CHAPTER 2 - INVENTORY OF EXISTING CONDITIONS

2.1 INTRODUCTION

The initial step in the master planning process is to develop an inventory of the existing physical conditions and operational characteristics of an airport and its surroundings. Chapter 2 addresses:

- The airport setting and transportation access
- The population and socio-economic conditions of the geographic area
- A review of historical and current airport activity
- An overview of the Airport's airspace and obstructions
- Descriptions of facilities and services provided at the Airport, including a general description of airside, landside, terminal, and support facilities
- Financial overview, including historical revenue and expense reports

This chapter provides the basis for developing the forecasts of aviation activity and evaluating facility requirements or the Westfield-Barnes Regional Airport.

2.2 PHOTOGRAMMETRIC DATA COLLECTION

Because the last Airport Master Plan update was in 2004, new photogrammetric-based mapping was needed and obtained for the airspace analysis completed as part of this update. FAA Advisory Circular (AC) 150/5300-13A, Airport Design, and AC 150/5070-6B, Airport Master Plans are the bases in developing the airport base map, ALP drawings, and airspace analysis. The data were not collected per AC 150/5300-16, AC 150/5300-17, or AC 150/5300-18 (series) standards but was uploaded to the FAA Airport Geographic Information (AGIS) site.

2.3 AIRPORT BACKGROUND

The Westfield-Barnes Regional Airport (BAF) is owned, operated, and in Westfield, Hampden County, Massachusetts, located in the southwestern portion of the state, near the Connecticut border. As the owner and operator, the City of Westfield is also identified by the FAA as the designated Sponsor of the Airport and accepts federal grants and the associated grant assurances. The Airport is identified in the National Plan of Integrated Airports System (NPIAS) with a service level of General Aviation and an Asset classification of Regional, serving as a critical component of the general aviation system in Massachusetts and fulfilling a principal role of a regional airport.

The Westfield-Barnes Regional Airport covers 1,200 acres at an elevation of 270 feet above mean sea level. It has two paved runways, with a primary instrument runway and a secondary crosswind runway. Additional runway information is listed later in this section.

The Airport is located 3 miles from the central business district of Westfield along the Massachusetts Turnpike (Interstate 90). Airport Road bounds the Airport to the north and west and Massachusetts Route 10 (State Route 202) to the north and south. The Airport's primary (public entrance) is via Airport Road and Apremont Way.

As illustrated in Figure 2.1 - BAF Location in Relation to other Massachusetts Airports, BAF is one of 39 public-use airports in the state and one of two airports in Hampden County.

Figure 2.1 - BAF Location in Relation to other Massachusetts Airports

In the 12 months ending December 2018, the Airport reported approximately 41,400 aircraft operations, an average of 114 per day: 82% civil and 18% military. Local operations accounted for 42% of flight activity, and 58% were itinerant.

As of December 31, 2018, the Airport had 110 based aircraft that includes 100 single-engine, six multiengine, four jets. Also, the Airport has 18 military aircraft assigned to the Air and Army National Guard units.

Westfield-Barnes Regional Airport has one fixed-base operator (FBOs). When the project started, Ross Aviation (Rectrix Aviation) is the newest FBO, operating in the terminal building, including a conference room, weather facilities, and comprehensive pilot services. Ross Aviation provides all standard FBO services, including fuel sales, aircraft parking, and aircraft maintenance.

Westfield-Barnes Regional Airport has two FAA-approved flight schools. The most extensive program is an official FAA Part 141 flight school named Westfield Flight Academy. Also, Fly LUGU operates a Part 61 flight school out of the new terminal building. Another flight school at BAF is Air1 Flight Training, specializing in high wing tail dragger and spin training.

The focal point of the Airport is the relatively new and modern terminal building which houses the airport administration offices, the FBO, and features a full-service restaurant, Sok's Runway Restaurant & Bar, open six days a week for lunch and dinner.

2.4 AIRPORT ROLE

Westfield-Barnes Regional Airport is a general aviation airport, meaning there is no commercial air carrier service. While there are military operations at BAF, it is not a military airfield. The FAA divides general aviation airports into four categories based on existing activity measures such as the number and types of based aircraft (i.e., aircraft kept at an airport) and the volume and types of flights.[1] The four new categories are national, regional, local, and basic airports. For example, under ASSET, BAF is a "Regional" airport, which means the Airport serves regional and national markets, with very high activity levels, including jets and multiengine propeller aircraft, and averages about 100 total based aircraft including three or more jets.

2.5 AIRSIDE FACILITIES

An airport's airside facilities include those within the airport security fence and typically relate to the landing, takeoff, or taxiing of aircraft. In addition, runway and taxiway systems, aircraft parking aprons and hangars, and airfield lighting, marking, signage, and navigational systems; aids in characterizing the airside of an airport. The design of airside facilities should reflect the standards stated in the FAA's advisory circulars that relate to the type of aircraft operating at an airport. The following sections describe the characteristics and conditions of the Airport's current airside facilities. FAA's Airport Master Record (Form 5010-1) Figure 2.2 - Airport Master Record, FAA Form 5010-1, lists detailed data on the Airport. Figure 2.3 - Existing Facilities Plan is the existing facilities plan (part of the ALP set in Chapter 6) and shows the Airport as it exists today.

[1] Beginning in 2010, the FAA began a national review of the general aviation airports resulting in two reports, General Aviation Airports: A National Asset (ASSET 1) issued in May 2012 and ASSET 2 issued in March 2014.

Figure 2.2 - Airport Master Record, FAA Form 5010-1

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

AIRPORT MASTER RECORD

PRINT DATE: 7/2/2020
AFD EFF 06/18/2020
FORM APPROVED OMB 2120-0015

> 1 ASSOC CITY: WESTFIELD/SPRINGFIELD 4 STATE: MA
> 2 AIRPORT NAME: WESTFIELD-BARNES RGNL
3 CBD TO AIRPORT (NM): 03 N 6 REGION/ADO: ANE/NONE
LOC ID: BAF
5 COUNTY: HAMPDEN MA
7 SECT AERO CHT: NEW YORK
FAA SITE NR: 09398.*A

GENERAL

10 OWNERSHIP: PUBLIC
> 11 OWNER: CITY OF WESTFIELD
> 12 ADDRESS: CITY HALL, 59 COURT ST
WESTFIELD, MA 01085
> 13 PHONE NR: 413-572-6201
> 14 MANAGER: CHRISTOPHER J. WILLENBORG
> 15 ADDRESS: 110 AIRPORT RD
WESTFIELD, MA 01085
> 16 PHONE NR: (413) 572-6275
> 17 ATTENDANCE SCHEDULE:
ALL ALL 0700- 1900 LOCAL

18 AIRPORT USE: PUBLIC
19 ARPT LAT: 42-09-28.6000N ESTIMATED
20 ARPT LONG: 072-42-57.1000W
21 ARPT ELEV: 270.0 SURVEYED
22 ACREAGE: 1,200
> 23 RIGHT TRAFFIC: NO
> 24 NON-COMM LANDING: YES

25 NPIAS/FED AGREEMENTS: NGY3
> 26 FAR 139 INDEX: IV A U 12/1974

SERVICES

> 70 FUEL: 100LL A
> 71 AIRFRAME RPRS: MAJOR
> 72 PWR PLANT RPRS: MAJOR
> 73 BOTTLE OXYGEN: NONE
> 74 BULK OXYGEN: HIGH/LOW
75 TSNT STORAGE: HGR, TIE
76 OTHER SERVICES:
AFRT, CHTR, INSTR, RNTL, SALES

FACILITIES

> 80 ARPT BCN: CG
> 81 ARPT LGT SKED : SEE RMK
BCN LGT SKED: SS-SR
> 82 UNICOM:
> 83 WIND INDICATOR: YES-L
84 SEGMENTED CIRCLE: YES
85 CONTROL TWR: YES
86 FSS: BURLINGTON
87 FSS ON ARPT: NO
88 FSS PHONE NR:
89 TOLL FREE NR: 1-800-WX-BRIEF

BASED AIRCRAFT

90 SINGLE ENG:	89
91 MULTI ENG:	6
92 JET:	3
TOTAL:	98
93 HELICOPTERS:	1
94 GLIDERS:	0
95 MILITARY:	18
96 ULTRA-LIGHT:	1

OPERATIONS

100 AIR CARRIER:	20
102 AIR TAXI:	723
103 G A LOCAL:	15,718
104 G A ITNRNT:	19,188
105 MILITARY:	5,337
TOTAL:	40,986
OPERATIONS FOR 12 MONTHS ENDING:	12/31/2018

RUNWAY DATA

	02/20	15/33		
> 30 RUNWAY INDENT:				
> 31 LENGTH:	9,000	5,000		
> 32 WIDTH:	150	100		
> 33 SURF TYPE-COND:	ASPH-E	ASPH-F		
> 34 SURF TREATMENT:	GRVD	NONE		
35 GROSS WT: S	75.0	51.0		
36 (IN THSDS) D	160.0	60.0		
37 2D	240.0	155.0		
38 2D/2D2				
> 39 PCN:	58 /R/B/W/T	58 /F/B/W/T		
LIGHTING/APCH AIDS				
> 40 EDGE INTENSITY:	HIGH	MED		
> 42 RWY MARK TYPE-COND:	PIR - G / PIR - G	BSC - G / BSC - G	- / -	- / -
> 43 VGSI:	P4L / P4L	P4L / P4R	/	/
44 THR CROSSING HGT	50 / 50	41 / 40	/	/
45 VISUAL GLIDE ANGLE:	3.00 / 3.00	3.50 / 3.50	/	/
> 46 CNTRLN-TDZ:	N - N / N - N	N - N / N - N	- / -	- / -
> 47 RVR-RVV:	- N / - N	- N / - N	- / -	- / -
> 48 REIL:	N / N	Y / N	/	/
> 49 APCH LIGHTS:	/ MALSR	/	/	/
OBSTRUCTION DATA				
50 FAR 77 CATEGORY	C / PIR	B(V) / B(V)	/	/
> 51 DISPLACED THR:	/	490 /	/	/
> 52 CTLG OBSTN:	TREES / TREES	TREES / TREES	/	/
> 53 OBSTN MARKED/LGTD:	/	/	/	/
> 54 HGT ABOVE RWY END:	56 / 83	48 / 30	/	/
> 55 DIST FROM RWY END:	1,325 / 2,950	1,150 / 150	/	/
> 56 CNTRLN OFFSET:	300R / 175R	35L / 0B	/	/
57 OBSTN CLNC SLOPE:	20:1 / 33:1	19:1 / 1:1	/	/
58 CLOSE-IN OBSTN:	N / N	N / N	/	/
DECLARED DISTANCES				
> 60 TAKE OFF RUN AVBL (TORA):	9,000 / 9,000	5,000 / 5,000	/	/
> 61 TAKE OFF DIST AVBL (TODA):	9,000 / 9,000	5,000 / 5,000	/	/
> 62 ACLT STOP DIST AVBL (ASDA):	9,000 / 8,919	4,508 / 5,000	/	/
> 63 LNDG DIST AVBL (LDA):	9,000 / 8,919	4,510 / 5,000	/	/

(>) ARPT MGR PLEASE ADVISE FSS IN ITEM 86 WHEN CHANGES OCCUR TO ITEMS PRECEDED BY >

> 110 REMARKS

A 017 FUEL AVBL 0700-1900, FOR SVC AFTER 1900 BY PRIOR ARNGMT BY PHONE, CONTACT 413-485-0078.
A 024 FEE FOR COML, CORPORATE AND ALL ACFT OVR 7500 LBS.
A 026 PPR 24 HRS FOR ACR OPNS WITH MORE THAN 9 PSGR SEATS CALL AMGR 413-572-6275.
A 030 RWY 15/33 CLSD TO ACR OPNS WITH MORE THAN 9 SEATS.
A 031 RWY 02/20 200 FT OVRN NE END & 200 FT OVRN SW END.
A 043 RWY 20 VGSI AND DESCENT ANGLES NOT COINCIDENT.
A 081 DUSK-DAWN. WHEN ATCT CLSD ACTVT MALSR RWY 20; HIRL RWY 02/20; MIRL RWY 15/33 - CTAF.
A 110-001 JET ACFT STARTING UNITS AVBL.
A 110-002 SVR DOWNDRAFT AER 33 WHEN WIND NW IN EXCESS OF 15 KT. BIRDS & OTHER WILDLIFE ON & INVOF ARPT.
A 110-004 TWY G CLSD TO CIVILIAN OPNS.
A 110-006 TPA 1300 (1029) LGT ACFT; 1800 (1529) HVY & MIL ACFT. EXPC MIL OVHD & CLSD PAT TFC.
A 110-007 ACFT & HEL NOISE ABATEMENT PROCS IN EFFECT; CTC AMGR FOR COMPLETE NOISE ABATEMENT PROCS AT 413-572-6275.
A 110-008 ARNG: OPR 1200-2200Z++ TUE-FRI EXC HOL. LTD COPTER MAINT, FUEL AND ACFT PRK ARNG RAMP. NO COPTER LDG OR DEP FR PRK RAMP. CTC DSN 698-1811 OR C413-568-9151 EXTN 1811.
A 110-009 ANG: PPR FOR ALL TRAN ACFT, DSN 698-1228/9 OR C413-568-9151 EXTN 6981228/9. OPR 1230-2200Z++ TUE-FRI, CLSD HOL EXC OFFL BUS ONLY. NO DE-ICING AVBL. FOR CURRENT BIRD WATCH COND CTC HAWK OPS 309.0; DURG NON-DUTY HR CTC WHIP ON 309.0. BASH PHASE II COND, JUL, AUG AND SEP FOR MIGRATORY BIRD ACT.
A 110-010 CSTMS/AG/IMG - 1300-2300Z++ MON-FRI, FONE PRIOR 2300Z++ PRECEDING WKD C413-785-0365, C800-973-2867.
A 110-011 MISC - FIRST 400 FT RWY 02/20 CONC, MID 8200 FT ASPH. RWY 02/20 GROOVED. CLASS D ASP EFF 1200-0300Z++, OT CLASS G. LDG FEE COML, CORPORATE AND ALL ACFT OVER 5000 LB. FLT NOTIFICATION SVC, ADCUS, AVBL. LAWRS.
A 110-012 BE AWARE WING TIP CLRNC S RUNUP/D-ARM PAD TWY CNTRLN MKGS FOR F-15 A/C ONLY.
A 110-013 SERVICE-A-GEAR: REQ THRU TWR DUR TWR OPR HR, WHEN TWR CLSD REQ THRU ANG CP, WHIP ON UHF 309.0. RWY 02/20, MIL ACFT ARST BARRIERS MAY FAIL IN THE UP POSN. VERIFY STATUS OF BARRIERS PRIOR TO LDG. UTILIZE RWY 15/33 MAX EXTENT AT NGT OR WHEN TWR CLSD.
A 110 014 ANG: NO ACFT WITH WINGSPAN GREATER THAN 110 FT ALLOWED ON ANG RAMP.
A 110-015 RWY 2/20 MIL ACFT ARST BARRIERS MAY FAIL IN THE UP PSN. SML GA ACFT SHOULD USE CTN, SPCLY AT NGT, AND IF POSS CFM THE ACTUAL STS OF THE BARRIERS PRIOR TO LDG. UTILIZE RWY 15/33 TO THE MAX EXTENT PRACTICAL AT NGT & WHEN TWR IS UNMANNED.
A 110-016 COLD TEMPERATURE RESTRICTED AIRPORT. ALTITUDE CORRECTION REQUIRED AT OR BELOW -21C.

A 112 08/27/2003

111 INSPECTOR: (F) 112 LAST INSP: 11/15/2017 113 LAST INFO REQ:

Source: GCR Associates, July 2021

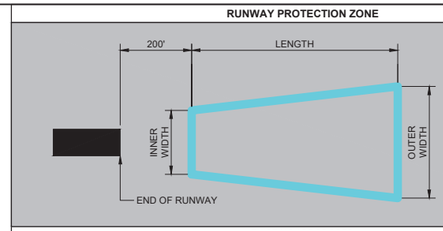
RUNWAY 15-33 DATA TABLE

RUNWAY DATA	RWY 15 - EXISTING - RWY 33	
Utility Runway (YES/NO)	NO	
Runway Design Code (RDC)	B-II	
Pavement Strength & Material Type	ASPHALT	
Strength by Wheel Loading	55,000 LBS SW	
Pavement Classification Number (PCN)	58 F/B/W/T	
Surface Treatment	NONE	
Effective Runway Gradient	0.4%	-0.4%
Runway Length	6,000'	
Runway Width	150'	
Displaced Threshold Coordinates		
Distance	490'	Not Applicable
Latitude (NAD 83)	42° 09' 47.08"N	Not Applicable
Longitude (NAD 83)	072° 43' 14.17"W	Not Applicable
Elevation (ft SL) (NAVD 88)	263.0'	Not Applicable
Runway End Coordinates		
Latitude (NAD 83)	42° 09' 50.79"N	42° 09' 12.86"N
Longitude (NAD 83)	072° 43' 18.36"W	072° 42' 35.68"W
Elevation (ft SL) (NAVD 88)	261.5'	246.9'
Runway Lighting Type	MIRL	
Approach Lighting	NONE	NONE
Vertical Glide Slope Indicator Lights (VGSI)	PAPI-4L	PAPI-4R
Runway Protection Zone (RPZ) (W x OW x L)	500' x 700' x 1,000'	500' x 700' x 1,000'
Runway Marking Type	VISUAL	VISUAL
14 CFR Part 77 Approach Category	20:1 VISUAL	20:1 VISUAL
Approach Type	VISUAL	VISUAL
Visibility Minimums	3 Miles	3 Miles
Runway Departure Surface (YES/NO)	YES	YES
Runway Safety Area (RSA)		
Length Beyond Departure End	300'	300'
Length Prior to Threshold	300'	300'
Width	150'	
Object Free Area (OFA)		
Length Beyond Departure End	300'	300'
Length Prior to Threshold	300'	300'
Width	500'	
Obstacle Free Zone (OFZ)		
Length	200'	200'
Width	400'	
Obstacle Clearance Surface (OCS)	No OCS Penetrations	No OCS Penetrations
Visual and Instrument NAVAIDs	MIRL, PAPI	MIRL, PAPI
Touchdown Zone Elevation (ft SL)	262.9'	247.8'
Taxiway Design Group	TDG-2	TDG-2

RUNWAY 2-20 DATA TABLE

RUNWAY DATA	RWY 2 - EXISTING - RWY 20	
Utility Runway (YES/NO)	NO	
Runway Design Code (RDC)	C-IV	
Pavement Strength & Material Type	ASPHALT w/concrete	
Strength by Wheel Loading	75,000 LBS SW	
Pavement Classification Number (PCN)	58/R/B/W/T	
Surface Treatment	Grooved	
Effective Runway Gradient	-0.1%	0.1%
Runway Length	9,000'	
Runway Width	150'	
Displaced Threshold Coordinates		
Distance	0	0
Latitude (NAD 83)	Not Applicable	Not Applicable
Longitude (NAD 83)	Not Applicable	Not Applicable
Elevation (ft SL) (NAVD 88)	Not Applicable	Not Applicable
Runway End Coordinates		
Latitude (NAD 83)	42° 09' 43.08"N	42° 10' 10.57"N
Longitude (NAD 83)	072° 43' 07.75"W	072° 42' 46.55"W
Elevation (ft SL) (NAVD 88)	268.4'	266.5'
Runway Lighting Type	HIRL	
Approach Lighting	PAPI-4L	PAPI-4L SSALSR
Vertical Glide Slope Indicator Lights (VGSI)	PAPI-4L	PAPI-4L
Runway Protection Zone (RPZ) (W x OW x L)	1,000' x 1,510' x 1,700'	1,000' x 1,750' x 2,500'
Runway Marking Type	NON-PRECISION	PRECISION
14 CFR Part 77 Approach Category	34:1 NON-PRECISION	50:1 PRECISION
Approach Type	VORTE C, TACAN, GPS	ILS,VOR, NDB, GPS
Visibility Minimums	1 MILE	1/2 MILE
Runway Departure Surface (YES/NO)	YES	YES
Runway Safety Area (RSA)		
Length Beyond Departure End	1,000'	1,000'
Length Prior to Threshold	600'	600'
Width	800'	
Object Free Area (OFA)		
Length Beyond Departure End	1,000'	1,000'
Length Prior to Threshold	600'	600'
Width	800'	
Obstacle Free Zone (OFZ)		
Length	200'	3,200'
Width	400'	
Obstacle Clearance Surface (OCS)	YES	YES
Visual and Instrument NAVAIDs	HIRL, PAPI	HIRL, PAPI, ILS, MALSAR, VGSI
Touchdown Zone Elevation	261.5'	267.3'
Taxiway Design Group	TDG-2	TDG-2

RUNWAY PROTECTION ZONE



EXISTING / PROPOSED

RUNWAY	APPROACH TYPE	VISIBILITY	INNER WIDTH	OUTER WIDTH	LENGTH	ACRES
2	PRECISION	1 MI	1000'	1510'	1,700'	78.914
20	PRECISION	1/2 MI	1000'	1750'	2,500'	78.914
15	VISUAL	Visual	500'	700'	1'000'	13.77
33	VISUAL	Visual	500'	700'	1'000'	13.77

AIRPORT DATA TABLE

AIRPORT DATA	EXISTING
FAA Site Number	13306A
Airport Elevation (MSL) (NAVD 88)	270.7'
Airport Reference Point (NAD 83) Latitude / Longitude	42° 09' 28.0"N / 072° 42' 56.4"W
Mean Max Temperature of Hottest Month	85°F
Airport Navigation Aids (Ownership)	ILS (FAA), PAPI (FAA), MALSR (FAA), REIL (FAA), Runway Lights (Airport), Rotating Beacon (Airport)
Miscellaneous Facilities	AvGas and Jet A Fuel
Declination / Source (Date)	13°44'W / NOAA (Feb 2019)
NPIAS Service Level	General Aviation
State Service Level	General Aviation Regional
Airport Reference Code	C-IV
Taxiway Design Group / Taxiway Width	TDG-2 / All = 50'
Design Aircraft	GULFSTREAM G650

TAXIWAY PROTECTION (EXISTING)

TAXIWAY	WIDTH (FT)	TSA WIDTH (FT)	TOFA WIDTH (FT)
A	50'	79'	131'
B (North)	125'	79'	131'
B (South)	50'	79'	131'
B1	35'	79'	131'
B2	60'	79'	131'
B4	35'	79'	131'
D	50'	79'	131'
E	50'	79'	131'
F	50'	79'	131'
G	50'	79'	131'
H	140'	79'	131'
S	155'	79'	131'

NOTE:

ALL ELEVATIONS ARE MEAN SEA LEVEL (MSL)
VERTICAL DATUM : NAVD 88
COORDINATE SYSTEM : NAD 83

LEGEND

- AIRPORT PROPERTY LINE
- EXISTING CONTOUR
- EXISTING FENCE
- RUNWAY SAFETY AREA
- OBJECT FREE AREA
- OBJECT FREE ZONE
- BUILDING RESTRICTION LINE
- RUNWAY VISIBILITY LINE
- RUNWAY PROTECTION ZONE
- FAR PART 77 SURFACE
- THRESHOLD SITING SURFACE
- EXISTING PAVEMENT
- EXISTING BUILDING
- EXISTING WETLANDS
- LEASE HOLD

DECLARED DISTANCES (EXISTING CONDITIONS)

RUNWAY	RUNWAY LENGTH (FT)	TORA	TODA	ASDA	LDA
2	9,000	9,000	9,000	9,000	9,000
20	9,000	9,000	9,000	8,919	8,919
15	5,000	5,000	5,000	5,000	3,960*
33	5,000	5,000	5,000	5,000	5,000

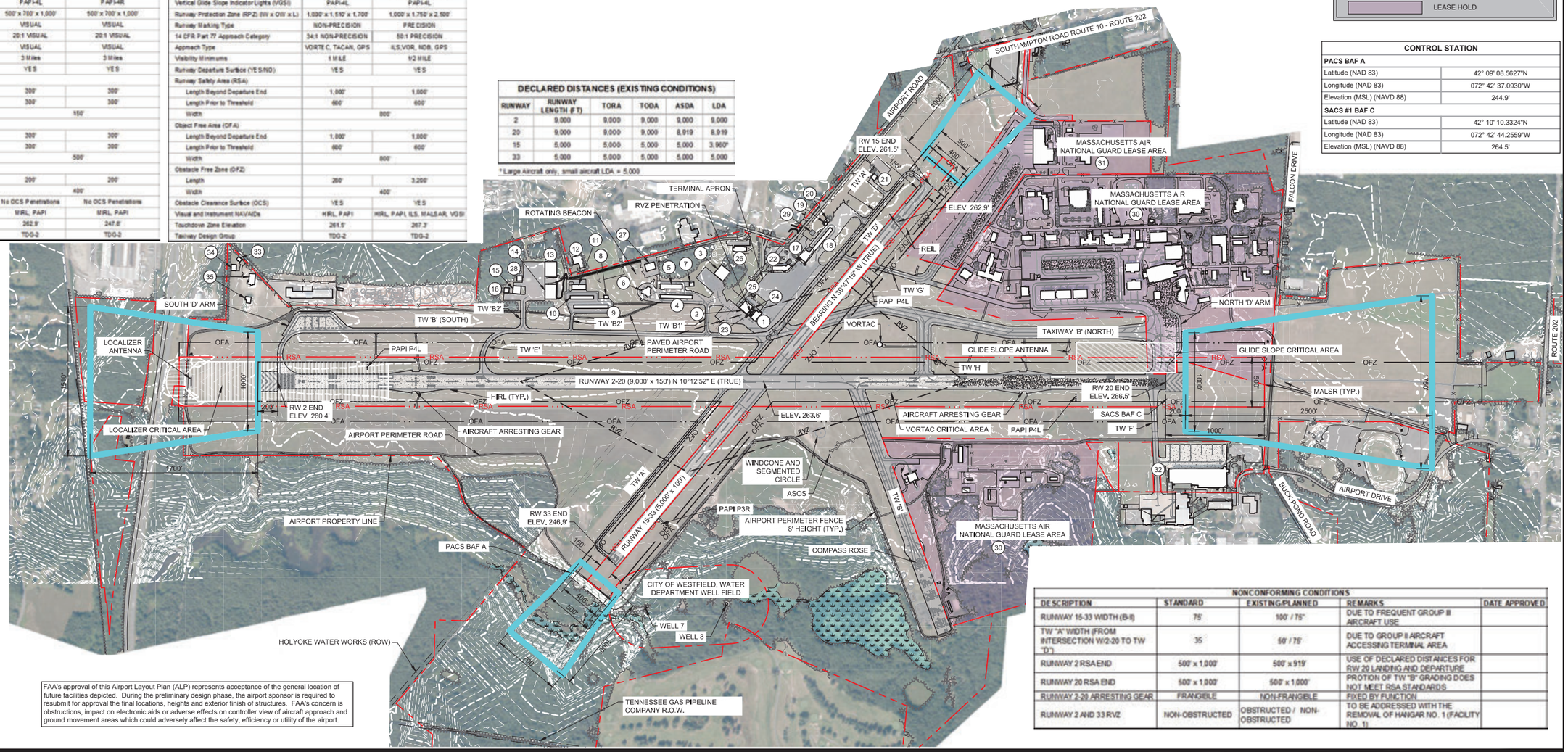
* Large Aircraft only, small aircraft LDA = 5,000

CONTROL STATION

PACS BAF A	
Latitude (NAD 83)	42° 09' 08.5627"N
Longitude (NAD 83)	072° 42' 37.0930"W
Elevation (MSL) (NAVD 88)	244.9'
SACS #1 BAF C	
Latitude (NAD 83)	42° 10' 10.3324"N
Longitude (NAD 83)	072° 42' 44.2559"W
Elevation (MSL) (NAVD 88)	264.5'

FACILITIES TABLE

NO.	EXISTING DESCRIPTION
1	Hangar 1
2	Hangar 2
3	Hangar 3
4	Tee Hangar
5	Hangar
6	HEX Hangar
7	Hangar
8	Hangar
9	Tee Hangar
10	Tee Hangar
11	Hangar
12	Tee Hangar (Off-Airport Property)
13	Hangar
14	Hangar
15	Hangar
16	Hangar
17	Hangar
18	Hangar
19	Tee Hangar
20	Tee Hangar
21	Hangar
22	Terminal Building
23	Air Traffic Control Tower
24	Abandoned Elec. Vault
25	Airfield Electrial Vault
26	Westfield City Building
27	SRE Building
28	Fuel Farm
29	Fuel Farm
30	MA Air National Guard (Leasehold)
31	Army National Guard (Leasehold)
32	Gulfstream (Leasehold)
33	Office
34	Hangar
35	Abandoned Buildings



NONCONFORMING CONDITIONS

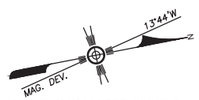
DESCRIPTION	STANDARD	EXISTING/PLANNED	REMARKS	DATE APPROVED
RUNWAY 15-33 WIDTH (B-II)	75'	100' / 75'	DUE TO FREQUENT GROUP III AIRCRAFT USE	
TW "A" WIDTH (FROM INTERSECTION W/2-20 TO TW "D")	35	50' / 75'	DUE TO GROUP II AIRCRAFT ACCESSING TERMINAL AREA	
RUNWAY 2 RSA END	500' x 1,000'	500' x 919'	USE OF DECLARED DISTANCES FOR RW 20 LANDING AND DEPARTURE	
RUNWAY 20 RSA END	500' x 1,000'	500' x 1,000'	PROTION OF TW "B" GRADING DOES NOT MEET RSA STANDARDS	
RUNWAY 2-20 ARRESTING GEAR	FRANGIBLE	NON-FRANGIBLE	FIXED BY FUNCTION	
RUNWAY 2 AND 33 RVZ	NON-OBSTRUCTED	OBSTRUCTED / NON-OBSTRUCTED	TO BE ADDRESSED WITH THE REMOVAL OF HANGAR NO. 1 (FACILITY NO. 1)	

FAA's approval of this Airport Layout Plan (ALP) represents acceptance of the general location of future facilities depicted. During the preliminary design phase, the airport sponsor is required to resubmit for approval the final locations, heights and exterior finish of structures. FAA's concern is obstructions, impact on electronic aids or adverse effects on controller view of aircraft approach and ground movement areas which could adversely affect the safety, efficiency or utility of the airport.

Revision | By | Appd. | MM.DD.YY

Issued | By | Appd. | YY.MM.DD

Permit-Seal



2019_02_08 NOAA MODEL WMM2015

0 500' 1000'

Stantec
3 Columbia Circle, Suite 6
Albany, New York 12203
www.stantec.com

Client/Project
WESTFIELD-BARNES REGIONAL AIRPORT

AIRPORT LAYOUT PLAN

WESTFIELD, MASSACHUSETTS

File Name: | CAM Dwn. | ECD Chkd. | PVE Dsgn. | X YY.MM.DD

Title
EXISTING FACILITIES PLAN

Project No. 195210988 | Scale AS SHOWN

Drawing No. 2 | Sheet 2 of 10 | Revision 0

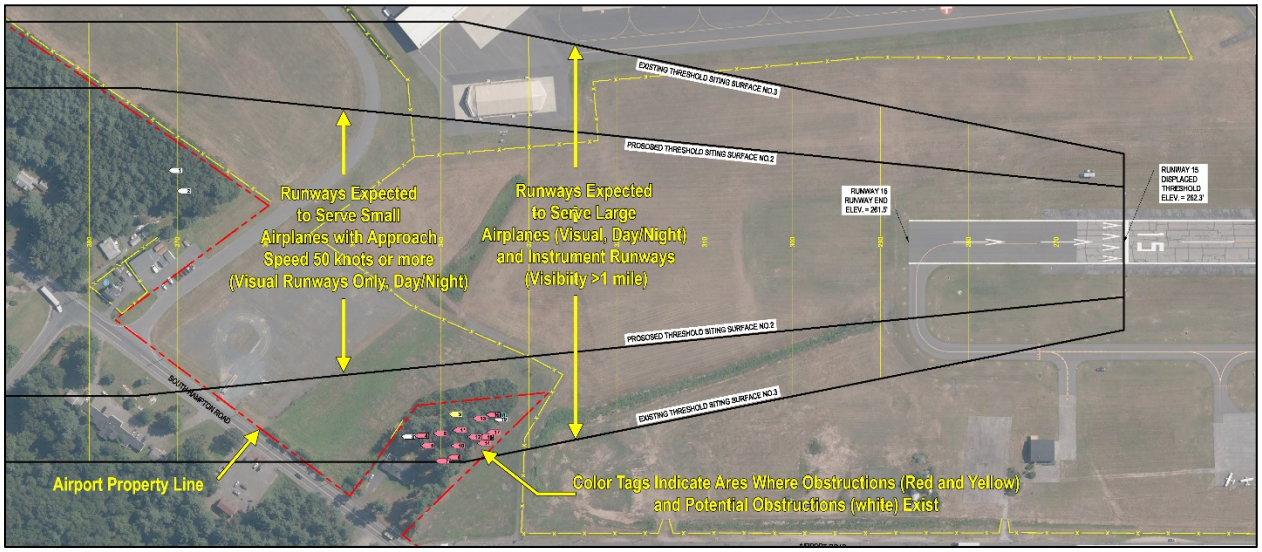
ORIGINAL SHEET - ARCH D BASE

2.5.1 Runways

Westfield-Barnes Regional Airport has two runways. Runway 02-20 is the primary runway, and Runway 15-33 serves as the Airport's crosswind runway. Runway 02-20 is 9,000 feet long and 150 feet wide. The surface is primary asphalt and is grooved. The center portion of the runway is concrete, which is visible in Figure 2.3 - Existing Facilities Plan. It is an instrument runway with a precision approach to Runway 20 and non-precision to Runway 2. The runway was reconstructed in 2014 and is in fair condition.

Runway 15-33 is 5,000 feet long and 100 feet wide with 25-foot-wide shoulders. The runway also has a 490-foot displacement on the Runway 15 approach, resulting in 4,590 feet of runway for landing aircraft. The pavement was overlaid around 1997 and is now in fair condition. The crosswind at BAF is a visual runway. The runway threshold displacement is required because of obstructions to the FAA Obstacle Clearance Surface (OCS). Figure 2.4 - Runway 15 Obstacle Clearance Surface shows the impact of obstructions, all in the form of trees on private property. This figure shows two different Obstacle

Figure 2.4 - Runway 15 Obstacle Clearance Surface



Source: Stantec Analysis with Data from Bluesky Geospatial Ltd.

Clearance Surfaces.[2] The smaller surface shows the OCS for airplanes with an approach speed of 50 knots or faster, for visual runways only, and both day and night operations. The larger surface is for large aircraft[3] for visual runways (both day and night) and instrument runways, day only with approach minimums 1 mile or greater. As illustrated, there are no obstructions to the smaller surface. Still, the

[2] See AC 5300-13A, Airport Design, Table 3-2, *Approach/Departure Standards Table*, and Figure 3-2, *Obstacle Clearance Based on Approach Slope*.

[3] Aircraft with a maximum gross takeoff weight greater than 12,500 pounds.

larger surface picks up numerous obstructions (all trees) in the private property outside the airport property near the intersection of Airport Drive and Southampton Blvd.

2.5.2 Taxiways

The Airport has a total of 12 taxiways, which are illustrated in Figure 2.3. The taxiways serve a wide range of aircraft, from the military F-15 Eagle and other tactical and support aircraft, large civilian business jets, ranging from Aircraft Design Group (ADG) I through IV, and the predominant aircraft, the smaller single and multiengine reciprocating and turboprop aircraft in ADG I and II.

This section examines each taxiway for consistency with FAA and DOD design requirements and reports the current pavement condition. The FAA uses AC 5300-13A, and the Department of Defense (DOD) design, which only applies to selected taxiways used by the ANG, is based on DOD Unified Facilities Requirements (UFC 3-260-01).

American Society for Testing and Materials (ASTM) adopted the Pavement Condition Index (PCI) as a pavement condition rating standard for airfield pavements. ASTM D5340, Standard Test Method for Airport Pavement Condition Index Surveys, covers the determination of airport pavement condition through visual surveys of pavement using the PCI method to quantify pavement condition. PCI is a numerical indicator that reflects the structural integrity and surface operational condition of a pavement. It is based on an objective measurement of the type, severity, and quantity of distress. The PCI values range from 0 to 100, as shown in Figure 2.5 - PCI Rating Scale, where 0 indicates a failed pavement and 100 is new pavement. The PCI data referenced in the subsequent sections were obtained from the Massachusetts Department of Transportation, Airport Pavement Management System (APMS).[4]

Figure 2.5 - PCI Rating Scale

PAVEMENT CONDITION INDEX		CONDITION DESCRIPTION
100 86		GOOD
85 71		SATISFACTORY
70 56		FAIR
55 41		POOR
40 26		VERY POOR
25 11		SERIOUS
10 0		FAILED

Source: FAA AC 5380-7B, Airport Pavement Management Program, 10/10/2014.

2.5.2.1 Taxiway A

Taxiway A is a parallel taxiway serving Runway 15-33. Taxiway A varies in width from 35 feet on both ends and 50 feet wide between Taxiway D and Runway 2-20. The taxiway has a Pavement Condition

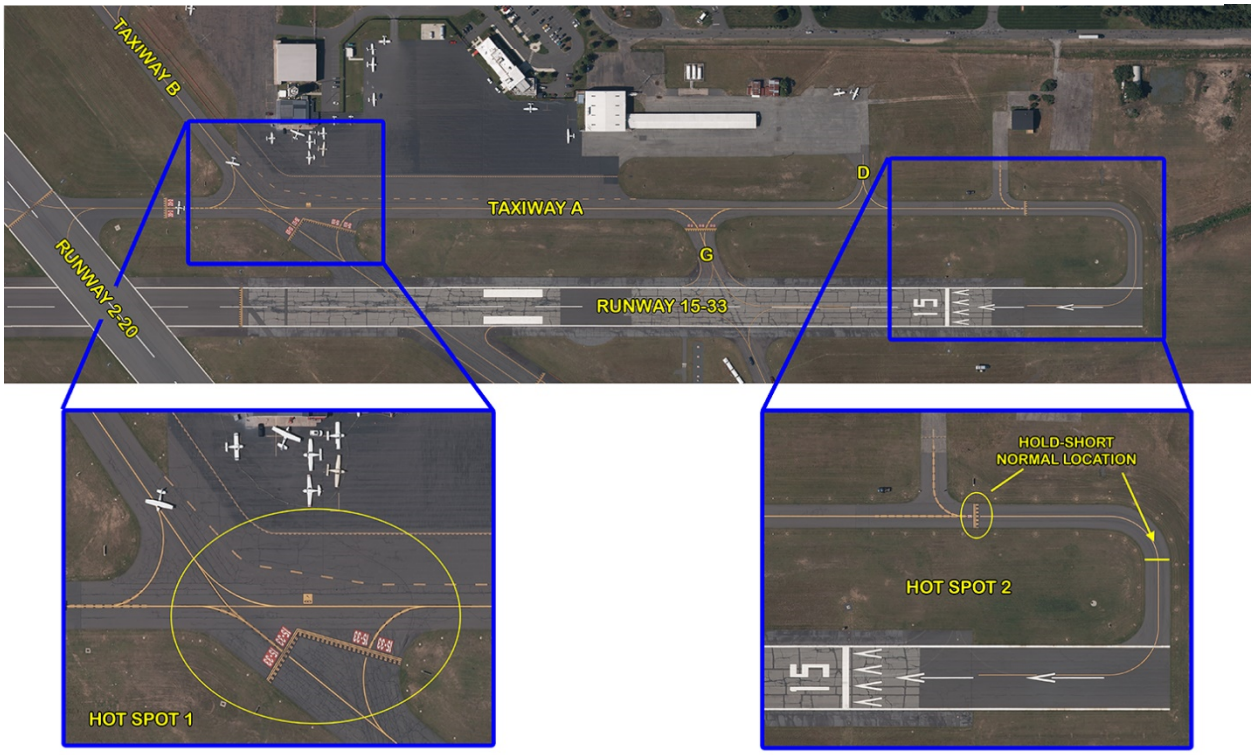
[4] https://www.mass.gov/airport-pavement-management-system-apms.

Index (PCI) that ranges from 70 (Very Good) to 95 (Excellent). The taxiway is equipped with medium-intensity incandescent edge lights.

The FAA identified two "Hot Spots"[5] at Westfield-Barnes Regional Airport, and they are both located next to Taxiway A (Figure 2.6 - FAA Identified Hot Spots).

Hotspot 1 (HS1) is at the intersection of Taxiway A and Taxiway B. The second (HS2) is on Taxiway A, near the approach end of Runway 15. The FAA has documented these hot spots as follows: HS1 at the intersections of Taxiway A and Taxiway B is considered a complex intersection because of its layout and proximity to Runways. HS2 is at an unusual location. In addition, the Runway 15 hold-short line is at an unusual place. Instead of holding perpendicular to the runway, with a clear view of the entire runway, pilots are facing northwest at the hold short line, with no clear view behind them. The FAA concern in both cases is because of the potential. Figure 2.6 illustrates both HS1 and HS2.

Figure 2.6 - FAA Identified Hot Spots



2.5.2.2 Taxiway B

The primary taxiway parallels Runway 2-20 and is designated B. An essential feature of this taxiway is its width between Taxiway A and the approach end of Runway 20. This section of the taxiway, plus Taxiway

[5] A hot spot as a location on an airport movement area with a history of potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary.

H, is 75 feet wide plus an additional 25 feet of pavement on each side (total width of 125 feet). This additional pavement meets military specifications for the F-15 Air National Guard aircraft. From Taxiway A to the approach end of Runway 2, the south end of Taxiway B is 50 feet wide, which is the FAA design standard for this Airport. The Hot Spot at the intersection of Taxiways A & B is discussed in the taxiway A section.

2.5.2.3 Taxiways B1, B2, B4

The three stub taxiways leading from Taxiway B to separate apron and hangar areas are B1, B2, and B4. B1 is a 280-foot-long by 35-foot-wide feeder taxiway to Hangars 12 -15, with a PCI of 24, or Very Poor. B2 is 150 feet long and 30 feet wide and leads to Hangars 6 - 10. The pavement was recently repaved and has a perfect PCI rating of 100 (Excellent). Therefore, changes in location or configuration are not required at this time. B4, which provides access to Hangars 1-5, is 260 feet long and 50 feet wide and is in fair condition with a 56 PCI. Reconstruction should be to ADG II standards of 35 feet in width.

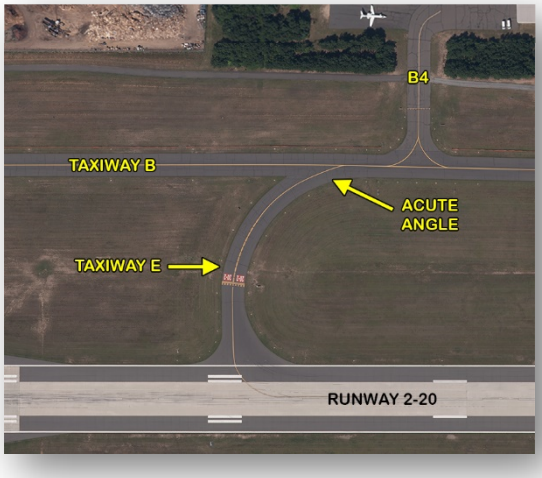
2.5.2.4 Taxiway D

Taxiway D is a stub taxiway connecting Taxiway A with Runway 15-33, and Taxiway G. Delta is 50 feet wide and has a PCI rating of 77 on the taxiway A side and 40 on the Runway 15-33 side.

2.5.2.5 Taxiway E

Taxiway E is a stub taxiway connecting the southern portion of Runway 2-20 with Taxiway B. It serves a variety of aircraft, including ANG F-15 and other military and larger civil jet aircraft. It is approximately 400 feet in length and is 50 feet wide. The taxiway's geometric layout does not meet FAA design criteria because of the wide radius where the taxiway intersects Taxiway B (see Figure 2.7. Taxiway E Configuration). Standards require a 90-degree interface the way the taxiway intersects the runway. The current PCI rating is 80 on the taxiway side and 90 on the runway side.

Figure 2.7. Taxiway E Configuration



2.5.2.6 Taxiway F

Taxiway F provides access from the primary runway to the Gulfstream facility. The PCI rating is 98 inward from the runway edge for approximately 230 x 50 feet, and then it is reduced to 58 feet for the portion leading up to the Gulfstream ramp.

2.5.2.7 Taxiway G

Taxiway G serves the Army National Guard and provides direct access to Runway 15-33 and continued access to the Airport. The portion of the taxiway that continues onto the ANG base is closed.[6] The taxiway is 50 feet wide from the runway to a point where it turns toward the Army Guard facility, where it widens to 50 feet plus 25-foot shoulders on both sides. This 440-foot section is in poor condition with a PCI rating of 40. The rest of the taxiway is new with a PCI of 100.

2.5.2.8 Taxiway H

Taxiway H connects Taxiway B to Runway 2-20 directly across from the ANG, with plans to connect it with Taxiway S on the opposite side of the runway. This taxiway provides access across the runway to the Airport's maintenance runup area and overflow aircraft parking area and eliminates aircraft back-taxi maneuvers on Runway 2-20.

2.5.2.9 Taxiway S

Taxiway S serves as a connector to the ANG engine testing "hush house" and the Airport's maintenance runup area. It also serves as an overflow parking apron for the Airport during peak conditions. The PCI rating is 59-60 (Fair). This taxiway once served the Airport as its third runway but has since been reconstructed is now 50 feet wide with no shoulders except around the compass rose.

2.6 LANDSIDE FACILITIES

Landside facilities are those that do not involve the active operation of aircraft during flight. These primarily include buildings, aircraft parking aprons, and hangars.

2.6.1 Hangars

On the civilian side and exclusive of Gulfstream, the Airport has 20 hangars, five are tee-style units, and the remaining are conventional hangars of various sizes (Figure 2.8 - BAF Civil Hangars). In addition, Gulfstream owns and maintains an 80,500-SF hangar for the company's exclusive use, which is a through-the-fence activity.[7] Table 2-1 - BAF Hangar Inventory (page 2.19) lists the hangars, their size, and ownership (exclusive of Gulfstream and the Air and Army National Guard.

[6] TW G was closed when the ANG built hangars for the F-15's adjacent to the taxiway. In doing so it became a secure area.

[7] A Through the Fence (TTF) operation is defined by the Federal Aviation Administration (FAA) as any activity or use of real property of an aeronautical or nonaeronautical nature that is located outside (or off) of airport property but has access to the airport's runway and/or taxiway system.

Figure 2.8 - BAF Civil Hangars

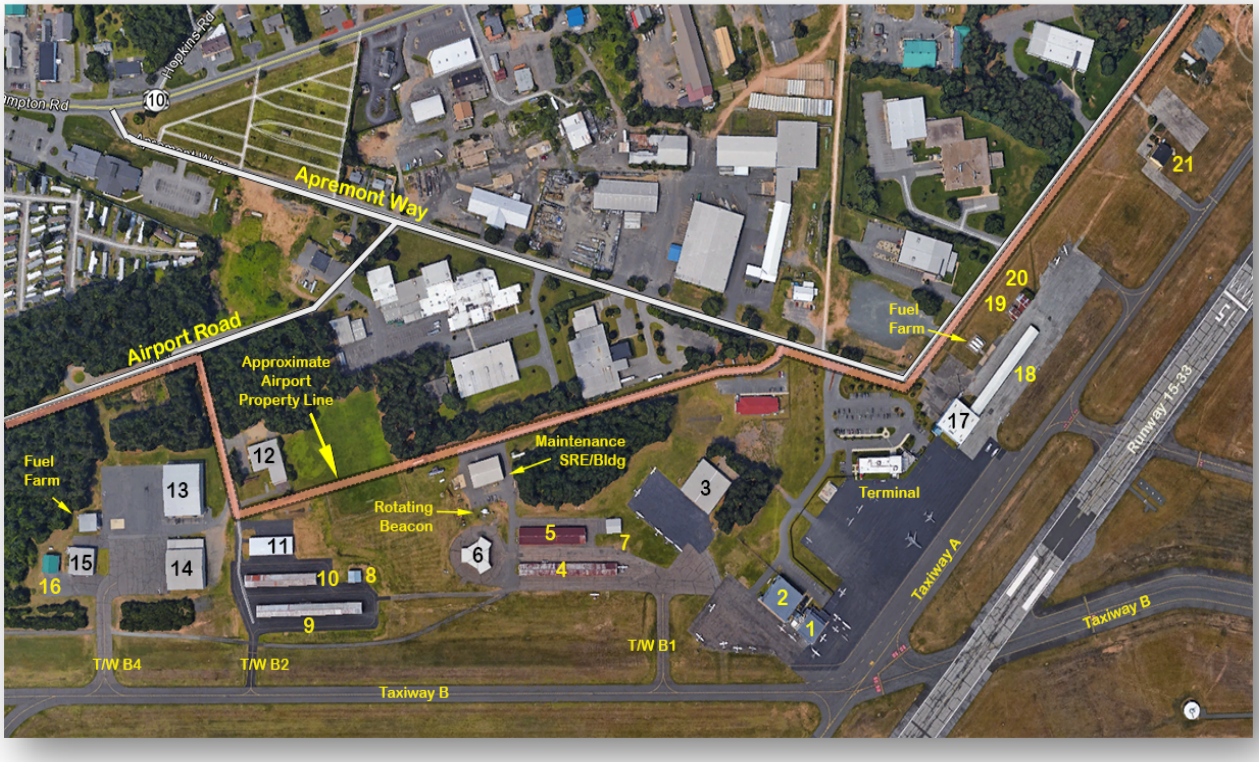


Table 2-1 - BAF Hangar Inventory

REFERENCE NUMBER*	HANGAR SIZE (SQUARE FEET)	APPROXIMATE HANGAR PARKING SPACES**	TYPE
1	2800	2	Conventional
2	7,000	4	Conventional
3	3,200	2	Conventional
4	20,000	10	Conventional
5	15,000	8	Conventional
6	10,300	6	Conventional
7	7,700	4	Tee Hangar
8	8,900	5	Tee Hangar
9	12,700	6	Tee Hangar
10	1,500	2	Conventional
11	7,000	3	Hybrid
12	12,400	6	Tee Hangar
13	11,400	6	Tee Hangar
14	2,300	3	Conventional
15	14,900	8	Conventional
16	9,300	6	Conventional
17	5,800	4	Conventional
18	10,900	8	Conventional
19	12,800	10	Tee Hangar
20	2,700	6	Conventional
21	2,600	4	Conventional
TOTAL	**175,800**	**109**	**14 Conventional, 6 Tee, 1 Hybrid**

* Reference numbers refer to Figure 2.3 and do not coincide with Airport Layout Plan
** Estimated space based on the typical aircraft that might park inside the hangar

2.6.2 Aprons

The Westfield-Barnes Regional Airport has five primary aircraft parking aprons. As identified in Figure 2.9 - Aircraft Parking Aprons, and in Table 2-2 - BAF Aircraft Parking Aprons, the five aprons have a combined area of approximately 35,600 square yards. The largest is the Terminal Apron, with an area of 16,700 square yards, which is used primarily by itinerant aircraft and serves as the main apron for large jets. The terminal Apron has no tie-down anchors. The South, Central, North, and Retrix Aprons are used primarily by small-based aircraft and have tie-down anchors. The Terminal Apron serves both based aircraft and serves as an overflow for itinerant aircraft, mostly aircraft remaining overnight. This apron has no tie-down anchors.

Figure 2.9 - Aircraft Parking Aprons

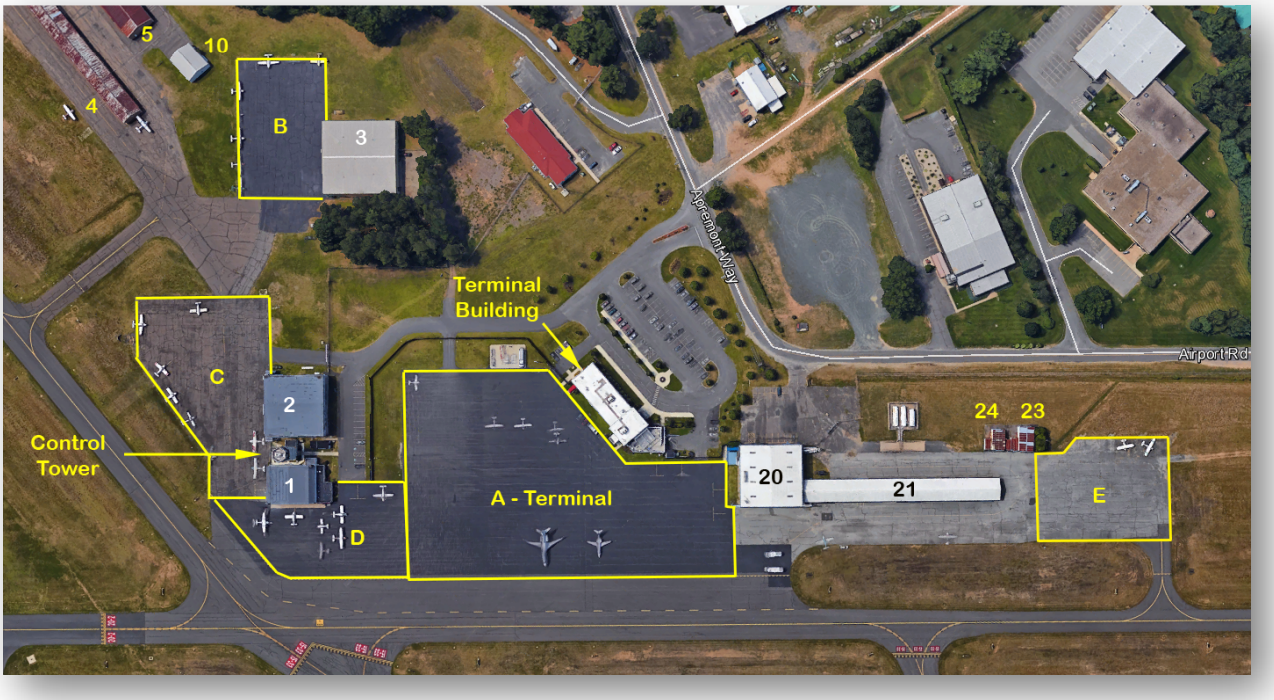


Table 2-2 - BAF Aircraft Parking Aprons

REFERENCE LETTERS*	SIZE (SQUARE YARDS)	APPROXIMATE NUMBER OF AIRCRAFT**
A – Terminal	16,700	20
B	3,745	8
C	6,080	12
D	3,900	10
E	4,170	15
Total	**34,595**	**65**

* Reference letters refer to Figure 2.9 and do not coincide with Airport Layout Plan
** Based on 350 2YD/aircraft less maneuvering space

2.6.3 Terminal Building

The focal point of the Westfield-Barnes Regional Airport is the large and spacious terminal building centrally located on the Airport's west side. Measuring just over 9,100 square feet (with a total of 14,100 SF of usable floor space (first and second floor), the building includes a large open-air atrium with 40' high floor to ceiling windows facing both the aircraft apron and automobile parking lot. In addition, the building supports the Airport's administrative offices, the fixed-based operator (FBO), and a full-service restaurant and bar. Figure 2.10 - Terminal Building, Terminal Apron, and Control Tower, and Figure 2.11 - Terminal Building and Parking Lot from Landside are aerial views of the terminal from the landside and airside.

Figure 2.10 - Terminal Building, Terminal Apron, and Control Tower

Figure 2.11 - Terminal Building and Parking Lot from Landside

2.7 AIRPORT DESIGN

Airports must provide and maintain facilities in compliance with recommended design standards to be eligible for federal or state funding. These regulatory agencies establish These standards to ensure the safe and efficient operation of aircraft on and in the vicinity of an airport.

Airport design standards correlate directly with the critical aircraft type(s) and FAA Airport Reference Code (ARC) system. The ARC system is the Runway Design Code (RDC) when discussed specific to a runway and its related infrastructure. The RDC defines the design standards to which a particular runway is to be built.

The Taxiway Design Group (TDG), based on an aircraft's landing gear dimensions, determines the taxiway design standards. The planned family of critical design aircraft estimated to operate a minimum of 500 annual itinerant operations from BAF, including both runways, the taxiway system, and aprons.

The critical aircraft, both existing and forecast, determine the ARC and RDC. The selection of the ARC as a first step in the airport facility requirements element ensures proper airport design standards selected during the remainder of the planning effort. For airports with two or more runways, it may be desirable to design all airport elements to meet the requirements of the most demanding ARC. However, it is more practical to develop some airport elements, e.g., a secondary runway and its associated taxiway(s), to standards with a less demanding Reference Code.

2.7.1 Design Aircraft

The selection of the correct ARC begins with the designation of the design aircraft. The design aircraft – also referred to as the critical aircraft – is the plane (or group of aircraft) with the longest wingspan and the fastest approach speed that conducts at least 500 annual operations at BAF.

The current ALP (and airport master plan) list the Boeing Business Jet as the design aircraft for the primary runway (2-20) and the Citation II and Beech 350 for Runway 15-33. However, after reviewing operations records and discussions with air traffic control personnel, the current design aircraft was the Gulfstream 650 for Runway 2-20. The Beech 350 remains the design aircraft for Runway 15-33. Except for the terminal apron, small aircraft[8] are the aircraft parking aprons and taxilanes. The current design aircraft and related measurements and design codes and the appropriate airport infrastructure are listed in Table 2-3 - BAF Design Aircraft.

2.7.2 Dimensional Design Standards

Airport dimensional design standards define the widths and clearances required to optimize safe operations in the landing and takeoff area. These dimensional standards vary depending upon the ARC for the runway. Because the Westfield-Barnes Regional Airport is a joint-use facility, the Airport must meet both FAA and Department of Defense (DOD) design standards. Therefore, while FAA standards[9] are crucial, principal areas where military activity occurs must meet DOD standards.[10] These areas

[8] Telephone conversation with A. Lustenburger (BAF Tower Chief) and E. Deck (Stantec) on January 11, 2018.
[9] Advisory Circular 5300-13A, Airport Design.
[10] Department of Defense, Unified Facilities Criteria (UFC), Airfield and Heliport Planning and Design, UFC 3-260-01,

include Runway 2-20 and Taxiways B and G. Ramp and taxilanes used exclusively by DOD aircraft, designed to DOD standards. In addition, Runway Safety Areas, Object Free Areas, and other defined areas are designed to FAA standards.

Exclusive of DOD requirements, Runway 2-20 should meet and be planned to the standards of the critical ARC, which is C-III and forecast to remain C-III for the next 20 years. Likewise, Runway 15-33 is a B-II.[11] Some of the apron and hangar areas design for small recreational aircraft are A-I.

Table 2-4 - Runway and Design Standards lists the current and planned FAA runway design standards for the Westfield-Barnes Regional Airport.

Table 2-3 - BAF Design Aircraft

AIRCRAFT	AS	WS	TH	MGTOW	ARC/RDC	TDG	APPLICABLE INFRASTRUCTURE
Gulfstream 650	131	99'-7."	25'-8."	99,600	C-III	2	Runway 2-20 All Taxiways Terminal Apron
King Air 350	110	57'-11"	14'-4"	15,000	B-II	N/A	N/A
Cessna 172	75	36'-0."	8'-11."	2,500	A-I	1A	Small aircraft hangar, aprons, and taxilanes

Legend

AS – Approach Speed in knots
WS – Wingspan in feet-inches
TH – Tail height in feet-inches
ARC – Airport Reference Code
MGTOW – Maximum gross takeoff weight in pounds
RDC – Runway Design Code
TDG – Taxiway Design Code

17 November 2008

[11] The project scope for this ALP update assumes no change in the critical aircraft or design standards, thus the current standards prevail.

Table 2-4 - Runway and Design Standards

RUNWAY	2	20	15	33
AAC-ADG	C-III	C-III	B-II	B-II
Visibility Minimums	1 mile	½ mile	Visual	Visual
Runway Width	150	150	75	75
Runway Safety Area (RSA) Width Length beyond the departure end Length before threshold	 500 1,000 600	 500 1,000 600	 150 300 300	 150 300 300
Runway Object Free Area (OFA) Width Length beyond the departure end Length before threshold	 800 1,000 600	 800 1,000 600	 500 300 300	 500 300 300
Runway Centerline to: Holding Position Parallel Taxiway	 250 400	 250 400	 240 250	 240 250
Runway Protection Zone (Approach) Length Inner Width Outer Width Acres	 1,700 500 1,010 29.465	 2,500 1,000 1,750 78.914	 1,000 500 700 13.770	 1,000 500 700 13.770

Source: FAA AC 5300-13A, Design Manual; BAF ALP (dated 2/2004))

2.7.3 Design Standard Issues

A cursory review of the design requirements at BAF indicates that these design requirements are not met. Table 2-4 - Runway and Design Standards outlines critical dimensional standards for the airport reference codes most applicable to Westfield-Barnes Regional Airport, both now and throughout the 20-year planning period.

- **Runway Safety Areas (RSA).** The RSA is a prepared surface surrounding the runway (and extends a specified distance beyond it) clear of obstructions. Keeping the RSA clear helps minimize damage to aircraft in the event of an accident. Unfortunately, the Runway 2 RSA at Westfield-Barnes Regional Airport does not fully meet the 500' x 1000' design standard. The Runway 2 RSA is currently 500' wide and extends 919' from the end of the runway.
- **Runway Protection Zone (RPZ).** The RPZ is a trapezoidal area located off each runway end. The RPZ should be clear of obstructions to the most significant extent possible to enhance the protection of people and property on the ground and provide an unobstructed approach surface. The RPZs at Westfield-Barnes Regional Airport vary in size from 13.77 to 78.9 acres. Runway 2, Runway 15, and Runway 33 RPZs are located entirely on airport property. However, the Runway

20 RPZ lies partially off airport property. In addition, the Runway 20 RPZ lies across the Massachusetts Turnpike (I-90), as well as private residences.

- **Object Free Area (OFA).** The OFA is a two-dimensional ground area surrounding the runway that must be clear of parked aircraft and objects other than those whose location is fixed by function (objects essential for air navigation and aircraft ground maneuvering). The OFAs at Westfield-Barnes Regional Airport meet design standards.
- **Runway Visual Zone (RVZ).** The RVZ is an area that should provide a clear line of sight to pilots between two intersecting runways. The area should be free and clear of obstructions for providing an unobstructed view of aircraft arriving at/from the intersection of the two runways at BAF. This area is depicted on the Airport Layout Plan, and the size is a function of the distance from the runway threshold to the intersection point of the two runways. The RVZ between Runway 2 and Runway 15 is obstructed by Hangar 1, located near the ATCT.

2.8 NAVIGATION AIDS

Navigational aids (navaids) play a significant role in pilot and passenger safety. BAF employs some aids to air navigation such as runway lighting, taxiway lighting, a rotating beacon, a nondirectional radio beacon (NDB), windsock, and an instrument landing system (ILS) approach.

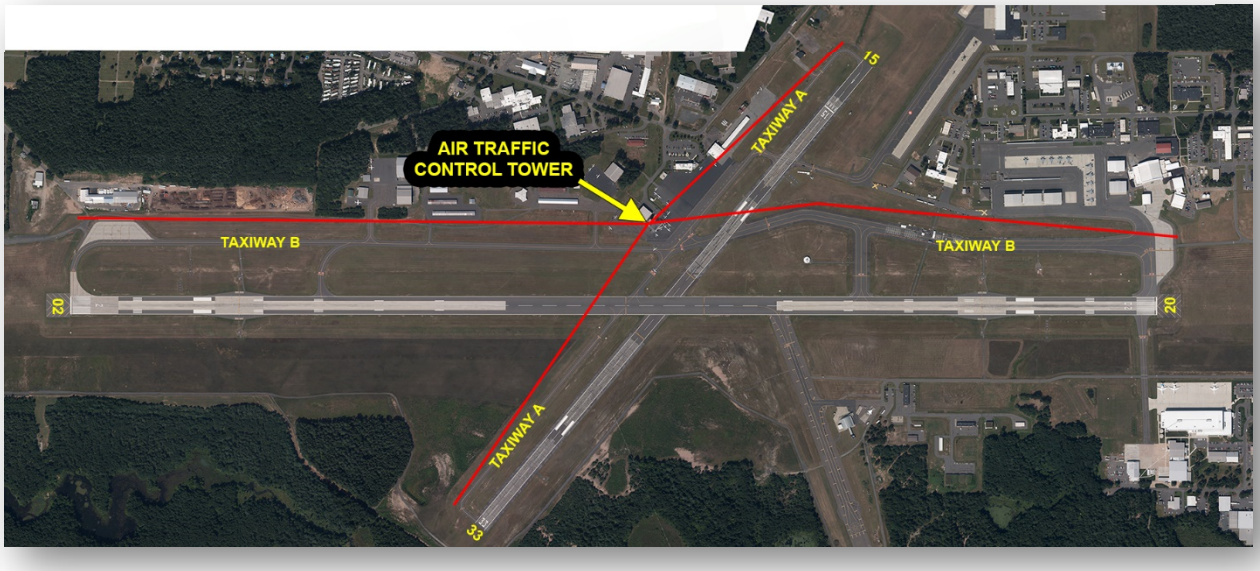
2.8.1 Air Traffic Control Tower

The air traffic control tower (ATCT) is located adjacent to the Terminal Ramp (Figure 2.10, page 2.21). The control tower is open 15 hours per day (7:00 am to 10:00 pm), seven days per week, including holidays.

While not an FAA design standard, visibility from the ATCT cab[12] shall allow an unobstructed view of all controlled movement areas of an airport, including all runways, taxiways, and any other landing areas, and air traffic in the vicinity of the Airport.[13] A plan view of the Airport with the control tower was performed (Figure 2.12 - Control Tower Line of Sight). This one-dimensional analysis indicates that ATC personnel should have a clear view of all aircraft movement areas. The red lines indicate the siting line from the tower cab to the approach end of each runway, including parallel and stub taxiways. As illustrated, tower personnel have an unobstructed view of all movement areas.

[12] The floor of the tower cab is 68 feet above the pavement.
[13] FAA Order 6480.4A, Air Traffic Control Tower Siting Process, April 10, 2006.

Figure 2.12 - Control Tower Line of Sight



2.8.2 Rotating Beacon

A 36-inch-diameter standard rotating beacon atop a 60' tower is located adjacent to and south of the snow removal equipment (SRE) building. The beacon emits the standard white and green flashes that indicate a land-based civil airport[14]. Both the tower and beacon are in good condition.

2.8.3 VORTAC

The Airport has a VORTAC located near the airport center, west of Runway 2-20 and north of Runway 15-33 (see Figure 2.3 - Existing Facilities Plan). A VORTAC is a combination of a civil VOR and a military TACAN.

VOR stands for VHF Omnidirectional Range. It is a navigation beacon intended for civil use and provides the user with a radial to/from the station. It works on frequencies between 108.00 and 117.95 MHz. The BAF VOR operates at 113.00 MHz.

TACAN stands for Tactical Air Navigation, a military system similar to VOR but with higher accuracy operating on frequencies between 960 and 1215 MHz. Part of the TACAN is DME (Distance Measurement Equipment), which works in the same frequency band. The DME used in TACAN is the same as that can be used by civil aircraft. The TACAN is used exclusively by the military for instrument approach procedures into BAF. These include the TACAN Runway 02 and

The VORTAC is owned and maintained by the FAA.

[14] Rotating beacons of varying colors of white, green and amber mark civil land and seaplane airports as well as military fields.

2.8.4 Runway Lighting and Markings

Both runways are marked and lighted per current standards. High-Intensity Runway Lights (HIRL) are installed on Runway 2-20. HIRLs are required for runways with an instrument approach procedure with a Decision Height (DH) of 200 feet and a runway equipped with Runway Visual Range (RVR) sensors and an RVR measurement of 2,400 feet. Medium-Intensity Runway Lights (MIRL) are installed on Runway 15-33.

Runways are marked according to the runway classification: visual (basic), non-precision, and precision. Runway 15-30 is a visual runway (no instrument approach procedure) to end and is marked basic. Runway 2-20 is marked as a precision runway.

2.8.5 Vertical Guidance Lights

Vertical guidance lights (VGLS) are located on the side of the runway near the landing threshold that provides visual descent guidance information during the approach. The two major systems are visual slope indicator lights (VASI) and a precision approach path indicator (PAPI). The Westfield-Barnes Regional Airport has a PAPI system on all four runways. The Runway 2 and 20 PAPI are located on the runway's left side and set at 3.0 degrees. The Runway 15 system is located on the runway's right side at 3.5 degrees, and the Runway 33 system is on the left side, also set at 3.5 degrees.

2.8.6 Runway End Identifier Lights

The Runway End Identifier Lights (REIL) system provides rapid identification of the end of the runway. The system consists of two synchronized, unidirectional flashing lights. The lights are positioned on each corner of the runway landing threshold, facing the approach area and aimed at an angle of 10 to 15 degrees. REILS are located on the approach end of Runway 15 only.

2.8.7 Approach Lighting System

Approach Light Systems (ALS) provide the necessary means to transition from instrument flight to visual flight for landing. Operational requirements dictate the sophistication and configuration of the approach light system for a particular runway. One type of ALS is the MALSR (Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights), which is a medium approach intensity lighting system (ALS) installed in airport runway approach zones along the extended centerline of the runway. The MALSR, which is installed on Runway 20 at BAF, consists of a combination of threshold lamps, steady burning light bars, and flashers, provides visual information to pilots on runway alignment, height perception, roll guidance, and horizontal references for Category I Precision Approaches.

Table 2-5. Runway Navigation Aids at BAF list the runway light and markings for the four runway ends.

Table 2-5. Runway Navigation Aids at BAF

RUNWAY	MARKINGS	EDGE LIGHTS	THRESHOLD LIGHTS	REIL	MALSR	VGLS
02	Precision	HIRL	Yes	No	No	PAPI-4L (GS 3.0º)
20	Precision	HIRL	Yes	No	Yes	PAPI-4L (GS 3.0º)
15	Basic	MIRL	Yes	Yes	No	PAPI-4R (GS 3.5º)
33	Basic	MIRL	Yes	No	No	PAPI-4L (GS 3.5º)

Legend
MIRL – Medium Intensity Runway Lights
HIRL – High-Intensity Runway Lights
PAPI – Precision Approach Path Indicator
4R/4L – Four light unit on the left or right side of the runway
GS – Glideslope
REIL – Runway End Identifier Lights
MALSR – Medium-Intensity Approach Lighting System with Runway Alignment Indicator Lights

2.8.8 Instrument Approaches

There are seven published Instrument Approach Procedures (IAP) at BAF, and all are published for Runway 02 or Runway 20. The procedures at BAF include one ILS precision approach, two GPS approaches, two military TACAN approaches, and two VOR approaches. Each of the types of procedures address is defined in Appendix A. In addition, instrument approach Procedures at

2.9 Miscellaneous Facilities

2.9.1 Automobile Parking and Access

The Westfield-Barnes Regional Airport has approximately 25,000 square feet of automobile parking directly adjacent to the terminal building for airport users and visitors with 85 marked spaces (see Figure 2.11 - Terminal Building and Parking Lot from Landside, page 2.21). An additional 6,400 square feet of automobile parking space (13 marked spots) are adjacent to the terminal behind Hangar #18 (see Figure 2.11).

2.9.2 Fueling Facilities

Ross Aviation sells 100LL aviation gasoline (Avgas) and Jet fuel at the Airport. Ross Aviation is the only FBO on the Airport that sells fuel. Ross Aviation uses three 10,000 gallon above ground fuel storage tanks. Two of these tanks store Jet fuel, and one for Avgas. As the only full-service FBO at the Airport, it provides aviation fuel services between the hours of 0700-1900. With advanced notification available 24 hours a day, with discounts on aviation fuel on Friday-Sunday. In 2017, Ross Aviation sold approximately 600,000 gallons of Jet A and 150,000 gallons of 100LL, most of which were aircraft coming into Ross Aviation for maintenance. Gulfstream also sells fuel to its customers.

Table 2-6. Instrument Approach Procedures at BAF

RUNWAY	PROCEDURE	DH/MDA	CEILING	VISIBILITY	CIRCLE
20	HI-ILS or LOC	250	300	1	Yes
20	ILS or LOC	250	300	1/2	Yes
02	RNAV (GPS)	251	300	1	Yes
20	RNAV (GPS)	250	300	1/2	Yes
20	VOR	670	700	¾	Yes
02	VOR or TACAN	516	600	1	Yes
20	HI-TACAN	533	600	1-1/4	Yes

Legend:
ILS – Instrument Landing System
HI – High Altitude
LOC – Localizer
RNAV – Required Area Navigation
GPS – Global Positioning System
DH – Decision Height
MDA – Minimum Descent Altitude
CIRCLE – Circling Approach Authorized

2.10 AVIATION ACTIVITY

This section is divided into two parts: based aircraft and aircraft operations. This information is typically gathered for general aviation airports and serves as a benchmark for measuring growth at the Airport.

At the end of 2019, the Airport has 111 based aircraft, plus an additional 18 military aircraft. The aircraft type includes 100 single-engine, six multiengine, four jets, and one helicopter. The based aircraft count represents 0.1% of all based aircraft in the United States and 7.5% of the total number of based aircraft in Massachusetts.[15]

Aircraft operations[16] counts are used to help with the sizing and quantity of aircraft aprons, hangar, and other facilities, such as the size of the terminal. Also, aircraft operations help plan the need for airport facilities, including fuel service and the size of fuel tanks and support equipment.

Operations at the Westfield-Barnes Regional Airport are measured by air traffic control tower personnel during the 15 hours when the tower is staffed. Operations during the other nine hours must be estimated. For this report, operations that occur between the hours of 10:00 pm and 7:00 am are estimated to be 2.5% of the total reported activity by ATC. The late-night activity (differential during the period the tower is closed) accounts for approximately three operations per night.

[15] FAA National Based Aircraft Inventory (https://basedaircraft.com/BaCounts/Default.aspx).
[16] An operation is a takeoff or a landing.

2.10.1 Historical and Existing Aircraft Operations

The Westfield-Barnes Regional Airport is considered a busy general aviation airport because of the number of itinerant operations, two active military bases, terminal restaurant, and the local FBO (Ross). However, like most general aviation airports, aircraft operations have declined throughout the past eight years. For example, during the eight years between 2010 through 2018, the number of operations has decreased by 35%, from 65,534 to 41,438. Table 2-7. Aircraft Operations and Based Aircraft, 2010-2017, lists the historic aircraft operations reported from 2010 through 2018.

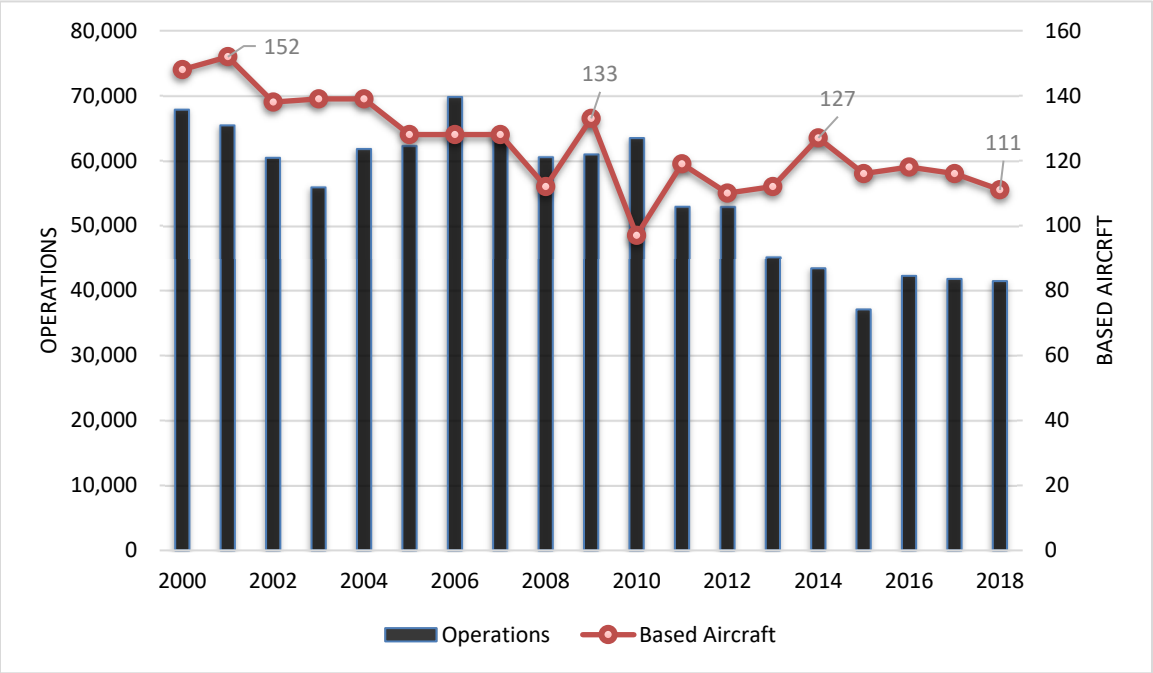
Table 2-7. Aircraft Operations and Based Aircraft, 2010-2017

YEAR	LOCAL OPERATIONS	ITINERANT OPERATIONS	TOTAL ATC REPORTED (7 am – 10 pm)	ESTIMATED OPERATIONS (10 pm – 7 am)	TOTAL AIRPORT OPERATIONS	BASED AIRCRAFT*
2010	34,754	27,230	61,984	1,587	63,571	97
2011	27,491	24,209	51,700	1,324	53,024	119
2012	29,417	22,250	51,667	1,323	52,990	110
2013	25,446	18,695	44,141	1,130	45,271	112
2014	25,698	16,626	42,324	1,083	43,407	127
2015	23,199	12,964	36,163	926	37,089	116
2016	24,606	16,592	41,198	1,055	42,253	118
2017	23,040	17,697	40,737	1,043	41,780	116
2018	22,955	17,449	40,404	1,010	41,414	111

Source: FAA Terminal Area Forecasts and Operations Network – OPSNET (2000 – 2016 data excluding military aircraft which is assumed to be 21+ aircraft); National Based Aircraft Inventory Program (2017 data only).

The operations listed in Table 2-7 indicated that the ratio of local to itinerant activity has remained reasonably constant, ranging between 40% and 43% local versus 53% to 60% itinerant. This data is used later in Chapter 4 in assessing the required amount of aircraft apron space. Figure 2.13 - Total Operations and Based Aircraft (2000-2018) is a graph that shows the total operations compared to based aircraft. As noted, operations have decreased over the past 18 years, which is not uncommon, whereas based aircraft have remained reasonably stable the past ten years, averaging 117 civil aircraft. However, like operations, the number of based aircraft had declined almost 40% since 2000, when the Airport reported approximately 68,000 operations to just over 41,000 in 2018.

Figure 2.13 - Total Operations and Based Aircraft (2000-2018)



2.10.2 Obstructions

This ALP update identified and evaluated obstructions to air navigation and determined their effect on airspace's safe and efficient use at the Airport. In addition to the obstructions identified earlier in the Runway 15 OCS (see §2.5.1), an obstruction analysis was performed on all four runway ends for the following surfaces:

- Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace (FAR Part 77)
- Terminal Instrument Procedures (TERPS)
- Obstacle Clearance Surfaces
- Siting and Survey Considerations for Precision Approach Path Indicator (PAPI) and Other Visual Glide Slope Indicators (VGSI)

The detailed analysis, including graphics, is in **Appendix C**. Recommendations for treating identified obstructions and cost estimates for acquiring property interests and removing the obstructions as recommended are included in **Chapter 4, Facility Requirements,** and **Chapter 5, Alternatives Analysis**, respectively.

2.11 Wind Data

A wind analysis was completed for each runway independently and combined. The analysis was performed based on the current and forecast runway design code (RDC) for each runway and 16, 13, and 10.5-knot crosswind components.[17] The combined analysis uses the RDC for each runway and 16 knots for Runway 2-20, and 13 knots for Runway 15-33. As the findings indicated in Table 2.8, the primary runway (2-20) exceeds the minimum FAA crosswind coverage of 95% at both 16 and 13 knots. Still, it falls below the minimum at 92.4% coverage for the 10.5-knot crosswind component. The 10.5-knot component applies to small aircraft in aircraft design group A.

Table 2-8. Wind Analysis Findings

Condition	RWY 2-20	RWY 15-33	COMBINED
Runway True Bearing	010-190°	140-320°	
Runway Design Code (RDC)	C-III	B-II	
Crosswind Component	16 knots	13 knots	
All-Weather			
16 knots	98.8%	99.8%	
13 knots	96.5%	98.6%	99.9%
10.5 knots	93.7%	96.4%	
Instrument Flight Rules (IFR)			
16 knots	99.7%	99.7%	
13 knots	99.3%	98.7%	100%
10.5 knots	98.9%	96.4%	
Visual Flight Rules (VFR)			
16 knots	98.5%	99.8%	
13 knots	95.7%	98.6%	99.9%
10.5 knots	92.4%	96.4%	

Source: Westfield-Barnes Regional Airport Automatic Surface Observation System (ASOS), provided through the FAA Airport Data Information Portal (ADIP) and generated using the FAA wind analysis generator (https://adip.faa.gov/agis/public/#/windAnalysisTools

[17] The 95% wind coverage is computed on the basis of the crosswind component not exceeding the allowable value as provided in AC 5300-13A, §302.c(3) and Table 3-1 (page 44).