

2018

WESTOVER AIR RESERVE BASE
**JOINT LAND USE
STUDY**

PREPARED BY THE PIONEER VALLEY
PLANNING COMMISSION



Westover Air Reserve Base JOINT LAND USE STUDY 2018

PREPARED BY

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ACRONYMS

| | | | |
|---------------|---|----------------|---|
| ADA | Americans with Disabilities Act | ICRMP | Integrated Cultural Resource Management Area |
| AICUZ | Air Installation Compatible Use Zone | Mass-TF | Massachusetts Military Asset and Security Strategy Task Force |
| AMA | Aircraft Movement Area | NEM | Noise Exposure Map |
| APZ | Accident Potential Zones | NCP | Noise Compatibility Plan |
| APZ I | Accidental Potential Zone I | OEA | Office of Economic Adjustment |
| APZ II | Accidental Potential Zone II | PVPC | Pioneer Valley Planning Commission |
| BAH | Base Allowance for Housing | PVTA | Pioneer Valley Transportation Authority |
| BASH | Bird/Wildlife Aircraft Strike Hazard | SHPO | State Historic Preservation Office |
| CEDS | Comprehensive Economic Development Strategy | WARB | Westover Air Reserve Base |
| CZ | Clear Zone | WJLUS | Westover Joint Land Use Study |
| DCR | Massachusetts Department of Conservation and Recreation | WMDC | Westover Metropolitan Development Corporation |
| DOD | Department of Defense | | |
| JLUS | Joint Land Use Study | | |

TABLE OF CONTENTS

| | |
|--|----|
| Executive Summary _____ | i |
| 1. Introduction _____ What is a JLUS? / AICUZ Study / Stakeholder Participation | 1 |
| 2. Study Area Profile _____ Regional Context / Land Use / Transportation / Economy / Housing / Natural & Cultural Resources / Local Stakeholders | 13 |
| 3. Compatability Analysis _____ Land Use & Development / WARB Mission Potential Impacts / Wildlife Management | 74 |
| 4. Recommendations _____ | 94 |

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EXECUTIVE SUMMARY



JLUS OVERVIEW

The Westover Air Reserve Base Joint Land Use Study (WJLUS) is a cooperative effort between the Westover Air Reserve Base (WARB) and the surrounding communities. The goal of this JLUS is the promotion of compatible community growth around the installation to preserve military capabilities. The primary aim of the WJLUS is to mitigate existing and prevent future incompatibility issues between base operations and the local communities.

The Pioneer Valley Planning Commission (PVPC) is serving as the WJLUS project sponsor. The Cities of Springfield and Chicopee; the Towns of Ludlow, Granby and South Hadley; Westover Metropolitan Development Corporation (WMDC), and MassDevelopment are key stakeholders represented on the WJLUS Steering Committee. This JLUS was funded by the Department of Defense (DoD) Office of Economic Adjustment (OEA) with contributions from PVPC, the surrounding communities and partners.

Study Area

The focus of this JLUS is the surrounding communities of Chicopee, South Hadley, Ludlow, Granby and Springfield. This study specifically analyzes compatibility and land uses concerns within the APZs (Accident Potential Zones) and CZs (Clear Zones), which extend from each runway. The APZs are areas of concern due to safety issues related to WARB operations.

Westover Air Reserve Base

The Westover Air Reserve Base is the nation's largest Air Force Reserve base in geographic area and is the closest fully operational U.S.-owned military base to Europe. WARB is home to the 439th Airlift Wing. The installation consists of approximately 2,100 acres of land in Chicopee and Ludlow. It is operated under an Airport Joint-Use Agreement (AJUA) with the Department of Defense hosting the Westover Metropolitan Development Corporation (WMDC), a nonprofit industrial development corporation established in 1974 to oversee the civilian operations at Westover Airport and to undertake development of surplus land from the former Westover Air Force Base.

Stakeholder Engagement

Stakeholder engagement is a significant component of this JLUS. Engagement efforts included a community survey, public meetings, base and community tours, a new WJLUS webpage, and use of social media and the press.

Through this process information was presented to the general public and input was gathered about concerns and issues related to base operations.

A WJLUS webpage is now located on PVPC's website, http://www.pvpc.org/westover_jlus. The webpage will function as a source of information about WARB and surrounding communities into the future. The website houses a GIS Data Portal, <http://westoverjilus-pvpc.opendata.arcgis.com>, which includes 51 different layers of data from tax parcels to water resource data to C-5A noise contours and APZs. The Data Portal is a significant new resource now available to the general public.



COMPATIBILITY ISSUES AND STRATEGIES

The goal of this JLUS is to address compatibility concerns with the communities surrounding the WARB. A series of Land Use Strategies have been developed in response to concerns that were voiced throughout the public engagement process and in conjunction with the WJLUS Steering Committee.

| Land Use Strategies | |
|---|---|
| Municipal Master Plans | Incorporate WJLUS related concerns into local Master Plans |
| Municipal Maps | Request that communities highlight CZs and APZs on all applicable town maps. |
| Aircraft Flight Overlay Districts | Establish new zoning districts designed to prohibit large congregations of people in the both APZs and CZs. |
| Avigation Easements | Consider purchasing Avigation Easements at appropriate locations to ensure continued access of aircraft. |
| Work with MA DCR / Chicopee State Park | WARB shall work with the MA Department of Conservation and Recreation (DCR) to address compatibility issues within Chicopee State Park. |
| Deed Notification | Consider requesting notification in deeds or other disclosure before title transfer of properties within APZs. |
| Joint WARB/Community Meetings | Recommend that WARB and the surrounding communities meet regularly, once or twice per year. |
| | |

Additional strategies related to transportation, housing, natural resources, and economic development have also been developed through this JLUS process. See the full report for additional information and details.

1. INTRODUCTION

The Westover Air Reserve Base Joint Land Use Study (WJLUS) is a cooperative effort between the Westover Air Reserve Base (WARB) and the surrounding communities. The goal of this JLUS is the promotion of compatible community growth around the installation to preserve military capabilities. The primary aim of the WJLUS is to mitigate existing and prevent future incompatibility issues between base operations and the local communities.

The Pioneer Valley Planning Commission (PVPC) is serving as the WJLUS project sponsor. The Cities of Springfield and Chicopee; the Towns of Ludlow, Granby and South Hadley; Westover Metropolitan Development Corporation (WMDC), and MassDevelopment are key stakeholders represented on the Steering Committee.



WHAT IS A JLUS?

A Joint Land Use Study (JLUS) is a cooperative land use planning effort between local governments and military installations. The overall goal is to ensure and even improve the compatibility of military operations and their neighboring communities. The JLUS program was originally developed in response to conflicts that arose between military bases and their surrounding communities. Some large installations originated in very rural areas that have seen significant growth and development. At times this growth has interfered with military operations. The Department of Defense Office of Economic Adjustment (OEA) developed the Compatible Use and Joint Land Use Program to address these issues. The program offers financial and technical assistance for studies designed to balance military and community needs.

The Westover JLUS (WJLUS) will focus on the surrounding communities of Chicopee, South Hadley, Ludlow, Granby and Springfield. This study will focus even more specifically on land uses within the APZs (Accident Potential Zones) and CZs (Clear Zones), which extend from each runway. The APZs are areas of concern due to noise impacts and safety issues related to Westover Air Reserve Base (WARB) operations.

AIR INSTALLATION COMPATIBLE USE ZONE (AICUZ) STUDY

The WARB completed the Air Installation Compatible Use Zone (AICUZ) Study in 2013. The objectives of the AICUZ program are:

1. to assist local, regional, state and federal officials in protecting and promoting the public health, safety and welfare by promoting compatible development within the AICUZ area of influence, and
2. to protect Air Force operational capability from the effects of land uses that are incompatible with aircraft operations. AICUZ reports focus on three types of constraints that affect or result from flight operations: APZs, noise, and height limitations.

The primary constraints that affect land uses around the WARB and are discussed throughout this document are the APZs. Accident Potential Zones are based on a statistical analysis of past Department of Defense (DOD) aircraft accidents. APZs consist of three zones:

- A **Clear Zone (CZ)** is the area closest to the end of the runway and the most hazardous,
- **Accident Potential Zone I (APZ I)** possesses a significant potential for accidents, and
- **Accident Potential Zone II (APZ II)** has a lower but still significant potential for accidents.

Land use planning and controls are strongly encouraged in these areas for the protection of the public.

Noise contours are the second area of concern included in the AICUZ. Since the AICUZ for WARB was published in 2013, an FAA Noise Exposure Map (NEM) and Noise Compatibility (NCP) update was completed by FAA, MassDOT and WMDC in 2018. Technology upgrades to the C-5 aircraft, the primary aircraft that flies out of the base, caused noise contours to be much smaller than they were in the 2013 report, creating fewer potential conflicts with land uses in the towns surrounding the base. Further explanation of these reports will be discussed later in this document.

Federal Aviation Regulation Part 77 establishes height limitation standards for determining obstructions to air navigation and applies to existing and proposed manmade objects, objects of natural growth, and terrain. The standards are intended to limit the height of buildings and other structures in the vicinity of the airfield in order to insure the safety of pilots, aircraft and individuals and

structures on the ground. In general, structures within the approaches to the runways should not obstruct aircraft that are taking off or landing. In addition, the land areas encompassed by the approach zones should be regulated to prevent uses that would be hazardous to aircraft operations. These include any release of steam, smoke or dust which produce emissions that could interfere with pilot vision; electrical emissions that could interfere with communication systems or navigational equipment; uses that attract birds or waterfowl, including sanitary landfills or the growth of certain vegetation.

STAKEHOLDER PARTICIPATION

Stakeholder participation is a critical component of any Joint Land Use Study. For the Westover JLUS, we reached out to the communities surrounding the base through multiple avenues. The following is a summary of stakeholder participation for the WJLUS.

Steering Committee

The Steering Committee consisted of base personnel, local community planners, PVPC planners and representatives of partner organizations, including the WMDC and MassDevelopment. The Steering Committee’s role was to provide guidance and input throughout the project. They met early in the process, participated in the Base Tour, attended public meetings and reviewed the final recommendations and report.

Survey

An online community survey was conducted early on in the project. Over 300 responses were received from the surrounding towns and others in the region, including Amherst, Belchertown and Easthampton. Overall the responses were positive, however, some areas of concern were identified. See the appendix for response details.

The first eight questions asked about the local familiarity with WARB and the base mission, 21% of responders said they

are very informed about base activities and 43 % said they are moderately informed. Only 25% were barely informed or not informed at all. When asked

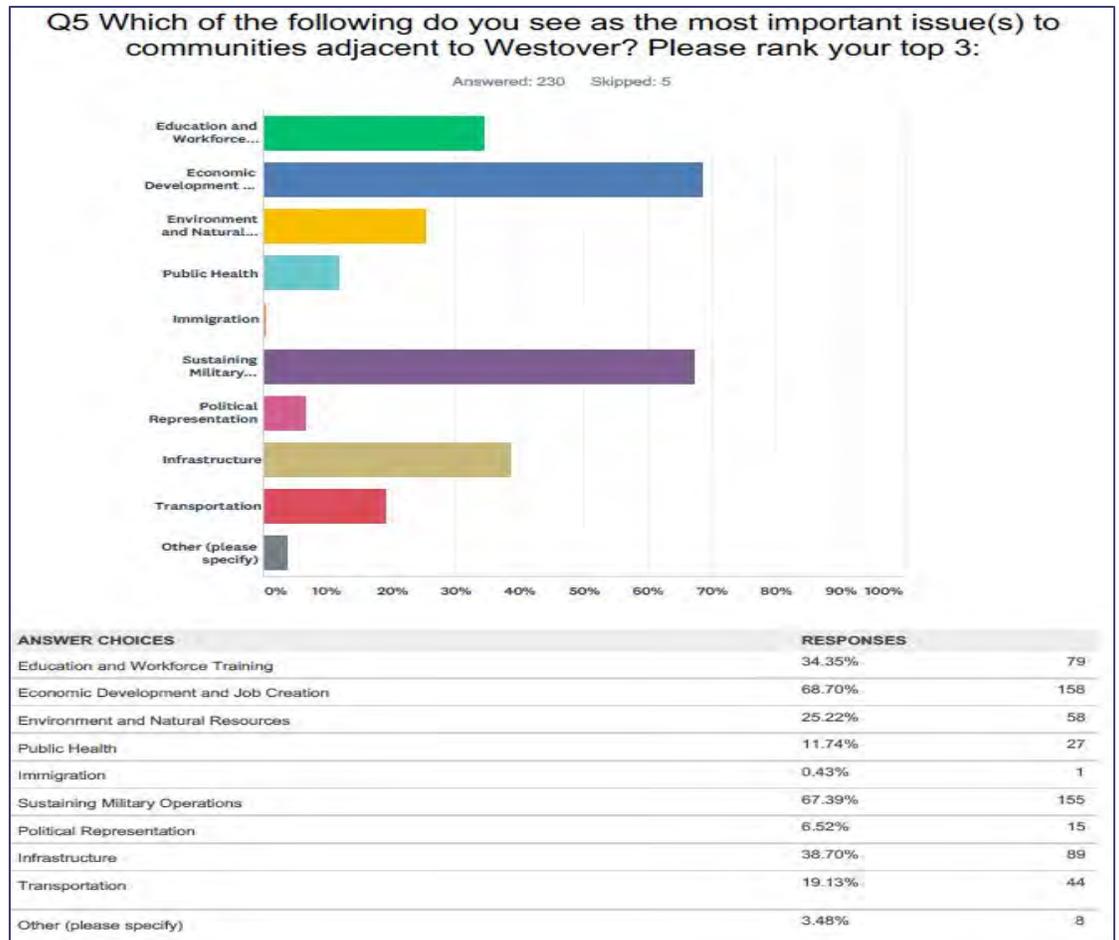


Figure 1. WJLUS Community Survey, Q5

about the significance of WARB to the local and regional economies, 71% and 62% respectively, rated the base as very significant.

Another question asked about the most important issues facing the communities surrounding the base. Economic development and sustaining the military came out way ahead of any other issues. See Figure 1. WJLUS Community Survey, Q5.

The survey also asked if the base's military operations had any negative effects. The response was overwhelmingly No, at 82%.

The next set of questions was designed to gain an understanding of local impressions. Impressions of the relationship between WARB and the surrounding communities were mostly positive, although there was more neutral feedback from landowners and neighborhoods, 17% and 19% respectively.

When asked if WARB impacted local zoning regulations, many people did not know. The survey also asked how compatible is WARB with the surrounding community. Figure 2. WJLUS Community Survey, Q15, shows that 53% of responders said it is very compatible and 23% said moderately compatible.

The survey asked about the operations of the Westover Airport which is run by the WMDC. It asked if civilian airport operations are an issue and overwhelmingly, 84% said that this is not a problem. There was also a question about increasing the civilian airport operations by increasing hours of operation to include flights coming and going overnight. 79% of responders said they would be comfortable with this.

Finally, the survey asked what are the most important aspects of the JLUS process.

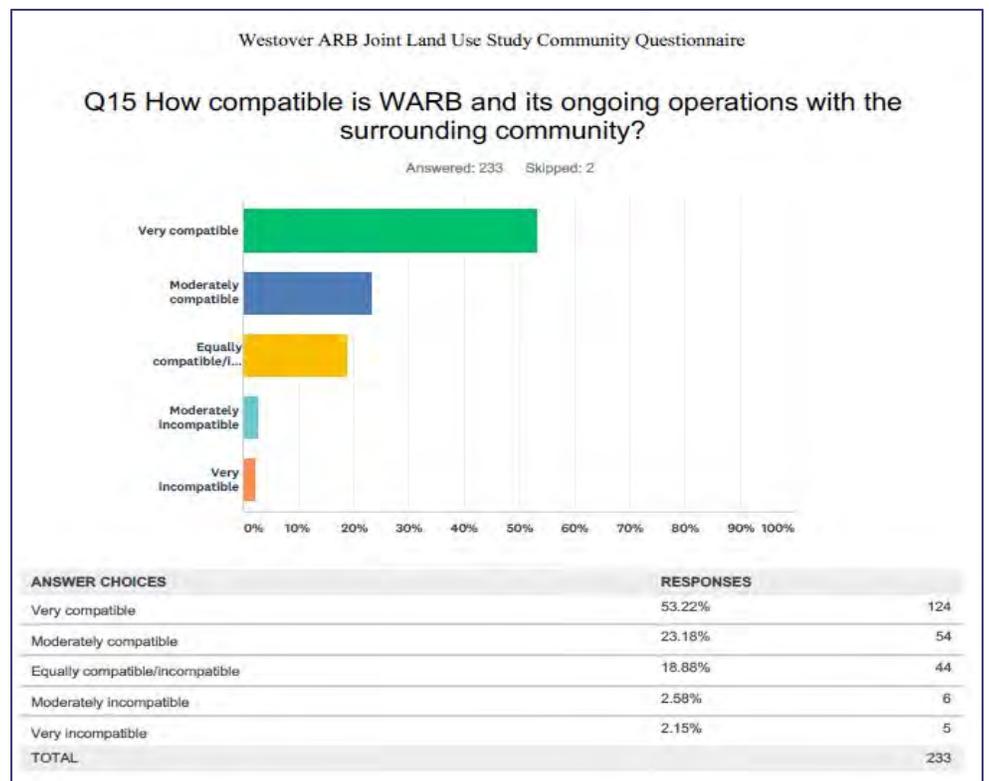


Figure 2. WJLUS Community Survey, Q15

While 53% said ensuring ongoing military operations, 32 % said they did not know.

The last question was open ended. It provided an opportunity for other comments. While most of these comments were positive, some took this opportunity to express their frustration, particularly about noise at night.

Base Tour

A tour of WARB was conducted on May 8, 2018. Attendees included base personnel, WMCD, Planners and Administrators from the surrounding communities, and PVPC staff. Attendees learned about the history of the base and current programs. The day included a bus tour around the base's 2,000 acres. The group viewed critical bird habitat and other improvements being implemented at WARB. The bus tour also visited the civilian side of the airport and included an explanation of their operations. Tour attendees visited a C-5 aircraft hangar and climbed aboard an aircraft. The group was amazed by the size of these planes, which can hold five large buses. The group also toured the Air Traffic Control Tower and was lucky to view an incoming aircraft. Overall, attendees found the tour very informative. Events like this can generate significant goodwill for the base and its operations.



Figure 3. WARB Tour

Community Tour

Tours of the communities surrounding the Westover Air Base were conducted in May of 2018. The goal of the tours was to identify conflicting land uses or other issues of concern in the CZs and APZs (Refer to Figure 10, Regional Context Map for APZ and CZ locations). Attendees included WARB and PVPC personnel and local town planners.

South Hadley

There are commercial, industrial and residential uses within the northwestern APZ which is located in South Hadley. The group toured the primarily industrial uses located in the APZ I. In the APZ II, the tour included low to medium density residential areas, conservation areas and commercial corridors.



Figure 4. C-5 Aircraft at WARB

The town established a Smart Growth Zoning District in May 2018 at the far edge of the APZ II. This district allows higher density development than currently exists, 20-24 units/acre with a maximum building height of 55 feet (or 4 stories). A small piece of this district is located within the APZ II.

The Town Planner noted that the town would like to encourage mixed use development near the new Big Y Plaza on Route 33 in the APZ II. The town sees the Route 33 and Route 202 corridors as opportunities for economic growth and may consider implementing tools to support those opportunities. This area is partially within the APZ II. In 2015, the town replaced the antiquated Plains School on the same general site with a modern Plains School serving the same Pre-K to 1st grade population. This school is located within the APZ II.

Chicopee

There are commercial, industrial, recreational and residential uses within the APZs in Chicopee. The tour included areas of potential concern within two of the CZs. The edge of the northernmost CZ is partially under private ownership. The group toured the automobile salvage lot located immediately adjacent to this CZ.

The Chicopee Memorial State Park is located partially within the southwestern CZ and APZ I. The group toured the state park and discussed potential concerns related to: 1) the park headquarters building, which is located within the CZ; and 2) the public beach and bath house, which are both located within the APZ I and attract large numbers of people during the summer months. Activities in the state park include swimming, picnicking, hiking, biking, fishing and cross country skiing.

Other uses viewed on this tour included the Chicopee Country Club, which is located partially within the southeastern CZ and APZ I. The group toured an industrial area which is partially located in the northwestern APZ I in Chicopee. The majority of the southwestern APZ I is located in Chicopee and includes some commercial uses and older residential neighborhoods consisting of 1, 2 and 3 family structures.

There was some discussion about clearing trees within the CZs. WARB would maintain cleared



Figure 5. WJLUS Public Meeting

areas within the CZs as grassland habitat for small birds. There is an issue with red pine trees dying in this area. The state park, the Chicopee Country Club and the City Forester may all be interested in removing these trees.

Granby

The APZs in Granby consist of low density residential uses, agricultural lands and solar fields. The tour viewed these areas and did not discover any new conflicts or issues. The tour included neighborhoods where houses within the APZ I were purchased and demolished by the Westover Metropolitan Development Corporation. These lots are fenced and some of them contain solar fields. They are interspersed with other residential uses.

Ludlow

There are commercial, industrial, recreational and residential uses within the APZs in Ludlow. The group toured the Chicopee Country Club area (also in Chicopee) which is located partially within the southeastern CZ and the APZ I in Ludlow. The Westover Golf Club is located partially within northeastern APZ I in Ludlow, as is the Westover Conservation Area.

The tour included a visit to the industrial area immediately adjacent to the northeastern CZ in Ludlow. WARB noted that the industrial users are good neighbors, however, there are some issues with pipes being stored immediately adjacent to and on the CZ. One building is located partially within the CZ and there are some fencing issues.

The southeastern APZ contains medium density residential areas, as well as commercial and industrial uses including a large solar field. There is a cell tower located just outside the APZ II just south of the Massachusetts turnpike. There were no other significant issues identified in these areas.

Springfield

Since the southeastern APZ only includes a very small area within the City of Springfield, the group did not tour the area. Instead they met with City Planners to determine if there were any issues of concern. The APZ II in this area is located within a well-established medium density residential neighborhood. A small new development, 7-8 single family lots, has been approved in the APZ II in Chicopee but access is through Springfield.

The only potential area of concern in Springfield is a new renewable energy project, a proposed biomass fired power plant with a 275 foot stack. However, this facility is well outside of the APZ.

Public Meetings

Three open public meetings were held to give residents of the communities surrounding WARB an opportunity to voice their concerns and learn more about the JLUS process. In early October, two meetings with similar content were presented in different locations and dates in order to give residents options for attendance. These meetings were held on October 1st and 4th in Chicopee and Granby, respectively.

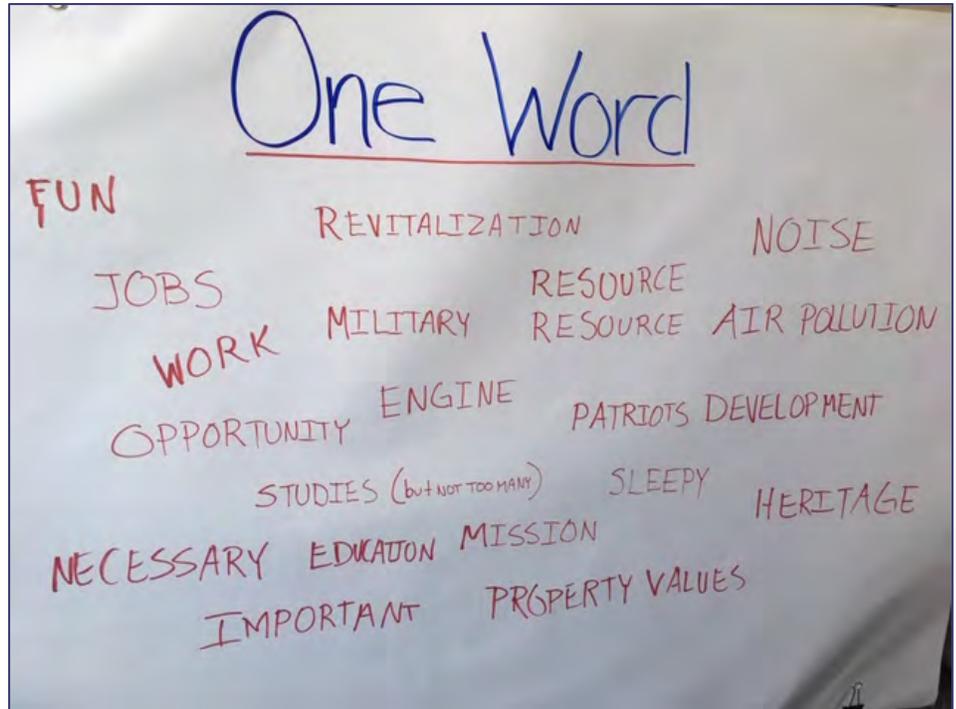


Figure 6. Public Meeting, One Word Exercise

The first public meeting was held at the Chicopee Public Library.

While there was good participation from the JLUS Team, including WARB, WMDC and PVPC personnel, public turnout was low. The second public meeting was held at the old library in Granby. Turnout was excellent with over 30 attendees from Granby and South Hadley. The agenda for both meetings included presentations about the JLUS process, the community survey results, online GIS data developed by PVPC and an overview of the Land Use/Zoning Analysis.

Following the presentations, PVPC staff engaged the public with a series of activities designed to get them to talk about their perceptions of WARB and their concerns. The first activity asked attendees to write down one word they think of when they think of WARB. The image above captures those words.

Another engagement activity focused more specifically on residents' perceptions of the benefits and concerns related to WARB. Boards with sticky notes were used to gather this information. The chart at the end of the section summarizes the benefits and concerns identified.

Other concerns discussed at the Granby meeting included issues related to air pollution, especially at end of the runways. WARB personnel explained that they measure potential pollutants regularly and they are consistently below state thresholds.

There were also questions related to the residential properties purchased in Granby by WMDC. Some concerns were about the property values of the remaining homes and others were about the solar farms that replaced the houses that were bought out. A Town Selectman clarified that they receive taxes on the solar equipment but not the land which is owned by the WMDC. WMDC also told residents that the Noise Program would no longer be available due to the 2018 Noise Exposure Map update and C-5M's new quieter engines.

Another question asked about the validity of the survey. A resident who has survey research experience suggested the survey should have been mailed to all residents in the APZs and reviewed by an outside organization to ensure that it was statistically significant. Although a budget for that level of survey research was not incorporated into this project, the WLJUS team feels that the information gathered through the online survey is valuable.

A final public meeting was held at the Westover Airport on November 28, 2018. Although this meeting was not well attended by the public, there was significant participation from WARB and its partners. At this meeting, participants were asked to communicate their support (or lack thereof) for a list of 19 proposed recommendations.

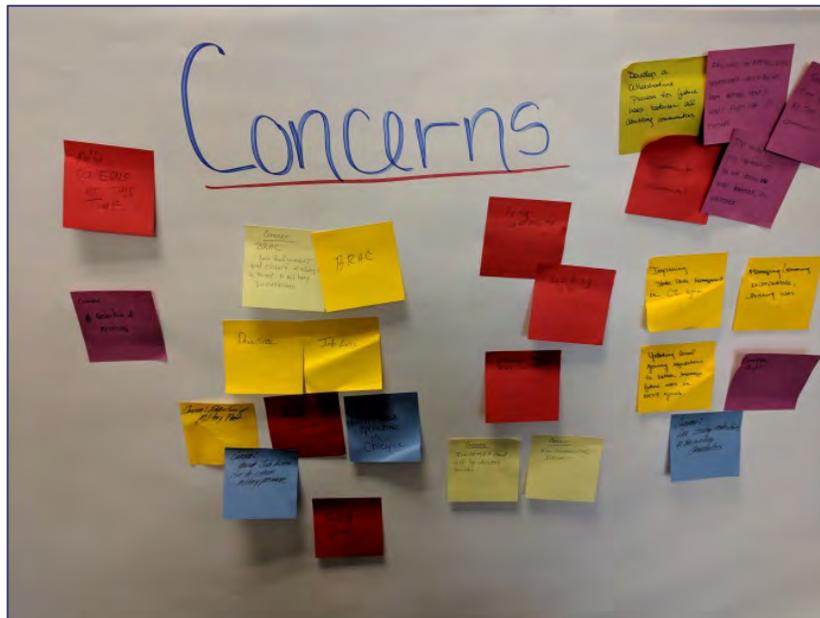


Figure 8. Public Meeting, Concerns



Figure 7. Public Meeting Benefits

Two recommendations, pertaining to the need for ongoing interaction of and between WARB, PVPC and the communities that host the base, received significant support. These recommendations are to establish joint WARB/Community meetings, as well as the incorporation of WJLUS considerations into local Master Plans. PVPC will work with DoD to identify funding to support PVPC staff to work with WARB to implement these recommendations. PVPC has a long history of catalyzing regional progress by bringing groups of member municipalities and other stakeholders together to implement regional and sub-regional plans.

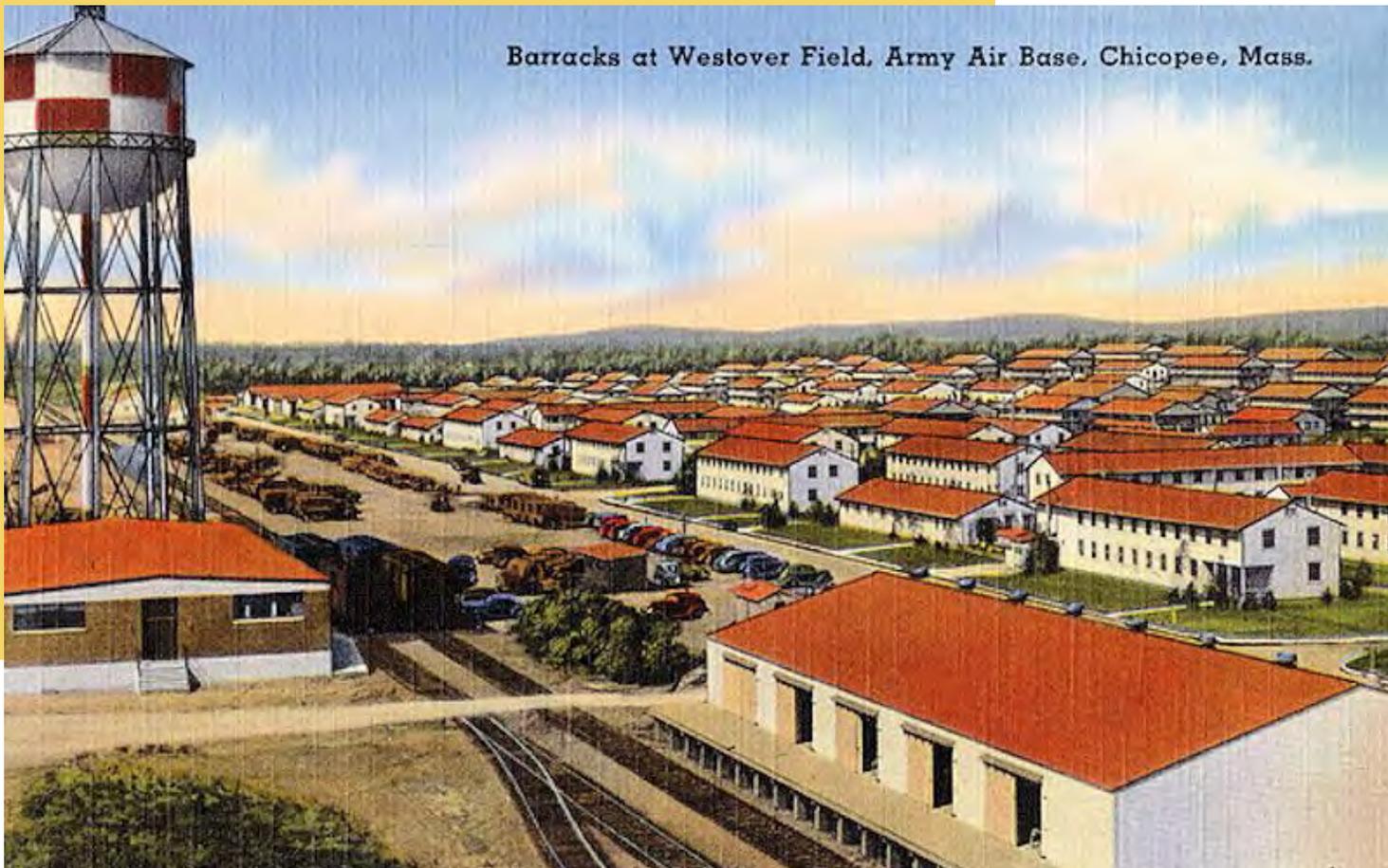
| Benefits | Concerns |
|--|---|
| Economic and military safety and security | Traffic, noise and land values |
| Patriotism, safety and necessity | Property values and lack of empathy |
| Jobs, security | Lower property values |
| Jobs, economic redevelopment, national security | Need more businesses and improve local knowledge of base's importance to local and regional economy etc |
| Employment, training, jobs | Lack of timely communication with host communities |
| Potential increase with tax revenue | APZ zones, noise, future of base in doubt |
| US security | Residents who are left out after continuous changes to noise exposure map |
| For Granby--increase tax revenue and possibly improve infrastructure for water and sewer | Can residents conduct their own noise studies? |
| | Noise--24 hour flying |
| | BRAC |

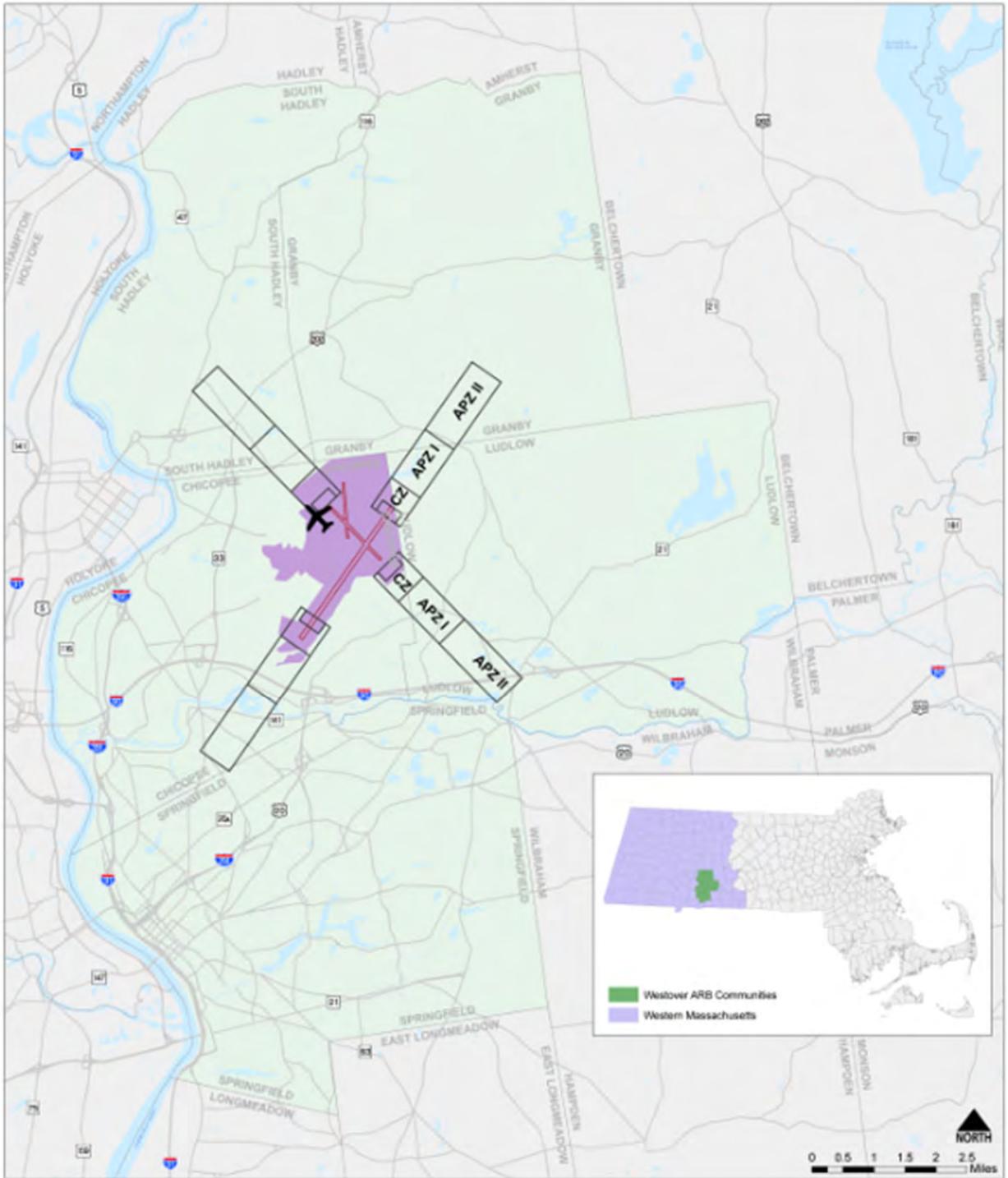
Figure 9. Public Meeting, Benefits & Concerns

2. STUDY AREA PROFILE

The WJLUS focuses on areas where operations at the WARB may impact its neighbors and where development and other civilian activities may impact the WARB. The study area includes the WARB and the municipalities surrounding or in close proximity to the base: Chicopee, Granby, Ludlow, South Hadley and Springfield.

This chapter describes the study area's regional context, population, land use, transportation, economy, and the environmental and cultural resource context relevant to this JLUS. This is followed by an overview of the primary JLUS participants: the WARB and the five municipalities that surround the base.





Westover ARB 2018 Joint Land Use Study

Regional Context

- Westover Air Reserve Base Footprint
- Air Reserve Base Runway Boundaries
- Accident Potential Zone (APZ) Boundaries
- Municipal Boundaries
- Major Roads
- Open Water



Figure 10. Regional Context Map

REGIONAL CONTEXT

Pioneer Valley Planning Commission

The Pioneer Valley Planning Commission (PVPC) is the designated regional planning body for the Pioneer Valley Region, which encompasses the 43 cities and towns in Hampden and Hampshire Counties. Although PVPC is a public sector agency, it is not a direct arm of federal or state governments. It is a consortium of local governments that have banded together under the provisions of state law to address problems and opportunities that are regional in scope. As a result, PVPC's planning area is designated as a special district under the provisions of state enabling legislation.

Regional Issues

In 2014, PVPC completed "Our Next Future: An Action Plan for Building a Smart, Sustainable and Resilient Pioneer Valley." This plan is organized around eight issues and goals that are further explored in the plans for each issue area:

- 1. Climate Action and Clean Energy Plan:** *Moving toward a carbon neutral future. Adapting to create resilient communities.* The purpose of the Climate Action and Clean Energy Plan is to promote greater understanding of the causes and consequences of climate change in the Pioneer Valley. The plan is intended to help the people of the region respond to climate-related changes in their communities by creating workable strategies for local and regional actions to reduce greenhouse gas emissions, including greater use and production of clean and renewable energy, and protect their communities from climate-related damage.
- 2. Food Security Plan:** *No one goes hungry. We grow our own food.* The Food Security Plan addresses the issues of the loss of farmland as well as the increasing numbers of food insecure households in the region due to poor access to healthy food, economic injustice and poverty. The plan also addresses food waste and composting, food assistance benefits, and zoning that can promote access to healthy food.
- 3. Housing Plan:** *Expanding housing choice. Creating communities of opportunity.* The purpose of the Regional Housing Plan is to identify opportunities related to housing market stability, housing affordability and fair access to housing in the Pioneer Valley in order to create a region in which all residents are able to choose housing that is affordable and appropriate to their needs. The plan is intended to assist

municipal officials, state government, and fair housing associations in creating a sustainable region that empowers our urban, suburban, and rural places.

4. **Environment Plan:** *Protecting greenways and blueways. Growing vibrant communities in our watershed.* The purpose of the Environment Plan is to correct the imbalances created by human impacts to the environment by restoring and/or protecting ecological integrity and identifying strategies for enhancing community character and quality of life. This plan addresses surface waters, open space protection, environmental justice, stormwater and erosion control.
5. **Green Infrastructure Plan:** *Promoting clean water. Greening our streets and neighborhoods.* The Green Infrastructure Plan was developed to assist communities in the region as they continue the journey toward a more environmentally sustainable stormwater management program. The plan identifies the three existing infrastructures (stormwater, combined sewers, and roads) where green infrastructure might best be integrated; describes useful criteria for mapping potential green infrastructure facility locations; explores important opportunities and challenges; and proposes workable strategies for local and regional actions that will help to address polluted stormwater flows and meet stormwater permit requirements.
6. **Sustainable Transportation Plan:** *Improving Mobility. Promoting alternative modes of transportation.* Sustainable transportation

WJLUS Study Area "Fast Facts"

Includes all census tracts that overlap with the APZs.

Population:
64,901

Land Area:
48634.1 acres

**Occupied
Housing Units:**
26,010

**Average
Household Size:***
Owner: 2.5
Renter: 2.2

**Rental
Household Rate:**
28.6%

**Employed Residents Over
Age 16:**
32200

Median Household Income:
\$60,160*

**Bachelor's Degree
or Higher Attainment:**
23.9%

Poverty Rate:
11.3%

*Due to data restrictions, these values are estimated based on weighted averages.

consists of the efficient use of existing resources to increase mobility while positively impacting economic development, quality of life, and the preservation of the natural environment. The Sustainable Transportation Plan identifies the existing sustainable transportation initiatives in the region and develops strategies to improve the sustainability of the regional transportation system in the Pioneer Valley. The purpose of the plan is to identify how sustainability can be incorporated into the transportation planning process in order to meet existing needs without compromising the assets of future generations. PVPC is in the process of updating the Regional Transportation Plan and plans to have a new plan adopted by 2020.

- 7. Regional Brownfields Plan:** *Cleaning up our industrial legacy. Building stronger neighborhoods and communities.* The Pioneer Valley Regional Brownfields Plan was developed to facilitate assessment, cleanup, and redevelopment of contaminated and blighted properties in our region. EPA defines a brownfield site as real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Thus, brownfields are sites with known or perceived contamination. The Pioneer Valley Regional Brownfields Plan identifies 20 neighborhood scale Areas of Brownfield Interest (ABI) where brownfields are pervasive, and resources to address them are most needed. The plan provides an analysis of the disproportionate number of brownfields within low income and minority block groups and offers a series of strategies for each ABI relative to site-specific environmental assessment, cleanup and/or redevelopment planning.
- 8. Valley Vision 4, The Pioneer Valley Land Use Plan:** *Growing smarter to reduce sprawl. Revitalizing our community centers.* The purpose of Valley Vision 4, the Land Use Plan Update for the Pioneer Valley, is to create a more sustainable Pioneer Valley region by managing growth and development to reduce sprawl, support and strengthen our urban and town centers, reduce vehicle miles traveled and the resulting air emissions, promote availability of affordable housing for all; reduce water pollution; and protect farmland, open space and natural resources.

Demographics Overview

The five municipalities that surround the WARB each have unique demographic characteristics and while they may not all be racially diverse they are diverse in many other ways. Fast Fact boxes and graphs and charts below are broken out by WJLUS Communities, which brings together each town surrounding WARB, and by the WJLUS Study Area, which includes all census tracts that overlap with the APZs (these numbers are approximate). The WJLUS Study Area is the best available demographic information for the APZs, which are the specific area of concerns for this WJLUS. Demographic highlights for each community in the WJLUS study area are included in the Stakeholders section below. All of this information is from the American Community Survey 2012-2016, 5-year estimates developed by the US Census Bureau.

Population

The table below shows the population of all the WJLUS Communities combined and the Pioneer Valley Region (Hampden and Hampshire Counties) from 2000 to 2030 as projected by the UMass Donahue Institute. While both regions are expected to grow in population, the WJLUS Communities are expected to grow at a slightly higher rate, 8.4%, than the Pioneer Valley Region, 7.4%. Population projections are approximations based on the UMass Donahue Institute’s studies of population growth and decline.

**WJLUS
Communities
“Fast Facts”**

Population: 255,558

**Land Area:
131.7 square miles**

**Occupied
Housing Units: 96,188**

**Rental
Household
Rate:
45%**

**Employed Residents
Over Age 16:
119,546**

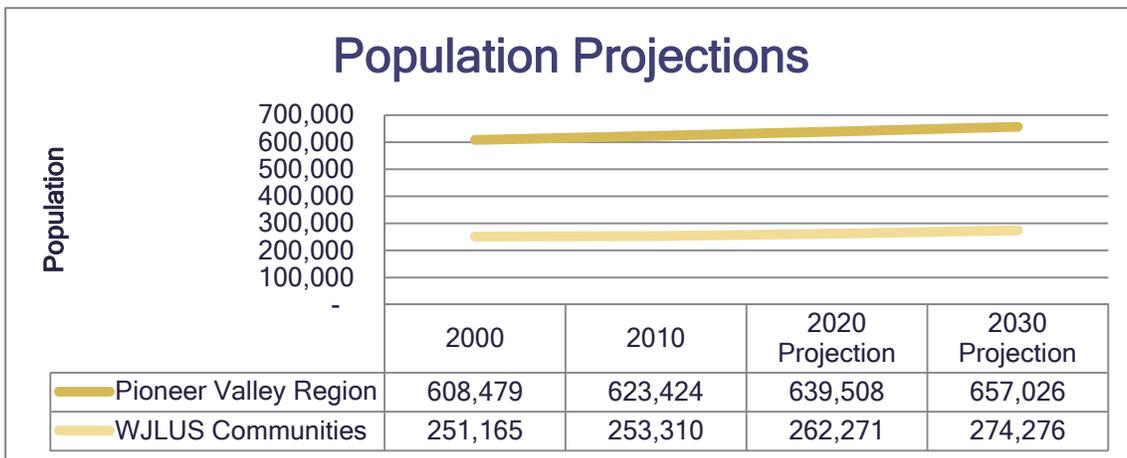


Figure 11. Population Projections

Other projected changes to population characteristics include:

- Significant increase in median age
- Greater ethnic diversity
- Increase in one-person households

| Community | Pop. Change 2000-30 |
|-----------------------|---------------------|
| Pioneer Valley Region | 7.4% |
| WJLUS Communities | 8.4% |
| Ludlow | -3.5% |
| Springfield | 10.0% |
| South Hadley | 5.9% |
| Granby | 3.1% |
| Chicopee | 9.4% |

Figure 12. Population Change

The range of population densities in the five WJLUS communities is highlighted in the graph below with Springfield and Granby at the extremes. Springfield has the highest population density with 4,562.3 people per square mile. Granby, a more rural community, has only 224.2 people per square mile. Overall, the five WJLUS communities average out to 1940.5 residents per square mile.

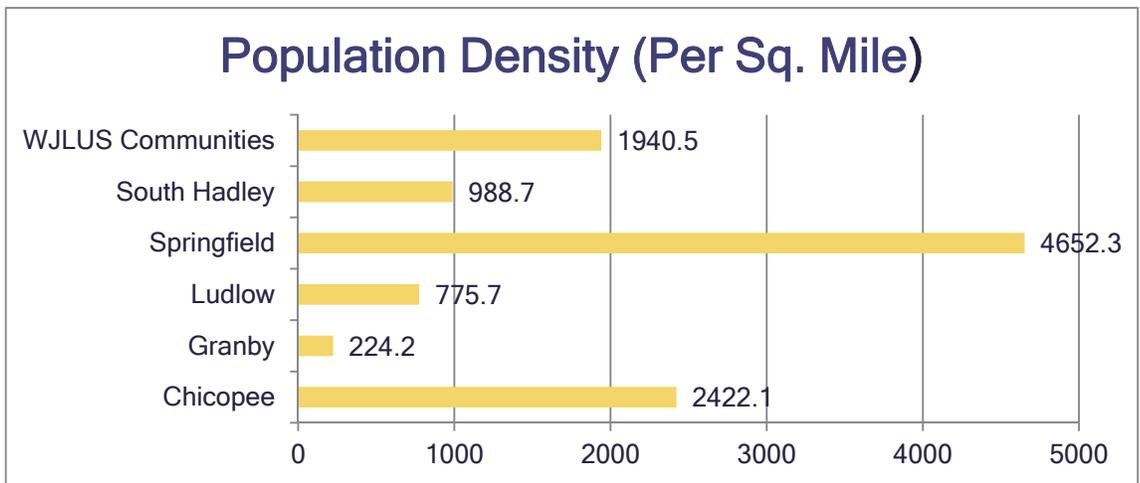


Figure 14. Population Density

The median age in each WJLUS community also falls within a wide range with Springfield and Granby at the extremes and the other communities falling in between.

Springfield has the lowest median age at 32.6 and Granby has the highest at 45.5.

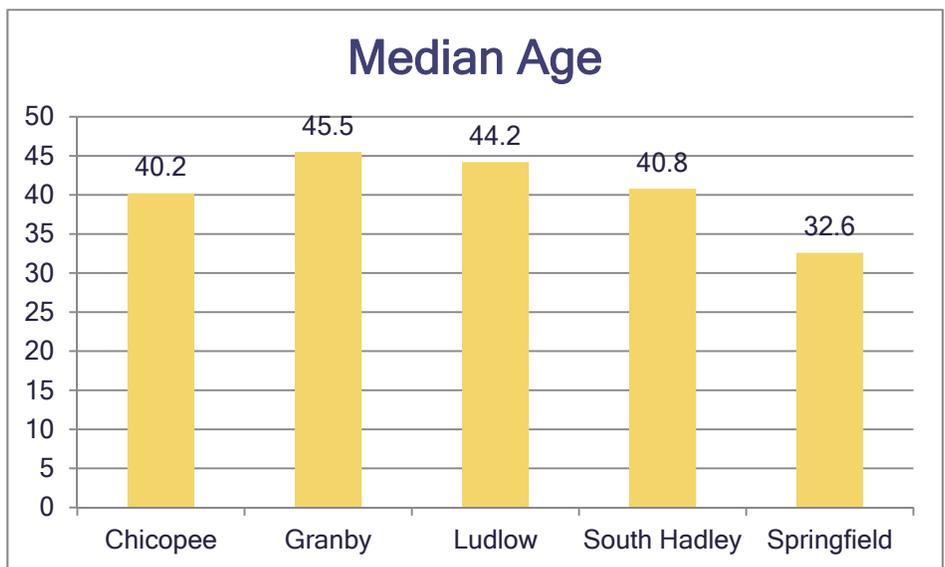


Figure 13 Median Age

The racial mix of the overall population of the five WJLUS Communities, which is highlighted in the graphic below, is 79% White, 9% Black, 2% Asian, 3% two or more races, and 2% some other race.

Springfield is the most diverse of the five communities and home to the largest Black, Asian, two or more races, and other races populations in this area.

While Springfield is the most diverse, Granby has the highest percentage of White residents. See the graph below for a detailed breakdown of the racial makeup of each individual municipality.

Figure 17 lists specific population numbers for each race by community, the WJLUS Communities combined, and the Pioneer Valley Region (Hampden and Hampshire Counties). This chart also highlights those who identify as Hispanic.

Figure 18 indicates the percentage of the population 25 years or older who has received a bachelor's degree or higher educational attainment. Again, there is a wide range with South Hadley and Springfield at the extremes. There are many colleges in the region which may contribute to some municipalities having higher levels of educational attainment. South Hadley is home to Mount Holyoke College.

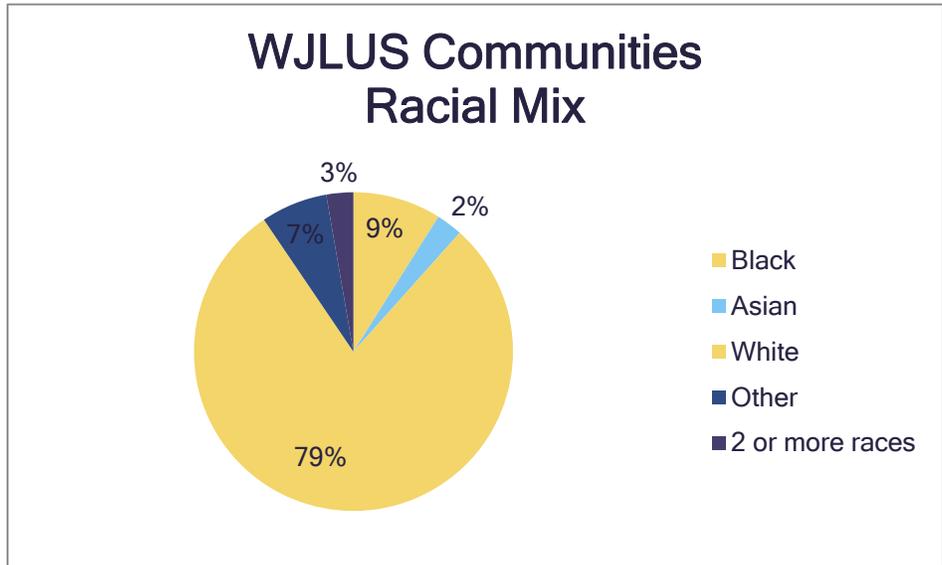


Figure 15. WJLUS Communities Racial Mix

| Community | Black | Asian | White | Other | Hispanic Can be of any race | 2 or more races |
|------------------------------|--------------|--------------|---------------|--------------|-----------------------------|-----------------|
| Chicopee | 2179 | 954 | 48403 | 3269 | 10506 | 1295 |
| Granby | 0 | 18 | 6189 | 60 | 436 | 60 |
| Ludlow | 251 | 290 | 20079 | 534 | 1409 | 198 |
| Springfield | 32286 | 3167 | 89346 | 22797 | 66480 | 6395 |
| South Hadley | 562 | 668 | 15858 | 131 | 939 | 534 |
| WJLUS Communities | 35278 | 5097 | 179875 | 26791 | 79770 | 8482 |
| Pioneer Valley Region | 44846 | 18401 | 516184 | 34028 | 117587 | 15648 |

Figure 16. Race by Community & Region

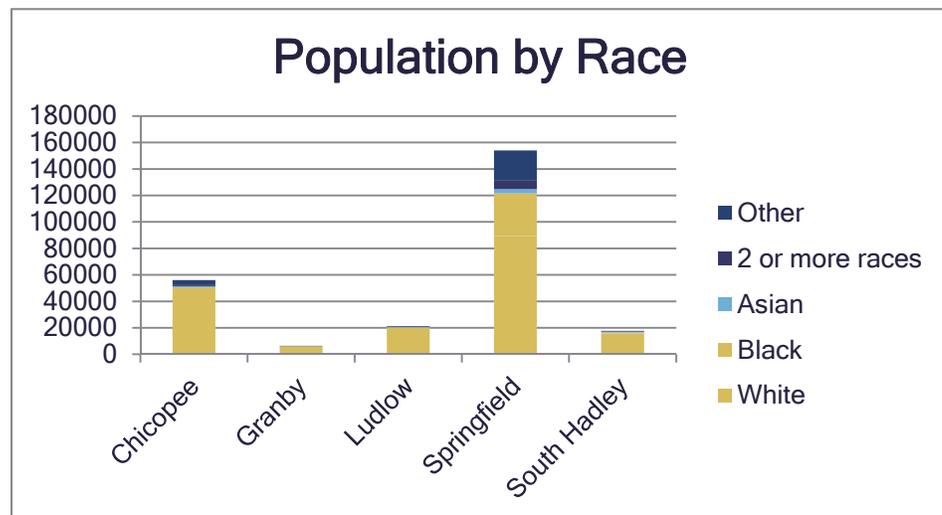


Figure 17. Population by Race

Springfield College, Western New England University, Springfield Technical Community College and American International College are all located in Springfield. Elms College is located in Chicopee. South Hadley and Granby about the Town of Amherst where UMass Amherst, Hampshire College, and Amherst College are all located.

The five WJLUS communities also range significantly in terms of household income. Figure 19

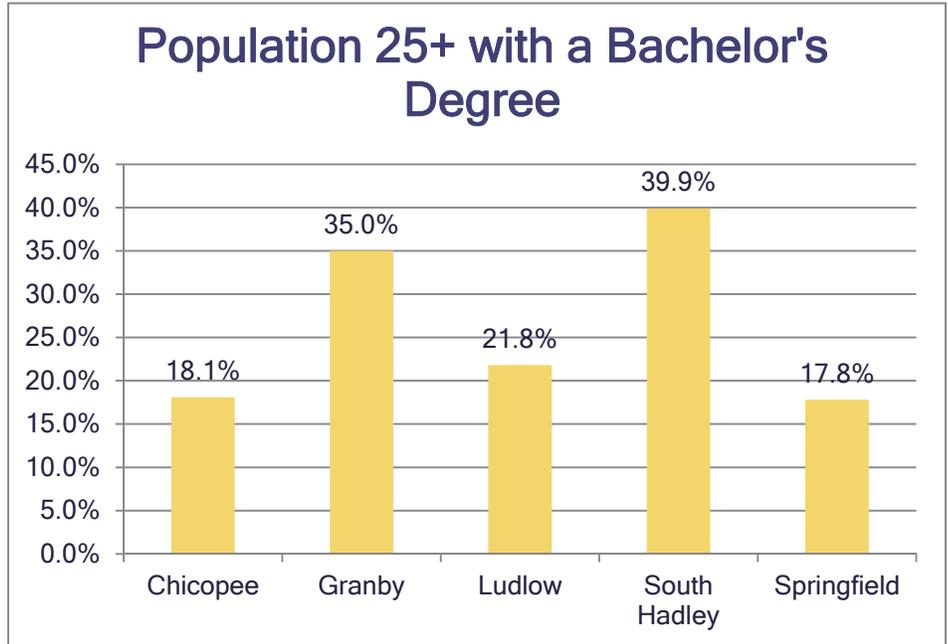


Figure 18. Population with a Bachelor's Degree

displays the median family income of each WJLUS community. Of the five WJLUS communities, Granby has the highest median family income at \$86,692 and Springfield has the lowest at \$35,742.

The range of household incomes may be related to the number of residents who are employed in each town. The table below outlines the total employed residents over the age of 16 in each WJLUS Community. In this case Granby and Springfield are at the extremes. The number of employed residents in a municipality can be an indicator in its potential for economic growth. However, it is important to note the stark differences in general population size between each community.

Another indicator of a region's economic health is the poverty rate. The poverty rate is the percentage of people living at or below the income level that is identified as poverty.

Springfield's poverty rate is the highest at 29.7%, followed by Chicopee at 14.5%. The poverty rates in the other three

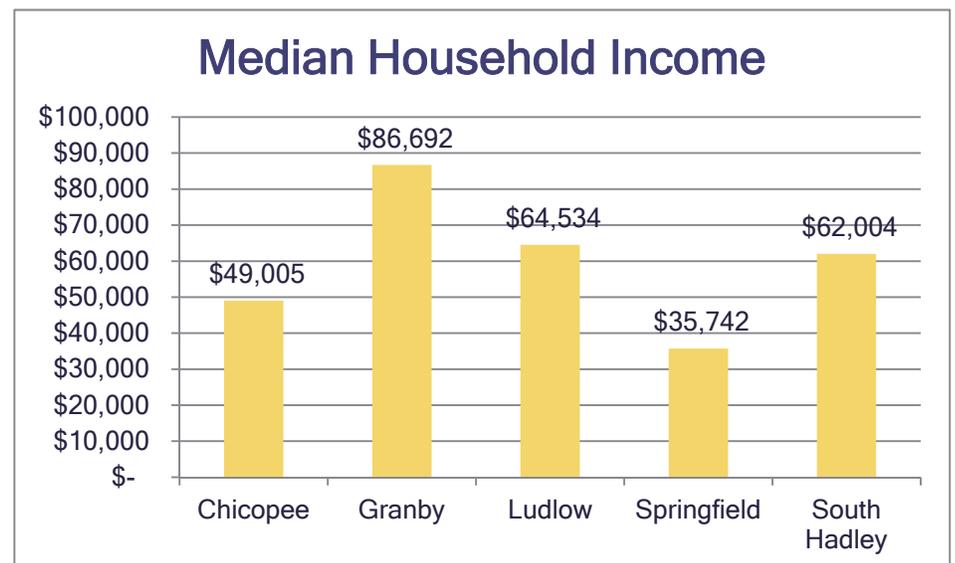


Figure 19. Median Household Income

communities falls below 10% with Granby being the lowest at 4.9%.

| Community | Employed Residents Over Age 16 |
|-----------------------|--------------------------------|
| Chicopee | 26,839 |
| Granby | 3,602 |
| Ludlow | 10,416 |
| Springfield | 69,500 |
| South Hadley | 9,189 |
| Westover Communities | 119,546 |
| Pioneer Valley Region | 293,636 |

Figure 20. Employed Residents

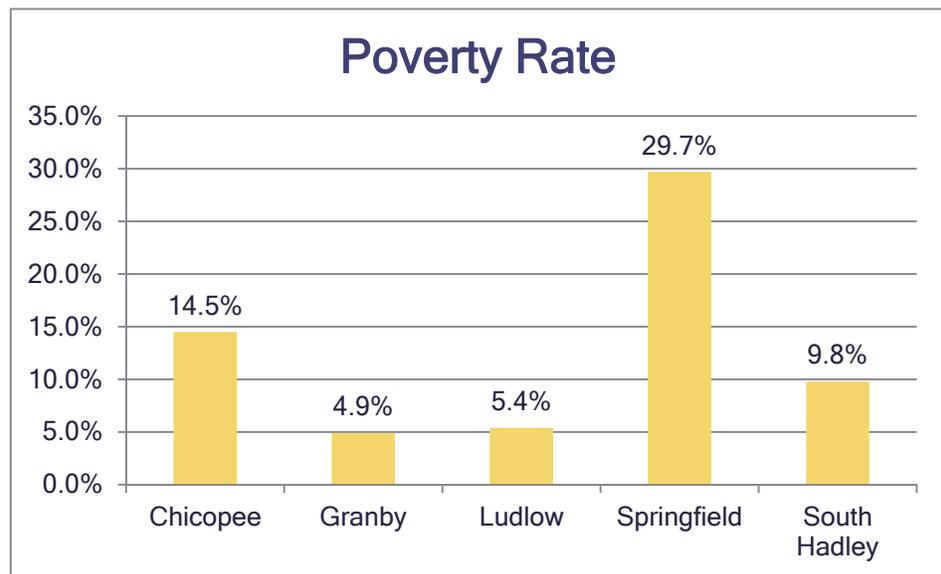


Figure 21. Poverty Rate

TRANSPORTATION

This section discusses access and transportation related matters within the vicinity of the WARB. It focuses on access to the military installation, civil airport, industrial and business parks, as well as the surrounding residential neighborhoods. A variety of land uses available within the study area present unique challenges at various times of the year and day.

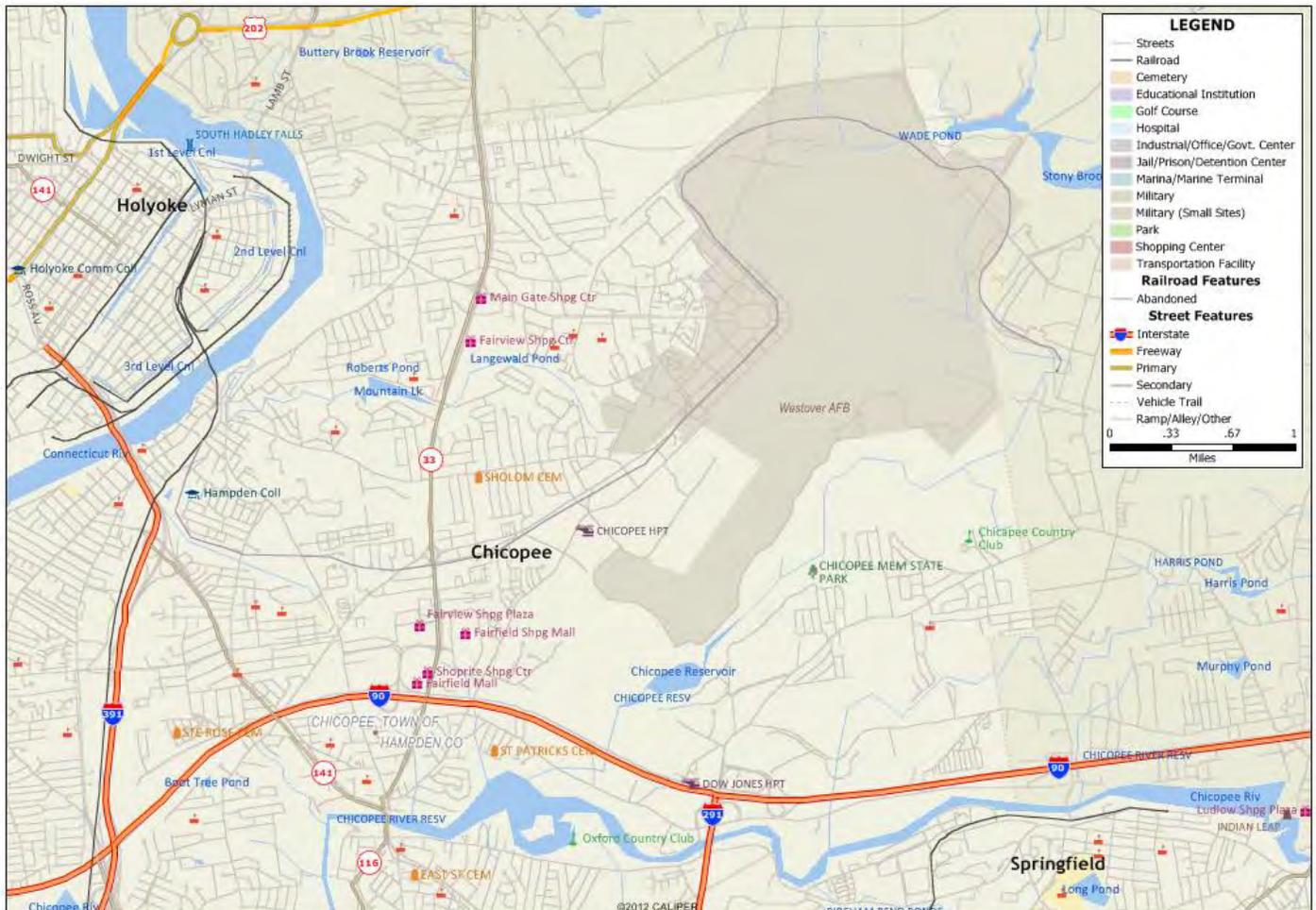


Figure 22. Regional Network Access to WARB

The highest congestion levels occurs every few years over the weekend when the WARB hosts the Great New England Air Show. For the remainder of the year, regular daily events based on the scheduling of shipping and distribution activities related to the adjacent business park could impact traffic flows along the major roadways that connects the airbase with State Route 33 to the west of the study area and the Massachusetts Turnpike (I-90) to the south.

The following sub sections of the study discuss existing conditions for the various modes of transportation that could access the study area such as vehicular traffic, public transit, bicycles and pedestrians. Planned transportation

projects which would serve the study area, will also be listed. Finally, issues observed and strategies for improvements will be suggested.

Roadway Network

Interstate 90 connects to State Route 33 at Interchange 5. In turn, I-90 connects to I-291 to the east and I-91 to the west via interchanges 6 and 4, respectively. This makes WARB strategically located a short distance from the major roadways in the Pioneer Valley region and in close proximity to both the east-west and the north-south interstate highways. The location serves well for both troop and resource deployment to support the needs of the military. Surrounding businesses and industrial uses also benefit from being in close proximity to the highway system, airbase and Westover Airport.

Existing Conditions of State and Local Roads

A field study surveying conditions of four major roadways surrounding and leading to WARB was conducted mid-week at the end of October 2018. The survey included approaching the base via James Street, Westover Road and Sheridan Street as well as Padgette Street which connects to the Westover Industrial Park. The following is a description of the five roadways surveyed. It includes observations about existing roadway features, attributes, pavement conditions and signage.

Memorial Drive

Memorial Drive is State Route 33. A four lane, divided highway with posted speeds of 40 miles per hour. It intersects with James Street and Westover Road which in turn provide access to the two main gates to WARB. There are numerous signalized intersections along Route 33. All total, there are 7 signalized intersections between Interchange 5 and James Street. The uncoordinated traffic signals contribute to long delays along Route 33 during periods of heavy traffic. A sidewalk was observed along the western side of Route 33 serving the southbound direction. Northbound sidewalks were observed to lack continuity in this area. In the southbound direction small wayfinding signs with the image of an airplane direct traffic to James Street. In the vicinity of the Route 33 intersection with Westover Road an overhead sign directs traffic to use the left lane to access the air base. A smaller sign in the median also guides traffic to the base. Similar signage is available in the northbound direction. However, there are no signs on Route 33 that direct traffic to the Westover Airport.

James Street

Beginning at its intersection with Route 33, James Street operates as an undivided roadway with one travel lane in each direction with wide shoulders. A

sidewalk is located on the southern side of the roadway. In the eastbound direction the wide shoulder transitions into a second travel lane with no shoulder east of Mandalay Road. At this point, the roadway also operates as a divided roadway with a grass median. Sidewalks are provided in both directions in this area beginning east of College Street. The median has a sign for the Westover Industrial Air Park North section and directs vehicles to take a left at the upcoming traffic light onto Griffith Road and beyond to Better Way. After this signalized intersection, the sidewalk along the eastbound approach ends then begins again east of Davis Road. The posted speed limit on James Street is 30 miles per hour. James Street provides access to three local schools, a number of small businesses and residential neighborhoods. James Street ends at the access gate to WARB. Four crosswalks were counted along the one mile stretch of James Street between the Westover Air Reserve Base Gate and Route 33. During the field study, one pedestrian was observed crossing midblock and another was observed walking along the wide northern shoulder due to the lack of sidewalks in this area.

Westover Road

Westover Road is a two-way roadway providing one travel lane in each direction with marked shoulders. The posted speed limit is 30 miles per hour. A sidewalk is available on the northern side of the street until the industrial park where it ends in the vicinity of Champion Drive. The sidewalk lacks continuity with several gaps after Champion Drive and roadway shoulders were observed to have deteriorated. The pavement conditions on Westover Road through the industrial area were observed to require maintenance due to cracks from age and heavy truck use. At its intersection with Padgette Street, there is a sign for the Westover Metropolitan Airport directing traffic to turn right onto Padgette Street. The speed limit reduces to 20 miles per hour through the industrial park.

The main gate to WARB is located off an access road near the end of Westover Road. This gate provides access to the visitor information center and has the longest hours of operation for the base. The sign for the main gate to WARB is posted perpendicular to Westover Road making it difficult to see. This could cause approaching traffic to miss the sign and need to perform a U-Turn. Westover Road ends abruptly at the fence to the air base after the access road to the main gate.

Sheridan Street

Sheridan Street is a two way road providing one travel lane in each direction and a sidewalk on both sides for a short distance, then one side up to the industrial area. The posted speed limit is 25 miles per hour near its intersection with Route 33 and 30 miles per hour north of its intersection with Fuller Road. It

traverses abandoned and partially buried rail tracks north of Air Park Way. There is a large blue sign hung on a small structure on the side of Sheridan Street's southbound approach located north of Champion Drive. The sign announces the Westover Industrial Airpark and Metropolitan Airport but its location on the opposite side of the direction of traffic flow makes it difficult to read by oncoming traffic. A small wayfinding sign is also provided at its intersection with Padgette Street. Pavement conditions along Sheridan Street are poor through the industrial area, and no sidewalks or marked shoulder are provided. Sheridan Street ends at the fenced border of the Westover Air Reserve Base.

Padgette Street

Padgette Street is a two way road that leads to the Westover Metropolitan Airport and the remainder of the industrial park. There are no sidewalks south of its intersection with Sheridan Street. The posted speed limit is 25 miles per hour. At its northern end Padgette Street ends at its intersection with Pendleton Avenue which services several residential developments and neighborhoods all the way to its intersection with Route 33.

Existing Transportation Conditions

This section provides a technical evaluation of the transportation conditions in the vicinity of WARB. It includes a presentation of data collected, as well as observations and summaries derived from the analysis. The figure on page 29 represents the estimated daily regional traffic volumes within the vicinity of the Westover Air Reserve Base:

- James Street eastbound east of Anderson Road
- James Street westbound east of Anderson Road
- Westover Road west of gate access road
- Sheridan Street east of Padgette Street
- Sheridan Street west of Padgette Street
- Padgette Street between Westover Road and Sheridan Street

| Roadway | Location | Average Weekday Volume | | |
|-----------------|---|------------------------|--------|----------|
| | | Total Vehicles | Trucks | Bicycles |
| James Street | East of Anderson Road | 2,219 | 0.18% | 0.05% |
| Westover Road | West of Gate Access Road | 3,036 | 3.84% | 0.86% |
| Sheridan Street | West of Padgette Street | 5,128 | 6.42% | 0.72% |
| Sheridan Street | East of Padgette Street | 1,601 | 16.08% | 3.22% |
| Padgette Street | Between Westover Road and Sheridan Street | 3,795 | 4.24% | 1.19% |

Figure 23. Average Traffic Volumes

Average Daily Traffic and Speed

PVPC collected average daily traffic counts and speed data by direction for each roadway midweek in October 2018.

Among the three main approaching roadways towards WARB, Sheridan Street experienced the highest average daily volume of traffic west of Padgette Street with a total of 5,128 vehicles daily. Three quarters of this traffic volume turned onto Padgette Street, while only a third of the vehicles continued onto Sheridan Street east of Padgette Street. Nearly 16% of the traffic on Sheridan Street east of Padgette Street was attributed to large trucks of three or more axles. This street services the heart of the Westover Air Park West and is flanked by many businesses and industrial uses. Westover Road had the second highest average traffic volume at 3,036 vehicles per day west of the base gate access road. This vehicular volume is attributed to visitor traffic in addition to employees at the base and the industrial building across the street. James Street had an average daily traffic volume of 2,219 vehicles. There were a small number of bicycles counted with the highest volume occurring on Sheridan Street east of Padgette Street, with 3.22% of all traffic attributed to bicycles.

The posted speed limit along the major east-west roadways is 30 miles per hour (mph), and 25 mph on Padgette Street. The average speed of vehicles travelling on three main thoroughfares ranged between 22 to 33 and the 85th percentile ranged from 36 to 42. The 85th percentile speed is the speed at which 85% of all traffic is travelling at or below. The 85% percentile speed on James Street and Westover Road was observed to be over 10 mph higher than the posted speed limit. Traffic on Sheridan Street was generally within 5 mph of the posted speed limit in the eastbound direction but over 10 mph higher in the westbound direction. Travel speeds on Padgette Street were generally within 5 mph of the posted speed limit.

The traffic volume values were calculated after combining data for both directions for each undivided street while taking into account the speed of vehicles moving in both directions. It should be noted that traffic counters were

| Roadway | Location | Miles Per Hour Posted Speed | Eastbound Speed | | Westbound Speed | |
|-----------------|---|--------------------------------|------------------|-----------------|------------------|-----------------|
| | | | Average | 85th Percentile | Average | 85th Percentile |
| James Street | East of Anderson Road | 30 MPH | 30 | 41 | 28 | 40 |
| Westover Road | West of Gate Access Road | 30 MPH | 31 | 41 | 31 | 42 |
| Sheridan Street | West of Padgette Street | 30 MPH | 21 | 34 | 33 | 42 |
| Sheridan Street | East of Padgette Street | 30 MPH | 22 | 36 | 23 | 37 |
| | | | Northbound Speed | | Southbound Speed | |
| Padgette Street | Between Westover Road and Sheridan Street | 25 MPH | 18 | 30 | 18 | 29 |

Figure 24. Vehicular Speeds

positioned in close proximity to the intersection in order to increase the accuracy of vehicle volume data. As a result, the measured vehicle travel speeds may not be indicative of true “free flow” speeds as they include a number of vehicles that are slowing down as they approach the intersection.

Public Transportation

Two Pioneer Valley Transit Authority (PVTA) fixed routes serve Memorial Drive (Route 33). Bus Route X90 has several marked and unmarked bus stops throughout the study area on both sides of Memorial Drive. The G1 route also serves the southern portion of Memorial Drive, terminating at the Chicopee Big Y.

The Inner Crosstown Route X90 connects Chicopee with the Holyoke Transportation Center to the north and Springfield to the south. This route runs every 30 minutes on weekdays and Saturdays and every hour on Sundays. Along Memorial Drive, the closest bus stops to the Westover Air Reserve Base for Route X90 in the southbound direction are:

- Memorial/Prospect
- Memorial/Connecting road (across from Ocean State Job Lot)
- Memorial/Jamrog
- Memorial/ Pondview
- Memorial/Pendleton
- Memorial/Lynn

Along Route 33, in the north direction, the closest bus stops to the Westover Air Reserve Base are:

- Chicopee Marketplace
- Memorial/Pendleton
- Memorial/Jamrog
- Memorial/Parking Lot (across from McDonald's restaurant)

The second bus route servicing the vicinity of the study area is the Chicopee/Sumner-Allen/Canon Circle Bus Route G1. On average, this route provides service every 30 minutes on weekdays and Saturdays and every 45

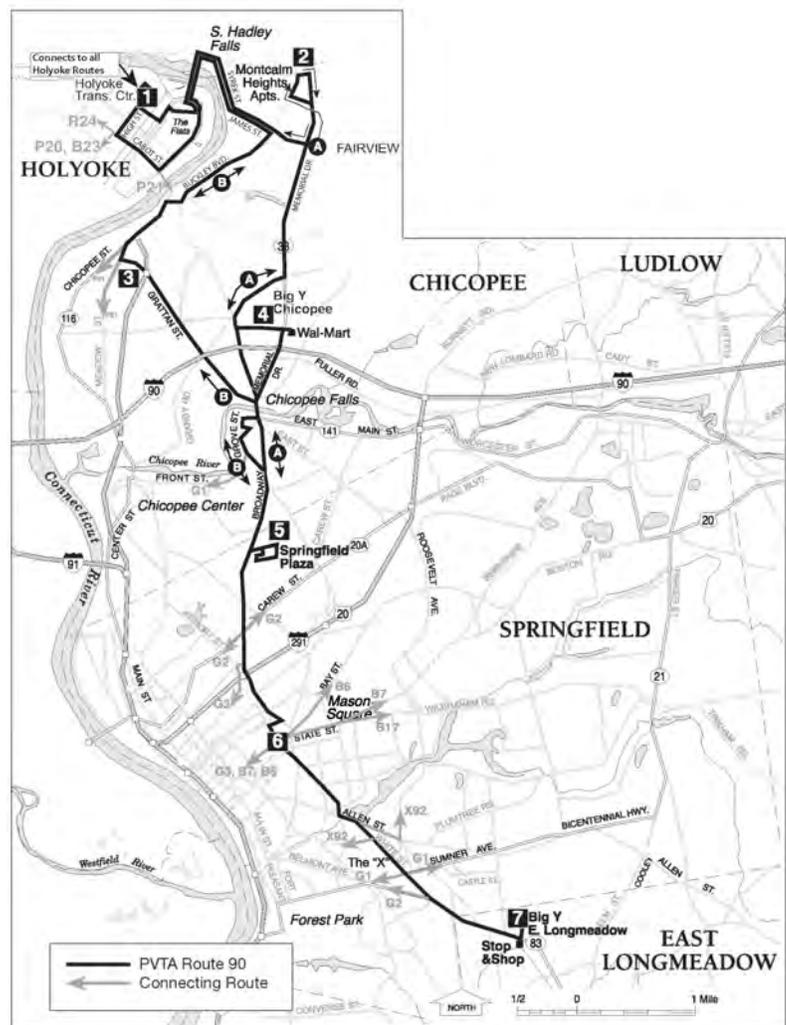


Figure 25. Map of the Inner Crosstown Bus Route X90

minutes on Sundays. There are two bus stops at commercial establishment parking lots which flank both sides of Memorial Drive. One stop is at the Chicopee Marketplace near the Home Depot store along the northbound direction of Memorial Drive and the other stop is a sheltered bus stop next to Big Y along the southbound direction of Memorial Drive.

The walking distance from the closest bus stop to WARB gates on James Street and Westover Road range from 1.5 to 1.8 miles and are an approximate walk of 30 - 35 minutes.

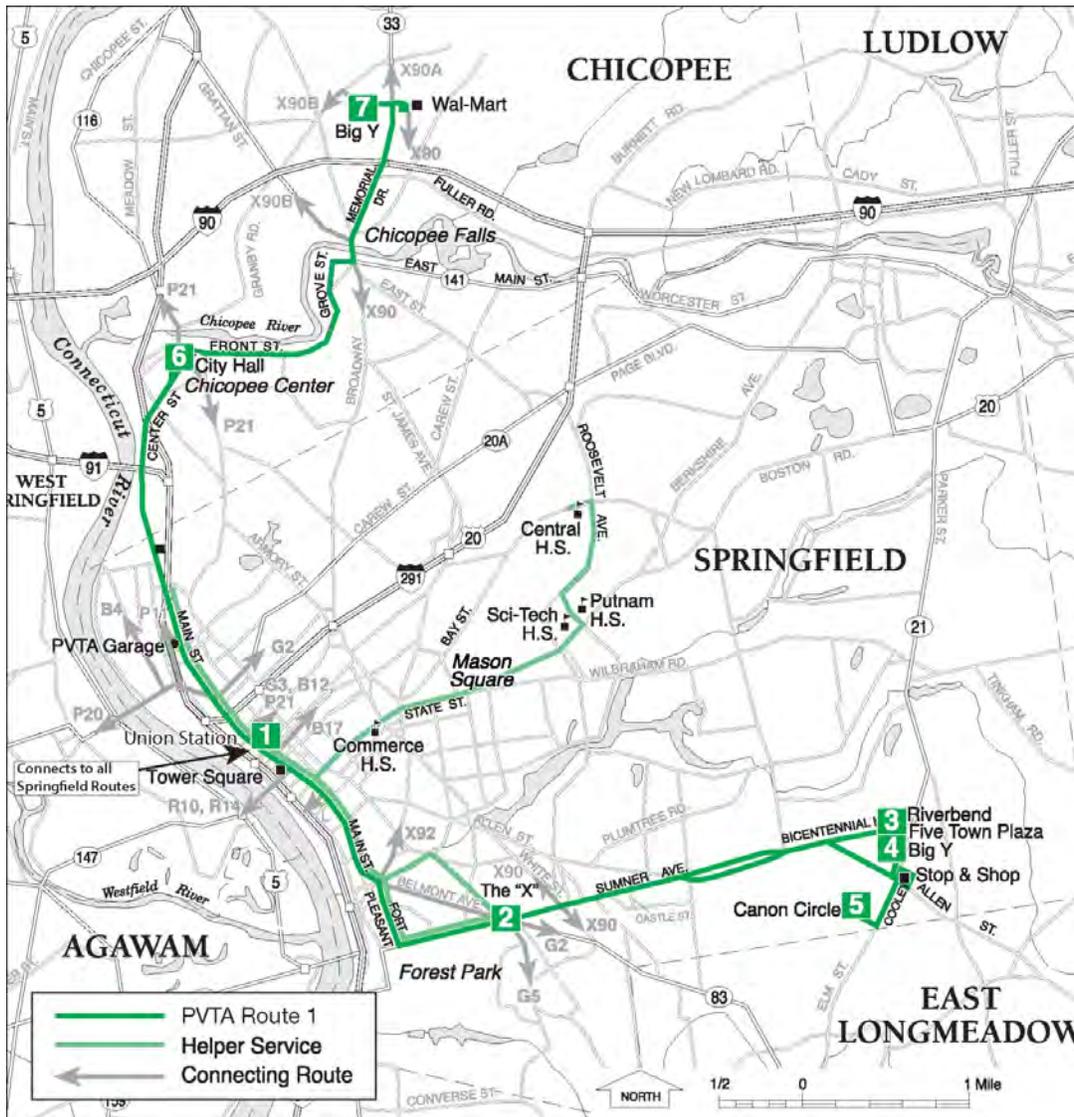


Figure 26. Map of the Chicopee/Sumner-Allen/Canon Circle Bus Route G1

Pedestrian Infrastructure

The availability of sidewalks within the vicinity of WARB varies for three approaches. In general, there is intermittent discontinuity of sidewalks on both or one side of James Street, Westover Road, and Sheridan Street.

A shortage of crosswalks was also noted within these roadways and the smaller connecting streets. Cases of pedestrians walking along the side of the street were noted as well as one crossing midblock. No other pedestrian facilities were available such as seating or shelters. The following sidewalk gaps were observed in the study area:

| Roadway | Side | From | To |
|------------------------|-------|-------------------|-------------------|
| James Street | north | Memorial Drive | College Street |
| James Street | south | Johnson Road | Davies Road |
| Memorial Drive | east | Applebee's | Westover Road |
| Sheridan Street | east | Fuller Street | Padgette Street |
| Sheridan Street | both | Padgette Street | end of road |
| Westover Road | south | Memorial Drive | brick structures |
| Westover Road | both | brick structures | utility pole #101 |
| Westover Road | south | utility pole #101 | Padgette Street |
| Westover Road | both | Padgette Street | end of road |

Figure 27 Sidewalk Gaps

In general, most sidewalks were found to be lacking in terms of accessibility with the Americans with Disabilities Act (ADA). The width of some sidewalks may not be able to safely accommodate wheelchairs. This is particularly true for the narrow sidewalk observed on the northern side of Westover Road near Padgette Street. Many sidewalks were also observed to not provide ADA accessible wheelchair ramps at intersections. It is recommended that a full ADA accessibility study be conducted for the pedestrian infrastructure surrounding WARB.

The traffic signal at the intersection of James Street with Griffith Road and Johnson Road provides push button activated pedestrian signals. These signals were observed to have outdated technology and are in need of updates to address ADA accessibility, better communicate the amount of time pedestrians have to cross the street through countdown signal heads, and improved signs and visibility to increase pedestrian compliance. Similar issues exist for pedestrian infrastructure at the signalized intersections of Memorial Drive with James Street, Memorial Drive with Westover Road, and Fuller Road at Sheridan Street. Planned improvement projects at all three of these intersections should result in improvements to pedestrian equipment in the future.

Bicycle Infrastructure

No bicycle facilities were observed within the study area. However, the roadway dimensions noted above could allow for lane width reductions to provide wide lane shoulders and accommodate bicycles within the shoulders. Otherwise, shared lane markings could be implemented along WARB approaches which run through residential neighborhoods. Roadway dimensions were measured at each of the locations selected for the traffic counts. These are listed in the table below to provide a snapshot for available opportunities to accommodate bicyclists.

| Roadway Dimensions | | | | | | | |
|--------------------|---|---------|----------|----------|------------|--------|------------|
| Road | Location | Roadway | Shoulder | Sidewalk | # of Lanes | Median | Lane Width |
| James | East of Anderson Road | 39'4" | None | 3'8" | 4 | 10' | 9'10" |
| Westover | West of Gate Access Road | 28'1" | None | None | 2 | None | 14' |
| Sheridan | West of Padgette Street | 29'9" | None | 4'2" | 2 | None | 14'10" |
| Sheridan | East of Padgette Street | 27'8" | None | None | 2 | None | 13'10" |
| Padgette | Between Westover Road & Sheridan Street | 29'2" | None | None | 2 | None | 14'7" |

Figure 28. Roadway Dimensions

Installation of on road bicycle lanes or a bidirectional shared use sidepath could most easily be accommodated along James Street in the vicinity of the existing 4 lane section of the roadway. Sidepaths offer separation of pedestrian and bicycle traffic from vehicular traffic while still allowing them to travel adjacent to the roadway.

Westover Airport Planned Improvements

Based on information received from the Westover Airport there are a number of proposals to improve the functionality of the airport. The airport recently applied for grants from the Federal Aviation Administration and MassDOT Aeronautics for necessary infrastructure improvements. They are also considering an application for a 2019 Site Readiness Grant to potentially acquire an additional parcel for Future Air Park South, the existing industrial park. Potential improvements include:

- An extension to Taxiway Golf, creating a complete Parallel Taxiway for the Main Runway.
- Improvements to the Aircraft Parking Apron at the Passenger Terminal. This will relocate vehicle parking to an existing undeveloped area adjacent to the current parking area.

- Partial Renovation of Hangar #13 for Aircraft Maintenance and Storage. Ultimately a full renovation will be sought.
- Installation of “Pilot-Controlled-Lighting.”

Planned Transportation Improvement Projects in the Vicinity of WARB

The Pioneer Valley Transportation Improvement Program was consulted to identify planned transportation improvement projects in the vicinity of WARB. Information on each of the planned improvement projects is summarized in the table at the end of the section.

The first four projects will improve traffic flow and operations along key roadways that provide access to WARB. The Memorial Drive (Route 33) intersection project will improve traffic flow and safety through the upgrade of existing signal equipment at several high crash locations. Route 33 is a key corridor providing access to WARB. Improvements to existing sidewalks, pavement markings and signs will help facilitate traffic to both Westover Road and James Street. Similarly, Fuller Street provides access from Massachusetts Turnpike I-90 exit 6, Interstate Route 291 and Burnett Road to Route 33 and Sheridan Street. This project consists of the upgrade of existing traffic signals, pavement rehabilitation and bicycle and pedestrian improvements for a total length of 1.7 miles. This project will not only result in improved access to Route 33 but also Sheridan Street which provides access to the Westover Airport and industrial areas adjacent to WARB.

Improvements at the intersection of the Massachusetts Turnpike I-90 Exit 6 with Burnett Road and Interstate Route 291 will reduce congestion and improve safety at this location. This intersection experiences a high level of congestion during the morning and afternoon peak hours. Construction of a double left turn lane from Burnett Road to Exit 6 will enhance operations at this intersection and provide better access to Fuller Road.

The intersection of Montgomery Street with Granby Road and McKinstry Avenue is a complicated five-way signalized intersection that experiences a high level of congestion and safety problems. Still in the preliminary design stages, change to this intersection will improve accessibility to the Westover Road entrance to the base as well as access to and from Route 391 in Chicopee. A planned rehabilitation and maintenance project for Route 391 in the cities of Chicopee and Holyoke will also benefit WARB. Slated to begin in the spring of 2019, this project will resurface the highway and bridge decks

along Route 391 for a total length of 4 miles. A similar resurfacing project was recently completed for Interstate 291 in the cities of Chicopee and Springfield.

| Project Name | SID # | Proposed Construction Year |
|---|--------|----------------------------|
| Reconstruction and related work on Fuller Road from Memorial Drive to Shawinigan Drive | 604434 | 2020 |
| Signal and Intersection improvements at 13 locations along Memorial Drive (Route 33) from Fuller Road to Abbey Street | 607736 | 2019 |
| Intersection Improvements at Montgomery Street, Granby Road, and McKinstry Avenue | 609061 | In Design |
| Traffic signal improvements at ramp resurfacing at I-90 Interchange 6 | 606599 | In Design |
| Interstate maintenance and related work on I-391 | 607560 | 2019 |
| Guide and traffic sign replacement on I-391 | 608575 | 2020 |

Figure 29. Planned Transportation Improvement Projects

ECONOMY

WARB is the nation's largest Air Force Reserve base in geographic area and is the closest fully operational U.S.-owned military base to Europe. The installation consists of approximately 2,100 acres of land in the City of Chicopee and the Town of Ludlow, Massachusetts. It is operated under a joint-use agreement, with the Department of Defense hosting the Westover Metropolitan Development Corporation (WMDC), a nonprofit industrial development corporation established in 1974 to oversee the civilian operations at Westover Airport and undertake development of surplus land from WARB.

WARB is an important part of the regional economy, supporting reservists from 34 states who travel to Westover to serve in Air Force, Army, Navy, and Marine Corps Reserve units. The Air Reserve's 439th Airlift Wing employs approximately 2,898 Air Force personnel, including 2,084 military members, 631 civilian employees, and 183 other civilians (contractors or non-appropriated fund employees). An additional 1,700 people are employed by the 28 other military units on base which include 10 Army and three Marine units. In addition, the industrial parks on former Westover property include more than 50 businesses which employ over 3,200 people, according to the 2014 Westover Airport Business Plan.

The 28 WARB Tenants include the following:

| | |
|---|--|
| Military Entrance Processing Command | U.S. Army Reserve |
| 655th Regional Support Group | 302nd Maneuver Enhancement Brigade |
| 382nd Military Police Battalion | 344th Transportation Company |
| 226th Transportation Operating Railway Company | 94th Reserve Support Command |
| Massachusetts Army National Guard | 747th Military Police Company |
| Marine Corps | Marine Corps Site Support Element |
| Marine Air Support Squadron-6 | Marine Wing Support Squadron |
| 472nd Detachment Bravo | Prior Service Recruiting Station-1 |
| Antitank Platoon, 25th Marines | Eastern Region Recruiting Office |
| Defense Contract Management Command, Westover Field Office | American Federation of Government Employees (AFGE) Union Local 3707 |
| U.S. Army Corps of Engineers, Westover Field Office | Air Force Office of Special Investigation |
| USO (Untied Service Organizations) | USDA Fish and Wildlife Service |
| Army and Air Force Exchange Services (AAFES) | Phoenix Management, Inc., at Westover ARB |
| Pioneer Valley Federal Credit Union | Civil Air Patrol |

Figure 30. WARB Tenants

As a joint-use facility Westover Airport/WARB serves both military and civilian purposes. WARB supports the mission of the 439th Airlift Wing. The Westover Airport serves scheduled and unscheduled aircraft charter operations and passengers, business aviation operators, and general aviation aircraft owners. WMDC operates the civilian operations at Westover Airport as well as several industrial parks developed from surplus base property.

As noted above, WARB and WMDC are located in the City of Chicopee and the Town of Ludlow and are adjacent to the City of Springfield, Town of South Hadley, and Town of Granby. This section of the JLUS examines the four communities of Chicopee, Ludlow, South Hadley and Granby in relation to WARB and the Airport. The City of Springfield is the largest city in the Pioneer Valley region and is an economic engine in itself; however, for the purposes of this economic assessment, it is not included so that the economic profiles of the smaller communities surrounding Westover can be examined more closely.

Figure 31 shows total employment in the four JLUS communities over the last 10 years. Similar to the region, there has been significant growth in the

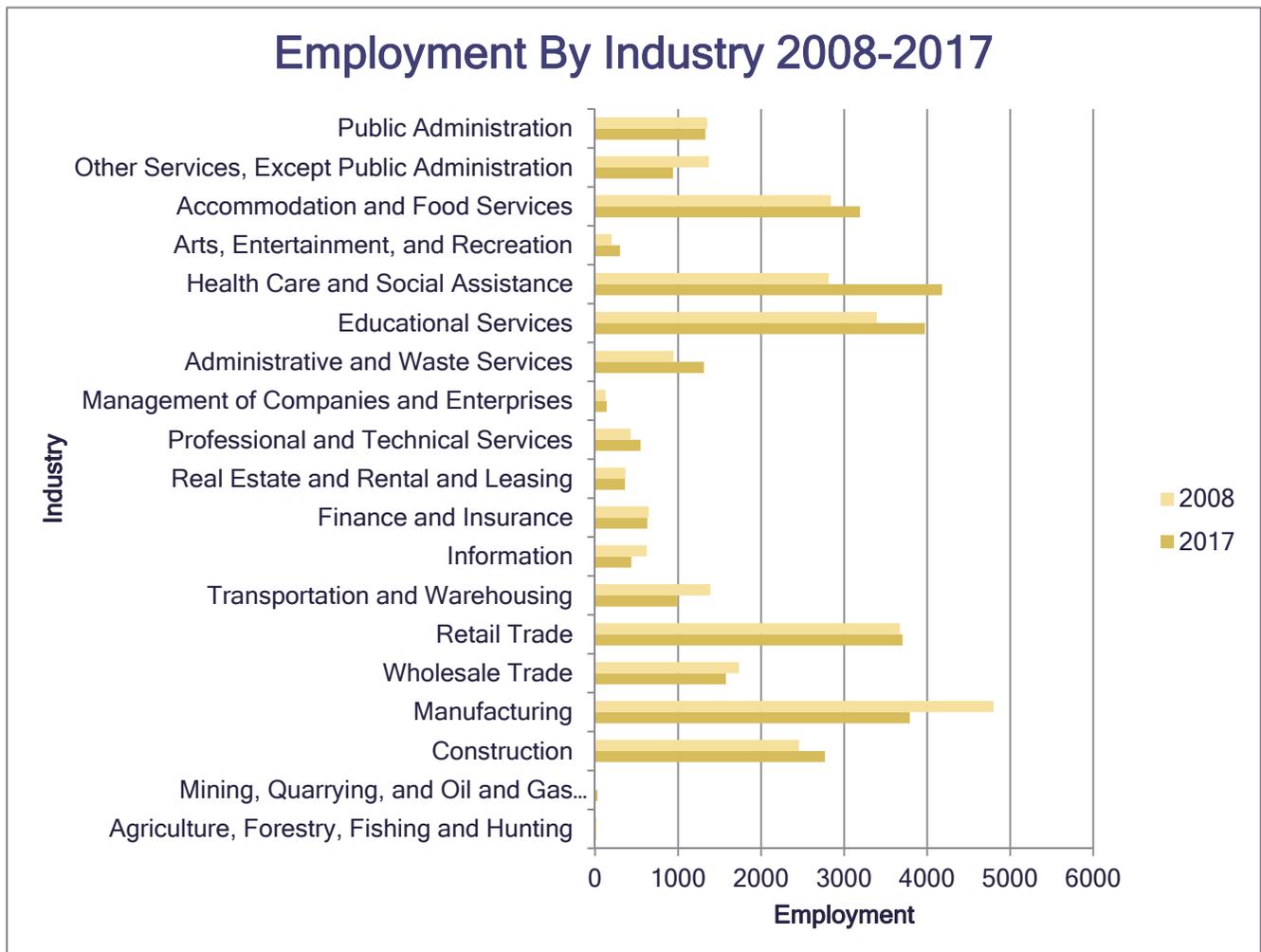


Figure 31. Employment by Industry 2008-2017

Health Care and Social Assistance, and Educational Services fields.

Conversely, Manufacturing employment has decreased, although it is still a substantial component of the economy. Other areas that have seen moderate increases include tourism and entertainment-related industries

(Accommodation & Food Services and Arts, Entertainment & Recreation), Administrative jobs, and Construction.

While Health Care & Social Assistance has grown and is now the largest industry by number of employees, Manufacturing is the most significant in terms of income, with Educational Services a close second (see table below).

Construction is a major industry in both number of

employees and wages. While Retail Trade and Accommodation & Food Services employ a relatively high percentage of workers (12% and 11% respectively), these jobs are low-paying and many are part-time.

Figure 33 shows the employers in the WJLUS communities with at least 100 employees. The largest employers surrounding the WARB are government entities and educational institutions, particularly in the City of Chicopee, but also including the Hampden County Correctional Center in Ludlow (which also houses the Hampden County Sheriff's Department). Other major employers include the Wholesale Trade and Manufacturing sectors. The composition of employment in the local region is similar to that of the Pioneer Valley, although Health Care and Social Assistance is a smaller component in this sub-region, and Manufacturing is significantly larger.

| Industry | Total Wages | Total Employment |
|--|------------------------|------------------|
| Total, All Industries | \$1,334,763,055 | 30,225 |
| Manufacturing | \$213,832,448 | 3,792 |
| Educational Services | \$200,524,095 | 3,974 |
| Construction | \$172,814,412 | 2,770 |
| Health Care and Social Assistance | \$160,203,771 | 4,180 |
| Retail Trade | \$112,739,999 | 3,704 |
| Public Administration | \$91,266,102 | 1,330 |
| Wholesale Trade | \$79,748,356 | 1,577 |
| Accommodation and Food Services | \$55,174,275 | 3,192 |
| Transportation and Warehousing | \$49,652,399 | 998 |
| Administrative and Waste Services | \$46,039,730 | 1,311 |
| Finance and Insurance | \$33,840,516 | 629 |
| Other Services, Except Public Administration | \$29,251,796 | 941 |
| Professional and Technical Services | \$29,018,412 | 547 |
| Information | \$25,757,863 | 436 |
| Real Estate and Rental and Leasing | \$15,938,977 | 360 |
| Management of Companies and Enterprises | \$10,344,282 | 141 |
| Arts, Entertainment, and Recreation | \$5,422,109 | 301 |
| Mining, Quarrying, and Oil and Gas Extraction | \$2,478,152 | 30 |
| Agriculture, Forestry, Fishing and Hunting | \$715,361 | 12 |

Figure 32 Total Wages & Employment by Industry

| | Company Name | Community | Number Employees | Industry |
|----|---|--------------|------------------|----------------------------|
| | Massachusetts Executive Office of Labor and Workforce Development, 2017. Includes City of Chicopee, Town of South Hadley, Town of Ludlow, and Town of Granby. | | | |
| 1 | Westover Air Reserve 439 th Airlift Wing | Chicopee | 1,000-4,999 | National Security |
| 2 | Chicopee Public Schools | Chicopee | 1,000-4,999 | Educational Services |
| 3 | Hampden County Correctional | Ludlow | 1,000-4,999 | Correctional Institutions |
| 4 | Mt Holyoke College | South Hadley | 1,000-4,999 | Educational Services |
| 5 | Chicopee City Hall | Chicopee | 500-999 | Public Administration |
| 6 | J Polep Distribution Svc | Chicopee | 500-999 | Wholesale Trade |
| 7 | Callaway Golf Co | Chicopee | 250-499 | Manufacturing |
| 8 | Cenveo Inc | Chicopee | 250-499 | Wholesale Trade |
| 9 | John R Lyman Co | Chicopee | 250-499 | Manufacturing |
| 10 | Valley Opportunity Council | Chicopee | 250-499 | Other Services |
| 11 | Walmart Supercenter | Chicopee | 250-499 | Retail Trade |
| 12 | Ludlow Public Schools | Ludlow | 250-499 | Educational Services |
| 13 | South Hadley Public Schools | South Hadley | 250-499 | Educational Services |
| 14 | Ethos Energy | Chicopee | 100-249 | Manufacturing |
| 15 | AM Lithography Corp | Chicopee | 100-249 | Manufacturing |
| 16 | Big Y World Class Market | Chicopee | 100-249 | Grocery Stores |
| 17 | Granby Public Schools | Granby | 100-249 | Educational Services |
| 18 | Kleeberg Sheet Metal Inc | Ludlow | 100-249 | Manufacturing |
| 19 | Randalls Farm Inc | Ludlow | 100-249 | Specialty Food Store |
| 20 | HealthSouth Rehabilitation | Ludlow | 100-249 | Rehabilitation Hospitals |
| 21 | Big Y World Class Market | Ludlow | 100-249 | Grocery Stores |
| 22 | Big Y Distribution Center | Ludlow | 100-249 | Grocery Stores |
| 23 | Big Y World Class Market | South Hadley | 100-249 | Grocery Stores |
| 24 | Pioneer Valley Performing Arts | South Hadley | 100-249 | Educational Services |
| 25 | Wingate at South Hadley | South Hadley | 100-249 | Skilled Nursing Facilities |

Figure 33. Large Employers

The Plan for Progress: Pioneer Valley's Comprehensive Economic Development Strategy (CEDS)

The Pioneer Valley Comprehensive Economic Development Strategy (CEDS) is a blueprint for economic development in the region and provides a means for regional collaboration to define and advance key economic goals. The Pioneer Valley region was designated an Economic Development District in 1999 by the U.S. Department of Commerce Economic Development Administration, and in

keeping with this designation, the region prepares a CEDS that is updated annually. The CEDS features a description of regional economic conditions and sets forth goals and objectives for the future, as well as a list of projects seeking EDA Public Works funding in the next year.

The CEDS has four major goal areas, each with its own set of strategies and tangible action steps to guide the plan's implementation:

GOAL #1: Develop and maintain a globally competitive and regionally engaged **talent pool**.

GOAL #2: Foster an environment where **established, new, and growing businesses and organizations** thrive.

GOAL #3: Implement and enhance the **infrastructure** that connects, sustains and ensures the safety and resiliency of the region.

GOAL #4: Conduct economic development activities in a regionally responsible manner, prioritizing **collaboration and engagement**.

WARB and Westover Metropolitan Development Corporation have a role in all of these goals, particularly fostering a positive environment for new and existing businesses and participating in workforce training efforts. The WJLUS process also serves to engage local residents and create opportunities for collaboration between WARB and the surrounding communities.

Under **GOAL #1**, two strategies are particularly relevant to the 2018 WJLUS:

- Strengthen Regional Engagement and Coordination in Talent Development Initiatives
- Enhance Career and Workforce Training

These strategies encourage engagement of major regional employers with those involved in career and workforce training, such as the MassHire Hampden County Workforce Board (formerly the Regional Employment Board of Hampden County), the community colleges, and other colleges and universities. In the WARB area, the MassHire Hampden County Workforce Board (formerly the Regional Employment Board of Hampden County) works with Valley Opportunity Council and the Westover Job Corps program (both based in Chicopee) and has conducted precision manufacturing trainings at Chicopee Comprehensive High School. The Westover Job Corps is a "One Stop" Career Center administered by the U.S. Department of Labor and provides no-cost education and career technical training to young people ages 16 to 24.

GOAL #2 includes the strategy to:

- Retain, Attract and Grow Businesses and Priority Clusters

WMDC oversees three (3) industrial parks and has acquired 80 +/- acres for Future Air Park South, and an expanding civilian airport that serves the surrounding region, therefore playing a significant role in retaining, attracting and growing local businesses. The Westover Airport Business Plan calls for strengthening the supply chain associated with the WARB mission aircraft.

Under **GOAL #3**, the following strategies are relevant to the WJLUS:

- Enhance High-Tech and Conventional Infrastructure
- Increase the Use of Clean Energy to Reduce Business Costs and Improve the Environment
- Enhance Regional Approaches to Public Safety, Public Health and Disaster Resilience

Infrastructure at WARB includes a particularly long, 11,597-foot runway, a robust network of feeder and access roads, and close proximity to two high volume, major Interstate highways (I-90 and I-91). The longest runway spans nearly 150% of the required length for adequate landings of most regional commercial aircraft.

The Base is also involved in energy resilience and has participated in Defense Energy Roundtables held by the Massachusetts Military Asset and Security Strategy Task Force (MASS-TF). The second annual roundtable was held in Boston in November of 2018 as part of the Department of Defense's Energy Action Month, focusing on opportunities for enhancing energy resilience at Massachusetts' six military installations.

GOAL #4 calls for the region's stakeholders to:

- Engage, Convene and Collaborate with Diverse Groups to Maximize Regional Success

The MASS Task Force and the WJLUS both include public outreach and community engagement initiatives. The WJLUS collaborates with local municipalities to solicit feedback and input from residents, including a community survey and three public forums. Ongoing civic engagement efforts include annual Youth Outreach programs, including a community event which has been held for at least 10 years in a row, bringing students (most but not all of whom are in Junior ROTC programs) for a day of activities and education, with discussions focused on teamwork, perseverance and leadership and

planning for the future. Students from Chicopee High School, Central High School in Springfield and Westover Job Corps in Chicopee, as well as students from Worcester have participated. WARB also hosts community events such as visits by historic aircraft and a “Run the Runway” fundraiser.

HOUSING

WARB currently employs over 5,500 civilian and military workers. According to a 2015 Demographic Study completed by the United States Department of Defense¹, there were approximately 151 Active Service Members associated with WARB. These 151 Active Service Members collectively have 289 dependents. The remaining employees at the base are air force reservists assigned to the 439th Airlift Wing and civilian employees.

Base Allowance for Housing (BAH)

Active military service members are given a Base Allowance for Housing (BAH) if they do not live on the base. (Because WARB has an extremely limited stock of long-term housing or no long term housing options, all active military members receive this allowance.) The BAH is typically meant to cover all or most of the median current market rent, average utilities, and average renter's insurance. The BAH is calculated annually and considers geographic regions, grade classifications, and whether or not the person receiving the BAH has dependents.

In 2018, the BAH for service members with dependents ranged from \$1,553 to \$2,643—dependent on grade². The range for those without dependents was less coming in at \$1,149 to \$2,295—dependent on grade. This is well above the Fair Market Rents established for the region by the United States Department of Housing and Urban Development. (In many communities in Hampden County, HUD's Fair Market Rents are in line with the offerings on the market. Rents in Hampshire County are typically slightly higher than the HUD Fair Market Rents.

Housing in the Pioneer Valley

According to population projections prepared by UMass Donahue Institute, the population in the Pioneer Valley is expected to grow fairly steadily (7%) from 2010 to 2030. Within the Westover JLUS target area, populations projections suggest that Chicopee will grow by 11% and South Hadley will grow by 5%. It is also projected that Granby's population will remain almost unchanged and Ludlow's population will decline by 5%. Additionally, across the region, the average household size in most communities is decreasing. This is likely caused by a number of factors including more people choosing to live alone or

¹ http://download.militaryonesource.mil/12038/MOS/Reports/2015-Demographics-Report.pdf?fbclid=IwAR30BdE5L-TemovaN0etiFqk0zTBFS9fdbzU4sjfY7PRK_FOL6J9NUJgE14

² <https://militarybenefits.info/bah-rates-state/massachusetts/?fbclid=IwAR1iQwv4QcQyKAZ7-KM5BLXzrRF4ZuV3Gsd2g36Cm6j43rW2OvhCEE-XDRI>

delaying household formation, more people having fewer children, and more people living longer. A growing population and shrinking household sizes will require more (and potentially smaller) housing units to accommodate the growing number of households.

| Population in each community in the Westover JLUS study area over time | | | |
|--|-----------------|-----------------|----------------|
| | 2010 Population | 2030 Projection | Percent Change |
| Pioneer Valley | 621,570 | 662,169 | 7% |
| Chicopee | 55,298 | 60,333 | 11% |
| South Hadley | 17,514 | 18,363 | 5% |
| Ludlow | 21,103 | 20,095 | -5% |
| Granby | 6,240 | 6,252 | 0% |

Figure 34. Population Change by Community & Region

Permitting for new homes across the state and region has not kept pace with demand for housing, which is leading to the increased rent and home sale prices that we are seeing today. From 1980 to 1989, communities across the Pioneer Valley permitted 22,883 units of housing³. Each decade after that, the number of units permitted

has dropped (1990s-13,257; 2000s-11,763; and 2010s⁴-4,094). This can be attributed to the tightening of

Number of units permitted by community in the WJLUS study

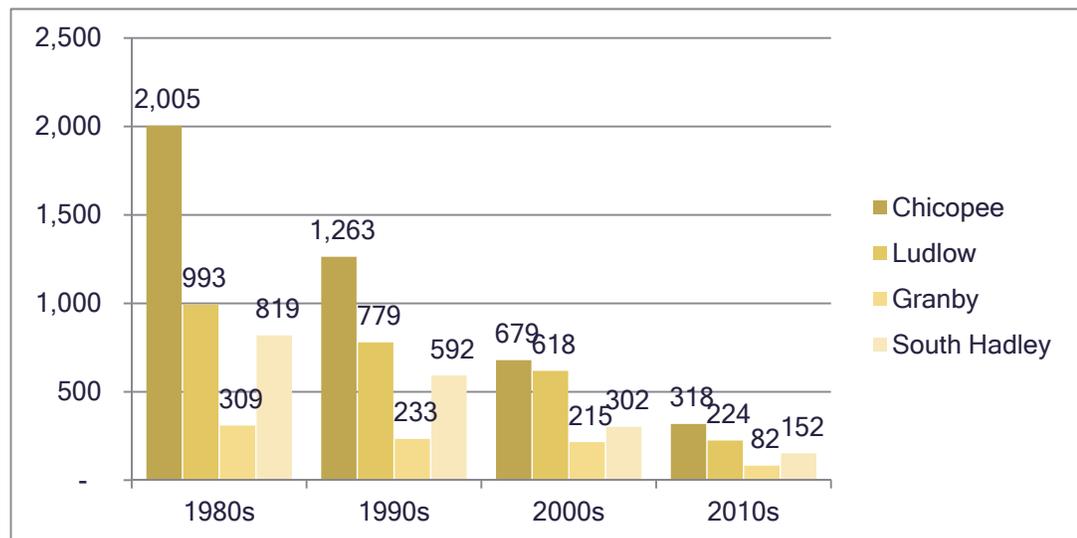


Figure 35. Units Permitted by Community Over Time

³ US Department of Housing and Urban Development, State of the Cities Data Systems Building Permits Database. It is important to note that municipalities are responsible for reporting this data to HUD. Numbers may be slightly lower than reality if communities failed to report or if multifamily permits were counted as one unit instead of the actual number of units. It is generally agreed upon though, that the trends the data is showing are accurate.

⁴ Data source currently includes data from 2010 to 2017. With two years remaining in the decade, the Pioneer Valley has seen less than half of the number of building permits pulled in previous decades.

land use regulations, lack of easily developable land remaining and a weaker housing market making development less profitable. With the exception of Granby, most towns in WJLUS study area followed a similar trend in regards to permitting---high numbers in the 1980s, with a rapid tapering off in subsequent decades. In Granby, the number of residential permits stayed fairly consistent through the 2000s and has only seen a decline in permits since 2010. This lack of building across the region means that as more people and households choose to call the region home, we will have significant issues meeting the demand with our existing stock.

| Vacancy Rate | | |
|---|------------------------|---------------------|
| US Census Bureau, American Community Survey 2012-2016 | | |
| Geography | Homeowner vacancy rate | Rental vacancy rate |
| Hampden County | 1.2 | 4.3 |
| Hampshire County | 1.2 | 3.6 |
| Chicopee | 1.7 | 3.4 |
| Ludlow | 1.4 | 6.2 |
| Springfield | 1.6 | 5 |
| Granby | 0 | 0 |
| South Hadley | 1.1 | 2.2 |

Figure 36. Vacancy Rate

Vacancy status has been long been used as a basic indicator of the strength or weakness of a housing market and its stability. It shows demand for housing, identified housing turnover, and suggests the quality for certain areas. A healthy

housing market usually has a 5-7% vacancy rate. All of the communities and counties in our study area have a less 2% homeowner vacancy rate, suggesting a competitive home buying market. This can cause home prices to rise dramatically pricing people out of the market. There is a little more lee-way in the rental market in the communities and the counties in this study area.

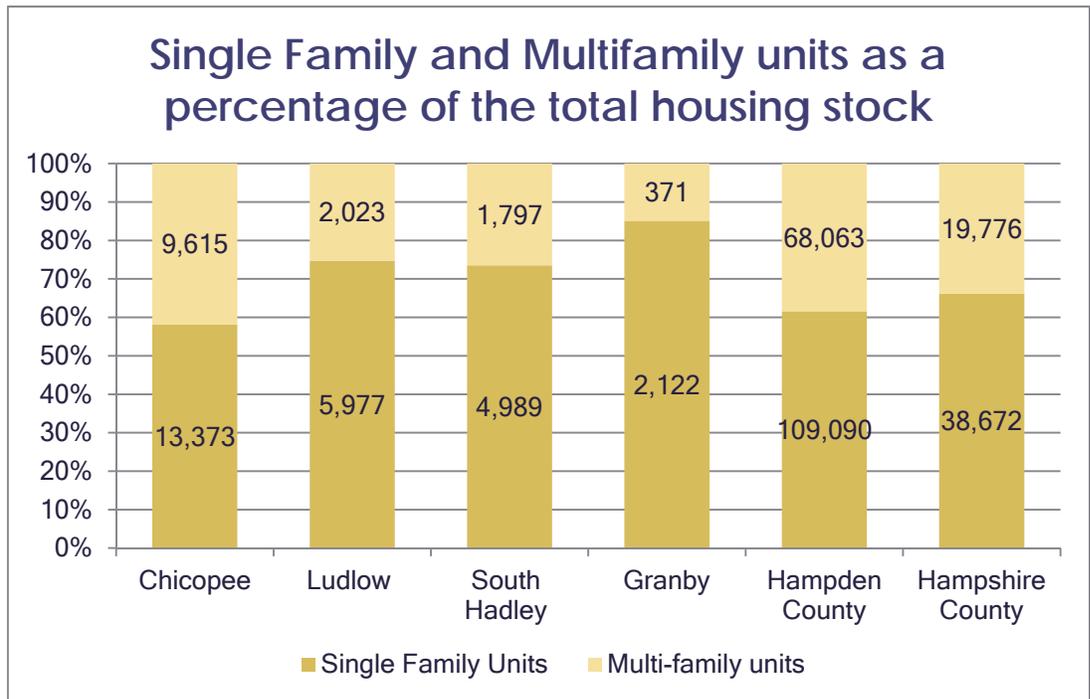


Figure 37. Type of Units as a Percentage of Total Housing Stock

There are approximately 235,600 occupied housing units in the Pioneer Valley (63%-owner occupied; 37%- renter occupied). In the four Westover JLUS target

area communities, multifamily units vary from 15% to 42% of the housing stock in the community.

Affordability

While housing costs in the Pioneer Valley are more affordable than the Eastern part of Massachusetts,

housing affordability still remains a challenge. HUD's fair market rents for the Springfield Metropolitan Statistical Area (MSA) are relatively in line with the costs of housing in Hampden County, but in many cases are lower than the rents in Hampshire County.

According to the 2012-2016 American Community Survey, the median gross rent in the region ranges from \$837 to \$977 and within the communities in the WJLUS study area from \$786-\$927. During this same time period, the median home value in the region ranged from \$196,500 to \$270,100.

A better indicator of housing affordability is the percentage of a household's income that is spent on housing. A household is considered cost-burdened if they spend more than 30% of their income on housing expenses (rent or mortgage and taxes). When a household spends more than 30% of their income on housing they often have challenges meeting their other needs including transportation, healthcare and other necessities. Almost 56% of renters in both Hampden and Hampshire County are considered cost burdened. Additionally, 19% of homeowners in Hampden County and 31% of homeowners in Hampshire County are considered cost burdened.

Challenges

The most pressing housing challenge in the region in regards this JLUS study is the affordability of units due to the lack of production. While active service members that have a Basic Allowance for Housing may not have a hard time finding a unit that the BAH covers, many workers at the base and residents of the Valley in general may be struggling with the growing cost of housing in the

| 2019 Fair Market Rents By Unit Bedrooms | | | | | |
|--|-------|-------|---------|---------|---------|
| US Department of Housing and Urban Development | | | | | |
| Number of Bedrooms | 0 | 1 | 2 | 3 | 4 |
| Cost | \$702 | \$831 | \$1,061 | \$1,329 | \$1,521 |

Figure 38. Fair Market Rents

| Median Gross Rent and Home Value in Study Area | | |
|---|-------------------|-------------------|
| US Census Bureau, American Community Survey 2012-2016 | | |
| | Median Home Value | Median Gross Rent |
| Hampden County | \$196,500 | \$837 |
| Hampshire County | \$270,100 | \$977 |
| Chicopee | \$173,800 | \$845 |
| Ludlow | \$228,300 | \$884 |
| Springfield | \$146,400 | \$839 |
| Granby | \$261,200 | \$786 |
| South Hadley | \$227,700 | \$927 |

Figure 39. Median Gross Rent & Home Values

region. There is a push across the state and region to produce more housing—both market rate and deed-restricted affordable—in order to help with affordability challenges.

Sustainable development and smart growth are key priorities in regional and local planning documents. These strategies stress the importance of meeting our future needs while still preserving our natural resources. WARB is located in the center of the Pioneer Valley near major population and employment centers and near communities that have the necessary infrastructure in place to accommodate the needed housing growth. There is an inherent tension between the call for sustainable development in “smart areas” and the desire/need for low density housing in the APZ-Zones. Additional consideration around how municipalities can meet their complex housing needs in a sustainable manner that still minimizes conflicts needs to be further considered.

| Percentage of Housing Cost Burdened Households | | |
|---|-----------------------------|--------------------------|
| US Census Bureau, American Community Survey 2012-2016 | | |
| | Homeowner Households | Rental Households |
| Hampden County | 19% | 55.9% |
| Hampshire County | 31% | 55.9% |
| Chicopee | 26% | 50.6% |
| Ludlow | 23.6% | 16.9% |
| Springfield | 37.5% | 63.8% |
| Granby | 23% | 69.3% |
| South Hadley | 33.3% | 55.4% |

Figure 40. Percentage of Housing Cost Burdened Households

NATURAL RESOURCES

WARB lies within the Silvio O. Conte National Fish and Wildlife Refuge, which was established in 1997 to conserve, protect, and enhance the abundance and diversity of native plant, fish, and wildlife species and the ecosystems they depend on throughout the 7.2 million acre Connecticut River watershed. The Connecticut River and its riparian lands provide habitat for migratory and resident fish, water fowl and other wildlife species including threatened and endangered species. The base has been identified as a “Special Focus Area” with a high priority biological value within the refuge. This designation was made as the base has the largest contiguous area of grassland in the watershed and provides habitat for the largest populations of grasshopper sparrow and upland sandpiper in the watershed.

A number of state parks and recreational areas in Holyoke, Chicopee, Springfield, and Ludlow are within a 3-mile radius of the base. In Chicopee, Sarah Jane Sherman Park is located to the southwest, River’s Park to the west, the Chicopee Memorial State Park and Chicopee Municipal Golf Course to the east, and Szot Park to the southwest. A small part of the Chicopee Memorial State Park is located in the southeastern CZ, and a portion is also located in an APZ I area in Chicopee. To the north, the Westover Golf Club is listed as a recreation area within APZ I. Ludlow hosts Facing Rock Wildlife Management Area, Camp White, the Stony Brook Wetlands and Haviland Park. Wade Lake is adjacent to the northeastern boundary of the base and has been leased by WARB as a Restricted Recreation area limited to military employees and dependents.

Soils, Hydrology & Stormwater

The WARB is located in the middle of an area that was formerly used for the cultivation of tobacco. Other than the runways and developed areas on the base, much of the surrounding land consists of important agricultural soils including farmland of statewide or unique importance.

The majority of the base itself has been developed, creating limitations to the formerly well-drained soils including a potentially high seasonal water table, shallowness to bedrock, slow permeability and excessive course stone. The base has extensive natural, man-made and surface drainage as well as underground storm sewer lines. The most recent Westover Multi Sector General Permit was issued on 6/4/15, and includes a storm water monitoring plan to satisfy EPA requirements.

The Cooley, Stony and Willimansett Brooks are the primary surface water drainages from the base. Cooley Brook flows south from a wetlands area along the southeastern boundary of WARB and into the Chicopee River. Cooley Brook receives discharges from most of the industrial areas of the base including hangars and runways via storm sewers, culverts and ditches. The southern portion of the brook has been dammed to form the Chicopee Reservoir

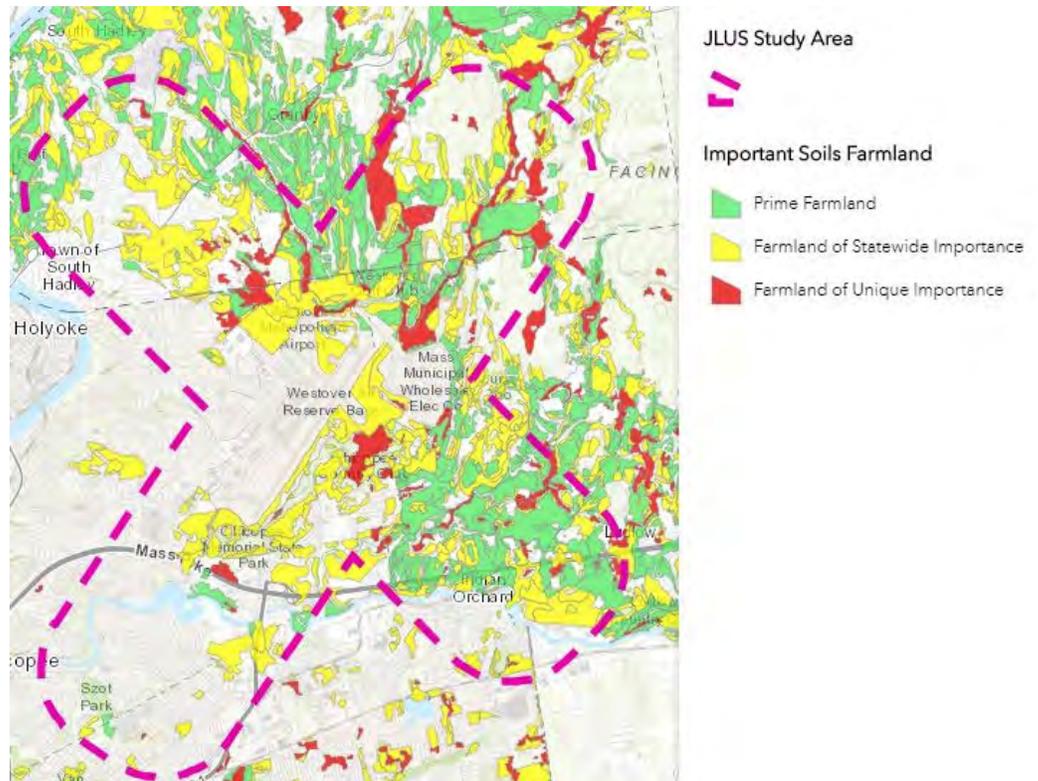


Figure 41. Important Soils & Farmland

located in Chicopee Memorial State Park. Although the Cooley Brook Dam and the Chicopee Reservoir were originally constructed to create as source of drinking water for the City of Chicopee, the City has since contracted to obtain drinking water from the Quabbin Reservoir. The Chicopee Reservoir is now used for recreational purposes including swimming.

Stony Brook, fed by Wade Lake, enters the base from the northeast, initially forming a wetland and then leaves the northern boundary of the base. Wade Lake is primarily fed by Muddy Brook which is located 2200 feet from the end of the runway. Stony Brook flows north after leaving the base, through South Hadley, and eventually into the CT River.

Drainage from the northwestern section of WARB flows into the headwaters of the Willimansett Brook and eventually through Mountain Lake. Willimansett Brook receives drainage from the base through a storm drainage system.

Water Supplies

A large aquifer area is located on the northwest side of the base and covers much of the Town of South Hadley and a portion of the City of Chicopee. Chicopee, Ludlow and South Hadley Fire District #1 get some of their drinking water from the Quabbin Reservoir, while South Hadley Fire District #2 sources drinking water from an underground aquifer. Currently the only town in the

study area that does not have a public water system is the Town of Granby (although parts of Granby are served by the South Hadley water districts).

Vegetation

Historically the land on and surrounding the WARB were forested and dominated primarily by white and red oak, and included a number of other hard and soft woods common to the area. These forests were logged during the 1800s and were cleared for agricultural uses such as row crops

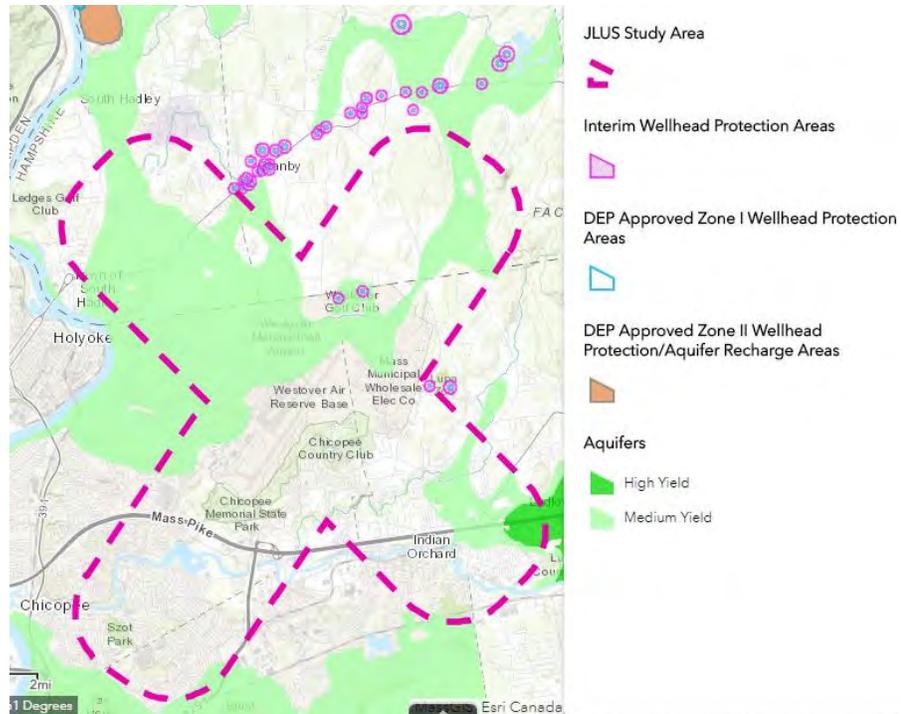


Figure 42. Wellhead Protection Areas & Aquifers

and tobacco. A survey conducted in 1994 identified three major native plant communities on WARB: deciduous woodlands, native grasslands and open wetlands.⁵ The wetlands are primarily located on the north and east side of the base, and the grasslands form the majority of the land surrounding the runways. Forested areas are located on the northern and eastern portions of the base as well as a small area along the Willimansett Brook on the far western side of the base. There are more than 1,300 trees located in the developed portion of the base.

WARB has the largest contiguous grasslands in the Connecticut River Watershed. These are located throughout the southern, central and northern portions of the base and are mowed with varying frequency. The US Air Force Mishap Prevention program updated its regulations in 2011 and 2013 to specify grass height requirements under the Bird/Wildlife Aircraft Strike Hazard (BASH) program. Grass height in the aircraft movement area (AMA) must be maintained between 7 and 14 inches. This is the area that encompasses the Primary Surface and Clear Zones as well as the apron areas and taxiways. In 2015, the WARB prepared an environmental assessment to evaluate the impact of altering mowing schedules and applying a plant growth inhibitor to manage grass height. Inputs from the monitoring program will be used in decisions of where and when to mow in order to comply with AFI grass standards while

⁵ Westover Integrated Natural Resource Management Plan, citing Jenkins 1995

minimizing impacts to grassland habitat. The main threat to grassland species is mowing while they are nesting in the taller grasses, so the intention of using growth inhibitors is to reduce the amount of mowing needed in some areas.

Fish & Wildlife

WARB supports the largest population of two state-listed species in the six-state New England Region: the upland sandpiper (on the state endangered species list) and the grasshopper sparrow, which is listed as threatened. Several other state-listed threatened or endangered species have also been documented on the base including the loggerhead shrike, the vesper sparrow and the blackpoll warbler.

A variety of mammals are known to be found on the base including white-tail deer, coyote, red fox, black bear, beaver, muskrat and porcupine; 11 species of amphibians and seven species of reptiles. A variety of native fish species have been identified during fish surveys in the Stony Brook and Cooley Brook while no fish were documented in the Willimansett Brook.

MassGIS maps show that the core of the WARB property and the surrounding areas, particularly in Granby and Ludlow, are listed as critical natural landscape, core habitat, or priority habits for rare species. The majority of these listings likely coincide with the aforementioned grassland habitats for grassland bird species. Some consideration should also be given to habitats that extend beyond the boundaries of the WARB property.



Figure 43. Priority Habitats

Wetlands and Floodplains

Thirty-four wetlands comprising 160 acres were documented on WARB in 2005. A wetlands validation survey was performed in 2015 to confirm and/or re-align the boundaries of some of these wetlands as many have been subject to ditching or other modifications. Four vernal pools have also been identified on the base.

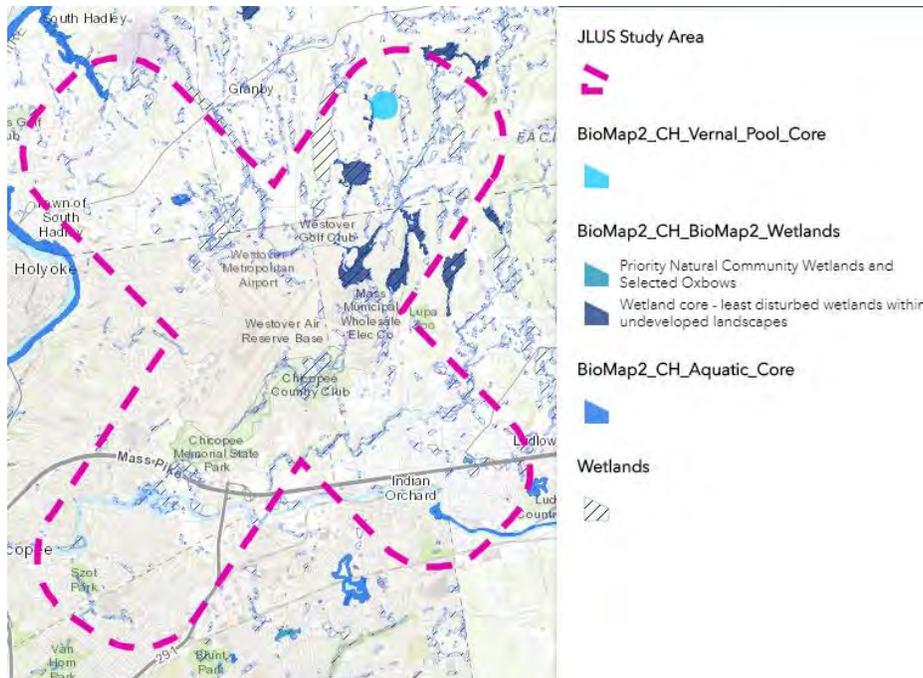


Figure 44. Wetlands & Vernal Pools

CULTURAL RESOURCES

According to the WARB Integrated Cultural Resource Management Plan (ICRMP), a number of zones on the base have potential for prehistoric remains, and significant archeological remains. Also, 28 facilities on the base have potential historic significance and are eligible for listing on the National Register of Historic Places (NRHP). The facilities on WARB that have been inventoried for potential historic significance and NRHP listing include structures built during the World War II era and three Cold War period facilities. WARB is in the process of developing a Memorandum of Understanding with the State Historic Preservation Office (SHPO) to remove almost all of these structures from historic consideration.

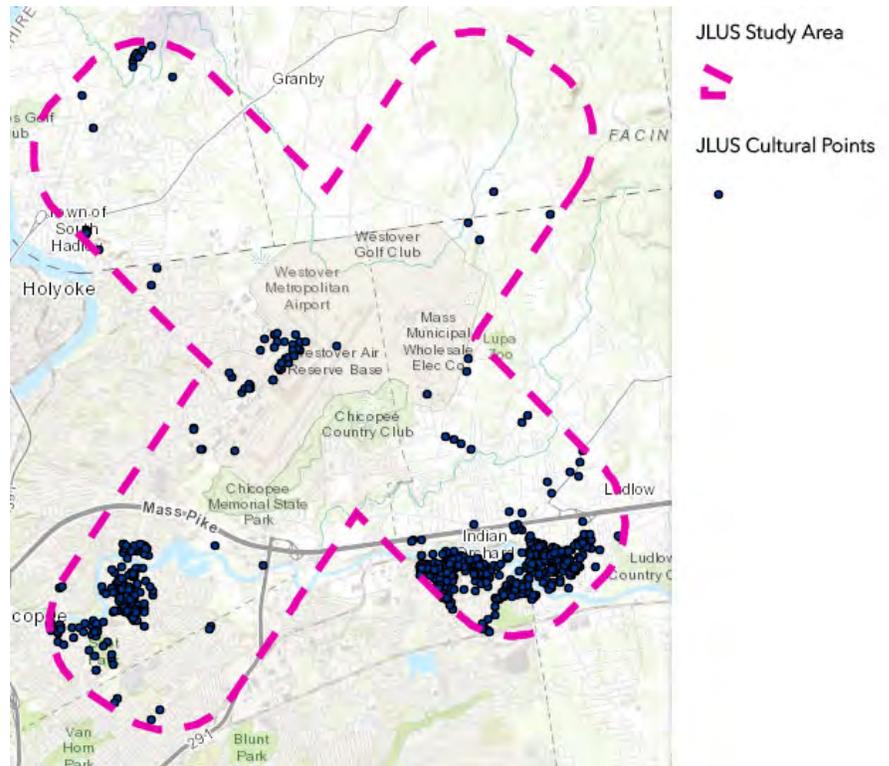


Figure 45. Cultural Resources

Historic & Cultural Resources Surrounding the WARB

The only historic structures that are located within the 2018 noise contours are located on the WARB. There are no “cultural points,” which encompass locations of buildings, burial grounds, structures, and objects listed on national or local inventories of historic places, located in the CZs surrounding the base, and very few historic places located in APZ I. The sites that are located in APZ I include one bridge in Chicopee and three historic buildings in Ludlow: the Russell Hubbard Place (formerly the Ezekiel Barton Hotel), the Daniel Hubbard House, and the Amos Keefe House. All of these structures are currently single family homes. Nine historic structures are located in APZ II. Two of these structures are listed as multi-family residences while the rest are single family homes. Part of the Lincoln Grove district and several historic structures are located in APZ II in Chicopee. Most of these structures are also currently single family residences. As none of the historic structures that are located in the APZ areas are used as museums or public gathering places, keeping them as residential homes does not present a substantial risk.

LOCAL STAKEHOLDERS

This section provides an overview of the primary WJLUS participants: the WARB and the five communities surrounding the base. Information on demographics, and the status of master plans and zoning bylaws are included in each stakeholder section. A master plan lays out a community's vision for its future, while zoning bylaws help communities implement their vision. Not all of these towns have master plans in place but they all have zoning bylaws. These regulations lay the ground work for the Compatibility Analysis and Recommendations provided in the next chapter of this report.

Westover Regional Air Base (WARB)

Land for the WARB was acquired in 1939 to serve as a Northeast Air Base following the Nazi invasion of Poland. Prior to construction of the base, the area mainly consisted of tobacco fields. During World War II, the Base served as a training and overseas transition station and was used primarily to train fighter pilots. The Air Force Reserve took over jurisdiction of the base in 1974 with the activation of the 439th Tactical Airlift Wing. This unit operated C-123, C-130B and C-130E aircraft until 1987 when it was designated as the 439th Military Airlift Wing (439 MAW) and converted to C-5A aircraft. The base was a major staging base in support of Operation Desert Shield and Desert Storm in 1990. In 1992, the 439 MAW was redesignated as the 439 AW, a designation which has continued until present day.

The 439 AW currently operates and maintains up to 16 C-5 aircraft, representing 5% of the total US airlift capability. Westover's vision is to build on their status as the largest mobility and training base in the Northeast, and thereby provide a Northeast Reserve Training Center that is also available as a fully operational Air Force Base. The 439 AW oversees three flying squadrons and 40 supporting units which are responsible for the movement of troops, equipment and supplies; and the performance of medical evacuations.⁶

Economic Impact of the Westover Air Reserve Base and Westover Airport

Massachusetts Statewide Airport Economic Impact Study, 2014 Update

This economic impact study was initially done in 2011 and was updated in 2014. Prepared by CDM Smith, Inc. for MassDOT Aeronautics Division, it

WARB *"Fast Facts"*

Land area:
2,511 acres

Total employees:
2,898
(active duty, Air Force Reserve, Air National Guard and civilian)

Total military payroll:
\$120 million

⁶ 2016 WARB Integrated Natural Resource Management Plan, p 9

analyzes all of the Massachusetts commercial airports including Westover and also has a detailed appendix on military aviation with a profile of Westover. The study finds that the total economic impact of the Westover Airport and Air Reserve Base is the fourth largest of commercial service airports in the state, after Logan International Airport, Hanscom Field, and Nantucket Airport.⁷ When counting employment and wages alone, Westover is the third largest in the state.⁸

The WARB and Westover Airport employed 5,241 in 2014, with a payroll of \$195 million. The economic output for both (including direct impacts from on-airport activities and visitors, indirect impacts, and “induced” impacts resulting from the recirculation of employee payroll within the economy) was calculated to be \$255.7 million per year.

Annual Economic Impact Analysis (EIA) for 439th Airlift Wing, Westover Air Reserve Base, FY18

The 2018 Economic Impact Analysis for the WARB calculates the impacts of the 439th Airlift Wing at Westover on the surrounding communities on an annual basis. In Federal Fiscal Year 2018, the 439th Airlift Wing added nearly \$194.5 million to the local economy. This figure includes a payroll of nearly \$120 million and construction funding of \$13.1 million. It does not include the Great New England Air and Space Show (which generates up to \$11.6 million in local spending according to a 2015 UMass study) or the eight new C-5M Super Galaxy planes now at the Base (which represent an investment of about \$720 million by the Department of Defense). It also does not include the 28 tenant units at Westover (10 U.S. Army units and three Marine units, which employ about 1,700 people, mainly reservists).

The \$194.5 million in spending and downstream economic impact is a decrease from \$212.5 million generated in FY17. There has been a decrease in funding over time due to federal budget reductions, including reductions in the number of planes (from 16 C-5s to eight) and corresponding reduction in staff. The economic impact of the Base was \$224.9 million in FY13; \$220 million in FY14; \$221 million in FY15 and \$197.2 million in FY16. In FY17, construction projects on the Base boosted the economic impact to \$212 million. Construction projects

⁷ Nantucket Memorial Airport experiences extremely high volume in the peak summer months due to its popularity as a summer resort destination and has had an increase in large corporate jets, according to the 2014 Nantucket Memorial Airport Master Plan Update, p. 2-3.

⁸ *Massachusetts Statewide Airport Economic Impact Study Update: Technical Report*, p. 1-6. CDM Smith, Inc. for MassDOT Aeronautics Division, 2014.

in FY18 included renovations at the base hangar, work at the avionics building, DC hangar and the security forces parking lots.

The total number of WARB Air Force employees - active duty, Air Force Reserve, Air National Guard and civilian - decreased from 3,284 in FY17 to 2,898 in FY18, with total base payroll at nearly \$120 million in FY18. Military salary funding was down \$7.1 million but was offset by a \$1.5 million increase in civilian payroll.

Major Stakeholders and Economic Initiatives

Military Asset and Security Strategy Task Force (MASS Task Force) - Ongoing

Housed within the Office of the Governor and supported by the Executive Office of Housing and Economic Development and MassDevelopment, the Massachusetts Military Asset and Security Strategy Task Force (MASS-TF) coordinates among the Commonwealth's six military facilities to maximize their efficiency. The Commonwealth of Massachusetts is home to six military installations with more than \$13 billion in total economic activity and support for more than 57,000 jobs, including Hanscom Air Force Base, Natick Soldier Systems Center, Joint Base Cape Cod, Fort Devens, Westover Air Force Reserve Base, and Barnes Air National Guard Base. The MASS-TF works with federal, state and local officials; industry representatives; and non-profit leaders to align efforts to strengthen the Commonwealth's military bases. One of the projects initiated by the MASS Task Force was the *Westover Airport Business Plan*, discussed above.

The Commonwealth, through the Military Task Force, has already taken the initial steps to foster greater economic opportunities at WARB. Partnerships to date include supporting the Base's master planning efforts and exploring the opportunities for shared services through the Air Force's Public-Private-Partnership Tabletop Exercise program; domestic emergency management operations with FEMA and MEMA; and Science, Technology, Engineering, and Math (STEM) education initiatives. The Commonwealth assisted Westover in making critical upgrades and replacements to energy infrastructure across the Base property and allocated funding to the City of Chicopee for the clearing and preparation of land for a solar field to be constructed outside of the Base that will reduce electricity costs at Westover and for Chicopee Electric Light's other customers.

Westover Metropolitan Development Corporation (WMDC)

(WMDC is a quasi-public development corporation created in 1974 to undertake industrial and aviation development of property surplus by the General Services Administration at WARB. The WMDC has acquired more than 1,300 acres and has developed three (3) industrial parks and the Westover Metropolitan Airport (WMA). WMDC is an affiliate partner of the EDC of Western Massachusetts, which is the hub of seven regional economic development groups. The corporation manages day-to-day operations of the WMA and the continuing development of commercial and industrial real estate at each of the parks. WMDC is proposing an additional 100-acre development area referred to as Air Park South. This area is located outside of the Clear Zone, APZ-1 and located south of Runway 05/23.

Westover Airport

Westover Airport is well-situated within the local and regional transportation networks servicing the New England area. These multi-modal networks facilitate the efficient movement of both people and goods across the Northeast and enable the airfield to capitalize on supply chain logistics that benefit surrounding businesses.

WMA is owned by the Air Force and leased to WMDC under a Joint-use Agreement, which operates it as a civilian airport sharing the runways and air traffic control tower with WARB. The civilian airport is a Federal Aviation Administration (FAA) and Transportation Security Administration (TSA)-certified air carrier facility handling commercial traffic and public charter flights. It has a 14,600-square-foot passenger terminal and over 300,000 square feet of hangar space.

WMDC is working with USAF on extended operating hours to facilitate non-towered operation between 11:00 p.m. and 7:00 a.m. seeking permission to operate 24 hours a day, instead of the existing hours from 7:00 a.m. to 11:00 p.m. which restrict commercial air traffic and make it difficult to compete with other commercial airports such as Bradley International Airport in Connecticut and Worcester Regional Airport in Massachusetts. The airport has capacity to handle large cargo and passenger flights, as the runways are sized for military cargo planes, currently the C-5M Super Galaxy, the military's largest aircraft.

Westover Airport Business Plan - 2014

The MASS Task Force initiative funded completion of a Westover Airport Business Plan in 2014, sponsored by MassDOT and MassDevelopment. The plan addressed growth opportunities at Westover Airport and outlined steps the Commonwealth and the WJLUS region can take to grow the economy in this

area of Western Massachusetts and support the mission of the WARB. As a result of the plan's findings, several initiatives have been launched, including the creation of a UMass Amherst-led Aviation Research and Training Center in Chicopee, with a state allocation of up to \$5 million leveraging about \$15 million in private investment and sponsored research to be conducted by UMass-Amherst and benefiting federal agencies. As many of the ideas outlined in the plan require 24-hour runway access for success and economic growth, WMDC has undertaken the necessary steps to accomplish this goal in partnership with WARB and other stakeholders including MassDOT, the City of Chicopee, other municipalities near the airfield, the Greater Chicopee Chamber of Commerce, and the Galaxy Council.

In order to support the pursuit of an Aircraft, Maintenance Repair and Overhaul (MRO) Facility, further research was conducted to explore the business case, design for hangar renovation, and potential for investment to attract an airline or private operator to provide MRO services at WARB/WMA. Finally, Westover Airport re-launched their website, www.westoverairport.com and produced new marketing materials to attract new businesses.

The Plan found that WMA, WARB, and their partners should pursue locating the following assets at the civilian side of Westover:

- Maintenance, Repair, and Overhaul Facility
- Air Charter Service
- General Aviation/Corporate Service
- Commercial Air Service
- Aviation/Aerospace Education Initiative
- Consolidated Public Safety Facility

On the military side, the Plan found that WARB and its partners should pursue the following:

- Joint Westover Plan with Westover Airport
- Preservation of Capacity for Future New Missions
- Expansion of Aerial Port Capabilities
- New Fixed or Rotary Wing Mission Potential
- Supply Chain Space Offer
- New Controlled Airfield Technology to expand runway operating hours

Westover Industrial Parks

Three (3) industrial parks are located adjacent to the base (East, West, and North), owned and managed by WMDC. The land is former Air Force Base property that is ideal for industrial use, with flat topography and excellent access to Interstate 91. More than 50 companies have located in three of the industrial parks, employing over 3,200 people and generating over \$2 million in tax revenue a year for Chicopee and over \$1.6 million for Ludlow. Airpark East

covers about 900 acres mainly in Ludlow and includes several businesses plus the Hampden County Correctional Center. Air Park West, about 256 acres, includes the Westover Airport, has 33 businesses, and still has about 18 acres of available land. Air Park North has about 100 acres and a former Avery Dennison plant that is partially occupied by a Yankee Candle distribution center. Finally, WMDC is undergoing the permitting process and seeking funds for infrastructure to develop the 88-acre Air Park South. This park is currently zoned residential and will need to be rezoned if it is to be used as an industrial site.

There is an additional 150-acre industrial park at the I-90/291 intersection in Chicopee, the Chicopee River Business Park. Owned by Westmass Area Development Corporation, an affiliate of WMDC and the Western Mass EDC, the park is thus far home to one company and a solar farm.

UMass Aviation Research and Training Center

UMass Amherst has launched plans for a new Aviation Research and Training Center at WARB in Chicopee where they will conduct advanced aeronautical research and provide training for air traffic controllers, pilots and other aviation professionals. Research will include development and hosting of hi-fidelity 3D simulation capability to model autonomous aircraft operations, which will be tested over the Atlantic Ocean out of Joint Base Cape Cod. The Aviation Center will be located at Westover in space leased from the Air Force and staffed by UMass Amherst faculty and students and scientists from M2C Aerospace, Inc. of Milford, Massachusetts. The center is supported by a \$5 million state grant that will be used to secure additional funding from the state and federal governments, private industry and foundations.

In conjunction with M2C, UMass has entered discussions with NASA to collaborate with the aviation center by providing access to their systems and eventually establishing a NASA presence, and additional discussions have occurred with the U.S. Coast Guard Research and Development Center in New London, Connecticut, to collaborate on aviation research to improve search and rescue, disaster response, and counterterrorism activities supported by air operations.

Other Major Developments

Other developments in the area may have an impact on the demand for airport services as well as for industrial park sites and for goods and services already available at WARB. These developments include the new CRRC MA subway car plant, located nearby in East Springfield, the MGM casino in downtown Springfield, and Ludlow Mills.

The CRRC MA manufacturing plant manufactures subway cars and currently has contracts with the MBTA to construct Red Line and Orange Line cars, Los Angeles, and Greater Philadelphia transit system. It employs 150 people in neighboring Springfield and other communities.

The Town of Ludlow and the Westmass Area Development Corporation are preparing access to an additional 60 acres of pre-permitted light-industrial land in the next several years at Ludlow Mills. The construction of Riverside Drive has been funded through a \$3.5 million MassWorks grant from the state and a \$3 million grant from the U.S. Economic Development Administration.

The \$960 million MGM Springfield Resort and Casino in downtown Springfield opened in August of 2018. The City of Chicopee and WMDC submitted a proposal to the Mass Gaming Commission in 2017 for assistance in WMDC's project for expanded operating hours. The project will require upgrading existing facilities and training and staffing of additional personnel, but will not require major infrastructural improvements.

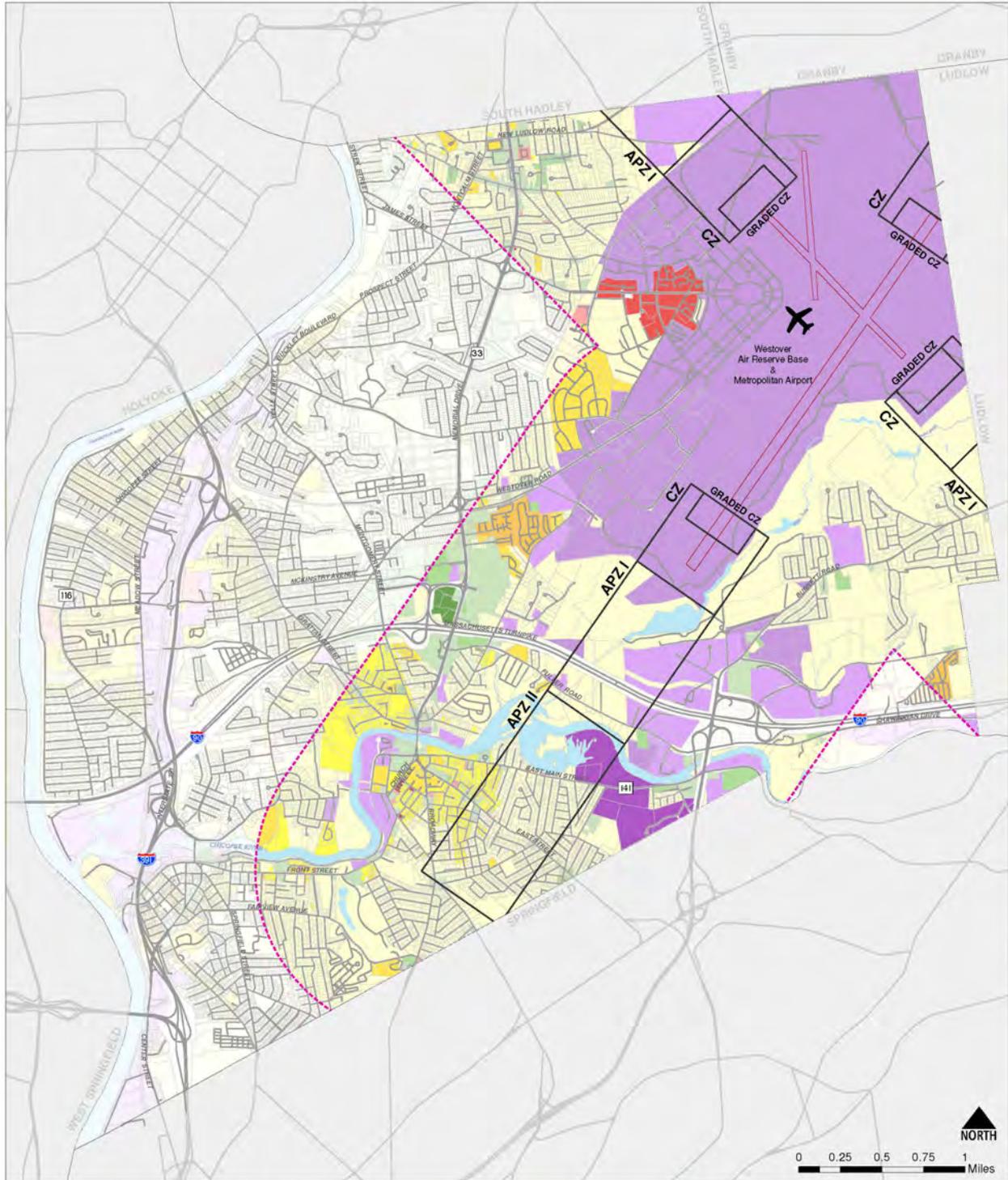
Great New England Air and Space Show

An additional economic impact is gained from the Great New England Air and Space Show, which generated approximately \$8.2 million in local spending in 2008 and \$11.5 million in 2015. When local attendees were removed from the 2018 analysis, the direct economic expenditures from non-locals was estimated to be \$9.3 million, and the direct and induced sales multiplier impact overall was estimated to be \$14.9 million. This compares to a direct economic impact of \$12.3 million in 2015. However, attendance at the 2018 Air Show was significantly reduced from previous events; the 2008 show attracted 345,000 people, and the 2015 show attracted 375,000, while in 2018, only 63,400 attendees were counted. The reasons for the change are unclear and should be investigated more closely. The next Air Show will be held at Barnes Air National Guard Base in Westfield.

City of Chicopee

Among one of the first planned industrial communities in the US, Chicopee now resides at the crossroads of four highways: I-90, I-91, I-291, and I-391. It is home to WARB and the Westover Industrial Airparks, which was developed through a partnership with the Department of Defense. The Westover Metropolitan Airport, adjacent to the industrial parks, offers private passenger and cargo service. The airport is operated by the WMDC. For more information see the Economy Section of this report.

Chicopee borders the Connecticut River to the west and the Chicopee River traverses the southern portion of the town. A sawmill was the first river industry when the area that is now Chicopee was first purchased from the Agawam Indians. The mill was built at what is now known as Chicopee Falls. Initially a part of Springfield, Chicopee was partitioned off into its own town in 1848 due to political factions.



Westover ARB 2018 Joint Land Use Study

Municipal Zoning Chicopee, MA

Chicopee MA Zoning Designations

- Business A
- Business B
- Business C
- Central Business District
- Commercial A
- Commercial A-1
- Industrial
- Industrial Garden Planned Unit Development Type 1
- Industrial Garden Planned Unit Development Type 2
- Mixed Use
- Residential A
- Residential B
- Residential C
- Residential D
- Railroad Right of Way
- Water

- JLUIS Study Area Boundaries
- Accident Potential Zone (APZ) Boundaries
- Tax Parcel Boundaries
- Air Reserve Base Runway Boundaries

Data Sources:
City of Chicopee, MA, MADO, MassGIS, Pioneer Valley Planning Commission, Westover ARB.

Figure 46. Chicopee Zoning

The Chicopee Memorial State Park, which surrounds the Chicopee Reservoir, is a major attraction for area residents during the warm weather months. Besides swimming, picnicking, fishing, hiking and biking are available to visitors of the park.

Chicopee is the most densely developed of all the communities abutting the WARB. There are a mix of land uses in Chicopee including residential, industrial and commercial development. The Massachusetts Turnpike traverses the city and the APZ, as does the Chicopee River.

Chicopee Master Plan

The City of Chicopee does not have a master plan in place but they are aiming to kick off a master planning process in 2019.

Chicopee Zoning Bylaw

Chicopee has eight zoning districts that fall within the APZs and CZs (See Figure 46). These include three residential districts, a business district and four industrial districts (See the Appendix for a detailed breakdown of uses allowed within each district).

Residential development is allowed at various densities with the Residential A District promoting single family homes, Residential B also allowing two family homes and Residential C adding multifamily homes. Other uses are allowed primarily by Special Permit.

The Business A District allows a wide range of business uses in high traffic areas. The three industrial districts are Industrial, Industrial Garden Type I and Industrial Garden Type II. Some uses are allowed by-right and others by special permit. The Industrial Garden Districts are Planned Unit Developments designed to promote flexibility in design and layout and simultaneously protect natural features.

Town of Granby

The Town of Granby is a rural suburban town on the outskirts of the Holyoke metro area. It was settled in 1727 and incorporated in 1768. The Holyoke Mountain Range is located in the northern portion of the town, which hampered agricultural development in

Chicopee *"Fast Facts"*

Population:
55,991

Median Age:
40.2

Land Area:
23.9 square miles

Population Density:
2422.1

Occupied Housing Units:
22,988

Average Household Size:
Owner: 2.51
Renter: 2.2

Rental Household Rate:
41.8%

**Employed Residents over
Age 16:**
26,839

**Median Household
Income:**
\$49,006

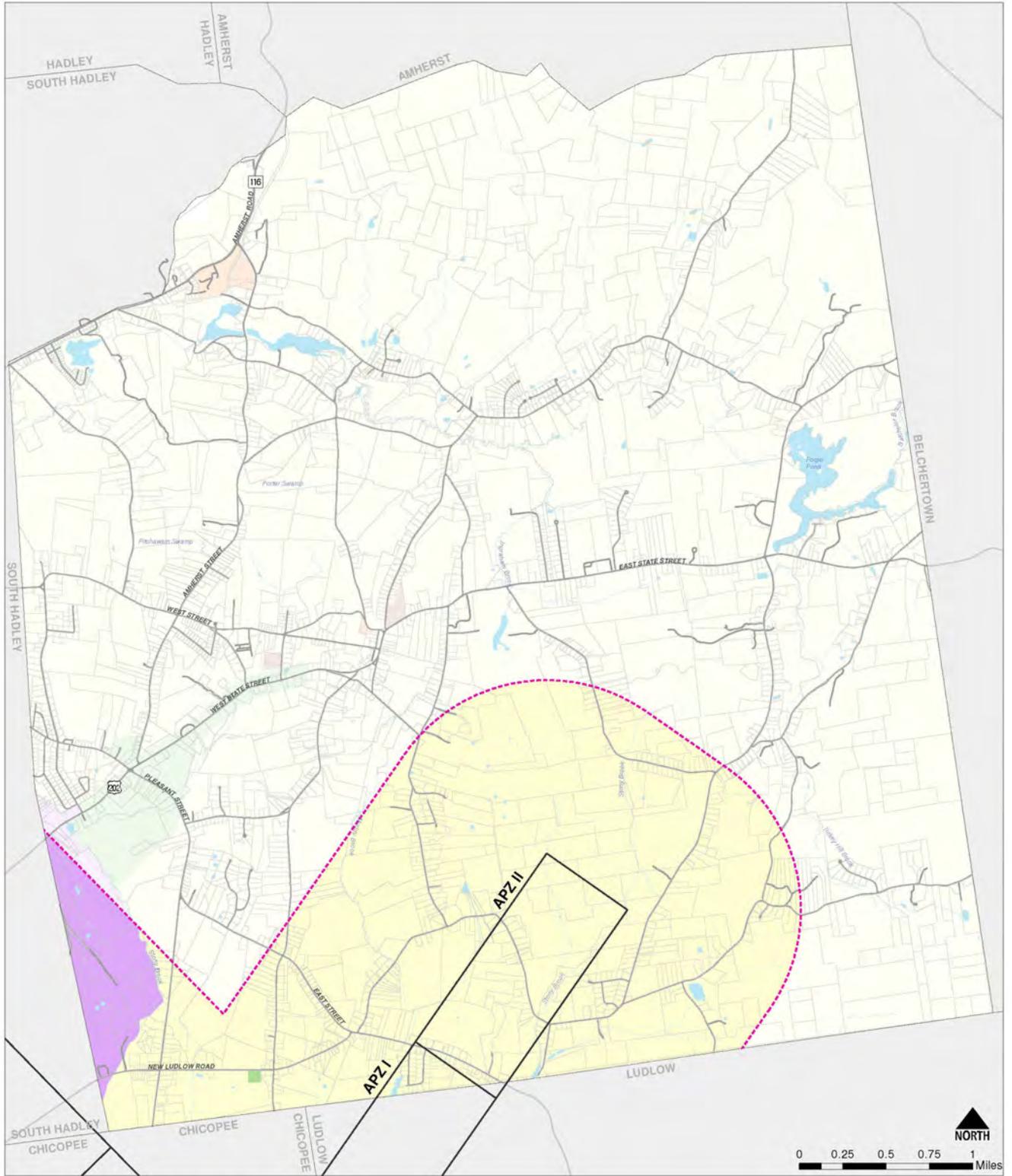
**Bachelor's Degree or
Higher Attainment:**
18.1%

Poverty Rate:
14.5%

that part of town. However, settlers did develop farms and limited industries elsewhere in the community. This helped to build the town's economic foundation. The largest crops in the early 1800's included grains, turnips, pumpkins, and hops. Dairy farming, button making, and palm leaf hats were also of economic importance. By the end of the 1800's agriculture, primarily dairy farming was the most significant industry in Granby.

Granby has retained its original meeting house green, neoclassical library, and a handful of Greek revival houses. The Mt. Holyoke Range State Park serves as a key recreational attraction to the region, as does the Granby Dinosaur Museum. Activities available at the state park include hiking, biking, horseback riding, snowshoeing, snowmobiling, hunting and other activities.

Granby is the most rural of the five communities surrounding the base. The community's economic development is focused on the Route 202 corridor. Residential development is scattered throughout the rest of the town at a fairly low density.



Westover ARB 2018 Joint Land Use Study

Municipal Zoning

Granby, MA

Figure 47. Granby Zoning

Base Map - Granby MA Zoning Designations

- General Business
- Multi-Family Low Density
- General Industrial
- Single Family Residential R2
- Municipal

- JULUS Study Area
- Accident Potential Zone (APZ) Boundaries
- Tax Parcel Boundaries

Granby Master Plan

The Town of Granby developed a Master Plan in 2014. They updated the Land Use Section of their Master Plan in 2017 with the assistance of PVPC. Community engagement at that time confirmed that residents would like to maintain the overall rural character of the town and continue to protect farmland. They are also interested in implementing smart growth strategies by focusing higher density development and economic development in areas that have the most potential for sewer and water infrastructure.

Granby Zoning Bylaw

There is only one Base zoning district in Granby in both the APZ I and II (See Figure 47). The Single Family Residential District, R2 allows residential development at a minimum density of one unit per acre. Other uses appropriate in rural communities are allowed by site plan and special permit approval (See the Appendix for a detailed breakdown of uses allowed in this district).

There are two overlay districts within the Granby APZs, the Floodplain and Agriculture Preservation Overlay Districts. The Agricultural District is designed to promote agricultural uses and allows for the development of open space residential development, which encourages clustering residential uses in order to protect farmland and other natural resources.

Granby **"Fast Facts"**

Population:
6,357

Median Age:
45.5

Land Area:
28.1 square miles

Population Density: 224.2

Occupied Housing Units:
2,493

Average Household Size:
Owner: 2.62
Renter: 2.11

Rental Household Rate:
14.9%

**Employed Residents over
Age 16:**
3602

**Median Household
Income:**
\$86,692

**Bachelor's Degree or
Higher Attainment:**
35%

Poverty Rate:
4.9%

Town of Ludlow

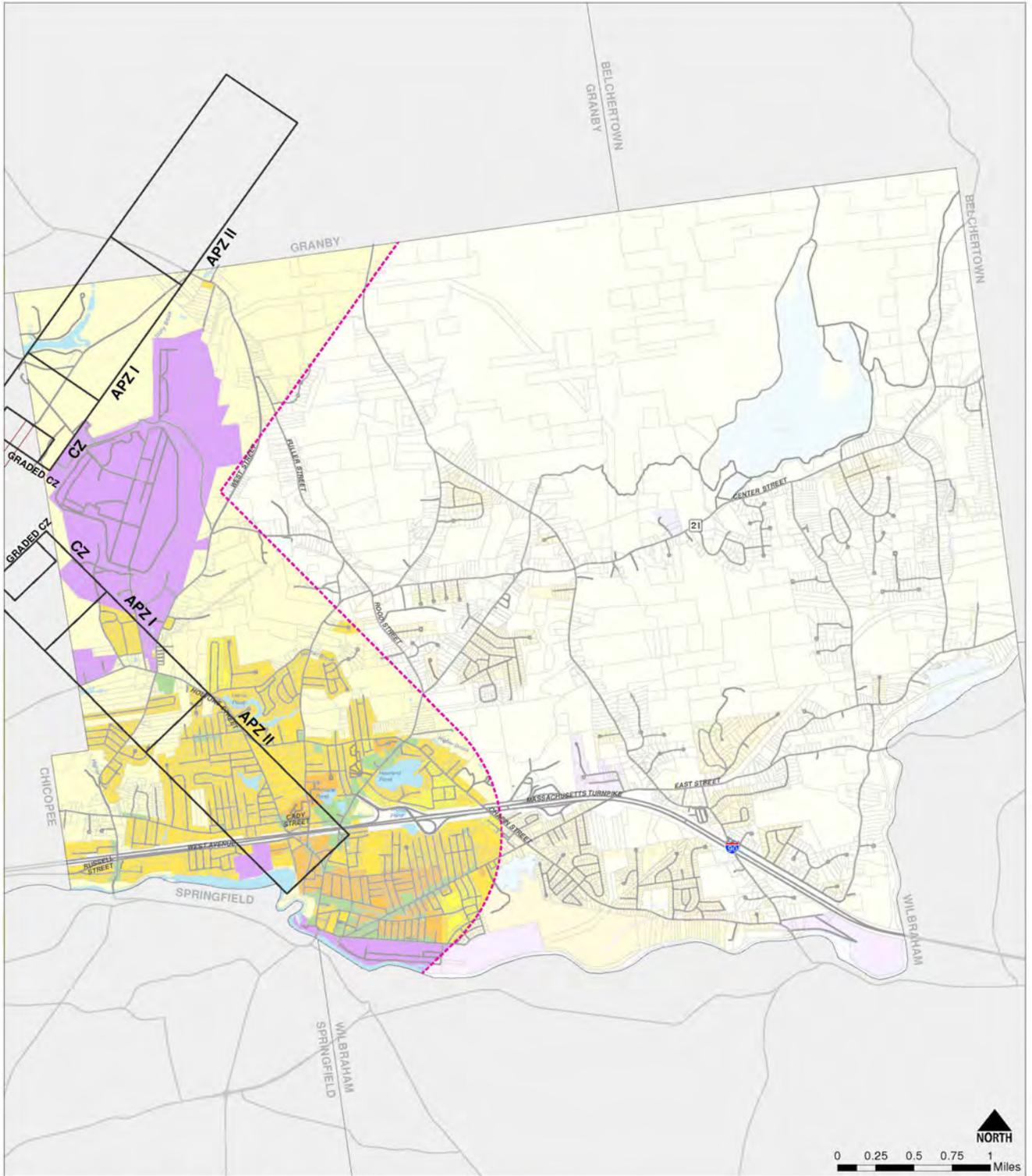
Settled in 1775 around the Ludlow Manufacturing Company, the Town of Ludlow was once home to waves of immigrants from Scotland, Ireland, Poland, Portugal, Canada, and Italy who came to work in the mills. It is now a suburban community, seeing recent growth in single and two-family homes. Ludlow is home to an established factory district and the Westover Air Park East. It is also the site of the Hampden County House of Corrections Facility.

The Massachusetts Turnpike traverses the southern portion of Ludlow and the Chicopee River forms the southern border. It is considered a suburb of the Springfield metropolitan area.

Land uses in Ludlow range from urban to suburban to rural. Ludlow's downtown area, which is adjacent to and partially within an APZ, consists of denser and more complex land uses than found elsewhere in town. The central and eastern parts of Ludlow are more suburban and rural.

Ludlow Master Plan

The Town of Ludlow adopted a Master Plan prepared by PVPC & the UMass Amherst Landscape Architecture and Regional Planning Department, in 2011. Priorities identified in this plan include a focus on downtown revitalization and establishing an open space and greenway network. The establishment of smart growth zones was identified as strategy to promote downtown revitalization.



Westover ARB 2018 Joint Land Use Study

Municipal Zoning

Ludlow, MA

Base Map - Ludlow MA Zoning Designations

- General Business
- Single Family Residential R4
- Limited Industrial
- Single Family Residential R5
- Residential Agricultural
- Water
- Single Family Residential R2

- JLUS Study Area
- Accident Potential Zone (APZ) Boundaries
- Air Reserve Base Runway Boundaries
- Tax Parcel Boundaries

Data Sources:
Town of Ludlow MA, MADOT, MassGIS, Pioneer Valley Planning Commission, Westover ARB
2009
pvpc

Figure 48. Ludlow Zoning

Ludlow Zoning Bylaw

The Town of Ludlow has five base zoning districts that fall within the APZs (See Figure 48) including residential (different densities), business and industrial and two overlay districts. The following describes the districts within the APZs (See the Appendix for a detailed breakdown of uses allowed within each district).

The Agricultural Zone allows single family homes by-right. Single family homes and some agricultural uses are allowed in the Residential A District by-right. The Residential B District allows single and two-family homes by-right and multifamily by site plan and special permit. Other uses are allowed in these districts by site plan and special permit.

The Business A District is designed for light commercial uses. Some of these commercial uses require site plan approval and some require a site plan and special permit. The Industrial A District allows industrial and other uses by site plan and special permit.

Ludlow also has an Aircraft Flight Overlay District, which includes the entire area of the APZs & CZs in Ludlow. There are two Aircraft Flight Overlay Districts because there are two runway flight paths in Ludlow. These overlay districts prohibit certain uses including:

- Adult Care Facilities (Amended 10/3/11), Hospitals, Auditoriums, Concert Halls
- Schools, Day Care Centers, Houses of Worship (Added 4/11/94 - See House Bill #4755)

The flight overlay districts were established over 20 years ago in response to WARB concerns. Special dispensation was required by the state legislature to prohibit houses of worship and schools, which generally cannot be prohibited by zoning in Massachusetts. The Compatibility Analysis below includes more details about land use and zoning issues and concerns within the APZs.

Ludlow also adopted three Smart Growth Overlay Districts in 2013. They are designed to allow a higher density of development and a mix of uses. The districts are voluntary and initiated at the request of a developer. A portion of one of the Smart Growth Districts falls at the edge of Ludlow's southern Flight Overlay District/APZ:

Ludlow "Fast Facts"

Population:
21,425

Median Age:
44.2

Land Area:
28.2 square miles

Population Density:
775.7

Occupied Housing Units:
8,000

Average Household Size:
Owner: 2.69
Renter: 2.31

Rental Household Rate:
25.3%

**Employed Residents over
Age 16:**
10,416

**Median Household
Income:**
\$64,534

**Bachelor's Degree or
Higher Attainment:**
21.8%

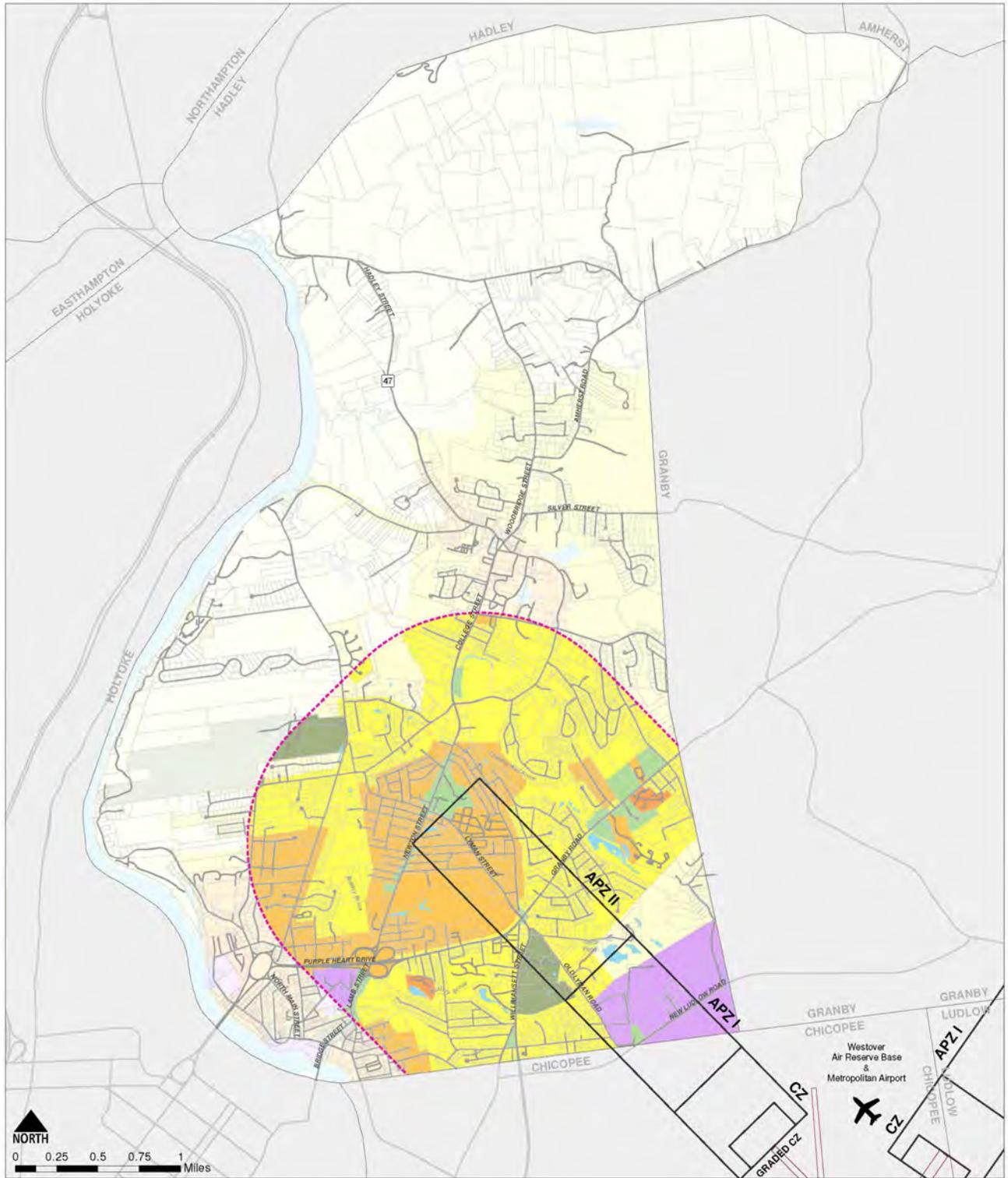
Poverty Rate:
5.4%

- Riverside Mixed Use District - Designed to transform lands along the Chicopee River into an active waterfront district and primary gateway into the community.

The Town of South Hadley

South Hadley is framed by the Connecticut River to the west and the Mount Holyoke Range to the north. Skinner State Park, including Mt. Holyoke, is located in the northern part of South Hadley. The park is a major attraction for hikers, bikers, horseback riding, snowshoeing, picnicking and other activities. South Hadley is home to Mount Holyoke College, founded in 1837 and known as the oldest continuing institution of higher learning for women. The town is also home to a vibrant farming community.

The two dominant neighborhoods in South Hadley are South Hadley Falls and The Center. South Hadley Falls is a historic district built around the South Hadley Canal and Dam. The Center is characterized by a national historic district, tree-lined residential streets, The Village Commons (a mixed use development), Mount Holyoke College, and the Town Common.



Westover ARB 2018 Joint Land Use Study

Municipal Zoning

South Hadley, MA

Base Map - South Hadley MA Zoning Designations

- General Business
- Single Family Residential R3
- Limited Business
- Single Family Residential R4
- General Industrial
- Single Family Residential R5
- Residential/Agricultural
- Multi family Low Density

- J.LUS Study Area Boundaries
- Accident Potential Zone (APZ) Boundaries
- Tax Parcel Boundaries
- Air Reserve Base Runway Boundaries

Data Sources:
Town of South Hadley MA, MADD, MassGIS, Pioneer Valley Planning Commission, Westover ARB



Figure 49. South Hadley Zoning

South Hadley Master Plan

South Hadley is in the process of initiating a Master Plan update. They have hired a consultant to help them through the process. South Hadley's most recent Master Plan was adopted in 2010 and an Open Space and Recreation Plan was developed in 2012. The 2010 Master Plan identified five core initiatives:

1. Revitalize South Hadley Falls
2. Invest in the Route 116/Route 33 Commercial Focus Area as a mixed-use center
3. Connect South Hadley's Centers
4. Secure open space in the range, river and rural areas
5. Update the regulatory infrastructure to support the community's desired outcomes

South Hadley Zoning Bylaw

Seven different zoning districts fall within South Hadley's APZs (See Figure 49), as well as a new overlay district. The following describes the districts within the APZs (See the Appendix for a detailed breakdown of uses allowed within each district).

The Residence A-1, Residence A-2 and the Agricultural Districts all allow single family homes by-right, while more extensive agricultural uses are promoted in the agricultural zone. Many other uses are allowed by site plan review and/or special permit, including two family and multifamily homes, except in the agriculture zone.

The Business Districts - A, A-1, B and C - allow a variety of commercial uses. Some of those uses are allowed by right, while others require site plan approval or a special permit. Most industrial uses allowed in the Industrial A and B Districts also require site plan approval or a special permit.

In the spring of 2018, South Hadley established a Smart Growth Overlay District at the northern edge of the APZ. The Newton Street Smart Growth District was established to promote redevelopment at a village scale with a mix of uses and higher density residential development.

South Hadley "Fast Facts"

Population:
17,794

Median Age:
40.8

Land Area:
18.4 square miles

Population Density:
988.7

Occupied Housing Units:
6,786

Average Household Size:
Owner: 2.45
Renter: 1.74

Rental Household Rate:
26.5%

**Employed Residents over
Age 16:**
9,189

**Median Household
Income:**
\$62,004

**Bachelor's Degree or
Higher Attainment:**
39.9%

Poverty Rate:
9%

The City of Springfield

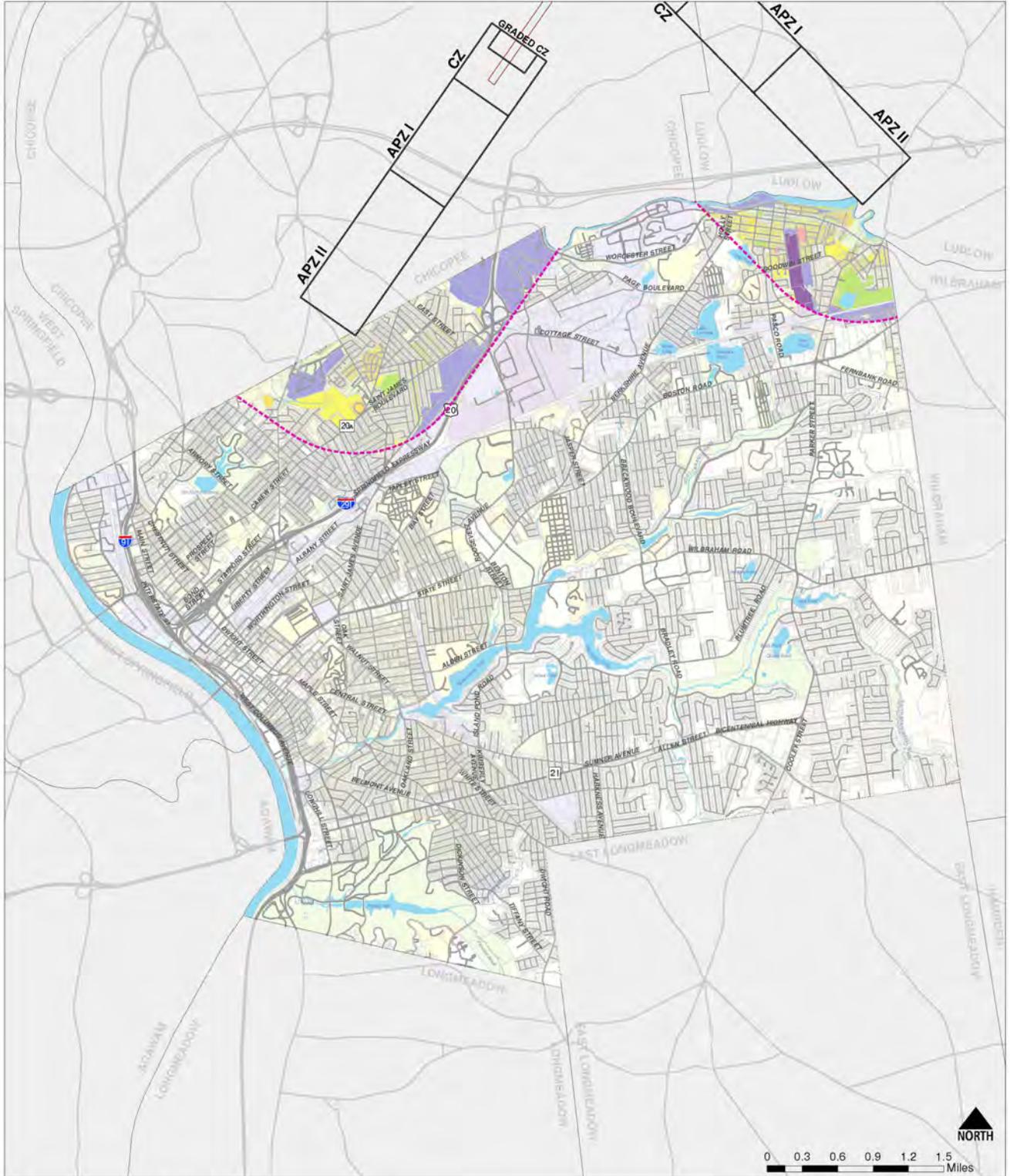
As the cultural and commercial center of the Pioneer Valley region, Springfield is the third largest city in Massachusetts. Springfield is home to five of the largest employers in the area including Baystate Health System and Mass Mutual. It is also home to the recently opened MGM Casino.

Springfield is known as the “City of Firsts.” The first gas powered automobile was built in Springfield, as was the first gas-powered cycle. The city also lays claim to the invention of basketball and is the location of the Basketball Hall of Fame. Springfield Technical Community College, American International College, Springfield College, and Western New England University and School of Law are all located in Springfield.

The City of Springfield is very densely developed overall with a wide variety and mix of uses. However, only a very small section of one of the APZs is located in Springfield. It is at the edge of the city that abuts Chicopee and is residential in nature.

Springfield Master Plans

Springfield has conducted various planning related studies in recent years, including an Open Space and Recreation Plan and Rebuild Springfield Plan in 2012 (developed to address damage cause the tornado). However, it does not have a master plan in place.



Westover ARB 2018 Joint Land Use Study

Municipal Zoning Springfield, MA

Springfield MA Zoning Designations

- Business A
- Business B
- Business C
- Business D
- Business B-1
- Business X
- Riverfront
- Commercial A
- Commercial P
- Office A
- Industrial Park
- Industrial A
- Residential A
- Residential A-1
- Residential B
- Residential C
- Residential C-1
- Residential C-2
- Open Space

- Air Accident Zone Boundaries
- Tax Parcel Boundaries
- JLUS Study Area Boundaries

Data Sources:
MADOT, MassGIS, Westover ARB
pvpc

Figure 50. Springfield Zoning

Springfield Zoning Bylaws

Since the APZ area in Springfield is so small, there is only one zoning district (See Figure 50). The Residential A District supports low density single family residential dwellings and appropriate public facilities.

Springfield "Fast Facts"

Population:
153,991

Median Age:
32.6

Land Area:
33.1 square miles

Population Density:
4,652.3

Occupied Housing Units:
55,921

Average Household Size:
Owner: 2.61
Renter: 2.71

Rental Household Rate:
52.8%

**Employed Residents over
Age 16:**
69,500

**Median Household
Income:**
\$35,742

**Bachelor's Degree or
Higher Attainment:**
17.8%

Poverty Rate:
29.7%

3. COMPATABILITY ANALYSIS



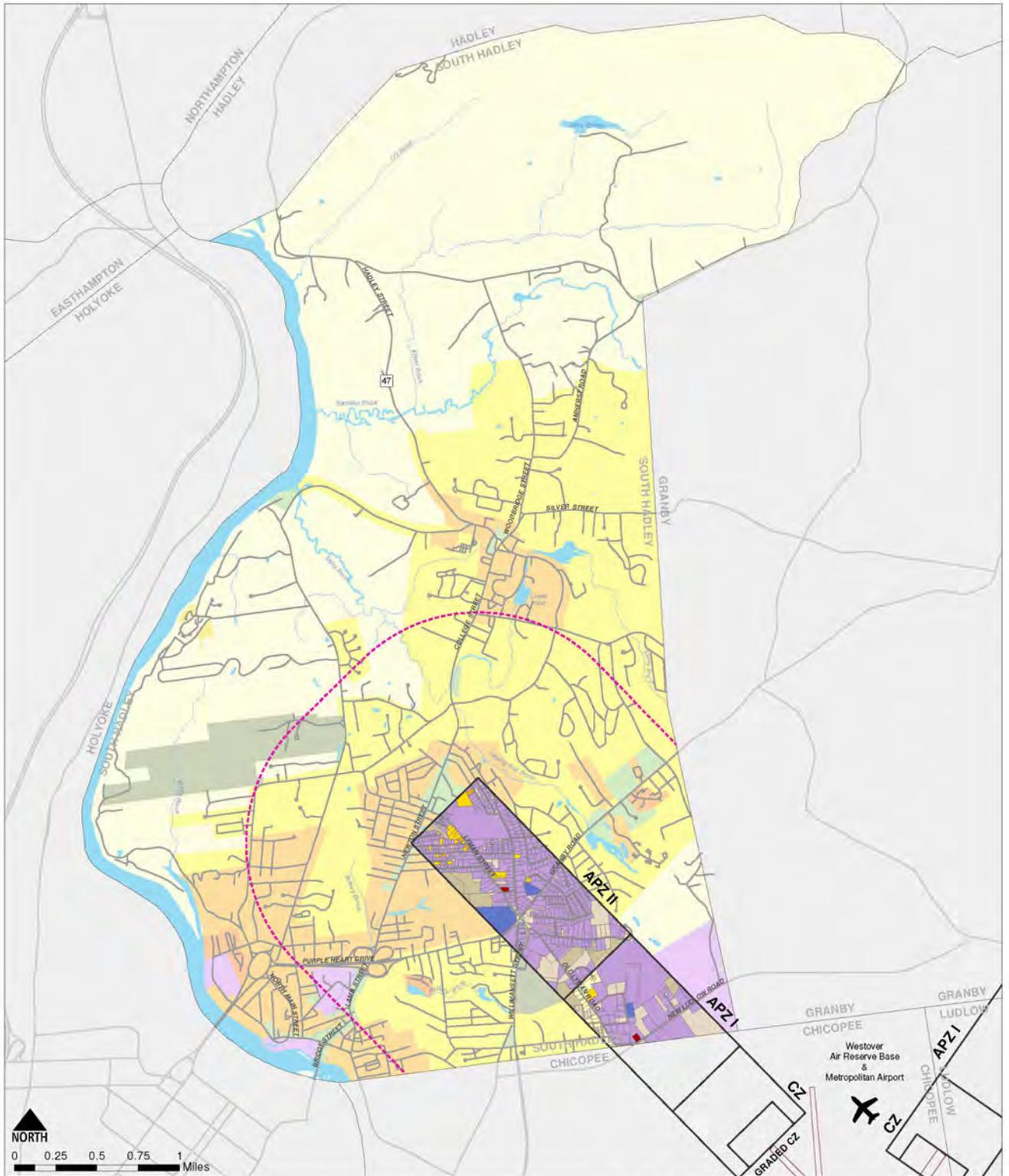
LAND USE & DEVELOPMENT

The compatibility analysis is the heart of a Joint Land Use Study. Since WARB is an Air Reserve Base, development in the flight paths at the end of the runways is of prime importance. WARB's goal is to avoid land use conflicts that put people in surrounding communities in danger or hinder WARB's operations.

As noted above, the area closest to the end of the runway is designated as a Clear Zone or CZ. The majority of the CZs are owned by WARB. The area in the flight path outside the CZ is called the Accident Potential Zone or APZ. There are two APZ categories. The APZ I is closest to the CZ and the APZ II is farther out (see the AICUZ maps in the following section). The military identifies land uses as compatible or incompatible within each APZ. The closer a land use is to the end of the runway, the more likely it is to be designated as incompatible. Higher density land uses and land uses that attract large numbers of people will increase the incompatible nature and designation of those uses. The following provides an analysis of each of the CZs and APZs surrounding WARB.

South Hadley

WARB's northeastern APZ II and part of the APZ I are located within the Town of South Hadley. The majority of the land uses in these APZs are compatible however there are some incompatible residential, commercial and institutional uses. There is a public school, a private school and a church in the APZ II. See Figures 51 and 52 for a detailed breakdown of the types of land uses in the AICUZ in South Hadley.



Westover ARB 2018 Joint Land Use Study

Air Accident Zone Existing Land Use Compatibility South Hadley, MA

- Air Accident Zone Compatibility**
- Compatible Land Use**
- Compatible - Developed
 - Compatible - Bare Ground or Water
 - Compatible - Vacant
 - Compatible - Westover Metropolitan
- Incompatible Land Use**
- Incompatible - Commercial
 - Incompatible - Institutional
 - Incompatible - Residential Low
 - Incompatible - Residential Low Medium
 - Incompatible - Residential Medium High

- Base Map - South Hadley MA Zoning Designations**
- General Business
 - Limited Business
 - General Industrial
 - Residential/Agricultural
 - Single Family Residential R3
 - Single Family Residential R4
 - Single Family Residential R5
 - Multi-family Low Density

- JLUS Study Area
- Accident Potential Zone (APZ) Boundaries
- Air Reserve Base Runway Boundaries

Data Sources:
Town of South Hadley MA, MADDI, MassGIS, Pioneer Valley Planning Commission, Westover ARB

pvpc

Figure 51. South Hadley Land Use Compatibility

The majority of the AICUZ area in South Hadley has already been developed at 71%. The remaining AICUZ is either developable at 6%, undevelopable at 6%, potentially developable at 7% or another unknown category.

As previously noted, South Hadley recently adopted a Smart Growth Overlay District at the far end of the APZ II. This district is the site of an old grocery store and plaza that the town has identified as an important redevelopment opportunity.

The new zone allows a mix of uses and higher density residential development, 20-24 units per acre. The height of the buildings allowed in this district is not a concern.

The Town of South Hadley has identified the Route 202 corridor, which traverses the APZ II, as an important economic development corridor. They would also like to see additional development, at a village scale, in the vicinity of the new Big Y plaza in the middle of the APZ II. Although this potential new development may be considered incompatible, it is not of a scale that would be a significant issue for WARB.

Chicopee

The majority of the WARB is located within the City of Chicopee, as are portions of all four CZs, three of the APZ I

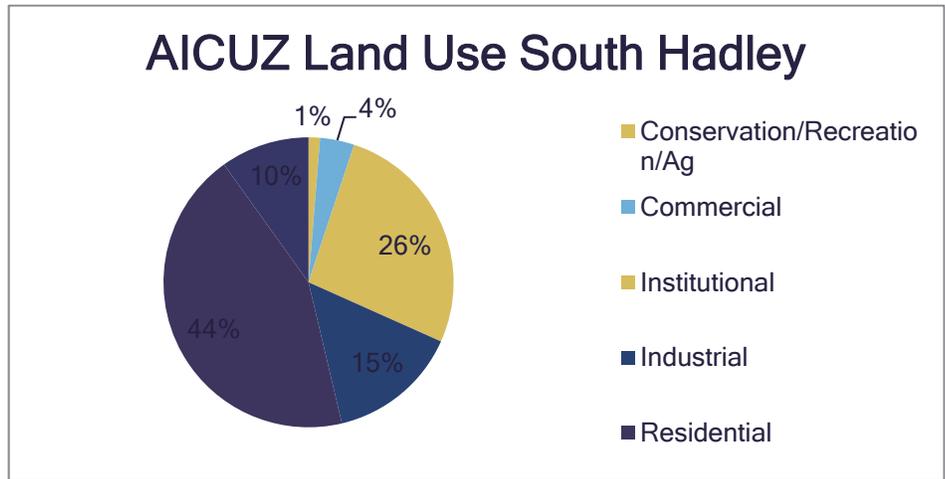


Figure 52. AICUZ Land Use South Hadley

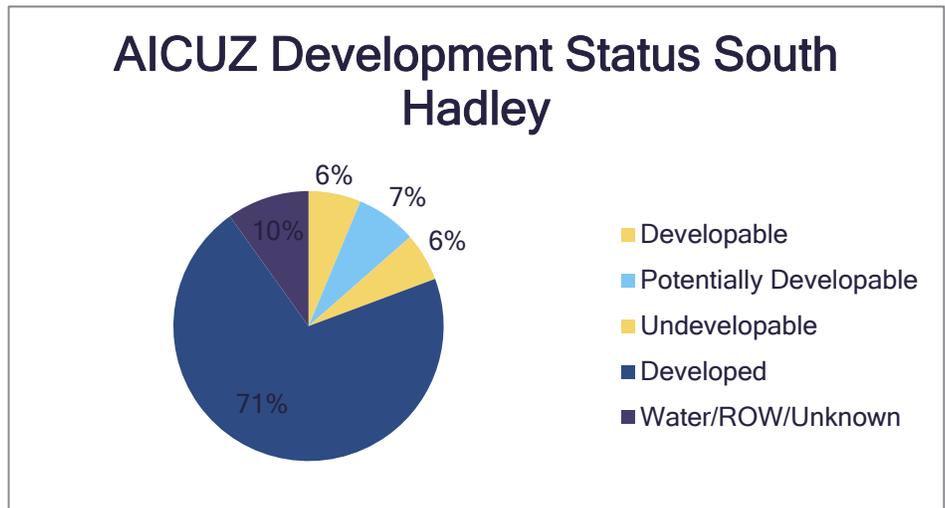


Figure 53. AICUZ Development Status South Hadley

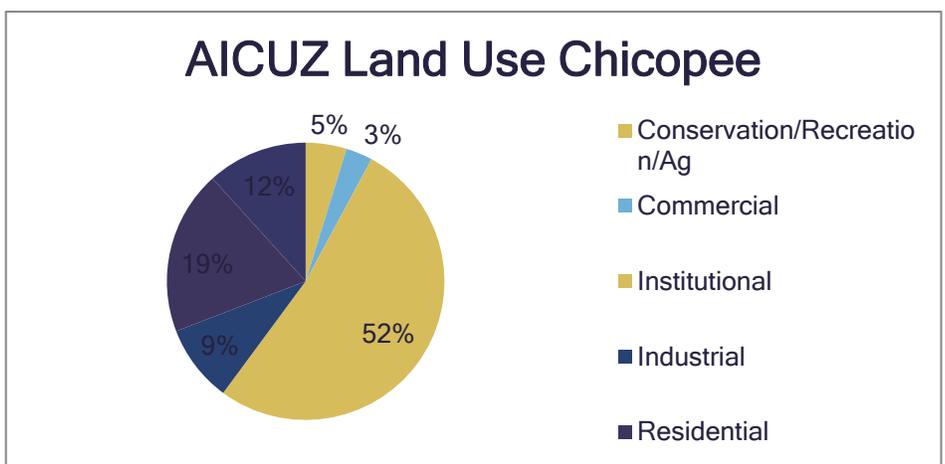


Figure 54. AICUZ Land Use Chicopee

areas and the southwestern-most APZ II. Chicopee is the most densely developed of all the communities surrounding the base. The majority of the CZs are owned by the base but there are some very small CZ areas that are privately owned. A small portion of Chicopee State Park is located in the southwestern CZ. Although this is not the part of the park where people congregate, the park's headquarters building is located in the CZ. See Figures 54 and 56 for a detailed breakdown of the types of land uses in the AICUZ in Chicopee.

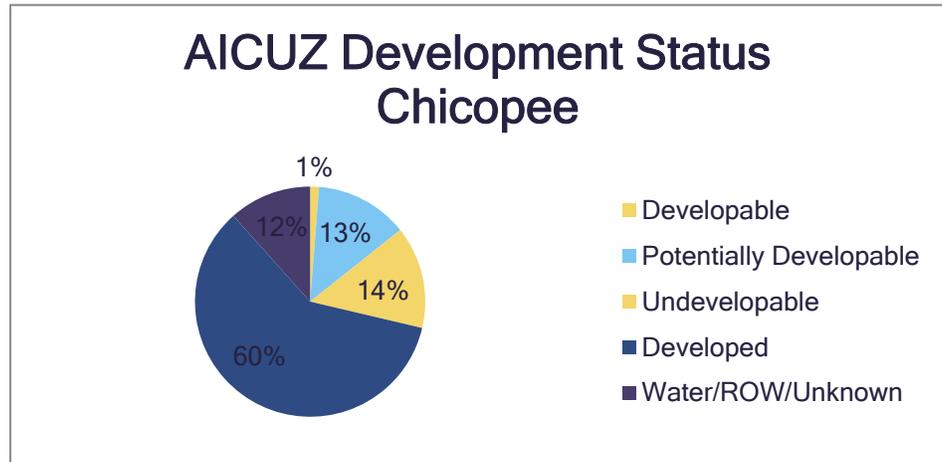
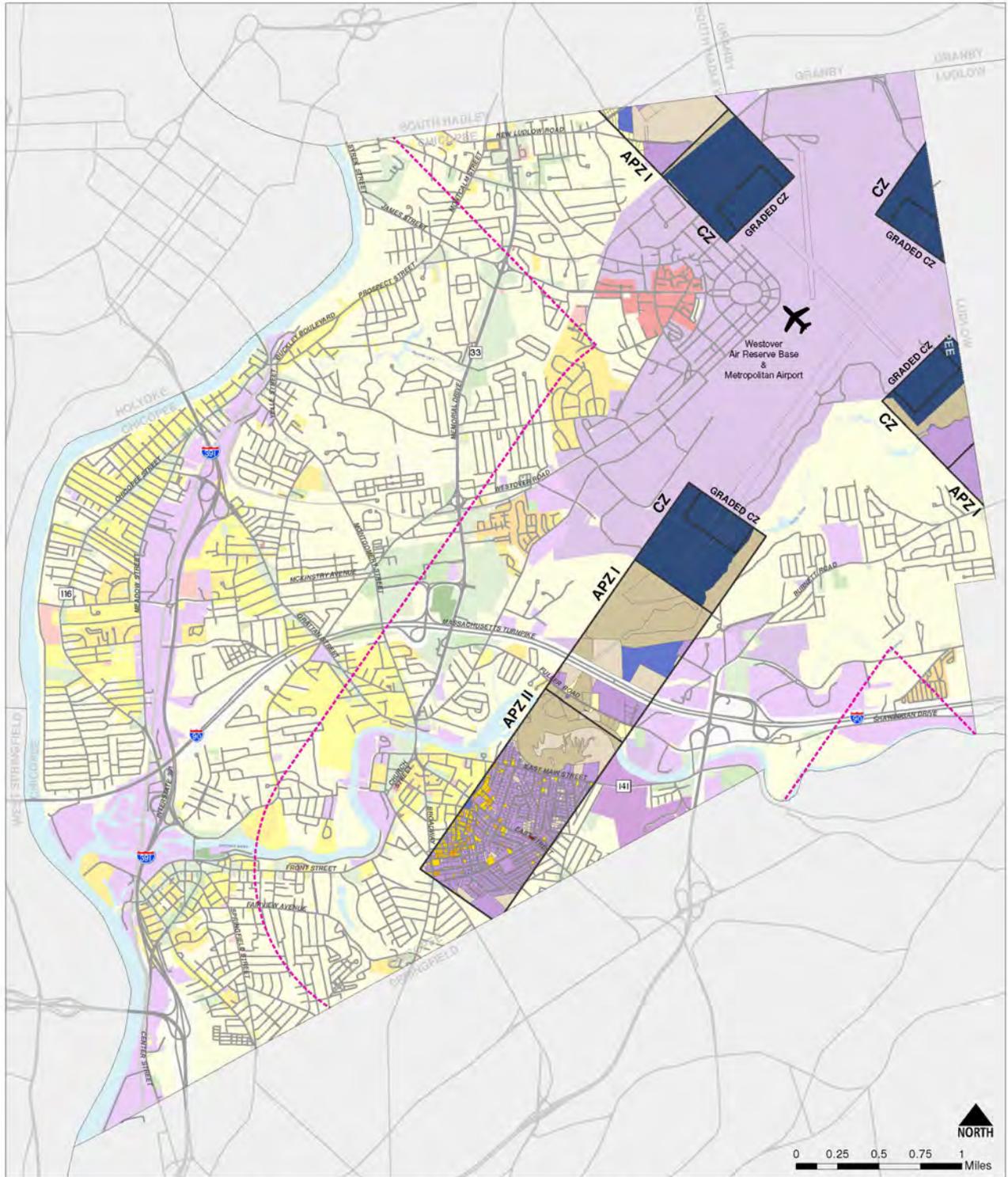


Figure 55. AICUZ Development Status Chicopee

The majority of the AICUZ area in Chicopee has already been developed at 60%. The remaining AICUZ is either developable at 1%, undevelopable at 14%, potentially developable at 13% or another unknown category.

The majority of the land uses in the three APZ I areas in Chicopee are considered compatible, although there are couple of incompatible institutional uses, including churches. The Massachusetts Turnpike and a significant portion of the Chicopee State Park are located within the southwestern APZ I. The state park is considered incompatible, since it is an area where people congregate during the warmer weather seasons. It is the site of a lake, beach and bathhouse that many people from Chicopee and the surrounding communities enjoy. The state park has existed in this location since 1960's, but the original reservoir was built in 1896.

The southwestern APZ II consists mostly of compatible residential land uses. There are some smaller areas that are considered incompatible because they are higher density residential development. Efforts by WMDC from 1992 through 2018 to alleviate incompatible residential use through land acquisitions in Chicopee and Granby included the purchase of 77 properties on 234 acres totaling over \$22million. The majority of properties are within the APZ-I.



Westover ARB 2018 Joint Land Use Study

Air Accident Zone Existing Land Use Compatibility Chicopee, MA

- Air Accident Zone Compatibility**
- Compatible Land Use**
- Compatible - Developed
 - Compatible - Bare Ground or Water
 - Compatible - Vacant
 - Compatible - Westover Metropolitan
- Incompatible Land Use**
- Incompatible - Commercial
 - Incompatible - Institutional
 - Incompatible - Residential Low
 - Incompatible - Residential Low Medium
 - Incompatible - Residential Medium High

- Base Map - Chicopee MA Zoning Designations**
- Business A
 - Business B
 - Business C
 - Central Business District
 - Commercial A
 - Commercial A-1
 - Industrial
 - Industrial Garden Planned Unit Development Type 1
 - Industrial Garden Planned Unit Development Type 2
 - Mixed Use
 - Residential A
 - Residential B
 - Residential C
 - Residential D
 - Railroad Right of Way
 - Water

JLUS Study Area
 Accident Potential Zone (APZ) Boundaries
 Air Reserve Base Runway Boundaries

Data Source:
 City of Chicopee, MA, MADCOT, MassGIS, Pioneer Valley Planning Commission, Westover ARB

Figure 56. Chicopee Land Use Compatibility

Ludlow

A portion of two CZs and APZs I and II fall within the Town of Ludlow. Most of the uses within the northern flight paths are considered compatible. The northern CZ falls entirely on base property. Most of the APZ I consists of a golf course and a conservation area. A very small section of the northeastern APZ II is located in Ludlow. This area includes a small amount of incompatible residential development.

The majority of the AICUZ area in Ludlow has already been developed at 80%. The remaining AICUZ is either developable at 2%, undevelopable at 6%, potentially developable at 2% or another unknown category.

The southern flight path in Ludlow is much more complicated, although the CZ falls on WARB property. The APZ I does have some incompatible commercial and residential development, as well as compatible development. Most of the APZ II is made up of compatible development with some higher density residential and commercial development at the far end in the vicinity of the Massachusetts Turnpike.

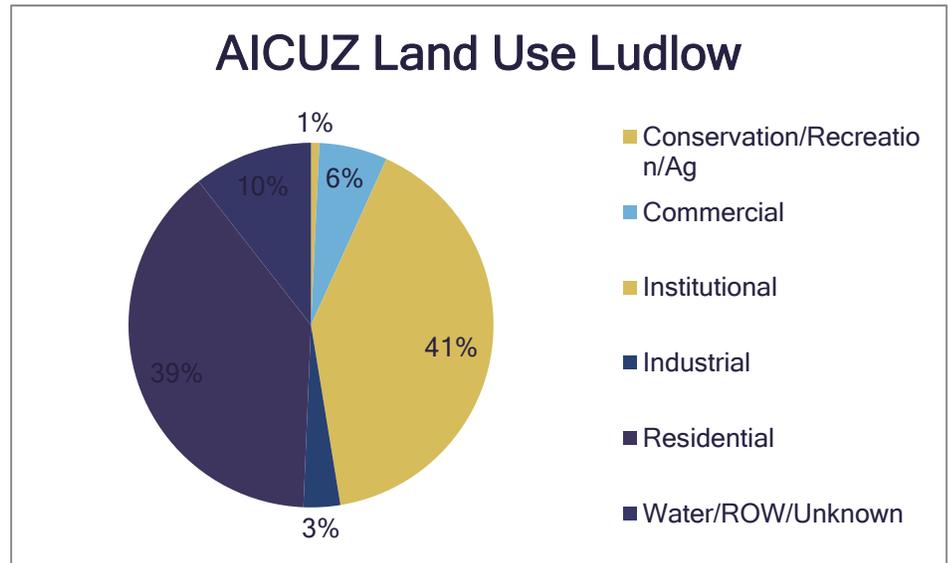


Figure 57. AICUZ Land Use Ludlow

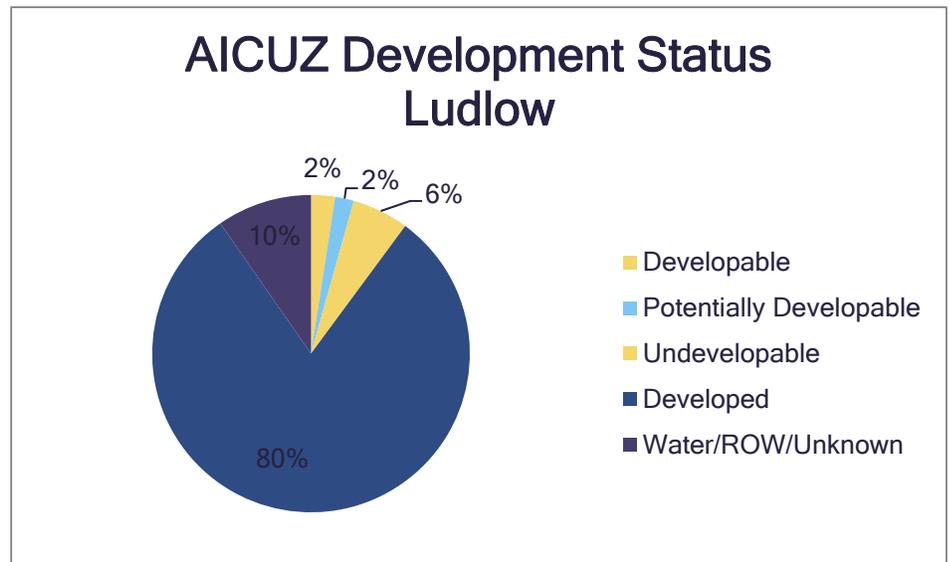
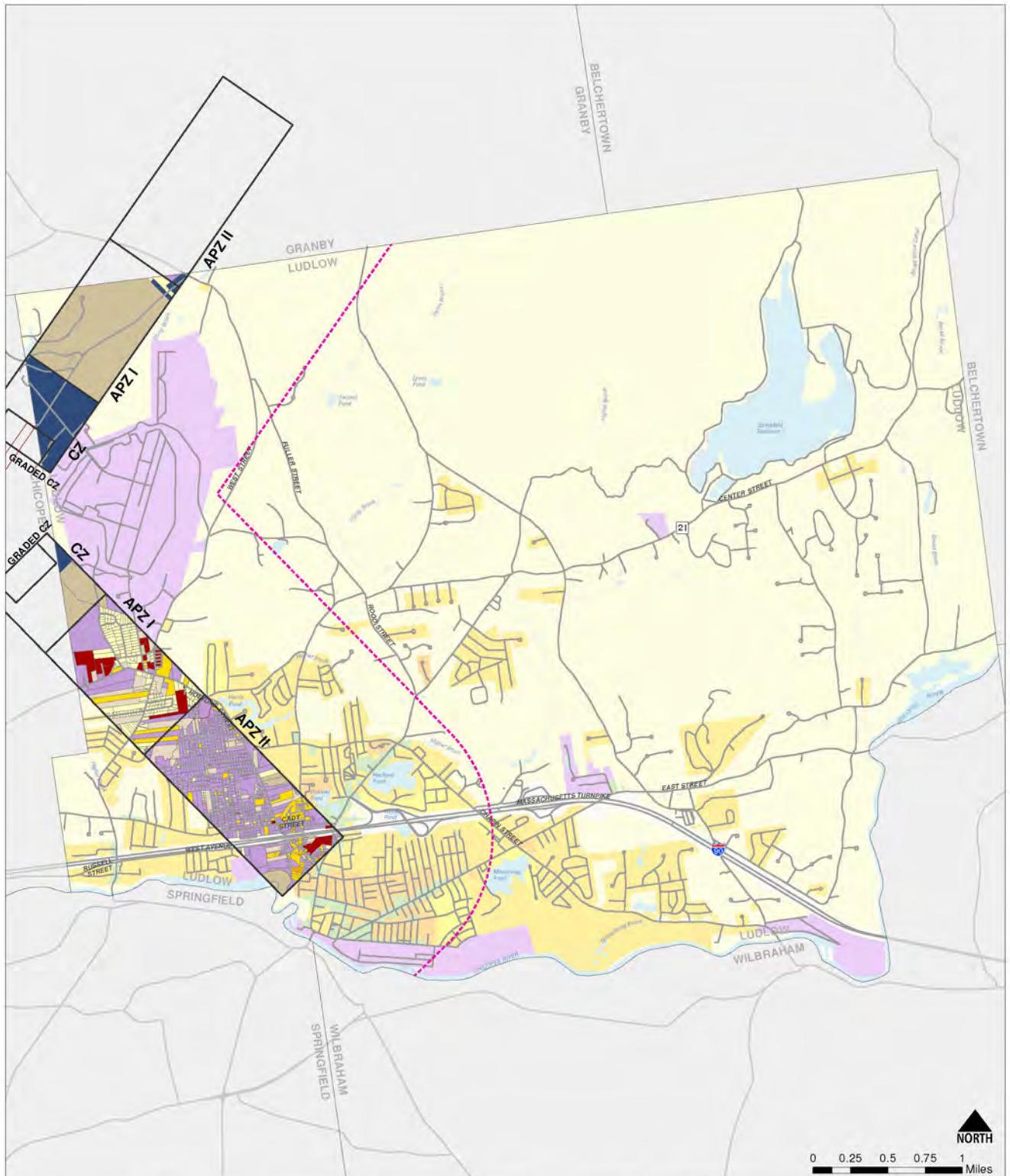


Figure 58. AICUZ Development Status Ludlow



Westover ARB 2018 Joint Land Use Study

Air Accident Zone Existing Land Use Compatibility Ludlow, MA

Figure 59. Ludlow Land Use Compatibility

Air Accident Zone Compatibility

Compatible Land Use

- Compatible - Developed
- Compatible - Bare Ground or Water
- Compatible - Vacant
- Compatible - Westover Metropolitan

Incompatible Land Use

- Incompatible - Commercial
- Incompatible - Institutional
- Incompatible - Residential Low
- Incompatible - Residential Low Medium
- Incompatible - Residential Medium High

Base Map - Ludlow MA Zoning Designations

- General Business
- Limited Industrial
- Residential/Agricultural
- Single Family Residential R2
- Single Family Residential R4
- Single Family Residential R5
- Water

- JLUIS Study Area
- Accident Potential Zone (APZ) Boundaries
- Air Reserve Base Runway Boundaries

Data Sources:
Town of Ludlow MA, MADD, MassGIS, Pioneer Valley Planning Commission, Westover ARB
pvmc

Since Ludlow adopted Aircraft Flight Overlay Zones over twenty years ago, new land uses that encourage large congregations of people have been prohibited. This is consistent with WARB goals. The only new inconsistency is related to the establishment of a new smart growth district at the far edge of the APZ II. As noted above, the Riverside Overlay District is designed to promote a mix of uses at a higher density, 20-24 residential units per acre. However, redevelopment in this district in the APZ II would require demolition of existing neighborhoods which is unlikely to happen in the foreseeable future.

Granby

WARB's northeastern APZ II and a small section of an APZ I are located in Granby. The APZ II is completely compatible. There are some residential lots within the APZ I that are considered compatible and some that are incompatible. See Figures 60 and 61 for a detailed breakdown of the types of land uses in the AICUZ in Granby.

Granby is the least developed of the town's surrounding the WARB. Only 26% of the AICUZ area has been developed. The remaining AICUZ is either developable at 17%, undevelopable at 47%, potentially developable at 8% or another unknown category.

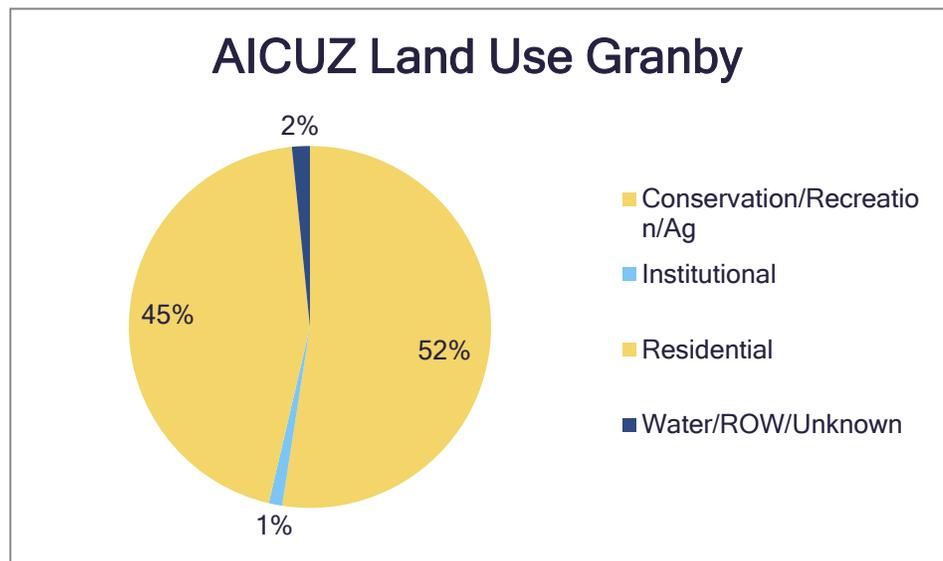
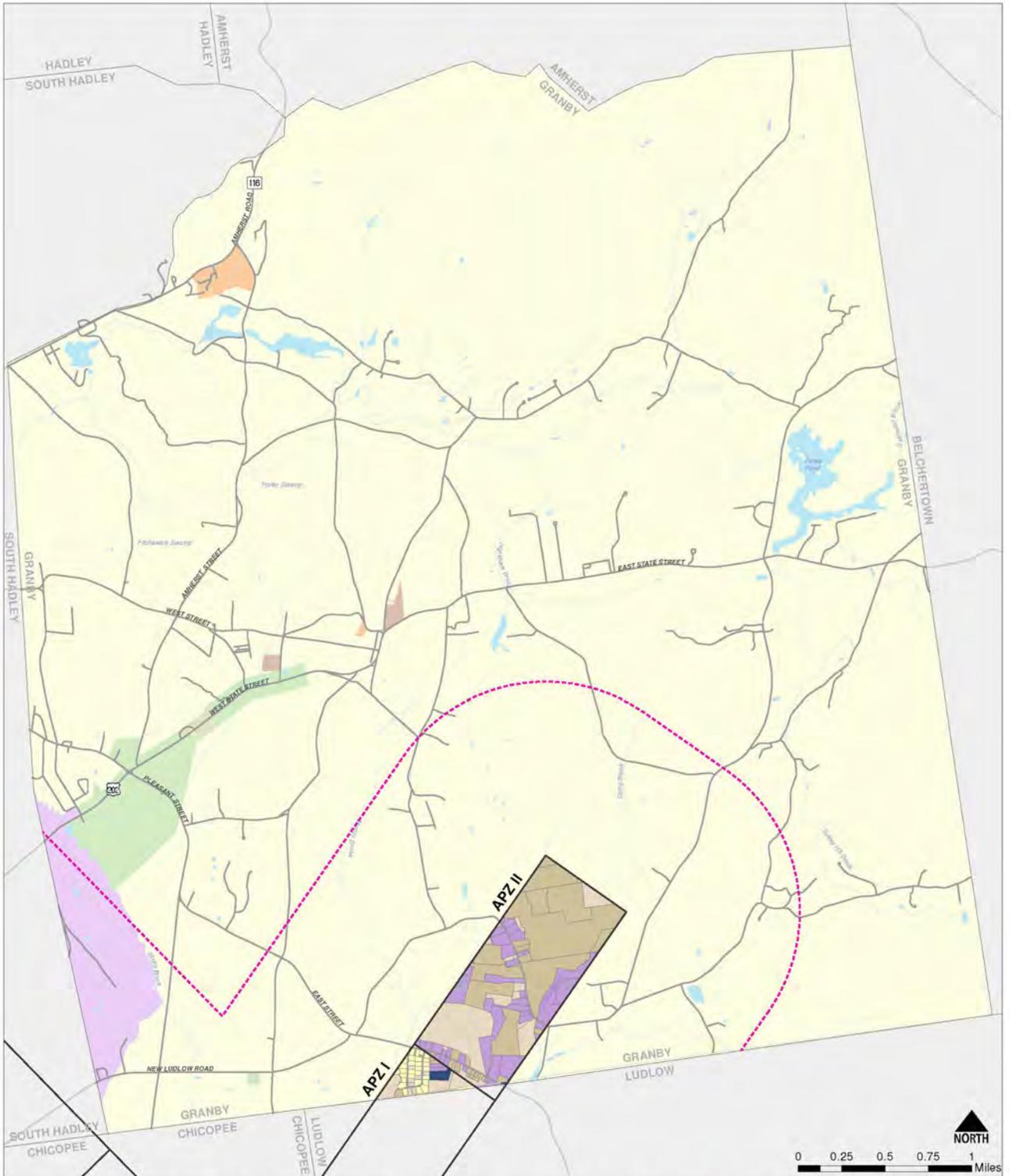


Figure 60. AICUZ Land Use Granby



Westover ARB 2018 Joint Land Use Study

Air Accident Zone Existing Land Use Compatibility Granby, MA

Air Accident Zone Compatibility

- Compatible Land Use**
- Compatible - Developed
 - Compatible - Bare Ground or Water
 - Compatible - Vacant
 - Compatible - Westover Metropolitan
- Incompatible Land Use**
- Incompatible - Commercial
 - Incompatible - Institutional
 - Incompatible - Residential Low
 - Incompatible - Residential Low Medium
 - Incompatible - Residential Medium High

Base Map - Granby MA Zoning Designations

- General Business
- General Industrial
- Municipal
- Multi-family Low Density
- Single Family Residential R2

- JLUS Study Area
- Accident Potential Zone (APZ) Boundaries

Data Source:
Town of Granby MA, MADOT, MassGIS, Pioneer
Valley Planning Commission, Westover ARB
pvpc

Figure 61. Granby Land Use Compatibility

The incompatible properties in the APZ I are located in a neighborhood that was previously the focus of a buyout program in conjunction WMDC. WMDC purchased sixty properties in Granby, Ludlow and Chicopee, which were considered incompatible because of noise impacts and other reasons. About half of the properties purchased in Granby were due to noise issues. Since that time, however, the design of the C-5 engines has changed and the noise those engines generates has been significantly reduced. See the Noise section for a more detailed explanation of how the noise impacts related to the planes at WARB have been reduced. As a result, WMDC is no longer purchasing properties for in this area.

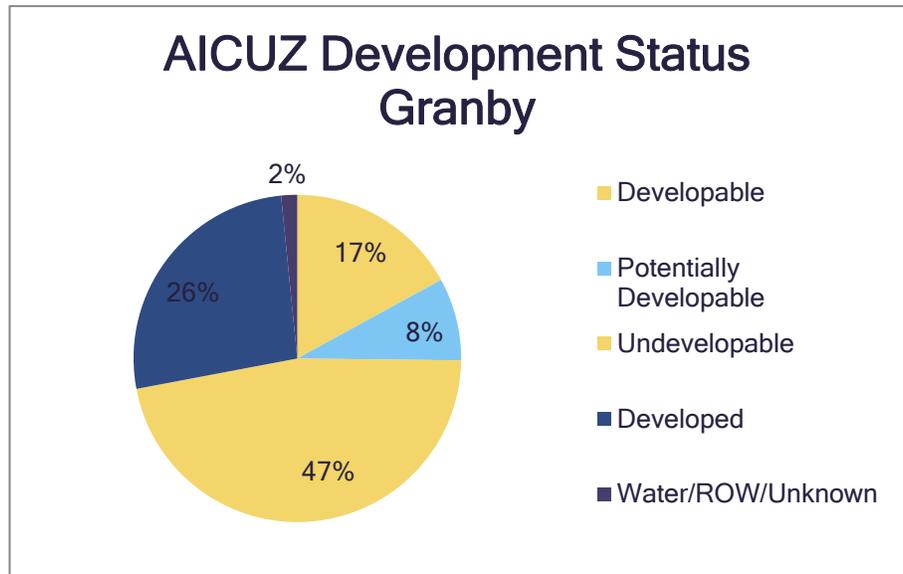
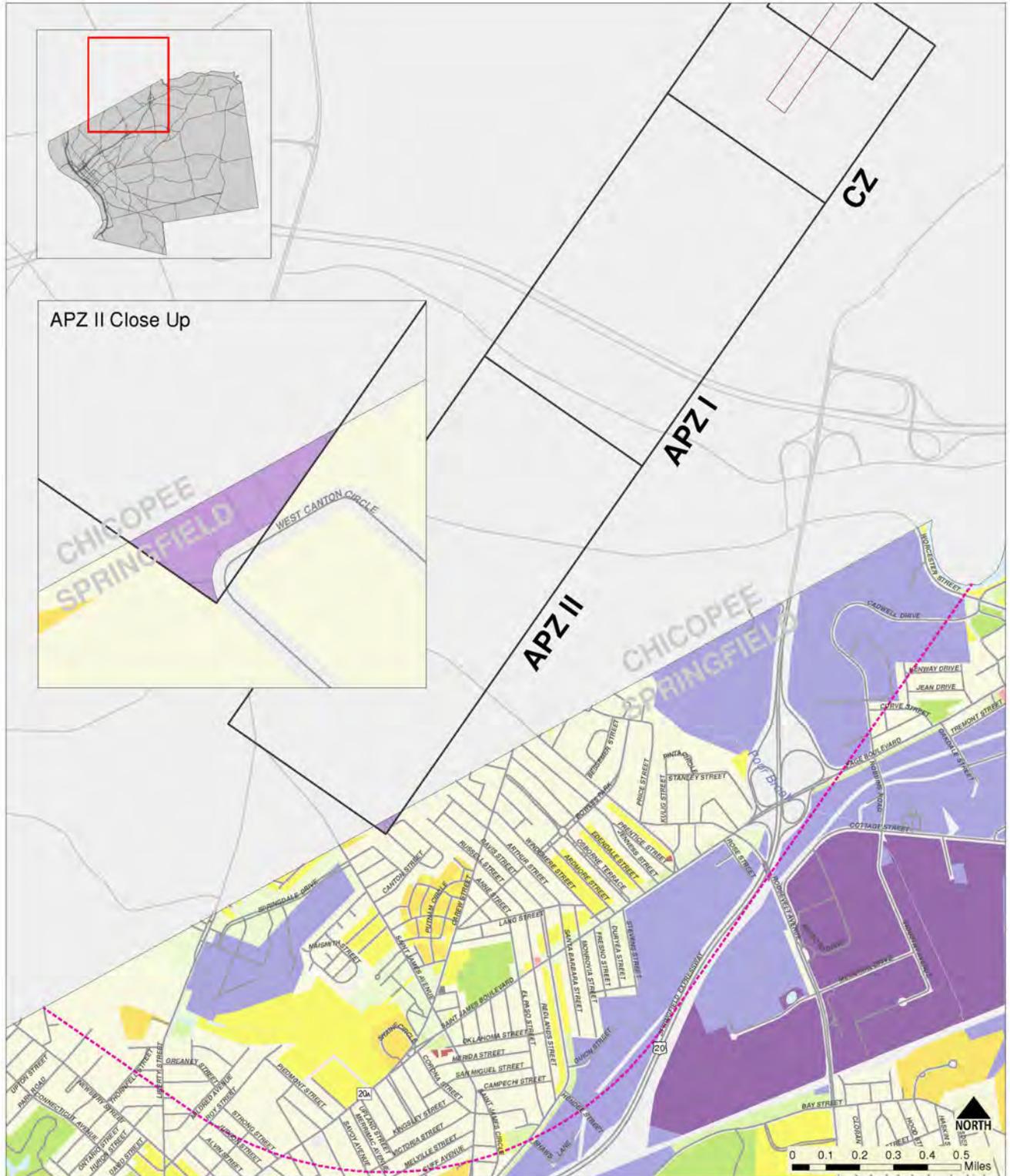


Figure 62. AICUZ Development Status Granby

Springfield

As noted above, only a very small piece of one of the APZ II's is located in the City of Springfield. This area consists entirely of compatible low to medium density residential development.



**Westover ARB 2018
Joint Land Use Study**

Air Accident Zone
Existing Land Use Compatibility
Springfield, MA

Air Accident Zone Compatibility

- Compatible Land Use**
- Compatible - Developed
 - Compatible - Bare Ground or Water
 - Compatible - Vacant
 - Compatible - Westover Metropolitan
- Incompatible Land Use**
- Incompatible - Commercial
 - Incompatible - Institutional
 - Incompatible - Residential Low
 - Incompatible - Residential Low Medium
 - Incompatible - Residential Medium High

Base Map - Springfield MA Zoning Designations

- Business A
- Business B
- Business C
- Business D
- Business B-1
- Business X
- Riverfront
- Commercial A
- Commercial P
- Office A
- Industrial Park
- Industrial A
- Residential A
- Residential A-1
- Residential B
- Residential C
- Residential C-1
- Residential C-2
- Open Space

- Air Accident Zone Boundaries
- JLUS Study Area Boundaries

Data Sources:
MADOT, MassGIS, Westover ARB
pvpvc

Figure 63. Springfield Land Use Compatibility

WARB MISSION POTENTIAL ENVIRONMENTAL IMPACTS

The Westover Air Reserve Base (ARB) has developed several plans for the management of environmental and cultural resources on and surrounding the WARB. These plans include the following:

- The Air Installation and Compatible Use Zone (AICUZ) study
- Integrated Natural Resource Management Plan (INRMP)
- Bird/Wildlife Strike Hazard (BASH) Plan
- Integrated Pest Management Plan (IPMP)
- Integrated Cultural Resources Management Plan (ICRMP)

Although these plans primarily address the land within the confines of the WARB property, the resources that are addressed by the plans and some of the threats posed to these resources extend beyond the WARB property boundaries. These plans are updated regularly as mission and management requirements change over time.

As mentioned in the introduction to the WJLUS, the AICUZ and updated Noise Study completed for the WMDC are the primary documents that affect the compatibility of land uses in the surrounding towns. In addition, the INRMP and ICRMP were reviewed for this report in conjunction with the natural and cultural resource considerations that extend from the base property to the surrounding towns and region as a whole.

Noise Compatibility Study

The Westover Metropolitan Development Corporation (WMDC) conducted a Noise Compatibility Study at the Westover Air Reserve Base/Metropolitan Airport in 2018. Title 14 of the Code of Federal Regulations (CFR) sets standards for airport operators to use in documenting noise exposure in the airport environs and to establish programs to minimize aircraft noise and land use incompatibilities.

The goal of the 2018 study was to develop an Existing Conditions (2018) Noise Exposure Map (NEM) and a Future (2023) NEM to replace the previously accepted maps from the AICUZ report. It was estimated that technology upgrades in aircraft and improved avionics at the airport would change the 2014 noise exposure maps for the Base. The 2018 study was conducted with the assistance of Stantec and HNTB. The noise model used for the updated WARB study incorporates flight profiles, time of operation, runway usage by military and civilian aircraft including helicopters, and flight paths.

Since the last NEM/NCP (Noise Compatibility Program) 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. This aircraft is used for missions involving outsized and oversized cargo that no other aircraft can carry. The Westover Metropolitan Airport is an FAA and TSA certified air carrier facility handling scheduled public charter flights and general aviation traffic. Overall, operations at the base are predominantly flown by military aircraft (77%), and most by the 337th Airlift Squadron flying the C-5 aircraft which fly approximately 260 days/year. Helicopter operations also represent a significant percentage of the overall activity at the airport.

Technology upgrades to the C-5 aircraft, the primary aircraft that flies out of the base, caused noise contours/noise impacts to be much smaller than they were in the 2013 report, creating fewer potential conflicts with land uses in the towns surrounding the Base. With the updated noise contours, only very small areas of land outside the Base property would be impacted by noise levels at the 65 dB level.

Noise and Land Use Compatibility

The noise model uses a Day-Night Average Sound Level (DNL) metric which was developed and approved in the early 1970s by the US EPA to describe the noise environment. The DNL is the energy-averaged sound level measured over 24 hours. A 10 dB penalty is applied to nighttime sound events (between 10 pm and 7 am) to account for increased annoyance from late night noise. According to guidelines provided in CFR Part 150, all land uses are normally compatible with noise exposures at or below 65 DNL.

FAA Part 150 requires consideration of noise sensitive public buildings and historic properties. The Town of Ludlow has implemented land use tools to mitigate or prevent non-compatible uses. The Ludlow Aircraft Flight Overlay District prohibits the use of adult care facilities, schools, hospitals, daycare centers, auditoriums, places of worship, and concert halls. The 2013 WARB AICUZ notes that the towns surrounding the WARB have implemented height restrictions to help maintain existing land uses characteristics.

Noise Abatement Measures

FAA/WMDC 1996 and 2014 NCP proposed a number of noise abatement measures in order to minimize impact of aircraft noise in the surrounding area. One measure that was adopted was a voluntary land acquisition and relocation program that would reduce the number of people living in the areas of high noise exposure. The 2014 NCP included a revised map of areas where noise

exposure would be 65 dB and above, whereas the 1996 program included a contour of 70 dB and above. To date, 77 properties accounting for 234 acres have been acquired. As there are no residences located in the updated existing (2018) or future (2013) NEM contours, additional land acquisition was not recommended in the NEM/NCP update.

The 65DNL contours for 2018 and 2023 do not include land within Granby, South Hadley, or Springfield. The contour extends 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. Neither area is currently developed. The noise study recommends re-zoning these residentially zoned areas to a compatible zoning category in order to ensure that these areas are not developed with residential uses in the future. A table showing land use compatibility in relation to noise levels included in **Appendix** of this report.

Hazardous Materials and Hazardous Waste

The operation of aircraft, vehicles and equipment requires the use of hazardous materials including fuels, solvents, lubricants and caustics. If released into the environment, these materials can negatively impact air, soil, and water quality. The activity that poses the greatest threat to the environment is the transfer and storage of petroleum, oils and lubricants (POL). The Base has implemented several programs (spill control and response, hazardous waste management and stormwater pollution prevention) to control waste releases to the environment.

POL transfer and storage operations take place throughout the base. These operations include receiving, storing and dispensing of jet petroleum-8 (JP-8) fuel is supplied to the Base via pipeline, and if the pipeline is down, fuel is brought in by commercial tankers. The average annual throughput of JP- 8 is approximately 8 million gallons. Oil-water separators have been installed to prevent fuel releases from entering the storm sewer system. Waste petroleum products are recycled through a Defense Reutilization and Marketing Office (DRMO) contract.

The base's Hazardous Waste Management Plan outlines procedures for accumulation, collection, and transportation of hazardous wastes. It is designed to ensure that hazardous wastes are collected and disposed of in a legal and timely manner. Since WARB is not permitted as a treatment, storage or disposal facility, the Base can only accumulate waste for a maximum of 90 days.

Environmental Restoration Programs (ERP)

The DoD established the Environmental Restoration Program (ERP) to ensure that military installations identify and evaluate selected problems associated with past waste disposal actions. WARB began restoration efforts under the ERP in 1981.

ERP sites can adversely impact the local natural environment if contaminants are able to migrate into surface waters or if they are conveyed through groundwater. During the original records search in 1982, 15 sites were identified on the WARB property. During the course of the investigations on these sites, nine were determined

to pose no threats to human health and no further actions were required. Since that initial study, 8 additional sites were added to the ERP list. Of the 21 original sites, 18 have been closed out in accordance with the Massachusetts Contingency Plan. The three remaining sites include two former landfills that are undergoing annual inspections and long term monitoring of groundwater, surface water, sediment and landfill gas; and a former service station (former Building 1601) which is undergoing quarterly



Figure 64. Location of Former POL

groundwater monitoring and is expected to close in 2020. Two compliance restoration areas were expected to close in September 2017 according to the INRMP,

The third compliance restoration area is the East Ramp Sites, which are undergoing ongoing remediation. These sites were caused by leaks into the subsurface sandy formation from the underground pipeline which supplied JP-8 fuel for the C5-B aircraft. The remediation includes removal of product and groundwater from installed monitoring wells and monitored natural attenuation.

The site of a former POL terminal that was part of the WARB property and was transferred to the WMDC after the terminal was deactivated in 1979 is still a location of concern. A site investigation conducted by CDM Smith in November

2016 revealed the presence of Light Non-Aqueous Phase Liquid (LNAPL) that may extend beyond the property boundary.⁹ At the time of the last report that was posted on the Mass DEP website, access was being requested in order to conduct additional investigation into the extent of the off-site impacts.

Water Quality

Surface water at the WARB can be negatively impacted by fuel or other hazardous material spills or leaks, seepage from ERP sites, de-icing chemicals and sediments from soil erosion. Several pollutants could be present in stormwater runoff and potentially enter surface waters. The base elected to replace urea with potassium acetate in 1997 for airfield de-icing operations as it is a non-toxic alternative.

WARB is covered under the Multi-Sector General Permit which regulates the industrial stormwater runoff from aircraft and vehicle maintenance activities. The base also uses Best Management Practices for controlling erosion and sediment runoff during development projects that involve disturbing soil.

Air Pollution

WARB is in Hampden County and is within the USEPA interstate Air Quality Control Region (AQCR) Number 42. This region is comprised of ten counties along the Interstate 91 corridor from Hartford, CT and north to Springfield MA, and is part of the Northeast Ozone Transport Region. The Northeast Ozone Transport region extends from Virginia to Maine along the eastern seaboard and is used by the USEPA to manage interstate air pollution and to administer air quality standards.

AQCR 42 is in compliance except for ozone. High ozone levels occur more in the summer months when longer periods of daylight combined with high levels of pollutants become stagnated over an area producing high ozone levels. These conditions can be exacerbated by local conditions such as the concentration of industry along with the volume of interstate traffic.

Westover ARB air emissions fall into two categories - stationary and mobile. Stationary sources include boilers, generators, ground powered equipment, refueling operations, and maintenance activities. Stationary sources are regulated by the MADEP, and WARB is required to maintain a 50% cap on stationary emissions. The largest source of air pollution at WARB is aircraft

⁹ <https://eeaonline.eea.state.ma.us/EEA/fileviewer> - Release Abatement Measure (RAM) Completion, POL Terminal, Former Westover Air Force Base, Chicopee, MA, RTN 1-14351, June 2017

operations - taxiing, takeoff & landing) which contributes 70% of the total air emissions at the base. As this contribution represents less than 1% of the Hampden County total emissions for each pollutant, WARB would not be considered as a major contributor to air pollution in AQCR No. 42. Air quality compliance at Westover is managed by the Air Force in terms of the Base's attainment status.

Wildlife Management

Populations of many species are limited by the fragmentation and isolation of habitats on the WARB. In addition, the base discourages population growth due to the incompatibility of bird and animals on flight operations. However, the base has been able to maintain habitat for nesting grassland birds away from flight operations. The WARB is located within the Atlantic Flyway bird migration route and within the Connecticut River Valley which is a major raptor migration corridor.

WARB has a USFWS permit to take nuisance species in order to lessen the danger of bird/wildlife strikes with aircraft. Permits are not needed for many species such as pigeons, crows, and sparrows when they are at concentrations to constitute a health hazard or other nuisance. WARB has obtained permission to remove beavers and their dams as they have built dams that increase the potential for flooding of roads. Although the State limits the lethal control methods, the WARB has obtained permits for lethal control of beaver.

ENCROACHMENT AND SUSTAINMENT CHALLENGES

The Department of Defense (DoD) has identified thirteen (13) encroachment and sustainment challenge criteria that are used to consider potential encroachment issues that may negatively affect military readiness and thus economic sustainability for areas surrounding WARB. Figure 65, the Analysis of Encroachment and Sustainment Challenges table, identifies current and/or potential encroachment factors highlighted per the DoD criteria and related issues. It also identifies potential solutions and recommendations to address these constraints.

| Analysis of Encroachment and Sustainment Challenges | | | |
|---|---------------------------------------|--|---|
| | Encroachment & Sustainment Challenges | WJLUS Issue/Concern | Recommended Actions |
| 1 | Airspace and Land Restrictions | Some CZ land is privately owned. Chicopee State Park located within a CZ & APZ. | Consider Avigation Easements. Consider Purchase. |
| 2 | Airborne Noise | Noise contours have shrunk since previous analysis. | No additional action needed. |
| 3 | Urban Growth | Zoning does not prohibit large congregations of people in most towns. APZs are mostly developed with some development opportunity available. | Consider Aircraft Flight Overlay Zones. |
| 4 | Spectrum Encroachment | Commercialization of spectrum, increased interference & competition for limited bandwidth could constrain Air Force operations. | No spectrum encroachment challenges have been discovered at WARB. Therefore, no action is needed. |
| 5 | Endangered Species & Critical Habitat | Land owned by WARB provides critical grassland habitat for grasshopper sparrow and upland sandpiper; important wetlands also located on property. Most bird & wildlife species are discouraged due to incompatibility with flight operations. | WARB Integrated Natural Resource Plan (INRMP) addresses habitat issues and includes a plan for addressing new grass height requirements in order to provide least detrimental impacts to grassland habitat. WARB is required to update INRMP regularly. |
| 6 | Air | WARB complies w/all Clean Air Act & other requirements. Air pollution was identified as a concern at public meetings. | WARB should continue to monitor potential air pollutants and ensure compliance with all related regulations. |
| 7 | Water | WARB is a designated Public Water Supply although their water comes from Chicopee/Quabbin Res. Potential impacts from fuel spills & former POL terminal now owned by WMDC. | Potential impacts from hazardous waste sites to groundwater should be addressed. Monitor surface waters that receive runoff from WARB & address active waste sites to prevent further impacts to groundwater. |

| | | | |
|-----------|--|--|--|
| 8 | Cultural Resources | A few historic sites located within APZs. | No current concerns – all historic sites in APZs are currently single family homes. |
| 9 | Unexploded Ordinance (UXO) & Munitions | There are no identified UXO sites on or off-base. WARB's Explosives Ordinance Disposal Team responds to threats in the community and may detonate material on base. The munitions storage area requires an additional facility. | No specific UXO encroachment challenges have been identified. A new munitions storage structure has been proposed. |
| 10 | Marine Resources | NA | NA |
| 11 | Energy Compatibility & Availability | WARB obtains power from Chicopee Electric Company. | Energy compatibility is not impacting WARB operations. Use of renewable energy sources should be encouraged. WARB is interested in siting of solar for microgrid; ground-mounted solar should be located so as to avoid glare (for flight operations) and in consideration of critical wildlife habitat. |
| 12 | Security/Safety | Although WARB has a continuous fenceline around the perimeter, there have been challenges with surrounding property owners & wildlife. There are also several roads that dead end at the boundary which has resulted in car accidents. | Continue to work with owners of adjoining properties to maintain separation & minimize fence damage. Identify ways to minimize car accidents on dead end roads. |
| 13 | Natural Resources & Climate | Although WARB is in compliance with Air Quality Control Region (AQCR) 42, flight operations produce high levels of air emissions. | Consider increasing alternate fuel usage in other areas and other ways to decrease impacts to climate change to counteract impacts to air pollution and base's carbon footprint. |

Figure 65. Analysis of Encroachment and Sustainment Challenges

4. RECOMMENDATIONS

The following recommendations have been developed in response to concerns that were voiced throughout the public engagement process and in conjunction with the WJLUS Steering Committee. They are designed to address the Compatibility Analysis and Encroachment and Sustainment Challenges previously reviewed. Following the recommendations is an Implementation Strategy Table identifying long and short term strategies.



WJLUS RECOMMENDATIONS

Land Use Strategies

4.1 Municipal Master Plans - Incorporate WJLUS related concerns into local Master Plans. The Towns of South Hadley and Chicopee will be updating their Master Plans over the next couple of years. This is a perfect opportunity to include consideration of the location CZs and APZs and potential related conflicts into local planning efforts. These concerns should be highlighted in all appropriate plans, including corridor plans, neighborhood plans, open space and recreation plans, economic development plans and any other plans that are impacted by the proximity to WARB.

4.2 Municipal Maps - Request that communities highlight CZs and APZs on all applicable town maps. This will help to communicate the location of these areas of concern to the larger community. Residents, businesses and developers should be aware of these locations and of potential conflicts with WARB's operations.

4.3 Aircraft Flight Overlay Districts - Establish new zoning districts modeled on Ludlow's example. This zoning district, which is designed to prohibit large congregations of people, covers both APZs and CZs in Ludlow. State legislation is needed to restrict certain uses, such as churches and schools. Communities should request special legislation to limit these uses.

This recommendation also includes the consideration of an overarching legislative change to allow the restriction of certain uses within areas of concern related to any military installation in Massachusetts.

MassDevelopment's Military Asset and Security Strategy Task Force may be the appropriate organization to pursue this effort that would help to ensure compatible land uses surrounding all bases in Massachusetts into the future.

4.4 Avigation Easements - Consider purchasing Avigation Easements at appropriate locations to ensure continued access of aircraft. These easements are especially important in all CZs that contain privately held land.

“An Avigation easement is an easement or right of overflight in the airspace above or in the vicinity of a particular property. It also includes the right to create such noise or other effects as may result from the lawful operation of aircraft in such airspace and the right to remove any obstructions to such overflight.” (www.uslegal.com)

Between 2008 and 2013, WMDC purchased Avigation Easements on ten properties in the vicinity of the base. WARB will work with property owners of the remaining privately held CZ parcels to purchase additional easements.

4.5 Work with the MA DCR - WARB shall work with DCR to address compatibility issues with Chicopee State Park. Consideration will be given to the purchase of avigation easements and to tree removal that will address problem trees in flight paths.

4.6 Deed Notification - Consider requesting notification in deeds or other disclosure before title transfer of properties within APZs. Notification of the Base location and flight paths at the time of property transfer would ensure that WARB neighbors are aware of potential compatibility concerns. There are multiple ways this could be done including:

- Partnering with the Realtor’s Association of the Pioneer Valley to encourage notification.
- Considering state legislation that would be needed to require notification in deeds.
- Asking the WJLUS communities to add APZs to their assessor’s data (supplemental field).
- Requesting that property owners notify renters.

4.7 Joint WARB/Community Meetings - Recommend that WARB and the surrounding communities meet regularly, once or twice per year. This recommendation is designed to:

- Keep communication channels open between WARB and the communities to discuss challenges and implementation. The Steering Committee was very enthusiastic about this idea.
- Consider the development of a Memorandum of Understanding to guide coordination and scheduling moving forward.
- Include invitations to the general public or establishing separate public meetings.

Transportation Strategies

The following strategies are recommended to improve traffic flow and safety for all modes of travel accessing WARB. It is not expected that WARB take these projects on alone, but that they partner with the surrounding communities and the state (especially MassDOT) to improve all modes of access to WARB.

4.8 Way Finding Signs - Signs should be reviewed and updated to direct traffic to the main access gate on Westover Road.

- Wayfinding signs, while present throughout the study area were found to be located inconvenient locations and confusing.
- Most wayfinding signs direct traffic to the Westover Air Reserve Base via Westover Road or James Street. However, these signs do not clarify that the James Street gate has limited hours of operation.
- Existing wayfinding signs should differentiate between the Westover Air Reserve Base and the Westover Metropolitan Airport. A small sign for the airport is located on the corner of the intersection of Westover Road and Padgette Street but can be easily missed.
- Vehicles exiting Exit 5 on the Massachusetts Turnpike to Memorial Drive are directed to turn left at the traffic signal. No information is provided to direct industrial park or airport traffic to turn right and use Memorial Drive to Fuller Road to Sheridan Street as an alternate form of access. This could reduce traffic impacts on the residential portion of Westover Road.
- A “No Exit” sign should be installed on Westover Road in the vicinity of the access road to the gate to alert traffic that the road ends shortly afterward.

4.9 Public Transportation - If future transit access to the base is desired, coordination with the PVRTA is recommended.

- Currently, there are no PVRTA transit routes that directly serve WARB.
- New service would require supplemental funding to pay for the additional operating and maintenance costs of transit service.

4.10 Traffic Signal Improvements - Coordinate transportation needs with both the City of Chicopee and MassDOT.

- Planned traffic signal improvement projects for Memorial Drive and Fuller Road are currently in the design stage. WARB should work with local partners to ensure that safe and efficient access to the base can be maintained as part of these transportation improvement projects.

- Coordinate with the City of Chicopee to identify opportunities to upgrade the intersection of James Street with Griffith Road and Johnson Road to improve pedestrian access, safety, and compliance with ADA requirements.

4.11 **Pedestrian Infrastructure** - Contact the City of Chicopee to discuss options for providing continuous sidewalk access into the Base along Westover Road.

- Most of the access roads into WARB provide pedestrian sidewalks on at least one side of the roadway. A notable exception is along Westover Road where no sidewalks are provided for a short distance between Champion Drive and Padgette Street and again for a longer distance east of Padgette Street to the gate access roadway.

A full ADA accessibility study is recommended to identify locations where sidewalks do not meet current ADA standards.

- Existing sidewalks on James Street, Sheridan Street, and Westover Road were found to be narrow and lack ADA accessible wheelchair ramps at intersections.
- The Federal Highway Administration (FHWA) recommends a minimum sidewalk width of 5 feet if set back from the curb or 6 feet if adjacent to the curb.

A pedestrian study should be conducted to address the following:

- James Street is very wide in some sections which could make it difficult for some pedestrians to cross the street. A grass center median does provide a refuge area; however, many of the medians do not extend all the way to the crosswalk.
- The existing crosswalk in the vicinity of the intersection of James Street with Celia Street and Richmond Way does not have any advance pedestrian warning signs. This crosswalk provides access to the Bowie Memorial School and should be more prominently marked to warn drivers of the potential for pedestrians to be crossing at this location.
- Additional warning signs may be warranted, such as a Rectangular Rapid Flash Beacon (RRFB) at the intersection above. RRFBs are user-actuated LEDs that supplement warning signs at unsignalized intersections or mid-block crosswalks. They are a low cost alternative to traffic signals and improve driver compliance with stopping for pedestrians in crosswalks.

- 4.12 **Bicycle Infrastructure** - Coordinate with the City of Chicopee to identify opportunities to develop bicycle lanes and sidepaths where appropriate on James Street, Sheridan Street, and Westover Road.
- Currently, no marked bicycle lanes are provided on these roads however there may be opportunities to restripe the roadways as part of future maintenance projects to accommodate bicyclists.
 - Bike lanes encourage bicyclists to ride their bikes for short trips, encourage bicyclists to ride in the correct direction with the flow of traffic and narrow down the vehicle travel lane to encourage lower motor vehicle speeds. Promote bicycling by providing bicycle racks at key locations on the base.
- 4.13 **Road Diet** - Consider reducing James Street from four to two travel lanes.
- The additional pavement width could be restriped to provide marked bicycle lanes.
 - In the long term, the City of Chicopee could also consider removing the existing center median on James Street to provide a shared use sidepath for pedestrians and bicycles along James Street. This would require an in-depth engineering study to determine the feasibility of removal of the medians and the relocation of existing street lighting in the median.
- 4.14 **Complete Streets** - Work with the City of Chicopee and encourage them to adopt a Complete Streets Policy.
- Cities can receive up to \$50,000 in planning funds to develop a Complete Streets Prioritization Plan and up to \$400,000 in construction funds to implement complete streets improvements.
 - There are 3 tiers to the Complete Streets program. The City of Chicopee is still in “Tier 1” of this process
 - This program could be used to construct pedestrian and bicycle infrastructure improvements.
- 4.15 **Safe Routes to School** - Collaborate with the City of Chicopee to identify opportunities to increase walking and biking for students at neighboring schools.
- The Massachusetts Safe Routes to School program assists communities in increasing safe walking and biking for elementary and middle school students.
 - The City of Chicopee is currently a Safe Routes to School Partner Community.

- Both the Chicopee Academy Middle School and the Bowie Memorial School are located off of James Street in close proximity to WARB.
- There may be opportunities to improve existing bicycle and pedestrian infrastructure along James Street in the vicinity of these schools.
- Funding for improvements to existing infrastructure such as pavement markings, signs, and sidewalks is available for Safe Routes to School partner communities through an online application process. For more information please visit the Safe Routes to School website:
<https://www.mass.gov/safe-routes-to-school>.

Housing Strategies

4.16 **Affordable Housing** - WARB should work with the surrounding municipalities to ensure that affordable housing is available for WARB employees.

- Lack of new housing production has contributed to affordable housing needs in the region.
- Encourage new housing development in a sustainable manner and outside of the APZs.

Economic Development Strategies

4.17 **Military Asset and Security Strategy Task Force** - Reinvigorate and sustain this local and regional collaborative.

- Regular engagement could result in new initiatives and increase effectiveness of ongoing projects.
- It is important for WARB to stay current with community economic development issues.

4.18 **Westover Airport Business Plan** - Work with this important partner to address recommendations and set forth new goals.

4.19 **Aviation Research and Training Center** - Work with UMass to facilitate and maximize this asset.

4.20 **Galaxy Council** - Continue to work with the Council to host community events onsite, including youth outreach and leadership programs, educational and historic events, community fundraisers and other events that raise awareness of the base and its activities and promote a positive environment for employees, employers, and new businesses locating in the region.

Natural Resource Strategies

- 4.21 **Hazardous Waste Sites** - WARB should provide status of remediation of open hazardous waste sites for which the base is the responsible party. Due to the high volume of fuel used and transported on the site, as well as proximity to valuable habitat, aquifers and surface water resources, monitoring and remediation of historic as well as recent releases should be a high priority.
- 4.22 **Wildlife Habitat** - Maintenance of grassland habitat for endangered grassland bird species should continue to be a priority for the base.
- 4.23 **Air Quality and Climate** - Encourage use of alternative fuels where possible to counteract impact from emissions from aircraft operations.

WJLUS Recommendations

The following Implementation Schedule identifies Short and Long Term Actions, as well as Responsible Parties.

WJLUS Implementation Schedule

| Recommendations | Short Term/Long Term | Responsible Parties |
|--|--|--|
| 4.1 Municipal Master Plans | Short & Long Term - depending on status of Municipal Plans - S. Hadley & Chicopee will be shorter term | S. Hadley, Chicopee, Ludlow, Granby & Springfield |
| 4.2 Municipal Maps | Short Term | S. Hadley, Chicopee, Ludlow, Granby & Springfield |
| 4.3 Aircraft Flight Overlay Districts | Long Term - because need state legislative approval & local Town Meetings | S. Hadley, Chicopee & Granby |
| 4.4 Avigation Easements | Long Term - requires negotiations and payments with property owners | WARB & WMDC |
| 4.5 Work w MA DRC/Chicopee State Park | Short & Long Term - tree removal can begin ASAP but easements may take longer | WARB, WMDC & MA DCR |
| 4.6 Deed Notification | Short & Long Term - working with Realtor Assoc. & Assessors are short term - state legislation & property owners discussions are longer term | WARB & S. Hadley, Chicopee, Ludlow, Granby & Springfield |
| 4.7 Joint WARB/Community Meetings | Short Term - scheduling meetings &/or developing an MOU can occur immediately | WARB & S. Hadley, Chicopee, Ludlow, Granby & Springfield |
| 4.8 Wayfinding Signs | Short Term | WARB, MassDOT & Chicopee |
| 4.9 Public Transportation | Long Term | WARB & PVTA |
| 4.10 Traffic Signal Improvements | Long Term | MassDOT & Chicopee |
| 4.11 Pedestrian Infrastructure | Long Term | Chicopee |
| 4.12 Bicycle Infrastructure | Long Term | Chicopee |
| 4.13 Road Diets | Long Term | Chicopee |
| 4.14 Complete Streets | Long Term | Chicopee & MassDOT |
| 4.15 Safe Routes to School | Long Term | Chicopee & MassDOT |
| 4.16 Affordable Housing | Long Term | Chicopee, S. Hadley, Ludlow, Granby & Springfield |
| 4.17 Military Asset & | Short Term | WARB, WMDC, Mass |

| WJLUS Implementation Schedule | | |
|-------------------------------|-------------------------------------|-------------------------------------|
| Recommendations | Short Term/Long Term | Responsible Parties |
| | Security Strategy Task Force | Development & local stakeholders |
| 4.18 | Westover Airport Business Plan | Short Term WARB & WMDC |
| 4.19 | Aviation Research & Training Center | Short Term WARB & UMass |
| 4.20 | Galaxy Council | Short Term WARB & Galaxy Council |
| 4.21 | Hazardous Waste Sites | Short & Long Term WARB |
| 4.22 | Wildlife Habitat | Short Term WARB |
| 4.23 | Air Quality & Climate | Long Term WARB |
| | | |

Figure 66. WJLUS Implementation Schedule

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APPENDIX A: JOINT LAND USE STUDY COMMUNITY SURVEY



Joint Land Use Study Community Survey

U.S. AIR FORCE

Westover Air Reserve Base

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Joint Land Use Study Community Survey

U.S. AIR FORCE

- Over 300 Responses
- 25 questions focusing on Westover economic effect on area, familiarity with mission, zoning, WMDC (Westover Municipal Development Corporation) operations.

➤ Far Reaching Response

- Chicopee,
- South Hadley,
- Granby,
- Ludlow,
- Springfield,
- Holyoke
- Across the Pioneer Valley (Amherst, Belchertown, Easthampton)

➤ Generally Positive Reviews of Westover operations.

- Positive economic effect on community FY2017 \$212m generated
- Jobs
- Safety
- Political importance for area
- Generally good compatibility between base and local area.



Joint Land Use Study Community Survey

U.S. AIR FORCE

Subject Matter Breakdown

Questions 1-8 Local familiarity of WARB (Westover Air Reserve Base) and base mission

Questions 8-15 WARB surroundings. Local impressions and land use

Questions 16-20 WMDC local impressions, 24 hour operations.

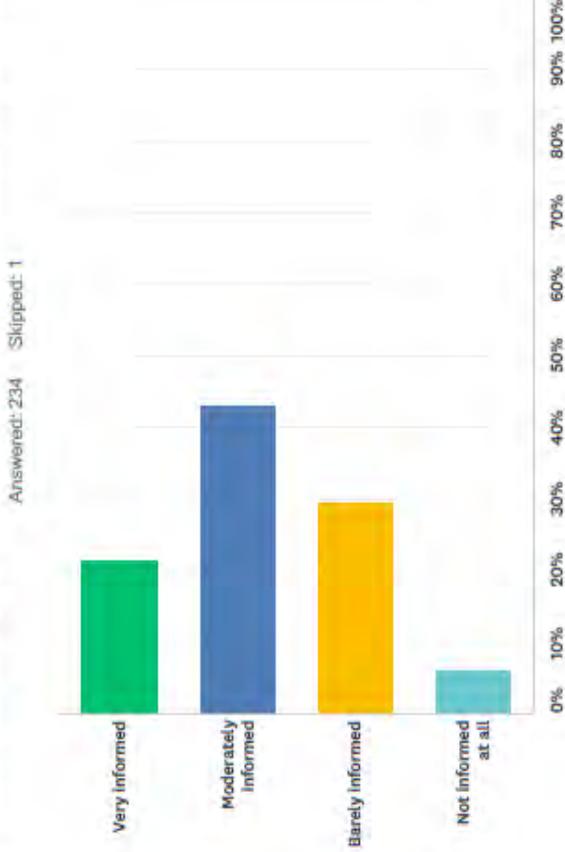
Questions 20-25 Discuss Joint Land Use Study



Joint Land Use Study Community Survey

U.S. AIR FORCE

Q1 How informed are you of the activities at Westover Air Reserve Base?



| ANSWER CHOICES | RESPONSES |
|---------------------|---------------|
| Very informed | 50 21.37% |
| Moderately informed | 101 43.16% |
| Barely informed | 69 29.49% |
| Not informed at all | 14 5.98% |
| TOTAL | 234 |

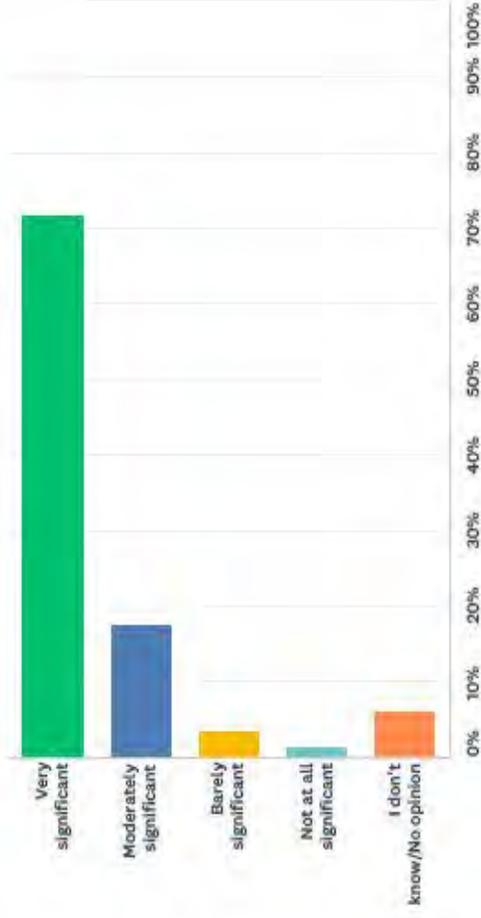


Joint Land Use Study Community Survey

U.S. AIR FORCE

Q3 How significant is WARB and its operations to the local economy?

Answered: 233 Skipped: 2



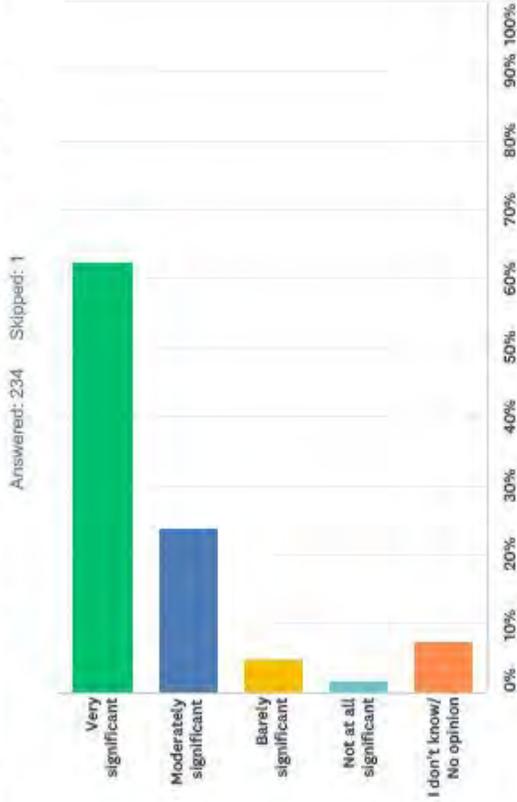
| ANSWER CHOICES | RESPONSES |
|-------------------------|---------------|
| Very significant | 167 71.67% |
| Moderately significant | 41 17.60% |
| Barely significant | 8 3.43% |
| Not at all significant | 3 1.29% |
| I don't know/No opinion | 14 6.01% |
| TOTAL | 233 |



Joint Land Use Study Community Survey

U.S. AIR FORCE

Q4 How significant is WARB and its operations to the regional economy?



| ANSWER CHOICES | RESPONSES |
|--------------------------|---------------|
| Very significant | 146 62.39% |
| Moderately significant | 56 23.93% |
| Barely significant | 11 4.70% |
| Not at all significant | 4 1.71% |
| I don't know/ No opinion | 17 7.26% |
| TOTAL | 234 |

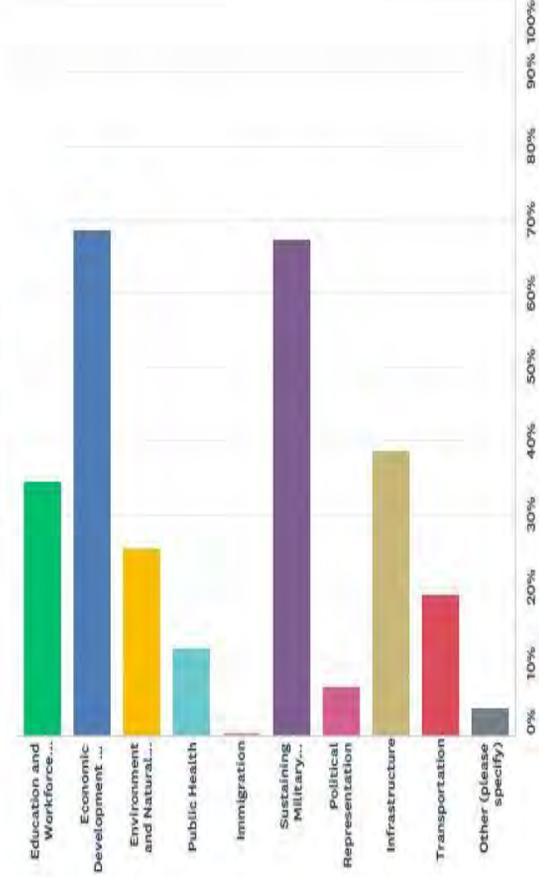


Joint Land Use Study Community Survey

U.S. AIR FORCE

Q5 Which of the following do you see as the most important issue(s) to communities adjacent to Westover? Please rank your top 3:

Answered: 230 Skipped: 5



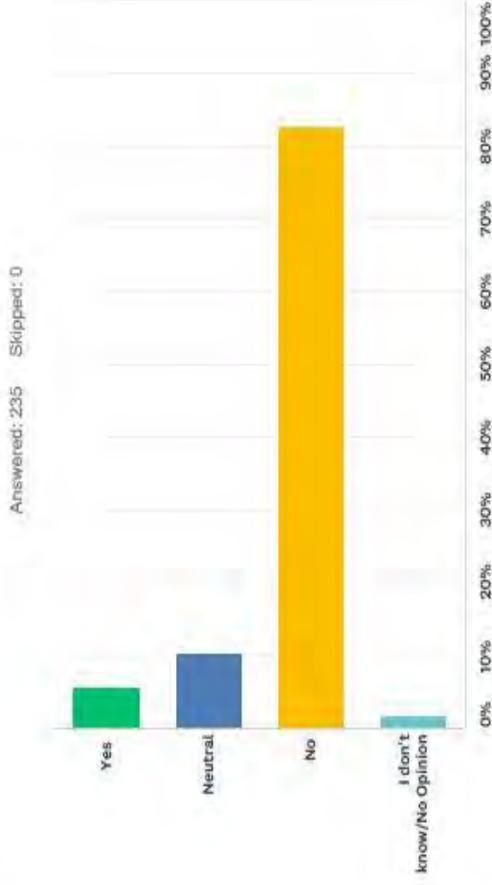
| ANSWER CHOICES | RESPONSES |
|---------------------------------------|-----------|
| Education and Workforce Training | 34.35% |
| Economic Development and Job Creation | 68.70% |
| Environment and Natural Resources | 25.22% |
| Public Health | 11.74% |
| Immigration | 0.43% |
| Sustaining Military Operations | 67.39% |
| Political Representation | 6.52% |
| Infrastructure | 38.70% |
| Transportation | 19.13% |
| Other (please specify) | 3.48% |



Joint Land Use Study Community Survey

U.S. AIR FORCE

Q6 Do you consider military operations at Westover to have negative effects?



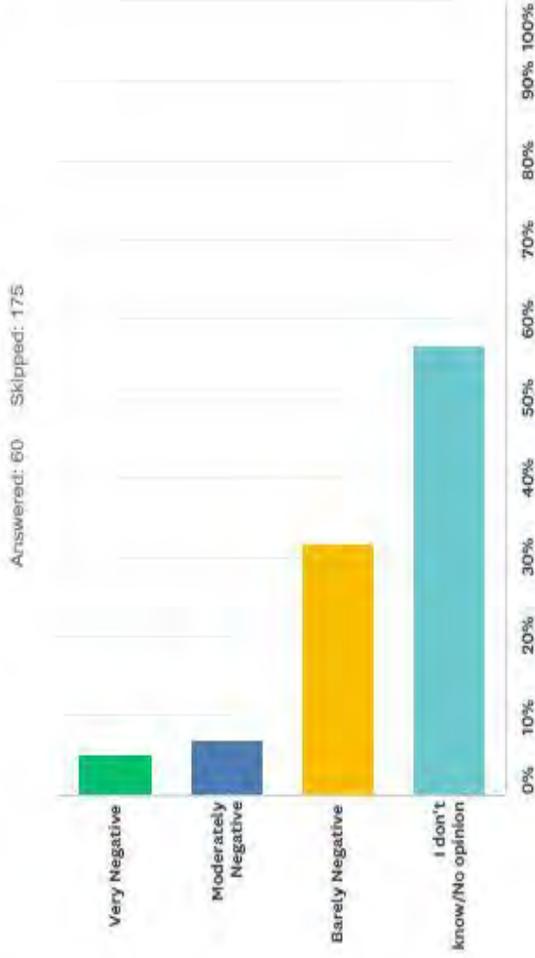
| ANSWER CHOICES | RESPONSES |
|-------------------------|---------------|
| Yes | 13 5.53% |
| Neutral | 24 10.21% |
| No | 194 82.55% |
| I don't know/No Opinion | 4 1.70% |
| TOTAL | 235 |



Joint Land Use Study Community Survey

U.S. AIR FORCE

Q7 If yes, how negative do you consider the effects of military operations to be?



| ANSWER CHOICES | RESPONSES |
|-------------------------|--------------|
| Very Negative | 3 5.00% |
| Moderately Negative | 4 6.67% |
| Barely Negative | 19 31.67% |
| I don't know/No opinion | 34 56.67% |
| TOTAL | 60 |



Joint Land Use Study Community Survey

U.S. AIR FORCE

Q8 If you perceive positive effects from operations at Westover, please list them:

Answered: 171 Skipped: 151

| # | RESPONSES | DATE |
|----|--|---------------------|
| 1 | Economic rewards | 10/23/2017 8:27 AM |
| 2 | Community Economics, community pride, community involvement | 10/19/2017 10:09 PM |
| 3 | Feel safe with the base in my area. | 10/16/2017 6:11 PM |
| 4 | Westover provides employment to both reservists and local civilians in the Chicopee area. | 10/11/2017 9:01 AM |
| 5 | economic growth, employment | 10/10/2017 3:41 AM |
| 6 | I love the military presence | 10/8/2017 12:26 PM |
| 7 | Business \$\$\$ to the city; Employment of city's citizens and the surrounding communities; POLITICAL representation in D.C. | 10/8/2017 9:34 AM |
| 8 | They bring money into the area. | 10/7/2017 1:15 PM |
| 9 | I love having a military presence nearby. I appreciate all the military does. | 10/6/2017 7:20 AM |
| 10 | Economic | 10/5/2017 7:27 PM |
| 11 | Jobs | 10/5/2017 7:08 PM |
| 12 | Aircraft are fascinating, so we enjoy watching them fly by the house. | 10/5/2017 7:01 PM |
| 13 | Excellence & on-going training to preserve our peace efforts. The sounds & seeing aircraft are comforting. | 10/5/2017 6:47 PM |



Joint Land Use Study Community Survey

U.S. AIR FORCE

Q9 What is your impression of the relationship between WARB and surrounding:

Answered: 235 Skipped: 0

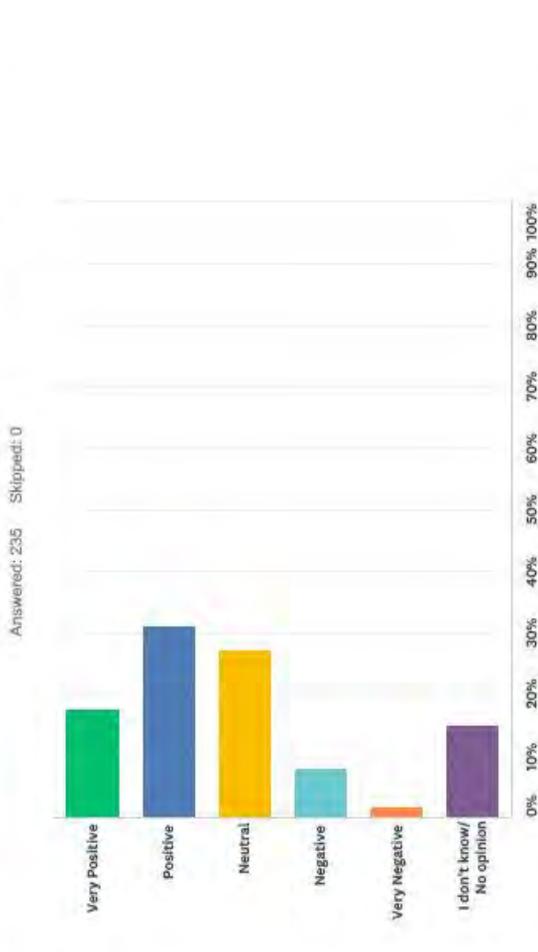
| | VERY POSITIVE | POSITIVE | NEUTRAL | NEGATIVE | VERY NEGATIVE | I DON'T KNOW/ NO OPINION | TOTAL |
|---------------------------|---------------|--------------|--------------|-------------|---------------|--------------------------|-------|
| Landowners | 28.63% 67 | 41.03% 96 | 17.09% 40 | 3.85% 9 | 0.85% 2 | 8.55% 20 | 234 |
| Businesses | 50.22% 115 | 34.50% 79 | 7.42% 17 | 0.87% 2 | 0.87% 2 | 6.11% 14 | 229 |
| Residential Neighborhoods | 28.14% 65 | 38.53% 89 | 19.05% 44 | 7.36% 17 | 1.73% 4 | 5.19% 12 | 231 |
| Local Governments | 47.39% 109 | 34.35% 79 | 8.26% 19 | 0.87% 2 | 1.30% 3 | 7.83% 18 | 230 |



Joint Land Use Study Community Survey

U.S. AIR FORCE

Q10 What is your impression of the impact of WARB on local real estate values?



| ANSWER CHOICES | RESPONSES |
|--------------------------|------------|
| Very Positive | 41 |
| Positive | 73 |
| Neutral | 64 |
| Negative | 18 |
| Very Negative | 4 |
| I don't know/ No opinion | 35 |
| TOTAL | 235 |

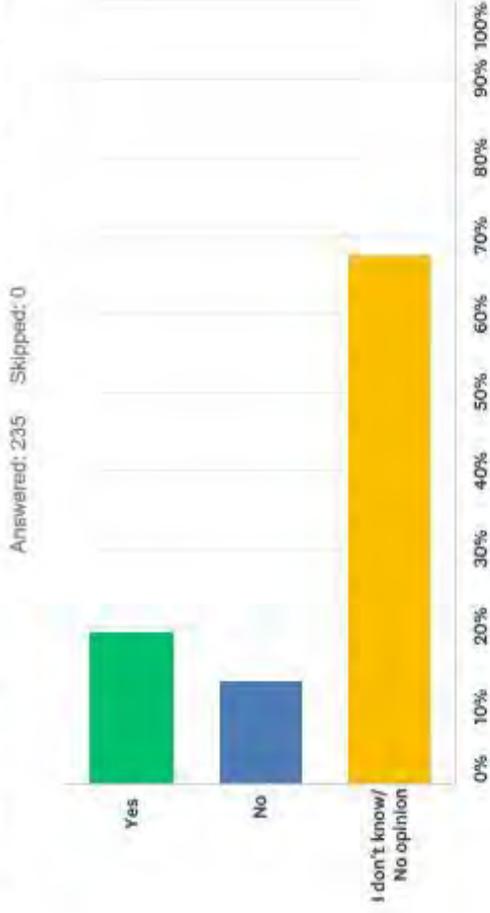


Joint Land Use Study Community Survey

U.S. AIR FORCE

Westover ARB Joint Land Use Study Community Questionnaire

Q11 Does WARB have an impact on local zoning regulations?



| ANSWER CHOICES | RESPONSES |
|--------------------------|------------|
| Yes | 45 |
| No | 31 |
| I don't know/ No opinion | 159 |
| TOTAL | 235 |



Joint Land Use Study Community Survey

U.S. AIR FORCE

Westover ARB Joint Land Use Study Community Questionnaire

Q12 If yes, what do you believe these impacts to be?

Answered: 49 Skipped: 273

| # | RESPONSES | DATE |
|----|--|--------------------|
| 1 | How close you can build and what type of building near the base, | 10/7/2017 1:15 PM |
| 2 | RESTRICTS NEARBY USE OF LAND | 9/30/2017 7:45 PM |
| 3 | Development restrictions | 9/29/2017 6:37 PM |
| 4 | N/A | 9/29/2017 8:19 AM |
| 5 | What about negative impacts....NOISE of PLANES very bad for real estate | 9/28/2017 9:09 PM |
| 6 | Vacant land around the base | 9/28/2017 3:46 PM |
| 7 | can't build in crash zones.....it makes perfect sense | 9/27/2017 11:33 AM |
| 8 | but they are ignored: i.e., S.Hadley built an elementary school in its flight path | 9/25/2017 8:35 PM |
| 9 | Air compatibility zones | 9/11/2017 5:52 PM |
| 10 | Creating development in possible failure areas | 9/6/2017 2:43 PM |
| 11 | crash zones | 9/6/2017 11:05 AM |
| 12 | Flight path; noise | 9/6/2017 4:25 AM |
| 13 | Traffic | 9/5/2017 8:17 PM |



Joint Land Use Study Community Survey

U.S. AIR FORCE

| | | |
|----|---|-------------------|
| 16 | Runway area restrictions | 9/4/2017 8:07 AM |
| 17 | land usage on the base and surrounding areas | 9/3/2017 6:56 PM |
| 18 | It was sad that so much of granby was lost to noise pollution program.. totally unnecessary and hurt the tax base badly | 9/3/2017 2:54 PM |
| 19 | Where one can build a house that won't affect the operations at Westover. | 9/3/2017 11:47 AM |
| 20 | Local safety-environmental impact | 9/3/2017 11:20 AM |
| 21 | Safety, why put homes and business's in harms way | 9/3/2017 10:11 AM |
| 22 | not being able to build in flight path areas | 9/3/2017 9:52 AM |
| 23 | land development due to safety concerns | 9/3/2017 9:48 AM |
| 24 | Abutting conservation land- building in low fly zones | 9/2/2017 9:12 AM |
| 25 | See ludlow town bylaws | 9/1/2017 9:57 PM |
| 26 | Cannot expand housing. | 9/1/2017 4:24 PM |
| 27 | No high population buildings are allowed proximal to the runways | 9/1/2017 4:02 PM |
| 28 | housing restrictions in flight path | 9/1/2017 1:54 PM |
| 29 | Needed restrictions on land use in flight paths. | 9/1/2017 1:23 PM |
| 30 | Restrictions on surrounding land use. | 9/1/2017 10:35 AM |
| 31 | appropriate business capacity control | 9/1/2017 9:50 AM |
| 32 | Zoning must keep large numbers of people out of harm's way in Accident Potential Zones | 9/1/2017 9:37 AM |
| 33 | Height restrictions on towers etc. close to the base. | 9/1/2017 9:13 AM |
| 34 | AICUZ related restrictions. | 9/1/2017 8:34 AM |



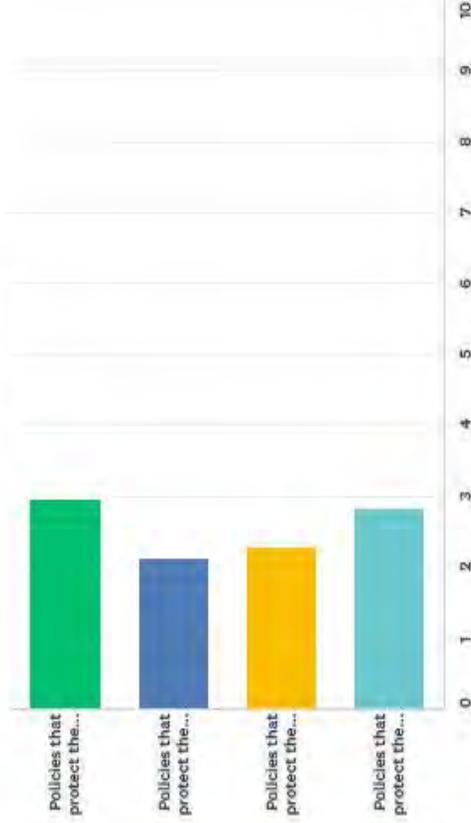
Joint Land Use Study Community Survey

U.S. AIR FORCE

Westover ARB Joint Land Use Study Community Questionnaire

Q13 What do you feel should be prioritized around WARB for land use zoning? Please rank in order of importance:

Answered: 224 Skipped: 11



| | 1 | 2 | 3 | 4 | N/A | TOTAL | SCORE |
|--|----|----|----|----|-----|-------|-------|
| Policies that protect the interests of residential zones | 83 | 43 | 52 | 22 | 12 | 212 | 2.94 |
| Policies that protect the interests of open space | 22 | 60 | 37 | 82 | 13 | 214 | 2.11 |
| Policies that protect the interests of local businesses | 14 | 62 | 82 | 40 | 13 | 211 | 2.25 |
| Policies that protect the interests of the WARB | 90 | 39 | 31 | 47 | 12 | 219 | 2.83 |

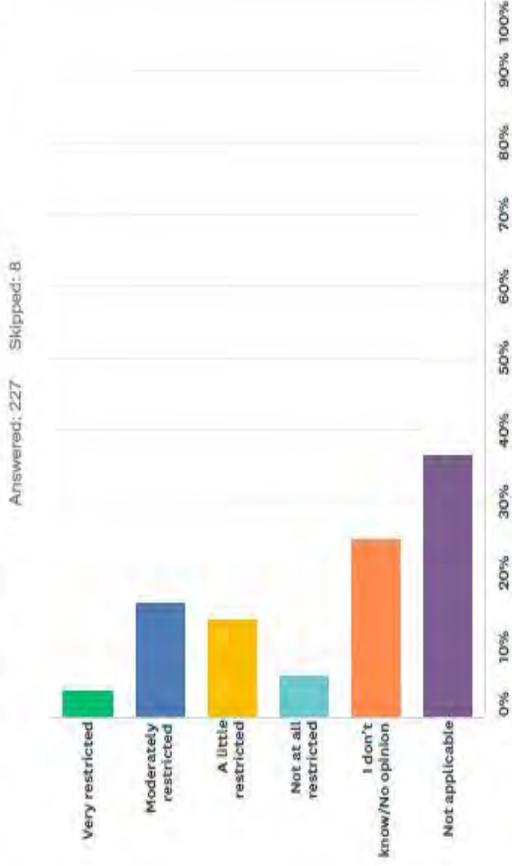


Joint Land Use Study Community Survey

U.S. AIR FORCE

Westover ARB Joint Land Use Study Community Questionnaire

Q14 If you are a landowner or developer, to what degree do you think zoning in the vicinity of the WARB is restricted:



| ANSWER CHOICES | RESPONSES |
|-------------------------|--------------|
| Very restricted | 8 3.52% |
| Moderately restricted | 36 15.86% |
| A little restricted | 31 13.66% |
| Not at all restricted | 13 5.73% |
| I don't know/No opinion | 56 24.67% |
| Not applicable | 83 36.56% |
| TOTAL | 227 |



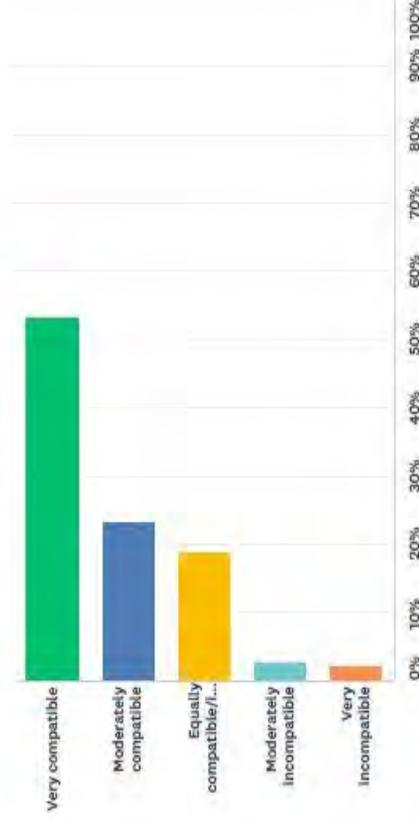
Joint Land Use Study Community Survey

U.S. AIR FORCE

Westover ARB Joint Land Use Study Community Questionnaire

Q15 How compatible is WARB and its ongoing operations with the surrounding community?

Answered: 233 Skipped: 2



| ANSWER CHOICES | RESPONSES |
|---------------------------------|------------|
| Very compatible | 53.22% 124 |
| Moderately compatible | 23.18% 54 |
| Equally compatible/incompatible | 18.88% 44 |
| Moderately incompatible | 2.58% 6 |
| Very incompatible | 2.15% 5 |
| TOTAL | 233 |



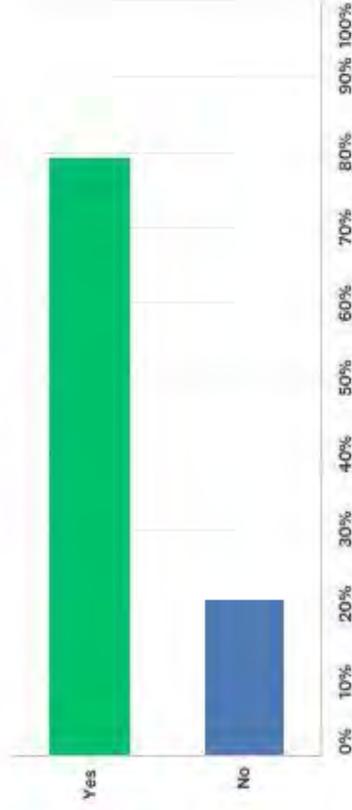
Joint Land Use Study Community Survey

U.S. AIR FORCE

Westover ARB Joint Land Use Study Community Questionnaire

Q16 Are you aware that there are civilian aircraft operations at Westover, handled by a not-for-profit Westover Metropolitan Development Corporation (WMDC) these services include; charter flights to Atlantic City, business and general aviation aircraft handling. Also home to the Massachusetts State Police Air Wing?

Answered: 232 Skipped: 3



| ANSWER CHOICES | RESPONSES |
|----------------|-----------|
| Yes | 184 |
| No | 48 |
| TOTAL | 232 |



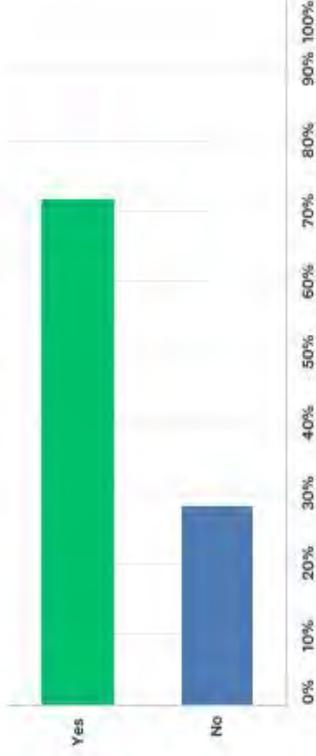
Joint Land Use Study Community Survey

U.S. AIR FORCE

Westover ARB Joint Land Use Study Community Questionnaire

Q17 Are you aware that WMDC is responsible for mitigating noise impacts eligible under the FAA Noise Program in the adjacent communities to Westover? (Recent investments were in excess of \$28mil purchasing 55 properties, 218 acres and relocating the families whom voluntarily moved.)

Answered: 233 Skipped: 2



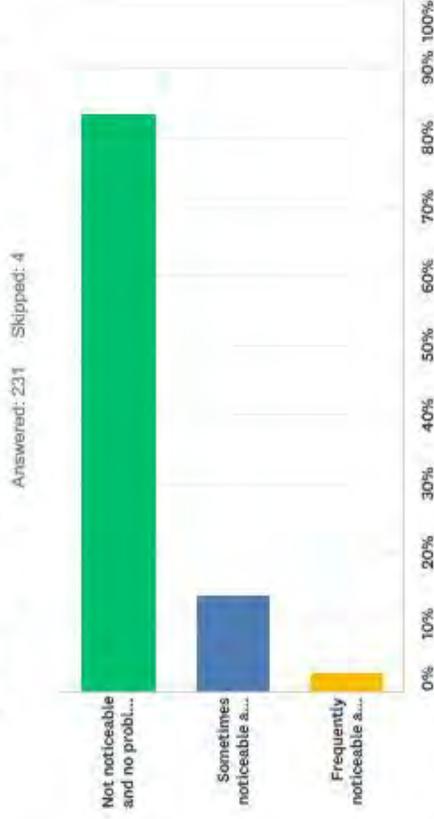
| ANSWER CHOICES | RESPONSES |
|----------------|-----------|
| Yes | 167 |
| No | 66 |
| TOTAL | 233 |



Joint Land Use Study Community Survey

U.S. AIR FORCE

Q18 Do you consider civilian operations at Westover Air Reserve Base such as airplane landings and take offs to be:



| ANSWER CHOICES | RESPONSES |
|---|---------------|
| Not noticeable and no problem at all | 193 83.55% |
| Sometimes noticeable and of annoyance | 32 13.85% |
| Frequently noticeable and a significant hindrance | 6 2.60% |
| TOTAL | 231 |



Joint Land Use Study Community Survey

U.S. AIR FORCE

Westover ARB Joint Land Use Study Community Questionnaire

Q19 According to WMDC, the civilian aircraft operations at Westover Air Reserve Base generate approximately 155 direct/indirect jobs with an economic output of approximately \$22M per year. An opportunity exists for WMDC to increase economic activity and output by allowing limited (6-8 flights) aircraft operations between the hours of 11:00PM and 7:00AM. Would you be comfortable with WMDC pursuing this opportunity?

Answered: 233 Skipped: 2



| ANSWER CHOICES | RESPONSES |
|----------------|---------------|
| Yes | 183 78.54% |
| No | 50 21.46% |
| TOTAL | 233 |



Joint Land Use Study Community Survey

U.S. AIR FORCE

Q20 What are the most important aspects of this JLUS process? Rank in order of importance

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | TOTAL | SCORE |
|--|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| Public education and information | 19.33% | 18.67% | 14.00% | 14.00% | 12.00% | 21.33% | 0.67% | 150 | 4.53 |
| Developing partnerships with local stakeholders | 5.96% | 15.89% | 18.54% | 14.57% | 24.50% | 18.54% | 1.99% | 151 | 4.01 |
| Identifying compatibility concerns | 14.86% | 18.92% | 22.30% | 23.65% | 13.51% | 6.08% | 0.68% | 148 | 4.77 |
| Developing strategies to mitigate compatibility concerns | 4.05% | 15.54% | 25.68% | 26.35% | 16.22% | 10.14% | 2.03% | 148 | 4.26 |
| Advancing economic development efforts | 8.84% | 25.17% | 12.93% | 14.29% | 16.33% | 20.41% | 2.04% | 147 | 4.27 |
| Ensuring ongoing military operations at WARB | 53.16% | 12.66% | 9.49% | 4.43% | 6.96% | 9.49% | 3.80% | 158 | 5.57 |
| I don't know/No opinion | 31.52% | 0.00% | 2.17% | 1.09% | 3.26% | 2.17% | 59.78% | 92 | 3.10 |
| | 29 | 0 | 2 | 1 | 3 | 2 | 55 | | |



Joint Land Use Study Community Survey

U.S. AIR FORCE

Q21 Please list the 3 issues that you consider to be most important for the JLUS to address:

Answered: 112 Skipped: 210

- Improving local economic activity
- Noise (multiple respondents)
- Expanding military operations
- Working with local bordering communities to mitigate any compatibility concerns
- Safety
- Defense
- Jobs
- Ensuring ongoing military operations
- Expansion of Air Force mission
- Protection of adjacent residential property values
- Environmental protection
- Building economic development opportunities
- LESS RESTRICTION ON LAND USE
- Developing partnership
- Developing outreach programs that bring WARB & local residents together
- Expansion of civilian use
- Vehicle traffic
- Better communication between base and local government



Joint Land Use Study Community Survey

U.S. AIR FORCE

Q22 Please add any other comments that you wish to share with the JLUS planning team:

Answered: 46 Skipped: 276

- We are close enough to hear "to the colors" so heavy aircraft departing is loud. Changes in operations that are planned ahead need better public notice. (Fighter craft departing for Europe in early hours)
- I DO NOT WANT FLIGHT NOISE AT NIGHT
- More civilian flights
- Cargo planes are LOUD and SCARY and OMINOUS - I and my family are fearful of them
- The loss of the neighborhood in Granby has given Granby a financial hit
- no night flights there is enough noise
- I would have no problem with quieter aircraft taking off and landing, however, when trying to sleep more noisy aircraft (think fighter jets on the extreme end) would be a problem. Maybe try testing out the project over a couple of nights to test compatibility. If residents could see what it would be like they would be better informed and prepared. Feel more a part of things/in some control.



Joint Land Use Study Community Survey

U.S. AIR FORCE

- Love the new C-5M engines, turning to base leg is right over my house!
- I have been a resident of Chicopee all my life and live basically at the end of the runway. My father helped build Westover, I grew up with The B-52's, I worked on the B-52's, left the active duty and continued my career till 2008 with the C-130 aircraft and the C-5's. The noise has not bothered me and I welcome any progress that will keep the military here as well as help Chicopee grow economically.
- Miss the big boys warming up their engines and flying over!
- I have zero issues with the base and the civilian airport.

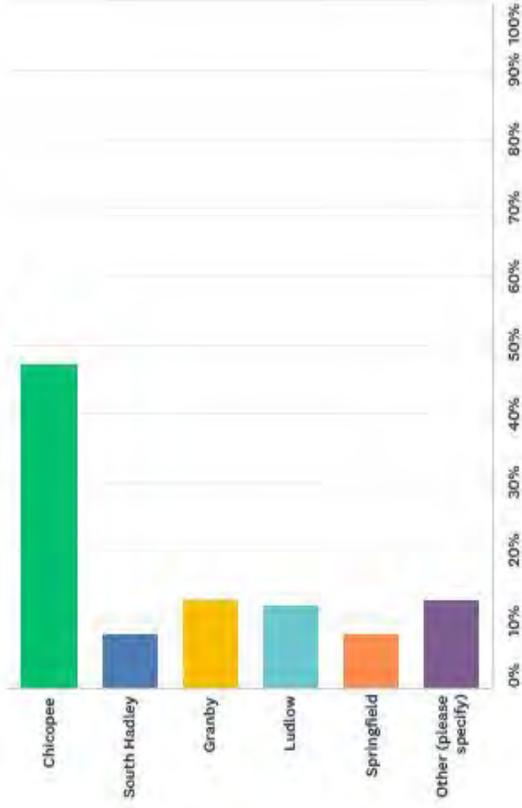


Joint Land Use Study Community Survey

U.S. AIR FORCE

Q23 Please indicate which community you live in:

Answered: 235 Skipped: 0



| ANSWER CHOICES | RESPONSES |
|------------------------|---------------|
| Chicopee | 111 47.23% |
| South Hadley | 18 7.66% |
| Granby | 30 12.77% |
| Ludlow | 28 11.91% |
| Springfield | 18 7.66% |
| Other (please specify) | 30 12.77% |
| TOTAL | 235 |



Joint Land Use Study Community Survey

U.S. AIR FORCE

Air Force Instruction (AFI) 90-2001 Encroachment Management

Promotes protections of public health, safety and general welfare in/around airfield environment (AICUZ)

Governs flight planning/operations and land use/management in/around airspace and ranges (AFI 13-201 Airspace Management)

Encroachment is “Any deliberate action by any governmental or non-governmental entity or individual that does, or is likely to inhibit, curtail, or impede current or future military activities within the installation complex and/or mission footprint; or deliberate military activity that is, or is likely to be, incompatible with the use of a community’s resources.” – AFPD 90-20

- Basically, encroachment comes in three forms:
 - Things the community is doing to the base / units
 - Things the base / units / tenants are doing to the communities
 - Things the base / units / tenants are doing to themselves or others internally

Encroachment Management is “Efforts undertaken by the Air Force alone or in conjunction with other federal, local, state, regional, and private entities, to prevent, eliminate or minimize impacts caused by encroachment.” – AFI 90-2001



U.S. AIR FORCE

Engaging Potential External Stakeholders

- Bureau of Reclamation/Water Management
- City/County Planners and Planning Boards
- Chambers of Commerce
- Conservation Groups
- Councils of Government
- Cultural Resources/SHPO
- Development Organizations
- DoD Units
- Economic Development Councils
- Elected Officials
- FAA/Civil Aviation
- Federal and State Land Management Agencies
- Military Support Groups
- Native American Tribes
- School Districts
- Special Advocacy Groups
- State Natural Resources Departments
- State Transportation Planning
- Utility Companies



U.S. AIR FORCE

Joint Land Use Community Survey

Questions?

APPENDIX B: COMMUNITY ZONING ANALYSES

- Chicopee
- Granby
- Ludlow
- South Hadley

Chicopee Zoning Analysis Details

| Chicopee Zoning Districts within WARB's APZs/CZ | | |
|--|--|--|
| Clear Zone | Accident Potential Zone -I | Accident Potential Zone-II |
| <ul style="list-style-type: none"> Residential A Industrial Garden Planned Unit Development-Type I | <ul style="list-style-type: none"> Residential A Industrial Garden Planned Unit Development-Type I Industrial | <ul style="list-style-type: none"> Residential A Residential B Residential C Business A Industrial Garden Planned Unit Development- Type II |

| Allowed uses in Chicopee's zoning districts within WARB's APZs/CZ | | | |
|---|--|---|--|
| Residential A | Residential B | Residential C | Business A |
| Allowed By-Right | | | |
| <ul style="list-style-type: none"> Single family detached Churches Cemeteries (adjacent to or an existing-extension) Private Schools/ Colleges Greenhouses Government Services Farms, Nurseries Utility Transmission Facilities Golf Courses Accessory Uses | <ul style="list-style-type: none"> Single family detached Two-family residences Churches Cemeteries (adjacent to or an existing-extension) Private Schools/ Colleges Greenhouses Government Services Farms, Nurseries Utility Transmission Facilities Golf Courses Accessory Uses | <ul style="list-style-type: none"> Single-family, Two-family & Three-family dwellings Multi-family dwellings Government Services Accessory Uses | <ul style="list-style-type: none"> Accessory Uses Automobile parking Automobile Service Stations Automotive Trade Business & Professional Serv. Commercial Greenhouses Communications Eating & Drinking Places w/out alcohol Educational Services Entertainment Assembly Finance, Insurance & Real Estate Funeral & Crematory Serv. Hotels & Motels Membership Clubs Personal Services Repair Services Retail Trade Welfare & Charitable Inst. Lodging House Motor Vehicle |

Allowed uses in Chicopee's zoning districts within WARB's APZs/CZ

| Residential A | Residential B | Residential C | Business A |
|---|--|---|--|
| | | | Repair • Animal Kennels |
| Allowed via Special Permit | | | |
| <ul style="list-style-type: none"> • Membership Clubs • Charitable Institution • Garages and Stables (not accessory) • New Cemeteries • Hospital • Isolation, drug and alcohol clinics • Parking Facilities • Permit for more than one unregistered vehicle • Animal Kennels | <ul style="list-style-type: none"> • Membership Clubs • Charitable Institution • Garages (not accessory) • New Cemeteries • Hospital or Sanitariums • Boardinghouses • Isolation, drug and alcohol clinics • Parking Facilities • Home Occupations • Permit for more than one unregistered vehicle • Animal Kennels | <ul style="list-style-type: none"> • Uses allowed in a Commercial A District subordinate to multifamily. Total floor area of Commercial A uses may not exceed 30% of the total floor area of the multifamily use. • Membership Clubs • Charitable Institutions • Parking Facilities • Permit for more than one unregistered vehicle • Animal Kennels • Cemeteries • Hospitals • Home Occupations | <ul style="list-style-type: none"> • Commercial Recreation • Billboards • Drive-in Restaurants • Eating & Drinking Places w alcohol • Up to 4 dwelling units in a business building • Small-scale Production Facilities • Towing & Storage of Motor Vehicles • Housing of Taxis, Limos & Car Rentals • Adult Uses |

Allowed uses in Chicopee's zoning districts within WARB's APZs/CZ

| Industrial | Industrial Garden (IPUD) Type I | Industrial Garden (IPUD) Type II |
|--|---|--|
| Allowed By-Right | | |
| <ul style="list-style-type: none"> • Industrial Uses and any use allowed as a permitted use in Business A (see above) or B Districts (see below) and accessory uses • Additional uses allowed in Business B <ul style="list-style-type: none"> • Motor Freight transportation • Utilities: Office, equipment storage and maintenance • Wholesale trade | <ul style="list-style-type: none"> • Industrial Uses except those in Chapter 275-62B • Office Uses, including R&D activities • Business and Professional Services • Financial, Insurance and Real Estate Services • Aviation and aviation services • Warehouse and Distribution • Contract Construction services • Communications • Accessory Uses | <ul style="list-style-type: none"> • Industrial Uses except those in Chapter 275-62B 1-23 • Office uses, including R&D activities • Business and Professional Services • Financial, Insurance and Real Estate Services • Communications, Telecommunications Uses, Call Centers and Telemarketing Uses • Recreation and Sporting Uses, including instructional & commercial uses, excluding sports assembly • Aviation & Aviation Services • Retail Sales only as an accessory to a permitted principal use • Accessory Uses |
| Allowed via Special Permit | | |
| <ul style="list-style-type: none"> • A number of industrial uses that may be noxious (See Chapter 275-62B) | <ul style="list-style-type: none"> • Education Services • Civic Center • Eating and Drinking Places | <ul style="list-style-type: none"> • Educational Services • Eating and Drinking Places • Warehouse & Distribution • Sports Assembly • Riverfront Activities, consisting of fishing piers and non-motorized boat launches |

Chicopee - Relevant Density Requirements

| | Minimum Lot Size | Maximum Height |
|--|---|----------------|
| Residential A | 10,000 Square Feet | 40 |
| Residential B | Single Family: 7,500 Square Feet | 40 |
| | All Others: 10,000 Square Feet | |
| Residential C | Single Family: 7,500 Square Feet | 40 |
| | Two & Three Family: 10,000 Square Feet | |
| | Multifamily, Government Services & Special Permit | |
| | Use: 30,000 Square Feet | |
| Business A | None | 40 |
| Industrial | None | 60 |
| Industrial Garden PUD | Principal Structure: 50,000 Square Feet | 45 |
| Industrial Garden PUD - Type II | Tract should be 6 acres, with parcel for principal structure = 50,000 Square Feet | 45 |

Granby Zoning Analysis Details

Granby Zoning Districts within WARB's APZs/CZ

| Clear Zone | Accident Potential Zone -I | Accident Potential Zone-II |
|---|--|--|
| <ul style="list-style-type: none"> No clear zone in Granby | <ul style="list-style-type: none"> RS-Residential Single Family | <ul style="list-style-type: none"> RS-Residential Single Family |

Allowed uses in Granby's zoning districts within WARB's APZs/CZ

RS-Residential Single Family

Allowed By-Right

- Agriculture, horticulture, floriculture, viticulture
- Commercial, livestock, dairy and poultry farm
- Farm Business, commercial greenhouse
- Forestry, wood harvesting, tree farm, nursery
- Conservation land
- Single Family Detached Dwelling
- Single Family Dwelling on estate lot
- Room rental
- Large Scale Ground Mounted Solar PV Installation
- Home Occupation
- Home Professional Office
- Private garage or stables not exceeding one thousand two hundred (1200) feet in area
- Parking of one large commercial vehicle over two tons capacity

Allowed via Special Permit

- Commercial boarding stable/riding academy
- Commercial Golf Course
- Commercial Recreational Camping for transient guests
- Commercial hunting, fishing or ski grounds
- Multi-family dwelling
- Congregate housing for the elderly or handicapped
- Open Space Community
- Dwellings and housekeeping facilities for employees and non-paying guests of owner or lessee in an accessory building
- Bed and Breakfast
- Age restricted Housing Committee
- Government Administration Building
- Public Utility Administration Building
- Fire or Police Station
- Municipal Dog Pound
- Municipal Highway Department and accessory uses
- Community Center, facility for the elderly
- Private School
- Private membership club (not conducted as gainful business)
- Hospital, sanitarium
- Rest home, convalescent or nursing home
- Cemetery, crematory
- Private museum, art gallery, craft center
- Accessory uses which are necessary in connection with scientific research, scientific development and related production
- Funeral establishment
- Medical or dental center or laboratory
- Veterinary establishment, place for boarding animals, or raising pets for gainful purpose
- Removal of soil, loam, sand, gravel, rock, quarried stone or other earth products

- Home studio or business
- Home shop
- Private garage or stables exceeding one thousand two hundred (1200) feet in area
- Parking more than one large commercial vehicle over two tons capacity

Allowed via Site Plan Review

- Public or non-profit educational institution
- Church, parish house or other place of worship
- Public library, museum
- Public park, playground or recreation area
- Philanthropic institution

Granby - Relevant Density Requirements

| | Min. Lot Size | Max. Height | Max. Lot Coverage |
|----------------------|------------------------|-------------|-------------------|
| Residential A | 40,000 FT ² | 35 | 25% |

Ludlow Zoning Analysis Details

| Ludlow Zoning Districts within WARB's APZs/CZ | | |
|---|--|---|
| Clear Zone | Accident Potential Zone -I | Accident Potential Zone-II |
| <ul style="list-style-type: none"> • Agriculture • Industrial A | <ul style="list-style-type: none"> • Agriculture • Residential A • Industrial A • Business A | <ul style="list-style-type: none"> • Agriculture • Residential A • Residential B • Industrial A • Business A |

| Allowed uses in Ludlow's zoning districts within WARB's APZs/CZ | | |
|--|--|---|
| Agricultural | Residential A | Residential B |
| Allowed By-Right | | |
| <ul style="list-style-type: none"> • Single Family • Agricultural & Livestock • Saddle Horse or Riding Stables on more than 5 acres • Sale of Agricultural Products • Forest and Wood Lots • Private Stable | <ul style="list-style-type: none"> • Single Family Dwelling • Agriculture & Livestock on more than 5 acres • Saddle Horse or Riding Stable on more than 5 acres • Sale of Agriculture Products on more than 5 acres • Forest and Woodlots on more than 5 acres | <ul style="list-style-type: none"> • Single Family Dwelling • Two Family • Agricultural & Livestock Agriculture on more than 5 acres • Saddle Horse or Riding Stable on more than 5 acres • Sale of Agriculture Products on more than 5 acres • Forest and Woodlots on more than and less than 5 acres |
| Allowed via Site Plan Review | | |
| <ul style="list-style-type: none"> • Small Wind Energy System • Large-Scale, Ground Mounted, Photovoltaic Systems • Lumber Mill • Flea Markets • Zoos • Room Rental • Brew Pub • Building Project over 50,000 sq. ft. • Commercial Kennel • Dining Establishments • Distillery • Halls • Home Occupation • Home Professional Office • Micro-Brewery • Micro-Cidery | <ul style="list-style-type: none"> • Small Wind Energy System • Room Rental • Home Occupation • Home Professional Office • Municipal Parking • Parks, Playgrounds, Recreation & Community Centers • Municipal Buildings • State and Federal Government Buildings • Utilities • Research Facilities • Adult Care Facilities • Religious & Educational | <ul style="list-style-type: none"> • Small Wind Energy System • Home Conversion • Room Rental • Home Occupation • Home Professional Office • Boarding House • Multi Family • Municipal Parking • Parks, Playgrounds, Recreation & Community Centers • Municipal Buildings • State and Federal Government Buildings • Utilities • Research Facilities • Membership Clubs • Adult Care Facilities • Religious & Educational Hospitals |

Allowed uses in Ludlow's zoning districts within WARB's APZs/CZ

| Agricultural | Residential A | Residential B |
|---|--|--|
| <ul style="list-style-type: none"> • Nano-Brewery • Nano-Cidery • Winery, Micro-Winery & Nano-Winery • Municipal Parking • Religious & Educational Hospitals • Parks, Playgrounds, Recreation & Community Centers • Municipal Government Building • State & Federal Government Buildings • Utilities • Aviation Fields • Membership Clubs • Wireless Communication Facilities • Research Facilities | <p style="text-align: center;">Hospitals</p> | |
| Allowed via Special Permit | | |
| <ul style="list-style-type: none"> • Saddle Horse or Riding Stables (less than 5 acres) • Flea Markets • Zoos • Room Rental • Accessory Apartment • Brew Pub • Building Project over 50,000 sq. ft. • Commercial Kennel • Dining Establishments • Distillery • Halls • Home Occupation • Home Professional Office • Micro-Brewery • Micro-Cidery • Nano-Brewery • Nano-Cidery • Winery, Micro-Winery, Nano-Winery | <ul style="list-style-type: none"> • Accessory Apartment • Home Occupation • Home Professional Office • Research Facilities • Adult Care Facilities | <ul style="list-style-type: none"> • Multi Family • Accessory Apartment • Home Occupation • Home Professional Office • Research Facilities • Adult Care Facilities |

Allowed uses in Ludlow's zoning districts within WARB's APZs/CZ

Agricultural

Residential A

Residential B

- Wireless Communications Facilities
- Research Facilities

Allowed uses in Ludlow's zoning districts within WARB's APZs/CZ

Business A

Industrial A

Allowed By-Right

- | | |
|--|--|
| <ul style="list-style-type: none"> • Agriculture & Livestock on more than 5 acres • Saddle Horse or Riding Stables on more than 5 acres • Sale of Agriculture Products • Forest and Woodlots on more than 5 acres • Clothing Donation Receptacles | <ul style="list-style-type: none"> • Agricultural & Livestock on more than 5 acres • Accessory Livestock Agriculture • Saddle Horse or Riding Stable on more than 5 acres • Sale of Agriculture Products • Forest and Woodlots • Clothing Donation Receptacles |
|--|--|

Allowed Via Site Plan Review

- | | |
|---|---|
| <ul style="list-style-type: none"> • Small Wind Energy System • Room Rental • Automated Teller Machine • Automated Vending Kiosk • Auto Service Station & Repair Service • Banks • Brew Pubs • Building Project over 50,000 sq. ft. • Commercial Kitchen • Dining Establishments • Drive-through Establishments • Halls • Home Occupation • Home Professional Office • Hotels/Inns • Micro-Brewery • Micro-Cidery • Motels • Municipal Parking • Nano-Brewery • Nano-Cidery • Office Buildings • Open Air Parking • Parking Garages • Retail • Services • Religious & Educational Uses • Parks, Playgrounds, Recreation & Community Centers • State & Federal Government Buildings • Utilities • Hospitals • Research Facilities • Membership Clubs • Adult Care Facilities | <ul style="list-style-type: none"> • Small Wind Energy System • Large-Scale, Ground Mounted, Photovoltaic Systems • Lumber Mill • Flea Market • Amusement Parks • Automated Teller Machines • Automated Vending Kiosk • Auto Body Shop • Auto Sales Lots • Auto Service Station & Repair Service • Banks • Bowling Alleys • Brewery • Brew Pub • Building Project over 50,000 sq. ft. • Commercial Kitchen • Dining Establishments • Distillery • Drive-through Establishments • Halls • Home Occupation • Home Professional Office • Hotels/Inns • Micro-Brewery • Micro-Cidery • Motels • Municipal Parking • Nano-Brewery • Nano-Cidery • Office Buildings • Open Air Parking • Parking Garages • Retail • Roller Rinks • Services • Warehousing • Whole Sale • Light Manufacturing • General Industrial • State and Federal Government Buildings • Utilities • Wireless Communication Facilities • Research Facilities |
|---|---|

Allowed uses in Ludlow's zoning districts within WARB's APZs/CZ

| Business A | Industrial A |
|---|---|
| | <ul style="list-style-type: none"> • Medical Marijuana Treatment Center/ Dispensary • Winery, Micro-Winery & Nano-Winery • Religious & Educational Uses |
| Allowed via Special Permit | |
| <ul style="list-style-type: none"> • Auto Service Station & Repair Service • Brew Pubs • Building Project over 50,000 sq. ft. • Commercial Kitchen • Drive-through Establishments • Home Occupation • Home Professional Office • Micro-Brewery • Micro-Cidery • Nano-Brewery • Nano-Cidery • Research Facilities • Adult Care Facilities | <ul style="list-style-type: none"> • Flea Market • Brewery • Brew Pub • Building Project over 50,000 sq. ft. • Commercial Kitchen • Distillery • Drive-through Establishments • Home Occupation • Home Professional Office • Micro-Brewery • Micro-Cidery • Nano-Brewery • Nano-Cidery • Wireless Communication Facilities • Research Facilities • Medical Marijuana Treatment Center/ Dispensary |

**Aircraft Flight Overlay District

- Includes entire APZ & CZ
- Prohibited Uses
 - Adult Care Facilities (Amended 10/3/11), Hospitals, Auditoriums, Concert Halls
 - Schools, Day Care Centers, Houses of Worship (Added 4/11/94 - See House Bill #4755)

Ludlow - Relevant Density Requirements

| | Minimum Lot Size | Maximum Height |
|----------------------|---|------------------------------|
| Agricultural | Any Permitted Use: 40,000 Square Feet | State Bldg Code Requirements |
| Residential A | Single-family: 15,000 Square Feet | State Bldg Code Requirements |
| Residential B | Single-family: 15,000 Square Feet Two, Three & Four Family?? | State Bldg Code Requirements |
| Business A | Any Business Use: 30,000 Square Feet | State Bldg Code Requirements |
| Industrial A | Any Business or Industrial Use: 40,000 Square Feet | State Bldg Code Requirements |

South Hadley Zoning Analysis Details

South Hadley Zoning Districts within WARB's APZs/CZ

| Clear Zone | Accident Potential Zone-I | Accident Potential Zone-II |
|---|---|--|
| <ul style="list-style-type: none"> None- No CZ in South Hadley | <ul style="list-style-type: none"> Agricultural Residential A-1 Business B Business C Industrial A | <ul style="list-style-type: none"> Agricultural Residential A-1 Residential A-2 Business A-1 Business C |

Allowed uses in South Hadley's zoning districts within WARB's APZs/CZ

| Agricultural | Residential A-1 | Residential A-2 | Industrial A |
|--|---|--|---|
| Allowed By-Right | | | |
| <ul style="list-style-type: none"> Single Family Dwellings Home Occupation I Agricultural (5 or more acres) Cemeteries Private Land strips Public Parks and Playgrounds Sale of Farm Products Accessory Uses Other Earth Removal/Extraction | <ul style="list-style-type: none"> Single Family Dwelling Home Occupation I Agricultural (5 or more acres) Cemeteries Public Parks and Playgrounds Accessory Uses Other Earth Removal/Extraction | <ul style="list-style-type: none"> Single Family Dwelling Home Occupation I Agricultural (5 or more acres) Cemeteries Public Parks and Playgrounds Accessory Uses Other Earth Removal/Extraction | <ul style="list-style-type: none"> Agricultural (5 or more acres) Federal and State Government Buildings Public Parks and Playgrounds Accessory Uses Other Earth Removal/ Extraction |
| Allowed via Site Plan Review | | | |
| <ul style="list-style-type: none"> Home Occupation II Agricultural (Less than 5 acres) Portable wood working mills on lots of less than 5 acres Stables or riding academies Town Buildings Educational Facilities Structures for religious purposes | <ul style="list-style-type: none"> Home Occupation II Agricultural (Less than 5 acres) Stables or Riding Academies Town Buildings Educational Facilities Structures for religious purposes | <ul style="list-style-type: none"> Home Occupation II Agricultural (Less than 5 acres) Stables or Riding Academies Town Buildings Educational Facilities Structures for religious purposes Clubs, lodges, social, and community center buildings Hospitals, sanitariums, | <ul style="list-style-type: none"> Town Buildings Educational Facilities Structures for religious purposes Personal, Business and Professional Services Automotive Repair and Services Office Wholesale Sales and Warehousing Telephone Exchange Buildings Railroad or bus passenger stations or shelters Amusement Parks, bowling alleys, roller skating rinks Training or education institutions operated for profit Professional Business Restaurant General Manufacturing (not considered noxious or odorous) |

Allowed uses in South Hadley's zoning districts within WARB's APZs/CZ

| Agricultural | Residential A-1 | Residential A-2 | Industrial A |
|---|---|--|---|
| | | and charitable services <ul style="list-style-type: none"> • Telephone Exchange Buildings • Railroad or bus passenger stations or shelters | |
| Allowed via Special Permit | | | |
| <ul style="list-style-type: none"> • Single Family Dwelling (Flag Lot) • Conversion of single family to 2-family • Bed and Breakfast Home • Bed and Breakfast Inn • Flexible Residential Developments • Outdoor Recreation Facilities • Gas to Energy Facility • Major earth removal/extraction • Extension or alteration of existing non-conforming use • Wireless communication Tower • Wireless communication Antenna | <ul style="list-style-type: none"> • Single Family Dwelling (Flag Lot) • Two Family Dwelling (new) • Three Family Dwelling • Multifamily Dwelling • More than one building for dwelling purposes • Mobile Homes • Bed and Breakfast Home • Bed and Breakfast Inn • Flexible Residential Developments • Sale of Farm Products • Professional Business • Major Earth Removal/Extraction • Extension or alteration of existing non-conforming use • Wireless communication Antenna | <ul style="list-style-type: none"> • Single Family Dwelling (Flag Lot) • Conversion of a single family to two-family dwelling • Two Family Dwelling (new) • Three Family Dwelling • Multifamily Dwelling • More than one building for dwelling purposes • Mobile Homes • Continuing Care Retirement Community • Bed and Breakfast Home • Bed and Breakfast Inn • Flexible Residential Developments • Professional Business • Major Earth Removal/Extraction • Extension or alteration of existing non-conforming use • Wireless communication Antenna | <ul style="list-style-type: none"> • Bed and Breakfast Inn • Railroad or bus passenger station or shelter • Commercial Kennels • Medical Marijuana Off-site Dispensary • Gas to Energy Facility • Medical Marijuana Treatment Center • Medical Marijuana Cultivation and Processing Facility • Major Earth Removal/Extraction • Extension or alteration of existing non-conforming use • Wireless communication Tower • Wireless communication Antenna |

Allowed uses in South Hadley's zoning districts within WARB's APZs/CZ

| Business A | Business B | Business C |
|---|---|---|
| Allowed By-Right | | |
| <ul style="list-style-type: none"> • Single Family Dwelling • Conversion of a single family to a two-family • Home Occupation I • Agricultural (5 or more acres) • Cemetery • Federal or State Government Building • Public playground and park • Accessory Use • Other Earth Removal/ Extraction | <ul style="list-style-type: none"> • Single Family Dwelling • Conversion of a single family to a two-family • Home Occupation I • Agricultural (5 or more acres) • Cemeteries • Federal or state government buildings • Public playgrounds and parks • Accessory Uses • Other Earth Removal/ Extraction | <ul style="list-style-type: none"> • Agricultural (5 or more acres) • Federal or state government buildings • Public playgrounds and parks • Other Earth Removal/ Extraction |
| Allowed Via Site Plan Review | | |
| <ul style="list-style-type: none"> • Home Occupation II • Agricultural (less than 5 acres) • Stables or riding academies • Town Buildings • Education Institutions • Structures used for religious purposes • Clubs, lodges, social and community center buildings • Hospitals, sanitariums, and charitable services • Retail Sales • Personal, Business and Professional Services • Open Air parking for 25 vehicles or less • Marinas • Offices • Telephone Exchange Building • Railroad or bus passenger stations or shelters • Training or educational facility | <ul style="list-style-type: none"> • Home Occupation II • Agricultural (less than 5 acres) • Stables or riding academies • Town Buildings • Education Institutions • Structures used for religious purposes • Clubs, lodges, social and community center buildings • Hospitals, sanitariums, and charitable services • Retail Sales • Personal, Business and Professional Services • Open Air parking for 25 vehicles or less • Public parking areas and garages (Unrestricted capacity) • Marinas • Offices • Wholesale sales and warehousing | <ul style="list-style-type: none"> • Agricultural (less than 5 acres) • Stables or riding academies • Town Buildings • Education Institutions • Structures used for religious purposes • Retail Sales • Personal, Business and Professional Services • Offices • Railroad or bus passenger stations or shelters • Training or educational facility operated for profit • Professional Business • Restaurant |

Allowed uses in South Hadley's zoning districts within WARB's APZs/CZ

| Business A | Business B | Business C |
|---|--|--|
| <ul style="list-style-type: none"> operated for profit • Professional Business • Restaurant | <ul style="list-style-type: none"> • Telephone Exchange Buildings • Railroad or bus passenger stations or shelters • Amusement parks, bowling alleys, roller skating rinks • Training or educational facility operated for profit • Professional Business • Restaurant • | |
| Allowed via Special Permit | | |
| <ul style="list-style-type: none"> • Two Family Dwelling (new) • Three Family Dwelling • Multifamily Dwelling • More than one building for dwelling purposes • Bed and Breakfast Inn • Drive In Services • Gasoline filling station • Automotive repair and services • New and second hand car dealers • Sale of Farm products • Flea Market • Commercial Kennels • Major Earth Removal/Extraction • Extension or alteration of existing non-conforming use • Wireless communication Tower • Wireless communication Antenna | <ul style="list-style-type: none"> • Two Family Dwelling (new) • Three Family Dwelling • Multifamily Dwelling • More than one building for dwelling purposes • Bed and Breakfast Inn • Drive In Services • Gasoline filling station • Automotive repair and services • New and second hand car dealers • Sale of Farm products • Flea Market • Commercial Kennels • Adult Entertainment Uses • General manufacturing uses not commonly considered hazardous or noxious • Major Earth Removal/Extraction • Extension or alteration of existing non- | <ul style="list-style-type: none"> • Single Family Dwelling • Multi-family Dwellings • More than one building used for dwellings • Clubs, lodges, social and community center buildings • Wholesale sales and warehousing • Motel-Hotel • Sale of Farm products • Commercial Kennels • Major Earth Removal/Extraction • Extension or alteration of existing non-conforming use • Wireless communication Tower • Wireless communication Antenna |

Allowed uses in South Hadley's zoning districts within WARB's APZs/CZ

| Business A | Business B | Business C |
|------------|---|------------|
| | <p data-bbox="529 239 716 270">conforming use</p> <ul data-bbox="483 275 716 447" style="list-style-type: none"><li data-bbox="483 275 716 359">• Wireless communication Tower<li data-bbox="483 363 716 447">• Wireless communication Antenna | |

South Hadley - Relevant Density Requirements

| | Minimum Lot Size | Maximum Height |
|------------------------|--|----------------|
| Agricultural | Principal Use: 30,000 Square Feet | 35 |
| | Churches, schools, colleges, libraries, Town buildings, and similar uses | 60 |
| Residential A-1 | Principal Use: 22,500 Square Feet | 35 |
| | Churches, schools, colleges, libraries, Town buildings, and similar uses | 60 |
| Residential A-2 | Principal Use: 12,500 Square Feet | 35 |
| | Churches, schools, colleges, libraries, Town buildings, and similar uses | 60 |
| Business A | Principal Use: 10,000 Square Feet | 45 |
| Business B | Principal Use: 12,000 Square Feet | 80 |
| Business C | Principal Use: 20,000 Square Feet | 60 |
| Industrial A | Principal Use: 40,000 Square Feet | 40 |

APPENDIX C: NOISE & LAND USE COMPATIBILITY

TABLE 1—LAND USE COMPATIBILITY* WITH YEARLY DAY-NIGHT AVERAGE SOUND LEVELS

| Land use | Yearly day-night average sound level (L _{dn}) in decibels | | | | | |
|--|---|-------|-------|-------|-------|---------|
| | Below 65 | 65-70 | 70-75 | 75-80 | 80-85 | Over 85 |
| RESIDENTIAL | | | | | | |
| Residential, other than mobile homes and transient lodgings | Y | N(1) | N(1) | N | N | N |
| Mobile home parks | Y | N | N | N | N | N |
| Transient lodgings | Y | N(1) | N(1) | N(1) | N | N |
| PUBLIC USE | | | | | | |
| Schools | Y | N(1) | N(1) | 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(2) | Y(3) | Y(4) | Y(4) |
| Parking | Y | Y | Y(2) | Y(3) | Y(4) | N |
| COMMERCIAL USE | | | | | | |
| Offices, business and professional | Y | Y | 25 | 30 | N | N |
| Wholesale and retail—building materials, hardware and farm equipment | Y | Y | Y(2) | Y(3) | Y(4) | N |
| Retail trade—general | Y | Y | 25 | 30 | N | N |
| Utilities | Y | Y | Y(2) | Y(3) | Y(4) | N |
| Communication | Y | Y | 25 | 30 | N | N |
| MANUFACTURING AND PRODUCTION | | | | | | |
| Manufacturing, general | Y | Y | Y(2) | Y(3) | Y(4) | N |
| Photographic and optical | Y | Y | 25 | 30 | N | N |
| Agriculture (except livestock) and forestry | Y | Y(6) | Y(7) | Y(8) | Y(8) | Y(8) |
| Livestock farming and breeding | Y | Y(6) | Y(7) | N | N | N |
| Mining and fishing, resource production and extraction | Y | Y | Y | Y | Y | Y |
| RECREATIONAL | | | | | | |
| Outdoor sports arenas and spectator sports | Y | Y(5) | Y(5) | 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 |

*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.

KEY TO TABLE 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.

NOTES FOR TABLE 1

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (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.

(2) Measures to achieve NLR 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.

(3) 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.

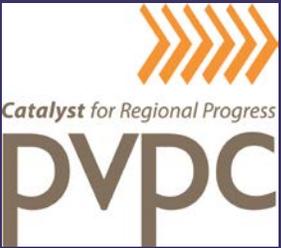
(4) Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal level is low.

(5) Land use compatible provided special sound reinforcement systems are installed.

(6) Residential buildings require an NLR of 25.

(7) Residential buildings require an NLR of 30.

(8) Residential buildings not permitted.



Pioneer Valley Planning Commission

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