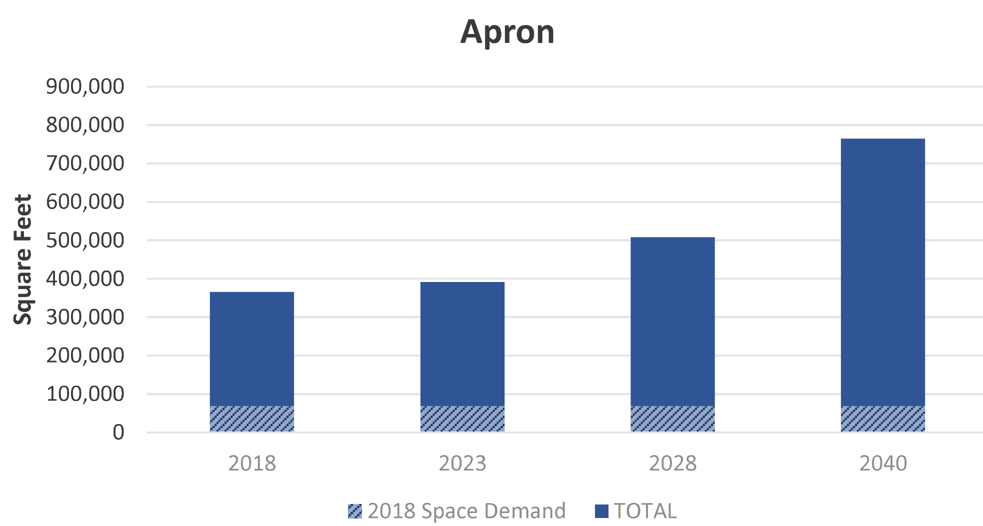


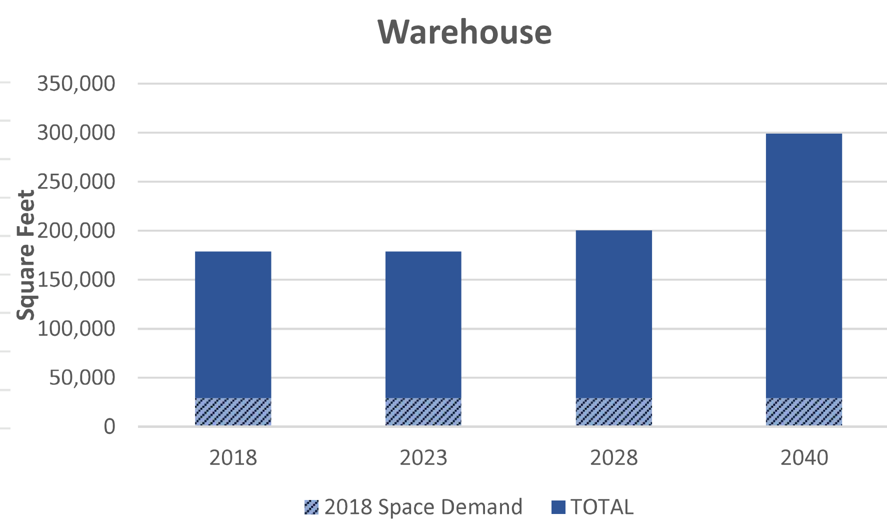


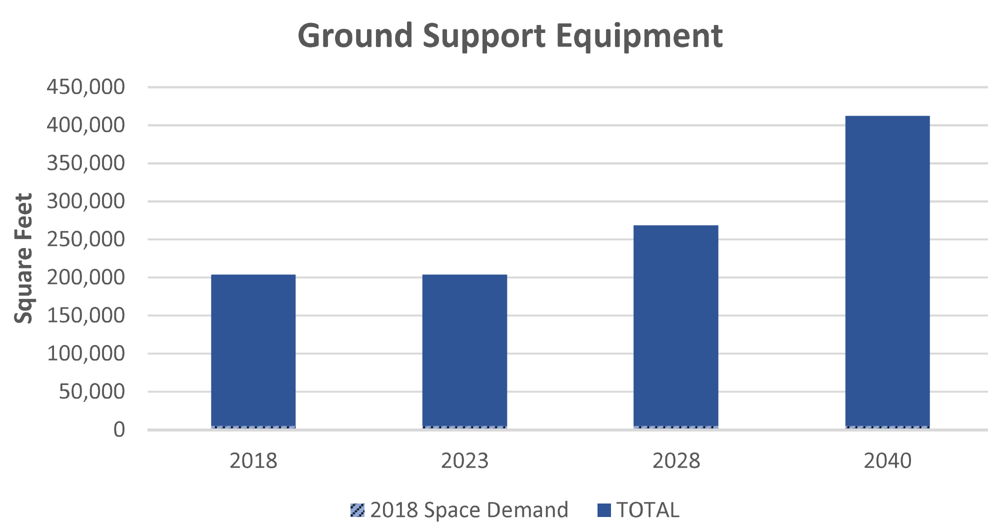


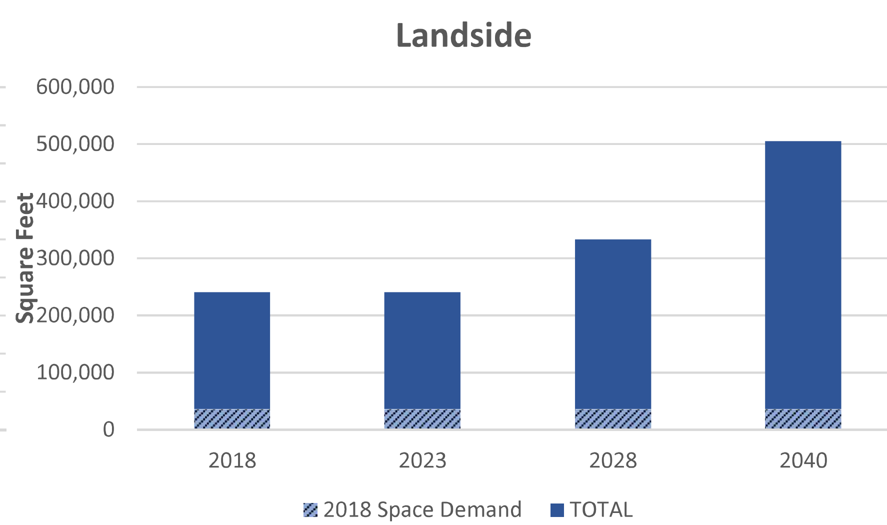


High Growth Cargo Facility Requirements



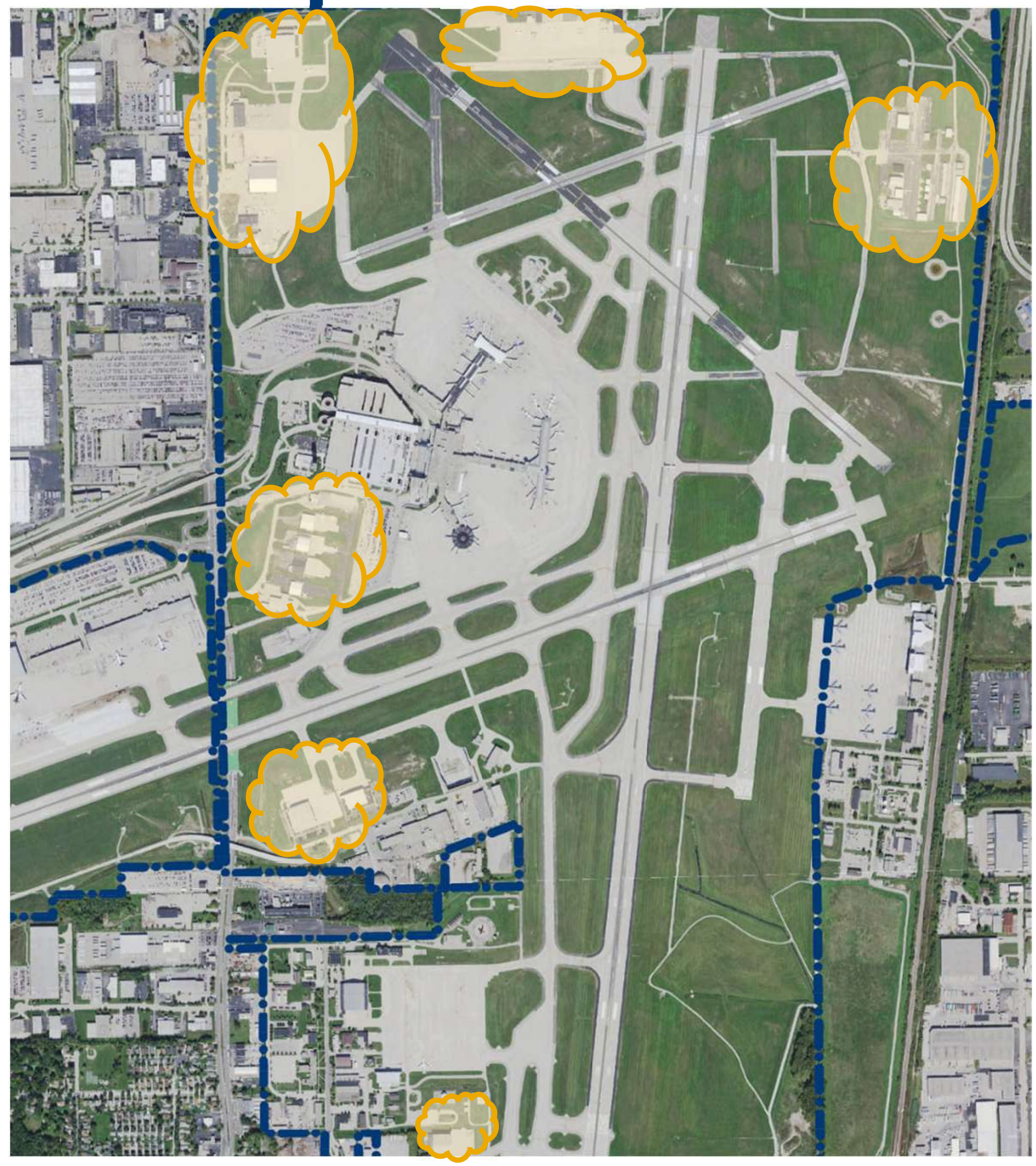




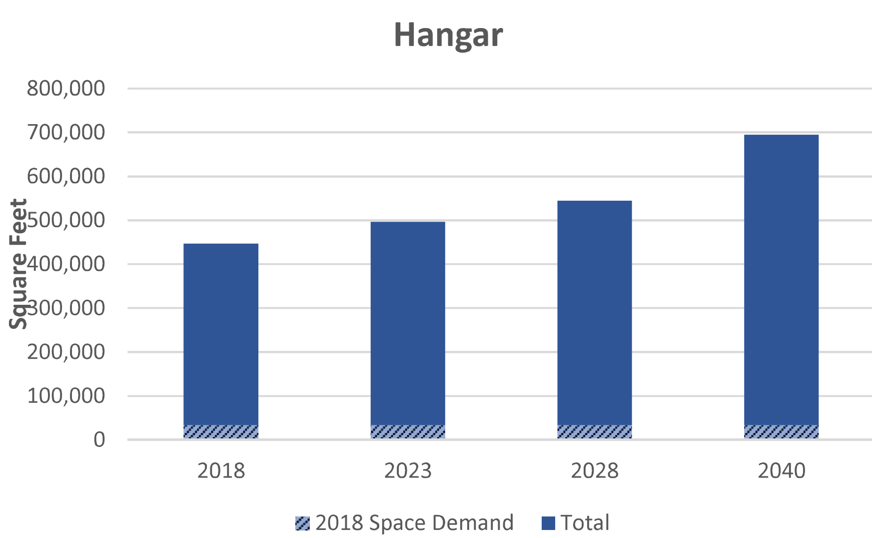


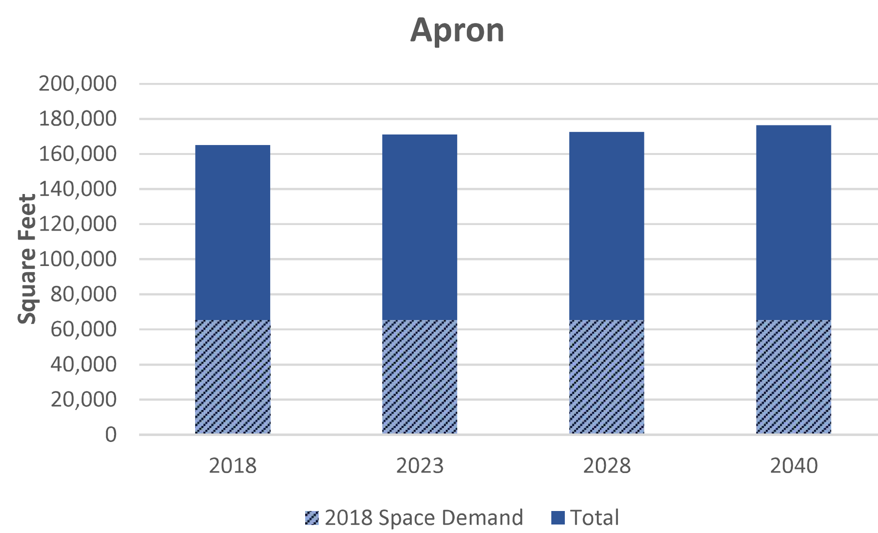
General Aviation Area Requirements

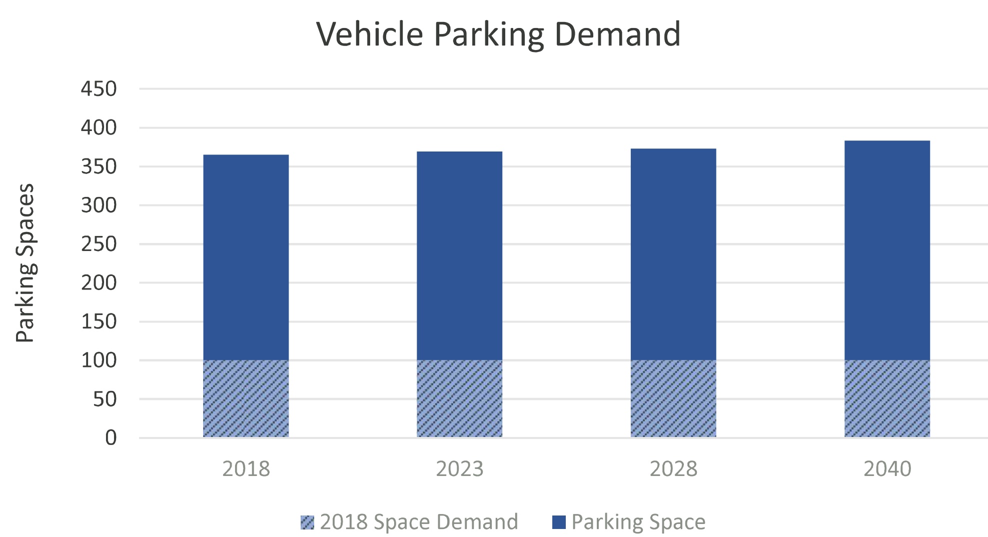
- Hangars
  - Based aircraft assigned square footage to determine hangar area
- Fixed-base Operator (FBO)
  - Based on square feet (SF) per type of operation
- Transient Apron
  - Itinerant operations used to determine apron areas
- Vehicle parking
  - Parking stalls determined by ratio to operations
  - No change to requirements in high growth Scenario



Baseline & High Growth GA Requirements

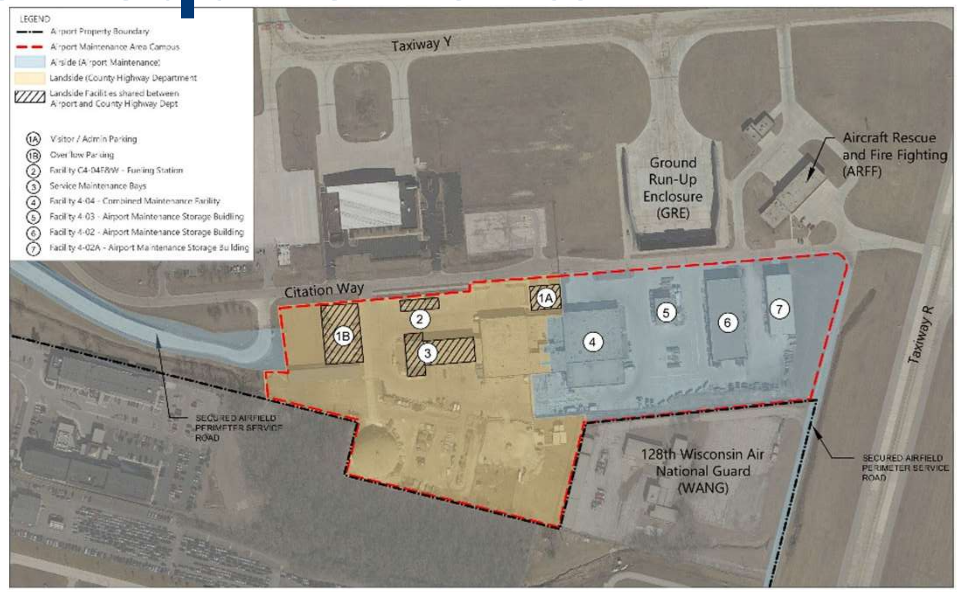


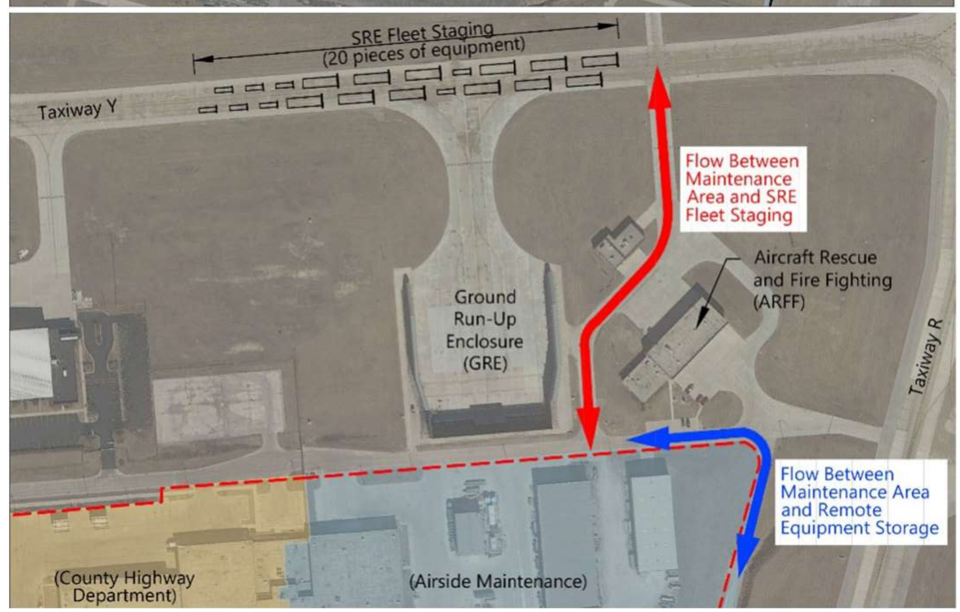




Airport Maintenance Requirements

- Area Needs: +200,000 to 250,000 SF
- Establish new snow removal equipment (SRE) building (57,000 SF)
- Store all airport maintenance equipment in same building/ area (12,000 SF)
- Improve depth and overall size of maintenance bays (5,000 SF)
- Minimize outdoor storage (18,000 SF)
- Provide sufficient exterior circulation space (1:1 ratio with structures)
- Install fueling system (25,000 SF)
- Improve dry chemical storage
- Upgrade west parking area
- Improve flow of snow removal operations



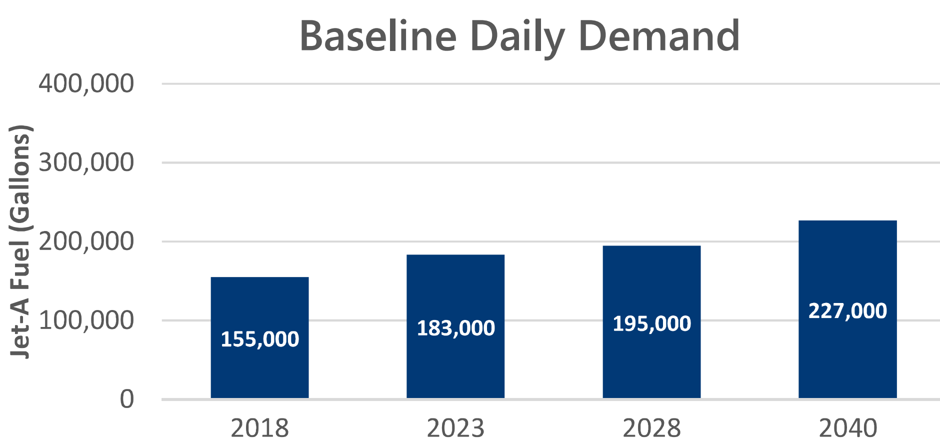


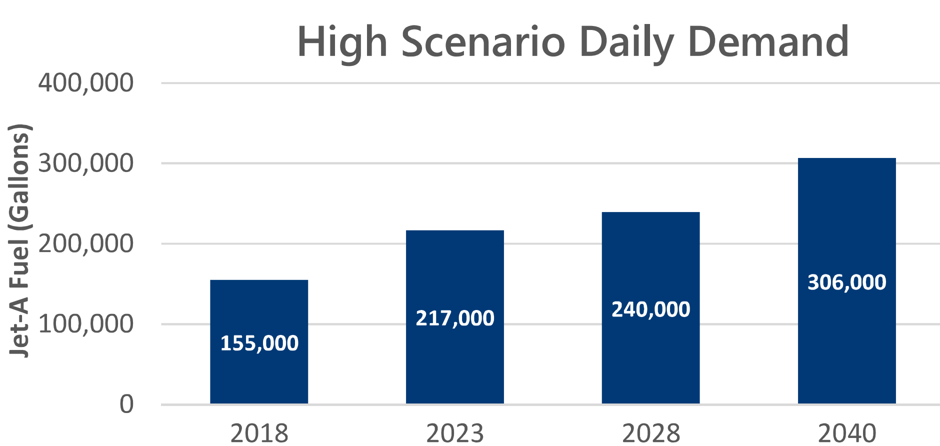
Aircraft Maintenance Requirements

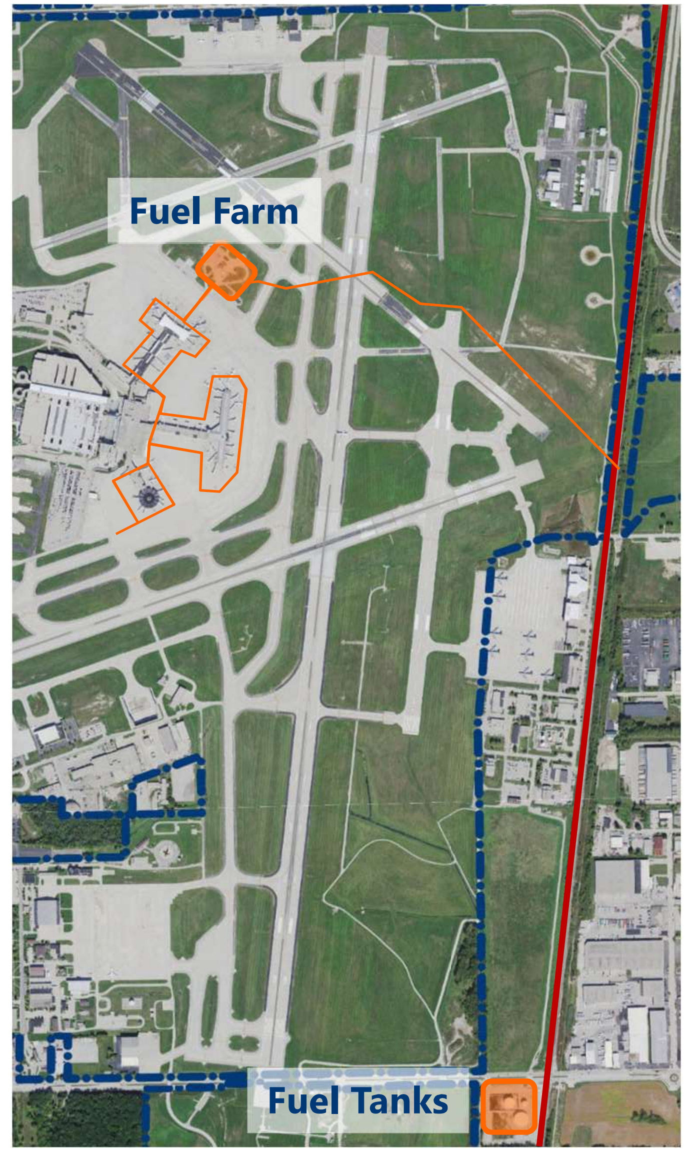
- Potential to consolidate airline maintenance facilities
- Typically, airlines and users determine expansion needs of airline maintenance facilities
- Individual tenants expressed specific needs and requirements
  - Apron area
  - Hangar Space
  - Building/office space
  - Service road management

Fuel Storage Requirements

- Current Jet-A fuel storage capacity: 8M gallons
- Conveyance: 2,400 GPM (meets current demand)







Next Steps

Master Plan Scope

- Demand/Capacity Input → Finalize Facility Requirements
  - Airside (airfield, air traffic, operational)
  - Landside (roadway, access, curbside, parking, rental car, other)
  - Terminal (functional areas and processors)
  - Support Facilities (cargo, general aviation/FBO, FAA, other)
- Alternatives Development and Evaluation

  MKE MILWAUKEE Mitchell International Airport + RICONDO®
- Meet with Advisory Groups to present development alternatives

APPENDIX E.6

Technical Advisory Group (TAG)

Meeting #3

Technical Advisory Group

Meeting #3

MASTER PLAN **2040**

Agenda

- Introductions
- Master Plan Status
- Master Plan Goals
- Alternatives Analysis
  - Component Alternatives
  - Screening
  - Integrated Alternatives
- Break
- Input and Feedback
- Next Steps

Introductions

- *Colleen Quinn, Ricondo*
  Project Manager
- *Michael Truskoski*
  Deputy Project Manager

Introductions

- Technical Advisory Group (TAG)

  TAG Role: Provide input and feedback on technical aspects of the master planning analyses and conclusions.

Meeting Objective

- *Share conceptual development alternatives*
- *Gather specific feedback to inform eventual identification of preferred alternative*

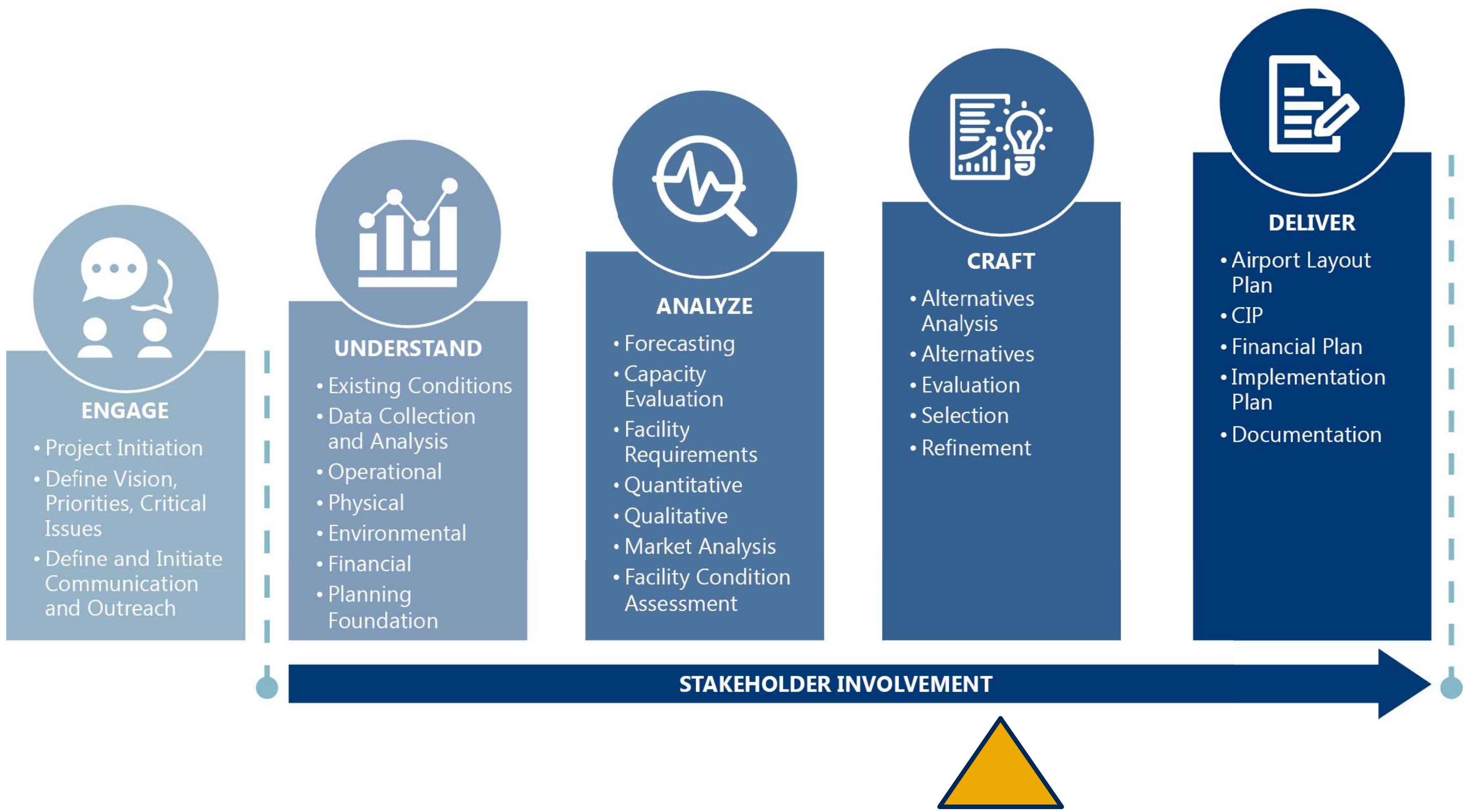
Master Plan Process

- FAA-guided process

> *The goal of a master plan is to provide the framework needed to guide future airport development that will cost effectively satisfy aviation demand, while considering potential environmental and socioeconomic impacts.*
>
> *FAA AC 150/5070-6B, Airport Master Plans*

- Unique to the issues and challenges faced by MKE
- Objectives
  - Forecast activity
  - Define and justify proposed development
  - Provide effective graphic representation of development (ALP Drawing)
  - Establish realistic implementation schedule
  - Propose an achievable financial plan
  - Establish a flexible framework for continued planning and decision-making

Master Plan Status



Master Plan Goals

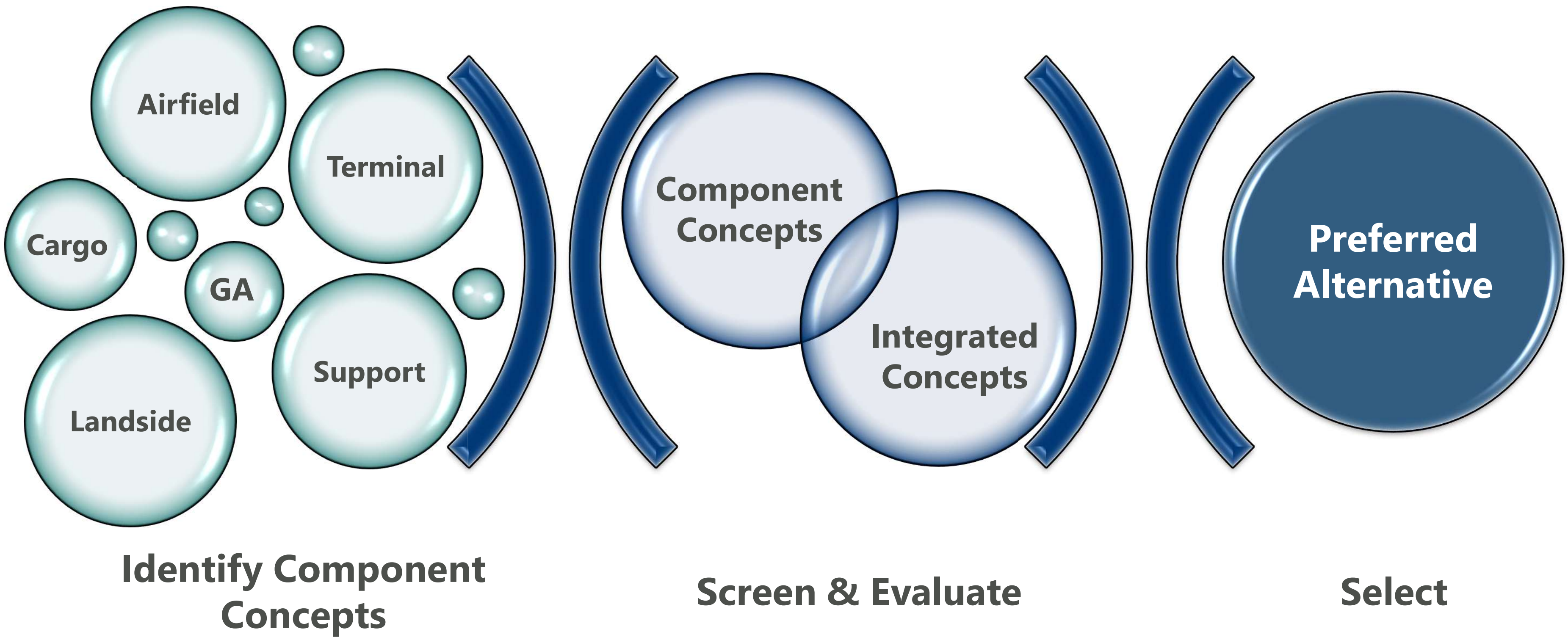
Master Plan Goals - DRAFT

- Affirm a **future-focused airport** that supports aviation growth in a safe, efficient, and cost-effective manner through an organized and synergistic long-range development plan.
- Recognize opportunities to **enhance the sustainability, resiliency, and environmental sensitivity** with continued growth of MKE.
- Seek opportunities for **enhanced customer and passenger experience**.
- **Optimize infrastructure and resources** in an operationally, financially, and sustainable manner.
- Adopt **scalable development plans** that flexibly accommodate variations in demand and technology over the planning horizon.
- Protect **long range utility** of the Airport (post-2040).
- Recognize opportunities for enhanced **non-aeronautical revenue generation** in the utilization of MKE property and amplify the revenue-generating potential of Airport property.
- Define a long-range development plan that **reflects MKE's role in the community** and recognizes diversity in community stakeholder priorities.

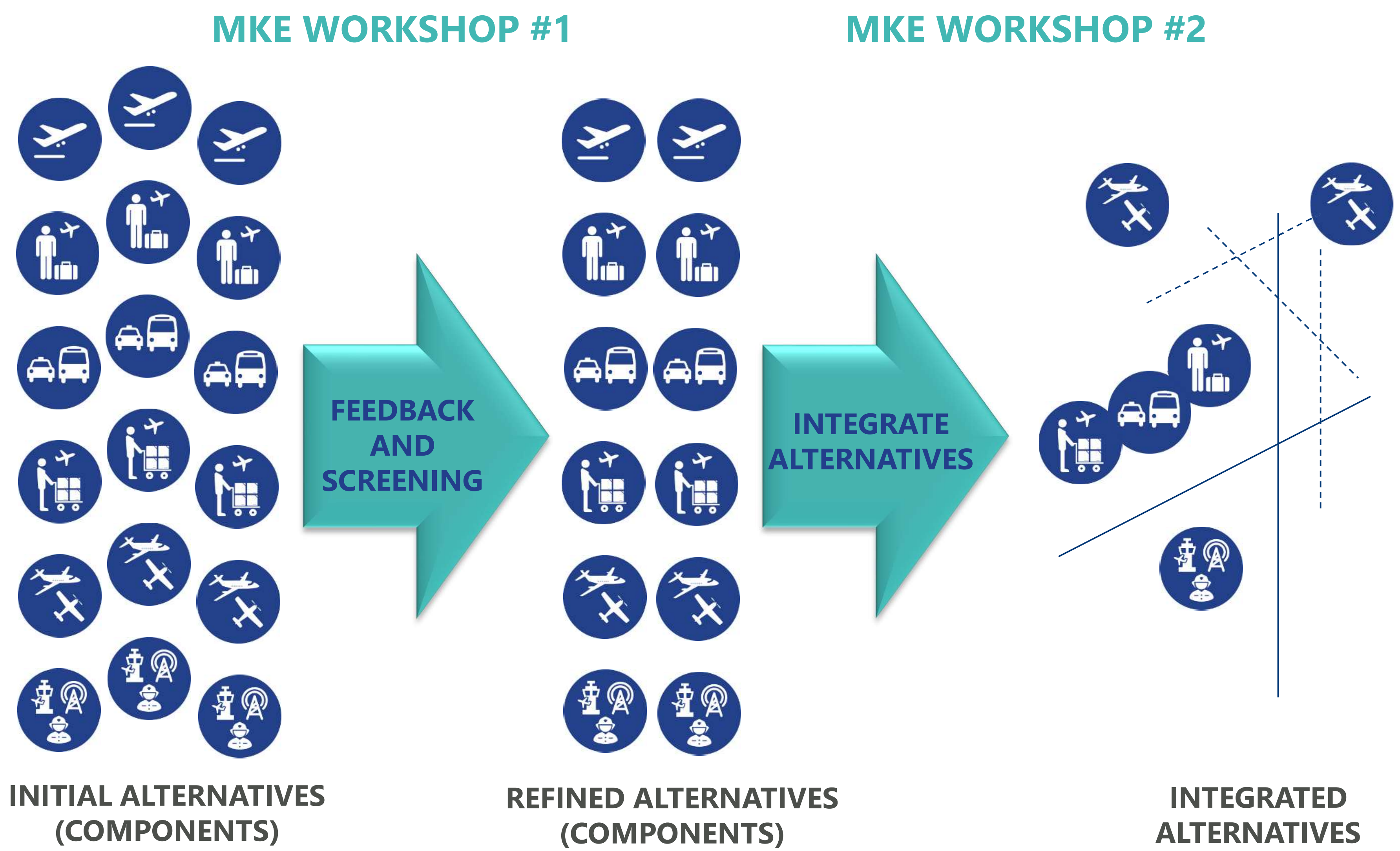
Alternatives Analysis

Alternatives Analysis Process

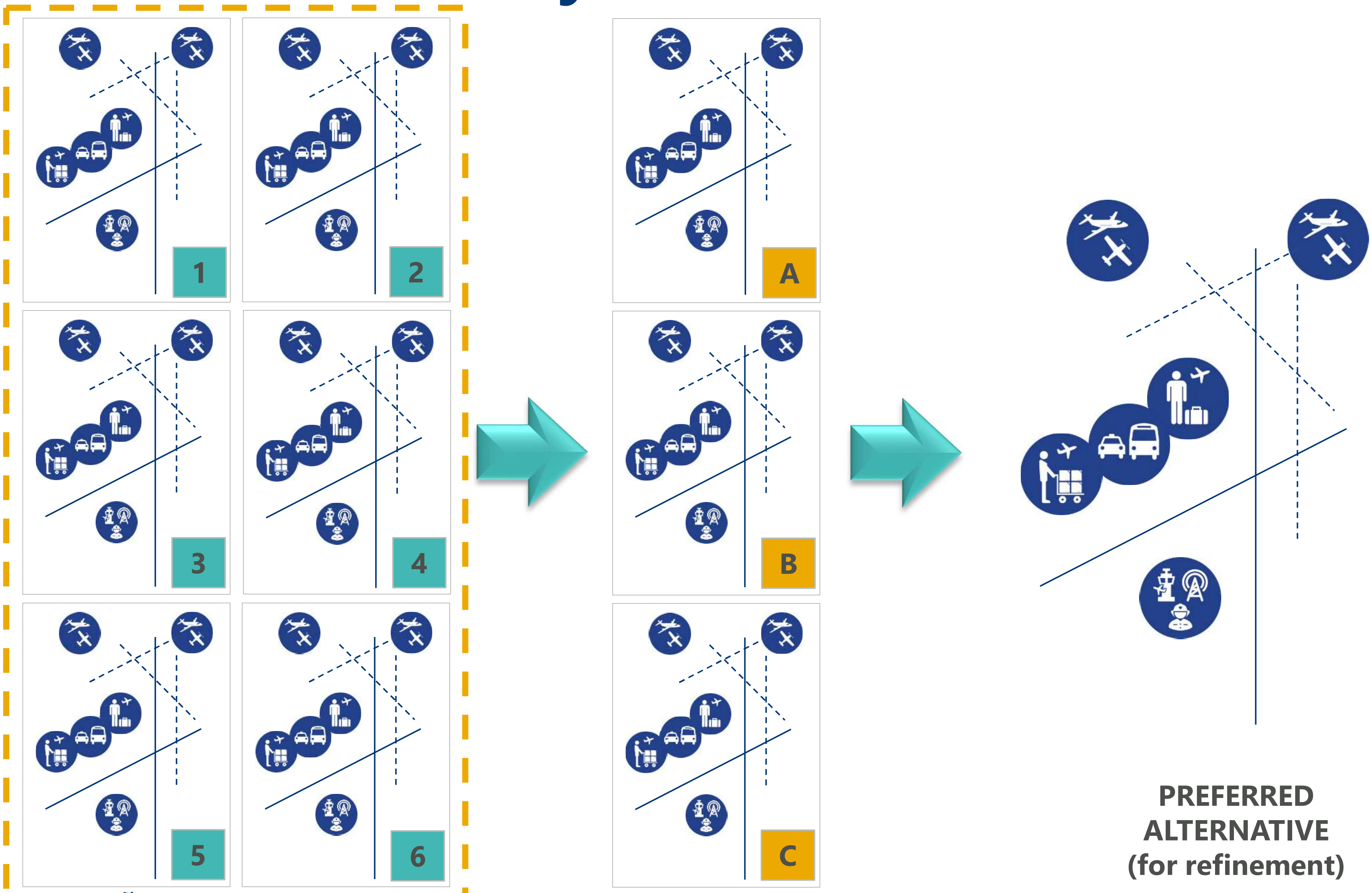
- Iterative and collaborative process
- Meet MKE's development needs, improving the airport as a system
- Align with Master Plan Goals



Alternatives Analysis Process

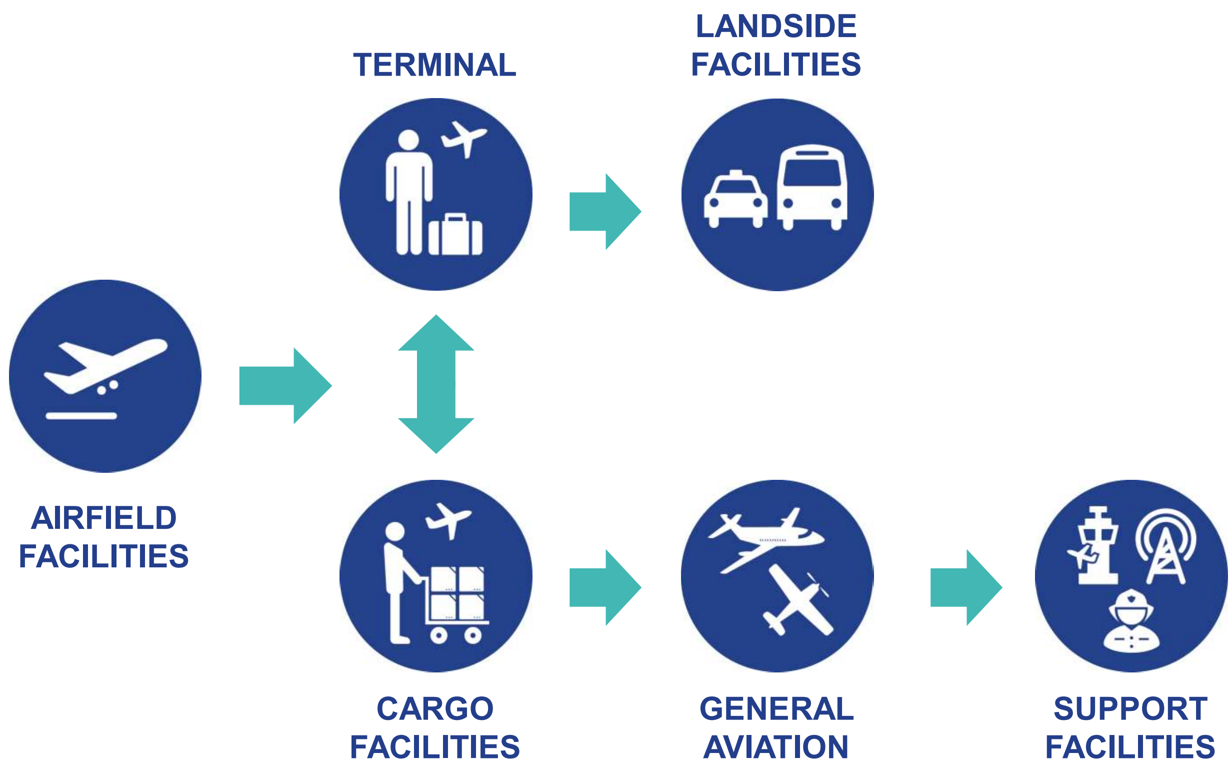


Alternatives Analysis Process



Alternatives Analysis Process

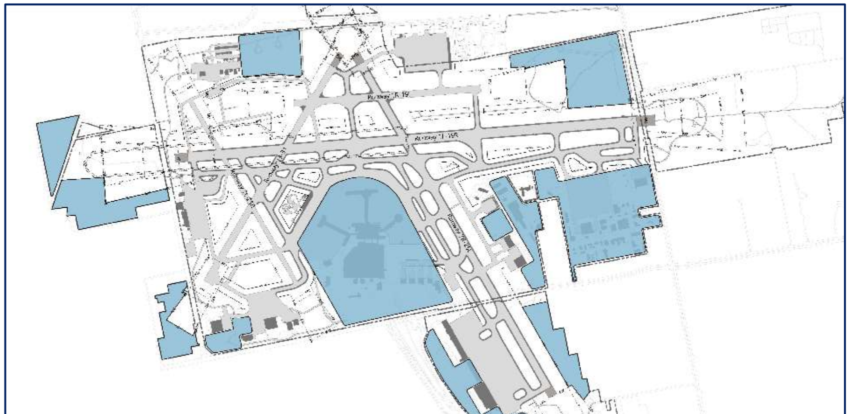
- Meet defined aeronautical needs and Airport development priorities
- Comply with FAA criteria
- Consider operational safety and efficiency
- Recognize hierarchy among facilities



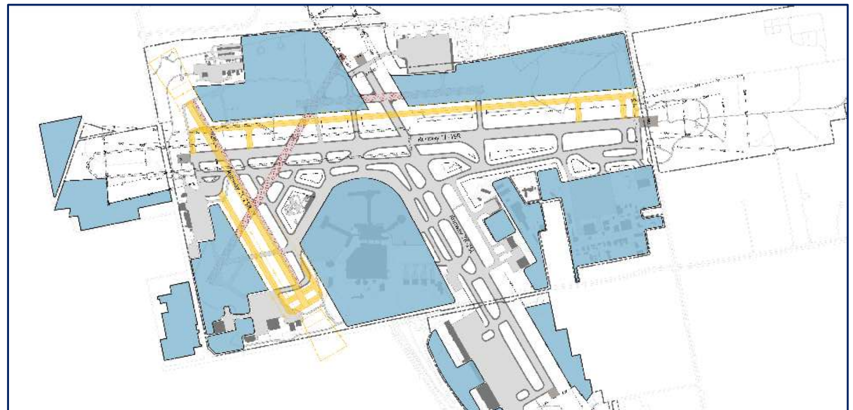
Alternatives Analysis: Facility Development Considerations

- Right-sizing facilities
- Critical dimensions, zones, and clearances (FAA guidance)
- Airspace protection (height restriction)
- Aircraft access and circulation
- Customer journey / experience
- Vehicular access
  - Secure / non-secure areas
  - Elevation and grade differences
- Highest and best use
- Operational characteristics / environment (similar/dissimilar)
- Implementation
- Other

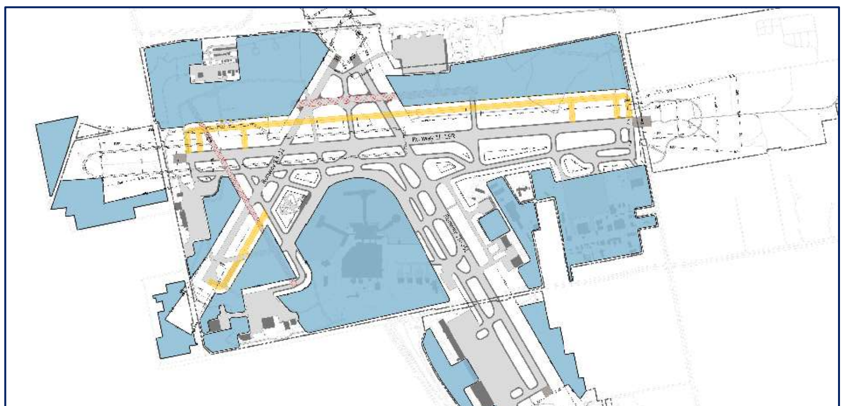
Alternatives Analysis: Candidate Development Zones



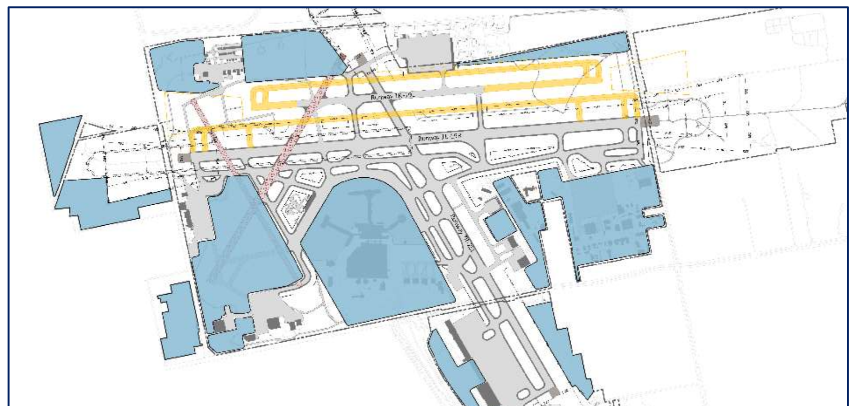
Existing Airfield



Alternative 3C Airfield
Decommission RW 13-31 & RW 1R-19L



Alternative 3B Airfield
Decommission RW 7L-25R & RW 1R-19L



Alternative 3E Airfield
Decommission RW 13-31 & RW 7L-25R

Component Alternatives

Airfield, Terminal, Landside, and Support Facilities

Airfield Challenges

- Right size airfield
- Wind coverage (FAA guidance: 95%)
- Align airfield capacity with forecast of activity
- Protect ability to increase capacity post-2040, based on Annual Service Volume
  - Airfield configuration
  - Airspace protection
- Compliance with current FAA standards
- 10,000 foot runway length
- Off-gate aircraft deicing operation

Annual Airfield Utilization (2017)

Category	1L-19R		7R-25L		7L-25R		13-31		1R-19L		Total	
Heavy [1]	1,407	1.30%	850	0.80%	0	0.00%	1	0.00%	0	0.00%	2,260	2.10%
Large Jet	48,938	44.90%	30,402	27.90%	16	0.00%	50	0.00%	25	0.00%	79,431	72.90%
Large Prop	220	0.20%	178	0.20%	48	0.00%	11	0.00%	1	0.00%	458	0.40%
Small+ Jet	5,819	5.30%	3,397	3.10%	10	0.00%	212	0.20%	5	0.00%	9,443	8.70%
Small+ Prop	3,408	3.10%	3,034	2.80%	839	0.80%	178	0.20%	45	0.00%	7,504	6.90%
Small Prop	2,670	2.50%	2,272	2.10%	1,525	1.40%	255	0.20%	110	0.10%	6,830	6.30%
Other [2]	1,362	1.30%	697	0.60%	652	0.60%	136	0.10%	145	0.10%	2,992	2.70%
TOTAL	**63,824**	**58.60%**	**40,830**	**37.50%**	**3,090**	**2.80%**	**843**	**0.80%**	**331**	**0.30%**	**108,918**	**100.00%**

NOTES:

1 Includes large military aircraft such as the Boeing C-135 Stratolifter or comparable aircraft type.

2 Includes other military aircraft and helicopters.

SOURCES: Milwaukee County, General Mitchell International Airport Noise Program Office, L3Harris EnvironmentalVue, calendar year 2017; Ricondo & Associates, Inc., July 2019.

Aircraft Weight Category	Aircraft Weight Range	Representative Aircraft Types
Heavy	MTOW ≥ 300,000 lbs	Wide body
Large	41,000 lbs < MTOW < 300,000 lbs	Narrow body, regional jet, large prop, large private jet
Small+	12,500 lbs < MTOW < 41,000 lbs	Small private jet, large private prop
Small	MTOW ≤ 12,500 lbs	Small private prop

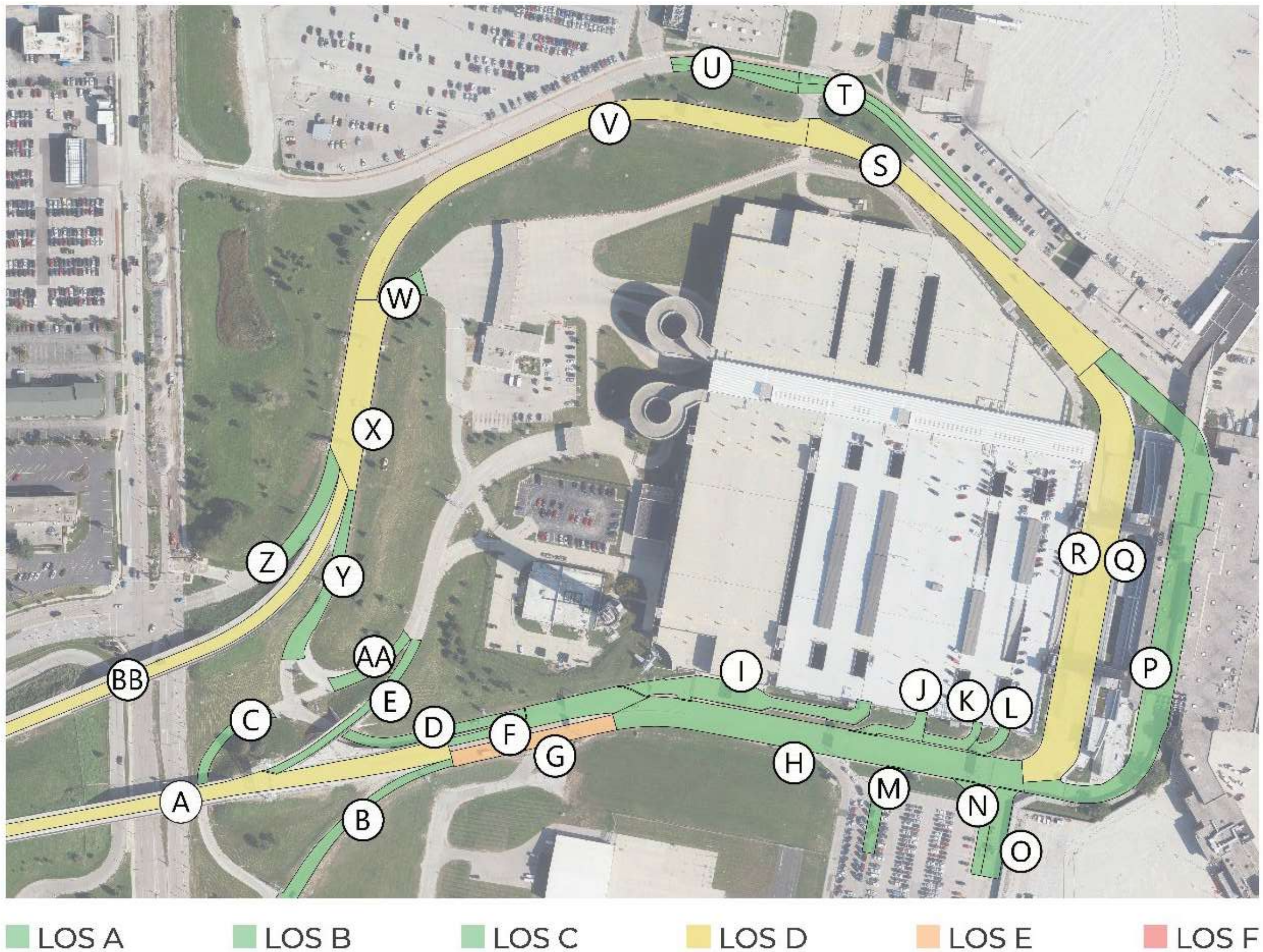
Terminal Area Challenges

- Concourse E integration (project in design)
- Security Checkpoint (SSCP) Consolidation potential
- Additional gates: +4 to +10 gates, depending on operational assumptions (portion of gate need will be met by Concourse E)
- Integration of near-term gating considerations
- Aircraft parking flexibility
- Defined 2040 space needs
  - Holdroom and passenger amenities spaces/dimensions
  - Additional check-in positions required after 2028
  - Additional SSCP lanes required by 2028 (Concourse C, if no consolidation)
  - Additional 10,000-15,000 sq ft baggage make-up space required (through 2040)
- Long-term balance of airfield, terminal and landside capacity

Landside Challenges

- Qualitative
  - Create “front-door” visibility at MKE entrance
  - Existing parking structure constructed in 3 separate projects
  - Driver experience and ease of wayfinding (complexity of navigation)
  - Simplify access along Howell Ave. and Airport Spur
  - Airport Spur presents horizontal and vertical constraints
  - Long-term balance of airfield, terminal and landside capacity
- Quantitative
  - Curbside and on-airport roadway congestion during peak periods
  - Potential for consolidation of facilities (CONRAC and/or Ground Transportation Center [GTC])
  - Potential for changes access in modes utilizing terminal roadway and curbfront
  - Limited sight distances and vehicle weave distances
  - Additional public parking required (2,600-4,600 spaces by 2040)

Landside Challenges



Note: Roadway segment LOS reflects high scenario forecast activity.

General Aviation Challenges

- Qualitative
  - Flexibility and scalability
  - Consolidation – operational similarity and efficiency
  - Runway access
  - Tenant-driven development
  - Long-range growth opportunities/capabilities
  - Landside (non-secure) access
- Quantitative
  - Future demand concentrates around large general aviation aircraft
  - Existing unmet demand

Cargo Facilities Challenges

- Qualitative
  - Flexibility and scalability
  - Physically constrained environment
  - Inefficient facility configuration for some tenants
  - Long-range expansion opportunity/capability
  - Ramp congestion and facility adjacency challenges
- Quantitative
  - Planned cargo ramp expansion
  - Landside adequacy for larger transportation vehicles (truck maneuvering)
  - Existing unmet demand

Support Facilities Challenges

- Qualitative
  - Preserve flexibility for demand-based expansion
  - Flexibility and scalability
  - Snow removal vehicle staging on taxiway
  - Jointly utilized airport maintenance facilities (County Highway Department)
  - Tenant-driven development (airline maintenance)
- Quantitative
  - Maintenance area expansion and consolidation of facilities

Support Facilities include:

- *Airport Maintenance*
- *Aircraft Maintenance*
- *Airport Operations*
- *Airport Administration*
- *Aircraft Rescue & Fire Fighting*
- *FAA/TSA/CBP*
- *Other*

Representative Component Alternatives Screening Criteria

- Identify component ideas that have limited utility or are not sufficiently strong to carry forward into broader alternatives
- Recognize that not all components are compatible with other ideas and components
- Alternatives that cannot meet the identified requirements are typically eliminated from further consideration
- Consider how component ideas support Master Plan Goals or lack alignment
- Qualitative and comparative consideration of capital investment
- Potential for environmental consequence
- Community interface/compatibility
- Phasing/implementation
- Required adjacencies and dependencies (including enabling work)
- Connection to Existing Infrastructure
- Customer journey/experience

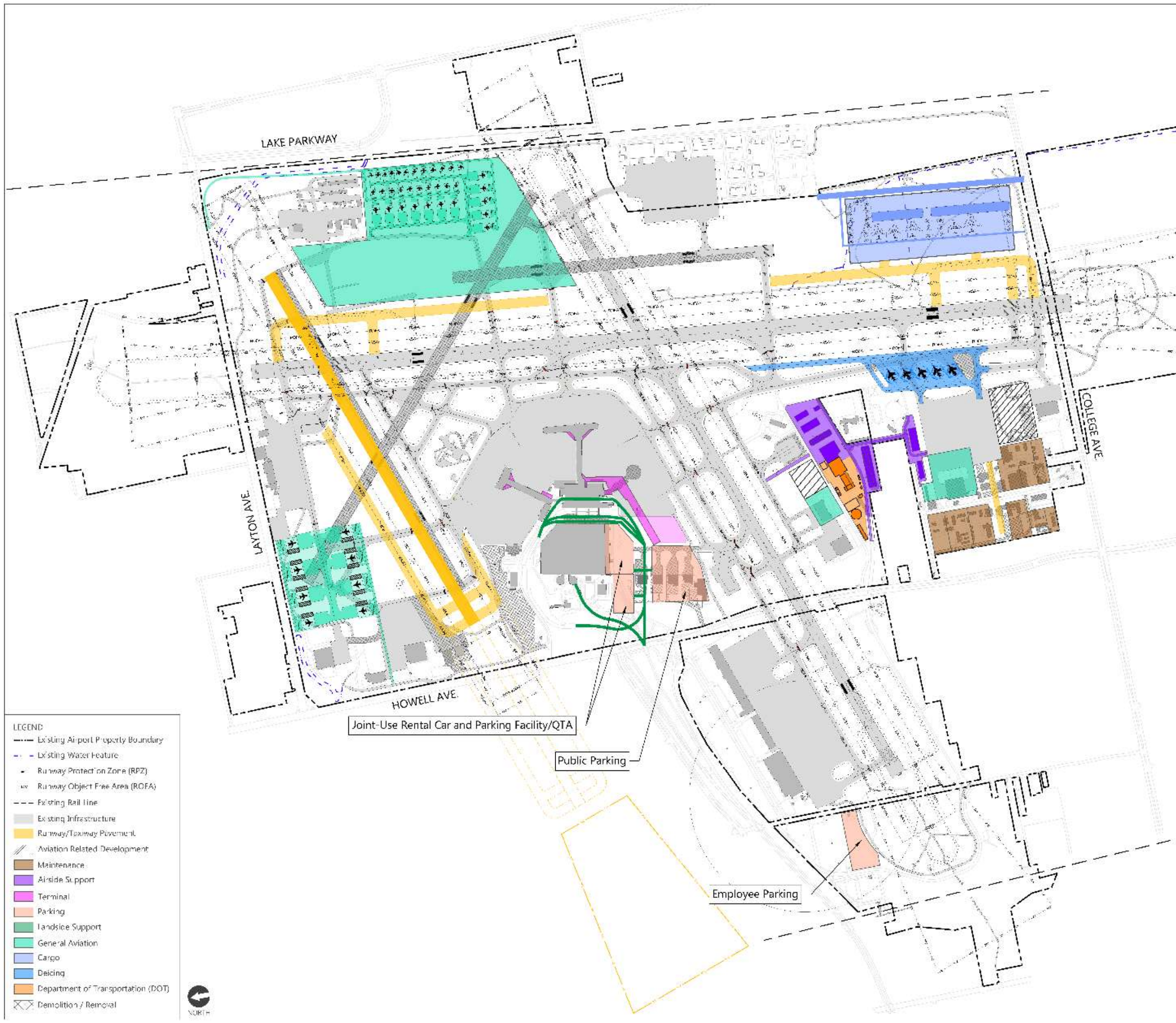
Integrated Alternatives

Integrated Alternative 1

PROS
- Centralized Deicing operation (near terminal)
- GA development located with existing
- Partial consolidation of airline maintenance activity
- Convenient parking and rental car expansion
- Improved segregation of traffic
- Terminal area expansion to the north
- Shifts cargo truck traffic from Howell/Airport Spur.
- Significant area of former 440th (MKE Business Park) available for development.
- No land acquisition required

CONS
- Constrained long-term airfield capacity
- Requires use of Guard West
- 13-31 active leaves northwest corner with limited future development
- Constrained long-term expansion of Concourse E
- Runway crossing required for cargo aircraft pad deicing

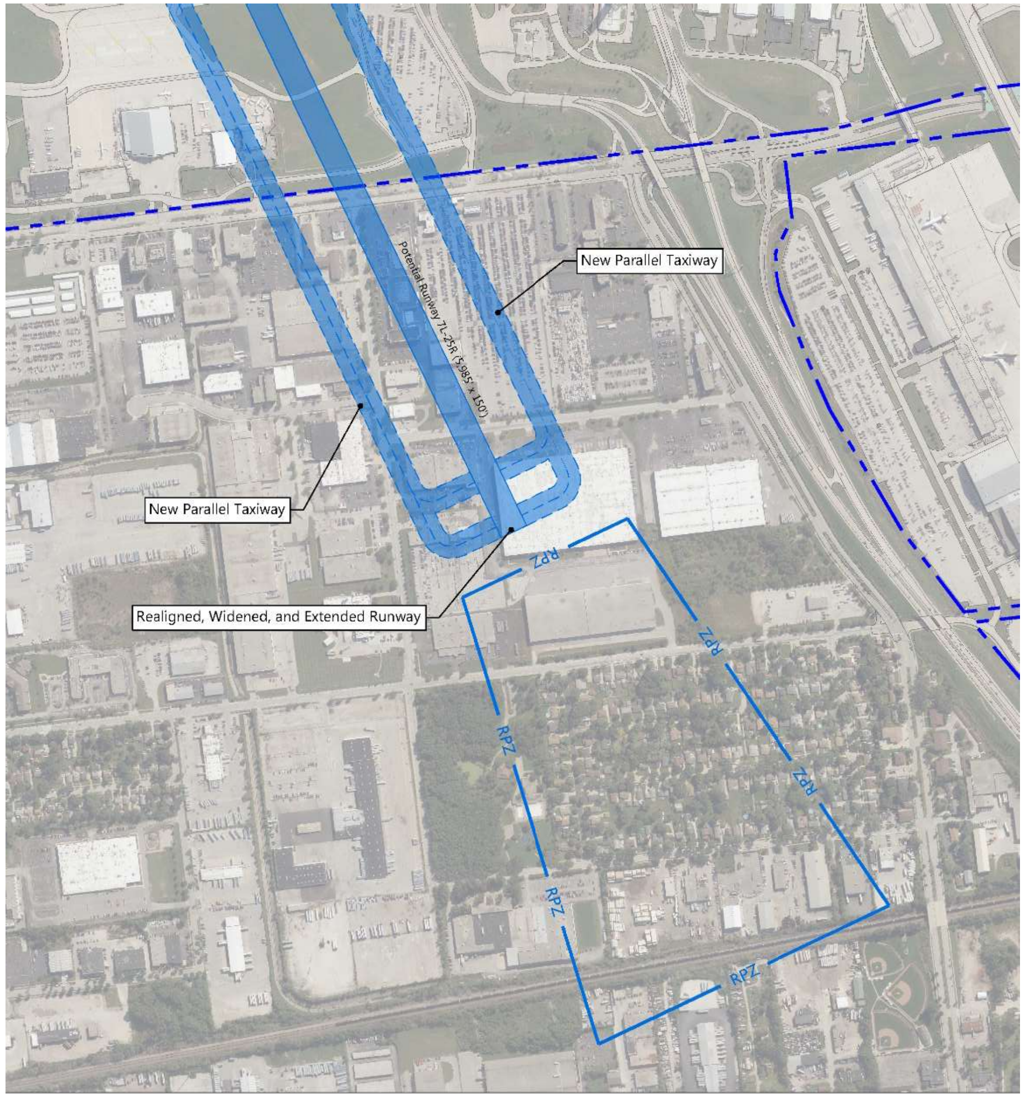
Integrated Alternative 2



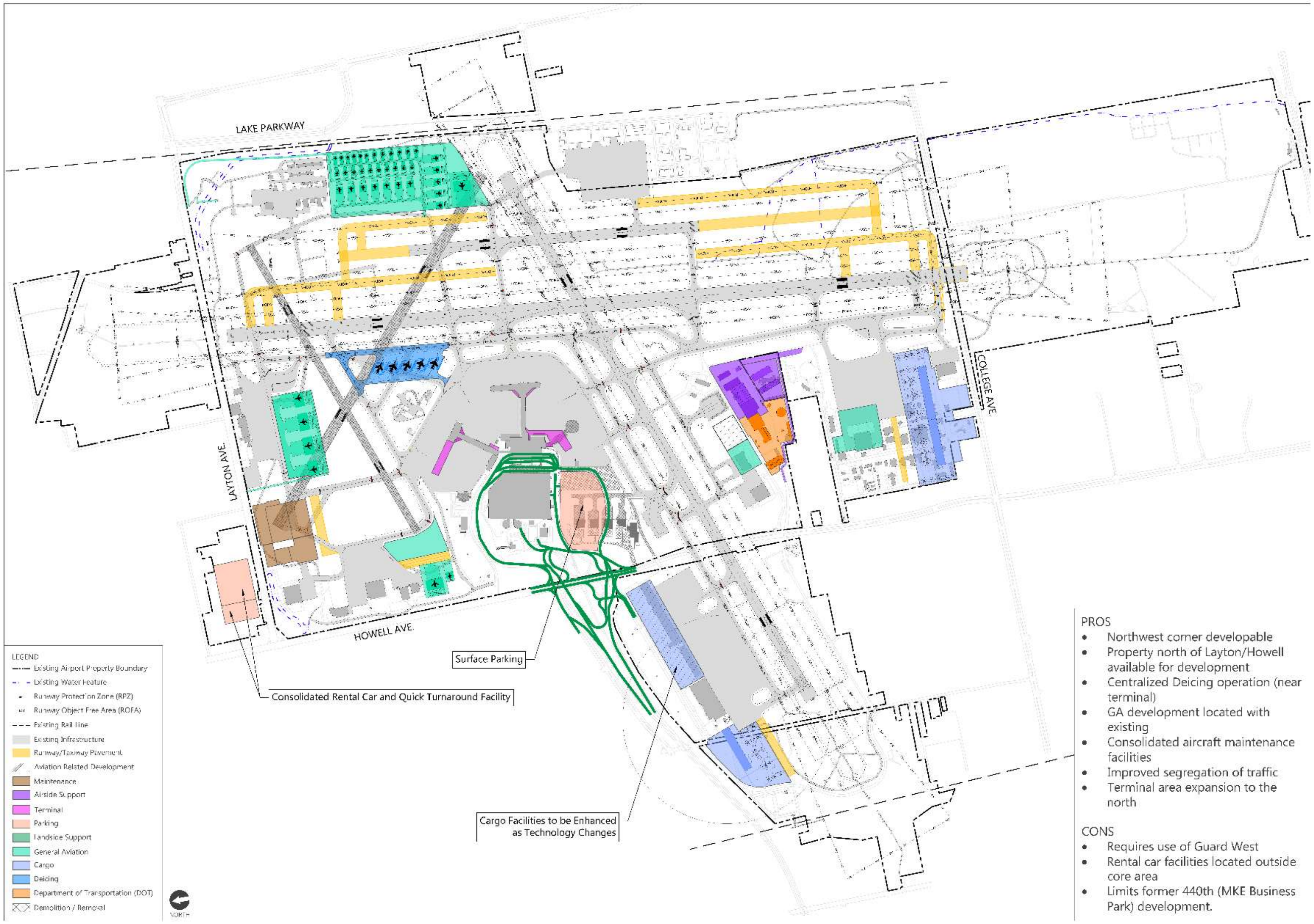
PROS
- Northwest corner developable
- Expanded east-side development potential
- Property north of Layton/Howell available for development
- Deicing near most-utilized runway in winter ops
- Convenient parking and rental car expansion.
- Efficient roadway operation
- Consolidated aircraft maintenance facilities (south ramp)
- Shifts cargo truck traffic from Howell/Airport Spur.
- GA development located with existing
- Increased flexibility and operational utility of 7L-25R (with shift).

CONS
- Limited long-term gate expansion
- Fully utilizes former 440th (MKE Business Park) development
- Displaces employee parking.

Integrated Alternative 2 – 7L-25R Ultimate



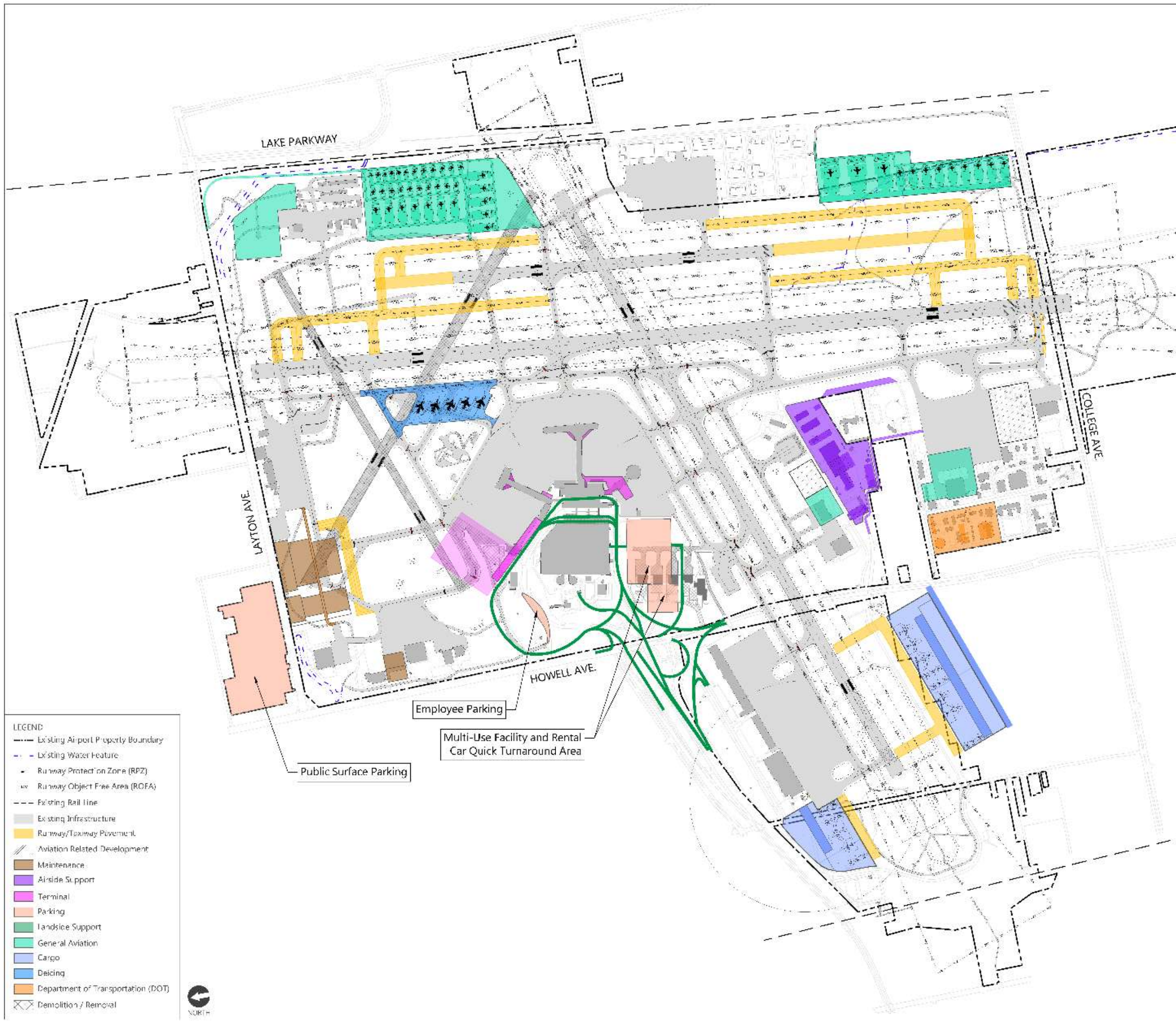
Integrated Alternative 3



PROS
- Northwest corner developable
- Property north of Layton/Howell available for development
- Centralized Deicing operation (near terminal)
- GA development located with existing
- Consolidated aircraft maintenance facilities
- Improved segregation of traffic
- Terminal area expansion to the north

CONS
- Requires use of Guard West
- Rental car facilities located outside core area
- Limits former 440th (MKE Business Park) development.

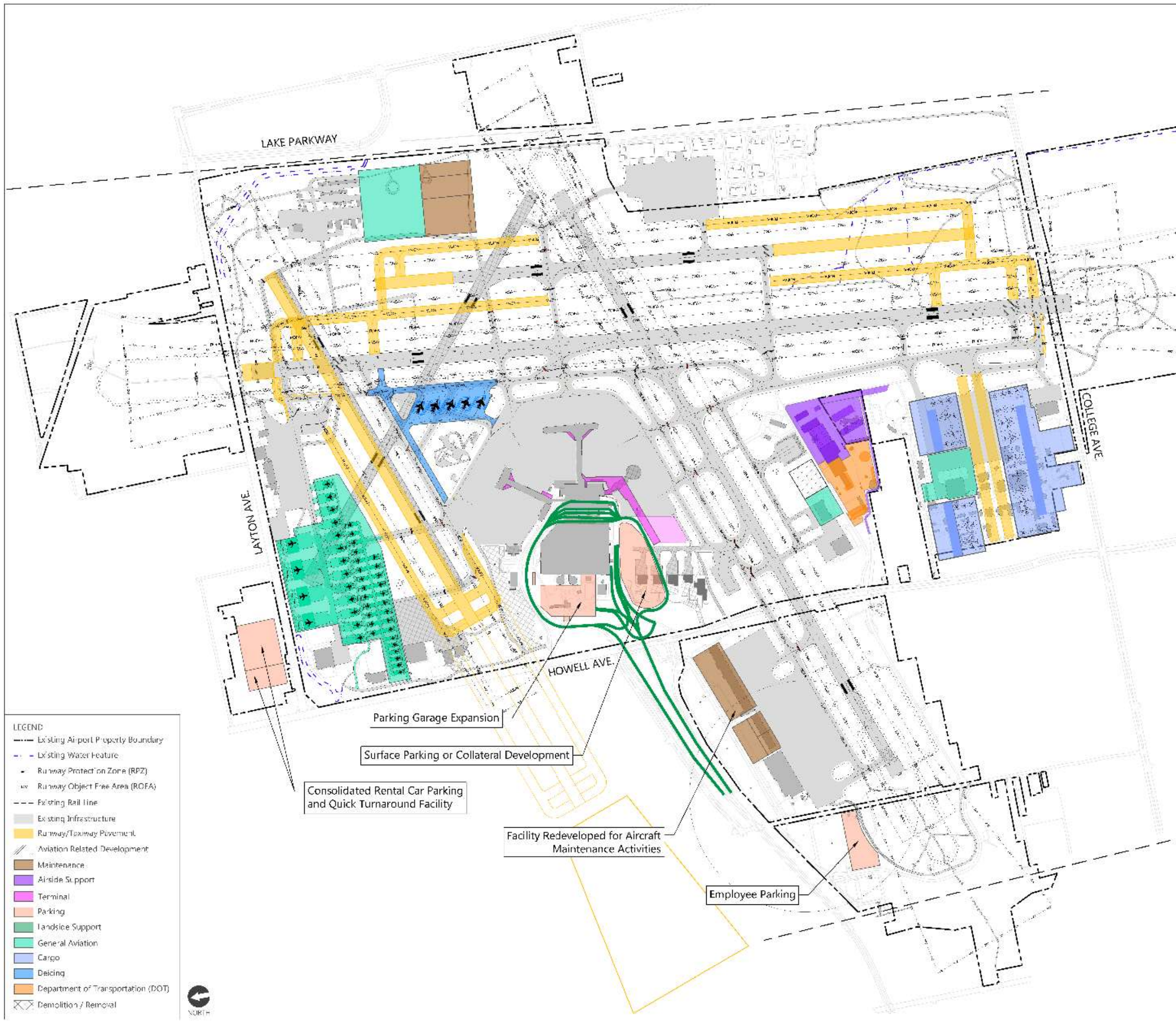
Integrated Alternative 4



PROS
- Northwest corner developable
- Property north of Layton/Howell available for development
- Terminal area expansion to the north
- Centralized Deicing operation (near terminal)
- Consolidated aircraft maintenance facilities
- Convenient Rental Car expansion
- Optimizes airport maintenance campus
- Simplifies traffic flow and wayfinding

CONS
- Fragmented GA development
- Land acquisition required for cargo (southwest) and GA (south east)
- Remote parking expansion
- Limits former 440th (MKE Business Park) development.

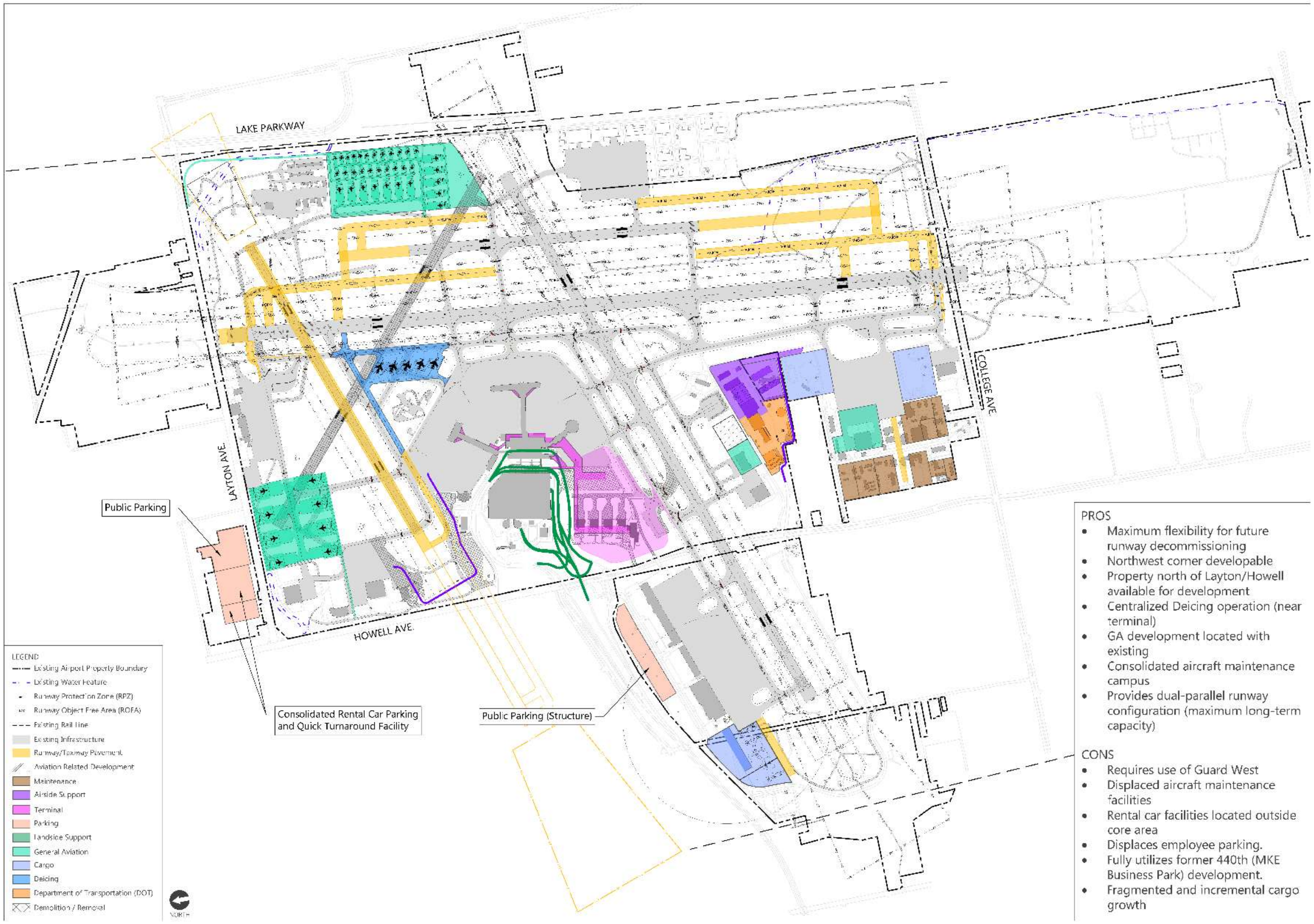
Integrated Alternative 5A



PROS
- Maximum flexibility for future runway decommissioning
- Northwest corner developable
- Property north of Layton/Howell available for development
- Centralized Deicing operation (near terminal)
- GA development located with existing
- Consolidated cargo operations (southwest)
- Provides dual-parallel runway configuration (maximum long-term capacity)
- Shifts cargo truck traffic from Howell/Airport Spur.
- Consolidated aircraft maintenance campus

CONS
- Rental car facilities located outside core area
- Requires use of Guard West
- Restricted long-term development areas
- Displaced aircraft maintenance facilities
- Fully utilizes former 440th (MKE Business Park) development.
- Displaces employee parking.

Integrated Alternative 5B



PROS
- Maximum flexibility for future runway decommissioning
- Northwest corner developable
- Property north of Layton/Howell available for development
- Centralized Deicing operation (near terminal)
- GA development located with existing
- Consolidated aircraft maintenance campus
- Provides dual-parallel runway configuration (maximum long-term capacity)

CONS
- Requires use of Guard West
- Displaced aircraft maintenance facilities
- Rental car facilities located outside core area
- Displaces employee parking.
- Fully utilizes former 440th (MKE Business Park) development.
- Fragmented and incremental cargo growth

Integrated Alternatives Discussion

- Which elements of the alternatives align with your priorities?
- What aspects of the alternatives/elements are considered to be strengths?
- What aspects of the alternatives/elements are considered to be challenging?
- Are there elements of specific alternatives that could be combined more productively?
- Are there concerns with anticipated stakeholder and community response?
- Is there any alternative/element perceived to be missing?
- Other?

Discussion Objective: Gather advisory group input and feedback on alternatives and priorities → consider this input and feedback in the shortlisting and evaluation of alternatives.

Break

Integrated Alternatives Discussion

- Which elements of the alternatives align with your priorities?
- What aspects of the alternatives/elements are considered to be strengths?
- What aspects of the alternatives/elements are considered to be challenging?
- Are there elements of specific alternatives that could be combined more productively?
- Are there concerns with anticipated stakeholder and community response?
- Is there any alternative/element perceived to be missing?

Your input is critical – feedback strengthens MP outcomes.

Discussion Objective: Gather advisory group input and feedback on alternatives and priorities → consider this input and feedback in the shortlisting and evaluation of alternatives.

Next Steps

Next Steps

- Public Open House (est. January 2020)
- Shortlist Alternatives

MKE MILWAUKEE Mitchell International Airport + RICONDO® → 3rd Workshop

- Select Preferred Alternative
- Refine Preferred Alternative

APPENDIX E.7

Combined Technical Advisory Group (TAG) and Stakeholder Advisory Group (SAG) Meeting #4

Advisory Group Meeting #4

September 25, 2020

MASTER PLAN **2040**

MKE MILWAUKEE

Webinar Features

- Presentation/interactive format
- Questions and comments
  - Q&A
  - Raise Hand
- Distribute presentation following meeting

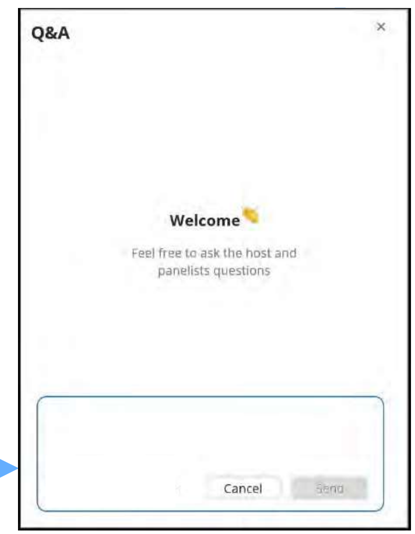
Presenters
- *Colleen Quinn, Ricondo*
- *Michael Truskoski, Ricondo*

Panelists
- *Brian Dranzik, MKE*
- *Kim Berry, MKE*
- *Wendy Hottenstein, WisDOT*
- *Sandy Lyman, FAA*
- *Chad Oliver, FAA*

GOAL: Engage as interactively as possible given the webinar format

Presenter will share your question and unmute you

Presenter will unmute you for question/comment



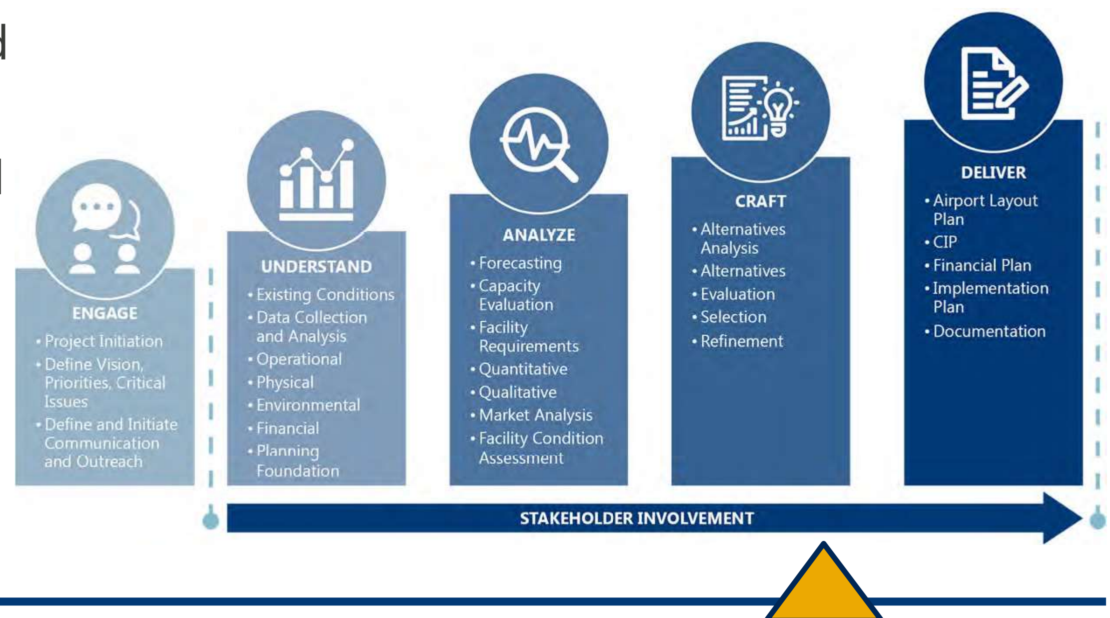
Agenda and Objectives

Agenda

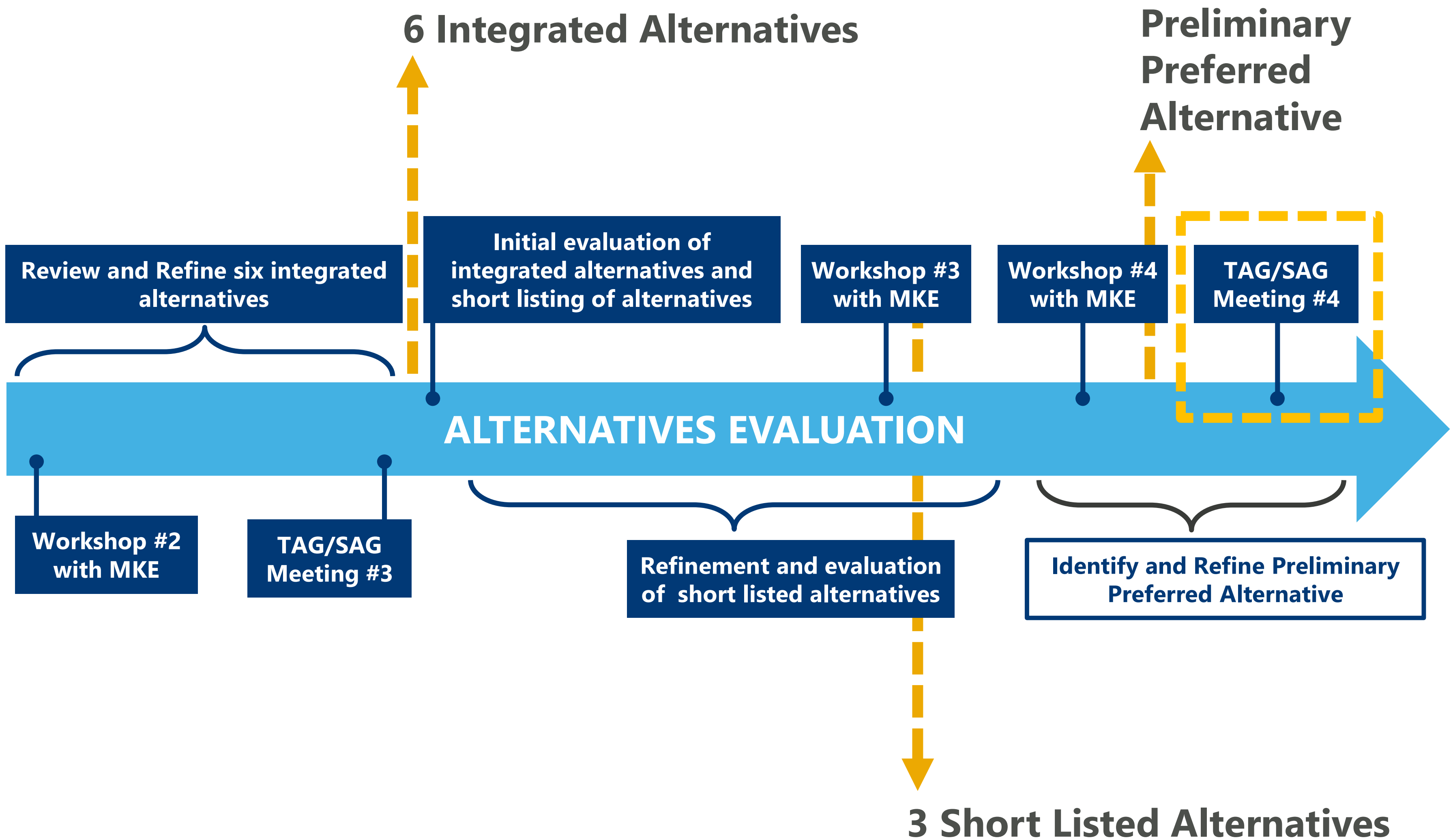
- Review project status
- Alternatives analysis
  - Review six integrated alternatives
  - Review three short-listed alternatives
- Identify preliminary preferred alternative
- Discuss preliminary preferred alternative
- Next Steps

Objectives

- Gather Advisory Group Input
  - Preliminary preferred alternative
  - Considerations for the refinement of the preliminary preferred alternative



Alternatives Analysis and Refinement Process



Short List of Integrated Alternatives

Principal Drivers - Initial Alternatives Evaluation

- Right-size airport facilities while accommodating 2040 demand
- Maintain long-term flexibility and scalability for all airport features
- Consolidate operationally similar facilities and activities where appropriate
- Prioritize customer convenience and experience
- Consider post-2040 development/capacity potential
- Accommodate future development within current MKE property boundary
- High-level assessment of six integrated alternatives – 12 criteria

FOCUS: Right-sizing of MKE to align with forecast demand, preserving the flexibility to respond to changes and accommodate post-2040 needs

Initial Evaluation Criteria

Flexibility: Ability of the concept to efficiently accommodate facility development that emerges differently than planned (timing, location, size, other) without adversely impacting dependent or adjacent facilities or conceptual development

Right Sizing: Effectiveness of the concept in optimizing long-term facility development, balancing capacity with forecast aeronautical demand

Relative Cost: Relative measure of comparative capital investment to implement the full concept (detailed cost estimates will be developed in subsequent evaluation steps)

Operational Efficiency: Measure of the relative efficiency of activity and operations (airfield, terminal, landside, and supporting facilities) if the concept is fully implemented

Implementation Complexity: Measure of the relative complexity of project and full-concept implementation considering project dependencies, required enabling projects, operational impacts during construction, and related considerations

Long-term Expandability: Ability of the concept to efficiently and effectively accommodate demand-driven development beyond the 2040 planning horizon, maintaining a balance among airfield, terminal, and landside facility capacities

Initial Evaluation Criteria

Collateral Development Potential: Ability of the concept to accommodate non-aeronautical, revenue-generating development on Airport-owned land that is not required to satisfy aviation demand

Compatibility with Adjacent Land Uses: Relative measure of the compatibility of the concept with adjacent and proximate land uses in the vicinity of the Airport

Landside Wayfinding: Relative measure of the complexity of wayfinding for Airport users considering arrival, departure, circulation, recirculation, and access decision points

Facility Consolidation : Relative measure of the effectiveness of the concept in consolidating similar facilities and operations in organized areas of the Airport, considering airside and landside activities associated with various facilities

Sustainability: Relative measure of the environmental, social, operational, and economic aspects and enhancements associated with the long-term development of the concept (focus on meeting present needs without compromising the ability to meet future needs)

Land Acquisition Requirement: Relative measure of the amount of additional land required to accommodate concept development

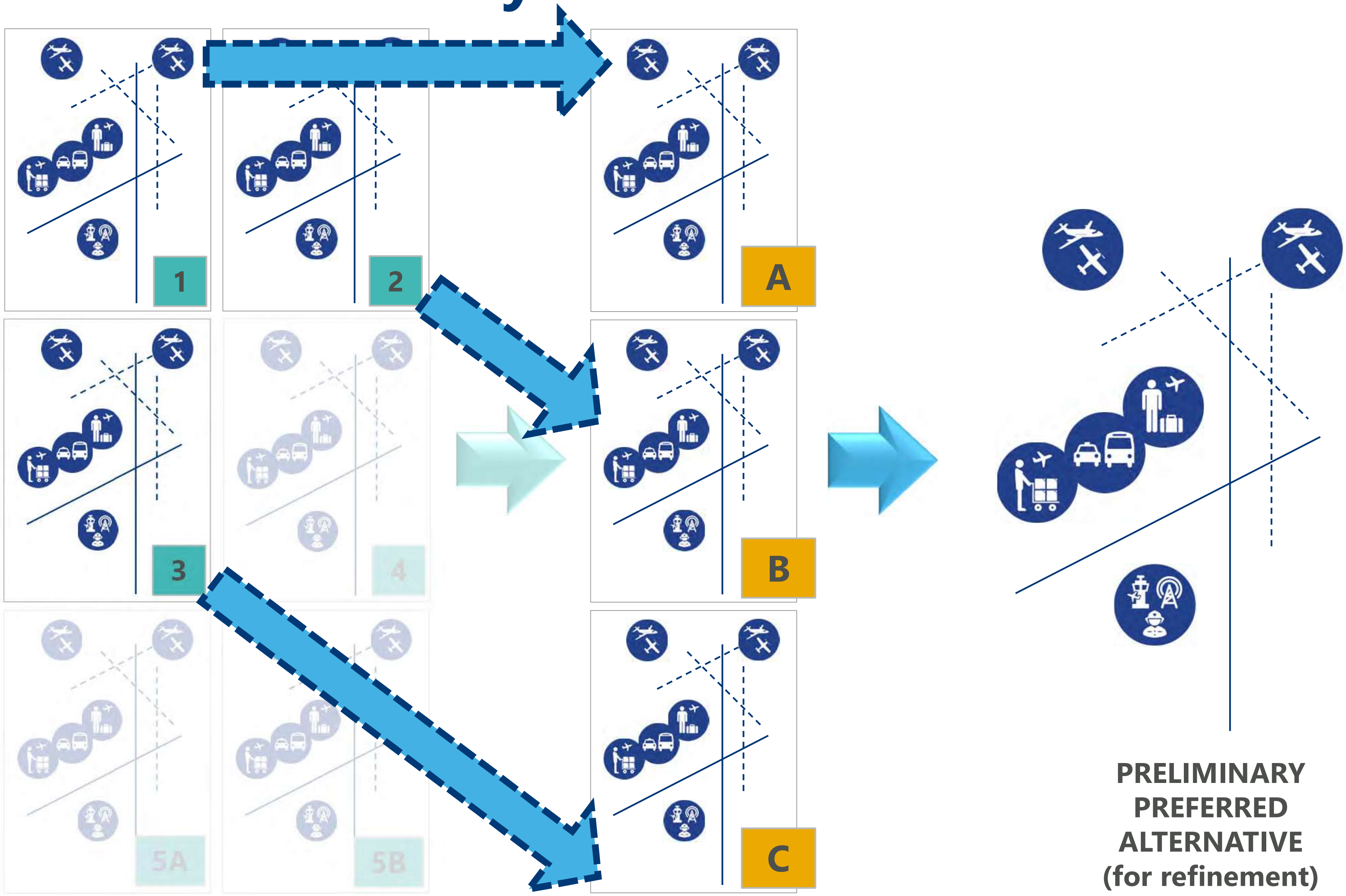
Initial Evaluation Summary

- Initial evaluation identified alternatives to carry forward for further evaluation
- Considered quantitative and qualitative criteria
- Conducted in conjunction with MKE staff in workshop to generate short list and areas of potential refinement

Initial Evaluation Matrix

	Alternative Number					
Initial Evaluation Criteria	**1**	**2**	**3**	**4**	**5A**	**5B**
Flexibility						
Right-sizing						
Relative Construction Cost						
Operational Efficiency						
Implementation Complexity						
Long-term Expandability						
Collateral Development Potential						
Compatibility with Adjacent Land Uses						
Landside Roads and Wayfinding						
Facility Consolidation						
Sustainability/Environemntal						
Requires Land Acquisition						

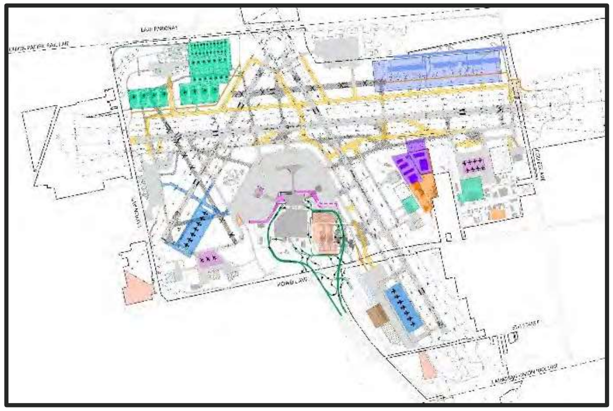
Alternatives Analysis and Refinement Process



Evaluation of Shortlisted Alternatives

Shortlisted Alternatives

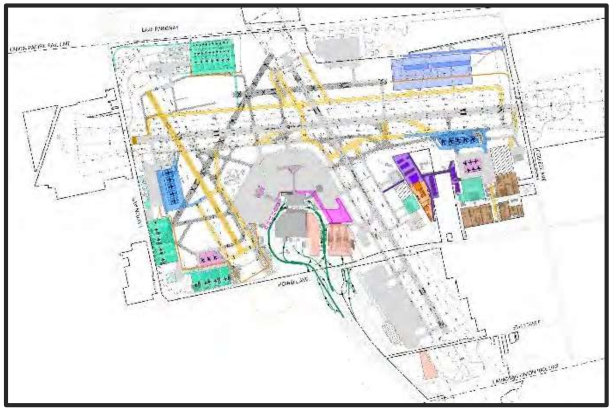
Alternative A
(previously Alternative 1)



- Three Runway Alternative

  1L-19R | 13-31 | 7R-25L
- Deicing: Northwest | West
- Cargo: Southeast
- GA: Northeast
- Parking/RAC: Terminal Core with Layton/Howell Parcel

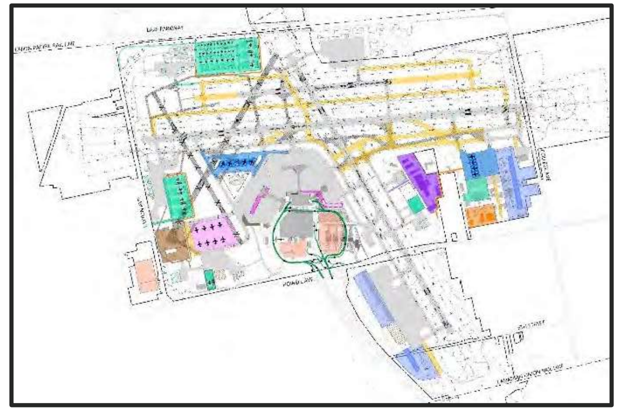
Alternative B
(previously Alternative 2)



- Three Runway Alternative

  1L-19R | 7L-25R | 7R-25L
- Deicing: North | South
- Cargo: Southeast
- GA: Northeast | Northwest
- Parking/RAC: Terminal Core
- 7L-25R extended 300 ft west

Alternative C
(previously Alternative 3)

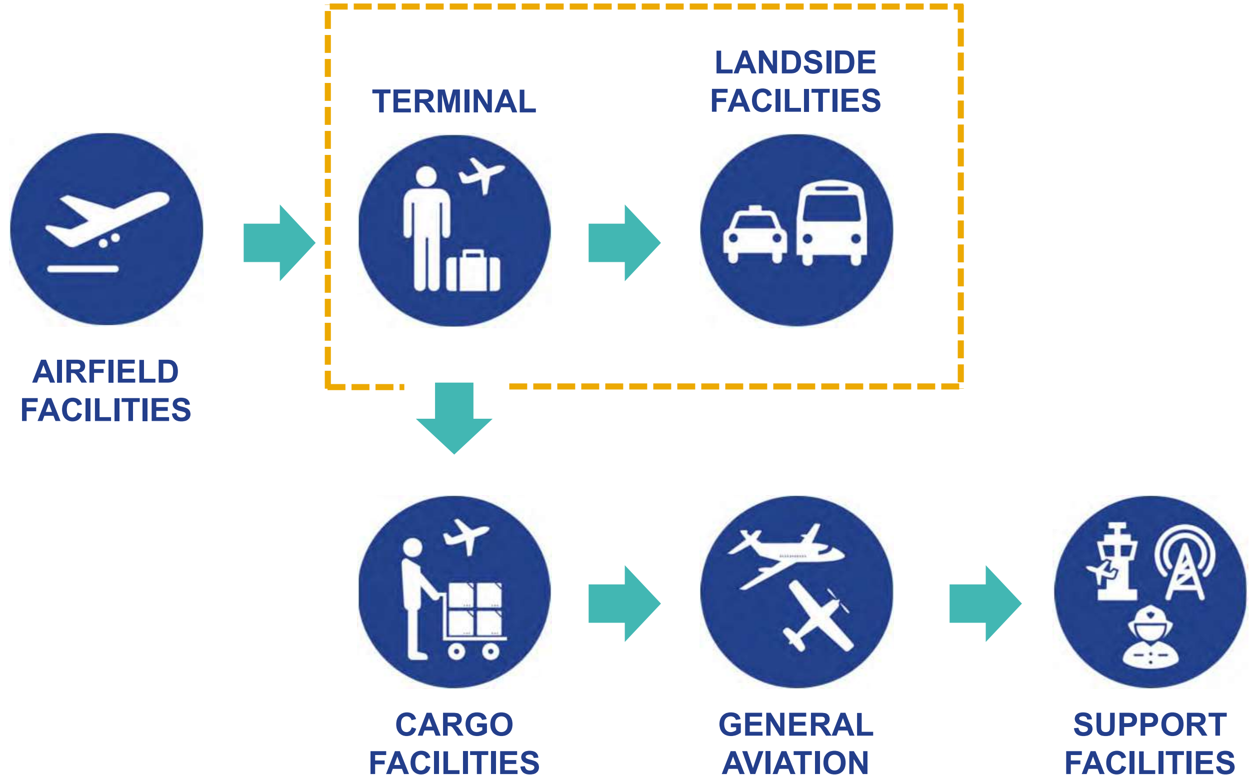


- Three Runway Alternative

  1L-19R | 1R-19L | 7R-25L
- Deicing: Northwest | West
- Cargo: South
- GA: Northeast | Northwest
- Parking/RAC: Terminal Core with Layton/Howell Parcel
- RW 1R-19L extended (variable)

All short-listed alternatives account for an additional 10 feet on Runway 1L-19R (10,000 ft runway length)

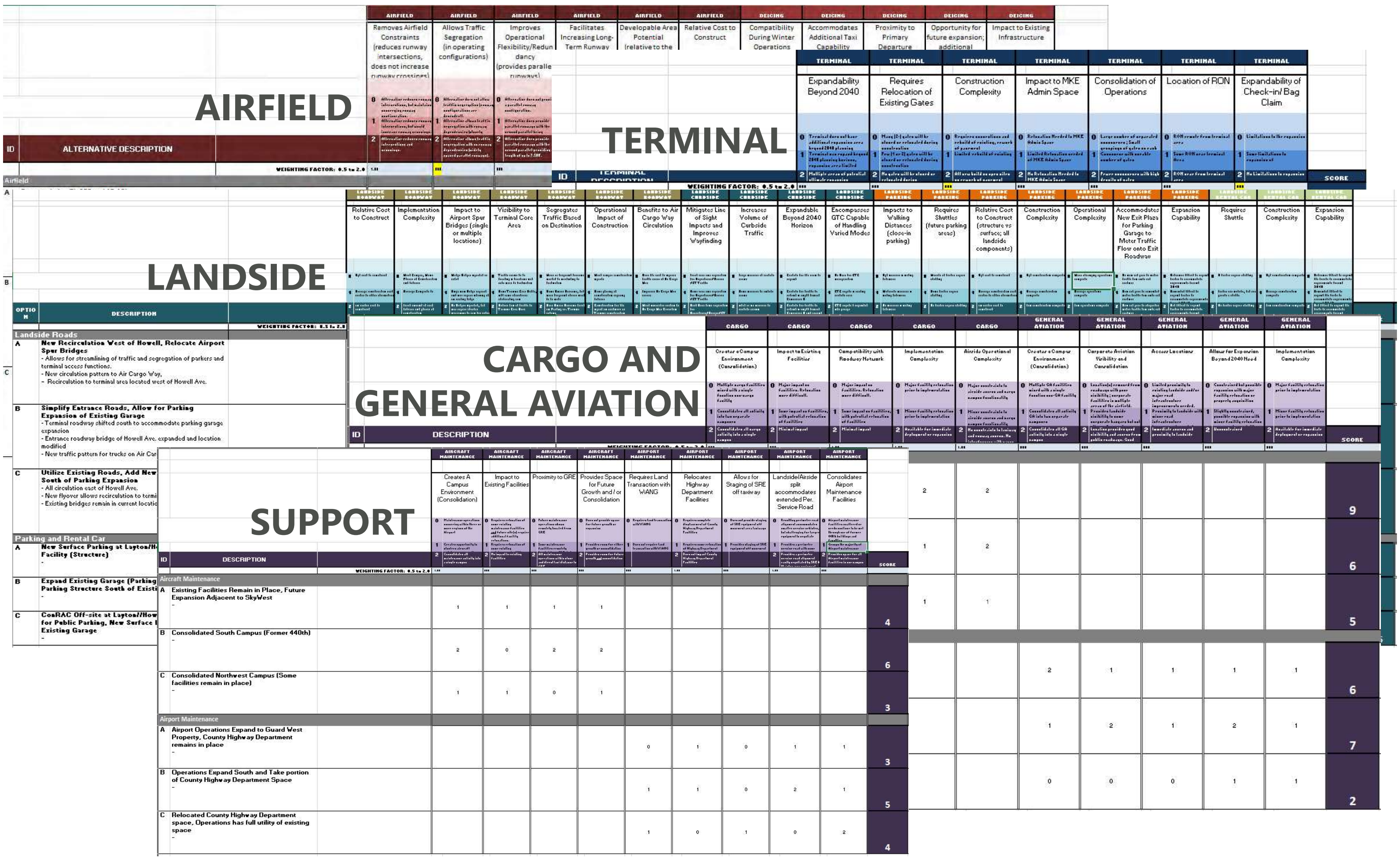
Facility Hierarchy in Evaluation



- Airport Maintenance
- Aircraft Maintenance
- Airport Operations
- Airport Administration
- Aircraft Rescue & Fire Fighting
- FAA/TSA/CBP
- Other

Given facility hierarchy, selection of each component influences decision on subsequent components

Shortlisted Alternatives Evaluation



Airfield Conclusion – Alternative A

Primary Advantages

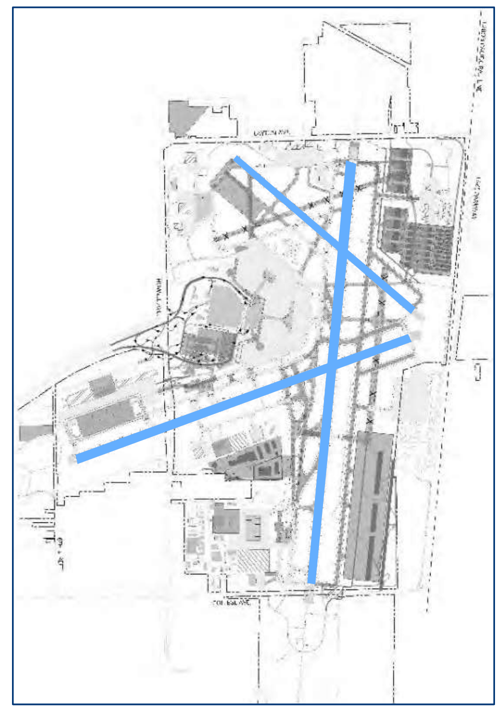
1. Operational flexibility during limited but specific weather conditions
2. Accommodates deice pad in north airfield
3. Decommissioned RW 1R-19L has lowest PCI values

Primary Challenges

1. No long-term capacity potential
2. Without availability of RW 7L-25R, reduction in current capacity (ASV)
3. Post-2040, future capacity likely to require substantial land acquisition (future parallel RW 7-25)
4. More regular and intensive use of runway (>500 annual operations) may affect critical aircraft designation and required dimensional and operational standards

Trade-offs (if selecting Alt A)

1. Reduced (existing) capacity and long-term capacity constraint are significant limitations balanced against limited utility of Runway 13-31



Airfield Conclusion – Alternative B

Primary Advantages

1. Maintains existing capacity (annual service volume (ASV))
2. With on-airport extension to 5,100 feet (RW 7L-25R), incremental capacity gain anticipated
3. Supports operational segregation of GA traffic
4. Accommodates deice pad in north airfield (runway crossing required)
5. RW 7L-25R: favorable PCI values

Primary Challenges

1. Post-2040, future capacity likely to require land acquisition (extension over Howell Ave or future parallel RW 7-25)
2. Limited 7L-25R extension capability (on-airport)

Trade-offs (if selecting Alt B)

1. Long-term capacity increase limited without land acquisition (to accommodate air carrier aircraft)

Airfield Conclusion – Alternative C

Primary Advantages

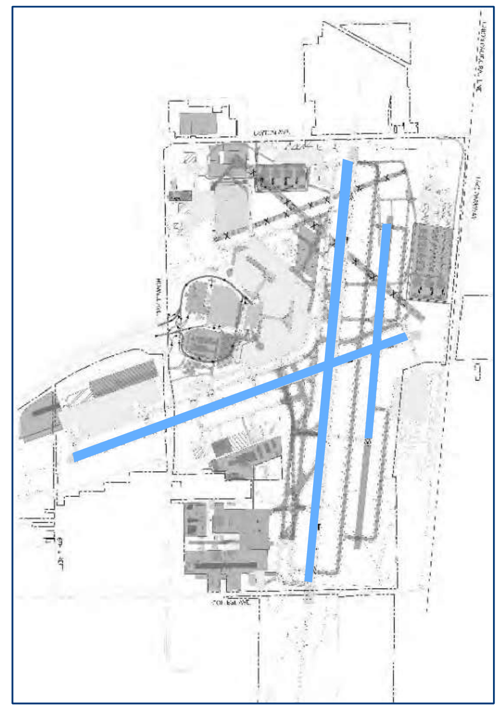
1. Provides maximum long-term capacity
2. Allows incremental RW extensions to meet fleet evolution
3. Deicing adjacent to terminal gate area

Primary Challenges

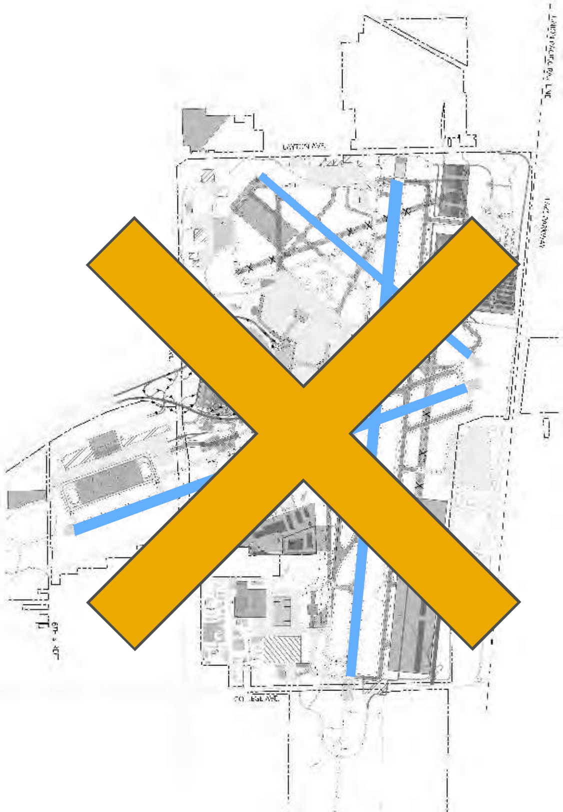
1. Condition of RW 1R-19L pavement (capital investment needed) → reconstruct aging asset
2. Parallel TW needed between 1-19 runways (significant capital investment)
3. Limits adjacent land uses (WiANG)
4. RW crossing for component of GA activity

Trade-offs (if selecting Alt C)

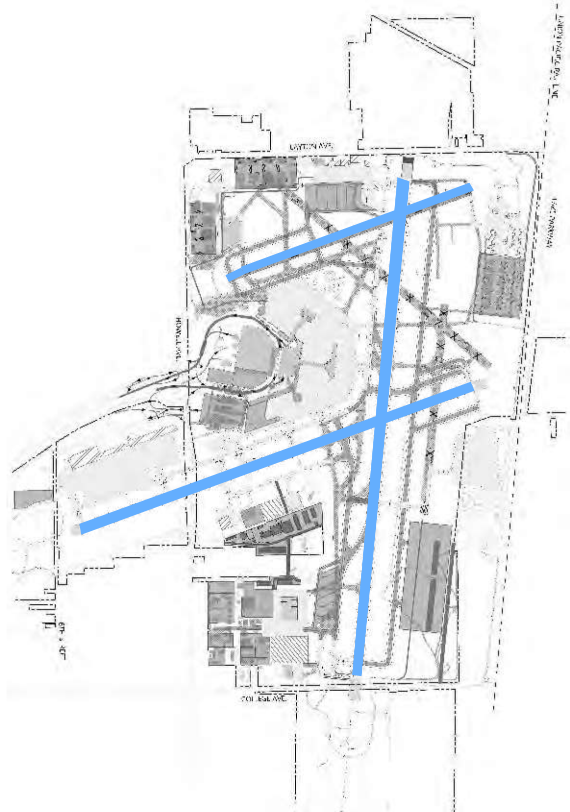
1. Significant near-term capital investment required; protects long-term capacity growth potential



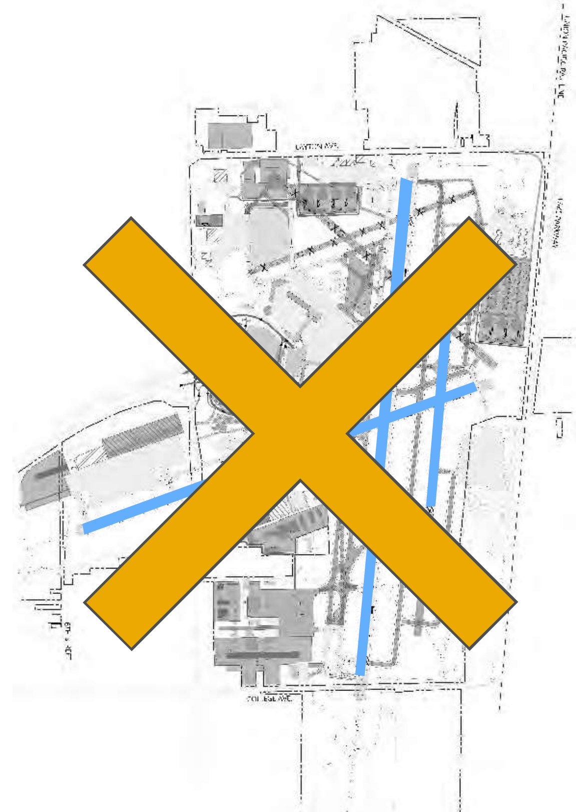
Airfield Conclusion



Alternative A



Alternative B



Alternative C

Deice Pads

Deice Pad Conclusion – Alternative A

Primary Advantages

1 7R deice pad is existing with deicing fluid collection system

Primary Challenges

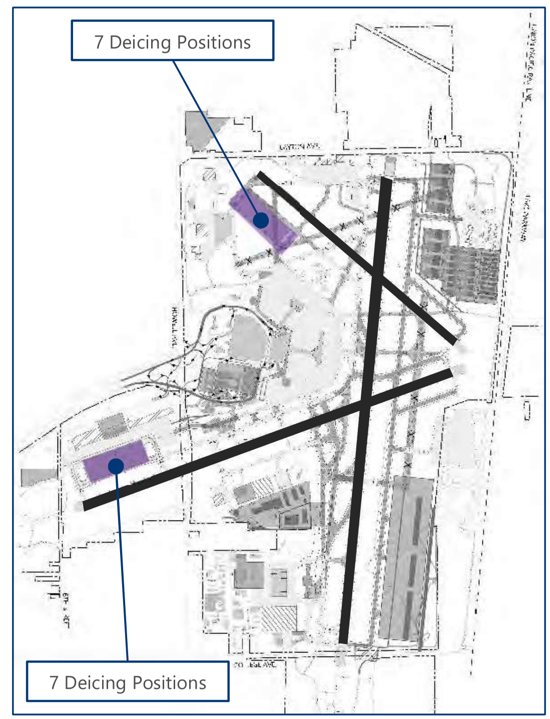
1 Efficient use of 7R deice pad requires TW bridge over Howell Ave and relocation of compass pad (substantial cost driver)

2 No dedicated deice pad at RW 1L (a primary winter departure runway)

3 North deice pad requires modification to accommodate Airfield Alternative B

Trade-offs (if selecting Alt A)

1 Significant capital investment needed for efficient use of 7R deice pad (taxiway bridge, Vehicle Service Road bridge over Howell Ave)



Deice Pad Conclusion – Alternative B

Primary Advantages

1 Deice pads at both ends of RW 1L-19R (primary winter runway)

Primary Challenges

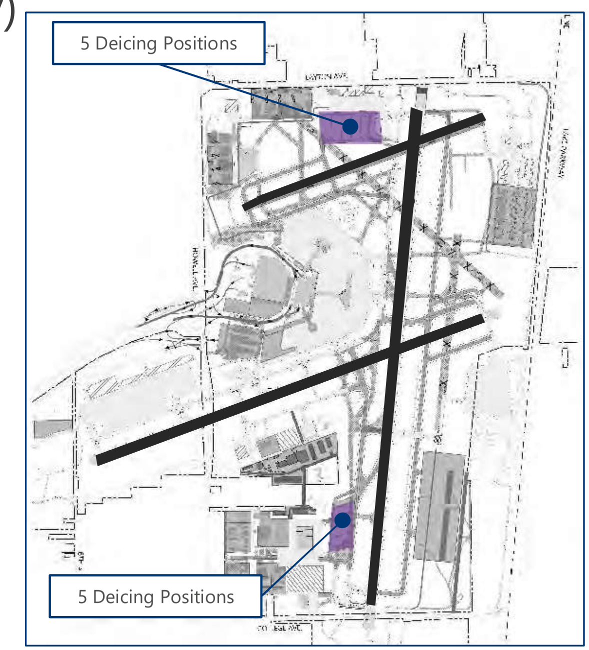
1 South deice pad configuration constrains options for future dual parallel taxiway (R and Q) to support RW 1L-19R and MKE Regional Business Park (if developed for aeronautical uses)

2 Proximity of north deice pad to residential area (north of Layton Ave) anticipated to create community concern

Trade-offs (if selecting Alt B)

1 Future dual parallel taxiway to support RW 1L-19R constrained by future south deice pad

2 Anticipated community opposition to north deice pad (noise, deice fluid overspray)



Deice Pad Conclusion – Alternative C

Primary Advantages

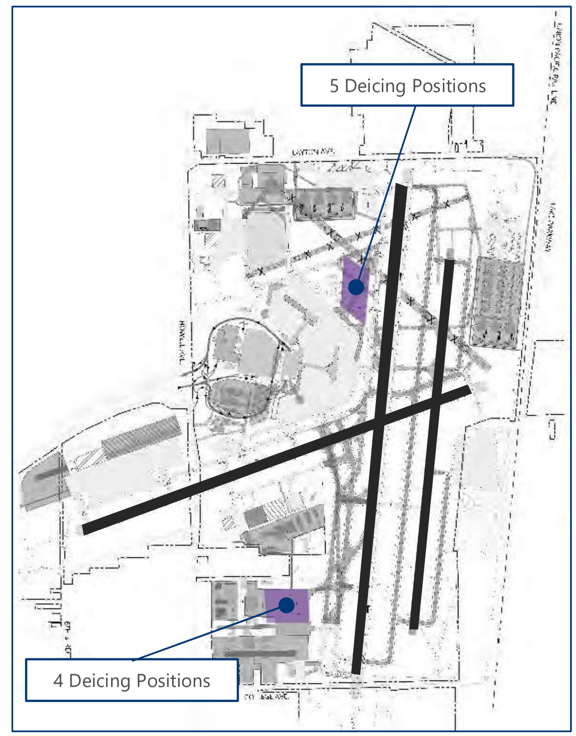
1. Deicing adjacent to terminal gate area
2. Accommodates future dual parallel taxiway system to RW 1L (TWs R and Q)

Primary Challenges

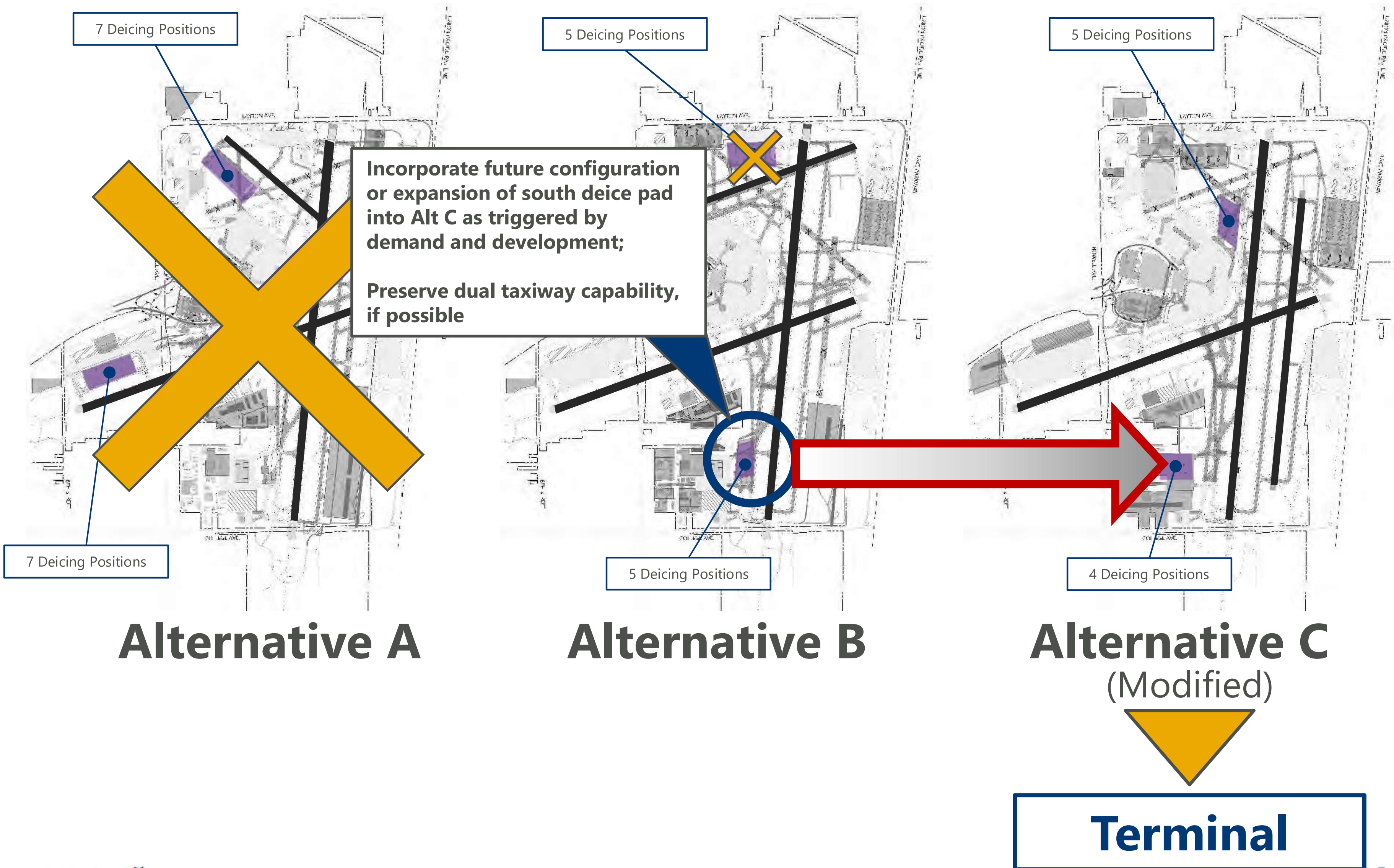
1. Limited capacity of south deice pad (potential to expand with future relocation of burn pit)
2. North deice pad requires modification to accommodate Airfield Alternative B (reduction in size/capacity)

Trade-offs (if selecting Alt C)

1. Modification to north deice pad
2. Restricted development potential in portion of MKE Regional Business Park



Deicing Facilities Conclusion



Terminal Conclusion – Alternative A

Primary Advantages

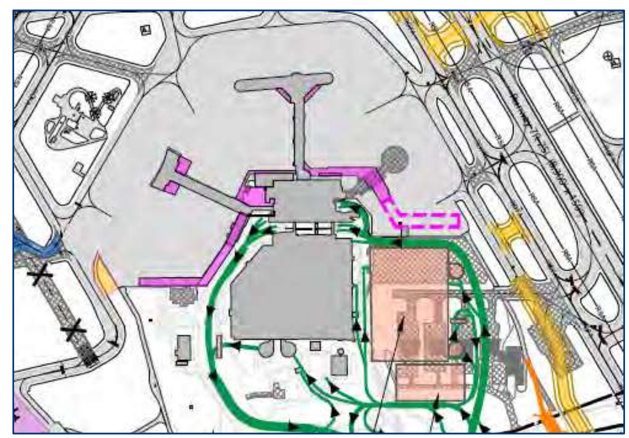
1. Minimal dependency on roadway improvements (timing/phasing advantage)
2. Compatible with Landside Alternatives B and C (flexibility)

Primary Challenges

1. Requires modification (expansion of Conc. E) to accommodate Airfield Alternative B (RW 7L-25R); reduces long-term gate capability
2. Operational complexity in the area of Conc. C and Conc. B when paired with Airfield Alternative B (RW 7L-25R)
3. Requires relocation or reconstruction of Airport Admin facility (third level of future concourse); reduces phasing flexibility

Trade-offs (if selecting Alt A)

1. Reduction in long-term gate expansion capability (Airfield Alternative B, RW 7L-25R limits gate expansion)
2. Relocation or reconstruction of Airport Admin Facility increases capital need without improving capacity or operational efficiency



Terminal Conclusion – Alternative B

Primary Advantages

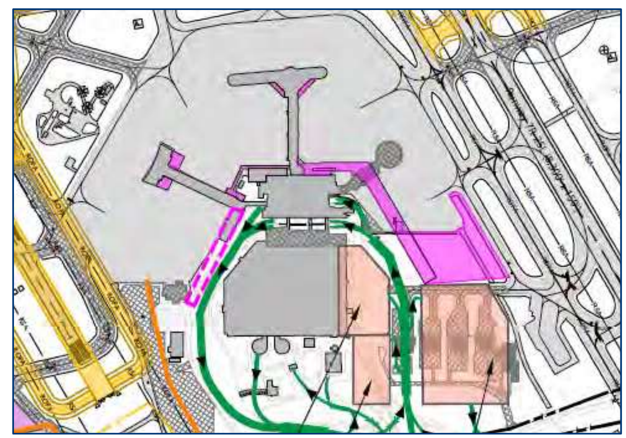
1. General compatibility with existing roadway and landside facilities
2. Allows incremental (demand driven) expansion of Concourse E gates
3. Concentrates new gates on south side of terminal complex, closer to primary runways used by air carriers

Primary Challenges

1. Not compatible with Landside Alternatives A or C without significant modification
2. Displaces DL GSE building

Trade-offs (if selecting Alt B)

1. Impact to footprint of landside facilities (parking and/or rental car)



Terminal Conclusion – Alternative C

Primary Advantages

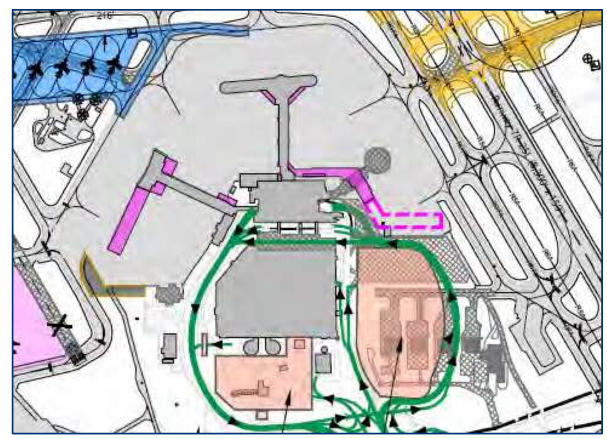
1. Compatible with Landside Alternatives A and B (flexibility)
2. Allows incremental RW extensions to meet anticipated fleet evolution
3. Provides maximum terminal expansion potential
4. Deicing adjacent to terminal gate area

Primary Challenges

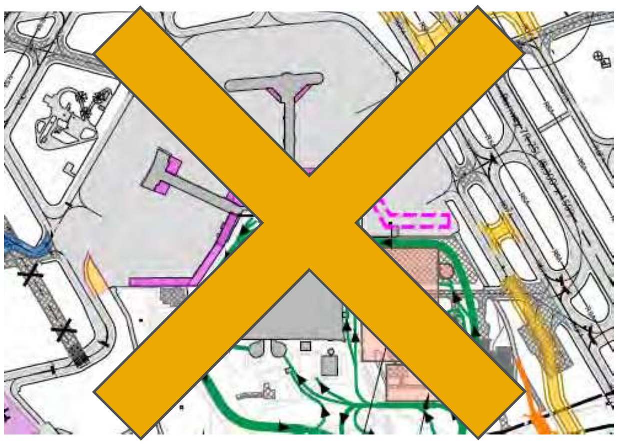
1. Puts additional passenger circulation demand on Concourse C "stem"; potential for widening concourse to accommodate circulation demand
2. Operational complexity in the area of extended Conc. C when paired with Airfield Alternative B (RW 7L-25R)
3. Concourse C gates taken out of service during construction

Trade-offs (if selecting Alt C)

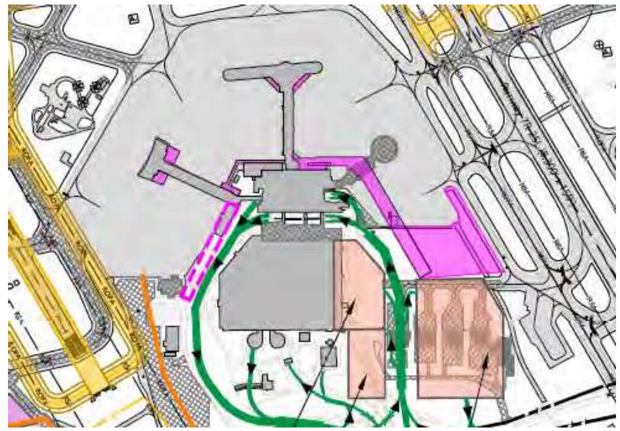
1. Footprint of expanded Concourse C requires modification to accommodate Airfield Alternative B (RW 7L-25R)



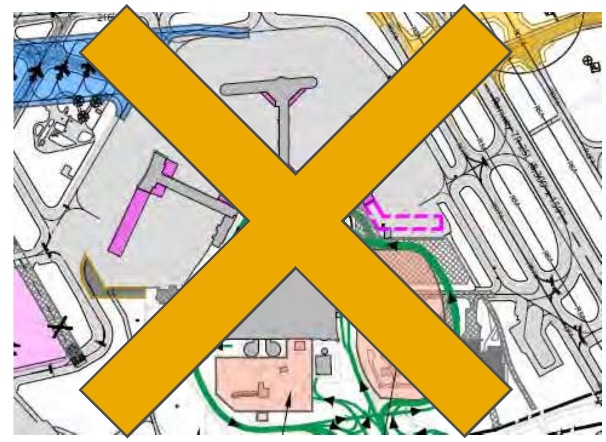
Terminal Conclusion



Alternative A



Alternative B



Alternative C

Landside

Roadway Conclusion – Alternative A

Primary Advantages

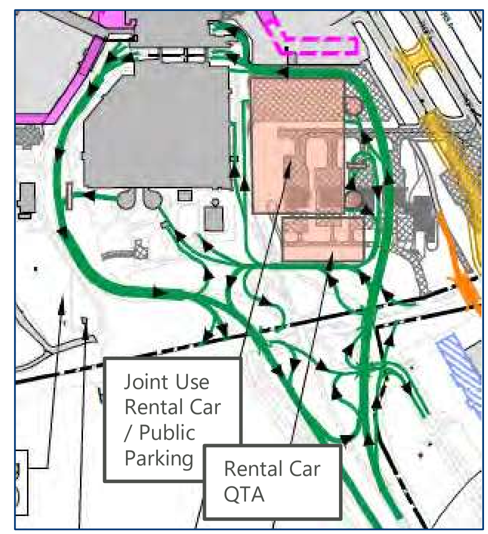
1. Enhanced segregation of inbound traffic (increased decision times and longer weave distances
2. Roadway improvements west of Howell Ave allow roadway elements to be more widely dispersed

Primary Challenges

1. Affordability of bridging Howell Ave and Air Cargo Way; increased on-Airport roadway lengths
2. Impact to Super Saver B Lot (limited reduction in parking capacity)
3. Implementation timing given the coordination necessary for modifications to Airport Spur (bridging over Howell Ave) and roadway improvements west of Howell Ave
4. Circuitous roadway routings
5. Limited incremental phasing opportunities (commitment to bridge and roadway configuration required)

Trade-offs (if selecting Alt A)

1. Increased roadway footprint and traffic segregation challenges affordability
2. Large-scale "program" necessary (financial commitment) due to inability to incrementally construct
3. Timing and cost uncertainties for roadway modifications off MKE property



Roadway Conclusion – Alternative B

Primary Advantages

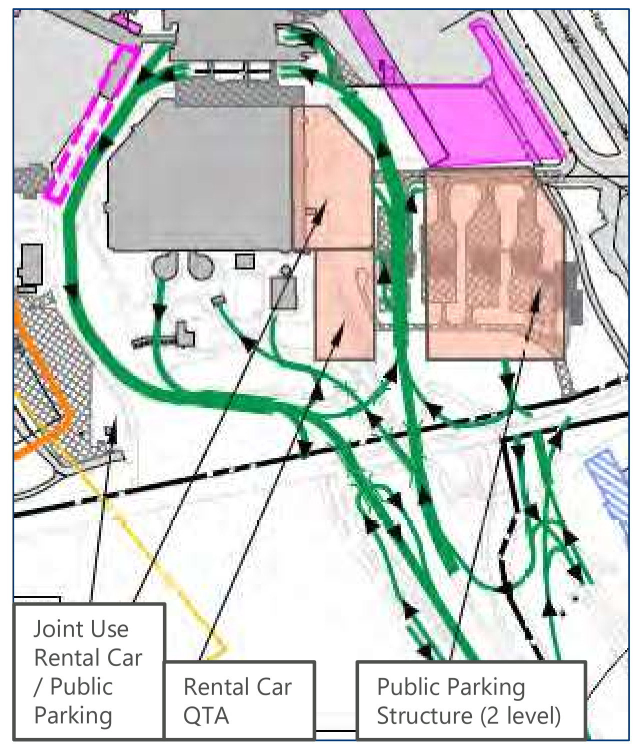
1. Reduced complexity of Air Cargo Way and Howell Ave intersection (southward shift)
2. Main truck route from Air Cargo Way to Airport Spur improved (all right-hand turns, simplified entrance)

Primary Challenges

1. Affordability (widening of inbound Airport Spur bridge)
2. Required modification of Super Saver Lot A reduces available revenue-generating spaces

Trade-offs (if selecting Alt B)

1. Timing and cost uncertainties for roadway modifications off MKE property



Roadway Conclusion – Alternative C

Primary Advantages

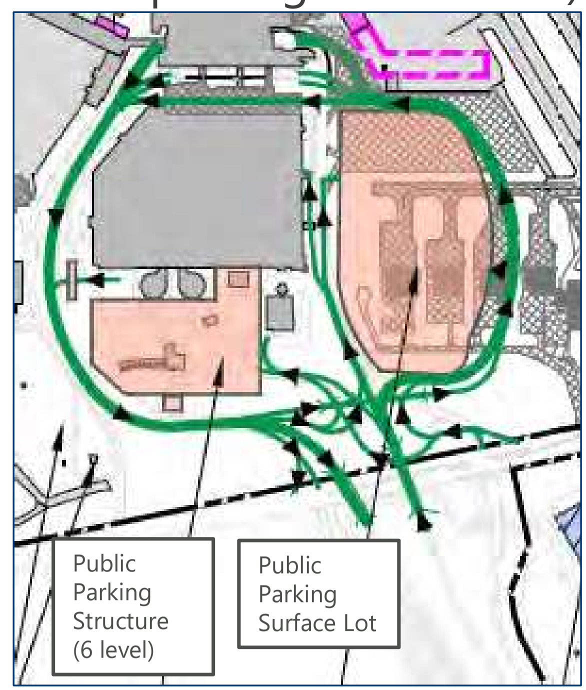
1. No impact to Airport Spur bridges
2. All roadway improvements are on-Airport
3. Relocated parking garage revenue/exit plaza enhances merge onto airport exit roadway
4. Implementation flexibility
5. Affordability (flyover bridge for recirculation is major cost item)

Primary Challenges

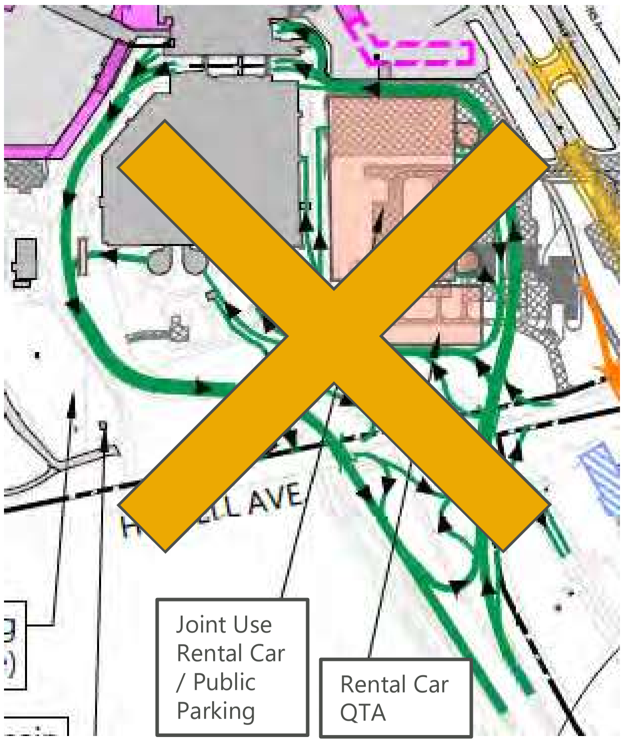
1. Expanded surface parking exits onto inbound terminal roadway putting all exiting vehicles through the core area
2. Limited improvement to intersection of Air Cargo Way and Howell Ave
3. Reuse of roadway elements limits entrance road geometry (turn radii, speeds)
4. Requires modification to accommodate Terminal Alternative B

Trade-offs (if selecting Alt C)

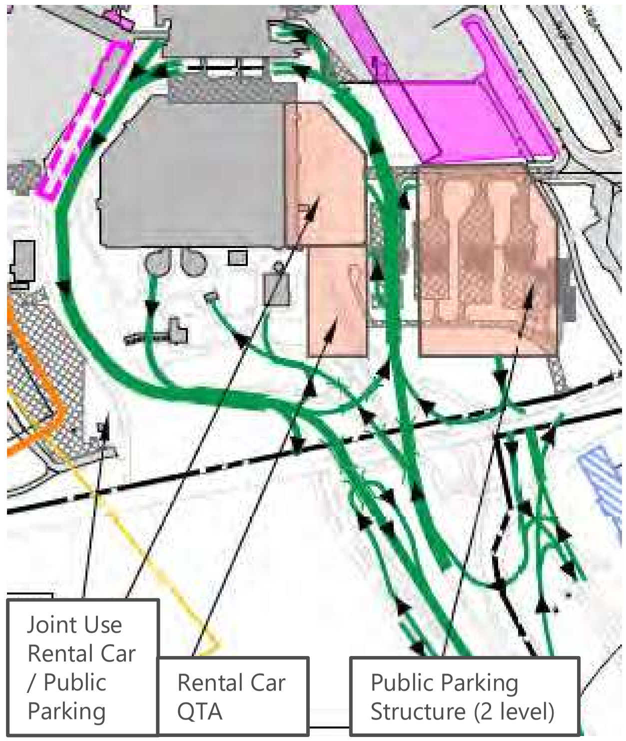
1. Enhanced affordability limits scope of roadway adjustments (tight turn radii)
2. Modification required to accommodate Terminal Alternative B (convert surface parking to structure)



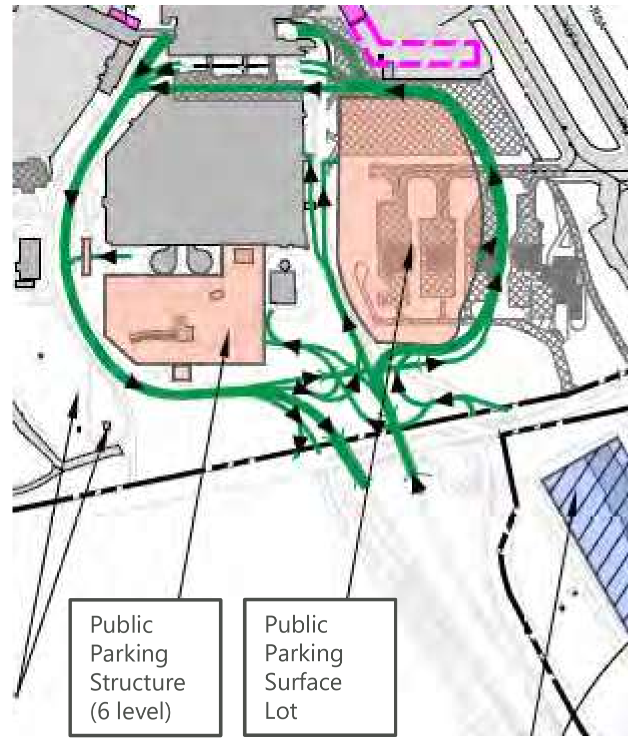
Roadway Conclusion



Alternative A



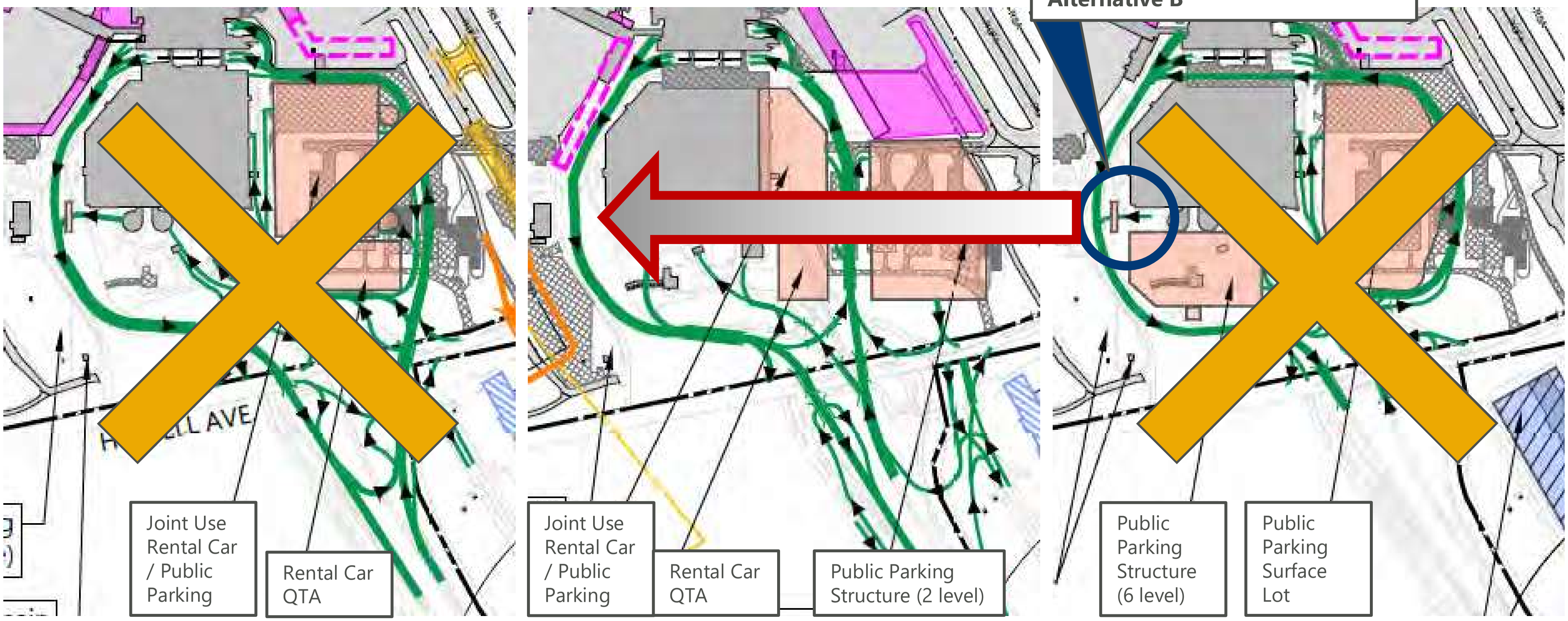
Alternative B



Alternative C

Roadway Conclusion

Incorporate relocated parking garage revenue/exit plaza into Alternative B



Alternative A

Alternative B
(Modified)

Alternative C

Curbside

Curbside Conclusion – Alternative A/B

Primary Advantages

1 Affordability – linear extension and allocation of curb may require canopy/enclosed space

2 Consistency with current operation

3 Linear curbside extension flexibility is maximized by full single-level roadway system; facilitates incremental expansion

Primary Challenges

1 Curbfront management necessary to protect roadway throughput capacity

Trade-offs (if selecting Alt A or Alt B or hybrid)

1 Management of curbside (policy), reallocating curbside among modes, maintains level of service with minimal infrastructure investment

Curbside reallocation by vehicle mode

Curbside Conclusion – Alternative C

Primary Advantages

1 Maximizes terminal roadway capacity with limited infrastructure investment

2 Allows for segregation of traffic modes

Primary Challenges

1 Limitation on vehicle types that can utilize remote curbside (vertical clearance); *(Note: vertical limitation can be mitigated by demo of 1-2 bays of existing parking structure when reconstructed)*

2 Remote curb users have longer walk than current; multiple vertical transitions to cross terminal roadway

3 Aging garage structure rehabilitation (or reconstruction) could impact remote curb

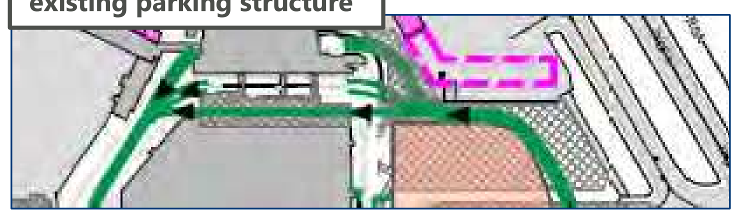
4 Displaces existing rental car customer counters and operations

Trade-offs (if selecting Alt C)

1 Efficient curbside environment increases passenger vertical transitions to use remote curb

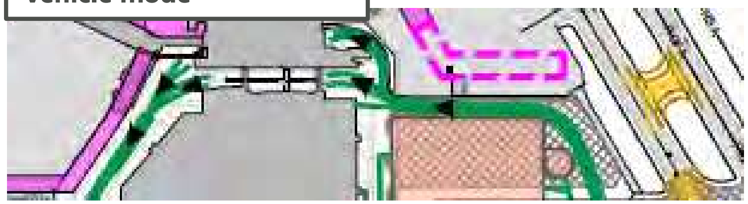
2 Requires construction of CONRAC facility prior to implementation of interior garage remote curb

Curbside reallocation and remote curbside in existing parking structure

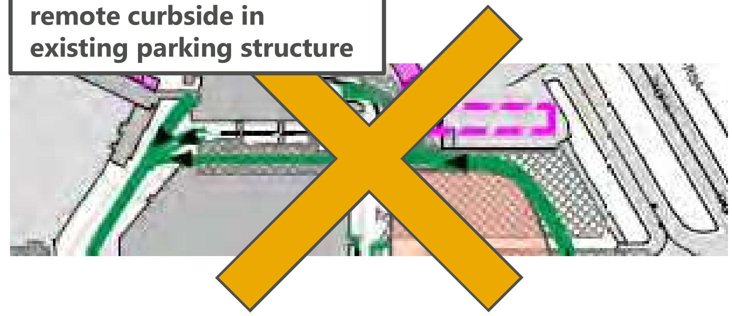


Curbside Conclusion

Curbside reallocation by vehicle mode



Curbside reallocation and remote curbside in existing parking structure



Alternative A/B

(Modified – curbfront reallocation by mode as triggered by demand)

Alternative C

Public Parking

Parking Conclusion – Alternative A

Primary Advantages

1 Proximity to terminal of significant portion of future public parking

2 Expanded remote surface parking increases economy parking (price sensitive users)

Primary Challenges

1 Affordability

2 Limited ability for incremental development or flexible phasing to respond to demand triggers (large-scale program driven by bridge relocation)

3 Large-scale landside program requires substantial financial commitment with potential to extend implementation duration

4 Prioritizes rental car capacity over parking capacity in terminal core (drives additional remote parking)

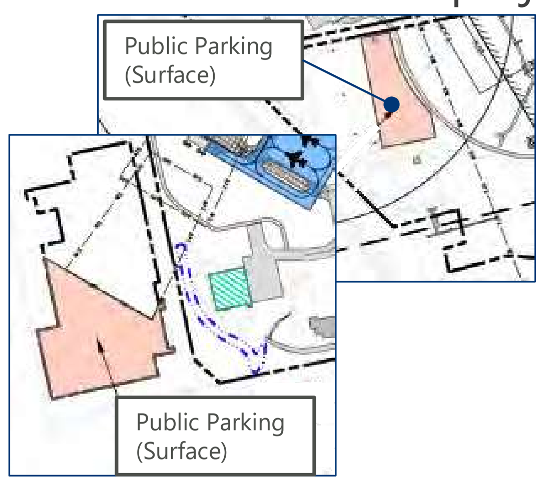
5 Joint use facility requires modification to accommodate Terminal Alternative B

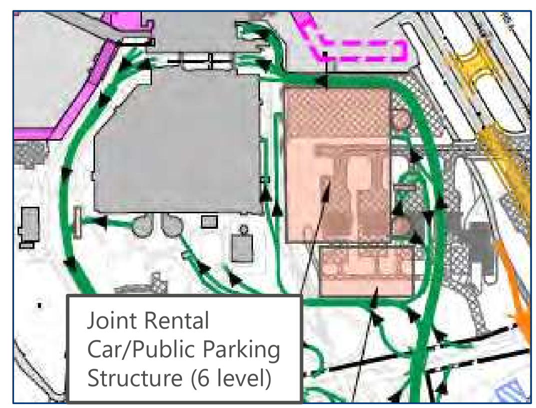
Trade-offs (if selecting Alt A)

1 Affordability: large-scale landside program anticipated, dependent on bridge relocation

2 Competition with private parking operators (leakage) given expanded remote parking facilities

3 Integration with rental car structure creates project dependencies





Parking Conclusion – Alternative B

Primary Advantages

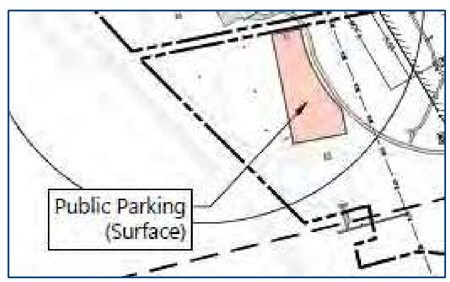
1. Proximity to terminal of significant portion of future public parking
2. Expanded remote surface parking increases economy parking (price sensitive users)
3. Parking improvements (2-level structure) can be implemented independent of roadway configuration (temporary connections)

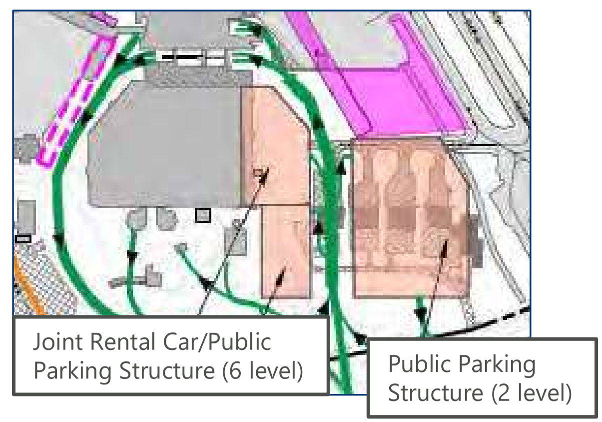
Primary Challenges

1. Limited parking expansion capability beyond 2040 horizon (challenging to expand structure vertically; height limits due to ATC line-of-sight)
2. Roadway relocation required to accommodate joint rental car/parking facility
3. Affordability
4. Walking distance to terminal entrance stretches convenience (may require shuttle)
5. Remote surface parking not compatible with preferred Cargo Alternative C (requires additional replacement spaces)

Trade-offs (if selecting Alt B)

1. Phasing/implementation flexibility can be balanced with overall financial capability
2. Integration with rental car structure creates project dependencies





Parking Conclusion – Alternative C

Primary Advantages

1 Proximity to terminal of all additional public parking
2 Parking facilities can be implemented largely independent of roadway improvements
3 Flexibility in parking facility phasing and implementation timing (align with demand)
4 Relative affordability

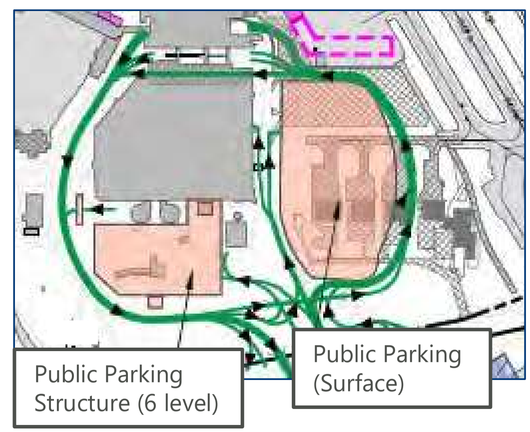
Primary Challenges

1 Height of expanded parking structure is limited (maximum 5 levels) by preferred Airside Alternative B (maintain runway 7L-25R in operation)
2 Surface parking facility requires modification to accommodate preferred Terminal Alternative B and supporting roadway
3 Affordability

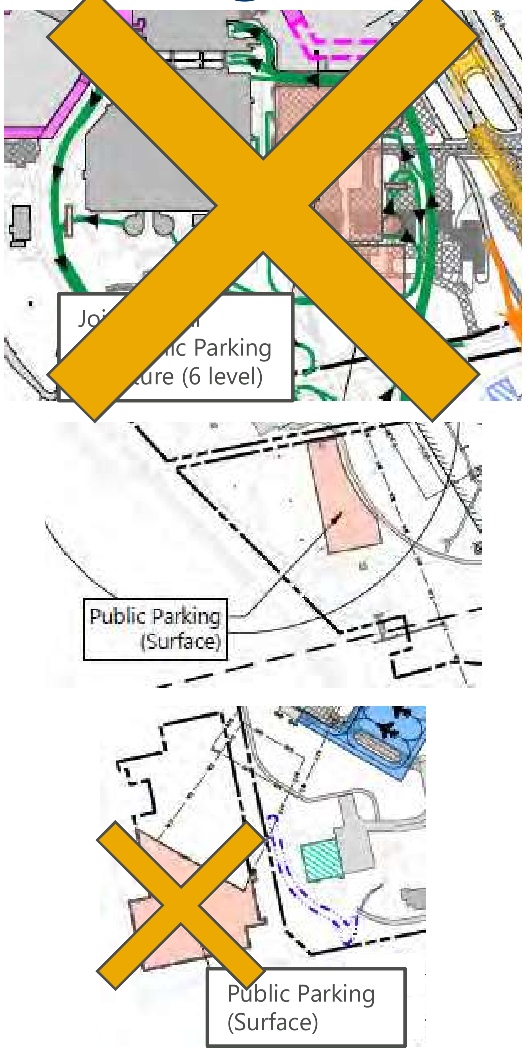
Trade-offs (if selecting Alt C)

1 Prioritizes public parking proximity over rental car proximity

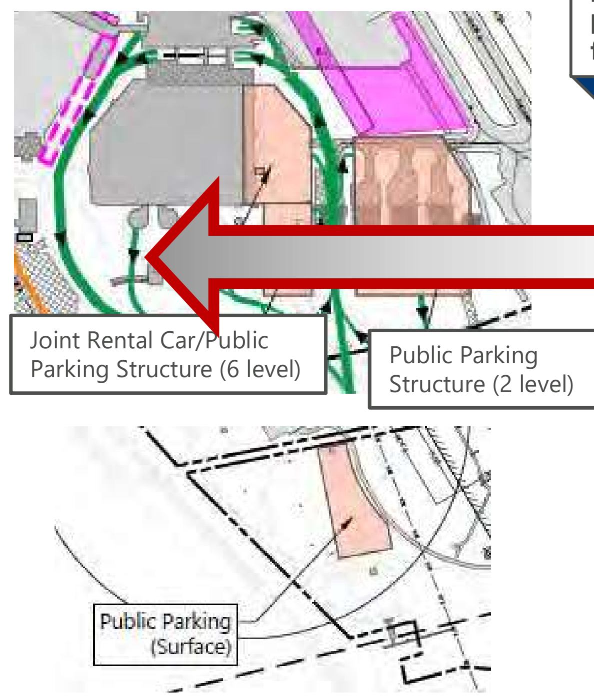
2 Concentrating public parking in core provides flexibility in scope and timing of improvements (financial feasibility)



Parking Conclusion

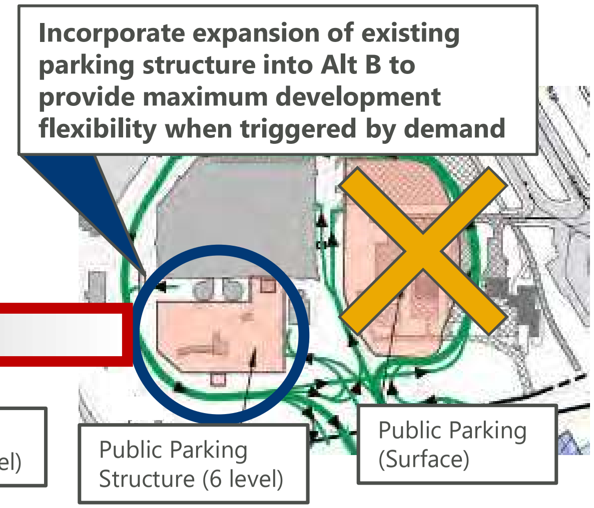


Alternative A



Alternative B

(Modified)



Alternative C

Rental Car

Rental Car Facilities Conclusion – Alternative A

Primary Advantages

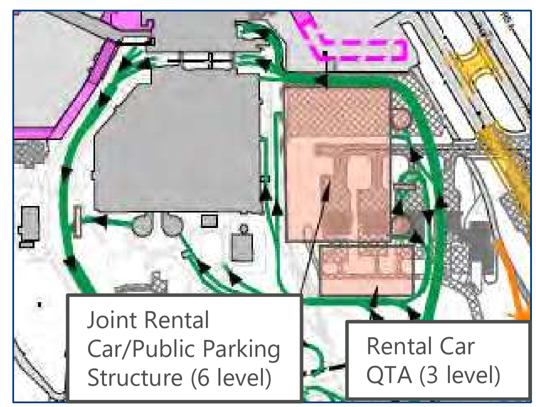
1. Proximity to terminal of rental car facilities
2. On-site QTA reduces vehicle traffic (on terminal roadway and Howell Ave; currently shuttling to remote QTA)

Primary Challenges

1. Not compatible with preferred Terminal Alternative B (modification opportunity [increased height] limited by line-of-sight considerations)
2. Large-scale landside program requires substantial financial commitment with potential to extend implementation duration
3. Affordability

Trade-offs (if selecting Alt A)

1. Rental car facilities reduce long-term parking capacity in terminal core → more remote parking in competitive environment
2. Integration with parking structure creates project dependencies (timing may not align with demand)



Rental Car Facilities Conclusion – Alternative B

Primary Advantages

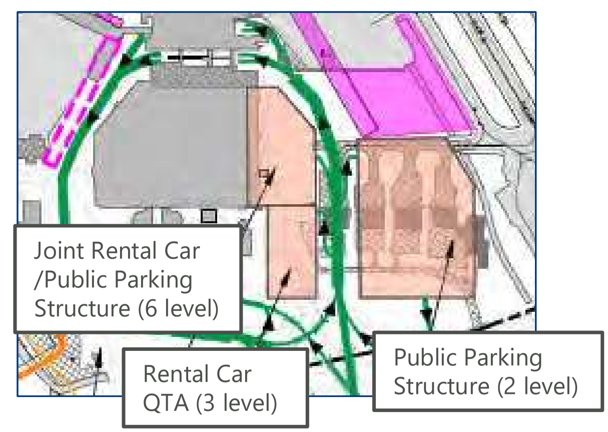
1. Proximity to terminal of rental car facilities
2. On-site QTA reduces vehicle traffic (on terminal roadway and Howell Ave; currently shuttling to remote QTA)

Primary Challenges

1. Affordability
2. Large-scale landside program requires substantial financial commitment with potential to extend implementation duration
3. Proximity of QTA (vehicle fueling) to ATCT (blast mitigation, other security measures may be required → cost drivers)

Trade-offs (if selecting Alt B)

1. Rental car facilities reduce parking capacity in terminal core → more remote parking in competitive environment
2. Integration with parking structure creates project dependencies (timing may not align with demand)



Rental Car Facilities Conclusion – Alternative C

Primary Advantages

1 Allows 2040 parking demand to be accommodated at close-in location

2 Rental car activity not on terminal roadway network; introduce rental car shuttles as new vehicle mode in landside environment

3 Avoids project dependencies between rental car and parking facilities

4 Simplified construction phasing (site outside of terminal core allows more efficient construction) → cost driver

Primary Challenges

1 Travel time/convenience to remote facility (weakens rental car location as differentiator)

2 Desirability of designated remote location for other revenue generating uses
(NOTE: Remote CONRAC may be accommodated on other remote sites)

Trade-offs (if selecting Alt C)

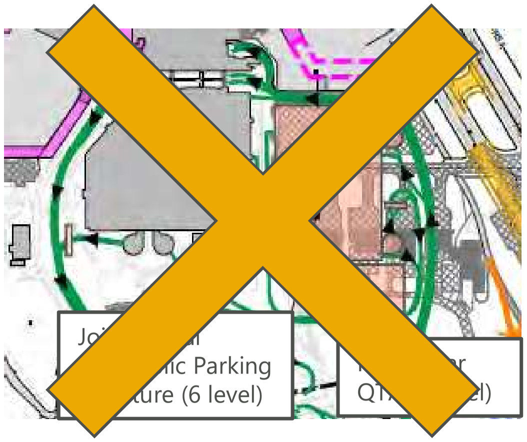
1 Minimize dependency on roadway and parking facility projects (timing and cost)

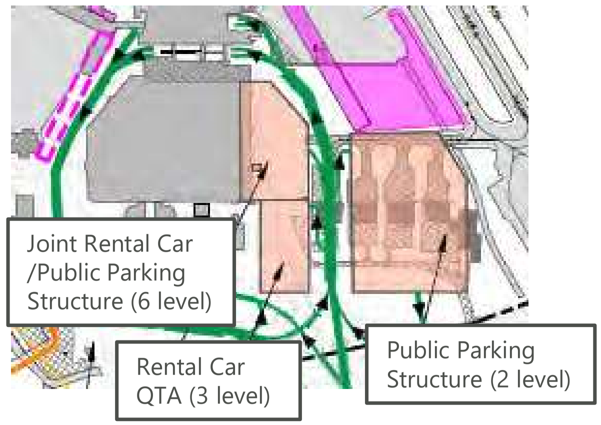
2 Remote parcel (irrespective of location) not available for alternative revenue-generating development/uses

Consolidated Rental Car Facility (3 level) and Rental Car QTA (3 level)

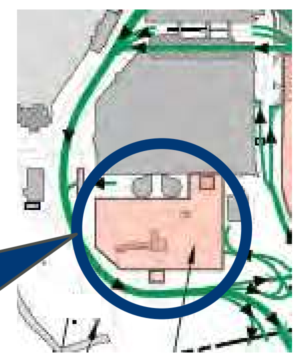
(NOTE: Remote CONRAC may be accommodated on other remote sites)

Rental Car Conclusion





(NOTE: Remote CONRAC may be accommodated on other remote sites)



Incorporate expansion of existing parking structure into Alt B to provide maximum development flexibility when triggered by rental car or parking demand

Alternative A

Alternative B
(Modified)

Alternative C

Support Facilities

Cargo Facilities Conclusion – Alternative A

Primary Advantages

1. Incremental expansion potential in response to demand
2. Dedicated cargo campus reduces cargo-related traffic at Air Cargo Way and Howell Ave intersection
3. MKE Regional Business Park remains available for revenue generating uses

Primary Challenges

1. Affordability – significant airfield infrastructure required to support new cargo campus
2. Undeveloped land is primary drainage area for watershed (significant drainage and potential environmental mitigation required to develop)
3. Not compatible with ultimate protection of RW 1R-19L airspace

Trade-offs (if selecting Alt A)

1. Substantial capital cost
2. Cargo development not compatible with RW 1R-19L protection (ultimate condition)

Cargo Facilities Conclusion – Alternative B

Primary Advantages

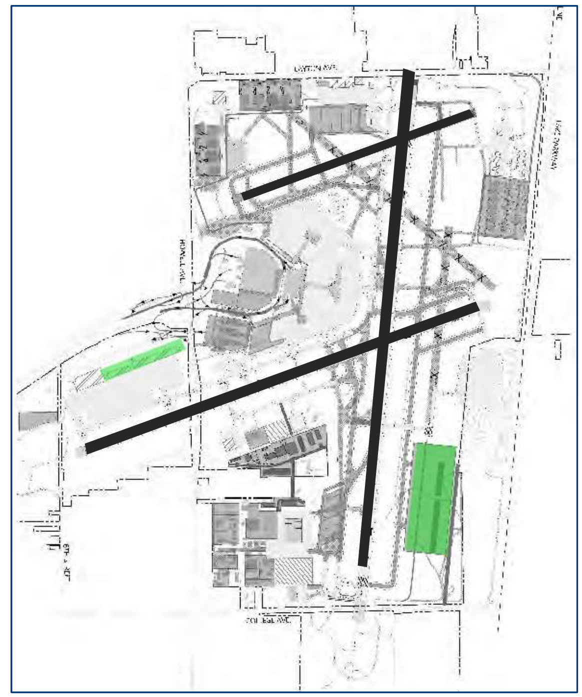
1. Incremental expansion potential in response to demand
2. Dedicated cargo campus reduces cargo-related traffic at Air Cargo Way and Howell Ave intersection
3. Post-2040 expansion capability

Primary Challenges

1. Affordability – significant airfield infrastructure required to support new cargo campus
2. Undeveloped land is primary drainage area for watershed (significant drainage and potential environmental mitigation required to develop)
3. Not compatible with ultimate protection of RW 1R-19L airspace

Trade-offs (if selecting Alt B)

1. Substantial capital cost
2. Cargo development not compatible with RW 1R-19L protection (ultimate condition)



Cargo Facilities Conclusion – Alternative C

Primary Advantages

1 Incremental expansion potential in response to demand

2 Redevelopment of majority of MKE Regional Business Park for aeronautical use

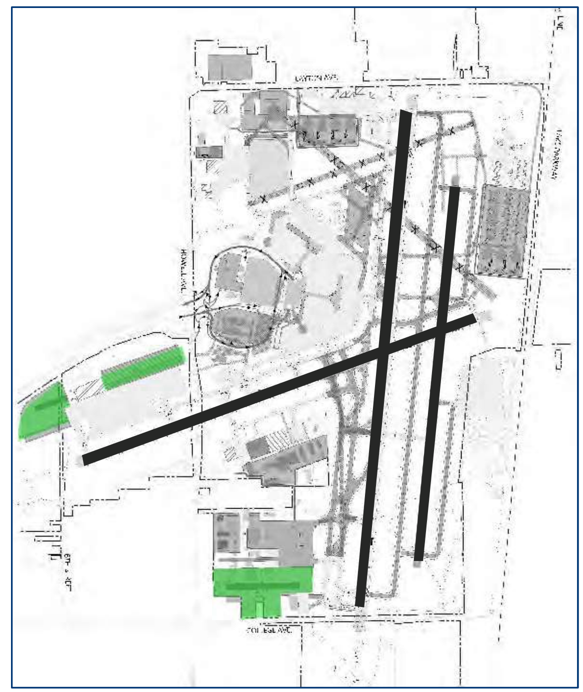
3 Relative affordability

Primary Challenges

1 Phased redevelopment/upgrade of existing west cargo facilities is operationally challenging

Trade-offs (if selecting Alt C)

1 Relatively affordable cargo development (avoids substantial airfield/taxiway investment)



Cargo Locations

Alternative A

Alternative B

Alternative C

General Aviation

General Aviation Facilities Conclusion – Alt. A

Primary Advantages

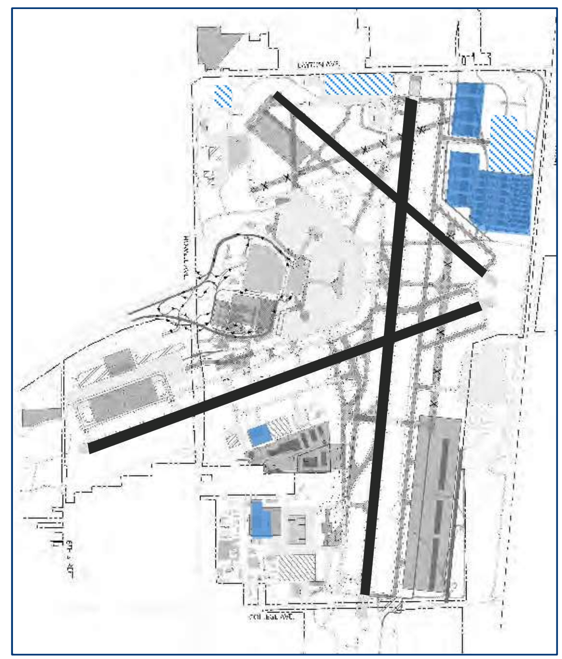
1. Incremental expansion potential in response to demand
2. Development concentrated in area with limited utility for other types of development
3. xxx

Primary Challenges

1. Facilities configuration requires adjustment to accommodate preferred Airfield Alternative B
2. Corporate GA facilities not segregated from small GA facilities
3. Not compatible with ultimate protection of RW 1R-19L airspace

Trade-offs (if selecting Alt A)

1. Consolidation of GA facilities does not facilitate segregation of corporate GA development
2. GA development not compatible with RW 1R-19L protection (ultimate condition)



General Aviation Facilities Conclusion – Alt. B

Primary Advantages

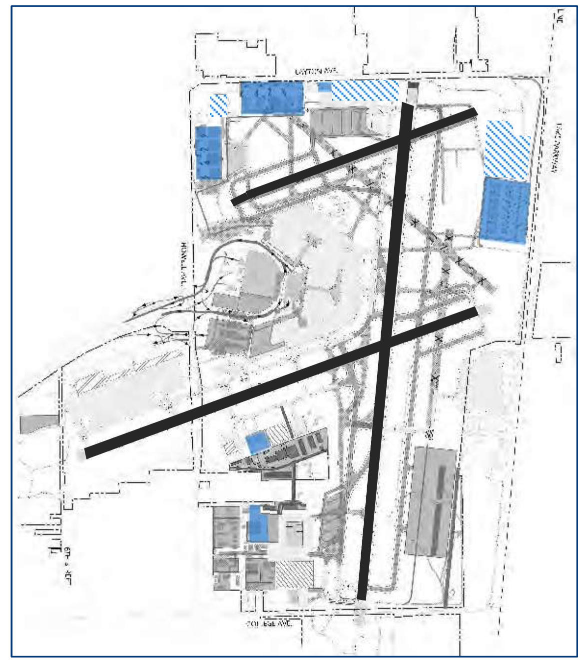
1. Incremental expansion potential in response to demand
2. Compatible with ultimate RW 1R-19L
3. Segregation of corporate GA facilities from small GA facilities

Primary Challenges

1. Corporate GA development abutting Layton Ave may cause community concern
2. Displaces existing aircraft maintenance facilities

Trade-offs (if selecting Alt B)

1. Segregation of corporate GA facilities (abutting Layton Ave) may not be compatible with community preferences



General Aviation Facilities Conclusion – Alt. C

Primary Advantages

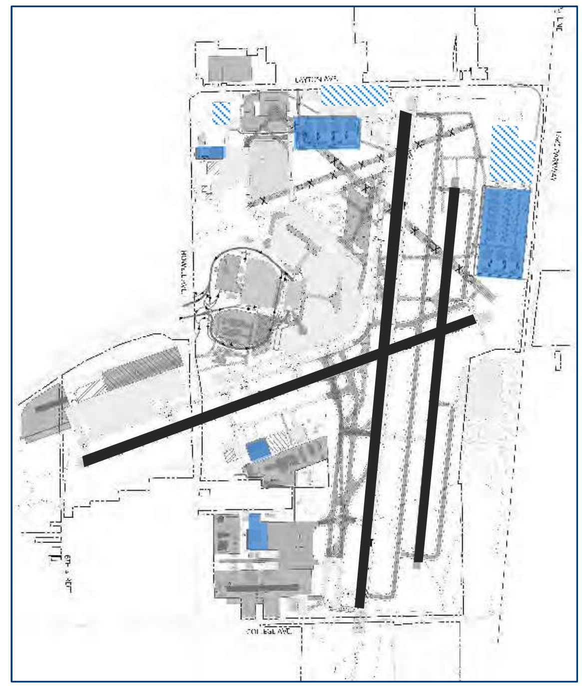
1. Incremental expansion potential in response to demand
2. Limited segregation of corporate GA facilities from small GA facilities
3. Development concentrated in area with limited utility for other types of development

Primary Challenges

1. Corporate GA facilities in north quadrant require adjustment to accommodate preferred Airfield Alternative B

Trade-offs (if selecting Alt C)

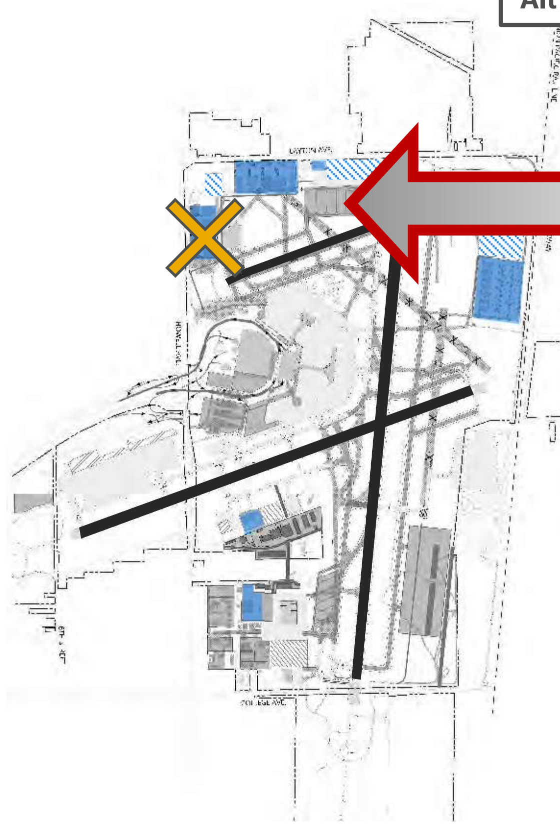
1. Limited segregation of corporate GA facilities necessary to avoid development abutting Layton Ave



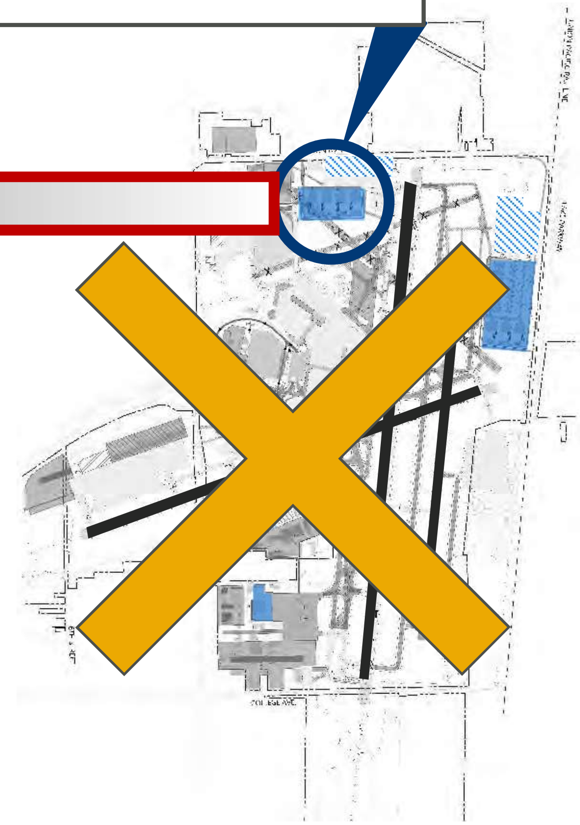
General Aviation Locations

Incorporate expanded GA area into Alt B

Alternative A



Alternative B
(Modified)



Alternative C

Maintenance

Maintenance Facilities Conclusion – Alt. A

Primary Advantages

1 County Highway Department remains in existing facilities

2 Consolidated Airport maintenance facilities

3 Snow removal vehicle staging accommodated on roadway (no longer staged on TW Y)

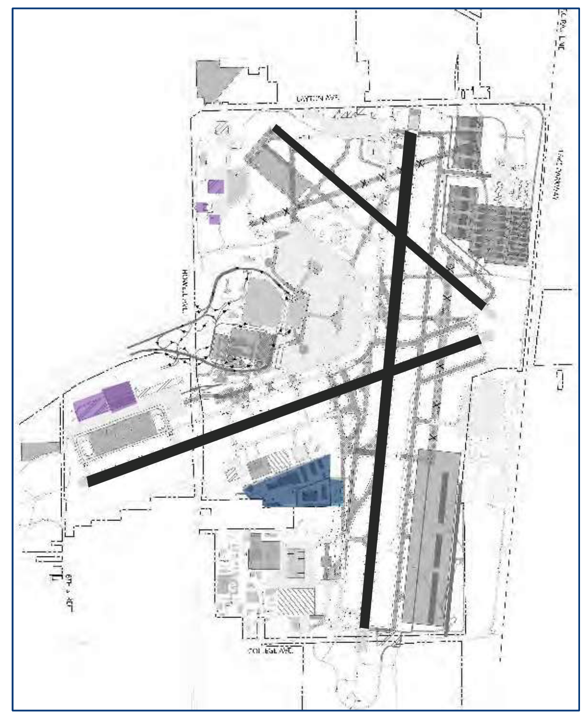
Primary Challenges

1 Land exchange with WiANG required for Airport Maintenance Facility development (Guard West parcel)

2 Development of Guard West parcel influenced by future dual parallel TW R/TW Q configuration

Trade-offs (if selecting Alt A)

1 Land exchange/transaction to maintain consolidated and contiguous facilities



Maintenance Facilities Conclusion – Alt. B

Primary Advantages

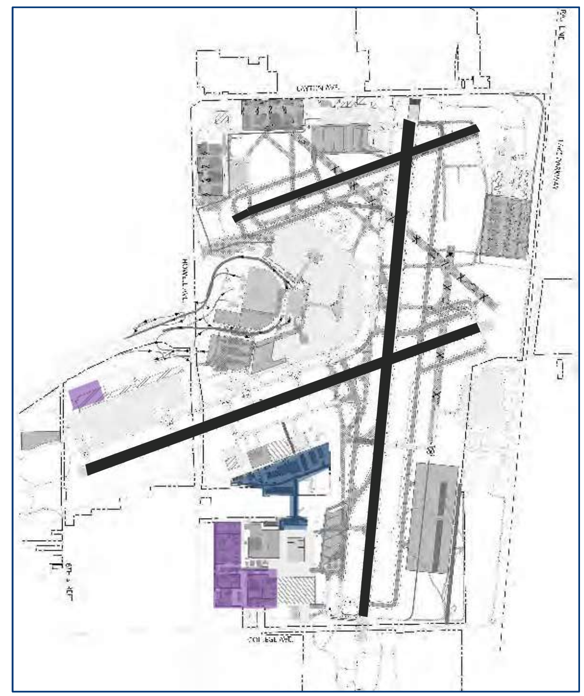
1. County Highway Department remains in existing facilities
2. Snow removal vehicle staging accommodated on roadway (no longer staged on TW Y)
3. Aircraft maintenance campus accommodates incremental/phased expansion
4. Redevelopment of majority of MKE Regional Business Park for aeronautical use

Primary Challenges

1. Airport maintenance facilities partially dispersed
2. With deicing pad, concentration of aircraft maintenance facilities may require dual parallel taxiway with increased activity

Trade-offs (if selecting Alt B)

1. Dispersed Airport maintenance facilities does not require land transaction



Maintenance Facilities Conclusion – Alt. C

Primary Advantages

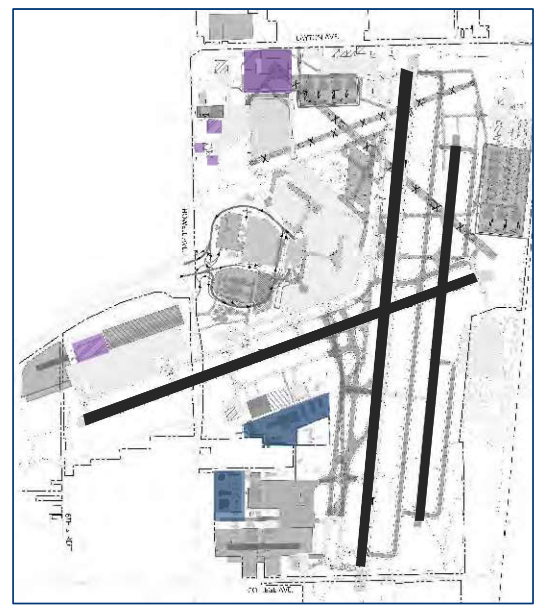
1. Consolidated Airport maintenance facilities
2. Snow removal vehicle staging accommodated on roadway (no longer staged on TW Y)
3. Aircraft maintenance campus accommodates incremental/phased expansion

Primary Challenges

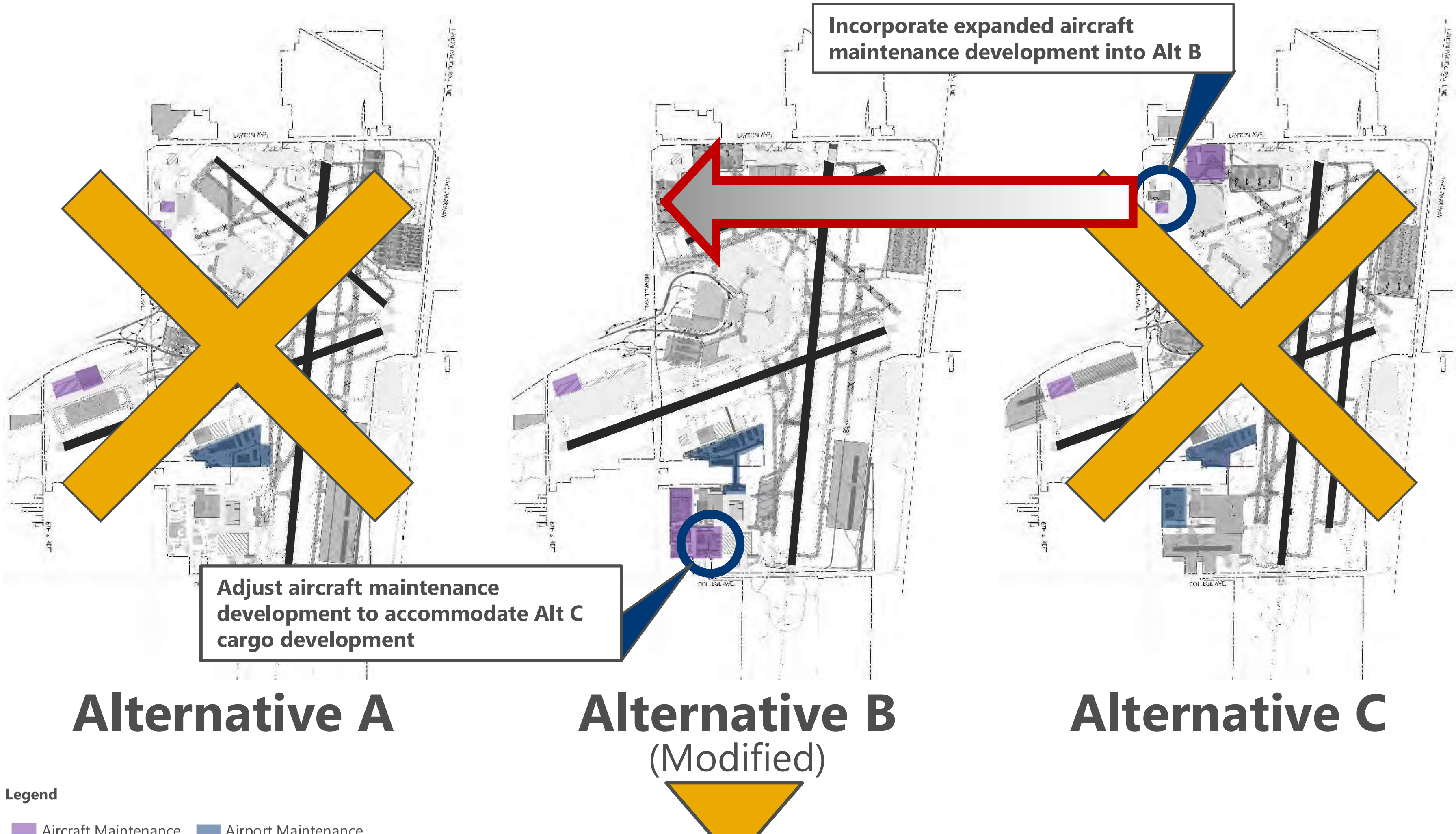
1. Relocation to County Highway Department facilities to MKE Regional Business Park parcel (not available for revenue generating development)
2. Aircraft maintenance development abutting Layton Ave may cause community concern

Trade-offs (if selecting Alt C)

1. Relocation of County Highway Department is not highest and best use of MKE Regional Business Park land
2. Consolidated aircraft maintenance campus location (along Layton Ave) may cause community concern

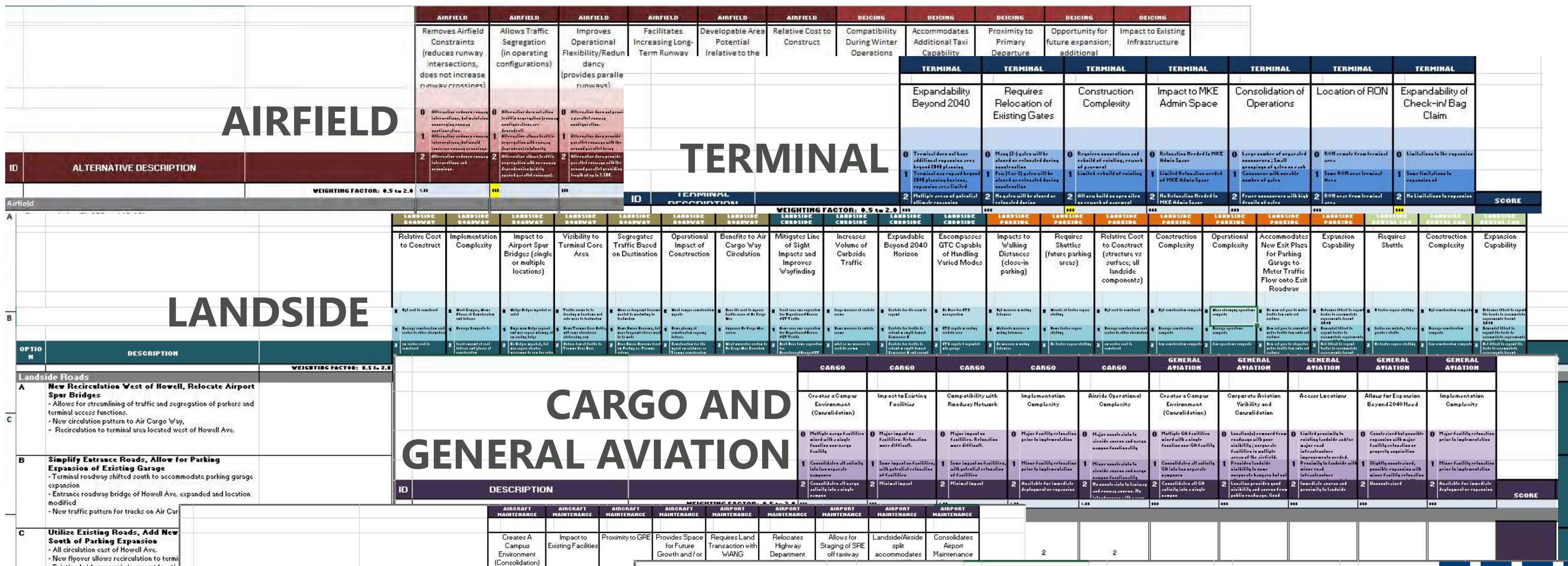


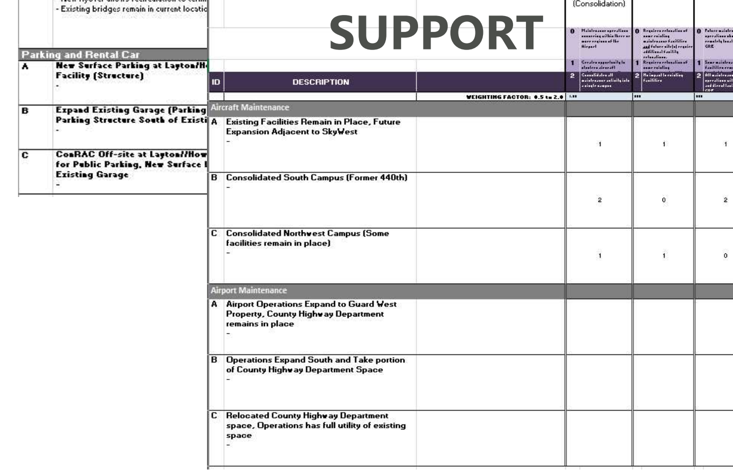
Aircraft and Airport Maintenance Areas



Preliminary Preferred Alternative

Shortlisted Alternatives Evaluation

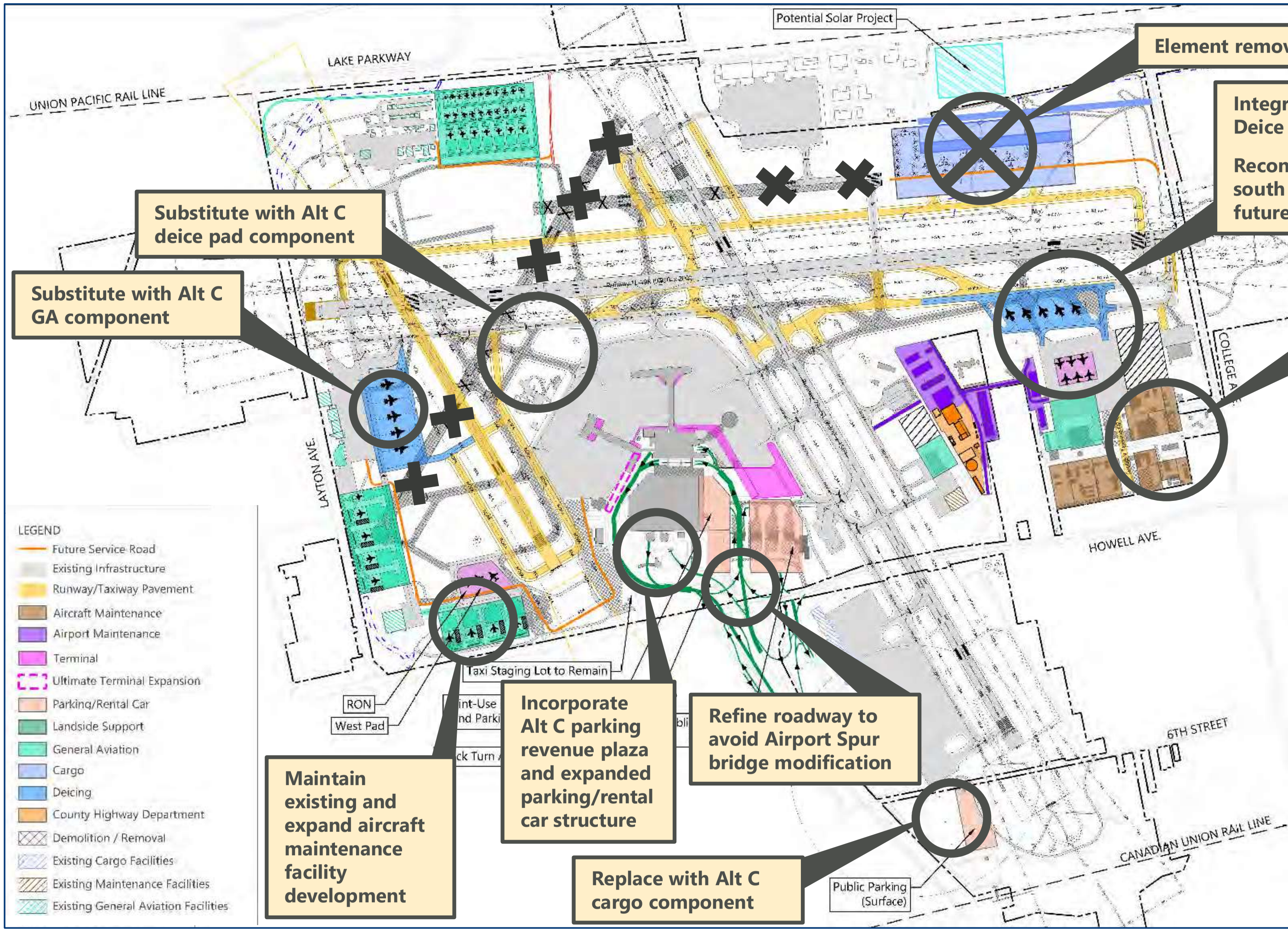




OVERALL

Alternative	AIRFIELD	LANDSIDE	TERMINAL	CARGO GENERAL AVIATION	AIRCRAFT/AIRPO MAINTENANCE	SCORE
ALTERNATIVE A	7.5	20	6.5	15	7	56
ALTERNATIVE B	16	[illegible]	[illegible]	13	11	64.5
ALTERNATIVE C	12.5	26.5	7.5	7	7	60.5

Preliminary Preferred Alternative (initial refinements identified)



Alternative B is the basis for the preliminary preferred alternative

Next Steps

TAG and SAG input is important to the refinement of the preliminary preferred alternative

- Refine Preferred Alternative
- Overall Master Plan Process
  - Prepare Implementation Plan and Financial Analysis
  - Develop Draft Capital Improvement Program (CIP)
  - Prepare Environmental Overview
  - Land use assessment to explore potential non-aeronautical development areas
  - Prepare ALP Drawing Set and Narrative Report (FAA signs and approves ALP)
  - FAA ALP review period: up to 180 days
  - Finalize and submit Master Plan report
- Upcoming meetings
  - Present alternatives analysis and Preferred Alternative to the public (Public Open House #4)
  - Final TAG/SAG Meeting #5