I. UTILITIES, FACILITIES AND SERVICES

A. Background

The communities in our region depend on a system of utilities, facilities and services to maintain the health and welfare of their citizens. This system includes such things as solid waste management, transportation infrastructure, water and wastewater services, emergency services and recreation. In urban areas, these systems are often intertwined between communities, requiring some level of regional oversight and maintenance. In the Two Rivers-Ottauquechee Region however, municipal government provides and maintains most of the systems (excluding state-owned highways and buildings) individually.

While TRORC does not have a direct role in maintaining these systems, it does have the ability to provide municipalities with guidance and technical assistance, and to take a regional approach to prioritization of future investments, particularly investments by the State of Vermont. It is our role to recognize when regional land use patterns may create a need for new or improved systems, and to identify areas where future investments might have a regional benefit. At the same time, we must also recognize when expansion of infrastructure and services may lead to poor planning and unsustainable patterns of land use.

Although Vermont's population growth has flattened substantially over the past decade, it is understood that population growth can influence the need for improved utilities, facilities and services. An increased number of residents within a community or region can require additional roads, additional capacity in wastewater systems, and additional capacity in solid waste removal systems, etc. Where this new growth occurs also has an impact. Increased development in rural areas of a region can tax existing road and emergency management systems. More development within villages and downtowns can overburden existing water and wastewater systems. To ensure that essential systems are able to sustain growth, long-range planning is needed.

In this chapter TRORC will address some of these systems including:

- Water and Wastewater
- Solid Waste
- Health Care Facilities
- Broadband and Cellular Communication
- Libraries

For each system we will analyze their regional impact, their needs, the benefits they offer and what investments might need to be made in the future. This chapter does not discuss transportation or emergency services as they are addressed in other parts of this Plan.

B. Water and Wastewater Systems

The TRORC region is by in large a rural region, with a majority of water supply and wastewater treatment handled through individual or small group on-site wells and septic systems. Only a fraction of TRORC's municipalities have water or wastewater systems, and in those municipalities, the systems serve a limited area – generally downtown or village areas. In general, these systems are considered "small" systems (i.e. serving less than 3,300 people).

For villages and downtowns, water and wastewater systems are a vital piece of infrastructure. The average area required for onsite septic and water is roughly one half acre to one acre. To create and maintain the feel and viability of a village or downtown, higher density is preferred. Water and wastewater systems allow communities to encourage greater density that would be possible without them. Well-maintained public drinking water and wastewater infrastructure is critical for public health, strong businesses and a clean environment.

Wastewater Treatment Systems

There are 12 wastewater treatment facilities in 9 communities in our region. The bulk of these systems were originally built in the 1970s and 1980s, with periodic improvements being made in response to aging equipment or increased demand. As these facilities age, the cost of necessary upgrades increases, putting improvements out of reach of smaller communities (see below).

	Design Capacity	Present Use - Annual Average Flow	% Available Capacity 2014
	(reported in gallons per day)		
Bethel	115,000	50,000	57%
Bradford	137,000	65,000	53%
Bridgewater	43,000	9,500	78%
Chelsea	55,000	28,000	49%
Hartford - Quechee	300,000	200,923	33%
Hartford - WRJ	1,215,000	668,901	45%
Randolph	400,000	250,000	47%
Rochester (septic tank and leachfields)	30,000	12,263	60%
Royalton	70,000	21,000	70%
Woodstock	450,000	235,000	48%
Woodstock – S. Woodstock	50,000	16,000	68%
Woodstock - Taftsville	10,000	2,233	78%

Figure 1: Wastewater Treatment Facilities in TRORC Region, 2014

With the exception of Hartford's Quechee Wastewater Treatment system (which currently has 33% remaining capacity), there are no issues regarding capacity[1]. The majority of systems in our region have at least 45% available capacity. Given that trends in population growth have flattened substantially, it is likely that most communities will be able to maintain their current design capacity. In the case of Hartford, the community has a strong capital improvement plan that will address capacity issues.

[1] The percentage of available capacity listed in figure # reflects allocated and unallocated reserve capacity.

Wastewater treatment facilities will eventually be necessary in additional communities as the need to further develop in community centers grows. At present the towns of Norwich, Hartland, Strafford and Fairlee are the most likely to need wastewater treatment facilities if the state's goal of densely populated villages and downtowns surrounded by open countryside is to continue. Hartland and Norwich are the largest communities in the TRORC region without wastewater treatment facilities. Fairlee and Strafford both have viable village centers that would benefit (from an economic and health standpoint) greatly from the ability to concentrate more development within those areas.

Municipal Water Systems

Town	SPA	Connections	Pop. Served	Ave. Daily Demand (gal/day)	Max. Daily Demand (gal/day)	Storage Capacity (gal)
Bethel	Yes	346	915	122000	220000	500000
Bradford	Yes	551	1512	227000	450000	1200000
Chelsea	Yes	114	140	26254	67500	244000
Fairlee	Unknown	284	284	115000	150000	1296000
Hartford	Yes	2600	2600	727413	1454826	2500000
Quechee Central	Yes	720	720	153280	181712	320000
Hartland	Unknown	262	262	26200	65000	150000
Newbury Village	Yes	180	480	44000	60000	350000
Wells River	Yes	130	490	35000	38000	275000
Norwich	Yes	333	333	87837	164800	125000
Randolph Village	Yes	795	2700	205000	325000	2400000
Randolph Center	Yes	50*	1138	60000	100000	250000
Rochester	Yes	180	440	32195	64390	265000
Royalton	Unknown	250	1500	10500	21000	900000
Woodstock	Yes	672	2473	351220	434563	1000000

Figure 2: Public Water Systems in the TRORC Region, 2014
**Randolph Center connection data does not reflect VTC total connections.*

There are 15 municipal water systems in 12 municipalities in the TRORC region. Like the region's wastewater treatment infrastructure, much of this equipment is aging and in need of repairs. Some systems suffer from inadequate storage, or from poor line pressure.

Municipalities are required by law to create source protection area (SPA) plans which ensure that drinking water supplies will remain safe and untainted.

Challenges

Land Use Patterns and Geography

The need for water and wastewater treatment facilities is driven primarily by the density and intensity of land development within a given area, the number of people located within the area and geography.

Vermont's land use law seeks "to maintain the historic pattern of compact village and urban centers separated by rural countryside." This land use goal creates a dichotomy between theory and action. While most would agree that the pattern is desirable, it is challenging to implement, particularly for communities without existing infrastructure. Continued increases in density and development in our villages and downtowns will eventually be unsustainable without water and wastewater facilities. Some villages in our Region, such as South Strafford, have already experienced issues of cross-contamination due to a high concentration of private systems in a small area. Fortunately, a majority of our communities with existing infrastructure have adequate reserve built into their systems to allow for steady, planned growth. However, unplanned spikes in population may tax those reserves.

Geography is also a challenge in many of our communities. Wastewater and water systems are complex, and the cost of developing them can vary dramatically due to variations in soil types, topography and other conditions. In a number of our communities, space to develop new systems is limited due to geography. Sharon's village, for example, is sandwiched between the White River on one side and I-89 and very steep slopes on the other. With maximum coverage in their village already reached, the development of a traditional water and wastewater system would be challenging.

Because population is also a factor in determining whether or not a water or wastewater treatment facility is needed, the nature of the population must be considered. In communities such as Fairlee or Barnard, where there are a substantial number of transient residents (i.e. residents who come during the summer to enjoy the lakes), it may not be feasible to build a system large enough to handle the summer population while remaining sustainable year-round.

Aging Infrastructure/Mapping

The American Society of Civil Engineers (ASCE) issues an Infrastructure Report Card for each state every four years. This report grades the condition of the state's infrastructure, including water and wastewater facilities. ASCE's most recent report card (2013) gave Vermont a C- in drinking water facilities and a D+ in wastewater facilities. These scores are similar to other New England states which, like Vermont, has underground infrastructure which is often over 100 years old.

Our region's water and wastewater infrastructure varies widely in age. Several communities have systems that were built in the early 1900's (Newbury and Wells River). Others were originally built in the mid-1980s. While many communities have upgraded their primary

facilities, aging service lines is a serious issue. Municipalities like Hartford, who have had water and wastewater for over 100 years, have service lines that are of multiple materials (cast iron pipe from the late 1800s, for example) and multiple ages. Many of these aging facilities are past their design lives. Cast iron, for example, has an average life expectancy of 120 years. Ductile iron pipes were introduced in the 1950's and were an improvement over their cast-iron predecessors, but they only have a life expectancy of 50 to 75 years due to corrosion. Older infrastructure is more likely to fail, creating health hazards and costing the town a substantial amount of funding to repair. In other cases, existing infrastructure is inadequate - sizing of pipes can range from a mere 4"-16" depending on the location and the town.

In many communities, the distribution systems are so old that there is not an adequate understanding of where the pipes are located, how old they are and what material they are made out of. Improved mapping of these underground systems is an essential part of creating a maintenance plan.

Infiltration and Loss

Wastewater treatment facilities suffer from leaks into sewer pipes as well as older built connections that funnel storm water from impervious surfaces such as rooftops, roadways and parking lots into combined sewer and stormwater lines. Drinking water systems often suffer from the opposite problem – loss of potable water from leaking pipes due to age, damage from frost or other causes. If systems are not properly gaged, such losses can go undetected for years. Large leaks in mains can and have caused damage to roads in our Region. During Tropical Storm Irene, several communities (including Woodstock) experienced damage to water lines that pass under the river, resulting in a loss of drinking water that was difficult to identify.

Cost of Upkeep and Investments

Water and wastewater systems are capital-intensive operations. Cost is the largest barrier to repairing, improving or expanding water and wastewater systems. During the 1970s, Federal programs existed that provided 78% of the funding needed to develop water and wastewater infrastructure. Today, federal grant programs provide less than 3%, leaving municipalities to find other sources of funding to pick up the remaining 97% or more. Commonly, these investments are funded through a mix of federal grants, bonding and pay-as-you-go funds generated through metering. The price of water supply and wastewater treatment that residents and businesses pay often do not reflect the full cost of the services. Many towns have found it challenging to get voters to buy-in to high cost investments. In the town of Bradford, for example, it took over a decade to extend their water system, despite the potential economic benefits.

Solutions

Water Efficiency Programs

To increase the long-term sustainability of existing water system infrastructure, municipalities can implement water efficiency programs. These programs include installation of water meters (which can help identify areas of unusual loss or use) and water-saving devices. Water efficiency programs can reduce operating costs and reduce the need for additional sources of water or water storage facilities. Reductions in water usage also lead to less energy being used to treat, heat and dispose of water. Financial surpluses from these efficiency upgrades can be set aside to build cash reserves for future system investments.

Future Infrastructure Investments

Long-range planning for infrastructure investments and maintenance is essential for water and wastewater systems. State statutes enable communities to create a Capital Budget and Program (CP&B) for the purposes of planning and investing in long-range capital planning. Although most communities have some form of capital account where they save money, many do not have a Capital Budget and Program as described in state statute (24 V.S.A §4443). A capital budget outlines the capital projects that are planned to be undertaken in the coming fiscal years over a five year period. It includes estimated costs and a proposed method of financing those costs. Also outlined in the Program is an indication of priority of need and the order in which these investments will be made. Any Capital Budget and Program must be consistent with the Town Plan. They shall include an analysis of what effect capital investments might have on the operating costs of the community. An adopted Capital Budget and Program should be drafted with assistance from the Planning Commission to ensure consistency with the Town Plan. While the Planning Commission is designated in statute as the "preparer" of the Capital Budget and Program, it is essential that members of the Selectboard and budget committee (if one exists) are part of the team that develops the CB&P. The Selectboard has the ultimate decision as to whether or not such a budget and program is adopted.

Importance to the Economy

Access to water and wastewater services is a valuable commodity for many businesses. The ability to serve multiple units in a concentrated area such as a village or downtown allows for a greater mix of commercial and residential uses. For businesses, having a larger cliental located in a central location creates a reliable base level of commerce.

Consistent service is important, as loss of either water or wastewater services for even an hour can cause problems, and in as little as a day some businesses may be forced to shut down. Smart planning and more long-term budgeting will make this possible.

From a regional standpoint, investments in municipal infrastructure must be made based on the population they will serve and the most pressing needs. Because capacity is not a significant issue in most communities with existing infrastructure, the priority for future investments is in modernizing aging infrastructure. This will make these systems more sustainable, affordable and

will protect against unwanted loss of water resources, or the potential hazards of effluent releases. In addition, any opportunities to make improvements to existing systems that increase their energy efficiency should be implemented. Expansion of infrastructure should be limited to locations that enhance the cohesive core of designated growth areas. Any such expansions shall not encourage sprawl or strip development.

Development of new systems in communities that do not currently have water or wastewater treatment facilities should focus on areas where there is a clear village center. Fairlee (WWT), Strafford and Sharon are the most obvious candidates for the development of new systems in the TRORC Region. The development of new systems must focus on the cohesive core of the village and shall not encourage sprawl or strip development.

Alternative Systems

Communities that do not have existing systems are unlikely to be able to afford to spend the millions necessary for a traditional centralized water and wastewater system. There are more affordable systems that will allow for village-scale wastewater treatment. Innovative decentralized systems include village-wide septic systems. The Village of Rochester maintains a village septic system that includes multiple leach fields. Although not inexpensive, this alternative approach has a more reasonable cost than a traditional system. Communities with unique geographical or topographical constraints may also be able to utilize alternative systems to make community wastewater and water service a reality.

C. Goal, Policies and Recommendations Relating to Water and Wastewater

Goal

1. Municipal water and wastewater systems that are secure, financially sustainable, well-maintained and energy efficient.

Policies

1. Municipalities should create capital budgets, enterprise funds and reserve accounts for utilities and facilities management.
2. Water and wastewater systems should utilize appropriate data for management purposes.
3. TRORC supports proposals to upgrade and improve existing public water supplies and wastewater treatment facilities that serve regional growth areas as designated in this Plan.
4. Water and sewer lines should be extended only to those areas where future development of high density residential is being encouraged by regional and local plans.
5. Proposals for upgrades, improvements or expansion of water and wastewater treatment infrastructure which promote sprawl and strip development and scattered land uses are not compatible with this Plan.

6. When systems are extended to service a new development, careful consideration must be given to the impacts of additional hookups along the length of the extension. The allowance of new hookups must not promote sprawl or strip development.
7. TRORC encourages the location of community water supplies and wastewater treatment facilities primarily in regional growth areas, however, systems designed specifically to supply cluster housing projects in rural areas may be consistent with this Plan.
8. Land development within existing or planned source protection areas which pose reasonable threat of contamination to public water supplies is not compatible with this Plan.
9. TRORC supports water conservation measures to reduce demand for water and to promote the life and efficiency of water and wastewater facilities.
10. TRORC encourages installation of community wastewater treatment facilities or water supply systems in areas of concentrated settlement where conventional onsite septic systems have failed or are marginally inadequate.
11. New water and wastewater systems should be designed so as to be as energy efficient and secure as possible.

Recommendations

1. Municipal plans, per Vermont statute, shall identify and prioritize future capital improvements/major repairs and estimate costs and means of financing for maintenance and future capacity.
2. TRORC shall assist communities with the identification and prioritization of future capital improvements/repairs.
3. TRORC shall offer capital budgeting workshops throughout the region.
4. Water efficiency programs and codes should be adopted at the state or local level to reduce demand on municipal water systems.
5. TRORC shall seek grant opportunities to map water and wastewater systems throughout the region.
6. When funding is available, municipal plans should inventory water and wastewater systems to identify current and projected capacity gaps.
7. Municipalities should conduct periodic auditing of all water and wastewater distribution systems for calculation of infiltration and losses.

D. Solid Waste

All Vermont municipalities, either individually or as part of a solid waste district or an inter-municipal association, are required by Vermont law to adopt a Solid Waste Implementation Plan (SWIP). The SWIP documents town or district waste management facilities and articulates how solid waste will be managed over the next five years. All solid waste districts and inter-municipal SWIPs must be in compliance or consistent with the goals outlined in the statewide Materials Management Plan (MMP), which came into effect in June 2014 (Act 148). All waste

districts and inter-municipal associations must, therefore, revise or rewrite their existing SWIPs to conform to the new MMP that adheres to policy changes stemming from Act 148.

In addition to being in conformance with the State Plan, all SWIPs must be in accordance with any municipal or Regional Plan, prepared and adopted pursuant to 24 VSA Chapter 117. Towns and districts need to demonstrate that the provisions of these plans match the goals and policies of the SWIP. The elements of a SWIP must meet Agency planning requirements, discuss waste diversion plans, household hazardous waste, biosolids, and septage management, waste facility siting criteria, and include a public participation component. All towns or districts for this region are encouraged to contact TRORC offices regarding their current planning activities and to seek a determination that their SWIP revisions meet overall goals and policies of this Plan.

The TRORC region is served by a total of six waste management districts, as well as one inter-municipal association (see Table ##). The Greater Upper Valley Solid Waste Management District covers a ten town area, which constitutes a third of the

Waste Management District	Towns	Population	% of Regional Pop. Total
Central Vermont SWMD	Bradford	2,797	11%
	Chelsea	1,238	
	Fairlee	977	
	Tunbridge	1,284	
Greater Upper Valley SWMD	Bridgewater	936	33%
	Hartland	3,393	
	Norwich	3,414	
	Pomfret	904	
	Sharon	1,502	
	Strafford	1,098	
	Thetford	2,588	
	Vershire	730	
	West Fairlee	652	
	Woodstock	3,048	
Northeast Kingdom WMD	Corinth	1,367	8%
	Newbury	2,216	
	Topsham	1,173	
Southern Windsor/Windham Counties SWMD	Plymouth	619	1%
Tri-Town Agreement	Braintree	1,246	13%
	Brookfield	1,292	
	Randolph	4,778	
White River Alliance	Barnard	947	17%
	Bethel	2,030	
	Granville	298	
	Hancock	323	
	Pittsfield	546	
	Rochester	1,139	
	Royalton	2,773	
	Stockbridge	736	
Hartford Community Recycling Center	Hartford	9,952	18%

Figure 3: Waste Management Districts in the TRORC Region

region's population, based on 2010 U.S. Census Bureau figures. The second largest service area is the Hartford Community Recycling Center, which covers 18% of the region's population. It currently operates a solid waste/recycling transfer center on a 19 acre site (the former town landfill). The third largest waste management district is the White River Alliance, which covers eight of the region's towns and roughly 17% of the regional population.

	Town	Facility Name	Type of Facility
Orange County	Bradford	Bradford Recycling Depot	Recycling
	Bradford	Knoxland Farm-Highfields Institute	Composting
	Braintree	Greenwood Composting Facility	Composting
	Chelsea	Chelsea Transfer Station	Transfer Station
	Corinth	Sandberg Farm - Highfields Institute	Composting
	Corinth	Corinth Recycling Facility	Recycling
	Corinth	Corinth Transfer Station	Transfer Station
	Fairlee	Fairlee Transfer Station	Transfer Station
	Newbury	Newbury, Town of	Recycling
	Randolph	Randolph Stump Dump	Landfill
	Randolph	Randolph Transfer Station-Casella	Transfer Station
	Strafford	Strafford Recycling Depot	Recycling
	Thetford	Thetford Transfer Station & Recycling Ctr.	Transfer Station
	Tunbridge	Tunbridge Transfer Station	Transfer Station
	Vershire	Vershire Recycling Center	Recycling
Windsor County	Barnard	Barnard Transfer Station	Transfer Station
	Bridgewater	A.B.L.E. Waste Mgmt. Transfer Station	Transfer Station
	Hartford	Hartford C&D Landfill & Transfer Station	Transfer Station
	Hartford	NE Waste Services, LTD Recycling Fac.	Recycling
	Hartford	Twin State Sand & Gravel Stump Dump	Landfill
	Hartland	D & D Excavating, Inc.	Recycling
	Norwich	Norwich Transfer Station	Transfer Station
	Plymouth	A.B.L.E. Waste Mgmt. Transfer Station	Transfer Station
	Rochester	North Hollow Farm	Composting
	Royalton	Bethel/Royalton Transfer Station	Transfer Station
	Stockbridge	Harvey's Peavine Pit	Landfill

Figure 4: Waste Management Facilities in the TRORC Region

As of 2014, there are twenty-five active solid waste facilities throughout our region that have been certified by the state (see Table ##). Presently, the region has: 7 recycling facilities, 4 composting facilities, 11 transfer stations, and 3 landfills. The table of existing facilities illustrates that a third of the region's towns lack any waste management facility, and are instead reliant on their neighboring waste management district partner municipalities for waste disposal. Four of our smallest towns (based on population numbers) are currently without waste management facilities. These four towns are: Granville, Hancock, Stockbridge and Pittsfield. In some instances, these towns find themselves two to three towns removed from a landfill or transfer station in other nearby towns or may otherwise be physically removed from nearby sites by mountain passes that make site access more challenging.

The only solid waste facility that currently has a permit for construction and use in the TRORC region is the proposed Upper Valley Landfill, which would be owned by the Greater Upper Valley Solid Waste Management District. The permit for the site has been in place since March 1996, and was recertified in 2014. Per the facility's management plan, the landfill would have an allowable acceptance rate of up to 50,000 tons of solid waste per year, with a contingency plan in place to utilize a to-be constructed transfer station in the event of a temporary landfill shutdown. The location of the landfill is to be in the Town of Hartland, on a 112.5 acre parcel that is located at Mille Street, between the I-91 highway and the Connecticut River. While the Greater Upper Valley Solid Waste Management District has transfer stations and recycling centers within its region, it is currently reliant on a landfill outside its region in neighboring Lebanon, New Hampshire.

E. Challenges

Universal Recycling Law

According to the Agency of Natural Resources (ANR), the average Vermont resident generates 5.18 pounds of waste per person per day in 2014, and, as of 2011, cumulatively dispose of over 400,000 tons of materials per year.

1,2 In 2012, Vermont adopted Act 148, commonly known as the Universal Recycling Law, to promote the universal recycling of solid wastes and to improve diversion rates (i.e., keeping less waste out of landfills through product recycling, composting, and other measures). (10 VSA § 6604). The Law works by phasing in a required separation of waste materials over a six year period, so as to afford municipalities and waste management districts time to establish necessary collection services and accompanying waste processing facilities for residents. Following on this, the Secretary of ANR promulgated rules in the form of the Vermont Materials Management Plan, which came into effect in June of 2014.

Four goals serve as the basis of the state Materials Management Plan (MMP), which serve to keep products out of the waste stream while also reducing reliance on conventional waste management needs:

1. To prevent waste from being generated;
2. To promote sustainable materials management, with a preference for highest and best uses;
3. To minimize reliance on waste disposal (landfilling and incineration); and
4. To conserve resources, minimize energy consumption, and reduce greenhouse gas (GHG) emissions and other adverse environmental impacts.[3]

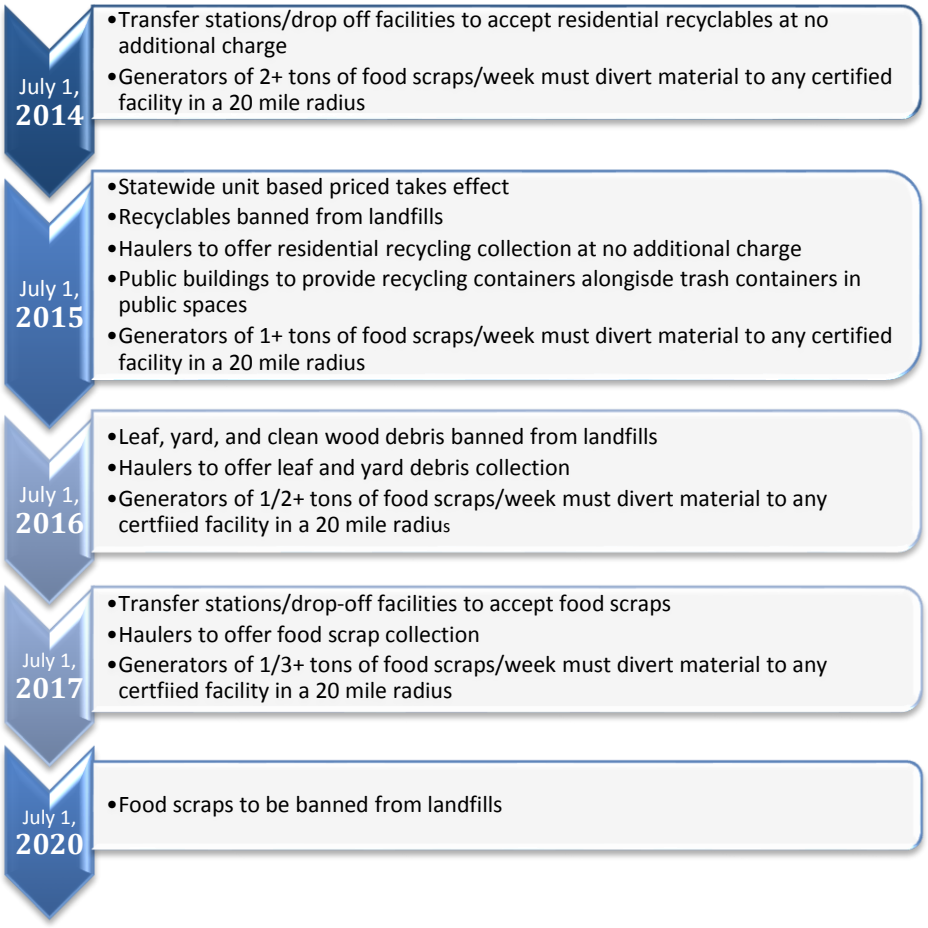
How solid waste management providers will adapt to the new requirements of Act 148 are unclear, because they lack sufficient data and understanding of the impacts of the MMP and Act 148, more broadly, on their capacity. TRORC, therefore, is not in a position to comment on or otherwise assess the capacity, fiscal, and overall management issues that the region's waste

districts will face while the Universal Recycling Law implementation rules are phased in between now and 2020. However, there are a number of potential challenges that may arise as each of the timeline milestones is reached:

- Effectively enforcing rules on what may and may not enter landfills (i.e., recyclables, yard and food compostable) may prove difficult. Determining how solid waste management entities will monitor waste is key to addressing this, and may be aided by variable rate pricing mechanisms.
- Ensuring cooperation between solid waste districts and business, particularly with respect to recycling and composting efforts, may take time.
- Many haulers, particularly those managing smaller operations, are fearful of being pushed out of the waste collection market by larger competitors, owing to a smaller capital base with which to acquire larger trucks capable of both trash, recyclable, and compostable waste products.
  Requiring towns to provide recycling receptacles in all publicly accessible spaces alongside trash receptacles is a cost that needs to be considered in municipal budgeting. While perhaps not overly onerous for many towns, this unforeseen cost has not been a formal consideration previously, and may prove burdensome for certain municipalities unless appropriately planned for prior to July 1, 2015.

The biggest task ahead of solid waste management entities is simply providing the necessary education and guidance to equip residents, businesses, and municipal governments alike with understanding their role in the roll-out of these new waste management practice requirements. Conducting the necessary outreach, to this end, is a critical task to ensuring proper compliance with the statewide MMP.

Figure 5: Act 148 Implementation Timeline



Solutions

Reduce Inputs

According to ANR, waste generation figures can be reduced substantially through improved product design, increased producer and consumer responsibility for products' lifecycles (a cradle to cradle approach to that leads to repurpose once a product's primary purpose or utility has been fulfilled), and increasing consumer and commercial awareness of reuse and reclamation opportunities for goods. In promoting a product's highest and best use, Vermont's residents and businesses are tasked with considering the environmental impacts of all stages of a product's lifecycle. One example of this approach is viewing organic materials as the greatest contributor of GHG emissions in landfills, and considering their reuse in a hierarchy that feeds not only people but also livestock, compost and anaerobic waste digesters, and ultimately fuelling energy production. Reliance on landfills requires the waste of natural resources, and is indicative of the inefficient management of waste products. Distancing ourselves from reliance on landfills will

lessen both current and future environmental degradation impacts. A zero-waste future, is one that is minimizes the ecosystem burdens to our land, our soil, our air, and our water resources from emissions, leachate, and toxins.

In line with the above-state goals, the MMP sets out eight implementation goals and objectives, from which municipal Solid Waste Management Plans are to stem:

1. Expanded education and outreach to schools, businesses, and the general public.
2. Extended producer responsibility and product stewardship.
3. Reduction in the statewide disposal rate (pounds per person per year).
4. The reuse, recycling, and composting of materials to reduce the amount needing to be landfilled.
5. Reduction of toxicity in the waste stream.
6. Improved availability of statewide infrastructure and services for waste reduction and diversion (strive for convenient, consistent, and cost-effective services).
7. Improved measurement and progress of performance standards.
8. Development of sustainable financial structures to manage materials.[4]

Outreach and Support

The most obvious role for the Two Rivers-Ottauquechee Regional Commission regarding solid waste is to provide outreach and education to our communities. As the Agency of Natural Resources begins to implement the requirements of the Vermont Materials Management Plan, TRORC can help guide our communities through those requirements, ensuring that the plan is implemented. Additionally, TRORC can continue to support our region's Solid Waste Districts when seeking permits through Act 250 or when renewing solid waste plans.

F. Goals, Policies and Recommendations relating to Solid Waste

Goals

1. Reduced solid and hazardous waste generation in the TRORC Region.
2. Increased reuse and recycling in the TRORC Region.
3. Disposal of municipal solid waste in lined landfills.

Policies

1. The scale, type, and design of major public utilities and facilities should be undertaken so as to complement the future land use settlement patterns recommended in this Plan and relevant municipal plans. Public investments in municipal, regional, and state facilities should be located within existing or planned regional growth areas unless those facilities are of a type that is considered inappropriate for these locations due to potential health hazards.

2. The placement of businesses that produce significant amounts of hazardous waste in areas where unintended, persistent waste discharge could cause harm to both the human and natural environment is inconsistent with this Plan.

Recommendations

1. TRORC shall continue to assist member towns, alliances, and the Greater Upper Valley Solid Waste Management District in the update and implementation of municipal and regional solid waste plans.
2. TRORC shall support and participate in any future discussions regarding the development of regional waste management services.
3. TRORC shall further Universal Recycling Law requirements for parallel solid waste collection services through outreach and education with assistance from the Agency of Natural Resources.
4. TRORC shall support the creation of municipal composting facilities for organic wastes where appropriate.

G. Health Care Facilities

Health care facilities are essential in the prevention, treatment, and management of illness, and in the preservation of mental and physical well-being through the services that they offer. Additionally, they provide benefits to our Region by providing jobs and supporting local economies. From a regional standpoint, the availability of quality health care to our citizens is of significant importance.

This chapter focuses specifically on medical facilities. It does not delve into a greater discussion about the regional health care system and the services offered through it. This is a very complex system, and it is likely that there are gaps and needs in the availability of services, particularly

Facility	Primary Focus	Location	Affiliation
Gifford Medical Center	Primary Care	Randolph	Gifford Primary Care
Kingwood Health Center	Rehabilitation Services	Randolph	Gifford Primary Care
Rochester Health Center	Primary Care	Rochester	Gifford Primary Care
Bethel Health Center	Primary Care	Bethel	Gifford Primary Care
Chelsea Health Center	Family Medicine	Chelsea	Gifford Primary Care
Sharon Health Center	Sports Medicine	Sharon	Gifford Primary Care
Twin River Health Center	Specialized Medicine	White River Jct	Gifford Primary Care
Little Rivers Health Care - Bradford	Family Medicine	Bradford	Little Rivers Health Care
Little Rivers Health Care - Corinth	Family Medicine	Corinth	Little Rivers Health Care
Little Rivers Health Care - Wells River	Family Medicine	Wells River	Little Rivers Health Care
VA Medical Center	Acute Care	White River Jct	U.S. Veteran's Admin.
Dartmouth-Hitchcock Medical Center	Tertiary Care	Lebanon, NH	Dartmouth-Hitchcock

Figure 6: Medical Care Facilities in TRORC Region, 2014

for the region's vulnerable populations (i.e. the elderly, the physically, mentally, or developmentally disabled, and the low-income). There is no statutory requirement to have a health element as part of the Regional Plan, however, TRORC recognizes that this is an important issue and in the future, a more in-depth discussion about the regional health care system should be considered as part of this plan.

Medical Facilities

Gifford Medical Center in Randolph, and the White River Junction branch of the Veteran's Administration Medical Center, are the largest medical facilities located in the TRORC Region. For more major medical issues, residents in our region use Dartmouth Hitchcock Medical Center in Lebanon, NH which includes a cancer center and children's hospital. The majority of our region's medical needs are provided by smaller health clinics, which are part of a larger network. These facilities allow local residents, including those on low or fixed incomes, direct access to day-to-day primary and family care services without requiring extensive travel. The local nature of our region's health clinics allows residents to create long-term relationships with their medical practitioners, a concept that is consistent with the concepts of primary care.

Medical services are available to lower income residents in several locations in the TRORC region. Gifford Medical Center in Randolph and the Good Neighbor Health Clinic in White River Junction can provide free primary medical care to nearby residents whose household incomes are below 200% of the poverty level.

Based on discussions with regional health care service providers, the Region's medical facilities are at a scale that is meeting the current needs of our residents. While there is always room to improve services and to expand opportunities, additional medical facilities are not needed at this time.

Elder Care Facilities

As the elderly (citizens aged 65 or older) become less comfortable with the tasks involved in managing their own home, they often turn to some sort of elder housing. If health is an issue and some form of constant care is required, seniors will need to enter a nursing home or a residential care facility. The chart below indicates the number of units or beds available for each level of elderly care. Data shows that there are limited options surrounding area for all levels of care, but full-time residential care is particularly scarce. Elderly residents in need of full-time care (Level IV) are often forced to move away from their community. This is a statewide problem, not just a regional issue.

Assisted Living Facilities	Units	
Valley Terrace	61	White River Junction
Woodstock Terrace	42	Woodstock
Hillside	40	Randolph Ctr
Nursing Homes	**Beds**	
Menig	30	Randolph Ctr
Brookside	67	White River Junction
Merten's House	14	Woodstock
Residential Care (Level III)	**Beds**	
Blue Spruce Home for the Retired	8	Bradford
Mountain View	8	Vershire
Oasis Home	6	Bradford
Pleasant Street Home	3	Randolph
Riverbend Residential Care Home	21	Chelsea
The Homestead	23	Woodstock
Valley View Home for the Retired	7	Fairlee
Windover House	15	Randolph
Residential Care (Level IV)	**Beds**	
Atkinson Residence	15	Newbury
Merry Meadow Farm - Bradford House	12	Bradford

Figure 7: Elder Care Facilities in the TRORC Region, 2014

Challenges

Access to Data

Medical facilities rely heavily on the transfer of data. In this age of digital data, this requires access to the internet. Because of the size and volume of these data, substantial bandwidth is required. Those facilities that are located in areas where internet access or internet bandwidth is limited are not able to be as responsive as other facilities.

Land Use Patterns

The expansion of existing or development of new medical or elder care facilities has the potential to conflict with existing and future land use patterns. The most appropriate locations for these facilities are within community centers (villages and downtowns), because they are often walkable, have existing services and access to business-class internet access.

In locations outside of designated growth areas, new facilities are less desirable because they have a broader impact. In rural areas, these facilities may require the extension of existing water

and wastewater systems, can negatively impact natural resources, and can create conditions that encourage sprawl and strip development.

Aging Population

The percentage of our Region's population that is over 60 years of age is growing, which creates new challenges for our region. The number of people with chronic illnesses (generally incurable illnesses or conditions that require ongoing medical attention and affect a person's daily life) is on the rise nationally. Four out of five Americans over the age of fifty suffer from at least one chronic condition, including high blood pressure, diabetes or mental illness. When chronic illnesses are coupled with age, some form of elderly care service becomes necessary. In 2010, the number of residents 60 years and older in our region was 13,665; nearly 25% of the TRORC region's total population. There are currently only 372 total beds/units dedicated to elderly care in our region, a fraction of what may be needed in the future.

Solutions

Encouraging Medical Facilities through Land Use Policy

Given the need for additional medical facilities, particularly those that specialize in elderly care, efforts to encourage their growth and development at sustainable levels is in the interests of the region. Municipalities can support their growth by allowing for these facilities in their villages and downtowns, and by creating regulatory structures that balance issues like historic preservation with the public value these facilities provide. Under Act 250, rules could be clarified to allow some leeway in permitting if a facility represents a clearly defined public good.

Importance to the Economy

Vermont's not-for-profit hospitals are cornerstones of our local economies, providing and supporting more than 27,000 direct and indirect jobs in Vermont – about five times the state's largest private employer and one out of every 12 workers.

For communities like Randolph, where Gifford Primary Care (Gifford Medical Center) is located, these facilities are a direct stimulator of the economy, providing employment, paying taxes and utilizing local services.

The priority for future investments in the health of our region should focus on elderly care facilities and services. The first step in making these investments is to determine where they would be most practical. TRORC could work with communities and stakeholders to identify possible locations for elderly care facilities throughout the region.

Beyond the clear health benefits of these facilities, the economic benefits are obvious. Medical and elderly care facilities have the potential to provide workers with a livable wage and act as stimulators of the local economy. When located in appropriate locations, such as within or immediately adjacent to villages and downtowns, medical and elderly care facilities are consistent with this Plan.

Support Facilities and Systems

The Regional Planning Commission can provide support for the development of new facilities, by reviewing any potential projects before they are submitted to the District Environmental Commission in order to reduce the possibility that a permit will be denied, delayed or heavily conditioned. During the Act 250 process, TRORC should actively participate and offer support for the proposed developments when possible. Priority of support should be given to developments that will increase the availability of elder care opportunities, provided that any proposed development is consistent with the policies contained within this Plan.

H. Goals, Policies and Recommendations for Medical and Elderly Facilities

Goals

1. Enhanced availability of medical and elderly care services in the Region.
2. Access for residents to all levels of health care, regardless of wealth or income status.

Policies

1. Medical and elderly care facilities are encouraged when located within or immediately adjacent to designated growth areas provided that they do not have an undue adverse impact on traffic or the character of the area.
2. Support efforts at the state and local level to develop additional elderly care services and facilities.

Recommendations

1. TRORC should identify areas of the region where medical or elderly care facilities would be beneficial.
2. TRORC should review local zoning and subdivision regulations to ensure that they do not have the effect of prohibiting health or elderly care facilities from appropriate areas and to assist with revisions as needed.
3. TRORC should work with state partners to clarify or revise Act 250 rules to allow permitting flexibility when a proposed development is consistent with this Plan and has a clearly defined public good.
4. TRORC should work with partners to further identify and document gaps or needs within the regional health care system, particularly for vulnerable populations.

I. Broadband and Cellular Communications

Information Technology (wired and wireless telecommunications, Broadband Internet) has

become increasingly important to the economic needs of residents and businesses in the region. As our region continues to become more reliant on online data and communication the need to expand these systems will grow. Because so much of our economy new relies on the availability of data and communications, in order for our region to remain economically competitive with more urban areas of the state, continued information technology development will need to be encouraged.

In the Vermont Telecommunications Plan 2014, the Department of Public service set the lofty goals, including the following:

- Every address in Vermont should have available broadband Internet access with the minimum technical requirements of 4 megabits per second (Mbps) download and 1 Mbps upload. By year end 2020, a majority of addresses in Vermont should have access to the Internet at speeds of at least 100 Mbps symmetrical, and every address should have access at speeds of at least 10 Mbps download.
- Every address in Vermont should have access to wired and wireless broadband Internet access service.
- Broadband service should be affordable to all members of every customer class.
- Universal adoption and use of broadband service at home and at work.
- Universal availability of mobile service along roadways and near universal availability statewide.
- Reliable, economical telephone service in all areas of the state, including rural areas. All residents, regardless of income or location, should have access to basic telephone service.

Importance to the Economy

On average, Vermont businesses report that 74 percent of their workforce utilizes email and seventy percent utilize web sites. Fifty-seven percent of businesses statewide indicate using mobile telecommunications. Broadband and mobile telecommunications and data access are essential to the Region's businesses.

Hospitals utilize broadband for "telemedicine," which is considered extremely important in rural areas such as ours. More accessible health information, products, and services provide real economic benefits in rural communities. Rural businesses with strong access to broadband can use the internet to expand market reach. Farms, for example, can utilize the internet to sell products online that would otherwise be sold only to local residents, expanding their market.

Availability of broadband services and mobile coverage has increased markedly since this report was released, but not all of these goals have been met. Despite this, the Regional Plan supports the goals of increasing availability of broadband and mobile communications. In the TRORC region access to broadband is provided via a number of mediums including: cable, DSL (Digital Subscriber Line), fiber optical cable, cellular, wireless and satellite.

Use of cellular phones in day-to-day activities has skyrocketed over the past decade. The availability of broadband cellular data has increased the usefulness of cellular phones to the point that they are essential to businesses and citizens alike. In a Vermont Telecommunications survey, 57% of businesses reported that they subscribe to cell phone services for their

organization. The average number of cell phones per household in Vermont is 2.39, further supporting the fact that these devices have become common.

Challenges

Lack of Coverage

Although data provided by the State of Vermont reports a majority of Vermonters have broadband access, the reality is less clear. Access to broadband varies from town to town, with the highest concentration of availability generally being in villages and downtowns. This is because broadband providers tend to locate their infrastructure in areas with high population density in order to maximize the subscriber to infrastructure ratio. 2013 broadband availability data indicates that availability is highest in areas with larger villages and downtowns (such as Hartford and Randolph), or in areas where development is concentrated along service corridors where infrastructure exists (such as major roads). The farther away from a community center, the fewer options for broadband connectivity, making the "last mile" homes and businesses, the least likely to have access.

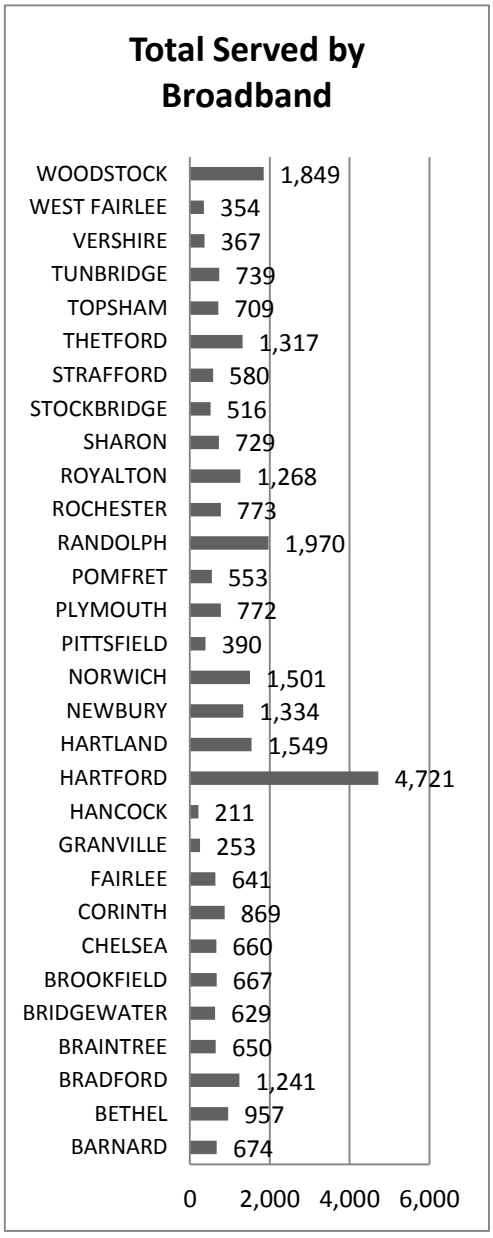


Figure 8: Total Served by Broadband, 2014

Cellular access is determined in great part by a region's topography in relation to the placement of cellular transmission towers. While coverage in the TRORC region is reasonably good along main travel corridors, it is spotty in more rural areas. In some instances there are entire communities (such as Barnard) that have virtually no access. Cell phones are particularly needed during severe hazard events when landline communications may be offline due to damage. The inability to communicate via phone during extreme events puts our communities at risk.

Aesthetic Concerns

Communities are conflicted on the value of cell towers. In most cases, residents support improved cell phone access, but are less supportive of having the necessary facilities located in their communities. When residents object to proposed facilities, it is almost always due to the potential for aesthetic impacts.

Although the Section 248a process (which allows cellular network providers to apply for a Certificate of Public Good rather than going through local zoning or Act 250) does not require support at the local level, it is preferred, as legal interference can slow down the process of developing new facilities.

Access Barriers

For a portion of our population, access to the internet is a challenge for reasons that go beyond the availability of the service. For the poor, there may be financial barriers to gaining internet access, for the elderly there may be issues of comfort with the technology. Access to broadband internet has become a necessary part of life. Underserved populations need access in order to interact with health and human service providers, many of whom utilize online forms and online data collection to assist these populations. It is important that access be made available at a cost that is sustainable.

The 2014 Vermont Telecommunications Residential Survey indicates that the average monthly cell phone bill is $109.82. The price of cell phone packages makes them cost prohibitive for those on a limited or fixed income.

Solutions

Improve Broadband Coverage

Efforts to improve broadband coverage in the TRORC region are ongoing. Between 2000 and 2012, the State of Vermont invested a substantial amount of funding in an effort to bring broadband to all Vermonters. One such project was the Vermont Digital Economy Project (VDEP), which developed as part of the State's goal to create more resilient communities after the damages caused by Tropical Storm Irene in 2011. In an effort to speed disaster recover, spur economic and job growth, and improve community resilience to disasters, the VDEP project was tasked with building digital infrastructure in communities that had been hardest hit by the storm.

In the TRORC Region, the VDEP project built free village Wi-Fi zones in the communities of Bethel, Royalton and Rochester. These investments provide residents who lack access in their homes with a reliable place to connect to the internet. In East Barnard, there is also a community-funded WiFi zone for residents. The benefit of village wide access is a boon to businesses who can take advantage of the additional customers who are drawn to the village to access the internet.

The East Central Vermont Fiber-Optic Network (EC Fiber) is a consortium of 24 towns (including 21 TRORC towns) that is working to expand access to high speed internet within the TRORC region. EC fiber currently provides high-speed internet access to selected communities including parts of Barnard, Pomfret, Stockbridge, Bethel, Royalton, Tunbridge, Strafford, Vershire, Corinth, Thetford and Norwich. There are additional expansions of the EC Fiber network planned in the future.

TRORC is highly supportive of efforts to expand broadband access provided that the infrastructure required does not have an undue adverse impact on the rural character of our communities.

Expand Cellular Coverage

Major cellular providers are continuously working to expand coverage, particularly along major transportation corridors such as Interstates 89 and 91. Under the Section 248a permitting process, the Public Service Board (PSB) must review the environmental, economic, and social impacts associated with a particular project, similar to Act 250. In making its determination, the PSB must give due consideration to the recommendations of municipal and regional planning commissions and their respective plans. Accordingly, it is appropriate that this Plan address these land uses and provide guidance to town officials, regulators, and providers.

For all cellular telecommunications facilities, the following policies shall apply:

1. **Preferred Locations**: New generation and transmission facilities shall be sited in locations that reinforce the region's traditional patterns of growth, of compact downtown and village centers surrounded by a rural countryside, including farm and forest land.

2. **Prohibited Locations**: Because of their distinctive natural, historic or scenic value, telecommunications facility development shall be excluded from the following areas;
   - Floodways shown on FEMA Flood Insurance Rate Maps (except as required for hydro facilities)
   - Fluvial erosion hazard areas shown on Fluvial Erosion Hazard Area maps (except as required for hydro facilities)
   - Wetlands as indicated on Vermont State Wetlands Inventory maps or identified through site analysis.
   - Rare, threatened or endangered species habitat or communities.

3. **Significant Areas**: All new telecommunications facilities and related infrastructure shall be sited and designed to avoid or, if no other reasonable alternative exists, to otherwise minimize and mitigate adverse impacts to the following:
   - Historic districts, landmarks, sites and structures listed, or eligible for listing, on state or national registers.
   - Public parks and recreation areas, including state and municipal parks, forests and trail networks.
   - State or federally designated scenic byways, and municipally designated scenic roads and viewsheds.
   - Special flood hazard areas identified by National Flood Insurance Program maps (except as required for hydro facilities)
   - Public and private drinking water supplies, including mapped source protection areas.

- Primary agricultural soils mapped by the U.S. Natural Resources Conservation Service.
- Necessary wildlife habitat identified by the state or through analysis, including core habitat areas, migration and travel corridors.

4. **Natural Resource Protection**: New telecommunications facilities and related infrastructure must be sited to avoid the fragmentation of, and undue adverse impacts to the town's working landscape, including large tracts of undeveloped forestland and core forest habitat areas, open farm land, and primary agricultural soils mapped by the US Natural Resource Conservation Service.

5. **Protection of Wildlife**: Designers must gather information about natural and wildlife habitats that exist in the project area and take measures to avoid any undue adverse impact on the resource. Consideration shall be given to the effects of the project on: natural communities, wildlife residing in the area and their migratory routes; the impacts of human activities at or near habitat areas; and any loss of vegetative cover or food sources for critical habitats.

6. **Site Selection**: Site selection should not be limited to telecommunications facilities alone; other elements of the facility need to be considered as well. These include access roads, site clearing, onsite power lines, lighting, and off-site power lines. Development of these elements shall be done in such a way as to minimize any negative impacts. Unnecessary site clearing and highly visible roadways can have greater visual impacts than the energy generation facility itself. In planning for facilities, designers should take steps to mitigate their impact on natural, scenic and historic resources and improve the harmony with their surroundings.

7. **Aesthetics**: The developer shall make all efforts to minimize the aesthetic impact of the telecommunications facility or infrastructure on the surrounding landscape. This includes options such as the utilization of "stealth towers," camouflage through paint scheme, or designs that blend into the surroundings such as asymmetrical mono-poles.

8. **Height of Structures**: telecommunications facilities shall be designed to be the minimum height necessary to achieve coverage.

9. **Colocation**: Applicants shall provide reasonable options for sharing space on existing towers or tower sites prior to proposing new towers sites and related facilities. In making such a determination on the feasibility of co-location, proposers should evaluate space available on existing towers, the tower owners ability to lease space, geographic service area requirements, mechanical or electrical incompatibilities, the comparative costs of co-location and new construction, and regulatory limitations.

10. **Resiliency Support**: To support resiliency, applicants should make space available for municipal communication systems to enhance or expand road and emergency service communication networks.

Remove Access Barriers

While broadband and cellular service expansion is not within TRORC's traditional purview, it can support opportunities for free access such as the village Wi-Fi zones developed through the Vermont Digital Economy Project.

Our Region's libraries and senior centers represent the best opportunity for underserved members of the community to access broadband. A library's public computers and high-speed access allow those in need to reach health and human service providers, as well as potential employers. Additionally, some libraries offer technology training as part of their program. These services are vital to our communities.

Goals, Policies and Recommendations relating to Information Technology

Goals

1. Universal broadband access using fiber throughout the TRORC Region.
2. Universal availability of mobile service in the TRORC Region.
3. Universal first responder communications.
4. Speeds and pricing for residential broadband on par with national urban areas.

Policies

1. Support public and private efforts to expand broadband access as long as the infrastructure required does not have an undue adverse impact on the rural character of our communities.
2. Encourage the expansion of the mobile telecommunications network in a manner that respects the rural character of our communities.
3. Support efforts to provide broadband access to segments of the population who cannot afford access.

Recommendations

1. Continue to participate actively in the Section 248a permitting process.
2. Seek out funding for our communities to implement new or sustain existing Wi-Fi Zones in villages and downtowns.

J. Libraries

These are times of tremendous change at all levels of society. Citizens of the region need information to make decisions and to solve problems associated with living in a complex society. Public libraries play an important role in providing materials to inform, challenge, and inspire the region's residents.

Public libraries and the services they provide are changing too, partly to meet the changing needs of users and also because of developments in technology and the availability of information. Statewide use of national on-line databases and the Internet by libraries has increased dramatically in the past few years. According to the Vermont Department of Libraries, the demand for electronic information services has come from rural and remote areas of the state. This presents a challenge to the region's libraries to find ways to ensure that all citizens have access to books, information, and worldwide resources, which is similar to the access opportunities at urban libraries. The onslaught of information technology and the number of new formats coupled with the vast number of books available will promote increased resource sharing among the region's libraries. This is likely to remain a priority of this decade and beyond. The Vermont Department of Libraries programs and services to local and regional libraries will be key factors in advancing coordination and services from the region's public library system.

K. Recreational Facilities

The TRORC has many recreational opportunities available to its residents and visitors. These range from organized, structured prospects at state and federal parks, as well as more informal opportunities in municipal parks and forests. Recreational opportunities attract tourists, second homeowners, and retirees to the region and contribute to the quality of life. The region's recreational resources include elements of the built environment like historic towns and buildings, museums and theatres, and the natural environment which includes scenic views, rivers, lakes, mountains, and forest lands that offer public and private access for hunting and fishing, hiking, mountain biking, skiing, snowmobiling, and use of all-terrain vehicles (ATVs). Access to private lands is also available through agreements brokered by groups such as VAST and other local groups. As pressure on private lands increase and more private land is posted, the need for publicly owned land for recreation is critical. Public recreational lands and resources should maximize their utility by providing for multiple uses.

Public Recreational Opportunities

The region has one national park - the Marsh Billings Rockefeller National Historic Park in Woodstock. Associated with the Park is the privately owned Billings Farm and Museum which offers farm educational programs. The region is also fortunate to have access to the Green Mountain National Forest in the Quintown valley and along the Appalachian Trail and Long Trail corridors. Additionally, recreation opportunities are available at the U.S. Army Corps of Engineer Sites along the Ompompanoosuc River at Union Village and the Ottauquechee River at North Hartland Lake.

Economic Benefits of Recreation

Outdoor recreation plays an important role in Vermont's economy. The Outdoor Industry Foundation in 2006 estimated that the outdoor recreation economy supported 35,000 jobs across Vermont, generated $187 million in annual state tax revenue, produced $2.5 billion annually in retail sales and services across Vermont, and accounted for 12 percent of the gross state product.

In the TRORC region, some communities, such as Fairlee, depend heavily on the economic benefits of outdoor recreation. For others, it is one part of their overall economic profile.

Several state parks can found in the region including the Calvin Coolidge Historic Site in Plymouth, the Quechee Gorge State Park and Theron Boyd State Historic Site in Hartford, the Allis and Ainsworth State Parks in Brookfield, Thetford Hill State Park and the Granville Reservation State Park. The Department of Forest, Parks and Recreation and the Department of Fish and Wildlife's several state forests, wildlife management areas and lake or river access points offer additional recreational opportunities.

Many towns throughout the region also have town forests that are available for recreation; these forests also offer unique educational opportunities for local school children and residents about forestry and landscape practices. Nineteen towns in the region have town forests: Barnard, Bethel, Bradford, Brookfield, Chelsea, Fairlee, Hancock, Hartford, Hartland, Newbury, Norwich, Plymouth, Pomfret, Randolph, Rochester, Royalton, Strafford, Thetford, and Woodstock. Currently, there are public and private statewide initiatives studying and encouraging town forest development and use; West Fairlee is in the process of developing a town forest.

Several towns also offer town recreation programs through their recreation departments. These may include ski programs in conjunction with local schools in the winter, camp and track & field programs in the summer, as well as various events year round. These recreation departments may also manage a modest network of town parks.

Many towns also have excellent trail networks linked to their road network and portions of these networks include Class 4 roads. Town selectboards have the authority to develop a policy that regulates use and maintenance of town trails and Class 4 roads and several towns have developed policies for these public rights-of-way (ROWs) based on the users' needs.

Public Access to Aquatic Recreation

The region's rivers and lakes offer opportunities for swimming, fishing, and boating, all of which require public access areas for parking or boat launching. Scenic waterfalls, cascades, and gorges are also destinations of tourists and recreators. There is a need for access areas to water resources in the region. In addition, there is a need for management of public access resources in a manner that will make them safe and attractive for human use as well as of a quality that will sustain fish and wildlife. See the Surface Water, and Fisheries and Aquatic Resources sections of this Plan, for more information.

Historic and Cultural Resources

According to the Vermont Department of Tourism and Marketing, winter tourism brings in approximately thirty percent of the state's tourism activity, while antique shopping, theater and art exhibits, festivals, historic site visitations, foliage viewing and outdoor recreation make up nearly seventy percent of annual tourist activity. Cultural heritage in particular is drawing substantial attention. According to the Department, requests for information on historic sites more than doubled in 1994. Cultural heritage resources include the scenic qualities inherent in village centers and hamlets, many of which have maintained the look and feel of 19th century Vermont. Historic resources and town centers that offer museums, shopping, and eating establishments may attract bicycle and pedestrian traffic. Towns in the region should determine to what extent they want town centers to be destinations for tourism and whether or not the facilities are available to accommodate additional traffic safely and effectively.

Private Recreational Opportunities

Only 15% of all land in Vermont is publicly owned, which means many of the outdoor recreational resources in the region rely on the traditional willingness of landowners to allow access to private land. As the population increases in the state, so does the pressure on private land. With increased use, more landowners experience vandalism, littering, and disregard for private property. Such negative impacts result in the posting of land and closing of trails. For private lands to continue to be used, landowners must feel secure in the protection of their traditional rights and land uses, and incentives for landowners to keep their land open are needed.

Several large private landowners allow access to their land. Three notable examples include the owners of the Wilder Dam facility in Hartford and its associated Kilowatt Park, the Quechee Gorge Dam in Hartford, and the Montshire Museum lands in Norwich. Other private facilities such as local ski areas and golf courses provide recreation opportunities year round. Users to all facilities, public or private, must respect the facilities. Users should get permission when appropriate from the landowner or local access club.

Facilities in the region include the ski centers of Bear Creek, Killington, Middlebury Bowl, Northeast Slopes, Nordic Centers, Quechee, Suicide Six; the Quechee Club; golf courses and exercise/fitness clubs.

ATVs (All-Terrain Vehicles) and Environmental Considerations

All-terrain vehicles (ATVs) provide for unique opportunities to experience nature, and at the same time, they provide opportunities to damage the critical ecostructures present in remote and sensitive areas.

Goals, Policies and Recommendations that relate to Recreational Facilities

Goals

1. Access for residents and tourists to a well-managed, network of outdoor recreation throughout the region.
2. Corridors provided for wildlife habitat as well as recreational areas for hiking, biking, and cross-country skiing.
3. Promote recreation and a healthy natural environment as regional assets, and to plan development in a way that will ensure that those assets are sustainable.

Policies

1. The maintenance and development of recreation trail networks (e.g. Appalachian and Long Trails, regional and state snowmobile networks, and cross-country ski trails) are encouraged.
2. In planning for development within or immediately adjacent to recreational amenities, design plans must work toward separation of these alternative travel modes from vehicular traffic and other competing or incompatible land uses.
3. New development and land subdivisions which have an undue adverse impact on the enjoyment or continued use of recreational uses are inconsistent with this Plan.
4. Consistent with property rights, ownership and management practices which maintain or enhance public access to and uses of recreational amenities on privately held land are encouraged.
5. Where development interacts with the Appalachian or Long Trails and other related side trails, design plans and construction must maintain the predominant scenic character and the primitive qualities of the trail corridor.
6. TRORC encourages planning and construction of recreational opportunities on sites of public utilities or public works facilities (e.g. incorporation of trail networks into public utility corridor planning) to achieve more efficient and productive use of these lands.
7. Roadways and village centers that are heavily used by bicycles and pedestrians must incorporate planning for sidewalks, bike lanes, or separate bike paths to promote safety and enjoyment of such activities and provide for alternative modes.

8. TRORC supports the development of multi-purpose trails using abandoned railroad beds, Class 4 roads, and other public rights-of-way.
9. TRORC encourages federal, state, and local acquisition of land and facilities well-suited for outdoor recreation, provided that adequate financial and management arrangements are made with involved local governments.

Recommendations

1. To further support outdoor recreation, TRORC will assist communities with the establishment of Conservation Commissions and will support existing Conservation Commissions when possible.
2. TRORC will help towns develop highway policies that address recreation needs, and encourage the adoption of a walkable communities programs within the Region.

L. Opportunities for Shared Services/Infrastructure

Earlier in this chapter, it was noted that there are few regional utilities or facilities in the TRORC region. As is the case in much of Vermont, our region is generally low-density with a limited population as compared to more urban locations. In urban areas, opportunities for shared services and infrastructure are obvious because density and development is high enough that communities are very easily connected.

While they may not be so readily apparent, opportunities exist in our rural communities as well. State statute enables communities to join into inter-local contracts or union municipal districts for the purposes of performing "any governmental service, activity, or undertaking which each municipality entering into the contract is authorized by law to perform."[5] Common examples include shared police services and municipal aid agreements. Communities may also share staff or equipment. Under certain forms of cooperative agreements they may purchase property together.

As costs of services and infrastructure investments continue to rise, communities should seek opportunities to work with neighboring towns. Engaging in well-planned and well-organized cooperative efforts can ensure that services are provided more efficiently and more effectively.

Goal, Policy and Recommendation Relating to Shared Services/Infrastructure

Goal

Services provided efficiently and effectively.

Policy

TRORC encourages communities to seek opportunities for shared services and infrastructure with other municipalities in an effort to reduce costs and improve quality of service.

Recommendation

1. TRORC will assist communities with the development of interlocal agreements, union municipal districts and other cooperative agreements whenever possible.

M. Overall Goals, Policies and Recommendations

Goals

1. The expansion or construction of new facilities and utilities will be financially sustainable for governments and taxpayers.
2. Regional services and infrastructure that is secure, financially sustainable, well-maintained and energy efficient.
3. Investments in utilities, facilities and recreation enhanced the desired pattern of development which is compact village and urban centers surrounded by open countryside.

Policies

1. Public investments in governmental and public utility facilities, services, and lands which support existing and future development within the regional center, town centers, village settlements, and hamlet areas, or other designated and planned regional growth areas are the policy of this Plan.
2. The scale, type, and design of major public utilities and facilities shall be undertaken so as to complement the future land use settlement patterns recommended in this Plan and relevant municipal plans. Public investments in municipal, regional, and state facilities should be located within existing or planned regional growth areas.
3. Controversial public facilities, such as solid waste disposal facilities, correctional facilities and wastewater treatment facilities, shall be situated in an area where they best serve their purpose while minimizing negative impacts on the surrounding area.
4. TRORC supports the acquisition of future public and quasi-public utility sites, properties, or interests, when public actions advance the goals and policies of this Plan and relevant local plans.
5. New land development shall be prohibited where it is found that the necessary supportive governmental facilities and public utility services are unavailable or have not been planned for as part of a capital budget program to be available concurrently with impacts, or when new development places an excessive or uneconomic demand on such services. To mitigate or prevent any such unreasonable burdens, the use of permit conditions, impact fees, exactions, and similar methods can be used.
6. The construction of primary educational facilities, health care facilities, emergency facilities, post offices, libraries, and other public facilities shall occur in or within or adjacent to existing or planned regional growth areas, so as to maximize their convenience and accessibility to people, infrastructure, and to contribute to the vitality of communities.

7. TRORC supports the development of innovative and stable sources of public facility funding to supplement traditional funding resources.

Recommendation for Action

TRORC will foster partnerships between public investment planning and implementation activities and the private sector, in a manner which advances the goals and policies set forth in this Plan.

[1] Vermont Agency of Natural Resources, *Vermont Materials Management Plan,* (2014), <http://www.anr.state.vt.us/dec/wastediv/solid/pubs/MMP2014/MMPdraft_18June2014_draft.pdf>, p. 3.
[2] Vermont Agency of Natural Resources, *Annual Solid Waste diversion & Disposal Reports,* (2011), <http://www.anr.state.vt.us/dec/wastediv/solid/DandD.htm>
[3] Vermont Agency of Natural Resources, *Vermont Materials Management Plan*, (2014), <http://www.anr.state.vt.us/dec/wastediv/solid/pubs/MMP2014/MMPdraft_18June2014_draft.pdf>, p. 4
[4] *Id.*, p. 8.
[5] 24 V.S.A. § 4861-4902