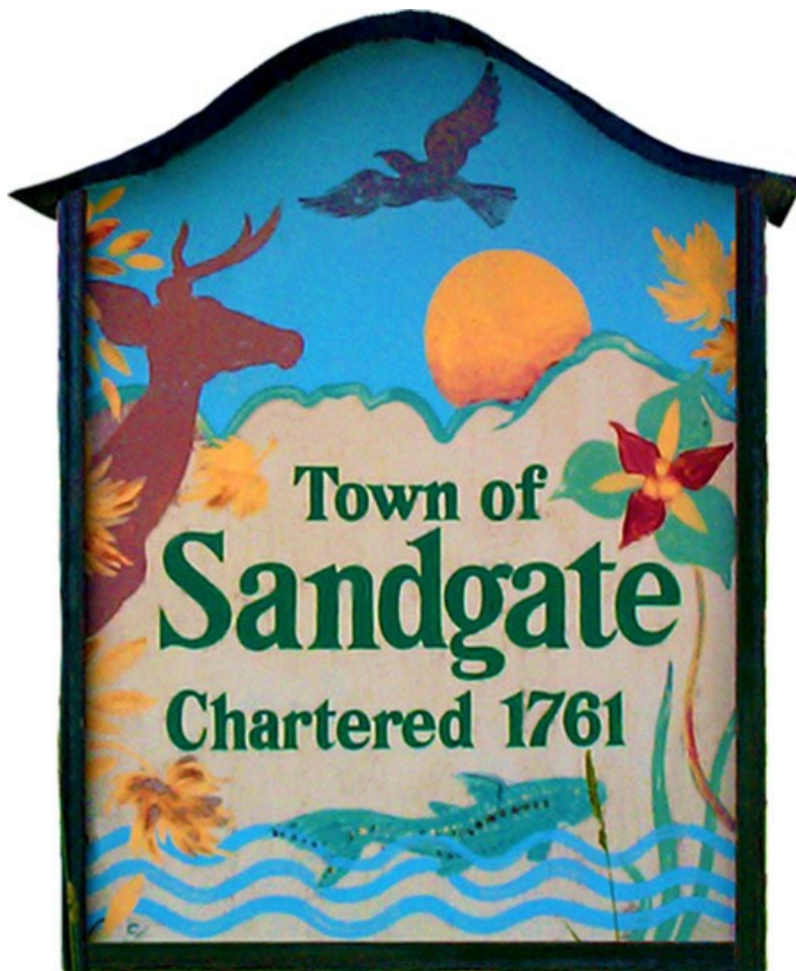


**Town
of
Sandgate, Vermont**



Sandgate Town Plan

Adopted December 19, 2022

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Assistance was provided by the Bennington County Regional Commission.

SECTION 1: INTRODUCTION

Prior to the arrival of the first white settlers, the area now occupied by the Town of Sandgate was part of the hunting and fishing grounds of several Native American tribes. An important Native American trail traversed the town and a campground was located at a spring near Chunks Brook.

The Town of Sandgate was chartered on August 11, 1761 by Benning Wentworth, Governor of New Hampshire. The town was laid out as a square with each side approximately six miles long. Sandgate actually covers 27,072 acres of extremely rugged land in the middle of the Taconic Mountain Range. The east side of the town, which includes the valley of the Green River, is separated from the Camden Valley and West Sandgate by a high mountain ridge that is crossed by just one road that snakes through "The Notch" in that ridge.

Despite the relatively harsh physical environment and climate, settlers began arriving in Sandgate not long after its founding. Many of these original settlers migrated from Connecticut, including Reuben Thomas who, in 1769, was the first to arrive. The town's first inhabitants cleared the land, grew a variety of crops, and raised livestock; sheep husbandry became particularly important in the early part of the 19th century. The population of Sandgate steadily grew until 1810 when 1,187 people resided in the town. A variety of businesses sprang up to support this burgeoning population. By 1801 the town supported four inns, a sawmill, a grist mill, a fulling mill, a still house, a tannery, three blacksmith shops, a lime kiln, a shoemaker's shop, a clothing shop, and a trip hammer works. A number of neighborhood schools were also established to educate the town's children; there were ten schools operating in Sandgate by the mid-19th century.

Much of the town was settled in these early years, but the greatest concentrations of population were located in the valley areas in West Sandgate, along the Green River, and in "Beartown." Roads were soon constructed to connect these areas and to establish links with other communities. The roads leading from Salem, N.Y., through West Sandgate and The Notch to the Green River, then northeast to Manchester and Dorset via Beartown, had become an important travel route by the middle of the 19th century. Roads also connected Sandgate with Rupert to the north and Arlington to the south.

An interesting early settlement in Sandgate was established by Daniel Shays and his followers. Soon after the Revolutionary War, Shays led an unsuccessful rebellion in Massachusetts to protest exorbitant taxes and foreclosures. When the rebellion failed, Shays was charged with treason and fled to Sandgate where he started a settlement in the northwestern part of the town. This settlement consisted of a tavern, a store, a fort and block house, a mill, a schoolhouse, and 15 to 18 houses clustered around a village green. A dysentery epidemic in 1798 ravaged the town and may have caused the dissolution of Shays' settlement.

While disease claimed the lives of many early settlers, the principal reason for the steady decline in Sandgate's population during the 19th century was the emigration of residents to more fertile farmland in the Midwest. Even so, numerous farms and businesses continued to operate in Sandgate through the 19th and into the 20th century. Several events in the 20th century have had a significant impact on the town: the arrival of the automobile led to the improvement of some roads and contributed to the abandonment of others; a disastrous flood in 1927 damaged or destroyed many roads, bridges, and much private property; and electricity arrived in Sandgate in 1938. The town's last general store was torn down in 1944, and the last local school was discontinued in 1956.

Sandgate's population continued to decline until 1960, when only 93 persons resided in the town. Since that time, however, a steady increase in the town's population has occurred.

According to the 2020 U.S. Census, 387 persons live in Sandgate. Many of today's residents, because of improved transportation and telecommunication systems, either commute to work outside of town or work out of their homes. A number of people have also chosen to live in Sandgate following retirement. Many vacation or seasonal homes also are located in the town; these structures range from modest camps to expensive contemporary residences. 2010 Census data reveals that 36.6% of the total housing units in Sandgate are classified as vacation/seasonal units. Current economic activities in Sandgate include one inn, an industrial maple business, an Italian foods online retailer, several small home-based businesses, a limited amount of farming, and logging. In addition, a Carthusian monastery is located high on the slopes of Mt. Equinox in the eastern part of the town.

Sandgate is best known today as a quiet rural community surrounded by the expansive forests of the Taconic Range. This outstanding natural environment, with its vast backcountry, cascading mountain streams, abundant wildlife, and spectacular vistas, contributes much to the quality of life for both residents of Sandgate and visitors to the town. Townspeople have long expressed a desire to maintain Sandgate's special rural character. Another long-standing interest has been the need to provide essential services without unduly burdening the taxpayers of the town.



Figure 1: Residents enjoy Sandgate's rural character.

In one effort to achieve these general objectives, the Town of Sandgate formed a municipal planning commission and, in 1970, adopted the first plan for the town. Updated and revised plans were subsequently prepared in 1975, 1982, 1987, 1992, 1994, 2002 and 2010. The Town has also put into effect zoning, subdivision, and health regulations. The Vermont Planning and Development Act was amended in 1988 to include a set of common planning goals that municipalities, regions, and state agencies should strive to achieve. The Act now also strongly urges regional cooperation and coordination among the various levels of government. Fortunately, Sandgate has historically espoused many of the same goals as those contained in the state planning law and has for many years participated in regional planning through the Bennington County Regional Commission.

This Town Plan is the most recent manifestation of Sandgate's ongoing planning process. The plan has been updated to reflect current conditions, issues, and objectives, and should serve as a tool to be used by residents in their efforts to guide development and ensure that Sandgate will continue to be an outstanding community in which to live. In 2008, the planning commission conducted a survey of Sandgate property owners, and the results of that survey clearly indicated that rural character, scenic beauty and natural resources are the attributes highly valued by the majority of respondents. Specifically, the Town Plan should be consulted when making public policy decisions, evaluating public investments, reviewing development proposals, and when considering new or amended bylaws and ordinances. The Plan should also provide clear guidelines to individuals who propose new developments in Sandgate. Essentially, this Town Plan will serve as the basic planning document for the town for the next eight years.

SECTION 2: GOALS

This section enumerates a number of goals which are deemed important for the Town of Sandgate. Some of the goals may be realized by continuing to pursue current policies and directions; others may only be attained with new policies, regulations, investments, or other strategies. Each goal, however, will remain important and relevant for the town over the next several years. Subsequent sections will detail specific policies and actions which will facilitate the attainment of these goals.

2.1 Maintain an effective planning process

Effective and responsible decision-making should be promoted through reliance on a coordinated, comprehensive planning process and policy framework. The planning process should be premised on the notion that residents of Sandgate should have the primary responsibility for shaping the town's future direction. Citizens should be encouraged to serve on town boards or commissions, attend public meetings and hearings, and otherwise actively participate in the local planning process.

Although the town is geographically rather isolated, activities and developments in nearby areas can affect Sandgate, and because few products or services are available locally, residents of Sandgate continually interact with other nearby communities. Moreover, many people who do not live in Sandgate enjoy the plentiful resources of our town. Cooperation with neighboring towns and the Bennington County Regional Commission is important to ensure that any intermunicipal and regional issues are effectively addressed.

2.2 Effectively manage future growth and development

Relatively few areas in Sandgate are well-suited to most land development activities. The town should regulate and direct new development to achieve the following objectives:

- discourage sprawl and development that would result in excessive costs to the town;
- provide opportunities for a reasonable level of continued growth in both primary and seasonal housing units;
- preserve the town's rural character and valuable open spaces;
- limit and discourage fragmentation of parcels in the F2 zone and of contiguous forest blocks;
- avoid soil erosion, ground water contamination, air pollution, and damage to other important natural resources.

To maintain the quality of Sandgate's unique rural character, the town must recognize the importance of aesthetic values. New developments and any public facilities should be sited and designed to be harmonious with the surrounding rural landscape and existing neighborhoods.

2.3 Identify and protect important natural resources and historic features

Sandgate derives much of its appeal from the high quality of its abundant natural resources. Protection of these resources will contribute to maintaining a high quality of life for residents. Special areas, including significant natural and fragile ecological areas, important features of the landscape, scenic roads, waterways, views, and historical, educational, cultural, and scientific sites should be identified, and measures taken to preserve them for the enjoyment of current and future residents of the town.

A variety of streams, wetlands, ponds, forests, agricultural soils, and important wildlife habitats are present in Sandgate. These areas should be protected from incompatible development or use because they provide valuable recreational and economic opportunities and help maintain the quality of the environment. The town should conserve and manage forested lands, particularly the Highest Priority Interior Forest Blocks, the Highest Priority Connectivity Blocks and Physical Landscape Diversity Blocks (terms defined in Section 4.3 and areas shown in Maps 5B and 5C) that occur within the Town and extend beyond the Town boundary, to avoid fragmentation and to provide connectivity and habitat. Existing measures that are designed to ensure natural resource protection should be evaluated and modified if necessary.

Sandgate relies on safe and clean ground water for much of its domestic water supply. Ground water recharge areas must, therefore, be protected from incompatible development and contamination.

Air quality is a natural asset of great value to Sandgate. Activities, whether local or beyond the town's boundaries, that would degrade air quality should be discouraged.

2.4 Maintain and enhance recreational opportunities

Many outdoor, natural resource based recreational activities are available in Sandgate. Cooperation with other communities may help to provide access to organized recreational facilities and activities that are not available in Sandgate.

2.5 Support appropriate economic activities

Because of its remote location and environmental constraints, the type of economic development that is appropriate in Sandgate is quite limited. Forestry, agriculture, outdoor recreation, and closely related businesses have historically been important in Sandgate and should be encouraged in the future. Opportunities for customary home occupations should also be supported; improved telecommunications and information services may contribute to the success of some such enterprises.

2.6 Encourage efficient energy use

The town's land use pattern, individual developments, and infrastructure should promote energy efficiency and conservation. In addition, sound proposals to develop renewable energy resources should be pursued.

2.7 Plan for, finance, and provide an efficient system of public facilities and services

Public facilities and services are critical to the well-being of Sandgate, and are necessary to support future growth and development. The local road system is of particular importance to the town. Emphasis should be placed on the maintenance and improvement of existing roads although certain portions of town roads that are in poor condition and are not maintained in the

winter may need to be reclassified (to Class 4) so that the town is not confronted with excessive maintenance costs in the future.

The adequacy of other public facilities and services should be assessed to determine whether any improvements are needed. Consideration should be given to schools, telecommunication systems, health care services, fire and police protection, solid waste disposal, and other public and quasi-public services. Cooperation with other towns should be pursued when appropriate.

Public capital investments should be planned to meet significant needs and coordinated so that excessive tax burdens are avoided.

2.8 Ensure access to good educational opportunities for all residents

Because Sandgate has not operated a local school since 1956, access to educational facilities for townspeople involves coordination with other towns and provides school choice. Children have been able to receive a good education by attending schools in nearby towns. A quality education should continue to be available to residents at costs not excessive to the town's taxpayers.

2.9 Actively encourage a high quality of life for residents of the town

The underlying goal of Sandgate's planning effort is to ensure a high quality of life for all residents through economic, environmental, and community planning. Particular emphasis should be placed on the availability of safe and affordable housing for all residents, the provision of necessary services, and the maintenance of a clean, healthy, and aesthetically pleasing environment.

SECTION 3: POPULATION, HOUSING, AND ECONOMIC CHARACTERISTICS

3.1 Population

After decades of decline, Sandgate's population began to increase in the 1960s. The town's population grew very rapidly in the 1970s, and continued to grow, although at a more moderate pace, during the 1980s and 1990s (Table 3.1). According to the 2020 U.S. Census, there were 387 year-round residents in Sandgate. The rate of population growth in Sandgate had been consistently higher than the regional growth rate over the past 30 years until the 2020 Census, which noted a 4% decline in population over the previous decade.

Table 3.1

Population Growth – Sandgate, Vermont (housingdata.org)

Year	Sandgate	Population % Change	Bennington County	% Change
1960	93	59	25088	4.03
1970	127	37	29282	16.72
1980	234	84	33345	13.88
1990	278	19	35854	7.52
2000	353	27	36994	3.18
2010	405	15	37125	0.35
2020	387	-4	37347	0.60

The median age of Sandgate residents is 52. A profile of the town's population age structure reveals a relatively high proportion of people in older age categories when compared to Bennington County or Vermont as a whole (Table 3.2). This data suggests that Sandgate is home to a relatively large number of senior citizens and retirees, and fewer young families with children than an "average" town in the county or state.

Table 3.2

Population Age Characteristics
Percent of Population in Age Class

	0-19	20-44	45-64	65+	Median Age
Sandgate	23	20.1	32.6	24	49.9
Bennington County	21.7	26.2	29.5	22.5	46.7
Vermont	21.7	30.5	27.7	20.1	42.8

Source: 2020 U.S. Census

Many of Sandgate's residents have moved into the town from outside of Vermont. Much of the town's population growth in recent decades has been due to this pattern of migration into the community.

3.2 Housing

Consistent with the town's population trend over the past 30 years, Sandgate has seen a significant increase in the number of housing units during this same time, and a small decline in the past decade. As of the 2020 census, there were 171 occupied year-round housing units in the town, an increase of 9 units since 2010 (Table 3.3). Of particular interest is the fact that there are a large number (36.6%) of seasonal and recreational housing units in Sandgate (2010 Census). There has been some conversion of seasonal dwellings to year-round housing units over the past decades. Clearly then, planning in Sandgate must give due consideration to both year-round and seasonal residential development.

Table 3.3

Year-Round and Seasonal Housing Units – Sandgate, Vermont

Year	Owner-occupied	Renter-occupied	Occupied Year-Round Housing Units	Seasonal/Recreational Housing Units	For Sale	For Rent	Vacant Units	Total Housing Units
1980	87	15	102	128	1	0	11	241
1990	80	31	114	128	4	0	20	262
2000	117	32	149	108	4	0	11	268
2010	136	26	162	105	3	4	20	287
2020	-	-	171	---	-	-	86	257

Source: 2020 U.S. Census

Several other interesting facts about housing in Sandgate can be discerned from recent U.S. Census data (only select data from the 2020 Census is available at this time) and American Community Survey (ACS) estimates. Of the 257 total housing units in town in 2020, nearly all are single-family dwellings or camps, and only an estimated 30 units are renter-occupied. Housing costs are relatively low in Sandgate. As of the 2020 Census, the median home value in Sandgate in 2020 was \$170,700

compared to a county median value of \$164,600 and a state median value of \$233,200. The median monthly mortgage payment in Sandgate (\$1,359) is comparable to the county median (\$1,368). On the other hand, median gross rent (all units) in Sandgate has fluctuated in recent years, from \$938 in 2005-2009 to \$639 from 2007-2011 to \$1,014 in 2020. As a percentage of household income, housing costs in Sandgate are relatively high, with 30% percent of owners and 26.3% percent of renters paying at or above 30% of their income toward housing costs.

In 2008, the Planning Commission performed a build-out analysis—which identifies all potential lots in the town, based on current zoning laws—to assist in the community planning process. According to this study, there was an adequate amount of land zoned for residential use that is physically capable of sustaining current levels of growth over the following several years.

3.3 Economic Characteristics

Economic activities in Sandgate are quite limited due to the town's small size and remote location. The town's extensive forests sustain ongoing logging activities. Other than logging and a small amount of farming, however, the only economic enterprises in Sandgate are an industrial maple business, an Italian goods online retailer, several home occupations, an inn, and a garage. Most Sandgate residents who are in the labor force commute to work in another town.

The town's total work force (2019 American Community Survey 5-Year Estimates) consists of 189 persons. The unemployment rate in 2019 was 3.0%, slightly lower than the county rate, and roughly equal to the state rate. Of the 179 employed workers over 16 years of age, over 85% reported that they commute to work and 12.4% reported that they work from home. The average commute time is approximately 26 minutes, reflecting, no doubt, the average commute times to the regional economic centers in Manchester and Bennington.

Data on the occupations of Sandgate residents reveal that a significant majority (39%) work in management, professional, and related occupations (Table 3.4). Service businesses, manufacturing, and retail trade are the leading employers by industrial classification.

The median income of a Sandgate household (\$51,979) is lower than the county and statewide medians (housingdata.org). The town's per capita income (\$28,618) is also lower than the county or statewide figures.

All of these economic and demographic statistics suggest that Sandgate is and will remain a very rural community with only limited economic activity within its borders. The town should support those industries that are most appropriate in this setting: principally forestry, agriculture, and home occupations. Improvements and technical advances in telecommunications could also be beneficial to Sandgate residents by enabling them to work out of their homes while exchanging information with offices or business clients in distant locations. Because many residents work in other towns in the area, local officials should also remain aware of important regional economic development issues.

Table 3.4

Occupation and Industry of Employed Residents of Sandgate, Vermont

Occupation	Number Employed	%
Management, business, science, and arts occupations	73	38.6%
Service occupations	28	14.8%
Sales and office occupations	43	22.8%
Natural resources, construction and maintenance occupations	17	9.0%

Industry	Number Employed	%
Production, transportation and material moving occupations	18	9.5%
Agriculture, forestry, fishing, hunting, mining	2	2.8%
Construction	13	8.9%
Manufacturing	15	8.4%
Wholesale trade	4	2.2%
Retail trade	16	14%
Transportation and warehousing, and utilities	6	3.4%
Information	0	0
Finance, insurance, real estate, and rental and leasing	5	7.3%
Professional, scientific, management, administrative and waste management services	11	11.7%
Education services, health care and social assistance	29	24%
Arts, entertainment, recreation, accommodation and food services	10	10.1%
Other services except public administration	5	3.9%
Public administration	2	1.1%

Source: 2019 American Community Survey 5-Year Estimates



Figure 2: The working landscape is an essential part of Sandgate's rural landscape.

SECTION 4: NATURAL RESOURCES

4.1 Physiography

The Town of Sandgate is located entirely within the structurally complex Taconic Mountain physiographic province. The bedrock in this area consists largely of metamorphosed sedimentary rocks: slate, shale, and phyllite, as well as some limestone, dolomite, marble, quartzite, and schist. The subsurface caves and enlarged bedrock fractures that occur in the area have resulted from naturally acidic water dissolving carbonate bedrock. Evidence of the Pleistocene glaciations can be seen in the till deposits -- unsorted mixtures of glacial sediments ranging in size from clays to large boulders -- that cover much of the town.

The town's topography is characterized by an irregular pattern of steeply sloping mountains and ridges separated by numerous stream valleys and hollows (Map 1). Over 19,000 of the town's 27,039 acres lie at slopes in excess of 20 percent; the only substantial areas of moderately level

ground occur in the valleys of the Green River and Terry Brook. Overall topographic relief is considerable, ranging from an elevation of about 670 feet above sea level along the Green River near Arlington to over 3,300 feet on Bear Mountain in the northeastern part of town. Other prominent summits in Sandgate include Moffit Mountain, Egg Mountain, Swearing Hill, and Minister Hill.



Figure 3: Swearing Hill in Spring.

A particularly significant geological feature in Sandgate is the rugged ridge that traverses the town from the southwest to the northeast and divides the drainage basin of the Green River from those of Terry Brook and Chunks Brook. This ridge is crossed by only one road, thus forming a very real physical barrier between east and west Sandgate. The one road that does connect the two sides of town passes through "The Notch," a spectacular switchback passage that winds through steep rock walls.

Physical characteristics of the land are important in determining locations that are best suited for development. Because development on steep slopes or on soils that are too shallow, wet, or unstable can cause severe problems—roads will be difficult and costly to maintain, emergency services may not be able to access the site, septic systems can fail and contaminate water supplies, erosion will result in soil loss and degrade aquatic environments, and so on—siting in these areas is discouraged. Conversely, when development is directed to appropriate locations, communities can grow and prosper while minimizing environmental damage and the need for inordinate expenditures of public funds. In Sandgate, areas well-suited to development are largely confined to valley areas along the Green River and some of its tributaries and in West Sandgate. These areas are characterized by moderate slopes and relatively deep soils that can supply adequate quantities of clean ground water while supporting sanitary wastewater disposal systems.

The U.S.D.A. Natural Resource Conservation Service has completed a comprehensive soil survey that covers the Town of Sandgate. This survey allows planners and landowners to determine whether soils in a particular area are best suited for residential development, agriculture, forestry, sand and gravel extraction, or some other activity. This information should be a basic element in future land use planning activities in Sandgate and is available at the Bennington County Regional Commission's GIS facility, allowing for rapid interpretations of soil data in conjunction with other geographic attributes.

4.2 Water Resources

Rivers and Streams

Nearly all of the water resources described below fall within the Interior Forest Blocks, Connectivity Blocks and Physical Landscape Diversity Blocks shown in Map 5B. These landscape level features integrate terrestrial and aquatic systems through surface and subsurface flows of water, limiting sediment and soil erosion, moderating flood flows, and allowing for the variety of habitat types required for both terrestrial and aquatic fauna and flora.

Sandgate contains a variety of surface water features (Map 3). The most prominent of these are the numerous streams that cascade down the town's hollows and valleys. The Green River and its tributaries drain the east side of town, while Terry Brook and Chunks Brook drain most of the west side of town. These three streams, in turn, all flow into the Batten Kill. A small area in the northwestern part of Sandgate drains toward White Creek in Rupert and New York State. Because White Creek, like the Batten Kill, is a tributary of the Hudson River, the entire Town of Sandgate lies within the Hudson River drainage basin.

These streams serve a number of important functions. In addition to supplying clean water to larger waterways, they serve as important fisheries (the Green River supports populations of native brook and brown trout), provide a critical habitat component for many wildlife species that inhabit them as well as serving as Surface Water and Riparian Corridors that provide pathways for species moving between higher and lower elevations (Map 5B). They also afford opportunities for swimming and other recreational activities, and are critical to the area's aesthetic appeal. These functions will be preserved if the streams, stream banks, and riparian vegetation are maintained in a free-flowing and unpolluted state. The Town of Sandgate has recognized the need to protect these resources, and has passed specific regulations as part of the municipal Zoning Bylaws that place restrictions on certain activities that occur within a stream's riparian buffer area. The town should also encourage development planning that maintains green space along streams, and should seek opportunities—such as conservation easements—for ensuring public access to streams in appropriate locations.

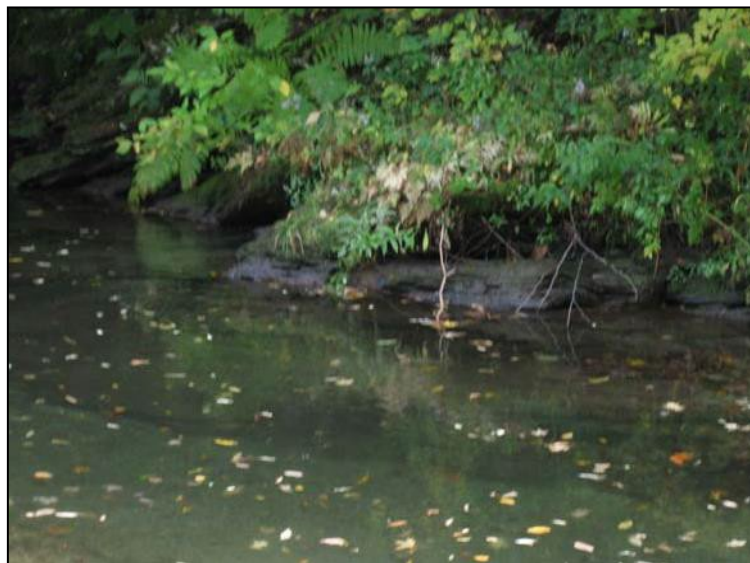


Figure 4: A favorite swimming hole on the Green River.

Ponds

Because of its rugged topography, Sandgate is not home to any large lakes. There are a number of small ponds, however, and one impoundment known as Lake Madeleine which, at 20 acres, is the largest body of water in town. Three of the town's larger ponds -- Lake Madeleine, Barbos Lake, and Hopper Pond -- are relatively inaccessible to the public, being located in a remote area on the private lands of the Carthusian Monastery on Mt. Equinox. Some ponds do offer such recreational benefits as fishing (especially in private, stocked ponds) and swimming. Moreover, all of the ponds serve as important wildlife habitat and scenic resources.



Figure 5: One of Sandgate's many small ponds.

Planning for the protection of water resources must consider not only activities that occur on or immediately adjacent to the waterbody, but also activities that occur within the watershed. For example, building construction or logging activities can add sediments and other contaminants to streams or drainage ways that flow into a pond. These materials can degrade water quality and accelerate excessive weed growth (eutrophication) in the pond. The Vermont Agency of Natural Resources has published a manual, *Planning for Lake Water Quality Protection*, which is intended to assist communities in planning for lakes and ponds. Persons undertaking activities that could affect pond water quality should consider the recommendations contained in that manual in addition to any local zoning regulations. Special attention should be given to ponds that lie at high elevations (above 1,800 feet) because these waterbodies support especially fragile ecosystems that thrive only in a relatively narrow range of water quality conditions.

Wetlands

Additional important water features, found principally along stream valleys in Sandgate, are wetlands. Wetlands are lands transitional between aquatic and terrestrial systems where the water table is usually at or near the surface or the land is covered by shallow water. The State of Vermont defines wetlands as “those areas of the state that are inundated by surface or ground water with a frequency sufficient to support significant vegetation or aquatic life that depend on saturated or seasonally saturated soil conditions for growth and reproduction.” A wetland has one or more of the following attributes: (1) at least periodically, the land supports predominantly hydrophytic vegetation; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season each year. Benefits provided by wetlands include: flood and storm water control, maintenance of surface and ground water quality, open space and aesthetic

appreciation, fish and wildlife habitat including a large number of threatened and endangered species, ecological research and educational opportunities, and sources of nutrients for freshwater food chains.

Wetlands include, but are not limited to, marshes, swamps, sloughs, potholes, fens, river and lake overflows, bogs and ponds. Since many of the town's wetlands lie in the same lowlands where most of the future growth will occur, special attention must be given to the protection of these natural areas.

Vernal Pools

Vernal pools are temporary bodies of water that usually occur in woodland depressions. Most vernal pools are filled by spring rains and snowmelt and are typically dry during the summer months. Some pools are filled again in the fall and contain water during the winter. During wet years, many vernal pools contain water year-round. Typically vernal pools are less than 3 feet deep and vary in size from just a few feet across to over 100 feet in width. Vernal pools provide important breeding habitat for many amphibians including the tree frog and salamanders as well as many species of insects. These habitats are safe breeding grounds because they do not support fish populations. Since many amphibians return to the same vernal pool each year to breed, destruction or alteration of vernal pools may result in the loss of local populations of some species. However, because of their small size and temporary nature, vernal pools are not protected under the Vermont Wetland Rules. They are a unique and very vulnerable habitat area that should be identified and protected under municipal regulations.

Floodplains and Fluvial Erosion Hazard Areas (River Corridors)

Development in floodplains and fluvial erosion hazard areas is inherently dangerous, due both to the immediate hazards associated with flood water inundation, and to the increased flooding that may occur downstream when developed floodplains are no longer capable of retaining flood waters. Such development can also interfere with the function and quality of floodplain wetlands. Flood hazard regulations are therefore necessary to reduce the risk that construction in floodplain areas will result in property damage, personal injury, or unnecessary costs to the public. Sandgate joined the National Flood Insurance Program in 2013 thereby providing access to flood insurance for anyone in the community as well as structures within high risk flood hazard zones. This insurance helps to protect owners from financial loss as private insurers mostly do not provide coverage for damage due to overland flow.

For areas at risk of inundation, FEMA revised its flood hazard maps in December 2015. These maps are based on a more accurate measure of topography using LIDAR, a method using lasers to determine elevations within a few centimeters.

For areas at risk of fluvial erosion, the Vermont Agency of Natural Resources, the Bennington County Regional Commission, and the Bennington County Conservation District have cooperatively completed a series of studies of the Batten Kill watershed resulting in the mapping of fluvial erosion hazard areas (river corridors). Most flood-related damage in Vermont is caused by fluvial erosion and not by inundation.

Fluvial erosion hazard areas and the new Digital Flood Insurance Rate Map with Special Flood Hazard Areas can be viewed at tinyurl.com/floodreadyatlas. Effective and historic Flood Insurance Rate Maps can be found at www.msc.fema.gov. The following hazard zones are mapped for the Town of Sandgate:

Special Flood Hazard Areas (Zone A): areas subject to inundation by a one percent annual chance "base flood" event. This area is also known as the 100-year flood zone however this is a misnomer and the area has an independent 1 percent chance of flooding on any year. Some

areas within this zone will flood more frequently. Over a 30-year mortgage, sites within this zone have more than a one in four chance of experiencing flooding.

Floodway: The floodway is a subsection of the DFIRM Special Flood Hazard Areas and refers to the channel of a river or other watercourse and the adjacent land areas that must be reserved to discharge the base flood without cumulatively increasing the water surface elevation more than one foot at any point. As of March 2022, mapping of floodways has not occurred in Sandgate, but they may be mapped in the future.

Fluvial Erosion Hazard Areas: these areas identify the extent needed for horizontal adjustments of river and stream channels as they meander. This space allows the channel to maintain a stable slope and least erosive/damaging form. This area accommodates the water, sediment, debris and energy of the system without causing a down-cutting (incision) process. Channels in an equilibrium slope can maintain their ability to flood (and disperse energy and sediment) thereby reducing the damaging erosive power of the flow. River Corridors are the most up-to-date area of fluvial erosion hazard mapped by Vermont Department of Environmental Conservation. They include the width of the meander belt of a river and an additional 50' buffer to allow for a stable wooded bank when the river is at its equilibrium / least erosive slope. River Corridors are not mapped for small streams but do include, by definition, the area within 50 feet of the top of bank of streams with a watershed less than 2 square miles.

Dynamic equilibrium is determined at the channel reach scale. These areas are subject to fluvial erosion hazards, from gradual stream bank erosion to catastrophic channel enlargement and bank failure. Fluvial erosion hazard areas provide the space needed by the stream channel to handle large flows and moderate damage. River Corridors have been mapped by The Vermont River Management Program in accordance with accepted state fluvial geomorphic assessment and mapping protocols.

Vermont has now established a statewide goal of flood resilience to encourage communities to protect river corridors and has established the Emergency Relief and Assistance Fund (ERAF) as an incentive for communities to take hazard mitigation actions before the next declared disaster. River Corridor protection is also in alignment with other state and community goals such as clean water, wildlife habitat, and public recreation.

The table below shows the number of structures by type from E911 data that are in the Special Flood Hazard Areas or within a fluvial erosional hazard area. These numbers are really estimates as the E911 points are not always located exactly where structures are.

TABLE 4.2 Structures in the Special Flood Hazard Area (SFHA) and/or River Corridors (FEH) in Sandgate. Source: BCRC GIS analyses		
Type	SFHA	FEH
Single family	2	12
Commercial	0	1
Lodging	0	1

As of May 2015, there were two structures located within the Special Flood Hazard Area. There are properties vulnerable to flooding or to flooding-caused-erosion that are not currently protected through the National Flood Insurance Program.

Most of the 14 structures already in the fluvial erosion hazard area are probably older “Pre-

FIRM” structures. Such buildings, built before the Flood Insurance Rate Maps were available may be able to access a special lower rate flood insurance at this time. Over the coming years the premiums for Pre-FIRM residential structures will rise at 5 to 18% per year plus fees until at actuarial cost for the risk of the group. The cost of insurance for non-residential structures is rising at 5 – 25% a year. The owners of these structures may need help, notably in the form of grants, to elevate or relocate. The community should assess the extent of this need in its Hazard Mitigation Plan and identify strategies to address them.

Shoreline Buffer Strips

The maintenance and enhancement of shoreline vegetation is perhaps the easiest and most effective means of protecting the many benefits and values associated with surface waters. Setting aside strips of naturally growing vegetation is essential to the health of all streams, lakes and ponds. Vegetated shorelines contribute to water quality and shoreline protection in the following ways:

- Provide bank support,
- Provide food and shelter for fish and wildlife,
- Intercept and filter out pollutants,
- Keep water temperatures cool during the summer months when fish are susceptible to heat stress,
- Reduce surface runoff,
- Increase wildlife diversity,
- Reduce the impacts of flood and ice damage to stream channels, adjacent lands, and structures, and
- Preserve the natural characteristics of water.

Where onsite evaluations have not been conducted by the Department of Fish and Wildlife staff, the agency recommends riparian buffer zones not less than 50 feet and up to 100 feet for the protection of water quality, fish habitat, and wildlife habitat for regulated projects on streams. A greater or lesser setback may be recommended when an onsite investigation has been conducted. Wider buffer zones are recommended for sites having the following characteristics: steeper slopes, specific natural resource values of concern (e.g. threatened or endangered species), and projects or activities posing great risks to the environment. Details regarding the calculation of buffer strip widths are available from the Department of Fish and Wildlife and the Vermont River Management Program.

Groundwater

Groundwater provides the primary supply of potable water for most of the town residents. Groundwater moves beneath the ground through aquifers. An aquifer is an underground area of water-saturated sand, gravel or fractured bedrock that is permeable enough to yield water through wells or springs. The surface area that drains into an aquifer is called an aquifer recharge area. Groundwater occurs in the unconsolidated sediment of streams and buried valleys and in bedrock fractures. While the potential for groundwater in areas of unconsolidated sediment is generally favorable, wells producing water from rock fractures usually have lower yields. The town’s mountains and uplands are composed of exposed bedrock or bedrock which is covered by a thin layer of glacial till with low permeability. Bedrock fractures are the primary source of groundwater in these upland areas. Protection of groundwater requires the protection of surface waters, wetlands, watersheds, and recharge areas in a coordinated and ecologically sound fashion.

When an aquifer becomes polluted, simply removing the source of contamination does not clean up the groundwater. A contaminated aquifer may remain polluted for many years or, in some cases, forever. Groundwater occurring in rock fractures is highly susceptible to contamination. While unconsolidated sediment can usually filter out organic pollution contained in groundwater, the same water can travel for miles through rock fractures without any appreciable purification. Once contamination occurs, control and abatement are extremely difficult. Contamination sources include improperly designed or malfunctioning septic systems, industrial floor drains, poor agricultural practices, road salt, leaking underground storage tanks, and old solid waste disposal sites.

Stormwater

Stormwater runoff is a threat to water quality in our local streams, ponds, and lakes. Stormwater runoff is typically a problem in areas with a significant amount of impervious surface, including roads, parking lots, driveways, and rooftops. These surfaces prevent rainwater from infiltrating into the ground. Instead, stormwater runoff moves across these surfaces collecting sediment, nutrients, and other pollutants which quickly flow into our surface waters. For streams, the result is a higher volume of water during rain storms, which leads to faster flows and the potential for more erosion and greater flood damage. The amount of impervious surface also reduces opportunities to recharge groundwater, which leads to lower stream flows during dry conditions.

Stormwater Treatment Options

There are a variety of stormwater management techniques that can be used to reduce the impact of impervious surfaces in the watershed. First and foremost, the amount of impervious surface can be reduced by ensuring that development is not creating excessive surfaces, such as unnecessary parking, long driveways, or overly wide roads. When surfaces are built, a variety of practices can be employed that capture and slow the runoff, provide opportunity for infiltration, and allow nutrients and sediment to be removed before stormwater is discharged into a stream.

Low Impact Development

Low Impact Development (LID) is “an innovative land planning and engineering design approach which seeks to maintain a sites pre-development ecological and hydrologic function through the protection, enhancement, or mimicry of natural processes.” LID is considered a non-structural practice used predominantly with new development. At its core, LID focuses on minimizing the impacts of development on a particular site. In doing so, LID mitigates problems before they start.

The concept of LID is generally thought to encompass eight principles (outlined below). When LID is incorporated as part of a site design the result is wetland and riparian habitat protection, reduction of peak runoff flow and rate through the reduction of impervious surfaces, reduced risk of flooding, improved community value and aesthetics, and long-term cost savings from reduced water infrastructure maintenance.

LID Principles

- Utilize Conservation Development
- Minimize Soil Compaction
- Minimize Total Disturbance
- Protect Natural Flow Patterns

- Protect Riparian Buffers
- Protect Sensitive Areas
- Reduce Impervious Surfaces
- Disconnect Stormwater

Municipalities support the use of LID through the enactment of LID bylaws. Such bylaws help guide future development in a way that protects water quality, encourages environmental protection, provides flexibility, and promotes sustainability.

Green Stormwater Infrastructure

The practice of LID often goes hand-in-hand with the use of Green Stormwater Infrastructure (GSI). GSI is defined as “systems and practices that restore and maintain natural hydrologic processes in order to reduce the volume and water quality impacts of the built environment while providing multiple societal benefits.” GSI represents a structural addition to the landscape and can be used to manage development impacts not addressed by LID. It can also be used to retrofit existing sites, which were planned with conventional methods.

GSI Best Management Practices (BMP) can be used to effectively restore and maintain natural hydrologic processes when developing/redeveloping land. Examples of GSI BMPs include bioretention systems, porous asphalt systems, and grass filter strips. The core benefit of these systems is that runoff generated from development is infiltrated, evaporated, or recycled rather than polluting downstream resources. The Town recognizes the importance of GSI for protecting its sensitive water resources as well as the State’s interest in promoting its use at the municipal level.

4.3 Forest Lands

The vast majority of land in Sandgate is covered by forests. This was not always the case, however, as early settlers cleared large areas for agriculture and settlement. With time, the economic viability of farming on Sandgate’s marginal lands declined, as did the demand for wood products. Consequently, the town’s population dwindled and the forests began reclaiming the once cleared landscape. Today, forests of mixed hardwoods (principally maple, beech, and yellow birch) cover most of the town. Oak stands occur on some south-facing slopes and on hill tops with shallow soils. Coniferous and mixed forests are found at higher elevations and on poor soils. The town also contains a large number of white birch trees, found mainly in areas that are in transition from open field to mature mixed hardwood forest.



Figure 6: Much of Sandgate is a forested landscape.

While Sandgate does contain some quality timber stands, there are extensive areas covered by forests of relatively poor quality. This situation is largely attributable to past logging practices that removed only the best trees and left the poorer ones. New logging practices are designed to improve the quality of timber stands. Effective logging can encourage the growth of a variety of economically valuable tree species and also provide improved habitat for many wildlife species. Economic factors play a strong role in promoting particular forest management practices. Any energy crisis, for example, encourages people to remove poor quality trees for use as firewood.

Forests help to prevent soil erosion and flooding, contribute to air and water quality, and provide valuable timber, wildlife, recreational, and aesthetic resources. Timber harvesting is a particularly important economic activity in Sandgate. Proper management will ensure a continuing yield of valuable forest products well into the future as well as improved wildlife habitat. Several lumber companies own and manage large parcels of timber land in Sandgate. In addition, numerous individuals and foundations own land that is enrolled in Vermont's Current Use (Use Value Appraisal) program (some of the lumber company lands are also enrolled in this program); a current forest management plan is required for all of these parcels. As of 2021 there are 62 parcels (up from 58 parcels in 2015) in Sandgate, containing approximately 18,124 acres of managed forest land, enrolled in this important program.

A number of other uses are also of great importance in Sandgate's forests. The town's forests contain some of the most popular deer hunting land in the region, important black bear habitat, hunting camps, and support other recreational pursuits. Obviously, the extensive network of trails and logging roads that exist in the forests are critical to many of these activities. The greatest threat to Sandgate's forests is the fragmentation of large parcels of forest land. Such land subdivision is caused by factors ranging from a landowner's inability to pay property taxes to speculative real estate development. Fragmentation replaces large contiguous tracts of forest land with multiple small parcels which are far more difficult to effectively manage for timber production, wildlife habitat, or recreational use.

There are several possible ways to preserve Sandgate's forest lands and the values that they serve. The Current Use program, mentioned earlier, provides property tax relief to landowners who keep their forest lands undeveloped and well managed. The foregone municipal tax revenues are replaced by payments from the state. The level of state funding for this program in future years is uncertain, however, particularly during recessionary times. Local zoning regulations are another tool that can be used to protect forest lands, for example, specifying parcel shape. Much of Sandgate is zoned "Forest 2," permitting only forestry, recreational uses and facilities, agriculture, and dwellings on large lots. Dwellings are not permitted on land lying above the 1,600 foot elevation contour. Land may also be preserved through the acquisition of development rights or conservation easements by organizations such as the Vermont Land Trust.

Forest Block Connectivity

Sandgate is entirely within the Taconic Mountains biophysical region, which is a large, distinct area defined by geology (primarily slate, phyllite and schist along with limestones and marbles), landforms (extensive hills, slopes, and ridgelines) and the types of plants and animals that inhabit them. The Taconics form the western boundary of Vermont with New York and extend south into Massachusetts and Connecticut. Approximately 94% of Sandgate is forested. Map 1 shows natural cover types as classified through the National Oceanographic and Atmospheric Administration (NOAA 2017). Detailed mapping of cover types has not been completed, the major cover types are deciduous forest (86%), mixed forest (5%) and coniferous forest (3%). Matrix forest types likely within the Taconics include:

- Northern Hardwood Forest – generally found on middle to upper elevations
- Rich Northern Hardwood Forest – generally found on middle elevations on east facing slopes
- Mesic Maple-Ash-Hickory-Oak Forest – primarily in dryer sites

These matrix forest types cover large areas and may have numerous other community types, including terrestrial communities, wetlands, and stream courses within them. Matrix forests form the “basket” in which a diverse array of natural communities exists. These smaller communities are maintained by variations in environmental gradients such as soil depth, depth to groundwater, exposure to wind and solar radiation, disturbance, and other factors. Significant natural communities mapped by the Vermont Fish and Wildlife Department include Dry Oak Forest, Dry Oak-Hickory-Hophornbeam Forest and Red Oak-Northern Hardwood Forest, all located in the southwestern part of the town.

Forests are the largest land cover type in Vermont and there are many forests that have not been fragmented by roads, development, power lines or other features. Maps 5B and 5C show areas, described below, identified in the Vermont Conservation Design program as those areas necessary for the long-term ecological function of a diversity of species and natural communities and which require large-scale conservation to remain viable.

Title 24, Chapter 117 of the Vermont Statutes governing municipal planning (24 V.S.A. §4382), requires the plan include 12 elements, many of which already directly or indirectly address natural resources. For forests, the relevant sections of 24 V.S.A. §4382 are as follows:

(2) A land use plan, which shall consist of a map and statement of present and prospective land uses, that:

(A) Indicates those areas proposed for forests, recreation, agriculture (using the agricultural lands identification process established in 6 V.S.A. §8), residence, commerce, industry, public, and semi-public uses, and open spaces, areas reserved for flood plain, and areas identified by the State, the regional planning commission, or the municipality that require special consideration for aquifer protection; for wetland protection; for the maintenance of forest blocks, wildlife habitat, and habitat connectors; or for other conservation purposes.

(D) Indicates those areas that are important as forest blocks and habitat connectors and plans for land development in those areas to minimize forest fragmentation and promote the health, viability, and ecological function of forests. A plan may include specific policies to encourage the active management of those areas for wildlife habitat, water quality, timber production, recreation, or other values or functions identified by the municipality.

An ecologically functional landscape is one that provides for connectivity across a broad range of habitat types and physical features such as slope, aspect, and elevation. (Vermont Wildlife Action Team, 2015). To map these natural resources, the Planning Commission used the Vermont Geportal and incorporated the following into a GIS data project:

Interior Forest Blocks are areas of contiguous forest, unfragmented by roads, development or agricultural lands that may also contain wetlands, waterbodies, and other features. These areas are critical to wide ranging species as well as Neotropical migratory bird (Vermont Wildlife Action Team, 2015). They also are likely to be most resilient to climate change.

Connectivity Blocks overlap with the High Priority Interior Forest Blocks and link forests and other habitat providing for the movement of wide-ranging species such as black bear and bobcat and animals with small ranges such as amphibians that breed in wetlands and vernal pools. They also provide habitat for many forest nesting birds that migrate to and from the tropics. These blocks cross local, county and state and sometimes international boundaries. The Nature Conservancy has identified connections between the Taconics, the Berkshires and the Rensselaer Plateau, while the Green Mountains connect to forest blocks to the north, east and south.

Physical Landscapes Diversity Blocks are areas of natural vegetation that may contain unique geologic, topographic and vegetation characteristics, and may also overlap with the above-mentioned types. Within Sandgate, are over 100 types categorized by elevation (high, mid to high, low to mid and low), geology (acidic, calcareous, moderately calcareous) and slope position.

These categories represent different potential habitat types as well as landscape variants that may be more or less vulnerable to climate change.

Physical Landscape Blocks: Relatively unchanged and discrete landscape features. These have not been mapped in Sandgate.

Riparian Wildlife Connectivity: Surface waters along rivers and streams that contain natural vegetation and provide connectivity from high to lower elevations. In Sandgate, Terry Brook which flows into Camden Creek and the Green River are the largest corridors, but many smaller tributaries flow into those from higher elevations (Map 5B).

Terrestrial Wildlife Crossings are road segments with suitable habitat on both sides of the road that provide connections for movement of animals. Basically, all roads in Sandgate fall into this category (Map 5C).

Riparian Wildlife Crossings are areas where wildlife may cross streams near roads and largely match up with terrestrial wildlife crossings.

For the purposes of making the plan more readable, the above will be referred to as “unfragmented forest blocks and connectors.”

In addition, the Commission used information from The Nature Conservancy and the New York Natural Heritage Program that depict Matrix Forest Blocks. These were developed for northeastern North America and are here discussed for the area in and around Sandgate.

Forest resources provide employment and scenic benefits to the Town and region. In addition, these areas serve as vital sources and recharge areas for public and private water supply. Forests greatly reduce the volume and velocity of water flowing downhill following rainfall or snow melt and therefore are critical to attenuating floods and maintaining flood resiliency. The high-quality forest environment also provides a recreational resource with a wilderness character, serves as a wildlife habitat, and prevents soil erosion. Forests also provide woody raw material for construction, firewood, and paper products.

Development can cause both the reduction in total forest area and fragmentation manifested by the splitting of forest blocks into disconnected stands. Fragmentation can reduce the ability of animals to move due to roads and other barriers, reduce the abundance of species dependent on large forest blocks, and provide pathways for invasive species¹ that can outcompete native species and interfere with regeneration of native trees. Fragmentation can also make forestry operations less economically viable or more difficult to practice while avoiding conflicts with residential and other uses. Fragmentation of ownership as large parcels are subdivided, also known as parcelization, can make management difficult as it is difficult to develop and implement coherent management plans on multiple ownerships. Sustainable forest management is difficult on forest parcels of less than 50 acres in area (Vermont Agency of Commerce and Community Development, 2017). New roads can increase stormwater runoff and reduce infiltration into groundwater resources.

Map 5C shows priority forest blocks and potential areas of connectivity with areas beyond Sandgate, including into New York.

4.4 Agricultural Lands

At one time, there were numerous farms in Sandgate, and much of the land was cleared for

¹ Invasive species are non-native plants, animals and other organisms introduced to natural systems that can reduce the viability of those systems and can harm the economy and human health (see <https://vtinvasives.org/intro-to-invasives/what-are-invasive-species>).

pasture and cropland. Agricultural activity rapidly declined as growth in the fertile lands of the Midwestern United States and improved transportation made farming in areas like Sandgate a losing proposition. Some of the better soils in town still are farmed, however, and these operations help maintain the rural character of the town. In addition to serving as a livelihood for some residents, the open fields provide valuable wildlife habitat and scenic vistas. The town should strive to preserve its most productive agricultural soils (Map 4), even if they are not currently being farmed, for some future time when local farming may once again become economically important or necessary.



Figure 7: Productive agricultural land in Sandgate is a valuable natural resource.

As in the case of forests, a number of techniques are available to help towns preserve agricultural lands. Zoning regulations that permit only compatible types and densities of development and "clustering" provisions that allow subdivisions to be concentrated on one section of a parcel while the best agricultural soils are left undeveloped are effective regulatory measures. Vermont's Current Use program provides property tax relief to agricultural landowners as well as to forest landowners.

4.5 Wildlife Habitat

The importance of Sandgate's waters, forests, and fields to populations of fish and wildlife has already been noted. Particular mention should be made of the Green River as an important fishery and of the numerous winter deer yards (Map 5) that provide crucial shelter and browse for deer during the winter months. The Vermont Department of Fish and Wildlife has determined that important seasonal black bear habitat exists east of the Green River in Sandgate. Many other wildlife species, both game and nongame animals, thrive in the town and contribute to the rural character and quality of life that residents enjoy.

The most important factor in maintaining viable populations of these animals is the protection of their habitats. Information on the nature and location of important habitats should be maintained and should be readily accessible to the public. The presence of such areas should be considered when determining the appropriateness of public land ownership. Development and logging activities should be planned so as to avoid damage to deer yards, aquatic environments, and other important wildlife habitats. Specific measures that can be taken to minimize adverse impacts on wildlife include: the maintenance or provision of natural buffers between developed areas and wildlife habitat, the maintenance of vegetated corridors along streams, shorelines, and between similar but separate habitat areas, and utilization of construction practices that minimize environmental disturbances.

Figure 8: Many Sandgate residents enjoy fishing, hunting and viewing wildlife.



4.6 Air Quality

The quality of the air in Sandgate is generally excellent, and efforts should be made to ensure that it remains clear and clean. There are a number of things that could impact air quality in the area. The increasing cost of disposing of solid waste may have the undesired effect of encouraging the burning of refuse, an activity that can produce unpleasant local air pollution. Such "backyard burning" is, in fact, illegal under state law and should be discouraged. Although Sandgate is not home to any industrial facilities that pollute the air, airborne contaminants emanating from distant sources can affect air quality locally. Sulfur dioxide emissions from coal-burning power plants and resulting air quality degradation and acid deposition in downwind mountainous areas is a well-documented example of such a situation that could pose a very real threat to Sandgate. The town should work with the Bennington County Regional Commission and other interested parties to present air quality concerns at state and interstate environmental reviews.

4.7 Earth Resources

There have never been extensive earth resource extraction activities in Sandgate. There are, however, a number of small sand and gravel deposits that provide materials for construction projects in the area (Map 6). These deposits are important and should remain available for use in years to come. The town should identify important deposits and ensure that new developments do not render these resources inaccessible.

Consideration must also be given to the fact that extraction operations can be damaging to the environment if carried out improperly. Extraction methods must consider both immediate environmental concerns and the use of the site after completion of the sand and gravel mining. The zoning bylaws contain specific regulations designed to minimize the environmental impacts of earth products removal, and to assure restoration of sites once work is completed. These regulations should be strictly enforced.

4.8 Policies and Recommendations

1. Growth should be directed to areas where physical conditions are most capable of supporting such development. Growth should be restricted in areas of high elevation, steep slopes, or poor soils where environmental damage is likely to occur as a result of development. Special attention must be given to the need to prevent soil erosion, contamination of surface and ground water, and damage to natural ecological communities.
2. The town should use soil data and other geographic information in land use planning.
3. The natural characteristics and values of Sandgate's rivers, streams, natural ponds, and state-defined wetlands should be preserved. The municipal zoning bylaws regulate uses within designated buffer areas adjacent to these resources.
4. The municipal subdivision and health ordinances, and the regulations of the Vermont Agency of Natural Resources, must be strictly enforced to protect individual water supplies.
5. An effort should be made to encourage public access to streams, forests, trails, and other important natural resources and recreation areas.
6. Development in important forest, agricultural, or wildlife habitat areas should consider the preservation of those resources.
7. The town should pursue and support policies and programs that encourage the preservation of important forest areas.
8. Silvicultural practices should promote growth of high-quality timber stands and the establishment or protection of important wildlife habitat. Such practices should also minimize soil erosion and impacts on roads, streams, and the natural appearance of mountain and ridge tops.
9. The town should remain aware of potential threats to local air quality, and work with appropriate organizations to ensure that Sandgate's air remains clear and clean.
10. Important sand and gravel resources should remain available for economic extraction and use. Local regulations should be designed to ensure that extraction operations are environmentally sound and that sites are properly restored.
11. Forest Connectivity: Sandgate should support and state initiatives aimed at preventing forest fragmentation. Large, intact forest blocks should be maintained to assure the long-term viability of the forest and for wide-ranging animals and neotropical migratory birds and to moderate flood flows at lower elevations.
12. Water Resources: The ecological and hydrological integrity of rivers, streams and wetlands should be maintained to provide key ecosystem services such as water purification, pollutant abatement, nutrient dispersal and cycling and flood water retention. Rivers, streams and wetlands should also be protected to allow for continued recreational use and to provide valuable scenic resources. Development within identified Special Flood Hazard Areas and fluvial erosion hazard areas should be avoided. The Town, BCRC and Vermont ANR should work cooperatively to complete and maintain updated flood hazard and fluvial erosion hazard maps and identify specific areas of concern
13. Flood Resiliency: To protect the public health, safety and welfare, new development should be avoided in identified Special Flood Hazard Areas and fluvial erosion hazard areas.

4.9 Actions

Water Resources Actions

1. The surface waters in the Town of Sandgate are extraordinarily valuable natural resources that must be protected from incompatible development and land uses. The natural characteristics and values of these resources should be preserved. An undisturbed buffer should be considered, wherever possible, between any developed area and a river, stream, lake, or state-defined wetland to ensure that water resources are protected. This buffer should be at least 50 feet for streams such as Tidd Brook with minimal potential for lateral or vertical adjustment and 100 feet for streams such as The Green River with significant potential for such adjustment.
2. Recreational uses such as fishing, canoeing and swimming are appropriate in natural settings in and along rivers, streams, lakes, ponds, and wetlands. Development planning should include provisions for public access to these resources.
3. Aquifers and ground water recharge areas must be protected from activities or development that would adversely affect the quantity or quality of available ground water. Municipal zoning and health ordinances and the regulations of the Vermont Agency of Natural Resources must be strictly enforced to protect individual water supplies.
4. Silvicultural practices that minimize soil erosion and impact on roads, streams, wildlife habitat and the natural appearance of mountain and ridge tops should be employed.
5. The Town should participate in cooperative planning for regional water resources. Such projects may consider issues related to environmental quality, public health, recreational use and public access, fish and wildlife habitat, and aesthetic values, and should involve representatives of town governments, special interest groups and interested persons.
6. In-stream ponds are discouraged on all streams that support fish life. In cases where feasible alternatives do not exist, in-stream ponds on seasonal streams, or off-stream ponds that discharge directly into a stream may be acceptable provided that the pond waters do not violate Vermont Water Quality Standards.
7. Developments or activities that would have an undue adverse effect on the quality of the Town's surface waters shall be prohibited

Flood Resiliency Actions

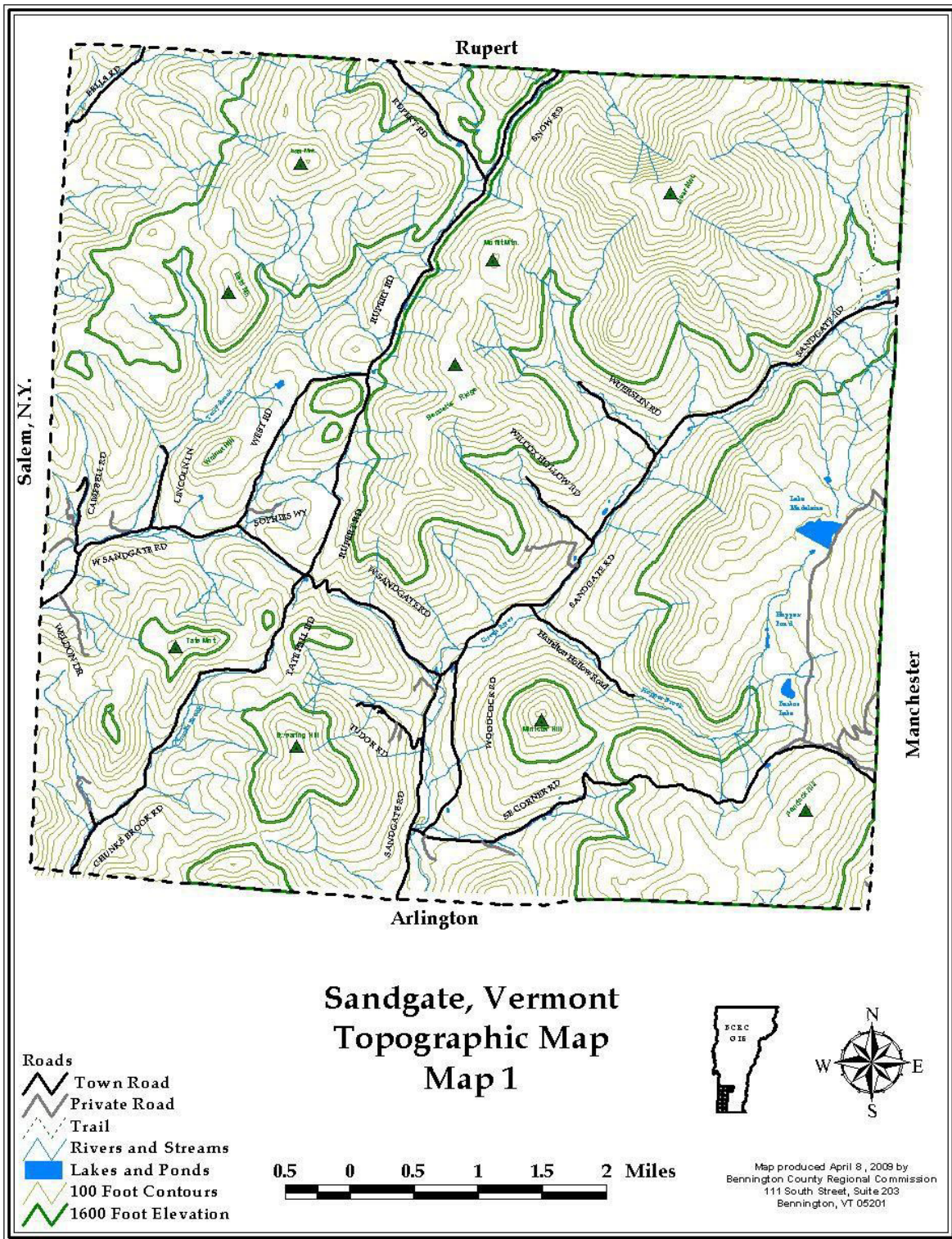
8. The Town should maintain flood hazard regulations to guide development toward safer locations and to incrementally achieve safer building stocks where they already exist in flood hazard areas. These regulations are designed to protect property and the health and safety of the population against the hazards of flood water inundation, and to protect the community against the costs which may be incurred when unsuitable development occurs in areas prone to flooding.
9. New development in Special Flood Hazard Areas and the fluvial erosion hazard areas should be avoided where possible. Any new development that does occur should be designed and sited so as to avoid any increase in flooding or erosion and have no adverse impact.
10. Support acquisition by public entities or conservation organizations of buffers and river corridors, especially those identified in hazard mitigation and river corridor plans.

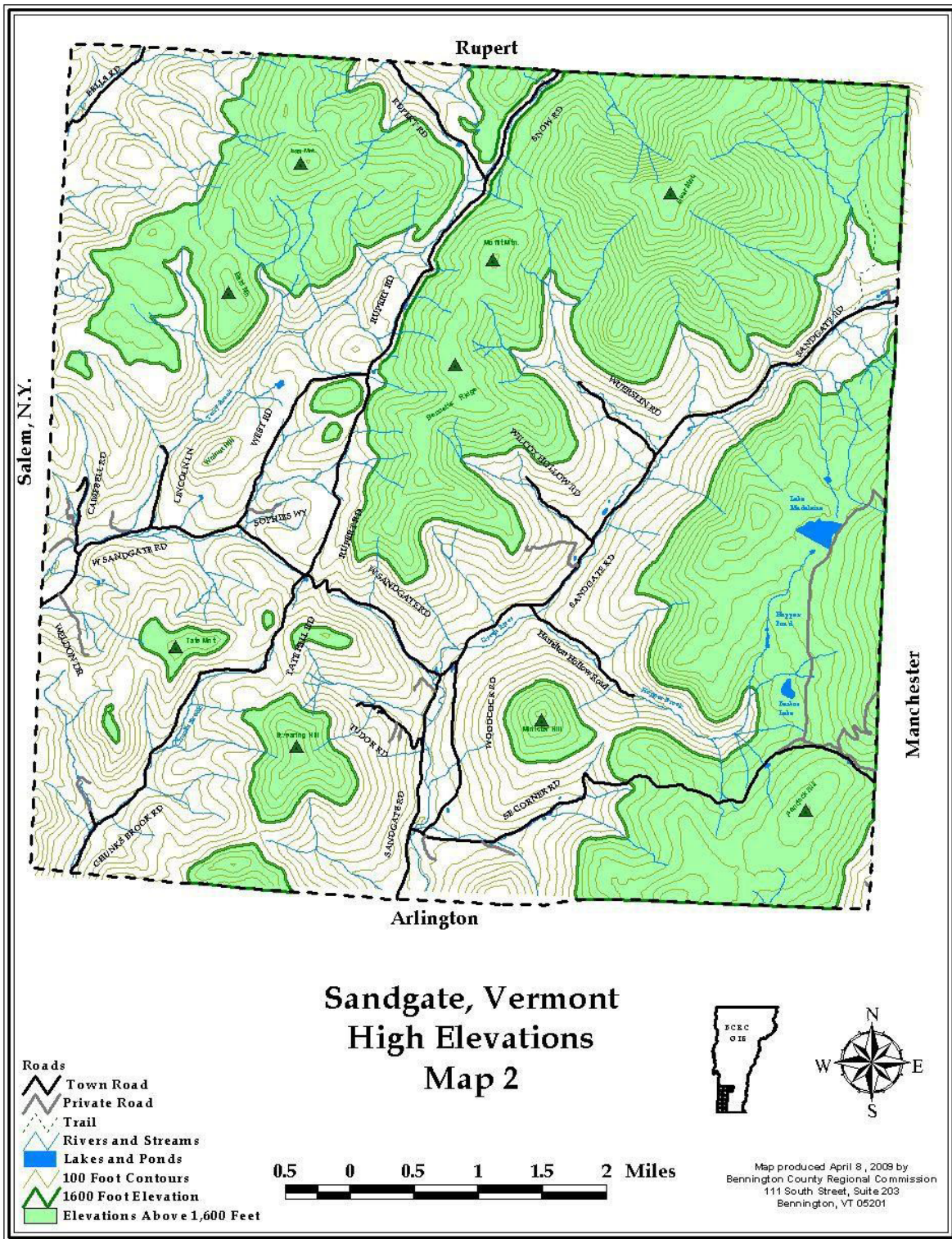
11. Sandgate should prioritize bridge and culvert repairs and replacements to address condition, geomorphic compatibility and ability to provide functional passage for aquatic organisms. Bridges and culverts that impede flow during flooding events should be reconstructed or replaced.
12. The Town should maintain a current Local Emergency Operations Plan that provides for emergency response and flood preparedness.
13. The Town should develop and maintain a local hazard mitigation plan that meets FEMA requirements and provides access to grant funds that will reduce current risks.
14. Forested lands should be protected to assure that precipitation can be absorbed by forest soils and litter and the peak flow attenuated. Acquisition of land or easements or Current Use assessment should be used to protect these areas, especially along the tributaries.
15. The Town should collaborate with other municipalities, the BCRC, and the State of Vermont in planning for the use and protection of regional water resources such as the Green River and The Batten Kill. This could involve an inter-municipal agreement.
16. The Town should reach out to property owners within the flood zones to support elevation or acquisition of structures subject to repeated flooding and eligible for funding under the FEMA Hazard Mitigation Grant Program.
17. The Town should encourage owners in flood hazard zones to secure propane tanks, fire wood, boats and other items that could float away in a flood, thereby creating hazards for those downstream.
18. The Town should consider participation in the FEMA Community Rating System program by implementing projects that would ultimately lead to rate reductions in flood insurance premiums for residents and businesses.
19. The Town should take comprehensive steps to increase flood resilience including the five elements that allow Sandgate to maximize post-disaster funding through the Emergency Relief and Assistance Fund.

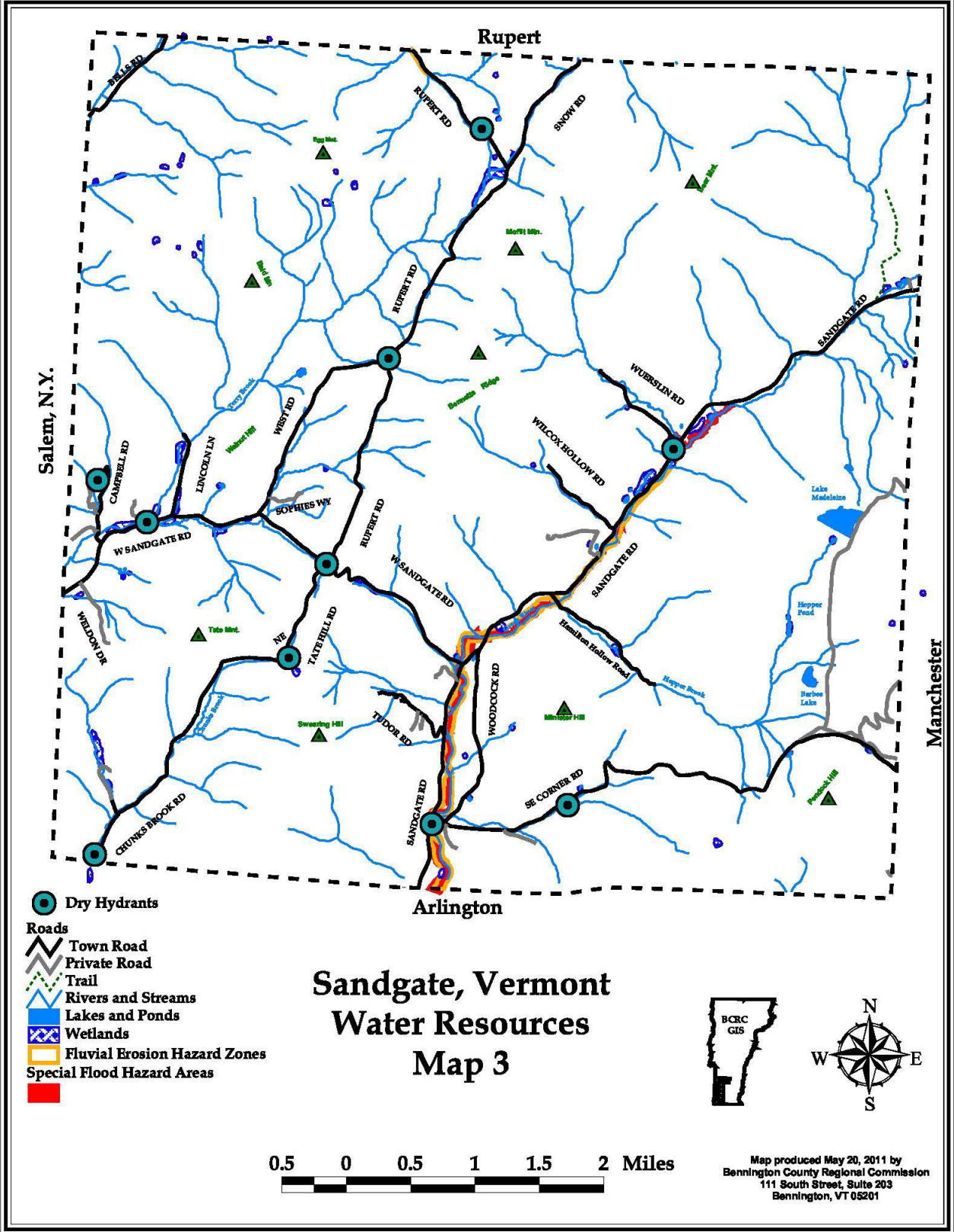
Stormwater Actions

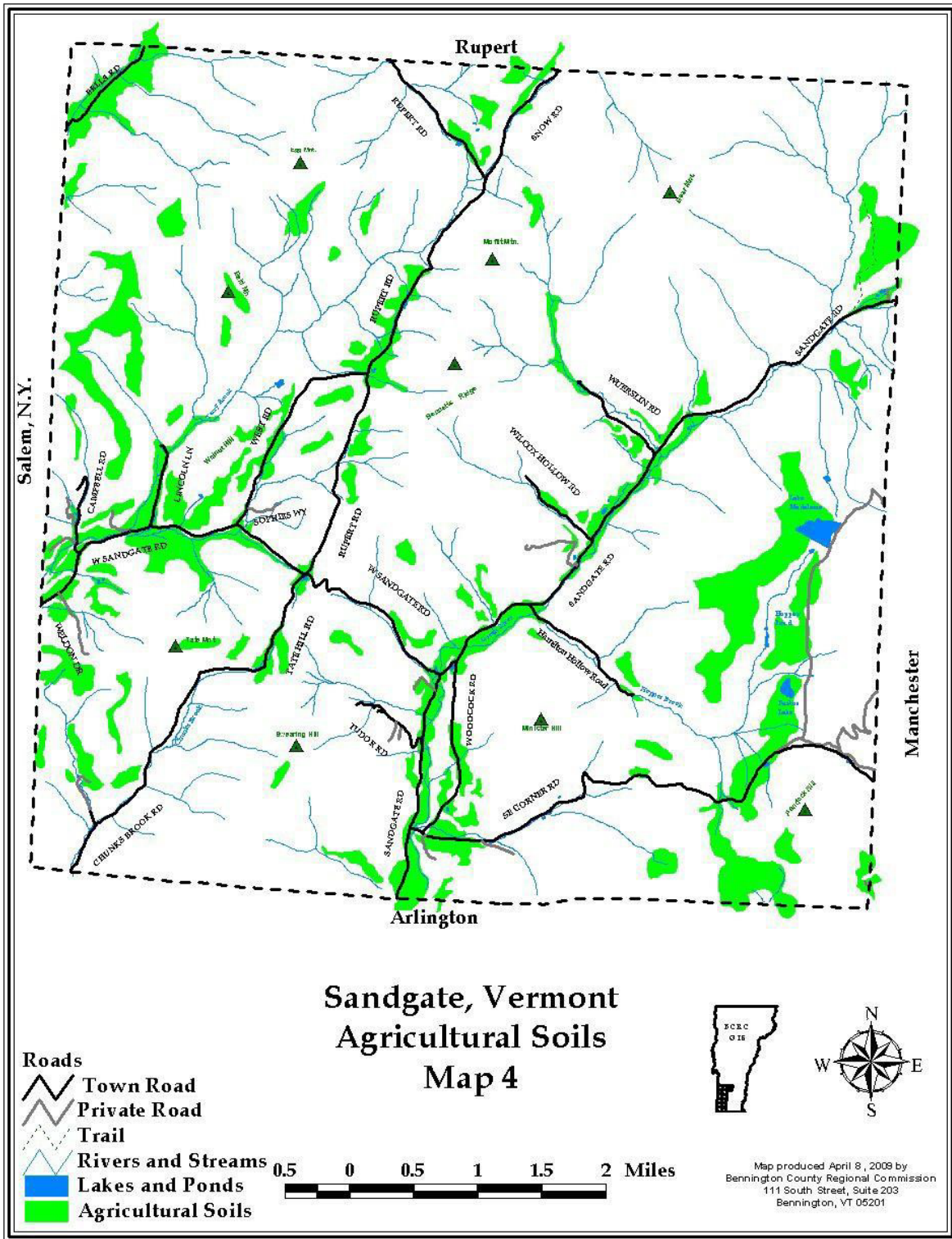
20. Evaluate a by-law within the Town regulatory framework to require LID for new development projects and to support the use of GSI. Specifically consider by-law additions/changes that:
 - i. Conserve and strive to enhance existing significant natural features, including steep slopes, wetlands, streams, creeks, trees, and fish and wildlife habitat conservation areas.
 - ii. Require that new development be designed in a manner that demonstrates respect of the natural features of the neighborhood, such as terraces, ravines, woodlands, streams and wetlands.
 - iii. Provide incentives and support for the preservation of open space corridors to maintain natural transitions between semirural areas and critical areas, in addition to open spaces and protected easements that are adjacent to developed portions of the neighborhood.
 - iv. Preserve native soils, to the extent possible, during development.
 - v. Allow, under the discretion and guidance of the Planning Commission, for the use of privately maintained, smaller and more strategically placed stormwater detention facilities.
 - vi. Encourage the use of native and habitat plants in landscaping.
 - vii. Encourage the use of permeable surfaces.

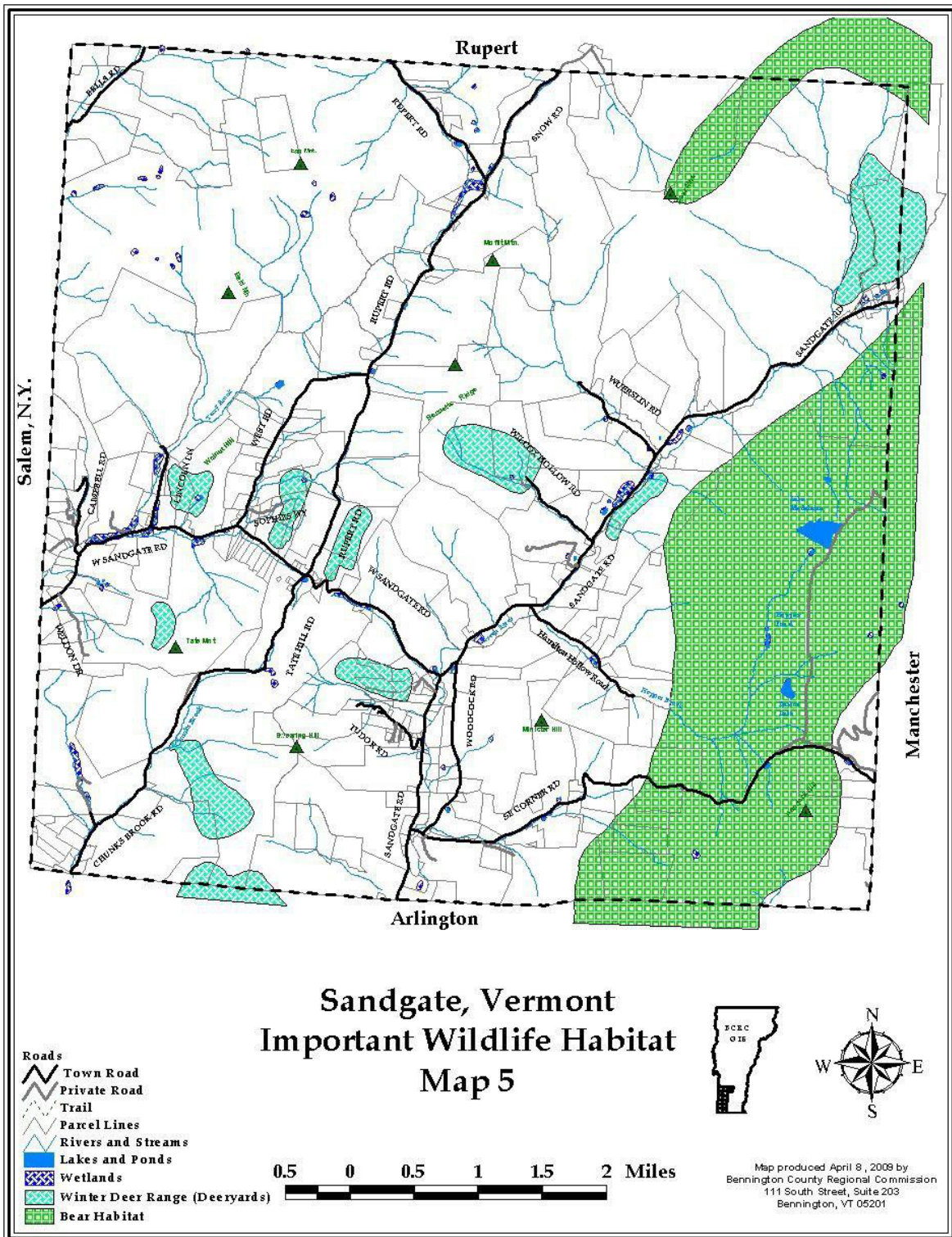
- viii. Minimize excavation, clearing, and grading.
- 21. Integrate GSI such as raingardens and filter strips at existing Town facilities.
- 22. Review new development projects for jurisdiction under State Stormwater Operational standards and require that the terms of the permit, including the installation and maintenance of GSI systems, are upheld by the project owner.
- 23. Promote LID and GSI by providing information for landowners and developers on the Town website.
- 24. Use road maintenance methods and materials that will maintain or improve water quality, such as those described in the *Vermont Better Backroads Manual*.
- 25. Evaluate standards for private roads and driveways including minimum culvert sizing, culvert spacing, as well as roadside ditch construction and erosion control to reduce the energy and volume of runoff entering the public right-of-way thereby reducing the likelihood of erosion and sedimentation to surface waters.
- 26. Provide incentives or require parking lot landscaping, shared parking lots and driveways and encourage creative design approaches that minimize impervious cover while still ensuring public safety and access for emergency vehicles.
- 27. Maintain the Forest District which prohibits commercial and industrial development in:
 - i. Watersheds of upland streams
 - ii. Watersheds characterized by steep slopes and shallow soils
 - iii. Areas supplying large amounts of recharge waters to aquifers.



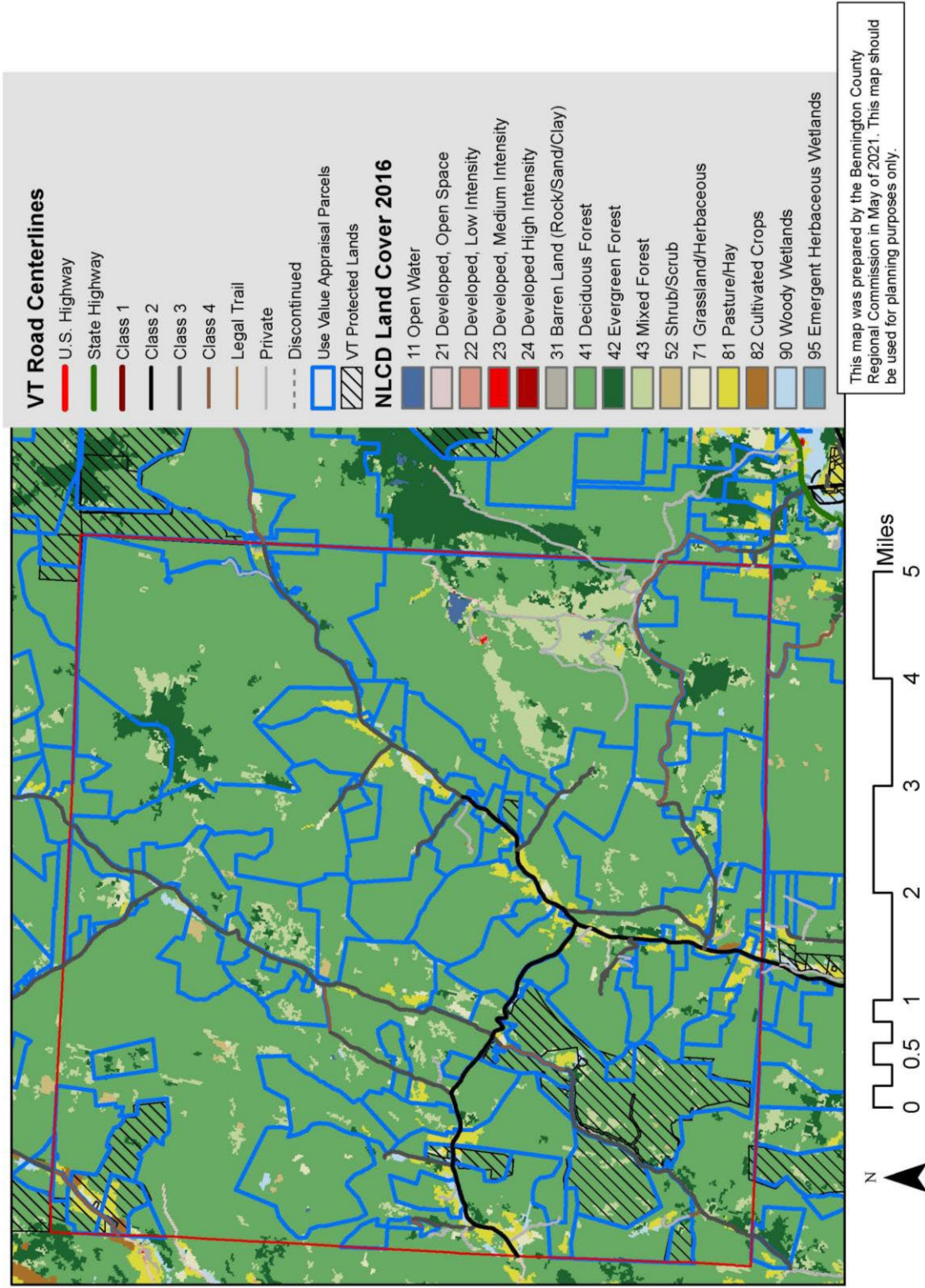




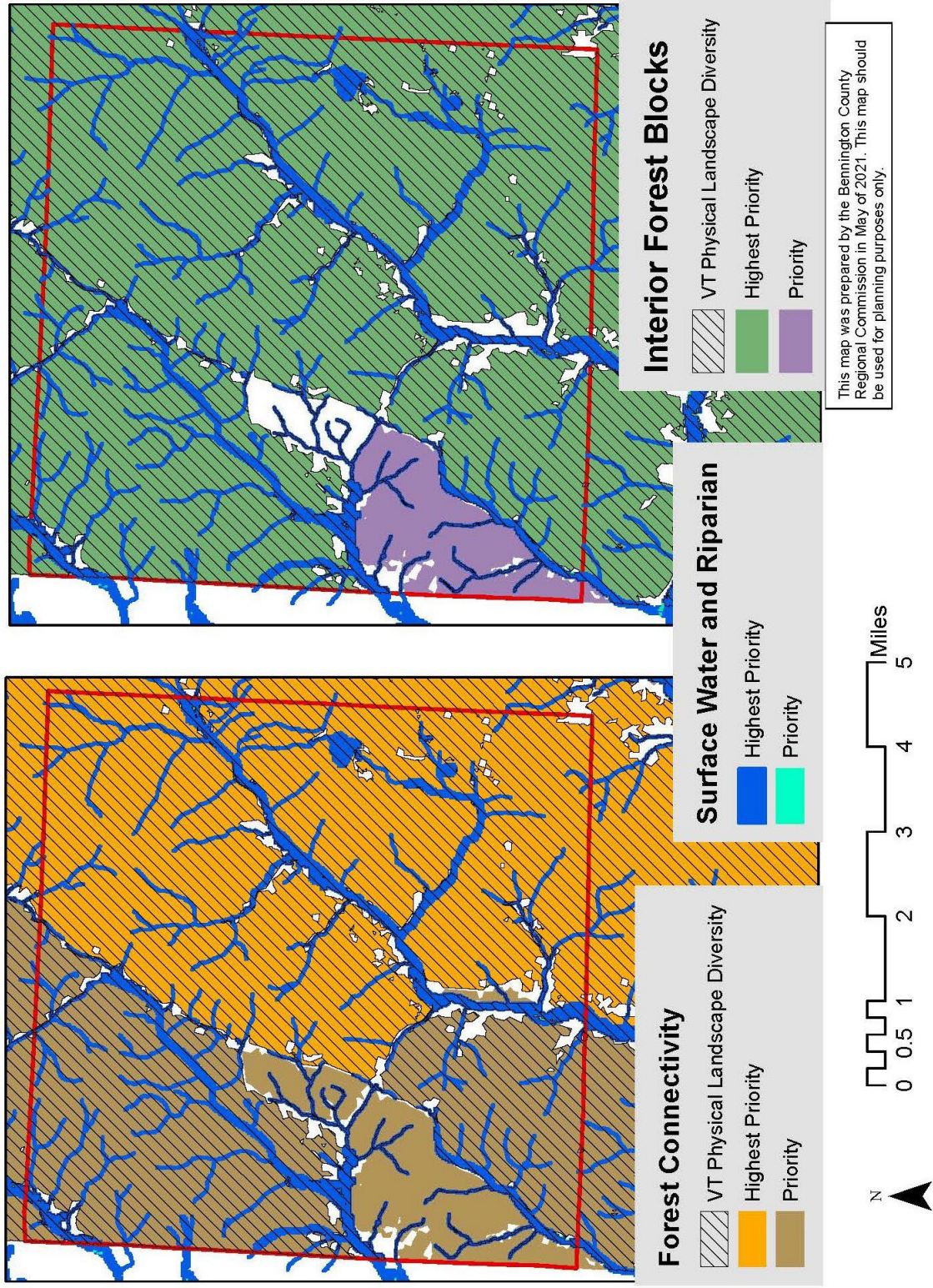




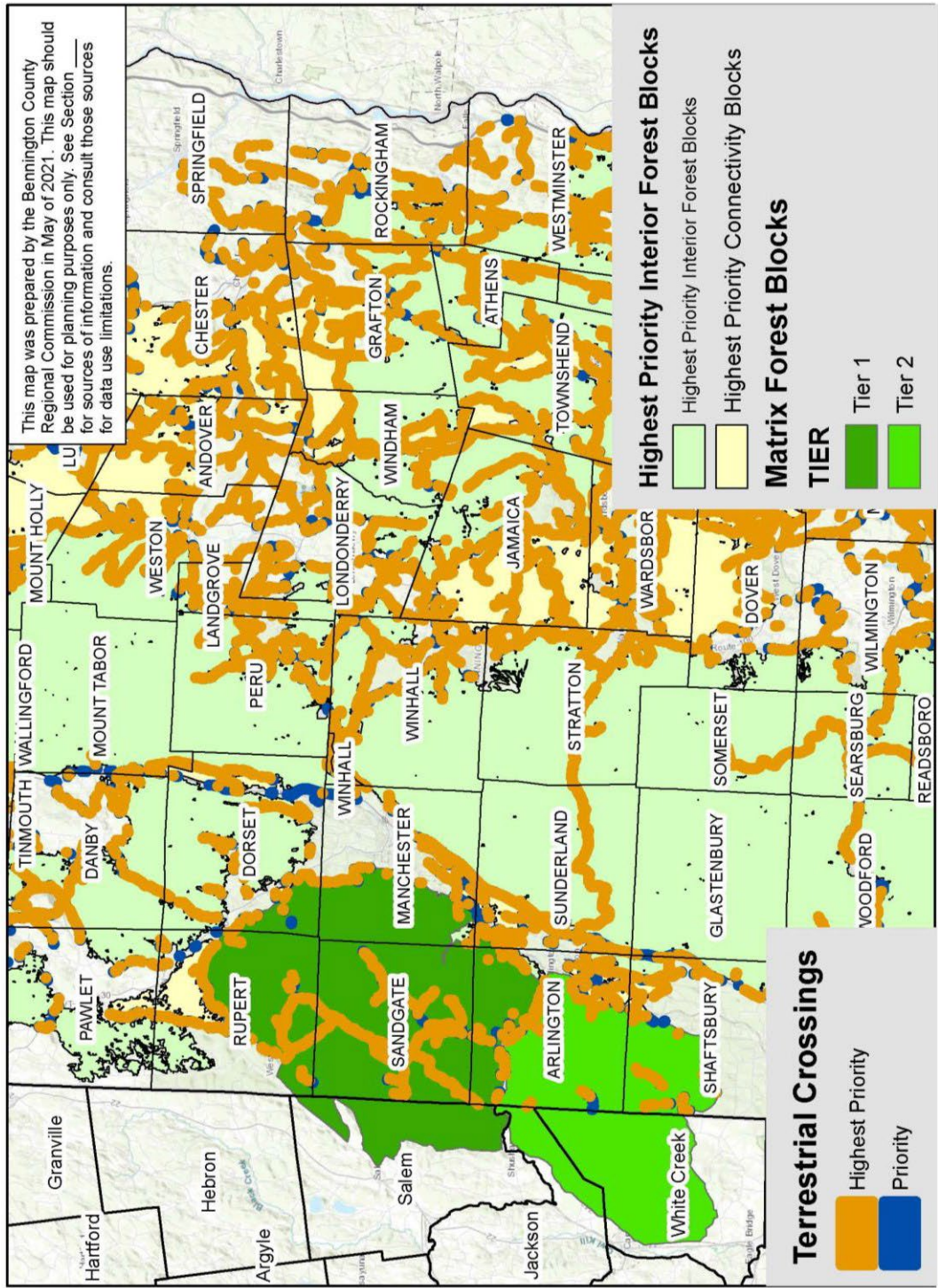
Map 5A. Town of Sandgate Land Cover

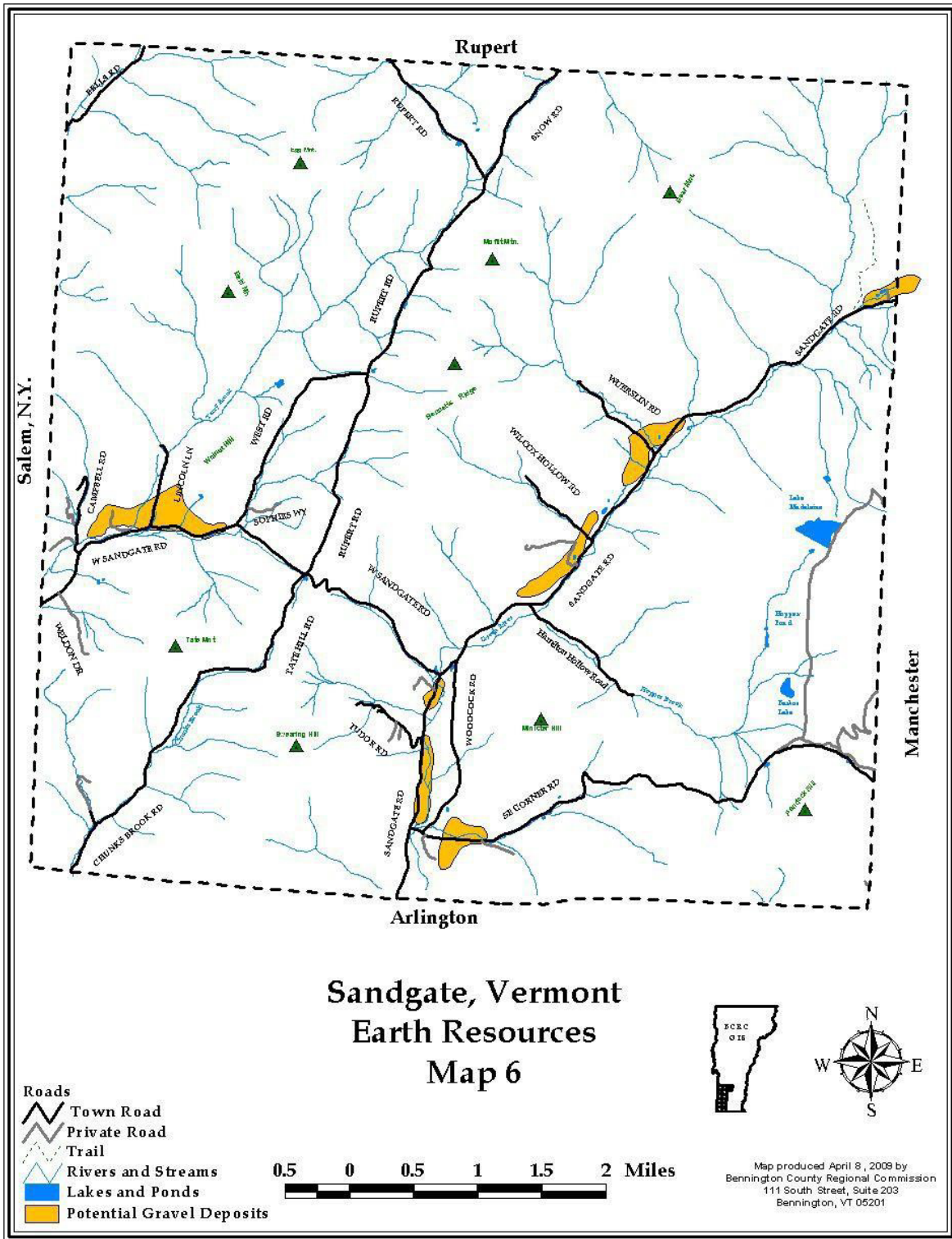


Map 5B. Sandgate Conservation Design Elements



Map 5C. Sandgate Forest Blocks in the Surrounding Area





SECTION 5: HISTORIC RESOURCES

5.1 Historic Resources

Human activity in the past has left historic structures, features, and archaeological sites. Because these artifacts of our past offer opportunities for learning and tangible reminders of our heritage, they are historic resources and entitled to parallel consideration with other resources in Sandgate. This section of the plan will describe known historic resources and expected resource potential in Sandgate, identify some threats to resource preservation, and outline the processes that will implement their preservation.

Historic structures and features (those 50 years old) known to exist in Sandgate are the old stone walls and foundations of the Daniel Shays Village, the remains of several mill sites, the stone arched bridge on Woodcock Road, four cemeteries, the old school house and the Sandgate United Methodist Church built in 1877. All of these structures have been located and mapped as part of an historic sites inventory completed in 2007 (Map 7). Sandgate also contains many houses, out buildings, and camps built before the 20th century.



Figure 9: The United Methodist Church built in 1877.



Figure 10: Sandgate's historic one room schoolhouse.



Figure 11: Old mill site near Beartown.

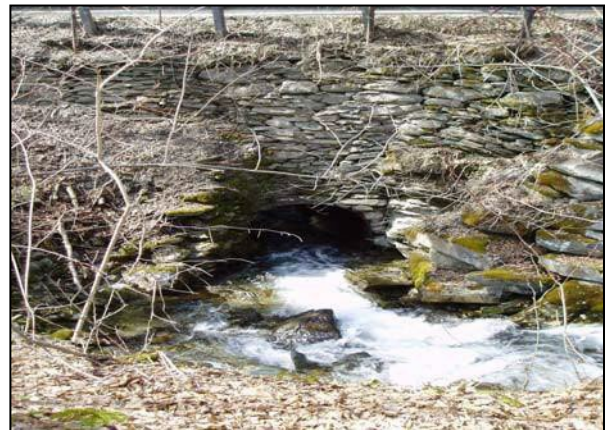


Figure 12: Stone arch bridge on Woodcock Road.



Figure 13: Old Beartown Cemetery.



Figure 14: Old cemetery on Rupert Road.



Figure 15: Sandgate Village Cemetery.



Figure 16: West Sandgate Cemetery

Although all of the known archaeological sites are historic, some parts of Sandgate may contain prehistoric archaeological sites. Certain areas around rivers, streams and wetlands, for instance, are archaeologically sensitive. Borrowing ideas about prehistoric Native American behavior from research results in nearby Green Mountain towns enables archaeologists to narrow their field of inquiry. Prehistoric sites are likely to reflect similar use of the Green Mountains as a source of quartzite for making stone tools. During the 17th century, Native Americans trapped for commercial trade with European posts in the Hudson and Connecticut River Valleys. Sandgate, with its proximity to the Batten Kill, is likely to have been a source of furs for trade as well as part of the Native American subsistence base. There are undoubtedly small, repeatedly occupied prehistoric sites in Sandgate, and thus additional reason to give proposed development projects close attention.

Any activity or development that alters land surfaces could have a negative effect on the preservation of archaeological sites in the area. Timber harvesting can also be destructive to archaeological sites, as can road construction and landscaping. Even hiking trails can expose

archaeological sites. In practice, all identified archaeological sites should be avoided during land altering projects.

Historic structures and features eligible for inclusion on the National Register should be protected. The National Register criteria are as follows:

Sites considered significant in American history, architecture, archeology, engineering, and culture are present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

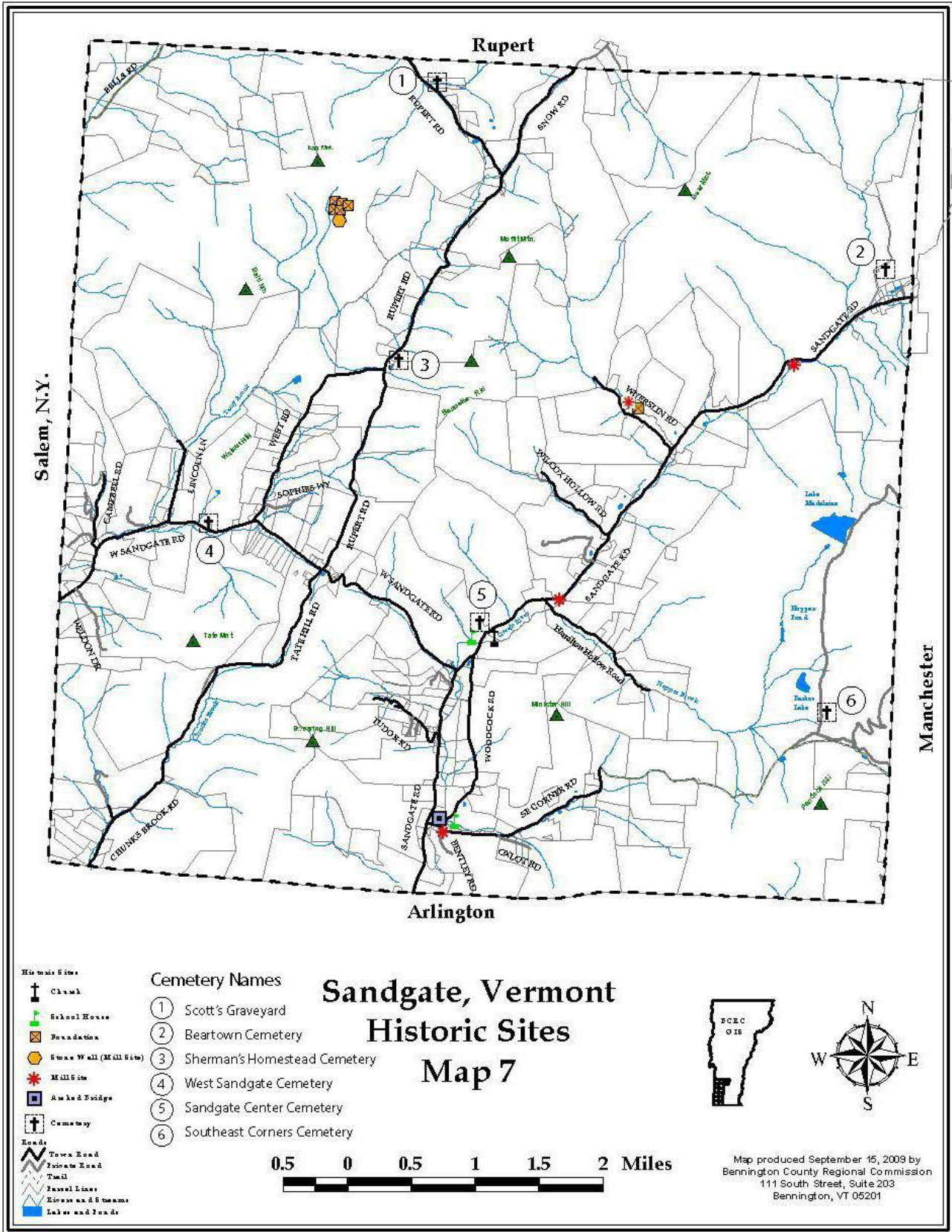
1. That are associated with events that have made a significant contribution to the broad patterns of our history; or
2. That are associated with the lives of persons significant in our past; or
3. That embody the distinctive characteristics of a type, period, or method of construction or that represent a significant and distinguishable entity whose components may lack individual distinction; or
4. That has yielded, or may be likely to yield, information important in prehistory or history.

A series of federal laws, including the Antiquities Act of 1906 and the National Historic Preservation Act of 1966, prevent the use of federal funds for projects that will harm important archaeological sites or historic structures. In addition, these laws protect archaeological sites and National Register eligible buildings (even on private land) from destruction by projects requiring federal funds, permits, or federal licensing. Highway and bridge construction and repair, modifications to wetlands and utility relicensing are all subject to these laws.

In Vermont, such projects are reviewed for their impacts to historic resources at the State Historic Preservation Office in Montpelier, and decisions are based on the Office's inventories of known archaeological sites and historic structures (the State Archaeological Site Register and the State Historic Sites and Structures Register). The Vermont Historic Preservation Act, administered by the same office, protects archaeological sites and historic buildings on state owned land. Vermont's Act 250 provides for a regional and state level review of certain projects. An Act 250 review includes consideration of the impact of the project on historic resources, as well as natural resources. This review is also performed by the Vermont State Historic Preservation Office (the Division for Historic Preservation), and can result in requests for project alterations and archaeological surveys. The Town of Sandgate can be an official party to any Act 250 hearings affecting its area.

Many small projects on private land, however, are not subject to any of these reviews. Some large or important sites, buildings, and districts can be lost piecemeal through the accumulated impact of several small projects. Even when a highway route is redesigned to avoid an important historic site, that site could be lost a few years later through residential construction or some other activity. Incorporating historic preservation criteria in conditional use zoning reviews can help preserve areas of high archaeological sensitivity, around streams and wetlands for example. In archaeologically sensitive areas, as determined from experience in nearby towns, land surface altering changes should be held to 100 feet from normal shorelines.

Vermont has enabling legislation for local historic district designation and a local review process. Sandgate should consider the feasibility of protecting its historic areas with such local designations and review. The Town should consider, as a certified local government, requesting funds for an architectural survey of all of Sandgate's historic structures, including bridges, houses and outbuildings as well as cabins and camps. The Vermont Division for Historic Preservation grants such surveys. Adding eligible structures to the State and National Register is the first step in preserving them.



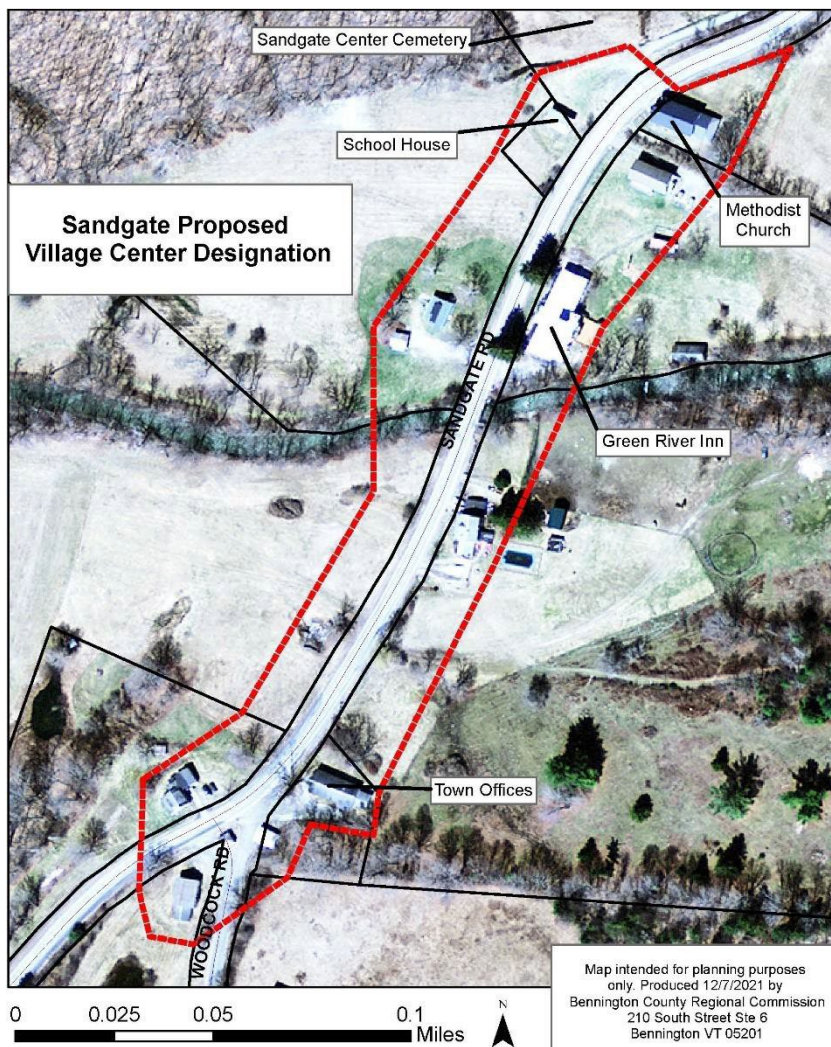
Finally, acquiring historic preservation easements from current landowners will improve the chances of a sites' continued preservation through succeeding ownership changes. Local and state preservation groups, or the Town itself, could hold these easements.

In summer 2021, the Sandgate Planning Commission hosted a public meeting to explore potential benefits of pursuing an historic district designation in the town. The VT Historic Preservation Office and BCRC provided information to distinguish between national, state, and local historic districts. National and state historic districts are purely honorific designations for the purposes of documenting and recognizing historic sites and areas. These historic districts are not regulatory and do not place any restrictions on what property owners can do with their properties. On the other hand, locally designated historic districts are typically regulatory since they enable a town to control development in a given area. A town must create or designate a local committee to oversee special regulations in a local historic district, so there is a higher level of commitment for a municipality to pursue this type of designation.

Based on community discussion at the public meeting, the Planning Commission determined that the primary interest of the community was to better document and protect historic buildings and sites throughout the town rather than to regulate future development by committee through a local historic district. The Town supports documenting more buildings and sites through the State Register of Historic Places, which is less onerous than the National Register, and they support incorporating additional review criteria for historic preservation into the zoning bylaws.

5.2 Village Center Designation for Preservation and Village Development

In summer 2021, a public meeting also explored the possibility of a village center designation along Sandgate Road. The Town plans to apply for a Village Center Designation to advance historic preservation and community development goals. The area under consideration is along Sandgate Road between the town offices and the Sandgate Center Cemetery. Designation of this area by the Agency of Commerce and Community Development will introduce several benefits for local preservation and revitalization efforts: access to tax credits for improving existing buildings, priority consideration for a range of state grant opportunities, and state technical assistance to navigate these programs and general community development strategies.



5.3 General Policies for Historic Preservation

1. Discourage any development, alterations or additions that encroach upon or threaten any historic feature, building, or site possessing architectural, archaeological, or historic merit. Incorporate historic and archeological site protections into development review process in the zoning bylaw.
2. Buildings and sites of historical or architectural merit shall be preserved, whenever possible, and new developments shall be compatible with existing historic buildings and development patterns.
3. Encourage the renovation and adaptive re-use of historic structures that might otherwise be lost to deterioration.
4. Developers should consider historic sites near proposed developments in their plans and provide compatible architectural designs and/or screening and buffers, as appropriate.
5. Work with the State of Vermont Preservation Trust and other preservation organizations, where indicated, to identify and acquire rights, easements or ownership of historic resources.
6. To preserve the historic fabric and integrity of historic sites in Sandgate this Plan encourages inclusion of major sites in the National and State Register of Historic Sites and Structures.

SECTION 6: LAND USE

The town's land use plan (Map 8), as implemented by the municipal zoning and subdivision regulations, will determine the future development pattern for the Town of Sandgate. The land use plan should be reviewed periodically to assess whether or not full implementation of the plan is an accurate representation of the community's vision for its future. This chapter will discuss the factors that are important to land use planning in Sandgate and will identify policies and recommendations that will result in future development that is both economically efficient and environmentally sound.

6.1 Current Zoning and Factors Affecting Land Use

The discussion of Sandgate's physiography (Section 4.1) pointed out that there are relatively few places in Sandgate that are well-suited to development. These areas are located in valleys where moderate slopes, deep soils, and adequate ground water supplies make development relatively easy. The highest concentrations of existing development are found in these areas, which are served by the two principal roadways in Sandgate: Sandgate Road and West Sandgate Road. Much of the land along these roads has been placed in the "Rural Residential" zoning district, which provides for the densest development -- two acres per dwelling unit -- in town (Map 8). According to the zoning bylaw, the Rural Residential district is intended to encourage development near existing roads, thereby minimizing future public infrastructure costs.

There are several other areas in town, either adjacent to the Rural Residential zones or along secondary town roads, where physical conditions and access do not present severe obstacles to development. Such areas are included in the "Forest #1" zoning district, a district intended to provide for development where it can be efficiently served by public roads and utilities while protecting important natural resources that are present. The minimum lot size in the Forest #1 district is five acres per dwelling unit.

Both the Rural Residential and Forest #1 district also provide for certain limited commercial and public or institutional uses. Commercial uses are restricted to those that are appropriate given the town's remoteness and environmental constraints: agriculture and forestry, home occupations, and outdoor recreational facilities, for example. Some of the larger facilities that are permitted are classified as conditional uses and must meet specific requirements to ensure that impacts on the natural environment and quality of life in Sandgate are minimized.

The great majority of land in Sandgate does not fit into either the Rural Residential or Forest #1 categories. Most areas in Sandgate are remote from town roads and are characterized by steep slopes and shallow soils. There are, however, numerous individual sites scattered throughout the hills and hollows that are capable of supporting some type of development. The type, intensity, and location of land uses that occur in these backcountry areas is very important to the town. Development in these areas, zoned "Forest #2," could potentially have profound impacts on both environmental quality and municipal budgets.

The Forest #2 district is meant to protect important natural resources, recreational opportunities, and forest-related industries. The zoning bylaw notes that excessive development in these areas could damage sensitive environmental resources and lead to the inefficient development of roads and utilities. Consequently, permitted land uses are limited to agriculture, forestry, and recreational uses, with camps and year-round residences restricted to lots of not less than 25 acres per unit. Development is discouraged above 1,600 feet in elevation. Applications for new houses in F2 are subject to a number of restrictions to ensure that the environment is protected and that municipal facilities and services can accommodate the development.

6.2 Recent Development, Budget Growth, and Property Taxes

Generally speaking, the town, highway, and school budgets have all grown since the late 2000s (Table 6.1). Average residential property taxes have also risen during this period, though they have declined in the past couple of years.

Table 6.1

Public budgets, number of resident school children, new housing units, and average residential property tax rate in Sandgate, 2007-2021

Year	Town and Highway Budget (\$)*	School Budget (\$)	Total Budget (\$)	Highway State Aid (\$)	School Children	New Housing Units	Residential Tax Rate/\$100**
2007	304,202	776,860	1,081,062	31,023	62	3	1.8019
2008	297,996	829,688	1,127,684	31,256	55	5	1.9465
2009	317,044	833,815	1,204,859	31,235	57	1	1.3074
2010	297,941	899,272	1,197,213	31,167	51	2	1.8943
2011	302,090	936,274	1,238,364	46,732	48	1	1.9040
2012	287,021	945,362	1,232,383	32,394	49	0	1.0904
2013	247,184	979,359	1,226,543	45,111	48	0	1.9394
2014	375,238	979,003	1,354,241	61,018	47	2	2.0171
2015	435,502	783,974	1,219,476	64,583	58	n/a	n/a
2016	478,420	924,087	1,402,507	66,520	65	1	2.0700
2017	471,952	890,087	1,362,039	62,748	62	3	2.0700
2018	501,960	975,521	1,477,481	62,749	50	0	2.0786
2019	508,279	832,252	1,340,531	62,832	56	1	2.0903
2020	571,029	927,787	1,457,535	65,448	54	1	1.8871
2021	592,580	857,129	1,425,495	62,034	53	1	2.0531

Source: Sandgate Town Reports *Amount shown is greater than what Sandgate actually pays. Amount includes a portion of the highway budget that is reimbursed by state aid programs. See column "Highway State Aid" for levels of funding reimbursements. ** Non-residential tax rates differ.

While both the town/highway and school budgets have grown during this period, the growth in the school budget has been variable. Growth in the highway budget appears to be greater than in the town's general fund and in the school budget, perhaps due to increased environmental quality standards to protect surface waters from road runoff. The Town of Sandgate initially deferred upgrading town roads to meet standards of the Municipal Road General Permit, and has recently begun to bring roads into compliance. New development (new home construction) declined following the Great Recession and has stayed at a low level for the past decade.

6.3 Land Use Planning Recommendations

There does not appear to be any reason for Sandgate to alter the land use policies that have been espoused by the town over the past several years. The type, intensity, and location of development that is permitted under the municipal zoning and subdivision bylaws is appropriate to the town's environmental limitations and remote, rural character. An increase in the rate or intensity of development in backcountry areas of Sandgate most likely would lead to additional costs to the town, and could have deleterious impacts on the natural environment. Future growth should, therefore, be directed to areas along existing town roads where topographic and soil conditions can best support such growth. The existing Rural Residential and Forest #1 zoning districts should be retained to support such growth. The Forest #2 district should remain an area where the wise use of natural resources, recreation, and environmental protection are emphasized, and limited development is permitted with proper controls, such as lot dimensions and shapes.

The municipal zoning regulations are written to ensure that they reflect these general land use policies. In addition to the use and dimensional requirements for each zoning district, the regulations contain provisions designed to protect important resources such as streams, ponds, and green spaces. "Planned Unit Developments" also known as "cluster subdivisions" should be permitted in Sandgate as a way to promote efficient development patterns and protect important resources. In a PUD or cluster subdivision, individual lot sizes in a new development may be reduced (to not less than one acre), thereby allowing the preservation of open fields or other important resources. An additional benefit of this type of development is that economic efficiency is promoted since the length of roads and other infrastructure is reduced. The municipal planning commission should encourage developers to utilize clustering or other creative techniques to achieve the objectives of this plan: provision of attractive, efficient new development while protecting important natural resources.

One area of special interest to the town is the "town center," located in the vicinity of the Town Hall. This area has been identified as a potential site for a future school, park, or other community facilities. If land becomes available, the town may consider acquiring suitable land in this area and should promote private development that will reinforce its traditional appearance as a rural New England hamlet. One strategy for attracting private development is to establish a Designated Village Center in this area through a program of the VT Department of Housing and Community Development. More information on this program is outlined in Section 5: Historic Resources.

6.4 Planning for Affordable Housing

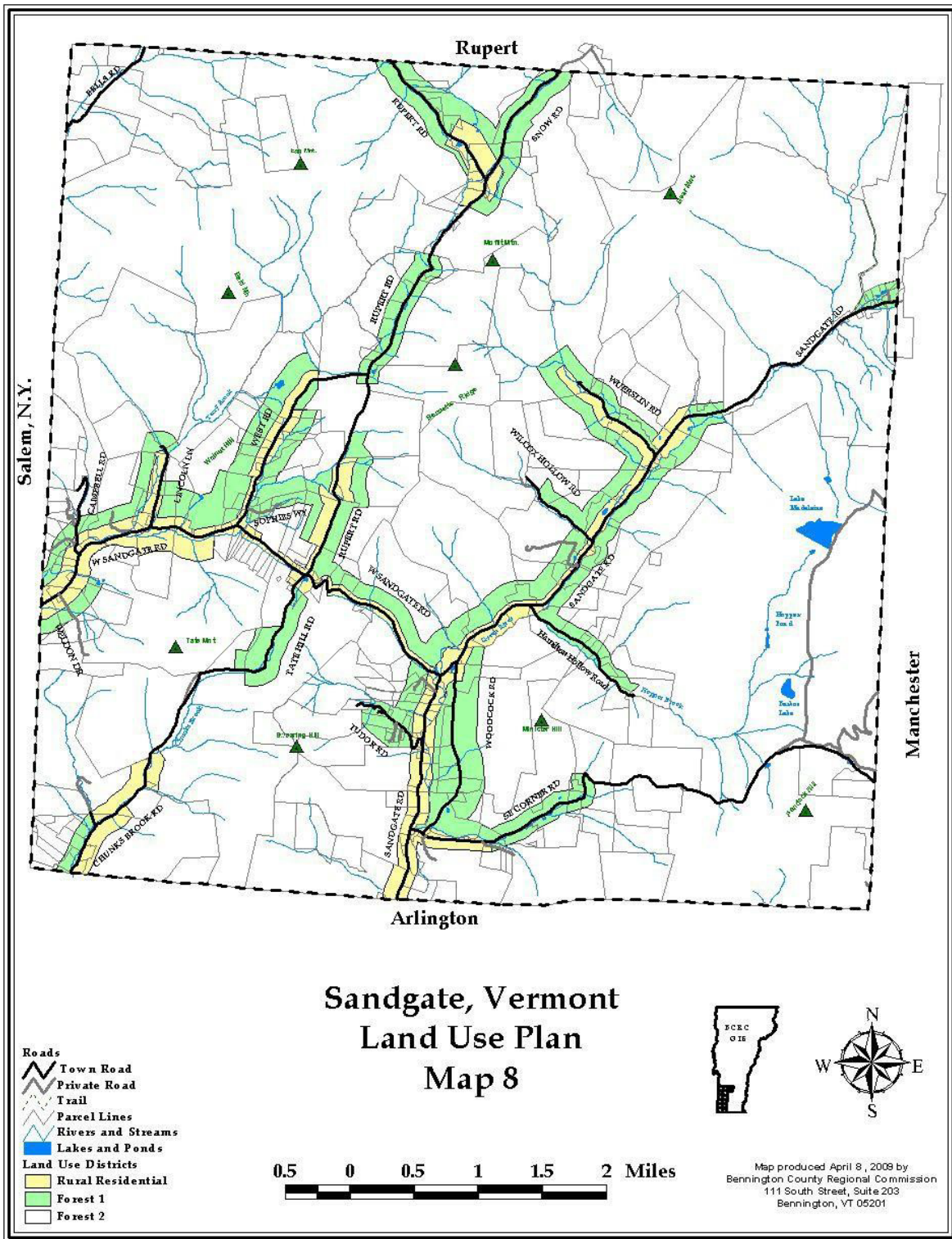
The town's existing land use policies do not discourage the development of affordable housing. The zoning bylaw even allows some added flexibility in the development of affordable housing by permitting the construction of a second dwelling unit on a lot that may be occupied by a (non-paying) relative or guest of the owner of the property. The town may wish to consider additional means of encouraging affordable housing, especially if rising real estate costs begin to make it difficult for Sandgate residents and their children to remain in town. One technique available to a rural town like Sandgate is to permit a "density bonus" for new subdivisions, provided that the additional lots/units are offered at prices that are deemed "affordable" by the town.

6.5 Policies and Recommendations

1. The amount of land available for residential development should be sufficient to meet the needs of anticipated population growth. New development should ideally be located along or near existing roads.
2. Residential growth in the Forest #2 district should be limited to those areas where new development will not result in excessive damage to the environment or costs to the town.
3. Permanent development in F2 rugged backcountry areas with poor access is discouraged. Such areas should generally be reserved for forestry and recreational uses.
4. The town should encourage land uses and development patterns that will protect important natural resources, green spaces, and scenic views.
5. Sandgate's rural character should be maintained; a special effort should be made to preserve important scenic and historic resources.
6. Commercial and institutional uses should be limited to those that are identified in the zoning bylaw, and should be of a scale and design consistent with the town's rural character.
7. Small- and mid-scale renewable energy development is appropriate, when well-sited, in

many areas of town. Large-scale renewable energy facilities are appropriate only in preferred areas.

8. The following specific policies apply to new development:
 - The density of development must not exceed the amount that the land is physically capable of supporting. For example, development must be carefully planned in areas where natural land slopes exceed 15 percent.
 - During construction, all necessary measures should be taken to minimize soil erosion.
 - New development shall adhere to the state mandated Residential Building Energy Standards, be planned to take advantage of a site's solar resource potential and be made to accommodate multiple transportation modes through the Site Plan and Subdivision Review processes.



SECTION 7: TRANSPORTATION

7.1 Introduction

As a small rural town, Sandgate's transportation infrastructure is quite limited. Sandgate is the only town in the Bennington Region that is not traversed by a single state highway. However, there are nearly 30 miles of town highways within the municipal limits (Table 7.1). These highways must be adequately maintained to provide safe, convenient, and economical transportation routes for Sandgate residents.

Table 7.1

Sandgate, Vermont – Town Highway Mileage*

Highway Type	Miles
Class 1	0.00
Class 2	7.58
Class 3	18.67
Total	26.25

*Sandgate also contains 7.37 miles of Class 4 (not maintained) town highways, *VTrans Sandgate Town Highway Map 2021*.

Three roads in Sandgate provide through routes and collect traffic from smaller side roads (Map 9). Sandgate Road follows the valley of the Green River from Route 313 in Arlington to Beartown. West Sandgate Road, running from the Green River through the Notch to West Sandgate and Salem, New York, is the only road connecting the east and west sides of the town. West Rupert and Route 153 can be reached by following the Rupert Road north from West Sandgate Road near the Notch. Twelve smaller roads provide access to homes and camps located in stream valleys, hollows, and other areas where some development has occurred.

7.2 Town Roads

The maintenance of the network of town roads, bridges, culverts, and drainage systems involves considerable work and expense. The underlying factor exacerbating many of Sandgate's road maintenance problems is the lack of a good road base. The town's road crew is able to keep the roads in good condition with day-to-day maintenance, but during mud season several roads frequently become impassable for many vehicles. Periodic high traffic volumes on certain roads (Rupert Road during hunting season, for example) also result in rapid deterioration of surface conditions. Significant effort has been directed recently toward upgrading culverts at key locations around town.

The Town of Sandgate is actively working on improving its dirt back roads to meet the Vermont "back road" Municipal Road General Permit (MRGP) standards. Improvements include:

- North end of Rupert Road reconstruction and ditch repairs;
- All of Snow Road reconstruction and ditch repairs;
- Regrading of all town dirt roads to meet the state required contours (crown).

The town road improvements are scheduled to meet the state required deadline.

Road sections that have been prioritized by Sandgate for repair are highlighted in Map 9.



Figure 17: Mud season.

Because significant increases in traffic can be expected to adversely affect the condition of many roads, the probable impact on town roads of any new major subdivision should be determined. If substantial upgrades of town roads or bridges will be necessary as a result of such a development, the developer should share in the cost of the construction work.

New developments also frequently involve the construction of new roadways to serve individual lots. New private subdivision roads and some shared driveways are subject to review by the Planning Commission under the municipal subdivision regulations. The Planning Commission should consult with the road foreman before approving new roads. New roads and driveways accessing onto town roads must also receive an access permit from the town; these permits are important to ensure that access points are safe, and that drainage does not damage town infrastructure. These new driveways and roads should take into consideration specific standards recommended by emergency providers. The town is generally reluctant to take over private roads. The quality of roads and compliance with town roads standards will be considered in assessing any requests to adopt roads as municipal liabilities.

One issue that should be addressed by the town is the need for access to all residential areas by emergency vehicles. Fire companies and rescue squads from surrounding towns serve the town, and access by their larger vehicles over certain narrow roads and two 16,000 pound limit bridges (Hamilton Hollow Road and Wuerslin Road) may present a problem. The town should work cooperatively with the Arlington Fire Department to assess the seriousness of any problem and identify appropriate remedial actions. Such an assessment would also benefit the town in the event that any new development occurs in these areas.

The level of development in remote areas, not readily accessible from good town roads, has been a concern in Sandgate for some time. Development in remote backcountry areas generally requires the construction of new private roads and driveways. All new private roads and driveways shall be held to the standards that local fire departments publish and to standards outlined in the zoning and subdivision bylaws. The Planning Commission may consider introducing development standards to limit the length of new private roads and driveways. The maintenance of town roads and the provision of other public services in these remote areas are costly. The town land use plan (Section 6.3) also reflects this concern over growing municipal expenses by directing new growth to areas along existing town roads.

Given the current level of growth and development, the town highway department's equipment and staffing are adequate. Equipment will need to be replaced periodically; the town maintains a fund for the acquisition of new equipment. Careful planning for future capital expenditures could help the town ensure that adequate funds will be available when major new acquisitions become necessary. The town should continue to pursue grants.

Expenditures on the town's transportation infrastructure have increased significantly in the past decade (Table 7.2). Fluctuations can occur from year to year as the need for major repairs does not occur on a regular schedule. The town can control fluctuations in capital expenditures through long-range planning for equipment replacement, town garage, and similar items. Costs to the town for roadway expenses are also moderated through receipt of state highway aid. The town should participate in the regional transportation planning process (developed in response to state and federal initiatives) with the BCRC and other towns in the region to ensure that important qualifying local projects receive funding.

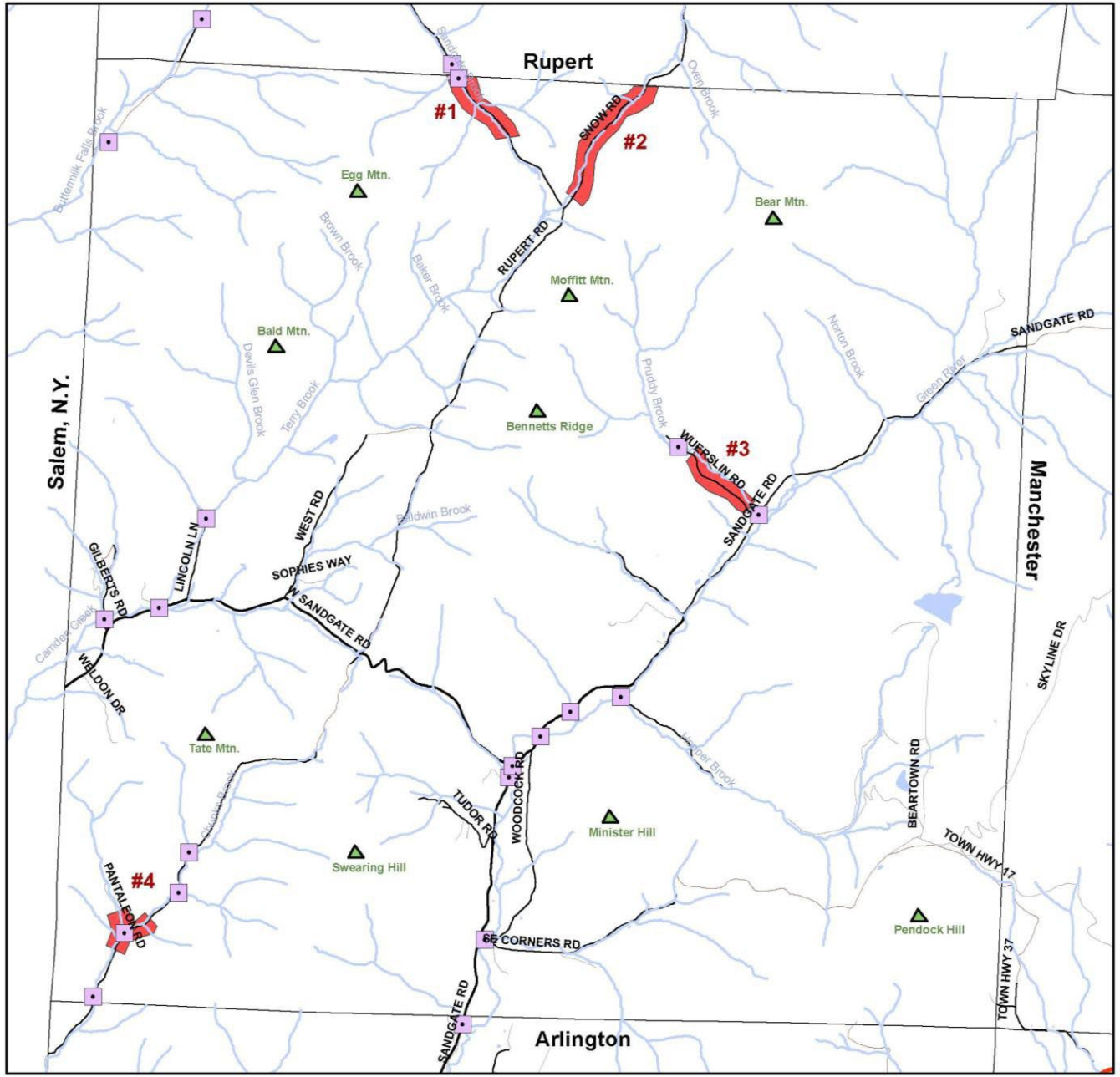
Table 7.2

Sandgate Town Highway Expenditures

Year	Highway Expenditures (\$)
2007	186,286
2008	279,385
2009	239,880
2010	255,008
2011	278,327
2012	251,216
2013	178,548
2014	253,169
2015	361,383
2016	391,794
2017	393,787
2018	394,923
2019	419,297
2020	475,324

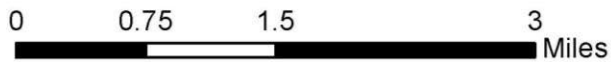
7.3 Public Transit

The need for some form of public transportation in Sandgate is most likely to be felt by elderly persons. Access to transportation for health care purposes, for shopping and personal business and for social or recreational purposes is particularly important to elderly residents. While many of these needs are met through the community, there are some programs offered by area health and human service organizations that can also benefit these individuals. The regional public transit provider, the Green Mountain Community Network and other service organizations currently offer transportation services for health-related trips and handicap accessible transportation services for seniors and disabled persons.



Sandgate, Vermont Transportation Map Map 9

- Bridges
- Highest Priority Road Repair Areas
- Streams and Water Bodies



Map produced May 11, 2022 by
Bennington County Regional Commission
210 South Street, Suite 6
Bennington, VT 05201

7.4 Bicycle, Pedestrian and Equestrian Travel

In recent years, there has been a marked increase in the number of bicycles touring through the town. Many Sandgate residents and visitors to the town also enjoy walking and horseback riding along the town's quiet roads. These recreational uses have not presented any problems to date, but if vehicular traffic increases substantially on certain roads (particularly roads such as Sandgate Road), consideration should be given to maintaining the 35 MPH maximum speed limit. While undertaking regular road reconstruction and maintenance activities, use of these roads by bicycles and pedestrians should be considered.

7.5 Policies and Recommendations

1. New roads, driveways, and drainage systems should be designed, constructed, and maintained in accordance with the municipal zoning and subdivision regulations.
2. Additions and improvements to the road network should be designed to minimize impacts on important natural resources.
3. Major transportation improvements and investments should be prioritized as part of long-term capital planning reflected in annual highway budgets.
4. All new road construction should be consistent with limitations imposed by topographical conditions, natural areas, and areas having special resource value.
5. Scenic roads should be maintained for their scenic value while providing safe access for residents. Road construction and maintenance shall be consistent with town road standards and with scenic values (width, alignment, roadside vegetation, etc.).
6. The town should carefully plan for large transportation related costs to avoid excessive budget growth in any one year. The town should also avoid taking over private roads as town liabilities.
7. The Town should support the widespread use of electric vehicles (EV) by encouraging businesses and municipal sites to install EV charging stations.
8. The town should consider promoting road design to safely accommodate pedestrian and cyclist use. The town should support public transportation such as school buses and carpooling.
9. Sandgate should participate in regional transportation planning activities and make use of available state funds.

SECTION 8: RECREATION

Residents of Sandgate are fortunate to have ready access to a wealth of recreational opportunities. Although there is no public recreation park in Sandgate, the town's location among the mountains and forests of the Taconic Range provides numerous opportunities for year-round outdoor recreational activities. Maintenance of the quality of these recreational resources is an important goal of this Town Plan.

8.1 Natural Resources

The forests that blanket Sandgate's hillsides and hollows are an integral part of the area's natural ecosystem and support large and diverse populations of indigenous flora and fauna. These resources provide numerous opportunities for nature appreciation and study, and also make Sandgate one of the most popular hunting destinations in the area. The remoteness of

Sandgate's forests is certainly one factor that makes the area attractive to residents, camp owners, hunters, and others who visit the town. Municipal land use policies and actions should include efforts to preserve the remote rural character of upland forest areas.

Miles of trails traverse the thousands of acres of unbroken land in Sandgate. Many of these trails were originally laid out and used as town roads, farm roads, or logging roads and trails.

After years of disuse, most of these traveled ways became overgrown and impassable. A number of them, however, continue to be used. With the exception of three Class 4 town roads (the upper portion of Southeast Corner Road, the northern end of West Rd. Tate Hill and Bell's Road) and one town trail (Moffitt Hollow road near Beartown), all of these trails are privately owned. Consequently, public access is possible only by virtue of acquiescence on the part of landowners. Recreational use of trails should not disturb wildlife, cause erosion, or result in any other type of environmental damage.

Sandgate's streams are also important recreational resources. The Green River, Terry Brook, Chunks Brook, Pruddy Brook and numerous other streams contain popular fishing and swimming holes, and provide an outstanding environment for hiking, picnicking, and other activities. With the exception of bridge crossings and stream segments that lie immediately adjacent to public roads, access to these streams involves crossing private property. As in the case of trails and forests, the town should encourage efforts to maintain public access to important streams.



Figure 18: Green River Brook Trout.

8.2 Recreational Resources Outside Sandgate

Just as many people who live elsewhere recreate in Sandgate, residents of Sandgate have access to nearby recreational resources in other towns. The Green River empties into the Batten Kill in Arlington. The Batten Kill is one of the premier recreational resources in the region, and Sandgate residents are among the many people who use the river for fishing, swimming, canoeing, and tubing. Similarly, many of Sandgate's trails extend into neighboring towns and the forests and wildlife populations of the Taconic Range are enjoyed by residents without regard to municipal boundaries.

There is also a very complete and well-run recreation park in Arlington; many Sandgate residents participate in activities at the park. In addition, since children from Sandgate attend schools in other towns, the scholastic recreational facilities and programs in those communities are important to Sandgate residents.

Because of this interdependence with other towns, it is important for Sandgate to communicate and cooperate with its neighbors. The town should remain active in regional planning through participation in the Bennington County Regional Commission. The Sandgate planning commission should solicit input from neighboring towns on local issues that might affect recreational uses or users in those towns. The Planning Commission should also attempt to stay informed of related issues in neighboring towns and should take advantage of opportunities to offer input in the planning processes in those towns.

8.3 Future Public Recreational Facilities

At the present time there is no organized public recreational facility in Sandgate. The Recreation Park in Arlington is open to the public and generally serves Sandgate residents' needs for playground equipment, sports fields, and accessible waterfront trails. It is not likely that additional recreation facilities will be needed or built in Sandgate. It is possible, however, that at some future time there will be interest in additional community facilities near the center of town. The town may consider acquisition of land adequate for such facilities in the Green River valley near the existing Town Hall.

8.4 Policies and Recommendations

1. Rugged and poorly accessible mountain and forest areas should remain free from development, reserved for forestry and recreational uses consistent with their wilderness character. Every effort should be made to maintain the pristine quality of our ridgelines.
2. The town should participate in regional or inter-town planning activities which involve important recreational resources.
3. The town should consider the question of whether additional land will be needed, at some future time, for community facilities that may include a small park. If such a need is likely to exist, the town should develop a plan for acquiring suitable land.

SECTION 9: PUBLIC FACILITIES AND SERVICES

9.1 Educational Facilities and Services

Sandgate closed its last school in 1956 and the size of the town does not warrant consideration of a school. Sandgate (along with Arlington) as of 2021 belongs to the Southwest Supervisory Union in accordance with school consolidation processes initiated by Act 46 passed in 2015. Most Sandgate students attend the nearby Arlington schools, although some students are enrolled in schools in surrounding towns. The Arlington elementary and secondary schools have been designated "primary" schools for Sandgate; the local school district will pay full tuition for students attending Arlington public schools and up to the state average tuition for students attending other schools, including private and independent schools.

The town also benefits from the presence of the Arlington Area Childcare, Inc. (Happy Days Playschool), a nonprofit publicly supported organization dedicated to quality, affordable childcare for the Arlington, Sandgate, and Sunderland area. This organization offers a playschool for children three to five years of age and an afterschool program for older children. Both of these programs are very important to Sandgate residents and should continue to receive annual appropriation support from the town.

9.2 Town Buildings and Land

The Town of Sandgate real estate assets include: the Town Offices and the small lot it sits on; School House #2 and the small lot it sits on; and the town garage located on a 17-acre parcel. The Town Offices have been improved to provide an adequate vault and to meet federal

accessibility requirements. Any new development or major modifications of Town property and buildings should take into consideration relevant policies of the Town Plan and must follow all state and local permitting and regulation requirements.



Figure 19: Sandgate Town Office



Figure 20: Sandgate Town Garage

9.3 Emergency Services and Law Enforcement

Sandgate is served by the Arlington Volunteer Fire Department and Fire Departments of surrounding towns and the Arlington Rescue Squad. A fire station, located near the intersection of Berwal Road and Route 313, serves the West Arlington and Sandgate areas. The town should continue its financial support of the fire department. Service by the Arlington Fire Department in Sandgate has generally been excellent, but the department has identified several accessibility problems in Sandgate that limit its ability to serve the town. Concerns include a number of unusable dry fire hydrants, lack of radio coverage to facilitate communication with emergency dispatch and other responders, seasonally impassible roads and driveways that cannot be served by the department's fire truck, and a need for more local vigilance and communication to reduce fire hazards. Concerns have been presented to the Sandgate Select Board, who should work with the Arlington Fire Department to resolve the concerns. In addition, it would be wise for the town to discuss the adequacy of narrow roads and weight-restricted bridges with the Department and determine if any improvements should be planned. One other issue of note is the fact that residents of West Sandgate must pay higher insurance premiums because of their remoteness from a fire station, although the situation has certainly improved with the establishment of the fire station in West Arlington.

Dry hydrants are especially important for a town with no central public water distribution system and scattered residential development. Through partnership with the Arlington Fire Department, and the Sandgate Road Crew, the Town of Sandgate has a very successful dry hydrant program. Tax-deductible donations, earmarked for the Sandgate dry hydrant program, will be accepted by the Arlington Fire Department. Residents who have or are planning on creating ponds are encouraged to contact the Town Clerk for more information on dry hydrants.



Figure 22: Green River dry hydrant.

The Arlington Rescue Squad responds to a number of emergency calls every year in the Town of Sandgate. Sandgate residents should recognize the importance and economy of this service and support it with their time and/or financial contributions.

The Emergency 911 system in Sandgate has been established and contributes significantly to improved public safety. Residents should be sure to follow guidelines for posting their address numbers along the roadway. A town constable provides local law enforcement and patrol services. The constable also communicates with the State Police and game wardens.

The Town budgets a small amount of money each year to support the services of the constable. Sandgate is fortunate that, for at least the next several years, current law enforcement services will suffice.

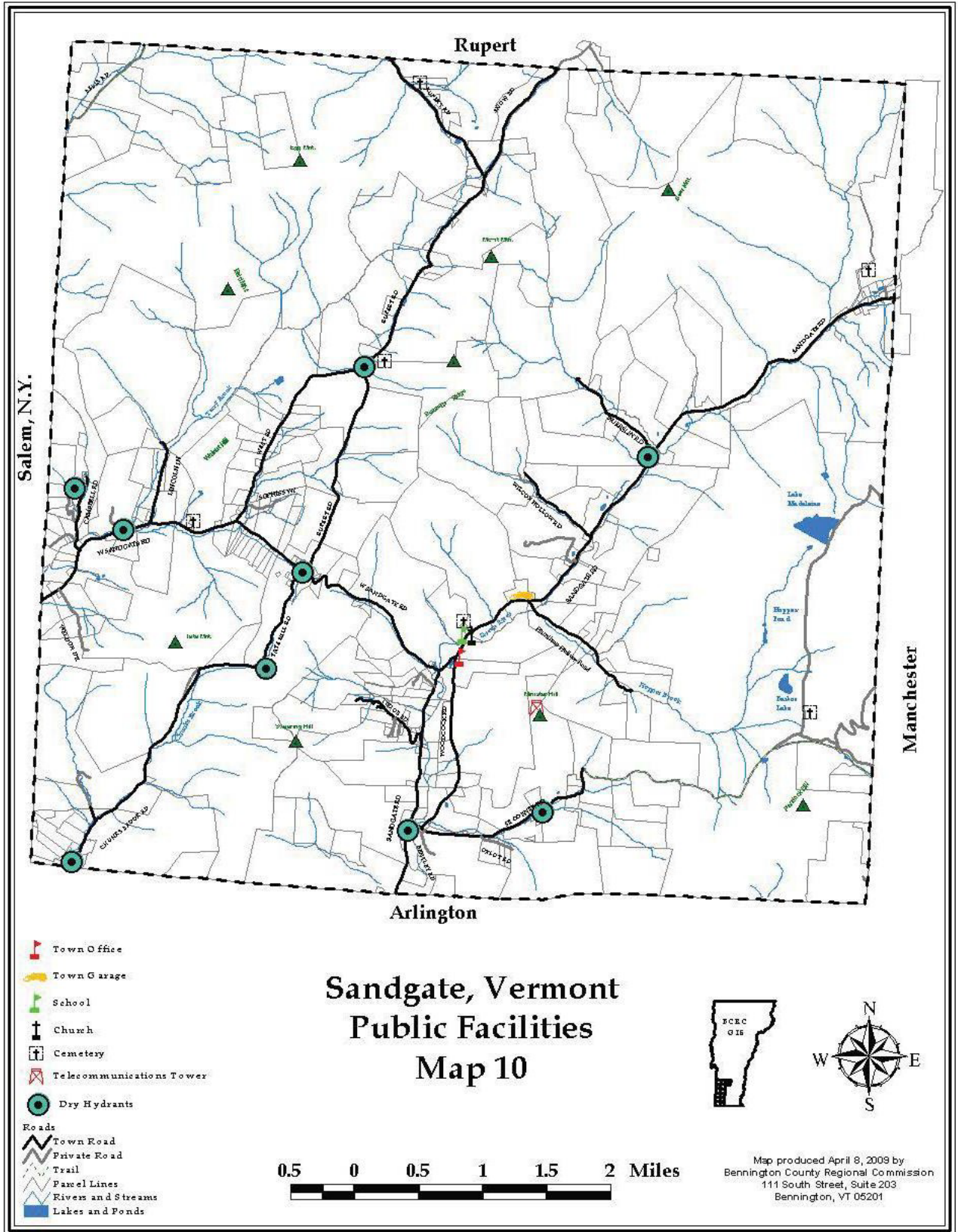
The land use policies of this plan discourage development in F2 zones, and steep slopes. One good reason for these policies is the significant costs associated with expanding emergency services that would be necessitated if development were allowed to spread to remote areas.

9.4 Electricity and Telecommunications

Sandgate receives its electrical service via 7200V transmission lines owned by the Green Mountain Power Corporation. Telephone service is provided by Consolidated Communications. Both electric and landline telephone services are adequate to meet existing demands and to accommodate reasonable future growth.

Telecommunication facilities and related infrastructure require careful consideration. These structures tend to be located in highly visible locations on mountaintops and ridgelines. The federal Telecommunications Act of 1996 placed certain limitations over municipal control of these structures; however, within those confines, Sandgate should act to protect its historic character, rural nature and aesthetic beauty. Toward that end, the zoning by-laws should incorporate specific provisions to guide and govern the placement of antennas and tower structures. Among other issues that may arise, the town is concerned about aesthetics, ridgeline protection, environmental protection and co-location of facilities and the town should fully participate in Section 248 proceedings to review proposals for public utility infrastructure.

Current cell phone and internet services in town are inadequate. Sandgate is also a member of the Southern Vermont Communications Union District, which strives to bring affordable, high-speed internet to Southern Vermont. The CUD has established a working relationship with Consolidated Communications Inc. and is pursuing state funding to bring internet service to unserved and underserved areas in Bennington County, including Sandgate. The Town's interests are well-represented in the CUD by a representative who serves on the executive committee, and two alternates.



9.5 Cemeteries

Two cemeteries, West Side and Sandgate Center, are overseen by an elected three-member Cemetery Commission. In addition to regular maintenance activities, the Cemetery Commission should investigate a restoration program where needed to improve and protect the appearance and integrity of the cemeteries and individual gravestones. The town should continue to appropriate funds to continue this program. At some time in the future additional land may be needed for burials. The several historical cemeteries in Sandgate located on private land are also important to the town and should be protected.

9.6 Library

The Town of Sandgate is designated by the U.S. Institute of Museum and Library Services as belonging to the legal service area of the Martha Canfield Library located in Arlington, VT. Each year the library submits a request for public funding to the town that is routinely included in the annual budget and approved at town meeting.

In addition to its extensive and well-maintained collection of books, videos, and other materials, the library provides 24/7 online access to audio and eBooks, along with other databases for research and classes through the links on its website at marthacanfieldlibrary.org. Library staff also facilitates the borrowing of materials from libraries across the state and throughout the country through the statewide CLOVER interlibrary loan system. Sandgate library users have access to public computers, assistance navigating online government information and social services, 24/7 free Wi-Fi, and are able to participate in programs that help children develop and maintain literacy, especially during summer vacations.

The library also houses the Russell Vermontiana Collection of rare books and chronicles about Vermont, works by Vermont authors, photographs, historic documents of all types and sizes, and genealogies. Informative programs are offered by the library throughout the year in the Sandgate Room.

9.7 Solid Waste

The Universal Recycling Law or Act 148 was passed by the Vermont Legislature in 2012. The primary purpose of this law was to significantly reduce the amount of material going into landfills. Over the past decade 30 to 36% of materials have been diverted from landfills. At the same time, the average amount of material each Vermonter generates has increased. This means that many useful and recyclable materials still end up in those landfills, which are gradually becoming full. The Universal Recycling Law seeks to provide more choices and convenience for Vermont residents, businesses and institutions to make it easier for them to recycle. The law is being phased in over time to allow for the creation of the systems for managing materials.

Effective July 1, 2020, food scraps and other compostable materials were banned from Vermont landfills under Act 148. This ban was enacted to divert more material away from landfills and reduce food waste and greenhouse gas emissions. Vermont residents are required to separate their food scraps from other disposable materials and either compost on their property, take their food scraps to a local food waste drop-off site (such as a transfer station), or contract with a curbside food scrap hauler.

The towns of Arlington, Bennington, Dorset, Glastenbury, Manchester, Pownal, Rupert, Sandgate, Searsburg, Shaftsbury, Stamford, Sunderland and Woodford have worked together to develop a Solid Waste Implementation Plan or "SWIP" consistent with the Universal Recycling Law. This plan will supersede previous plans. The SWIP describes a series of actions that the Alliance will implement to increase recycling of plastics, glass, metals, textiles and other

materials banned from landfills, management of organics through composting, anaerobic digesters or other means, the proper disposal of household hazardous waste, the disposal of construction and demolition debris, and the proper management of biosolids. The SWIP also establishes the following specific targets:

1. Reduce the generation of all solid waste, both disposed and diverted, by 10% between 2020 and 2025.
2. Decrease the amount of material disposed by 25% by 2025 from 2020 levels.
3. Achieve a diversion rate of 50% by 2025.
4. Increase food diverted to food rescue organizations by 10% by 2025.

As part of the solid waste planning process, the towns formed the Bennington County Solid Waste Alliance (BCSWA) through an interlocal contract, pursuant to 24 V.S.A. Chapter 24, to implement the plan. Solid waste disposal occurs locally through transfer station sites where refuse is collected, sorted, and transported to landfills and recycling centers. Sandgate residents can take their solid waste, recycling, and e-waste to the transfer station in Sunderland.

Residents can dispose of hazardous waste at one of the biannual household hazardous waste events organized by the BCSWA. The dates for these events are posted at the Sunderland transfer station. The BCSWA is developing a permanent household hazardous waste facility at the Bennington transfer station. The town should continue to discourage backyard burning of household waste which is against Vermont State Law.

9.8 Water Supply and Wastewater Disposal

There is no area in Sandgate with sufficient population density to warrant construction of any type of a public wastewater disposal facility. Town residents will continue to rely on individual on-site septic systems. Likewise, there will be no central public water supply system in Sandgate in the foreseeable future. The presence of individual wells and septic systems in residential areas makes it imperative that the state's sewage disposal regulations are strictly enforced.

9.9 Policies and Recommendations

1. Sandgate residents should continue to have the ability to choose the school that their children will attend.
2. The town should continue its support for important emergency service providers and public facilities that are used by Sandgate residents. The town should ensure that new developments are designed to facilitate emergency access and adequate water supplies for fire services.
3. The town should work with the Arlington Fire Department and seek funding opportunities to resolve specific issues that currently limit effective emergency response.
4. Careful and coordinated financial planning for public facilities is very important. The town should integrate capital expenditures into long-term and annual budgets for any facilities that will be funded using Sandgate tax dollars.
5. Public investments in utilities, facilities, and services should support development in areas designated for growth, and not in outlying areas.

SECTION 10: ENERGY

Energy is a resource that should be considered in any comprehensive land use planning process. The Town of Sandgate recognizes that as conventional fuel resources dwindle globally, the future resilience of its small community will require lowering dependence on imported, non-renewable fuels, tapping local energy sources for enhanced self-reliance, and improving efficiency.

The State of Vermont established markers through its Comprehensive Energy Plan (CEP updated in 2022) to help guide communities to a sustainable future. A central goal of the plan is to attain 90% renewable energy by 2050. To achieve this goal, however, development of new renewable energy sources is insufficient on its own. Since renewable sources yield less energy per unit than their fossil fuel-based counterparts, a drastic reduction in overall energy consumption is critical to meeting this target. In the Town of Sandgate, total energy consumption would have to be cut by more than half by 2050 to meet this goal. Energy conservation efforts combined with improved energy efficiency through technology upgrades and building weatherization will enable Vermont towns to reduce energy consumption.

A key aspect of improved efficiency will be a greater reliance on electricity. Since electricity can be generated from renewable resources, and electric-powered technologies such as heat pumps and electric vehicles are highly efficient, switching to electricity will help lower overall energy consumption even as lifestyles remain much the same as today. By 2050, nearly half of all energy will be supplied through electricity according to projections in the VT CEP.

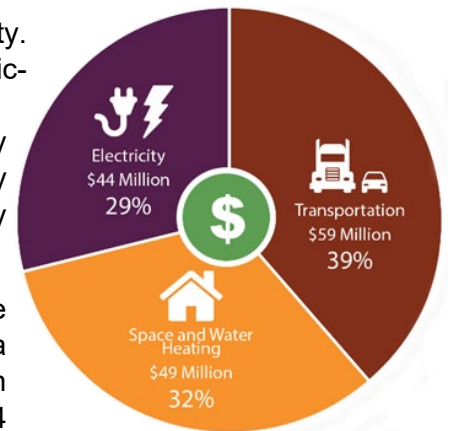
Though this major shift in energy use is considerable, there are opportunities to lower costs and bolster the local economy through a transformation of the Energy Sector, which now costs the Bennington Region over \$150 Million a year in imported fuels electricity costs (2014 estimates). Nearly all this money currently flows out of the region and the state, so redirection of these funds to local energy businesses and jobs will better retain wealth in local communities.

The Energy Chapter of the Town of Sandgate municipal plan is intended to provide the residents and local leadership of the town with information and strategies needed to plan for an energy future that maintains a vibrant community, as the energy sector evolves to lower energy costs, to promote local renewable energy development, and to better protect the environment. Much of the data below come from Low Emissions Analysis Platform (LEAP) model projections. The LEAP system is a modeling tool used by the State of Vermont to analyze and project energy supply and demand for the years 2015-2050.

10.1 Current and Future Energy Use

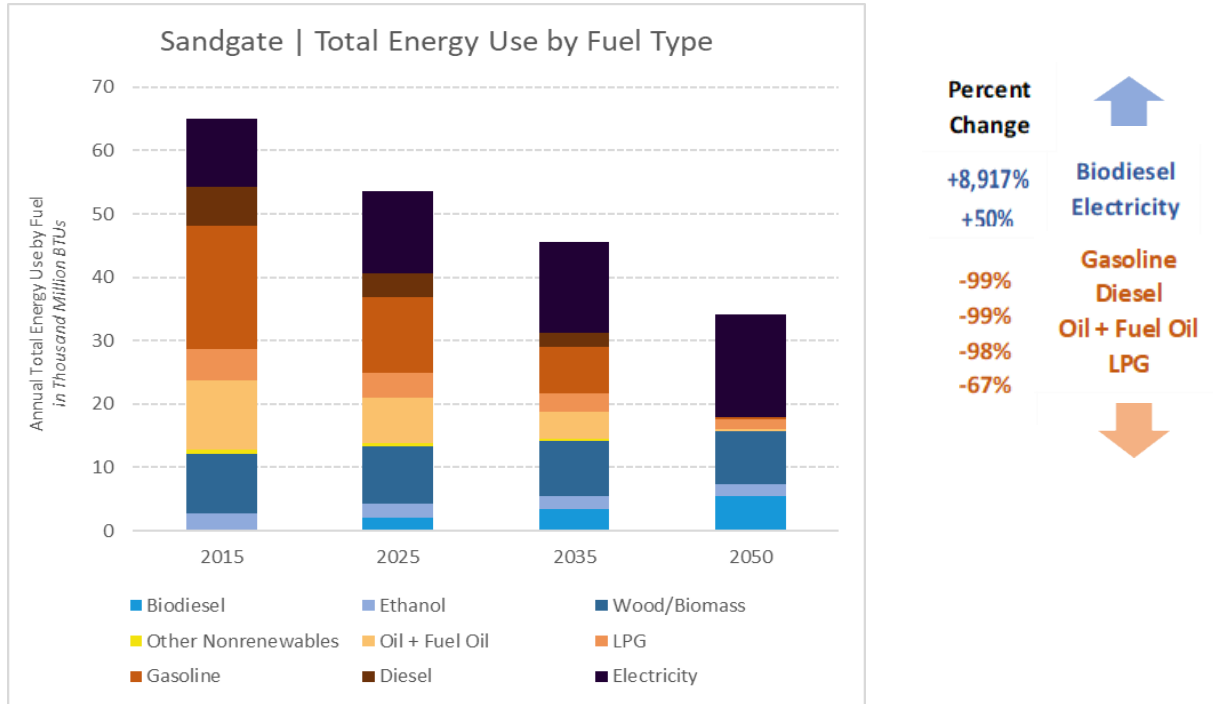
As a rural town with 387 residents housed mostly in single family homes, Sandgate consumes a considerable amount of energy every year to meet its transportation, space heating, and electricity needs. According to LEAP model projections (see BCRC Regional Energy Plan 2017, page 39, for more details), Sandgate uses over 70,000 thousand million BTUs (British Thermal Units) per year.

The chart below illustrates one path the town can pursue to achieve this target through gradual adaptation and fuel switching over the next several decades. With the year 2015 as a baseline, the town has identified energy use targets by fuel/energy carrier for years 2025, 2035, and 2050:



*Figure 1: BCRC Region Energy Cost Estimates, 2014
Based on data from Census Bureau, VT Dept. of Motor Vehicles, and US Energy Information Administration.*

Figure 2: Sandgate Total Energy Use by Fuel Type, 2015-2050. Based on LEAP Projections



According to LEAP projections, Sandgate would phase out fossil fuels through electrification of the transportation and heating sectors, with biodiesel replacing some conventional diesel and oil fuels, and with widespread use of woody biomass for space heating. Over time, electricity will go from meeting just 17% of total energy needs in 2015 to 47% of energy needs in 2050. More details on how specific technologies and strategies will achieve this energy reduction and fuel conversion are broken down by energy sector below.

10.2 Residential Energy Use

Energy use can be grouped into 3 major sectors: transportation, thermal (heating and cooling), and electricity. Sandgate’s more than 300 residents consume large amounts of energy for transportation, to heat space and water, and to power lights and appliances with electricity. By identifying technologies and practices capable of catalyzing the transformation of each energy sector, Sandgate aims to provide its residents and municipal officials the tools necessary to realize the state’s energy goals.

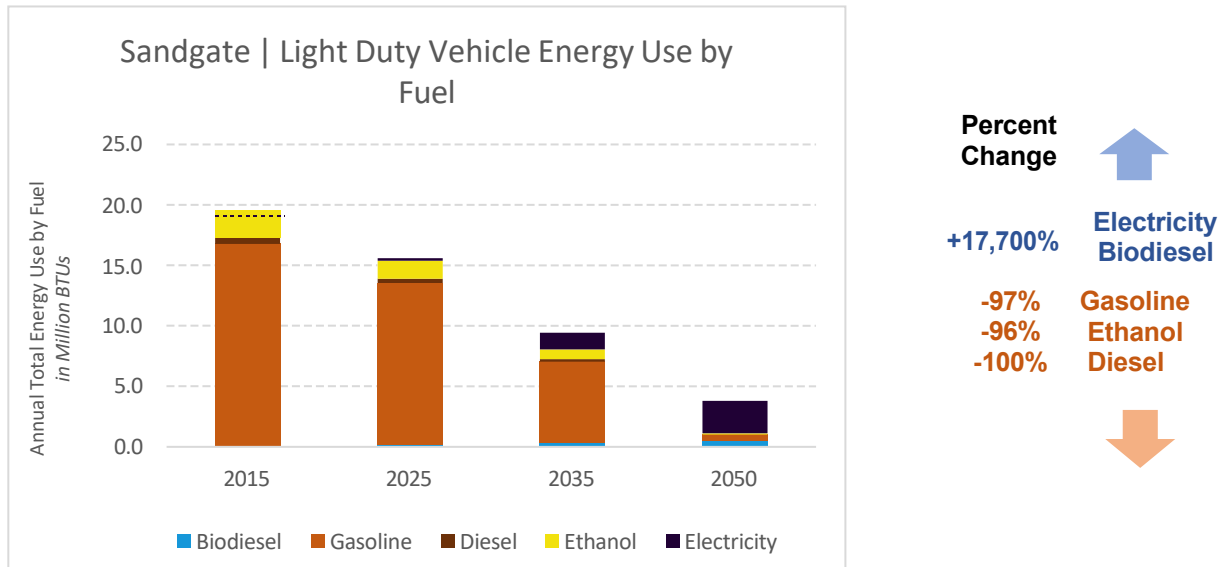
10.2.1 Transportation

In Sandgate, and across all Vermont, transportation consumes the most energy of any one sector. Due to Sandgate’s rural location, people and goods constantly travel long distances to move to and from the community. The light duty vehicle has made this independent mobility and the freedom and access that come with it possible, yet most vehicles rely on vast amounts of non-renewable fuel inputs to function. Given the dependence most households have developed on fossil fuel vehicles, transportation represents one of the greatest challenges to reducing overall energy use.

For example, consider commuting to work. The average worker living in Sandgate has a mean commute time of 27.4 minutes, or about 30 miles roundtrip per day. With roughly 189 resident workers mostly commuting to work alone, commuting accounts for approximately 5,670 miles per

day of travel, over 82,000 gallons of gasoline per year, and a yearly cost of over \$213,000 to commuters. Although it is notable that 33% of workers worked remotely in 2020. It is estimated that Sandgate residents own over 340 vehicles and drive about 4.1 million miles per year, so commuting represents only a fraction of total transportation in the area (all data based on 2016-2020 ACS estimates).

Figure 3: Sandgate Light Duty Vehicle Energy Use by Fuel, 2015—2050. Based on LEAP projections.



Electric vehicle (EV) technologies have advanced significantly in recent years and these systems are projected to dominate the car industry in coming decades. By electrifying the light duty vehicle fleet, Sandgate residents have the opportunity to improve transportation efficiency and divert money currently spent on fossil fuels. Targets for gradually reducing energy consumption and converting to EV technologies are shown below.

Over the next three decades, total energy for transportation would fall gradually to less than 20%, or one fifth, of current levels by 2050. Electrification of 70% the light duty vehicle fleet would account for much of this reduction in energy use. The following EV vehicle count targets should guide adoption rates in Sandgate: by 2025, 34 EVs; by 2035, 232 EVs; and by 2050, 478 EVs (targets generated through LEAP analysis). A combination of biodiesel and gasoline fuels will power the remaining portion of light duty vehicles.

While EVs will play a major role in reducing energy use while allowing Sandgate residents to continue to rely on some personal vehicle travel, efficiency gains from EVs alone will not account for all the energy reduction needed to meet future transportation energy targets. Conservation through behavior changes such as carpooling, transit use, and increased reliance on walking and biking will be critical to reaching 2050 energy targets. Policies that encourage dense land use development and implementation of Complete Streets road design are necessary to shift the predominant transportation model from being vehicle-centric to multimodal and efficient-by-design. Complete Streets is an approach to road design and maintenance that considers all users of a road including pedestrians, cyclists, and transit riders (see “Complete Streets: A Guide for Vermont Communities” for more information).

10.2.2 Thermal

Over half of Sandgate homes are heated by oil throughout the 7-month heating season. Though this fuel source has been inexpensive and widely accessible in the past, projected future shortages of fossil fuels suggest that the town should mitigate reliance on this fuel source by switching to more

efficient systems that can be powered by local resources. Woody biomass is one abundant local resource already used for space heating. Wood and pellet stoves currently heat 27% of Sandgate residences, and this proportion is projected to increase to about 40% of Sandgate homes by 2050. Though the number of homes heated by woody biomass will increase, the total energy consumed by these systems will lower from about 14 thousand million BTUs to 9 thousand million BTUs as aging stoves are replaced by newer, more efficient ones.

Sandgate’s energy use for residential heating would decline to just 40% of current use, or 8 thousand million BTUs, by 2050. Cold-climate electric heat pumps are another highly efficient technology that will play a major role in lowering overall energy consumption in the town through electrification. By 2050, more than one in four homes would use an electric heat pump as its primary heating source. Cold-climate heat pump technology, based on the mechanism that cools refrigerators by extracting cold air from ambient space, has improved significantly in recent years. In addition to being more energy efficient than other heating technologies, heat pumps can cool one’s home during the warmer months. To meet 2050 goals, electric heat pumps can be adopted in accordance with the following household target counts: by 2025, 10 households heated primarily by cold climate heat pump; by 2035, 23 households; and by 2050, 50 households (targets generated through LEAP analysis). The overall shift in residential thermal energy use can also be shown by portion of households (see chart on following page). According to LEAP estimates, of Sandgate’s nearly 200 households, over 70 homes would rely for heating on woody biomass through high efficiency pellet and wood stoves, 50 homes would use electric heat pumps, and 43 homes will use biodiesel-based systems.

Some homes would continue to use liquid propane gas (LPG), but at a fraction of today’s usage (about 12 homes in 2050).

Figure 5: Sandgate Total Residential Energy Use for Heating, 2015—2050. Based on LEAP projections.

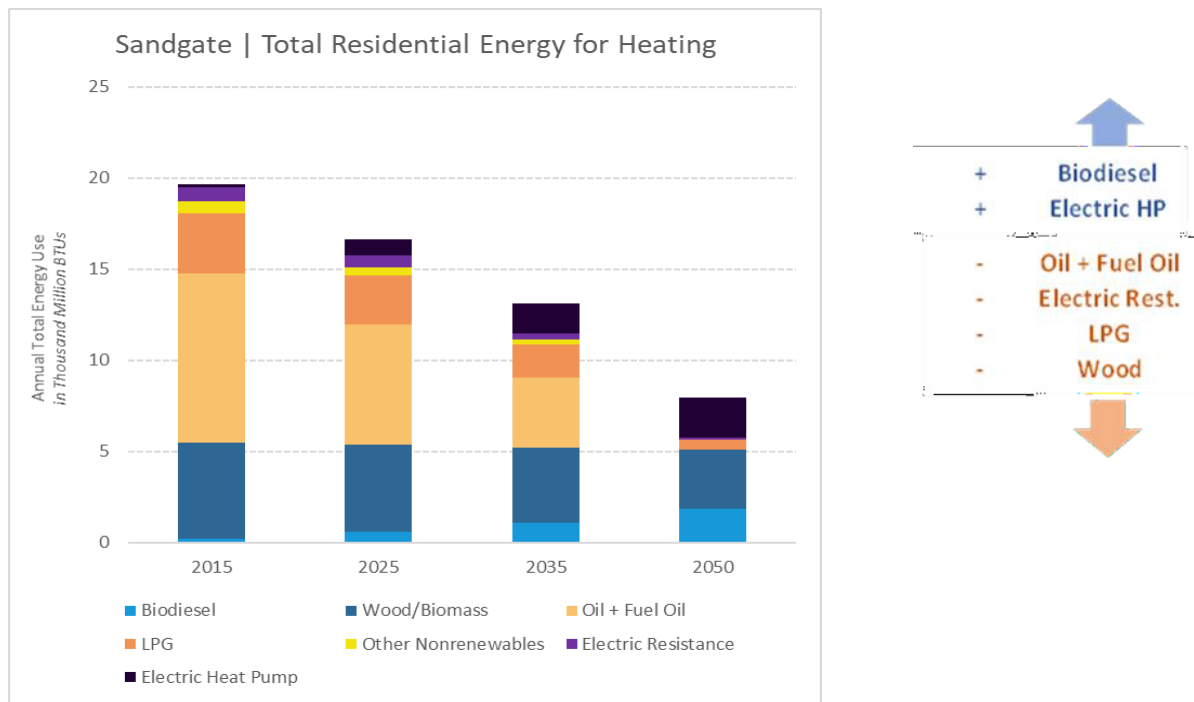


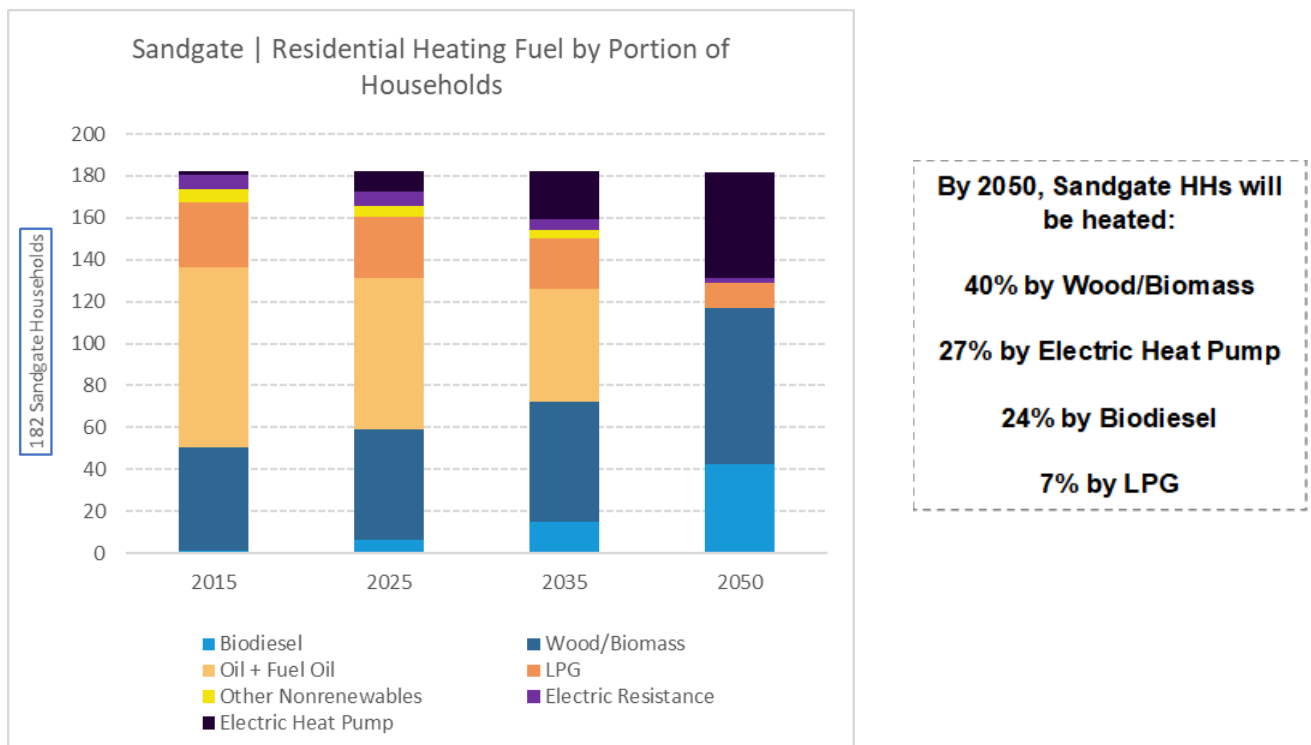
Table 10.1: Sandgate Residential Heating and Electric Use and Costs. ACS 2015 Estimates, Efficiency Vermont data.

The vast majority of Sandgate’s 182 occupied housing units are single family homes, which together consume close to \$1.6 million a year in heat and electric energy use. Dense, multi-unit dwellings are more efficient than single family homes due to lower average square footage and efficiencies arising from passively shared heat. Town residents spend the most money on heating oil and non-heat electricity.

	Occupied Residential Units	Total Oil Use (gallons)	Total LP Gas Use (gallons)	Total Wood Use (pellet bags)	Electric Use for Heat (kWh)	Non-heat Electric (kWh)	Total Cost by HH Type	Cost /HH
Single Family	170	73,658	38,184	15,692	295,487	1,209,482	\$634,135	\$3,730
Two-Family	8	2,600	1,348	554	10,429	61,770	\$25,188	\$3,149
Multi-Family	0	-	-	-	-	-	-	-
Mobile Homes	4	1,300	674	277	5,214	24,131	\$11,601	\$2,900
Cost Factor	-	\$2.75/gal	\$3.45/gal	\$5.00/bag	\$0.15/kWH	\$0.15/kWH	-	-
Total Cost	-	\$213,283	\$138,708	\$82,615	\$45,767	\$190,551	-	-

Methodology: Assumed heating efficiency of 60,000 BTU/sq.ft. and the following square footage assumptions: 2,000 sf; 1,500 sf; 1,000 mf; and 1,500 mobile homes (higher sq.ft. due to generally lower efficiency). Units in housing structure and heating source shares from Census.

Figure 6: Sandgate Total Residential Energy Use for Heating by HH, 2015—2050. Based on LEAP projections.



Gradually switching thermal systems to more efficient electric options would do much to improve energy efficiency, but thermal conservation gains would rely on extensive weatherization of existing homes and incorporation of building codes for new construction. The following household weatherization count targets can help guide efforts in Sandgate: 20 households weatherized by 2025; 60 households by 2035; and 131 households by 2050 (targets generated through LEAP analysis).

By better sealing and insulating homes, total energy use will decrease drastically since it requires less energy to heat and cool a weatherized home. NeighborWorks of Western Vermont is a regional organization that offers technical assistance and financing options to make weatherization programs accessible. Efficiency Vermont data shows that at least 5 homes made thermal shell improvements from 2019-2021 and nearly 20 homes installed heat pumps during that same period, indicating that residents already value this approach to efficiency.

10.2.3 Electricity

As mentioned previously, electricity use will expand greatly in the future since it is a reliable way to make renewable energy sources available for use. Electricity is a conductor of energy, not a source, but electricity is often mentioned as if it were an energy source since widespread adoption of appliances, vehicles, and thermal technologies powered by electricity are critical to achieving Vermont’s energy goals.

Current trends suggest that total electric use is already declining in Sandgate’s commercial and industrial sector:

Table 10.2: Sandgate Electricity Usage by Year and Sector (in kWh). Source: Efficiency VT

Sector	2018	2019	2020
Residential	1,685,162	1,581,578	1,649,502
Commercial & Industrial	249,731	180,103	137,824
Total	1,934,893	1,761,681	1,787,326
Count of Residential Premises	150	163	171
Average Residential Usage	11,234	9,702	9,646

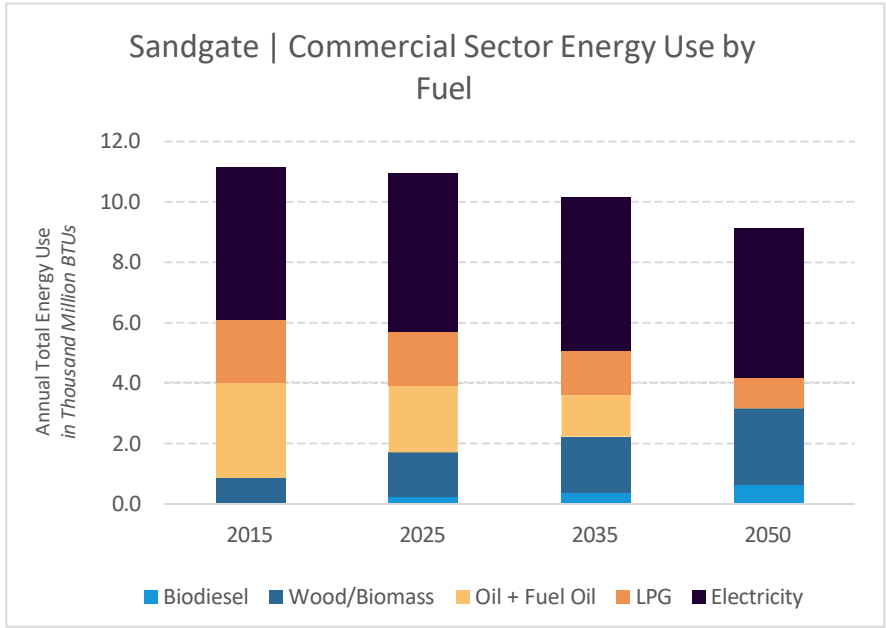
Efficiency Vermont reports that electricity use has declined in residences over the past several years, in part due to efficiency enhancement programs and initiatives. Efficiency Vermont estimates that Sandgate homes saved \$11,254 from 2018-2020 by switching to high efficiency appliances and weatherizing their homes. While these trends show electricity consumption on the decline, total electricity use will eventually begin to increase as Sandgate residents switch to electric transportation and thermal systems.

As part of this process, total electricity use is expected to increase to 16 thousand million BTUs, nearly doubling current usage, by 2050. This increase may seem contrary to energy use reduction goals, but since electricity is much more efficient than the fuels it will replace, total energy consumption will decline even as electricity use rises. More is said about local generation of electricity in a later section on local renewable energy potential.

10.3 Commercial and Industrial Energy Use

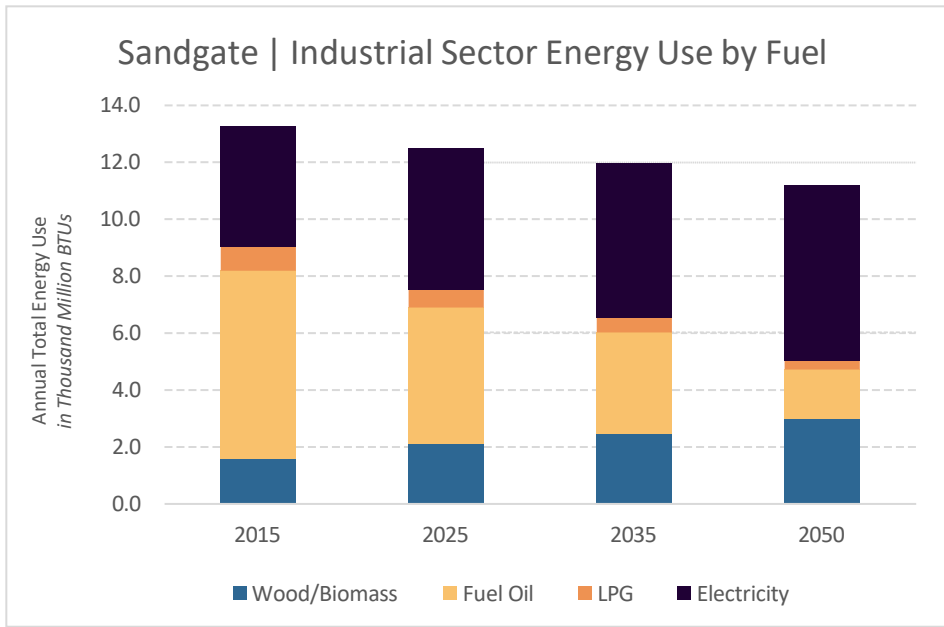
Sandgate is home to a few manufacturing, utility, and service-based establishments that provide approximately 10 jobs. About 6 establishments are classified as commercial (service producing) and 2 as industrial (goods producing) (VT Dept. of Labor, 2021).

Figure 7: Sandgate Total Commercial Energy Use by Fuel, 2015—2050. Based on LEAP projections.



By 2050, total Sandgate commercial sector energy use is projected to decline by 18% to 9 thousand million BTUs.

Figure 8: Sandgate Total Industrial Energy Use by Fuel, 2015—2050. Based on LEAP projections.



By 2050, total Sandgate industrial sector energy use is projected to decline by 20% to 11 thousand million BTUs.

It is clear at a comparative glance that overall energy use reduction at Sandgate’s businesses and industries is not projected to be as dramatic as for Sandgate homes. This flexibility is intended to prevent energy reduction goals from threatening local establishments’ viability over the next several decades. At the same time, policies and market forces still expect businesses to pursue energy reduction strategies appropriate to their ability.

Fuel oil use is projected to decrease almost entirely in the commercial sector and 74% in the industrial sector by 2050, businesses will need to plan for electrification, woody biomass combustion systems, and biodiesel use to replace this fuel over time. Most businesses can reduce energy consumption through straightforward conservation practices such as upgrading lightbulbs and appliances, powering down appliances and machinery when not in use (such as by using programmable timers), and adjusting thermal settings. Comprehensive energy audits are an excellent first step to identifying strategies that make the greatest impact on energy reduction and cost savings. Additionally, since many commercial and industrial operations involve sizeable building footprints, some sites may be well suited to accommodate rooftop solar arrays.

10.4 Municipal Energy Use

Local government and schools are significant consumers of energy, and the costs associated with energy use by those entities have a direct bearing on taxes. Energy conservation and use of alternative energy systems in this sector have the potential to produce significant savings for the community and to set a visible example of responsible energy use. The Sandgate Town Office is over 50 years old and is heated by propane. The town garage is a newer structure at approximately 20 years old and is heated with oil. Both buildings have recently received insulation and lighting upgrades, but further efficiency improvements, such as the installation of heat pumps, could save the town additional money in heating costs.

Table 10.3: Annual Fuel Consumption and Cost for Town Offices and Garage, FY21: Sandgate, VT.
Estimates from Town, 2021.

Energy Source	Quantity Used	Cost Factor	Total Cost
Town Offices			
Propane Heat	620 gallons	\$3.75/gallon	\$2,323
Electricity	14,147 kWh	\$0.15/kWh	\$2,122
Town Garage			
Oil	477 gallons	\$2.75/gallon	\$1,312
Electricity	3,767 kWh	\$0.15/kWh	\$565
Diesel Fuel	3,919 gallons	\$2.75/gallon	\$10,777
Total Cost			\$17,099

The town office consumes over four times as much electricity as the town garage. Although the lighting was upgraded within the last five years, further upgrades, such as lights connected to timed motion sensors could help the town reduce its electricity use and save money. Over 60% of municipal energy expenditures go to diesel fuel costs, and the town could see significant savings by pursuing improvements to its heavy-duty vehicles through programs like the Diesel Emissions Reduction Financial Assistance Program.

One opportunity for wider community energy savings lies in greater use of the school bus. Sandgate is a member of the Southwest Supervisory Union which provides a bus for Sandgate students. The town also has school choice, and students who attend other schools must provide their own transportation. A campaign to raise bus ridership could lower passenger vehicle trips to the school, creating savings for Sandgate families.

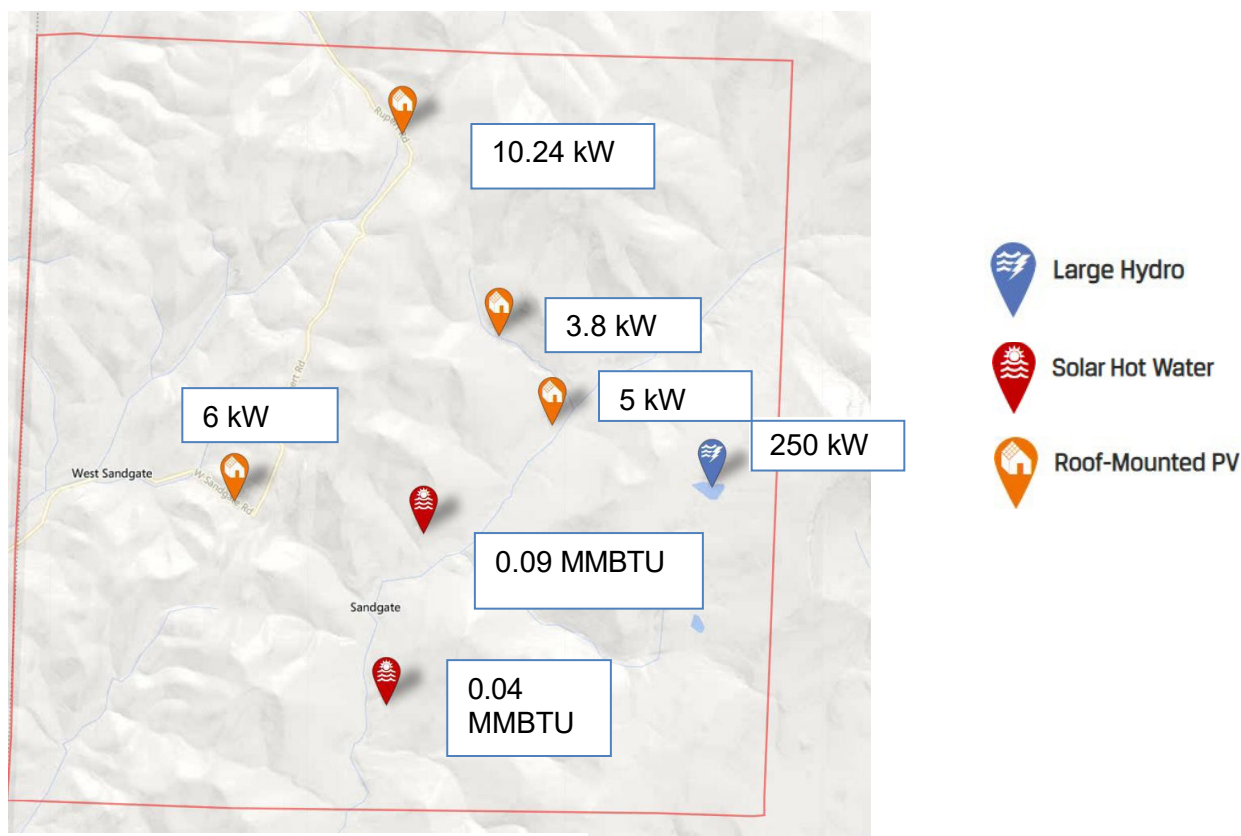
10.5 Local Renewable Energy Generation and Potential

Nearly all energy consumed in Sandgate is currently imported in the form of gasoline, oil, propane, and electricity. Some imported electricity is powered from renewable sources, primarily the electricity purchased from hydroelectric generating facilities in Quebec and Labrador, Canada.

Today limited energy production occurs in Sandgate in the form of a hydro site at the Carthusian Monastery, numerous rooftop solar arrays (total installed capacity of 25 kW) and several residential solar hot water heaters (Figure 9). The small hydroelectric generator at the Carthusian Monastery previously generated 250kW of electricity, however, over time one of the system's penstocks has degraded beyond repair. The Monastery plans to replace 90kW of hydroelectric generation with small scale wind energy generated by three 30kW turbines.

Energy generated from local, renewable sources can be stored in battery energy storage systems (BESS) and used later in the event of a power outage, playing an important role in both energy independence and emergency preparedness. The widespread adoption of renewable energy and storage technologies can help Sandgate become more resilient in future emergencies and insulate the town from volatile fossil fuel prices.

Figure 9: Sandgate Existing Renewables



Based on VT Energy Dashboard data, accessed 4/14/22

Note: There may be other renewable resources in the town that are not reflected on this map.

There are many more areas in the municipality where specific scales of solar and wind development are appropriate. The following map analyses, which comply with Act 174 standards for renewable resource mapping (for more details, see Bennington County Regional Energy Plan, pages 80-83), are intended to provide information about renewable resource availability in the town. Maps were generated using GIS (geographic information systems) data layers developed by VCGI (the VT Center for Geographic Information). Renewable resource layers were mapped, and then

'Known Constraints' (vernal pools; river corridors; floodways; state significant natural communities and rare, threatened, and endangered species; national wilderness areas, and class 1 and 2 wetlands) were removed entirely from available resource areas. Then 'Possible Constraints' (VT agriculturally important soils; special flood hazard areas; protected lands; deer wintering areas; conservation design highest priority forest blocks; and hydric soils) were overlapped with renewable resources to highlight where there are potential complications for developing generation facilities. Remaining resource areas that do not overlap with any environmental constraints are considered 'Prime' resource areas, and resource areas that overlap with Possible Constraints are considered 'Secondary' resource areas.

10.5.1 Locally-Identified Constraints

Act 174 authorizes municipalities to identify local resource areas where renewable energy development is inappropriate and comparable development is already restricted. One such area exists in Sandgate, namely the Forest 2 land use district. The Town Plan notes that the Forest 2 district should remain an area where environmental, natural, and recreational resources are protected, and limited development is permitted with proper controls.

10.5.2 Solar

Given the low population of Sandgate, and limited amount of identified solar resource potential, it is unlikely that the town will need to develop large-scale solar sites. See local constraints, 'Prime' and 'Secondary' resource areas, and preferred solar sites in the Sandgate Solar Resources Map.

The town also lacks sufficient 3-phase electrical distribution lines, further limiting solar resource development potential. Preferred areas for solar facilities up to 150 kW include the following areas: roof-mounted systems; former brownfield sites; disturbed areas such as gravel or sand pits, sealed landfills, and former quarries; areas where topographical features or hedgerows naturally screen a site from common view; and areas adjacent to large-scale commercial or industrial buildings. The Town of Sandgate encourages solar development at residential and commercial scales in appropriate areas throughout town. Residential scale solar arrays, which primarily provide energy onsite and typically range from 1 to 15 kW, are suitable on rooftops and on ground-mounted trackers at homes and businesses. Commercial solar arrays, which primarily produce energy for sale to the electric grid, range from 75 kW up to several MWs' worth of capacity.

The Bennington County Regional Energy Plan has determined that the Town of Sandgate should aim to develop an additional 0.6 MW of solar capacity by 2050 to help meet regional and state energy targets. The resource areas identified in the Sandgate Solar Resource Map, along with current and planned installations, are more than sufficient to meet this target.

Solar energy policies should consider the constantly evolving nature of energy technologies. As capacity and diversity of solar energy systems increase over time, the policies presented here should be reviewed to reflect relevant updates in the technology. For example, recently introduced Tesla Solar Roof tiles on a Sandgate home may surpass current capacity thresholds contemplated here but could be found to be aesthetically and environmentally suitable in the town.

Solar Scale Definitions & Examples

Residential-scale:
capacity ≤ 15 kW



Commercial-scale:
capacity ≤ 500 kW



Utility-scale:
capacity > 500 kW



Solar Screening– Ground-mounted solar facilities shall comply with state minimum setbacks as well as any siting and screening standards outlined by the Town. The objective of screening policies is to mitigate the visual impacts of ground-mounted solar facilities on natural and historic vistas as viewed from public roads and neighboring residential properties.

10.5.3 Wind

The Town of Sandgate only has one small-scale wind project in development at the Carthusian Monastery, which is likely due to the fact that areas with significant wind resource are in high altitude, high slope areas where development is generally not permitted. In Sandgate, portions of these high-altitude, high-wind resource areas are conserved as part of state forest land. Though wind energy development may be allowed in forested uplands, it is considered less favorable to develop conserved land and environmentally sensitive lands if other comparable and unrestricted areas are available for development. High-elevation forest land in Sandgate currently lacks electric transmission infrastructure to which a generator could be connected, making potential grid connection a very costly undertaking.

Due to these points of concern, the town has determined that only small-scale (residential) and mid-scale (commercial) wind power generation are appropriate in the municipality.

Only wind energy generation facilities referred to as 'residential scale' with capacities up to 10 kW and facilities referred to as 'commercial scale' with capacities up to 50 kW are permitted in the Rural Residential (RR), and Forest 1 districts. Mid-size, commercial-scale wind turbines are only appropriate for placement at institutions such as schools and businesses. Wind energy generation infrastructure is discouraged in the Forest 2 District. The images to the right provide an idea of the scale of residential and commercial-scale wind turbines. *Star Wind Turbines LLC*, located nearby in the Town of Dorset, is a local manufacturer of small- and mid-scale wind turbines.

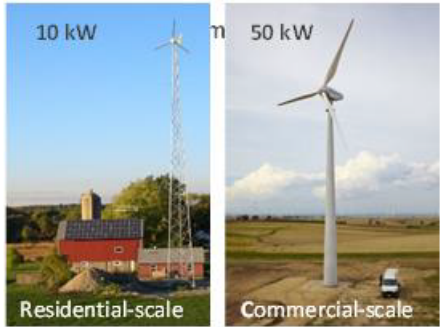
This policy shall not preclude development of larger-scale wind projects that serve and are supported by the local community. For example, community-serving wind development that offsets electrical use at municipal buildings or in a defined neighborhood may be appropriate. All wind development must comply with the State's turbine noise standards and environmental regulations. See Sandgate's Wind Resource Map below to view areas where smaller-scale wind installations could be most effective.

Wind Scale Definitions

Utility-scale: Turbines with hub heights \geq 70 meters, and capacity \geq 1 MW.

Commercial-scale: Turbines with hub heights \leq 50 meters, and capacity \leq 100 kW

Residential-scale: Turbines with hub heights \leq 30 meters, and capacity \leq 10 kW



10 kW Residential-scale 50 kW Commercial-scale

10.5.4 Hydro

There is one hydroelectric site at the Carthusian Monastery at Lake Madeleine that will soon be supplemented with small-scale wind. Due to environmental regulations, it is highly unlikely that new dams or hydro sites will be developed in Vermont. Currently, Sandgate does not plan to develop hydroelectric generation facilities in the town, however the town recognizes the potential of micro-hydro facilities to meet its renewable energy needs in the future and would support the development of micro-hydro sites.

10.5.6 Geothermal

The soils in low-lying, developed areas of Sandgate have high resource potential for geothermal well heating systems. This technology is highly encouraged in new residential and commercial

construction.

10.5.7 Woody Biomass

With more than 18,000 acres of forested land in the town, Sandgate has abundant woody biomass resource to be used for local heat generation – the most efficient use of biomass for energy. High-efficiency wood pellet and wood chip heat systems are a good choice for buildings of sufficient scale such as apartment buildings, schools, and other institutions. Local installations of such systems include several sites in the Town of Bennington: wood chip heat systems at the middle and high schools and a wood pellet heat system at Orchard Village Apartments.

When it comes to using biomass for electricity generation, the town sees combined heat and power biomass projects as preferable to enterprises dedicated solely to electricity generation. Biomass electricity facilities may be appropriate in Sandgate, though only projects operating at a capacity of 5 MW or less shall be permitted in the town. Other plant-derived renewable fuels such as biodiesel can be produced from oil seed crops to support farm operations and to supply businesses in the area.

10.6 Energy Conservation, Efficiency, and Renewable Energy Strategies

To achieve the energy goals advanced by the state of Vermont, Sandgate’s residents and municipal officials must commit to concrete actions that reflect the transformations required for this undertaking. Achievement of 90% renewable energy by 2050 will depend on improving efficiency, conserving energy, and developing local renewable energy facilities at a steady, resolute pace over the next three decades.

The town has identified the following policies and actions as the most effective pathways to realize the town’s energy planning objectives. Many of the policies indicated here are discussed in more detail in relevant sections of the Sandgate Town Plan, particularly in the areas of transportation and land use. The town referenced both the Bennington County Regional Energy Plan (2017) and Act 174 guidance and standards documents published by the Vermont Department of Public Service to prepare these policies.

Municipal Leadership and Land Use Planning

1. Municipal Energy Committee: The town should establish a municipal energy committee to implement this plan and track progress on the policies and actions stated herein. This committee would promote local residential and commercial efficiency and conservation improvements through coordination of information and technical assistance and advocate for appropriate renewable energy generation throughout the town.
2. Land Use Policies: Land use policies must promote compact, historical development patterns. Though there is currently no single, dense village core in the town, there are areas where future development could be concentrated to establish walkable, multi-use hubs. To encourage development of these dense hubs of activity, EV charging stations could be installed in conjunction with development projects. Participation in state designation programs should be evaluated as potential catalyst for this development.
3. Municipal Infrastructure. All municipal infrastructure should be evaluated to identify opportunities for efficiency improvements and renewable energy generation and use. At the town offices, an EV charging station shall be installed and the viability of installing solar panels on the building’s roof shall be assessed. Professional energy audits shall be pursued at the town hall and town garage to identify cost-effective energy saving strategies.

The town should consider weatherization improvements and upgrading existing thermal and transportation systems to high efficiency electric technologies.

4. New Development: New development in Sandgate shall adhere to the state mandated Residential Building Energy Standards, be planned to take advantage of a site's solar resource potential and be made to accommodate multiple transportation modes through the Site Plan and Subdivision Review processes.

Conservation and Efficient Use of Energy

1. Residential: The Sandgate municipal energy committee should work with BCRC to coordinate presentations and local conversations that promote residential energy efficiency and conservation through the following programs: the "Energy Star" building performance rating system; educational programming and appliance upgrade rebates available through Efficiency Vermont; and weatherization assistance provided by the Bennington Rutland Opportunity Council (BROC) and NeighborWorks of Western Vermont (NWWVT). Providing information on programs that assist low-income residents and owners of rental units in pursuing weatherization and thermal systems upgrades should be prioritized.
2. Commercial and Industrial: Energy efficiency and conservation may be promoted at these sites in the following ways: by requiring all new commercial and industrial buildings meet the state mandated Commercial Building Energy Standards; by encouraging existing business to explore efficiency and conservation strategies outlined by Efficiency Vermont, which include promoting carpooling and alternative commuting modes among employees, completing energy audits, installing EV charging infrastructure, and upgrading thermal and transportation systems to higher efficiency and electric technologies when possible.

Transportation

1. Electric Vehicle (EV) technology: The Town of Sandgate shall explore programs for installing an EV charging station at the town offices. Informational presentations for Sandgate residents and business owners on the advantages of EV technologies as well as state and federal rebate opportunities may be coordinated with the assistance of Efficiency Vermont.
2. Alternatives to Single Passenger Vehicle Commuting: The municipal energy committee, in partnership with BCRC and other groups, can share information with local businesses and institutions on promoting rideshare, vanpool, and car-sharing, on strategies to support seasonal bike commuting, and on using telecommuting to reduce energy expended for work travel. A school campaign to increase ridership of the school bus could create community savings.
3. Complete Streets Design: The town should assess existing roads for their ability to accommodate safe and convenient walking and biking. Areas for improvement should be prioritized and funding sought to align these areas with Complete Streets guidelines.

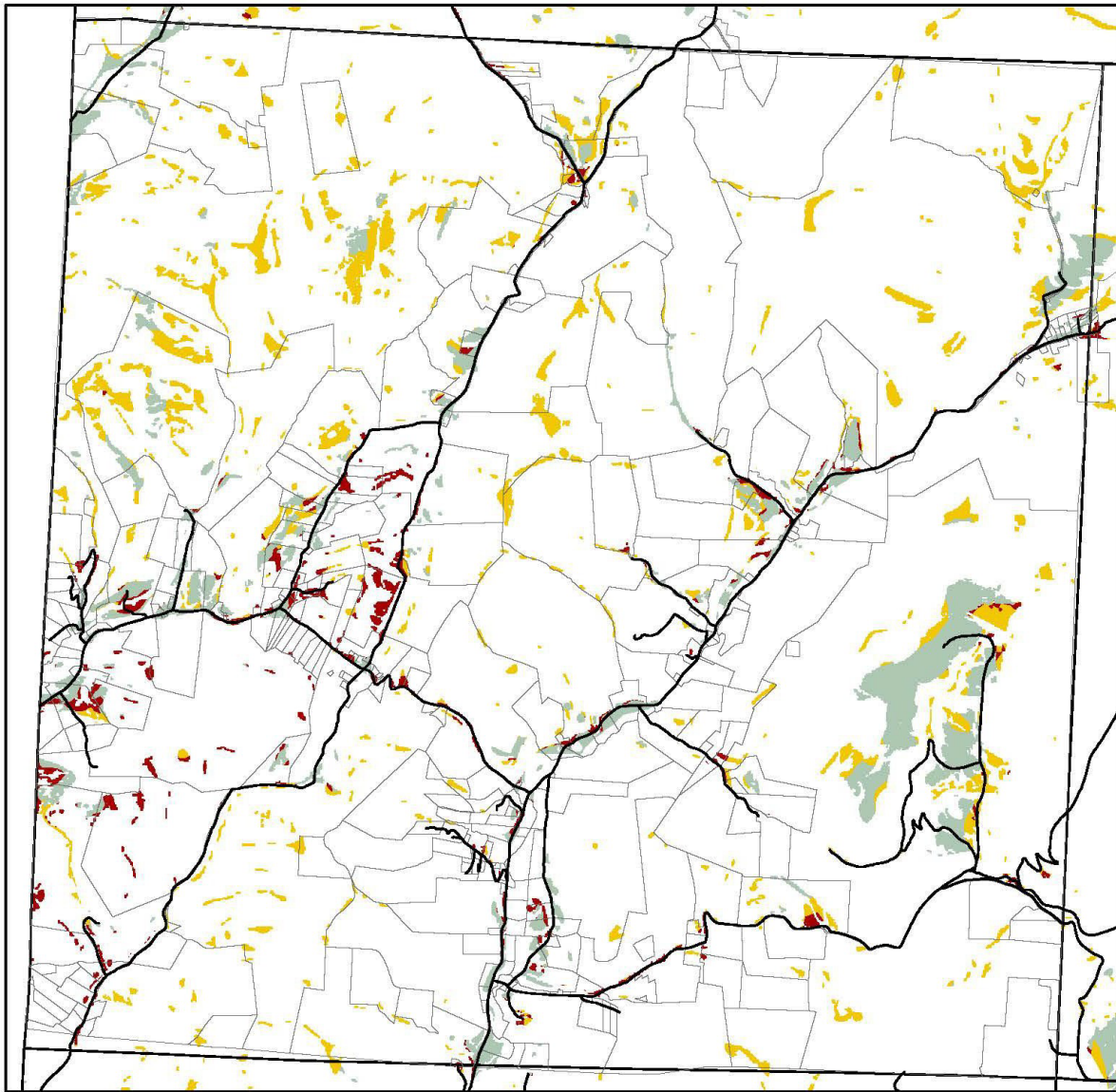
Renewable Energy Development

1. The town should offset ongoing fossil fuel consumption by developing renewable energy facilities on appropriate town-owned parcels. The town should support interested residents in developing renewable energy facilities on their properties. The town should consider trialing use of blended biofuel in diesel-powered municipal trucks and equipment.

Local Food Production

1. The municipal energy committee can help facilitate dialogue between local/regional food producers and local/regional institutions such as schools, hospitals, and meal delivery or provision programs to enhance the interconnectedness of the regional food system.
2. The municipal energy committee should encourage residents to support the local food system by promoting nearby farmers markets and other local food programs such as Northshire Grown: Direct.

Sandgate Solar Resource Map

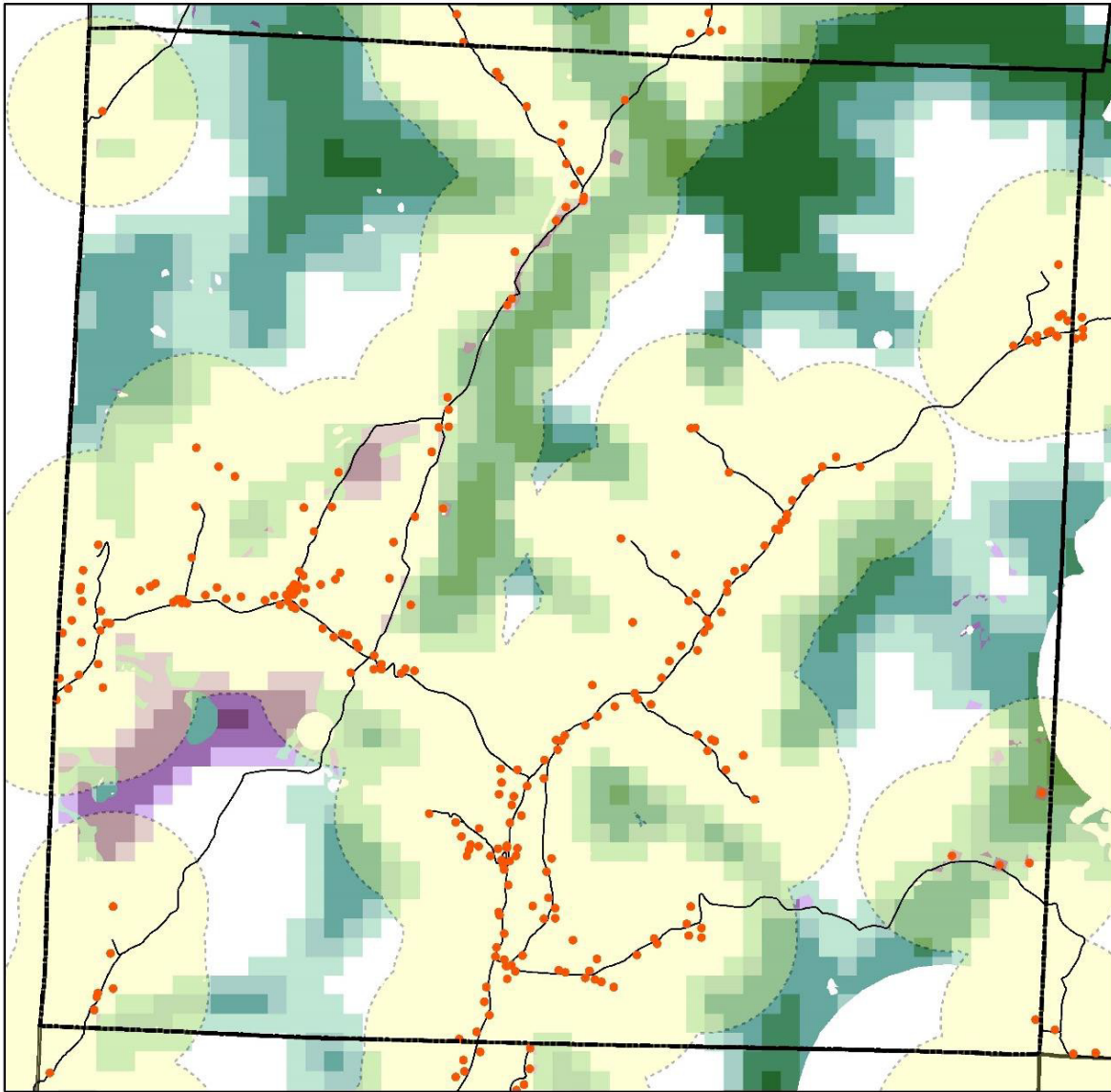








- Secondary Solar with Prime Agricultural Soils
- Solar Resource - No Identified Environmental Constraints
- Solar Resource - No Known Constraints, but at least one Possible Constraint

- 3-Phase Distribution Lines
- Transmission Lines
- Roads
- Parcel Data



Sandgate Wind Resources Map



-  Sandgate
-  Residential Structures
-  Transmission Lines
-  3-Phase Distribution Lines
-  Roads
-  1KM Residential Buffer

1 PRIME WIND
Areas with high wind potential and no identified Constraints (Known or Possible).
Darker areas have higher wind speeds.

2 SECONDARY WIND
Areas with high wind potential and no Known Constraints, but where at least one Possible Constraint exists.
Darker areas have higher wind speeds.



0 0.5 1 2 Miles

SECTION 11: MUNICIPAL FINANCE

11.1 Budget and Tax Issues

The fact that town, and especially highway, costs have risen steadily over the past ten years was documented in Section 6.2. The largest portions of the budget are the school tuition and town highway expenditures. The budget has seen an increase of 15% since 2011.

The tax rate paid by individuals owning property in Sandgate has risen by about 8% over this same time period (Table 6.1). The town must stay vigilant to ensure the local property tax does not become an excessive burden on the average household's income, especially for young families. Efforts to control our growing reliance on property taxes, through fair and equitable reform programs should be supported.

The town must consistently plan for significant large expenditures through careful annual and long-term budget planning. The town should ask questions like: "Which projects should be undertaken?" "When should they be implemented?" and "How should they be paid for?" By answering these questions, the Town can develop a simple capital budget that can help to smooth out a fluctuating tax rate, anticipate problems before crisis conditions develop, coordinate related projects and activities, and assess alternative solutions.

11.2 Policies and Recommendations

1. The town should continue to carefully develop annual budgets in an effort to minimize the burden on local taxpayers and integrate budgeting for long-range capital expenditures.

SECTION 12: HAZARD MITIGATION PLANNING

12.1 Introduction

Hazard mitigation planning is intended to reduce potential losses from future disasters. Hazard mitigation plans identify potential natural hazards that could affect a community and the projects and actions that a jurisdiction can undertake to reduce risks and damage from natural hazards such as flooding, landslides, wildland fire, and similar events. The Federal Emergency Management Agency (FEMA), within the U.S. Department of Homeland Security and the Department of Vermont Emergency Management both advocate the implementation of hazard mitigation measures to save lives and property and reduce the financial and human costs of disasters.

A Sandgate Hazard Mitigation Planning Committee consisting of the Sandgate Select Board, the Sandgate Emergency Management Director, the Sandgate Road Foreman, the Sandgate Planning Commission and Bennington County Regional Commission staff was formed in July 2014. A Sandgate Hazard Mitigation Plan was adopted in 2016. The Hazard Mitigation Plan, which is posted on the Town website, is intended to identify, describe and prioritize potential natural hazards that could affect the Town of Sandgate and measures to reduce or avoid those impacts.

The Hazard Mitigation Plan uses local knowledge, existing plans and studies, reports and technical information to analyze the following natural hazards:

- Floods and Flash Floods
- Winter Storms
- High Wind Events

- Hail
- Temperature Extremes
- Drought
- Wildfire
- Landslides and Debris Flow
- Earthquake
- Hazardous Materials Spill
- Infectious Disease Outbreak
- Invasive Species

The plan also reviews current mitigation programs and capabilities, describes a comprehensive set of actions to mitigate the identified hazards and describes how the plan will be maintained and updated. Data references and sources of information including sources for the maps are also provided.

12.2 Mitigation Goals

The Sandgate Hazard Mitigation Planning Committee identified the following mitigation goals:

1. Significantly reduce injury and loss of life resulting from natural disasters.
2. Significantly reduce damage to public infrastructure, minimize disruption to the road network and maintain both normal and emergency access.
3. Establish and manage a program to proactively implement mitigation projects for roads, bridges, culverts and other municipal facilities to ensure that community infrastructure is not significantly damaged by natural hazard events.
4. Design and implement mitigation measures so as to minimize impacts to rivers, water bodies and other natural features, historic structures, and neighborhood character.
5. Significantly reduce the economic impacts incurred by municipal, residential, industrial, agricultural and commercial establishments due to disasters.
6. Encourage hazard mitigation planning to be incorporated into other community planning projects, such as Town Plan, Capital Improvement Plan, and Town Basic Emergency Operation Plan
7. Ensure that members of the general public continue to be part of the hazard mitigation planning process.

Based on the above goals and the assessment of hazards, Sandgate identified and prioritized 55 specific hazard mitigation actions. These actions are to be addressed through local plans and regulations, education and awareness, natural system protection, and structural and infrastructure projects. In light of accessibility concerns recently raised by the Arlington Fire Department, the Hazard Mitigation Plan update should pay special attention and recommend actions to address issues of fire suppression and response.

The Plan expired in 2021 and should be updated to receive higher rates of State reimbursement for damage to public infrastructure resulting from natural disasters. The Select Board is responsible for reconstituting the special planning committee and seeking Hazard Mitigation Grant Program (HMGP) funding from Vermont Emergency Management (VEM) to support a plan update. Since Sandgate is considered a low-resource community, the town is prioritized for funding through this program. Changes to the state's funding program have restricted the role the Bennington County Regional Commission can play to develop applications for municipal HMGP funding, as BCRC did in the past. Lack of BCRC technical support for HGMP funding applications limits small towns' ability to pursue funding to maintain these plans and the benefits they provide.

SECTION 13: RELATIONSHIP TO ADJACENT TOWNS AND THE REGION

The Bennington Regional Plan recognizes that Sandgate is a mountainous rural community. Residential development and agricultural uses are planned for the valleys, while the rugged upland forest areas -- roughly corresponding to forest zones -- will allow development on large parcels along with forestry and recreational uses. The Regional Plan acknowledges the importance of Sandgate's upland environment: its preservation serves to protect ground water, forest resources, wildlife habitat, and other natural values. The Sandgate Plan and the Regional Plan are thus in accord. Both state that Sandgate will remain a rural community, accommodating new residential and limited commercial growth where zoning and health regulations permit, thereby allowing for growth while preventing environmental degradation.

Similarly, the plans of adjacent towns (principally Rupert, Manchester, and Arlington) do not conflict with Sandgate's Plan as those towns all have extensive forest and low-density residential land uses and zoning districts along their boundaries with Sandgate. The Sandgate Plan also identifies a number of issues -- schools, emergency services, recreation, solid waste, etc. -- where intermunicipal cooperation and communication is necessary. Particular attention should be directed toward issues involving roads and trails that run between Sandgate and adjacent towns.

It does not appear that the level of development planned for Sandgate will result in significant impact in any other town; moreover, Sandgate has planned for the growth pressures it will face as a result of development in the rest of the Northshire. It would be wise, nonetheless, for the town to participate in joint meetings with neighboring towns when issues of common concern arise, and to continue to participate actively in the Bennington County Regional Commission.

SECTION 14: IMPLEMENTATION PROGRAM - SUMMARY

Most of the sections in this Town Plan contain specific policies and recommended actions designed to implement the goals which were presented in Chapter II. A brief synopsis of principal implementing measures is presented here. Refer to the text of the Plan for a thorough discussion of these items.

1. The Town Plan should serve as a guide to local officials. Boards and commissions should refer to the plan as a regular part of their decision-making process.
2. The Town Plan should be consulted as the Town reviews and comments on the plans of state agencies, the regional planning commission, and neighboring towns. The Planning Commission and Selectboard should also appear at any Act 250 hearings in Sandgate and offer testimony on a proposed development's conformance with the plan.
3. Enforcement of the town's regulations -- especially the zoning, subdivision, and health ordinances -- is necessary to ensure that the objectives of the Town Plan are realized. These regulations should be periodically reviewed and amended as appropriate.
4. The Planning Commission should utilize soil maps, geographic information systems, and other data and technologies that provide valuable information for land use planning.
5. The town should evaluate the need for public facilities and services, giving consideration to strategic capital budgeting to help plan for such needs.
6. The Selectboard must consider the impact of transfers of private land to the United States Forest Service. The fiscal (tax) impacts must be evaluated together with the value of resources present and the appropriateness or potential for development on the parcel.

7. Sandgate should participate in multi-town or regional planning initiatives dealing with solid waste management, transportation, the Taconic forests, recreation, public services, and other issues that require cooperation among several towns.
8. Important historic and natural resources (including agricultural land) should be inventoried. Programs that are designed to preserve these resources should be supported.

SECTION 15: CONSISTENCY WITH STATE PLANNING GOALS

The Planning and Development Act contains one set of goals that deals with the planning process—24 V.S.A. 4302 (b):

- To establish a coordinated, comprehensive planning process and policy framework;
- To encourage citizen participation;
- To consider the use of resources and the consequences of growth and development;
- To work with other municipalities to develop and implement plans.

Sandgate has a long-established planning program, implemented through several municipal boards and commissions, the Town Plan and implementing regulations, part time professional staff, and active participation in the Bennington County Regional Commission (BCRC). Citizen participation is actively encouraged at all stages of the planning process; numerous public meetings and forums are held on a variety of issues and public attendance at planning commission and development review board meetings is somewhat strong. A guiding principle of the town's planning effort is to manage growth so that it is directed to achieve the greatest benefit to residents while avoiding wasteful consumption of land and other resources. Through its active role in the BCRC and various inter-municipal and regional projects and studies, the town works on a regular basis with other towns in the region and has particularly close ties with the neighboring towns of Arlington and Rupert.

Fourteen specific goals (24 V.S.A. 4302(c)) should be reflected in the Town Plan. Those goals are presented below with a discussion of how each is addressed in the Town Plan.

1. To plan development so as to maintain the historic settlement pattern of compact village and urban centers separated by rural countryside.

The plan puts an emphasis on restrictive zoning as a way of ensuring longevity to the town's land, specifically discouraging development in Forest 2 zones. The town encourages new development to be built in areas close to existing town roads to minimize costs to the town. Development is to be consistent with the town's desire to maintain its rural character while residences are encouraged to use creative clustering techniques in order to have as limited effect on the natural environment as possible.

2. To provide a strong and diverse economy that provides satisfying and rewarding job opportunities and that maintains high environmental standards, and to expand economic opportunities in areas with high unemployment or low per capita incomes.

The plan includes current economic characteristics of the town and mentions that the only considerable economic activity comes from forestry, home occupations, and a small amount of agriculture. Many residents, as a result, commute into nearby towns for work. There is little mention of ways in which the town plans to develop future economic activity in accordance with their rural values although it is stated that an increase in

telecommunications infrastructure could make home occupations a much more viable option.

3. To broaden access to educational and vocational training opportunities sufficient to ensure the realization of the abilities of all Vermonters.

The plan touches briefly on current schooling and childcare conditions but little thought is put into funding for future education should the number of local students increase. There is also no plan for increasing adult and post-secondary education.

4. To provide for safe, convenient, economic, and energy efficient transportation systems that respect the integrity of the natural environment, including public transit options and paths for pedestrians and bicyclers.

The importance of maintaining town roads is stressed, especially relating to spreading out road expenditures as to avoid excessive one year growth. The plan talks of intentions to talk with local emergency responders to ensure all roads are accessible in case of emergency and to create emergency management routes. The plan does not address the potential an increase in economic activity could have on the town's roads (e.g., increased logging and maple sugaring activity).

5. To identify, protect, and preserve important natural and historic features of the Vermont landscape.

The town's natural resources are described in detail and are accompanied by means in which they can be protected through zoning and environmentally conscious development. The plan addresses the need to protect waterways including the importance of maintaining riparian zones while still providing water access to residents. The economic and ecological importance of forests is stressed. The Current Use program is mentioned as a way for property owners to maintain healthy and undeveloped lands. The plan recognizes that although there is limited agricultural land, efforts should be made to ensure that these areas of good soil are maintained even if not currently farmed, realizing in the future farming could be economically important. Numerous historical features are noted including the importance they have to the town. The plan encourages renovation and use of historic buildings as a way of ensuring they are preserved while also adding eligible sites to the National Register of Historic Places.

6. To maintain and improve the quality of air, water, wildlife, and land resources.

The plan recognizes that while the air is generally clear and clean an increase in solid waste disposal fees could lead to an increase in backyard burning although a solution to this problem was not discussed. The protection of critical wildlife habitat, both aquatic and terrestrial, is the basis of wildlife protection and the plan describes having this information about habitats available to the public. Maps of wildlife specifically focus on forest blocks, the wintering areas of deer and seasonal bear habitat. Planning for the extraction of land resources puts focus on sustainable extraction practices and ensuring these resources are not made inaccessible by new development.

7. To encourage the efficient use of energy and the development of renewable energy resources.

The town has an Act 174-compliant energy chapter that describes renewable energy

potential and identifies preferred sites. The chapter also outlines specific energy efficiency and conservation strategies that should be undertaken to improve efficiency at the municipal and residential levels.

8. To maintain and enhance recreational opportunities for Vermont residents and visitors.

The plan recognizes that while the town has many options for recreation, neighboring towns also offer excellent recreational activities. A problem with many recreational areas in the town is that there is no public access without crossing over private property. The town does not address ways in which to create more recreational areas with access to the public. The plan does address the possibility of purchasing land near the center of town with the potential of creating a small recreation park.

9. To encourage and strengthen agricultural and forest industries.

The plan includes a map locating the best soils and mentions that some of these soils are still farmed. The plan does not include the potential these soils have either economically or as a food source for the community. There is also little focus on the current logging and maple sugaring industry although it is mentioned that silvicultural practices are encouraged to ensure healthy and sustainable lands. The plan does not include what the current condition of the town's forests are, whether they can sustain an increase in logging and maple sugaring activity, or the economic effects this would have.

10. To provide for the wise and efficient use of Vermont's natural resources and to facilitate the appropriate extraction of earth resources and the proper restoration and preservation of the aesthetic qualities of the area.

The plan includes a map of potential gravel and aggregate sites and stressed the importance of ensuring these sites are available for use in the future while also ensuring their extraction has a minimal impact on the environment. There is no discussion of the economic value of these resources.

11. To ensure the availability of safe and affordable housing for all Vermonters.

The plan explains there are areas available for building of affordable housing but does not discuss the status of current affordable housing except that the town has flexibility with zoning bylaws allowing for a second dwelling to be built on a lot which houses a non-paying guest of the property owner. Although a "density bonus" is offered for new subdivisions the town should create alternative plans for affordable housing should construction of new subdivisions not be a viable option.

12. To plan for, finance, and provide an efficient system of public facilities and services to meet future needs.

The plan does a good job addressing current community facilities and some successful projects, such as the dry hydrant project, but should plan for changes that will likely take place in the near future. The status of cell phone and internet access should be addressed along with what changes the availability of internet service would have. The town should look into creating additional places where internet service is available to the community beside the Town Office and the Martha Canfield Library in Arlington. There is no discussion on planning for an increase in the cost of law enforcement and emergency services should there be an increased need for these services.

13. To ensure the availability of safe and affordable child care and to integrate child care issues into the planning process, including child care financing, infrastructure, business assistance for child care providers, and child care workforce development.

Some discussion mentions the continued support of Arlington Area Childcare Inc. for use by residents.

14. To encourage flood resilient communities.

A new flood resilience section has been added to the plan. Topics covered in this chapter are: the Emergency Relief and Assistance Fund, Special Flood Hazard Areas, River Corridors, and the new FEMA Flood Insurance Rate Maps. Structures located in the Special Flood Hazard Area and River Corridors are listed, and strategies for protecting those properties and limiting future losses are covered. The plan references the town's flood hazard area regulations and the National Flood Insurance Program that provides access to flood insurance. The plan also includes information and recommendations relating to mitigation actions and flood recovery resources.

Required Elements

1. Statement of Objectives, Policies, and Programs: The plan sets forth a clear set of goals and objectives with policies and recommendations on how best to achieve these through municipal action.
2. Land Use Plan: The plan describes current land use, which is further shown through maps while addressing ways in which zoning and policy making will influence future development in accordance with the Town's values.
3. Transportation Plan: The plan describes the condition and maintenance of town roads while also outlining the financial and logistical challenges of maintaining roads in a rural area. Also included is a map showing the different classes of transportation routes within the town.
4. Utility and Facility Plan: The plan contained information on all utilities and facilities needed by the town while also addressing facilities used which are located in neighboring municipalities. A map shows all current facilities in the town and addresses the need for future development to be located in a way which does not increase financial burden on the public.
5. Natural Areas, Scenic and Historic features: The plan describes these features extensively along with their importance to the community. Policies focus on careful development to preserve these areas.
6. Educational Facilities Plan: Only A small section of the plan discusses education since the town does not have any schools within its municipal boundaries. Since the town does not have a school, the plan does not have a map of educational facilities.
7. Implementation Plan: Each section of the plan is concluded with a detailed sub-section on policies and recommendations along with the final section of the plan which summarizes the town's overarching implementation plan.
8. Relationship to adjacent towns and the region: Numerous sections state the importance and need of interacting with neighboring municipalities while also maintaining strong connection with the county through the BCRC's regional plan.
9. Energy Plan: The plan contains issues involved with energy usage along with plans for

energy conservation and education. The plan also addresses the potential for renewable energy and puts a priority on ensuring future construction is done in the most energy efficient way possible.

10. Housing Element: The plan contains goals on areas best suited for development in order to minimize disturbance to the environment and lessen the need for new infrastructure. Increased planning should go into ways of providing affordable housing for low- and middle-income residents.
11. Economic Development Plan: The plan includes a description of the economic activity within the town focusing on forestry and home occupations. The plan also acknowledges the importance of the nearby economic centers of Bennington and Manchester which employ a large number of the residents.
12. Flood Resiliency Element: A newly required flood resilience element has been added to the plan. Topics covered in this chapter are: the Emergency Relief and Assistance Fund, Special Flood Hazard Areas, River Corridors, and the new FEMA Flood Insurance Rate Maps. The plan references the town's flood hazard area regulations and the National Flood Insurance Program that provides access to flood insurance. The plan also includes information and recommendations relating to mitigation actions and flood recovery resources.



Figure 22: Sandgate-grown flowers