Town Plan & Energy Plan

2022

Middlesex, Vermont

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As Adopted by Middlesex Voters on March 1, 2022

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Approved by Middlesex Voters March 1, 2022

ADOPTED

[As approved by the voters of Middlesex, Date, 2019]

ACKNOWLEDGEMENTS

MIDDLESEX SELECTBOARD

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Theo Kennedy

The Town of Middlesex thanks all of its Selectboard members and Commissioners who served during the development of this Plan.

Cover Photo: The old Webster House in Middlesex Village. Painting by Middlesex artist, Connie D'Anna

Approved by Middlesex Voters March 1, 2022

ACKNOWLEDGEMENTS

TOWN STAFF

Sarah Merriman, Town Clerk and Selectboard Assistant
Maryke Gillis, Assistant Town Clerk

SUPPORTING GROUPS

Central Vermont Regional Planning Commission
Middlesex Conservation Commission
What's Next Middlesex and resultant working groups

The town thanks all of its volunteers and citizen participants for their assistance in guiding and supplementing the text, vision and goals contained in this Plan.

PHOTO CREDITS

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Approved by Middlesex Voters March 1, 2022

TOWN PLAN 2019: SUMMARY

Current Challenges and Vision

Middlesex is a small central Vermont community with limited financial and administrative resources. Middlesex does have a wealth of other resources, however, in its community, landscape, significant emerging opportunities in its Village Center, and a strong foundation in equitable and effective governance. While its citizenry has identified its challenges, this town plan is an effort to lay crucial policy groundwork needed to help utilize and protect its strongest assets, while advancing the Town's vision and goals.

Plan Purpose

This Town Plan documents and assesses the present conditions of key components of life in Middlesex, while also serving as an important expression of the community's vision for the future. It lays out the goals and outlines the strategic map to reach that vision.

A plan can then guide growth by: directing Town, state, and federal investments in roads, buildings, and recreational facilities to areas where the Town most needs and desires them; informing the revision of land use regulations; and setting out a course of action for the Town's committees and Select Board.

This 2019 Town Plan represents the culmination of a public process led by the Middlesex Planning Commission. It provides the most recent available data on present conditions and projections for the Town's future in each plan element. It also includes results of the 2018 *What's Next Middlesex?* outreach and report, and early findings of the 2018-2019 Town Plan survey solicited by the Middlesex Planning Commission which assessed the values and priorities of residents. For example, a majority of survey respondents (88%) would recommend Middlesex to a friend or family member as a good place to live.

This plan sets out to do this by presenting goals and implementation strategies for each section that, if carried out, can achieve the vision that residents have for the future of Middlesex.

The Town Plan is an opportunity to evaluate key accomplishments as well as areas for improvement. It also provides an opportunity to review current trends and conditions, explore new issues and opportunities and ensure that recommendations contained in the updated Plan are aligned with the community's vision and goals for the future.

See Chapter 5 for a discussion on "Achieving the Vision" and how the town plans to use this plan.

Public Outreach and Update Process

Throughout 2018, the citizens and stakeholders of the town came together to participate in one of the most robust community conversations that has ever taken place in Middlesex: to ask and answer the question What's Next Middlesex, an ambitious and successful vision to action forum. Middlesex embarked on a dynamic series of two-way conversations between community members and local leaders. Extensive planning brought with it an elder/youth oral history project, a creative community-building Story Pot activity involving townspeople and elementary students at Rumney School, a well-attended community dinner, a

day and a half of vibrant facilitated discussions, a final report, and four resultant community action committees to focus on economic development and infrastructure, trails, community spaces and events, and outreach/communication. The Planning Commission offered a survey to residents, and the town received more than 300 responses as of May 2019.

Public outreach continued with regular meetings of the Planning Commission, and a public hearing was held on May 9th. More than a dozen residents came to listen to a presentation, ask questions, and provide input which has been directly incorporated into this Plan.

The Planning Commission held a warned public hearing on June 19, 2019

The Selectboard held a warned public hearing and voters approved in November 2019. In 2021 the Planning Commission and Selectboard held warned public hearings to add the Enhanced Energy Plan as an Appendix. Voters approved the 2022 Town Plan and Enhanced Energy Plan on March 1, 2022.

New Trends and Key Plan Updates

Though the update to the plan was completed in a relatively short time period, the plan is remarkably distinct from its 2013 predecessor. While there are many updates in text, data, and vision, a few stand out as critically rejuvenated.

- New key themes;
- Changes in community conversation, including *What's Next Middlesex?*
- Updates to goals, objectives, and implementation strategies;
- Refreshed organization;
- Key components not previously discussed, including a future land use map, forest block identification and protection, infrastructure planning;
- Updates to Village Center planning and goals.

Themes and Organization

This 2019 Town Plan is organized around 4 key principles that emerged from the What's Next Middlesex Process.

A Community that Works for All. People, Housing and Livelihoods

A Landscape that Lasts. Protecting Working and Conservation Lands

A Place to Gather. Fostering a Vibrant, Connected Village Center

A Strong Foundation. Equitable and Effective Governance and Services

What is Next, Middlesex?

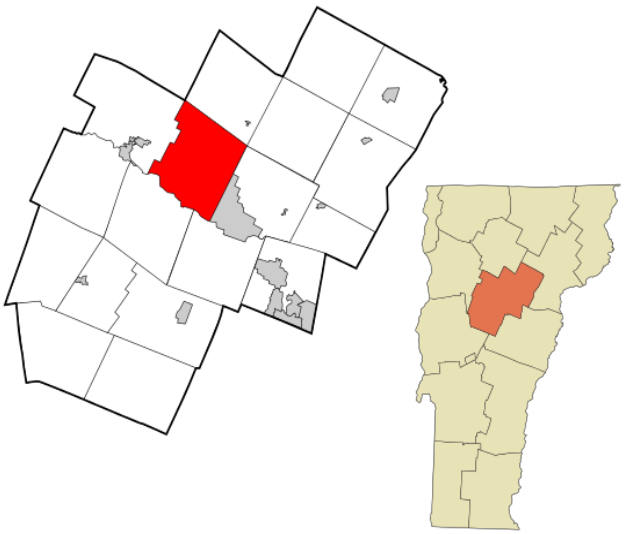
This Town Plan will serve as a guide for strengthening and protecting Middlesex here and into the future. While the Plan document may reflect work and tasks to be completed over 8 years, much of the vision contained herein reflects timeless values that represent the beloved community of Middlesex, Vermont.

CHAPTER 1: A COMMUNITY THAT WORKS FOR ALL

People, Housing, and Livelihoods

1.1. Overview

Middlesex, Vermont is by some common standards a small municipality: Fewer than 2,000 residents live here in just 752 households, making it the 106th most populous municipality in the state and home to only about 0.2% of Vermont's population. Its small size means that small fluctuations in demographic characteristics can sometimes appear as significant trends in short time periods and pose challenges for understanding temporal changes.



Middlesex, Washington County, Vermont

Still, Middlesex is home to immeasurable riches that rival any in the region. Embedded in central Vermont and sustaining nearly 44 square miles of land, it draws people through and in for both its convenient access to nearby places and also for its own majesty, charm and spirit. Its high school educational attainment, household income, median income, median home value and labor force participation rate all easily exceed the state averages.

Facts About Middlesex:	
Total area:	28,173 acres + (44 sq. miles)
Area above 2000 ft.:	1469 acres
Area above 2500 ft.:	501 acres
Area where slope exceeds 15%:	13,470 acres (48% of the Town)

A profile of Middlesex includes its deep history, variety of resources, strength of its people, diversity of livelihoods and stability of its homes.

More than 88% of 2018 resident survey respondents declared that they would recommend Middlesex to a friend or family member as a good place to live.

1.2. History that Shapes Middlesex Today

There has been a Native American presence in the area now known as Vermont for at least the past 11,500 years. Early permanent settlements included the Iroquois and Western Abenaki tribes in the Champlain Basin. Eventually, the Abenaki expanded their presence up the larger river valleys flowing into the eastern shores of Lake Champlain including the river now called the Winooski. The pre-Middlesex area

along the Winooski witnessed early Indian habitation primarily in the form of seasonal hunting and fishing gathering camps.

The remains of early historic sites have been found along the river near and in Middlesex. One site on the town's eastern boundary contained "evidence of an Indian village including a cornfield and burial place where Indian weapons were found." Native Americans lived in the area from 1750-60 before the arrival of explorers and settlers of European descent.

The township of Middlesex was chartered in the name of English King George III on June 8,1763. Vermont declared itself an independent republic in 1777 and became the 14th state of the United States in 1791.

Middlesex was the first town settled in Washington County, when Thomas Mead arrived in 1783 from Westfield, Massachusetts and staked his claim on the river near the present-day Settlement Farm. By 1796, 60 more settlers had arrived and the 1800 census listed 262 Middlesex inhabitants. By 1810, the population had increased to 401 and by 1830, to 1156. As the population of the town grew, Middlesex Village emerged as a thriving community and commercial center.

Grist and sawmills were constructed along the river beginning around 1800 just upstream from the Middlesex Narrows. Additional mills soon followed, including linseed oil, clothing-dressing, woolen and wood shingle. However, the river proved an unfriendly host for commerce as the mills were destroyed by floods in 1818, 1828, and 1830 and a fire in 1821. The mills were quickly rebuilt following each catastrophic event. These industries and the town's emerging farming community led to a growing local economy of craftsmen and merchants along with an active civic life centered in the village. The first record of a postmaster in town is in 1826. By 1871, two large hotels had opened in the village.

The Central Vermont Railroad completed its rail line from Windsor, Vermont to Burlington in 1849. The new line included an important station in Middlesex Village. The station depot supported not only local commerce but an active stagecoach route that extended from the village up into the Mad River Valley. Water to the village was supplied from a spring located across the river in Moretown with a pipe that ran under the covered wooden bridge spanning the Narrows. At the height of its development in the late 1800's, the village supported a church, schoolhouse, three stores, three blacksmith shops, a public house and about 200 inhabitants. The majesty of Middlesex Narrows was tamed in 1895 by the

construction of a wooden crib power dam for electricity generation. The bulk of the electricity was transported by poles and wires not to the town or village but upstream to the Capital city of Montpelier and to a rapidly growing granite industry. Much of Middlesex had to wait until the early 1940s and the assistance of the U. S. Department of Agriculture's Rural Electrification Agency before becoming electrified.

20TH CENTURY. Flooding of the Winooski continued to be a frequent occurrence culminating in the Great Flood of 1927. The rampaging waters severely damaged the power dam and took out the High Bridge across the Narrows and the Buck Bridge, a 214' covered doubleway over the river west of the village into Moretown. In his book, *Vermont in Floodtime*, Luther Johnson describes the wet summer and fall of 1927: "On November 3, there was a downpour of eight or nine inches over 24 hours causing the river to rise beyond all expectation and with great rapidity. A huge volume of water rose and bypassed the upstream bend and flowed directly into the lower level of the village, removing structures and excavating the north bank until it scoured the bedrock clean nearly around to the Narrows High Bridge."

The town's original village lost nearly one-third of its buildings. The bridges were later replaced and the power dam repaired but most of the village's commercial facilities lost in the flood were not rebuilt. In addition, the calamity heralded a decline of rail service to and through Middlesex. The decline was hastened in later years by an improving highway system and a growing emphasis on highway travel throughout the state.

SITES OF HISTORICAL SIGNIFICANCE IN TOWN

- Three large cemeteries and many private small burial grounds
- Three church buildings (including the present Town Hall)
- The cluster of homes in Middlesex Village and Putnamville
- Seven former one-room schoolhouses that have become private homes
- Old farmhouses, barns, and cellar holes scattered throughout the rural sections of Middlesex
- Stone walls and old trees lining the town's roads
- Wrightsville Beach and Wrightsville Dam, a recreation area and flood protection area created after the Flood of 1927 which required the state to remove or demolish the buildings in the small hamlet of Wrightsville.

FEDERAL INTERSTATE. Then, in the 1950s, the new Federal Interstate System came to Middlesex in the form of Interstate 89. Although the new divided highway bypasses the village to the north, its arrival has had a profound impact on the village and the town. The construction of the road bisected several large farms and replaced U.S. Route 2 as the primary route between Montpelier and Burlington. Much of the tremendous amount of sand and gravel required was mined from local sources. The extensive removal of this material is still evident on the local landscape. An interchange, Exit 9, was constructed just outside

the village where I-89 crosses Center Road. The interchange has proven to be a catalyst for the Middlesex economy prompting construction of a State Highway maintenance facility, barracks for the Vermont State Police, a State Records facility and a florist distribution center.

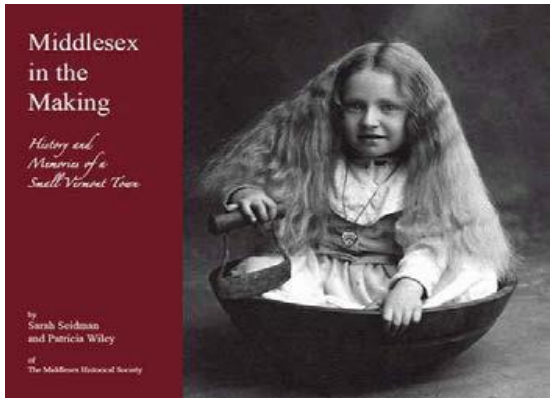
The Welch Park Development was created near Exit 9 in 1993, an eight-lot subdivision initially intended for a mix of commercial and residential uses. Eventually, it became exclusively an industrial park. Bell Atlantic (now Consolidated Communications) constructed a 52,650 square foot regional garage and administrative facility in the park becoming the largest commercial enterprise in town. The town's new fire station was built on another lot in 2009. A lot bordering the river was deeded to the town to be used for public recreation and conservation purposes. In 2011 it was dedicated to a long-time selectboard member and named the Walter H. Kelley Memorial Park.

RECENT DEVELOPMENTS. Discussions for future use and community opportunities are just starting for Camp Meade, a 10-acre property that previously served as a Civilian Conservation Corps campus and sits near the Winooski and Mad Rivers on Route 2. It was purchased in 2017 by entrepreneurs collectively working through a new company called Planetary Matters. There is a optimism about the property and its potential, which may include improved infrastructure, creative economic development, concerts and permanent community spaces.

The Camp Meade property already boasts a permanent stage and its green hosts a weekly summer series as well as other special events throughout the year, including a successful speaker series.

Middlesex adopted zoning regulations in 1987 with Commercial Zoning mainly confined to lands lying between U.S. Route 2 and the Winooski River both to the west and east of the village. Welch Park takes up most of the Commercial Zone to the west. Another section of commercial development emerged in the east section of the Zone between Cross Road and the Middlesex Town Line mainly in response to property tax incentives issued by the town around 1990. Commercial activity here intermingles with residential uses and currently includes construction, propane storage, trucking, metal and plastic milling and public self- storage. Because of the rich bottomland along the river, the area of Commercial Zoning between this eastern section and the village has remained primarily in agriculture.

Existing written history of Middlesex, such as old maps, books, letters and articles, as well as oral history tapes, have already been compiled. Continuing additional oral history is an ongoing project, to be completed by interested volunteers and school children as well as Middlesex Historical Society members.



In 2006, Sarah Seidman and Patricia Wiley of the Middlesex Historical Society completed an award-winning history of Middlesex called *Middlesex in the Making: History and Memories of a Small Vermont Town.* This book includes a historical map of Middlesex, allowing residents to easily learn the locations of old houses, school houses, cemeteries, and other sites of historic interest in town. It is available at the Town Hall as well as through local bookstores and Society members.

Approved by Middlesex Voters March 1, 2022

A. Summing Up History: Goals, Objectives and Strategies

Objective 1. To preserve significant historical sites in cooperation with property owners.

Strategy 1. Using the Middlesex Historical Society (MHS) as an educational resource, owners of sites of historical significance will be encouraged to preserve their property, with assistance as possible from MHS and/or state and federal agencies.

Strategy 2. The town will work closely with state and federal agencies, as well as with the Middlesex Historical Society, to assist with preservation and community education projects.

Objective 2. To educate residents about the town's history.

Strategy 3. The Middlesex Historical Society will continue to collect and centralize this material (as their volunteer staffing and funding allow) to make it more easily accessible. The lack of a town facility in which to display the Society's collection of photos, artifacts and written materials continues to significantly hamper the accessibility of this information to residents.

Strategy 4. The Middlesex Historical Society will continue to work with teachers, staff and volunteers at the Rumney Elementary School to incorporate the study of Middlesex history into the third-fourth grade school curriculum.

Strategy 5. Rumney School and the Middlesex Historical Society will continue to educate residents about the history of the town through efforts such as regular meetings of the Society, public events, the published History, and continued research (as their volunteer staffing allows) into specific historic sites in town and people important to Middlesex history.

COMMUNITY HISTORY GOALS

1. Significant sites will be preserved in cooperation with property owners.
2. Ongoing preservation efforts will not place a burden on taxpayers.
3. Children will learn about the town's past while they are in elementary school.
4. Historical information will be readily available and centralized so that people can easily find what they are looking for and so that historical artifacts are preserved.
5. Both new and old residents will possess an increased sense of belonging to a community, based on knowledge of the rich traditions and contributions made by those who came before them.

1.3. Community Profile: Who We Are

In any planning process it is important to know who exactly we are planning for. Population is a basic index of community growth and population projections are a key element in determining a community's growth-management policies. Knowing how many current and future residents will live in Middlesex, what ages they will be, their incomes and education will help the town target limited resources to those services needed most by the greatest number of residents. Schools, roads, emergency services, public infrastructure, recreational opportunities, and tax rates are affected by a community's population.

Understanding current demographics helps us to assess and plan for any changes in population growth. Also, as shown in the survey results and throughout *What's Next Middlesex*, residents bear pride in their community, as well as a desire for some change in community population diversity.

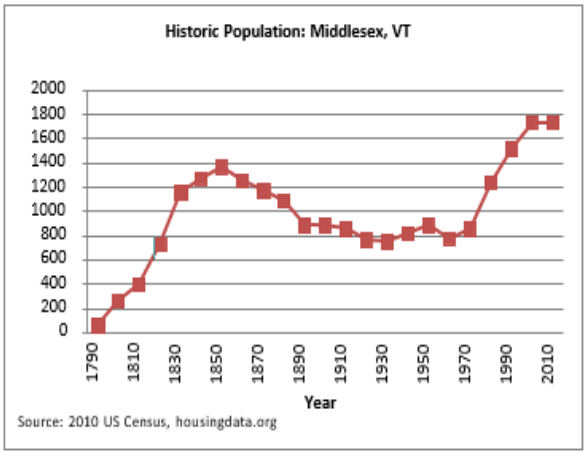
Demographic assessment details residents of Middlesex as demonstrating high school educational attainment, household income, median income, median home value and labor force participation rate which all exceed the state averages. Going into the schools, attending public forums, and meeting our neighbors in the local shops and businesses gives us even greater insight.

In understanding population characteristics, we can identify elements for preservation or change.

A. Population Conditions and Projections

Historic Population & Population change. As the Historic Population table shows, Middlesex experienced a decline in population between 1850 and 1970. However, since the 1970s the population has been steadily increasing at an average rate of 25% every ten years. Middlesex's 0.12% growth rate between the last two Censuses in 2000 and 2010, was below that of Washington County (2.78%) and the state (2.78%)

The town's 2010 population is 1,731 according to the 2010 U.S. Census. Because Middlesex has less than 2,500 residents, under the Vermont Municipal Planning and Development Act, it is classified as rural.

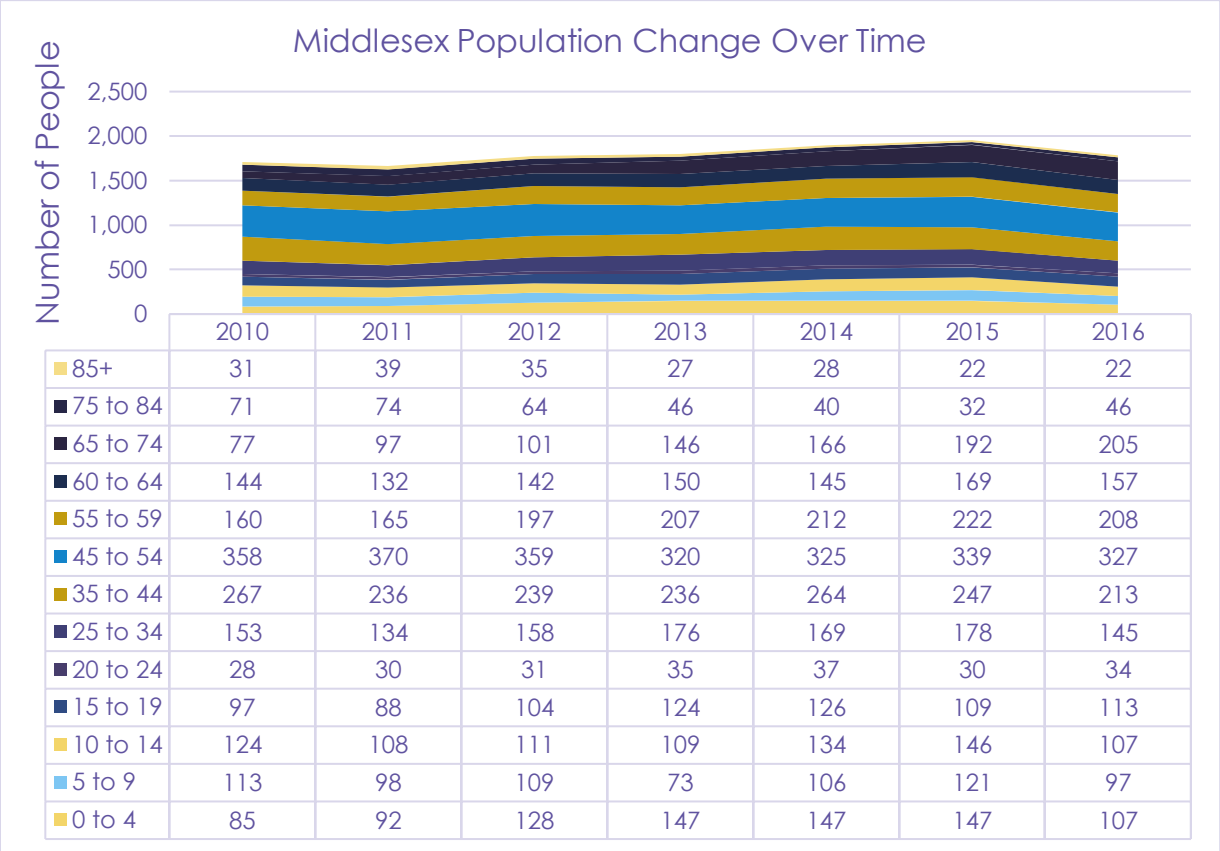


Source: 2010 US Census

Middlesex's population as of 2016 is 1,781 residents. Population trends across the last six years should be cautiously considered. Given the small community size, the inflow or outflow of just a few families or the addition of a few new housing units can appear to reflect a significant percentage change.

To analyze trends in housing and population, this portion of the report reviews and presents several different kinds of regional indicators over time, including population change, household composition, and household unit value, all within Middlesex, VT.

POPULATION GROWTH. We observe that Middlesex's overall population gradually increased from 2010 to



	2010	2011	2012	2013	2014	2015	2016
85+	31	39	35	27	28	22	22
75 to 84	71	74	64	46	40	32	46
65 to 74	77	97	101	146	166	192	205
60 to 64	144	132	142	150	145	169	157
55 to 59	160	165	197	207	212	222	208
45 to 54	358	370	359	320	325	339	327
35 to 44	267	236	239	236	264	247	213
25 to 34	153	134	158	176	169	178	145
20 to 24	28	30	31	35	37	30	34
15 to 19	97	88	104	124	126	109	113
10 to 14	124	108	111	109	134	146	107
5 to 9	113	98	109	73	106	121	97
0 to 4	85	92	128	147	147	147	107

Source: CVRPC from US Census Bureau, 2010-2016 American Community Survey 5-year estimates

2015, only to drop significantly from 2015 to 2016. These trends do not seem to be symptomatic of any significant loss or gain confined to any particular age group demographic – indeed, the increases and decreases in the overall population appear to be congruent with the respective gains and losses across the different age groups of Middlesex residents each year. The proportion of Middlesex residents aged 0 to 4 years experienced a net increase over time, as did the proportion of Middlesex residents aged 15 to 19 years, 20 to 24 years, 55 to 59 years, and 60 to 64 years, rising 26%, 16%, 25%, 30%, and 9%, respectively, from 2010 through 2016. The most significant increase occurred within the proportion of residents aged 65 to 74 years, as the amount of these individuals residing in Middlesex nearly tripled from 2010 through 2016. Net declines occurred within the proportions of residents aged 5 to 9 years, 10 to 14 years, 25 to 34 years,

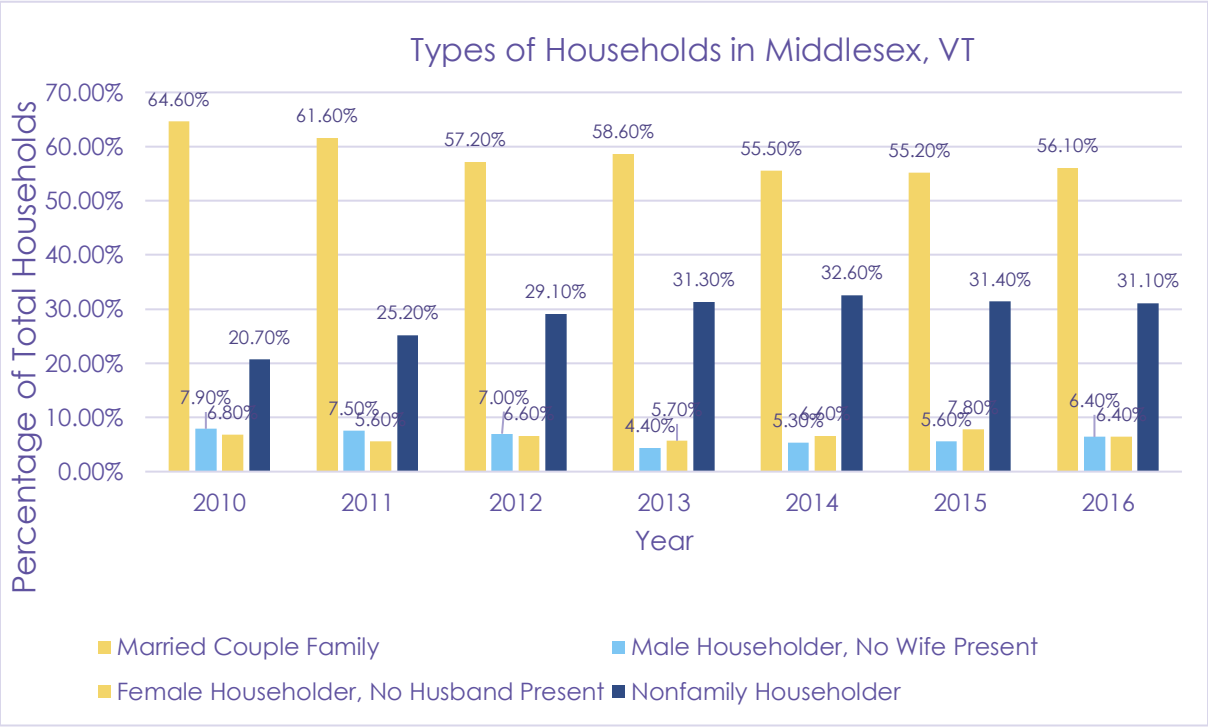
35 to 44 years, 45 to 54 years, 75 to 84 years, and 85 years and over. The corresponding declines from 2010 through 2016 for these age groups were 14%, 14%, 5%, 20%, 9%, 35%, and 29%, respectively. Again, all of these trends should be reviewed with caution given the small size of the population.

B. Households

An analysis of Middlesex's overall household composition reveals a general downward trend in married couple householders and a general upward trend in nonfamily householders. This is generally consistent with broad national trends towards non-married households due to an increased divorce rate and a trend towards later age for first marriage. These patterns generally remained consistent year after year over the time frame of the research, while the patterns concerning single male householders and single female householders remained slightly more mixed.

Regarding net changes, there were 8.5% fewer married couple householders in 2016 than in 2010, and 10.4% more nonfamily householders in 2016 than in 2010. There were roughly 1.5% fewer single male householders in 2016 than in 2010, and 0.4% fewer single female householders.

The 2010 census found that a little over half of the town's residents were native to Vermont. Only 1.4% of the town's residents were born in a different county.



Source, CVRPC from US Census Bureau, 2010-2016 American Community Survey 5 -year estimates

C. Educational Attainment

Judiciously measuring educational attainment in any municipality involves keeping patterns in perspective with population changes.

With this in mind, the data in Figure 6 reveal some trends. For example, while 28.8% of Middlesex residents aged 18 to 24 years possessed a high school diploma or higher in 2010, the proportion had climbed to 42.4% in 2016. At the same time, the proportion of individuals within the same age group that possessed a Bachelor's Degree or higher dropped 6.8% from 2010 to 2016. In other words, while the proportion of Middlesex's young adults in possession of a high school diploma increased, the proportion of those in possession of a Bachelor's Degree decreased over time.

Year	2010	2011	2012	2013	2014	2015	2016
Population 18 to 24 years	**52**	**52**	**73**	**89**	**93**	**85**	**85**
High School Graduate (Includes Equivalency)	28.80%	21.20%	28.80%	22.50%	28.00%	43.50%	42.40%
Bachelor's Degree or Higher	11.50%	19.20%	13.70%	13.50%	12.90%	3.50%	4.70%
Population 25 Years and Over	**1,261**	**1,247**	**1,295**	**1,308**	**1,349**	**1,401**	**1,323**
Percent High School Graduate or Higher	92.10%	91.80%	94.30%	95.90%	97.60%	97.40%	97.70%
Percent Bachelor's Degree or Higher	50.30%	50.40%	48.60%	49.00%	49.60%	49.30%	49.80%
Population 25 to 34 Years	**153**	**134**	**158**	**176**	**169**	**178**	**145**
High School Graduate or Higher	95.40%	94.00%	93.00%	95.50%	97.60%	97.80%	97.20%
Bachelor's Degree or Higher	44.40%	50.00%	44.30%	50.60%	54.40%	61.20%	66.20%
Population 35 to 44 Years	**267**	**236**	**239**	**236**	**264**	**247**	**213**
High School Graduate or Higher	95.10%	93.60%	95.80%	97.50%	98.90%	96.80%	96.20%
Bachelor's Degree or Higher	52.80%	55.10%	50.60%	44.50%	45.80%	46.20%	42.30%
Population 45 to 64 Years	**662**	**667**	**698**	**677**	**682**	**730**	**692**
High School Graduate or Higher	97.30%	97.60%	99.00%	98.40%	98.70%	98.60%	99.10%
Bachelor's Degree or Higher	58.60%	56.50%	53.00%	51.70%	51.50%	48.50%	48.40%
Population 65 Years and Over	**179**	**210**	**200**	**219**	**234**	**246**	**273**
High School Graduate or Higher	65.90%	70.00%	77.00%	86.80%	92.70%	93.90%	95.20%
Bachelor's Degree or Higher	20.70%	26.20%	34.00%	44.30%	44.90%	45.90%	50.50%

Figure 6. Educational Attainment in Middlesex. Source CVRPC.

Trends. The trends are equally mixed for Middlesex residents aged 25 years and over. While 1.8% more 25 to 34-year-old residents were in possession of a high school diploma in 2016 than in 2010, a full 21.8% more 25 to 34-year-olds were in possession of a Bachelor's Degree or higher in 2016 than in 2010. Meanwhile, those aged 35 to 44 years were 1.5% more likely to have a high school diploma in 2016 than in 2010, but 10.5% less likely to have a college degree. A similar pattern existed among those aged 45 to 64 years, as nearly every Middlesex resident in that age group possessed a high school diploma by 2016, but 10.2% fewer possessed a Bachelor's Degree or higher.

The most significant gains concerning educational attainment in Middlesex involved the town's oldest residents: nearly 30% more residents aged 65 years and over had acquired a high school diploma in 2016 compared to 2010, and nearly 30% more had acquired a college degree. This is consistent with national trends with this age cohort less likely to have been deployed overseas and more likely to have finished high school or attended college.

Overall, the educational attainment patterns in Middlesex are mixed. While there was a positive general trend across all age groups concerning the acquisition of a high school diploma over time, the opposite appeared to be true for procuring a Bachelor's Degree or higher.

D. Cultural Diversity

The average Middlesex resident is 46 and non-Hispanic white. This is slightly older than the state average (43). Ethnic and cultural diversity in Middlesex is less than the state and national averages, with 97% of residents self-identifying as Non-Hispanic White, compared to 93% and 62% respectively. Participants in *What's Next Middlesex* identified lack of ethnic diversity as a concern, as did those surveyed in 2018, where 26% of respondents listed it as one the most pressing issues in Middlesex.

Employment choices for those living in town are diverse, ranging from agriculture to retail to finance and other professional industries. Many residents are able to commute to nearby employment centers, with an average commute to work time of more than 26 minutes.

Residents identify the town as beautiful and in stating so refer to its fields, forests, peaks, trails, wildlife, waterways, history, culture, and people. Residents also have stout pride in the community, expansively identified to include friendly neighbors, accessible government, strong schools, boundless civic relationships and opportunities and its 'makers and creators'.

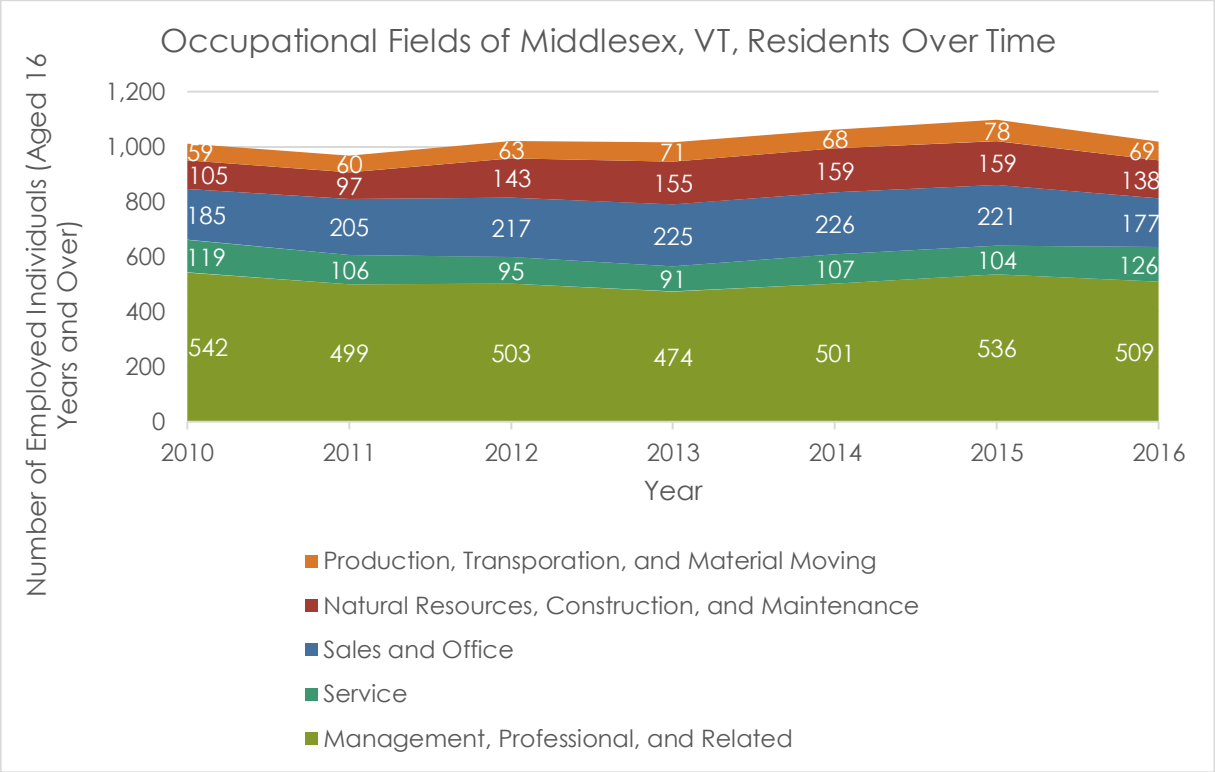
1.4. Livelihoods: What We Do, Where We Work, What We Earn

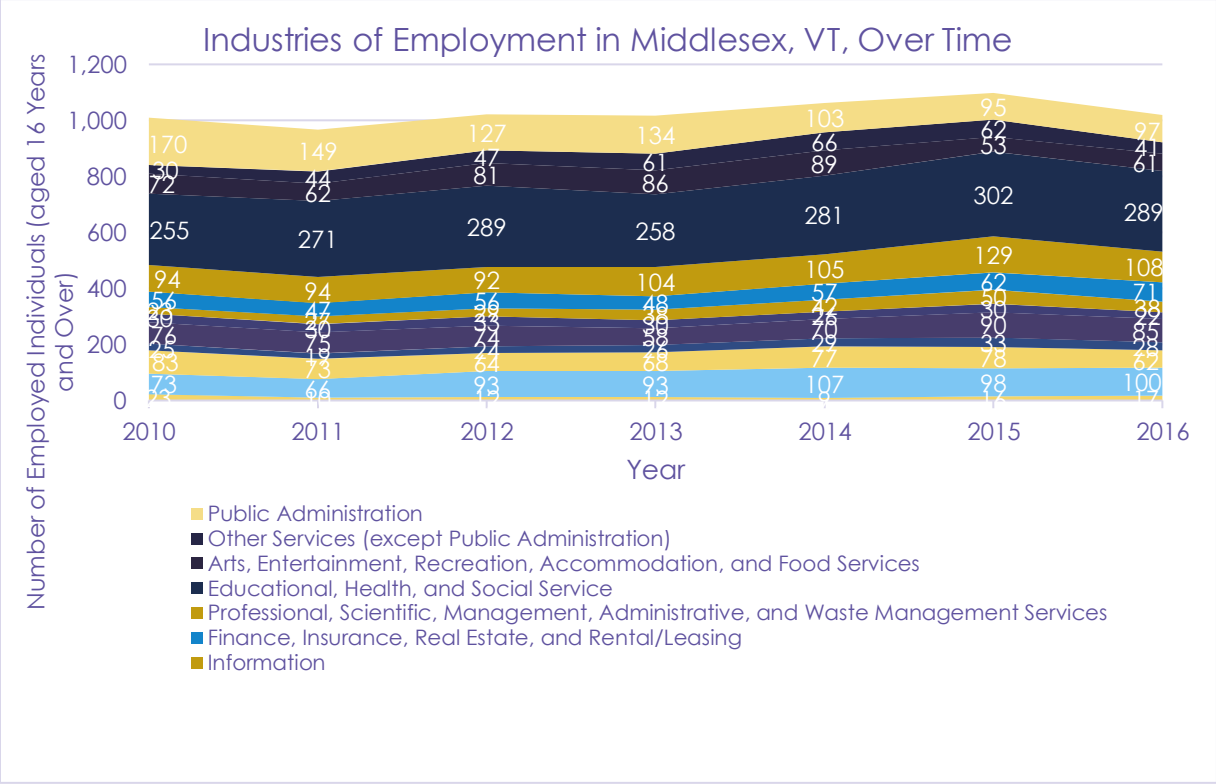
A. Employment and Income

Middlesex residents are centrally located between two employment centers in Waterbury and the state's Capital of Montpelier. They participate in a variety of employment fields, ranging from Service to Construction to Management and other professional fields. Though Middlesex residents enjoy the farmland scenes in town, less than one percent of working residents have made their living this way.

Occupational Fields of Middlesex, VT Residents displays the occupational fields in which residents of Middlesex worked from 2010 to 2016. Considering the fluctuations within all five listed occupational fields, the 31.4% increase in the proportion of Middlesex residents working in the Natural Resources, Construction, and Maintenance field was the most significant fluctuation over the course of the research. The other four fields listed in the graph experienced mild to moderate fluctuations over time: The Management, Professional, and Related field lost a net 6% of its Middlesex-based personnel, while the Service field increased its Middlesex-based workforce by 6%. Meanwhile, the Sales and Office field increased its

personnel by 4%, and the Production, Transportation, and Material Moving field increased its Middlesex-based workforce by 17% from 2010 through 2016.





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Industries of Employment provides a closer look at the data by breaking down the occupational fields into more specific "industries of employment". This permits a view of the more subtle aspects of the aforementioned fluctuations, such as the 65% increase in the proportion of Middlesex residents working in the Information industry. Other significant changes from 2010 to 2016 included the 26% decrease in the proportion of residents working in the Manufacturing industry; the 46% decrease in the proportion of residents working in the Public Administration industry; and the 37% increase in the proportion of residents working in Other Services.

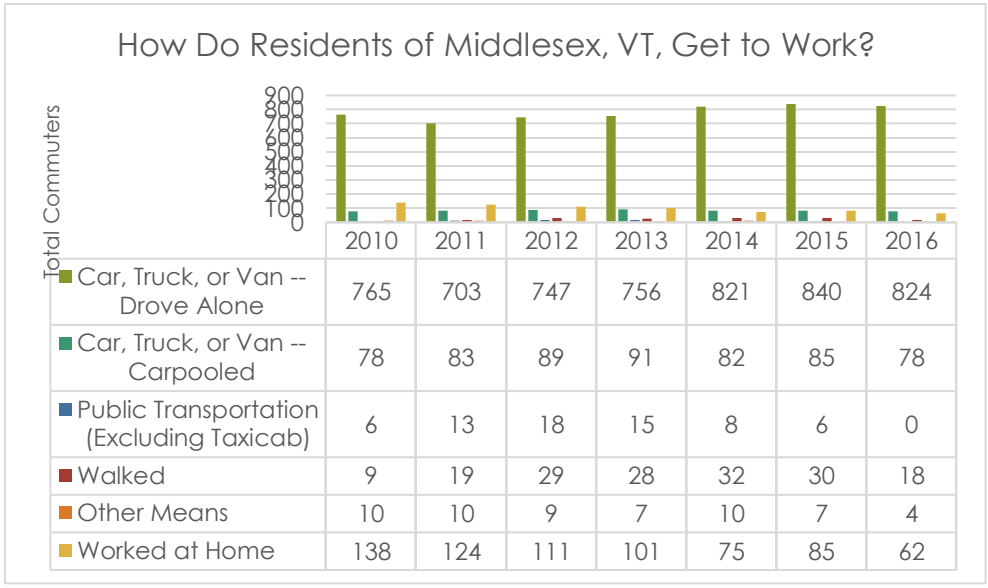
B. Commuting

Like most of Vermont, the vast majority of Middlesex residents regularly used a car, truck, or van to commute alone to work between 2010 and 2016, as seen in Figure 11. (In fact, 8% more workers commuted alone to work in 2016 than in 2010.)

While the dominance of solo commuters never wavered throughout the time frame of the research, almost all other forms of commuter travel experienced a fluctuation of some kind.

Although the number of carpoolers in Middlesex was exactly the same in 2016 as it was in 2010, the number of employees that walked to work doubled, and the number of people that took public transportation to work dropped to zero. 60% fewer Middlesex residents used other means, such as a bicycle, to get to work in 2016 than in 2010, and the number of people that worked from home dropped 55% from 2010 to 2016.

Average commute time. The average commute time to work for Middlesex residents was 26.7 minutes, exceeding the state average of 21.5 minutes. Promoting economic development in Middlesex, coupled with an increasing trend towards the ability to work from home could decrease the time Middlesex residents spend in their vehicles.



	2010	2011	2012	2013	2014	2015	2016
Car, Truck, or Van -- Drove Alone	765	703	747	756	821	840	824
Car, Truck, or Van -- Carpooled	78	83	89	91	82	85	78
Public Transportation (Excluding Taxicab)	6	13	18	15	8	6	0
Walked	9	19	29	28	32	30	18
Other Means	10	10	9	7	10	7	4
Worked at Home	138	124	111	101	75	85	62

Figure 11. Commuting Options for Residents of Middlesex. Source: 2010-2016 American Community Survey 5-year estimates

Again, these numbers should be assessed cautiously given the small population size and large margin of error in statistical extrapolation.

C. Employers in Middlesex

Understanding the town's current economic conditions will assist the town in planning for the types of economic development that best suits the town and its residents. Appropriate forms of economic development will:

- Preserve the town's rural and agricultural character,
- Increase tax revenues,
- Present employment opportunities, and
- Provide services for town residents.

The survey results tell us that Middlesex residents believe in the importance of increasing local employment and small businesses in town. The goals and policies for future economic development in Middlesex reflect this priority.

Middlesex currently has a mix of businesses including some light industry, a laboratory, several excavating businesses, forestry businesses, several livestock enterprises, a produce and nursery business, a restaurant, a B&B, a building supply business, a utility, a state warehouse, self-storage units, floral supply, and a number of home businesses.

Camp Meade. The Red Hen Bakery opened a café in the former Camp Meade diner building in early 2008, and soon after shared the building with a chocolate shop and pottery school and store, and later again by a retail shop selling locally produced arts and crafts. The property has grown into a thriving community hub.

The Camp Meade property has been a welcome addition to the character and livability of Middlesex. The Red Hen Bakery is well-known statewide and is a popular attraction for Vermonters and tourists who are passing through the area. Operating 363 days per year, the Bakery employs more than 40 people full time, bakes an average of 2,200 loaves of bread each day, and delivers to an average of 65 local stores and restaurants. Open seven days per week, the café is also successful and is often a lively spot for locals to gather or grab a pastry, sandwich, or beverage.

According to the Vermont Department of Labor, there were 55 town employers in 2011 employing 371 workers.

The new owners of the Camp Meade complex have also purchased the former Champlain Oil gas station across the road (currently operating as a consignment shop). Owners are considering a number of options, including developing the site as a station for a light commuter rail service.

In 2018, Kingsbury Construction received approval to subdivide and sell a portion of their Center Rd property to Vermont Patient Alliance, which will be the site of a secure medical marijuana grow facility. When both sites are fully built out, the two businesses could employ upwards of 60 people.

In 2018, the 100-year-old Middlesex railroad station and property was purchased by an artist and entrepreneur who hopes to contribute to the village renaissance by renovating and opening parts of the station as a public gallery. Most recently, the old Middlesex Country Store was purchased with plans to reopen as a commercial produce market.

MIDDLESEX THERAPEUTIC COMMUNITY RESIDENCE. When the flooding from Tropical Storm Irene forced the closure and temporary relocation of many of the state's buildings, the Middlesex Therapeutic Community Residence opened in Middlesex in 2013. It employs more than 30 full-time staffers.

JOB EXPORTS. Middlesex is a job exporting town, with the town having more workers than it does jobs. This is typical of a bedroom community and while residents have expressed interest in having more local job opportunities, there is no expectation that Middlesex will become the job importer the way of several of its neighbors.

Montpelier, Berlin, and Waterbury are the job importing towns which surround Middlesex, meaning that these towns have more jobs than workers. According to the 2010 Census there were1,027 workers residing in Middlesex who were 16 years or older and 76% of them worked in jobs outside of Middlesex. This affects the length of time residents have to commute to work as shown in other sections of this Town Plan.

Commute times did not appear to be a significant concern expressed in either the What's Next Middlesex outreach or the town survey responses. Residents did list proximity to the interstate and the state Capital as important features of town, though local jobs and affordable co-working also appeared as desired goals.

D. INDUSTRIAL AREAS

There are two industrial areas in town. Along Route 2 just northwest of Middlesex Village is Welch Industrial Park. Here, off Welch Park Drive, several businesses operate with several dozen employees. The buildings here are largely unobtrusive, hidden from the busier road by a row of trees. The industrial park is also home to a town recreational area and the town's volunteer fire station. It could likely accommodate some future commercial expansion or additional growth.

There is also a developed industrial area in the eastern section of town. This area lies partially in the flood hazard overlay and mapped river corridor area. Future land use planning will monitor whether there are any hazards threatening the properties in this industrial zone.

E. Summing Up Community and Livelihoods: Goals, Objectives and Strategies

Objective 3. Plan for future economic growth.

Strategy 6. Create an Economic Development Advisory Committee to develop an economic development plan for approval by the Planning Commission and the Selectboard which will address light industry, small scale commercial/service uses, and agriculture and forestry.

Strategy 7. The Advisory Committee should also develop a plan for retail and service business growth to meet expected population growth, while retaining an emphasis on affordability, community-scale, and unique sense of place.

Strategy 8. Examine the town's Zoning Map and update as needed.

Objective 4. Promote small home-based businesses that faithfully maintain the rural nature of the residential sections of town.

Strategy 9. Amend zoning regulations as needed to make the permitting process for home-based businesses clear, easy and affordable.

Objective 5. Assist in enabling affordable child care in town.

Strategy 10. Examine zoning regulations as needed to ensure that childcare centers are permissible where appropriate and make the permitting process clear, easy and affordable.

Objective 6. Support agricultural enterprises, while preserving natural and agricultural resources, fragile features, and the scenic and rural character.

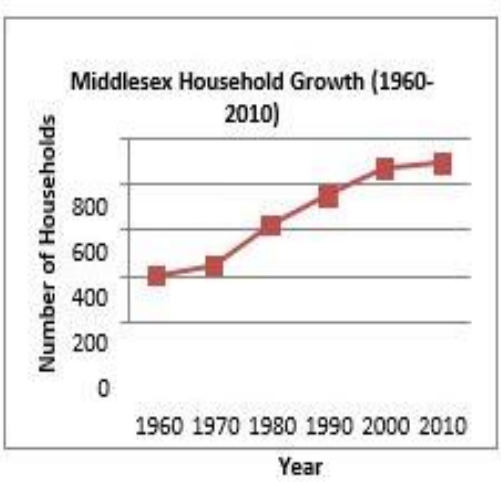
Strategy 11. Examine the town's Zoning Map and update as needed. The zoning map should respect the areas identified for resource conservation.

Strategy 12. Provide access to business capital and support for grant funding, tax incentives and events and programs to attract and nurture emerging agricultural and forestry enterprises.

ECONOMIC DEVELOPMENT GOALS

6. Encourage economic development that will provide good-paying, highly skilled jobs and desired services to town residents.
7. Promote an active retail and service center in the Village District which is scaled to reflect a traditional historic village downtown.
8. Support agriculture and forestry-based businesses.
9. Promote accessible and affordable child care in town.

1.5. Housing: Where We Live



Housing is important to every family in Middlesex. Housing needs often change over a resident's lifetime. A younger resident may need rental housing or an affordable home for beginning a family. An older resident may want to retire to a townhouse or condominium where there is less space to take care of. Middlesex strives to provide a range of housing opportunities to meet the needs of all residents.

This section describes the town's current housing stock and future housing demand. It then proposes strategies to meet the demand for housing in a way that also meets the goals listed in other sections of this report and preserves the town's current high quality of life for all residents.

INCREASE IN HOUSING UNITS. Housing units commonly exceed the proportional growth of population as the average household size is decreasing. This results in an increased number of households as residents spread themselves out in a greater number of housing units.

A. HOUSEHOLD UNITS BY OCCUPANCY.

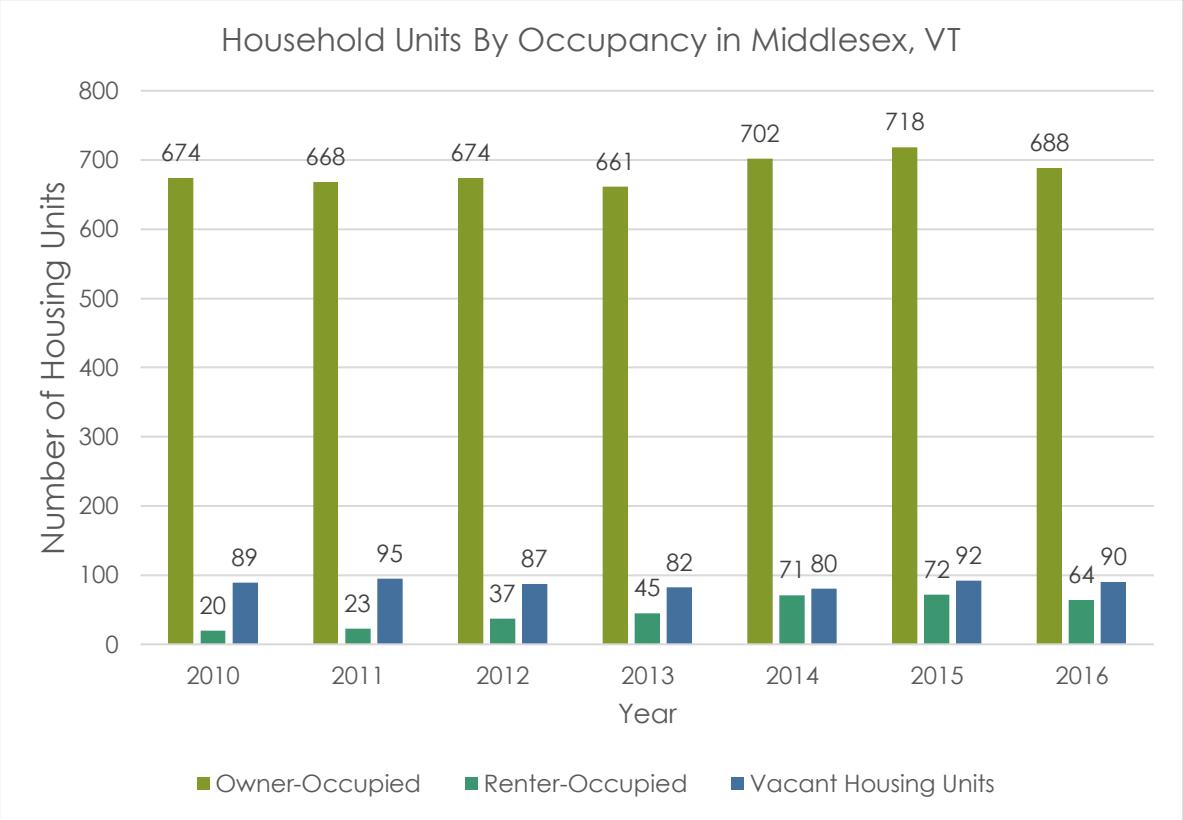
Total	Owner 618	Renter 69
1-person household	93	27
2-person household	261	27
3-person household	119	12
4-person household	112	3
5-person household	22	0
6-person household	6	0
>6-person household	5	0
SOURCE: US Census 2010		

Household Size by Tenure

Data from the US Census divulges the dominance of owner-occupied household units in Middlesex over time, a characteristic that remained steady from 2010 through 2016, with a peak in 2015 of 718 household units. The fluctuations shown are almost certainly the result of sampling bias. Both figures above show nearly identical fluctuations for the years 2014-2016. Due to the small population in Middlesex, the margin of error is proportionally very high.

Concerning net trends, there were 2% more owner-occupied household units in 2016 than in 2010, along with 320% more renter-occupied units and 1% more vacant units. Again, it is important to temper a reading of these statistics with the small population and likelihood of sampling bias.

Middlesex issues very few housing permits per year. A five-year average shows less than 6 single family dwelling units per year, with no single year more than 8. Only one permit for a multifamily dwelling unit has been issued in the years 2013-2018.



Source: CVRPC

B. Year Round versus Seasonal Occupancy

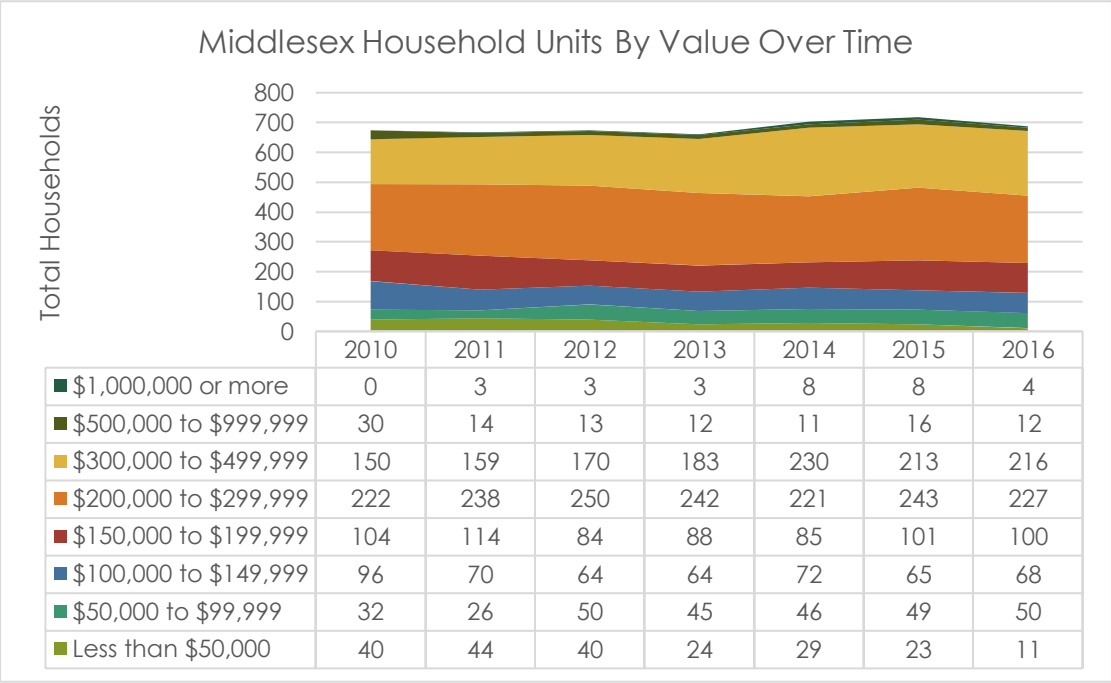
A significant majority of the housing units in Middlesex (82%) are primary residences. 5.5% are vacation homes, and an additional 9% of the homes are mobile homes. Almost 60% of all primary residences are located on more than 6 acres of land.

Property Type	Number	Percent
Primary Residences < 6 acres	256	33.5%
Primary Residences > 6 acres	376	49.1%
Vacation homes < 6 acres	10	1.2%
Vacation homes > 6 acres	33	4.3%
Mobile homes with land	61	8%
Mobile homes without land	6	2.9%
Total Housing Units	***764***	***100%***
SOURCE: 2012 Municipal Listed Values Report – VT Department of Taxes		

There are a number of known accessory dwelling units in town. Though the state of Vermont has enabling legislation to require municipalities to allow them, some appear to be unpermitted in town. The town is working with property owners to ensure all can come into compliance.

There are very few shared lot buildings in town, with only a handful of duplex and triplex buildings; most are in the village, though the town has recently permitted a multifamily unit building through its Planned Unit Development provisions.

Middlesex is an attractive location with its proximity to the state's Capital, various ski resorts, and other outdoor amenities. The town plans to closely monitor any increase in vacation homes or temporary rentals of homes and evaluate needs as they arise for any new related policies.



	2010	2011	2012	2013	2014	2015	2016
$1,000,000 or more	0	3	3	3	8	8	4
$500,000 to $999,999	30	14	13	12	11	16	12
$300,000 to $499,999	150	159	170	183	230	213	216
$200,000 to $299,999	222	238	250	242	221	243	227
$150,000 to $199,999	104	114	84	88	85	101	100
$100,000 to $149,999	96	70	64	64	72	65	68
$50,000 to $99,999	32	26	50	45	46	49	50
Less than $50,000	40	44	40	24	29	23	11

Figure 9. Source: CVRPC for US Census Bureau, 2010-2016 American Community Survey 5-year estimates

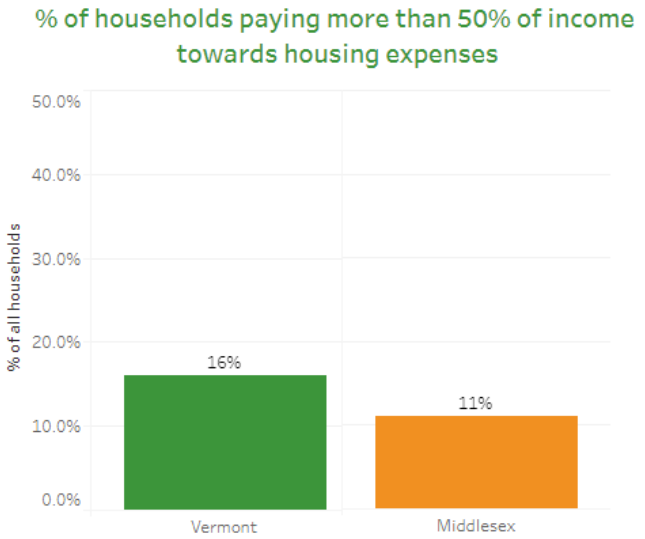
C. Housing Supply and Affordability

Household Units by Value. Generally speaking, Figure 9 illustrates the decline in the amounts of the highest- and lowest-valued household units in Middlesex over time. There were four more household units valued at $1,000,000 or more in 2016 than there were in 2010; 60% fewer households valued between $500,000 and $999,999; and 73% fewer households valued under $50,000. Proportionally, the most significant increase involved the 44% gain in households valued between $50,000 and $99,999; quantifiably, the addition of 66 household units valued between $300,000 and $499,999 between 2010 and 2016 was the most significant. Overall, there were slightly more household units in Middlesex in 2016 than in 2010. Rising from $233,500 in 2010 to $252,900 in 2016, the median household unit value increased by $19,400 over six years.

Interestingly, the median home value exceeds the state and national average, while the gross monthly rent is currently slightly below the state and national average. It is noteworthy that there are very few multi-family dwelling units in town- the first was a 4-unit condominium permitted in 2010.

Despite the town's rich history, the housing stock in town is generally newer. The median construction year of homes in Middlesex is 1976, significantly newer than the county average of 1964.

HOUSING AFFORDABILITY. Affordable housing helps to retain and attract a qualified work force and provides an opportunity for first-time home buyers and older residents to remain in town. Housing affordability is measured by how much of a household's income is spent on housing costs. If a household spends more than 30% of its income on housing, the home is considered unaffordable for that homeowner or renter. In 2017, 26% of mortgage ownership households and 71% rental households were paying more than 30% of their incomes on housing costs in Middlesex. 11 % of households were paying more than 50% of their income to housing costs while 43% of renters were paying more than 50% of their income to housing costs! (Source: VHFA)



Although these numbers fall slightly below the state average, it still indicates that many households are severely cost burdened with housing costs.

ACCESSORY HOUSING UNITS & DIVERSITY OF HOUSING TYPES. To meet the town's goals for diversity and affordability, a wider spectrum of housing will have to be built in Middlesex. There are options available to do this that Middlesex plans to consider and pursue: small multi-family buildings and accessory dwelling units. There are not currently many multi-family dwelling units in Middlesex, even though they are permitted within several zoning districts, most especially the Village and Mixed-Use districts. A closer examination will be needed to understand what is preventing landowners from constructing these types of buildings.

Accessory housing units are a beneficial tool in the provision of affordable housing in towns of all sizes. They may provide housing opportunities for an elderly population that could not otherwise live independently, provide extra income to the homeowner to enable affordability of the home, and supply affordable housing for single persons or couples, a growing segment of the Vermont population which is now the majority.

Vermont's law on equal treatment of housing requires municipalities to allow homeowners to add one Accessory Dwelling Unit (ADU) to their house as a permitted use as long as certain conditions are met. Accessory dwelling units are accordingly permitted in Middlesex. However, admittedly, very few have sought permits. Middlesex endeavors to increase awareness of this allowance and continue to assist

homeowners seek to create an accessory dwelling unit within their home or on their property. This includes utilizing the Vermont Department of Economic and Community Development's brochure *Adding an Apartment to Your House.*

D. Regional Planning Projections

Middlesex is one of 23 member municipalities of the Central Vermont Region, supported by the Central Vermont Regional Planning Commission (CVRPC). Like municipalities, the CVRPC is similarly obligated to create a plan in accordance with Vermont Statutes and statewide planning goals. The CVRPC adopted its current (2016) plan in June of 2018.

The Regional Plan recognizes challenges in housing affordability and supply, noting that housing costs are increasing at a faster rate than family income.

CVRPC's Regional Housing Distribution Plan: Middlesex. In 2008, the Central Vermont Regional Plan adopted a Housing Distribution Plan as part of its Regional Plan. It reaffirmed the same Housing Distribution Plan and language in 2018 as part of its 2016 Regional Plan.

CVRPC's Housing Committee developed the Plan to encourage the development of more meaningful and practical local housing plans and to promote the sustainable and efficient distribution of housing region-wide. It was formulated with the aim of ensuring that all towns continue to contribute similar percentages of the Region's total housing in the future as they did in the year 2000. By doing so, it is hoped that the burdens and benefits of providing housing can be balanced among Central Vermont communities and sprawling, inefficient patterns of growth can be curtailed.

That document asks municipalities to plan for a future estimated housing need through the year 2020. Specifically, it asks municipalities to provide:

- A detailed map or maps of the town showing the town's preferred locations for future housing units – consistent with current or proposed zoning – for 80 percent of the anticipated 10 to 15-year housing allocation.
- Mapping updates that identify the locations and number of housing units created in the town since the previous town plan adoption.

While municipalities are under no obligation to comply with the guidelines of Distribution Plan, inclusion of the above items will be necessary in order for any plan adopted after January 1, 2009 to receive regional "approval" (per Chapter 117, Section 4350).

Middlesex Housing Distribution per CVRPC Regional Plan

2000-04	*2005-09*	*2010-14*	*2015-20*	*Total*
76	*68*	*84*	*151*	*379*

It is important to emphasize that CVRPC views the Town's response to the Distribution Plan as a planning exercise. According to CVRPC: "The projected housing demand numbers are not quotas or targets and

we will not be requiring implementation. We are most interested in knowing that municipalities are cognizant of where housing growth is currently occurring, and thinking about where it should occur in the future, in their respective communities." As such, it makes sense for the Town to plan for this growth, as the housing market is subject to change and such growth is likely to come eventually.

The Distribution Plan allocates 235 new housing units to Middlesex through the years 2010-2020. With less than one dozen homes built each year, Middlesex has not produced the CVRPC's forecast of 379 units. However, Middlesex does endeavor to locate 80% of its actual growth in the Village, Mixed Use, and Medium Density Zoning Districts.

Accordingly, a map showing preferred locations for accommodating 80% of allocated future units from 2010 through 2020 and the difference from 2000 to 2010 (or 267 units in Middlesex's case) will be included in the Municipal Plan.

Middlesex's 2019 Town Plan is compatible with the Regional Planning Commission's housing goals and projections to the extent that they are current. Middlesex's Town Plan endeavors to plan for 10-20 years of planning. Expiring in 2027, it will exceed the regional housing projections which are not yet forecast past 2020.

E. Trends, Implications, and Community Response

Growth and Development. Middlesex has a relatively low level of growth and development in town. The town employs a part time zoning administrator, and only a few dozen permits are issued each year.

Middlesex Zoning Permit Activity -- 5-Year Average

Project Type	2014	2015	2016	2017	2018	5-yr ave	Frequency
Subdivision (add'l lots)	4	3	5	2	4	**3.6**	9%
Boundary Line Adjustment	0	2	4	1	3	**2.0**	5%
Single Family Dwelling	5	8	7	3	6	**5.8**	14%
Multi-Family Dwelling	0	0	1	0	0	**0.2**	0%
Mobile Home	1	2	1	2	1	**1.4**	3%
Garage/Barn	5	7	6	4	5	**5.4**	13%
Carport	0	2	0	1	1	**0.8**	2%
Deck	4	5	4	6	0	**3.8**	9%
Porch	4	1	2	1	5	**2.6**	6%
Addition/Alteration	5	10	3	3	2	**4.6**	11%
Shed/Accessory Structure	3	10	11	6	6	**7.2**	18%
Commercial Building	4	0	3	0	1	**1.6**	4%
ZBA Hearing	1	2	2	2	2	**1.8**	4%

Source: Town of Middlesex Zoning Officer

Middlesex hopes to manage its growth in housing and population as a necessary strategy for achieving the objectives in this plan. Thus, we do not seek to grow to a target size, but rather to keep growth within limits that allow maintain the rural character of town. Opportunities for more development in areas closer to the Village District where there are good roads and access should be encouraged, while new development in the more rural areas of town must respect the existing rural character of the area and be very carefully planned such that they are in alignment with the stated goals of this Plan.

AFFORDABILITY. If the demand for housing in Middlesex is not met, prices will continue to rise and the number of homes that become unaffordable will increase. Residents with low or moderate incomes will likely be forced to leave the community.

In response to the 2018 survey, Middlesex residents overwhelmingly listed "Affordability" as the most pressing issue in town, with more than 65% ranking that as their first priority. The increased median age of the average Middlesex resident, and the increased median home value may indicate that it is becoming increasingly difficult for younger households to afford housing in town.

Measurable impacts on housing affordability will need be multi-faceted. Increasing housing stock in the village areas may be helpful, but will not be enough on its own. The town will strive to work with community and state partners to obtain access to funding sources. A dedicated town commission or subgroup will be necessary to help outline ideas and seek practical solutions.

ZONING. Middlesex's re-zoning of March 23, 2010 created a mixed-use district that allows multifamily homes and higher density, as well as provisions to manage density, rather than lot size to allow smaller lot sizes, and generous allowances for accessory apartments, are measures that can make development less expensive and provide business for local stores and restaurants in the village center.

Most of the property in the mixed-use district is owned by a few land owners and some development has begun; two new businesses in new buildings now call Middlesex home. This land is extremely attractive in that it provides easy access to the interstate and as such the town anticipates that more proposals may soon be made. Residents and town leaders continue to approve of and support the land use plan for this area and anticipate positive outcomes related to housing and employment. No changes to the zoning are anticipated for this area at this time.

The Regional Housing distribution map identifies Mixed Use, Rural Residential and Medium Residential, as well as Village District zones as targets for new housing developments. When asked what types of housing development should be promoted in Middlesex, survey respondents were direct.

Single Family	206
Starter Home	148
Tiny Homes	145
Cluster Development	107
Assisted Living	104
Low Income	98
Condominiums	67
Other	52
Mobile Home Park	24
Multi-Family	0

Approved by Middlesex Voters March 1, 2022

The town acknowledges that the current zoning regulations may not sufficiently address or permit the housing types indicated as desirable in the survey, which also generated comments suggesting that co-housing could help with affordability concerns. The town endeavors to examine the zoning regulations and seek to align them with promoting the goals herein.

F. Summing Up Housing: Goals, Objectives, and Strategies

Objective 7. Implement the goals of the Town Plan and support the continued fit between housing and tax supported systems such as schooling and roads, and between housing and the natural environment.

Strategy 13. Align zoning regulations to reflect targeted areas of increased or decreased housing density.

Objective 8. To increase education in the home-building process.

Strategy 14. Provide information about energy conservation, sewage systems, road access and compliance with zoning regulations for owners who want to undertake new construction.

Objective 9. To maintain low density, rural character outside of the Village as a matter of policy.

Strategy 15. Limit housing types to single family and two-family use throughout the rural areas of town, while promoting small-scale, small-footprint multifamily units in the village center and mixed-use areas.

Objective 10. To increase affordable housing options in Middlesex.

Strategy 16. Ensure that accessory dwelling unit provisions in the zoning code meet state legislating requirements.

Strategy 17. Consider additional options towards increasing housing affordability within the town as part of the Planning Commission's 3-year work plan.

Strategy 18. Target the Mixed Use, Medium Density Residential, and Village zoning District as targets for 80% of new housing, including a diversity of housing types.

HOUSING GOALS

10. Manage the growth of housing in Middlesex in order to protect the town's rural character and quality of life.
11. Meet the needs of residents for affordable housing and special needs housing.
12. Ensure that any new housing does not exceed the abilities of existing or planned infrastructure.
13. Housing growth should minimize impacts on the natural environment.

CHAPTER 2: A LANDSCAPE THAT LASTS

Protecting Working and Conservation Lands

2.1. Overview

This section covers the mountains, waters, forests, fields, plants, and animals that comprise the physical character of Middlesex. From wildlife habitat to farmland, the natural beauties and wonders are an essential part of what make Middlesex what it is, and what residents most often cite when describing their home.

The health of the Town's natural resources is important, as is their pivotal role in the land-use occupations they support, the outdoor recreation they provide, and the opportunities for learning about our natural world so close to home. These natural resources provide recreational opportunities, wildlife habitat, groundwater recharge and even flood water storage.

In order to protect and encourage responsible use of natural resources, Middlesex's goals and policies will aim to encourage the manufacturing and marketing of value-added agriculture and forest products; the use of locally grown products; the use of best resource management practices; and the planning of public investment to minimize development pressures on agricultural and forest lands.

RIDGELINES. The Town recognizes the importance of preserving its ridgelines for future generations to enjoy. These high mountain areas play a vital role in the water cycle. There are greater amounts of precipitation that filter through the thin soils, eventually reaching major ground water supplies. Uses which result in the removal of vegetation and soil cover are especially detrimental to the natural drainage of water. These same areas are the natural habitat for a variety of birds and animals, which could be impacted, were development to occur.

2.2. Forests and Fields

The combination of forests and fields are a significant element in determining the rural character of Middlesex. The views of these open spaces to a large extent define the character of rural living. The forests are used by many residents for logging, as well as hunting, hiking, skiing, and other recreational pursuits. Most of the land is privately owned.

Middlesex has significant large forested areas, currently undeveloped, which are interrupted only by the occasional logging road or trail. The Putnam State Forest runs along the western boundary of the town, part way up the slope of the Worcester Range. As detailed in this report, Middlesex has a protected Town Forest.

The State of Vermont's Agency of Natural Resources has identified both "Highest Priority" and "Priority" interior forest blocks in their 2016 Biofinder application. These exist throughout much of the town of Middlesex. These landscape scale components are not unique to just Middlesex and are likely included as highest priority because they provide such valuable linkages throughout the state.

The Biofinder resource also highlights priority connectivity blocks to be found throughout the State of Vermont and in Middlesex. These consume nearly the entire town. Careful attention will need to be given as to how land within these overlays is regulated.

When these layers are combined, Middlesex is able to quickly see the highest priority community and species scale data, as well as the highest priority landscape scale components. Together, these represent overall priorities in Vermont Conservation Design.

These layers are mapped and shown in Map 1.6 in the appendix of this Plan. A description of the highest priority landscape scale elements can also be found in the appendix of this Plan.

A. Land Use, Current Use, Conservation Status

Current Use. There are approximately 86 privately owned parcels in the town currently enrolled in the State of Vermont's 'Current Use' program as of 2018. This program provides tax relief for parcels of 25 undeveloped acres or greater, to landowners who keep their land in forestry or agricultural uses for a minimum amount of time, allowing the valuation and taxation of the farm or forest land to be based on its value of such use, rather than its value in the market place.

B. Productive Agricultural Lands and Food Systems

SMALL FARMS. Middlesex currently hosts a variety of agricultural operations. Persons Farm on Center Road has chickens, horses, and cows and sells eggs, vegetables, and meat. Osprey Hill Farm in Putnamville sells lamb, sheep pelts, yarn, raw wool, and wool blankets.

Settlement Farm along Route 2 has operated intermittently and has offered a multitude of vegetables grown on the farm including a dazzling array of chrysanthemums, pumpkins and corn. Christmas trees are available at Meadow Ridge Farm and Sunnybrook Farm. Sunnybrook Farm also offers eating and seed garlic. Maple sugaring occurs throughout Middlesex, including the yearly batch made with the help of Rumney Memorial School students. Pease Farm on Culver Hill Road sells mulch hay and operates as a stable for horse riding lessons, therapeutic riding programs, leasing, and boarding. Newer to Middlesex is the growing of hemp, with several residents growing and harvesting small crops.

Eggs can be purchased along at least 5 roadways through town, and sometimes eggs can be seen for sale by neighbors directly across the road from each other, as on East Hill. Blueberries can be picked at a farm on North Bear Swamp Road. Backyard farms offer for sale honey, eggs, and chickens, pigs, and other meat which can often be seen advertised on Front Porch Forum or on signs posted around town. The barter of home-grown vegetables can also be seen on FPF each harvest season. Someone always has too many zucchinis or is looking for more cucumbers to pickle.

The small scale of Middlesex's farms serves local residents by providing healthy and affordable food and provides educational opportunities for the community's children and adults.

While most of Middlesex is hilly, there remains some higher quality agricultural soils in the town. These soils often are valuable for agriculture, and are also suitable for siting septic systems. As housing increases in town, efforts to support and allow the continued use of fields for agriculture should be encouraged.

Middlesex farms, both commercial and backyard, play a valuable role in the conservation of Middlesex's natural resources and in ensuring soil health, and maintaining water quality. Town efforts can support agricultural planning that aligns with statewide water quality goals – supporting farmers and encouraging homestead, hobby operations, and homeowners to adopt best practices that reduce pollution. These include soil, nutrient and manure management strategies that limit nitrogen, phosphorus and sediment from flowing into streams, and sequester carbon to help mitigate the impacts of extreme weather events. This can include sharing information about lawn and garden practices (keeping grass longer, not having bare soil in gardens) and layout of barns and barnyards and paddocks at the "homestead" or "hobby" level to reduce runoff.

Approved by Middlesex Voters March 1, 2022

Farmers in Middlesex have worked with Rumney Memorial School students, inviting them to their farms so they can understand the connection and dependence that humans have to the land and animals. Going forward opportunities to expand this sharing of information and knowledge about farming resources with school-age children should be encouraged.

C. Town Forest and Management Plan

Town Forest. In January 2009 the Town acquired a 403-acre parcel at the end of Notch Road that has been designated as the Middlesex Town Forest. The Town of Middlesex owns the Middlesex Town Forest property and is responsible for its long-term management. Vermont Land Trust (VLT) and Vermont Housing and Conservation Board (VHCB) hold the Conservation Easement, which permanently protects the natural resources on the property and removes all development rights from the property. The Vermont Land Trust and Vermont Housing and Conservation Board require an approved Management Plan for the property. The Middlesex Town Forest Planning Committee, a sub- committee of the Middlesex Conservation Commission, was created to solicit input from Middlesex residents and draft a Management Plan that was later approved by the Town.

The Plan describes management strategies for natural resource protection, sustainable forestry, community recreation and education. The Plan is intended to increase the continuity of management over time by providing the Town with background information and a consistent policy framework. The Plan is a living document that can be revised periodically as new information is gathered, as forest conditions change, and as management strategies improve. Upon adoption of the Management Plan, all future management issues will be decided or delegated by the Middlesex Select Board. The Conservation Commission helps the Select Board fulfill their responsibilities. The Conservation Commission is responsible for the day-to-day management of the Town Forest.

The Management Plan is a guiding document to help Middlesex steward its Town Forest in perpetuity. The Town of Middlesex recognizes that forests are an essential component of Vermont's healthy ecosystems and healthy communities. The Town Forest will be managed in a manner that promotes the health of both, and that encourages all members of our community to learn about, enjoy, and gather in our Town Forest. The plan's primary objective is to balance human uses of the Town Forest with protection of its natural resources, according to the legal requirements of the property's Conservation Easement and the desires of all Town residents.

D. Wildlife and Plant Communities and Corridors

PLANTS AND ANIMALS. A great diversity of wildlife species makes their home in Middlesex or travels through it, providing residents with ample opportunities to view wildlife. The species range from song birds and small mammals such as red squirrels and raccoons to large mammals such as deer, bear and moose. Among the important habitats in town are vernal pools that are important breeding sites for amphibians such as wood frogs and spotted salamanders and marshy areas in the northern end of Wrightsville Reservoir that are home to a healthy population of beaver and other animal and bird life. Five main deer wintering areas in Middlesex have been identified by the VT Department of Fish and Wildlife. The relatively intact forests of the Worcester Range in Middlesex provide important habitat connectivity with the rest of the range extending to the north in Worcester and Elmore. The entirety of the Worcester Range is a crucial link to the extensive forest areas found in the Northeast Kingdom.

The Natural Heritage Program of the VT Department of Fish and Wildlife lists three sites in Middlesex that are known locations of rare plants or plant communities. Detailed information about these sites is available from this agency.

Other community and species scale component data is readily available from the State of Vermont which helps us to understand the presence, movement, and habitat for the state's wildlife. In considering impacts on natural resources, Middlesex will assess the presence of vernal pools, wetlands, surface waters, wildlife crossings, grasslands, mast stands, and rare and uncommon species and natural communities.

Priority interior forest blocks and connectivity blocks shown in this report contribute directly to the health and sustenance of the state's wildlife. Fragmentation of these blocks can have disastrous impacts to these creatures.

The Conservation Commission is doing an ash borer survey along town roads.

E. PRIORITY CONSERVATION PARCELS

The future land use map indicates priority conservation parcels identified by the town. These are preliminary assessments based on known resources and community priorities. We recognize that further data collection and community outreach is needed to both finalize this list and to determine the appropriate methods for conservation of these parcels. These methods may range from Land Trust involvement, purchase, third party easements or restrictive zoning. Where development is permitted, subdivision regulations will need to be updated to objectively detail the limits imposed and the expectations, in order to minimize adverse impacts to site specific community and species scale resources as well as landscape scale forest and connectivity blocks.

F. Summing Up: Forest & Fields Goals, Objectives, and Strategies

Objective 11. Development should be planned and carried out to ensure the continued use of forests and fields, and avoid fragmentation of identified forest blocks and connectivity.

Strategy 19. Align zoning regulations to reflect this goal. This could include a change to developable areas, as well as enhanced resource specific standards.

Strategy 20. Amend the town zoning regulations to ensure that they preserve and protect the Town's ridgelines.

Strategy 21. Identify specific natural resources that are significant including wetlands, forest blocks, waterways & habitat in future Town Plan update or amendment.

Objective 12. To maintain the quality and use of existing conserved lands

Strategy 22. Coordinate with natural resource agencies, organizations and outdoor recreation planners to manage conservation plans for publicly owned lands in Middlesex.

Strategy 23. Work with private land owners to encourage shared use for hunting, hiking, or other recreational uses.

Objective 13. Support the ability of farmers to provide locally grown food for residents

Strategy 24. Maintain the availability of affordable land for agricultural operations.

Strategy 25. Encourage educational opportunities on Middlesex farms.

Strategy 26. Support farmers efforts to protect natural resources including wetlands, water quality and clean air.

Objective 14. Encourage and support farming and other natural resource-based occupations.

Strategy 27. Evaluate and explore opportunities to help landowners keep their lands open for forest and agricultural uses in Middlesex.

LANDSCAPE RESOURCE GOALS

14. Protect identified natural resource features.
15. Avoid fragmenting important natural resources.
16. Recognize the carrying capacity of our natural resources and accommodate development that does not jeopardize these resources.
17. Support a range of home and backyard farming operations.

2.3. Waters and Waterways

A. Streams and Rivers: Assessments, Corridor Overlay, Riparian Buffers

Middlesex is cradled in the confluence of the Winooski River and its major tributary, the North Branch. The north and east parts of town drain toward the North Branch, which is largely impounded within Middlesex as the Wrightsville Reservoir. The North Branch watershed in Middlesex is largely comprised of the Martins Brook drainage (a.k.a., Shady Rill), with its two main tributaries: Patterson Brook in the north, and Herrick Brook flowing into Martins from the south. The headwaters of Herrick Brook and Patterson Brook have been designated as higher quality fisheries. The south and western third of Middlesex drain directly to the mainstem of the Winooski River. The principle tributaries flowing south to the Winooski are the Notch, Great, and Sunny brooks.

Where the Winooski River flows by the Middlesex village and into the gorge it is already one of Vermont's largest rivers. For its size, the Winooski flows in a relatively narrow valley, and when a major flood event occurs, the River's fast-moving flood water inundates most of the valley bottom lands along its corridor. Tributary streams in Middlesex also drain through narrow valleys and different geologic settings off the flanks of the Worcester Mountains and East Hill. When the glaciers retreated over 10,000 years ago, a vast glacial lake extended into the hills of Middlesex. When the ice dam broke and the glacial lake receded, deep layers of clayey silts and sands that had collected on the lake bottom were exposed within the lower elevations of Middlesex. Rivers and streams have been eroding down through glacial tills and these glacial lake sediments ever since. The steeper brooks have beautiful cobble-boulder and woody debris streambeds. The rivers have sand and gravel beds.

The Winooski River, on Middlesex's southern town boundary, shares its valley with a major state transportation corridor (I-89, State Route 2, the Central Vermont Railroad) and lands that have long been used for commercial-industrial businesses, agriculture, and the Middlesex Village. More severe storms from climate change and impervious-surface stormwater and wastewater discharges from developed lands, including Montpelier just up-river, impact the water quality of the Winooski River. The mainstem was historically straightened through Middlesex as well, but the bedrock of the gorge and flow regulation at Wrightsville and East Barre flood control dams have moderated the river's response to this channelization.

Existing Conditions and Human Stressors. Several Middlesex brooks are also followed by roads, and nearly all have culverts or bridge crossings. There are exceptions, but the brooks are predominately

buffered from the town's dirt roads with strips of trees or woodland valleys that provide cooling shade, runoff filtration, fish and wildlife habitat, and stable streambanks. Even those roads and lands set back from the streams may be hydrologically-connected, however, through the road-side ditches that deliver sediments and contaminants to surface waters during rainstorms, especially where gullies have formed. The other stressor to Middlesex brooks is the close placement of homes, driveways, and utilities, so that channel armoring must be used to try and stop the brooks from moving. Streams are dynamic systems, and extensive efforts to stop their movement lead to more movement (i.e., erosion) downstream.

The Great Brook deserves special mention. Driving slowly along the Brook Road, one will notice the many, many trees tilting over the brook. What is harder to see are the numerous landslides occurring along the Brook bringing large quantities of silty-clays down with the trees. The Great Brook runs milky gray during and after most rainstorms. The natural downward stream erosion into the old glacial lake beds mentioned above is partly the cause of these landslides. As the stream cuts down, the toe of the streambank is over-steepened, and the hillside fails. These natural processes are exacerbated by road runoff and stream channelization practices to protect the road and houses that deepen or constrain the Brook, thereby increasing the energy of flood flows.

Impacts will increase with more severe storms from climate change. Eventually, the landslides will widen the Great Brook valley and new pockets of floodplain will lessen the Brook's erosive power under flood conditions. In the meantime, however, there are flood-related hazards that should be a concern to landowners and the town in maintaining the road, bridges, and culverts.

Map 5 details the water resources and flood hazard potential within Middlesex.

SURFACE WATER USE AND ENJOYMENT. Middlesex Residents and visitors enjoy: taking a woods walk along the brook; having a family picnic at Shady Rill; watching the falls and cascades of the North Branch; finding stream bugs with Rumney school children; catching perch or smallmouth bass in the evening when the beaver slap their tails off the shores of Wrightsville; taking a summer dip in the pool below a culvert; and canoeing the Winooski River, maybe all the way to Lake Champlain. The waters in Middlesex's natural landscape are an immense part of its culture.

Land along the Winooski River is mostly in industrial, commercial, and agricultural use. ANR's Biofinder application easily shows the town's riparian areas: riparian wildlife connectivity, highest priority surface water and riparian areas, and priority surface waters and riparian areas.

POTENTIAL FOR RECLASSIFICATION. Two streams in Middlesex have been identified by the Vermont Department of Environmental Conservation (DEC) to have the potential for reclassification under the revised Vermont Water Quality Standards. These streams are Martins Brook and Herrick Brook and data collected by the Vermont Department of Fish and Wildlife show that these streams have high quality fisheries and therefore have the potential to be reclassified. The updated water quality standards have included a higher level of protection for waters that meet certain criteria for specified uses. For instance, if a community has a stream section that meets the criteria for high quality for fishing, the stream can be reclassified to a higher level for that use. Martins Brook and Herrick Brook meet such criteria for a higher classification (B1) for fishing. The Central Vermont Regional Planning Commission (CVRPC) presented this information to the Middlesex Conservation Commission in early 2019 and laid out the process for Middlesex

to follow with the DEC. Middlesex is in support of the reclassification of these waters, which will be essential to move forward with the process with Department of Environmental Conservation.

B. Past Damage and concerns

The town's streams, rivers, and lakes are a valuable resource for the community, providing a source of fresh water, natural beauty, and recreational opportunity. However, they have and can pose a flood risk to the community. These risks must be continually assessed and the hazards adequately planned for.

Middlesex has not been immune to seasonal or storm flooding. Most in town know of the great flooding of 1927. Though the Wrightsville Dam was later constructed to mitigate this, the Winooski River still carries a great deal of water during storm events. In 2011, Topical Storm Irene led to flooding of almost all of Vermont's waterways. There was vast and expensive damage to surrounding communities, but the structure of this particular storm and the elevations above the river left Middlesex relatively unscathed.

Middlesex is committed to planning for these areas and these storms should it not be as fortunate during future storms or above-average seasonal flooding.

C. Mapped Floodplain Inundation areas, FEH areas

River Corridors refer to the land area adjacent to a river that is required to accommodate the natural flow and maintenance of rivers. They identify the area that the stream or river needs to maintain physical / geomorphic equilibrium. These dynamic areas are also where a great deal of damage occurs during flooding disasters and will likely increase due to climate change. River Corridor data can be used along with Floodplain data to direct new structures to safer locations.

It is important to understand and map these corridors- the channels and adjacent lands- so that new and existing structures may be protected from natural channel migration and so that channel migration may be as natural as possible.

The State of Vermont has been working diligently towards mapping new floodplain inundation areas, updating the models to show not just where rivers and streams currently exist, but also including where they are likely to move, meander, and where their banks have the potential to overflow. This 'River Corridor' data replaces the former 'Fluvial Erosion Hazard Areas' and became available to municipalities in 2019.

Middlesex respects these delineations and is committed towards local regulations which carefully consider restrictions in these floodplains and appropriate levels of development in river corridors. Middlesex is also committed to working with local landowners to advise them of their location within these areas as the conditions and related mapping delineations change.

D. Ponds and Wetlands

Wetlands are places where land and water meet. They may be inundated by water for a few weeks of the year or may have shallow water year-round. These wetlands are protected under the State Wetlands Rules (those on the National Wetland Inventory Maps) where they provide significant functions and values, or where a buffer is needed to protect them. They are shown on Map 5. It is possible that noteworthy wetlands may exist that are not shown on the NWI Maps. Field delineation is expected for all development applications. The current zoning regulations prohibit land development in the wetlands and defer to state regulations as part of Act 250 review.

E. Groundwater

Groundwater is an extremely important public health and safety resource. It begins as precipitation that infiltrates through the soil to the water table. In the saturated zone, below the water table, groundwater occupies pore spaces between rocks or within fractures. Generally following the topography, groundwater slowly flows downgradient and is a source of recharge to lakes and ponds, rivers and streams, and wetlands. Groundwater also supplies thousands of Vermonters with drinking water. This is especially true in rural areas where springs, dug wells, and drilled wells serve single family homes.

Everyone should be knowledgeable about their water system. To protect groundwater, homeowners must be mindful of where their drinking water supplies are located with respect to potential source of contamination. For instance, water supplies need to be an appropriate distance from a septic system and away from the path of leachate, wells should not be placed near roads to prevent salt contamination, pesticide and fertilizer use should be limited around drinking water sources, while oil spills and leaking fuel tanks can pollute drinking water. The State of Vermont offers a drinking water testing service.

Areas around water sources are critical to keeping water safe and clean. These source water protection areas are monitored and, in most cases, regulated by the State of Vermont Department of Environmental Conservation.

Middlesex has several Non-Transient Non-Community (NTNC) Water Systems. These systems by definition regularly serve at least 25 of the same people daily for more than six months per year. Rumney School serves more than 200 users, while the General Services Complex and Welch Park Association serve a combined 100 users. Private wells in Middlesex are also non-transient. These water sources are vitally important to the people of Middlesex and afforded high levels of protection.

The Planetary Matters property (currently Red Hen, Nutty Steph's), and Wrightsville Beach are part of a Transient Non-Community Water System (TNC). While the risk of effects from contamination are slightly lower than in a NTNC because most users are not consuming the water for sustained periods of time, Middlesex is nevertheless committed to ensuring clean and safe water for its residents, employees and visitors.

Middlesex is also committed to planning for future municipal groundwater needs. It does not currently have a Public Community Water System, but recognizes that the need may arise with population growth or economic growth in the village and multiuse districts. Middlesex should identify these future areas and plan now for groundwater protections, regulating accordingly.

F. Planning and Regulatory Needs

Land Use Regulations (last updated January, 2017) defer to the State of Vermont for some of its regulations related to surface waters, hazard areas, and wetlands. Site plan and Planned Residential Development review does provide for general overview of all classes of wetlands, with broad authority given to the Planning Commission to impose appropriate conditions on development to protect wetlands and floodplains where there may be adverse impacts.

PRD review is in place in the town's Land Use Regulations such that clustering is encouraged: greater concentrations of development may be permitted on less environmentally sensitive land in order to protect those areas with greater ecological resources.

Some specific uses, including salvage yards and similar, are also regulated with increased setbacks to important fluvial features. Conditional use review is another tool employed by the town to provide a more detailed assessment of a development's impact on critical resources.

G. Summing Up Waters and Waterways: Goals, Objectives, and Strategies

Objective 15. Keep waterways clean and free of pollution.

Strategy 28. Invest in road maintenance and other practices that provide for natural absorption of pollutants and resilience to climate change impacts.

Strategy 29. Maintain best practice standards for septic and manure management systems to avoid pathogen discharges that adversely affect swimming and other contact recreation.

Objective 16. Prepare for future flood hazards.

Strategy 30. Keep new buildings, utilities and other infrastructure set back from streams and rivers so that flood flows are neither restricted nor diverted to the detriment of others.

Strategy 31. Adopt stormwater management best practices.

Strategy 32. Replace town culverts to meet state stream alteration standards.

Strategy 33. Develop a hazard mitigation plan for the Great Brook and Brook Road corridors.

Objective 17. Protect the natural quality of streams, rivers, and wetlands.

Strategy 34. Require the preservation of adequate vegetated buffers along streams and wetlands during the development process. Tree removal should be limited to those that are hazardous.

Strategy 35. Educate residents about property management and stream ecosystems.

Strategy 36. Restore and maintain the flows of Middlesex streams and rivers to the greatest extent feasible.

Objective 18. Plan for and protect future water sources

Strategy 37. Explore opportunities for a public water supply source

Strategy 38. Protect existing wells and groundwater source protection areas

Strategy 39. Explore potential Class 2 protections of drinking water sources

Strategy 40. Continue to require state permitting of private wells

WATERS AND WATERWAYS GOALS

18. Continue to ensure clean surface waters for drinking and recreational enjoyment.
19. Plan for flood resiliency.
20. Maintain riparian areas along waterways.
21. Restore natural water flows.

Approved by Middlesex Voters March 1, 2022

2.4. Community Lands

Outdoor recreation opportunities provide some of the greatest benefits of living in Middlesex. From the spine of Vermont's Worcester Range to the waters of Vermont's largest river, Middlesex has something for everyone. The ability to enjoy the natural beauty of Vermont within walking distance of one's home is one of the aspects of a rural life style that Middlesex residents highly value. In the 2012 town wide survey, 87% of Middlesex residents feel that a rural lifestyle is either important or highly important and close proximity to outdoor recreation is a manifestation of this lifestyle.

The residents who attended What's Next Middlesex strongly supported the importance of trails to the future of the town. Not only are they a valued recreation resource, they also have the potential to be an economic driver (as shown in nearby towns) and a transportation system for the future that will help cut greenhouse gas emissions. The development of a cohesive trail system that separates fast moving vehicles on our Class 2 and 3 roads from pedestrian and other slower moving users is essential for safety, health, and livability.

This topic was of such strong interest that it was designated as one of only four working groups that are continuing to meet to create timelines and identify projects that can advance these goals. There is hope that Middlesex will maintain and expand its recreation trails, develop trails that connect key locations in town (such as Rumney School, the Village, and Wrightsville), and ultimately connect with adjoining towns in a central Vermont trail network. The trails group is already working closely with the Conservation Commission and the Recreation Director towards these goals.

A. Town or State Sponsored Recreational Lands

The Middlesex Grand List shows that there is a total of 2,523 acres of State-owned public lands in Town.

State Owned Lands			
Owner	**Description**	**Location**	**Acres**
Department of Fish & Wildlife	Middlesex Notch WMA	TH 33 Notch Road	580.00
Department of Forests, Parks & Rec.	Putnam State Forest	NW Corner Middlesex	76.00
Department of Forests, Parks & Rec.	Putnam State Forest: I-89 Tract	US 2	127.00
Department of Forests, Parks & Rec.	Putnam State Forest: Densmore Mountain Tract	NW Corner Middlesex	125.80
Department of Forests, Parks & Rec.	Putnam State Forest	TH 41	329.00
Department of Forests, Parks & Rec.	Wrightsville Dam: Fee Lands	VT 12	675.90
Department of Forests, Parks & Rec.	Wrightsville Dam: Flowage Rights Only	VT 12	112.30
Department of Forests, Parks & Rec.	Putnam State Forest	NW Corner Middlesex	496.70
Department of Forests, Parks & Rec.	Putnam State Forest: Parking Lot TH #7	TH 41 North Bear Swamp Road	1.00
Total			**2523.70**

PUTNAM STATE FOREST. The Putnam State Forest is made up of several parcels on opposite corners of the town: 127 acres on the I-89 Tract, 329 acres that can be accessed from North Bear Swamp Road and Notch Road and 496 acres in the northwest corner of Middlesex.

HUNGER MOUNTAIN HEADWATERS PROJECT. In 2018, the Trust for Public Land (TPL) acquired approximately 1700 acres of forestland in the towns of Middlesex, Worcester and Stowe which surround and support the Hunger Mountain Headwaters. The TPL is in the process of transferring this land to the State of Vermont and may become part of the Putnam State Forest.

The land has significant forest resources, wildlife habitat, and outdoor recreational value, including over one mile of the popular trail that ascends White Rock and Hunger Mountains.

WRIGHTSVILLE RESERVOIR. The next largest parcels of land include the Wrightsville Reservoir and surrounding lands. This reservoir offers more than 150 acres of surface water with hundreds more acres in the surrounding area. The reservoir is a great outdoor recreational asset to the Town. There are miles of trails surrounding the reservoir, a disc golf course, a picnic area with tables, two shelters, and a public beach. The shelters can be reserved.

Wrightsville Beach is managed by the four member municipalities of the Wrightsville Beach Recreation District Board (Middlesex, Montpelier, East Montpelier and Worcester). The Water Resources Board rules allow personal watercraft, motorboats, and airplanes to use the water body. An area north of the narrows is a no wake zone; motor crafts are required to maintain a speed of less than 5 mph. The Shady Rill Picnic Area is also part of this property and is located off Shady Rill Road along Martin's Brook. It has a picnic area and shelter. Use of these facilities is on a first-come, first-served basis.

The Department of Fish and Wildlife owns and manages 600 acres of lands available for hunting, trapping, wildlife watching, fishing and hiking. Motorized vehicles are not allowed. Middlesex owns a total of 506.81 acres. There are two landlocked parcels owned by the Town of 21 and 11 acres located adjacent to the Town Forest that for management purposes are included in the Town Forest.

WALTER KELLEY MEMORIAL PARK. River enthusiasts can access the Winooski River from the Walter Kelley Memorial Park, next to the Consolidated Communications garage. Anglers and boaters can launch from here. While there is a picnic shelter and several picnic benches in the largely grassed area, a steep slope to the riverfront may serve as a barrier to some users. Opportunities exist to improve this parcel.

Approved by Middlesex Voters March 1, 2022

Town Lands				
Owner	Description	Description	Location	Acres
Middlesex		23 Acres	TH 2 Brook Road	0.23
Middlesex	Community Use (tennis and basketball)	14.75 Acres & Bor Garage	TH 2 Shady Rill Road	14.75
Middlesex	Landlocked	21 Acres Chandler Lot	TH 33 Notch Road	21
Middlesex	Landlocked	11 Acres Vaughn Pitch Lot	TH 33 Notch Road	11
Middlesex	Active	30.2 Acres Gravel Pit	TH 33 Notch Road	30.2
Middlesex		0.7 Acres Village Cemetery	TH 34 Notch Road	0.7
Middlesex		.6 Acres & Town Hall & "Old" Fire Station	TH 34 Gallagher Road	0.6
Middlesex		3.03 Acres & Fire Station	5 Church Street	3.03
Middlesex		.7 Acres Village Cemetery	Welch Park	0.7
Middlesex		4 Acres North Branch	US 2	4
Middlesex	Forest	403 Acres Town Forest	Portal Road	403
Middlesex	School	20.08 Acres & School	TH 33 Notch Road	20.08
Middlesex		1.52 Acres	US 2	1.52
Total				506.81

B. Trails and Easements on Private lands

For many Middlesex residents, class 2 or 3 roads often serve as multipurpose paths; many residents use them for walking, hiking, pet exercise, running, biking, and even cross-country skiing. As traffic has increased on our roads and vehicles travel faster, these roads may no longer be appropriate for multipurpose uses. The time is right for Middlesex to develop a trail network that allows residents and visitors a safe and reliable option for getting around town. One that will encourage healthy alternatives to driving and provide opportunities for neighbors to meet and strengthen our community.

Approved by Middlesex Voters March 1, 2022

CLASS 4 ROADS AND LEGAL TRAILS. Middlesex has 9.43 miles of Class 4 roads and approximately 3.32 miles of legal trails. The roads and trails are a valuable resource to the Town. Class 4 roads are legal rights of ways. They are often part of the Town's transportation history, having served as main travel routes prior to the construction of railroads, state highways and federal interstate roads. Over the years they have been downgraded from primary travel routes to Class 4, the lowest tier of road in the Town road classification system. Legal trails are the next and last tier down. Class 4 roads and legal trails are not eligible for state highway funding.

It is rare to see a municipality create a new Class 4 road, although they have the right to do so. New development requiring new roads are created at the Class 3 level or higher, since it is in the Town's best interest due to state highway funding criteria. Class 4 roads and legal trails are therefore rare resources which become more vulnerable as development increases. The Select Board has ultimate authority over the management and classification of Class 3 & 4 roads and legal trails. The Select Board may elect to reclassify a Class 4 road to Class 3 or a legal trail or they may choose to discontinue the road and forfeit all public rights of way.

Vermont statutes state that all highways including Class 4 roads: "… shall be three rods wide (49.5') unless otherwise properly recorded. Any highway which had been designated as a trail prior to July 1, 1967 and later becomes a trail shall retain the same width of right-of-way as a trail as it had as a highway, but not exceeding three rods."

Many residents in the community also enjoy the trails for mountain biking and snowmobiling. Several property owners participate in the VAST program which provides seasonal access to their lands.

C. OTHER RECREATIONAL OFFERINGS AND OPPORTUNITIES

The Town employs the services of a part-time Recreation Director for 5 hours per week.

The Recreation Director administers the Learn-to-Swim program, which receives financial support from the Town. This program makes affordable swim lessons available to children from ages 4 to 12.

Opportunities for field and court sports are found at the Rumney Memorial School. The school owns 20 acres and the Town owns 14 acres adjoining it. Recreation facilities include a basketball gymnasium, a playground, an outdoor skating rink (subject to availability of a volunteer to maintain it) and a nature trail. The outdoor basketball court, two outdoor tennis courts, and baseball/soccer field are owned by the Town and maintained under the supervision of the Recreation Director. Priority is given to school activities but the facilities are available for all town residents.

Use of the indoor facilities is based on availability and the Principal's approval. There may be a fee charged if the activity will result in work for the custodial staff. The playground and nature trail can be used by town residents at any time.

Respondents to a survey indicated that they plan on staying in Middlesex through their retirement years. National health and recreation trends demonstrate that as people retire from work, they are more active and

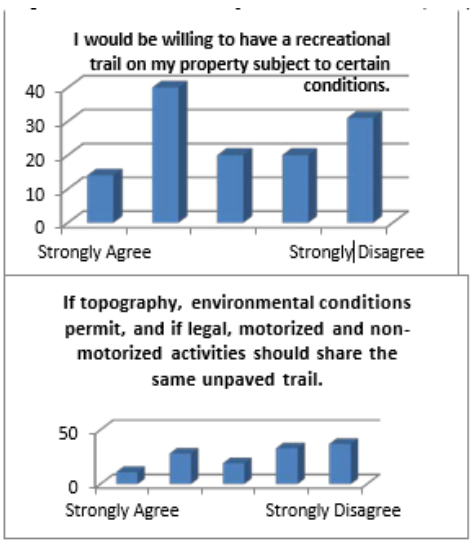
healthier than ever before. For these two reasons, the use of and demand for Middlesex lands for recreation purposes will likely increase. This indicates that recreation planning in Middlesex is of strong value.

The Recreation Director is working to maintain and improve existing recreational facilities in Town, and continually exploring ways to partner with neighboring communities to continue to provide affordable recreational opportunities to the Town.

Mapping of additional public facilities incorporating Wrightsville, community lands and public trails should be included in future Town Plan update or amendment.

D. Planning Needs, Coordination and Opportunities

A 2012 survey asked full time residents about trail use and desires. The survey revealed the survey respondents being divided as to whether there is a need for more trails. Thirty-eight percent thought there was an adequate supply of trails in town while 28% felt there should be more.



The survey asked residents whether motorized and non-motorized activities should share the same unpaved trail. The majority of respondents (55%) felt the uses should be separate while 30% thought they could share the same trail.

When asked if they would allow a trail on their private property for public use, slightly more respondents indicated they would host a trail (43%) than those who would not (41%). Forty-six percent of those responding stated that they would be willing to have a public trail on their land under certain restrictions.

Keeping an accurate inventory of the Town's Class 4 roads and ensuring they are not lost or forgotten over the years is wise public policy. As growth increases and property is subdivided, Class 4 roads and legal trails become a valuable recreation resource. If the trend in Middlesex is for more people to own smaller house lots, then our residents will require more trail opportunities off of their property.

Class 4 roads are currently Town-owned assets that can meet this demand at little or no cost to the Town other than ensuring they are not lost to development or simply forgotten. Class 4 roads are important in providing access to timber for harvesting and to agricultural fields; in that sense, they are also important economic development assets.

E. Summing Up Community lands: Goals, Objectives and Strategies

Objective 19. Maintain existing trails and trail opportunities.

Strategy 41. Develop an inventory of legal trails.

Strategy 42. The Conservation Commission should work on delineating all Class 4 roads and legal trails on the ground in Middlesex.

Strategy 43. To work with willing landowners in strategic locations to establish cooperative agreements leading toward sustained long-term use of trails.

Strategy 44. Work with the Conservation Committee, Recreation Director, and interested community volunteers to maintain these resources so they remain usable for recreational purposes.

Objective 20. Explore the potential for creating additional trails on public lands or with willing private landowners.

Strategy 45. Educate landowners regarding liability issues and the protections afforded them through the State of Vermont when permitting the public to traverse private property.

Strategy 46. Explore possible connections with trail systems in adjoining towns.

Strategy 47. Support pedestrian/bicycle transportation, especially where located near public transportation routes to reduce vehicle emissions and use of fuel.

Strategy 48. Identify potential trails that will connect and form loops with existing Class 4 roads and legal trails.

Strategy 49. Identify potential trail routes that can serve as safer and more inviting transportation corridors that pedestrians, bikers, skiers, etc. can use to get around the town. For example, an off-road path from Rumney School to the village or to Wrightsville.

COMMUNITY LANDS GOALS

22. To protect and preserve the town's existing resources of Class 4 roads and legal trails.

23. To plan for additional trails.

24. Seek to provide non-vehicular connections between community hubs.

2.5. Earth Resources and Extraction

The Town supports small scale operations. Historically, small deposits of sand and gravel have been excavated in the Town. If sand and gravel are not available locally, they would have to likely be hauled in from distant locations at a greater expense. There is one privately-owned active permitted pit in the Town. There remain limited areas of sand and gravel deposits in the Town.

Because sand and gravel are important for the Town for road maintenance and construction projects, the Town anticipates continued extraction of these resources. Local and State regulations as well as careful site planning, operation and reclamation can address the adverse impacts of earth resources extraction. In order to mitigate or avoid social and environmental impacts on the Town and neighboring properties, the Town should evaluate each proposed operation on a case-by-case basis to determine its compatibility with the Town Plan. The Town acknowledges that an Act 250 Permit is required for extraction of all-natural resources and drilling of oil/gas wells, and in accordance with the Zoning Regulations.

2.6. Air Quality

Clean air is critical resource, now and into the future. This Plan provides for a multi-faceted approach to prioritizing access to clean air; objectives and strategies can be found throughout the Plan that aim to facilitate global, regional, and local impacts. This includes a reduction of fossil fuels through promotion and prioritization of renewable energy infrastructure, clustered development and infrastructure planning which reduces needs for new paved roads, conservation of natural resources including trees and waterways, and promotion of non-motorized and multi-modal transportation alternatives. Improvements in energy efficiency and energy sources will enable to Middlesex to do its share to improve local and regional air quality.

Middlesex is committed to continued focus in these areas, with appropriate relationships to other local and state regulatory documents.

2.7. Energy

Energy is a pervasive influence on our lives. We use energy to heat homes and offices, power industry, and to transport people, goods and services from place to place. Energy costs are a major line item in government, business, and personal budgets.

Common sense dictates that we attempt to decrease overall energy demands, use current supplies more efficiently, and begin to shift demand to renewable sources such as small-scale hydropower, wind, solar, and biomass. While these alternatives are not completely benign in their impacts, they are generally less harmful than fossil fuels and are available in perpetuity at more stable costs.

Land use policies are important in facilitating energy conservation and the development of renewable energy resources. Land use planning can save energy that would otherwise be lost through inefficient site designs and settlement patterns. Standards to consider include encouraging building development on southern slopes, in areas sheltered from the wind, use of vegetation as wind blocks and shade, and flexible lot layouts encouraging planned unit developments with the above considerations according to topography, soils and aesthetic considerations. Directing new growth toward areas with existing infrastructure and services can also reduce energy demands.

Although, the energy picture often appears abstract and beyond the influence of individual communities, local planning can play a positive and effective role in guiding energy decisions. By promoting efficient land use patterns, participating in energy development decisions, facilitating alternative transportation options, and encouraging energy conservation strategies, even small towns can do much to bring about a sustainable energy future.

A. Current Sources and Use

In Vermont, fossil fuels are the primary source of our energy, accounting for 75 percent of all energy use. Our reliance on fossil fuels contributes to our dependency on foreign countries, the accumulation of "greenhouse gases" in the atmosphere, acid precipitation, and human health hazards resulting from declining air quality. Continued dependency on fossil fuels over the long term will ultimately create severe environmental problems and the potential for economic hardship when supplies dwindle or are cut off.

The three main sources of energy consumption in Middlesex are household heating, private vehicles, and electricity.

Current Municipal Transportation Energy Use

Transportation Data	In Middlesex
Total # of Vehicles (ACS 2011-2015)	1,478
Average Miles per Vehicle per year (Vtrans)	12,500
Total Miles Traveled	18,475,000
Average Gallons Used per Vehicle per Year (VTrans)	576
Total Gallons Use per Year	993,280
Transportation BTUs (Billion)	120

Average Cost per Gallon of Gasoline (RPC)	2.31
Gasoline Cost per Year	$2,294,476.00

This table uses data from the American Community Survey (ACS) and Vermont Agency of Transportation (VTrans) to calculate current transportation energy use and energy costs.

Current Municipal Residential Heating Energy Use

Fuel Source	Municipal Households (ACS 2011-2015)	Municipal % of Households	Municipal Square Footage Heated	Municipal BTU (in Billions)
Natural Gas	3	0.4%	5,952	0.36
Propane	196	25.4%	368,302	22.10
Electricity	3	0.4%	5,952	0.36
Fuel Oil	269	34.8%	522,074	31.32
Coal	0	0.0%	0	0.00
Wood	283	36.6%	537,334	32.24
Other (Includes Solar)	19	2.5%	30,544	1.83
No Fuel	0	0.0%	0	0.00
Total	**557**	**100%**	**1,470,158**	**88.21**

This table displays data from the ACS that estimates current municipal residential heating energy use.

Current Municipal Commercial Energy Use

	Commercial Establishments in Municipality (VT DOL)	Estimated Thermal Energy BTUs per Commercial Establishment (in Millions) (VDPS)	Estimated Thermal Energy BTUs by Commercial Establishments in Municipality (in Millions)
Municipal Commercial Energy Use	56	572	32,032

This table uses data available from the Vermont Department of Labor (VT DOL) and the Vermont Department of Public Service (DPS) to estimate current municipal commercial establishment energy use in the municipality.

Current Electricity Use

Use Sector	Current Electricity Use
Residential (Efficiency Vermont) (kWh)	5,245,430
Commercial and Industrial (kWh)	5,437,045
Total (kWh)	10,682,475

This table displays current electricity use within the municipality. This data is available from Efficiency Vermont (EVT).

B. RENEWABLE ENERGY

In Middlesex, home heating costs and energy use can be dramatically reduced and climate pollution lessened through auxiliary solar systems, passive solar design, and building orientation. In recent years, a growing number of Middlesex households have had solar systems installed. In addition, proper insulation/weatherization of both new and existing structures yields returns far greater than the investment required over the life of most buildings. New construction can and should utilize these appropriate renewable energy techniques.

Existing Renewable Generation

Renewable Type	MW	MWh
Solar	0.26	316.12
Wind	0.01	29.13
Hydro	0.00	0.00
Biomass	0.00	0.00
Other	0.00	0.00
Total Existing Generation	**0.27**	**345.24**

Table shows existing renewable generation in the municipality, in MW and MWh, based on information available from the Vermont Department of Public Service.

Renewable Generation Potential

Renewable Type	MW	MWh
Rooftop Solar	1.05	1,291
Ground-mounted Solar	829.71	1,017,562
Wind	132.43	406,015
Hydro	0.00	0
Biomass and Methane	0.00	0
Other	0.00	0
Total Renewable Generation Potential	**963.19**	**1,424,868**

Renewable generation potential is based on mapping completed by the regional planning commission that is based on the Municipal Determination Standards and associated guidance documents developed by DPS. The renewable generation potential is expressed in MW and MWh by the type of renewable resource (solar, wind, hydro, etc.).

C. Energy Efficiency Targets

Given the continued costly reliance on fossil fuels, there is likely to be increased interest in developing renewable projects in Middlesex. While the Town encourages the use of solar and small-scale wind, a delicate balance must be sought in deciding the placement of solar and wind energy equipment.

In the 2012 survey, Middlesex residents expressed the most interest in solar power as a renewable energy source and the least support for wind towers on ridge tops.

Middlesex has not yet developed an Enhanced Energy Plan. However, it is committed to working towards targets for energy use and efficiency. The targets below are a draft to help set future discussion of benchmarks and plan for the next 30 years and should be viewed as guidance at this time.

Middlesex plans to work towards an Enhanced Energy Plan by 2022.

Residential Thermal Efficiency Targets

	2025	2035	2050
Residential – Increased Efficiency and Conservation (% of municipal households to be weatherized)	20%	42%	92%

This table displays targets for thermal efficiency for residential structures based on a methodology developed by DPS using data available from the regional Long-range Energy Alternatives Planning (LEAP) analysis and ACS. The data in this table represents the percentage of municipal households that will need to be weatherized in the target years.

Commercial Thermal Efficiency Targets

	2025	2035	2050
Commercial - Increased Efficiency and Conservation (% of commercial establishments to be weatherized)	22%	33%	61%

This table sets a draft target for commercial thermal efficiency. Information from the VT DOL is required to complete this target.

Electricity Efficiency Targets

	2025	2035	2050
Increase Efficiency and Conservation	1.5%	7.3%	15.2%

Data in this table displays a target for increased electricity efficiency and conservation during the target years. These targets were developed using regional LEAP analysis.

Use of Renewables – Targets for Transportation

	2025	2035	2050
Renewable Energy Use - Transportation	9.6%	31.3%	90.2%

This data displays targets for the percentage of transportation energy use coming from renewable sources during each target year. This data was developed using the LEAP analysis.

Use of Renewables – Targets for Heating

	2025	2035	2050
Renewable Energy Use - Heating	52.4%	66.6%	92.5%

This data displays targets for the percentage of heating energy use coming from renewable sources during each target year. This data was developed using information from the LEAP analysis.

Use of Renewables – Targets for Electricity

	2025	2035	2050
Renewable Energy Use – Electricity (MWh)	2,785	4,456	11,140

Approved by Middlesex Voters March 1, 2022

This data displays targets for MWh generation coming from renewable sources within the municipality during each target year. This data was developed using information from the regional planning commission and DPS.

Renewable Generation Targets

	2025	2035	2050
Total Renewable Generation Target (in MWh)	2,785	4,456	11,140

Renewable generation targets for municipalities were developed by the regional planning commission.

D. Facility Siting

Sufficient Land

	Y/N
Solar	Y
Wind	Y

This table shows whether or not there is sufficient land in the municipality to meet the renewable generation targets based on the renewable generation potential in the municipality.

Middlesex fully recognizes and respects the importance of renewable energy sources and is dedicated to working towards state and federal goals of a clean and sustainable future. Middlesex also recognizes that there may at times be competing goods, where the presence of these facilities can disrupt important wildlife corridors or damage important public scenic views.

Middlesex believes that these goods can work in concert if facility siting is thoughtful and, as such, wishes to provide guidance to applicable regulatory agencies in making these decisions. Siting of large-scale wind or solar projects can be categorized as follows:

Preferably Prohibited Sites: The town will not support installations at these sites because of the scenic, significant natural resource, or cultural values of the specified areas.

- Highest priority forest blocks as delineated by the Agency of Natural Resources;
- Areas with endangered or uncommon species;
- Class I and Class II wetlands;
- Ridgelines of the Worcester Mountain range within the town of Middlesex. Ridgelines are defined as (a) those lands above 1,500 feet elevations, including but not limited to the main range of the Worcester Mountains (west of Center Road and Bear Swamp Road) and (b) all land above an elevation of 1,400 feet on Dumpling Hill.

Approved by Middlesex Voters March 1, 2022

POTENTIALLY SUITABLE SITES: The town will give cautionary consideration to installations at these sites; careful consideration should be given to context and availability of lands with similar resource constraints.

- Areas with Prime Agricultural soils;
- Lands in agricultural production;
- Lands with slopes over 25%.

PREFERRED SITES: The town will support installations at these sites:

- Industrial areas;
- In or near landfills, parking lots, previously paved surfaces and brownfields;
- Near schools and community spaces to offer increased awareness and potentially serve as an educational opportunity;
- On rooftops of existing and proposed buildings.

E. Summing Up Energy: Goals, Objectives and Strategies

Objective 21. Promote the use of renewable energy resources in town which are aligned with other goals of this Plan.

Strategy 50. Reinforce smart growth patterns to reduce energy consumption in the transportation, energy and land use sectors.

Strategy 51. Promote small scale, individual and group net-metered and community-based energy projects which are compliance with this Plan.

Strategy 52. Efforts should be made to limit the adverse environmental and social impacts of renewable energy projects.

Strategy 53. Work with the Vermont Public Utility Commission to site facilities which respect the specific energy facility siting conditions outlined in this Plan.

Objective 22. Encourage energy efficiency and conservation in municipal construction projects.

Strategy 54. Consider removal and/or replacement of conventional street lights with LED fixtures.

Strategy 55. Continue to analyze results of past municipal energy audits and perform recommended upgrades to buildings.

Strategy 56. Complete an Enhanced Energy Plan by 2022.

ENERGY GOALS

25. Decrease overall energy demands and use current supplies more efficiently.

26. Encourage small scale and appropriately sited renewable energy generation facilities.

27. Work with the region and the State of Vermont towards its renewable energy goals.

CHAPTER 3. A PLACE TO GATHER

Fostering Community and a Vibrant and Connected Village Center

3.1. Overview

The residents of Middlesex place a high value on a strong sense of community. Every other element of this plan is intended to support that value. Middlesex recognizes, however, that there are still improvements which can be made to better enhance the community's ability to gather in public places and participate in shared community events. When asked what uses should expand in Middlesex, residents overwhelmingly included small retail uses, restaurants and café spaces, recreation fields and walking paths.

3.2. Land Use Districts

The Town's Zoning Bylaws establish and regulate development according to six land use districts, as follows:

Village District: Allows residential, commercial, office, and public uses on 1 acre lots (1/4 with public sewer or water). This includes areas just south and east of Exit 9 and the part of town known as Putnamville.

Mixed Use District: Allows uses complementary to the Village in an area just north and west of Exit 9. There is no minimum lot size but overall density in the zone "must be" equivalent to one building per two acres.

Industrial District: This zoning district includes a small area south and west of Exit 9 and the area along Route 2 from the Village to the Montpelier line. Industrial uses are encouraged. There are limited agricultural uses in this zone. The minimum lot size is 1 acre.

Medium Density Residential District: A minimum lot size of 2 acres is required in this primarily residential zone. This district occurs in the vicinity of Shady Rill and Rumney School and along Route 2 north and west of the Exit 9 and along Middlesex Center Road.

Rural Residential District: Allows similar use on lot sizes of 2 acres provided a 5-acre density is maintained.

Conservation District: Allows residential and other low intensity uses on 4 acre lots provided a 10-acre density is maintained.

The town also recognizes a Flood Hazard Overlay District.

See Middlesex Zoning Map in Appendix

A. Summing Up: Community Building and Land Use Planning Goals, Objectives, and Strategies

Objective 23. To maintain a future land use plan and keep zoning regulations up to date and aligned with the Town goals outlined in this plan.

Strategy 57. Prioritize zoning updates which relate to the development of housing subdivisions, uses in the Village, business parks, home-based businesses, commercial/retail zones, and residential zones and cluster housing.

Strategy 58. The Town shall maintain, and update as needed, a comprehensive zoning map that is coordinated with zoning regulations.

Objective 24. To identify and promote land to be zoned for productive use.

Strategy 59. Recommend zoning regulations, ordinances, and tax policies to support agriculture and forestry in the best interest of land owners, users, and the community as a whole.

Strategy 60. The Town's industrial and commercial areas should have adequate parking and well-planned traffic flow.

Objective 25. To plan for the future of the area of town known as Putnamville and assess its village status.

Strategy 61. Host a community conversation to consider whether any zoning changes are appropriate for the Putnamville area.

COMMUNITY BUILDING & LAND USE PLANNING GOALS

28. The Town's Zoning Regulations should effectively support and regulate growth management and land use that meets the goals set out in his plan.

29. Lands employed in production will be recognized as potential assets to the community and zoning will promote land use that benefits owners and the community.

3.3. Middlesex Village

MIDDLESEX VILLAGE/EXIT 9: LAND USE AND DEVELOPMENT PLAN. In October 2001, Middlesex completed the "Middlesex Village/Exit 9 Land Use and Development Plan" to guide actions in those areas. The 2013 Town Plan incorporated this plan by reference. While some elements of the Village Plan would benefit from updated technical studies, many of the goals and desires remain applicable.

Included herein are a selection of the most relevant and timely pieces in 2019.

TRAFFIC PEDESTRIAN SAFETY AND CIRCULATION. Currently there are no sidewalks, cross walks or other pedestrian or recreation paths within the village or larger planning area. Pedestrians and bicycles are required to use road shoulders. The new Route 100B and bridge designs do not incorporate sidewalks but do retain their paved width through the residential area near the bridge.

The straightened alignment of 100B does bring concerns as well. State routes are typically designed to carry larger volumes of traffic and could encourage higher traffic speeds into the village. Additional traffic calming may be necessary in these areas, including curbing, sidewalks, and crosswalks; reduced lane widths and other road design modifications, curb-cut consolidations, and off-street path networks for pedestrians. Future development in the village should be served by existing roads and new curb cuts and development roads should be carefully considered.

STREETSCAPE AND VILLAGE CHARACTER. As noted in the Vermont State Standards for roadway design, small villages such as Middlesex historically have been sited along road corridors which often serve as the community's Main Street. Given the importance of village centers to community identity, the state is now promoting, within village and urban areas, road and bridge designs that enhance rather than detract from their historic pedestrian setting. Design options include:

- Pedestrian scaled lighting
- Street trees
- Landscaping to define access roads, gateways and adjoining public spaces
- Coordinated signs
- Aesthetic treatments of bridges, abutments, and retaining walls to emphasize gateways and prominent features
- The integration of historic features and design elements

The current configurations of Route 2 and 100B tend to overwhelm the historic and pedestrian character of Middlesex Village. Existing and future rehabilitation and reconstruction projects should incorporate village streetscape and traffic calming improvements.

Public Transit Services. Public transit services are currently limited. It's reasonable to expect that a Middlesex stop could be added to existing bus/van routes to Waterbury, Montpelier and the Mad River Valley, if a safe stop or pullover areas can be located within the village. Given that these are

the principal commuter destinations for Middlesex residents, regular bus service could also afford an alternative, more cost-effective means of getting to work. In the long term, commuter rail service through Middlesex may also be a possibility, if warranted by the potential ridership between larger, regional shopping and employment centers.

HISTORIC VILLAGE. It is important that Middlesex retain a traditional village. To this end, any future development or growth in the village should exhibit these traits:

- A compact settlement pattern, with most lots of less than one acre;
- A comfortable walking distance- the distance from the village center at the intersection of Church Street and Route 2 to village edges is less than a five-minute walk;
- A concentration of residential uses;
- A defined village streetscape where buildings are set relatively close to the road;
- A mix of uses- the greatest concentration, and variety, of land uses within the planning area;
- Small and human scale, defined by architecture and associated land uses;
- Locally owned businesses providing products and services valued by Middlesex residents;
- A wealth of historic resources; and
- Clear entrances or gateways.

VILLAGE-WEST. The character of land west of the historic village (or, alternatively, west of Center Road) differs considerably from the historic village. This area is physically separated from the much more heavily developed historic village by extensive Agency of Transportation rights-of-way and heavily wooded, undeveloped land along Route 2. This area has not been developed at the density, or with the mix of uses that characterize the historic village. Defining characteristics of the area include lower densities, scattered low density residential development, fewer historic structures and more vacant land.

The community has continually supported well managed development within much of this area.

NORTH OF EXIT 9. The area north of I-89 is sparsely developed. In many respects, this area serves as the rural contrast to the more heavily developed Village District. It also stands in stark contrast to the poorly planned unsightly development pattern that has come to dominate many highway interchanges throughout the state and nation. The current land use reflects the state goals to plan development so as to maintain the historic settlement pattern of compact villages and urban centers separated by rural countryside and to discourage strip development along highways.

Due to its proximity to I-89, favorable development potential west of Center Road and large parcel sizes which enhance landowner flexibility, this area presents a relatively clean slate for development. The rural character and residential nature of the surrounding land and lack of infrastructure raise significant concerns regarding how this land should be developed and potential impacts to the surrounding community.

PUTNAMVILLE. In the northeast corner of town lies a small area known as Putnamville. This area is currently zoned with a Village zoning designation, the same as is used in the historic village area of Route 2. This area is of historical significance to the town, as noted in chapter 1 of this Plan. Here there lies a historic schoolhouse, evidence of the area's importance as a community gathering spot

and village area. With new development along Route 2 and closer to the interstate, Putnamville has seen little change.

The future of Putnamville is an active area of discussion. In the 2018-2019 survey, residents were largely split as to whether the area should remain under village zoning. It is sure to be an area of discussion in the next few years, under the duration of this Plan.

A. Summing Up: Middlesex Village Considerations

Objective 26. Update the 2001 Village Plan.

Strategy 62. Secure funding and professional assistance to update the 2001 Village Plan.

Strategy 63. By 2020, itemize and collate implementation strategies from the 2001 Village Plan that exceed those included in this Plan and that remain relevant to the Town.

Objective 27. Assess the appropriate boundaries of the historic village area, predominately along Route 2.

Consider potential amendments to the zoning map to expand the village zoning district or create new transitional zoning areas along Route 2.

Objective 28. Plan for vehicular traffic while enhancing pedestrian access and safety.

Strategy 64. Pursue streetscape feasibility study for the Village area.

Strategy 65. More clearly define village gateways or entrances through the use of attractive landscaping and signs.

Strategy 66. Develop traffic calming and access management plans for the Route 2 corridor and Exit 9 interchange area.

Objective 29. Provide increased access to regular public transit options.

Strategy 67. Work with the state and regional partners to maintain and supplement bus and van routes through the village.

Strategy 68. Evaluate the feasibility of a commuter rail stop in Middlesex.

Objective 30. Maintain the historic village as a commercial, cultural and civic center of the community.

Strategy 69. Avoid strip development around the interchange that detracts from the vitality of the historic village.

Strategy 70. Protect aesthetic and scenic character of the Center Road and I-89 corridor.

Strategy 71. Address the Mixed-Use District as related but distinct from the Village Zoning District.

Approved by Middlesex Voters March 1, 2022

MIDDLESEX VILLAGE GOALS

30. Middlesex Village shall continue to be recognized as the hub of the community, with growth targeted and permitted accordingly.

31. Encourage small-scale commercial development in the Village District characterized by compact and mixed-use development, while preserving natural and agricultural resources, fragile features, and the scenic and rural character.

32. Enhance vehicular and pedestrian access and circulation within the Village area.

33. Plan for the area surrounding the interchange to promote appropriately scaled growth that doesn't detract from the nearby village center.

Strategy 72. Apply for Village Center designation through the State of Vermont.

Strategy 73. The possible designation of Putnamville as a Village should be addressed in a future Town Plan amendment or update.

Objective 31. Plan for and promote appropriately scaled growth near the I-89 Interchange.

Strategy 74. Give strong consideration to the strategies presented in the Vermont Interstate Interchange Planning and Development Guidelines Manual.

3.4. Transportation and Connectivity

Transportation is a key element of Middlesex's residential and commercial health. Transportation systems should be designed to provide residents, visitors, employees, merchants, and suppliers access to diverse alternatives for getting to their desired destinations. In addition, transportation systems should provide for the orderly and continued economic growth of our community. It is critical that the improvements and expansion of transportation systems provide for safe and convenient access and should proceed in a way that is efficient and complements the pattern of existing and proposed land uses, natural resources, and energy goals.

AIR AND RAIL TRAVEL. Although roadways are the main mode of transportation, Middlesex is in close proximity to two airports – Burlington International Airport located in Burlington, VT for main commercial travel; as well as Knapp Airport, located in Berlin, VT for private transportation. The closest rail stations are in Waterbury and Montpelier along Amtrak lines which transports passengers as far north as St. Albans, VT or as far south as Washington, DC.

Middlesex acknowledges that these modes of transportation are useful in providing long distance travel alternatives to traditional automobile transportation. The town will look for additional opportunities to increase use of these modes such as encouraging additional public transit routes and stops through Middlesex that stop at the train stations and airports.

ROADWAYS. With respect to transportation and land use factors, Middlesex understands the two are very much intertwined. Past development has shown the location and condition of town roads can be an important factor in determining where people build new homes or start a business. The locations of new roads, or conversion of Class IV to Class III roads can also determine which natural resources are conserved or developed by allowing or limiting access to an area.

There has frequently been discussion about the possibility of paving more town roads. However, these desires are often tempered by concern about travel speeds on rural roads, road widening, increased washouts, and great expense. Where safety is not an issue, maintaining the rural character of the roads will take precedence over improving road surfaces or motorists' sight lines. Roads should be maintained to support car travel within the posted speed limit and not be widened or straightened unless such changes maintain existing rural character or are absolutely necessary for safety reasons.

Middlesex participates in culvert and bridge inventories conducted by CVPRC. These inventories allow Middlesex to better understand culvert and bridge conditions in order to plan for future replacement, upgrade and repair projects. Road maintenance should include protection of stone walls and mature trees in the road right of way.

The I-89 exit in Middlesex is along the most heavily traveled section of highway in the state and the Middlesex exit is one of the least commercially developed exits in central Vermont. Further industrial and mixed-use development of this area is possible and encouraged by the town given the sites close proximity to existing infrastructure and location on a public transit route. However, given that this is the gateway to the community and the historic village district, the development here needs to be appropriate to the scale and rural character of the community.

The new bridge to Moretown and the widening of Route 100B is complete. This has helped to define the edge of the Village and has created an improved intersection, but lacks pedestrian infrastructure. The lanes here are remarkably wide, and there is hope that sidewalks or paths can be added in the future.

In Middlesex today, cars are the primary means of transportation and the biggest source of greenhouse gas emissions that contribute to climate change. The condition of our roads and opportunities to reduce gasoline use and car travel are important to all of us. Middlesex has no town-owned class one roads. We have 14.2 miles of class two, 33.8 miles of Class 3, an estimated 11.8 miles of Class 4, 3 miles of legal trails, 16.9 miles of State highways, and several miles of interstate highway. We also have two railroad sidings in the Town.

Class II, III and IV roads provide Middlesex residents with the opportunity to recreationally explore Middlesex via bicycle, walking, horseback riding or hiking (in the case of Class IV roads). This is addressed in Chapter 2 of this Plan.

A. Summing Up: Transportation and Connectivity Goals, Objectives, and Strategies

Objective 32. To have detailed information, updated regularly, about the condition of its roads, its rights of way, and the types and volume of traffic using them.

Strategy 75. Continue using the mapping technology available through the Regional Planning Commission, the town should continue to update information on town roads, culverts, traffic loads, and an annual maintenance schedule. The areas where access for emergency vehicles and school buses are limited should be identified.

Objective 33. Class 4 roads should be kept available for public access and use.

Strategy 76. Conduct a survey of all Class 4 town roads and public rights of way and develop a plan to ensure public access for recreation, forestry, and to prevent further deterioration whenever practical.

Objective 34. The town shall set road construction and maintenance standards to protect its investment, the environment, and to promote safety for the traveling public.

Strategy 77. Use road maintenance and construction standards prescribed by the State for road construction projects.

Strategy 78. Scenic vistas, roadsides, and bridges that are publicly owned should be maintained as part of the regular road maintenance program.

Strategy 79. Continue to incorporate a capital budget to meet the current and future needs of residents.

Strategy 80. Every effort should be made to minimize erosion from roads, particularly near streams and wetlands. Chemicals, including salt, should not be used unless authorized by the Select Board after consideration of potential damaging impacts on surface water, ground water, plants and animals.

Objective 35. Commuter parking should continue to be available at the Interstate 89 interchange.

Strategy 81. Provide for electric vehicle charging at commuter parking areas and where accessible to local and interstate travelers.

Approved by Middlesex Voters March 1, 2022

COMMUNITY BUILDING & LAND USE PLANNING GOALS

34. Roads should be considered a strong community asset and shall be given the appropriate investments.

35. Infrastructure should support the cultural, environmental and economic development goals of this Plan.

36. The Town shall continue to plan for long term infrastructure and transportation needs.

Objective 36. **The Town shall maintain a long-range plan, schedule, and associated budget for the location, capacity and installation of public services and facilities that voters will want and need.**

3.5. Supporting Infrastructure

ALTERNATE MODES OF TRANSPORTATION. The Waterbury Commuter run by GMTA runs through Middlesex with stops along Route 2 between Waterbury and Montpelier. This route serves as an important mode of transportation for workers commuting to Montpelier and Waterbury. Additionally, the route connects riders to routes that go to Chittenden County and St. Johnsbury. Although the Waterbury Commuter is the only public transit route that stops in Middlesex at the time, the Town would like to see expanded routes that allow residents to travel to other employment centers such as the Stowe area, the Mad River Valley and Burlington.

Many roads in Middlesex are not paved and do not contain sidewalks; however, some have lower levels of traffic and are ideal for walking, hiking and biking. Some students walk and bike to school. For commuting purposes, Route 2 has a wide enough shoulder to afford cyclists room to ride. There are several cyclists who use the roads for commuting to work. The road was recently repaved and traffic is minimal during off commuting hours.

PARKING FACILITIES. A park n' ride is available in Middlesex. This park and ride is located at the interchange area to allow for easy access to I-89 and in Middlesex Village. The lot is well lit, paved, and has handicapped parking for disabled residents. The lot offers Level 2 Electric Vehicle charging, and, if notified in advance, the commuter bus will stop at the lot.

3.6. Opportunities & Priorities

The key to solving our future transportation problems will be to anticipate and plan for the inevitable growth of the Town and to understand that decisions about our roads will be an important factor in determining if this growth will have positive or negative effects. It is important that Middlesex acknowledges the relationships among energy, land use and transportation in order to provide multiple modes of transportation for all residents and have an effective and efficient transportation system.

Although road maintenance represents the largest portion of the Town budget, and the second largest use of property tax revenues, Middlesex strives for multimodal transportations options for its residents. This includes:

- Public transit options and paths for pedestrians and cyclists. By increasing and encouraging alternate modes of transportation, Middlesex can more effectively and efficiently provide safe, convenient, economic and energy efficient transportation for its residents.
- Increased access to public transportation

Approved by Middlesex Voters March 1, 2022

BROADBAND INTERNET. The Town of Middlesex recognizes that improving residential access to broadband internet service is critical to ensuring its economic vitality and keeping it a desirable place to live. While broadband cable internet service is available along the Interstate 89 corridor and on many of the town's more populous roads, an estimated half of residents are forced to rely on dial-up internet service or DSL, with widespread complaints about slow, deteriorating or nonexistent service. The town shall embrace opportunities to:

- Lobby the state to pressure internet service providers to broaden its reach to rural customers;
- Encourage the state to make incentives available to groups and municipalities working to improve internet service; and
- Stay abreast of and support efforts to develop municipal service providers.

STREETSCAPE FEASIBILITY STUDY. A theme that emerged out of the Town's 2018 "What's Next Middlesex?" community forum was the recognition of the need to plan for a Village District. One of the committees resulting from What's Next Middlesex has taken important steps to engage the public in creating a dynamic, well-planned future for the Village District. In 2001, the Middlesex Village/Exit 9 Land Use and Development Plan was prepared, starting the process of envisioning the area as a mixed-use center and multi-modal transportation system. Subsequently, there have been material changes to the Village: Route 100B was relocated and a new bridge over the Winooski was constructed; the Camp Meade property was sold and several adjacent parcels consolidated into it; and new vitality and traffic have come as Red Hen Bakery and other businesses have grown and changed. Now is an opportune time to look at the Village's future anew and begin the process of outlining specific and realistic steps toward implementation.

While the Village District and Camp Meade have long functioned as centers for the Town, with the Town Offices, church and a mix of commercial and residential uses present, the lack of streetscape, parking, and other visual markers along Route 2 has always made this area feel like a "pass-through" rather than a destination. There are numerous transportation features in and near the Village District, including the Exit 9 interchange, the beginnings of a path system in areas north of the Village District along Route 2, the former railroad stop on the east side of Route 2, and the "stub" of Old Route 100B that now dead-ends near the Winooski River. Public transit comes through the Village, as highlighted in the Town Plan.

There is also potential for access to the beautiful stretch of the Winooski River that runs behind the Camp Meade property. To date however, the Town has not had the resources or the direction to evaluate where and how these elements can be improved and tied together through paths, streetscape improvements, and river access.

New funding opportunities will allow the Town to obtain professional help to catalog and evaluate the potential options and order-of-magnitude costs for streetscape improvements, pathway routes and connections, and utility upgrades in the Village District. While not a full engineering or design evaluation, compiling information, options and cost ranges will address the greatest "unknown" in planning for Village District and allow the Town and its partners to identify detailed planning needs, and move forward with other planning and implementation steps.

The town endeavors to apply for funding for the studies outlined in this plan, beginning with the streetscape feasibility study outlined above.

Approved by Middlesex Voters March 1, 2022

FUTURE LAND USE PLAN. A land use plan for Middlesex is a significant tool for achieving the goals set out in this plan.

The major land use tool in Middlesex today is its Zoning Regulations. These regulations have recently been updated and should be periodically reviewed to make sure they achieve our priority goals. This Land Use section of the Town Plan does not specify details of which areas of Town should be used for particular purposes. Instead it identifies the decisions the Town should make about land use and proposes a process for gathering information necessary to help make these decisions.

A land use plan is a key tool for managing the effects of residential and commercial growth so that these effects are positive and do not adversely affect the Town. This land use plan and the actions it anticipates are designed to:

- Plan for the possible allocation of lands, if needed, for public facilities and services
- Strike an equitable balance between the interests of property owners and public purposes when there is potential for conflict in the use of land; and
- Employ land use tools, as appropriate and approved by the citizens, to achieve the Town's goals.

Future land use planning for Middlesex seeks to include areas of both residential and non-residential growth, as well as areas for conservation and more restricted growth. Given the rural nature of town, the existing historic villages, and the limited roads, it is possible to examine the future land use goals in just a few broad categories, which include:

- Low Intensity Residential Growth Areas. This includes areas of town where there is a desire for relatively low density, low intensity residential growth. This should be zoned to preclude non-residential uses. It should be noted that the use of "low" density here is relative. While it should reflect what is considered low density compared to some surrounding communities, these areas are still targeted to accommodate most of the single-family residential growth in town.
- Non-Residential Growth Areas. These areas are intended to reflect future growth for non-residential uses that would exist outside of a typical village setting, including larger office park and industrial areas. Given the potential nuisance qualities of these uses, these areas are generally not intended for residential use, though it is not the intention of this plan to indicate that they would be expressly prohibited.

  Some existing development in these areas is on flood plains and in areas protected by Middlesex flood plain regulations. Future development in these areas should accommodate the flood plain and be in line with the Middlesex flood plain regulations which precludes new development in the flood plain.

- Mixed Use Growth. These areas reflect a desire to incorporate a mix of uses, both through a traditional village setting and also in areas where a more modern mixing of residential and non-residential uses could occur and be complementary to each other. This area may include what is or will become zoned transition areas from surrounding residential and non-residential growth areas.
- Conservation and Limited Growth. This area reflects areas where the lowest density residential uses should be located, along with areas desired to be of the highest levels of conservation zoning in Middlesex. These areas also include some larger hazard areas, including in some cases river corridors and Flood Hazard Areas.

The future land use plan for Middlesex is not a zoning map, but does reflect the aspirational land use goals of development and conservation. As such, future zoning will be expected to align with these goals.

As included in Chapter 2 of this Plan, the Town of Middlesex has significant holdings of and access to forested and park lands.

CHAPTER 4. A STRONG FOUNDATION

Equitable and Effective Governance and Services

4.1. Overview

The town of Middlesex strongly values its small community which provides a common elementary school, community town hall, and easy access to its volunteer government. Town Meeting honors tradition as residents are able to gather, speak directly with each other, and cast personal votes from the floor. Emergency services are provided by community volunteers, many of whom are known to those who call them for assistance.

4.2. Education

This section discusses the Town's public schooling, including the quality and cost of educating our students. It also recognizes opportunities for continued learning and community interaction with and for all residents.

RUMNEY SCHOOL. Middlesex residents have been strong supporters of the local Rumney Elementary School, which provides pre-K through grade 6 education for Middlesex residents. The school serves as both the center for education of young Middlesex residents and a community center. Town meeting is held at the Rumney School as well as local events, including a Fall Harvest Dinner, Pie Breakfast and school fair. Outside the school, the Town owns the recreation fields used by students and a gazebo that hosts weekly outdoor concerts throughout the summer.

BUDGET. Due to school consolidation, the most recent budget was approved on April 9, 2019 through a special vote for the Rumney budget. The budget is designed to address the academic, social, and functional needs of Middlesex students in a cost-efficient manner. Going forward, if consolidation is finalized, the budget will be determined by vote as part of the broader district. Votes occur by Australian Ballot.

The community has consistently provided strong support for the school including supporting a bond vote for school improvements in 2014, supporting school budgets by wide margins, and community members providing volunteer services throughout the year.

FACILITY, STUDENTS & INSTRUCTIONAL STAFF. Rumney School is a single-story structure with 29,000 square feet. The student to teacher ratio at the school is 14:1, which is higher than the Vermont State average of 12:1 but does vary depending upon student enrollment and needs. Other teachers and instructional aides are employed to provide services, the number of which fluctuates depending upon

student enrollment and need. Rumney provides special education services through employees and contracted services. Student assessments are conducted annually.

188 students attended Rumney School in 2018-2019, which has been fairly stable with only moderate and sustainable growth over the past decade. Minority enrollment in the 2018-2019 school year was 6%, compared to the State of Vermont average of approximately 9%. The school offers free and reduced lunches to those students who are in need.

Rumney consistently ranks among the top third of schools in Vermont in overall test scores.

U-32 High School. Seventh through twelfth graders attend Union High School (U-32) in East Montpelier, the designated high school of Middlesex, Berlin, Calais, East Montpelier, and Worcester. Total enrollment at U-32 for the five towns it serves was 768 students in 2018.

U-32 School is a two-story structure that underwent a significant expansion and renovation which was completed by the 2002-3 school year. At U-32, student assessment is conducted annually. Aggregate test results generally are reported to school boards and are available to the public. Existing student performance measurements focus mainly on academic areas. The school has a graduation rate of 85%, which is more than the 50th percentile for the state.

Some Middlesex students attend area private schools or are home schooled.

The Middlesex School Board is primarily responsible for developing policies and budgets designed to achieve the Town's educational goals of providing a challenging, quality education for each student in a safe, respectful, and caring environment. The School Board's mission is to meet its obligations to Middlesex students and community members through periodic reassessment of its goals and policies in light of qualitative and quantifiable results.

School Consolidation Considerations. In recent years, the prospect of a merger of school districts has been a topic of discussion by residents and the school board. The state board of education rejected the governance proposal advanced by the Washington Central Supervisory Union towns and directed Middlesex to merge with other nearby districts. While that decision is being appealed, a merged board has been created with school directors being elected on May 21, 2019.

A survey in 2017 showed that Middlesex valued high quality education affordability and a positive/ supportive school culture for students, teachers and staff.

Continuing Education, Vocation, and Nearby Adult Education Opportunities. Although there are no colleges in Middlesex, there are several public and private traditional and nontraditional higher education institutions located in Montpelier. These institutions include: New England Culinary Institute, Community College of Vermont, Vermont College of Fine Arts, University of Vermont Extension, and Goddard College in Plainfield, VT. There are also numerous higher education institutions in Burlington, which can be reached via car or the commuter bus routes. Warren, VT in the Mad River Valley also hosts Yestermorrow Environmental Design/Build School and Northfield, VT hosts Norwich University. Vocational opportunities for high school students are offered at the Barre Technical School as well.

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Adult basic education programs are available at the Central Vermont Adult Basic Education Center in Waterbury. This program provides educational services to adults in their homes or at the Center. Programs aim to improve job related reading, writing and math skills or help those who are wishing to take their General Education Development (GED) exam. The Center also provides computer trainings.

The *What's Next Middlesex* effort is exploring educational opportunities beyond those provided by the school, including coordinating volunteers to host a yoga class, provide a class on dream interpretation, a training on using Excel, and other subjects, as there are volunteers to provide and community interest to participate.

STUDENT ATTRIBUTES. Middlesex hopes for success for all of its students. As such, the community aspires to the following attributes for all of its public-school graduates:

1. Basic Academic Skills - Students should reach their full potential in reading, writing, and mathematics. Their skills should be comparable to skills of students in other towns, states and countries, and are appropriate for later employment or education;

2. Citizenship - Students should be intellectually prepared and motivated to participate actively and intelligently in the democratic process at the local, state and national level. Students should be prepared to participate as community members in energy conservation, preservation of the environment, and the preservation of community history;

3. Knowledge of the Physical World - Students should understand and be capable of interacting creatively with their physical surroundings. Suitable to their ability, they should have a basic understanding of the natural, physical, and chemical processes that surround them, and of how natural laws limit human activities. Students intending to pursue higher education in science should be suitably qualified;

4. Personal, Family and Group Skills - Students are prepared to lead safe, healthy and productive lives as individuals, as members of social groups, and as principal partners in new family units;

5. Creativity - Students should have knowledge and skills that permit them to express their creative impulses in socially useful and personally rewarding ways; and

6. Transition to Work - Students are prepared to enter skilled employment with career opportunities, undertake a business occupation, or enter an institution of higher education. Special needs students are prepared to enter an employment, educational, or home setting that allows them to develop to their full potential.

PRESCHOOL OPPORTUNITIES. Vermont's Act 166 mandates funding for 10 hours of universal pre-K for all 3 to 5-year-olds in Vermont in a prequalified program for 35 weeks in a school year. Regardless of parental income or circumstance, all children who are age 3-5 on or before September 1st of the applicable year are eligible to receive this early learning experience. For 2019/20 the Act 166 funding is equal to $3356 per child. Local preschool classes are hosted at the Rumney School.

A. Summing Up: Education Goals, Objectives, and Strategies

Objective 37. Educate and advance Middlesex public school students towards achievements in academics; citizenship; world knowledge; personal, family and group skills, creativity; and a strong foundation to enable transition to work.

Strategy 74. The School Board should continually evaluate and establish expectations for each of these student objectives towards student outcomes and measurable performance expectations.

Objective 38. Foster continued use of and access to the Rumney school building as a community resource for community events and activities.

Strategy 75. The Town and School Board should endeavor to maximize the use of the facilities, including the library, the gym, and the grounds by Town residents.

Objective 39. The Town shall support educational opportunities provided by community volunteers for a range of Middlesex residents.

Objective 40. Continue to support early learning educational opportunities for Middlesex residents of preschool age.

EDUCATION GOALS

37. Maintain high quality, affordable education in a supportive environment for all Middlesex students.

38. Champion local access to budgeting and decision-making in education.

39. Foster a strong relationship between the community and the school.

40. Cultivate educational opportunities outside of the traditional classroom structure.

4.3. Emergency Services

Emergency services in Middlesex are provided through a volunteer fire department and the Vermont State Police. The nearest hospital is located approximately 10 miles away in Berlin, Vermont.

THE MIDDLESEX VOLUNTEER FIRE DEPARTMENT. Emergency medical services are accessible to residents through the Middlesex Volunteer Fire Department (MVFD), with mutual aid to and from the neighboring towns. The MVFD operates from two stations: Station 1 is the three-bay main headquarters located on Welch Park Drive and Station 2 is the two-bay facility located on Shady Rill between the Rumney Elementary School and the Town shed.

The stations and vehicles are owned by the Town.

Equipment includes one engine, one tanker and one rescue vehicle at Station 1, one 4x4 engine and a utility vehicle at Station 2. The MVFD has approximately 10 members, 9 of whom are active firefighters. There are four members of the Fast Squad, who are also firefighters. The membership is comprised of Middlesex residents and residents of surrounding towns.

The MVFD is a member of the Capital Fire Mutual Aid System serving other towns in Central Vermont. The Mutual Aid System works through a pre-planned arrangement between and among neighboring towns. The active firefighting members of the MVFD have received a basic level of training regarding response to hazardous material incidents. This training prepares the firefighters to keep people away from the scene, to stay away themselves, and to contact the proper state authorities who are trained and equipped to deal directly with such situations.

Police coverage is supplied by the Vermont State Police and ambulance coverage is purchased from the Montpelier Fire Department.

Approved by Middlesex Voters March 1, 2022

Funding for the Department includes both an annual appropriation and debt service by the Town for its new building, pumper truck and vehicles, private donations, and fundraising activities conducted by the MVFD to supplement the Town appropriated funds. The Town is confident that it can provide continued protection for all Middlesex residents, businesses, and travelers on our highways, but will continue to evaluate its ability to keep up with services against future growth.

CENTRAL VERMONT MEDICAL CENTER. The nearest hospital is easily accessible for most Middlesex residents and employees. Central Vermont Medical Center (CVMC) is located approximately 10 miles away in Berlin, Vermont. CVMC provides emergency services as well as care for primary care, pregnancy and childbirth, rehabilitation and nursing, laboratory access, dialysis, as well as several specialty fields such as cancer care, cardiology and neurology.

While there are currently no family medical offices located within the town of Middlesex, residents have access to dozens in the surrounding towns of Montpelier, Berlin, Barre, and Waterbury.

MIDDLESEX THERAPEUTIC COMMUNITY RESIDENCE. When the flooding from Tropical Storm Irene forced the closure and temporary relocation of many of the state's buildings, the Middlesex Therapeutic Community Residence opened in Middlesex in 2013. It is a relatively small building with only seven beds, but is a secure facility with perimeter fencing intended to treat a portion of the region's psychiatric patients who are transitioning through levels of care. While the initial lifespan of the space was stated for three years, the facility is still in use as of the adopted date of this 2019 Plan.

A. Summing Up: Emergency Service Goals, Objectives, and Strategies

Objective 41. Provide the best emergency service possible

Strategy 76. The MVFD should strive to conform to the National Fire Fighting Code.

Strategy 77. Provide continuous fire training for service, safety, and use of equipment, using accepted best practices and seeking certification whenever possible.

Strategy 78. The Town should minimize risk by working toward the goal of being able to reach every building in Middlesex within 20 minutes of a call for assistance.

Strategy 79. Prioritize the use of up-to-date communications technology.

Strategy 80. Develop emergency plans for Middlesex including transportation of toxic wastes and hazardous materials on the interstate.

Objective 42. Prepare for capital needs

Strategy 81. Continually work with the Selectboard towards a 5-year capital budget and coordinated development plan.

Strategy 82. The Department should be primarily publicly financed based on its needs as approved by the voters.

Strategy 83. Both the MVFD and Fast Squad should seek supplemental forms of financing whenever possible.

Objective 43. Routinely monitor new development proposals and expansions for safety compliance.

Strategy 84. Work with the Planning Commission to develop procedures and authorization for a review of industrial processing, building safety relating to fire and other emergencies, and a procedure for approval of planned access to new buildings to assure access by the Fire Department.

Objective 44. The Middlesex Fire and Emergency Department will cooperate with a regional emergency management agency.

Strategy 85. Actively participate in regional emergency management agency discussions and tasks, including training.

EMERGENCY SERVICE GOALS

41. To provide adequate fire protection and emergency medical service for the community and its residents.

42. To balance fiscal awareness and responsibility with adequate service and equipment needs.

43. Expand emergency services if growth in demand dictates.

44. Consider regional coordination of emergency management.

Approved by Middlesex Voters March 1, 2022

4.4. Child Care

The Town recognizes that safe and affordable child care is an important resource for working families. The provision of safe, local, and accessible childcare and pre-school is an important element in attracting families to Middlesex and supporting the Middlesex workforce. As such, the Town endeavors to ensure that childcare is as permissible and accessible as possible within its borders.

The Town supports use of federal and state funds to assist with the development of child care facilities, programs and small businesses. The Town will strive to maintain an inventory of all child care programs in the Town and their capacity.

The Vermont Department for Children and Families regulates daycare facilities. Vermont law requires any person who cares for children from more than two families, other than their own children, to be registered or licensed by the Department for Children and Families. Day care providers operating out of private homes who care for a maximum of six children under the age of six years old (only two of those six can be under the age of two years old), and four school age children must be licensed with the State of Vermont.

Those day care facilities not operating out of the care provider's home must be licensed by the State. A licensed facility is allowed to provide care to a larger number of children. The State regulates the licensed facilities and does periodic inspections.

HOME CHILDCARE. Middlesex currently defines Home childcare as:

> *a state-registered or licensed child care home serving 6 or fewer children on a full-time basis, and up to 4 additional children on a part-time basis, which is conducted within a single-family dwelling by a resident of that dwelling. A child care home as defined shall be considered a permitted use of a single-family dwelling.*

DAYCARE CENTERS. Day Care Centers are defined as:

> *All state registered or licensed day care facilities which do not meet the definition of "home child care," including nonresidential child and adult day care facilities, and home-based child care facilities that serve more than six children on a full-time basis. See also Home Child Care, Residential Care Facility.*

As of early 2019, there were no home child care operators in Middlesex that are registered with the State. The preschool, pre-K, and before and after school programs located at Rumney Memorial School are the only licensed facility operators in the Town.

Other than allowing for the use of the elementary school, the Town has not been involved in providing childcare to local residents. It is not anticipated that the Town's role will change.

Home child care is one of the most widely permitted uses in town, allowed in the Village, Mixed Use, Industrial, Medium Density Residential, Rural Residential, and the Conservation District. It is even permitted within the Flood Hazard Area Overlay District.

Approved by Middlesex Voters March 1, 2022

Day care centers are permitted either as of right or as a conditional use within most zoning districts, excepting the rural and conservation districts.

Publicly funded preschool through Act 166 provides all families of preschool age children with access to preschool programs and preschool funding. The funding model is also credited with reducing the weekly childcare costs for working families, as the state preschool funding is utilized in many childcare programs towards the weekly cost, thus reducing the tuition burden on families with children in this age cohort.

4.5. Groundwater and Solid Waste Management and Resource Recovery

This section discusses plans for adequate supplies of safe drinking water, and for adequate systems for every building that generates waste to treat and dispose of domestic sewage and other wastewaters. Middlesex fully recognizes that water supplies are critical to fire protection services and to business and agriculture.

DOMESTIC WATER SUPPLIES. Middlesex groundwater aquifers are being used as drinking water. Individual well systems and springs are being used with no filtration, with mechanical filtration systems, or chemical filtration and disinfection systems. It is not known to what extent these different treatment levels are being used. Little is known about the quality of the groundwater in Middlesex. Some wells in the Village on Route 2 are known to be contaminated from a petroleum leak. A pollution remediation plan has been completed. Middlesex's waste, wastewater and sewage are treated and disposed of with individual septic systems.

A water and wastewater survey for the village was completed in 2001. That survey indicated that the village did not have a wastewater problem, it had a water problem. A preliminary design for a water system was completed. Due to a lack of State or Federal funding it was unfeasible to go forward at that time.

COMMUNITY WATER AND SEWAGE SYSTEMS. Middlesex groundwater aquifers that could serve the needs of concentrated residential, commercial, or industrial development, including future Middlesex schools, are most likely located along the Winooski River/Route 2 corridor. The soils, sands, and gravel deposits that, using existing technology, could serve the sewage disposal needs of concentrated residential, commercial, or industrial development and future Middlesex schools are mostly located in the same southern fringes of Town. The Middlesex Village Plan addresses future water needs and goals in more detail.

SOLID WASTE. Solid waste is any material that is discarded after use by residential, commercial, industrial, and agricultural generators. Middlesex currently relies on out-of-town landfills and a regional solid waste district for management of its solid waste.

> Residential - Many families practice recycling by bringing recyclable materials to drop-off centers in Montpelier, Worcester, or elsewhere. Recycling, in conjunction with trash pickup, is offered by some local haulers. Additional recycling and waste reduction is also accomplished by households that use backyard composting. Trash disposal is handled

similarly to recycling: either by drop-off at a landfill, transfer station or other drop-off location.

Commercial and Industrial - Commercial and industrial operations generally rely on commercial trash haulers for trash disposal and pick-up of conventional recyclables. Special wastes and recyclable materials require special attention by businesses.

Schools- Rumney's school food program actively composts food waste.

Agricultural - Agricultural operations can offer a model for the rest of the Town. Vermont farms can be nearly zero-waste operations: manure is used as fertilizer, paper is used as bedding, cardboard is reused as package for saleable products, and food waste is often fed to livestock. Farm-grown products require minimal or no packaging. The waste that farms do have is generally handled in the manners described for residential generators.

Middlesex residents recognize that untreated or poorly treated wastewaters and sewage put at risk their own health, the health of their neighbors, the prosperity of agriculture, and the Town's ability to attract business. For these reasons, individual and community investments should be made to treat wastewater and sewage and properly dispose of these and other wastes to ensure that water supplies are ample and pure and that Middlesex's natural resources are protected. These investments will be offset by savings in the costs required to treat polluted groundwater and surface waters at the levels safe for human consumption.

CENTRAL VERMONT SOLID WASTE MANAGEMENT DISTRICT. The CVSWMD was formed in the early 1980s to provide a cooperative negotiating entity with local private landfills serving the Barre-Montpelier area. In 1987, with the passage of a significant solid waste legislation, the district expanded its scope to encompass planning and development of solid waste facilities, and its membership rose to as much as 33 member communities. Since that time the District has successfully developed some small recycling and trash transfer facilities, completed some educational programs, instituted some special waste programs, written and published a regional solid waste plan, and continues to negotiate with private facilities for recycling and disposal services.

A. Summing Up: Groundwater and wastewater Goals, Objectives, and Strategies

Objective 46. The Town shall ensure that there is adequate provision of water for future development goals.

Strategy 86. Middlesex should inventory potential water supplies for municipal needs including firefighting and the Village center.

Strategy 87. Groundwater, aquifers, aquifer recharge areas, surface waters, and soils that have the potential to serve the water supply and sewage disposal needs of concentrated residential, commercial, or industrial development should, if needed, be identified, protected, and maintained.

Objective 47. Manage solid waste where the benefits of reduced cost, sound environmental practices and greatest efficiency can be obtained.

Strategy 88. Strive to reduce the total quantity of solid waste generated, encourage the integration of reusability into current practices, return materials to source or other locations where it may be recycled into new materials or products.

Strategy 89. The Selectboard should review periodically the solid waste management options of the Town and reevaluate or reaffirm its decision to participate in the Central Vermont Solid Waste Management District.

WATER AND SEWER GOALS

45. Waste, wastewater, and sewage should be treated and disposed of in a manner that ensures the integrity of Middlesex's natural resources and so that groundwater aquifers are protected for use as drinking water with no more than filtration treatment in accordance with State Regulations.

46. Ensure adequate water supply for future development needs.

4.6. Citizen Engagement, Participation and Town Communication

Middlesex places a high value on civic engagement. Citizen participation is likely to produce more well-rounded, sustainable decisions, and it strengthens our sense of community, civic skills and democracy. Middlesex residents have made these values known through the recent 2018-2019survey, (Appendix 1.10) as well as a variety of community efforts.

Photo Credit: Delia Clark

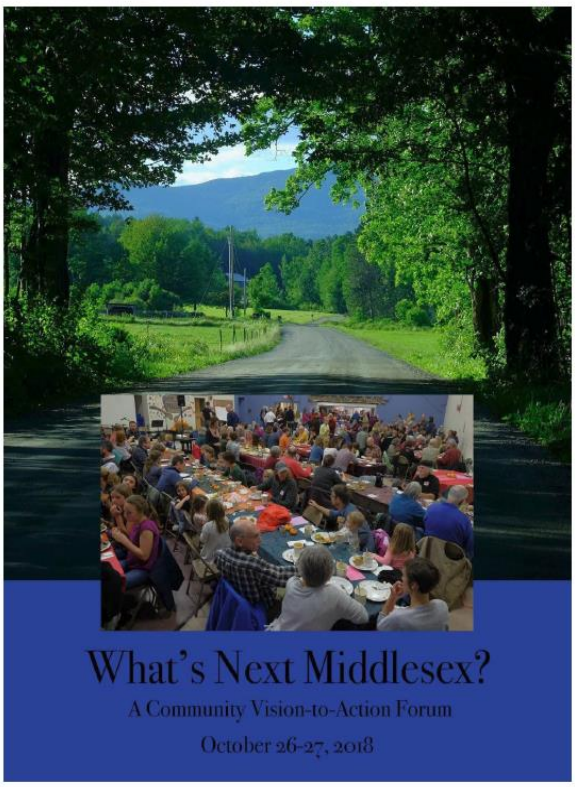
In recent years, Town leaders have encouraged a well-informed citizenry through the implementation of an official Town website (www.middlesexvermont.org), the active adoption of the Front Porch Forum online community forum, the publication of the *Middlesex Operator's Manual*, and other initiatives.

Middlesex has worked to increase participation and engagement in our annual Town Meeting by implementing an all-volunteer Remote Town Meeting Participation process so that people with mobility issues or who are abroad for public service reasons can participate by phone and internet; by moving to a larger more accessible meeting space (Rumney School); by creating informational budget pie charts and discretionary funding background materials; by collaborating on child care and a community meal after Town Meeting; and other efforts.

TOWN SURVEY. The Town has sent surveys to residents in advance of the 2013 and 2019 Town Plans. Selectboard members and Planning Commissioners felt strongly that all citizens should be able to participate, regardless of access to technology, and made available the funding such that surveys could be mailed to all town residents. The participation rate of over 300 (18 percent) is impressive and reflects an active citizenry.

WHAT'S NEXT MIDDLESEX. In 2018, residents came together to ask and answer *What's Next Middlesex*, an ambitious and successful vision to action forum with a goal of strengthening and diversifying community engagement. The town embarked on a dynamic series of two-way conversations between community members and local leaders.

Extensive planning brought with it an elder/youth oral history project, a creative community-building Story Pot activity involving townspeople and elementary students at Rumney School, a well-attended community dinner, a day and a half of vibrant facilitated discussions, a final report, and four resultant community action



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committees to focus on economic development and infrastructure, trails, community spaces and events, and outreach/communication. Volunteers met more than a half dozen times as a full group, with additional meetings in smaller committees, over the course of several months in 2018.

Citizen participation was the overarching goal. The planning team worked to raise interest in this event through as many different means as possible. Volunteers staffed a booth and talked with neighbors at many Middlesex Bandstand and Camp Meade concerts throughout the summer, on Primary Day at Town Hall, and at multiple Rumney events. Volunteers created a high-quality, informative website which was publicized widely and linked to the town website.

The team distributed posters to all public bulletin boards in town, and posted regular updates and invitations through Front Porch Forum and the Rumney newsletter/calendar. Planning team members met with existing town committees to keep them informed on event planning, and initiated conversations with as diverse an array of neighbors as possible, to help spread the word with as wide a group as possible. Sandwich boards were placed at key Middlesex intersections reminding all passersby of the upcoming weekend events. Volunteers worked with the planning team to create a colorful event flyer featuring a wide array of Middlesex faces, which was mailed, courtesy of the Selectboard, to every household.

Approved by Middlesex Voters March 1, 2022

To raise interest in registering (either online or by mail), all registrants were entered in a raffle to win prizes. To allow young families to participate, planners used grant funds to arrange with Community Connections to offer free child care for the entire event. Food helped to keep participants satiated.

More than 200 Middlesex residents attended the dinner, with 90 staying to participate in the small group sessions on Friday evening. 40 people participated in events on the following day. This participation rivals or exceeds that of regional towns with larger populations and budgets. Middlesex residents can be proud of their commitment to strengthening community, sharing their ideas, and participating in setting the town's goals.

Throughout it all, residents concurred: Middlesex is and strives to be a *Successful Community*, bearing:

- Effective community leadership
- Informed citizen participation
- Strong social capital
- Vibrant arts, cultural heritage, and recreation
- High quality educational opportunities for all ages
- Adequate physical infrastructure
- Equitable and adequate social services and health care
- High quality environment and natural resources
- Strong and stable local economy
- Carefully planned growth and development

As a partner event to the What's Next Middlesex outreach, the Town hosted a "Middlesex Makers and Creators" event in late 2018. focusing on the makers and creators of Middlesex. Over 40 "Middlesex Makers" (both professionals and hobbyists), from builders and excavators to quilters and poets, shared their work in this well attended community celebration.

The *What's Next Middlesex* community events resulted in four continued volunteer working groups:

- Middlesex Outreach Team;
- Trails;
- Economic Development & Infrastructure
- Community Spaces and Events

These citizen working groups will continue to work towards the goals identified by community members participating in the What's Next Middlesex vision to action forum, for the benefit of Middlesex.

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A. Summing Up: Citizen Participation Goals, Objectives, and Strategies

Objective 48. Provide access and transparency through Middlesex's committee work.

Strategy 90. Middlesex shall continue to post notice of meetings and hearings that meet or exceed statutory requirements.

Objective 49. Actively engage citizenry.

Strategy 91. To the extent that volunteers are available, and that it does not compromise the experience of those attending Town Meeting in person, Middlesex should make an effort to offer technological methods to participate in Town Meeting. Given limited resources, priority should be given to Middlesex voters who cannot attend Town Meeting for health-related reasons, and for reasons of public service.

Strategy 92. Encourage informed, civil, face-to-face deliberation in forums such as the annual Town Meeting.

Strategy 93. Invest in technology to advance access to information, including website design and management and locally broadcast public hearings.

Strategy 94. Continue to empower and engage the Middlesex Town Solutions Committee and other volunteers.

CITIZEN PARTICIPATION GOALS

47. Continue to provide well informed, inclusive, deliberative, empowered participation in Middlesex's public issues.

CHAPTER 5. ACHIEVING THE VISION

Implementing the Town Plan

5.1. Authority and Purpose

The authority to prepare and implement the comprehensive plan is granted to the Town of Middlesex through the Vermont Planning and Development Act, Title 24 of the Vermont Statutes Annotated, Chapter 117. It is the purpose of the Act to "... encourage the appropriate development of all lands in this state... in a manner which will promote the public health, safety against fire, floods, explosions and other dangers ... and to provide means and methods for the municipalities and regions of this state to plan for the prevention, minimization and future elimination of such land development problems as may presently exist or which may be foreseen and to implement those plans when and where appropriate."

The Vermont Statutes also specifically detail a series of elements that are required to be included in any local plan, and include a series of statewide planning objectives which local plans are encouraged to be consistent with.

5.2. Duration

The vision for this plan extends as far as 20 years.

This plan, once adopted, will be in effect for a period of eight (8) years.

Middlesex recognizes that if the plan expires, bylaws and capital investment programs cannot be updated or amended and that an expired plan cannot be considered in local or state regulatory proceedings. Furthermore, the town acknowledges that an expired plan cannot be confirmed in the local planning process, a requirement for qualification in a number of state grants and designation programs.

5.3. Regulatory Effect & Implementation- How the town plans to use the plan

The 2019 Middlesex Town Plan is a framework and guide for accomplishing community aspirations and intentions. It states goals and objectives and recommends courses of action for future growth, development and conservation of land, treatment of public facilities and services, and protection of the environment. Plan includes three levels of policy statements: Goals, Objectives, and Strategies.

- ✦ GOALS. These are intended to be broad statements of the direction that the town is headed towards. Goals, by definition, are not measurable.

✦ **OBJECTIVES.** These are intended to set intentions and, where possible, targets. They are organized by subject area and are contained within each chapter. Objectives strive to follow multiple Goals.

✦ **STRATEGIES**. These are specific statements of policies and/or types of work to be done to meet the Objectives laid out in the Plan. They do not reach the detailed level of a regulation or a management policy.

The plan is implemented through various town ordinances and regulations, fiscal practices including budgeting and capital planning, involvement and coordination with state and federal agencies, zoning and other land development regulations, and interactions with residents and other stakeholders.

The Plan recommends a number of actions and practices that should be undertaken in order to achieve the goals. It is important to note that these recommendations are not mandates but rather well-informed guidelines in order to help steer the operations of the Town and its citizens. This plan and its recommendations are intended to aid the town as it prepares and adopts regulations, prepares capital budgets and annual work programs, and forms citizen committees to study particular concerns. These recommendations shall be implemented only after considerable thought, discussion and analysis.

5.4. Regional Coordination & Compatibility

The town of Middlesex recognizes its role within a larger regional context and shall plan in cooperation with neighboring municipalities and other towns in the region. The development of the Middlesex Town Plan involved consideration of compatibility with the plans of adjoining municipalities and the region. The proposed plans of adjoining municipalities and the CVRPC were advised of the Plan and discussions were held with regional staff planners.

ADJACENT TOWNS. Development in Middlesex has had little impact on surrounding towns. Although Middlesex has two small industrial areas, most of the development has been in the form of residential construction. Housing growth in Town is strongly influenced by our proximity to Montpelier and our interstate access to Barre, Berlin, and Burlington. In particular, the growth in business activity and state government in Montpelier and Berlin has increased the demand for housing in the region, and we expect this demand to continue.

To the north, Middlesex abuts Worcester, and at present both towns have conservation zoning districts along the North Branch. A change in zoning in this valley by either town would have significant impact on its neighbor.

To the south Middlesex abuts Moretown and Berlin, with a mixture of industrial, village and residential zones. A new bridge over the Winooski River and the widening of Route 100B in Moretown may increase traffic in this area. At present, no major zoning changes are contemplated along this border.

To the west, Middlesex borders the town of Waterbury along the eastern slope of the Worcester Mountain range. This is a rugged area that has not yet come under development pressure. This area is currently used primarily for recreation and the harvesting of timber. Any future use of this portion of Middlesex would have little impact on Waterbury. The Town road that once connected the two communities through the Middlesex Notch is no longer passable by motor vehicles due to erosion and extensive beaver dams.

To the east, the Town borders Montpelier and East Montpelier. Middlesex residents rely on Montpelier for shopping, employment and a wide range of other services. Montpelier's stated economic development plan, if successful, could have a major impact on the demand for housing in Middlesex.

Regional Cooperation. The Town of Middlesex is committed to working cooperatively with neighboring towns to address issues of mutual concern. Middlesex cooperates with other towns in a number of areas, including schools (as part of the Washington Central Supervisory Union), emergency services (as a member of the Capital West Mutual Aid System), and solid waste (as part of the Central Vermont Solid Waste Management District). As a member of the Central Vermont Regional Planning Commission, Middlesex participates along with all Washington County towns and three Orange County towns. The opportunity exists for the towns abutting the Worcester Mountains to develop a long-term plan for the range.

The 2019 Middlesex Town Plan is compatible with the plans of adjoining municipalities and that of the CVRPC. As Middlesex takes steps to implement its plan, adjoining municipalities will be consulted and invited to comment on projects and studies which may affect an adjoining town or city.

Future Updates. For future updates or amendments the Town should consider moving the current and future land use discussion into separate and distinct chapters or sections to make more distinct what exists now compared to the future vision.

For future updates or amendments the Town should include an implementation matrix that provides a timeline and responsible party for the strategies and objectives so it is easier to track progress on actions included in the plan.

5.5. Compatibility with Regional Plan

Middlesex is one of 23 member municipalities of the Central Vermont Region, supported by the Central Vermont Regional Planning Commission (CVRPC). Like municipalities, the CVRPC is similarly obligated to create a plan in accordance with Vermont Statutes and statewide planning goals. The CVRPC adopted its current plan in June of 2018.

Compatibility Statement. The Middlesex Town Plan as proposed is unlikely to have an adverse impact on the plans of neighboring towns. The Central Vermont Regional Planning Commission and the Planning Commissions of all neighboring towns have been provided with a copy of this proposed Plan.

The Middlesex 2019 Town Plan is in conformance with the 2018 Central Vermont Regional Plan.

CHAPTER 6. MAPS AND APPENDICES

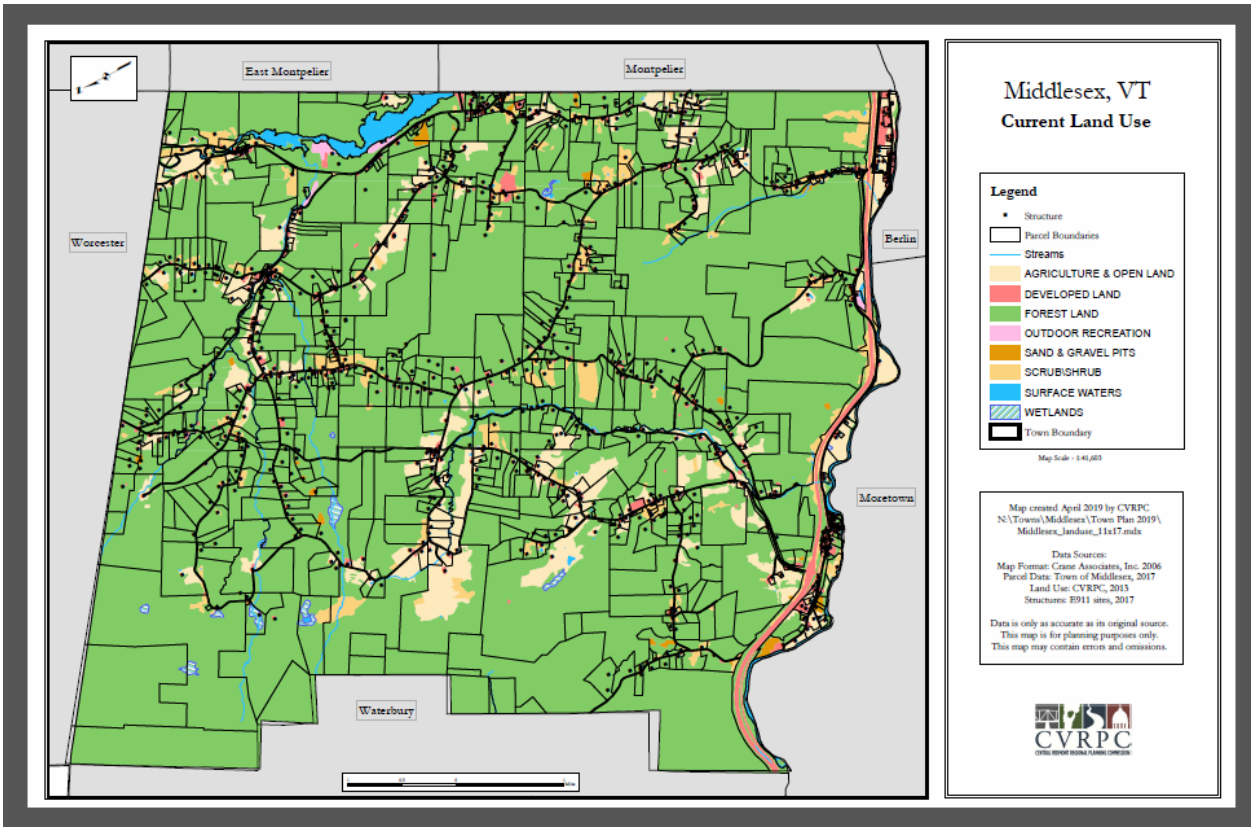
The Maps

Map 1: Current Land Use
Map 2: Future Land Use
Map 3: Transportation Infrastructure
Map 4: Utilities and Public Facilities
Map 5: Water Resources and Flood Resilience
Map 6: Forest Blocks and Wildlife Habitat
Map 7: Agriculture
Map 8: Future Housing

Appendixes

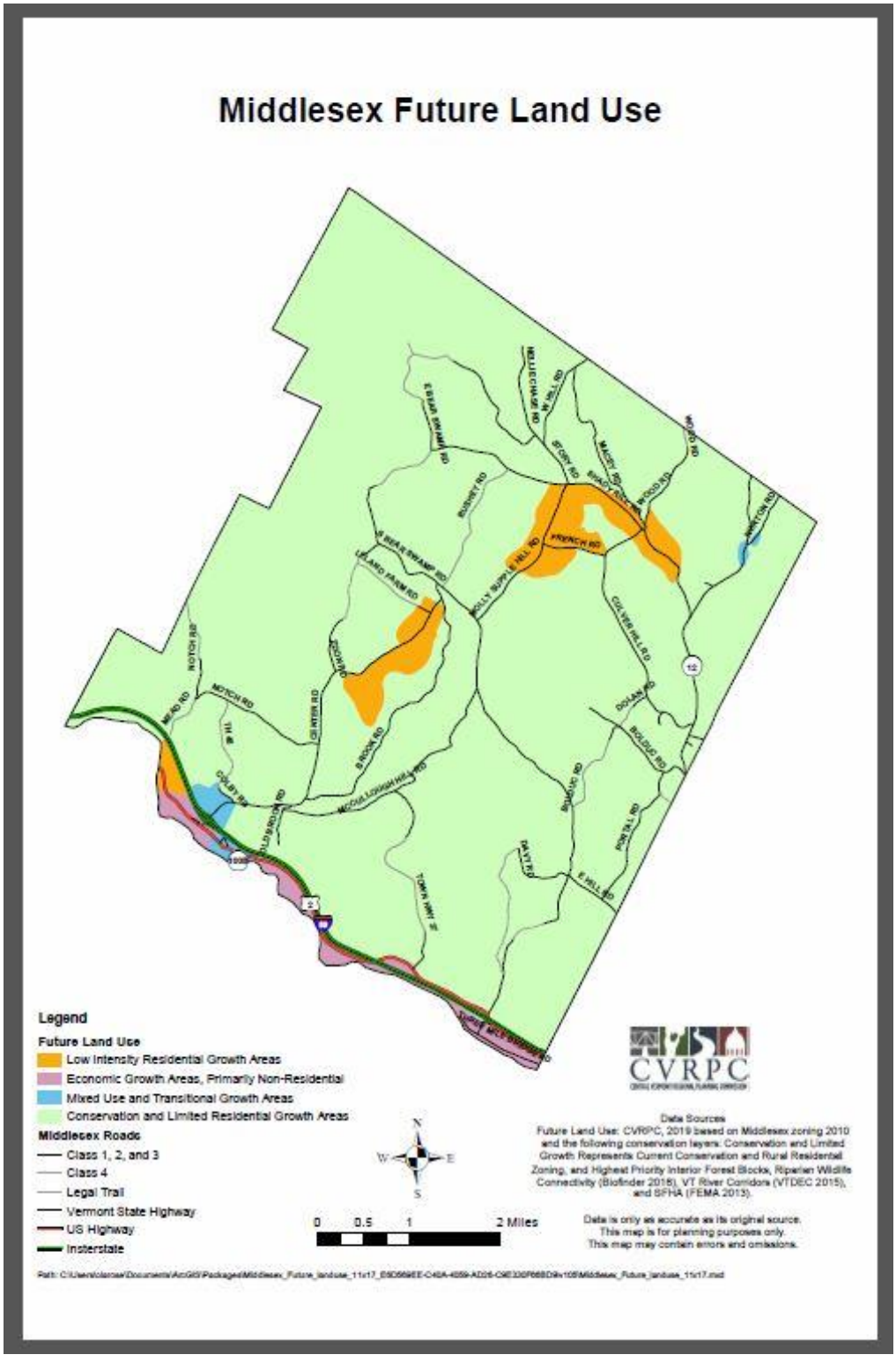
1.9 What's Next Middlesex? Links and Highlights
1.10 2018-2019 Town Survey
1.11 References and Other Plans
1.12 Vermont Agency of Natural Resources *Biofinder* References
1.13 Higher Resolution Maps

1.1. Current Land Use Map



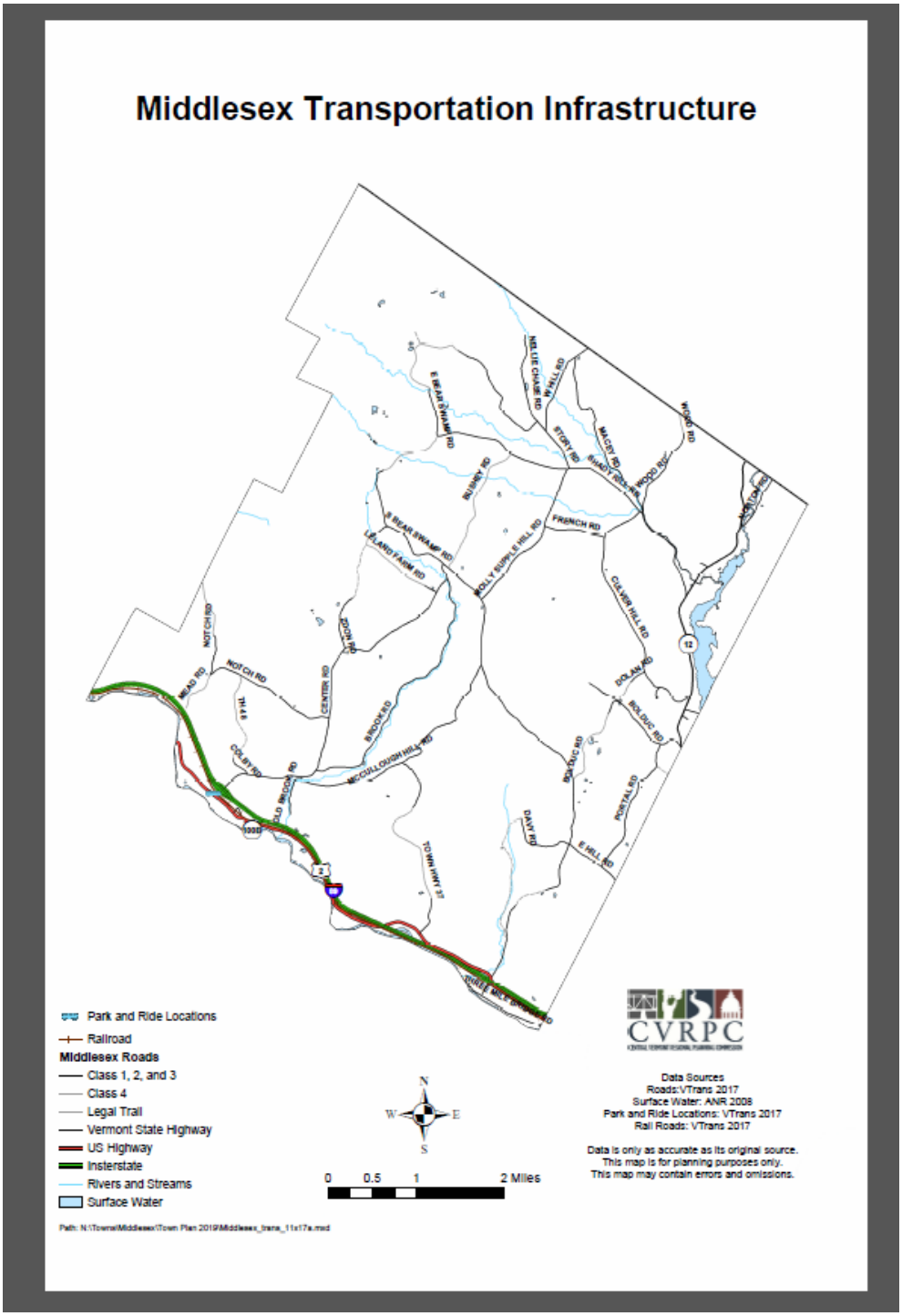
See also Higher Resolution Maps in Appendix

1.2. Future Land Use Map-



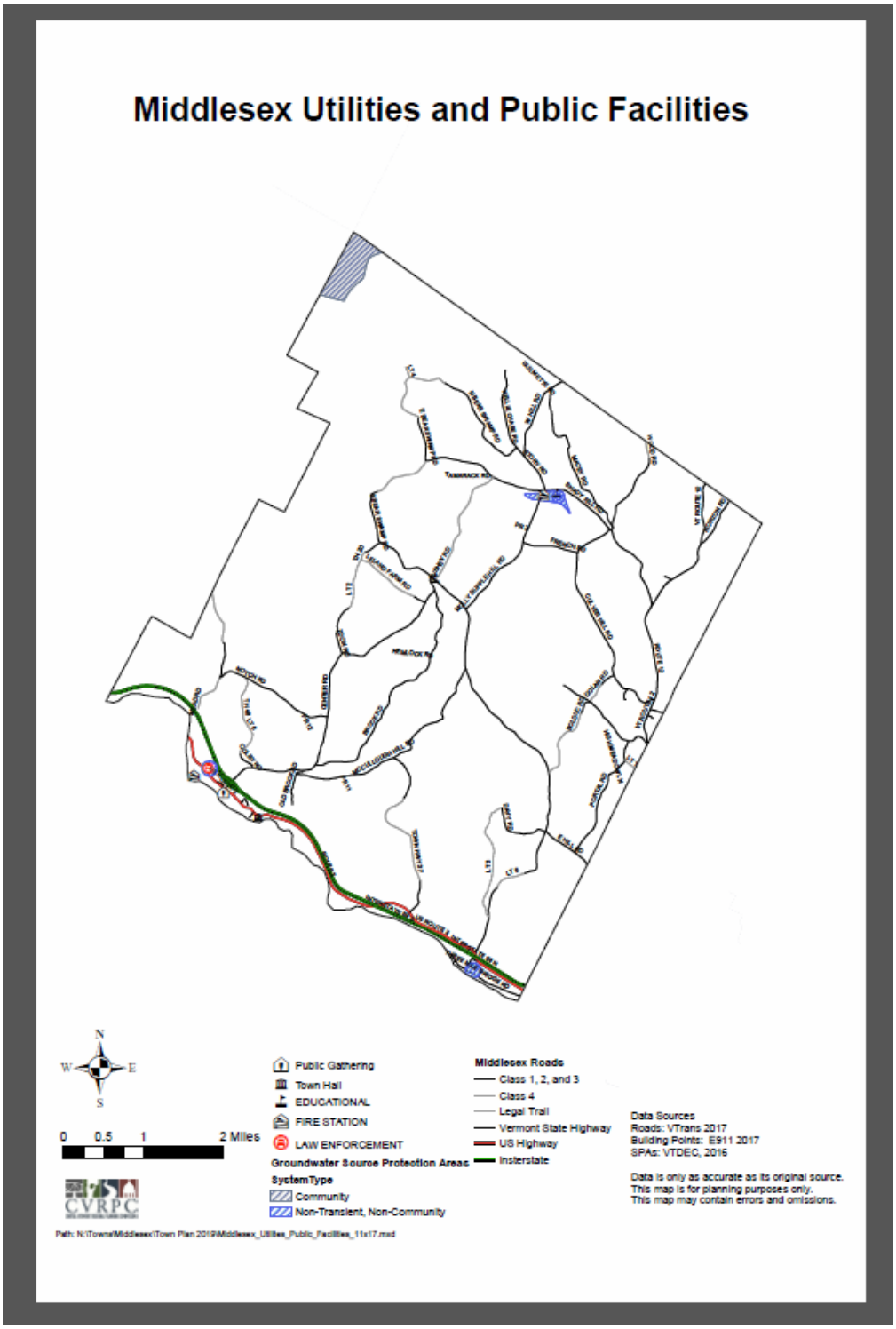
Approved by Middlesex Voters March 1, 2022

1.3. TRANSPORTATION INFRASTRUCTURE MAP



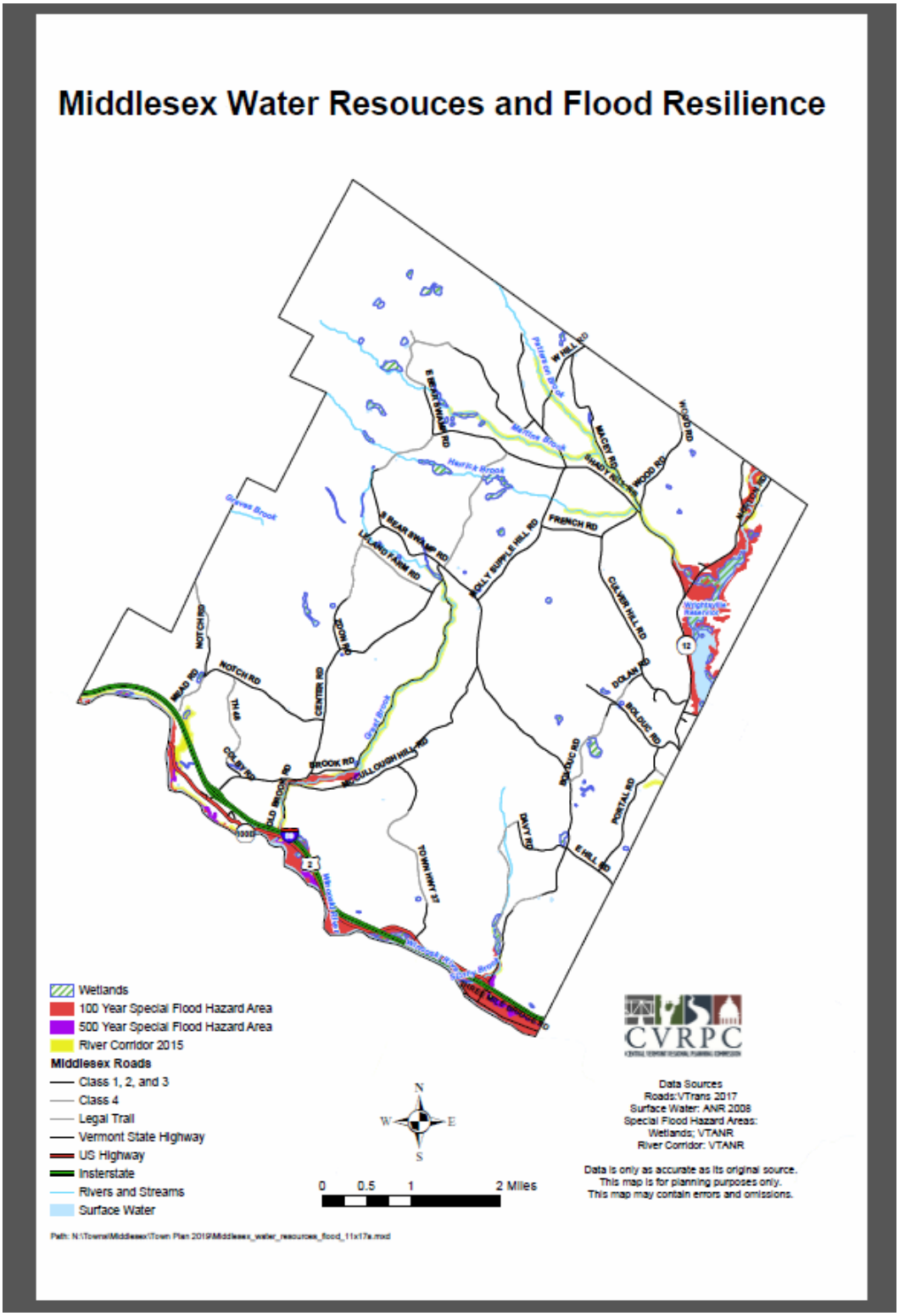
Approved by Middlesex Voters March 1, 2022

1.4. Utilities and Public Facilities Map



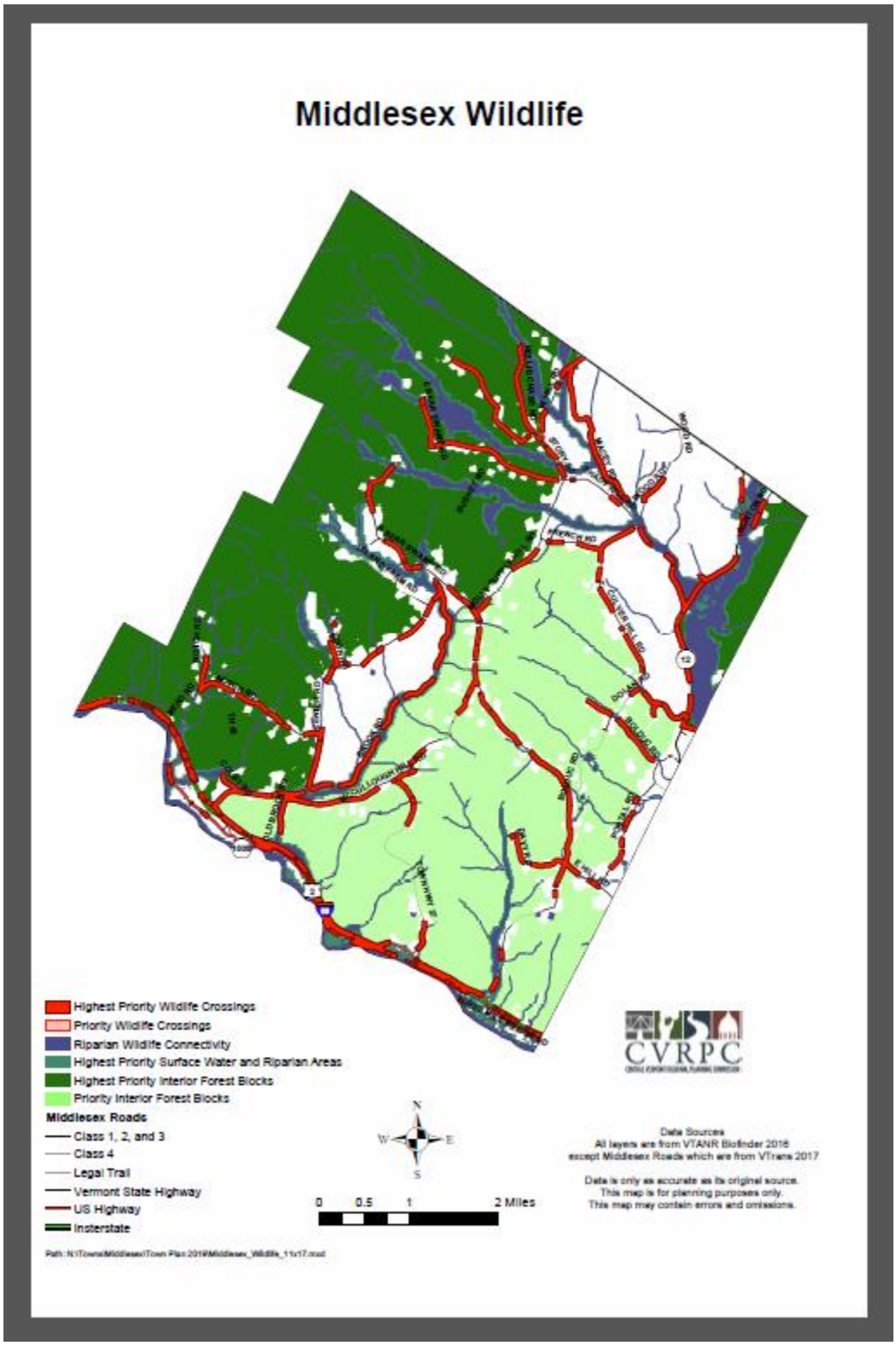
Approved by Middlesex Voters March 1, 2022

1.5. Water Resources and Flood Resilience Map



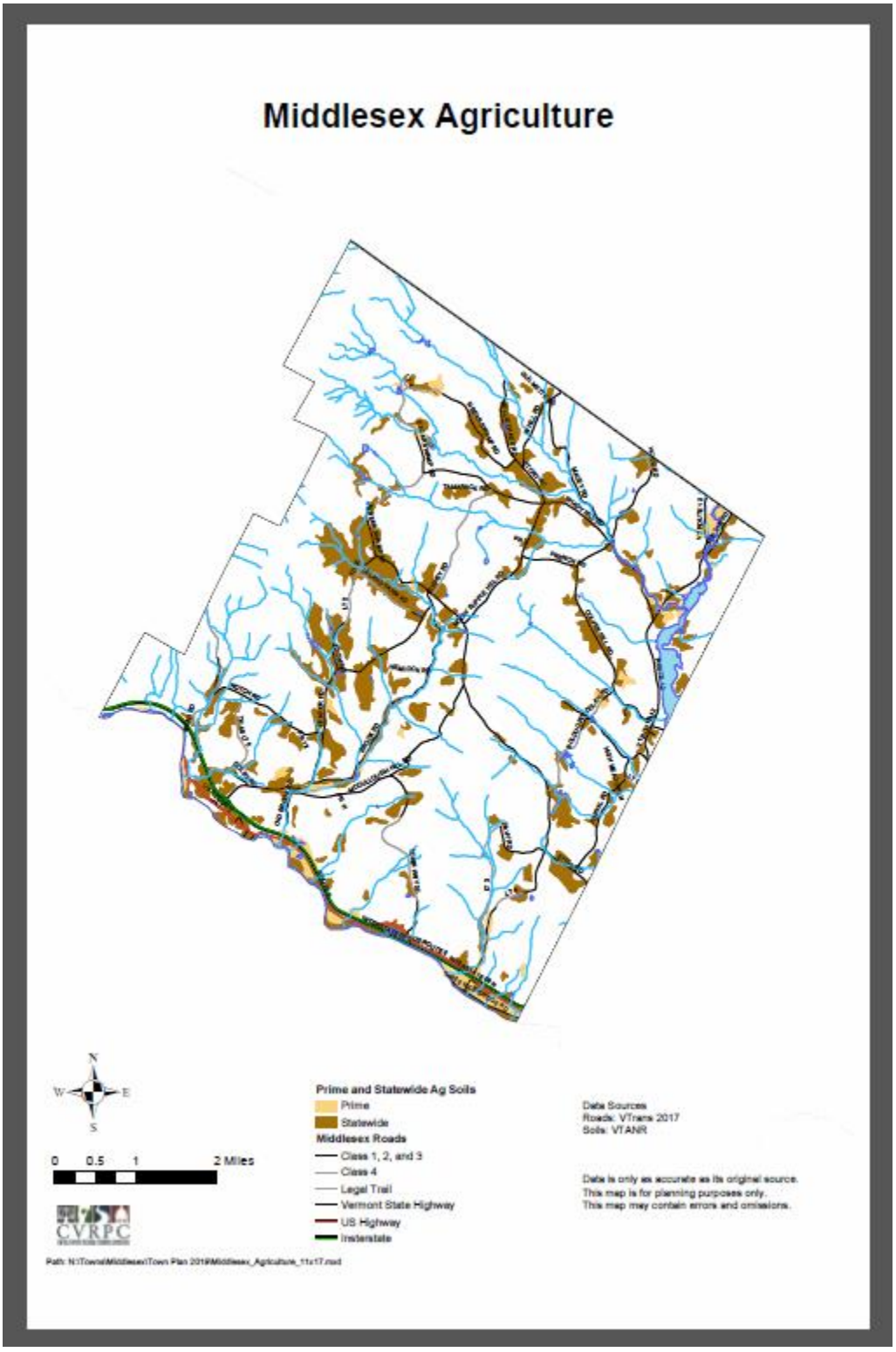
Approved by Middlesex Voters March 1, 2022

1.6. Forest Blocks and Wildlife Habitat Map



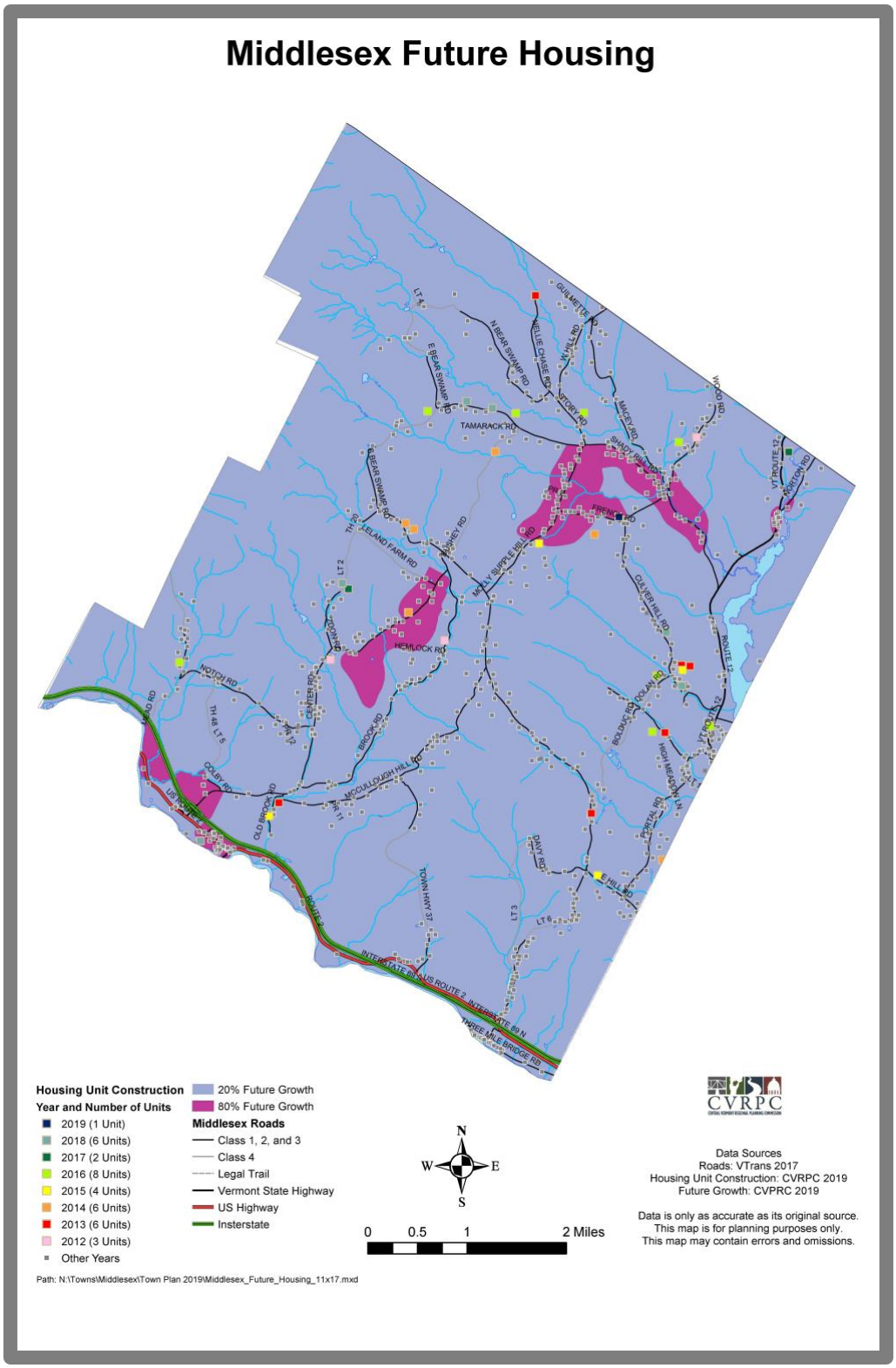
Approved by Middlesex Voters March 1, 2022

1.7. AGRICULTURE MAP



Approved by Middlesex Voters March 1, 2022

1.8. Future Housing Map



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1.9. What's Next Middlesex: Links and Highlights from Report

http://middlesexvermont.org/whats-next-middlesex/

www.WhatsNextMiddlesex.org

Excerpted from What's Next Middlesex Final Report (2019):

The Mosaic: What is Middlesex like today?

- Spread out
- Great school
- Shitty internet
- Summer concerts
- Barns
- Cross-country skiing/snowshoeing
- Good friends
- Close to Montpelier
- Winooski
- Local firewood
- Hunting camps
- Settlement Farm
- Disc golf
- Need a disco!
- Pie Breakfast
- Volunteer Fire Department
- Local foods for school lunches
- Accessible politicians
- Help from neighbors with plowing, etc.
- Heaven
- Friendly
- Beautiful views
- Too quiet
- Community
- Pretty safe
- Great kids
- Politically engaged
- Fearful of school merger
- Harvest Dinner
- Trusted neighbors
- Near the mountains
- Rural
- Heavily forested
- Sunny and cool
- Neighbors
- Wildlife
- Great coffee shop
- Engaged
- Deer
- "Makers"
- Dirt roads
- Town Hall
- Need a Post Office
- Good quality roads
- Close ski mountains
- Good neighbors
- Sally's thrift shop (Sally's Second Act)
- Bear Swamp Vet
- Riverside park
- Close to state capital
- Bears
- Food shelf
- Far from ocean (close?)
- Chocolate shop (Nutty Steph's)
- Lack of accessible trails
- Peace and quiet
- Salamander crossing
- Interstate access
- No town green
- The bear swamps
- Good vet
- Pease Farm and therapeutic riding
- Bears
- Lots of turkeys
- Near Montpelier
- Near the mountains
- Fast drivers
- Walkers
- Bikers
- Hilly
- Expensive
- Turkeys
- Potholes
- Many ponds
- Slow internet
- Poor cell service
- Home
- Beautiful
- New homes
- Mud season
- No gas stations
- No grocery stores
- Hunger Mountain
- Sugaring at school
- Wrightsville Beach
- Class IV roads
- E911 signs

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- Kayaking
- Wood stoves
- Swimming holes
- Rumney
- Sugaring
- Feels supportive
- Feels peaceful
- Discarded trash on roadways
- Not racially diverse
- Lacking public transportation
- Great parents/grandparents
- Independent
- Politically engaged
- Town hall meeting
- Generous
- Will live here forever
- Spacious
- No shared community space
- Lots of posted land
- Deep-rooted Vermont native families
- Cultural division
- Great Rumney theater productions

The Vision: What do we want Middlesex to be like in the future?

- Business space
- Fiber internet
- Local control of our school
- Youth in leadership roles
- An ultimate Frisbee team
- Local jobs
- Rural
- Global warming has reversed itself
- Intact forests
- Ash trees
- Public shooting range
- Ordinance against noise pollution in our own yards
- More moose
- Fewer porcupines
- No lost cats
- Strengthened communication between neighbors
- Tolerance
- Diversity
- Public transportation
- Woods, and lots of ‘em!
- It still snows
- Sidewalks/crosswalks in village
- Affordable childcare
- Late-night coffee
- Bike paths connecting school
- Community center with outdoor spaces
- Successful farms
- Great healthcare
- Affordable healthcare
- Progressive care center
- Good cell coverage
- Secure wetlands
- Post Office
- Local train stop in village
- More time!
- More childcare
- Community trails
- Community garden
- Non-polluting cars
- Community speaker series
- More meat raised in town
- Preserved farm land
- Downhill ski area
- Affordable co-working
- Safe dirt roads
- Independent schools
- Help for young families
- Community pool
- Trails
- Combination community space (music venue, coffee shop, Post Office)
- Young helping old/old helping young
- Kids coming home to raise families
- More free community events
- Clearinghouse for home services

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- Local Vermont brewery with pub
- Protect Worcester Range
- No hungry neighbors
- Community sledding hill
- Support for teachers and staff
- High-speed internet
- Lower property tax
- Rumney gym converted to concert space
- Preserve land surrounding Hunger Mountain trails
- Paved roads
- Rumney open to community after school hours
- Pizza pub
- Gas station and convenience store
- Community art projects
- More possums (to eat ticks)
- Dark night sky
- Freedom for the dogs!
- Continued traditional uses of our woods

Approved by Middlesex Voters March 1, 2022

1.10. 2018-2019 Town Survey

Town Plan Survey Summary

As of 5/12/2019, the survey has received 305 responses.

1. Would you recommend Middlesex to a friend or family member as a good place to live?

Yes	272
No	31
No answer	2

2. Which of the following uses do you think should be expanded in Middlesex?

Biking/Walking Paths	201
Small Retail	197
Restaurant/Café	163
Gas Station	156
Parks/Recreation Fields	147
Nature Center	97
Other	95
Commercial Business	81
Health Club/Fitness Center	46
Large Retail	17

3. What types of uses would be acceptable at the Exit 9 interchange?

Small Retail	228
Small Gas Station (4 pumps)	222
Restaurant/Cafe	208
Transit Center	126
Low cost Housing	118
Rest Area	117
Hotel/Motel	77
Other	74
Contractor's Yard	69
Warehouse	52
Large Retail	35

4. Should Putnamville continue to be zoned as a Village District or changed to Medium Density Residential?

Village District	107
Medium Density Residential	105
No Opinion	90

5. What types of housing should Middlesex promote?

Single Family	241
Starter Homes	173
Tiny Homes	169
Cluster Development	122
Assisted Living	121
Low Income	115
Condominiums	79
Other	58
Mobile Home Park	26

6. Should Middlesex encourage the development of renewable energy resources?

Residential Solar	269
Residential Wind	175
Commercial Solar	148
Commercial Wind	89
Other	49

7. Should Middlesex have a say in determining the siting for a commercial utility?

Yes	277
No	11
No Opinion	17

8. Are recreational activities in Middlesex adequate?

No	129
Yes	117
No Opinion	54

9. What do you feel are the most pressing issues in Middlesex?

Affordability	180

Other	95
Renewable Resources	85
Cultural Diversity	80
Lack of Housing	52
Underdevelopment	35
Having my voice heard	33
Overdevelopment	29

10. Do current zoning regulations allow for an appropriate level of growth in town?

Yes	110
No	37
No Opinion	150

11. Would you be interested in helping Middlesex by serving on a committee?

Town Forest Committee	27
Conservation Commission	25
Planning Commission	23
Historical Society	22
Advisory Committee	22
Solutions Committee	12
Budget Committee	10
Facilities Committee	10

12. Should Middlesex create an economic advisory committee to develop new zoning techniques and subdivision regulations to allow for greater development of agricultural/forest-based industries?

Yes	187
No	65
No Opinion	51

1.11. References and other plans

2016 Central Vermont Regional Plan:

http://centralvtplanning.org/wp-content/uploads/2012/03/2016-Central-Vermont-Regional-Plan-ADOPTED-06.12.2018-Reduced.pdf

Vermont Act 166 Relating to Childcare:

https://www.vtpublicprek.info/act-166

Accessory Dwelling Unit Information, State of Vermont:

https://accd.vermont.gov/housing/planning/adu

Vermont Interstate Interchange Planning and Development Guidelines Manual

https://accd.vermont.gov/sites/accdnew/files/documents/CD/CPR/DHCD-Planning-Interchange-Development-Design-Guidelines.pdf

Vermont Flood Ready

https://floodready.vermont.gov/

https://floodready.vermont.gov/assessment/vt_floodready_atlas

1.12. Vermont Agency of Natural Resource *Biofinder* References

https://anr.vermont.gov/maps/biofinder

Highest Priority Landscape Scale Elements include:

- **Interior Forest Blocks** - *Interior forest blocks support the biological requirements of many native plants and animals. They support viable populations of wide-ranging animals, including bobcat, American Marten, and black bear, that require large areas to survive by allowing access to important feeding habitat, the ability to move and find mates for reproduction, and as a result ensure genetic integrity of populations.*

- **Connectivity Blocks** - *Movement of animals from one habitat patch to another is the most common function associated with connecting habitat. This function is particularly important for*

wide-ranging animals, such as bobcats and black bears, or for animals that require a great deal of space to meet their daily life needs, such as barred owls or otter. Although connecting habitat is often associated with wide-ranging mammals, it is equally important for animals with relatively small ranges and even for plants over long time periods as climate changes. Spotted salamanders, for example, use connecting habitat in spring to move from their hibernation sites to breeding pools, sometimes crossing roads or agricultural fields.

• Surface Waters and Riparian Area - *While Vermont's rivers, streams, lakes, and ponds cover a small percentage of Vermont's area, they provide vital habitat for a rich assemblage of aquatic species, including fish, amphibians, reptiles, invertebrates (e.g., insects, mussels, snails, worms, freshwater sponges), and plants. This represents an enormous contribution to Vermont's biological diversity. All of Vermont's rivers, streams, lakes, and ponds are important for the aquatic biota that they support. As aquatic species are mobile, it is important to maintain connected aquatic habitats in order to protect the diversity of species. Water quality and temperature of upstream reaches directly influences the ability of downstream receiving waters to support aquatic assemblages. Fish and other aquatic populations may travel extensively throughout the lake and stream network for seasonal and life cycle needs. Therefore, it is critical to protect the entire aquatic network in order to maintain the ecological processes necessary to sustain these aquatic populations and assemblages*

• Riparian Corridors - *The riparian connectivity component represents the vegetated portions of river and stream valley bottoms and lakeshores which provide numerous ecological functions relating to surface water quality, flood attenuation, and shoreline stability. It also includes floodplain forests and other riparian natural communities that together provide habitat for many rare species represent a concentration of biological diversity.*

• Physical Landscapes - *(otherwise known as enduring features) are important for understanding biological diversity and informing conservation planning because they can serve as a surrogate, or substitute, for information on natural communities and species when that information is not available. Conserving and providing stewardship for the diversity of enduring features will in turn help protect the diversity of natural communities and species.*

1.13. Higher Resolution Maps

Drafted with the assistance of Cathyann LaRose, AICP

North River PLANNING

Approved by Middlesex Voters March 1, 2022

ENERGY PLAN

FOR THE

TOWN OF MIDDLESEX

PREPARED BY:

The Central Vermont Regional Planning Commission

24 Main Street, Suite #4
Montpelier, Vermont 05602
802.229.0389

and the Middlesex Planning Commission

ADOPTED by Middlesex Voters March 1, 2022

Table of Contents

Executive Summary & Introduction

With the passage of Act 174 in 2016, Towns have been allowed a higher level of deference in the Section 248 proceedings if they meet specific planning standards, which would allow Middlesex an opportunity to reexamine the actions its community is taking to meets its energy goals.

Through Act 174, three primary planning areas are identified and need to be met satisfactorily in order for successful compliance. These sections include Analysis & Targets; Pathways & Implementation Actions; and Mapping. All three sections include an evaluation of energy sectors that include thermal (heating), electrical, and transportation.

Throughout this plan, data was compiled at the Regional Planning Commission level through sources including the US Census Bureau's American Community Survey (ACS), the Vermont Department of Labor (DOL), the Vermont Public Service Department (PSD), the Energy Information Administration (EIA), Efficiency Vermont (EVT), and the Vermont Agency of Transportation (VTrans). This data was then used to create targets by the Vermont Energy Investment Corporation's (VEIC) Long-range Energy Alternatives Planning (LEAP) tool.

While this data was provided to the Town by the Regional Planning Commission, there may be some error to account for from some of the sources listed. This data is intended to be used as a starting point for energy planning in Middlesex and will be regularly revised and updated in future iterations of this plan.

Section I: Analysis & Targets

This section provides an approximate baseline of information as a template for where a municipality currently stands in terms of energy and identifies the trajectories and pace of change needed to meet targeted reductions and conservation of energy. It includes information on current electricity use for residential and non-residential uses; existing and potential renewable resource generation; and current transportation energy use information. Additionally, targets are established to provide milestones for thermal efficiency, renewable energy use, and conversion of thermal and transportation energy from fossil fuels to renewable resources. These milestones are intended to help the municipality measure progress towards the overall goals and are not identified as requirements. Targets are established for the years 2025, 2035, and 2050 which coincide with the State Comprehensive Energy Plan.

Specific information in this section notes that Middlesex currently uses approximately 7,691 megawatt hours of electricity on an annual basis across the identified sectors. By comparison, Middlesex's share of new renewable energy generation needed to meet the state's goal is approximately 11,140 megawatt hours. Based on the mapping and resource data (Section III), Middlesex has resources available to generate approximately 1,424,868 megawatt hours of energy.

Other analysis includes 2050 targets for fuel switching of vehicles from fossil based to alternative power, and conversion or installation of high efficiency heating systems for residential and commercial structures. Specific targets for Middlesex include approximately 2,416 alternative powered vehicles and approximately 407 heating systems. The specific 2050 targets for transportation and heating renewable use in Middlesex are 90.2% and 92.5% respectively. It's important to note that the targets for alternative powered vehicles listed in Section One are based on maintaining current land use and transportation policies. Transit, ride sharing, telecommuting, or similar policies may be prioritized by the Town which would impact these targets and reduce dependency on individual vehicle needs.

Section II: Pathways & Implementation Actions

Section II provides the basis for how Middlesex will meet their target year goals as noted in Section I. The implementation actions are categorized by:

1. Conservation & efficient use of energy
2. Reducing transportation demand and single occupancy vehicles trips, and encouraging the use of renewable sources for transportation
3. Patterns and densities of land use likely to result in conservation of energy
4. The siting of renewable energy generation

The implementation actions that are identified in this section focus primarily in areas where the Town of Middlesex is already working to support its residents and businesses through local land use, transportation, and environmental planning activities.

To this end, the current Middlesex Town Plan was first reviewed and implementation actions that pertained to any of the above mentioned sections were noted. These implementation items were carried forward for inclusion in the energy plan to establish consistency with the two documents. To ensure all the categories for implementation as noted above were adequately addressed, guidance from the Department of Public Service related to implementation was utilized.

The implementation actions identify who will be responsible for completing each action, the timeframe for when it should be completed, and an anticipated outcome that will help provide a measure of success. This section will serve as the basis for how energy planning will be incorporated into local activities. The implementation actions that were included are based on Middlesex's ability to lead the action. This will create consistency with regard to implementation and put the responsibility for action on the Town. Other partners are listed when appropriate to indicate which groups will be engaged to support the successful completion of the identified actions.

ADOPTED by Middlesex Voters March 1, 2022

Section III: Mapping

The mapping section allows the Town of Middlesex to visually identify where renewable energy generation is most suitable. This section combines resource information with specific known and possible constraints to the development of renewable energy generation. The mapping section also allows the opportunity to identify preferred locations for renewable energy development and areas that are unsuitable for development of any kind. In addition, the maps identify existing infrastructure to support renewable energy development.

In general, the mapping information looks at state-level data and breaks it down to a municipal perspective. From there, an analysis was done (as noted in Section I) regarding the potential renewable energy generation that might be possible based on resource areas and constraints. This information is useful to visualize what geographies throughout Central Vermont are most ideally suited or best to avoid regarding renewable energy siting.

This section also contains specific information regarding the development and siting of renewable energy resources that are reflected on the maps. The Regional Planning Commission did, however, identify additional possible constraints to be considered. These include elevations above 2,500 feet, slopes greater than 25%, municipally owned lands, and lakeshore protection buffer areas of 250 feet. The decision was made to include these resources as possible constraints to allow for further analysis by the region or the municipalities to determine if development of renewable energy generation facilities may be appropriate based on specific conditions.

Appendices

There are three appendices included with this plan. Appendix A provides definitions for the known, possible, and regional constraints that are included on the maps and discussed in Section III. These definitions include source information and in several instances provide insight as to why the particular resource is listed as a known, possible, or regional constraint. Appendix B includes the specific resource and constraint maps. Included in the resource mapping is data specific to wind, solar, hydrological, and woody biomass. All of these maps also include information regarding three-phase power and transmission lines; roads; and other relevant data used to assist with siting of renewable energy development. Appendix C includes the Streetlighting and Outdoor Lighting Plan as developed by the Middlesex Energy Committee.

How This Plan Will Be Used

The Middlesex Energy Plan will help guide the establishment of the policies that will help the Town achieve its share of the state's goal of 90% of the state's energy coming from renewable sources by 2050, as outlined in the 2016 State Comprehensive Energy Plan. In order for this document to have standing, it will need to receive a Determination of Energy Compliance (DOEC) from the Central Vermont Regional Planning Commission (CVRPC). This determination

will give the Middlesex Town Plan "substantial deference" before the PUC during their review of applications for Certificates of Public Good related to renewable energy generation facilities. Once a DOEC has been issued, the Middlesex Town Plan will be used to establish a position in proceedings before the PUC if warranted. Additionally, where applicable, the Town Plan will be used during Act 250 proceedings before the District 5 Environmental Commission. This plan is intended to be implemented in such a way that financial and cultural equity is always considered as a factor to help ensure equal access, fundamental fairness and opportunity for all Middlesex residents to the greatest degree possible.

Additional Energy Generation Technology

The general premise of the Middlesex Energy Plan is based on the idea that generation of energy will be achieved using more renewable sources and less fossil fuel based resources. To this end, the focus for generation of energy is primarily based on existing technologies such as solar, wind, and hydroelectric. Additionally, the plan notes woody biomass and biogas as renewable forms of energy generation. This direction is taken from the State's Comprehensive Energy Plan which focuses on electrification of the grid with alternative energy generation in order to meet their goals of 90% of the state's energy use coming from renewable sources by 2050.

The sources of renewable energy generation that are identified in this plan include current technologies that are known and supported in Vermont. Advances in the development of renewable energy technologies may result in generation measures or techniques that are not currently considered in this plan but may be more efficient or effective, such as hydrogen fuel cell technology, and negative emissions technologies that sequester carbon. As such, this plan will consider renewable generation technologies that do not have an adverse impact on the Town of Middlesex, the Central Vermont Region, or the policies that guide the Planning Commission and not be limited exclusively to the generation techniques and technologies noted herein.

Analysis & Targets

In order to adequately determine if the Town of Middlesex is on the right path to meeting its share of the state's goal of 90% of the energy used being produced by renewable resources, an identification and analysis of current energy use is necessary. To this end, the following questions have been identified to help determine current energy use and targets moving forward.

1. Does the plan estimate current energy use across transportation, heating, and electric sectors?
2. Does the plan establish 2025, 2035, and 2050 targets for thermal and electric efficiency improvements, and use of renewable energy for transportation, heating, and electricity?
3. Does the plan evaluate the amount of thermal-sector conservation, efficiency, and conversion to alternative heating fuels needed to achieve these targets?
4. Does the plan evaluate transportation system changes and land use strategies needed to achieve these targets?
5. Does the plan evaluate electric-sector conservation and efficiency needed to achieve these targets?

These five questions and their respective responses serve as the basis for identifying where the Town of Middlesex is now, where it needs to go, and how it will get there in terms of its energy future.

1. **Estimates of current energy use across transportation, heating, and electric sectors.**

Transportation

Transportation is a large consumer of energy in Middlesex. Transportation typically consists of passenger vehicles, light duty trucks, and heavy duty trucks. It may also include transportation related to public transit, rail, or air service, however these uses are minimal and trips may not originate within the municipality. As such, this section focuses primarily on vehicles, however rail, air, and public transit are addressed in other sections of the energy plan and throughout the municipal plan. Table 1 provides an overview of the current energy usage in Middlesex related to transportation.

Table 1 Current Transportation Energy Use[1]	
Transportation Data	Municipal Data

[1] This table uses data from the American Community Survey (ACS) and Vermont Agency of Transportation (VTrans) to calculate current transportation energy use and energy costs.

Total # of Vehicles (ACS 2011-2015)	1,478
Average Miles per Vehicle (Vtrans)	12,500
Total Miles Traveled	18,475,000
Average Gallons Used per Vehicle per Year (VTrans)	576
Total Gallons Use per Year	993,280
Transportation BTUs (Billion)	120
Average Cost per Gallon of Gasoline (RPC)	2.31
Gasoline Cost per Year	$2,294,476.00

Electricity

In 2016, Middlesex's electricity usage was split at 36% by commercial and industrial customers, and 64% by residential customers. Utility rates are regulated by the Vermont Public Utility Commission. In 2018, the U.S. Energy Information Administration reported the average cost per kilowatt hour in Vermont was approximately 15 cents and approximately 18 cents for all of New England. Middlesex's current electricity usage can be found in Table 2, below:

Table 2 Current Electricity Use[2]	
Use Sector	Current Electricity Use
Residential (Efficiency Vermont) (kWh)	4,906,458
Commercial and Industrial (kWh)	2,784,962
Total (kWh)	7,691,420

Home Heating

2015 American Community Survey Data indicate that approximately 38.4% (269) of homes in Middlesex are heated with fuel oil. The number of homes heated with propane and other bottled fuel oils has increased from 144 in 2010 to 196 in 2015. Electric heat has increased from 0 in 2010 to 3 in 2015, and wood heat has increased from 186 in 2010 to 283 in 2015.

[2] This table displays current electricity use within the municipality. This data is available from Efficiency Vermont's (EVT) 2019 Annual Regional Planning Commission Report.

Heating Energy Use:

Table 3 provides a breakdown of the fuel sources used for residential heating in Middlesex while Table 4 lists the current commercial energy use.

Table 3 Current Municipal Residential Heating Use[3]				
Fuel Source	Municipal Households (ACS 2011-2015)	Municipal % of Households	Municipal Square Footage Heated	Municipal BTU (in Billions)
Natural Gas[4]	3	0.4%	5,952	0.36
Propane	196	25.4%	368,302	22.10
Electricity	3	0.4%	5,952	0.36
Fuel Oil	269	34.8%	522,074	31.32
Coal	0	0.0%	0	0.00
Wood	283	36.6%	537,334	32.24
Other (Includes Solar)	19	2.5%	30,544	1.83
No Fuel	0	0.0%	0	0.00
Total	**557**	**100%**	**1,470,158**	**88.21**

Table 4 Current Commercial Energy Use[5]			
	Commercial Establishments in Municipality (VT DOL)	Estimated Thermal Energy BTUs per Commercial Establishment (in Millions) (VDPS)	Estimated Thermal Energy BTUs by Commercial Establishments in Municipality (in Millions)
Municipal Commercial Energy Use	56	572	32,032

2. **2025, 2035, and 2050 targets for thermal and electric efficiency improvements, and use of renewable energy for transportation, heating and electricity.**

[3] This table displays regional data from the ACS that is extrapolated to estimate current municipal residential heating energy use.
[4] The data used for this table is extrapolated from statewide American Community Survey data, which includes a measure for Natural Gas. There is currently no natural gas infrastructure present in Middlesex as of 2020.
[5] This table uses data available from the Vermont Department of Labor (VT DOL) and the Vermont Department of Public Service (DPS) to estimate current municipal commercial establishment energy use in the municipality.

Energy efficiency is commonly viewed as the most effective and lowest-cost option for reducing energy consumption for electricity, heat, and transportation. Energy efficiency and conservation efforts such as improved insulation and weatherization of new and existing structures; improvements in building design; and the use of high-efficiency vehicles often have a dramatic impact on reducing fuel consumption. These methods are supported and encouraged by the town. In a challenging economy and at a time of increasing concern for the impacts of climate change, steps to reduce fuel use, fuel expenditures, and to shrink emissions make good sense for the pocketbook and the environment.

For the purposes of this section, thermal and electric efficiency will be defined as overall improvements or reductions in the amount of energy used to run mechanical systems or provide climate control for structures. To effectively identify efficiency improvements for Middlesex, the Central Vermont Regional Planning Commission has provided targets for efficiency improvements for each of the target years. These improvements relate to residential, commercial, and overall electric efficiency. The target number may seem to be skewed towards the later years, however there is an expectation that efficiencies will increase with technological advances and occur over time regardless of additional actions being taken. The thermal efficiency targets for residential and commercial improvements are noted in Table 5.

Table 5
Targets for Thermal Efficiency Improvements[6]

	2025	2035	2050
Residential – Increased Efficiency and Conservation (% of municipal households to be weatherized)	20%	42%	92%
Commercial - Increased Efficiency and Conservation (% of commercial establishments to be weatherized)	22%	33%	61%

In order for Middlesex to help support the state's goals of 90% of the energy used being derived from renewable sources by 2050, the Central Vermont Regional Planning Commission allocated megawatt hour targets for the years 2025, 2035, and 2050. This municipal target is based on an allocation from a region-wide target for renewable energy generation. Table 6 notes Middlesex's targets for renewable energy use and Table 7 identifies the targeted renewable energy generation.

Table 6
Targets for Renewable Energy Use

	2025	2035	2050
Renewable Energy Use - Transportation	9.6%	31.3%	90.2%
Renewable Energy Use - Heating	52.4%	66.6%	92.5%

[6] This table displays targets for thermal efficiency for residential and commercial structures based on a methodology developed by DPS using data available from the regional Long-range Energy Alternatives Planning (LEAP) analysis and ACS. The data in this table represents the percentage of municipal households and commercial businesses that will need to be weatherized in the target years.

Table 7 Targets for Renewable Energy Generation[7]			
	2025	2035	2050
Total Renewable Generation Target (in MWh)	2,785	4,456	11,140

Groups to Support Energy Planning

State and local support for energy planning makes identifying energy related actions and implementing energy objectives a more manageable task. Several groups exist that fill this role. A brief overview of these groups is noted below including some of the accomplishments that benefit the Town of Middlesex.

Efficiency Vermont

Efficiency Vermont helps Vermonters to reduce energy costs, strengthen the local economy, and protect the environment by making homes and businesses energy efficient. A volumetric charge on electric customers' bills supports energy-efficiency programs.

Efficiency Vermont provides technical assistance, rebates, and other financial incentives to help Vermont households and businesses reduce their energy costs with energy-efficient equipment, lighting, and approaches to construction and major renovation. Additionally, it partners extensively with contractors, suppliers, and retailers of efficient products and services throughout the state.

It is operated by a private nonprofit organization, the Vermont Energy Investment Corporation, under an appointment issued by the Vermont Public Utility Commission.

3. **Evaluation of the amount of thermal-sector conservation, efficiency, and conversion to alternative heating fuels needed to achieve these targets.**

Energy Audits and Energy Efficiency Measures

The Environmental Protection Agency estimates that half of the energy used in most buildings is for heating and cooling. Much of this energy is lost -seeping through cracks in windows and doors for instance -which wastes energy and money and makes homes and businesses less comfortable.

[7] Renewable generation targets for municipalities were developed by the regional planning commission.

Weatherization is the practice of modifying a building to protect its interior from the elements, to reduce energy consumption, and to optimize energy efficiency. Investing in thermal efficiency improvements -primarily air sealing, insulation, and heating system replacements-- can dramatically reduce a home's heating energy use and an owner's fuel bills.

Middlesex will seek to inventory all heated structures and establish a weatherization performance standard to assess the need for weatherization. The first step in a weatherization effort for a structure is to, at minimum, prepare a thermal energy model of the structure. Weatherization improvements should only be recommended when careful considerations of indoor air quality, moisture control, and structural requirements are made. This holistic approach is essential to ensure a safe outcome of weatherization by considering secondary impacts of air sealing and envelope improvements.

An estimated 62,000 single and multi-family homes in Vermont will require energy efficient improvements by 2020. The state's weather conditions play a critical role in how buildings can cost-effectively be heated and that most of the economic benefit of money Vermonters spend on fossil fuel accrues outside the state. At current fuel prices home energy efficiency investments can save Vermont residents money on utility costs.

As a result, this plan suggests comprehensive and rapid weatherization of Vermont's buildings to:

Reduce the vulnerability of Vermonters to fuel market volatility and dramatic weather fluctuations.

- Ensure that more of the money spent on energy will stay within the Vermont economy.
- Reduce greenhouse gas emissions
- Conserve natural resources
- Improve standard of living in terms of comfort, cost, and individual health

One of the most important goals in the 2016 Vermont Comprehensive Energy Plan is for the state to use energy audits, weatherization, and other tools to substantially improve the energy fitness of 25% of the state's housing stock by 2020.

In addition to weatherization, another step to increasing home heating efficiency is replacing outdated or inefficient home heating systems with high efficiency units. One example is replacing a system that used fossil fuel such as oil with an electric heat pump, wood burning system, or other renewable based heating systems. Specifically, Table 8 identifies the number of new efficient wood heating systems or heat pumps needed in each target year to meet Middlesex's portion of the state's comprehensive energy goals.

Table 8

Thermal Sector Conversions Per Target Year[8] (Residential and Commercial)			
	2025	2035	2050
New Efficient Wood Heat Systems (in units)	3	1	23
New Heat Pumps (in units)	79	202	384

A building energy audit is a service where the energy efficiency of a structure is evaluated by a person using professional equipment (e.g., blower doors, infrared cameras) to identify best ways to improve energy efficiency in heating and cooling the house. The goals are to:

- Evaluate the building's overall thermal performance.
- Identify cost effective ways to improve the comfort and efficiency of the building.
- Estimate the potential savings in fuel and expenses for the proposed changes.
- Consider secondary effects to indoor air quality, moisture control, and structural requirements

Many building and energy contractors in Central Vermont offer home and business energy audits for a fee (typically ranging from $300-$500). Depending on income, some families or individuals may qualify for free audits or energy efficiency grants from Efficiency Vermont or other organizations.

4. **Evaluation of transportation system changes and land use strategies needed to achieve these targets.**

Transportation Efficiency

According to the 2016 Vermont Comprehensive Energy Plan, transportation accounts for approximately one third of the overall energy use in Vermont, at 33.7%. Nationally, transportation represents 28.6% of overall energy use. This difference is a result of Vermont's higher dependence on automobile transportation due to the state's rural character, more dispersed population, as well as a relatively small industrial base.

Gasoline and diesel account for more than a quarter of all energy consumed in Vermont across all energy sectors. Gasoline and diesel consumption is twice that of fuel oil and kerosene used for heating. Petroleum combustion in the transportation sector is also the state's largest contributor to greenhouse gas emissions.

Fuel prices are typically higher in northern than in southern New England. Significant increases in the costs of gasoline, diesel fuel, and heating fuel have occurred over the last decade. Price

[8] This table provides a target for new wood heating systems and cold climate heat pumps for residential and commercial structures in the municipality for each target year. This target was calculated using data from LEAP and ACS.

spikes in recent years highlight our area's heavy reliance on limited sources and types of fuel and leave the local population, particularly low-income residents, vulnerable to fuel shortages and price fluctuations.

One component of reducing fossil fuel based energy used in the transportation sector is to convert or replace older vehicles with alternative fuel vehicles such as electric or biodiesel. Table 9 identifies the targets for the number of new electric or biodiesel vehicles over each of the target years to help Middlesex reduce its transportation energy consumption to a point that will help meet the state's comprehensive energy planning goals. Again, this information assumes efficiency and improved technologies will be included in the development of vehicular fuel technology.

It should be noted that another consideration is to reduce the use of vehicles overall. This can be done through encouraging compact development patterns, increased public transit opportunities, or alternative transportation options such as bicycles or walking. The Town should evaluate additional objectives that will promote a shift away from vehicle use rather than rely on the conversion of vehicles to renewable fuels.

Another fact that is essential to reducing greenhouse gas (GHG) emissions with electric vehicle (EV) use is the source of power used to charge the vehicle. Residential and solar charging is a high performer- charging with grid source coal produced power is a low performer. The trend is towards cleaner power (i.e., without excessive GHG emissions). The continuation of this trend is essential for successful GHG reduction via EV implementation. Another trend is increased used of EV for personal transportation. This trend is motivated by lower cost vehicles, moderate electric cost and personal desires to reduce GHG emissions. Increased personal use of EVs will likely increase the availability of charging stations through market demand.

Reduced vehicle use can also be achieved by increasing the ability of people to work/conference from home, by promoting small businesses at home and locally and close to where people live, so residents can shop and buy near home rather than rely on large commercial centers that exist at a long distance and by making rural/public transportation available and practical.

Table 9
Transportation Fuel Switching Targets[9]

	2025	2035	2050
Electric Vehicles*	127	877	1,751
Biodiesel Vehicles	221	410	665

[9] This tables displays a target for switching from fossil fuel based vehicles (gasoline and diesel) to electric and biodiesel vehicles. This target is calculated by using LEAP and ACS data.

* (with the goal of increasing the generation of low polluting vehicles to high polluting vehicles overtime)

5. **Evaluation of electric sector conservation and efficiency needed to achieve these targets.**

Conservation and efficiency of electricity is a key component to achieving the state's comprehensive energy planning goals. Over time, advancements in technology will provide a degree of the needed efficiency and conservation measures to achieve these goals, but also, efforts can be taken now to ensure the Town of Middlesex is on track to meet its conservation and efficiency targets. Table 10 outlines the electric efficiency improvements needed for each of the three target years. Additionally, information related to more proactive ways to achieve these efficiencies are also noted below.

Table 10
Targets for Electric Efficiency Improvements[10]

	2025	2035	2050
Increase Efficiency and Conservation	1.5%	7.3%	15.2%

Energy Efficient Design

It is much more effective to plan, design and build a structure and its systems with energy efficiency in mind at the outset than to perform weatherization activities after the building has been constructed.

Leadership in Energy and Environmental Design (LEED) consists of a suite of rating systems for the design, construction and operation of high performance green buildings, homes and neighborhoods. Developed by the U.S. Green Building Council, LEED is intended to provide building owners and operators a concise framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions.

Across Vermont, in 2012 nearly one-third of new homes were EnergyStar rated. The 2016 Vermont Comprehensive Energy Plan sets a goal of 60% by 2020.

School Energy Efficiency

Schools are one of the largest consumers of energy in most Vermont communities. Because they are such large consumers of a variety of energy sources, they often offer significant opportunities for saving fuel and taxpayer expenditures. There have been local efforts to save schools, and local taxpayers, fuel and funds.

[10] Data in this table displays a target for increased electricity efficiency and conservation during the target years. These targets were developed using regional LEAP analysis.

Local Food

The average food item in the average grocery store travels between 1,000 and 1,500 miles to reach the table. Food transportation consumes a considerable amount of energy, and the related emissions contribute to climate change. A typical meal bought from a conventional supermarket chain – including some meat, grains, fruit and vegetables – consumes 4 to 17 times more petroleum for transport than the same meal using local ingredients.

Renewable Energy

The Town of Middlesex actively supports the use and development of renewable energy. Specifically, through 2016 renewable energy generation installations create approximately 345 megawatt hours of energy each year. This includes a mix of solar and wind. This allocation of renewable energy generation will help the Town meet their renewable energy goals. The specific breakdown of renewable energy generation is outlined in Table 11. Table 13 also provides a breakdown of existing renewable energy generation and identifies those sources generating 8 kW or more.

Table 11
Existing Renewable Energy Generation[11]

Renewable Type	MW	MWh
Solar	0.518	673.4[12]
Wind	0.095	190[13]
Hydro	0.00	0.00
Biomass	0.00	0.00
Other	0.00	0.00
Total Existing Generation	**0.613**	**953.4**

Hydroelectric

In the past, local waterways powered numerous mills and provided small-scale electricity across Vermont. Today, power from in-state and out-of-state hydroelectric dams (most notably Hydro Quebec) supply approximately 40% of Vermont's annual power needs.

There is currently one hydroelectric facility located at the Wrightsville Beach Recreation District in Montpelier. The dam has a capacity of 933 kW and was installed in December of 1982, primarily as a means of flood control for the City of Montpelier. The dam is currently operated by Washington Electric Cooperative, since their lease in 1989. This dam provides the area

[11] This Table shows 2018 renewable generation in the municipality, in MW and MWh, based on information available from the Vermont Department of Public Service.
[12] Generation capacity from VT Community Energy Dashboard, output calculated assuming a 14-16% capacity factor and a 1,300:1 MWh to installed MW capacity for solar, as issued by the PUC.
[13] Generation capacity from VT Community Energy Dashboard, output calculated assuming a 20-25% capacity factor and a 2,000:1 MWh to installed MW capacity for small wind, as issued by the PUC.

municipalities, including Middlesex, with hydroelectric power, and additional recreation activities such as boating, paddling, swimming and disc golf at Wrightsville Beach.

Due to the environmental impact of damming these sites for the small generation boost, there are no plans in place at this time to develop further hydroelectricity in Middlesex.

Solar

Converting radiation from the sun into electricity is a clean, renewable energy source. Solar photovoltaic (PV) cells convert sunlight into electricity for homes and businesses, while solar thermal arrays provide hot water for domestic use and may even be designed to augment a household's heating system.

Advances in technology have improved solar efficiency and solar arrays are becoming more affordable. The cost to install one kilowatt of PV in Vermont fell by nearly 40% from 2004 to 2011. Federal and state incentives and leasing programs have improved financial accessibility to the technology. Green Mountain Power's willingness to pay a small premium for solar energy (the "solar adder") has also helped to support the burgeoning solar industry. In 2014, the State of Vermont ranked nationally in the top ten in solar installations.

As of 2018, solar collectors were installed at approximately 72 sites in Middlesex with a total photovoltaic capacity of 518 kW. This number derives from numerous, dispersed residential scale solar projects.

Middlesex has made great strides to incorporate solar energy into its energy portfolio. According to the Energy Action Network's Energy Dashboard, Middlesex ranks 31st among Vermont municipalities in total solar installation with 76 sites. A number of south-facing roofs and slopes provide the potential for even greater use of the technology, although some roofs may need to be retro-fitted to support solar panels.

According to the Vermont Energy Atlas, Middlesex has the capability to produce 1,291 MWh on rooftop solar alone. There is also the possibility of 1,017,562 MWh from ground mounted solar as well. Considering the goal of 11,140 MWh, Middlesex has sufficient land to meet the goal and keep lands conserved and in their current uses. Additional information on potential generation is noted in Table 13 and is reflected on the maps in Appendix B.

Commercial leasing programs now allow households and companies access to solar energy at fixed costs that often are less than their current electricity bills. Further advances in technology will likely improve the efficiency, and lower the cost, of solar panels. Finding space for additional solar arrays remains an issue in Middlesex, particularly for residents and businesses lacking south-facing rooftops or land.

Wind

Improvements in turbine technology in combination with federal and state subsidies have recently made investments in wind power more attractive across the country as well as in Vermont. The Vermont Energy Atlas identifies the possibility of generating 406,015 MWh of wind in Middlesex. Almost all sites are located on ridge lines in the western part of Town, which may conflict with the Town's plans for conserving areas on the Worcester Range. Specific suitability for wind resources is noted in the mapping section. The wind maps identify where wind speeds are appropriate for smaller scale wind generation and do not include large industrial scale wind suitability.

The 2013 Community Survey indicated that there is less local support for wind farms for utility energy production than other types of renewables. The survey results suggest that many worry about the impacts large -scale wind may have on our natural and scenic resources, particularly Middlesex's forested ridgelines.

In order to support large-scale wind projects, we believe that projects must meet certain criteria to ensure that they do not cause undue negative impacts on natural, recreational, and aesthetic resources. Middlesex plans to establish clear and specific guidelines that can be used when evaluating proposed large scale wind projects. Also, the current Central Vermont Regional Energy Plan limits wind generation facilities to hub height of 125 feet and restricts development above 2,500 feet in elevation. Middlesex will work to maintain consistency with these regional limits.

Wood

Historically, wood has been Vermont's, and Middlesex's, most abundant local energy source. Statewide residential firewood consumption grew from 275,000 cords per year in 1997 to 315,000 cords in 2008, a nearly 15% increase. Current use of cordwood for heating in Middlesex is unknown. In addition to firewood, wood biomass heating, in the form of woodchips and pellets, is becoming more popular.

Approximately 37% of Vermont's households utilize biomass (including cord wood and wood pellets) to heat at least a portion of their homes.

There are potential negative side effects to extensive wood harvesting and burning, among them habitat impairment, soil erosion, sedimentation and water pollution if forests are not properly managed, as well as the degradation of air quality and an increase risks of accidental fires. These are, however, easily manageable risks. Best forest management practices, as outlined by the state and independent forest certification groups, can reduce the adverse impacts of harvesting while regular maintenance of wood stoves and adherence to fire codes lessens the risk of accidental fires.

According to the Vermont Department of Public Service, the efficiency factor for biomass is between 60% and 80%. Use of wood for heating is calculated as carbon-neutral; that is, the

carbon sequestered by a tree during its lifetime balances with the carbon emitted during its burning.

If factoring in the fossil fuels used to cut and haul wood/wood biomass, as well as the inefficiencies of current biomass burning, wood may not be fully carbon neutral. More efficient burning of woody biomass would greatly improve biomass's potential for wider adoption as a local power source. This could be supported by converting to high-efficiency wood heating systems as noted in Table 8.

Other Local Renewable Energy Sources

Other potential local renewable energy sources include:

- Methane recovery systems that convert farm manure or landfill gases into electricity.
- Bio-fuels produced from green crops such as soy beans, or from waste vegetable oil.
- Geothermal energy, which uses the temperature differential in water taken from deep wells to heat and cool buildings.

Siting

An analysis of existing land and renewable resource potential will help determine the amount of local renewable energy that could be developed within the Town of Middlesex. Table 7 identifies the amount of renewable energy generation (in megawatt hours) that the Town of Middlesex would need to generate by 2050 to help meet their share of the Region's total renewable energy generation.

The information in Table 12 includes an analysis of the renewable energy generation potential and will be complemented by information and maps that are in Appendix B of the plan. It is clear that there is adequate land area available for Middlesex to accommodate renewable energy generation that can meet their share of the region's renewable energy allocation. It should be noted, however, that not all renewable energy generation is appropriate at the same scale. For example, wind may be appropriate in the Town of Middlesex at a residential scale, but not at a commercial scale. Local objectives will need to be established to address these issues. Also, it should be noted that not all areas are appropriate for development of renewable energy and more detailed analysis may be needed to identify appropriate locations for renewable energy development.

One final factor to consider is efficiency of renewable resources and their ability to generate energy. Since not all sources of renewable energy generation provide the same level of capacity, it is important to understand the efficiency differences between the common types of renewable generation. Simply put, the sun doesn't always shine and the wind won't always blow therefore these renewable generators are not always producing energy. These efficiency

factors will allow the municipality to utilize whatever renewable resource is most appropriate for the specific circumstances.

Table 12 Potential Renewable Energy Generation[14]		
Renewable Type	MW	MWh
Rooftop Solar	1.05	1,291
Ground-mounted Solar	829.71	1,017,562
Wind	132.43	406,015
Hydro	0.00	0
Biomass and Methane	0.00	0
Other	0.00	0
Total Renewable Generation Potential	**963.19**	**1,424,868**

Table 13 Existing Renewable Energy Generation greater than or equal to 8 kW based on existing Certificates of Public Good[15]				
Category	Sub Category	Electricity Type	Utility	Capacity kW
Solar	Ground-mounted PV: Tracker	Net Metered	Washington Electric Coop	15
Solar	Roof-Mounted PV	Group Net Metered	Washington Electric Coop	15
Solar	Ground-mounted PV: Tracker	Group Net Metered	Green Mountain Power	15
Solar	Ground-mounted PV	Net Metered	Washington Electric Coop	13.1
Solar	Roof-Mounted PV	Net Metered	Green Mountain Power	11.4
Solar	Roof-Mounted PV	Net Metered	Washington Electric Coop	11.4
Solar	Roof-Mounted PV	Net Metered	Washington Electric Coop	11.4
Solar	Ground-mounted PV	Net Metered	Washington Electric Coop	11.2
Solar	Ground-mounted PV	Net Metered	Green Mountain Power	11.2
Solar	Roof-Mounted PV	Net Metered	Green Mountain Power	11

[14] Renewable generation potential is based on mapping completed by the regional planning commission that is based on the Municipal Determination Standards and associated guidance documents developed by DPS. The renewable generation potential is expressed in MW and MWh by the type of renewable resource (solar, wind, hydro, etc.).

[15] This data is available and updated regularly on the Vermont Community Energy Dashboard.

Table 13 Existing Renewable Energy Generation greater than or equal to 8 kW based on existing Certificates of Public Good[15]				
Category	Sub Category	Electricity Type	Utility	Capacity kW
Solar	Roof-Mounted PV	Net Metered	Washington Electric Coop	10.73
Solar	Ground-mounted PV	Net Metered	Washington Electric Coop	10
Solar	Ground-mounted PV	Net Metered	Washington Electric Coop	10
Wind	Small Wind	Net Metered	Vermont Electric Coop	9.5
Solar	Roof-Mounted PV	Net Metered	Washington Electric Coop	9.3
Solar	Roof-Mounted PV	Net Metered	Washington Electric Coop	8.25

Conclusion

As noted throughout this section, the Town of Middlesex faces challenges similar to the rest of the state regarding its energy future including the need for conservation, renewable energy development, and changing habits and attitudes towards renewable technology and land use choices. All of these components need to work together in order to ensure a collective and comprehensive approach to energy planning is initiated.

The information provided in this section has shown that Middlesex has the ability to shape its energy future within the spectrum of the avenues that it can control. The unknown component is whether or not the changes and development will occur and when. The State Comprehensive Energy Plan has set a goal of 90% renewable energy by the year 2050. This goal is achievable if all stakeholders including the state, the region, the municipalities, the energy developers, the private land owners, the special interest groups, and the interested citizens come together to discuss the issues and work collectively to identify the outcomes that satisfy the needs of the whole to the best of their ability.

This plan primarily explores renewable energy related to the production of electricity and electrification of the grid. In addition to the resources noted herein, it's important to consider other forms or technologies that could contribute to our renewable energy future. With advancements in safety, efficiency, and technology, the Region's energy future could look vastly different in the next five or ten years. This will not only impact the generation of energy, but the delivery and infrastructure to support distribution of energy.

Pathways and Implementation Actions

The following goals and implementation actions outline the specific pathways for the region to consider in order to effectively support the State of Vermont's goals that are outlined in the 2016 Comprehensive Energy Plan. These goals are intended to cover a variety of pathways that address land use and siting of developments (including renewable energy generation); efficiency of building construction and weatherization; and fuel switching from fossil based fuels to more sustainable and renewable options.

A. Conservation and Efficiency

Objective A-1: Increase conservation of energy by individuals and organizations.

	Implementation Action	Responsibility	Priority/ Timeline	Measure of Success
1	Formalize an Energy Committee to supplement the Planning Commission's implementation of this plan and action as the community resource for weatherization needs.	Planning Commission, Selectboard	High 1 – 2 Years	An Energy Committee is formalized or Energy Coordinator appointed within the term of this plan.
2	Create a Data Committee within the Energy Committee	Energy Committee	High 1-2 Years	Middlesex specific data whenever possible

Objective A-2: Promote energy efficiency in the design, construction, renovation, operation, location and retrofitting of systems for buildings and structures.

	Implementation Action	Responsibility	Priority/ Timeline	Measure of Success
1	Provide information at Town Office and to zoning permit applicants on Vermont's Residential and Commercial Building Energy Standards, as well as Efficiency Vermont's promotional materials on data and financial incentives. [Town Plan Strategy 14]	Zoning Administrator, Town Staff	High/Sustained 1 – 8 Years	Information will be provided at the municipal office and with the issuance of permits.

Objective A-3: Identify ways to decrease the use of fossil fuels for heating.

	Implementation Action	Responsibility	Priority/ Timeline	Measure of Success
1	Evaluate opportunities for landowners to keep lands in forest production use. [Town Plan Strategy 27]	Planning Commission	Medium 3 – 5 Years	Opportunities list is compiled and kept up-to-date, distributed on town website for public knowledge.
2	Create an accurate inventory of current heating technologies, efficiencies, and energy consumption in Town.	Energy Committee	High 1-2 Years	Inventory completed
3	Seek/create grant funding opportunities for energy audits, especially thermal energy audits	Selectboard/ Planning Commission/ Energy Committee	High 2-3 Years	Funding secured-audits performed
4	Acquire underperforming buildings to showcase energy models for low cost housing	Selectboard/ Planning Commission/ Energy Committee	High 2-3 Years	Best practices exhibited

Objective A-4: Demonstrated municipal leadership by example regarding efficiency of municipal buildings.

	Implementation Action	Responsibility	Priority/ Timeline	Measure of Success
1	Develop a plan to remove/replace conventional streetlights with LED fixtures. [Town Plan Strategy 54]	Planning Commission and Road Department	High 1 – 3 Years	Planning Commission meets with Road Department to outline feasibility of replacement, and develops plan to implement.
2	Implement recommended upgrades to municipal buildings from completed energy audits. [Town Plan Strategy 55]	Planning Commission, Selectboard	High 1 – 3 Years	List of all upgrades will be compiled in one place, with costs and pay-back periods identified. In term of

				plan, at least 2 will be implemented.

Objective A-5: Inventory all relevant current Middlesex resources and materials to help support implementation actions hereinabove and throughout the Plan.

	Implementation Action	Responsibility	Priority/ Timeline	Measure of Success
1	Identify needed inventories and initiate processes	Planning Commission/ Energy Committee	High 1-3 Years	Completed inventories

B. Reducing Transportation Energy Demand, Single Occupancy Vehicle Use, and Encouraging Renewable or Lower-Emission Energy Sources for Transportation

Objective B-1: Encourage increased use of public transit as a primary method to complete daily trips and reduce demands on existing infrastructure such as roads and parking.

	Implementation Action	Responsibility	Priority/ Timeline	Measure of Success
1	Evaluate the feasibility of a commuter rail stop in Middlesex, and how it can connect with stops in Waterbury and Montpellier, with service to the employment hubs residents are already commuting to. [Town Plan Strategy 68]	Planning Commission	Medium 3 – 5 Years	3 public meetings (standalone or part of other meetings) are held within the term of this plan to invite residents to share their desires of commuter rail, and to meet with landowners in the immediate area.
2	Analyze current data, or conduct an inventory of ridership on the Waterbury Commuter to understand how many Middlesex residents ride it, and how often.	Planning Commission, Green Mountain Transit/Energy Committee	Medium 3 – 5 Years	Planning Commission will work with GMT to attain ridership data and hold at least 1 public meeting (standalone or part of other meetings) to discuss this data.
3	Inventory vehicles throughout the Town.	Budget Committee/ Planning Commission/ Energy Committee	High 1-2 Years	Inventories completed
4	Promote study and implementation of rural transit solutions for the entire Town.	Selectboard/ Budget Committee	High 1-3 Years	Study completed and implementation resources identified.
5	Educate Town Energy Committee and other Town entities to be a resource to residents re: EVs/alternate fuel vehicles.	Selectboard/ Energy Committee	High 1-3 Years	Training received

Objective B-2: Promote the shift away from single-occupancy vehicle trips to reduce congestion, impacts to local facilities, and support alternative options for transportation needs.

	Implementation Action	Responsibility	Priority/ Timeline	Measure of Success
1	Continue to maintain the Park-And-Ride Facility at I-89 Exit 9. [Objective 35]	Selectboard with State of Vermont as required	Sustained 1 – 8 Years	Park-And-Ride facility is maintained and utilization is kept high.
2	Explore various ways to support carpooling efforts through such campaigns as Way to Go and the Hitching Post and possible use of combined school and general public transportation	Planning Commission, School Board	High 1 – 3 Years	Planning Commission will invite speakers to discuss options to increase carpooling to meetings.
3	Formalize a park-and-ride facility in the northern part of Town.	Planning Commission, Selectboard	Medium 1 – 6 Years	A park-and-ride facility is formally recognized by the State in the Northern part of Middlesex.
4	Reduce road extensions and upgrades from Class 4 roads through avenues appropriate to Middlesex.	Planning Commission, Selectboard	Medium 1 – 6 Years	Subdivision regulations are revised and adopted, or a road ordinance is adopted, to discourage further upgrades of Class 4 roads.
5	Support regional efforts to bring improved broadband connectivity to Middlesex.	Planning Commission, Selectboard	High 1 – 3 Years	Regional efforts to bring broadband access to Town are supported.

Objective B-3: Promote the shift away from gas/diesel vehicles to electric or non-fossil fuel transportation options to reduce dependency on non-renewable fuel sources for transportation.

	Implementation Action	Responsibility	Priority/ Timeline	Measure of Success
1	Expand access to EV charging near the I-89 Exit 9 area, to	Planning Commission, Selectboard	High	EV charging is kept available in village, and expanded to 2

	incentivize electric vehicle use and economic development. [Town Plan Strategy 81]		1 – 3 Years	more stations in the surrounding area.

Objective B-4: Facilitate the development of walking and biking infrastructure to provide alternative transportation options for the community.

	Implementation Action	Responsibility	Priority/ Timeline	Measure of Success
1	Identify possible funding sources to pursue for road improvements that include bike/ped linkages between major hubs. [Town Plan Strategy 47]	Planning Commission, Selectboard	High/Sustained 1 – 8 years	A list of possible funding sources is identified and funding is pursued on at least two projects during the term of this plan.
2	Consider the needs of the entire community and identify and expand possible off-road linkages for bike/ped travel in Middlesex. [Town Plan Strategy 49]	Planning Commission, Selectboard, Conservation Commission	Medium 1 – 5 Years	At least two public meetings are held during the term of this plan to identify the linkages missing in Middlesex and inventory outcomes for future use.

Objective B-5: Demonstrated municipal leadership with respect to efficiency of municipal transportation to show an on-going commitment on behalf of the Town of Middlesex.

	Implementation Action	Responsibility	Priority/ Timeline	Measure of Success
1	Inventory municipal vehicles and collect data annually on current municipal vehicle fuel efficiency and incorporate these figures when considering the purchase of a new municipal vehicle.	Selectboard, Planning Commission, Energy Committee	High 1 – 3 Years	Efficiency Standards will be a priority for the Selectboard when purchasing a new vehicle and inventory completed.

C. Patterns and Densities of Land Use Likely to Result in Conservation of Energy

Objective C-1: The Town of Middlesex is committed to reducing sprawl and minimizing low-density development by encouraging density in areas where infrastructure exists or is planned to support growth.

	Implementation Action	Responsibility	Priority/ Timeline	Measure of Success
1	Refine zoning bylaws to encourage increased density in the village center areas and to promote less development north of I-89. [Strategy 15]	Planning Commission, Zoning Administrator	Medium 3 – 5 Years	Zoning bylaws are amended and readopted to include language of increased density in the Village.

Objective C-2: Strongly prioritize development in compact, mixed-use centers when feasible and appropriate and identify ways to make compact development more feasible throughout the Town of Middlesex.

	Implementation Action	Responsibility	Priority/ Timeline	Measure of Success
1	Consider State Designation Programs and other density-focused programs to target 80% of new housing in the Mixed Use, Medium Density Residential, and Village Zoning Districts (such as a Neighborhood Development Area). [Strategy 18]	Planning Commission, Selectboard, Zoning Administrator, and residents	High 1 – 4 Years	4 Public Meetings (standalone or part of other meetings) will be held on the topic of housing density, and where to accommodate growth. A list of options will be maintained.

D. Development and Siting of Renewable Energy Resources

Objective D-1: Evaluate generation from existing renewable energy generation including the identification of constraints, resource areas, and existing infrastructure by energy type.

	Implementation Action	Responsibility	Priority/ Timeline	Measure of Success
1	Hold a public meeting and invite current landowners with solar facilities to discuss the process of installing solar on their land, to inform future policies.	Planning Commission, Energy Committee	High 1 – 2 Years	List of landowners with solar is identified and invitations are sent to them; a meeting is held during the duration of this plan.

Objective D-2: Evaluate generation from potential renewable energy generation including the identification of constraints, resource areas, and existing infrastructure by energy type.

	Implementation Action	Responsibility	Priority/ Timeline	Measure of Success
1	Hold joint meetings with the Conservation Commission and other community groups to discuss important resources to protect in Middlesex.	Planning Commission, Conservation Commission	High 1 – 3 Years	At least two meetings are held during the term of this plan to discuss locally important constraints.
2	With support from the regional planning commission, hold meetings to identify those qualities that make a site preferred in Middlesex.	Planning Commission, CVRPC (if needed)	High 1 – 4 Years	At least one meeting is held during the duration of this plan to get public engagement on sites appropriate for renewable energy generation.

Mapping

The siting and generation of renewable resources is a critical part to identifying whether or not the region can meet its share of the state's renewable energy goals by 2050. Furthermore, this analysis is important to determine where resources are available throughout the region to ensure no one municipality is unduly burdened with supporting more than should be reasonably anticipated. Finally, this information will better position the Town of Middlesex to evaluate the renewable energy generation options that are available to meet these goals.

To this end, maps were created for the Town of Middlesex that identify resources related to solar, wind, hydroelectric, and woody biomass. Maps were also created to identify constraints that may limit the overall area of possible resource development within the town. The following information will address the evaluation of current and future generation potential within the Town of Middlesex.

Existing Renewable Resource Generation

As noted in the Analysis and Targets section, Tables 11 and 13 identify the existing renewable generation for the Town of Middlesex. Information on existing generation is a representation of all projects that were issued a Certificate of Public Good by the Public Service Board through the end of 2018. Projects that are currently under review are not included in these numbers therefore additional renewable energy generation may be developed that will not be noted in the total generation represented in Table 11 or 13.

Potential Renewable Energy Generation

Table 12 in the Analysis and Targets section identifies potential generation of renewable energy for Middlesex. This information is based on mapping data provided by the Vermont Center for Geographic Information (VCGI) and the Department of Public Service. This information includes specific data related to prime resource areas for solar and wind development which is an indication of where the conditions are most ideal for generation of the specific resource. Also included with this data is information regarding constraints to be considered when evaluating areas for renewable energy development. Additional detail regarding known and possible constraints is discussed below.

Constraints

As part of this effort, the Central Vermont Regional Planning Commission has identified information for each municipality related to renewable energy generation that includes an analysis and evaluation of resource areas within each municipality and how those resource areas are impacted by statewide and regionally identified constraints. In order to determine the impacts, an understanding of the constraints needs to be discussed.

For the purpose of this plan, constraints are separated into two main categories; known and possible. Known constraints are those areas where development of a renewable resource are very limited and therefore are not likely to occur. Known constraints that have been identified include:

- Vernal Pools (confirmed or unconfirmed)
- River Corridors as identified by the Vermont Department of Environmental Conservation
- Federal Emergency Management Agency Identified Floodways
- State-significant Natural Communities and Rare, Threatened, and Endangered Species
- National Wilderness Areas
- Class 1 and Class 2 Wetlands (as noted in the Vermont State Wetlands Inventory or Advisory Layers
- Regionally or Locally Identified Critical Resources

Similarly, the state has identified a list of possible constraints to be considered. Possible constraints identify areas where additional analysis will need to occur in order to determine if development of renewable energy resources is appropriate. In some cases, conditions may be prohibitive, but in others the conditions may be suitable for renewable energy development. The possible constraints include:

- Agricultural Soils
- Federal Emergency Management Agency Special Flood Hazard Areas
- Protected Lands (State fee lands and private conservation lands)
- Act 250 Agricultural Soil Mitigation Areas
- Deer Wintering Areas
- Vermont Agency of Natural Resources Conservation Design Highest Priority Forest Blocks
- Hydric Soils
- Regionally or Locally Identified Resources

In addition to the items listed above, the Regional Planning Commission, through its Regional Energy Committee, has identified additional constraints to be included for all the municipalities that were noted as being regionally significant. For the purposes of this mapping exercise, all of the regional constraints are considered possible constraints. This is due to the fact that the Regional Energy Committee determined that, like the statewide possible constraints, conditions could be such that developing renewable energy resources in these locations could occur but should be studied further at the municipal level to determine if the specific conditions regarding these locations are suitable. The possible regional constraints that were identified include:

- Elevations above 2,500 feet

- Slopes greater than 25%
- Municipally Owned Lands
- Lakeshore Protection Buffer Areas of 250 feet

Methodology

With all the known and possible constraints identified, this information was overlaid on the resources maps for solar and wind resources. Where known constraints existed the resource areas were deleted. Where possible constraints existed, the resource areas were shaded. The resulting areas included those lands where prime resources exist without any constraints and prime resource areas with possible constraints. The total area within these two categories served as the basis to determine the amount of resource that is available for potential development within the Town of Middlesex.

As noted in Table 12 of the Analysis and Targets section, based on the solar, wind, and hydroelectric potential within Middlesex, approximately 1,424,868 megawatt hours of energy could be produced, well above the town's allocation of 11,140 megawatt hours by 2050 as noted in Table 7. The potential energy generation for the Town of Middlesex increases when other sources of renewable energy generation such as biomass, biogas, and methane are included. No specific generation numbers are listed in Table 12 for these types of energy generation as their siting is not specifically tied to the availability of a resource, therefore calculating a potential for generation would be difficult.

In order to generate the Town's allocation of 11,140 MWh by 2050, the Town can plan for certain amounts of land needed to satisfy the goal. For example, if the Town chose to pursue solar as the primary generation type for the 2050 goal, they would need to install 8.57 MW of solar capacity in the Town. Figures provided by the Public Service Department suggest a conversion factor of 8 acres per installed megawatt, but recommend planning for 60 acres per installed megawatt to accommodate for landowners who may not wish to install solar. This provides Middlesex a range between 68.56 acres (0.2% of all land) and 514.2 acres (2.01% of all land) that would need to be utilized for solar production in order to meet the 2050 goal.

Transmission Infrastructure

In addition to identifying and calculating possible generation of renewable energy based on resources and constraints, the mapping included in this plan also incorporates the existing three phase power infrastructure throughout the municipality. This is important to include because renewable energy generation needs three phase power to provide energy generation back to the grid. Without three phase power, renewable energy generation would be limited to scales necessary to serve uses in close proximity that would not require transmission infrastructure.

Similar to limits on three phase power are potential limitations on existing transmission infrastructure and the ability to transmit energy from its point of generation to the possible users. As noted previously, the mapping includes three phase power, but it also includes information on current transmission infrastructure. This is another component to consider when identifying where specific generation types should be located to ensure the transmission capacity exists within the grid or to identify areas where upgrades may be needed before development of renewable energy generation can occur. Based on the factors noted above, it may be appropriate for mapping to identify areas where significant energy loads are currently occurring or anticipated based on future land use and zoning.

Preferred & Unsuitable Siting Locations

The Town of Middlesex recognizes the preferred locations that have been identified by the State of Vermont's Net Metering Rules. Additional preferred locations may be identified after an analysis of the needs with the community have been conducted. The state preferred locations include but are not limited to:

- Parking lots
- Gravel pits
- Brownfield sites
- Landfills
- Rooftop installations

In October 2019, the Middlesex Planning Commission expressed a desire to protect those ridgelines that provide a scenic aesthetic in the western portion of Town. The Planning Commission has recognized the current constraints in place (State Protected Lands, Slopes Greater than 25%, Highest Priority Forest Block (Connectivity) and Hydric Soils) will discourage development on the Worcester Range. At this time, the Planning Commission is not identifying any additional local constraints, however it does intend to plan for local constraints in the coming years, shortly after development of this plan is complete.

Local Mapping

To provide a more specific visual representation of resources and constraints, mapping was developed by the Central Vermont Regional Planning Commission that includes:

- Solar Resource Areas
- Wind Resource Areas
- Hydroelectric Resource Areas
- Known Constraints
- Possible Constraints

- Woody Biomass Resource Area
- Existing Renewable Generation Sites
- Statewide Preferred Generation Sites

These maps should be used as a starting point to determine what areas may exhibit characteristics consistent with conditions that would support renewable energy development. More detailed review and analysis should be conducted to determine specific boundaries for resource areas or constraints. These maps can be found in Appendix B.

APPENDIX A: KNOWN & POSSIBLE CONSTRAINT DEFINTIONS AND DESCRIPTIONS

The following is a list of the known, possible, and regional constraints that were used and referenced in the mapping section of this document. A definition of the constraint including source of the data is provided.

Known Constraints

Vernal Pools (confirmed and unconfirmed layers)
Source: Vermont Fish and Wildlife, 2009- present

Vernal pools are temporary pools of water that provide habitat for distinctive plants and animals. Data was collected remotely using color infrared aerial photo interpretation. "Potential" vernal pools were mapped and available for the purpose of confirming whether vernal pool habitat was present through site visits. This layer represents both those site which have not yet been field-visited or verified as vernal pools, and those that have.

Department of Environmental Conservation (DEC) River Corridors -
Source: DEC Watershed Management District Rivers Program, January 2015

River corridors are delineated to provide for the least erosive meandering and floodplain geometry toward which a river will evolve over time. River corridor maps guide State actions to protect, restore and maintain naturally stable meanders and riparian areas to minimize erosion hazards. Land within and immediately abutting a river corridor may be at higher risk to fluvial erosion during floods.

River corridors encompass an area around and adjacent to the present channel where fluvial erosion, channel evolution and down-valley meander migration are most likely to occur. River corridor widths are calculated to represent the narrowest band of valley bottom and riparian land necessary to accommodate the least erosive channel and floodplain geometry that would be created and maintained naturally within a given valley setting.

Federal Emergency Management Agency (FEMA) Floodways-
Source: FEMA Floodway included in Zones AE- FEMA Map Service Center

These are areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. A "Regulatory Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

State-significant Natural Communities and Rare, Threatened, and Endangered Species-
Source: Vermont Fish and Wildlife, National Heritage Inventory

The Vermont Fish and Wildlife Department's Natural Heritage Inventory (NHI) maintains a database of rare, threatened and endangered species and natural (plant) communities in Vermont. The Element Occurrence (EO) records that form the core of the Natural Heritage Inventory database include information on the location, status, characteristics, numbers, condition, and distribution of elements of biological diversity using established Natural Heritage Methodology developed by NatureServe and The Nature Conservancy.

An Element Occurrence (EO) is an area of land and/or water in which a species or natural community is, or was, present. An EO should have practical conservation value for the Element as evidenced by potential continued (or historical) presence and/or regular recurrence at a given location. For species Elements, the EO often corresponds with the local population, but when appropriate may be a portion of a population or a group of nearby populations (e.g., metapopulation).

National Wilderness Areas-
Source: United States Department of Agriculture Forest Service

A parcel of Forest Service land congressionally designated as wilderness.

Class 1 and Class 2 Wetlands-
Source: Vermont Significant Wetland Inventory (VSWI) and advisory layers

The State of Vermont protects wetlands which provide significant functions and values and also protects a buffer zone directly adjacent to significant wetlands. Wetlands in Vermont are classified as Class I, II, or III based on the significance of the functions and values they provide. Class I and Class II wetlands provide significant functions and values and are protected by the Vermont Wetland Rules. Any activity within a Class I or II wetland or buffer zone which is not exempt or considered an "allowed use" under the Vermont Wetland Rules requires a permit.

Class I wetlands have been determined to be, based on their functions and values, exceptional or irreplaceable in its contribution to Vermont's natural heritage and, therefore, merits the highest level of protection. Class III wetlands are neither Class I or Class II wetlands. They are not protected under the Vermont Wetland Rules. All wetlands contiguous to wetlands shown on the VSWI maps are presumed to be Class II wetlands, unless identified as Class I or III wetlands, or unless determined otherwise by the Secretary or Panel pursuant to Section 8 of the Vermont Wetland Rules.

Possible Constraints

Agricultural Soils -
Source: Natural Resources Conservation Service (NRCS)

Primary agricultural soils" are defined as "soil map units with the best combination of physical and chemical characteristics that have a potential for growing food, feed, and forage crops,

have sufficient moisture and drainage, plant nutrients or responsiveness to fertilizers, few limitations for cultivation or limitations which may be easily overcome, and an average slope that does not exceed 15 percent. Present uses may be cropland, pasture, regenerating forests, forestland, or other agricultural or silvicultural uses.

The soils must be of a size and location, relative to adjoining land uses, so that those soils will be capable, following removal of any identified limitations, of supporting or contributing to an economic or commercial agricultural operation. Unless contradicted by the qualifications stated above, primary agricultural soils include important farmland soils map units with a rating of prime, statewide, or local importance as defined by the Natural Resources Conservation Service of the United States Department of Agriculture.

FEMA Special Flood Hazard Areas -

The land area covered by the floodwaters of the base flood is the Special Flood Hazard Area (SFHA) on NFIP maps. The SFHA is the area where the National Flood Insurance Program's (NFIP's) floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies.

Protected Lands -

Include State fee land and private conservation lands. Other state level, non-profit and regional entities also contribute to this dataset. The Vermont Protected Lands Database is based on an updated version of the original Protected Lands Coding Scheme reflecting decisions made by the Protected Lands Database Work Group to plan for a sustainable update process for this important geospatial data layer.

Act 250 Ag Mitigation Parcels -
Source: Vermont Department of Agriculture

All projects reducing the potential of primary agricultural soils on a project tract are required to provide "suitable mitigation," either "onsite or offsite," which is dependent on the location of the project. This constraint layer includes all parcels in the Act 250 Ag Mitigation Program as of 2006.

Deer Wintering Areas (DWA)-
Source: Vermont Department of Fish and Wildlife

Deer winter habitat is critical to the long term survival of white-tailed deer (Odocoileus virginianus) in Vermont. Being near the northern extreme of the white-tailed deer's range, functional winter habitats are essential to maintain stable populations of deer in many years when and where yarding conditions occur. Consequently, deer wintering areas are considered under Act 250 and other local, state, and federal regulations that require the protection of important wildlife habitats. DWAs are generally characterized by rather dense softwood

(conifer) cover, such as hemlock, balsam fir, red spruce, or white pine. Occasionally DWAs are found in mixed forest with a strong softwood component or even on found west facing hardwood slopes in conjunction with softwood cover. The DWA were mapped on mylar overlays on topographic maps and based on small scale aerial photos.

Vermont Conservation Design include the following Highest Priority Forest Blocks: Connectivity, Interior, and Physical Landscape Diversity -
Source: Vermont Department of Fish and Wildlife

The lands and waters identified in this constraint are the areas of the state that are of highest priority for maintaining ecological integrity. Together, these lands comprise a connected landscape of large and intact forested habitat, healthy aquatic and riparian systems, and a full range of physical features (bedrock, soils, elevation, slope, and aspect) on which plant and animal natural communities depend.

Hydric Soils -
Source: Natural Resources Conservation Service

A hydric soil is a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part. This constraint layer includes soils that have hydric named components in the map unit.

Regional Constraints

Elevations above 2500 feet-

This constraint uses USGS contours over 2500 feet.

Lake Shore Protection Buffers (250 Foot and 800 Foot in Calais Only)-

For this constraint, CVRPC selected Vermont Hydrologic Dataset lakes and ponds greater than 10 acres and then buffered those by 250 feet and use the Town of Calais Land Use Regulations for shore lands in Calais.

Slopes Greater Than 25%-

For this constraint, CVRPC performed a slope analysis using a 10 meter Digital Elevation Model.

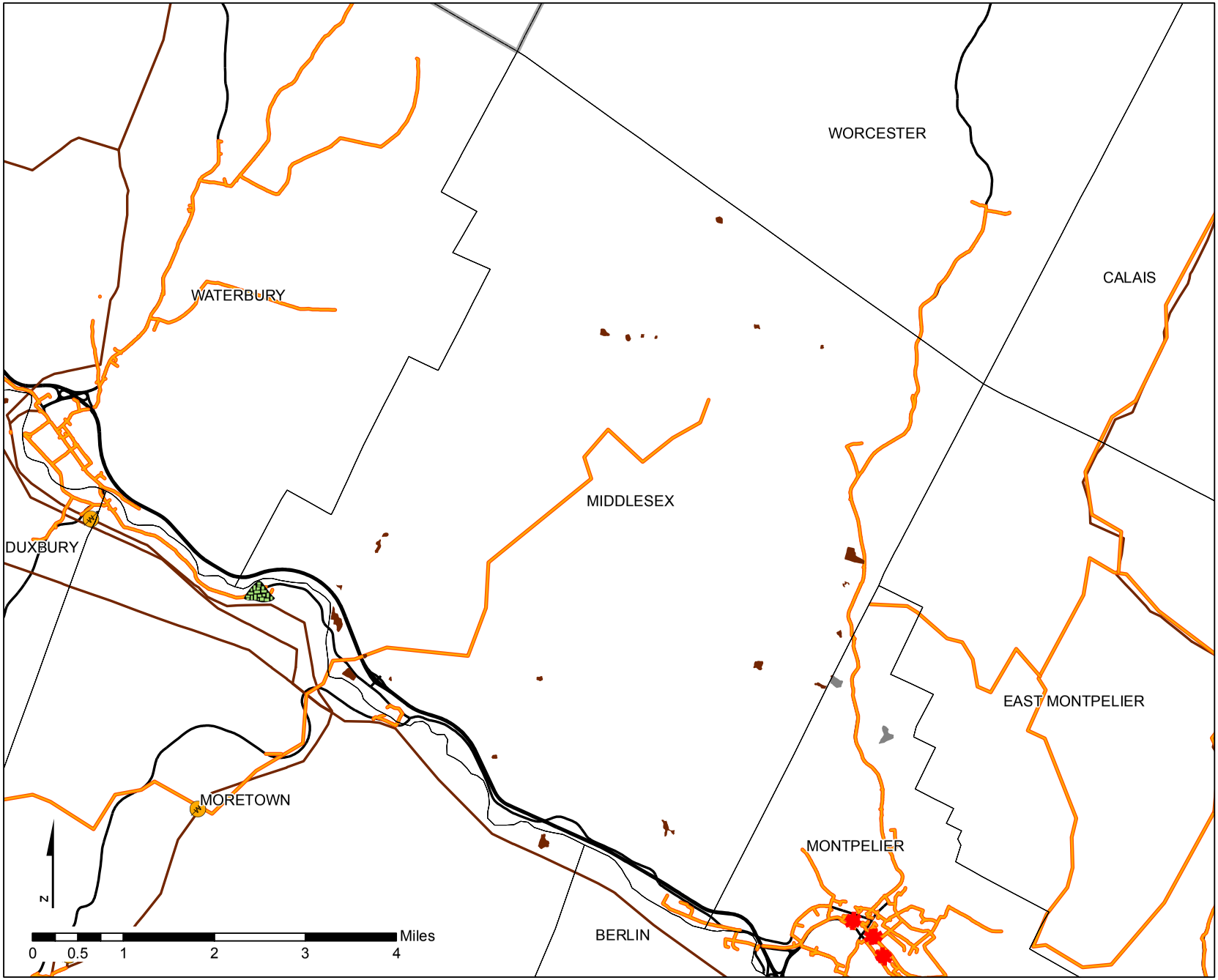
Municipal Lands -

For this constraint, CVRPC used the Vermont Center for Geographic Information's Protected Lands Database.

Local Constraints

No local constraints have been identified as of the 12/13/2019 draft of this plan.

APPENDIX B: ENERGY MAPS



Central Vermont Regional Planning Commission Preferred Sites

MIDDLESEX

Key

- Brownfields Sites
- Moretown Landfill
- Sand and Gravel Pits
- Quarries
- Substations
- 3 Phase Power Lines
- Transmision Lines
- Major Roads

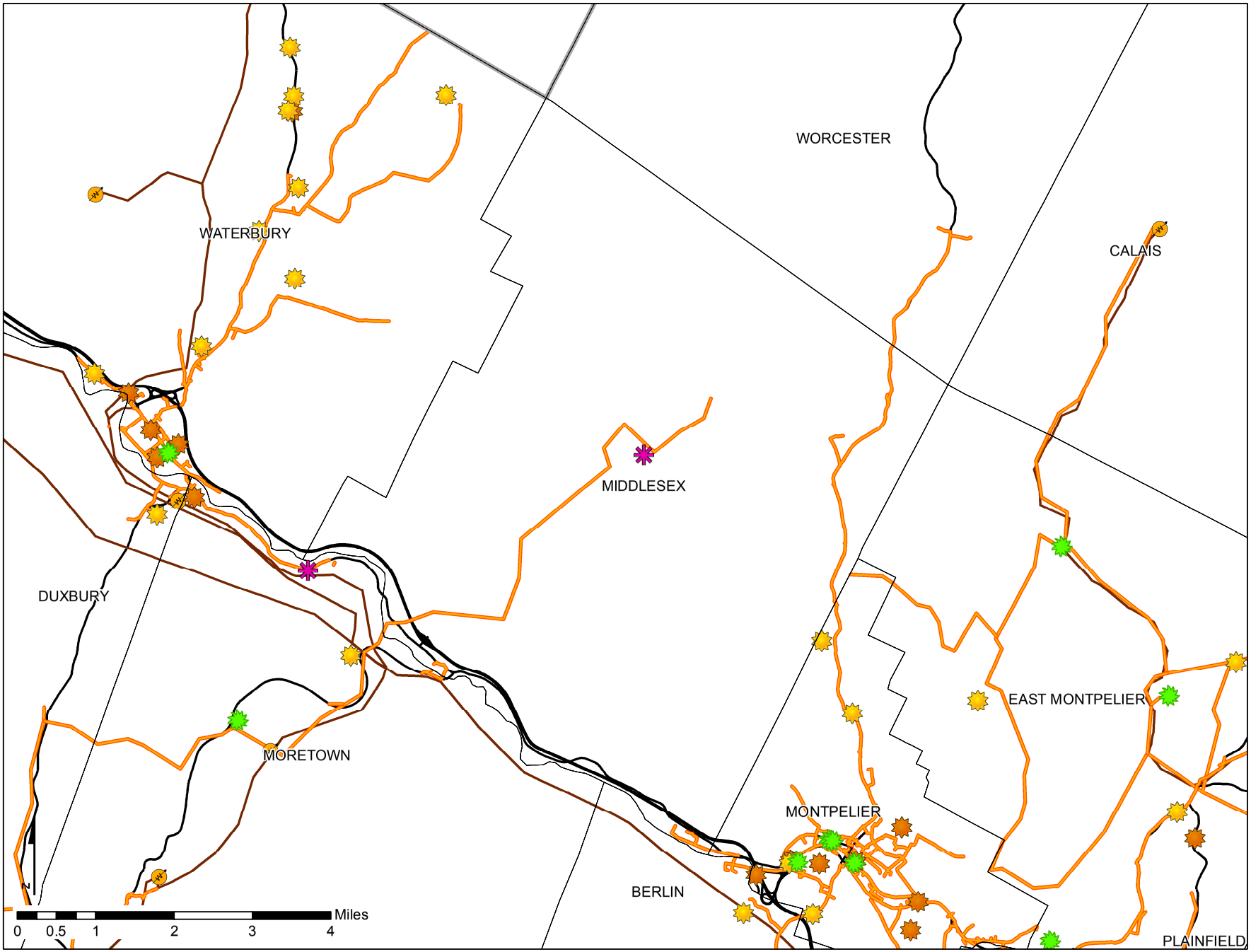
CVRPC
CENTRAL VERMONT REGIONAL PLANNING COMMISSION

Data:

Brownfields: VT ANR, VCGI.
Sand and Gravel Pits, Quarries:
CVRPC, 2013 disgitized from 1998 imagery.

This map was created as part of a Regional Energy Planning Initiative being conducted by the Bennington County Regional Commission, and the Vermont Public Service Department.

Created: November 2017 by CVRPC GIS.



Central Vermont Regional Planning Commission Existing Renewable Energy Generation

MIDDLESEX

Key

- Biomass for Heat - Current Sites
- Wind Generation - Current Sites

Solar Sites - Current Generation > 15 KW

- Ground-mounted PV
- Roof-Mounted PV
- Substations
- 3 Phase Power Lines
- Transmision Lines
- Major Roads

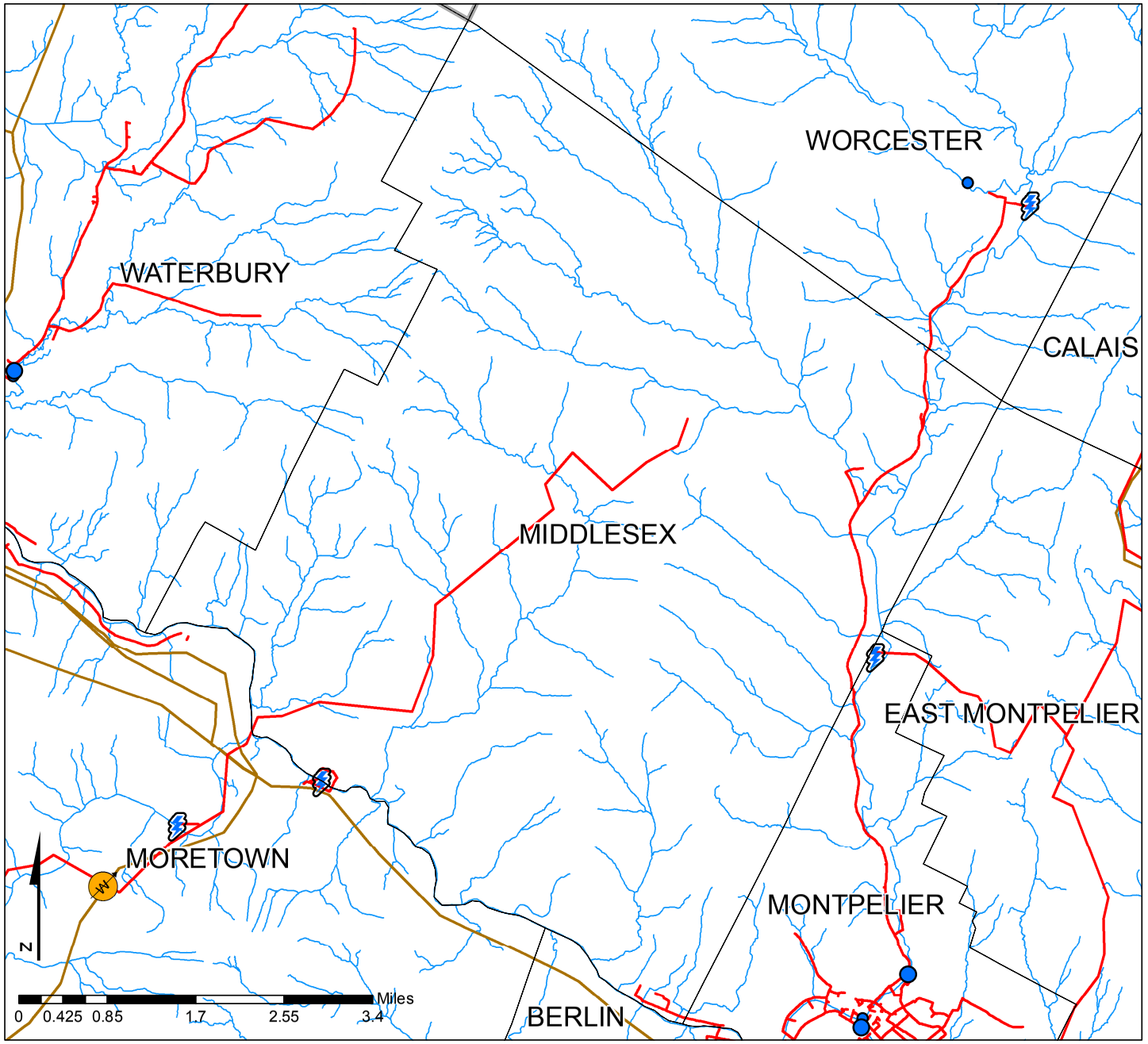
CVRPC
CENTRAL VERMONT REGIONAL PLANNING COMMISSION

Data:

Wind and Biomass generation:
VT Energy Dashboard
Solar Sites: VT Energy Dashboard

This map was created as part of a Regional Energy Planning Initiative being conducted by the Bennington County Regional Commission, and the Vermont Public Service Department.

Created: November 2017 by CVRPC GIS.



MIDDLESEX
Hydroelectric Resources Map

Key

- Substations
- 3 Phase Power Lines
- Transmission Lines
- Major Roads
- Lakes/Ponds
- Rivers/Streams
- Dams not on National Wild and Scenic Rivers
- Dams on National Wild and Scenic Rivers

Potential Hydroelectric Facilities

Potential Hydroelectric Facilities

- <50kW Capacity
- >50kW Capacity
- High Hazard with <50kW Capacity
- High Hazard with >50kW Capacity

Methodology

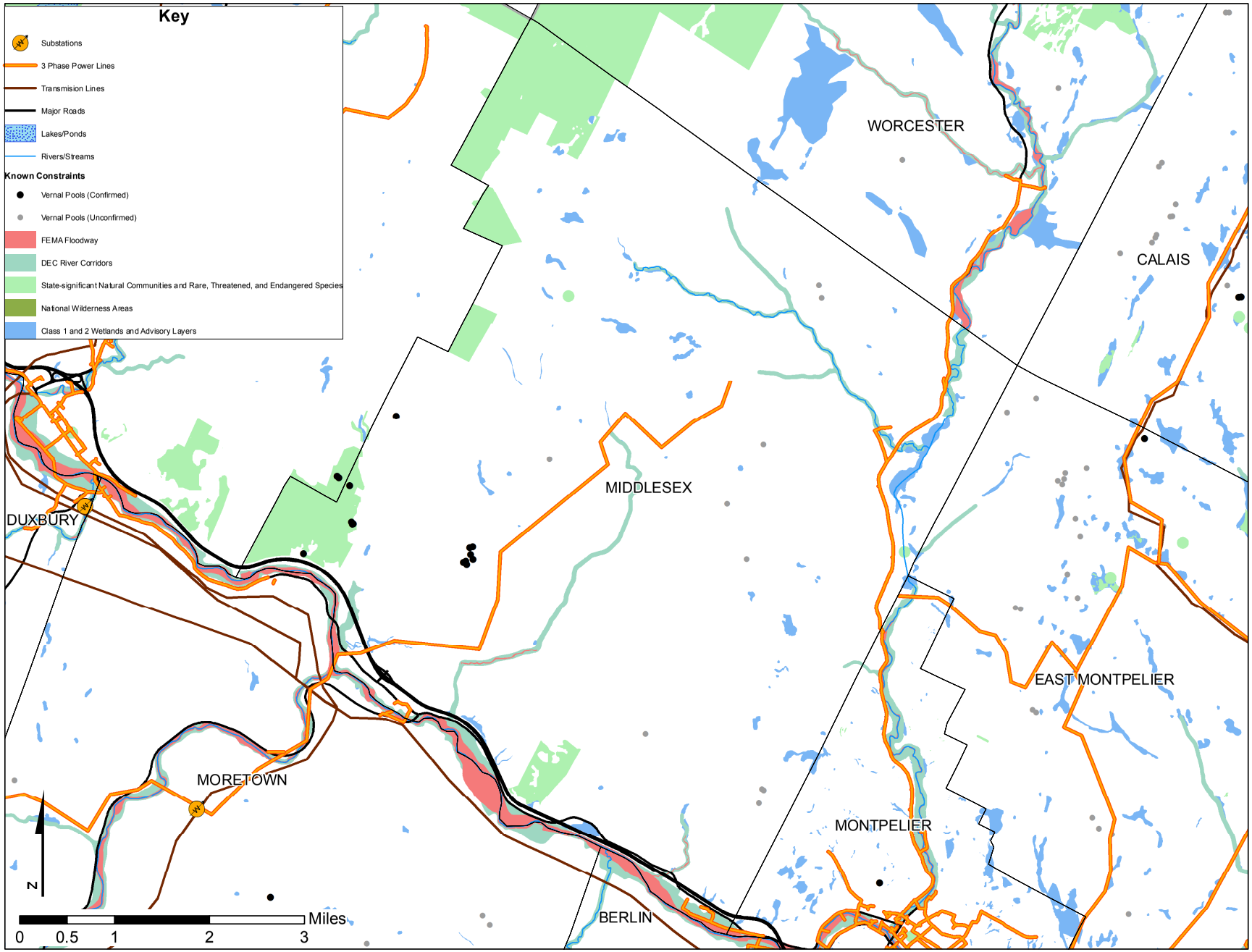
This map shows areas of resource potential for renewable energy generation from hydroelectric , i.e., dams that could be converted in to hydroelectric facilities as well as active hydroelectric sites. Existing hydroelectric dam information was extracted from the Vermont Dam Inventory, while potential hydroelectric sites were derived from a study conducted by Community Hydro in 2007.1 Based on estimates conducted within the report, this map categorizes dams based on their potential hydroelectric generation capacity, and the downstream hazard risk that would be involved in hydroelectric production at each site.

High hazard potential dams are those where failure or mis-operation will probably cause loss of human life. The other rankings were grouped together and their failure or mis-operation results in no probable loss of human life, but could cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns. These dams are often located in predominately rural or agricultural areas, but could be located in areas withpopulation and significant infrastructure.

This map was created as part of a Regional Energy Planning Initiative being conducted by the Bennington County Regional Commission, and the Vermont Public Service Department.

Created: December 2016 by CVRPC GIS.
N:\Region\Projects\2017\Act174_Energy\Hydroelectric Resources 11x17.mxd

CVRPC
CENTRAL VERMONT REGIONAL PLANNING COMMISSION



MIDDLESEX
Known Constraints Map

Known Constraints

These constraints signal likely, though not absolute, unsuitability for development based on statewide or local regulation or designated critical resources.

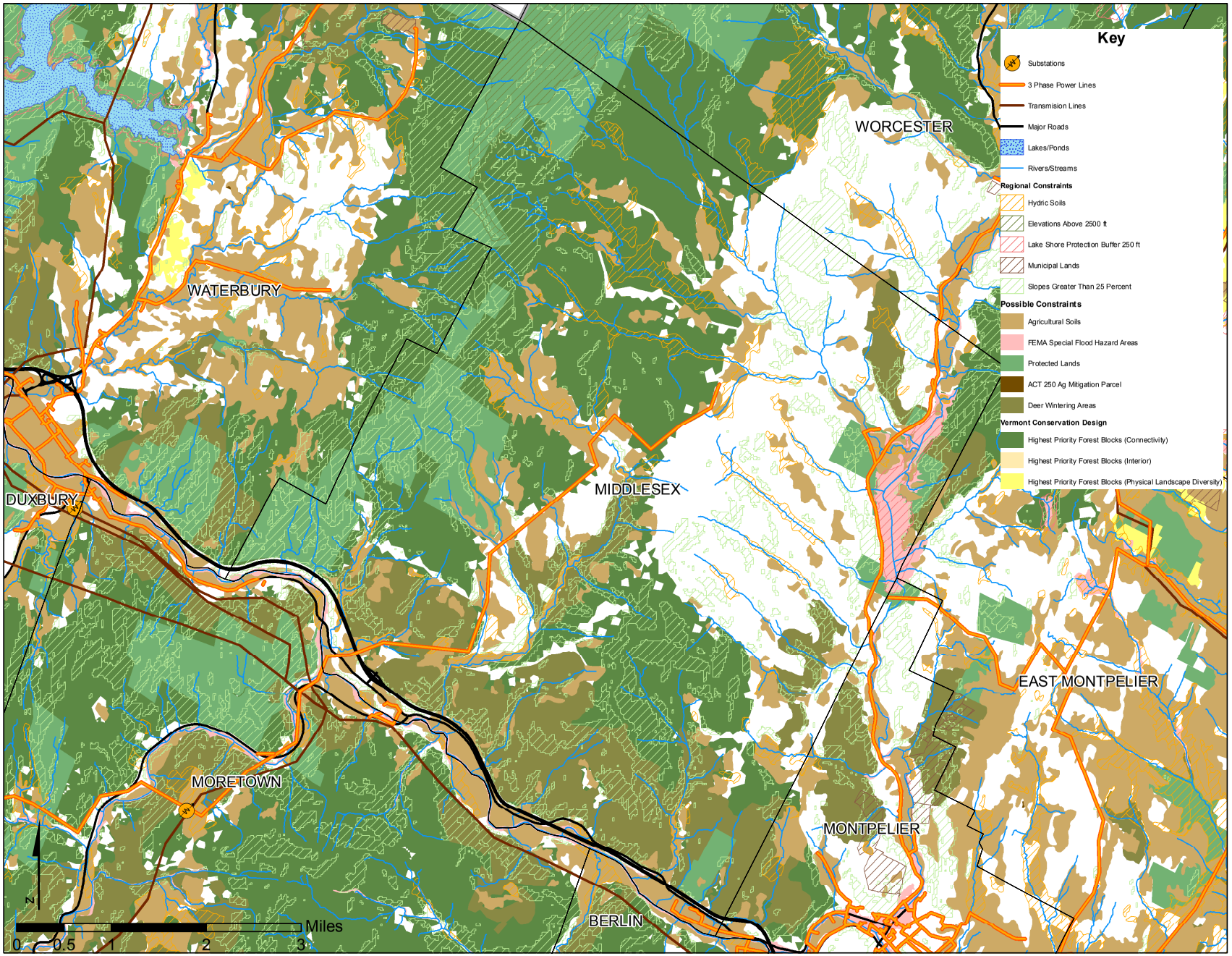
Link to Data -
http://vcgi.vermont.gov/opendata/act174

Known Constraints
Vernal Pools incuding confirmed and unconfirmed -
Vermont Fish and Wildlife
DEC River Corridors -
DEC WSMD Rivers Program 1/2/15
FEMA Floodway included in Zones AE -
FEMA Map Service Center
State-significant Natural Communities and Rare, Threatened, and Endangered Species -
Vermont Fish and Wildlife, Natural Heritage Inventory
National Wilderness Areas -
USDA Forest Service
Class 1 and Class 2 Wetlands (VSWI) and Advisory Layers - VT Watershed Management Division

This map was created as part of a Regional Energy Planning Initiative being conducted by the Bennington County Regional Commission, and the Vermont Public Service Department.

Created: December 2016 by CVRPC GIS.

CVRPC



MIDDLESEX
Possible Constraints Map

Possible Constraints

These constraints signals conditions that would likely require mitigation, and which may prove a site unsuitable after site-specific study, based on statewide or regional/ local policies that are currently adopted or in effect.

Link to Data - http://vcgi.vermont.gov /opendata/act174

Possible Constraints Data Sources
Agricultural Soils include local, prime and statewide classifications - NRCS
FEMA Special Flood Hazard Areas include Zones A and AE - FEMA Map Service Center
Protected Lands - Include State fee lands and private conservation lands - VCGI
Act 250 Ag Mitigation Parcels include parcel as of 2006 - VT Dept. of Ag
Deer Wintering Areas - VT Fish and Wildlife
Vermont Conservation Design include the following Highest Priority Forest Blocks: Connectivity, Interior, and Physical Landscape Diversity) - VT Fish and Wildlife
Hydric Soils include soils that have hydric named components in the map unit - NRCS

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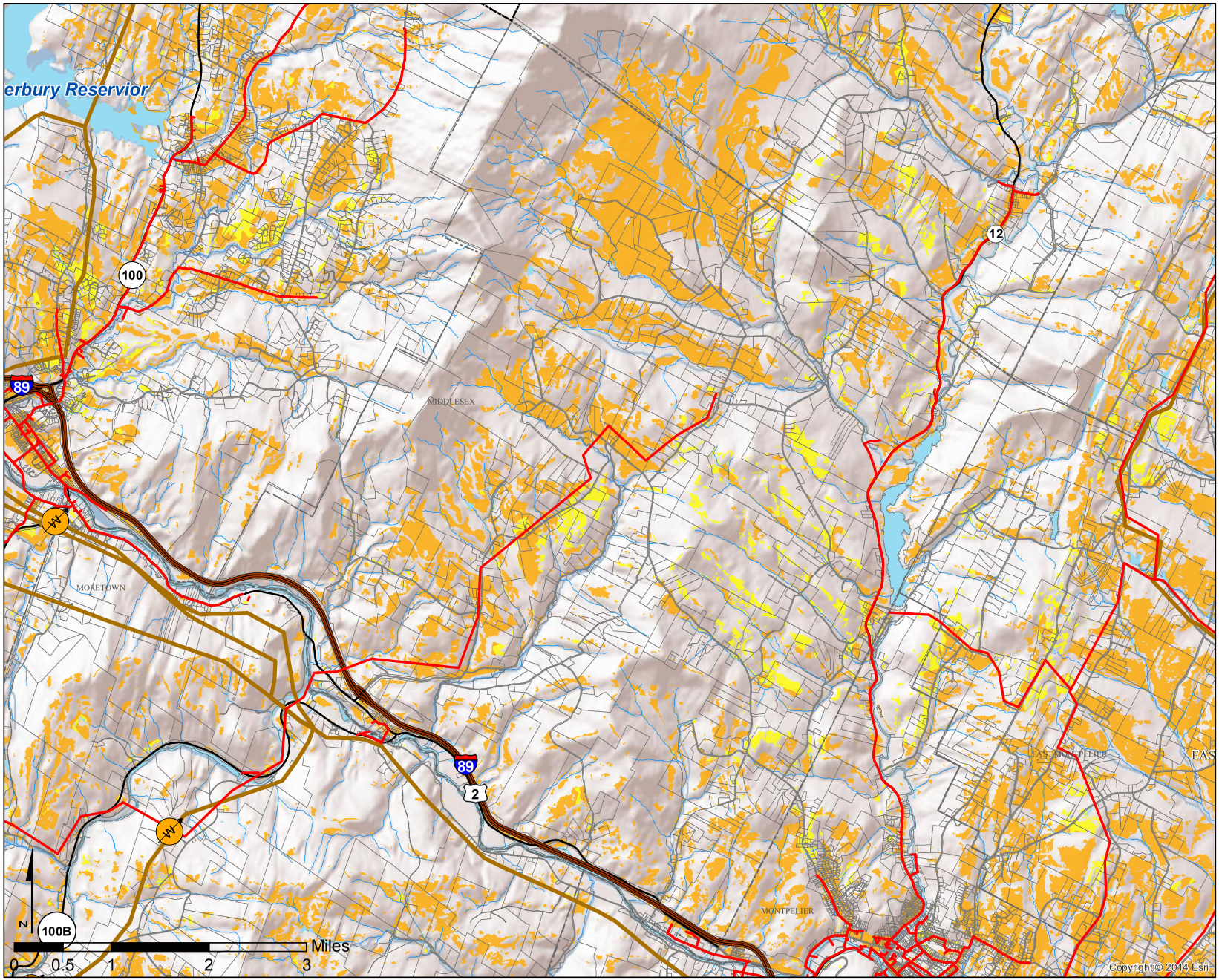
Created: December 2016 by CVRPC GIS.

CVRPC
CENTRAL VERMONT REGIONAL PLANNING COMMISSION



MIDDLESEX

Solar Resources Map

Legend

- Substations
- 3 Phase Power Lines
- Distribution Lines

Solar Potential

- Prime (No Constraint)
- Secondary (Possible Constraint)
- Parcels

Roads

- Interstate
- US Highway
- Vermont State Highway
- Town Class 1-3

Known Constraints

Areas not shown on map

Vernal Pools
River Corridors
FEMA Floodways
Natural Communities & Rare, Threatened and Endangered Species
National Wilderness Areas
Wetlands Class 1 and 2

Possible Constraints

VT Agriculturally Important Soils
FEMA Special Flood Hazard Areas
Protected Lands
Act 250 Agricultural Soil Mitigation Areas
Deer Wintering Areas
Highest Priority Forest Blocks
Hydric Soils
Elevations Above 2500Ft
Lake Shore Protection Buffer 250 Ft
Municipal Lands
Slopes Greater Than 25 Percent

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Act174_Energy\Solar Resources 11X17

Data is only as accurate as the original source materials.
This map is for planning purposes.
This map may contain errors and omissions

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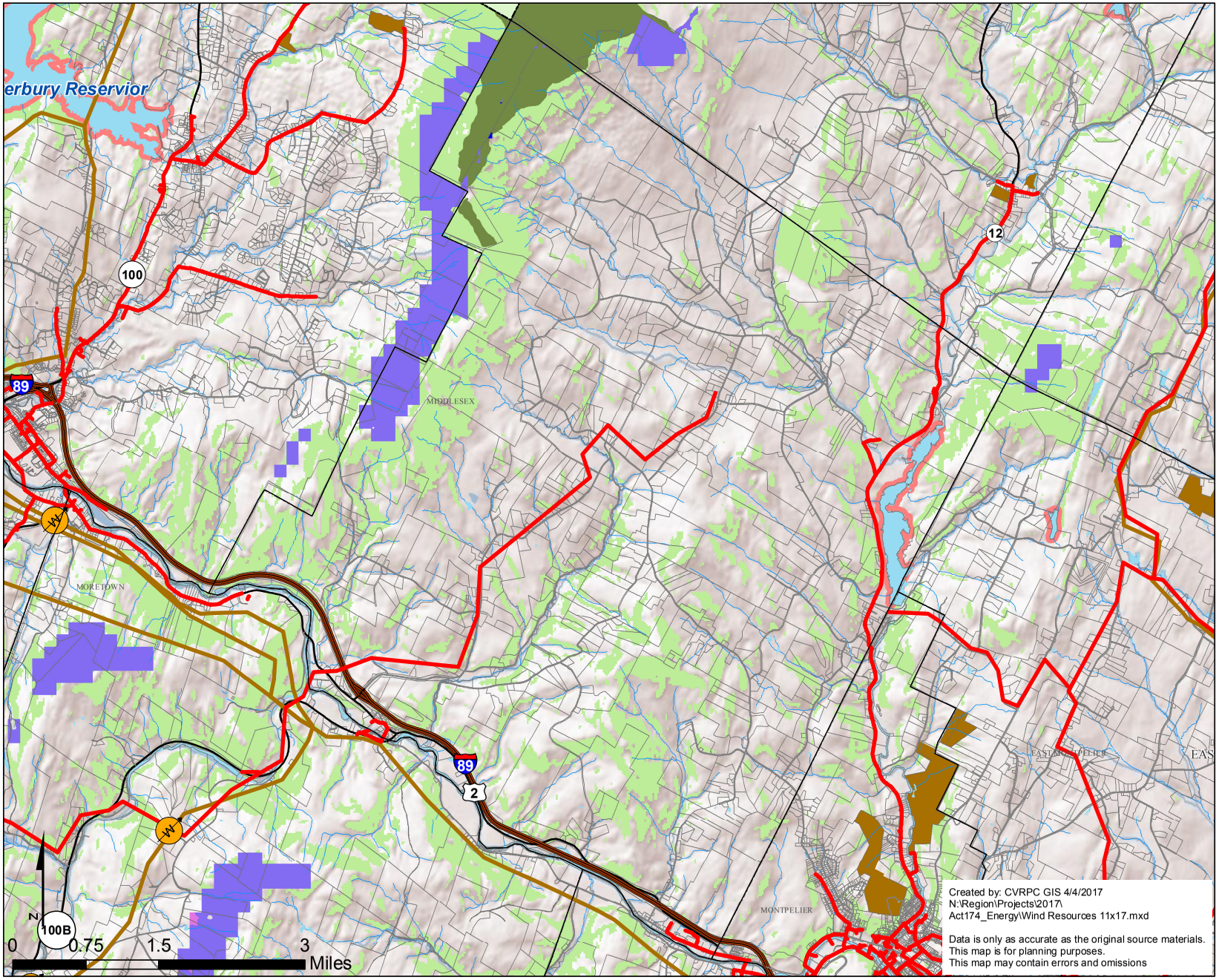

MIDDLESEX
Wind Resources Map

Legend

- Substations
- 3 Phase Power Lines
- Transmission Lines

Wind Potential

Prime Wind (No Constraint)
Hub Height (m)

50 70

Secondary Wind (Possible Constraint)
Hub Height (m)

50 70

- Parcels

Roads

- Interstate
- US Highway
- Vermont State Highway
- Town Class 1-3

Regional Constraints

- Elevations Above 2500 ft
- Lake Shore Protection Buffer 250 ft
- Municipal Lands
- Slopes Greater Than 25 Percent

Known Constraints

Areas not shown on map
Vernal Pools
River Corridors
FEMA Floodways
Natural Communities & Rare, Threatened and Endangered Species
National Wilderness Areas
Wetlands Class 1 and 2

Possible Constraints

VT Agriculturally Important Soils
FEMA Special Flood Hazard Areas
Protected Lands
Act 250 Agricultural Soil Mitigation Areas
Deer Wintering Areas
Highest Priority Forest Blocks
Hydric Soils

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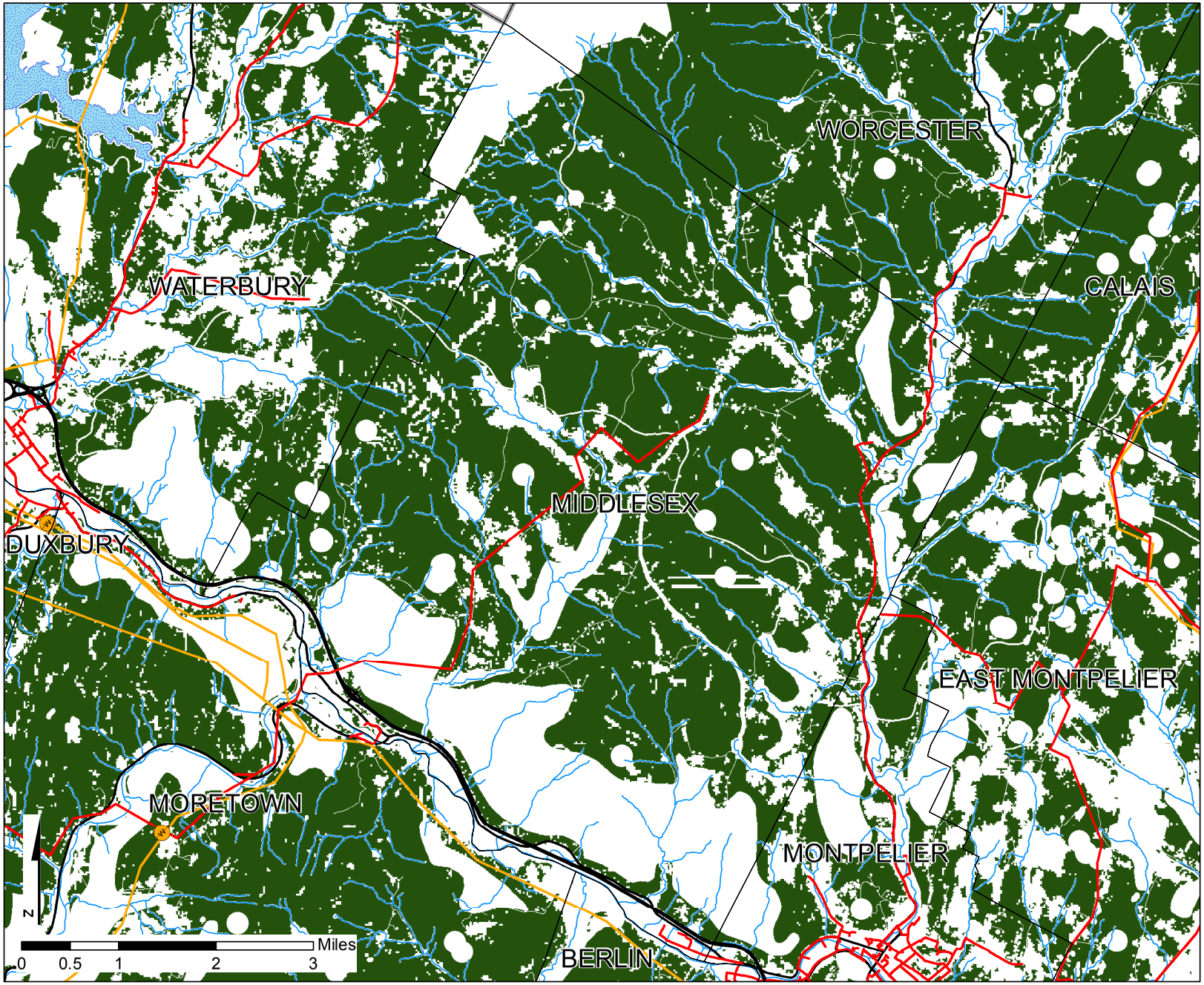

MIDDLESEX
Woody Biomass Resources Map

Key

- Substations
- 3 Phase Power Lines
- Transmission Lines
- Major Roads
- Lakes/Ponds
- Rivers/Streams
- Woody Biomass

Methodology

This map shows areas of resource potential for woody biomass, i.e., locations where forested areas are. This map also considers various other conditions, such as ecological zones, that may impact the feasibility of renewable energy/alternative heating source. These conditions are referred to as constraints. This map does not include areas where other types of biomass, such as biomass from agricultural residue, could be grown/harvested.

This map was created as part of a Regional Energy Planning Initiative being conducted by the Bennington County Regional Commission, and the Vermont Public Service Department.

Created: December 2016 by CVRPC GIS.

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Appendix C – Streetlighting and Outdoor Lighting

Streetlighting and Outside Lights: Preserving the Night Sky and Saving Energy

The Middlesex Energy Committee has some recommendations discouraging the use of streetlighting -- the use of bright outdoor lights that stay on all night, on roads and in yards and driveways -- except in cases where it is needed, both to save energy and to help prevent light pollution that reduces the clarity of the night sky.

History

Streetlighting has its purpose. It is typically used in urban settings to provide safety for pedestrians, typically over sidewalks and at crosswalks. They are less frequently (and less effectively) used for illuminating roadways, as cars provide their own illumination with their headlights. (Glare from poorly designed streetlighting actually makes it harder to see things in front of you).

"Security lighting" was promoted by utility companies in the past. They often would install streetlights at no charge so that they could charge a monthly energy fee. The theory that a lighted yard or space provides greater security has been debunked, and allowing the criminals to see what they are doing has been shown to be of no advantage. With the advent of motion sensor controlled lights and motion controlled security cameras, leaving a streetlight on all night is both wasteful and ineffective, and contributes to light pollution.

Act 250 recognizes the negative impacts of all exterior lighting, and requires them to be "cut-off" type fixtures, which means all their light shines down on what you want to see, and no light spills horizontally or upward.

Recommendations

1. USE FOR PEDESTRIAN SAFETY ONLY, where sidewalks or crosswalks are part of densely populated areas and auto/pedestrian conflicts exist. These should be energy efficient cut-off type, which are controlled by timers, and thus off when not needed.
2. "SECURITY LIGHTING" should be motion-controlled, ideally in combination with motion detector cameras.
3. AVOID LIGHT POLLUTION/LIGHT SPILL. Where streetlighting is required for pedestrian safety, it should utilize fixtures that shine downward only, not sideways or up into the sky.
4. ENERGY EFFICIENCY: All fixtures should be LED type, which are now common and save energy compared to the Mercury Vapor, High or Low Pressure Sodium lamps.
5. TIMER CONTROL IN PUBLIC AREAS: All exterior lighting in public spaces for sidewalks and crosswalks should be on timers, so they are not left on all night during times when no one is likely to be awake and therefore are not needed.
6. MOTION CONTROL IN PRIVATE USE: For private yard lighting or driveway or security lighting, motion detection should be used to have lights on only when needed. This saves energy, reduces light pollution, and provides more effective security as well.

ADOPTED by Middlesex Voters March 1, 2022

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