

**Westover Air Reserve Base/
Metropolitan Airport Noise
Exposure Map (NEM) & Noise
Compatibility Plan (NCP) Update**

This document provides an update to the
2014 NEM and 2014 NCP.

June 1, 2018

Prepared for:

Westover Metropolitan Redevelopment
Authority

Prepared by:

Stantec Consulting Services
and
HNTB Corporation



Table of Contents

	<u>Page</u>
Chapter 1: Introduction.....	1
1.1 14 CFR Part 150.....	1
1.2 Noise Exposure Maps.....	2
1.3 Noise Compatibility Program.....	2
1.4 Project Roles and Responsibilities	2
1.4.1 Westover Metropolitan Development Corporation.....	3
1.4.2 439 th Airlift Wing of the Air Force Reserve	3
1.4.3 Pioneer Valley Planning Commission	3
1.4.4 Massachusetts Department of Transportation - Aeronautics Division.....	3
1.4.5 Consultant	3
1.4.6 Federal Aviation Administration (FAA).....	3
1.5 NEM/NCP Update Study Goals.....	4
Chapter 2: Existing and Forecast Flight Operations.....	5
2.1 Airport Location and Layout	6
2.1.1 General information	6
2.1.2 Users.....	6
2.1.3 Weather and Climate	7
2.1.4 Airspace and Air Traffic Control	7
2.2 Existing (2018) Conditions	7
2.2.1 Flight Operations and Fleet Mix	8
2.2.2 Aircraft Flight Profiles.....	14
2.2.3 Runway Use	14
2.2.4 Flight Track Locations and Use.....	15
2.2.5 Run-up/Maintenance Operations	16
2.3 Future (2023) Conditions	16
2.3.1 Flight Operations and Fleet Mix	16
2.3.2 Aircraft Flight Profiles.....	16
2.3.3 Runway Use	16
2.3.4 Flight Track Locations and Use.....	16
2.3.5 Run-up/Maintenance Operations	16
Chapter 3: Noise and Land Use Compatibility	22

3.1	Land Use Guidelines.....	22
3.1.1	Federal Guidelines.....	22
3.1.2	Local Land Use Guidelines	25
3.2	Development of Land Use and Population Data.....	25
3.3	Existing Generalized Land Use	26
3.3.1	Noise-Sensitive Resources	26
3.4	Existing Generalized Zoning	26
3.5	Future Land Use	27
Chapter 4:	Noise Exposure Maps.....	28
4.1	Land Use Base Map	28
4.2	Noise Exposure Map for Existing Conditions (2018)	28
4.3	Noise Exposure Map for Future Conditions (2023).....	29
Chapter 5:	Noise Compatibility Program.....	31
5.1	History of Noise Compatibility Planning at the Airport	31
5.2	2014 Noise Compatibility Program.....	32
5.2.1	Noise Abatement Measures.....	32
5.2.2	Land Use Measures.....	35
5.2.3	Implementation, Monitoring, and Review Measures	39
Chapter 6:	Record of Consultation	42
6.1	Meetings and Coordination	42
6.2	Draft NEM/NCP Update Document	42
6.3	Public Information Workshop	42
6.4	Comments on the Draft Document.....	42

List of Tables

Table 2.1 2018 Average Annual Day Fleet Mix..... 9
Table 2.2 Overall Runway Usage15
Table 2.3 2023 Average Annual Day Fleet Mix.....17
Table 3.1 Part 150 Noise and Land Use Compatibility Guidelines23
Table 4.1 Generalized Land Uses within the Existing (2018) Conditions 65 DNL Noise Exposure Contour.....29
Table 4.2 Generalized Land Uses within the Future (2023) Conditions 65 DNL Noise Exposure Contour.....30

List of Figures

Figure 2-1 Vicinity Map 6
Figure 2-2 Airfield Layout..... 7
Figure 2-3 Flight Tracks – Civilian Fixed Wing Arrival15
Figure 2-4 Flight Tracks – Civilian Fixed Wing Departure.....15
Figure 2-5 Flight Tracks – Civilian Helicopter Arrival15
Figure 2-6 Flight Tracks – Civilian Helicopter Departure15
Figure 3-1 Generalized Existing Land Use.....26
Figure 3-2 Generalized Zoning.....26
Figure 3-3 Regional Land Use Plan Map27
Figure 4-1 Existing (2018) Conditions Noise Exposure Map28
Figure 4-2 Future (2023) Conditions Noise Exposure Map.....29
Figure 5-1 Proposed Rezoning of Residential Parcels with 2023 NEM37

Appendices

- Appendix A: Part 150 NEM and NCP Checklists
- Appendix B: 1996 and 2015 FAA Records of Approval (ROA)
- Appendix C: AEE Coordination
- Appendix D: Noise and its Effect on People
- Appendix E: Record of Consultation

CHAPTER 1: Introduction

Title 14 of the Code of Federal Regulations (CFR) Part 150, “Airport Noise Compatibility Planning,” sets forth standards for airport operators to use in documenting noise exposure in airport environs and establishing programs to minimize aircraft noise and land use incompatibilities. Federal Aviation Administration (FAA) Advisory Circular 150/5020-1, “Noise Control and Compatibility Planning,” establishes the framework for conducting Part 150 studies. This Circular notes that the goal of the study process is “to develop a balanced and cost-effective program to minimize and/or mitigate the airport’s noise impact on local communities.”

Section 1.1 of this chapter provides an overview of the Part 150 process. Section 1.2 reviews the requirements of Noise Exposure Map (NEM) submittals, Section 1.3 discusses Noise Compatibility Program (NCP) measures, Section 1.4 discusses the project roles and responsibilities, and Section 1.5 explains the study goals.

Chapter Two presents the existing and forecast operations data used in determining the noise environment around Westover Air Reserve Base / Metropolitan Airport (CEF). **Chapter Three** discusses land use and compatibility criteria. **Chapter Four** includes the updated NEMs for 2018 and 2023. **Chapter Five** details the impact to the existing NCP based on the NEMs, and **Chapter Six** provides a summary of consultation completed throughout the NEM/NCP Update process. **Appendices A through E** provides supporting material relevant to this study.

1.1 14 CFR Part 150

14 CFR Part 150 (referred to as Part 150 within this document) prescribes specific standards for the following:

- measuring aircraft noise;
- estimating cumulative aircraft noise exposure using computer models;
- describing aircraft noise exposure (including instantaneous, single event and cumulative levels);
- coordinating NCP development with local land use officials and other interested parties;
- documenting the analytical process and development of the compatibility program;
- submitting documentation to the FAA;
- FAA and public review processes; and
- FAA approval or disapproval of the submission.

A full Part 150 submission to the FAA consists of two elements: NEMs for an existing and forecast condition, and an NCP. The Westover Metropolitan Development Corporation (WMDC) first completed an NEM and NCP under 14 CFR Part 150 for the Airport in 1994. An NEM/NCP Update was conducted in 2003 and again in 2014. The 2014 NEM Update included a review of the 1996 NCP and revisited the mitigation component of the document based on the future 2019 NEM. The FAA issued a Record

of Approval (ROA) for the 2014 NEM/NCP Update in February 2015.

This document provides an update to the 2014 and 2019 NEMs and provides a review of an update to the 2014 NCP.

1.2 Noise Exposure Maps

The FAA developed a checklist for use in reviewing NEM submittals, which must be completed before submission of the final NEM. A copy of the FAA checklist is provided in **Appendix A**. The checklist provides specific requirements for approval of NEMs, along with section references indicating the location in the document where the requirements are addressed.

The NEM documentation describes the airport layout and operation, aircraft-related noise exposure, land uses in the airport environs, and the resulting aircraft noise and land use compatibility status. NEMs include graphic depictions of existing and forecast (i.e., future) noise exposure levels resulting from aircraft operations and land uses in the airport environs. The NEM documentation also describes the data collection and analyses undertaken in its development.

NEMs must address two timeframes: the year of submission (the “existing condition”) and the fifth calendar year following the year of submission (the “forecast condition”). The submission year for this NEM/NCP Update is 2018 and a Future (2023) NEM represents the 5-year forecast noise exposure. Upon acceptance by the FAA, the NEMs replace previously accepted maps from the 2014 NEM Update.

1.3 Noise Compatibility Program

A review of the Airport’s FAA-approved NCP was conducted to evaluate the implementation of the recommended and

approved NCP measures. The NCP analysis also considers the most recent NEMs and how the implementation of the mitigation program would be affected. **Appendix B** provides the FAA’s ROA of the 1996 and 2014 NCPs completed for the Airport. An NCP checklist for this document is provided in **Appendix A** following the NEM checklist.

The NCP is a list of the actions the airport operator, airport users, local governments, and FAA propose to undertake to minimize existing and future aircraft noise and land use incompatibility. The NCP documentation must recount the development of the program, including a description of all measures considered, the reasons that individual measures were accepted or rejected, how measures will be implemented and funded, and the predicted effectiveness of individual measures and the overall program.

1.4 Project Roles and Responsibilities

As discussed below, several groups had major roles in the Part 150 process, including the WMDC, the 439th Airlift Wing of the Air Force Reserve, the project consultant team (Stantec and HNTB Corporation (HNTB)), the Pioneer Valley Planning Commission (PVPC), the Massachusetts Department of Transportation (MassDOT), and the FAA.

The Airport hosts both civilian and military activity. WMDC manages civilian operations at the Airport, while the Air Force Reserve manages military operations. The facility is operated under a joint use agreement with the USAF hosting the WMDC, a quasi-public non-profit development corporation established in 1974.

1.4.1 Westover Metropolitan Development Corporation

As the recognized sponsor of the civilian side of the airport by the FAA, WMDC is the project sponsor and has responsibility for the entire NEM/NCP Update. Using the information provided by the consulting team, the WMDC, in consultation with the FAA, also reviews the previous NCP with the updated NEMs to ensure that these two components of Part 150 are aligned.

1.4.2 439th Airlift Wing of the Air Force Reserve

The 439th Airlift Wing is based at Westover and operates eight C-5M Super Galaxy aircraft. As the primary user of the Airport, the 439th Airlift Wing provided information on military flight operations and procedures.

In February 2013, the Air Force Reserve finalized an Air Installation Compatible Use Zone (AICUZ) Study update. The purpose of the AICUZ program is to promote compatible land development in areas subject to aircraft noise and accident potential. The Study reaffirmed Air Force policy of promoting public health, safety, and general welfare in areas surrounding the Airport. The report presented changes in flight operations since the previous AICUZ Study (1996) and provided current noise zones and future noise zones and compatible use guidelines for land areas.

The Westover Airport Traffic Control Tower (ATCT or Westover Tower) is operated by the USAF and provided significant input into several areas, including existing and future operational procedures and trends.

1.4.3 Pioneer Valley Planning Commission

The PVPC is the regional planning body for the jurisdictions surrounding the Airport.

PVPC serves the member governments within its district and provided land use compatibility assistance for this NEM/NCP Update.

1.4.4 Massachusetts Department of Transportation - Aeronautics Division

The Massachusetts Department of Transportation-Aeronautics Division of Aeronautics provided funding assistance for this NEM/NCP Update and provided a review of the document.

1.4.5 Consultant

The WMDC retained Stantec Consulting Services (Stantec) who in turn retained the services of HNTB to conduct the technical work required to fulfill Part 150 analysis and documentation requirements. Stantec is responsible for the overall document submittal, as well as the forecasting effort. HNTB completed the development of the NEMs and the analysis and update of the NCP program.

1.4.6 Federal Aviation Administration (FAA)

The FAA has ultimate review authority over the NEMs submitted under Part 150. FAA review includes an assessment of both the adequacy of the technical documentation and the broader issues related to satisfying the Part 150 process requirements.

FAA's participation includes the following:

- When the Airport submits the Part 150 documentation to the FAA for review, the FAA's New England Region–Airports Division will conduct an initial, local review to determine if it satisfies all NEM and NCP checklist requirements.

- The FAA's New England Region – Airports Division is responsible for the final review of the NEM documentation for adequacy in satisfying technical and legal requirements and approval of any revisions to the NCP.

1.5 NEM/NCP Update Study Goals

The overall goal of the NEM/NCP Update is to develop an existing condition (2018) and a forecast future condition (2023) NEM, and to update the Airport's NCP thereby defining necessary continued implementation of mitigation programs currently underway. The previous NEMs represented existing (2014) and future (2019) conditions and were accepted by the FAA in September 2014. The WMDC's ongoing voluntary acquisition program uses boundaries established in the existing (2014) NEM.

Several goals have been identified to guide the development of the 14 CFR Part 150 NEM/NCP Update. These goals include:

- Develop an understanding of probable future noise levels including any potential changes to the C-5M mission;
- To characterize and present to the public, local jurisdictions, and other interested parties the existing and reasonably foreseeable future noise levels associated with aircraft activity at the Airport;
- To identify existing and potentially non-compatible land uses within the existing and future 65 and above Day-Night Average Sound Level (DNL) noise exposure contours;
- To identify the status of the measures that were recommended and

previously approved in the Airport's NCP; and

- To identify boundaries for the continuation of the WMDC, MassDOT and FAA-sponsored voluntary acquisition program, if any, based on the revised 65 DNL noise exposure contours and remaining within the context of Federal regulations and eligibility criteria, financial feasibility, and fairness to aviation and non-aviation interests.

CHAPTER 2: Existing and Forecast Flight Operations

This chapter describes existing and forecast aircraft operations at the Airport. Noise exposure is shown in the form of DNL noise contours. Part 150 requires the use of DNL noise contours to describe the noise environment around an airport.

The scope of this study is to quantify noise exposure for the following conditions:

- *Existing (2018) Conditions NEM*, which models anticipated conditions during the current year.
- *Future (2023) Conditions NEM*, which models future conditions in the fifth year following the year of submission.

The FAA requires the analyses of subsonic aircraft noise exposure around airports to be accomplished using the Aviation Environmental Design Tool (AEDT), a computer program distributed by the FAA. The latest version of AEDT (version 2d) was used for this study to model civilian aircraft and helicopter operations. The DoD maintains NOISEMAP a noise modeling tool similar to AEDT which the FAA accepts for the modeling of military aircraft and helicopter operations. The output from each noise model is combined in AEDT, as required by the FAA, to present DNL noise contours.

Both models use representative samples of actual data to develop noise exposure. Annual Average Day (AAD) operations are representative of all aircraft operations that occur over the course of a year and represent annual operations divided by 365

days. Runway and flight track use is also averaged over the same period.

Aircraft operations consist of departures and arrivals categorized by acoustical daytime and nighttime. For noise modeling, acoustical daytime is defined as 7:00 a.m. to 9:59 p.m., and nighttime is defined as 10:00 p.m. to 6:59 a.m. The DNL metric applies a 10-decibel (dB) penalty to nighttime flights due to the added intrusiveness of nighttime operations. Runway use, flight track location and use, and aircraft profiles define the paths that aircraft use as they fly to and from the Airport.

The noise models compute noise exposure (i.e., DNL) at points on the ground around the Airport. From the grid of points generated by the models, contours of equal sound level are drawn and overlaid onto land use maps.

The use of computer-based noise modeling allows for the projection of future forecasted noise exposure, which could not be accomplished with noise monitoring that can only assess existing noise exposure at a limited number of locations. When the calculations are made in a consistent manner, noise models are most accurate for comparing “before-and-after” noise effects resulting from forecast changes or potential alternatives. The noise models allow noise predictions for such forecast change actions without the need for noise monitoring over an extended period of time, or actual implementation of any forecast changes. The noise models allow for the evaluation of aircraft noise exposure at many more points,

thus permitting the development of DNL contours.

2.1 Airport Location and Layout

2.1.1 General information

The Airport is located approximately three (3) miles northeast of downtown Chicopee, Massachusetts, and is a joint-use military (Westover Air Reserve Base, WARB or Base) and civilian airfield (Westover Airport) that consists of approximately 2,500 acres of land in the City of Chicopee and the Town of Ludlow. The facility is operated under a joint use agreement with the USAF hosting the WMDC. The Base is accessed via James Street from Route 33/Memorial Drive. The civilian terminal area can be accessed via Westover Road from Route 33/Memorial Drive. The Airport is accessible from the Massachusetts Turnpike (Interstate I-90) at Route 33 and Interstate 291 (Exit 5). **Figure 2-1** presents the general location of the Airport.

2.1.2 Users

WARB is the nation's largest Air Force Reserve base and is home to the 439th Airlift Wing, which serves as the military host unit. The mission of the 439th Airlift Wing is to provide worldwide air movement of troops, supplies, equipment and medical patients. The Wing's flying unit is the 337th Airlift Squadron, which operates eight Lockheed C-5M Super Galaxy (C-5M) model aircraft. The C-5M is used for missions involving outsized and oversized cargo that no other aircraft can carry.

The Base is also home to several tenant units including 302D Maneuver Enhancement Brigade, 655 Regional Support Group, Marine Support Squadron Six, a marine corps site support element, Marine Wing Support Squadron 472 (Detachment B), and the US Army Corps of

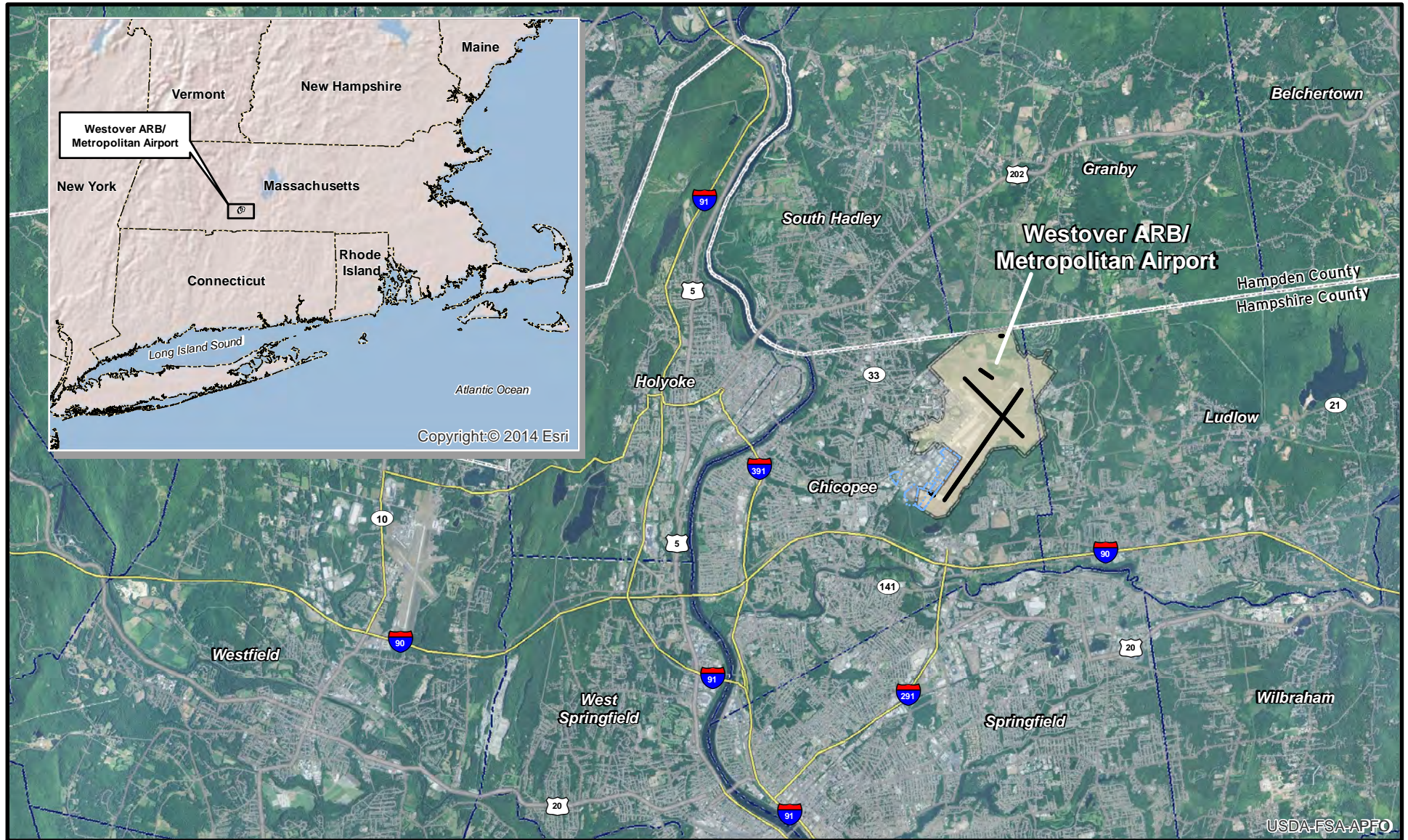
Engineers. Also based at Westover ARB is the Defense Contract Management Administration office, an Armed Forces Reserve Center, a US Army Reserve Center, 302nd Brigade, 665th Area Support Group, 226th and 304th Transportation Company, 382nd Military Police Battalion, the Springfield Military Entrance Processing Station, the Massachusetts National Guard, and two US Marine Corps Recruiting Centers (active and reserve). Transient military aircraft not assigned to one of the military tenants also frequent the facility.

The Airport is an FAA, and Transportation Security Administration certified air carrier facility handling scheduled public charter flights and general aviation traffic. The WMDC has acquired and developed over 1,300 acres of surplus military property to form three industrial parks. The WMDC manages day-to-day operations at the Airport, and the continuing development of commercial and industrial real estate at each of the industrial parks. A 15,000 square foot passenger terminal and over 300,000 square feet of hangar space are available.

The Airport lies at an elevation of approximately 241 feet above mean sea level and maintains two runways (Runway 05/23 and Runway 15/33). The primary runway (Runway 05/23) is oriented in a north-south direction with a length of 11,597 feet and a width of 300 feet. There is a displaced threshold on the Runway 05 end (to the south) of approximately 1,200 feet, meaning the landing threshold is approximately 1,200 feet from the end of the runway. Both Runway 05 and Runway 23 provide an Instrument Landing System for aircraft arrivals in adverse weather.

The crosswind runway (Runway 15/33) is 7,082 feet long and 150 feet wide and is oriented in an east-west direction. The Massachusetts State Police Air Wing is

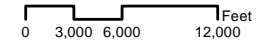
Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update



LEGEND

- Westover Air Reserve Base Installation Area
- Westover Metropolitan Development Corporation Aviation Property
- County Boundary
- Town Boundary

**Vicinity Map
Figure 2-1**



Sources: Bureau of Geographic Information (MassGIS),
Commonwealth of Massachusetts,
Executive Office of Technology and Security Services,
WMDC 2018, HNTB GIS (2018),
Aerial - USDA 2016, ESRI

located on the airfield to the northwest of the Runway 05 end and conducts helicopter operations. A drop zone is utilized for military training activity, located on the north side of the Airport.

Figure 2-2 presents an illustration of the airfield layout, including the location of airport users, runways, and other facilities.

2.1.3 Weather and Climate

Runway use and the operational characteristics of aircraft are heavily influenced by weather conditions, including temperature, humidity and wind speed. Weather conditions also influence the propagation of sound. As the temperature increases, the density of air decreases; this reduces wing lift and engine thrust, which results in increased takeoff distance and a lower climb rate. Therefore, departing aircraft are at a lower altitude, and noise exposure generally increases. Conversely, noise exposure is decreased on cold days when aircraft have improved performance capabilities.

Humidity does not significantly impact aircraft performance, however in conjunction with temperature; humidity does impact the propagation of sound. In general, sound travels farther in more humid conditions. Humidity is highest at night and gradually drops during the day, generally reaching its lowest point in the afternoon.

Wind speed and direction primarily determine runway selection and operational flow. Aircraft generally takeoff and land into the wind (known as a headwind) whenever possible. Headwinds reduce an aircraft's takeoff and landing distance and increase climb rate. Aircraft can operate with significant crosswinds (winds blowing to the side of the aircraft): up to about 20 knots for a typical large air carrier size aircraft. Aircraft can operate with limited tailwinds (winds

blowing to the rear of the aircraft): up to 10 knots for a typical large air carrier size aircraft. Tailwinds increase takeoff and landing distance. Winds in excess of crosswind and tailwind limits generally force aircraft to use a different runway. The wind at the Airport is generally from the south and north, and favor operations on the existing runways, which are aligned accordingly.

AEDT default average weather conditions were used as input for each noise model. The default weather temperature for the Airport was missing in AEDT, and the most recent 30-year average temperature was applied. On average, weather conditions at the Airport averaged 50.0 degrees Fahrenheit, 6.6 knots wind speed, and 65.3% relative humidity.

2.1.4 Airspace and Air Traffic Control

The airspace and air traffic control procedures in use at the Airport direct the flow of aircraft in and out of the area. As a result, they are an essential component in determining cumulative noise exposure. The Westover Tower, located near the geographic center of the airport northeast of the East Ramp, is generally staffed and operational between the hours of 7:00 a.m. to 11:00 p.m. Through prior arrangement, the Westover Tower may remain open to accommodate air traffic during the hours of 11:00 p.m. and 7:00 a.m.




2.2 Existing (2018) Conditions

This section describes noise model operational inputs, including flight operations, aircraft database, flight profiles, runway use, and flight track location and use. Each noise model uses these inputs to compute noise exposure on the ground. The data in this section provides an overview of the aircraft operations included in the noise model.

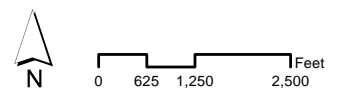
Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update



LEGEND

-  Westover Air Reserve Base Installation Area
-  Westover Metropolitan Development Corporation Aviation Property
-  County Boundary
-  Town Boundary

**Airfield Layout
Figure 2-2**



Sources: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services, HNTB GIS (2018), Aerial - USDA 2016, ESRI Data and HNTB Analysis

2.2.1 Flight Operations and Fleet Mix

Flight (or aircraft) operations include the numbers of arrivals, departures, and closed pattern (touch-and-go) operations conducted by each type of aircraft. Two groups of users primarily fly operations: USAF users (including operations by the 337th Airlift Squadron (flying the C-5M), other based users, and transient military aircraft); and civilian operators, which include all other operations. Information on the types of aircraft, the time of operations, and other relevant noise model input was determined through consultation with the Westover Tower, FAA, and non-government sources.

Because no single source can provide the level of flight data required for AEDT and NOISEMAP input, flight data activity is the compilation from several sources. The resources include: air traffic activity reports and control tower flight strips for calendar year 2017 from Westover Tower; FAA activity from the Traffic Flow Management Systems County (TFMSC) for the period from January 2017 through March 2018; and flight data from FlightAware, a non-government business that provides flight tracking and data reports for the 12-month period from April 2017 through March 2018. As a supplement consultation with Westover Tower personnel, 439th Airlift Wing pilots and staff, and WMDC staff supplemented the quantitative data.

The data was assembled and organized to form the base year (2018) operations. This data is representative of the average conditions anticipated in the base year.

The noise models contain noise and performance data on nearly all aircraft types commonly flown in the US. Most of the military aircraft data used in AEDT comes from NOISEMAP, the Air Force's computer model for evaluating military aircraft noise

exposure. The data is used to model an aircraft's departure and arrival flight profiles and resultant noise exposure. Aircraft that are not specifically included in the database (such as those with unique engine combinations) are modeled using appropriate substitution aircraft and criteria per the FAA's pre-approved substitution list. Coordination with the FAA's Office of Environment and Energy was undertaken to assist in the identification of appropriate aircraft to be used in the model when a pre-approved substitution was not available and is included in **Appendix C**.

The base year of operations (2018) is presented in **Table 2.1**. The table includes the identification of the fleet mix, its corresponding noise model aircraft type, and the number of average daily arrivals, departures, and closed pattern operations by day and night. On average, the Airport sees approximately 54.1 daily operations (of which 21.21 are performed by the C-5M Super Galaxy), which equates to an annual total of approximately 19,754 aircraft operations.

Overall, operations are predominantly flown by military aircraft (approximately 77%). Most of the aircraft activity at the Airport is flown by the 337th Airlift Squadron flying the C-5 aircraft, which fly approximately 260 days per year. Helicopter operations also represent a significant percentage of the overall activity at the Airport.

Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update

Table 2.1
2018 Average Annual Day Fleet Mix

Civil / Military	Category	Aircraft Name	AEDT/NOISEMAP Aircraft	AAD Arrivals		AAD Departures		AAD Closed Pattern		AAD Total
				Day	Night	Day	Night	Day	Night	
Military	JET	* Super Galaxy	C5-M	2.04	0.03	2.04	0.01	17.10	-	21.21
Military	JET	Boeing Globemaster 3	C17	0.29	0.00	0.29	0.00	-	-	0.59
Military	JET	Boeing Sentry TF33/E3C	E3A	0.01	-	0.01	-	-	-	0.02
Military	JET	Boeing F-15 Eagle	F15E	0.28	-	0.28	-	-	-	0.56
Military	JET	Boeing Raptor F22	F22	0.01	-	0.01	-	-	-	0.01
Military	JET	Boeing KC-135 Stratotanker	KC-135R	0.47	-	0.47	-	-	-	0.95
Military	JET	Extender	KC10A	0.28	-	0.28	-	-	-	0.55
Military	MET	Lockheed 130 Hercules	C130H&N&P	0.31	0.00	0.31	0.00	0.82	-	1.45
Military	SEP	Lockheed P-3C Orion	P3A or P3C	0.03	-	0.03	-	-	-	0.06
Military	HEL	Boeing CH-47 Chinook	CH47D	2.12	-	2.12	-	2.19	-	6.43
Military	HEL	Sikorsky SH-60 Seahawk	S70	4.68	-	4.68	-	2.19	-	11.56
Civil	HEL	Hughes 269	H500D or SC300C	0.01	-	0.01	-	-	-	0.02
Civil	HEL	Sikorsky S-76	S76	0.01	-	0.01	-	-	-	0.02
Civil	JET	Airbus A319	A319-131	0.02	-	0.02	-	-	-	0.03
Civil	JET	IAI Astra 1125	IA1125	0.01	-	0.01	-	-	-	0.02
Civil	JET	Boeing 737-400	737400	0.12	-	0.12	-	-	-	0.24
Civil	JET	Boeing 737-700	737700	0.04	-	0.04	-	-	-	0.07
Civil	JET	Boeing 737-800	737800	0.04	-	0.04	-	-	-	0.09
Civil	JET	Boeing 757-200	757PW or 757RR	0.01	-	0.01	-	-	-	0.02
Civil	JET	Raytheon/Beech Beechjet 400/T-1	MU3001	0.05	-	0.05	-	-	-	0.11
Civil	JET	Cessna Citation CJ2	CNA500	0.07	-	0.07	-	-	-	0.13
Civil	JET	Cessna Citation CJ3	CNA500	0.04	-	0.04	-	-	-	0.09
Civil	JET	Cessna Citation CJ4	CNA525C	0.02	-	0.02	-	-	-	0.03
Civil	JET	Cessna 500/Citation I	CNA500	0.01	-	0.01	-	-	-	0.01
Civil	JET	Cessna CitationJet/CJ1	CNA500	0.10	-	0.10	-	-	-	0.20
Civil	JET	Cessna Citation II/Bravo	CNA55B	0.04	-	0.04	-	-	-	0.07

Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update

Table 2.1
2018 Average Annual Day Fleet Mix

Civil / Military	Category	Aircraft Name	AEDT/NOISEMAP Aircraft	AAD Arrivals		AAD Departures		AAD Closed Pattern		AAD Total
				Day	Night	Day	Night	Day	Night	
Civil	JET	Cessna Citation V/Ultra/Encore	CNA560U or CNA55B or CNA560E	0.08	-	0.08	-	-	-	0.17
Civil	JET	Cessna Excel/XLS	CNA560XL	0.13	-	0.13	-	-	-	0.27
Civil	JET	Cessna III/VI/VII	CIT3	0.02	-	0.02	-	-	-	0.03
Civil	JET	Cessna Citation Sovereign	CNA680	0.06	-	0.06	-	-	-	0.13
Civil	JET	Cessna Citation Latitude	CNA680	0.01	-	0.01	-	-	-	0.01
Civil	JET	Cessna Citation X	CNA750	0.07	-	0.07	-	-	-	0.14
Civil	JET	Bombardier (Canadair) Challenger 300	CL600	0.06	-	0.06	-	-	-	0.12
Civil	JET	Bombardier Challenger 300	CL600	0.03	-	0.03	-	-	-	0.06
Civil	JET	Bombardier Challenger 600/601/604	CL600	0.10	-	0.10	-	-	-	0.21
Civil	JET	Bombardier CRJ-200	CL600	0.02	-	0.02	-	-	-	0.04
Civil	JET	Boeing (Douglas) DC 10-10/30/40	DC1010 or DC1030 or DC1040	0.05	-	0.05	-	-	-	0.10
Civil	JET	Embraer ERJ-145	EMB145	0.01	-	0.01	-	-	-	0.02
Civil	JET	Embraer 190	EMB190	0.01	-	0.01	-	-	-	0.01
Civil	JET	Embraer 135 LR	EMB145	0.01	-	0.01	-	-	-	0.01
Civil	JET	Embraer Phenom 100	CNA510	0.01	-	0.01	-	-	-	0.01
Civil	JET	Eclipse 550	CNA55B	0.01	-	0.01	-	-	-	0.01
Civil	JET	Embraer Phenom 300	CNA55B	0.09	-	0.09	-	-	-	0.18
Civil	JET	Eclipse 500	ECLIPSE500	0.04	-	0.04	-	-	-	0.09
Civil	JET	Dassault Falcon 2000	CNA750	0.13	-	0.13	-	-	-	0.27
Civil	JET	Dassault Falcon 900	CNA750	0.02	-	0.02	-	-	-	0.04
Civil	JET	Dassault Falcon/Mystère 20	FAL20	0.01	-	0.01	-	-	-	0.01
Civil	JET	Dassault Falcon/Mystère 50	CNA750	0.12	-	0.12	-	-	-	0.23
Civil	JET	Dassault Falcon F7X	CNA750 or GIV	0.01	-	0.01	-	-	-	0.02
Civil	JET	Gulfstream G280	IA1125	0.01	-	0.01	-	-	-	0.01
Civil	JET	Bombardier BD-700 Global 5000	GV	0.01	-	0.01	-	-	-	0.01

Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update

Table 2.1
2018 Average Annual Day Fleet Mix

Civil / Military	Category	Aircraft Name	AEDT/NOISEMAP Aircraft	AAD Arrivals		AAD Departures		AAD Closed Pattern		AAD Total
				Day	Night	Day	Night	Day	Night	
Civil	JET	Gulfstream IV/G400	GIV	0.29	-	0.29	-	-	-	0.58
Civil	JET	Gulfstream V/G500	GV	0.27	-	0.27	-	-	-	0.54
Civil	JET	Gulfstream	GV	0.02	-	0.02	-	-	-	0.05
Civil	JET	BAe HS 125/700-800/Hawker 800	LEAR35	0.21	-	0.21	-	-	-	0.43
Civil	JET	BAe/Raytheon HS 125-1000/Hawker 1000	LEAR35	0.04	-	0.04	-	-	-	0.07
Civil	JET	Bombardier Learjet 31/A/B	LEAR35	0.01	-	0.01	-	-	-	0.03
Civil	JET	Bombardier Learjet 35/36	LEAR35	0.01	-	0.01	-	-	-	0.02
Civil	JET	Learjet 40; Gates Learjet	LEAR35	0.01	-	0.01	-	-	-	0.03
Civil	JET	Bombardier Learjet 45	LEAR35	0.05	-	0.05	-	-	-	0.09
Civil	JET	Bombardier Learjet 55	LEAR35	0.02	-	0.02	-	-	-	0.04
Civil	JET	Bombardier Learjet 60	LEAR35 or CNA750	0.06	-	0.06	-	-	-	0.12
Civil	JET	Boeing P-8 Poseidon	737800	0.06	-	0.06	-	-	-	0.12
Civil	JET	North American Rockwell Sabre 40/60	SABR80	0.01	-	0.01	-	-	-	0.02
Civil	JET	Northrop T-38 Talon	T-38A	0.01	-	0.01	-	-	-	0.02
Civil	MEP	Beech Baron 55	BEC58P	0.02	-	0.02	-	-	-	0.03
Civil	MEP	Beech 58	BEC58P	0.09	-	0.09	-	-	-	0.18
Civil	MEP	Beech 76 Duchess	BEC58P	0.00	-	0.00	-	-	-	0.01
Civil	MEP	Cessna 310	BEC58P	0.01	-	0.01	-	-	-	0.02
Civil	MEP	Cessna 340	BEC58P	0.01	-	0.01	-	-	-	0.01
Civil	MEP	Cessna Golden Eagle 421	BEC58P	0.01	-	0.01	-	-	-	0.02
Civil	MEP	Piper PA-30	PA30	0.01	-	0.01	-	-	-	0.02
Civil	MEP	PA31 - Piper Navajo PA-31	BEC58P	0.02	-	0.02	-	-	-	0.04
Civil	MEP	Piper PA-34 Seneca	BEC58P	0.01	-	0.01	-	-	-	0.02
Civil	MET	Airbus A400M Atlas	C-130E	0.01	-	0.01	-	-	-	0.02
Civil	MET	Beech Super King Air 350	DHC6	0.38	-	0.38	-	-	-	0.76
Civil	MET	Beech 200 Super King	DHC6	0.88	-	0.88	-	-	-	1.76

Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update

Table 2.1
2018 Average Annual Day Fleet Mix

Civil / Military	Category	Aircraft Name	AEDT/NOISEMAP Aircraft	AAD Arrivals		AAD Departures		AAD Closed Pattern		AAD Total
				Day	Night	Day	Night	Day	Night	
Civil	MET	Raytheon 300 Super King Air	DHC6	0.07	-	0.07	-	-	-	0.13
Civil	MET	Beech King Air 90	DHC6	0.03	-	0.03	-	-	-	0.05
Civil	MET	Cessna Conquest	CNA441	0.01	-	0.01	-	-	-	0.02
Civil	MET	CASA CN-235	SF340	0.05	-	0.05	-	-	-	0.10
Civil	MET	BAe-3100 Jetstream	DHC6	0.01	-	0.01	-	-	-	0.01
Civil	MET	Piaggio P-180 Avanti	DHC6	0.01	-	0.01	-	-	-	0.03
Civil	MET	Piper Cheyenne 1	CNA441	0.01	-	0.01	-	-	-	0.01
Civil	MET	Piper Cheyenne 2	CNA441	0.02	-	0.02	-	-	-	0.03
Civil	MET	Swearingen Merlin 4/4A Metro2	DHC6	0.01	-	0.01	-	-	-	0.02
Civil	SEP	American AA-5 Traveler	GASEPF	0.00	-	0.00	-	-	-	0.01
Civil	SEP	Beech Bonanza 33	GASEPV	0.02	-	0.02	-	-	-	0.03
Civil	SEP	Beech Bonanza 35	CNA208	0.02	-	0.02	-	-	-	0.04
Civil	SEP	Beech Bonanza 36	CNA208	0.02	-	0.02	-	-	-	0.03
Civil	SEP	Cessna 150	CNA172	0.01	-	0.01	-	-	-	0.02
Civil	SEP	Cessna Skyhawk 172/Cutlass	CNA172	0.03	-	0.03	-	-	-	0.07
Civil	SEP	Cessna 177 Cardinal	CNA172	0.00	-	0.00	-	-	-	0.01
Civil	SEP	Cessna Skylane 182	CNA182	0.03	-	0.03	-	-	-	0.05
Civil	SEP	Cessna 206 Stationair	CNA206	0.01	-	0.01	-	-	-	0.02
Civil	SEP	Cessna 210 Centurion	GASEPV	0.01	-	0.01	-	-	-	0.02
Civil	SEP	Cessna Cardinal RG	GASEPV	0.01	-	0.01	-	-	-	0.01
Civil	SEP	Diamond Star DA40	COMSEP	0.00	-	0.00	-	-	-	0.01
Civil	SEP	Mooney M-20C Ranger	GASEPV	0.01	-	0.01	-	-	-	0.01
Civil	SEP	Mooney M-20C Ranger	GASEPV	0.03	-	0.03	-	-	-	0.05
Civil	SEP	Turbo Mooney M20K	GASEPV	0.01	-	0.01	-	-	-	0.02
Civil	SEP	Piper Cherokee	GASEPF or PA28	0.02	-	0.02	-	-	-	0.03
Civil	SEP	Piper Aztec	BEC58P	0.00	-	0.00	-	-	-	0.01

Table 2.1
2018 Average Annual Day Fleet Mix

Civil / Military	Category	Aircraft Name	AEDT/NOISEMAP Aircraft	AAD Arrivals		AAD Departures		AAD Closed Pattern		AAD Total
				Day	Night	Day	Night	Day	Night	
Civil	SEP	Piper Cherokee Six	GASEPV	0.01	-	0.01	-	-	-	0.02
Civil	SEP	Piper Malibu	GASEPV	0.04	-	0.04	-	-	-	0.09
Civil	SEP	Cirrus SR-22 Turbo	COMSEP	0.01	-	0.01	-	-	-	0.02
Civil	SEP	Cirrus SR-20	COMSEP	0.02	-	0.02	-	-	-	0.03
Civil	SEP	Cirrus SR 22	COMSEP	0.19	-	0.19	-	-	-	0.38
Civil	SET	Piper Malibu Meridian	CNA441	0.01	-	0.01	-	-	-	0.03
Civil	SET	Pilatus PC-12	CNA208	0.43	-	0.43	-	-	-	0.85
Civil	SET	Socata TBM-850	CNA441	0.02	-	0.02	-	-	-	0.04
Civil	SET	Raytheon Texan 2	GASEPF	0.01	-	0.01	-	-	-	0.02
Total				15.89	0.03	15.89	0.01	22.30	-	54.12

Source: Stantec and HNTB Analysis, 2018.

DRAFT

2.2.2 Aircraft Flight Profiles

Flight profiles model the vertical paths of aircraft during departure and arrival to determine the altitude, speed, and engine thrust of an aircraft at any point along a flight track. The noise model uses this information to calculate noise exposure on the ground along each track section.

Profiles are unique to each aircraft type and are based on operating procedures, temperature, and aircraft operating weight. Detailed information on aircraft flight profiles, under varying conditions, is stored in the noise model aircraft database.

The climb rate and flight profile of departing aircraft can vary considerably. New, modern aircraft have higher thrust engines and improved wing designs which results in an increased climb rate as compared to older aircraft. Modern jet engines are also much quieter than their predecessors, even though they can produce more thrust. Temperature, takeoff weight, and airline operating procedures are also important factors that affect climb rate.

The AEDT aircraft database groups aircraft-specific profiles by stage length, which refers to the length of the trip to be made by the aircraft type. For departures, AEDT assumes aircraft weight increases with stage, or trip length, because of the need for more fuel and that each aircraft type's takeoff distance and climb performance is different for each stage length. High-weight (long trip, high stage length) aircraft have increased takeoff distances and lower climb rates than lighter (short trip) aircraft for a given aircraft type.

Arriving civilian aircraft do not use stage lengths, as they are modeled using a standard three-degree approach path. AEDT has a database of standard arrival flight profiles for each modeled aircraft type.

When the 2013 AICUZ and the 2014 NEM studies were developed, there were 16 C-5A/Bs based at CEF. The first C-5B left CEF for an upgrade to a C-5M in 2015. Due to budget cuts in 2015, the number of the based C-5s were reduced from 16 to eight. In January 2017, the last C-5B left CEF for the scheduled upgrade. Ever since, all eight C-5Bs have been upgraded to C-5Ms and returned to CEF.

Information for the operations flown by the C-5A/B aircraft were collected and modeled in the 2013 AICUZ study. After consultation with a 439th Airlift Wing C-5M pilot, the flight paths modeled in the 2013 AICUZ study were confirmed to remain valid for the C-5M.¹ The C-5M standard flight profiles were provided by the USAF noise modeling team and were also confirmed by the C-5M pilot.

2.2.3 Runway Use

Runway use is determined by several factors, including safety, wind, weather, traffic demand, runway capacity, direction of flight, and prescribed runway use procedures. The Westover Tower assigns runway use with consideration to all of these factors. Runway use was evaluated based on a series of categories, including by military and civilian operations, and by aircraft type including jets, single and multi-engine turboprop, single- and multi-engine piston, and helicopter operations. **Table 2.2** presents the overall runway use, including military and civilian operations.

Table 2.2
Overall Runway Usage

Civilian			
Operation Type	Runway	Day	Night
Arrival	05	20%	20%
	23	80%	80%
Departure	05	80%	80%
	23	20%	20%
Touch-and-Go	05	20%	0%
	23	80%	0%
Military			
Operation Type	Runway	Day	Night
Arrival	05	19%	38%
	23	61%	59%
	15	0%	0%
	33	1%	2%
	32DZ	1%	1%
	Helipad	19%	0%
Departure	05	13%	29%
	23	27%	59%
	15	1%	2%
	33	3%	10%
	Helipad	56%	0%
Touch-and-Go	05	20%	0%
	23	58%	0%
	15	3%	0%
	33	10%	0%
	32DZ	10%	0%

Notes: Total may not sum due to rounding.
32DZ denotes use of the Drop Zone (see Figure 2-2).

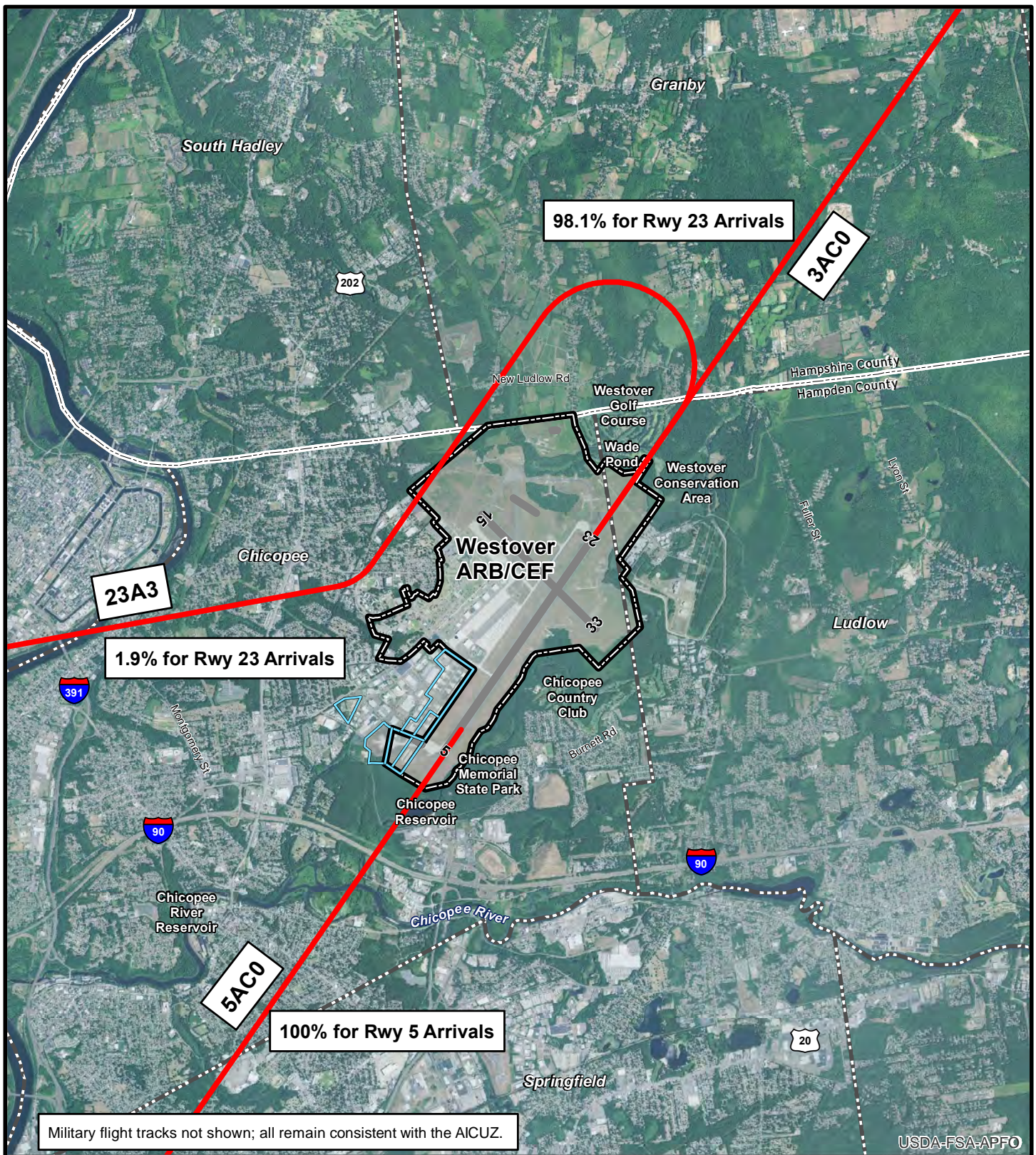
Source: HNTB Analysis.

Civilian operations remain primarily on the main runway (Runway 05/23), and operations are predominantly to and from the north (arrivals to Runway 23, and departures from Runway 05). Military operations use both runways but remain concentrated on the longer primary runway as well. The crosswind runway (Runway 15/33) includes a smaller number of arrivals, departures and closed pattern (touch-and-go) operations.

2.2.4 Flight Track Locations and Use

Modeled flight tracks depict the approximate paths, or ground tracks, that aircraft use as they travel to and from the airport. Flight tracks are intended to be representative of typical aircraft operations at the Airport. As with runway use, flight track use reflects the percentage of annual operations that use a specific flight route, grouped by arrival or departure and daytime or nighttime. **Figures 2-3 through 2-6** present the noise model representative flight tracks used by both

Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update

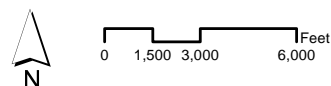


USDA-FSA-APFO

LEGEND

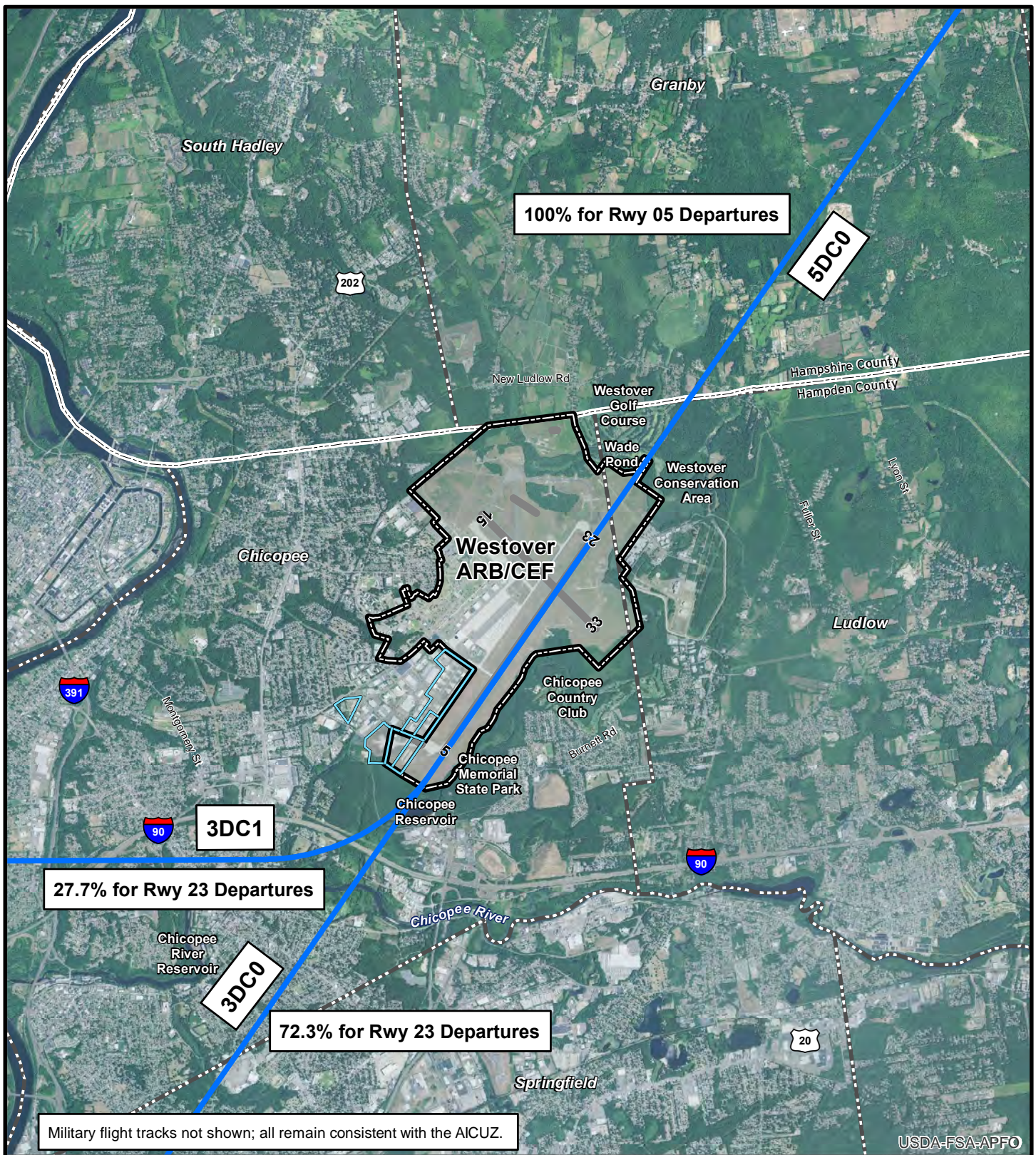
- Civilian Arrival Flight Track
- Westover Air Reserve Base Installation Area
- Westover Metropolitan Development Corporation Aviation Property
- County Boundary
- Town Boundary

Flight Tracks – Civilian Fixed Wing Arrival Figure 2-3



Sources: Bureau of Geographic Information (MassGIS),
Commonwealth of Massachusetts,
Executive Office of Technology and Security Services,
WMDC 2018, HNTB GIS (2018),
Aerial - USDA 2016, ESRI Data and HNTB Analysis






Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update



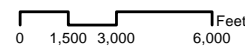
Military flight tracks not shown; all remain consistent with the AICUZ.

USDA-FSA-APFO

LEGEND

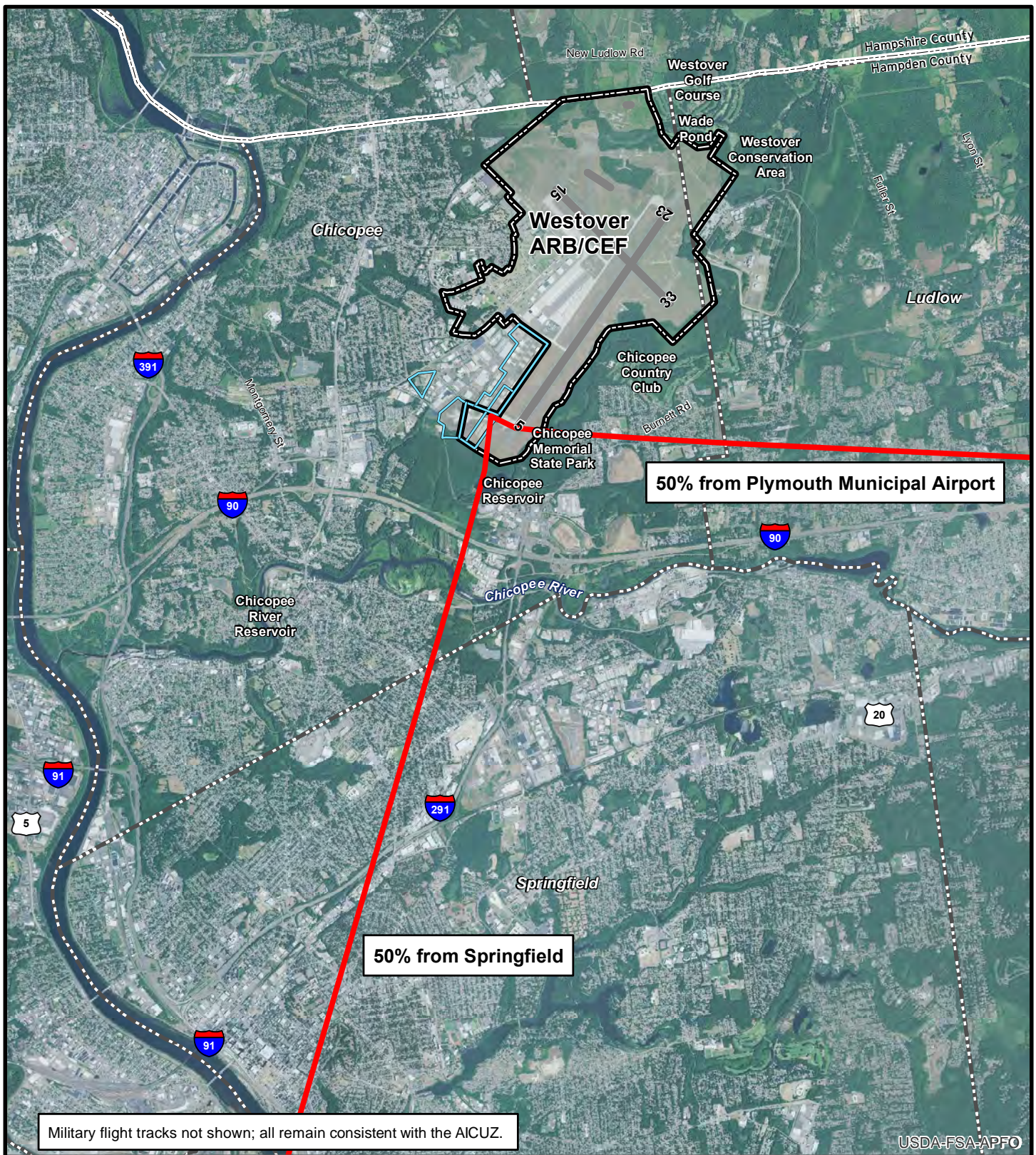
-  Civilian Departure Flight Track
-  Westover Air Reserve Base Installation Area
-  Westover Metropolitan Development Corporation Aviation Property
-  County Boundary
-  Town Boundary

Flight Tracks – Civilian Fixed Wing Departure Figure 2-4



Sources: Bureau of Geographic Information (MassGIS),
Commonwealth of Massachusetts,
Executive Office of Technology and Security Services,
WMDC 2018, HNTB GIS (2018),
Aerial - USDA 2016, ESRI Data and HNTB Analysis

Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update



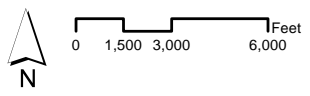
Military flight tracks not shown; all remain consistent with the AICUZ.

USDA-FSA-APFO

LEGEND

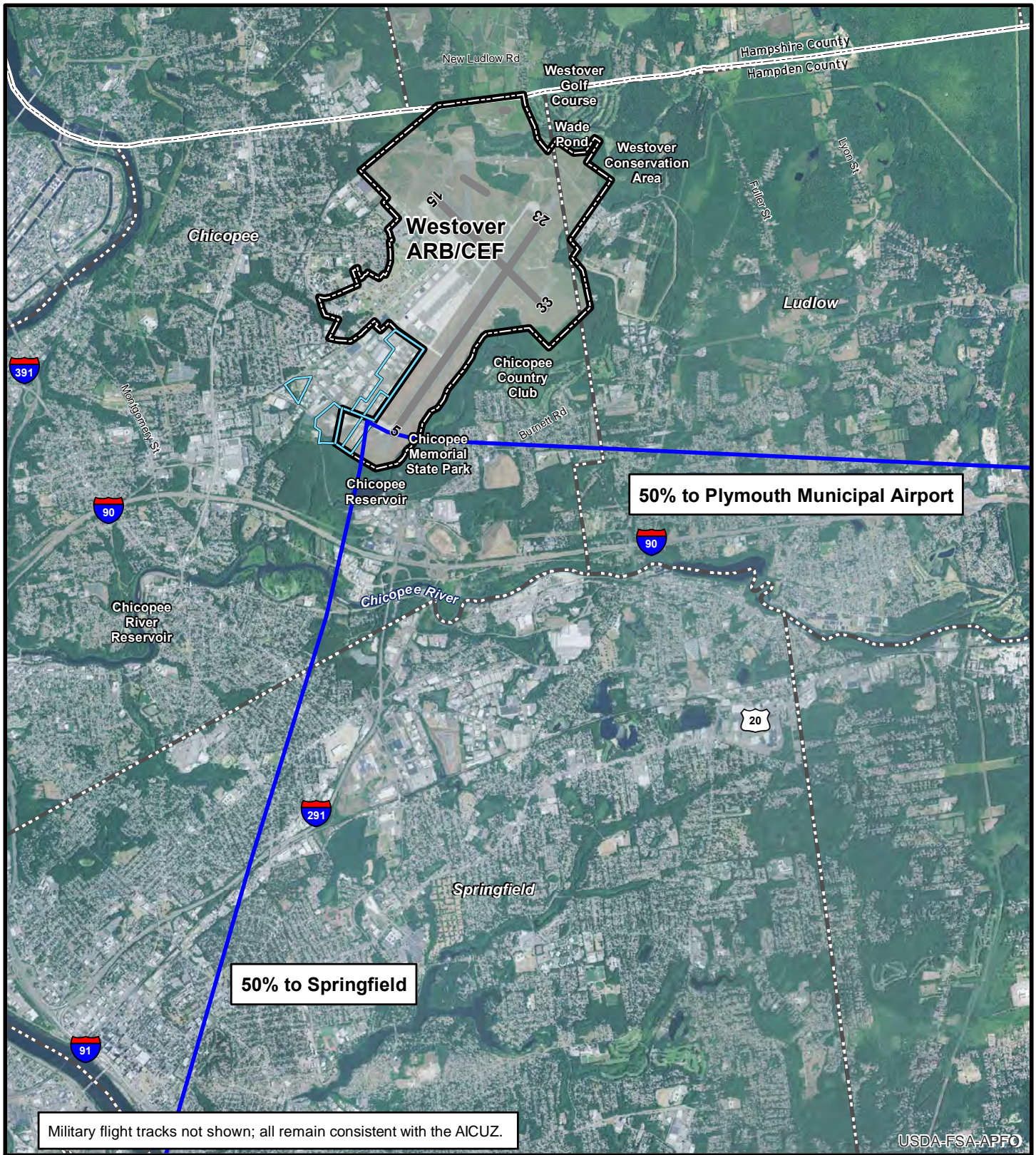
- Helicopter Arrival Flight Track
- Westover Air Reserve Base Installation Area
- Westover Metropolitan Development Corporation Aviation Property
- County Boundary
- Town Boundary

Flight Tracks – Civilian Helicopter Arrival Figure 2-5







Sources: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services, WMDC 2018, HNTB GIS (2018), Aerial - USDA 2016, ESRI Data and HNTB Analysis

Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update



LEGEND

-  Helicopter Departure Flight Track
-  Westover Air Reserve Base Installation Area
-  Westover Metropolitan Development Corporation Aviation Property
-  County Boundary
-  Town Boundary

Flight Tracks – Civilian Helicopter Departure Figure 2-6



0 1,500 3,000 6,000 Feet

Sources: Bureau of Geographic Information (MassGIS),
Commonwealth of Massachusetts,
Executive Office of Technology and Security Services,
WMDC 2018, HNTB GIS (2018),
Aerial - USDA 2016, ESRI Data and HNTB Analysis

civilian and military aircraft, including specific procedures flown by the C-5 aircraft.

2.2.5 Run-up/Maintenance Operations

Run-up operations increase the engine throttle while the aircraft is on the ground. Run-ups are usually not associated with arrival or departure operations but are used as part of maintenance and engine warm-up procedures.

The Airport is one of three C-5 inspection/repair facilities for the Air Force and conducts maintenance procedures on both based C-5 aircraft and those assigned to other bases. For the NEM, C-5 maintenance activity was collected for a 12-month period from Base personnel and input into the noise model. Generally, run-ups are performed on the East Ramp with the aircraft oriented at 330 degrees, while a majority of engine run-up activity is conducted between the hours of 7:00 a.m. and 9:59 p.m.

2.3 Future (2023) Conditions

Part 150 regulations require that the forecast condition be representative of operations anticipated to occur five years following the year of submission. As such, conditions were forecast for calendar year 2023, and factors that influence noise exposure, including forecast operations, runway use, flight track locations and use, engine run-up activity, and any changes to the airfield were evaluated. The forecasts were developed based on discussions with staff of the 439th Airlift Wing and WMDC. The Air Force does not anticipate any appreciable increase in operations in the next five years. Whereas WMDC does foresee an increase in flight operations based on improved economic conditions in the region and the opening of MGM Resorts International casino in Springfield, MA in August 2018.

2.3.1 Flight Operations and Fleet Mix

Operations, including the types, frequencies, and time of day of operations, were forecast for 2023. The forecast included a 0.7% annual growth rate with a 3.4% increase over the next five years for military activity resulting in an increase from 15,900 to 16,400 operations in 2023. The military fleet mix will remain unchanged.

Civilian operations were forecast to increase approximately 5.1% per year (25.5% between 2018 and 2023), from 3,870 annual operations to 4,850. The fleet mix is expected to change slightly as larger business jets frequent the airport.

Overall, total aircraft operations will increase from 19,750 to about 21,300 (rounded), or 7.7% in calendar year 2023. This equates to approximately 57.0 operations on an average annual day. **Table 2.3** provides a summary of the forecast (2023) operations.

2.3.2 Aircraft Flight Profiles

There are no changes to the flight profiles used by aircraft in 2023.

2.3.3 Runway Use

Runway use in 2023 is forecast to remain unchanged from the existing (2018) condition.

2.3.4 Flight Track Locations and Use

The location and frequency of use of flight tracks is forecast to remain unchanged from the existing (2018) condition.

2.3.5 Run-up/Maintenance Operations

The run-up operations associated with the C-5M aircraft are forecast to increase at the same rate as the increase of the C-5M operations.

Table 2.3

2023 Average Annual Day Fleet Mix

Civil / Military	Category	Aircraft Name	AEDT/NOISEMAP Aircraft	AAD Arrivals		AAD Departures		AAD Closed Pattern		AAD Total
				Day	Night	Day	Night	Day	Night	
Military	JET	* Super Galaxy	C5A	2.08	0.03	2.08	0.01	17.81	-	22.01
Military	JET	Boeing Globemaster	C17	0.30	0.00	0.30	0.00	-	-	0.61
Military	JET	Boeing Sentry TF33/E3C	E3A	0.02	-	0.02	-	-	-	0.03
Military	JET	Boeing F-15 Eagle	F15A or F15E	0.30	-	0.30	-	-	-	0.60
Military	JET	Boeing Raptor F22	F22	0.01	-	0.01	-	-	-	0.02
Military	JET	Boeing KC-135 Stratotanker	KC-135R	0.49	-	0.49	-	-	-	0.99
Military	JET	Extender	KC10A	0.29	-	0.29	-	-	-	0.58
Military	HEL	Boeing CH-47 Chinook	CH47D	2.16	-	2.16	-	2.19	-	6.52
Military	HEL	Sikorsky SH-60 Seahawk	S70	4.71	-	4.71	-	2.19	-	11.62
Military	MET	Lockheed Hercules	C130HP	0.33	0.00	0.33	0.00	1.10	-	1.76
Military	SEP	Lockheed P-3C Orion	P3A or P3C	0.03	-	0.03	-	-	-	0.07
Civil	JET	Airbus	A319-131	0.02	-	0.02	-	-	-	0.03
Civil	JET	IAI Astra 1125	IA1125	0.01	-	0.01	-	-	-	0.02
Civil	JET	Boeing	737400	0.14	-	0.14	-	-	-	0.27
Civil	JET	Boeing	737700	0.04	-	0.04	-	-	-	0.08
Civil	JET	Boeing	737800	0.51	-	0.51	-	-	-	1.01
Civil	JET	Boeing	757PW or 757RR	0.02	-	0.02	-	-	-	0.03
Civil	JET	Raytheon Beechjet	MU3001	0.07	-	0.07	-	-	-	0.14
Civil	JET	Cessna Citation CJ2	CNA500	0.07	-	0.07	-	-	-	0.14
Civil	JET	Cessna Citation CJ3	CNA500	0.05	-	0.05	-	-	-	0.11
Civil	JET	Cessna Citation CJ4	CNA525C	0.02	-	0.02	-	-	-	0.03
Civil	JET	Cessna 500/Citation I	CNA500	0.01	-	0.01	-	-	-	0.01
Civil	JET	Cessna CitationJet/CJ1	CNA500	0.11	-	0.11	-	-	-	0.22
Civil	JET	Cessna Citation II/Bravo	CNA55B	0.04	-	0.04	-	-	-	0.08
Civil	JET	Cessna Citation V/Ultra/Encore	CNA560U or CNA55B or CNA560E	0.10	-	0.10	-	-	-	0.19

Table 2.3

2023 Average Annual Day Fleet Mix

Civil / Military	Category	Aircraft Name	AEDT/NOISEMAP Aircraft	AAD Arrivals		AAD Departures		AAD Closed Pattern		AAD Total
				Day	Night	Day	Night	Day	Night	
Civil	JET	Cessna Excel/XLS	CNA560XL	0.14	-	0.14	-	-	-	0.27
Civil	JET	Cessna III/VI/VII	CIT3	0.02	-	0.02	-	-	-	0.03
Civil	JET	Cessna Citation Sovereign	CNA680	0.07	-	0.07	-	-	-	0.14
Civil	JET	Cessna Citation Latitude	CNA680	0.01	-	0.01	-	-	-	0.01
Civil	JET	Cessna Citation X	CNA750	0.08	-	0.08	-	-	-	0.16
Civil	JET	Bombardier Challenger	CL600	0.06	-	0.06	-	-	-	0.12
Civil	JET	Bombardier Challenger	CL600	0.03	-	0.03	-	-	-	0.06
Civil	JET	Bombardier Challenger	CL600	0.10	-	0.10	-	-	-	0.21
Civil	JET	Bombardier CRJ-200	CL600	0.02	-	0.02	-	-	-	0.04
Civil	JET	Boeing (Douglas) DC 10-10/30/40	DC1010 or DC1030 or DC1040	0.07	-	0.07	-	-	-	0.14
Civil	JET	Embraer ERJ-145	EMB145	0.01	-	0.01	-	-	-	0.02
Civil	JET	Embraer 190	EMB190	0.01	-	0.01	-	-	-	0.02
Civil	JET	Embraer 135 LR	EMB145	0.01	-	0.01	-	-	-	0.01
Civil	JET	Embraer Phenom 100	CNA510	0.01	-	0.01	-	-	-	0.01
Civil	JET	Eclipse 550	CNA55B	0.01	-	0.01	-	-	-	0.01
Civil	JET	Embraer Phenom 300	CNA55B	0.07	-	0.07	-	-	-	0.14
Civil	JET	Eclipse 500	ECLIPSE500	0.04	-	0.04	-	-	-	0.09
Civil	JET	Falcon 2000	CNA750	0.14	-	0.14	-	-	-	0.27
Civil	JET	Falcon 900LX	CNA750	0.02	-	0.02	-	-	-	0.04
Civil	JET	Dassault Falcon/Mystère 20	FAL20	0.01	-	0.01	-	-	-	0.01
Civil	JET	Dassault Falcon/Mystère 50	CNA750	0.12	-	0.12	-	-	-	0.23
Civil	JET	Falcon 7X	CNA750 or GIV	0.01	-	0.01	-	-	-	0.02
Civil	JET	Gulfstream 280	IA1125	0.01	-	0.01	-	-	-	0.02
Civil	JET	Bombardier BD-700 Global 5000	GV	0.01	-	0.01	-	-	-	0.01
Civil	JET	Bombardier Global 7000	BD-700-1A10 or BD-700-1A11	0.01	-	0.01	-	-	-	0.01

Table 2.3

2023 Average Annual Day Fleet Mix

Civil / Military	Category	Aircraft Name	AEDT/NOISEMAP Aircraft	AAD Arrivals		AAD Departures		AAD Closed Pattern		AAD Total
				Day	Night	Day	Night	Day	Night	
Civil	JET	Gulfstream IV/G400	GIV	0.29	-	0.29	-	-	-	0.58
Civil	JET	Gulfstream 550	GV	0.27	-	0.27	-	-	-	0.55
Civil	JET	Gulfstream 650	GV	0.03	-	0.03	-	-	-	0.05
Civil	JET	BAe HS 125/700-800/Hawker 800	LEAR35	0.21	-	0.21	-	-	-	0.43
Civil	JET	BAe/Raytheon HS 125-1000/Hawker 1000	LEAR35	0.04	-	0.04	-	-	-	0.07
Civil	JET	Bombardier Learjet 31/A/B	LEAR35	0.01	-	0.01	-	-	-	0.03
Civil	JET	Bombardier Learjet 35/36	LEAR35	0.01	-	0.01	-	-	-	0.02
Civil	JET	Learjet 40; Gates Learjet	LEAR35	0.01	-	0.01	-	-	-	0.03
Civil	JET	Bombardier Learjet 45	LEAR35	0.05	-	0.05	-	-	-	0.09
Civil	JET	Bombardier Learjet 55	LEAR35	0.02	-	0.02	-	-	-	0.04
Civil	JET	Bombardier Learjet 60	LEAR35 or CNA750	0.06	-	0.06	-	-	-	0.12
Civil	JET	Boeing P-8 Poseidon	737800	0.10	-	0.10	-	-	-	0.19
Civil	JET	Pilatus PC-24	CNA55B	0.07	-	0.07	-	-	-	0.14
Civil	JET	North American Rockwell Sabre 40/60	SABR80	0.01	-	0.01	-	-	-	0.02
Civil	JET	Northrop T-38 Talon	T-38A	0.01	-	0.01	-	-	-	0.02
Civil	MEP	Beech Baron	BEC58P	0.03	-	0.03	-	-	-	0.05
Civil	MEP	Beech 58	BEC58P	0.09	-	0.09	-	-	-	0.18
Civil	MEP	Beech Dutchess	BEC58P	0.00	-	0.00	-	-	-	0.01
Civil	MEP	Cessna 310	BEC58P	0.01	-	0.01	-	-	-	0.02
Civil	MEP	Cessna 340	BEC58P	0.01	-	0.01	-	-	-	0.01
Civil	MEP	Cessna Golden Eagle 421	BEC58P	0.01	-	0.01	-	-	-	0.02
Civil	MEP	Piper PA-30	PA30	0.01	-	0.01	-	-	-	0.02
Civil	MEP	PA31 - Piper Navajo PA-31	BEC58P	0.02	-	0.02	-	-	-	0.04
Civil	MEP	Piper PA-34 Seneca	BEC58P	0.01	-	0.01	-	-	-	0.02
Civil	MET	Airbus	C-130E	0.01	-	0.01	-	-	-	0.02

Table 2.3

2023 Average Annual Day Fleet Mix

Civil / Military	Category	Aircraft Name	AEDT/NOISEMAP Aircraft	AAD Arrivals		AAD Departures		AAD Closed Pattern		AAD Total
				Day	Night	Day	Night	Day	Night	
Civil	MET	Raytheon Beech King Air	DHC6	0.38	-	0.38	-	-	-	0.77
Civil	MET	Raytheon Beech King Air	DHC6	0.89	-	0.89	-	-	-	1.78
Civil	MET	Raytheon Super King Air	DHC6	0.08	-	0.08	-	-	-	0.16
Civil	MET	Beech King Air 90	DHC6	0.03	-	0.03	-	-	-	0.05
Civil	MET	Cessna Conquest	CNA441	0.01	-	0.01	-	-	-	0.02
Civil	MET	CASA CN-235	SF340	0.05	-	0.05	-	-	-	0.10
Civil	MET	BAe-3100 Jetstream	DHC6	0.01	-	0.01	-	-	-	0.01
Civil	MET	Piaggio P-180 Avanti	DHC6	0.01	-	0.01	-	-	-	0.03
Civil	MET	Piper Cheyenne 1	CNA441	0.01	-	0.01	-	-	-	0.01
Civil	MET	Piper Cheyenne 2	CNA441	0.02	-	0.02	-	-	-	0.03
Civil	MET	Swearingen Merlin 4/4A Metro2	DHC6	0.01	-	0.01	-	-	-	0.02
Civil	SEP	American	GASEPF	0.00	-	0.00	-	-	-	0.01
Civil	SEP	Beech Bonanza	GASEPV	0.02	-	0.02	-	-	-	0.04
Civil	SEP	Beech Bonanza	CNA208	0.02	-	0.02	-	-	-	0.04
Civil	SEP	Beech Bonanza	CNA208	0.02	-	0.02	-	-	-	0.03
Civil	SEP	Cessna 150	CNA172	0.01	-	0.01	-	-	-	0.02
Civil	SEP	Cessna Skyhawk	CNA172	0.03	-	0.03	-	-	-	0.07
Civil	SEP	Cessna Cardinal	CNA172	0.00	-	0.00	-	-	-	0.01
Civil	SEP	Cessna Skylane	CNA182	0.03	-	0.03	-	-	-	0.05
Civil	SEP	Cessna Stationair	CNA206	0.01	-	0.01	-	-	-	0.02
Civil	SEP	Cessna Centurion	GASEPV	0.01	-	0.01	-	-	-	0.02
Civil	SEP	Cessna Cardinal RG	GASEPV	0.01	-	0.01	-	-	-	0.01
Civil	SEP	Diamond Star DA40	GASEPV	0.00	-	0.00	-	-	-	0.01
Civil	SEP	Mooney M-20C Ranger	GASEPV	0.01	-	0.01	-	-	-	0.01
Civil	SEP	Mooney M-20C Ranger	GASEPV	0.03	-	0.03	-	-	-	0.05

Table 2.3

2023 Average Annual Day Fleet Mix

Civil / Military	Category	Aircraft Name	AEDT/NOISEMAP Aircraft	AAD Arrivals		AAD Departures		AAD Closed Pattern		AAD Total
				Day	Night	Day	Night	Day	Night	
Civil	SEP	Turbo Mooney M20K	GASEPV	0.01	-	0.01	-	-	-	0.02
Civil	SEP	Piper Cherokee	GASEPF or PA28	0.02	-	0.02	-	-	-	0.03
Civil	SEP	Piper Aztec	BEC58P	0.00	-	0.00	-	-	-	0.01
Civil	SEP	Piper Cherokee Six	GASEPV	0.01	-	0.01	-	-	-	0.02
Civil	SEP	Piper Malibu	GASEPV	0.04	-	0.04	-	-	-	0.09
Civil	SEP	Cirrus SR-22 Turbo	COMSEP	0.01	-	0.01	-	-	-	0.02
Civil	SEP	Cirrus SR-20	COMSEP	0.02	-	0.02	-	-	-	0.03
Civil	SEP	Cirrus SR 22	COMSEP	0.19	-	0.19	-	-	-	0.38
Civil	SET	Piper Malibu Meridian	CNA441	0.01	-	0.01	-	-	-	0.03
Civil	SET	Pilatus PC-12	CNA208	0.44	-	0.44	-	-	-	0.88
Civil	SET	Socata TBM-850	CNA441	0.02	-	0.02	-	-	-	0.04
Civil	SET	Raytheon Texan 2	GASEPV	0.01	-	0.01	-	-	-	0.02
Civil	HEL	Hughes 269	H500D or SC300C	0.01	-	0.01	-	-	-	0.02
Civil	HEL	Sikorsky S-76	S76	0.01	-	0.01	-	-	-	0.02
Total				16.85	0.03	16.85	0.01	23.29	-	57.03

Source: Stantec and HNTB Analysis, 2018.

CHAPTER 3: Noise and Land Use Compatibility

This section reviews the Federal and local land use guidelines related to compatibility with aircraft noise exposure and aeronautical uses, and the development of land use data needed for the analyses required in Part 150. Note that **Appendix D** presents an introduction to the relevant fundamentals of acoustics and noise terminology and the effects of noise on human activity.

A discussion of existing and future land use compatibility relative to the Existing (2018) and Future (2023) NEMs is included in Chapter Four.

3.1 Land Use Guidelines

Land use guidelines provide the primary means of preventing new non-compatible development within the 65 db DNL noise contours. The following sections provide a description of federal and local land use guidelines.

3.1.1 Federal Guidelines

The degree of annoyance that people experience from aircraft noise varies, depending on their activities at any given time. For example, people are usually less disturbed by aircraft noise when they are shopping, working, or driving than when they are at home. Transient hotel and motel residents seldom express as much concern with aircraft noise as do permanent residents of an area. The concept of “land use compatibility” has arisen from this systematic variation in community reaction to noise.

In a Part 150 Study, DNL noise values have the following two principal uses:

- Provide a basis for comparing existing noise conditions to the effects of noise abatement procedures and/or forecast changes in airport activity; and
- Provide a quantitative basis for identifying potential noise impacts and mitigation.

Both of these functions require the application of objective criteria for evaluating noise impacts. Reproduced in **Table 3.1**, Part 150 provides the FAA’s recommended guidelines for noise and land use compatibility evaluation. In setting the various compatibility guidelines, however, the regulations state that the designations do not constitute a Federal determination that any use of land covered by the [noise compatibility] program is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

The FAA’s guidelines represent a compilation of the results of scientific research into noise-related activity interference and attitudinal response.

However, reviewers of DNL contours should recognize the highly subjective nature of an individual's response to noise, and that special circumstance can affect individual tolerances. For example, a high, non-aircraft background noise level can reduce the significance of aircraft noise, such as in areas consistently exposed to relatively high levels of vehicular traffic noise. Alternatively, residents of areas with unusually low

background noise levels may find relatively low levels of aircraft noise annoying.

The response may also be affected by expectation and experience. People may become accustomed to a level of exposure that guidelines typically indicate may be unacceptable. Conversely, minor changes in exposure may generate a response that is far greater than that which the guidelines suggest.

Table 3.1

Part 150 Noise and Land Use Compatibility* Guidelines

Land Use	Yearly Day-Night Average Sound Level, DNL, in Decibels					
	<65	65-70	70-75	75-80	80-85	>85
<i>Residential Use</i>						
Residential, other than mobile homes and transient lodgings	Y	N(a)	N(a)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(a)	N(a)	N(a)	N	N
<i>Public Use</i>						
Schools	Y	N(a)	N(a)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(b)	Y(c)	Y(d)	Y(d)
Parking	Y	Y	Y(b)	Y(c)	Y(d)	N
<i>Commercial Use</i>						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail--building materials, hardware and farm equipment	Y	Y	Y(b)	Y(c)	Y(d)	N
Retail trade--general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(b)	Y(c)	Y(d)	N
Communication	Y	Y	25	30	N	N
<i>Manufacturing and Production</i>						
Manufacturing, general	Y	Y	Y(b)	Y(c)	Y(d)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(f)	Y(g)	Y(h)	Y(h)	Y(h)
Livestock farming and breeding	Y	Y(f)	Y(g)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
<i>Recreational</i>						
Outdoor sports arenas and spectator sports	Y	Y(e)	Y(e)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

Table 3.1

Part 150 Noise and Land Use Compatibility* Guidelines

Key to Table 3.1	
SLUCM	Standard Land Use Coding Manual
Y(Yes)	Land use and related structures compatible without restrictions.
N(No)	Land use and related structures are not compatible and should be prohibited.
NLR	Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, or 35	Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

* The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute Federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

Notes to Table 3.1

- (a) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor NLR of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.
- (b) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas or where the normal noise level is low.
- (c) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas or where the normal noise level is low.
- (d) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas or where the normal noise level is low.
- (e) Land use compatible provided special sound reinforcement systems are installed.
- (f) Residential buildings require an NLR of 25.
- (g) Residential buildings require an NLR of 30.
- (h) Residential buildings not permitted.

Source: 14 Code of Federal Regulations Part 150, *Airport Noise Compatibility Planning*, Appendix A, Table 1.

The cumulative nature of DNL means that the same level of noise exposure can be achieved in an infinite number of ways. For example, a reduction in a small number of relatively noisy operations may be counterbalanced by an increase in relatively

quiet flights, with no net change in DNL. Residents of the area may be highly annoyed by the increased frequency of operations, despite the seeming maintenance of the noise *status quo*.

Part 150 guidelines specify that all land uses are normally compatible with aircraft noise exposure levels at or below 65 DNL. This guideline is supported formally by standards adopted by the Department of Housing and Urban Development (HUD). HUD standards address whether sites are eligible for Federal funding support. These standards, set forth in 24 CFR Part 51 *Environmental Criteria and Standards*, define areas with DNL exposure not exceeding 65 dB as acceptable for HUD assistance or subsidy. Areas exposed to noise levels between 65 and 75 DNL are “normally unacceptable,” and require special abatement measures and review. Those areas at 75 DNL and above are “unacceptable” except under limited circumstances.

As with the previous Part 150 Study and NEM Updates, this NEM/NCP Update uses the Federal Part 150 guidelines to assist in identifying potential land use incompatibilities surrounding the Airport.

3.1.2 Local Land Use Guidelines

The Airport is located in the City of Chicopee and Town of Ludlow in Hampden County, Massachusetts and is bordered to the north by the towns of South Hadley and Granby in Hampshire County. The area was relatively undeveloped when the Westover Base was dedicated in 1946; however, development has increased to the south and west and industrial, and low-to-medium density residential development has emerged to the north and east. The Airport is now located close to the largest population center in Western Massachusetts but is also near rural areas that could be susceptible to sprawling residential development. The region is unique in that it continues to experience suburban sprawl without population growth.²

Each of the cities/towns have a municipal zoning ordinance to regulate land use.

Despite recommendations in previous Part 150 studies and updates, the Town of Ludlow is the only community within the affected noise area (within the DNL 65 dB contour) with land use tools that have been implemented to mitigate or prevent non-compatible uses. Ludlow’s Aircraft Flight overlay district prohibits the use of adult care facilities, schools, hospitals, daycare centers, auditoriums, places of worship and concert halls.

As stated in the 2013 WARB AICUZ, local governments have implemented height restrictions to help maintain existing land use characteristics. While none of these height restrictions were designed specifically by FAA (i.e., FAR Part 77) obstruction limits, they tend to be compatible with them.

PVPC serves as a regional planning agency for these jurisdictions, and is the primary agency responsible “for increasing communication, cooperation, and coordination among all levels of government within the region’s 43 cities and towns as well as the private business and civic sectors in order to benefit the Pioneer Valley region and to improve its residents’ quality of life.”³ PVPC provides planning guidance to communities and maintains general zoning data, but the agency does not regulate zoning or subdivision regulations.

3.2 Development of Land Use and Population Data

This section describes the development of land use and population data, and existing and future land use in the vicinity of the Airport. Land use and population data, and ultimately the noise impact analysis discussed in Chapter 4 was developed using a Geographic Information System (GIS). The GIS facilitated a detailed, comprehensive analysis of the geographical relationships

and patterns emerging from the region surrounding the Airport.

Land use data and aerial photography were obtained from the Office of Geographic Information (MassGIS).⁴ The most recent available US Census Bureau data (2010) was used to compile demographic information, such as housing units and population. Population estimates were developed using the population in the affected Census blocks in Hampden County and Hampshire County. Demographic data was correlated to land use data using GIS. This data served as the baseline land use database for the NEM/NCP Update.

3.3 Existing Generalized Land Use

Generalized land use was collected from MassGIS, and was refined based on MassGIS parcel boundary outlines and aerial photo interpretation. **Figure 3-1** depicts the types of existing land uses surrounding the Airport. Land uses were generalized into the following categories: Commercial/ Industrial, Open/ Agricultural/ Recreational, Public/ Quasi-Public, Residential, Cemetery, Institutional, Transportation, and Water. Requests for land use verification were submitted to nearby jurisdictions (Chicopee, Ludlow, Granby). Any updates to the land use maps were made based on responses from these communities. Correspondence is included in **Appendix E**. Areas that have been acquired under the WMDC's voluntary acquisition program are also identified in Figure 3-1.

Land use north of the Airport, in Granby, is classified as Open/Agricultural/Recreational and Residential, with small pockets of Commercial/ Industrial. In Ludlow to the east of the Airport, land use is predominantly Open/ Agricultural/ Recreational (Westover Conservation Area) and Residential. Public/Quasi-Public land use (Hampden

County Jail) is adjacent to the Base to the east. On the west side of the Airport in Chicopee, nearest to the James Street Gate, land uses are a combination of Public/Quasi-Public and Residential. Adjacent to Airport property, just west of the Runway 5 end are Commercial/Industrial uses (Westover Industrial Park). Further to the west of the Airport in Chicopee is more dense land use development, including predominantly residential areas with pockets of commercial uses. To the south, land uses in Chicopee are predominantly Open/ Agricultural/Recreational and Residential with interspersed Industrial and Commercial uses. Further south, Springfield is developed with primarily Residential, Industrial and Commercial land uses.

3.3.1 Noise-Sensitive Resources

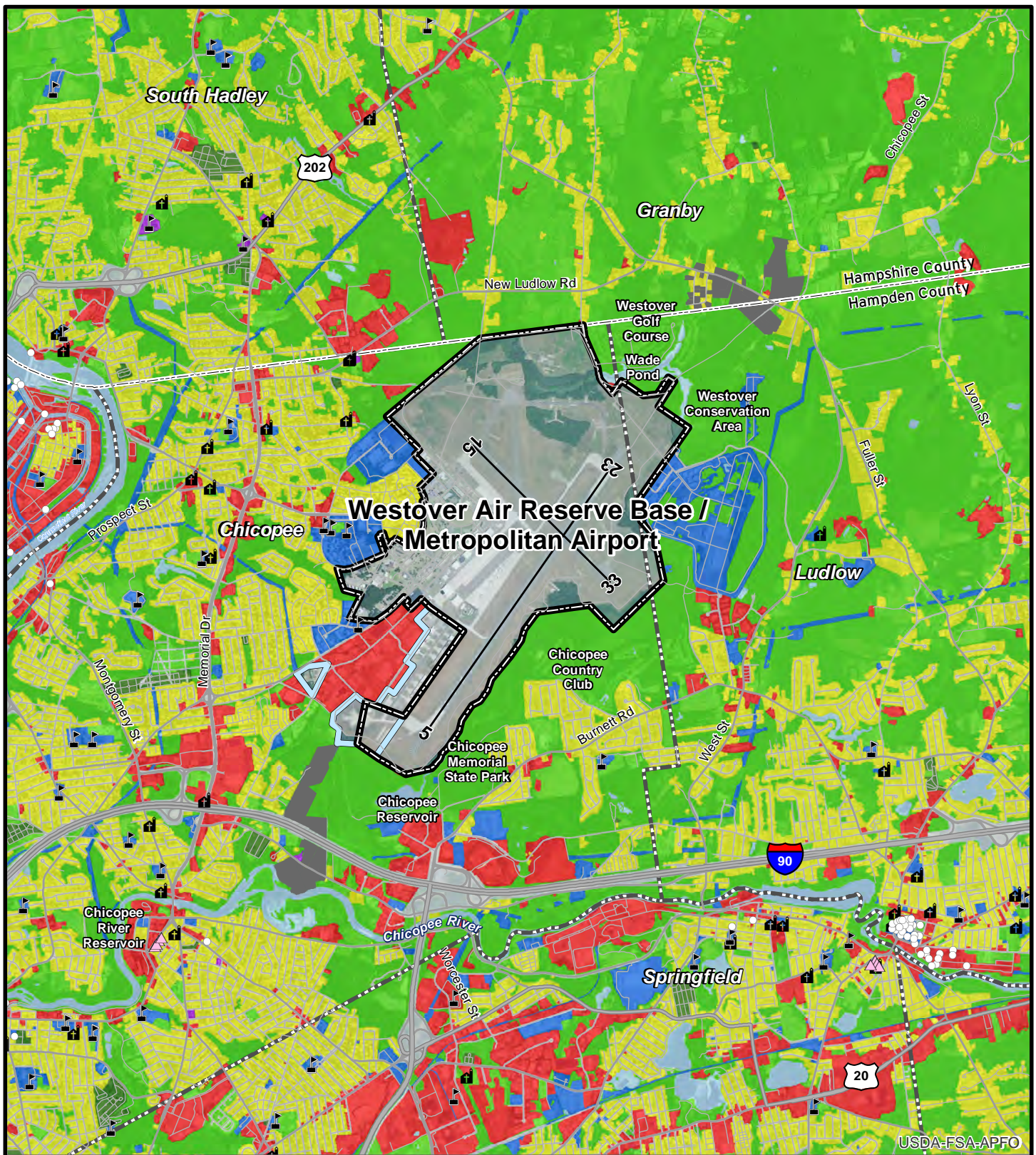
Part 150 requires consideration of noise sensitive public buildings and historic properties. MassGIS data for historic resources were used to identify locations of schools and historic properties. Places of worship were identified using the most recent information available using Google Maps.

3.4 Existing Generalized Zoning

Zoning establishes permitted and non-permitted uses in areas within a town, municipality or county. A jurisdiction's zoning code, through an ordinance and a map, provides regulations pertaining to the types of uses allowed and elements of buildings such as height, density, and siting. A zoning code helps to promote orderly growth within a community. Each jurisdiction in the vicinity of the Airport is responsible for the development and implementation of its own zoning regulations.

Generalized zoning GIS data was collected from PVPC, except the City of Chicopee and is shown in **Figure 3-2**. The City provided

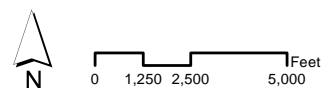
Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update



LEGEND

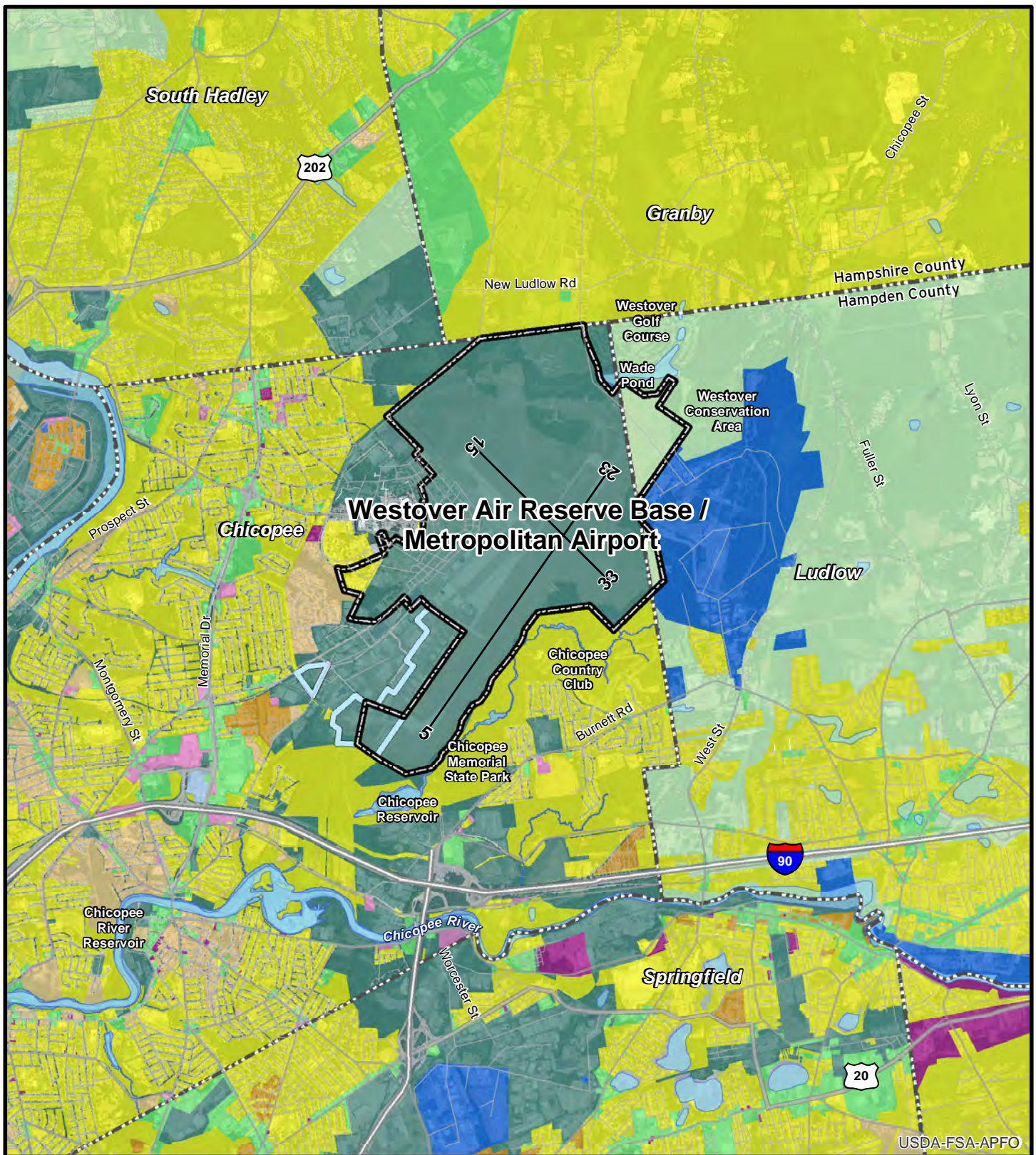
- | | |
|---|--|
| ■ Commercial/Industrial | ■ Transportation |
| ■ Open/Agricultural/Recreational | ■ Water |
| ■ Public/Quasi-Public | ■ WARB Installation Area |
| ■ Residential | ■ WMDC Aviation Property |
| ■ Previously Acquired Property under the Voluntary Acquisition Program | ■ County Boundary |
| ■ Cemetery | ■ Town Boundary |
| ■ Institutional | ⚪ Place of Worship |
| | ⚫ School |
| | ○ National Register of Historic Places |
| | △ Local Historic District |

Generalized Existing Land Use Figure 3-1



Sources: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services, WMDC 2018, HNTB GIS (2018), Aerial - USDA 2016, ESRI Data and HNTB Analysis

Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update

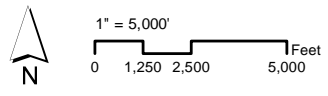


USDA-FSA-APFO

LEGEND

- | | | |
|------------------------|---|-------|
| WARB Installation Area | Mixed Use | Water |
| WMDC Aviation Property | Residential (Single Family) | |
| Central Business | Residential (Multi Family, Low/Med Density) | |
| General Business | Residential (Multi Family, High Density) | |
| General Industrial | Residential-Agricultural | |
| Highway Business | Professional & Research Park | |
| Limited Business | Not Zoned | |

Generalized Zoning Figure 3-2



Sources: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services, Chicopee Planning Department - January 2018
WMDC 2018, HNTB GIS (2018), Aerial - USDA 2016, ESRI Data and HNTB Analysis

updated (January 2018) zoning GIS data, which was converted into the generalized zoning categories for purposes of showing all zoning.⁵

The majority of the Airport and several areas adjacent to the west and northwest are zoned General Industrial, including the WMDC Aviation Property. To the west in Chicopee, the area is zoned predominantly Residential (Single-Family, Multi-Family [low/mid-density]), with properties along Memorial Drive and other roadways identified as Limited Business and Highway Business. The area adjacent to the Airport's James Street is zoned Mixed Use. South of the Airport in Chicopee is predominantly zoned Single-Family Residential with areas zoned as General Industrial, Limited Business, and Highway Business interspersed further south. South of Chicopee, the City of Springfield comprises the area's urban center and zoning classifications are more varied.

To the north of the Airport in Granby, land is predominantly zoned Single-Family Residential. The area beyond the Runway 23 end along the northeastern border of the Airport and immediately beyond in Ludlow (including the Westover Conservation Area) is zoned Residential-Agricultural. The area immediately east of the Airport in Ludlow is zoned Professional and Research Park.

3.5 Future Land Use

Valley Vision 4 is the Pioneer Valley's regional land use plan developed by the PVPC. The land use plan is intended to serve as a general guide and planning tool for the communities and others in managing growth and development. The map associated with future land use in the Pioneer Valley⁶ illustrates PVPC Priority Areas for Development and Priority Areas for Protection. Priority Areas suitable for development at

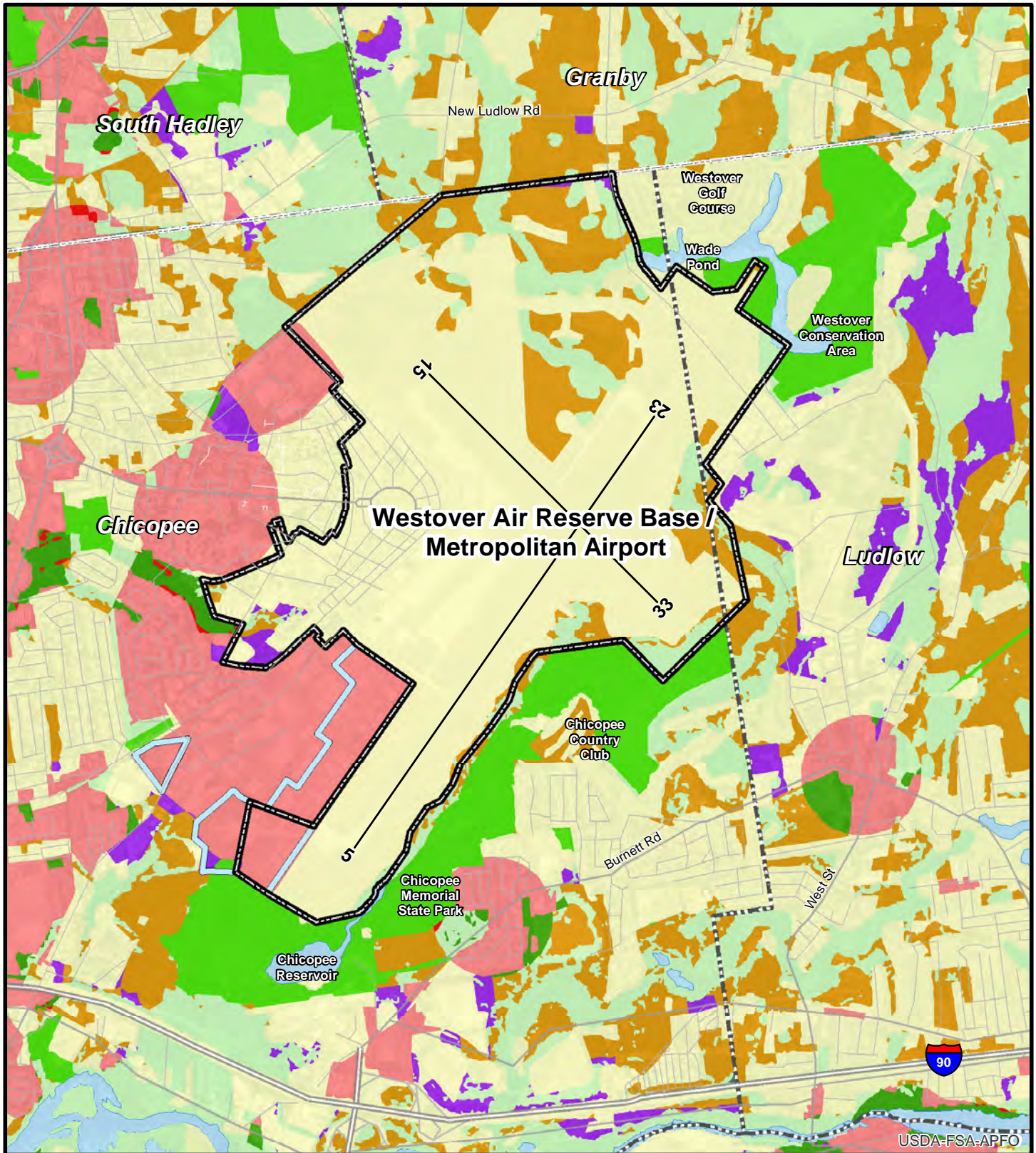
various densities, lands suitable for open space protection, and identifies areas that are suitable for study as Smart Growth Districts, as is shown in **Figure 3-3**. Land use in the vicinity of the Airport in the regional land use plan is primarily designated as Existing Developed Land area, with several areas of Land Suitable for Low-Density Residential, Agriculture or Forestry.

Land to the north and east of the Airport are identified as Land Suitable for Protected Open Space and Farmland. An area within the installation boundary near the Runway 05 end is classified as Developed Land Possibly Suitable for Infill.

In February 2014, the PVPC updated the regional land use plan with *Valley Vision 4: the Regional Land Use Plan for the Pioneer Valley*. *Valley Vision 4* is an update to *Valley Vision*, the Regional Land Use Plan for the Pioneer Valley. *Valley Vision* focuses on smart growth planning, in that "it is designed to promote compact, mixed-use growth in and around existing urban and town centers while promoting the protection of open space and natural resources."⁷ *Valley Vision 4* specifically provides updated smart growth strategies; a smart growth toolbox, Transit Oriented Development (TOD) Priority Locations, Strategies and Market Analysis; and Strategies for Enhancing Equity and Environmental Justice.














Potential impacts to future land use within the Future (2023) NEM are discussed in Section 4.3.

Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update

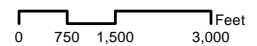


USDA-FSA-APFO

LEGEND

-  WARB Installation Area
-  WMDC Aviation Property
-  Open Water
-  Existing Developed Land
-  Existing Protected Land
-  Land Suitable for Protected Openspace & Farmland
-  Land Suitable for Environmental Protection and Low Density Residential, Agriculture or Forestry
-  Undeveloped Land Suitable for Smart Growth Districts
-  Land Suitable for Industrial or Commercial Development
-  Developed Land Possibly Suitable for Infill Development
-  Sensitive Land Within Smart Growth Boundary
-  County Boundary
-  Town Boundary

Regional Land Use Plan Map Figure 3-3



Sources: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services, WMDC 2018, HNTB GIS (2018), Pioneer Valley Planning Commission, Aerial - USDA 2016, ESRI Data and HNTB Analysis

CHAPTER 4: Noise Exposure Maps

This chapter presents the land use information for the geographic area within the 65 DNL contour for the Existing (2018) and Future (2023) NEMs. The 65 DNL is the Federal significance threshold for aviation noise analysis.

Section 4.1 summarizes the development of the base map. Section 4.2 presents and discusses the graphic and tabular information for the Existing (2018) NEM. Section 4.3 presents the graphic and tabular information for the Future (2023) NEM.

4.1 Land Use Base Map

Noise exposure contours, when superimposed on the land use map, allow assessment of the underlying land use compatibility for existing and forecast noise exposure conditions. As discussed in Section 3.2, land use data and aerial photography were obtained from MassGIS.⁸ US Census Bureau data was not used or needed to compile demographic information for this NEM/NCP Update, as there are no residences (or population) within the 65+ DNL contours of the Existing (2018) or Future (2023) NEMs, as discussed in Sections 4.2 and 4.3.

As noted in Section 3.3, existing land uses in the vicinity of the Airport include Commercial/Industrial, Open/Agricultural/Public/Quasi-Public, Recreational, Residential, Cemetery, Institutional, Water, and Wetland.

The land uses within the affected noise area (within the 65+ DNL noise contours) fall within the jurisdictions of Chicopee and Ludlow, in Hampden County.

4.2 Noise Exposure Map for Existing Conditions (2018)

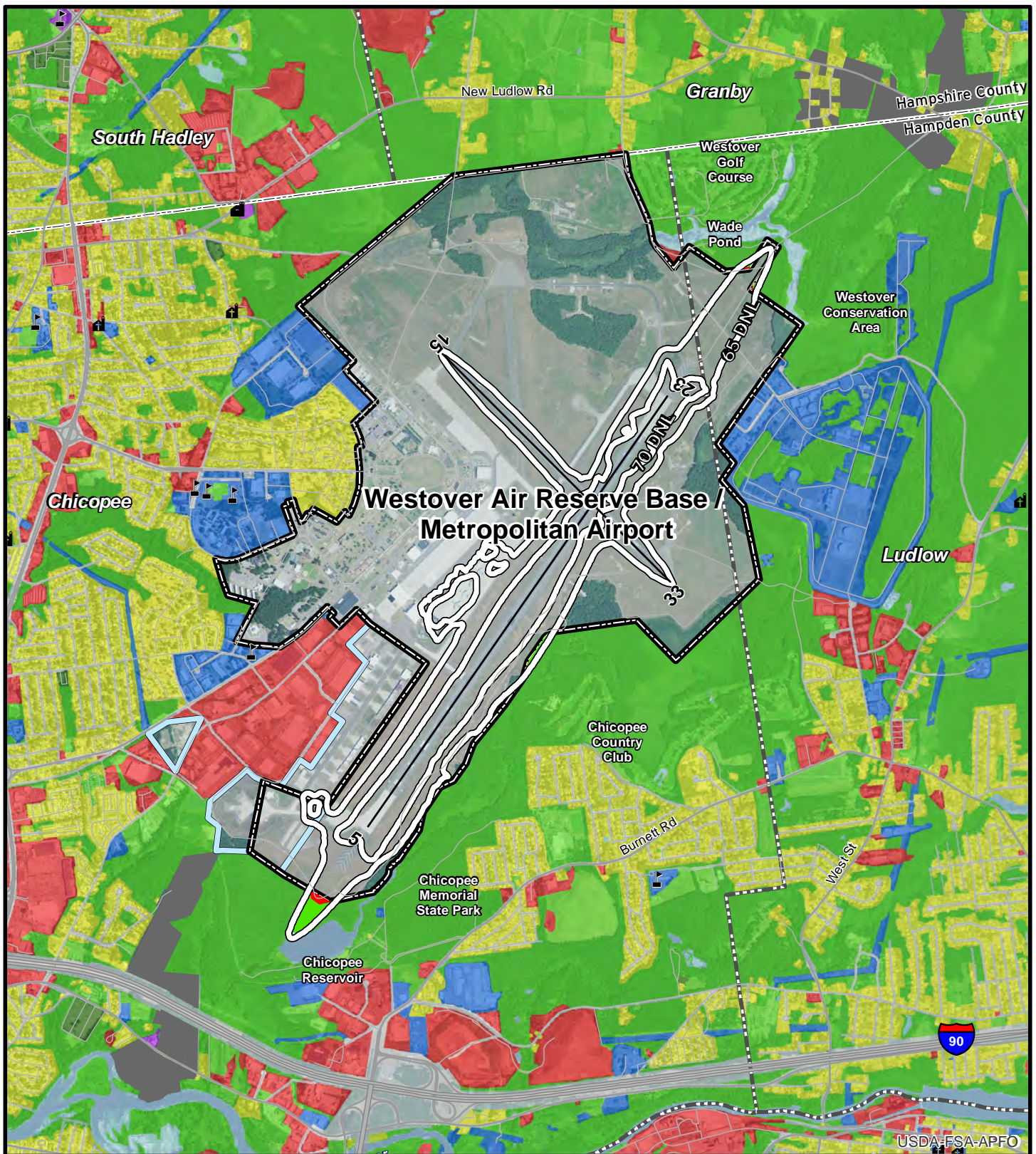
Figure 4-1 represents the existing conditions for the year of submission (2018), with the existing aircraft flight procedures, airport layout, aircraft operations, and other noise modeling assumptions described in Chapter 2.

The 65+ DNL noise exposure contours encompass approximately 613 acres (almost one square mile) in total. Of this acreage, approximately 597 acres are within Airport property. **Table 4.1** presents the range of land uses encompassed by the 65+ DNL noise exposure contour under the existing conditions. There are no residential land uses within the 65+ DNL noise exposure contour, nor are there any properties previously acquired by the Airport for noise abatement. An aerial map was also reviewed to determine if any houses exist within the 65+ DNL noise exposure contour. As no houses appear to be present, population counts were not needed. There are also no recreational uses or noise-sensitive locations within the 65+ DNL noise exposure contour. Thus there are no incompatible land uses when considering the FAA's Part 150 land use guidelines.

The entire 70+ DNL noise contour (approximately 229 acres/0.36 square miles) remains within the boundaries of the Airport. There are no incompatible land uses within the 70+ DNL noise contour.

There are no known non-residential noise-sensitive land uses, such as hospitals, places of worship, schools, historic sites, or nursing homes, within the 65+ DNL noise contours.

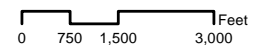
Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update



LEGEND

- | | |
|--|--------------------------------------|
| 2018 DNL Noise Contour | Institutional |
| Commercial/Industrial | Transportation |
| Open/Agricultural/Recreational | Water |
| Public/Quasi-Public | WARB Installation Area |
| Residential | WMDC Aviation Property |
| Previously Acquired Property under the Voluntary Acquisition Program | County Boundary |
| Cemetery | Town Boundary |
| | School |
| | National Register of Historic Places |
| | Local Historic District |
| | Place of Worship |

**Existing (2018) Conditions
Noise Exposure Map
Figure 4-1**



Sources: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services, WMDC 2018, HNTB GIS (2018), Aerial - USDA 2016, ESRI Data and HNTB Analysis

USDA-FSA-APFO

Table 4.1
**Generalized Land Uses within the Existing (2018)
 Conditions 65 DNL Noise Exposure Contour**

Generalized Land Use	Land within Contour (acres)			
	65-70 DNL	70-75 DNL	75+ DNL	Total (65+ DNL)
Airport Property	368.4	171.3	57.2	596.9
Commercial/Industrial	1.7	0	0	1.7
Open/Agricultural	13.8	0	0	13.8
Recreational	0	0	0	0
Residential	0	0	0	0
Transportation/Utility	0	0	0	0
Voluntary Acquisition Property	0	0	0	0
Water	0.6	0	0	0.6
Wetland	0	0	0	0
Grand Total (acres)	384.5	171.3	57.2	613.0

Source: MassGIS, HNTB, 2018.

4.3 Noise Exposure Map for Future Conditions (2023)

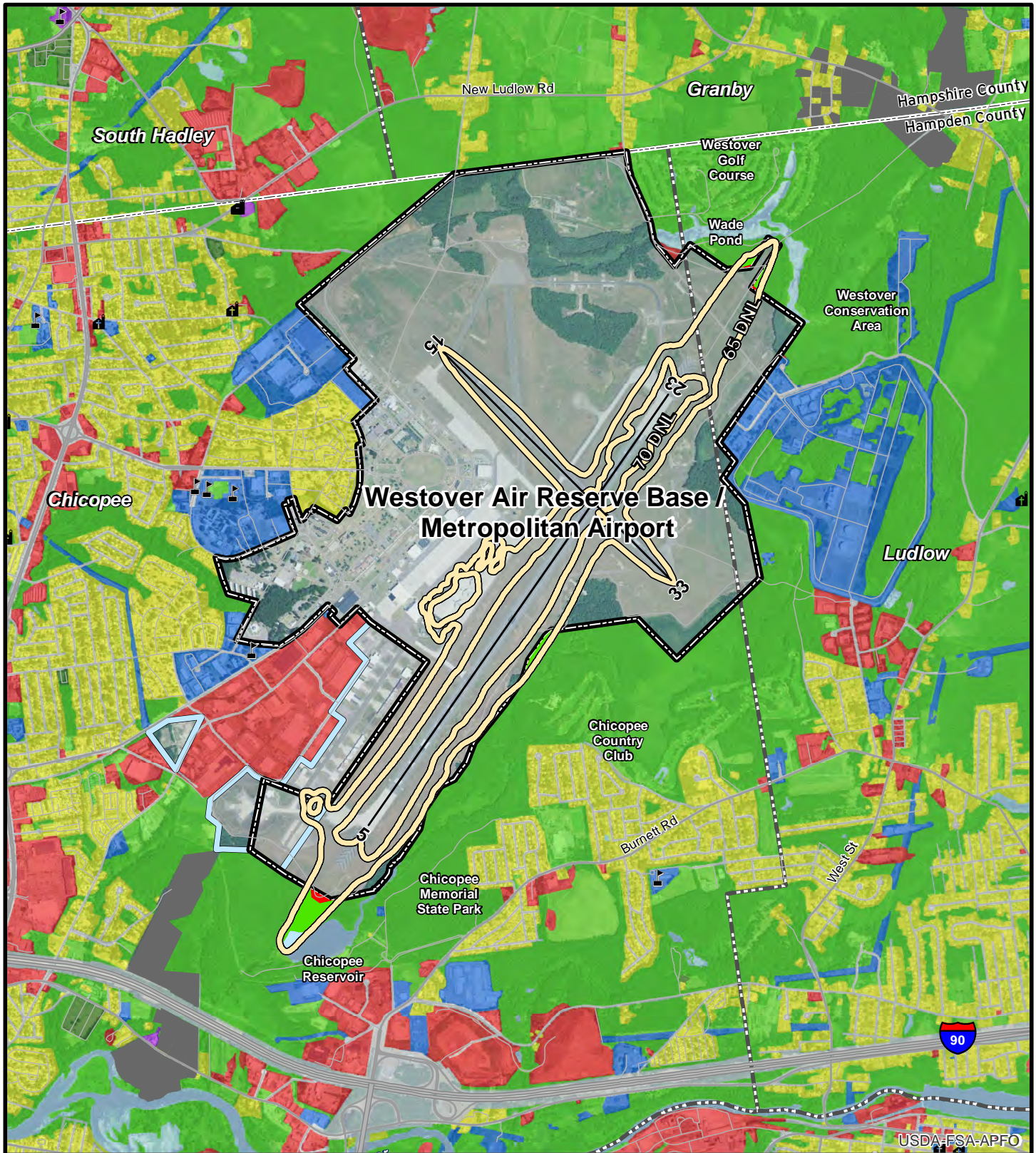
DNL noise exposure contours prepared for the Future (2023) NEM are shown in **Figure 4-2**. The overall size of the 65 DNL noise exposure contour increases by approximately 40 acres to nearly 653 acres (slightly more than one square mile), due to an increase in operations. **Table 4.2** presents the existing land uses within the 65+ DNL noise exposure contours of the Future (2023) NEM. The Future (2023) NEM is based on forecast conditions without the implementation of any of the measures included in this study's NCP.

comprehensive plan (*Valley Vision 4*), future land uses within the 65-70 DNL noise exposure contour off Airport property include Existing Protected Land and Open Water only; uses that are not considered incompatible with the FAA's Part 150 land use guidelines.

The 65+ DNL noise exposure contour does not include any residential or recreational land uses. No population counts were needed as no residences appear to exist within the 65+ DNL noise exposure contour.

According to the Regional Land Use Plan Map associated with the most recent PVPC

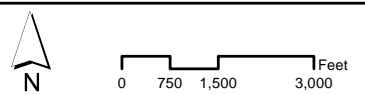
Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update



LEGEND

- | | |
|--|--------------------------------------|
| 2023 DNL Noise Contour | Institutional |
| Commercial/Industrial | Transportation |
| Open/Agricultural/Recreational | Water |
| Public/Quasi-Public | WARB Installation Area |
| Residential | WMDC Aviation Property |
| Previously Acquired Property under the Voluntary Acquisition Program | County Boundary |
| Cemetery | Town Boundary |
| | School |
| | National Register of Historic Places |
| | Local Historic District |
| | Place of Worship |

**Future (2023) Conditions
Noise Exposure Map
Figure 4-2**



Sources: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services, WMDC 2018, HNTB GIS (2018), Aerial - USDA 2016, ESRI Data and HNTB Analysis

USDA-FSA-APFO

Table 4.2

**Generalized Land Uses within the Future (2023)
Conditions 65 DNL Noise Exposure Contour**

Generalized Land Use	Land within Contour (acres)			
	65-70 DNL	70-75 DNL	75+ DNL	Total (65+ DNL)
Airport Property	386.8	163.7	76.2	626.7
Commercial/Industrial	1.8	0	0	1.8
Open/Agricultural	20.9	0	0	20.9
Recreational	0	0	0	0
Residential	0	0	0	0
Transportation/Utility	0	0	0	0
Voluntary Acquisition Property	0	0	0	0
Water	3.3	0	0	3.3
Wetland	0	0	0	0
Total	412.8	163.7	76.2	652.7

Source: MassGIS, HNTB 2018.

DRAFT

CHAPTER 5: Noise Compatibility Program

5.1 History of Noise Compatibility Planning at the Airport

Noise compatibility planning surrounding CEF began in earnest in the early 1990s through a series of joint studies. A Joint Land Use Study (JLUS) led by the PVPC was completed in 1995.

The JLUS was followed shortly thereafter by the Airport's first 14 CFR Part 150 Noise Compatibility Program study, sponsored by the WMDC. The JLUS recommendations were incorporated into the measures submitted to the FAA under the Part 150 NCP. The NEMs (for existing 1993 and forecast 1998 conditions) were completed in 1995. The FAA issued a Record of Approval of the NCP on January 26, 1996.

In 2001, a JLUS Update was undertaken. The JLUS Update coincided with an update of NEMs, developed for the FAA by HNTB Corporation. The updated land compatibility maps in the JLUS Project include the results of the NEM update. Work began in December 2001, and the final report was completed in October 2004. NEMs under the Part 150 study were prepared for existing 2003 and forecast 2008 conditions. A JLUS Update is currently under development as a cooperative land use planning effort by the USAF, PVPC, and WARB.⁹

The land use mitigation recommendations of the 2004 JLUS Update were included in the NEM Update for the Airport, consistent with the NCP that the FAA had reviewed in 1996. The FAA's responsibility for review of the NCP focused on the eligibility of the mitigation components (voluntary acquisition

and sound insulation). The FAA's comments and approval status of each of the measures are discussed under the detailed description of each.

In 2013, the USAF completed an AICUZ study, which included the development of a 2009 Noise Exposure Contour and a 2014 Forecast Noise Exposure Contour. Following completion of the AICUZ, an NEM/NCP Update was conducted with existing 2014 and future 2019 conditions. The purpose of resubmitting that NCP was to gain FAA approval of revising the voluntary acquisition program to include properties located in the future 2019 NEM. The FAA accepted the NEMs in September 2014 and issued a Record of Approval of the NCP on February 6, 2015.

This NEM/NCP Update is being conducted in response to a change in the fleet mix that was anticipated to result in a possible change to the noise contour. Since the last NEM/NCP Update in 2014, the 439th Airlift Wing transitioned from the C-5A/B Galaxy to the C-5M Super Galaxy, an upgraded version with new (quieter) engines and improved avionics. Due to the reduced size of the noise contours, it is prudent to update the NCP, and specifically the Airport's noise mitigation program.

It should be noted that this document only discusses those elements of the recommended NCP submitted in 1996, and the updated NCP approved in 2015. Other land use management strategies, as recommended by the previous or ongoing JLUS Update or AICUZ, are not discussed in

this document. It should also be noted that the FAA evaluation of these measures is done within the context of the Existing (2018) and forecast Future (2023) NEMs, and the reader should recognize that noise exposure can and will fluctuate based on the fleet mix at the Airport as well as the types and frequency of operations.

Noise programs at the Airport are funded through a combination of Federal, State and local funding. Nearly \$21 million has been used for noise studies and land acquisition through 2017. Of this funding amount, the FAA has contributed \$19.53 million, the MassDOT Aeronautics Division has contributed \$824,000, and the WMDC has contributed \$522,000.

5.2 2014 Noise Compatibility Program

The 2014 NCP consisted of an update to the 1996 NCP based on the noise contours of the existing 2014 and future 2019 NEMs. The Study provided an overview of all the noise mitigation measures previously approved in the 1996 ROA, with one proposed change; the WMDC proposed to expand the noise-land acquisition boundary from the 70 DNL noise contour, out to the 65 DNL noise contour. This measure was approved. All other previously approved (1996) measures were reviewed for their updated status, and for consistency with Part 150.

In February 2015, the FAA approved the NCP, which was submitted following the FAA's acceptance of the NEMs. The FAA's 1996 and 2015 Records of Approval are included in *Appendix B*.

The NCP included noise abatement measures, compatible land use measures, and program measures designed to abate

and mitigate the impacts of aircraft noise surrounding the Airport.

The following sections provide an overview and status update of each of the measures recommended in the NCP, including noise abatement, compatible land use planning, and program or implementation measures.

5.2.1 Noise Abatement Measures

Noise abatement measures are procedures or techniques used by aircraft to minimize the impact of noise on surrounding communities. Noise abatement measures are evaluated based on their feasibility, including regarding the aircraft's performance capabilities, the air traffic control environment, and their potential to reduce noise impacts within the 65 DNL noise contour.

The 2014 NCP evaluated the approved noise abatement measures originally included in the 1996 NCP. These measures were initially modeled and compared to the noise exposure contours developed under the 1996 Study, and those which provided a benefit (a reduction in the number of residences and estimated population within the 65 DNL noise contour) were included in the Airport's recommended plan submitted to the FAA. For the 1996 NCP, each of the four approved measures included consultation with the Westover Tower and Bradley Approach Control, the air traffic facility whose jurisdiction surrounds that of the Westover Tower. As part of the 2014 NCP review, the FAA disapproved two of the noise abatement measures, as they "provided no measurable benefit inside the 65 DNL noise contour:" the noise abatement departure procedures for civilian aircraft on Runway 23 and noise abatement departure procedures for civilian aircraft on Runway 05.

Measures were proposed for both civilian and military operations. The following

sections describe each of the measures, the FAA's conclusions at the time (approval or disapproval) and evaluates the procedure in the current environment.

Nighttime Preferential Runway Use for Civilian Aircraft

Description: This measure calls for civilian aircraft to use Runway 05 for departures and Runway 23 for arrivals to the maximum extent practicable. The WMDC Board of Directors first adopted this preferential runway use in 1987. Thus, the recommended pattern of civilian operations would be departures to the north and arrivals from the north, taking advantage of the lower density of residential land uses in Granby and Ludlow. If nighttime operations increased to levels predicted at the time, the WMDC would reevaluate the measure to achieve a more balanced level of runway use.

This non-mandatory measure was recommended in part to assist noise abatement efforts once the Westover Tower remained open for 24 hours per day. At the time, civilian operations could not operate at the Airport when the Westover Tower was closed (11:00 p.m. to 7:00 a.m.) without prior arrangement. The 1996 NCP included the assumption that the Westover Tower would begin 24-hour operations, although this has not yet occurred. Implementing this measure was forecast to reduce the estimated population within the 65 DNL noise contour south of the Airport.

FAA Finding 1996: The FAA approved this measure as voluntary.

FAA Finding 2015: Re-approved.

Current Status: Preferential runway use for civilian operations remains consistent, mostly due to the location of the general aviation facilities (FBO/terminal area).

Approximately 80% of civilian operations occur to or from the north. The Westover Tower remains closed to civilian operations from 11:00 p.m. to 7:00 a.m., although the WMDC can request a waiver for the Westover Tower to open before 7:00 a.m. or remain open past 11:00 p.m. if needed.

Costs associated with implementing this measure would be administrative, and the timeline for implementation would be dependent upon FAA and/or other responsible agency(ies) requirements for approval.

Noise Abatement Departure Procedures for Military Aircraft on Runway 23

The 1996 NCP proposed that select military C-5M departures from Runway 23 follow a noise abatement procedure. Military operations primarily depart from Runway 23 (south). At the time of the study, C-5M Runway 23 departures were required to climb on runway heading (approximately 230 degrees) until radar contact is confirmed with Bradley Approach Control, located 20 miles south of Westover. Due to the distance between the radar and aircraft, this sometimes resulted in the overflight of heavily populated areas until radar contact was established and aircraft were instructed to turn towards their destination. The proposed flight paths included earlier left or right turns, coordinated with the Bradley Approach Control.

FAA Finding 1996: The FAA approved this measure as voluntary, as implementation was shown to reduce the estimated population within the 65 DNL noise contour.

FAA Finding 2015: Re-approved.

Current Status: The military continues to use Runway 23 as the primary departure runway. C-5M operations use an early turn to

the west to avoid overflight of more densely populated areas.

Noise Abatement Departure Procedures for Civilian Aircraft on Runway 23

Description: This measure proposed that civilian aircraft, notably larger and louder aircraft that depart from Runway 23, use a noise abatement heading of 205 or 255 degrees, rather than flying a runway heading (approximately 230 degrees).

FAA Finding 1996: The FAA approved this measure as voluntary. Implementation of this measure would have, at the time, assisted in reducing the number of residences within the 65 DNL noise contour.

FAA Finding 2015: Disapproved. This measure provides no measurable benefit within the 65 DNL contour at this time. Meaningful noise abatement procedures may be designed and recommended under a future NCP update, as the local conditions warrant.

Current Status: Many of the larger aircraft that operated at the Airport before 2000, such as 727's or 737-200's, were phased out of the fleet through the passage of the Airport Noise and Capacity Act of 1990 (Stage 2 aircraft weighing less than 75,000 pounds will be prohibited from operating in 2015). As a result, the overall fleet of passenger aircraft is quieter. Noise modeling input data, developed in consultation with the Westover Tower, indicates that a majority (approximately 72%) of civilian departures from Runway 23 depart on a course that follows the runway heading (approximately 230 degrees), while approximately 28% depart from the runway and turn towards a heading of approximately 270 degrees.

In consideration of the current and forecast levels of civilian air traffic, the current types

of aircraft in use at the airport, and the predominant noise characteristics of the military fleet, it is not expected that use of the noise abatement procedure would reduce the noise-sensitive land uses within the 65 DNL however it continues to be recommended as a voluntary measure.

Costs associated with implementing this measure would be administrative and the timeline for implementation would be dependent upon FAA and/or other responsible agency(ies) requirements for approval.

Noise Abatement Departure Procedures for Civilian Aircraft on Runway 05

Description: The measure called for aircraft, upon departure from Runway 05 and once safely airborne, to turn to an ATC-assigned heading of 080 degrees, then follow instructions issued by Bradley Approach Control towards their respective navigation fix. This early turn of approximately 30 degrees would route departing aircraft further away from the Acrebrook subdivision, taking advantage of more compatible land uses. The measure was proposed to be applied between the hours of 10:00 p.m. and 6:00 a.m. and was estimated to reduce potential noise impacts in the Acrebrook subdivision, which was also proposed for eligibility under the voluntary acquisition program. The measure was proposed contingent upon FAA approval of the voluntary acquisition program (discussed in Section 5.2.2) to reduce noise north of the Airport, specifically in the Acrebrook neighborhood.

FAA Finding 1996: The FAA approved this measure as voluntary, as it would reduce the number of residences and estimated population within the 65 DNL noise contour.

FAA Finding 2015: Disapproved. This measure provides no measurable benefit within the 65 DNL contour at this time. Meaningful noise abatement procedures may be designed and recommended under a future NCP update, as the local conditions warrant.

Current Status: Generally, aircraft departures from Runway 05 fly a runway heading of approximately 50 degrees. In consideration of the current and forecast levels of civilian air traffic, the current types of aircraft in use at the airport, and the predominant noise characteristics of the military fleet, it is not expected that use of the noise abatement procedure would reduce the noise-sensitive land uses within the 65 DNL however it continues to be recommended as a voluntary measure.

Costs associated with implementing this measure would be administrative and the timeline for implementation would be dependent upon FAA and/or other responsible agency(ies) requirements for approval.

5.2.2 Land Use Measures

Land use measures seek to correct existing non-compatible land uses and to prevent the development of land uses that could be impacted by noise from aircraft operations. It is essential to discuss the lines of authority for implementing any recommended measures. The WMDC does not control the land uses surrounding the Airport but can make recommendations in consultation with local jurisdictions. The recommended land use measures have historically included mitigation programs (voluntary acquisition and relocation, sound insulation) and preventive measures, which seek to limit the possibility of future non-compatible development.

All of the land use measures approved in the 1996 NCP continued to be recommended as part of the 2014 NCP, with one update to the voluntary land acquisition and relocation program, which the WMDC has continued to implement.

Voluntary Land Acquisition and Relocation Program

Description: The intent of the voluntary land acquisition and relocation program was to eliminate or significantly reduce the number of people remaining in areas of high noise exposure. The 1996 NCP identified approximately 150 residences exposed to 70 DNL, which was updated under the 2004 NEM Update to include approximately 416 potentially eligible structures (single and multi-family structures) within the 70 DNL of the 2003 NEM. The WMDC received funding from the FAA to initiate the voluntary acquisition program in 2005.

FAA Finding 1996: The FAA approved this measure as voluntary.

FAA Finding 2015 / Status: The boundaries for participation in the Voluntary Land Acquisition and Relocation Program were modified as part of the 2014 NCP to include residences exposed to noise levels 65 DNL and above of the Future (2019) NEM be included in the program. This was a change from the previously approved noise land acquisition program in the 70 DNL contour, and was the one measure proposed for revision in the 2014 NCP. Overall, the WMDC identified approximately 48 parcels for continued participation in the voluntary acquisition program.

The 2015 ROA approved the revised Voluntary Acquisition and Relocation Program, except for the identified parcels removed from the eligible noise contour. Due to changes in the aircraft fleet mix and

level of operations, some parcels once eligible for noise mitigation [were] not eligible at the time of the 2014 NCP.

Current Status: To date, a total of 55 properties, accounting for approximately 220 acres, have been acquired. Since the 2014 NCP, additional properties have been acquired, all to the north of the Airport. On the acquired properties, the homes have been or will be demolished (if present), and the land remains vacant (therefore compatible with aircraft operations). The WMDC is currently involved in negotiations with additional eligible properties.

Of the 55 total acquired properties, 46 properties are located in residential areas north of the airport; 30 properties in Granby and 16 properties in Ludlow, while the nine remaining properties are located to the south of the Airport in Chicopee. For each acquired property, an aviation easement is attached to the deed after parcel assembly is completed. Once acquired, the properties are maintained by the WMDC until a complete reuse and disposal plan is developed.

The anticipated benefit associated with this program was the elimination of non-compatible land uses within and adjacent to the 65 DNL noise contour. As there are no residences exposed to noise levels above 65 DNL within the Existing (2018) or Future (2023) NEM, this measure is not proposed for continuation in this NCP.

Voluntary Sound Insulation Program

Description: A sound insulation program is a voluntary program with the goal of providing acoustic treatment to eligible homes to reach a 5 dB improvement compared to existing indoor levels. FAA guidelines for sound insulation programs aim for an interior noise level of 45 dB.

The sound insulation program was initially identified to include those residences within the 65 DNL noise contour, in addition to residences located in the 70 DNL noise contour that declined participation in the voluntary acquisition program. In exchange for the installation of sound insulating materials, which typically include acoustically-rated windows and doors, and could include upgrades to mechanical systems, the property owner would be required to grant a noise easement.

FAA Finding 1996: The FAA approved this program.

FAA Finding 2015 / Status: The sound insulation program had not been implemented as of the 2014 NEM/NCP Update, and was not recommended in the 2014 NCP. The WMDC preferred to complete the voluntary acquisition program before initiating a sound insulation program. Any initiation of a sound insulation program would be approved in advance by the FAA, to ensure conformance with Part 150.

Current Status: As there are no residences exposed to noise levels above 65 DNL within the Existing (2018) or Future (2023) NEM, there is no proposal at this time for a sound insulation program. Thus, this measure is not proposed for continuation in this NCP.

Compatible Use Zoning

Description: Zoning for compatible land uses includes rezoning land that may be developed with noise-sensitive land uses, such as residences, places of worship, or schools. Rezoning would change the development potential of the land to a use that is more compatible with aircraft operations, such as industrial or open space. The 1996 NCP included specific recommendations for each city or town to minimize chances that new noncompatible

land uses will be developed within the 65 DNL contour. The 1996 NCP suggested that Chicopee, Granby, and Ludlow maintain their existing zoning but consider adopting overlay zoning and that Springfield and South Hadley maintain their existing industrial zoning classifications.

FAA Finding 1996: The FAA, although it has no jurisdiction in local land use affairs, approved this measure for Part 150.

FAA Finding 2015 / Status: Portions of the Future (2019) NEM 65 DNL contour included residential zoning in Granby, residential-agricultural zoning in Ludlow, and general industrial and residential zoning in Chicopee. The 65 DNL noise contour did not include land within South Hadley or Springfield. The WMDC would continue to work with each jurisdiction to determine the feasibility of implementing the measure.

Current Status: Based on zoning information provided by MassGIS and the City of Chicopee, the Existing (2018) and Future (2023) NEM 65 DNL noise contour extends just off Airport property to the north into land zoned for Residential-Agricultural in the Town of Ludlow and to the south into a small area of land zoned for Residential (Single Family) in the City of Chicopee. Currently both areas where the noise contours extend into residentially-zoned areas are not developed. The Existing (2018) and Future (2023) NEM 65 DNL noise contours do not include land within Granby, South Hadley or Springfield, although aircraft do overfly these areas.

Although the 65 DNL noise contours do not impact existing residential development, it is recommended to prevent future non-compatible land uses by rezoning the residentially-zoned areas within the Future (2023) NEM in Chicopee and Ludlow to a

compatible zoning category to ensure that these areas are not developed with residential use in the future. This would prevent any future development of uses that are incompatible with airport operations. See **Figure 5-1** for the residentially-zoned properties proposed for rezoning and/or an airport overlay district, discussed in the next section.

Costs associated with implementing this measure would be administrative for the jurisdiction(s) if implemented, and the timeline for implementation would be dependent upon the jurisdictions' processes and requirements for approval.

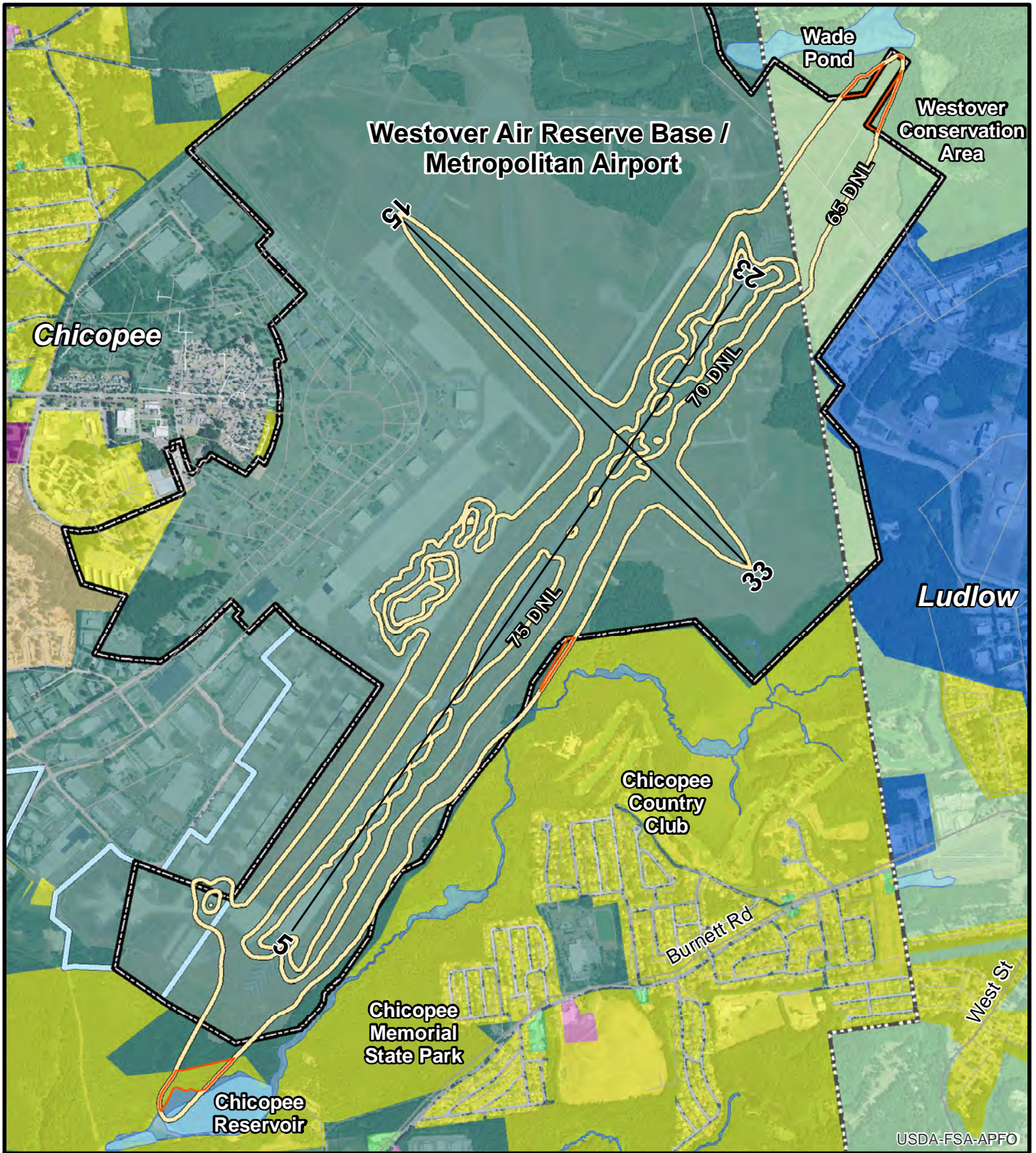
Airport Overlay District

Description: An overlay district is a zoning technique which identifies additional restrictions on development in addition to the underlying zoning, by modifying (but not eliminating) the underlying zoning. Overlay districts offer an option to provide a more flexible development control than that of changing the allowed uses in entire zoning districts and focusing on only the portion of the community with potential non-compatible land uses.

Since 1992, the Town of Ludlow has had an Aircraft Flight Overlay District intended to protect the public health, safety, and general welfare, and to protect human life and property from hazards of aircraft noise and accident potential created by the Town's proximity to Westover.

By 1996, Ludlow had implemented the aircraft flight overlay district, encompassing the noise and accident potential zones from the AICUZ. At that time, hospitals, nursing homes, auditoriums and concert halls were prohibited within the overlay districts. Educational and religious institutions are permitted by right in all districts according to

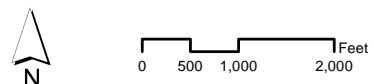
Westover Air Reserve Base / Metropolitan Airport NEM/NCP Update



LEGEND

- | | |
|------------------------|---|
| 2023 DNL Noise Contour | Residential (Single Family) |
| WARB Installation Area | Residential (Multi Family, Low/Med Density) |
| WMDC Aviation Property | Residential (Multi Family, High Density) |
| Central Business | Residential-Agricultural |
| General Business | Professional & Research Park |
| General Industrial | Not Zoned |
| Highway Business | Water |
| Limited Business | Proposed for Rezoning to Compatible Use |
| Mixed Use | |

Proposed Rezoning of Residential Parcels with 2023 NEM Figure 5-1



Sources: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services, Chicopee Planning Department - January 2018
 WMDC 2018, HNTB GIS (2018), Aerial - USDA 2016, ESRI Data and HNTB Analysis

the Massachusetts Zoning Enabling Act, and the Town had sought and received home rule authority from the state legislature to allow restriction of development of schools, day care centers, and houses of worship within accident potential zones. The existing overlay district does not prohibit residential land uses or impose sound insulating requirements on residential lands.

The initial NCP recommended that Chicopee and Granby adopt an airport overlay district which encompasses land within the 65 DNL contour and that the Town of Ludlow change the boundaries of its airport overlay district to include all of the land within the forecasted 1998 contour.

FAA Finding 1996: The FAA, although it has no jurisdiction in local land use affairs, approved this measure for the purposes of Part 150.

FAA Finding 2015 / Status: No changes to the Town of Ludlow's overlay district had been implemented, and no other jurisdictions had developed an overlay district to date. The 65 DNL noise contour of the Future (2019) NEM extended into Ludlow, Granby and Chicopee. The WMDC would continue to work with each jurisdiction to determine the feasibility of implementing this measure.

Current Status: Changes to the Town of Ludlow's overlay district have still not been implemented, and no other jurisdictions have developed an overlay district to date. Although the Existing (2018) and Future (2023) NEM 65 DNL noise contours do not impact existing residential areas, implementation of an airport overlay district within the residentially-zoned areas of the Future (2023) NEM contour is recommended as it offers an additional level of protection and safety for residents. An overlay zone would prevent any future noncompatible

uses with airport operations. See Figure 5-1 for the residentially-zoned properties proposed for rezoning and/or an airport overlay district.

Costs associated with implementing this measure would be administrative for the jurisdiction(s) if implemented, and the timeline for implementation would be dependent upon the jurisdictions' processes and requirements for approval.

Subdivision Regulations

Description: Subdivision regulations describe the procedures and standards for the division of parcels of land, most notably for sale or development as smaller parcels. The use of subdivision regulations by a municipality prescribes certain conditions that must be met by a developer before receipt and recordation of a plat. Generally, amending subdivision regulations is most practical when large amounts of undeveloped land are present.

The 1996 NCP recommended that the Town of Granby, as the jurisdiction with the most notable assemblage of undeveloped land within the 65 DNL noise contour, amend their subdivision regulations to require noise easements to be obtained on newly created lots within the 65 DNL noise contour.

FAA Finding 1996: The FAA, although it has no jurisdiction in local land use affairs, approved this measure for Part 150.

FAA Finding 2015 / Status: The Town of Granby had not included the recommendations requiring noise easements into their subdivision regulations. The 65 DNL noise exposure contour of the Future (2019) NEM extended into Granby, in areas where the WMDC was offering voluntary acquisition at the time. The WMDC

would work with Granby to determine the feasibility of implementing this measure.

Current Status: The 65 DNL noise exposure contour of the Existing (2018) and Future (2023) NEMs do not extend into the Town of Granby; thus, this measure is not proposed for continuation for this NCP.

5.2.3 Implementation, Monitoring, and Review Measures

Implementation, monitoring, and review measures are those that can be undertaken by the WMDC to track the progress of the recommended noise compatibility program. They include measures that are designed to increase awareness of noise abatement and mitigation, and provisions for the continued monitoring of noise surrounding an Airport.

The 1996 NCP identified four measures for inclusion in the program, as described in the following sections. The status of the measures was updated as part of the 2014 NCP. The current status provides the current update for this NCP.

Pilot Awareness Program

Description: This measure identified that the WMDC would publish a pamphlet of noise abatement practices to be distributed to civilian pilots through the aviation services provider and WMDC's airport management. The pamphlet would include a map of noise sensitive areas around the airport and describe the operational measures which WMDC has adopted for noise abatement, including the use of noise abatement departure procedures recommended by the National Business Aircraft Association or by individual aircraft manufacturers. The measure suggested that the WMDC would install signs in all terminal areas frequented by civilian pilots and along ramp and taxiway

areas controlled by WMDC, instructing pilots to follow noise abatement procedures.

FAA Finding 1996: This measure was approved by the FAA, with the caveat that the location and content of signs may be subject to FAA approval.

FAA Finding 2015 / Status: The WMDC had installed signs in the terminal area pilot lounge and in areas leading to airside facilities directing pilots to be aware of noise-sensitive locations around the Airport. The WMDC would further evaluate the feasibility of installing more permanent signs encouraging the use of the noise abatement procedures for civilian aircraft from Runways 5 and 23.

Current Status: No new signs have been added to encourage the use of the noise abatement procedures for civilian aircraft from Runways 5 and 23.

Costs associated with implementing this measure would be administrative and the timeline for implementation would be dependent upon FAA and/or other responsible agency(ies) requirements for approval.

Public Awareness Program

Description: This measure served to increase public awareness in the surrounding communities regarding the latest developments in the noise compatibility program.

FAA Finding 1996: The FAA approved this measure.

FAA Finding 2015 / Status: As part of the voluntary acquisition program, the WMDC had maintained contact with property owners within the 65 DNL noise contours of the previous NEMs.

Current Status: Although the Voluntary Acquisition and Relocation Program is not proposed as part of this NCP as there are no residences within the 65 DNL contours, it is recommended that the WMDC continue to maintain contact with property owners within past program areas.

Costs associated with implementing this measure would be administrative and minimal to continue.

Monitoring Nighttime Operations and Runway Use

Description: This measure was intended to assist in the identification and quantification of nighttime aircraft activity, specifically during the hours in which the Westover Tower was closed. Information to be collected included the time, type of aircraft, registration/flight number, landing or take-off, runway used, and wind and weather conditions. The information would be used to determine compliance with WMDC's nighttime noise rule and to help provide guidance to Air Force contract tower personnel to determine compliance with the preferential runway use program.

FAA Finding 1996: The FAA approved in part and disapproved in part this measure. The FAA stated that using the data to ensure compliance with any rules that would essentially limit aircraft operations would require an additional noise study.

FAA Finding 2015 / Status: The Westover Tower tracked operations during hours the tower is open. Minimum operations occur during nighttime hours (10:00 p.m. to 7:00 a.m.). The additional information noted in the 1996 FAA Finding was not submitted, and therefore the partial disapproval remained in effect.

Current Status: The Westover Tower tracks operations during hours the tower is open.

Minimum operations occur during nighttime hours (10:00 p.m. to 7:00 a.m.).

However, the Airport is currently considering opening the Westover Airport for 24 hours per day and an Environmental Assessment is underway to evaluate potential impacts. Monitoring nighttime operations and runway use would help determine compliance with WMDC's nighttime noise rule and to help guide Air Force tower personnel to determine compliance with the preferential runway use program, if more nighttime operations were to occur. This measure is therefore carried forward.

Costs associated with implementing this measure would be administrative, and the timeline for implementation would be dependent upon FAA and/or other responsible agency(ies) requirements for approval.

Periodic Updates of Noise Exposure

Description: This measure recommended the ongoing monitoring of changes in noise exposure at the Airport, primarily by focusing on the changes that would likely have the greatest impact to cause an increase in cumulative noise exposure. The original measure identified, as primary potential drivers of noise exposure, any planned changes in scheduled jet operations by civilian aircraft, any planned changes in nighttime operations by civil aircraft, or annual changes in total civil operations. Further, once noise exposure reached levels forecasted in the original NEM, the WMDC would update the Part 150 study.

1996 FAA Finding: The FAA approved this measure.

FAA Finding 2015 / Status: The WMDC has completed or supported multiple evaluations of noise exposure as a result of changes in

operations, including the 2014 NEM/NCP Update.

Current Status: As indicated in the introduction to the NCP in this chapter, the WMDC has completed or supported multiple evaluations of noise exposure as a result of changes in operations, including this update. WMDC will provide periodic NEM updates as required by law and regulation.

Costs associated with implementing this measure would be administrative, and the timeline for implementation would be dependent upon FAA and/or other responsible agency(ies) requirements for approval.

DRAFT

CHAPTER 6: Record of Consultation

The following sections describe the consultation with various parties as required by 14 CFR Part 150, including coordination meetings and plans for public involvement via public review of the Draft NEM/NCP Update document and a subsequent public meeting.

6.1 Meetings and Coordination

Multiple meetings and teleconferences were held throughout the development of the NEMs and update to the NCP to obtain and share information to ensure the most accurate information was available and incorporated into the NEMs. Consultation was undertaken with the 439th Airlift Wing to ensure C-5M flight paths from the 2013 AICUZ study and the standard C-5M flight procedures in the noise model are accurate. Site visits and multiple teleconferences were held with the Westover Tower to collect data on aircraft operations, including the frequency, types, and times of day of operations. Consultation was undertaken with other operators at the Airport, including the Massachusetts State Police Air Wing.

Land use verification letters were submitted to the nearby jurisdictions of Chicopee, Ludlow, and Granby to confirm the use of the most recent land use data available. To date, Ludlow and Chicopee have responded to confirm the existing land use mapping. Ludlow provided several updates to the Town's land use which were incorporated into the land use mapping. Correspondence with these jurisdictions is included in *Appendix E*.

6.2 Draft NEM/NCP Update Document

The updated NEMs, NCP, and related study data will be made available to the public for review and comment to satisfy Part 150 public involvement requirements. This opportunity for comment on the NEMs and NCP will be provided with the publication of the Draft NEM/NCP Update document and at a subsequent public meeting.

The locations where the hard copies of the Draft NEM/NCP Update are provided will be included in the Final NEM/NCP Update.

6.3 Public Information Workshop

This section will be updated with Public Information Workshop information once available. This workshop is intended to provide the public the opportunity to discuss the draft NEMs and NCP with project team members and to provide comments. *Appendix E* will provide copies of sign-in sheets, newspaper advertisements, meeting handouts, display boards and comments received.

The range of topics discussed at the public meeting will include the draft existing and future NEMs, a review of the Airport's existing NCP, and proposed revisions to the NCP.

6.4 Comments on the Draft Document

The publishing of the Draft document will include a 30-day comment period. A summary table of the comments and a response to each comment will be provided in the Final NEM/NCP Update. The comment letters will be provided in *Appendix E*.

Notes

- 1 In-person interview and email consultation with Colonel Ian Coogan of the Massachusetts Air Force Reserve 439th Airlift Wing.
- 2 Pioneer Valley Planning Commission, *Valley Vision 4: The Regional Land Use Plan for the Pioneer Valley*, Executive Summary, March 2014. <http://www.pvpc.org/sites/default/files/Executive%20Summary%20Land%20Use.pdf>, accessed 4/25/18, p. 4.
- 3 Pioneer Valley Planning Commission, "What is the Pioneer Valley Planning Commission?" <http://www.pvpc.org/about>, accessed 4/25/18.
- 4 Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services, <http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/layerlist.html>, WMDC 2018, HNTB GIS (2018), Land Use (2005); USDA-FSA-APFO Massachusetts 2016 60cm NAIP Imagery.

5

City of Chicopee		Generalized Zoning (MassGIS)
BusA	Business A Districts	General Business
BusB	Business B Districts	Highway Business
BusC	Business C Districts	Highway Business
CBD	Central Business Districts	Central Business
ComA	Commercial A Districts	Limited Business
ComA1	Commercial A-1 Districts	Limited Business
Ind	Industrial Districts	General Industrial
Ind_IPUD1	Garden Industrial Planned Unit Development	General Industrial
Ind_IPUD2	Garden Industrial Planned Unit Development, Type II	General Industrial
MIXED	Mixed Use MXD District	Mixed Use
ResA	Residential A Districts	Residential (Single Family)
ResB	Residential B Districts	Residential (Multi Family, Low/Med Density)
ResC	Residential C Districts	Residential (Multi Family, Low/Med Density)
ResD	Residential D Districts	Residential (Multi Family, High Density)

- 6 Pioneer Valley Planning Commission, "PVPC Priority Areas for Development & Protection," <http://www.pvpc.org/content/pvpc-priority-areas-development-protection>, accessed 5/8/2018.
- 7 Pioneer Valley Planning Commission, *Valley Vision 4: The Regional Land Use Plan for the Pioneer Valley*, February 2014 (accessed 5/17/18). <http://www.pvpc.org/sites/default/files/PVPC%20Valley%20Vision%204%20Land%20Use%20Plan%20FINAL%202-18-14.pdf>, p. 5 (accessed 5/17/18).
- 8 Executive Office for Administration and Finance, MassGIS Datalayers, <http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/layerlist.html>, Land Use (2005); USGS Color Ortho Imagery (2013).
- 9 Westover Air Reserve Base – Joint Land Use Plan Update 2018, http://www.pvpc.org/westover_jlus (accessed 5/24/18).