



TOWN OF SUNDERLAND, VT
MUNICIPAL PLAN

Adopted by the Selectboard
August 20, 2018

Selectboard

Mark Hyde, Chair
Steven Bendix
Jon French
Rick Timmerman
Melanie Virgilio

Planning Commission

Ed Bove, Chair
Lewis Herbert
Tucker Kimball
Scott Magrath

Zoning Board of Adjustment

Peter Van Haverbeke, Chair
Robert Alexander
Robert Faley
Peter Van Vleck, Jr.

Zoning Administrator

Missy Bell-Johnson

TABLE OF CONTENTS

Introduction.....	2
Economic Development.....	7
Housing.....	9
Natural Resources.....	10
Land Use.....	21
Historic Preservation.....	28
Transportation.....	30
Public Utilities, Facilities and Services.....	31
Child Care.....	33
Energy.....	34
Implementation.....	51

INTRODUCTION

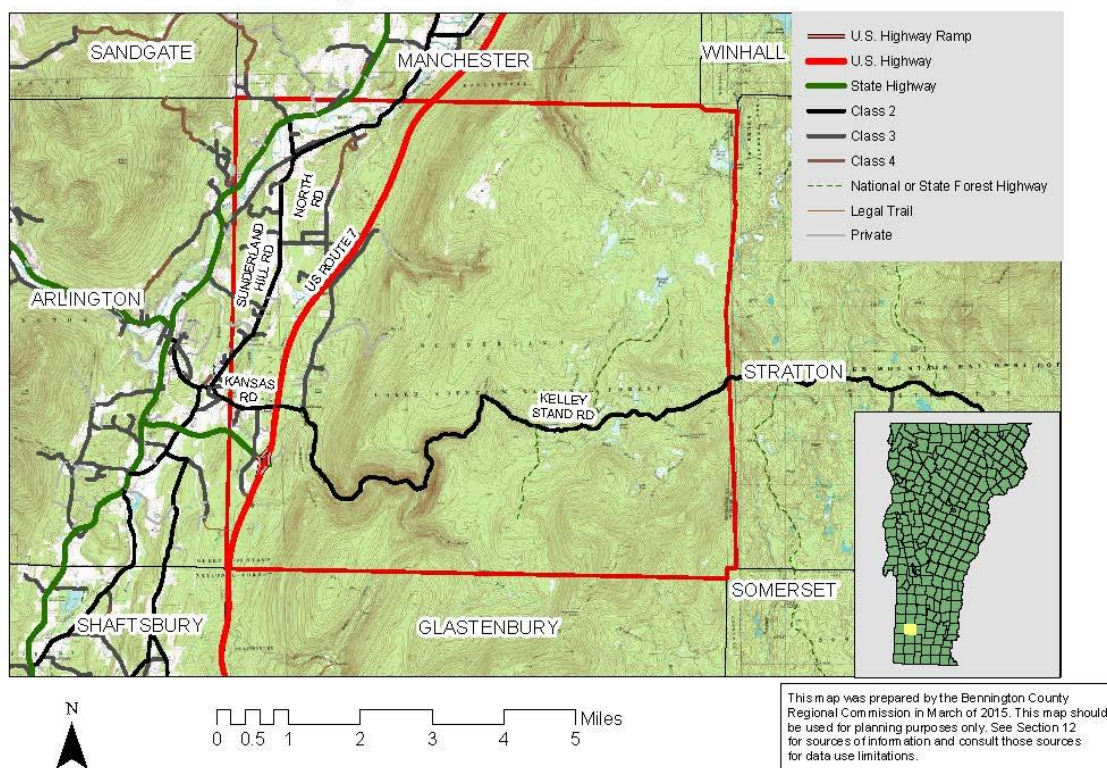
The purpose of the Sunderland Town Plan is to provide a comprehensive framework to guide actions, programs, policies, and implementing measures. The plan is both a blueprint for the future and a dynamic document over time reflecting change and new conditions. The plan has been created in accordance with Title 24 of the Vermont State Statutes.

Location

Sunderland is located in the "Northshire" of Bennington County in the Southwest corner of southern Vermont. The town is bordered on the North by Manchester, on the South by Glastenbury, on the East by Stratton (Windham County), and on the West by Arlington. Sunderland consists of about 36 square miles, similar to most of the other towns in Bennington County. However, more than 80% (21,884 acres) of the town has been acquired over time by the Federal Government as part of the "Green Mountain National Forest".

The balance of the town is situated in the north-west corner of the town, with Manchester on the north side, and Arlington on the west. This small triangular shaped area of land in north-west corner of the town is the only area available for use and development. It is bisected by the Batten Kill River, as well as a railroad and historic Rt7A which more or less follow along each side of the river, and several other roads including the newer limited access "highway" called the new Route 7 which creates a loose boundary along the National Forest.

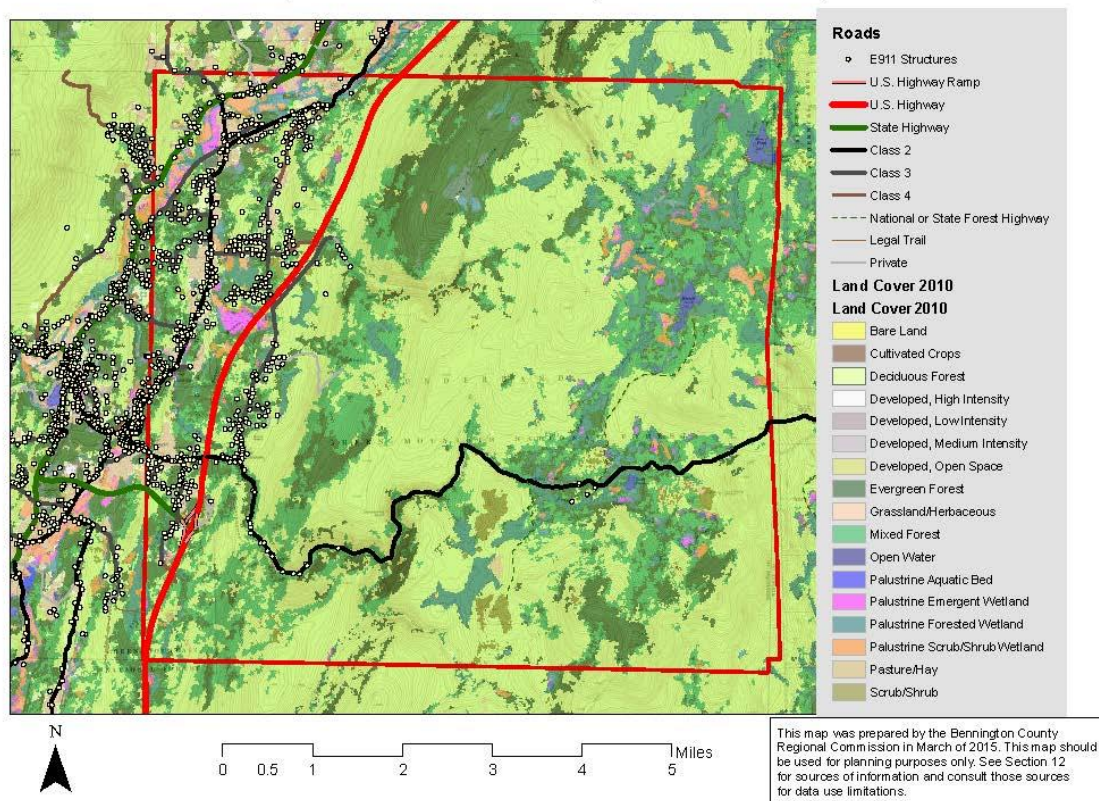
Map 1. Town of Sunderland



This corner section of the town consumes all the valley and lowlands, as it is wedged between the Green Mountains and the Mount Equinox foothills (the highest mountain in the Taconic Range on the other side).

At the junction of the four adjoining towns in this corner there stands a historic marble Monument to the "four corners" of Sunderland, Arlington, Sandgate, and Manchester. Sunderland's situation is unique, while the town enjoys the benefits of the extensive wilderness resource surrounding the town, the geography of Sunderland leaves area with an extremely limited potential for future growth and development.

Map 2. Land Cover (NOAA 2010)



History

The earliest inhabitants of this area that became the town of Sunderland were Native American Indians who lived a nomadic lifestyle, and set up camps/villages in places along the Batten Kill River, especially at locations where natural springs provided pure sources of drinking water as there exists here in Sunderland.

Sunderland's "founding father's" were very active in the long struggle to assert their ownership of their homes and land amidst a pitched and sometimes violent disagreement between the states of New York and New Hampshire over "rights" to the "land-grants" in Bennington county. Sunderland records, and other historical documents provide a description of those pioneers founding the town by charter on July 29, 1761, and subsequent settlement in 1766. The original grantees were 64 in number, Issac Searles being the first

mentioned. A series of "proprietors' meetings" were held at various homes whereby the town was first organized and lots of certain sized parcels were distributed. A Col. Gideon Brownson became Sunderland's first Town Clerk.

The majority of the town's settlers came from Connecticut. The most prominent of these were Ira and Ethan Allen. The exploits of Ethan Allen before and during the Revolution as a "Green Mountain Boy" leader and war hero made him a colorful legend in American history. During Ethan's time in Sunderland he authored various controversial pieces of literature, however the Allen's were primarily land speculators, and were part-time residents of Sunderland at best. Their homestead was situated near the Batten Kill River just north of today's intersection of historic Route 7a with the Hill Farm and Bentley Hill Roads. Neighbors to the Allen's were the homestead of the Brownsons. General Ethan Allen's first wife was Mary Brownson. A cemetery on the hill across the river from their homestead was deeded to the town by Ira Allen who is buried there. The gravesites of Mary Brownson, Gideon Brownson and both his wives, and the gravesites of various other Sunderland pioneers can be found in the Ira Allen cemetery.

The historical records provide consistent mention of members of the Brownson family in the context of Sunderland history, and their roles in the Revolution. At that time, Gideon Brownson was unquestionably the foremost man in the town or its vicinity. He served through the war and was promoted to the rank of major; and afterward General in the Vermont Militia. As proof of his valiant conduct, he still carried in his body eighteen pieces of lead when he died. There were 50 companies of volunteer soldiers called up from Sunderland at the Dorset Convention on July 26, 1775 on the verge of the Revolution, and Gideon Brownson was placed in command. These soldiers and commanders are the examples we have from Sunderland's history, who served out of love for their homes and community, and dedication to the principles that gave them the opportunity to live free, work to make a living, and enjoy life, liberty, and the pursuit of happiness.

For additional historic information about Sunderland, the following resources are suggested:

- *A history of Bennington County Vermont 1889, L.C. Aldrich*
- *An Atlas of Bennington County Vermont 1869, F. W. Beers*
- *The Vermont Historical Gazetteer 18 68 A. M. Heinenway*

Demographics

Table 1 below provides the total population by town for each of the towns in Bennington County and from 1970 to 2010. Sunderland's population grew significantly from 1970 to 1990, declined by 2.5% in 2000, and then increased by 12.5% by 2010. In Bennington County, all towns except Bennington, experienced increases in population through 2000. Arlington, Dorset, Peru, Pownal, and Shaftsbury experienced small declines in population from 2000 to 2010. The overall Bennington County population increased from 1970 to 2010. The small population in Glastenbury likely did not change as much from 1990 to 2000 as indicated but rather has remained stable.

Table 1. Population trends in Bennington County and adjacent New York. Sources: U.S. Department of Commerce 1980 a and b, U.S. Department of Commerce 1990, U.S. Department of Commerce 2003, U.S. Department of Commerce 2014.

Bennington County Towns	1970	1980	1990	2000	2010
Arlington	1,934	2,184	2,299	2,397	2,317
Bennington	14,586	15,815	16,451	15,737	15,764
Dorset	1,293	1,648	1,918	2,036	2,031
Glastenbury	-	3	7	16	8
Landgrove	104	121	134	144	158
Manchester	2,919	3,261	3,622	4,184	4,391
Peru	243	312	324	416	375
Pownal	2,441	3,269	3,485	3,560	3,527
Readsboro	638	638	762	805	763
Rupert	582	605	654	704	714
Sandgate	127	234	278	353	405
Searsburg	84	72	85	96	109
Shaftsbury	2,411	3,001	3,368	3,767	3,590
Stamford	752	773	773	813	824
<i>Sunderland</i>	601	768	872	850	956
Winhall	281	327	482	702	769
Woodford	286	314	331	414	424
Total	29,282	33,345	35,854	36,994	37,125
Vermont Total	444,732	511,456	562,758	608,827	625,741

As of 2010, 96.7% of the population was caucasian, a slight decline from the 98.9% reported in 2000. The population of Sunderland has been projected to increase by 5.9% to 1,012 in 2020 and by 8.5% to 1,037 in 2030 (Jones and Schwarz 2013).

Table 3 below shows a comparison of age distribution between 2000 and 2010. In general, the population has grown, but is remaining relatively stable in terms of these broad categories.

Table 3. Broad categories of age distribution in Sunderland, VT. Source: U.S. Department of Commerce 2012, U.S. Department of Commerce 2003.

Median Age	2000		2010	
	45.3		45.0	
	Number	Proportion	Number	Proportion
18 years and older	651	76.6	753	78.8
Male	312	36.7	370	38.7
Female	339	39.9	383	38.4
21 years and older	631	74.2	731	76.5
62 years and older	184	21.6	218	22.8
65 years and older	155	18.2	181	18.9
Male	80	9.4	89	9.3
Female	75	8.8	92	9.6

Community Vision

Sunderland's residents are proud of their town. Because of the town's rural character, natural beauty, recreational opportunities, unspoiled environment, and its convenient proximity to Vermont's many desirable amenities, as well as its accessibility to the county's economic opportunities; most residents believe Sunderland to be an excellent community and place to reside. Sunderland's "vision" is to maintain the rural nature of the town with pockets of more intense mixed use development. This pattern of development is influenced by neighboring townships due to the limited size of Sunderland's usable area, and its small population. As a result, it is dependent on Manchester and Arlington for most municipal and commercial services. For example, Sunderland has no municipal police, fire, or rescue service, and no public water or wastewater systems and is not likely to provide these or other services in the future.

The Town Plan is designed to guide the nature and rate of development toward the vision which the residents wish to achieve in the community. The following are town goals to achieve this vision:

- ❖ Ensure the best possible quality of the physical environment through conservation of natural resources and protection of special environmental features, and preservation of air, surface and groundwater quality.
- ❖ Ensure development is compatible with land suitability, particularly with regards to the availability of water and soils suitable for on-site waste disposal.
- ❖ Provide an efficiently managed town supported by reasonable taxes.
- ❖ Provide areas for commercial and light industrial activity in designated areas, providing employment for residents and augmenting the tax base.
- ❖ Preserve the working lands character of the Town by maintaining prime agricultural land free of development, as well as preserve and maintain the integrity of the forest and open space.
- ❖ Accommodate a reasonable rate of population change and growth without impacting the provision of existing services or creating demands for new services.

- ❖ Encourage recreational use of the Green Mountain National Forest and offer access to this vast resource.
- ❖ Encourage the economic and effective use of timber resources in accordance with appropriate management plans.
- ❖ Carefully evaluate and guide development near the Route 7 interchange to maximize protection of scenery and compatibility with the natural setting; prohibiting strip development, protecting water quality and public investment in terms of traffic safety, road condition, access and capacity.
- ❖ Encourage protection and management of the Batten Kill River for its outstanding resource waters (ORW) values: fish habitat, wildlife habitat, scenic areas and sites, recreational and educational use and access, water quality, and other natural values.
- ❖ Encourage safe and sanitary housing and encourage an adequate supply of affordable housing commensurate with Sunderland needs and which respects other goals and policies of the plan.
- ❖ Provide for appropriate closure of the Sunderland Landfill. Any continued use must avoid surface or groundwater contamination.

ECONOMIC DEVELOPMENT

The median household income in Sunderland is well above the median for Bennington County and the State of Vermont. As reported in the 2010 census, 55 people lived below the poverty line and 255 people had some form of disability, most in the 16 to 64-year old age group (Vermont Housing Finance Agency and Center for Rural Studies, University of Vermont 2015).

Table 5. Trends in median household income for Sunderland, Bennington County and Vermont. Vermont Housing Finance Agency 2014

Year	Sunderland	Bennington County	Vermont
1979	\$14,955	\$14,719	\$14,790
1989	\$29,219	\$38,485	\$29,792
1999	\$40,500	\$39,926	\$40,856
2005-2009	\$60,962	\$46,265	\$51,284
2007-2011	\$61,985	\$48,083	\$53,422

Sunderland has a small commercial base. The 2014 grand list shows 40 properties listed as commercial, though these include several town and school properties. The largest commercial properties include Orvis, Green Mountain Power, Casella Waste Management, Applejack Property Management as well as the Ira Allen House, Arcady at Sunderland Lodge and Christmas Days. Table 6 shows the number of employers and employees from the Vermont Department of Labor.

Table 6. Number of employers and employees in Sunderland. Source: Vermont Department of Labor 2015					
Year	Number of Establishments	Number of Employees	Number of Female Employees	Number of Government Employees	Number of Female Government Employees
1990	12	76	30	24	18
2000	18	86	37	23	17
2010	21	101	35	20	17

The Bennington County Regional Plan (2015) states that Arlington and Sunderland have the highest average wages of all towns in the County as the jobs in those communities are in manufacturing, professional services and utilities. As of 2012 there were 500 people in the resident workforce in Sunderland and 79 jobs located in the town (Bennington County Regional Commission 2015). The Town's natural resource base provides some employment opportunities in forestry, recreation, and agriculture.

Economic Development Policy: Continue to support a mix of economic activities, and attract new businesses which provide rewarding jobs and good wages while not adversely impacting the quality of the natural environment.

Economic Development Actions:

- The Town should foster the use of local forest and agricultural lands for related commercial activities. Conservation of agricultural and forest resources is encouraged.
- Small farms that can provide food for residents and local restaurants shall be supported.
- Sunderland is midway between Bennington and Manchester and in close proximity to both Cambridge and Salem in New York. Cooperative actions with area chambers of commerce to market the community should be explored to promote local businesses and employment.
- The Town shall encourage uses and development patterns and design that will attract visitors including establishments offering entertainment and food.
- Broadband and cellular communications shall be maintained to cover the developed parts of town. Training in the use of broadband technologies should be made available to the public to increase utilization.
- Promoting walking paths, sidewalks where appropriate and biking trails would bring visitors and provide for healthy recreational opportunities for residents.
- The Town should promote the Green Mountain National Forest as a recreational attraction, particularly those forest lands within the town itself.
- Increased public access to the Batten Kill should be provided and interpretation of resources and unique ecological values of that river provided.

HOUSING

As with population, the number of households has increased through 2010, while average size has decreased. Households in renter occupied dwellings have ranged from 10-17% over that period. A household consists of one or more people living in the same dwelling. Table 2 shows the number of households in Sunderland and in Bennington County and average size.

Table 2. Numbers of households in Sunderland and Bennington County and average household size.						
Source: Vermont Housing Finance Agency 2014						
Year	Sunderland Number of Households			Bennington County Number of Households		
	Owner	Renter	Avg. Size	Owner	Renter	Avg. Size
1970	151	23	NA	6,598	2,624	NA
1980	221	42	NA	8,375	3,581	NA
1990	284	43	2.67	9,511	4,084	2.57
2000	292	58	2.43	10,599	4,247	2.44
2010	351	42	2.43	11,017	4,453	2.34

Table 4 shows the number of housing units by type from 1970 to 2010. There has been a steady increase in the number of units and the town has a substantial number of seasonal units. The seasonal population requires town and private sector services, though likely less than year round residents.

Table 4. Number of housing units by type in Sunderland, VT. Source: Vermont Housing Finance Agency 2014						
	Occupied			Vacant		
Year	Total	Owner	Rental	Seasonal	Rental	Sale
1970	282	151	23	NA	NA	NA
1980	381	221	42	44	4	11
1990	458	284	43	111	5	7
2000	473	292	58	99	4	12
2010	525	351	42	104	7	12

Among the goals of the planning act (Title 24, Chapter 117) is to encourage safe and affordable housing for those citizens of low and moderate income. Housing is considered affordable when incomes at or below the county median income pay no more than 30% of their gross income on housing costs. Income limits for assistance are determined by HUD and refined for various size families.

Policies:

- Accommodate affordable housing commensurate with the needs of the town. This will likely involve small scale, low density housing.
- New and rehabilitated housing shall be safe, sanitary, located close to employment and commercial centers, and coordinated with the provision of necessary public facilities and utilities.

NATURAL RESOURCES AND FLOOD RESILIENCE

Soils

Soils have a direct bearing on the suitability of land for development purposes, since adverse characteristics such as poor permeability, poor stability, and shallow depth to bedrock can create limitations for septic systems, roads, and building foundations. Soils information provides guidance for overall growth and density and, subject to site verification, individual site development potential.

Policies:

- The type and intensity of development on a given site shall be compatible with soil conditions.
- Development planning shall recognize the use potential of soils. The development or subdivision of lands with high potential for agriculture, forestry, public water supply, wildlife habitat, or mineral and earth resource extraction shall not prevent the continued or potential use of the land for these activities.
- Land use and density shall be evaluated in light of prevailing soil conditions to ensure that development is being directed to appropriate areas and that important resource areas are protected.

Topography

The description of topography in Bennington County generally forms three categories: valley land -gently rolling and river bottom; rugged mountainous and forest land -steep slopes, higher elevations; and Intermediate areas having varying conditions. In Sunderland it is estimated that 87% (25,800 acres) is in the rugged mountainous category, and most of this land is in the National Forest. In contrast, valley land is only 11% (3,300 acres) of the total area, having the greatest development potential as well as a variety of important natural resources. The interface between mountain and river bottom is the intermediate category with approximately 2% (500 acres) of the total. In addition to the obvious mountainous areas, there are a number of steep hillsides near roads and streams. They also provide an important visual resource for the community and region. Topography and, in particular, steep slopes impose a natural constraint and limitation for development. Topography is classified by gradient; a slope of 0-5% is usually suitable for development. Grades in excess of 20% usually have severe limitations for development. Approximately 30% of the land area of Sunderland has slopes in excess of 20%.

Policies:

- Residential development shall be carefully planned in areas where the natural slopes are greater than 10%. On slopes greater than 20%, residential development shall not be permitted. No road or driveway serving a subdivision serving two or more homes shall be constructed on a slope in excess of 9% at any point along its length.
- The construction of homes using septic tanks or subsurface disposal shall not be permitted when natural slopes are greater than 20% and when it is determined that soils with poor percolation or geology can cause a health hazard, jeopardize public investment, or impact other resources.
- During construction, builders should follow conservation practices that are recommended by the

U.S. Soil Conservation Service.

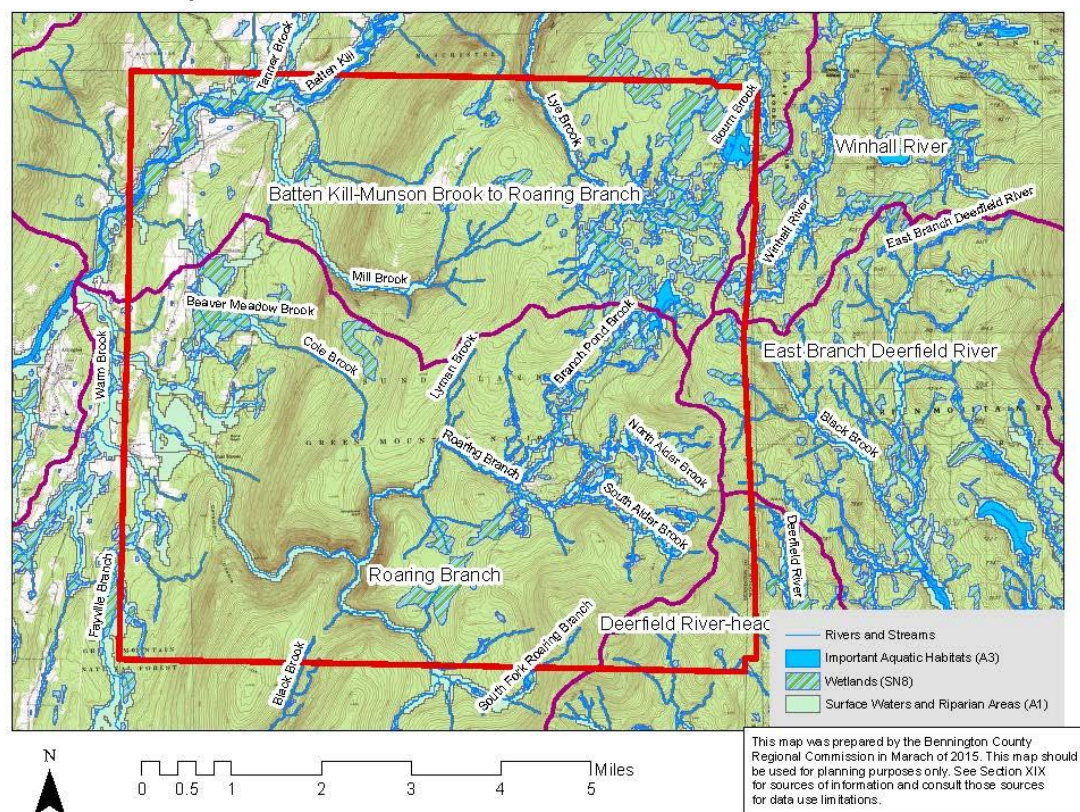
- Future growth should occur on land with relatively few topographic limitations to development, thus reflecting historic development patterns. Permanent development other than seasonal camps shall not be permitted in the rugged back-country areas.

Surface Water Resources

Nearly all of Sunderland drains to the Batten Kill and from there to the Hudson River, except for small portions in the east that drain to the Winhall and Deerfield Rivers and from there to the Connecticut River. Map 3 shows rivers and streams, riparian areas and wetlands.

The Vermont Fish and Wildlife Department characterizes the Batten Kill as a “large coldwater stream” and it supports species such as trout that require cold water temperatures, high alkalinity and cold baseflow from groundwater. The Batten Kill was designated an outstanding resource water in 1991.

Map 3. Sunderland Surface Water Resources



Nearly the entire length of the Batten Kill has been altered by bank armoring, culverts and bridges, encroachment into buffers and by erosion. The most significant changes have resulted from straightening that likely occurred 80 years or more ago. Straightened sections create higher velocities and scouring of the streambed. Bridge and culvert constrictions can have similar effects. The resulting excessive energy and sediment movement destabilize the banks removing cover needed by trout and other organisms. Erosion rather than inundation has been the primary cause of property damage in previous storms such as Tropical Storm Irene and increased velocity exacerbates erosion (Sunderland Hazard Mitigation Plan 2014). There is a clear need for areas where the Batten Kill can meander to dissipate energy and for flood waters to be retained and allowed to drain.

The documented decline of the wild trout population has been attributed to these past river channel alterations and encroachments, the reduction in cover due to the loss of forested areas and the removal of woody debris that provides cover. Cover is critical for trout to avoid predation and stresses from flooding events or winter mortality. The Vermont Fish & Wildlife Department imposed “catch and release only” rules on the river that will remain in effect through 2017. The local non-profit river group, the Batten Kill Watershed Alliance, has partnered with the state and federal officials to restore habitat for the fishery, though focused on the Arlington stretches. The goal is to restore the fishery to a level of productivity that will allow sustainable harvesting. Such a recovery could lead to the return of the seasonal influx of anglers that has been an important revenue source for local businesses. Thus far, studies indicate significant increases in juvenile trout and modest increases in larger size classes in areas where cover has been enhanced. The study also indicated that habitat cover along the Batten Kill is well below optimal levels. Water quality studies based primarily on macroinvertebrates indicate that water quality is good to excellent, but that impairments from both point and nonpoint sources exist. Many of these occur upstream where the Batten Kill goes through more developed areas.

Important Aquatic Habitats include rivers, streams and water bodies that support important species assemblages. In Sunderland, these include the Batten Kill, high elevation streams such as the Roaring Branch, and high elevation ponds such as Beebe Pond, Branch Pond and Bourn Pond. The high elevation, coldwater streams support species only found in such habitats. The importance of the Batten Kill has been discussed above.

Surface Waters and Riparian Areas represent both valley bottoms containing stream courses and buffers to protect those streams. The continued viability of species that depend on these streams and rivers is directly dependent on the quality of those areas as well as the contributing watersheds. Natural vegetation helps in stabilizing banks, moderating temperature fluctuation by providing shading, providing cover for aquatic species and filtering of sediments and pollutants from water draining from roads and other human uses. Many bird species, such as migrating warblers, mammal species, such as mink and otter, and reptiles, such as wood turtles, use these riparian areas for habitat. They also provide connectivity for these species as they move across the landscape and/or from one stream to another as well as from low elevations to the Green Mountains. Finally, they provide an area for the natural meandering of streams, particularly those connected to a floodplain. Streams migrate and meander as the channel shifts with the removal of material from erosion and the consequent deposition of material elsewhere. These areas were mapped as valley bottoms and flood plains using a GIS model and include a 100 foot buffer for higher order streams and 50 foot buffer for lower order streams.

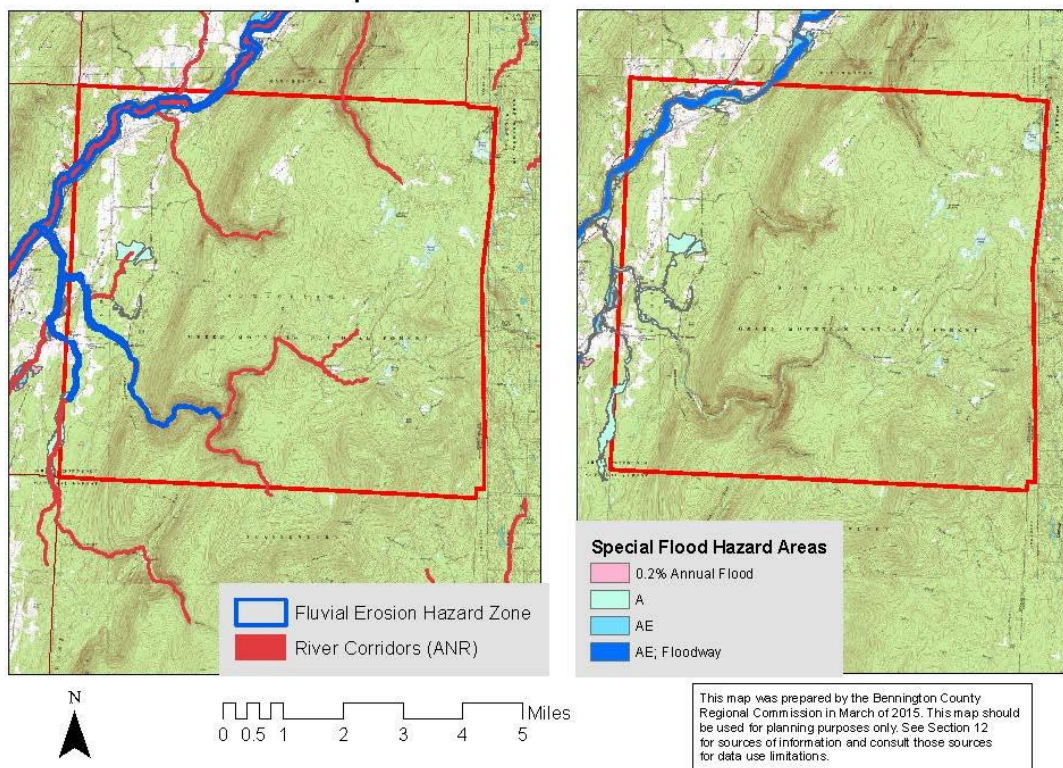
There are numerous wetlands in Sunderland, but the largest are along the Batten Kill, Beaver Meadow Brook, Branch Pond Brook and Bourn Brook (Map 3). Wetland mapping is based on both the National Wetland Inventory and mapping by the Vermont Agency of Natural Resources. Wetlands are aquatic systems

transitional between uplands and lakes and river. They are permanently or periodically flooded, dominated by hydrophytic vegetation that is adapted those conditions and having soils with physical and chemical characteristics of low or no oxygen conditions created by saturation with water. They provide important ecosystem services including flood storage, groundwater discharge and recharge, nutrient absorption and nutrient recycling as well as habitat for numerous flora and fauna.

Flood Hazard Areas

The Federal Emergency Management Agency (FEMA) has developed flood hazard maps for Bennington County identifying properties that could be threatened by flooding. The National Flood Insurance Program provides insurance to those property owners within flood hazard zones to protect owners from financial loss as private insurers will not provide such coverage. Sunderland joined the National Flood Insurance Program in 1985, and the current maps became effective in 2014.

Map 4. River Corridors, FEH Zones and Special Flood Hazard Areas



FEMA has since developed revised flood hazard maps based on a more accurate measure of topography using LIDAR, a method using airborne lasers to determine elevations within a few centimeters. FEMA has produced new flood hazard zone maps that are currently under review (Vermont ANR undated). 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 resulting in mapping of river corridors, formally known as Fluvial Erosion Hazard (FEH) Areas. The Vermont Agency of Natural Resources also completed maps of river corridors that include areas in addition to the FEH zones.

A: areas subject on inundation by a one percent annual chance event. This is also known as the 100-year flood zone as the area could potentially flood once in 100 years or as the “base flood.”

AE: areas as with A but where detailed methods have been used to create base flood elevations, which is used in determining insurance premiums

Floodway: 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 the designated height.

The Floodway and Zones A and AE constitute the Special Flood Hazard Area.

0.2% Annual Chance or 500 Year Floodplain: areas subject to flooding on a 500 year or 0.2% annually. These are for information purposes and insurance is not mandatory under the NFIP program.

The Floodway, Zones A, and AE address hazards from flooding due to inundations. However, most flood damage in Vermont streams is the result of erosion.

River Corridors are those areas where vertical and horizontal adjustments of the stream as it meanders to disperse energy and sediment would occur to maintain stable slope and dimensions over time. Stability is determined at the watershed scale as the amount of water, sediments and woody debris moving in and through the stream cause the stream to alter course to adjust to these materials. These river corridors were mapped by VT ANR using geospatial (GIS) analyses.

Fluvial Erosion Hazard (FEH) zones are subsets of river corridors subject to fluvial erosion hazards, from gradual stream bank erosion to catastrophic channel enlargement, bank failure, and changes in course, due to naturally occurring stream channel adjustments. These have been identified and mapped by Vermont ANR. The Sunderland bylaws protect both the Special Flood Hazard Areas and the FEH zones.

Development within river corridors will not be sustainable over the long term as the river meanders and will decrease the functions of the corridor for protection of water quality and movement and habitat of organisms.

The table below shows the number of structures by type from E911 data that are in the special flood hazard zone or outside of that zone but within a river corridor. E911 data represent a GIS layer showing the location of structures, including single family homes, commercial businesses, government buildings and other types and is updated by the Enhanced 9-1-1 Board (2015) in Montpelier, VT. These numbers are estimates as the E911 points are not always located exactly where structures are. For the most part, the two boundaries correspond, but there are areas where the river corridor goes beyond the special flood hazard zone, thereby affecting more properties.

Structures by type in flood hazard zones in Sunderland, VT.Source: Vermont Center for Geographic Information www.vcgi.org

Type	Number in special flood hazard zone	Number in fluvial erosion hazard zone	Number in river corridor
Commercial	1	1	1
Single Family Residential	1	10	28
Multi-family Residential	1	0	0
Mobile Home	1	2	4
Camp	0	1	12

There are nine properties with flood insurance policies in Sunderland: seven single family homes, one multifamily dwelling and one nonresidential (Ned Swanberg, personal communication). One is in the currently mapped Zone A. The others with policies are between the 100 and 500 year floodplains or above the 500 year floodplain. So, there are uninsured properties in the Town.

There are also properties in either or both the special flood hazard zone or the river corridor that are vulnerable to flooding or to erosion or both and that are not currently protected through the National Flood Insurance Program. Properties that have flood insurance that are damaged due to erosion may or may not be able to collect on a policy depending on whether or not the erosion can be attributed to a flood event.

Surface Water and Flood Resiliency Policies and Actions

Surface Waters Policy: The ecological and hydrological integrity of rivers, streams and wetlands shall 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 shall also be protected to allow for continued recreational use and to provide valuable scenic resources. Development within identified special flood hazard, fluvial erosion and river corridor protection areas should be avoided.

Surface Waters Actions:

- The Town and other partner organizations including the Vermont Agency of Natural Resources, the Batten Kill Alliance, the Bennington County Conservation District and others shall work together to maintain and enhance the ecological integrity of the Batten Kill and tributaries.
- An undisturbed buffer of natural vegetation shall be established between rivers, streams and other water bodies to reduce nutrient input and attenuate overland flow. This buffer shall be at least 50 feet for streams with minimal potential for lateral or vertical adjustment or 100 feet for streams with significant potential for such adjustment. For wetlands, the buffer shall be 100 feet for Class I wetlands and 50 feet for Class II wetlands as determined by Vermont ANR.
- Developments or activities that would adversely affect the quality of the Town's surface waters shall be prohibited.
- Utility lines near streams shall be visually unobtrusive.
- Recreational uses of surface waters shall not diminish reduce water quality or the viability of natural habitat.
- Shorelines shall be protected to preserve natural vegetation, scenic quality, plant and animal habitat and to minimize erosion and sedimentation.
- Wetland loss due to land conversion, filling or draining shall be avoided.

Flood Resilience Policy: To protect the public health, safety and welfare, new development should be avoided in identified flood hazard, fluvial erosion hazard and river corridor protection areas.

Flood Resilience Actions:

- Development in flood hazard areas must be carefully controlled in accordance with the Town's flood hazard regulations.
- The Planning Commission and the Zoning Board of Adjustment shall assure that any new development in either Special Flood Hazard Areas or the Fluvial Erosion Hazard Area, as shown on Map 4, is avoided. This would include the storage of any hazardous materials.
- The Town should regularly adopt the most recent State of Vermont Town Road and Bridge Standards as they are developed.
- The Town should encourage farm and forest owners along the river as well in upland forested areas to enroll in the Current Use Value program so as to provide for planted buffers and to maintain the forested upland watershed.
- Forested lands shall 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.
- The Town should collaborate with other municipalities, the Bennington County Regional Commission, and the States of Vermont and New York in planning for the use and protection of regional water resources such as the Batten Kill. This could involve an intermunicipal agreement between these towns and communities in New York State for the long-term protection of the Batten Kill for both resources and to address flood hazards.
- The Town and partner organizations shall support continued monitoring of the Batten Kill and work with other interested groups to implement actions that will ensure ecological integrity and quality of the river environment and of the aesthetic, recreational and cultural resources of the Batten Kill watershed.
- The Town should implement the actions listed in the Town Hazard Mitigation Plan (2014) for flood hazard mitigation. These include:
 - a. Encouraging 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.
 - b. Participating in the Community Rating System to help reduce flood insurance premiums
 - c. Requiring appropriate stormwater and erosion control measures in new developments
 - d. Regular surveys of culverts by the road crew and maintenance of records on damages
 - e. Identifying and replacing culverts and bridges that do not meet the current Vermont Town Road and Bridge standards. This would entail upgrading culverts following a hydraulic study to determine the necessary size to avoid constrictions that would accelerate or impede flow and to allow for passage by aquatic organisms.
 - f. Encouraging property owners in special flood hazard zones and river corridors to consider selling their properties or implementing structural and other means of flood proofing.
 - g. Implementing corridor protection, buffer plantings and structure and berm removal projects listed in the 2007 Batten Kill corridor plan (Field 2007). The Town should work with the Batten Kill Alliance, the Bennington County Conservation District and interested partners and landowners to implement buffer planting. High priority areas for buffer

planting may need to be acquired either in fee or easement to allow for long-term management of those buffers.

- h. Acquiring lands or work with conservation organizations to acquire lands subject to flooding or wetlands with adjacent flood prone areas to provide flood storage. This would include acquisition of river corridors to provide area for lateral adjustment of streams. This may also include acquisition or other means to remove berms that prevent lateral adjustment and can cause damage downstream.

- The Town shall maintain a current Local Emergency Operations Plan that provides for emergency response and flood preparedness.
- The Town shall maintain an updated hazard mitigation plan that fulfills FEMA requirements.

Groundwater

Parts of Sunderland and Arlington obtain their water from the Arlington Water Company system. The well recharge area for this system has been mapped by the state, and more recently by consultants to the Bennington County Regional Commission. The latter study indicates a much larger area of recharge influence. At this point in time, this plan takes a conservative view and recognizes the larger designation until such time that more specific data and fieldwork suggests a revised designation. Maximum protection of the public health, safety, and welfare is a fundamental concern. The remainder of the town obtains water from private on-site wells and springs.

Commercial and industrial groundwater extraction (mining) for commercial purposes is a growing enterprise due to contamination of once pristine supplies and the demand for high quality water sources. Unlike traditional municipal supplies intended to serve a local population groundwater withdrawal for commercial purposes and use outside a community and region may have a local impact. Any such use should be classified as commercial or industrial under the zoning bylaw. Act 199 recognizes groundwater as a public trust resource that must be managed in the best interest of Vermonters. While the state act establishes a threshold for withdrawal subject to a state permit, Sunderland takes a view that non-municipal commercial groundwater withdrawal proposals are not appropriate when there is the potential to impact the quantity and quality of supplies for existing and future growth in the Town.

Policies:

- Aquifers and aquifer recharge areas shall be protected from activities or development that would adversely affect the quantity or quality of available groundwater.
- The municipal subdivision and health regulations must be strictly enforced to protect individual water supplies.
- Groundwater withdrawal for non-municipal commercial processing is not appropriate in the Town when there is the potential to impact the quantity and quality of supplies for existing land use and future growth.

Air Quality

A large portion of the town lies within the Lye Brook Wilderness Area of the Green Mountain National Forest. Under federal legislation it is also a Class I air quality area, having the highest standards for air quality in the northeast. Major sources of air pollutants within approximately 50 miles must consider impacts on Lye Brook. From a local perspective, larger projects may also be scrutinized for emissions. This can include Sulfur Dioxide or suspended particulates. Visual impairment from regional haze and ozone is also a consideration. Acid rain deposition has already impacted aquatic and terrestrial environments in the Green Mountain National Forest.

Policies:

- Sources of emissions, which degrade air quality and the aquatic or terrestrial ecosystem, shall be avoided.
- Larger projects shall employ the best available control technology to mitigate potential impacts. Such projects shall also comply with federal and state standards.
- The Town should evaluate its own local ordinance for open backyard burning.

Forests

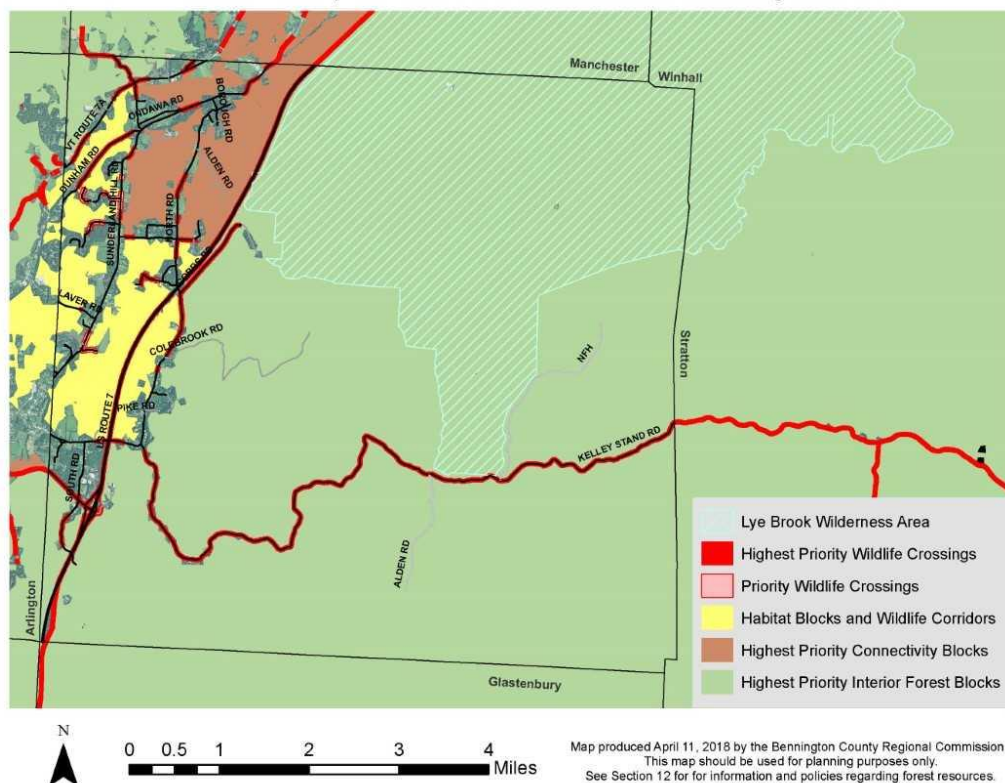
Approximately 86% of the Town of Sunderland is under federal ownership and encompassed within the Green Mountain National Forest (GMNF). In 1986, the GMNF developed a Land and Resource Management Plan. As mentioned in the previous section, a large area is the Lye Brook Wilderness Area. Other management designations in the town have different emphases: high quality saw timber, semi-primitive recreation, recreation and wildlife, special areas; and silviculture as well as areas with no wood production. From a municipal perspective is the concern about the Kelly Stand Road corridor connecting Stratton to the east. This corridor and connecting east-west link should not become a high quality convenient access to major recreation resorts east of Sunderland. Caution should also be exercised by the GMNF in developing or leasing lands for expanded recreation activities that require improved transportation.

Policies

- In forest areas, only permit uses that are compatible with the characteristics of the backland forest. Multiple uses include timber management, fish and wildlife appreciation, recreation, solitude, hiking, etc.
- Any significant improvements or intensity of use in the GMNF shall be carefully evaluated for potential impact on Sunderland and its residents.
- Silvicultural practices, which minimize erosion and impacts on roads, streams, wildlife habitat, and natural areas; shall be employed.
- The Land Use Plan shall be reviewed and updated to preserve forest blocks, wildlife habitat, habitat connectors, and wildlife road crossings. Development shall be planned to reduce fragmentation, preserve contiguous areas of active or potential wildlife habitat, and promote the health, viability, and ecological function of forests.

- Development regulations shall address forest and wildlife resource preservation. Subdivision regulations shall be reviewed and updated to better discourage fragmentation of contiguous forest areas. Participation in the Use Value Appraisal program, also known as the Current Use program, is encouraged.

Map 5. Forest Connectivity



Agricultural Lands

The results of a community survey indicated strong support for the protection of agricultural land. It was not too long ago that the community and interested residents initiated a major effort to protect the Hill Farm and preserve some of the significant open lands.

Policies

- Construction and utilities on prime agricultural soils shall be carefully sited to retain as much as possible this valuable resource. Fragmentation of important parcels or contiguous parcels shall be avoided.
- Encourage the use of local, regional and statewide protection programs to protect agricultural resources.

-
- Promote conservation subdivision design that protects agricultural resources.

Unique Natural Areas and Wildlife Habitat

Sunderland has a number of local and regional resources that warrant special protection. Sources of information include the State of Vermont Natural Resource Atlas, Vermont Natural Heritage Program and Bennington County Regional Commission. The following are specific areas to be protected:

- ❖ Deer wintering areas
- ❖ Battenkill River
- ❖ Bourn, Branch and Beebe Ponds
- ❖ Beaver Meadow
- ❖ Kelly Stand Road Corridor
- ❖ Natural areas in the vicinity of the Sunderland Covered Bridge
- ❖ Bear habitats
- ❖ Catamount Cobble
- ❖ Vermont Conservation Design forest and habitat connectivity blocks

Policies:

- Development that encroaches upon or may adversely impact any unique natural feature shall not be permitted.
- Development planning shall identify important wildlife habitat and shall incorporate appropriate protection measures. Examples of such measures are: the maintenance or provision of natural buffers between developed areas and wildlife habitat, the maintenance of vegetated corridors along streams, shorelines, and between otherwise separate habitat areas, and utilization of construction practices that minimize environmental disturbances.
- Development in the vicinity of the Batten Kill shall not adversely affect any of the values that contribute to its designation as Outstanding Resource Waters.

Hillsides and Ridgelines

The natural appearance of hillsides, ridgelines, and mountains are fundamental to the town's rural character and appeal. A single development or piecemeal development sprawling across or along a prominent hillside or ridge line would seriously degrade these attributes. Appearance is especially critical given the significant points of observation from Route 7, the Route 7 interchange and Route 313, and the Batten Kill.

These scenic upland areas also tend to be environmentally fragile due to prevalent steep slopes, poor soils, and inadequate infrastructure. Such lands shall be regulated to minimize the potential for substantial changes in topographic features, destruction of vegetation or other visual/aesthetic degradation, and to minimize erosion, pollution of ground or surface waters, and flooding in lowland areas.

Policies:

- Development on hillsides, mountains, or ridgelines shall be situated or screened by vegetation, so as not to be prominently visual from off-site locations.
- Commercial electric generation infrastructure shall be sited to not cause adverse aesthetic impacts to ridgelines and hill profiles, as viewed from the public right of way.
- Development on hillsides, mountains, or ridgelines shall be carefully planned to protect the environment.

LAND USE

Historic development patterns in Sunderland have been dictated largely by topographic conditions and the large holdings of Green Mountain National Forest. Existing developed areas are located primarily between Route 7 and Route 7A. While the town's population is less than 1,000, given the limitations on developable lands, the population density is roughly 70-80 per square mile.

Land Capability

In addition to the limitations imposed by steep terrain, wetlands and floodplains further limit development potential. 381 acres have been designated flood hazard area. Of these, 340 are located along the Batten Kill, the remainder along Beaver Meadow Brook and the Roaring Branch.

The maps included with this plan show the areas of Sunderland which have various limitations for development. While these limitations may not preclude all development, detailed site evaluation in each case, will be required.

Public Services Affecting Land Development

There is no central sewage disposal system in Sunderland. This situation is expected to continue. Individual on-site sewage disposal is regulated by the State of Vermont and must be carefully sited and designed to avoid pollution of surface or groundwater. Much of the existing and future water consumption needs will be provided by groundwater sources. Sunderland has no central water system; however, thirty-four Sunderland homes receive service from the Arlington Water Company, a privately owned utility. Five of these homes are on the Kansas Road and the remainder are on Sunderland Hill Road and in Chiselville.

Land for Future Development

After deducting land in use for residential, commercial or institutional purposes, and land with physical limitations, less than 7% of the town may be suitable for development. Even within these 2,000 acres, there may be areas where development must be avoided because of land suitability and protection of resources.

General Land Use Policies:

General land use policies for the Town of Sunderland and policies concerning various categories of land are presented below:

- Land in the Town of Sunderland shall be treated as a valuable and limited resource. All development of land must be compatible with environmental characteristics and appropriate for the site and purpose.
- Some areas should remain completely free from use by man. These include unique or rare fragile areas.
- In the absence of public services, such as central sewage disposal and water supply, each building site shall not adversely affect adjacent property and water resources.
- The Town intends to preserve its rural character. To this end, development shall be focused in existing settled areas.
- The Batten Kill and many streams in Sunderland are visual and functional assets which must be allowed to remain in their natural state. Compatible recreation use is encouraged; development with structures, utility lines, or other impairment of scenic qualities is considered unnecessary and undesirable. The flood hazard zones of the Roaring Branch and the Batten Kill are protected by special regulation consistent with the Federal Flood Insurance requirements.
- Natural resources, such as aquifers, must be protected from pollution. Before development is permitted, the importance of the resource to Sunderland or the Region must be fully assessed.
- Utilization of mineral resources, such as sand, stone, and gravel deposits, shall not create adverse aesthetic impacts or hazardous slopes. Screening, either natural or man-made, is required during the operation of the site, and reclamation when excavation is completed is required.
- Encourage various types of agricultural uses such as dairy and stock farms, truck and nursery gardening, specialty crops, poultry, sheep, etc.; and encourage permanent protection of these lands through the acquisition of development rights, permanent conservation restrictions, and tax policies.
- Land development and subdivisions shall preserve, as much prime agricultural and productive forest lands as possible. Construction of roads, utilities, and other permanent improvements should attempt to avoid working land areas, rather than divide them.
- Discourage land development that would impair or endanger watersheds and well head protection areas supplying public or private water supply systems.
- Any land use, storage, disposal, or transport of any material or liquid that could present a threat to the quantity or quality of water obtained from the well head protection area-aquifer shall be carefully evaluated. Those uses with greater potential for groundwater contamination shall make provision for remedial actions.
- Protect the values of the Batten Kill as a State designated Outstanding Resource Water(s) and assure compatible uses and development with such values.

Policies for Upland and Mountainous Areas:

- Land above 1,500' elevation shall be maintained in its natural state. Non-intensive recreation use shall be permitted with controls to avoid erosion or other damage to fragile soils and botanical and wildlife areas.
- Other steep and hilly areas generally are inaccessible or have unimproved access trails. Permanent improvements are unsuitable to the topography, and the Town does not intend to improve access to provide services. Primitive recreation activities, such as wilderness camping, are encouraged in areas with existing access, as well as non-intensive recreation. Utilization of forest lands for commercial enterprises such as logging and sugaring are appropriate activities, and encouraged with approved forest management plans.

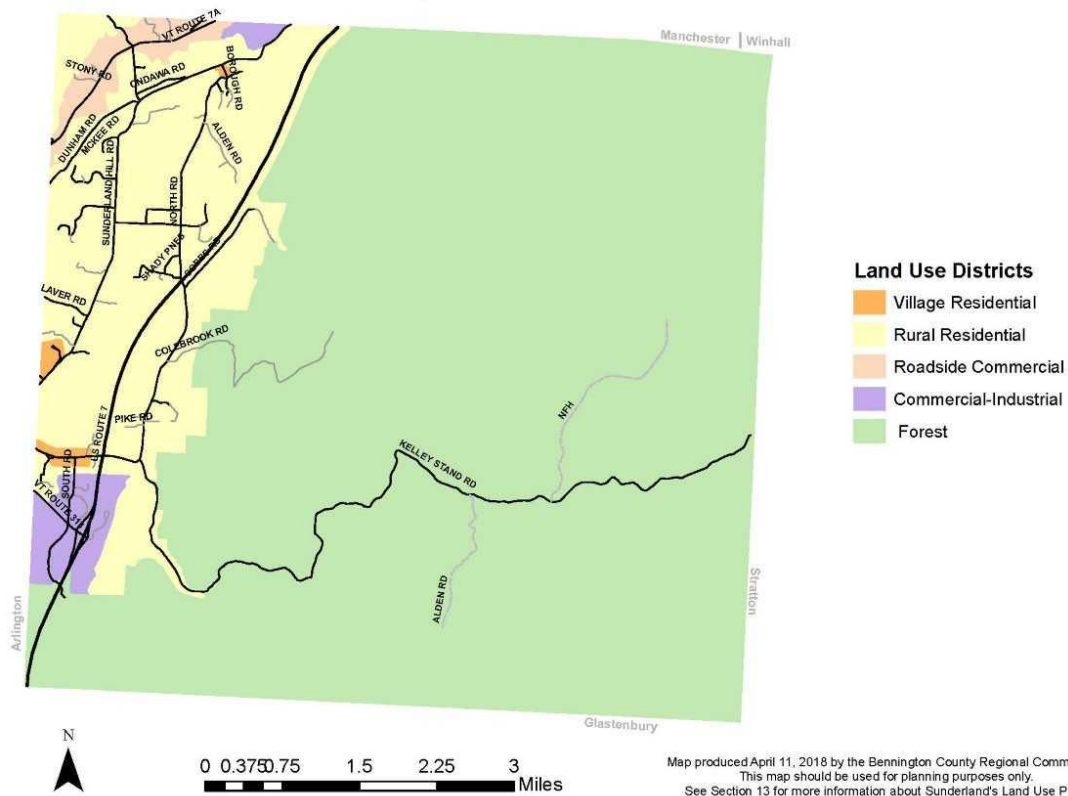
Policies for Valley Areas:

- Valley land will be the location of future development in Sunderland.
- The town intends for avoid air, water, wind, noise and visual pollution from any source.
- As a rural residential area of the 'Bennington County Region, low density development is most appropriate for Sunderland.
- Development should occur at a rate that the Town is able to absorb without sudden increases in Town expenditures for public services, such as education, roads, solid waste, emergency services, etc.

Land Use Classifications

A fundamental purpose of the Town Plan is the identification of planning districts to guide the type, location, and density of land use and future growth. The Town of Sunderland has zoning and subdivision regulations; and is a “10 acre town” with regards to State of Vermont Act 250 permitting.

Map 6. Land Use Plan



CLASSIFICATION

RESIDENTIAL DISTRICTS:

Rural Residence (RR)
Village Residence (VR)

COMMERCIAL-INDUSTRIAL DISTRICTS:

Roadside Commercial (RC)
Commercial-Industrial (CI)

OPEN USE DISTRICT:

Forest (F)

OVERLAYS:

Special Flood Hazard Area
River Corridors

Residential Districts

The Rural and Village residential districts provide for a minimum of 1 Acre in the Village Residence district and 2 Acres in the Rural Residence district. Not all lands are alike to support a given level of density. Land suitability combined with the recognition of special resource lands provides a framework for accommodating future growth and change. Overall, conventional suburban development is not consistent with many goals of the plan.

Policies:

- Residential development projects, especially major subdivisions, shall be evaluated for appropriate density based on land suitability and to retain, to the maximum extent possible, special resources identified in the Town Plan such as agricultural and open land. Consideration should also be given to lot sizes best suited to a given parcel to provide the best fit given the characteristics of a parcel and surrounding area and to avoid a conventional and monotonous subdivision which detracts from the character of the surrounding area.
- Require and provide incentives for creative site planning and design such as cluster and planned residential development techniques in appropriate locations of the RR District.
- Minimize the extension of municipal capital improvements and provision of services. Maintain the existing road network and avoid major expansions.
- Encourage the provision of parks and open space through public, quasi-public, and private means.

Supplemental Performance Standards

- ❖ In addition to the foregoing residential and other district policies, the following standards generally apply to all residential development. In some cases they may also apply to nonresidential uses.
- ❖ Density: Residential diversity should maintain a level of density compatible with land suitability to support a project. While zoning prescribes an overall density scheme, not all land has the same development potential. All development must carefully assess land suitability.
- ❖ Natural Condition: Natural features of the land including terrain, natural ground cover, trees, wetlands, natural or unique features should be integrated in the preliminary site planning stages.
- ❖ Infrastructure: Utilities and roads should be sited in a manner that provides the least possible intrusion, especially in the open-undeveloped portions of the town.
- ❖ Settlement Pattern: New development must carefully be integrated into the town. Conventional suburban subdivisions would not be consistent with this standard in rural areas.
- ❖ Slopes: Residential development should be limited and carefully planned on slopes greater than 10%. Where natural slopes exceed 20%, no residential development and associated improvements shall occur.
- ❖ Natural Ridgelines and Hill Profiles: Natural ridgelines and profiles are an important natural asset of the town. Ridgelines and hill profiles are not necessarily higher elevations in the town, but could include the natural ridge profile and side slopes along Route 7, Kelly Stand, Batten Kill, etc. Commercial electric generation infrastructure shall be sited to not cause adverse aesthetic impacts to ridgelines and hill profiles, as viewed from the public right of way.

-
- ❖ **Water Supply and Sewage:** Residential development should be supported by adequate water supply and sewage disposal.
 - ❖ **Erosion Control and Earth Modification:** During construction, builders should follow state and SCS conservation practices to minimize erosion and effect on drainage patterns. Such work should avoid filling of natural drainage, wetlands, floodplains, and other fragile environmental areas.
 - ❖ **Site Planning and Design:** Projects must assess the viability of creative site design techniques such as clustering to maximize protection of special resources identified in the plan.
 - ❖ **Traffic and Access:** Safe and suitable access is required; as is storm water drainage from connecting roads and driveways. Projects shall avoid excessive curb cuts along town roads. Projects that generate traffic must have a road capability, safe and efficient access. One goal of the plan is to maintain the existing town road system versus major expansion of roads.
 - ❖ **Minor/Major Development/Subdivision Projects:** While the zoning bylaw provides for an overall density for the zoning district(s), subdivision regulations modify the density of a given parcel given its qualitative characteristics. Subdivision regulations typically vary the degree of review and specificity according to their classification as minor or major subdivisions. While minor subdivisions do not have the same level of review as major subdivisions, they should nevertheless accommodate any special resources as identified in the Town Plan. Major subdivisions on the other hand have the potential to change the low density character of the Town and may have impacts on special resources which the Town Plan seeks to protect.

Roadside Commercial

The purpose of Roadside Commercial (RC) Districts is to provide appropriate locations for limited types of business primarily serving the motoring public where this is the most suitable use, under controls which preserve aesthetics and traffic safety. The RC District is located on both sides of Route 7 A for its entire length of this state highway in the town (approximately 1.6 miles). On the west side of Route 7A the depth of the district is the 1000 ft. elevation line and on the east side, with the exception of a small area, the Batten Kill forms the boundary. Both sides contain sensitive lands requiring natural buffers such as along the Batten Kill, wetlands, floodplains, and steep slopes.

Policies:

- Provide for commercial uses of a smaller scale in keeping with the rural setting of this area.
- Avoid excessive curb cuts and low density strip-type development and uses which have substantial trip generation rates and turning movements. This is particularly important in some areas such as the intersection of Route 7A and Hill Farm Road where vertical and horizontal visibility is poor.
- Fragile resources of the corridor shall be avoided in site development proposals: slope, floodplain, wetlands and buffers, open space, aesthetics, recreation, water quality, etc.
- Work with VTrans to implement a new roadway geometry and traffic calming measures to slow vehicular travel in this district.

Commercial-Industrial

The purpose of the Commercial-Industrial (CI) District is to provide appropriate locations for commercial and industrial establishments which promote the sound economic development of the town without detracting from the livability, aesthetics and water supply sources of the rural environment. This designation is located

along Route 7 in the southwest corner of town, which includes the Route 7 Arlington-Sunderland interchange.

Policies:

- Encourage small-scale commercial or industrial uses that will not pollute groundwater. Carefully evaluate the types of waste or special wastes generated, processed, or stored, and in relationship to the wellhead protection area.
- Avoid off-site impacts to adjoining non-industrial uses and areas, such as smoke, air quality, noise, lighting etc.
- Projects shall integrate natural conditions, land suitability, and resources as part of the project's design. This includes such factors as the rural character, open space and scenic values, resources such as agricultural soils, habitat, vegetation and natural features, while avoiding areas which have severe constraints for construction.
- Because of proximity to public lands and water near this district, consideration should be given to limited public access and linkage to such lands. This will depend on the nature of the involved land and proximity of public lands waters.

Forest

The Forest District in Sunderland includes lands above the 1,250' elevation. Nearly all of the land is also within the Green Mountain National Forest. A fundamental goal of this plan is to preserve tracts suitable for perpetuating the forest resources and forest related industries which have been an important part of the state's economy; to protect the vital sources of pure water for public supplies; and to maintain a high quality environment for forest or mountain based low-density recreation. This area is generally characterized by grades in excess of 20%, absence of improved roads, and the absence of permanent structures for year round or sustained use.

Policies:

- Land above the 1,500' elevation shall be maintained in a natural state to retain as much as possible the wilderness type setting. These upper elevations are fragile environments. There are approximately 8,800 acres in this category in Sunderland.
- Dispersed (hiking trails, etc.) versus intensive (developed campgrounds, etc.) open-air recreation uses are encouraged.
- Uses such as hiking, cross country skiing, snowmobile trails, hunting and fishing, horseback riding, and natural resource utilization such as logging, sugaring, motorized recreation in designated areas, etc. are the most appropriate activities for this planning area.
- Permanent improvements such as roads and utilities that support sustained or year round use are prohibited. This recognizes the need to protect natural resources and to minimize the cost borne by communities in providing services to these backlands.
- Recreation activities such as group campsites are encouraged in areas with existing and suitable access.

Overlays – Special Flood Hazard Areas and River Corridors

These districts minimize hazards from flooding through the control of land use in flood hazard areas are shown on the Natural Resource Maps. The official designation of these areas is the Flood Insurance Rate Maps readopted in 2014. In addition to the primary purpose of mitigating flood damage, flood designations have a secondary benefit of maintaining the natural state of streams and river environments. This is especially important given the designation of the Batten Kill and West Branch as an Outstanding Resource Waters. Recent mapping of Fluvial Erosion Hazard Areas FEH is also intended to protect property from damage and to maintain the natural flow of a channel over-time. This is especially important in high risk areas that may suddenly or slowly be subject to flooding.

Policies:

- In the floodplain, encourage open air uses (recreation, agriculture, etc.) versus structural uses, obstructions or fill.
- Avoid impacts to the special qualities of the river environment. Such qualities may include: fisheries and habitat, plant life and natural vegetation, scenery, open space and rural setting, water quality, recreation experience and river use, etc.
- Restrict development and filling in of floodplains and wetlands along (the main) stream channels to protect their recharge and water storage benefits as they relate to flooding and to protect them as wildlife habitats.
- Maintain appropriate setbacks from streams and surface waters, as specified in the Unified Development Ordinance.
- Avoid development in and protect high risk fluvial erosion hazard areas and their ability to maintain natural flows during peak flooding events.

HISTORIC PRESERVATION

Of special interest and concern to the town's residents is the preservation of historically significant sites and buildings and archaeological sensitivity. A general survey was undertaken by the Bennington County Regional Commission and the Vermont Historic Preservation Division in the 1970's and 1980's. Sites, which have been identified for their historic significance, include:

Chiselville Covered Bridge: Date built, 1870. It is located at the Sunderland Road and spans the Roaring Branch. The bridge has large timber truss supports and has the highest pier supports in the county.

Sunderland Church: Date built, 1880. Queen Anne church has extending central bay tower ending in shingled spire. Both spire and tower façade feature a variety of imbricate shingle patterns. Simple entrance surround with denticulate cornice. Narrow windows of 2/2 panes. The Sunderland Church and neighboring cemetery, located across Hill Farm Road, are the two most dominant features of the surrounding landscape, stretching from Route 7A south to the Hill Family Farm Complex. The church is in extremely good structural condition, yet its present vacancy puts this structure in potential danger.

Hill Farm Inn Complex: - the Hill Farm Inn Complex is located on Hill Farm Road, between Route 7A and Sunderland Hill Road. The Hill family first owned the land comprising the present inn more than 200 years

ago and operated a dairy farm on approximately 180 acres. In 1905, a descendant of the original family began to operate an inn in the summer time. The current main inn was built in 1830 and the annex building was built in 1790.

Sunderland Borough: This community is Sunderland's earliest residential cluster. There are a number of small land parcels and homes with distinctive period architecture that originally shared a common water source. This area was indicated on maps and considered the Sunderland town center.

Hayden Homestead: Date built, 1777. Simple, 3-bay tavern building with 1-story bracketed verandah addition on facade. Small central chimney. Sash 2/2 and 2/1. Hayden House served as a stagecoach stop during the period 1777 to 1841. It still fronts on the Old turnpike alignment between Kelly Stand and East Arlington. Traces of the road remain, as do those of a ticket window. The interior of the house features 24" panels and a domed ballroom. After it ceased to function as a tavern, the house took in boarders for a period and was subsequently converted to a residence.

"Kelley Stand" Road and Roaring Branch Scenic Corridor: This historic "turnpike" was one of Vermont's earliest roads. Beyond the Summit is the site of the gathering place for thousands who traveled there, on horseback, in wagons and buggies, and by foot, to hear Daniel Webster give a speech. It is a curvy and narrow dirt road, canopied by ancient trees. It closely follows the "stream", in places so close the sound of the water is consuming, as the road ascends the Green Mountains. It is a wonderful natural environment that offers continuous views and provides the best entrance by vehicle into the National Forest. At the lower start of the road there are a few residences, most along the stream bank. One of the cottages was owned by the artist Norman Rockwell where he went to "get away from it all" and get close to nature. At the summit is the "Kelly Stand" site of a long gone thriving mountain community with its own hotel and a large logging camp. Today a few "rustic" camps are in the vicinity. The road is closed to all vehicles in the winter starting at the point of entry into the National Forest. Winter snowmobiling use is permitted and popular. This "scenic corridor" is one of Sunderland's most inspiring natural features. This is an area that the Town should protect and prevent any adverse impacts or unnecessary road or utility improvements.

Ethan and Iran Allen Homestead: Located on the westerly side of Route 7A, the present Ira Allen House was built by Ethan Allen, of the Green Mountain Boys, and Ira Allen, his brother, who was the Surveyor-General of Vermont. It currently operates as a Bed and Breakfast and is one of the oldest inns in Vermont and designated as a state historic site.

Historic Route 7A Scenic Corridor: This road was previously known as U.S. Route 7 and was part of the original Federal Highway System. It was the primary and only North-South means of travel in Vermont up until the 1970's when the new Route 7 was completed. Its existence has its origin by being the first road most towns decided to survey, clear, construct, and connect with adjoining towns. In Sunderland most of Route 7A follows the original course along the Batten Kill River at the edge of the Vermont Valley with Mount Equinox towering in the distance on the opposite side. The route features various excellent viewpoints that offer views of mountains and valley. It is also named the Ethan Allen Highway as the first Allen homestead in Vermont was here in Sunderland. Just up the road was the neighboring homestead of a Sunderland "founding Father" Col. Gideon Brownson. Their house, built in the 1760's still remains today, but it bears no resemblance to its former Saltbox style. It is the farmhouse just south of the entrance to the Skyline Drive off Route 7A.

Policies:

- Encourage protection of sites of historic/cultural merit from encroachment by incompatible uses, and assure to the best degree possible that surrounding development enhances such historic features.

- Encourage renovation and re-use or adaptive use of historic structures which might otherwise be lost due to deterioration. Provide assistance to seek funds for maintaining such sites or structures.

TRANSPORTATION

Roads

Major access to Sunderland is by VT Route 7A and US Route 7, (a limited access road). VT Route 7A is affectionately called 'Old Route 7' due to US Route 7 not being constructed until the 1970's, before which VT 7A was the only major route through Sunderland. One of two interchanges connecting Route 7A and US7 between Bennington and Manchester is located in the southeast corner of Sunderland (the other such interchange being in Shaftsbury). In addition, approximately 2,000 feet of the access road (now VT Route 313) connecting US Route 7 to VT Route 7 A is within the town borders of Sunderland.

Sunderland Hill Road is the primary route through the town. It is hilly in nature with several dangerous curves. The speed limit is 35 mph. Near the southern end, a one-lane covered bridge with a low top clearance creates a considerable inconvenience for trucks and other large vehicles.

In 2004, Sunderland had a total of 0 miles of Class 1 highway, 15.17 Class 2 town highway miles, 14.16 Class 3 town highway miles, and 1.68 Class 4 town highway miles. Additionally, Sunderland has 11.37 miles of State highway.

Sunderland has a considerable amount of road mileage, especially when considering that a substantial portion of land lies within the Green Mountain National Forest. The US7 interchange provides direct and easy access, shifting and increasing traffic counts on town roads. One goal of the plan during the next five-year planning period is to avoid expansion of the existing system and to direct its financial resources toward the maintenance of the system. Because the Sunderland road system is basically rural, overlaid by US7, there are many areas where roads and bridges have safety and structural deficiencies. Recently Bridge #3, on Town Highway #2 has been reconstructed over the Vermont Railway because of structural deficiencies. The approaches and capacity of other roads, bridges, and intersections present unique challenges and safety concerns: Bridge #14 (East Kansas) and Kelly Stand intersection, Bridge #5 and Route 7A intersection, etc.

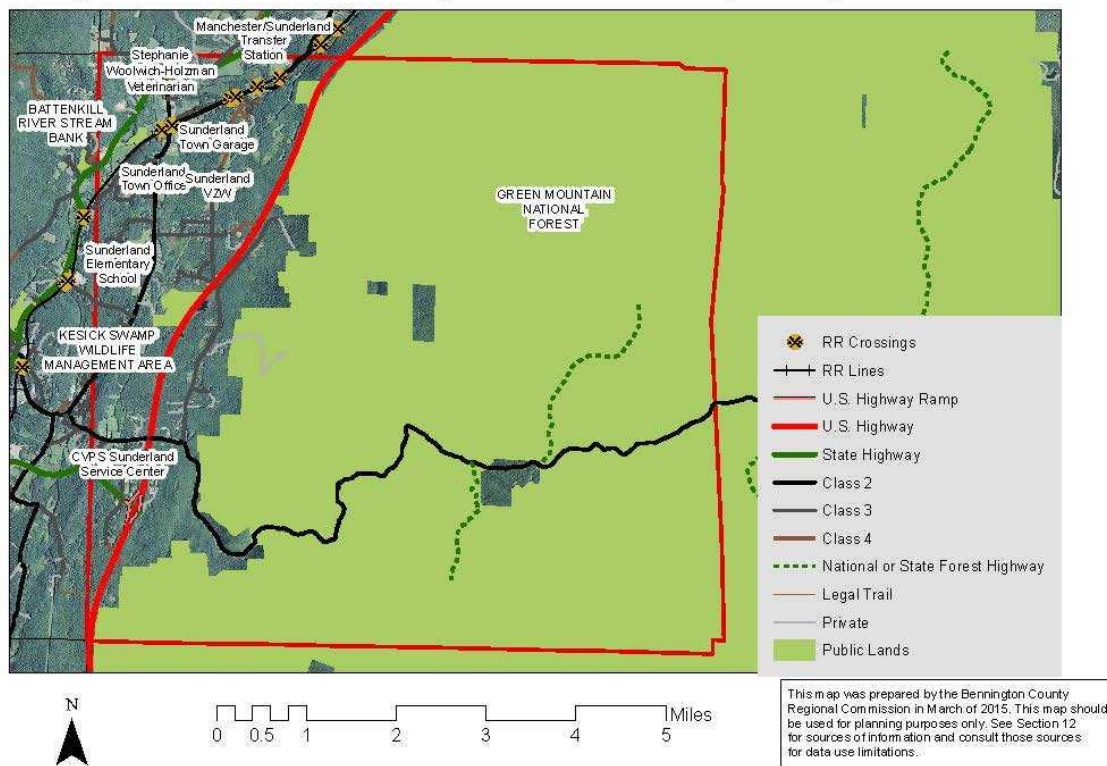
Additional growth and facilities such as the Sunderland transfer station, or other significant generators of traffic need to be carefully evaluated for their impacts on the system: structural, safety, weight loads, etc. When a project or facility places additional burdens or stresses on already poor conditions, alternative means of mitigation need to be considered: financial contributions, project size trip generation and location, etc.

Policies:

- New roads, driveways, and drainage systems shall be designed, constructed, and maintained to meet the goals and objectives of the town plan.
- Additions and improvements to the transportation system shall be designed to minimize impacts on residential areas and avoid the loss of natural resources, unique sites, and wildlife habitat.
- Major transportation improvements and investments shall be encouraged in the existing system, with minimal investment for road expansion serving remote and mountainous areas.

- All new road construction shall be consistent with limitations imposed by topographical conditions, natural areas, and areas having special resource value.
- Commercial and industrial developments shall provide for safe and efficient vehicular ingress and egress. To the extent possible, adjacent commercial or industrial uses should make use of common parking and access drives.
- Scenic roads shall be maintained for their scenic value while providing safe access for residents.
- In the Roadside Commercial District, work with VTrans to implement new roadway geometry and traffic calming measure to slow vehicular travel.
- The Route 7 interchange and bordering land is basically rural and a natural landscape. Future change and proposals shall retain the character of this setting.

Map 7. Facilities, Transportation and Open Space Lands



PUBLIC UTILITIES, FACILITIES, AND SERVICES

Water Supplies and Wastewater Disposal

The villages of Arlington and East Arlington, and the Chiselsville area of Sunderland, are served by the Arlington Water Company. The Arlington Water Company is a privately owned community water supply regulated by the Vermont Department of Health and the Public Service Board. This system draws most of its supply from a groundwater source located in Sunderland. The well head (aquifer) protection area for this source was originally identified by the State Department of Health. Subsequently, a preliminary assessment by consultants for the Bennington County Regional Commission suggested a probable larger protection area and the need to

undertake a more thorough study. Town recognizes the enlarged well head protection area until such time as additional studies are completed. Approximately 1,200 people rely on the Arlington Water Company system for their water supply. Consequently, protection of the quality and quantity of the groundwater that feeds this system is critical.

The Arlington Water Company system was constructed in 1894. Recent activities have included, pursuant to a 1986 State order, installation of an auxiliary generator at the well site and the laying of 760 feet of new main in East Arlington. Planned improvements include the development of a back-up well, a new storage reservoir (primarily to improve fire protection), and the addition of approximately one-half mile of new main in conjunction with the new storage reservoir. The estimated capacity of the system is 684,000 gallons per day (gpd), and with a current usage of 204,000 gpd, the system is capable of accommodating new growth if system improvements proceed on schedule.

Sunderland does not have any public water supply, or wastewater/sewer system, nor are any anticipated. The majority of residences utilize private onsite wells and septic systems. All systems must be designed to conform to state standards, and obtain state permits.

Public Buildings and Lands

Town Office Building: New building opened in November 2014.

Town Highway Garage: The town highway garage is located on Sunderland Hill Road. It was constructed in the early 1970s. It presently houses the Highway Department vehicles. It is expected to meet the needs for Sunderland for the foreseeable future.

Recreation: Recreation facilities in Sunderland are located at the elementary school. A softball field, playground equipment, and a basketball area were installed in 1978, using a federal grant for Public Works. Residents also use recreation facilities in nearby towns including the Arlington Rec. Park, which Sunderland financially supports.

Schools

In 1969 Sunderland opened a new elementary school with a capacity of 160 students. Currently the Town operates the elementary school for grades K through Six with grades 7 and 8 educated out of town on a tuition basis. The school also accepts and currently has several tuition students. In addition the school operates an Early Educational Program for children of pre-kindergarten age. Elementary enrollment (K-6) has fluctuated between (77 and 65 students during the past five years. Current enrollment is at 56 students with 8 full-time teachers. Capacity is projected to be sufficient for enrollments based on a reasonable rate of growth. The town has also attracted a fair amount of new residential development. Since Sunderland is not a large community, there is a need to frequently monitor change, size of development projects and location, to ensure an adequate capacity.

Since Sunderland has no secondary school, education for grades 7 through 12 is provided outside the town, with the majority of students attending either Arlington High School or Burr and Burton Academy in Manchester. Tuition reimbursement is provided for students attending non-sectarian out-of-town facilities.

Fire and Emergency Services

The Arlington Fire Company maintains two firehouses, one in East Arlington and one in West Arlington. The Company responds to calls in Arlington, Sunderland, and Sandgate, and each of these towns provides some financial backing. The Fire Company has prepared a capital budget that details a replacement schedule for trucks and other equipment. Capital expenses are expected to remain constant at approximately \$50,000 per year through this time period. Volunteers primarily staff the Rescue Squad, like the Fire Company. Moreover, the Rescue Squad receives funding from the towns and private donations. Residents and towns served by the Rescue Squad should continue to support the service, as any alternative would be more costly and less efficient.

Solid Waste

Sunderland residents arrange for solid waste and trash pickups/disposal directly with one of the private companies in the area that provide such services. The Sunderland Selectboard has adopted the Regional Solid Waste Implementation Plan (SWIP) written by the BCRC on behalf of 13 BCSWA member municipalities in the region. Municipalities must have a state approved plan to use solid waste facilities in Vermont, in accordance with Act 148. The SWIP was approved by VT Agency of Natural Resources in 2015 as submitted by the BCSWA. Sunderland, like the other Northshire Towns, continues to coordinate its efforts for appropriate short and long-term solutions for waste reduction and recycling. As a "host" community for the existing transfer station, it must be watchful and protective of its own residents and the environment.

Telecommunication Facilities

Currently, there are locations within Sunderland where coverage *is* not adequate for cell phone. Given the demand for the full range of telecommunication facilities, Sunderland adopted zoning by-laws in November of 2003 to regulate the placement, design, construction and modifications of telecommunications facilities. Their purpose is to promote the public health, safety, welfare of the Town and to protect its historic, cultural, natural, and aesthetic resources. Telecommunications permitting is the jurisdiction of the State of Vermont Public Service Board.

Policies

- While recognizing the importance of telecommunications facilities, such facilities shall be sited to minimize their visual and environmental impacts. Existing structures such as radio towers, water towers, power poles, silos, church steeples, public buildings and public lands are preferred facility locations.
- The Sunderland Landfill has been closed and is being monitored by the Town and State. The location is now the site of a privately operated waste transfer and recycling operation.

Child Care

Child care centers and family child care homes provide a significant service and contribute to the town and region's economy. It enables working parents (especially two working parents) to participate in the workforce not only for meeting personal financial needs, but filling the needs of the workforce as well. Child care centers vary in size and function and range from small home-based facilities to larger state registered and licensed facilities.

Policy:

- The town encourages quality child care services commensurate with the demand (existing and projected) to assure an effective level of service and delivery system. To that end, an assessment/survey of needs should be conducted including demand, financing, infrastructure, and assistance needs of providers. Other types of assistance to facilitate services could include public forums, collaboration, inventory of space needs, grant assistance, and identifying opportunities or barriers for providing services. Encourage the provision of quality child care services and facilities to meet the needs of the area residents, workforce, and employers.

ENERGY

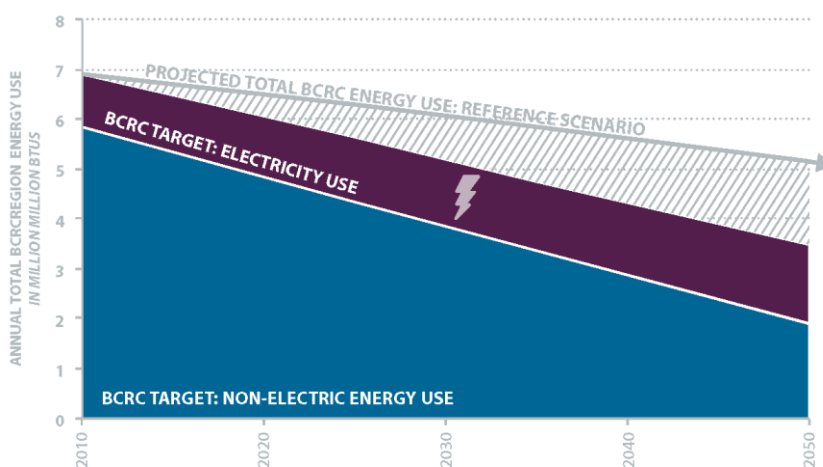
Energy Planning in Town and State

Energy is a resource that must be considered in any comprehensive planning process. The Town of Sunderland 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.

Sunderland Energy Goals and Policies:

- **Use land use planning to reduce reliance on fossil fuels and imported energy sources.**
- **Reduce overall energy consumption through conservation and efficiency.**
- **Develop renewable energy resources locally.**

The State of Vermont established markers through its Comprehensive Energy Plan (CEP updated 2016) 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.



BCRC Region Energy Cost Estimates, 2014

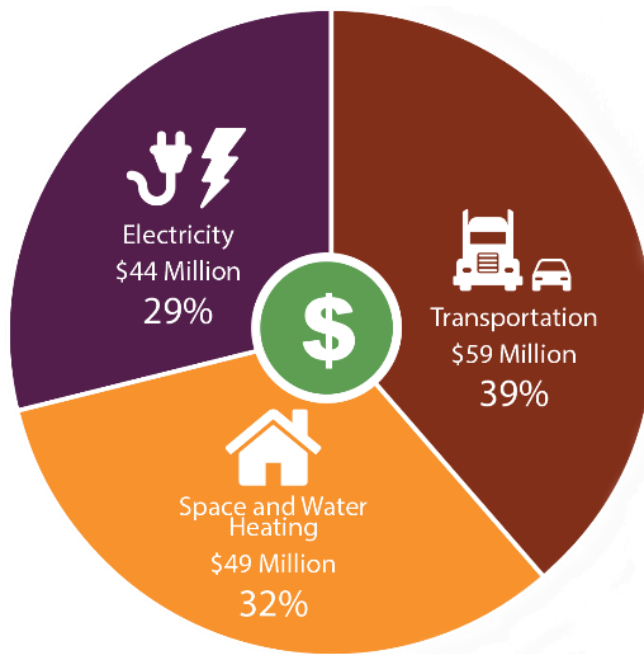
According to LEAP estimates (see below for more details), to achieve the 90X50 energy goal, the BCRC region will need to dramatically reduce energy use by increasing efficiency and relying on electricity for many more purposes. The 'Reference Scenario' above represents a business-as-usual scenario.

VT Energy Goals and Policies (VT CEP 2016):

- **Obtaining 90% of energy for all uses from renewable sources by 2050.**
- **Reducing greenhouse gas emissions to 50% below 1990 levels by 2028 and 75% by 2050.**
- **Relying on in-state renewable energy sources to supply 25% of energy use by 2025.**
- **Improving the energy efficiency of 25% of homes by 2025.**
- **Meeting the Vermont Renewable Energy Standard through renewable generation and energy transformation.**

In the Town of Sunderland, 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.



BCRC Region Energy Cost Estimates, 2014

Based on data from Census Bureau, VT Dept. of Motor Vehicles, and US Energy Information Administration.

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 the region and the state, so redirection of these funds to local energy businesses and jobs will better retain wealth in local communities.

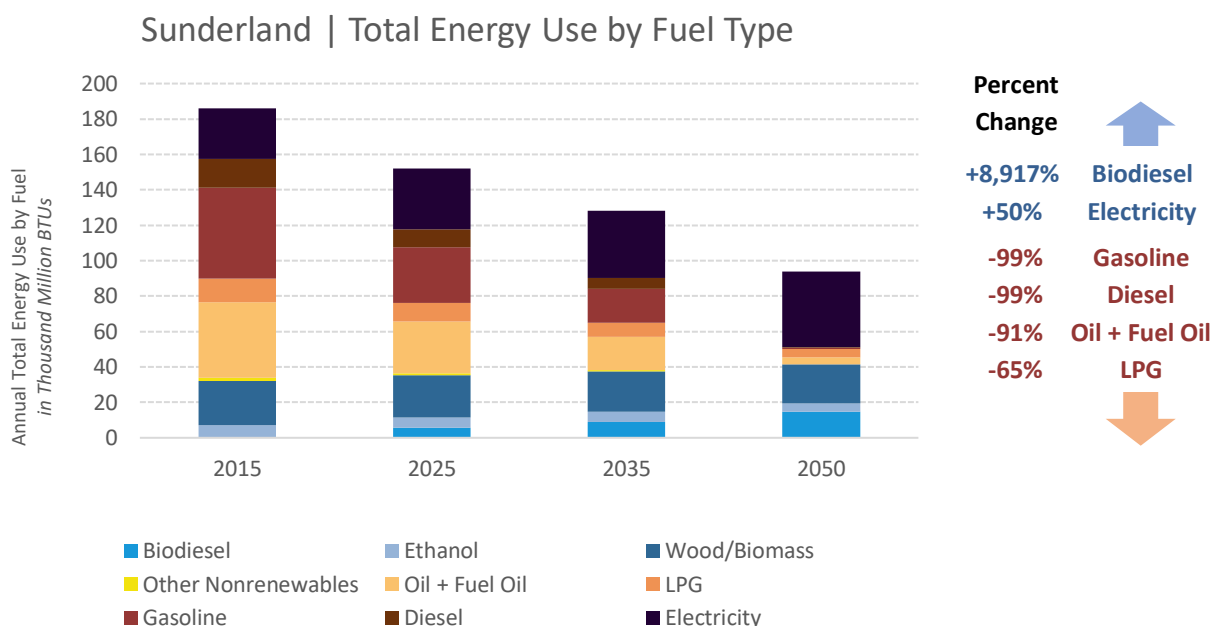
The Energy Chapter of the Town of Sunderland municipal plan is intended to provide the residents and local leadership of the town with information and strategies needed to plan for an energy future that maintains a vibrant community, as the energy sector evolves to lower energy costs, to promote local renewable energy development, and to better protect the environment.

Current and Future Energy Use

As a rural town with 956 residents housed mostly in single family homes, Sunderland 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), Sunderland uses over 180,000 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. According to LEAP projections, Sunderland 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 15% of total energy needs in 2015 to 46% 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.

Sunderland Total Energy Use by Fuel Type, 2015—2050. Based on LEAP projections.



Residential Energy Use

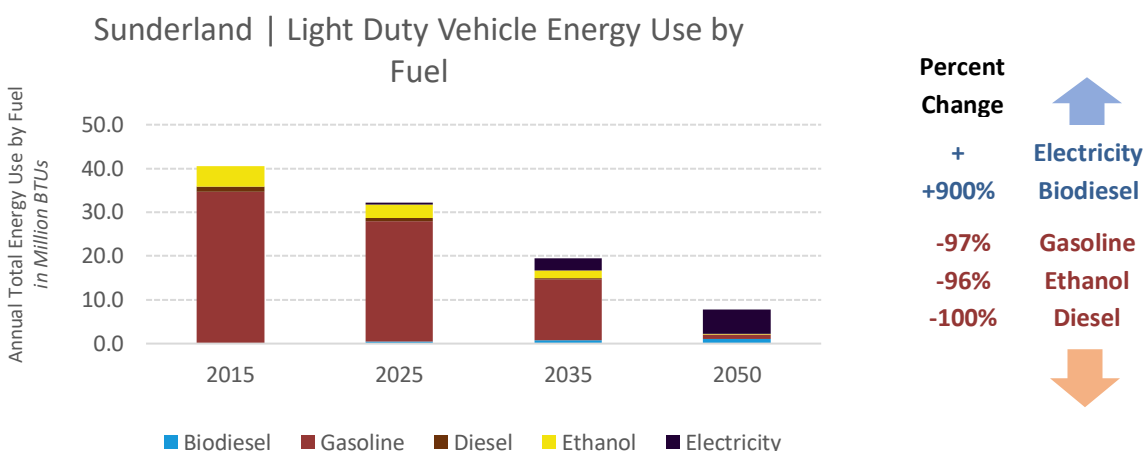
Energy use can be grouped into 3 major sectors: transportation, thermal (heating and cooling), and electricity. Sunderland's more than 900 residents consume large amounts of energy for transportation, to heat space and water, and to power lights and appliances with electricity. By identifying technologies and practices capable of catalyzing the transformation of each energy sector, Sunderland aims to provide its residents and municipal officials the tools necessary to realize the state's energy goals.

Transportation

In Sunderland, and across all Vermont, transportation consumes the most energy of any one sector. Due to Sunderland'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.

The average worker living in Sunderland has a mean commute time of 23.4 minutes, or about 35 miles roundtrip per day. With roughly 516 resident workers mostly commuting to work alone, commuting accounts for approximately 18,060 miles per day of travel, over 150,000 gallons of gasoline per year, and a yearly cost of over \$390,000 to commuters. It is estimated that Sunderland residents own over 800 vehicles and drive about 8.5 million miles per year, so commuting represents only a fraction of total transportation in the area (all data based on 2015 ACS estimates).

Sunderland Light Duty Vehicle Energy Use by Fuel, 2015—2050. Based on LEAP projections.



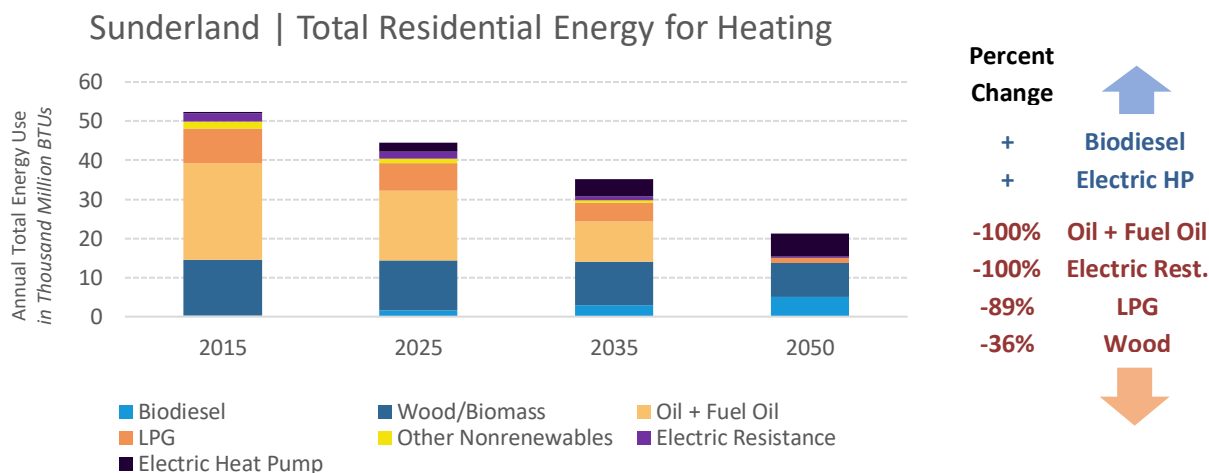
Electric vehicle (EV) technologies have advanced significantly in recent years and these systems are projected to dominate the car industry in coming decades. By electrifying the light duty vehicle fleet, Sunderland residents have the opportunity to improve transportation efficiency and divert money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

Over the next three decades, total energy for transportation would fall gradually to just 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 Sunderland: by 2025, 44 EVs; by 2035, 325 EVs; and by 2050, 672 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 Sunderland 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.

Thermal

Close to half of Sunderland homes are heated throughout the 7-month heating season by oil. 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 Sunderland residences, and this proportion is projected to increase to about 40% of Sunderland 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.

Sunderland Total Residential Energy Use for Heating, 2015—2050. Based on LEAP projections.

Sunderland's energy use for residential heating would decline to just 40% of current use, or 21 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, 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, 21 households heated primarily by cold climate heat pump; by 2035, 50 households; and by 2050, 113 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 Sunderland's more than 400 households, over 160 homes would rely for heating on woody biomass through high efficiency pellet and wood stoves, about 115 homes would use electric heat pumps, and almost 100 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 27 homes in 2050).

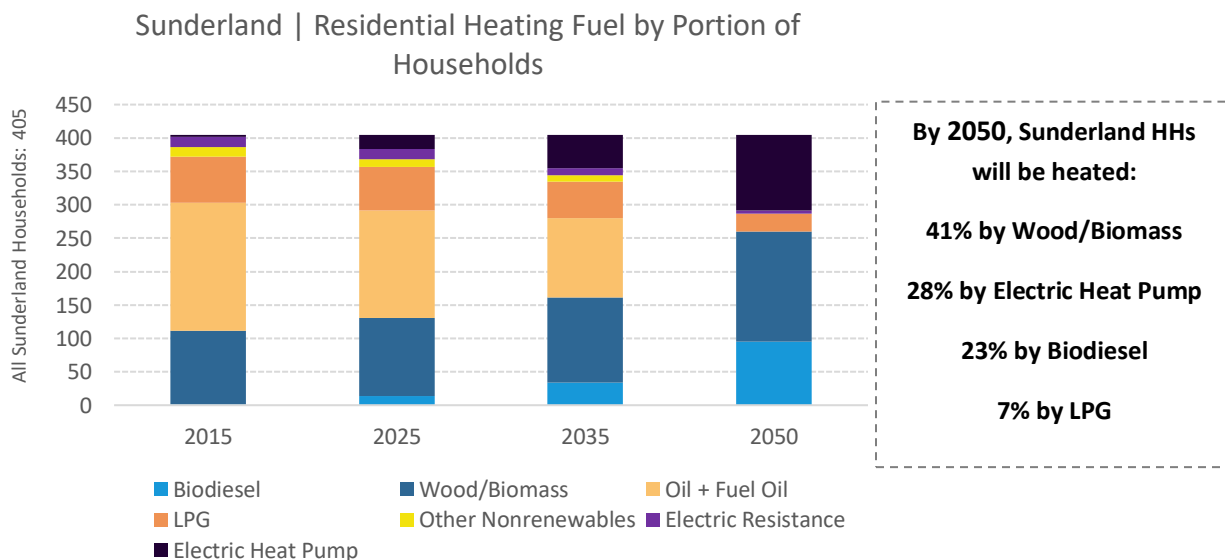
Gradually switching thermal systems to more efficient electric options would do much to improve energy efficiency, but thermal conservation gains would rely on extensive weatherization of existing homes and incorporation of building codes for new construction. The following household weatherization count targets can help guide efforts in Sunderland: 36 households weatherized by 2025; 112 households by 2035; and 243 households by 2050 (targets generated through LEAP analysis).

Sunderland Residential Heating and Electric Use and Costs. ACS 2015 Estimates, Efficiency Vermont data.

The vast majority of Sunderland's 448 occupied housing units are single family homes, which together consume close to \$1.6 million a year in heat and electric energy use. 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 /Unit
Single Family	386	197,923	73,852	30,427	363,427	3,860,000	\$1,572,479	\$4,074
Two-Family	16	6,153	2,296	946	11,298	144,000	\$52,416	\$3,276
Multi-Family	0	-	-	-	-	-	-	-
Mobile Homes	46	17,690	6,601	2,720	32,482	368,000	\$143,929	\$3,129
Cost Factor		\$2.75/gal	\$3.45/gal	\$5.00/bag	\$0.15/kWh	\$0.15/kWh		
Total Cost		\$609,858	\$285,483	\$170,462	\$59,899	\$643,121		

Methodology: Assumed heating efficiency of 60,000 BTU/sq.ft. and the following square footage assumptions: 2,000 sf; 1,500 tf; 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.

Sunderland Total Residential Energy Use for Heating by HH, 2015—2050. Based on LEAP projections.

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 24 Sunderland households made thermal shell improvements in 2016, indicating that residents already value this approach to efficiency.


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 Sunderland homes:

Sunderland Electricity Usage by Year and Sector (in kWh). Source: Efficiency Vermont.

Sector	2014	2015	2016
Residential	4,085,807	3,954,751	3,809,560
Commercial & Industrial	816,417	1,105,384	1,161,441
Total	4,902,225	5,060,135	4,971,001
Count of Residential Premises	604	601	600
Average Residential Usage	7,511	7,324	7,081



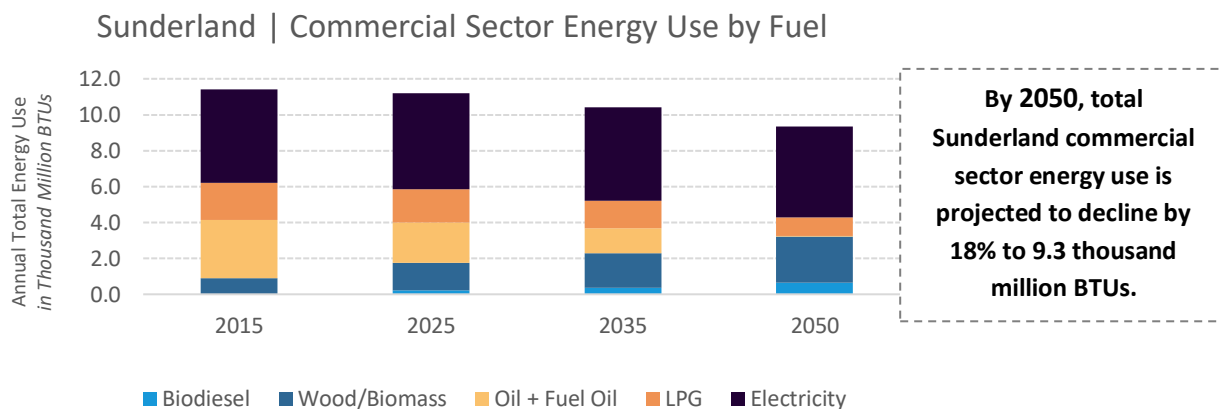
Efficiency Vermont reports that electricity use has declined in residences over the past several years, in part due to efficiency enhancement programs and initiatives. Efficiency Vermont estimates that Sunderland homes have saved \$8,300 since 2014 by switching to high efficiency appliances and weatherizing their homes. While these trends show electricity consumption on the decline, total electricity use will eventually begin to increase as Sunderland residents switch to electric transportation and thermal systems.

As part of this process, total electricity use is expected to increase to 42.7 thousand million BTUs, more than 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*.

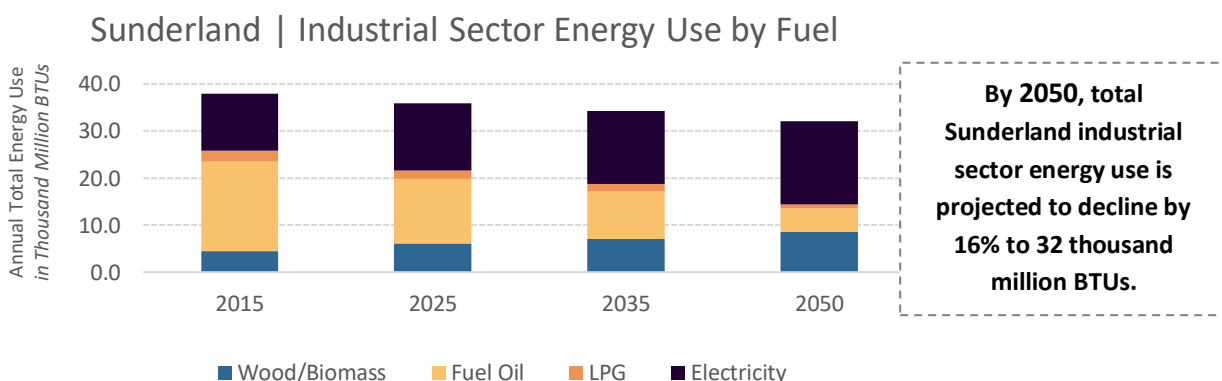
Commercial and Industrial Energy Use

Sunderland is home to several manufacturing, utility, and service-based establishments that provide 79 jobs and some of the highest average wages in the county. About 15 establishments are classified as commercial (service producing) and 11 as industrial (goods producing) (VT Dept. of Labor, 2016).

Sunderland Total Commercial Energy Use by Fuel, 2015—2050. Based on LEAP projections.



Sunderland Total Industrial Energy Use by Fuel, 2015—2050. Based on LEAP projections.



Overall energy use reduction at Sunderland’s businesses and industries is not projected to be as dramatic as for Sunderland 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.

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. Fortunately, Sunderland's town offices are housed in a new building completed in 2014, so the offices are well-insulated and have up-to-date heating and electric systems that keep energy costs low. Baseboard propane and propane radiant heat systems in the floors warm the building in winter, and two heat pumps are installed to provide A/C in the summer. The heat pumps have not been necessary, though, since building insulation keeps office spaces comfortably cool year-round.

The town garage – in contrast to the offices – is notoriously energy inefficient with minimal insulation in its aging metal construction. More than twice as much propane is currently used to heat the garage than the town offices (more details on office and garage energy use and costs provided in Table 3). Though the town has made patch improvements to the garage in recent years, a comprehensive building upgrade is needed and could deliver significant savings to the town over time.

Annual Fuel Consumption and Cost for Town Offices and Garage, FY16-FY17: Sunderland, VT.

Estimates from Town, 2018.

Energy Source	Quantity Used	Cost Factor	Total Cost
Town Offices			
Propane Heat	238 gallons	\$3.75/gallon	\$892
Electricity	7,131 kWh	\$0.15/kWh	\$1,049
Town Garage			
Propane Heat	509 gallons	\$3.75/gallon	\$1,909
Electricity	8,776 kWh	\$0.15/kWh	\$1,291
Diesel Fuel	6,897 gallons	\$2.75/gallon	\$18,966
Total Cost			\$22,198

The town offices and garage consume comparable amounts of electricity. Offices use high-efficiency indoor and outdoor light fixtures for which Efficiency Vermont issued rebates. Indoor lights are connected to timed motion sensors and outdoor lights are scheduled to come on for the least number of hours possible each day. The garage houses several municipal vehicles and pieces of equipment, including a pick-up truck and two dump trucks that use diesel fuel. Over 85% of total municipal energy expenditures go to diesel fuel costs.

Sunderland Elementary School serves about 84 children in kindergarten through sixth grade school levels. The school building (about 9,000 sq.ft.) is a modular construction built in the late 1960s. The school uses baseboard oil heat and has no A/C systems. Roughly seven years ago a series of improvements were made to the building, including a new roof, replacement of all windows with double-paned windows, new external doors with better weather sealing, a new oil furnace, and a vestibule entrance to reduce heat loss. At the time, about 80% of all baseboard heating units and electric systems were upgraded to new, digital systems. A few years later, lighting was upgraded to high-efficiency fluorescents and the water heater was replaced with a heat pump water heater with the support of Efficiency Vermont rebates. In the past year, LED exterior security lights were installed and the school purchased a new school bus to replace its existing bus.

Annual Fuel Consumption and Cost for Sunderland Elementary School, FY16-FY17: Sunderland, VT.

Estimates from Bennington-Rutland Supervisory Union, 2018.

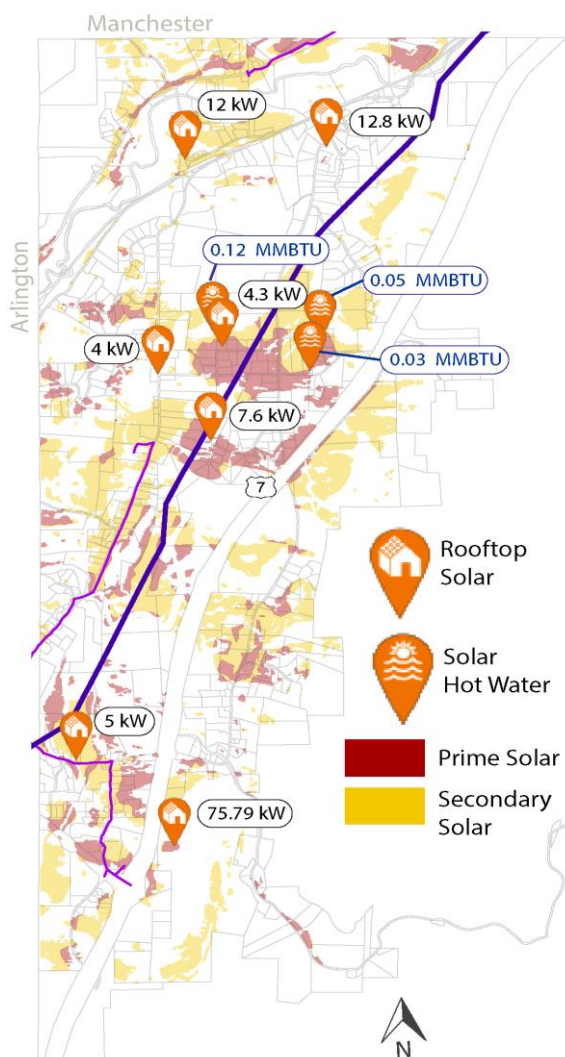
Energy Source	Quantity Used	Cost Factor	Total Cost
School Building and Bus			
Oil Heat	2,523 gallons	\$2.50/gallon	\$6,307.00
Electricity	30,720 kWh	\$0.19/kWh	\$5,772.24
Electricity for Security Lights	7,300 kWh	\$0.20/kWh	\$1,456.72
Diesel Fuel for School Bus	927 gallons	\$2.15/gallon	\$1,961.93
Total Cost			\$15,498

The school spends over \$15,000 each year on energy costs (see full estimate breakdown in above table), with the largest expenditure being for heating oil. One way to lower this cost could be to install cold climate heat pumps in strategic areas of the building as a complement to oil heating (these units also provide A/C in warmer months). Electricity is currently a significant energy expense at the school, and it may be lowered by installing timed motion sensor light switches that automatically turn off after a few minutes of inactivity and by completing the upgrade of the school electrical system to new and digital systems.

One opportunity for wider community energy savings lies in greater use of the school bus. The bus driver estimates that only about half of students currently use the school bus despite the fact that the bus route is designed to serve most of the community. It appears to be a matter of preference and habit that many families opt to drive children to and from school. A campaign to raise bus ridership could lower passenger vehicle trips to the school, creating savings for Sunderland families.

Local Renewable Energy Generation and Potential

Nearly all energy consumed in Sunderland 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 Sunderland in the form of numerous rooftop solar arrays (total installed capacity of 110 kW) and several residential solar hot water heaters. At least two

Existing Renewables Generation

Based on VT Energy Dashboard data, accessed 2/14/18

Sunderland Existing Renewables

local businesses have placed solar panels on the rooves of their commercial buildings: the Hill Farm Inn (12 kW) and Orvis Company headquarters building (75kW).

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 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.

Locally-Identified Constraints

Act 174 authorizes municipalities to identify local resource areas where renewable energy development is inappropriate and comparable development is already restricted. Two such areas exist in Sunderland, namely the Forest land use district and the Route 7 right-of way. The Town Plan notes that development near the Route 7 interchange should be carefully guided so as to protect scenic and natural resources, and that significant points of observation along Route 7 should be preserved. For the Forest land use district, the Town Plan states that permanent development such as roads and utilities is discouraged in order to protect forest resources and minimize costs for maintaining access to backlands. Agricultural soils are flagged so that precautions be taken to preserve agricultural soils when possible.

Solar

There is abundant solar resource throughout low-lying areas of the town, and much of this resource is unrestricted by state-identified environmental constraints. See local constraints, 'Prime' and 'Secondary' resource areas, and preferred solar sites in the Sunderland Solar Resources Map.

The town has identified preferred sites for commercial-scale solar facilities in the Commercial/Industrial (CI) District, as shown on the Land Use Plan (Map 6). Solar electric generation facilities of 75 kW capacity and greater are encouraged in these areas. Solar facilities of 75 kW capacity and greater shall not be developed in other areas of town. Solar generation facilities of a capacity lower than 75 kW are permitted throughout the town, except in the local constraint areas of the Forest (F) land use district and VTRANS right-of-way. Preferred areas for solar facilities less than 75 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 Sunderland 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 Sunderland should aim to develop an additional 3.4 MW of solar capacity by 2050 to help meet regional and state energy targets. The resource areas identified in the Sunderland Solar Resource Map are more than sufficient to meet this target. Resource areas in preferred sites alone total about 120 acres, which will support between 2 MW and 10 MW of solar installed capacity. Given that about 85 kW of the town's solar target is estimated to be met by roof-top solar (see Bennington County Regional Energy Plan, page 91 for calculation methodology), the remaining 2.5 MW of new solar capacity will reasonably be met in the identified preferred and potential mapped resource areas, which total an additional 1,385 acres of solar resource.

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 Sunderland home may surpass the 75 kW capacity threshold delineated here, but could be found to be aesthetically and environmentally suitable in the town.

Solar Screening— Ground-mounted solar facilities shall comply with state minimum setbacks and all screening and landscaping requirements of the C/I district. 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.

Wind

The Town of Sunderland currently has no wind generation facilities connected to the grid, 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 Sunderland, these high-altitude, high-wind resource areas are conserved as part of the Green Mountain National Forest. Though wind energy development could be allowed in the national forest, it is considered less favorable to develop than other comparable and unrestricted areas are available for development.

Solar Scale Definitions & Examples

Residential-scale:

capacity \leq 15 kW



Commercial-scale:

capacity \leq 500 kW



Utility-scale:

capacity $>$ 500 kW



The national forest land in Sunderland 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 small-scale (residential) power generation is most appropriate in the municipality. Only wind energy generation facilities referred to as ‘residential scale’ with capacities up to 10 kW are permitted in the Rural Residential (RR), RCR, and CI districts. Mid-size, commercial-scale wind turbines are only appropriate in the Commercial/Industrial District. No wind energy generation infrastructure is permitted in the F District. The images to the right provide an idea of the scale of residential and commercial-scale wind turbines.

All wind development must comply with the State’s turbine noise standards and environmental regulations. See Sunderland’s Wind Resource Map below to view areas where wind installations could be most effective.

Hydro

There are no existing hydroelectric sites in Sunderland. Due to environmental regulations, it is highly unlikely that new dams or hydro sites will be developed in Vermont. For the moment, Sunderland does not plan to develop hydroelectric generation facilities in the town.

Geothermal

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

Woody Biomass

With more than 25,800 acres of forested land in the town, Sunderland 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 Applegate 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 Sunderland, 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.


Wind Scale Definitions

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

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


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

Examples



10 kW

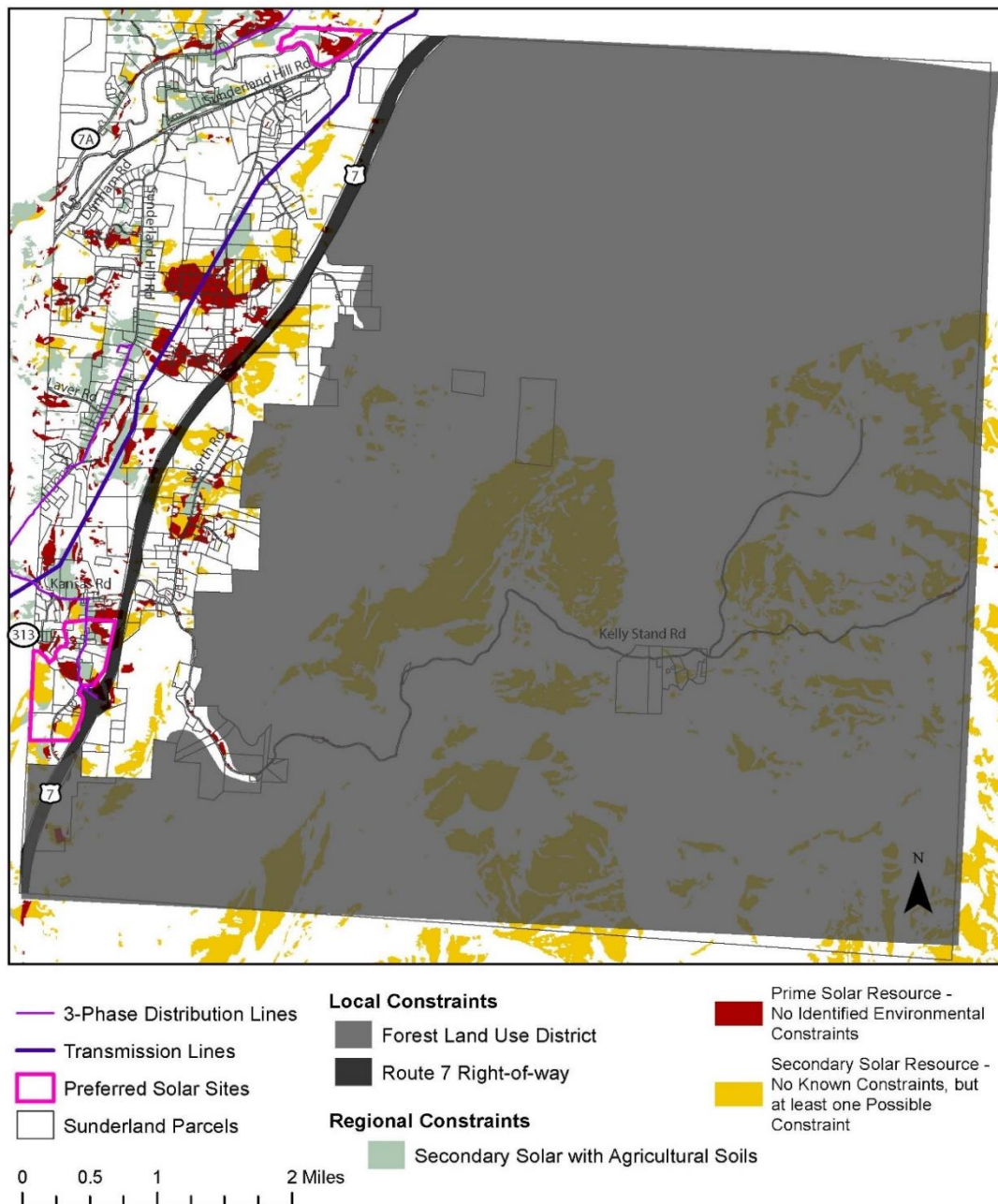
Residential-scale



50 kW

Commercial-scale

Sunderland Solar Resource Map



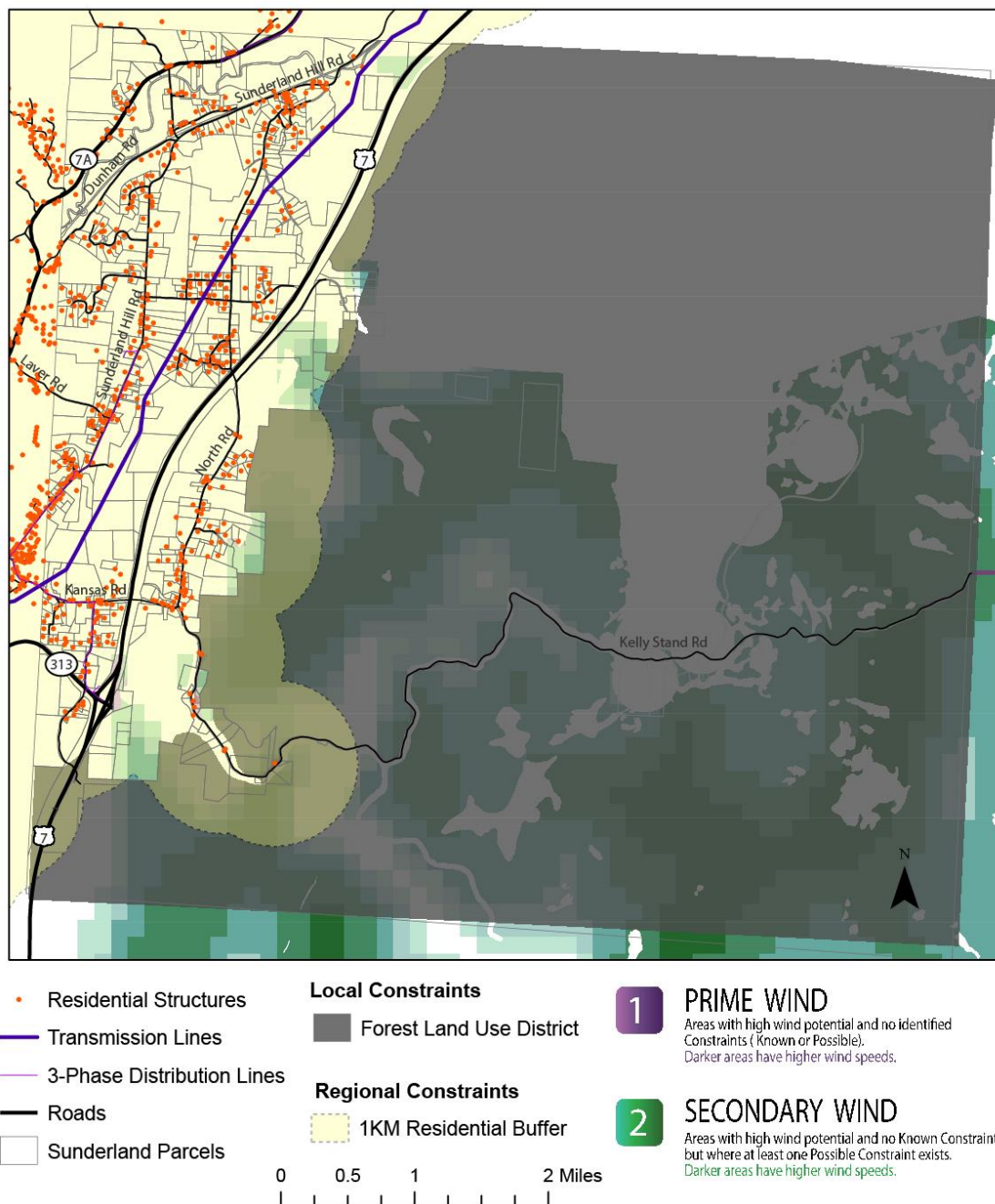
Local Constraints – Solar resource has been removed from these areas where solar development and similar development is considered inappropriate and is not permitted.

Regional Constraint – Presence of prime agricultural soils is flagged. Special attention shall be paid to preserve agricultural soils for future agricultural activities. If development does occur, efforts shall be made to mitigate impacts on agricultural soils and/or preserve portions of agricultural soils for future use.

Preferred Sites – Suitable for all scales of solar development, including commercial (75 kW and greater in the Commercial/Industrial (CI) District). Preferred sites contain about 120 acres of solar resource area.

Prime and Secondary Solar Resource Areas – Solar resource areas outside of preferred sites are suitable for solar electric generation under 75 kW. Potential areas for residential-scale solar include over 1,390 acres of resource area.

Sunderland Wind Resource Map



Local Constraints – No wind energy generation infrastructure is permitted in the F District, where similar development is considered inappropriate and is not permitted.

Regional Constraints - the Bennington County Regional Energy Plan establishes a regional constraint of 1KM residential buffer for utility-scale wind development

Preferred Sites – Sunderland has not identified any preferred sites for wind development in the town.

Wind Resource Areas – Outside of local constraint areas, residential-scale wind facilities (hub heights ≤ 30 meters, and capacity ≤ 10 kW) are permitted. Outside of local constraint areas, commercial-scale facilities (hub heights ≤ 50 meters, and capacity ≤ 100 kW) are only permitted in the Commercial/Industrial District.

Energy Conservation, Efficiency, and Renewable Energy Strategies

To achieve the energy goals advanced by the state of Vermont, Sunderland'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 Sunderland 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 garage and elementary school to identify cost-effective energy saving strategies. The town's capital budget program should consider weatherization improvements and upgrading existing thermal and transportation systems to high efficiency electric technologies.
4. New Development: New development in Sunderland 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

5. Residential: The Sunderland 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.
6. 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

7. Electric Vehicle (EV) technology: The Town of Sunderland shall pursue installation of a EV charging station at the town offices and the Sunderland Elementary School. Informational presentations for Sunderland 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.
8. Public transit: New public transit routes should be explored and pursued, including the potential for a future bus stop along Route 7 in the RCR District. Installation and maintenance of high quality and ADA accessible amenities at public transit stops such as shelters, benches, bike racks, posted signage and schedules, and park-and-rides should be pursued. Town officials shall be involved in any future proposals to develop passenger rail access along Route 7A.
9. 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.
10. 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

11. The town should offset ongoing fossil fuel consumption by developing residential-scale renewable energy facilities on appropriate town-owned parcels. The town should support interested residents in developing residential-scale 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

12. 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.

IMPLEMENTATION

The policies adopted in this town plan provide a guide for the consistent and rational action to control of land use. These policies also provide a guide for thoughtful decision-making that will have the effect of implementing the town plan. Unlike town plans in other states, the Vermont town plan has legal foundation for decision making through the Act 250 and Section 248 processes. Consequently, the goals and policies formulated in this document will serve not only to guide growth, but in fact can be implemented.

The town has many options available to it, whether regulatory or non-regulatory, to pursue the plan's objectives. Implementation can take many forms: special study follow-through; community facility and capital programming; grant assistance for implementation; participation in various proceedings -local or state; formation of special study committees; inter-municipal coordination; etc. Other traditional techniques include: zoning, subdivision regulations, capital programming, health ordinances, traffic, road ordinances and standards, mapping, database, etc. Zoning bylaws and subdivision regulations are primary tools to implement the Town Plan, consequently, they must be aligned with as many of the goals and policies that are contained in the plan.

While the plan is the basis for regulatory documents, it is the regulation that provides the substance to implement the plan. As provided in the state planning and zoning enabling act, a municipality that has adopted a plan through its bylaws may define and regulate land development in any manner that the municipality establishes in its bylaws, provided those bylaws are in conformance with the plan and are adopted for the purposes set forth in the Act. In its bylaws, a municipality may utilize any or all of the tools provided in the enabling act and any other regulatory tools or methods not specifically listed.

Regional Coordination

Sunderland has been experiencing a comparatively significant amount of growth for the last 30 years. This can mostly be attributed to growth and change in Manchester and Arlington. Other factors contribute not only to change within Sunderland, but its relationship to surrounding towns and the region include the new Route 7 and interchange, schools, Green Mountain National Forest, commercial and industrial growth, Sunderland landfill, affordable housing options, Arlington Water Company and aquifer protection, etc.

The Town of Sunderland Land Use Plan and regulatory implementation documents such as the Unified Development Ordinance support land development patterns that promote compact centers surrounded by working lands. This is similar to the surrounding towns, and therefore, their corresponding land use plans depict lower intensity land uses in areas that border with Sunderland.

Sunderland will continue to coordinate its efforts as circumstances arise. It is also necessary to review the plans of adjoining municipalities to improve coordination, sharing of information-expertise, and participation in forums to discuss common areas of interest.