

1 **Town of Underhill, VT**
2 **Trail Handbook**

3
4 Introduction

5
6 Underhill has traditionally been a community that has been characterized as an active
7 area for hiking, biking, horse-back riding, skiing, sledding, swimming, and other outdoor
8 activities. In January, 2008 the Selectboard created a Trails Committee consisting of
9 members of the public, the Planning Commission, the Conservation Commission, and the
10 Recreation Committee to develop a policy for use of trails on Town-owned land and to
11 develop a trail use model that could be used by residents and user-groups in their private
12 establishment of new trails and maintenance of existing trails. The result of this is the
13 "Underhill Trails Handbook", a guide to public and private property owners and user
14 groups that suggests best practices and gives information about the development of a trail
15 or the maintenance of an existing trail.

16
17 This document is the product of over a year's worth of investigation by the Committee
18 into how a trail could be developed or maintained while being respectful of the natural
19 environment and the private property rights of landowners. In developing the Handbook,
20 the committee met with representatives from successful trail organizations¹ and read
21 several guides for trail building and maintenance to get ideas on the best practices for
22 siting, design, crossing structures and maintenance practices. The Handbook sites these
23 references throughout, and the Committee strongly encourages private land owners and
24 user groups to go to the source material for detailed instructions in each area.

25
26 Outdoor recreation provides great exercise in a natural setting. However, trail users and
27 landowners should be cognizant of the effect of trail use on the natural environment: from
28 the soils and tree roots underfoot to the fragile vegetation and special habitats that exist
29 along the trail route to the wildlife that lives there. Users also need to recognize the
30 importance of the landowner's wishes with regard to trail use on private property. A
31 good trail conserves the total trail environment, actively respects a landowner's property
32 rights, and provides a fun and healthy recreational opportunity for users.

33
34 The Underhill Trails Committee hopes that this Handbook will prove to be a useful guide
35 to the Town when developing trails on town-owned land, as well as for private
36 landowners and user groups when developing trails on privately-owned land. It should
37 be emphasized that this Handbook does not create any new regulations; it is merely a
38 compilation of best practices and suggestions to guide the development and maintenance
39 of new and existing trails in Underhill.

¹ The Committee would like to extend its thanks to Rolf Anderson President of the Hazen's Notch Association; Rick Sokolov of the Stowe Mountain Bike Club; and Jim Fredericks, Executive Director of the Catamount Trail Association for meeting with the Committee and sharing with them their collective experience and advice on the right and the wrong things to do when establishing a trail system.

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1 **CHAPTER 1: TRAIL STEWARDS AND PROPOSED TRAIL NOTEBOOK**

2 Section 1.1 Trail Stewards

3 To begin with, trail users and landowners should become acquainted with the term "trail
4 steward". As used herein, a trail steward is that individual or body that is responsible for
5 landowner contacts; addressing landowner concerns; securing permissions from
6 landowners; designing/maintaining the trail in such a way that the natural environment is
7 protected; securing all required permits; performing trail maintenance; and trouble
8 shooting any trail issues that may arise.

9
10 A trail steward could be the landowner, a user group, or an individual. However
11 stewardship is organized, the goal is to allay landowner concern about any trail issues and
12 to assure that trail use is not interfering with the goal of environmental protection of the
13 trail environment, which includes wildlife habitat in the trail corridor.

14
15 It should be recognized that some of the stewardship duties may be divided, for instance a
16 landowner may prefer to maintain the trail on their own land, but want a user group to
17 take care of other stewardship duties. There is no right or wrong way for trail
18 stewardship to function; what is important is that there is a trail steward for each trail if
19 the landowner desires one.

20 Section 1.2 Trail Notebooks

21 A "trail notebook" is a compilation of the documents that a trail steward will amass when
22 talking with landowners about either creating a new trail or maintaining an old trail. The
23 trail notebook could be a loose leaf binder that can be easily added to as trail stewards
24 progress in discussions with landowners. At first the notebook will be comprised of a
25 very short document that proposes a rough idea of a trail location and a trail name, and
26 also identifies the proposed trail stewards and what stewardship for this trail would mean.

27
28 As the steward and the landowner makes decisions about the details of trail uses, designs,
29 maintenance practices, and permits, those agreements should be memorialized on paper
30 and added to the notebook. The trail notebook will then become a working blueprint of
31 how the trail is to be used and maintained throughout the life of the trail. A copy of the
32 notebook should be distributed to all landowners and stewards so that everyone is in
33 agreement as to their respective trail responsibilities. Subsequent landowner contacts
34 should be recorded in the trail notebook and updated copies of the notebook should be
35 distributed annually. A sample Trail Document is found in Appendix D.

36
37 The documents for each trail shall vary depending on what type of agreement the
38 stewards and landowners reach. For example, is this for maintenance of an existing trail,
39 or is what is being proposed the development of a new trail? Wherever possible, the
40 Trails Committee has appended documents at the end of the Handbook to give you an
41 idea of the type of documents you may want to use. These document templates are meant
42 to give landowners and stewards an idea of how to start. The Committee urges
43 community members to amend these templates to suit the needs of each trail.

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CHAPTER 2: LANDOWNERS

Section 2.1 Landowner as King/Queen

As noted in the introduction, landowners' wishes about trail use on their property are of paramount importance and must be respected. Permission to use a trail, even one that has been in place for years, should be secured by every user or user group or they run the risk of having the trail permanently closed. Trails that may have been constructed on land years ago by one landowner may not be owned today by the same landowner, or the trail location may not be acceptable to the landowner. Of course, it almost goes without saying that new trails should never be constructed on private land without landowner approval. Permission is discussed in more detail in section 2.10 below. Before that though, a landowner must know what he is giving permission for. Below are some of the topics to cover with landowners when seeking permission to use their land.

Section 2.2 Landowner Representative

As part of trail stewardship, a trail steward should be assigned to each landowner as his or her representative. This will give a landowner a person who is personally responsible for meeting with him, answering his calls, and working on any concerns the landowner may have about trail use on his property. The representative should check in periodically with the landowner during the year to make sure that any concerns or issues that the landowner has are addressed. Landowners are encouraged to immediately notify their representative should a problem arise with trail usage or maintenance on their land. It is recommended that representatives respond to a landowner within 24 hours of receipt of a complaint.

Section 2.3 Landowner Liability

Often landowners are concerned about whether they can be held responsible for any injuries that occur on their land by a trail user. Vermont law (12 VSA §§5791-5795) states that landowners who do not charge for access onto their land for recreational purposes shall not be liable for injury sustained by the user while on private land. The exception to this would be if the landowner causes injury as a result of "willful or wanton misconduct." Two classic examples of this would be if the landowner knew about a pit located on the property and did not flag it off, or if the landowner installed trip wires at knee height across a trail on his property. These would be examples of "willful or wanton" misconduct on the part of the property owner that could result in landowner liability. Simply being unaware of a natural hazard on a piece of property does not make a landowner liable under the statute.

It is recommended that a copy of the Vermont Agency of Natural Resources "Public Recreation on Private Land: A Landowner's Guide" be provided to landowners during the

1 initial contact visit so they are aware of what the law says in regards to public use on their
2 lands. This guide is available on-line² and at the Town Hall for copying. In addition, a
3 copy of the state statutes relevant to landowner liability is available in this Handbook as
4 Appendix B.
5

6 Section 2.4 Landowner Outreach

7
8 Landowners should be approached respectfully as you are asking to use a portion of their
9 land for recreational purposes. Before contacting landowners, it is recommended that a
10 little research be done to answer basic questions. A trip to the Town Hall and a
11 conversation with Town Hall staff will help determine who owns the land; if there is a
12 lease on the land that could affect use of the land; if there are any deeded trail easements
13 already on the land; how the land is currently used, including commercial/agricultural
14 uses; and if the landowner has expressed concerns in the past about trail usage.
15

16 Once initial research is done, a letter to the landowner outlining the broad concepts of the
17 proposed trail and asking if he/she would agree to meet with representatives from the trail
18 organization could be sent. A sample copy of this letter is included in this handbook as
19 Appendix A. If a trail user prefers a more informal approach, that is fine too; the point is
20 that landowners should be contacted before using their land.
21

22 Section 2.5 Landowner Meetings

23
24 The most important activity for trail groups at any landowner meeting is to listen to what
25 the landowner requires from the trail stewards in order to give permission for access onto
26 his/her land. If the trail already exists, would the landowner prefer to have it moved to a
27 less intrusive location? What are the landowner's concerns? What type of activities is he
28 or she willing to allow on his/her land? A discussion of landowner preferred trail uses
29 can be kick-started by using the sample "Landowner Preference Checklist" found in
30 Appendix C.
31

32 At the initial meeting, or at a follow up meeting, the user group should walk the land with
33 the landowner and review possible trail locations or, for an existing trail, possible
34 relocations. Inspect for re-routing if desired by the landowner and fragile habitats that
35 should be avoided. Begin to identify trail maintenance requirements to avoid adverse
36 environmental impacts to the land. Ideally trail stewards will meet at least annually with
37 landowners to discuss any trail issues, to distribute updated information for the trail
38 notebook, and to give stewards an opportunity to thank landowners in person for the use
39 of their land.
40

² <http://www.vtfrp.org/pdf/pubrec.pdf>

1 Section 2.6 Allowed Uses/Hours of Operation/Seasons of Operation

2
3 Standards for allowed uses, hours of operations, and seasons of operation should be
4 established based upon landowner requests and recommended best practices from state
5 and local natural resource consultants. These standards are included in the "Landowner
6 Preference Checklist", Appendix C.

7
8 Section 2.7 Determining Trail Usage

9
10 Realistically, a trail may well consist of several different parcels owned by several
11 different landowners. If each landowner has a different set of trail requirements, how do
12 you determine what the use on the trail will be? A recommended best practice to
13 determine a common trail use would be to have a meeting of all the trail landowners once
14 the landowners have been contacted and specifics about trail use have been discussed
15 individually with each landowner. This way you can get all the landowners together to
16 reach accord on the trail use. A trail meeting with all the landowners also provides the
17 stewards with another opportunity to thank the landowners for their use and will build
18 community and communications among the trail landowners.

19
20 If a trail landowners' meeting is not feasible, then the stewards should use a "least
21 common denominator" approach to trail usage. That is, only those trail uses that each
22 individual has identified as acceptable in common will be allowed. For example,
23 landowner A only wants walking, while landowner B is open to walking and skiing on
24 his portion of the trail. The allowed use for the trail would be walking, the trail use that
25 both landowners agree upon.

26 Section 2.8 Signs

27
28 Signs are a good way to keep trail users on the designated trail and could also point out
29 unique habitat features. However, as with all trail related activities, signs should only be
30 placed in accord with landowner wishes. Some landowners may prefer discreet signs to
31 encourage users to stay on the trail. Some may only want painted trail blazes in order to
32 minimize trail infrastructure on their land. Signs are discussed in more detail in §4.4.

33 Section 2.9 Permits

34
35 Permits for trail location and structures are the mechanisms that federal, state and local
36 governments use to assure compliance with environmental protection regulations. Trail
37 locations and structures that do not have the required permits or are not allowed under the
38 law constitute violations to the landowner, not the trail organization. It is obvious that
39 the proper permitting procedures for trail locations and structures must be followed to
40 avoid any landowner liability for land use violations. The trail organization that
41 undertakes stewardship of a trail should offer to be responsible for paperwork and paying
42 for any required trail-related permits. In most instances, the landowner will have to be

1 the permit applicant. Potential required permits are discussed in greater detail in Chapter
2 5.

3 Section 2.10 Trail Maintenance

4
5 How the trail shall be maintained, what the limits of maintenance will be, and who will
6 perform trail maintenance are all topics that should be discussed with the landowner.
7 Consent of the landowner about maintenance practices is part of the package of
8 landowner permissions. For more details on maintenance and recommended
9 maintenance practices, see Chapter 6.

10
11 Section 2.11 Landowner Permission

12
13 After discussions with the landowner and agreement as to trail use, location, design, and
14 maintenance, a landowner will hopefully agree to allow a trail on his land or continued
15 use of an existing trail. A landowner may give verbal or written permission for trail use,
16 with the understanding that this permission may be rescinded at any time if the landowner
17 is unhappy with trail activities. A sample Landowner Permission Form is in Appendix D.

18
19 Annual Permission: One of the best practices is to agree to have landowner permission
20 reviewed and renewed annually. This will give landowners an opportunity to discuss
21 with their representatives any concerns that may have arisen over the previous year. You
22 will notice on the sample form that there is space for the landowner and steward to list
23 any conditions that apply to the trail use on his land. This includes agreed upon
24 structures, maintenance practices, responsibility for obtaining and complying with
25 permits, allowed signs, and allowed uses. These conditions must be observed and
26 enforced by the trail stewards to the best of their ability in order to insure that the trail
27 stays open.

28
29 Special Events: Another consideration addressed in the permission form is whether a
30 landowner's permission extends to special events that will result in a higher concentration
31 of trail use for a short period of time. A "special event" is defined as one that results in a
32 greater intensity of trail use for a short period (usually 1 day) of time. Examples of this
33 could be a school outing or private user group event. A frank discussion with landowners
34 as to their expectations in the beginning should fend off problems in the future with
35 special event usage. A recommended best practice is to have a discussion with each
36 landowner as to what kind of density would trigger the "special event" designation.
37 Would a group of 10 or greater at any one time be considered a special event? 20 +?

38
39 The Trails Committee heard landowner complaints about special event usage during the
40 course of its research. As a result, the permission form includes two checkboxes: one
41 that gives blanket permission for special event use in addition to day-to-day use, or a box
42 that requires separate permission for special event use. While the trail stewards may not
43 be aware of each and every special event, they do have the responsibility to educate trail
44 users to any special requirements and to make sure that if they are aware of a special
45 event that permission has been secured if required by the landowner.

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Easements: Annual written or verbal agreements can be rescinded at any time and as such do not make for a secure trail. Permanent easements are the only way to guarantee that the trail, once agreed upon, will remain in place. Some landowners may not be averse to granting a permanent easement on their land for trail use. A trail easement should be drafted by an attorney and once signed, recorded in the land records. Some landowners may require payment for the trail easement. Stewards should look to grant programs and fundraising to secure money for the purchase of easements.

10 Section 2.12 Landowner Appreciation

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As cited in § 2.5 above, meeting annually with landowners is a minimum best practice on the part of trail stewards. Even better practice is to have an event each year that gives the trail stewards and users an opportunity to thank the landowners, or to send them some sort of thank you for the continued use of their land. We have heard of annual picnics, the free distribution of a trail fund-raising calendar to landowners, and service days for landowners where trail users help with projects for the landowner. Landowner appreciation can be shown many ways; we encourage stewards to be creative. This to the Trails Committee sounds like a great way to build trail community and have fun while you're doing it.

CHAPTER 3: SUSTAINABLE TRAIL DESIGN

So you have met with the landowners and secured at least provisional approval to go ahead with designing a trail. The goal of good trail design is to produce a sustainable trail: one that is dry, easily maintained, and appropriate for the use it will receive. A sustainable design also means that the proposed construction techniques and materials will be available in the future should part of the trail need to be replaced; that materials used can be recycled; and considers whether recycled materials are appropriate for construction.³ Wherever possible, trail treads should be constructed with natural materials; drainage structures should be the least invasive of the natural area to achieve the desired drying; and crossing structures should be the minimum required to achieve trail continuity over fragile areas. First, some trail basics:

Section 3.1 Three Basic Components of a Trail Corridor

There are three basic components to a trail. They are:

1. Trail Tread: This is the surface of the trail that the user actually makes contact with while using the trail.
2. Trail Right-of-Way: This represents the cleared area around the treadway, including the width and height of clearing to accommodate the desired use.
3. Trail Buffer Zone: This is the area outside of the trail right-of-way that is used to buffer the impacts of: trail use from abutting neighbors; fragile natural habitat/resource areas; and to provide a more natural experience for trail users.⁴

Taken all together, the three trail components comprise the trail corridor.

Section 3.2 Trail Tread

A sustainable trail tread is one constructed of the correct natural materials. Ideal trail treads are constructed of a particle mixture of sand, clay and silt with a 20-50% gravel content. The seasonal depth to water table is 4 feet or more and slope⁵ is 0-5%. A trail tread that would require the most mitigation would be one with a high clay content with a seasonal high water table depth less than one foot and a slope greater than 20%. Soil types and depth to seasonal water table can be tested by digging small pits next to the

³ *Wetland Trail Design and Construction*, p 21 US Forest Service, University Press of the Pacific 2005.

⁴ *The Complete Guide to Trail Building and Maintenance* 3rd ed; Demrow & Salisbury, Appalachian Mountain Club Books 1998, Chapter 2.

⁵ "Slope is the number of feet of vertical rise per 100 feet of horizontal distance; expressed as a percentage...a 10% slope rises 10 feet vertically for every 100 feet traversed horizontally." *The Complete Guide to Trail Building and Maintenance* 3rd ed; Demrow & Salisbury, Appalachian Mountain Club Books 1998, pg 53.

1 proposed tread area.⁶ For trail treads that fall somewhere in between these two, varying
 2 degrees of mitigation and maintenance will be required to maintain the trail tread.

3
 4 **Section 3.3 Height and Width of Clearing**

5
 6 According to the Vermont Trails and Greenways Manual, the following general trail
 7 characteristics would be recommended for a trail for the following typical Underhill trail
 8 uses:⁷ Keep in mind these are suggested clearing limits; landowners and stewards can
 9 reach any accommodation they wish.

10

Trail Type	Recommended Tread Width	Cleared Width	Cleared Height	Recommended Maximum Grade	Surfaces	Bridges and Boardwalks
Hiking	18"-2'	3'-4'	8'	15% 25% for short stretches	Soil, stone	Rock crossings, timber, prefab bridges, or lumber boardwalks
Mt. Biking	18"-24"	2'-4'	8'	15%	Natural surface	Rock crossing or timber bridges
Horseback Riding	18"-30"	5'-6'	10'-12'	10%; 20% for less than 50 yds.	Natural surface	Flat, solid decking that doesn't bounce; min. 4' wide with strong high railings
X-Country Skiing	Varies, Depending on Terrain and Trail Design, Backcountry or Groomed ⁸	4'-6' Backcountry; 10'-12' Groomed ⁹	8' above average depth of snow	8%-25%	Snow	Min 8' wide and 4.5' railings

⁶ Id. A very useful chart entitled "Summary of Soil Indicators for Evaluation of A Proposed Trail Tread" is found on page 53 of the AMC Guide referenced here. Trail builders should refer to this chart for more details.

⁷ *Vermont Trails and Greenways Manual*, p 39 VT Trails and Greenway Council, 2007. Refer to this page for suggestions on trail characteristics for other types of uses.

⁸ The Trails Committee has amended the recommendation of the VT Trails and Greenways Manual here. The Manual recommends 8 feet.

⁹ The Trails Committee has amended the recommendation of the VT Trails and Greenways Manual here. The Manual recommends 4-6 feet.

1 Section 3.4 Contour Trails

2
3 When siting or re-locating trails, it is essential to walk the land multiple times to get the
4 best natural route for the trail. Contour trails are those that in general follow the contour
5 of the land. When designing a trail along the contour, grade reversals allow the trail to
6 shed water more easily. Grade reversals also create a more interesting and enjoyable
7 trail. While following the natural contours of the land, be sure that you avoid "fall line"
8 trails. These are trails that go straight up or down a hill. Water follows the path of least
9 resistance and will follow these trails, which in turn will cause erosion.

10
11 Section 3.5 Abutting Landowners and Set-backs

12
13 In discussing trail design with landowners, the steward should also consider the concerns
14 of abutting property owners. Underhill zoning regulations require setbacks from abutting
15 property lines for structures. While it is not clear that a trail in and of itself would be
16 considered a "structure," following the minimum 20' set-backs from adjoining property
17 lines for structures is a recommended best practice. This best practice for set-backs could
18 also be improved by screening the trail from abutting properties by planting native plants.
19 While ultimately the final siting of the trail will be the landowner's decision, if the
20 stewards can anticipate neighbor concerns and address them early on it may make things
21 easier for the landowner in the future and provide for a more secure trail site.

22 Section 3.6 Wildlife and Plant Habitat

23
24 Landowners and trail stewards should consult with the state wildlife biologist and the
25 Underhill Conservation Commission to determine if a proposed or existing trail has any
26 negative impacts on plant and wildlife habitat. Impacts on plant and wildlife should be
27 minimized. *See* § 3.8, 5.1, 5.2, & 5.3. For areas that are prone to wildlife interaction, a
28 best practice is to design the trail with few sharp curves and maintain a sight distance of
29 75' to 100' so that users and animals will have some reaction time should they encounter
30 one another.¹⁰ Scenic views and points of interest are also important considerations for
31 trail designers. When walking the existing or proposed trail, designers, stewards, and
32 landowners should be aware of interesting wildlife, plants, or views that the designers
33 may want to accommodate or identify for trail users.

34 Section 3.8 Riparian Buffer

35
36 Riparian buffers are vegetated areas next to water resources that protect water resources
37 from nonpoint source pollution and provide bank stabilization and [protection for]
38 aquatic and wildlife habitat.¹¹

¹⁰ *Wetland Trail Design and Construction*, p 12 US Forest Service, University Press of the Pacific 2005.

¹¹ University of North Carolina, <http://www.soil.ncsu.edu/publications/BMPs/buffers.html>
Another, more precise definition provided by the Agency of Natural Resources, State of Vermont is: " The
width of land adjacent to lakes or streams between the top of bank or top of slope or mean water level and
the edge of other land uses. Riparian buffer zones are typically undisturbed areas consisting of trees,

1 Best Practice: Trails should be sited whenever possible with at least a 100' riparian
2 buffer of natural vegetation from streams. Stewards should discuss with landowners the
3 possibility of relocating existing trails and restoring riparian buffers with native plants. It
4 is highly recommended that any steward consult with the Underhill Conservation
5 Commission on appropriate riparian buffer plants to use when restoring riparian buffers
6 with native species.

7
8 According to the VT Greenways Manual, if possible, the very best practice around
9 streams is to maintain a riparian buffer of 330'. "This buffer will protect nearly all the
10 valuable functions in a riparian habitat, including high-quality cover for many wildlife
11 species." ¹² When constructing near streams, VT Greenways recommends giving trail
12 users access to a stream early on and then periodically throughout the length of the trail to
13 discourage random incursions into the buffer zone. For access areas, the
14 recommendation is to use large rocks to armor the streambank to prevent erosion.

15
16 Wetlands will also benefit from riparian buffers. Wetlands serve as critical habitat areas
17 for wildlife and plants; allowing the buffer from the trail will protect them from intrusion.
18 Scenic pull-offs for wildlife viewing can be incorporated into the trail design to allow
19 users the opportunity to observe the wetlands in certain areas while leaving the rest of the
20 wetland undisturbed.

21 22 Section 3.9 Permit Note

23
24 The 2011 Unified Land Use and Development Regulations may require a permit from the
25 Zoning Administrator or Development Review Board when development is proposed
26 within 100' of a stream or within 50' of any wetland. The Zoning Administrator¹³
27 should be consulted for each project to see which, if any, town or state permits are
28 needed. Stewards should be prepared to show that the proposed project meets the
29 requirements of the applicable sections(s) of the Unified Land Use and Development
30 Regulations. Certain structures (i.e. bridges) and encroachments may also require
31 additional review by the state and/or the Army Corps of Engineers. This can all be
32 coordinated through the Underhill Zoning Administrator. For more on permitting, see
33 Chapter 5. (Revised 6/11)

shrubs, groundcover plants, duff layer, and a naturally vegetated uneven ground surface, that protects the waterbody and adjacent riparian corridor ecosystem from the impact of these land uses." State of Vermont Agency of Natural Resources "Guidance for Agency Act 250 and Section 248 Comments Regarding Riparian Buffers" adopted 12/9/2005.

¹² Id p 54.

¹³ River Management Engineer: Chris Brunelle, 879-5631.
Section Chief, State Wetlands Coordinator: Alan Quackenbush, (802) 241-3761,
alan.quackenbush@state.vt.us
Vermont Fish & Wildlife Department: (802) 241-3700.
For Underhill regulation information and review, contact the Underhill Zoning and Planning Administrator,
Kari Papelbon, 899-4434 x 106; underhillzoning@comcast.net

1 Section 3.10 Mapping

2

3 A final element of trail design is to decide whether to map. If so, who will be responsible
4 for mapping the trail? how detailed will the map be? how widely will the map be
5 distributed? To keep usage local, landowners and stewards may choose to have the only
6 map on an informational kiosk at a trail head; it would not be made portable and private
7 user group mapping would be strongly discouraged. Or, a landowner may prefer to not
8 have a map of the trail at all. Conversely, all the landowners along the length of a trail
9 may be fine with mapping the trail and having that map distributed. Like trail usage
10 decisions, if all the landowners on the trail cannot agree on whether to map or not, the
11 decision must default to not mapping trails.

12

13

14

CHAPTER 4: SUSTAINABLE STRUCTURES

Section 4.1 Hardening the Trail Tread

When trails become slippery or muddy, users will oftentimes walk around that area creating "a vicious cycle of soil breakdown and trail widening."¹⁴ This is evidence of a trail that is not environmentally sustainable and in need of some trail hardening techniques. First, the trail should be examined as to location and slope and to determine if there is a better place or way to re-route the trail. If not then some structural assistance may be required. Examples of some of the drainage and crossing structures referenced here are depicted in Appendix E of this Handbook.¹⁵

Section 4.2 Drainage Structures¹⁶

There are two types of structures that could be constructed on a trail to protect the environment. They are drainage structures to remove water from the trail tread and thus reduce erosion of the tread, and crossing structures where there is either a wetland or a stream that require some type of bridge so as not to impact the natural landscape. In both instances, the appropriate structure will be determined by site conditions. Structures will be described below in a hierarchical fashion, starting with the least complicated and progressing on to the most complicated. The best practice here is to use the structure lowest in the hierarchy that adequately protects the environment in a sustainable manner. Drainage is a very important thing to consider.

A trail that does not shed water is not sustainable or enjoyable. One step to take to ensure proper drainage is to avoid low lying areas. If not possible, "armor" the low lying areas with rocks or build appropriate crossing structures. All drainage structures should be located near the top of a slope where erosion is occurring.

Drainage Ditches: According to the AMC, a proper drainage ditch should be 12"-18" wide at the bottom and 6"-8" deep. Ditch sides should slope gently out to avoid material from filling the ditch, which can happen if the ditch sides are too steep.¹⁷

Drainage Dips: Drainage dips are basically earthen berms that are built into the downslope side of a cross-trail drainage ditch where the grade is 5% or less. A ditch is dug across the trail at a sharp angle, (45°-50°) so that water flow is slowed to reduce erosion of the earthen mound. On the down-slope side of the ditch, make a berm 1'-2'

¹⁴ See *The Complete Guide to Trail Building and Maintenance* 3rd ed; Demrow & Salisbury, Appalachian Mountain Club Books 1998, 144.

¹⁵ Special thanks to the US Forest Service for granting permission to reprint their figures from *Wetland Trail Design and Construction*.

¹⁶ For complete instructions it is recommended that Chapter 7 of AMC's *The Complete Guide to Trail Building and Maintenance* be reviewed.

¹⁷ Id at 68.

1 thick and 1'-2' high. For extra strength, rocks can be used at the foundation of the mound.
2 Water is diverted off the trail by the dip and into an outflow ditch that gradually
3 broadcasts the diverted water onto the downslope trail right of way and trail buffer.¹⁸

4 Rock or Wood Water Bars: Water should be redirected without its flow being changed
5 dramatically to avoid sedimentation and eventual clogging of the water bar and outflow
6 ditch. To construct a water bar, a trench is dug that extends off both sides of the
7 treadway. The angle of the trench should be 30°-50° to the treadway. The trench should
8 be deep enough that the water bar material will be flush with the downslope side once in
9 place.

10 For stone water bars, the stones should be placed in the trench with the flat surface
11 towards the uphill side of the ditch and slightly overlapped so that water does not leak
12 between them. For wood water bars, peeled rot resistant wood such as spruce, fir or
13 hemlock logs may be used. Set the logs to impede people or water from going around
14 them. Large rocks ("pin rocks") are put on each end of the log to hold it in place.

15 Once the stone or logs are in place, dig a ditch upslope of the water bar that extends
16 across the treadway to catch all the runoff. "Four feet uphill from the bar gradually slope
17 the ditch to the middle of the rock or log, leaving half the rock or log buried below the
18 bottom of the ditch."¹⁹ Next, backfill the water bar by packing soil against the downhill
19 side using the excavated ditch material and construct the outflow ditch off the lower end
20 of the water bar to broadcast the diverted water to the trail right of way and buffer.²⁰

21 Section 4.3 Crossing Structures²¹

22 Stepping Stones: For shallow streams or boggy areas, stepping stones are the first choice
23 for crossing structures. The stone surface should be flat and the stone thick enough to
24 stay above the water or mud. Larger rocks are preferable as they will be less likely to
25 move. Stepping stones may not be appropriate if the streambank will be eroded by
26 certain uses such as horseback riding and bikes.²²

27 Rock Treadway: Using stepping stones in a tight pattern, rock treadways are created
28 where stepping stones do not provide enough environmental protection. A rock box is a

¹⁸ See *The Complete Guide to Trail Building and Maintenance* 3rd ed; Demrow & Salisbury, Appalachian Mountain Club Books 1998, 127; *Wetland Trail Design and Construction*, US Forest Service, University Press of the Pacific 2005 pg 25.

¹⁹ Id 26.

²⁰ Id 119-126.

²¹ For complete instructions, see *The Complete Guide to Trail Building and Maintenance* 3rd ed; Demrow & Salisbury, Appalachian Mountain Club Books 1998, Chapter 7; and *Wetland Trail Design and Construction*, US Forest Service, University Press of the Pacific 2005 pg 21-41.

²² *The Complete Guide to Trail Building and Maintenance* 3rd ed; Demrow & Salisbury, Appalachian Mountain Club Books 1998, 146.

1 frame constructed of peeled rot resistant logs spiked together to form a box. The box is
2 buried halfway into the ground and filled tightly with stepping stones, or stones that are a
3 little smaller.²³

4 Turnpike: Used to elevate the trail above wet areas, turnpikes work best when installed
5 in areas with a 0-20% sideslope. Ditches are excavated on either side of the treadway
6 and geotextile material is placed first in the treadway and under the retainer rocks or logs
7 on the side of the treadway. Retainer logs should be rot-resistant and at least 6 inches in
8 diameter. Then the treadway is topped with high quality fill so that the fill crowns in the
9 center of the treadway and slopes out to the top of the retainer material. The crown of the
10 filled trail tread should be a minimum of 2 inches or 2% grade above the retainer.²⁴

11 Preservative Treated Puncheon: A puncheon is the next level of crossing structure in that
12 it rests on preservative treated log sleepers. The puncheon is a short-span crossing
13 bridge that consists of a treated base lumber (the "sleepers"); stringers are attached at 90°
14 angles to the sleepers; and treads are nailed perpendicularly across the stringers to create
15 the treadway. The sleepers can be 6x6 or 8x8 inch square timbers. Stringers are
16 attached to the sleepers with bolts or nails. Size of the stringers is determined by the type
17 of traffic the trail will have: foot traffic requires less size than equestrian traffic. Best
18 sustainable practice is to attach a nailer to the sides of the stringers and nail the tread to
19 the nailer. This way, when the treads need to be replaced, the stringers will not be
20 compromised by repeated replacement of the treads; instead the nailers will simply be
21 replaced as necessary.²⁵ For pressure treated lumber used in a wet area, the
22 recommendations of the Western Wood Preservers Institute of AWWPA Use Category
23 UC4A should be followed.²⁶

24 Gadbury: A gadbury is a structure using 2 half logs for a treadway attached to a notched
25 sleeper. It generally requires more wood than a puncheon and requires more skill to make
26 and maintain. It is not considered as sustainable as the bog bridge.²⁷

27 Bog Bridges: A bog bridge consists of sleepers topped by planks. The sleeper is placed
28 in a shallow trench at right angles to the trail centerline. Another sleeper is placed in
29 another ditch located at right angles to the trail centerline approximately 6'-9' away from
30 the first ditch. This is continued until the desired span is reached. The sleepers are
31 notched wide enough to hold the plank that will be the treadway. Planks are put in place,

²³ Id.

²⁴ *Wetland Trail Design and Construction*, US Forest Service, University Press of the Pacific 2005
pg 22-24.

²⁵ Id at 36-38

²⁶ *Guide to Pressure Treated Wood Characteristics, Use, Specifications* Western Wood Preservers Institute.
Document is on file at the Underhill Town Hall in the Trails Committee file for review.

²⁷ *Wetland Trail Design and Construction*, US Forest Service, University Press of the Pacific 2005 pg. 38.

1 sawed to length, and nailed to the sleeper. If the area to be crossed is particularly wet, the
2 sleepers may be set on stone footings and stream banks may be armored with rock.²⁸

3 Section 4.4 Signs

4 While perhaps not recognized as such, a sign is another trail structure that may or may
5 not require permitting and can take on various forms. Best practice as always is to
6 consult with landowners for the type of signs they will allow.

7

8 Trail Signs: The trail should be clearly marked by the use of signs and/or trail blazes per
9 the landowner's wish. The more clearly a trail is signed the less chance that users will
10 wander from the trail. Where the trail intersects with a private trail or a protected natural
11 area on land that is not part of the designated trail, it is a recommended best practice that
12 a small sign shall be posted that reads, "The area beyond this sign is (private property/a
13 protected natural area). Please stay on the designated trail."²⁹

14

15 It is also a recommended best practice to design signs using a vertical format/or a single
16 wide post to minimize beaver and moose damage.³⁰ Signs can also be used to point out
17 unique natural features along the trail if that is desired by the trail stewards and approved
18 by the landowner.

19

20 Theft Prevention: Some trail signs may be irresistible to vandals. To discourage theft
21 and/or vandalism, a best practice recommendation is to use stainless steel wood screws
22 that require either an Allen wrench or other type of special screwdriver for removal.³¹

23

24 Trail Blazes: Not all landowners may wish to have signs on their land or feel that signs
25 may not be in keeping with the primitive nature of a proposed trail. In these instances
26 trail blazes may be used. Trail blazes may consist of a specified color painted on a tree or
27 small colored medallions either attached to a tree or affixed to a post.

28

29 Informational Kiosk: Informational kiosks that depict the trail and natural features that
30 can be seen while on the trail are structures that should be considered by trail stewards
31 near each parking area. According to the AMC, a best practice for keeping trail usage
32 local is to site the kiosk not at the parking area but about 50'-100' in on the trail. Again,
33 having a kiosk would require landowner permission and the information contained
34 therein can vary greatly.

35

²⁸ Id at 39-40.

²⁹ Credit to the Hazen's Notch Association for the wording of this sign.

³⁰ See *Wetland Trail Design and Construction*, pp12-13, U.S. Forest Service Federal Highway Administration 2005 on file at the Underhill Town Hall.

³¹ *Wetland Trail Design and Construction*, US Forest Service, University Press of the Pacific 2005 pg. 52.

1 For instance, the kiosk could have a statement that the designated trail consists of private
2 and/or public lands and that trail users must stay on the trail so as not to lose the use of
3 the private lands or disturb protected natural areas on public lands. Another suggested
4 piece of information for a kiosk is to include hunting information. Natural features
5 information can also be included and it may be desirable to have that information
6 portable for trail users to reference while on the trail. The Underhill Conservation
7 Commission should be consulted when compiling this information for any trails in
8 Underhill.

9 Section 4.5 Parking Areas

10
11 Off-road parking for trail access should be sufficient so that cars are not parking in a
12 public or private right-of-way. This is a safety concern: when residents and emergency
13 vehicles cannot access residences, the potential for serious problems arise. Trail stewards
14 may want to consider towing as an option to remove vehicles from rights of way and
15 should discuss this option with landowners after making sure that this is a legal option.
16 Trail designers should bear in mind that the potential for greater density of trail use at any
17 one times increases as the size and accessibility of the parking area increases.³²

18
19 Parking areas must be identified and approval of a curb cut by the Underhill Selectboard
20 must be obtained if accessing off of a Town road. See § 5.4. All parking areas require
21 landowner approval. If the access is off a private road or driveway, trail stewards should
22 consult with landowners and affected neighbors for permission and to ascertain that there
23 are no private covenants restricting such use. Finally, a best practice for stewards would
24 be to patrol the trail access area from time to time and place windshield reminders not to
25 park in the right-of-way.

26

³² See *The Complete Guide to Trail Building and Maintenance 3rd ed*; Demrow & Salisbury, Appalachian Mountain Club Books 1998, pg 42.

CHAPTER 5: PERMITTING^A

Section 5.1 Why Get a Permit?

As noted earlier, obtaining the required federal, state, and/or local permit is not meant to make the trail design process more complicated or to insert "big brother" into things. Instead, getting the proper permits is the steward's guarantee to landowners and all trail users that they have developed a trail that complies with environmental protection and land use regulations. This is what brings the trail into synch with the underlying conservation ethic of environmental protection that was discussed in the introduction.

Now is a good time to reiterate that the permittee is generally the landowner, so trail stewards must work with landowners to secure all the proper permits for the trail. Failure to get a permit or to comply with the permit conditions constitutes a land use violation for the landowner, not a user group or steward. A best practice is for stewards to offer to pay for all permits, to file all the required paperwork with the proper agency, and ensure, as part of their stewardship, compliance with all permit requirements and conditions, if any.

Stewards should be aware that permitting may take extra time depending on the permitting authority and project. This time can be considerably reduced if stewards are aware of permit application requirements and submit complete permit applications. It is recommended that trail stewards talk to the Underhill Zoning Administrator before starting any kind of work on a trail. The Administrator can determine what permits, if any, you will need; provide contact information for the correct agency(ies) where necessary; and help you understand permitting requirements and process. Below is an outline of some permits that may be required as noted in § 3.9.

Section 5.2 Federal Permits

Even if federal funds are not being used for a trail, ethics suggests that the stewards voluntarily comply with the intent of the National Environmental Policy Act (NEPA), which requires a consideration of the potential adverse effects the trail may have on the environment, and also the Endangered Species Act which protects rare, threatened and endangered plants and animals. The stewards should consult with the Underhill Conservation Commission as to potential environmental impacts. If the trail encroaches on waterways regulated by the Army Corps of Engineers, then a permit from the Corps may be required.

Section 5.3 State Permits

State permits may be required depending on the type of trail use and where it is located. Potential state permits are: a Stream Alteration permit for any stream crossings; a Wetlands Permit if any activity occurs within a wetland and associated buffer; and if any structures are to be placed in a floodplain, a site plan review and recommendations by the State Floodplain Coordinator's office. After a discussion with the Underhill Zoning

1 Administrator, the stewards should contact the appropriate state agency for permitting
 2 requirements. The stewards should also consult with state biologists and the Underhill
 3 Conservation Commission if there are concerns with plant or wildlife trail impacts.

4
 5 Section 5.4 Local Permits

6
 7 Under the 2011 Unified Land Use and Development Regulations, many structures and
 8 uses require a permit from the Zoning Administrator and/or approval by the Development
 9 Review Board. Any structures put in place without the proper permitting constitutes a
 10 local zoning violation for the landowner. Impacts to wetlands are also regulated. In
 11 addition, parking area access off a Town Road will require an access permit from the
 12 Underhill Selectboard.

13
 14 To determine if a proposed trail or structure requires a permit or additional approval,
 15 contact the Underhill Zoning Administrator.

16
 17 Section 5.5 Permit Chart

18 Below is a Chart of some of the permits that may be required. This chart is provided as
 19 guidance for potential project permitting that may be required. Before beginning any
 20 work on a trail, contact the Underhill Zoning Administrator for a project review.³³

PROJECT DESCRIPTION	TYPE OF PERMIT THAT MAY BE REQUIRED
Trail Creation/Maintenance w/ Federal Funds	NEPA/Endangered Species Act Compliance
Construction/Maintenance near Army Corps of Engineers-Regulated Waters	Corps Permit/Permission
Stream Crossing	Corps Permit/State Stream Alterations Permit/Town Permit(s)
Construction/Maintenance of Trail or Infrastructure w/in Wetland Buffer	Corps Permit/State Conditional Use Determination/ Town review/approval/permit
Construction/Maintenance of Trail or Infrastructure in Floodplain	Review by State Floodplain Coordinator/Town ZA review (minimum), Development Review Board approval (if necessary)
Creation/Maintenance of Trail Infrastructure	Depends on project
Trail Near Mapped Deer Yard	Review by VT Fish and Wildlife (minimum)
Access to Parking Areas off Town Road	Curb Cut Permit from Underhill Selectboard

23
 24
 33 899-4434 x 106.

1

2 **CONCLUSION**

3 **Sustainable Trails and the Trail Notebook**

4

5 As you can see, there are many decisions that must be made when in the process of designing and
6 maintaining a new trail or maintaining an existing trail. To make the trail notebook an active
7 reflection of those decisions, the trail stewards should update the notebook to include those decisions
8 as they are made. In the end, you will have a reference guide for your trail that includes: trail design
9 basics such as the type of trail use and the width and height limits of clearing on the trail; conditions
10 for landowner approval; a description of what types of trail structures will be used where; a copy of the
11 permits for those structures, if necessary; any accommodations for fragile habitat areas; what signage,
12 if any, will be used; where the parking for the trail will be and permission for parking areas secured;
13 and what, if any, mapping is going to be done on the trail.

14

15 If trail stewards and landowners follow the agreed upon trail guidelines as set forth in the trail
16 notebook, then we may all look forward to years of trail enjoyment in Underhill.

APPENDIX A

Initial Letter to Landowners

XYZ User Group
Underhill, VT

Date

John and Mary Smith
Main Street
Underhill, VT

Dear John and Mary:

I am writing as a member of [private user group], a group of local people who [insert short history of your organization or membership here]. One thing we have learned since our incorporation is the importance and necessity of private landowners being an active part of any trail discussion that would encompass a trail on or near private lands.

Currently, your land [contains an existing trail/abuts land that contains an existing trail/is part of a proposed new trail system]. What we, the [private user group] would like to do is to meet with you to discuss the potential of working in partnership with you to [maintain and improve the existing trail/develop a new trail].

As a volunteer trail organization, we would not presume to maintain or create a trail on your land without your express permission first. We would like to meet with you at your convenience to discuss if you are interested in having our organization be a part of the [development/maintenance] of [a/the] trail on your land. To help facilitate the discussion, we are using the recommendations of the Underhill Trails Handbook as a guide to the best practices for establishing and maintaining trails in Town. We have enclosed a copy of the Handbook with this letter for your review. We are committed to being trail stewards as outlined in the Handbook and for obtaining informed landowner consent before any trail activities take place on your land by our membership.

You will be contacted shortly by [_____] of our organization to see if you are willing to meet. The meeting would, of course, be at a time and place of your convenience.

Thank you for your consideration of this proposal. We look forward to speaking with you.

Sincerely,

XYZ User Group

APPENDIX B

Vermont Statutes: Exemptions from Landowner Liability

Below are printed the relevant state statutes for protecting landowners from liability for recreational use on their land.

Title 12: Court Procedure Chapter 203: Limitations On Landowner Liability

12 VSA § 5791: Purpose

The purpose of this chapter is to encourage owners to make their land and water available to the public for no consideration for recreational uses by clearly establishing a rule that an owner shall have no greater duty of care to a person who, without consideration, enters or goes upon the owner's land for a recreational use than the owner would have to a trespasser. (Added 1997, No. 110 (Adj. Sess.), § 1.)

12 VSA § 5792: Definitions

As used in this chapter:

(1) "Consideration" means a price, fee or other charge paid to or received by the owner in return for the permission to enter upon or to travel across the owner's land for recreational use. Consideration shall not include:

(A) compensation paid to or a tax benefit received by the owner for granting a permanent recreational use easement;

(B) payment or provision for compensation to be paid to the owner for damage caused by recreational use; or

(C) contributions in services or other consideration paid to the owner to offset or insure against damages sustained by an owner from the recreational use or to compensate the owner for damages from recreational use.

(2)(A) "Land" means:

- (i) open and undeveloped land, including paths and trails;
- (ii) water, including springs, streams, rivers, ponds, lakes and other water courses;
- (iii) fences; or
- (iv) structures and fixtures used to enter or go upon land, including bridges and walkways.

(B) "Land" does not include:

- (i) areas developed for commercial recreational uses,
- (ii) equipment, machinery or personal property, and
- (iii) structures and fixtures not described in subdivision (2)(A)(iii) or (iv) of this section.

(3) "Owner" means a person who owns, leases, licenses or otherwise controls ownership or use of land, and any employee or agent of that person.

(4) "Recreational use" means an activity undertaken for recreational, educational or conservation purposes, and includes hunting, fishing, trapping, guiding, camping, biking, in-line skating, jogging, skiing, swimming, diving, water sports, rock climbing, hang gliding, caving, boating, hiking, riding an

animal or a vehicle, picking wild or cultivated plants, picnicking, gleaning, rock collecting, nature study, outdoor sports, visiting or enjoying archeological, scenic, natural, or scientific sites, or other similar activities. "Recreational use" also means any noncommercial activity undertaken without consideration to create, protect, preserve, rehabilitate or maintain the land for recreational uses. (Added 1997, No. 110 (Adj. Sess.), § 1.)

12 VSA § 5793. Liability limited

(a) Land. An owner shall not be liable for property damage or personal injury sustained by a person who, without consideration, enters or goes upon the owner's land for a recreational use unless the damage or injury is the result of the willful or wanton misconduct of the owner.

(b) Equipment, fixtures, machinery or personal property.

(1) Unless the damage or injury is the result of the willful or wanton misconduct of the owner, an owner shall not be liable for property damage or personal injury sustained by a person who, without consideration and without actual permission of the owner, enters or goes upon the owner's land for a recreational use and proceeds to enter upon or use:

(A) equipment, machinery or personal property; or

(B) structures or fixtures not described in subdivision 5792(2)(A)(iii) or (iv) of this title.

(2) Permission to enter or go upon an owner's land shall not, by itself, include permission to enter or go upon structures or to go upon or use equipment, fixtures, machinery or personal property. (Added 1997, No. 110 (Adj. Sess.), § 1.)

12 VSA § 5794. Landowner protection

(a) The fact that an owner has made land available without consideration for recreational uses shall not be construed to:

(1) limit the property rights of owners;

(2) limit the ability of an owner and a recreational user of the land to enter into agreements for the recreational use of the land to vary or supplement the duties and limitations created in this chapter;

(3) support or create any claim or right of eminent domain, adverse possession or other prescriptive right or easement or any other land use restriction;

(4) alter, modify or supersede the rights and responsibilities under chapters 191, animal control, and 193, domestic pet or wolf-hybrid control, of Title 20; under chapters 29, snowmobiles, and 31, all-terrain vehicles, of Title 23; under chapter 23, bicycle routes, of Title 19; and under chapter 20, Vermont trail system, of Title 10;

(5) extend any assurance that the land is safe for recreational uses or create any duty on an owner to inspect the land to discover dangerous conditions;

(6) relieve a person making recreational use of land from the obligation the person may have in the absence of this chapter to exercise due care for the person's own safety in the recreational use of the land.

(b) Nothing in this chapter shall create any presumption or inference of permission or consent to enter upon an owner's land for any purpose.

(c) For the purposes of protecting landowners who make land available for recreational use to members of the public for no consideration pursuant to this chapter, the presence of one or more of the following on land does not by itself preclude the land from being "open and undeveloped": posting of the land, fences, or agricultural or forestry related structures. (Added 1997, No. 110 (Adj. Sess.), § 1; No. 147 (Adj. Sess.), § 190a.)

12 VSA § 5795. Exceptions

This chapter shall not apply to lands owned by a municipality or the state. (Added 1997, No. 110 (Adj. Sess.), § 1.)

Title 10: Conservation and Development
Chapter 20: Vermont Trails System

10 VSA § 443. Vermont trails system

The Vermont trails system shall consist of those individual trails recognized by the agency of natural resources with the advice of the greenways council. The agency, with the advice of the council, shall establish criteria for recognition of single use and shared use trails. (Added 1993, No. 211 (Adj. Sess.), § 28.)

10 VSA § 448. Landowner liability

No public or private owner of land which is a part of the Vermont trails system shall be liable for any property damage or personal injury sustained by any person using these trails unless the public or private owner intentionally inflicts the damage or injury. (Added 1993, No. 211 (Adj. Sess.), § 28.)

APPENDIX C

Landowner Trail Use Permissions/Preferences Checklist

Date: _____

Property Owner: _____

Location of Property: _____

Trail Stewards: _____

Contact Information: Tel: _____ **Email:** _____

Mailing Address:

Please check the type of activity that would be permitted on your property and season(s) that you would approve of the activity taking place:

ACTIVITY	SPRING	SUMMER	FALL	WINTER
Walking				
Running				
Mountain Biking				
Cross-Country Skiing				
Snowshoeing				
Dirt Biking				
ATVs				
Snowmobiling				
4-Wheeling (SUVs)				
Horseback Riding				
Other Activities <i>Please Specify:</i>				

Special Event Usage:

- No Special event permission required**
- Special event permission required**

How many users would trigger the special event permission requirement? _____

Time of Day during which you approve usage of trails:

(Please enter times)

- No Restrictions Mornings _____
- Mid-Day _____ Evenings _____
- Nights _____

- Dogs on Trails:** No Restrictions Not Permitted
- With Leash Only Leash use near buildings or animals

Prohibited Activities: _____

Weather/Ground Cover Conditions:

- No Restrictions Not When Muddy
- Not when snow covered Only when snow covered
- Only when water ways are frozen
- Other: _____

Should activities be limited during hunting, fishing, or trapping seasons?

- Hunting: Yes No
- Fishing: Yes No
- Trapping: Yes No

Do you have a "Safety Zone" posting on your land? Yes No

Is your land posted for hunting? Yes No

Will parking be allowed on your property? Yes No

Will you allow the trail on your property to be mapped? Yes No

Do you have any other preferences or concerns?

APPENDIX D

Sample Trail Document

Trail Name: _____

Landowner Name: _____

Landowner Contact Information: _____

Trail Steward: _____

Personal Representative: _____

Representative Contact Information: _____

Date of Landowner Meeting(s): _____

Permitted Trail Uses: Attach Landowner Trail Use/Permission Checklist

Permit Required? Yes No

If "Yes" list permits and conditions if any:

1. _____

2. _____

3. _____

Trail Design/Infrastructure Agreements: Please check if discussed and attach sheets detailing agreements:

Tread Width Cleared Width Cleared Height Max. Grade

Surface Crossing Structures Drainage Structures

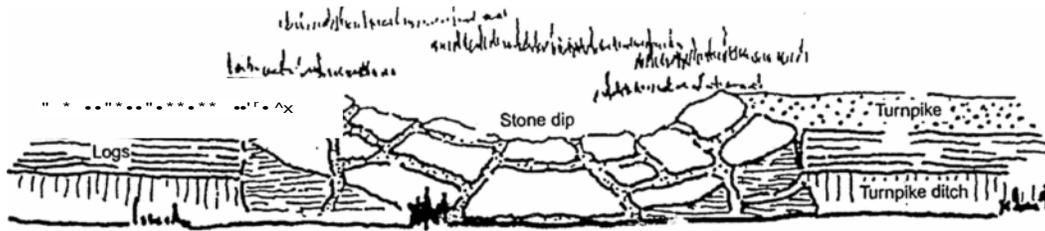
Signs Parking Areas

Maintenance Agreements: Please check if discussed and attach sheets detailing agreements:

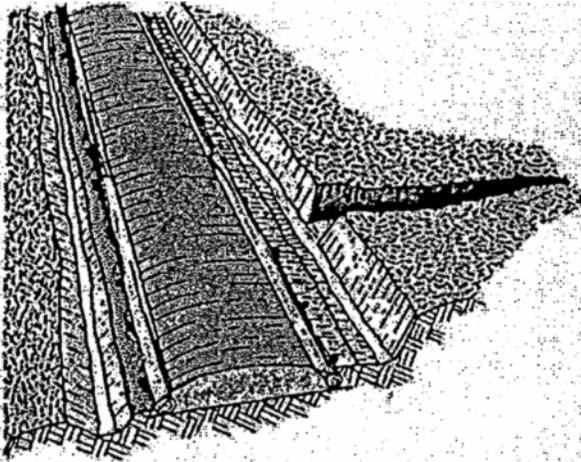
Clearing Drainage Clearing Blow-downs Brushing Blazing/Marking

APPENDIX E Drainage and Crossing Structures

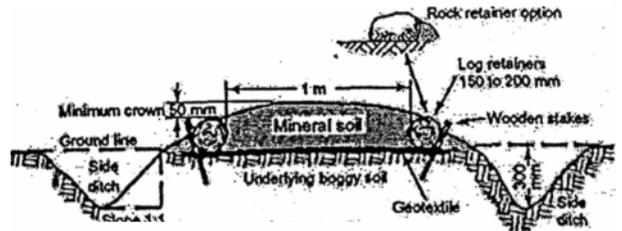
Dips



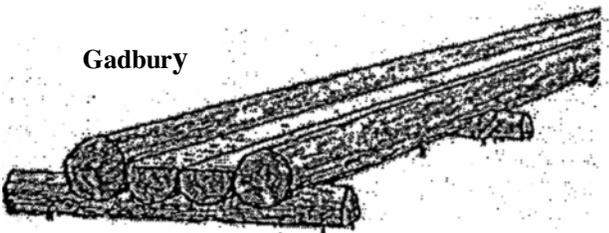
Turnpike



Geotextile Placement



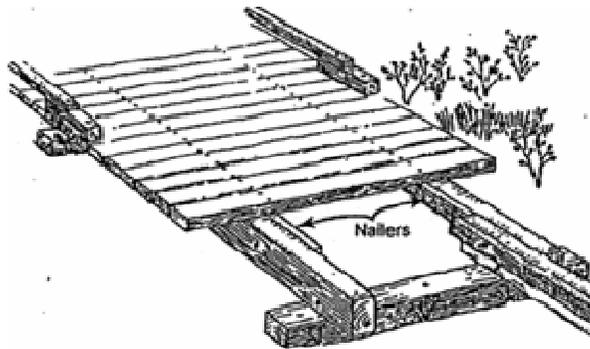
Gadbury



Bog bridge with sleepers



Preservative-treated puncheon



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1

2

APPENDIX F

3

References

4

5 *The Complete Guide to Trail Building and Maintenance* 3rd ed; Demrow & Salisbury,
6 Appalachian Mountain Club Books 1998.

7

8 *Wetland Trail Design and Construction*, US Forest Service, University Press of the
9 Pacific 2005.

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11 *Vermont Trails and Greenways Manual*, VT Trails and Greenway Council, 2007

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13 *Guide to Pressure Treated Wood Characteristics, Use, Specifications* Western Wood
14 Preservers Institute. Document is on file at the Underhill Town Hall in the Trails

15 Committee file for review.

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