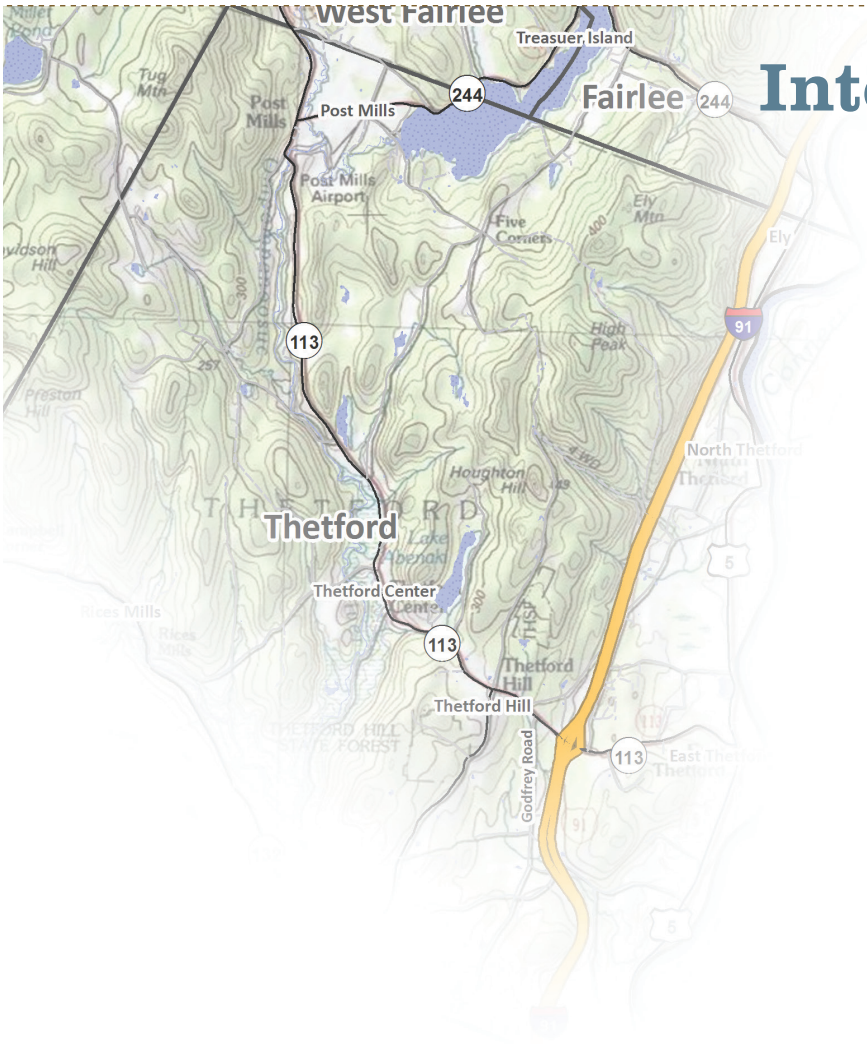
TOWN OF THETFORD



Inter-Village Trails Master Plan

DECEMBER 2011

RSG INC. RESOURCE SYSTEMS GROUP, INC.

MORTON TRAILS

TWO RIVERS-OTTAUQUECHEE REGIONAL COMMISSION
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Acknowledgements:
This plan was funded by federal earmark 69-9911, through the Federal Highway Administration, Department of Transportation. This plan would not have been possible without the support and advice from the Project Steering Committee, the Stakeholder Committee, and the residents of the Town of Thetford.

Master Plan Prepared by:

RSG INC.
TRANSPORTATION
55 Railroad Row, White River Junction, Vermont 05001
TEL 802.295.4999 ▪ FAX 802.295.1006 ▪ www.rsginc.com

MORTON TRAILS
Morton Trails, LLC
543 Old Strong Road
Thetford Center, VT 05075
(802) 785-4229

Master Plan Prepared for:
The Town of Thetford, Two Rivers Ottauquechee Regional Commission, and the Vermont Agency of Transportation.

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Section 1 Introduction

In 2009, the Town of Thetford Conservation Commission hosted a series of community charettes to identify the conservation priorities for the Town. One of the ideas that came to light during these charettes was the notion of providing better trail connectivity between Thetford's six major villages, residential areas, and important natural resources. Further, the need to balance conservation and development was noted as the dispersed location of conserved land may lead to an increase in vehicle use, whereas compact developments surrounded by open lands may be preferable. Linking the villages and conserved areas with lower impact trails and pathways was seen as an important way to improve connectivity throughout the Town.

In July 2010, the Town of Thetford hosted a Village Visioning Forum with residents to discuss their long-term vision for the Town's villages, including identifying priorities and projects that would serve to move the vision forward. Participants were split into groups based on their Village of residence; within each group, participants discussed the vision for their respective Village. One of the central themes that came out of each separate group and of the Visioning Forum was interest in creating an inter-connected trail and pathway system throughout Thetford.

Building upon these previous efforts and the residents' desire to plan for a Town-wide trail system, the Town of Thetford, in coordination with the Two Rivers-Ottauquechee Regional Commission (TRORC), embarked on a comprehensive effort to develop an Inter-Village Trails Master Plan in March 2011.

The goals of this Inter-Village Trails Master Plan were identified as follows:

1. Develop a Town-wide Trails Master Plan with the objective of connecting the Town's several villages, subject to natural resource and property constraints.

2. Manage an effective public outreach process to obtain input, feedback, and preferences, and to reach consensus.
3. Prioritize future trail efforts to wisely invest the remainder of the project funds on implementing the first phases of the Master Plan and to optimize future trail expansions.
4. Meet the transportation objectives of the VTrans' Local Transportation Facilities (LTF) process.

This plan represents the culmination of a process that began in March 2011 and involved significant collaboration with the project Steering and Stakeholder Committees as well as public input through two public meetings and resident surveys. The plan was developed to serve as a blueprint for future trail development in Thetford while also adhering to the requirements of the VTrans' Local Transportation Facilities (LTF) process. The plan includes the following sections:

- Community Outreach
- Project Purpose and Need
- Existing Conditions Assessment
- Principles of Trail Planning and Design
- Trail Connections
- Trail Prioritization
- Alternatives Assessment
- Trail Maintenance and Management Organization
- Next Steps

Section 2 Community Outreach

2.1 Steering Committee

The project was directly overseen by a Steering Committee that consisted of members of the Town Selectboard, TRORC, and the consultant team. The project Steering Committee met on a regular basis to provide updates on the project, discuss progress to-date, and plan for future meetings. Members of the project steering committee include the following:

- Tig Tillinghast – Thetford Selectboard
- Peter Gregory – Two Rivers-Ottauquechee Regional Commission
- Mike Pomeroy – Thetford Selectboard
- Casey Huling – Thetford Selectboard

2.2 Stakeholder Committee

Local stakeholder groups were invited to be involved in the Trails Master Planning process early on and included various representatives from the Town of Thetford, local conservation and trails groups, as well as the local schools. The Stakeholder Committee was comprised of the following representatives:

- Thetford Conservation Commission
- Thetford Planning Commission
- Thetford Recreation Department
- Thetford Academy
- Thetford Elementary School Outdoor Spaces Committee
- Upper Valley Trails Alliance
- Snow Travelers
- Cross Rivendell Trail Organization
- Two Rivers-Ottauquechee Regional Commission

Other groups that were invited to stakeholder and public meetings, but did not send a representative include:

- Thetford Recreation Advisory Council
- Thetford Emergency Services
- Thetford Highways Department
- Strafford Conservation Commission
- Lyme Conservation Commission
- Ompompanoosuc Outing Club
- Green Mountain Club – Ottauquechee Section Orange County Branch
- Norwich Trails Committee
- Cops of Engineers – Union Village Dam
- Upper Valley Land Trust
- Vermont Department of Fish and Wildlife

2.3 Public Meetings

Several meetings were held with various stakeholder groups, Town officials, and citizens during the course of this project. These meetings were to allow time for interested parties to learn more about the project and offer comments and suggestions about the direction of trail planning within the Town. Table 1 lists these meetings with a short description of each meeting.

Table 1. Summary of project meetings

Date	Meeting	Summary/Description
April 21, 2011	Project kick-off meeting	Kick-off meeting with the Steering Committee to define project goals, and understand the relevant concerns, thoughts, and ideas from the Town.
May 19, 2011	Stakeholder Committee meeting	Meeting with local stakeholder groups and Town officials to review the public meeting agenda and logistics and gather feedback.
June 9, 2011	Public Meeting #1	Presentation of the project to the community including breakout sessions to gather feedback from residents and stakeholders regarding potential origins and destinations as well as desired connections (see meeting details below).
September 13, 2011	Steering Committee meeting	Meeting with the Steering Committee to review alternative trail alignments and gain feedback about these alternatives (and others). Review of the alternatives matrix with the committee.
October 3, 2011	Stakeholder Committee meeting	Meeting with local stakeholder groups and Town officials to review the resident survey results and potential trail alignments.

Date	Meeting	Summary/Description
October 31, 2011	Steering Committee meeting	Meeting with the Steering Committee to review the Thetford Hill to Thetford Center connection. Prepare for the public meeting.
November 9, 2011	Thetford Conservation Commission	Members of the team met with Conservation Commission members to describe the project in greater detail and answer questions.
December 1, 2011	Public Meeting #2	Presentation to the community and interested stakeholders of the alternative alignments for highest priority connections to gather feedback and interest in various alignments (see meeting details below).
December 16, 2011	Steering Committee meeting	Meeting with the Steering Committee to review and finalize the selected alternative and gather feedback on the Draft Master Plan.

Summary of Public Meeting #1

Approximately 30 people attended the public meeting on June 9, 2011 at the Thetford Elementary School. Town officials, RSG, and Morton Trails provided a brief presentation to outline the Trails Master Plan project to date, detail some of the characteristics of good trail design, and discuss the goals of the meeting. Participants were then split into three breakout groups to further discuss issues around trails in Thetford.

Large maps detailing topography, roadways, and existing trails were laid out with transparencies for participants to draw on and indicate the various origins and destinations present in Thetford (village centers, schools, etc) and potential connections that could be made. Participants also discussed uses and user groups for trails and other issues they thought were important moving forward.

Overall, there was a lot of interest in connecting the villages by building upon existing trails and linkages and also by creating new trails. One of the key ideas that came out of the breakout groups was the need to support multiple users including those using trails for shorter distances (children travelling to school, families with children) as well as accommodating experienced hikers looking for longer trips by creating longer loops or connecting to existing trails for longer distances (i.e. Rivendell Trail).

Other issues that were raised were that trails should focus on non-motorized transportation and that if maintenance would primarily be done by volunteers, that it should be included in the discussion early. Overall, people thought that this was an important community building opportunity: *building community through building trails*.

Complete notes from the meeting, as well as the participant maps/transparencies can be found in Appendix A.

Summary of Public Meeting #2

Approximately 40 people attended the second public meeting on December 1, 2011 at the Thetford Elementary School. Town officials, RSG, and Morton Trails provided a presentation to outline the Trails Master Plan project to date, describe the prioritization of trail connections within the Town, and to present details of the more detailed analysis of the highest priority connection: Thetford Center to Thetford Hill. Ample time was provided for participants to ask questions and provide feedback on the trails plan so far.

Many questions were asked about the various aspects of the Master Plan – including VTrans Local Transportation Facilities requirements, and how the Town will move forward once the Master Plan has been completed. Information about the LTF process was provided, including a link to the LTF guidebook. Tig Tillinghast answered questions about the Town's goals and process once the Plan has been accepted.

The largest concerns raised by participants were environmental concerns that potentially could be an issue with future trail development within the Town. These concerns were for the sensitive river corridor, fragmentation of wildlife corridors, and the potential introduction of invasive species along trail corridors. Many of these concerns will be addressed during the next phases of trail development – design and construction.

Overall, the general opinion was that the Master Plan provides an opportunity for the Town to move forward with connecting its villages and provide alternative transportation corridors for both children and adults. The Thetford Elementary School's Outdoor Spaces Committee mentioned that once the Plan is in place, the ability to obtain future funding for trails and Safe Routes to School projects will be easier due to the fact that the Town has a Master Plan, which proves support for such projects. Complete notes and PowerPoint slides from the meeting can be found in Appendix A.

Section 3 Project Purpose & Need

The Purpose and Need Statement is a summary of the context and issues related to the project, and it also justifies the need for action. It is based upon the analyses of existing and future conditions and incorporates comments received from the public. The Purpose and Need Statement also helps to guide the development of actions and recommendations.

PURPOSE:

The purpose of the Inter-Village Trails Master Plan is to provide a comprehensive Town-wide trail assessment that prioritizes and guides the planning, design, and construction of specialized multi-use trails in Thetford. The Plan should be developed with ample opportunity for public input and should identify logical trail connections around and between the Town's several villages to provide the greatest benefit for the long term. The Plan should identify trails that minimize the impact on natural and cultural landscapes and respect the intended use(s) of trails. The Plan should also identify trail connections that **maximize direct access from homes** to the trail network.

To maintain consistency with VTrans Local Transportation Facilities requirements, the Plan will also include the development of a specific 'preferred' alignment alternative that connects two logical destinations that has been defined enough to move forward into final design and construction.

The Plan must address the needs identified below.

NEEDS:

- Lack of inter-village off-road connectivity. Pedestrians and bicyclists often must use on-road routes to travel within the Town, which are not safe travel routes
- Lack of trail accessibility to many Town residents (within walking distance).
- Lack of trail connectivity to significant and natural destinations within the Town.
- Lack of trails to accommodate many trail uses and user groups that are not currently being met now.
- Lack of trail connectivity to adjacent towns and existing trail networks outside of Thetford.

Section 4 Existing Conditions Assessment

Before examining and comparing potential routes and alignments for trails it is important to make note of existing conditions in the area. These include environmental conditions (steep slopes, wetlands), existing land uses (conserved land, residential densities), placement of utility lines, as well as noting existing roadways and networks of trails in Thetford that could act as potential connections.

In order to do a comprehensive assessment of the existing conditions, data was collected from several sources including GIS data from the Vermont Center for Geographic Information (VCGI), TRORC, the Town of Thetford, Town maps detailing publicly owned land, maps of existing trails and walking paths, and up-to-date wetland information provided by the Thetford Conservation Commission. Meetings with stakeholders and the public were also useful for identifying areas of Town that people would like to be connected by trails as well as currently used pathways (formal and informal).

The full assessment of existing conditions, including narrative and maps, can be found in Appendix B.

Section 5 Principles of Trail Planning

5.1 Guiding Principles of Trail Planning and Design

There are several principles of trail planning that need to be taken into account when considering creating a trails master plan:

- Understand first how the trail will be used
- Make trails that are safe in all conditions
- Provide a trail width that fits the need
- Make uphills manageable, humane, and sustainable
- Design downhills that can be fun, sometimes exhilarating, and safe
- Use the right tools appropriate to the job
- Recognize most "trails" used today were designed for other purposes
- With some exceptions, design trails across the "fall-line"
- Highlight natural features and points of interest
- Use natural surface materials, where possible
- Combine and separate uses when appropriate
- Find the balance between distance and elevation change
- Design trails that are logical and well-signed.

There are many more nuances of trail planning and design, but the above principles provide a fundamental set of guidelines.[1]

[1] There are many resources available associated with trail planning, design, construction, and management. One excellent resource is *Trail Planning, Design, and Development Guidelines*, by the Minnesota Department of Natural Resources, Section of Trails and Waterways Division, 2007. Another comprehensive location for other important resources can be found at www.americantrails.org.

5.2 Trail Uses and Activities

Trails and pathways can serve a number of uses and activities, as well as user groups in a transportation, recreational, and community events capacity.

Table 2. List of potential uses and activities on trails

Potential Uses and Activities	
Walking (commuting and leisure)	Cyclocross
Running (recreational and competitive)	Par Course/Fitness Trails
Hiking	Nordic Walking
Road Biking	Orienteering
Equestrian	Snowmobiling
Cross Country Skiing	ATV/Off-Road Vehicle Use
Snowshoeing	Rollerskiing
Mountain Biking (single and double track)	ADA (scooters, golf carts, wheelchairs)
Nature/Interpretive Trails	Triathlons

Each of these different uses poses varying planning and design requirements. A single-file hiking trail can accommodate hand-built methods of construction, be 3 feet wide, and tolerate a steeper gradient than other uses if developed in a sustainable manner. In contrast, a trail for cross country skiing requires a minimum of 8 feet wide, or greater, for purposes of function, safety, and, if appropriate, for grooming.

Another factor is the relative compatibility of differing uses on the same trail – both from a functional standpoint (i.e., width, gradient, radius of turns, etc.) as well as the actual activity of the trail user (e.g., speed, desirability for a solitary versus social experience, pet usage, special considerations for horses on equestrian trails, etc.).

Although there have been specific guidelines developed for trails of different types and functions by such entities as the US Forest Service, the International Mountain Biking Association (IMBA), the Federal Highway Administration, the International Ski Federation, the Rails-to-Trails Conservancy, and a host of other public and private entities, the development of a trail differs in many respects from that of a road, sidewalk, or bike lane/path. Table 3 provides a framework for some of the design guidelines for different uses, as well as areas of compatibility (or incompatibility) for these uses.

Table 3. Trail Design Guidelines

Use/Type of Trail	Width and Grade	Compatibility	Remarks
Hiking	3-4 feet (one-way, light use); 6-8 feet (two-way and/or heavy use); grade up to 25% but 10% is a reasonable objective to meet multiple ability levels.	Generally incompatible with most other uses; can serve as snowshoeing trails in winter.	Day use – ¼ to 6 miles; backpacking, varied distances of 20 miles or greater.
Walking/Running	6-8 feet – one-way; 12-14 feet two-way; gradient of no greater than 20%, with 3-10% being the norm.	Suitable for multi-use with managed mountain biking; can double as cross country ski trails in winter.	Surface can be natural grasses, occasional woodchips, or crushed stone for areas of heavy use or in or near village settings. Typical distance travelled can be ½ mile to 10 miles.
Snowshoeing	3-4 feet; gradients can vary, but typically no more than 20%.	Generally single lane trails, though can be incorporated into a lane on cross country ski trails.	Substantial increase in popularity and product technology, allowing varied outings and appealing to users of all abilities and ages. Interest in both groomed and ungroomed snow surfaces.
Mountain Biking – Single-Track	2-5 feet in width; gradients of 5-10%; trend is toward lower gradients and more technical layout. One-way trails are preferred, but two-way is possible with careful design including longer sight lines and sections for greater width. Banked turns on downhills and some uphills.	Specialized use is first preference, but uses can be compatible with pedestrians (though typically not equestrian), if trails are of sufficient width and design.	4 to 15 miles per hour; need for micro-level design for sustainability and features. Surface needs to be hardened in places and careful attention to drainage; removal of all organic debris from trail bed.

Use/Type of Trail	Width and Grade	Compatibility	Remarks
Mountain Biking – Double-Track	8-14 feet in width; sections can be made to provide a single-track experience (by allowing grass to grow during summer months) while accommodating novice and intermediate skill users. Grade should not exceed 15%; rolling, flowing, terrain with average uphill and downhill gradient of 5%.	Compatible with multiple uses provided sufficient width and trail user management. One-way trail systems are preferred to accommodate multiple users, or a wider track for two-way corridors. Equestrian use not recommended in same areas.	Accommodates wide range of skill levels; encourages social interaction; appropriate for groups or event-oriented activities. Surface can be natural seeded vegetation on topsoil, with a sub-surface layer of coarse stone/soil mix.
Cross Country Skiing	Minimum of 8 feet wide, up to 12-14 feet for groomed trails to allow for both skate and classic technique. Grades should not exceed 18% except for very short stretches. Average uphill grade between 5% and 10%.	Excellent compatibility with summer, multi-use, or double-track mountain biking, if planned and designed properly. Snowshoeing and winter pedestrian traffic is possible but not a preferable long-term management practice. Ski-jouring and pet users often have separate, designated trails.	Trails should be planned and designed, incorporating existing forest roads or other routes where possible. Routes should generally go across or diagonal up and down the fall line. Downhill turns should be banked and sweeping; no long straight, steep downhill sections without sufficient runout.
Equestrian	6-8 feet minimum width; up to 15% gradient, but overall 5-10% preferred for climbs and descents.	Generally compatible with pedestrian uses if managed well; incompatible with biking uses.	Typical speed of 5 to 9 miles per hour.

5.3 Sustainable Trail Planning and Design Practices

All trails have some impact on a landscape, which can be both adverse and/or beneficial to flora and fauna habitats and significant natural features. Some of the adverse impacts can include: disturbance of wildlife nesting, feeding, or migration routes; loss of wetland habitats; erosion of soils or disturbance of important geologic features; loss of native plant communities and/or attraction of invasive plant species.

There also can be benefits as well. Seeded trails are sometimes called “long, green pastures” and have been found to accommodate travel routes and feeding habitats for deer, bear, and other mammals. Trails designed and built for sustainability can offer access and appreciation of natural features without disturbing the features of sensitive habitats. They can also provide formalized trail routes, discouraging the creation of “bootleg” trails undertaken using unpredictable practices of design and construction.

There are numerous principles associated with creating sustainable and ecologically sensitive trails (and this Master Plan incorporates these principles to the extent of its purpose and level of scale). Some of these principles include:

- Avoid or work carefully within and around sensitive ecological areas, critical habitats, and important archaeological/cultural features, whether designated formally by a regulatory or other body, or informally by knowledge of the community;
- Provide buffers near sensitive ecological and watershed/wetland areas, as appropriate – make crossings of drainages and sensitive areas in the narrowest or least obtrusive places;
- Design trails that provide natural drainage of infiltration and stormwater management through such practices as avoiding steep gradients for substantial sections, frequent terrain rolls or other techniques to drain water off the trail corridor, and seeding or vegetation of the trail route or sections subject to erosion;
- Construct the trail with the most appropriate techniques and equipment, which include both hand-built and use of correct machinery;
- Revegetate trails and other routes that are unsustainable or inconsistent with the objectives of a broader trails plan; and
- Implement practices to provide maintenance and stewardship, as human and natural needs and influences dictate.

Unfortunately, many routes that are currently used as trails – in Thetford and elsewhere – were never planned, designed, or constructed with these principles in mind, and the adverse effects can be seen visually (for example, a long stretch of eroded Class IV road down an unsustainable steep slope) or in more subtle ways (of which some can be detected only by those trained in these areas such as wetland and wildlife biologists, archaeology experts, foresters, and others). Much of this information is incorporated into this plan, though the appropriate time to evaluate these factors at a more granular scale is during the specific design of a possible trail route.

Section 6 Trail Connections

One of the primary goals of this Inter-Village Master Plan is to identify potential trail connections between the Town's several villages and destinations. These Villages include:

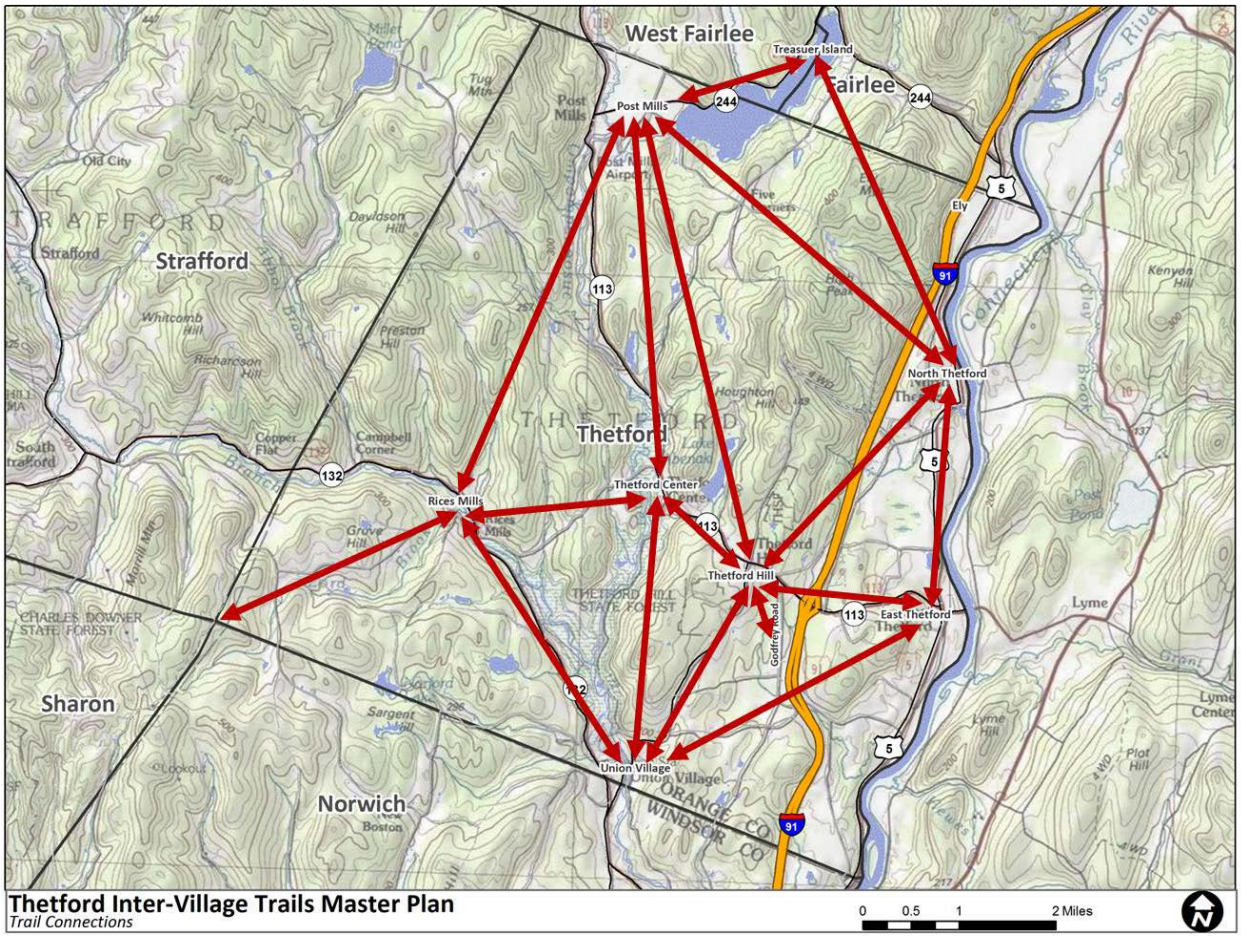
- East Thetford
- North Thetford
- Post Mills
- Rices Mills
- Thetford Center
- Thetford Hill
- Union Village

Additional destinations identified through this process include:

- Godfrey Road residents
- Treasure Island
- Norwich/Sharon/Strafford trails and points of interest.

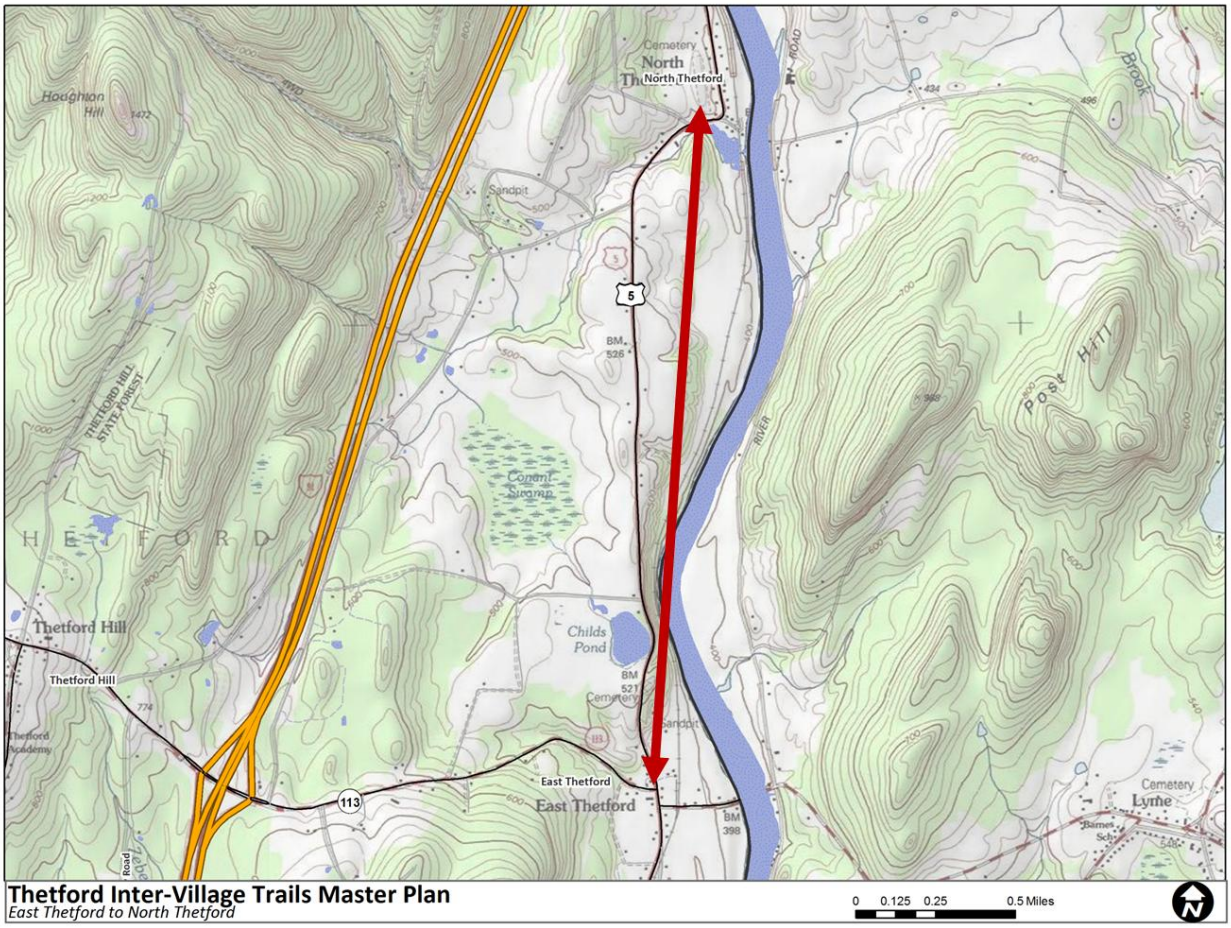
Working with the project Steering Committee, stakeholders, and Town residents, potential connections were identified to connect these destinations (Figure 1).

Figure 1. Potential trail connections.



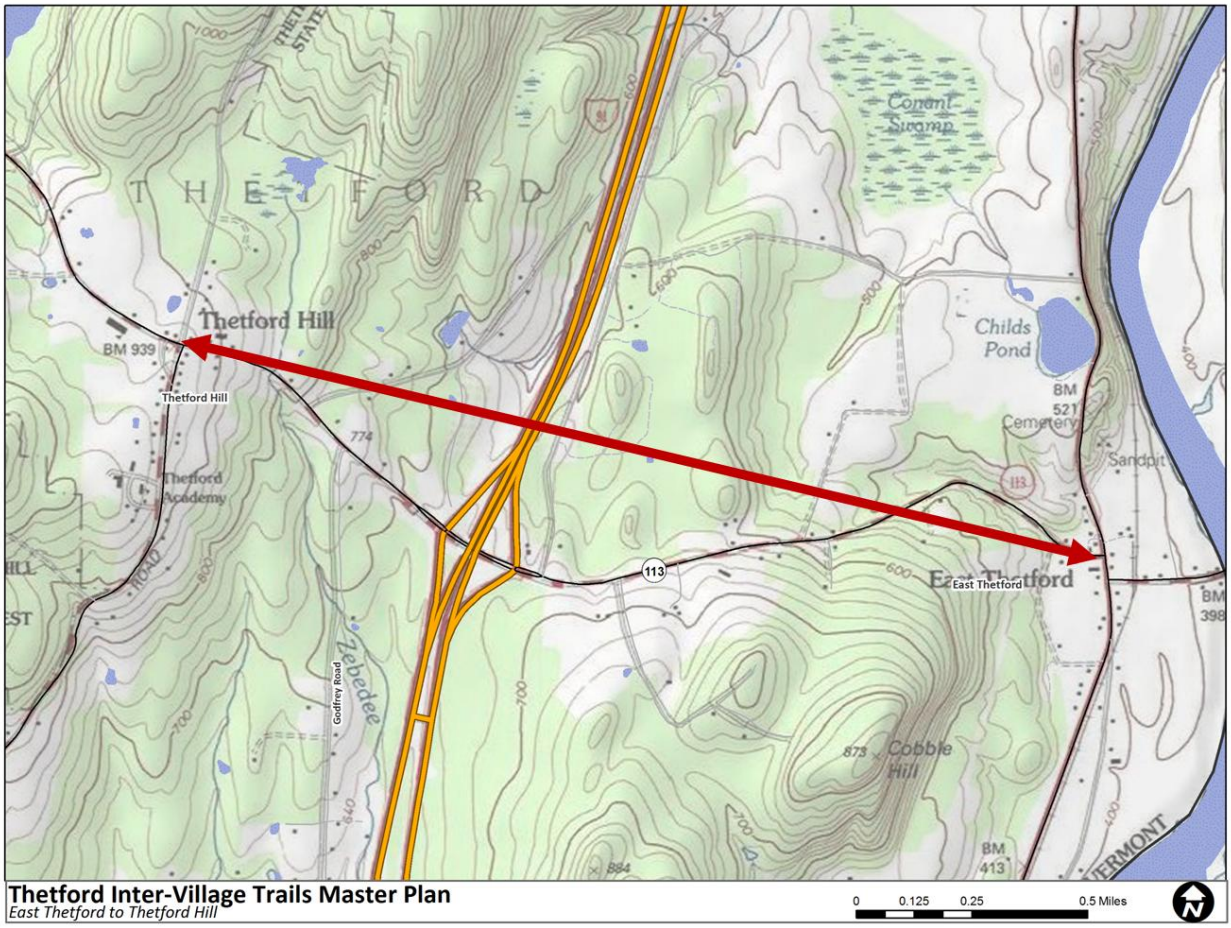
An overview of each of these potential connections is provided in the following sections.

6.1 East Thetford to North Thetford



An off-road connection between the villages of East Thetford and North Thetford is one of a very few in the Town to involve only a modest change in elevation. Although a trail overlooking the Connecticut River would be appealing, the steepness of the river bank and the proximity of US Route 5 and the railroad tracks make such an alignment seem problematical. A feasible alternative might climb from East Thetford generally north to Child's Pond (a popular community destination in winter for ice skating and pond hockey), an elevation gain of about 100 feet, which is modest compared to other proposed routes in Thetford. The proposed route would continue north across Sanborn Road, skirting the east edge of Conant Swamp, a desirable location for wildlife viewing. The proposed trail would then cross US Route 5 (thus avoiding a crossing of Latham Road) and thread its way into the village of North Thetford. This proposed connection could be appealing to less adventurous outdoor enthusiasts since it would contain relatively modest elevation change, would be a manageable 3.5 miles, or so in length, and might boast some excellent views of the river and surrounding hills.

6.2 East Thetford to Thetford Hill



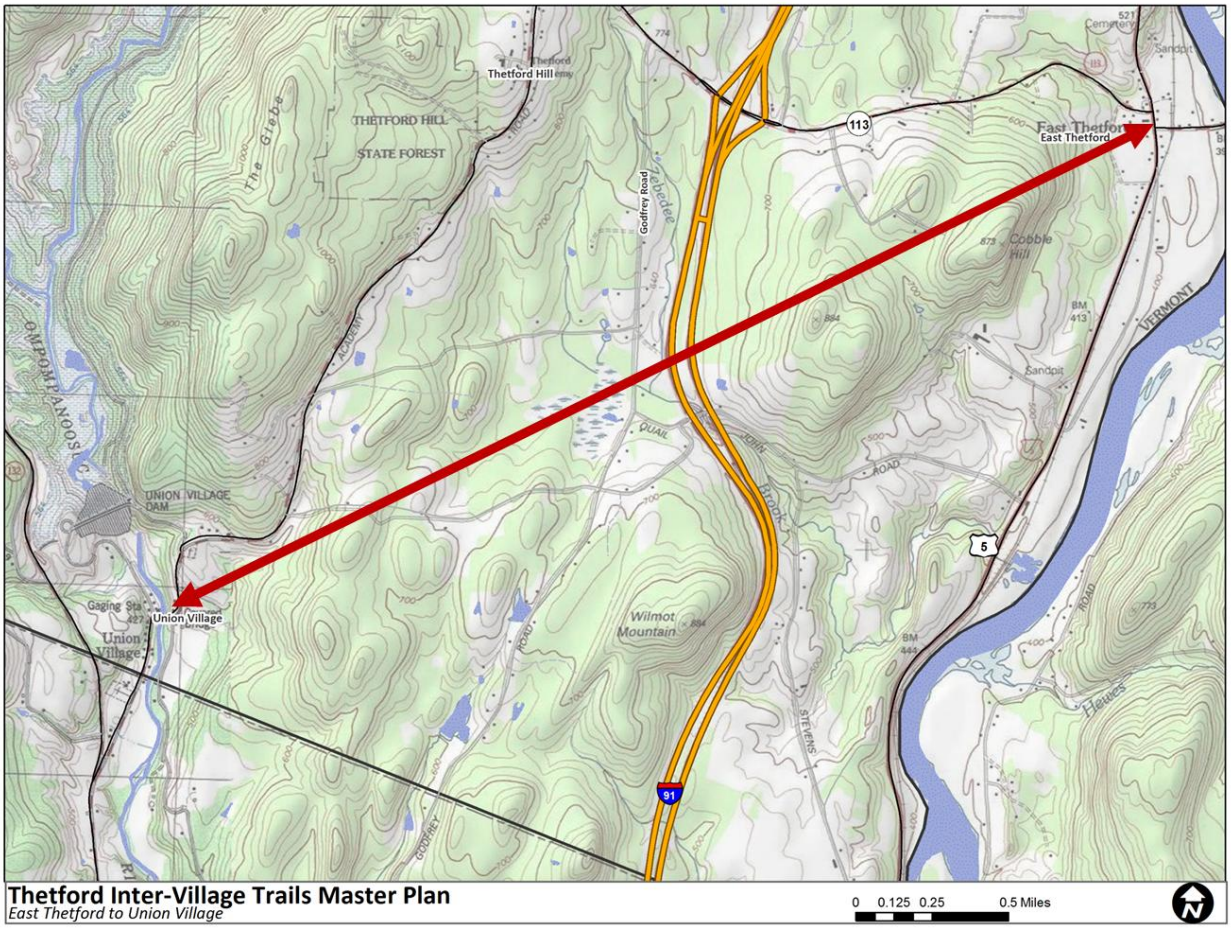
A manageable, off-road route linking East Thetford to Thetford Hill faces two significant challenges: 1) an elevation gain of more than 500 feet, and 2) only two options to cross Interstate-91 (the VT Route 113 overpass and a mile or so further south at the Quail John Road overpass). Although it might be possible to configure a trail roughly paralleling VT Route 113, such a configuration would inevitably involve several road crossings; in addition, it might be difficult to avoid duplicating the unacceptably steep sections (at least for non-motorized travel) of the road.

An alternative that seems promising is a route from East Thetford headed generally southwest, gradually climbing the shoulder of Cobble Hill. To the south of Cobble Hill there might be three options. The first might be to gradually climb northwest through the saddle heading generally toward the VT Route 113 overpass. A second option would be to continue southwest from Cobble Hill gradually climbing the next hill (with an elevation of 884 feet), traversing the shoulder of that hill, and then heading back north to cross the Interstate on VT Route 113. Any trail crossing the Interstate on the VT Route 113 overpass would climb to and cross Godfrey Road, then climb (as gradually as possible) to the vicinity of Thetford Academy.

The final option would be to traverse the hill of 884 feet of elevation only around its southern flank, then gradually descend to cross the Interstate at the Quail John Road overpass. From that crossing, the trail would make its way along, and then across Godfrey Road to gradually climb Thetford Hill to the vicinity of Thetford Academy. Although the third alternative would be significantly longer

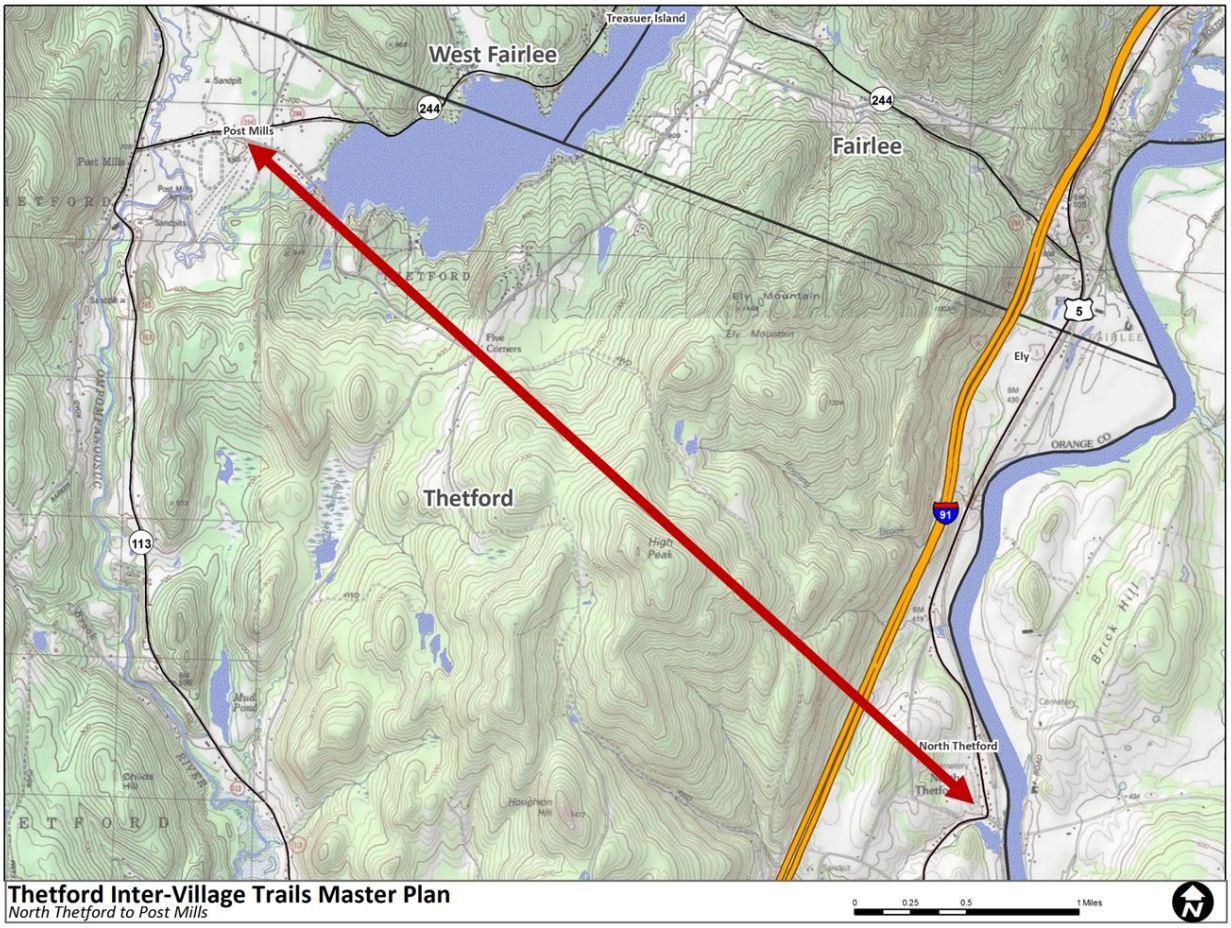
than the other options, it might provide some excellent vistas of the Connecticut River to the south, and would fulfill an additional objective of providing students living along Godfrey Road a safe, off-road route to the schools on the top of Thetford Hill.

6.3 East Thetford to Union Village



A possible route for this connection is, in effect, an extension of option 3 in the previous description of a trail from East Thetford to the Quail John Road crossing of Interstate-91. From that crossing, a trail route would generally parallel Burnham Road and then Academy Road to the vicinity of Union Village. Although this route would not contain the 500 feet height difference of the route from East Thetford to Thetford Hill, it would be challenging to configure this route in a way that would minimize unnecessary elevation gain and loss, especially between the Quail John Road crossing of Interstate-91 and Academy Road.

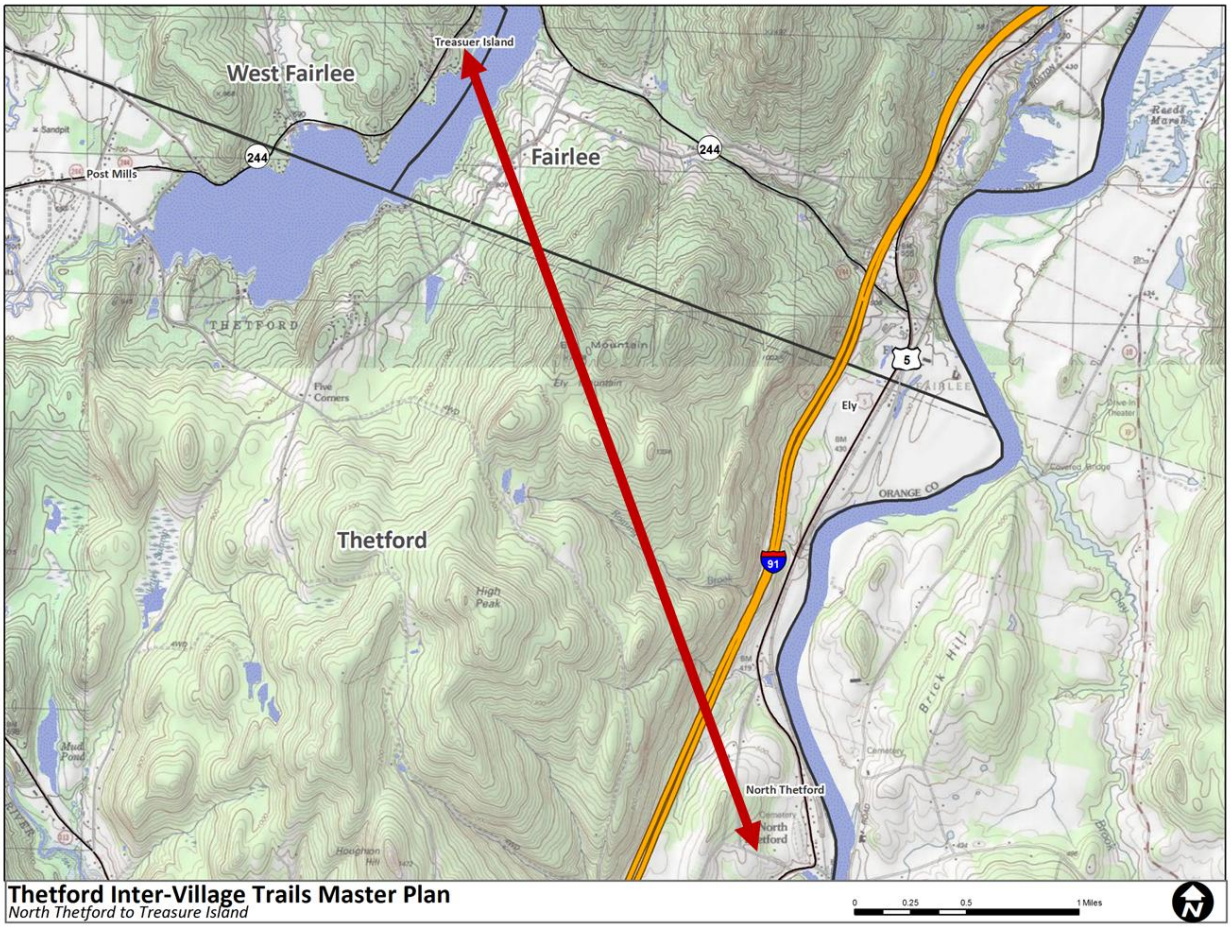
6.4 North Thetford to Post Mills



This route, and the following (Section 6.5 – North Thetford to Treasure Island) are the two most ambitious potential routes, not only in terms of length, but also because of the challenging topography they would traverse. A connection from North Thetford to Post Mills would first cross the rolling terrain between the village and Interstate-91, crossing the highway through the underpass just off Latham Road. Then the trail would have to climb, as gradually as possible, for roughly 700 feet. There is currently a 4 wheel drive road (Potato Hill Road) which climbs to the saddle between High Peak and Ely Mountain before descending to Five Corners to the west. It might be possible to refine this route to make it manageable for non-motorized travelers, but in its current alignment, there are several segments that are simply too steep.

A promising alternative might be to head south from the Interstate-91 underpass, gradually climbing the hillside, eventually accessing Thetford Hill State Forest on Houghton Hill. This alignment appears to have more options in terms of finding gradual climbs. Crossing Houghton Hill Road, the proposed route could join the existing Mimi's Trail. By continuing north beyond the current termination of Mimi's Trail on the summit of Houghton Hill, the proposed route could descend via several options to the northwest ending in the village of Post Mills. This trail could provide participants a genuine feeling of wilderness since it would be a relatively long trail accessing some of the highest terrain in the Town.

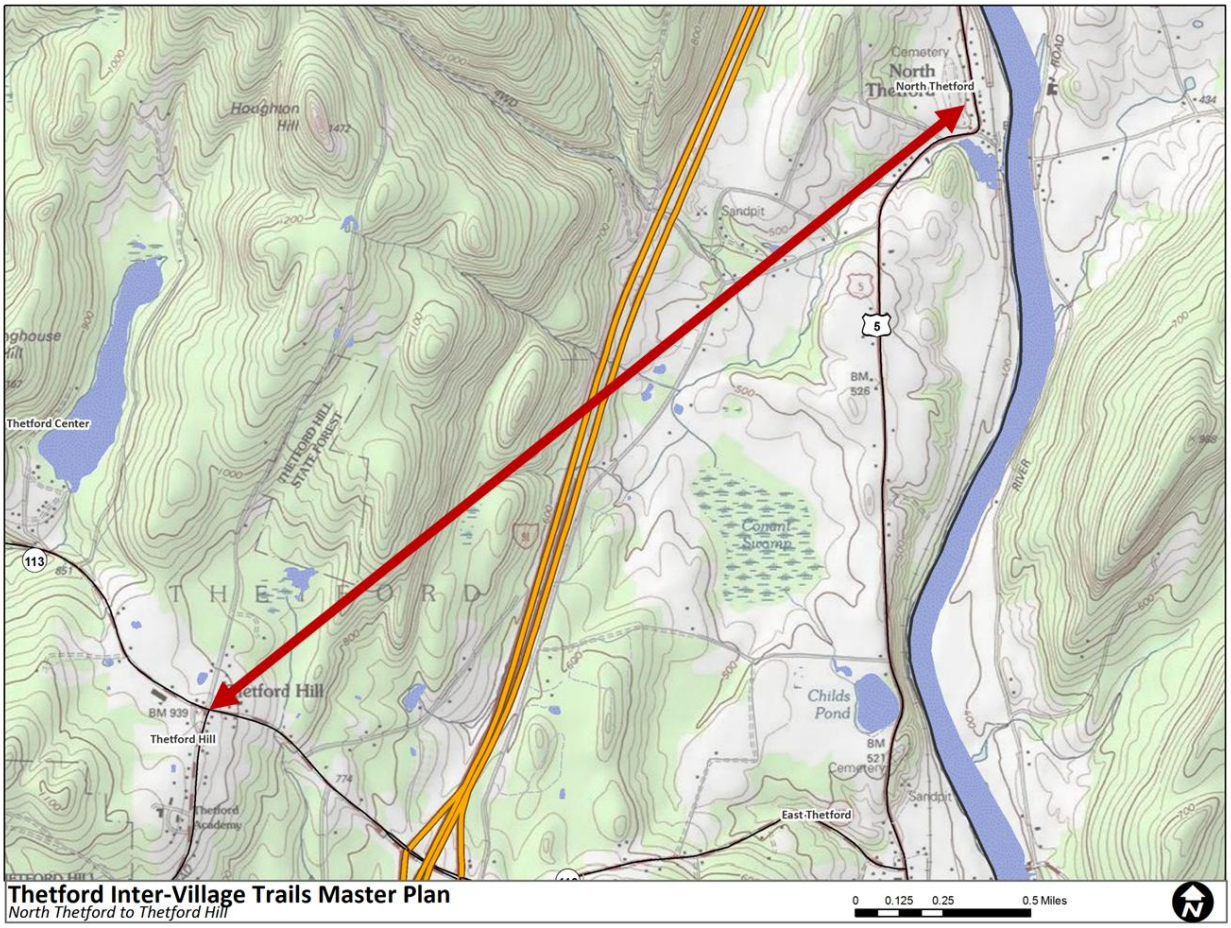
6.5 North Thetford to Treasure Island



As mentioned previously, a connection between North Thetford and the community recreation area at Treasure Island (actually located in the neighboring Town of Fairlee) is one of the most ambitious routes in the plan. The length, perhaps as much as 7 miles, and the elevation involved with this trail would make it impractical as an off-road, bike route for children in North Thetford to travel to the beach on a summer day. However, this proposed route would provide a scenic and interesting segment of a trail that roughly circumscribes the Town, linking the several villages.

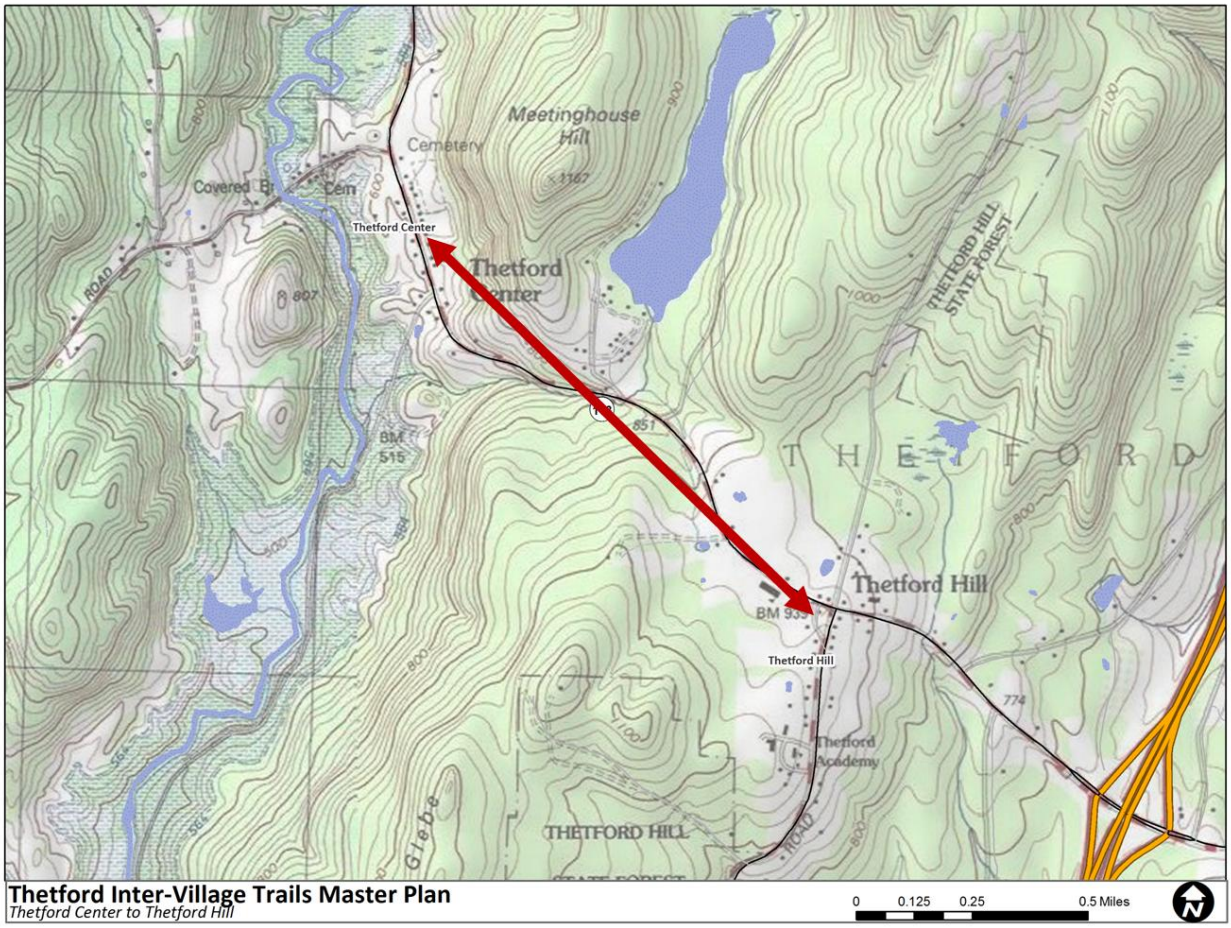
The route from North Thetford to Treasure Island could use the previously mentioned alignment as far as the Interstate-91 underpass. At that point, there are two, general options. The first might be to use the previously mentioned climb between High Peak and Ely Mountain, then on the western slope of that ridge, traverse north, eventually to join VT Route 244 around the end of Lake Fairlee to Treasure Island. An alternative, involving far less elevation change would be to head north after crossing under Interstate-91, gradually gaining elevation and working to the west, ideally joining VT Route 244 at the height of land between the Connecticut River and Lake Fairlee. This alternative would require 500 feet less climbing than the previously described route.

6.6 North Thetford to Thetford Hill



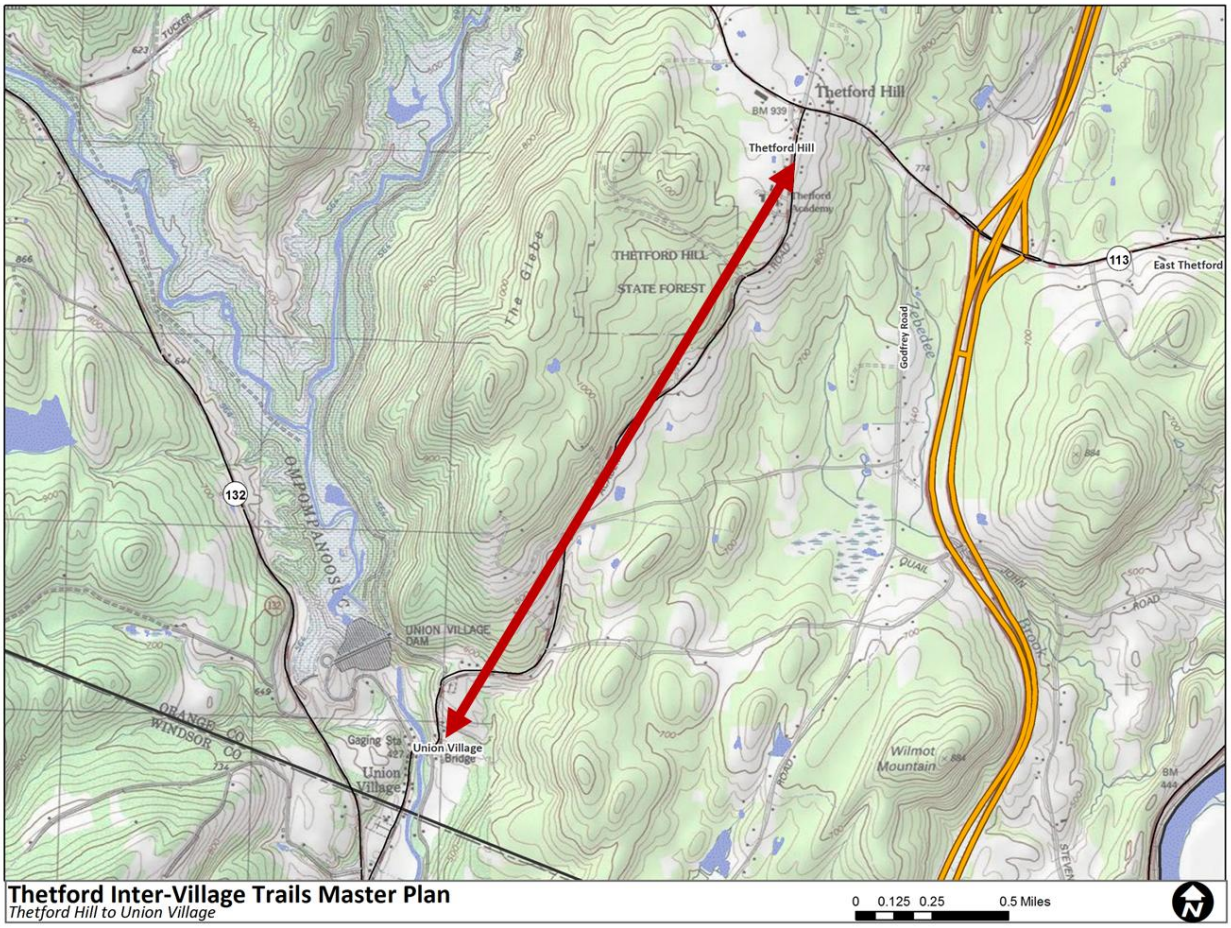
An off-road trail connection between North Thetford and Thetford showcases most of the major challenges previously mentioned: significant distance between villages, an impressive change in elevation, and the need to cross Interstate-91. The suggested route of this connection would be identical to those previously mentioned from North Thetford to the Interstate underpass off Latham Road, then the trail would traverse the hillside heading south, parallel to the Interstate. This section of the trail should provide some excellent views to the east of the farmland, the Connecticut River, and the mountains in New Hampshire. Ideally, the trail will be gradually gaining the roughly 500 feet in elevation from North Thetford to Thetford Hill. It might make sense for the trail to turn west through the Thetford Hill State Forest, cross Houghton Hill Road, then join the pre-existing Mimi's Trail for the gradual descent to Thetford Hill. A second alternative might be to stay to the south of the newly conserved Zebedee Swamp, joining Houghton Hill Road not far from where it joins VT Route 113.

6.7 Thetford Center to Thetford Hill



This connection is discussed in greater detail in Section 8, as it is a prioritized connection, and we provide three separate alternatives for evaluation. This could potentially be a popular route for alternative transportation (i.e., school children biking or walking to and from Thetford Elementary School or Thetford Academy) and a relatively short linkage between two important nodes of the Town. The most significant challenge is one of elevation gain (and, correspondingly, steep slopes). If designed and constructed properly, this route could be a central piece of the broader vision of the master trails plan.

6.8 Thetford Hill to Union Village

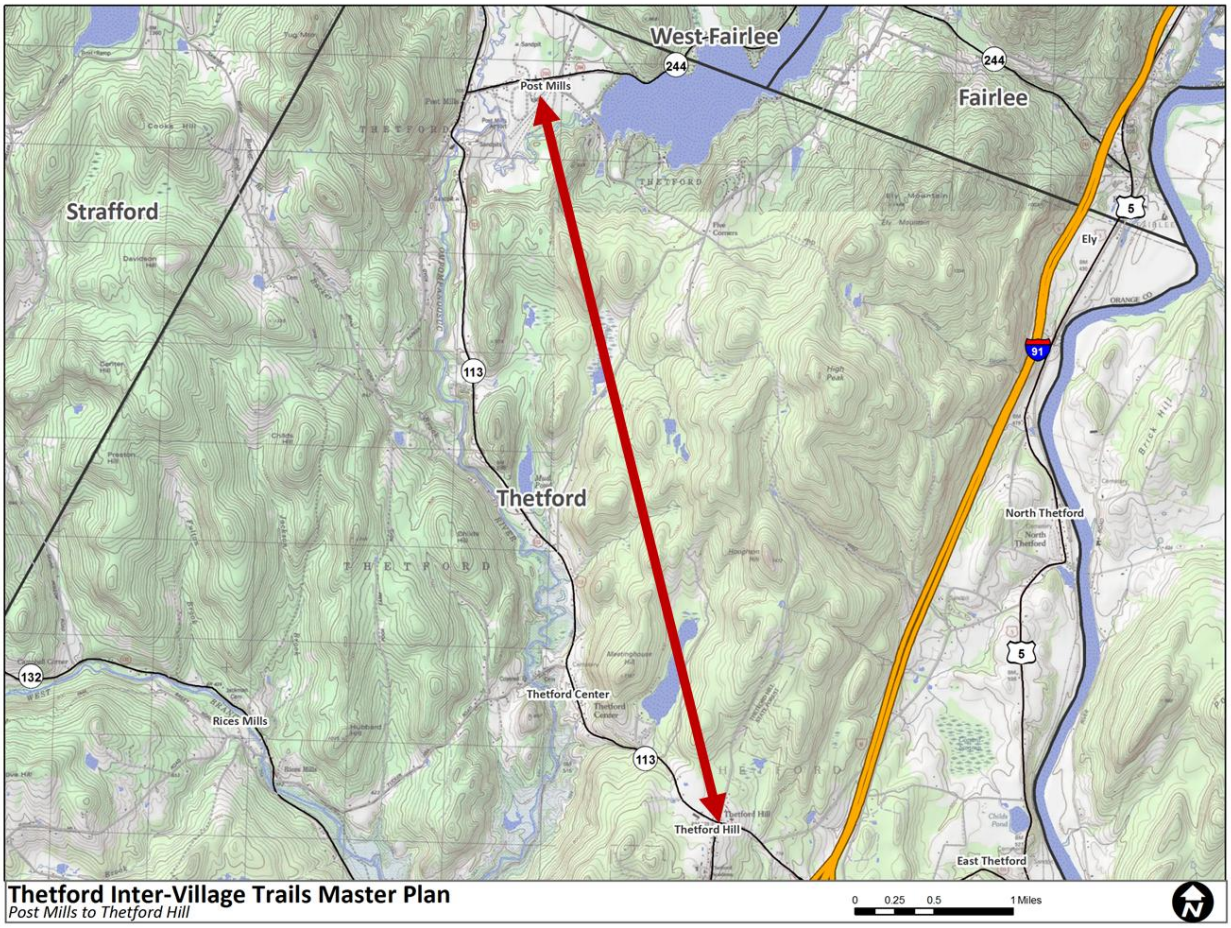


The connection between Thetford Hill and Union Village requires at least 450 feet of elevation change overall; a logical, off-road trail connection would entail at least twice this amount of total climb as there are significant topographical features on either side of Academy Road (which is a paved, Town road between the two locations). The Thetford Hill State Forest, which also includes most of the Dan Grossman 5 kilometer Woods Trail, provides a possibly appropriate starting point for such a connection. The "Glebe" is the ridge between the Ompompanoosuc River drainage (and Union Village Dam lands managed by the Corps of Engineers) and Academy Road. This ridge includes a number of private land owners, including Thetford Academy. There is also a VAST trail connection from the State Forest down a steep route to Buzzell Bridge Road, along the Ompompanoosuc River (and within the Union Village Dam lands). There also includes an informal network of old logging/skid roads in the area.

Aside from a trail that followed Academy Road, a trail connection that traversed from the vicinity of the Dam to the Glebe Ridge connecting eventually to the Dan Grossman trail would offer a variety of forest types, view opportunities, and terrain variation along the ridge, as well as incorporation of existing trails and other cleared routes. A number of private parcels are also under conservation easements. This route would also provide the possibility of a loop connection via Buzzell Bridge Road to Thetford Center (and a route from Thetford Center to Thetford Hill). The most significant challenge of this route would be creating a route that traverses a substantial amount of elevation –

providing access for users of all abilities following the route up from Union Village, as well as a safe route travelling (generally) downhill from Thetford Hill.

6.9 Post Mills to Thetford Hill

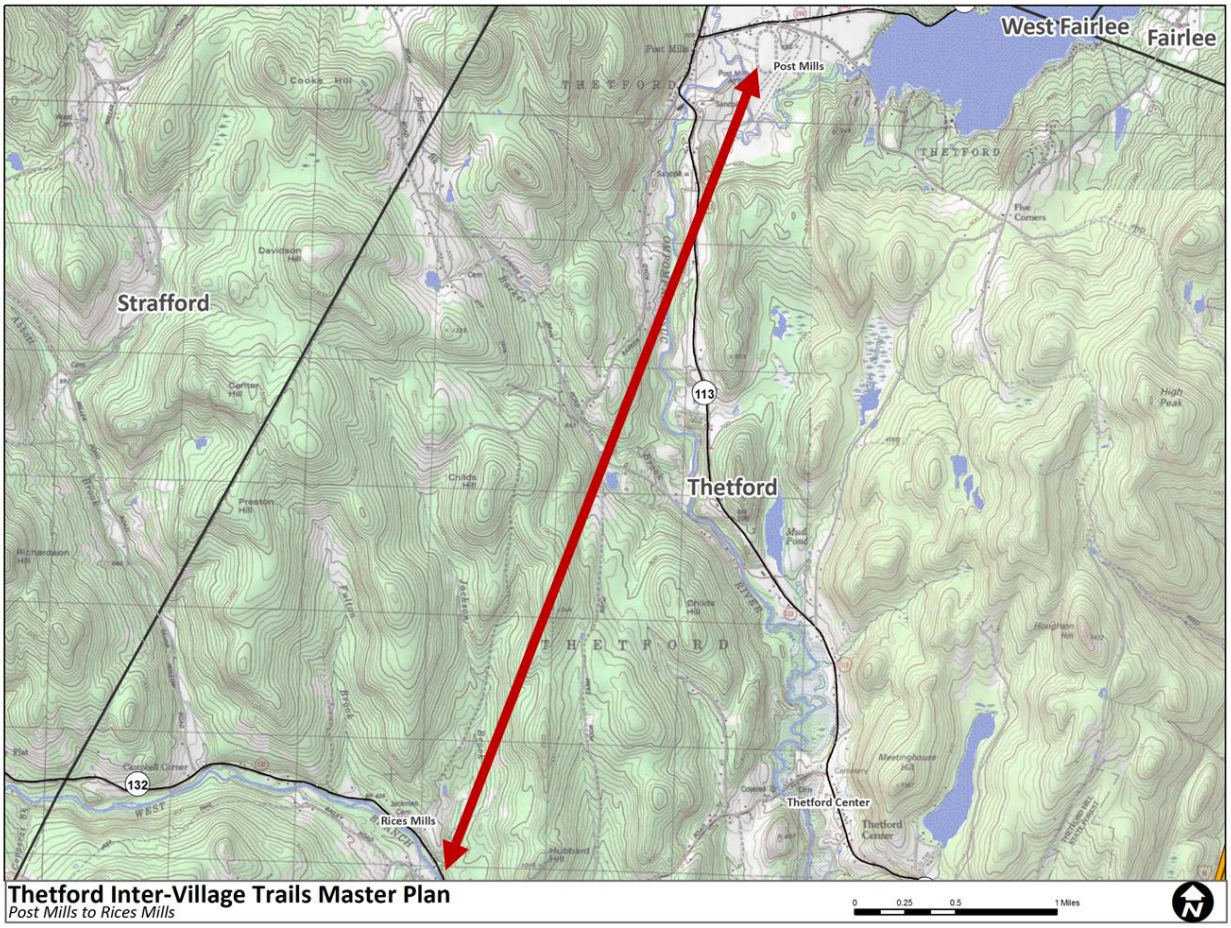


Thetford Hill and Post Mills are two important destinations within the Town of Thetford. The first, Thetford Hill, is the location of the Town's elementary school, middle and high school (Thetford Academy), public library, and designated historic district and common. Post Mills remains a focal point for its small commercial area, the Peabody Library, the site of former historic mill activities, playing fields, and a summertime community of campers and second-home visitors around nearby Lake Fairlee. Many non-motorized users (and winter and summer motorized users) travel between the two locations via Class II-IV roads, specifically Houghton Hill Road, the unmaintained sections of Turnpike Road, Potato Hill Road, and Robinson Hill Road. The VAST trail also provides a connection which incorporates portions of these Town roads. Additionally, Mimi's Trail provides a completely off-road, multi-use trail from the Thetford Hill Post Office to the summit of Houghton Hill.

In general, there are two broad possibilities for connecting these two locations via an off-road trail. One route is by the combination of a trail between Thetford Hill and Thetford Center (see Section 6.7 and the later discussion of the prioritized route in Section 8) and a trail between Thetford Center to Post Mills (Section 6.11). A second alternative would be via Houghton Hill towards Five Corners (the intersection of Five Corners Road, Quinnebeck Road, Potato Hill Road, Turnpike Road,

and Robinson Hill Road). This second alternative would be more remote, provide challenges of more elevation change and terrain variation, and be longer in distance; it would offer the opportunity to incorporate some of the Class IV roads identified above and likely encourage use by those seeking a varied and interesting non-motorized, off-road experience.

6.10 Post Mills to Rices Mills

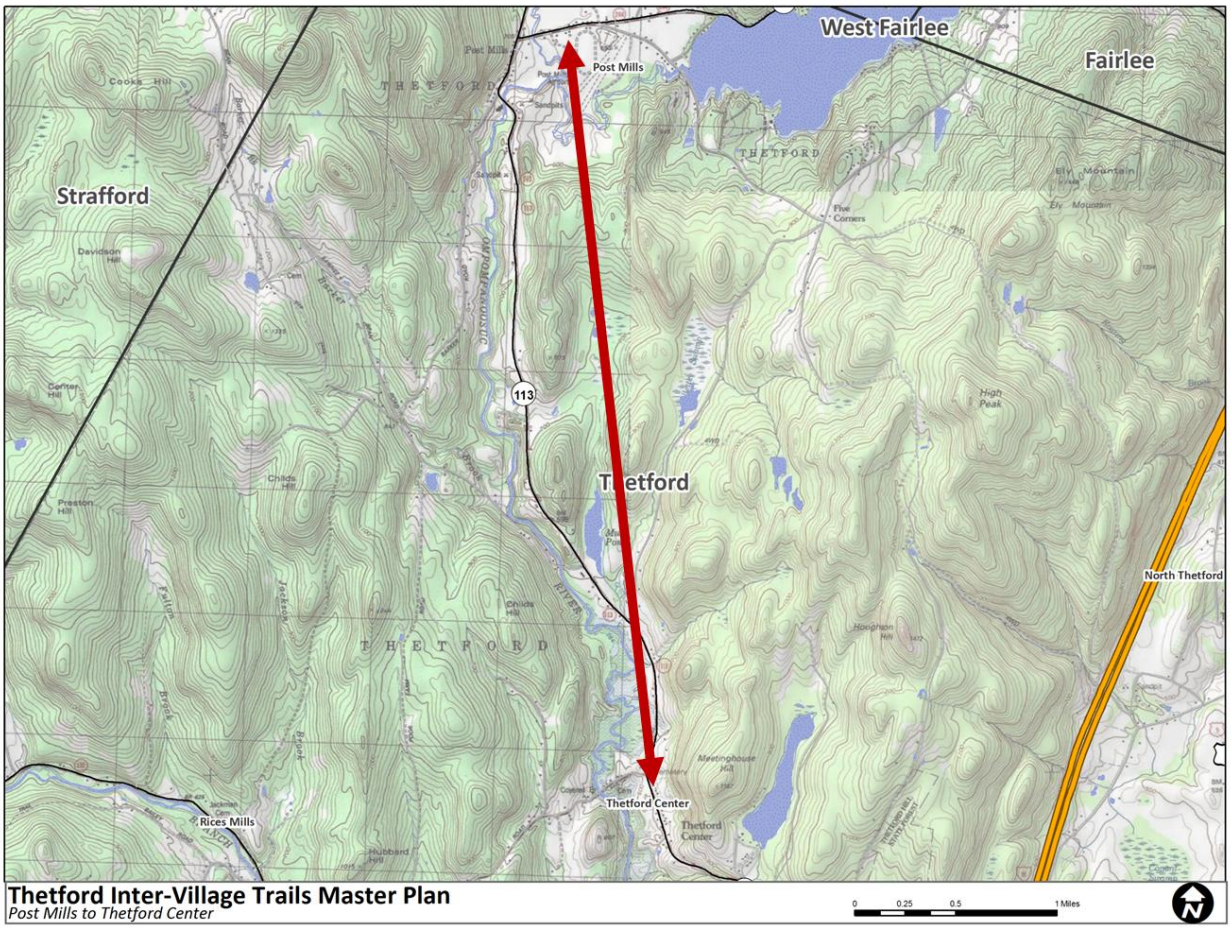


Rices Mills is a small community within Thetford, although many residents associate themselves with this area located generally where Tucker Hill Road, VT Route 132, and Gove Hill Road join, bisected by the west branch of the Ompompanoosuc River. A connection between Rices Mills and Post Mills offers the potential for a trail of substantial topographical, forest type, and aesthetic variation. A ridge running generally north to south, with Hubbard Hill at the southern terminus, requires an elevation gain of approximately 500 feet to cross this ridge (even at its lowest point). Such elevation change would require a carefully designed trail, while also negotiating some important wetland, wildlife habitat, steep slope, and other features. This connection would also cross one of the most remote areas of the Town of Thetford – an opportunity for residents to enjoy and appreciate this interesting area as well as a means for residents of Rices Mills to connect to an important populated and light commercial village (i.e., Post Mills) of the Town without necessitating use of a motorized vehicle.

Portions of this route could incorporate existing Class IV and other thoroughfares, such as Poor Farm Road and Whipporwhill Road. The route could also connect to a potential route between

Thetford Center and Post Mills near Sawnee Bean Road to encourage dual uses of other trail connections.

6.11 Post Mills to Thetford Center



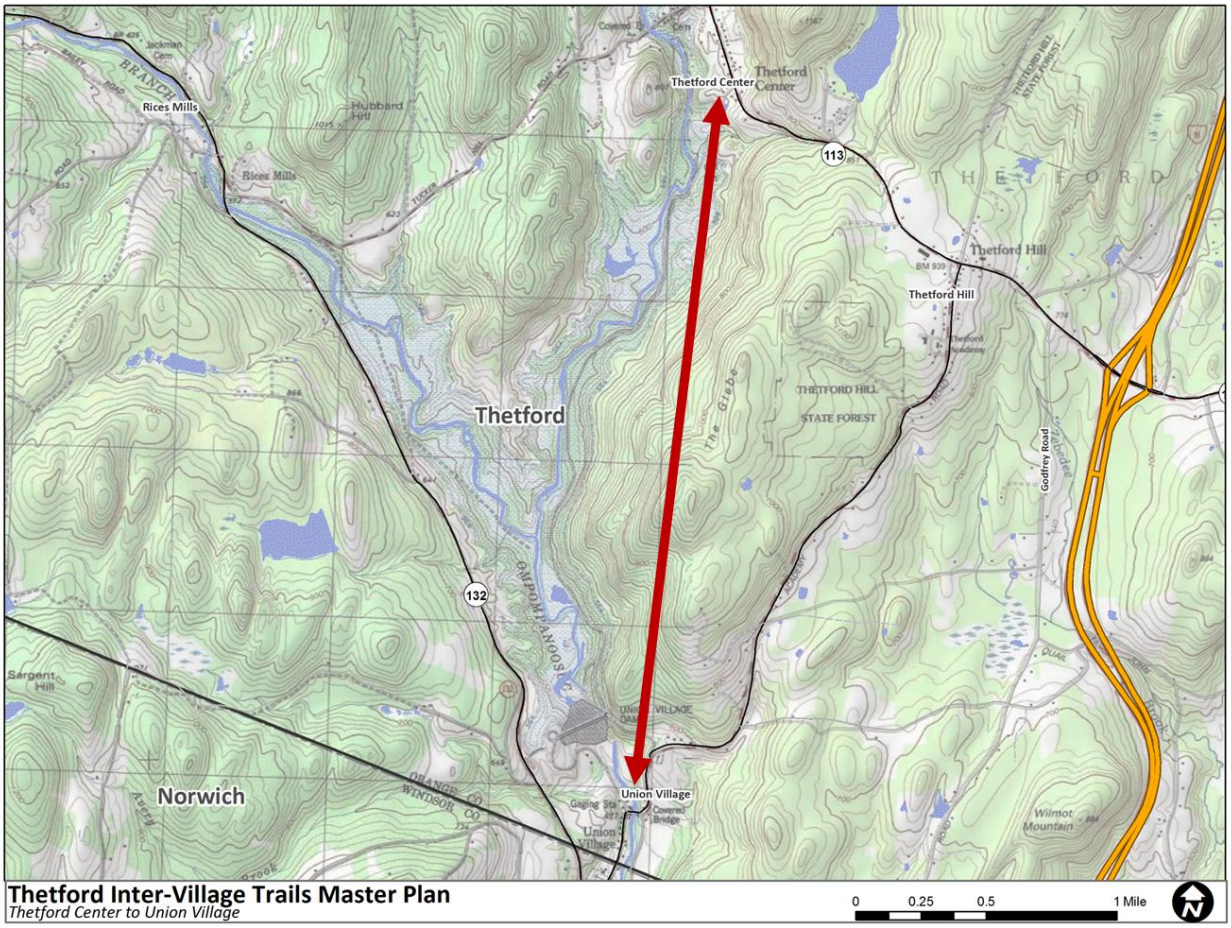
This connection is characterized by two primary natural and manmade features: 1) the Ompompanoosuc River and tributaries, and 2) VT Route 113. Although a direct route along either of these features has moderate elevation change (particularly in comparison to other possible trail connections in this plan) and would also satisfy a desire by Thetford residents to connect these two locations, there are numerous challenges and considerations in developing a trail between these two locations. One challenge is that the Ompompanoosuc River is a valuable natural resource for flora and fauna habitats including alluvial shrub swamps, shallow emergent swamps, and alder swamps, as well as significant natural communities of regional and state-level concern. Some of these habitats have narrow geographic dependence from the river basin, while others are more expansive. Creating a trail route that preserves these important natural resources is certainly possible (and, in fact, there a number of trails along this route primarily on private property which follow the watershed area), provided sustainable trail design, construction, and management practices are implemented.

An alternative possible route avoids the potential conflicts along the Ompompanoosuc, though it offers other challenges including more elevation terrain variability (potentially discouraging use of

the trail for alternative transportation uses) as well as other upland habitat protection considerations.

Our preliminary evaluation is that either of these two general routes is potentially viable and would offer an important connection between two of Thetford's important nodes, avoiding pedestrian and other non-motorized uses along VT Route 113.

6.12 Thetford Center to Union Village

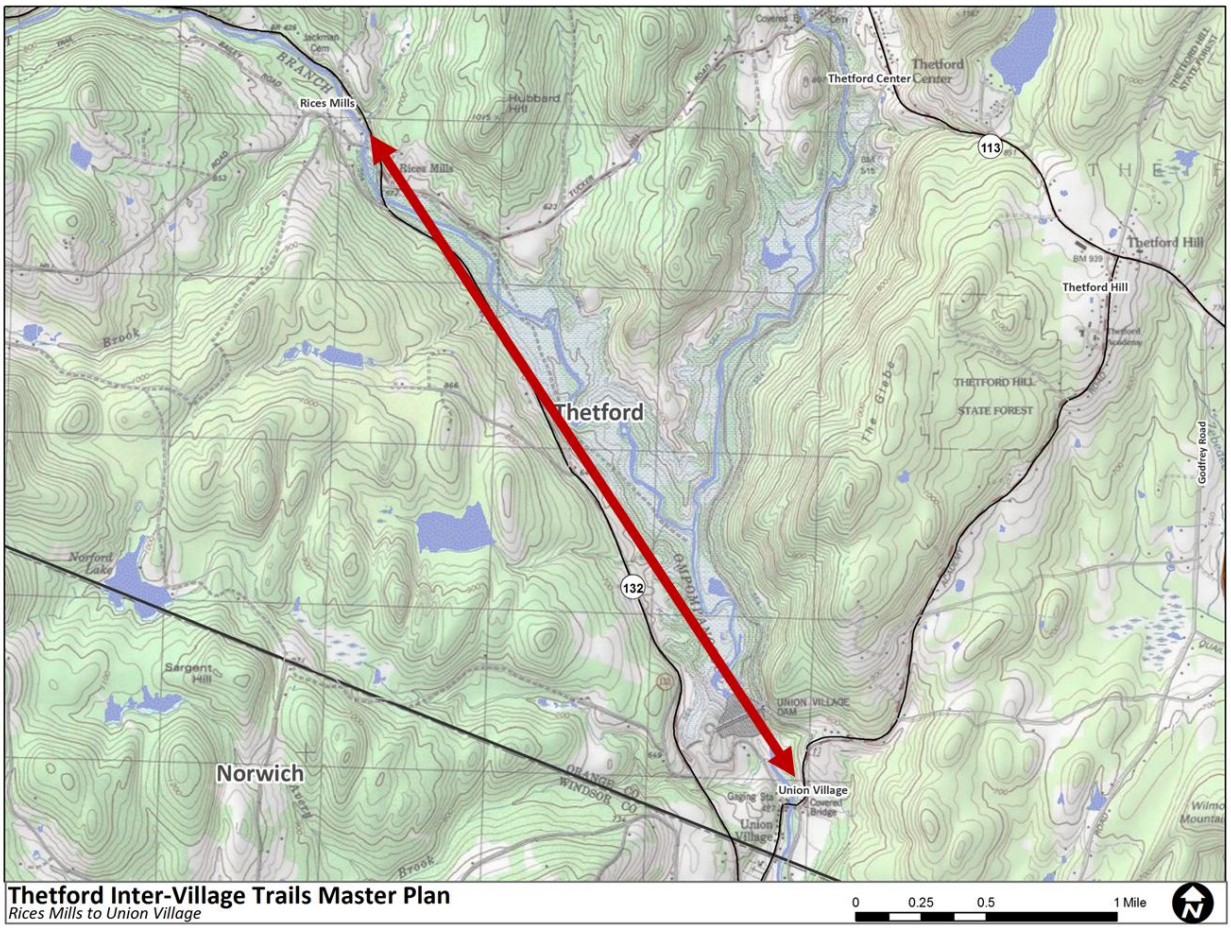


In many respects, a multi-use trail already exists between these two locations with the access road to and/or above the Union Village Dam, and Buzzell Bridge Road – a low-use dirt road during summer months maintained by the Corps of Engineers, and an ungroomed, multi-use winter thoroughfare in other months. The primary disadvantage of this route as it exists is that it is subject to flooding (based on the flood control operations of the dam), and it is a road and not necessarily one planned or designed for particular trail uses.

A possible alternative, or extension, to this primary connector would be trails that traverse portions of the Glebe ridge, or cross the river at the "Mystery Trail" bridge and incorporate sections of trail and terrain on the western portion of the Ompompanoosuc River. There are wildlife, flora habitat, and other conservation considerations of such a route, but this area already has established trails used for a variety of both motorized (VAST) and non-motorized uses. Re-crossing the river at the

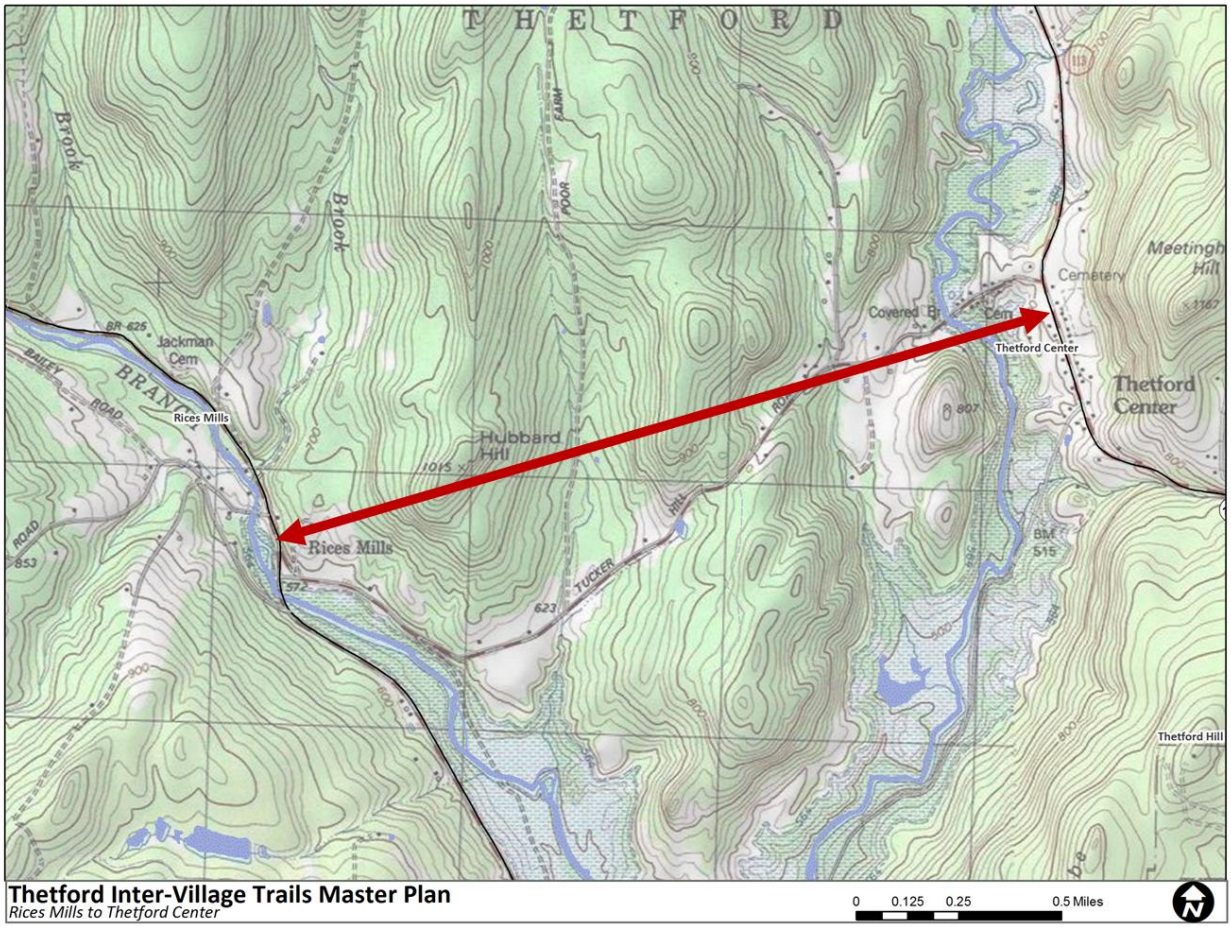
north end would be via the covered bridge along Tucker Hill Road, with the possibility of then making an off-road trail connection to the Thetford Center common.

6.13 Rices Mills to Union Village



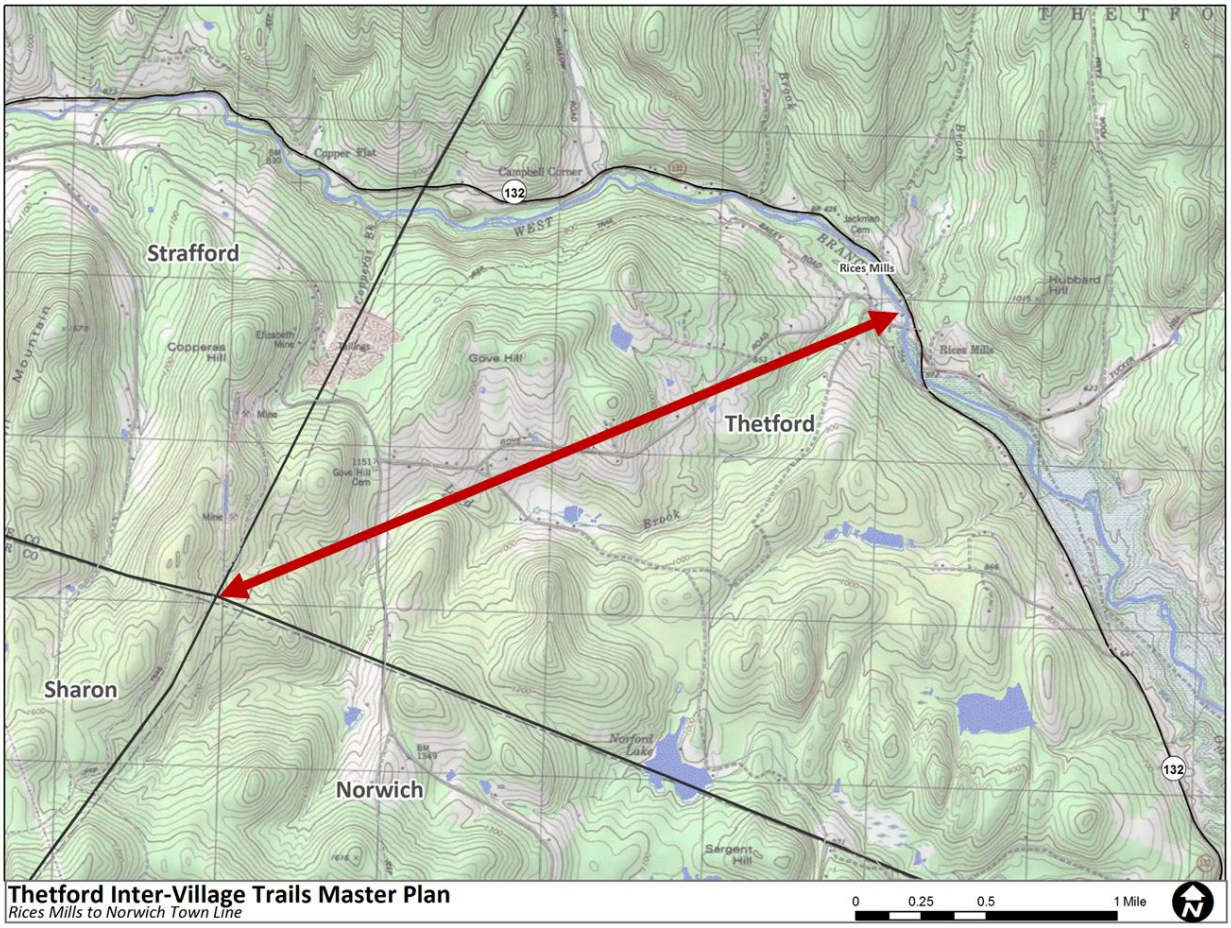
A route from Rices Mills to Union Village could use much of the former VT Route 132 through the Union Village Dam area. There are existing old roads that are upland of the major flood zone areas, and a viable trail would require remaining above this level between the existing VT Route 132 and the Ompompanoosuc River. The southern end of the trail could terminate near the existing parking lot/shelter at the gate of the Dam recreation area near the Union Village covered bridge.

6.14 Rices Mills to Thetford Center



A connection between Rices Mills and Thetford Center, absent significant elevation gain and loss over or around Hubbard Hill, could incorporate the Old Route 132 which is now the northwest entrance to the Union Village Dam area. A trail may be possible that would avoid use of Tucker Hill Road to provide this access. From the Old Route 132, there is a well-established trail (former road) which provides a connection to the Mystery Trail and bridge (see Section 6.12). This road/trail would require rerouting to provide incorporation of uses other than hiking, as there are gradients which are well in excess of 25% and not considered sustainable according to best practices of trail design and construction. This route provides interesting diversity in forest/landscape types, historical/cultural features, and multiple views of the Ompompanoosuc River valley.

6.15 Rices Mills to Norwich/Sharon/Strafford Town Line



An important component of this trails master plan is to identify potential trail routes that connect to other trail systems outside the boundaries of the Town of Thetford. One such connection is to the vicinity of Norwich and Gile Hill, Strafford, and Sharon (such as Downer State Forest). Rices Mills offers an opportunity to be one end of such a connection, though, again, there are multiple challenges to such a route. The first is, as is common throughout Thetford, one of vertical relief. Rices Mills sits at 600 feet; the corner joining the four towns of Thetford, Strafford, and Sharon is at an elevation of approximately 1,400 feet (and making such a connection is not a simple uniform grade). Additionally, there are other challenges as well as important conservation resources in this vicinity. One significant challenge is the former Elizabeth Mine, which has been in the midst of a significant hazardous materials remediation under the EPA's Superfund program. Once complete, this location does offer a point of interest for a trail system, as well as a means to connect the communities of Strafford (especially the village of South Strafford) and Thetford. Routes along old roads on the west side of the West Branch of the Ompompanoosuc River could potentially be incorporated into a reasonable trail route.

Section 7 Trail Prioritization

While much of the analysis provided in Section 6 identifies specific connections between various villages and other identified locations, it is important to note that many of the benefits of trails, or a system of trails, derive from creating multiple linkages and routes. A key objective of this plan (and this section) is to provide a prioritization of possible routes such that the plan can be implemented in phases. The Town should not lose sight of the broader benefits of the larger vision, including:

- Creation of logical off-road loops, for longer excursions (for example, a Thetford Hill to Thetford Center to Union Village to Thetford Hill combination);
- Extended point-to-point routes, providing opportunities for cross-Town trips connecting to other trail systems (e.g., a Norwich to Fairlee and Cross-Rivendell trail connection) as well as providing multiple points of access for trail users;
- Dispersion of trail users to encourage sustainability and discourage overuse of small sections;
- Creation of a "critical mass" of trails to provide diverse trail experiences and, if desired, attract visitors to the Town, similar to a trail system as the Kingdom Trails in East Burke, Vermont.

With this broader vision in mind and having identified potential trail connections in the previous section, the next step in this process was to prioritize these connections to identify which trail connections to move forward with first, and how best to allocate funds for future trail building.

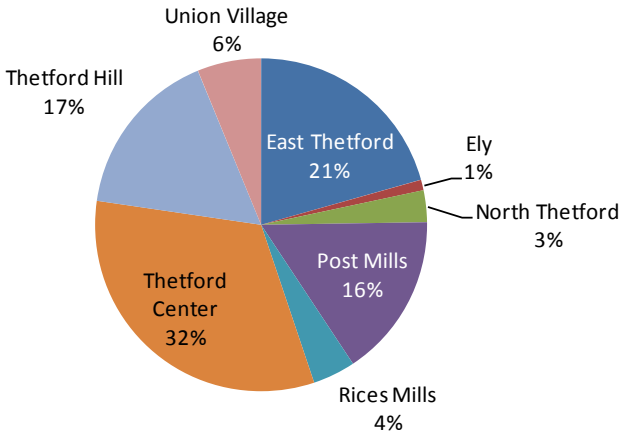
An online survey was developed (Appendix C) and administered from September 19 through September 29, 2011 to gauge Town residents' preferences on trail uses and priorities on village connections. In addition to the online survey, a paper survey was administered (Appendix C) at the Thetford Transfer Station on Saturday September 24, 2011. Overall, there were 117 responses to the online survey and 82 responses to the paper survey for an overall sample size of 199 responses.[2] This response rate is comparable to similar surveys that have been conducted within the Town.[3]

[2] Respondents to the paper survey were first asked if they had completed an online survey; none of the respondents to the paper survey identified as filling out an online survey.

[3] The Town of Thetford initiated a Town Poll, both online and at the Town Meeting in 2011. They received a total of 161 responses.

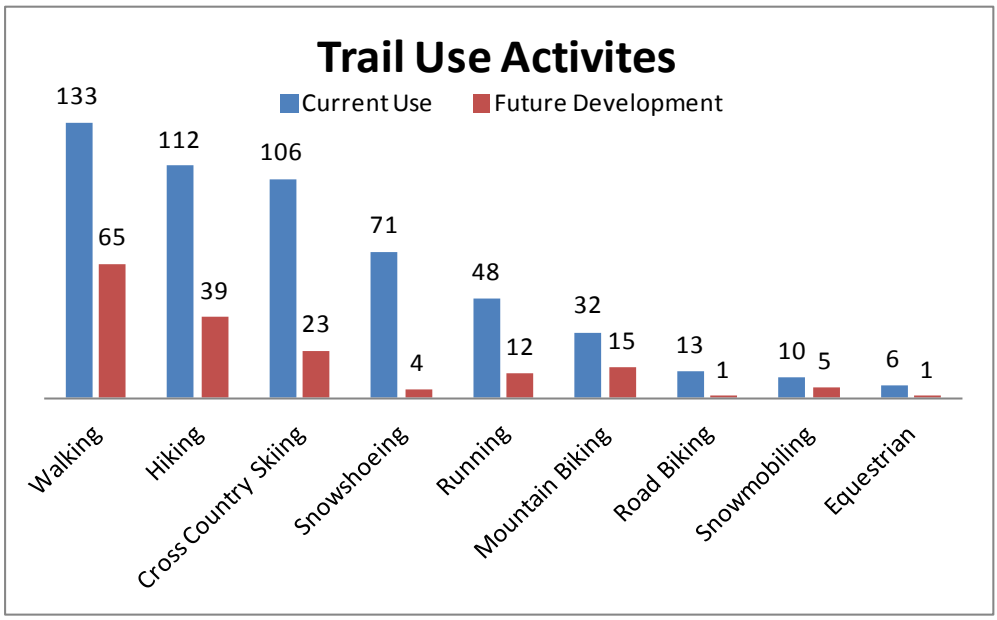
Survey respondents were first asked which Village they identified most with. The results are shown below and appear to be generally representative of the distribution of the population throughout the Villages.

Figure 2. Which Village survey respondents most identify with.



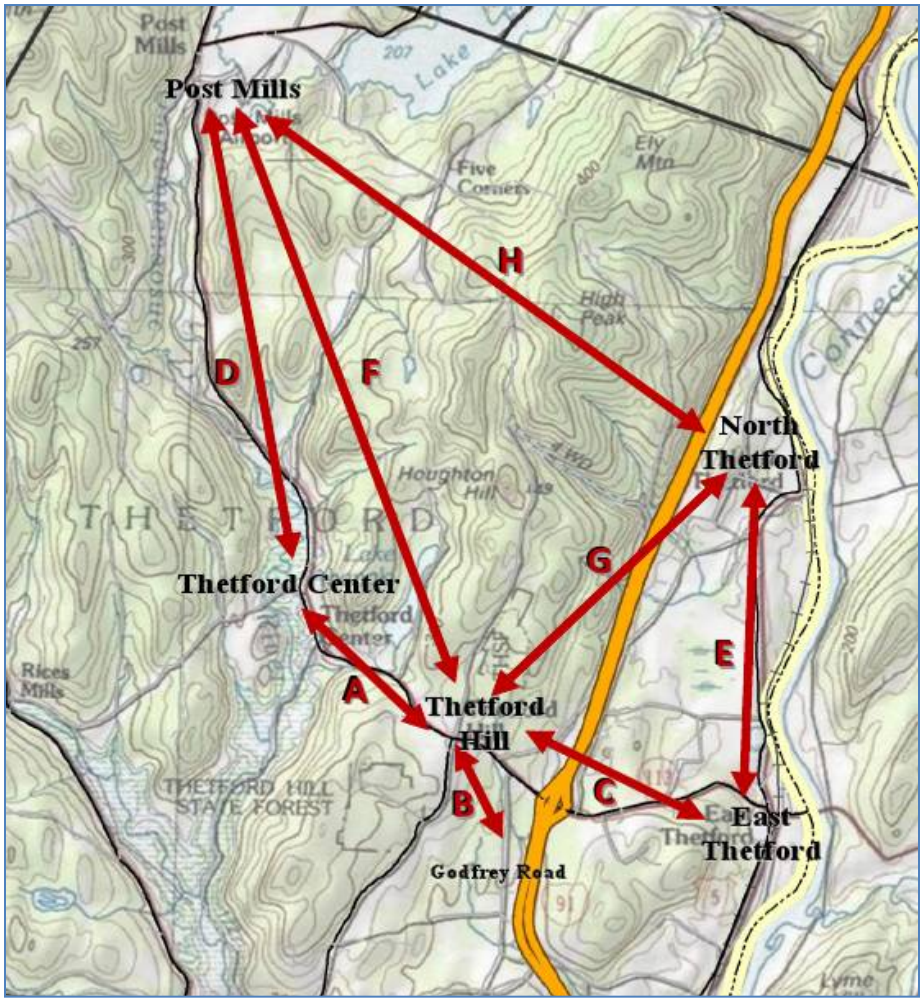
The survey then asked which trail uses respondents currently participate in and which uses they would like to see further developed in Town. Most respondents identified that they use trails in Thetford for walking or hiking, cross country skiing, and snowshoeing. When asked which activity should be the priority for future trail development, walking, hiking and cross-country skiing were rated the highest, followed by mountain and road biking.

Figure 3. Activities respondents currently use trails for, and activities identified as the priority for future trail development.



Respondents to the survey were then presented with a map showing potential connections between Thetford's villages and asked to identify their top three choices for future trail connections. Note, not all of the trail connections identified earlier in the project were presented on this survey. This was done to limit respondent burden and not overwhelm survey respondents with an excessively large number of potential connections. The generalized village connections graphic presented in the survey is shown below.

Figure 4. Map depicting potential trail connections between the Villages of Thetford.



Survey responses were each weighted (1st priority = 3 points, 2nd priority = 2 points, 3rd priority = 1 point) and these values were summed to get a weighted score for each potential connection. The results are presented in the table below. The Thetford Center to Thetford Hill connection was clearly identified as the highest priority connection with the most first priority rankings and the highest weighted score.

Table 4. Trail connection priorities.

	1st Priority	2nd Priority	3rd Priority	Weighted Score
1. Thetford Center <----> Thetford Hill	69	28	19	**282**
2. Thetford Center <----> Post Mills	27	38	24	**181**
3. Thetford Hill <----> Post Mills	32	26	24	**172**
4. East Thetford <----> Thetford Hill	25	31	30	**167**
5. Thetford Hill <----> Godfrey Road	22	14	9	**103**
6. North Thetford <----> Post Mills	9	14	26	**81**
7. East Thetford <----> North Thetford	5	11	18	**55**
8. Thetford Hill <----> North Thetford	4	13	14	**52**

For additional comments survey respondents left about trail planning, design, and building, refer to Appendix C.

Section 8 Alternatives Assessment

As identified in the Town resident survey and confirmed by the trails Steering Committee, the Thetford Center to Thetford Hill connection was identified as the preferred trail to advance into planning, design, and construction.

Potential trail alignments were identified to connect Thetford Center to Thetford Hill based on sound trail planning, field observations, and existing conditions. While these alternatives have been identified conceptually on the map below, they are not intended to represent the final trail alignments. With any trail planning and design project, one of the first steps will be to reach out to the appropriate land owners and work with them to assess the potential to establish easements for trail crossings of their property. Once the land owner agreements are in place, additional field investigations will be needed to examine the on-the-ground conditions of the trail alignment and identify any potential environmental impacts and route configuration in greater detail. Topography, water resources, natural and cultural resources, and many more variables will be examined in greater detail when the design process gets underway.

8.1 Thetford Center to Thetford Hill Alternatives

Three potential trail alignments were identified for the Thetford Center to Thetford Hill connection. One alignment was identified using only the topographic map and a base knowledge of the surrounding area ("Through Woods Original"). A second alignment was further developed through on-the-ground observations to refine the original trail ("Through Woods Refined"). A third option assumed a trail or path immediately adjacent to VT Route 113 between Thetford Center and the Thetford Elementary School. The approximate configuration of each of these potential trail alignments are displayed in Figure 5.

Through The Woods

The section of VT Route 113 which joins the village of Thetford Center to Thetford Hill is notoriously steep and narrow for cyclists or pedestrians, gaining almost 340 feet of elevation in about a mile. For decades, community members have envisioned a more humane, and perhaps more scenic alternative for non-motorized, outdoor enthusiasts. Such a route, though possible, poses three significant challenges: 1) the significant climb; 2) the relatively steep slopes between Thetford Center and Thetford Hill; and 3) the fact that an alternative pedestrian route would traverse the property of several private landowners. One additional factor to consider is that since the trail would be intended for two-way traffic (both climbing and descending a relatively steep hill) the finished route would have to be relatively wide, perhaps 16 feet or so, to safely accommodate concurrent travel in both directions.

Both the "Through Woods" routes are feasible. The original route would provide an enjoyable outing accessing some interesting terrain, natural features, and potential view spots. It would probably be too long, however to provide a reasonable alternative for community members looking for an off-road route between the villages. The "Refined" Through Woods route reflects a balance between moderating the elevation gain and a manageable, overall distance of the route. The Refined route measures roughly 50% longer than following the road, and would have an average gradient of 8%, creating a compromise that seems to be a reasonable balance.

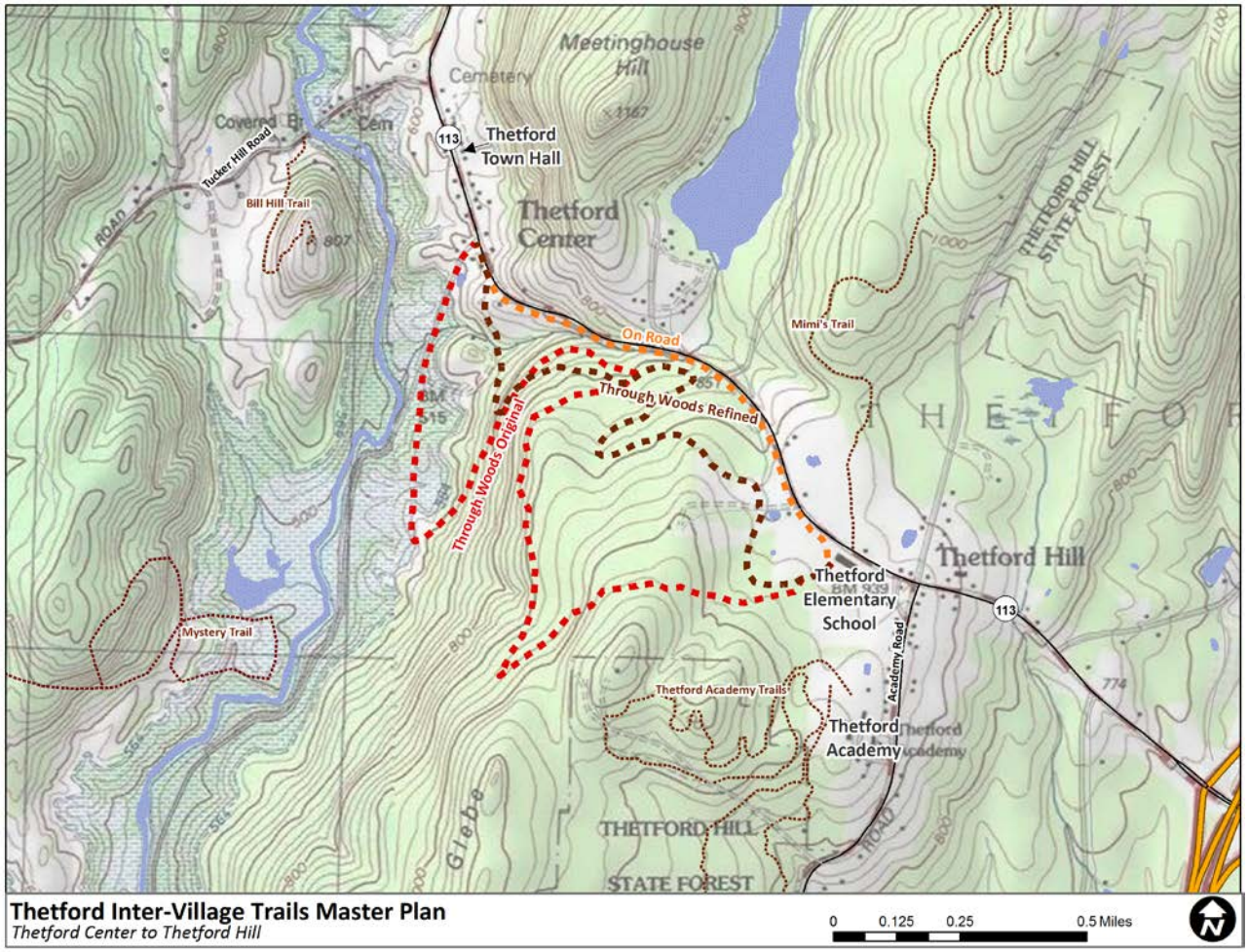
Both of the Through Woods options could be designed to come close to an existing bridge over the stream that originates across VT Route 113 at Mud Pond. That existing bridge could provide convenient access to the proposed trail from Camp Farnsworth, thereby creating a safe route for campers to reach destinations either on Thetford Hill or in Thetford Center.

Along the Road

As an alternative to an overland trail connection, a potential connection from Thetford Center to Thetford Hill along VT Route 113 was also considered. VT Route 113 climbs steadily from Thetford Center up to Thetford Hill, with an average grade of 7%. This approximately one mile section of VT Route 113 is characterized by two 12-foot travel lanes and relatively narrow shoulders (1-2 feet). The side slopes at the edge of pavement on both sides are very steep, with the northern side climbing steeply ("cut" section) and the southern side dropping off to a stream ("fill" section). There is a guardrail along the southern side of VT Route 113 through much of this section.

Of the various alternatives considered, the "along road" alternative is the most direct (1.02 miles) and impacts the fewest private properties. However, considering the significant limitations along either side of the road, the potential costs to provide either bicycle lanes or a shared-use path are significant. Any widening on the north side of VT Route 113 would likely require a retaining wall in the slope, while a widening on the south side would require considerable amounts of fill (or a retaining wall) – both of which would have significant impacts to the stream at the base of the section.

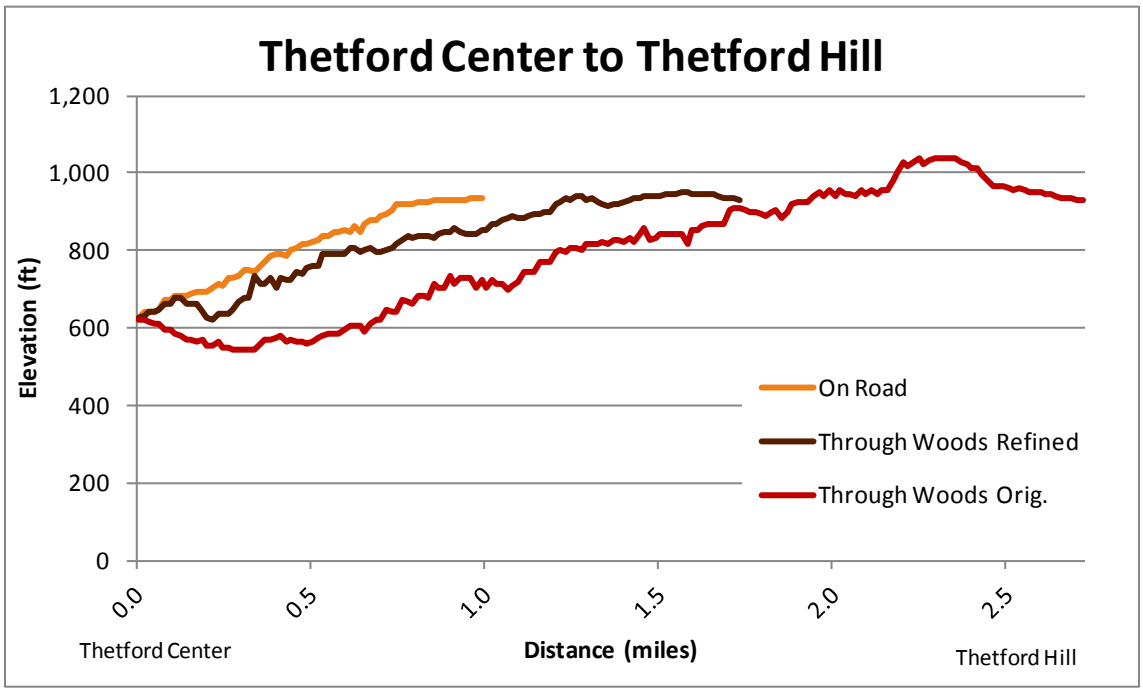
Figure 5. Thetford Center to Thetford Hill trail alignment alternatives.



Elevation profiles of these three trail alternatives are displayed in Figure 6 and help visualize the vertical and horizontal differences between the alignments. As the figure shows, the "On Road" alignment provides the shortest connection; however, as described above, is likely the most difficult

to implement due to topographic constraints along VT Route 113. The figure also shows that the "Through Woods Refined" alignment is significantly shorter than the original through woods alignment and minimizes vertical climb along the alignment.

Figure 6. Elevation profiles of trail alignments.



8.2 Thetford Center & Thetford Hill Trailhead Areas

To supplement the assessment of various trail alignments between Thetford Center and Thetford Hill, an evaluation of potential trailhead connections was conducted to identify potential linkages to both parking areas and key destinations in both villages.

Figure 7 below shows potential connections to and around the Thetford Elementary School. As shown in the graphic, the "On Road" and "Through Woods" trail alignments from Thetford Center approach the Elementary School parking lot from the left at different locations. It was felt that the western portion of the main school parking lot would provide a good trailhead parking area, potentially supplemented with a trailhead sign and maps showing trail connections from that location. A trail connection is shown extending south from the trailhead parking area, which would tie into the existing Thetford Academy trail network. The graphic also shows two potential connections heading east across the school grounds – one in front of the school and the second behind the school. These connections converge and cross the stream between the elementary school and library using an existing pedestrian bridge. The sketch shows this connection from the elementary school tying into a new sidewalk along Library Road which then connects north to the church and south to Thetford Academy and the residences in Thetford Hill. The Town has already prepared some preliminary design concepts for a pedestrian connection from the school to the library and church, which includes potential median treatments along VT Route 113 west of Academy Road to calm traffic speeds. As that project progresses, Town officials should be cognizant of the opportunities to make broader connections beyond Thetford Hill.

Figure 7: Thetford Hill Trailhead Connections

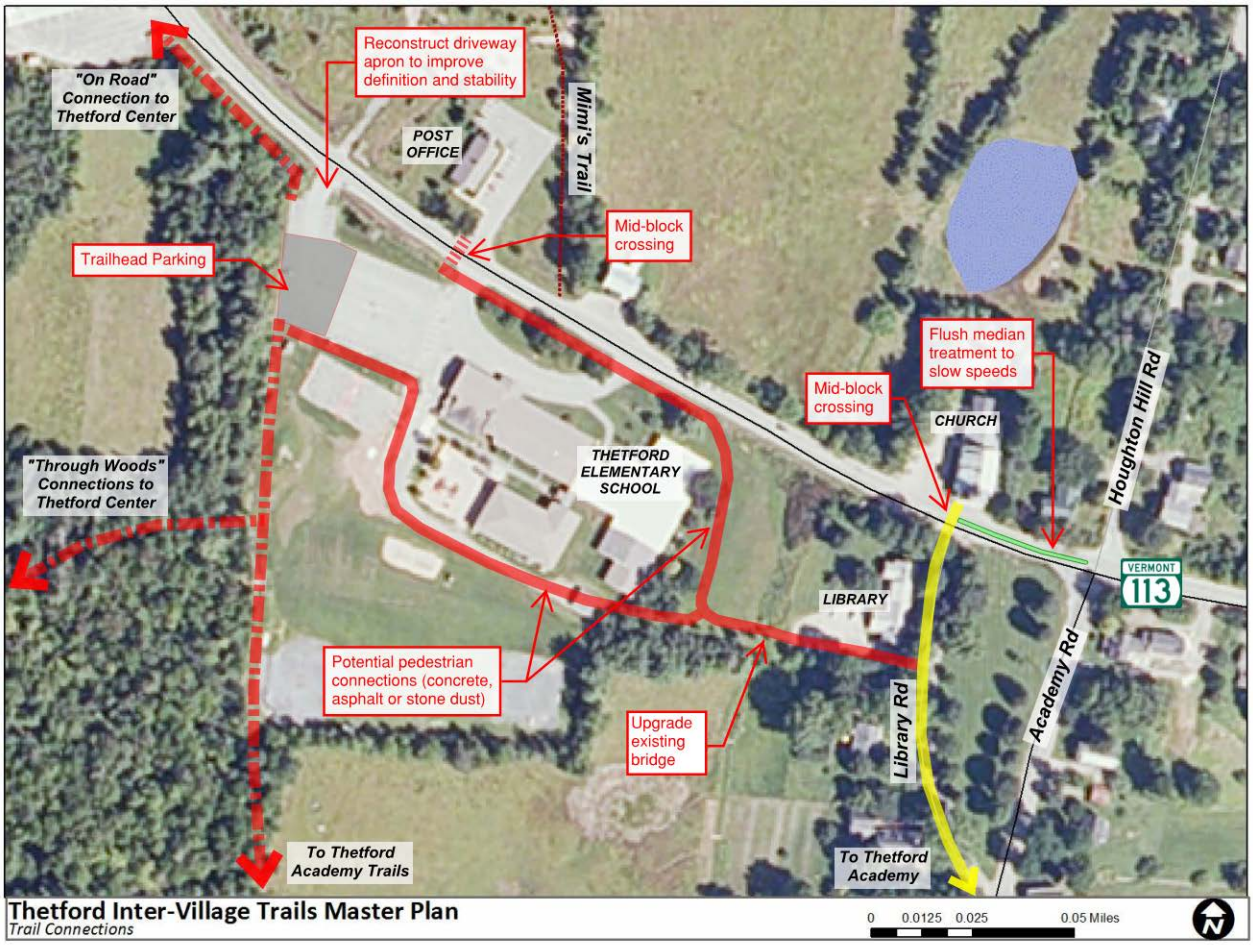
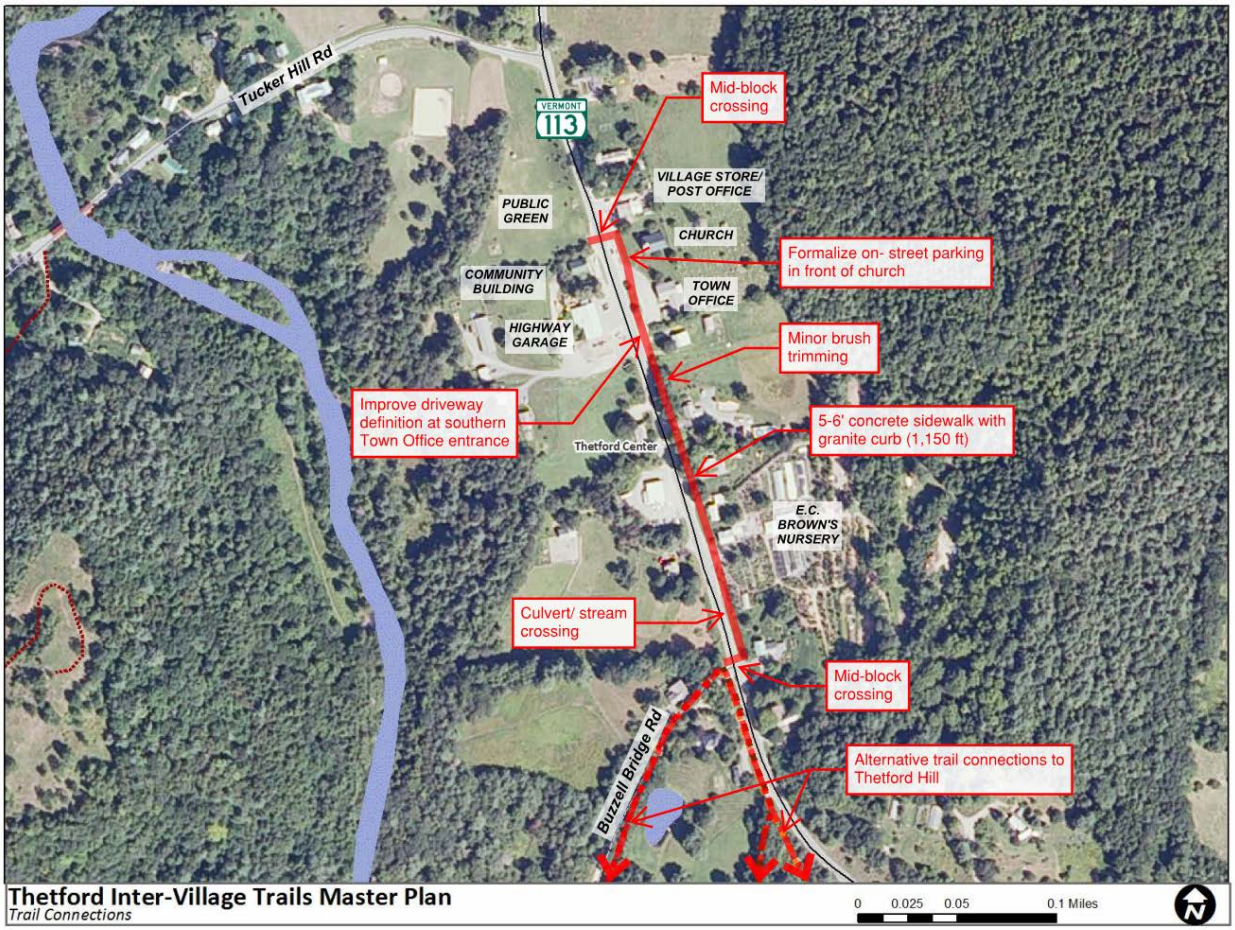


Figure 8 below shows potential connections to Thetford Center. As shown, the "On Road" and "Through Woods" trail alignments from Thetford Hill approach Thetford Center from the bottom of the graphic at different locations. The main feature of the pedestrian connection in Thetford Center is a new 5-6' sidewalk that would run along the east side of VT Route 113 from Buzzell Bridge Road north to the Village Store. In addition to providing a connection from Thetford Hill to Thetford Center, this sidewalk would also serve to enhance the overall village feel of Thetford Center, calm traffic speeds on VT Route 113, and connect many important destinations within Thetford Center, including the Town Office, Village Store, Community Building, and community green. Using general figures, we would anticipate this 1,150 foot section of concrete sidewalk with granite curb to cost approximately $200,000 to design, permit, and construct.

Figure 8: Thetford Center Trailhead Connections



8.3 Evaluation Matrix

The three Thetford Center to Thetford Hill trail alternatives were evaluated based on a number of criteria. These criteria were assessed based on the following categories:

- **Costs**: estimates of how much various trail alternatives will cost to build
- **Trail Characteristics**: characteristics of the various trail alternatives
- **Impacts**: potential impacts to the natural and historical realm
- **Permits**: the potential need for various federal and state permits

Each of the evaluation criteria are described in greater detail in Appendix D.

Table 5. Thetford Center to Thetford Hill Evaluation Matrix.

		Thetford Center to Thetford Hill		
		Through Woods Original	Through Woods Refined	On Road
COST (order of magnitude)	Through Woods Cost Estimate ($5/lineal foot)	$73,435	$45,456	$0
	On Paved Road Cost Estimate ($70/lineal foot)	$0	$23,172	$376,117
	Total Cost Estimate	**$73,435**	**$68,629**	**$376,117**
TRAIL CHARACTERISTICS	Length of Trail *[miles]*	2.78	1.78	1.02
	Length of Trail on Private Property *[miles]*	2.34	1.55	0.93
	Length of Trail on Paved Roadway *[miles]*	0.00	0.06	1.02
	Length of Trail on Existing Trail *[miles]*	0.00	0.00	0.00
	Number of Homes within 1/4 mile *[# homes]*	56	56	56
	Number of Private Properties Crossed *[# parcels]*	8	6	7
	Number of Major Road Crossings *[# crossings]*	0	Portion along 113	All along 113
	Number of River/Stream Crossings *[# crossings]*	1 (across dirt road)	1 (across bridge)	Follows road along stream
	Average Slope *[percent]*	10%	8%	7%
	Elevation Change *[feet]*	1,458	758	378
	Elevation Change/Distance *[feet/mile]*	532	434	378
	Connections to Existing Trails *[Yes/No]*	Yes	Yes	Yes
IMPACTS	Agricultural Lands *[miles]*	0.81	0.27	0.35
	Archaeological (UVM CAP)	Limited	Not Likely	Not Likely
	Conserved Lands *[miles]*	0.34	0.00	0.00
	Deer Wintering Areas *[miles]*	1.41	0.37	0.17
	Historic Structures/Sites (UVM CAP)	Limited	Not Likely	Not Likely
	Rare, Threatened & Endangered *[Limited/None Identified]*	None Identified	None Identified	None Identified
	Public Lands *[miles]*	0.44	0.23	0.09
	Riparian 100ft Buffer *[miles/Not Likely]*	0.11	0.06	0.55
	Floodplains *[miles]*	0.52	0.00	0.00
	Wetlands - General *[miles/Not Likely]*	0.09	0.22	0.30
	Wetlands - Significant *[miles/Not Likely]*	Not Likely	Not Likely	Not Likely
PERMITS	Act 250	Potential	Potential	Potential
	401 Water Quality	No	No	No
	404 Corps of Engineers Permit	Possible	Possible	Possible
	Stream Alteration	Not Likely	Not Likely	Not Likely
	Conditional Use Determination	Possible	Possible	Possible
	Storm Water Discharge	Possible	Possible	Possible
	Shoreland Encroachment	No	No	No
	Endangered & Threatened Species	No	No	No
	VTrans ROW Permit	No	No	Possible
	State Historic Preservation Office Clearance	Possible	Possible	Possible
	NEPA Category	CE	CE	CE

8.4 Preferred Alignment

Based on the preliminary assessment of alternative trail connection routes between Thetford Center and Thetford Hill, input from residents and other stakeholders, and discussions with the project Steering Committee, it was determined that the "Through Woods Refined" was the preferred alignment. As the Town moves forward with implementing this Master Plan, the next step will be to conduct a more thorough assessment of this preferred alignment, address any permitting needs, and develop any final plans needed to build the trail.

Section 9 Trail Maintenance and Management Organization

Once a trail or system of trails are planned, designed, and constructed, a critical component involves the maintenance and stewardship of these trails, including the entity (or entities) responsible for longer term management.

In general, there are three types of structures that have been successful in overseeing (and being the conduit for funding) these activities:

1. A private, for-profit entity;
2. A public agency or department; and
3. A non-profit and/or volunteer organization(s).

With respect to the first (a private, for-profit entity), this is not considered a viable option for this master plan given the broader public purpose, as well as the requirement to coordinate across many landholders in the Town of Thetford. If this were a trails plan that resided on a single or few large parcels (such as a resort), it could be an option. If, in the future, there were the desire to create a solely-dedicated trail-based business (e.g., a mountain bike park in a designated area), then this option could be explored further at a later time.

The rest of this section discusses the latter two options: that of a public entity and one of a non-profit or volunteer organization(s).

9.1 Public Agency or Entity

There are many successful trail-based organizations either entirely or partially operated and funded by a government entity. Such places include: Kincaid Park in Anchorage, Alaska; a diverse system of trails and parks in Minneapolis, Minnesota; and many systems of State and Federal "Sno-Parks," particularly across the western U.S. For many municipal-based governments, a Parks and Recreation Department (or related agency) fulfills many or most of the trail system functions, similar to operating a community pool or playing field facility.

For Thetford, a chartered and incorporated Town in Vermont, the Town could oversee these functions either within an expanded Recreation Department in collaboration with the Conservation Commission, or establish a separate Trails Department specifically dedicated to trails. Currently, public trails in Thetford are overseen by the Conservation Commission in conjunction with the Recreation Department and other public, non-profit, and volunteer entities. The functions necessary to maintain trails, secure and disburse funding, and help direct long-term implementation of the trails master plan may be more appropriate if dedicated specifically to this function.

Funding for the trail system, both for capital needs and long-term operations, can be achieved through a variety of means including:

- Federal and State grants and programs, such as the Recreational Trails Program, Safe Routes to School, Transportation Enhancement Act funding, and other programs;
- Foundation grants through such entities as the Robert Wood Johnson Foundation, local foundations, and private sector programs;
- Voluntary user contributions, select user fees, or tax revenues.

9.2 Non-Profit or Quasi-Public Entity

Another organizational option, which has also been successful across many communities, is the use of a current (or creation of a new) non-profit entity, likely a 501(c)3 or similar organizational structure. A variety of factors can make this an appealing alternative:

- Ability to generate multiple forms of revenue including membership/user fees (if supportable), grants, and donations including major gifts;
- Flexibility in undertaking activities (such as educational objectives), accepting funds, and having a broadened mission/scope that would not otherwise be available or as easily implemented under a public entity; and
- Possible greater acceptance by the public (i.e., not seen as a department diverting direct tax resources of the Town).

There are a number of such trail-based organizations that can serve as models – within the region, state, and other areas of the US. Table 6 provides examples of some of these organizations.

Table 6. Example Non-Profit Trail-Based Organizations.[4]

	Stated Mission	Staff	Annual Budget (Expense)
Methow Valley Sports Trails Association (MVSTA) Winthrop, WA	"Maintain a 200 kilometer trail system year round for cross country skiing, hiking and mountain biking in the Methow Valley. To promote outdoor recreation. To provide environmental education to the public. To stimulate the local economy."	24 incl. Exec. Director; 200 volunteers	$778,417
Kingdom Trails E. Burke, VT	"To provide recreation and education opportunities for local residents and visitors while working to conserve natural resources and create economic stimulation. We strive to accomplish this mission by providing a network of quality non-motorized trails for all level of abilities incorporating the best of the local scenery and natural diversity. We have permission of 50 landowners and businesses that make this all possible."	21 incl. Exec. Director; 222 volunteers	$306,709
Mammoth Lakes Trails and Public Access (MLTPA) Mammoth Lakes, CA	"MLTPA advocates for, initiates, facilitates, and participates in the planning, management, and stewardship of a four-season trail system in Mammoth Lakes and the immediate Sierra."	6 incl. Exec. Director	$341,289 (budget has increased significantly since last IRS 909 Form)
Upper Valley Trails Alliance (UVTA) Norwich, VT	"The UVTA advocates for the use, maintenance, and development of trails in the region. Through education, outreach, and stewardship, we: 1) promote active lifestyles through trail use in all seasons, 2) connect people and places through a regional trail network, and 3) lead a coalition of local trail groups and advocates."	10 incl. Exec. Director; 50 volunteers	$162,957
Rivendell Trails Association (RTA) Fairlee, VT	"Create and maintain the Cross-Rivendell Trail as an educational and recreational resource."	1; 175 volunteers	$15,766

As one can see from Table 6, there are a variety of activities a non-profit entity can undertake – from the fundamentals of developing and maintaining a trail system, to providing formal education and training programs. In our experience, a non-profit umbrella organization can provide the flexibility to pursue all of the elements of a successful, trail-based community. There would be the possibility of working with an existing organization such as the Upper Valley Trails Alliance in

[4] Source: IRS Form 990 for 2009 or 2010; from www.guidestar.org.

creating a subsidiary arm, or at least collaborating to coordinate with other trails and programs in the Upper Valley.

In summary, there are multiple options for funding and providing the longer term management of a Town-wide trail system (and associated programs). In any structure, it is important to recognize that there are existing, and likely prospective groups of very willing volunteers to be part of maintaining and providing stewardship of any trail system developed in Thetford.

Section 10 Next Steps

The Thetford Inter-Village Trails Master Plan was developed to provide a blueprint for developing a more connected trail network over the next 5, 10, 50 years. This Master Plan describes general trail connections between the several villages of Thetford and provides a prioritization for the Town to use in implementing the recommendations.

In the context of Master Plan implementation, the next steps for the Town to pursue are outlined generally below:

- Complete the "Through Woods Refined" trail alignment between Thetford Center and Thetford Hill:
  - Prepare detailed trail design plans and conduct a thorough environmental assessment along the proposed alignment
  - Obtain necessary permits/clearances (e.g., Act 250, Section 404 Corps of Engineers, Conditional Use, Storm Water Discharge, Section 106, and Categorical Exclusion)
  - Obtain formal easements for trail use over all private properties
  - Develop final plans, bid document, and construction cost estimate (if State and/or Federal funds will be used for construction)
  - Trail Construction
- Identify and designate an entity or organization to oversee and maintain the existing trails and trail-related infrastructure throughout Town.
- Continue to implement the Master Plan recommendations based on priority of trail development within the Town (Figure 9).

Figure 9. Trail Development Prioritization.