

Peter A. Krusch Nature Preserve Trail Extension Planning Project

Cambridge, Vermont



Submitted to:

Sally Laughlin of Cambridge, VT

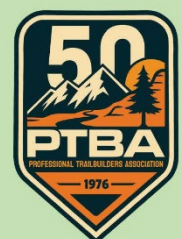
Krusch Nature Preserve Committee

Prepared by:

Erin Amadon, Trail Planner and Builder

Town 4 Trail Services, LLC

Providing access to nature through trails



Peter A. Krusch Nature Preserve Trail Extension Planning Project

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Peter A. Krusch Trail Extension Planning Summary

Introduction

In late 2025, Town 4 Trail Services, LLC was contacted to conduct a trail assessment and develop a trail extension plan for the Peter A. Krusch Nature Preserve. This planning summary outlines the proposed Krusch Trail extension and highlights key considerations for future trail development. The document assesses opportunities to enhance recreational access, improve trail connectivity, and support long-term sustainability while protecting natural resources. Recommendations are intended to guide future planning, design, and implementation to create a durable and enjoyable trail experience for visitors.

Town 4 Trail Services, in collaboration with members of the Krusch Nature Preserve Committee, conducted a site visit and reviewed conceptual trail maps to evaluate opportunities for future trail development. Based on field observations and project objectives, sustainable trail alignment modifications were developed to balance recreational access with environmental stewardship while maintaining a high-quality hiking experience. The resulting plan includes detailed trail alignments, drainage improvements, and construction specifications consistent with sustainable trail design principles. The document outlines recommended environmental mitigation measures and construction methods to support sustainable trail development.

Trail Improvement Overview

This document includes trail planning services following the principles of sustainable layout and design, focusing on creating a positive user experience, sustainable grades, following the half rule, constructing an outsloped treadway, incorporating frequent grade reversals, making provisions for sheet flow, building with an erosion-resistant material, and resulting in a trail that is low maintenance.

Below, I have outlined the planning and construction details of the Peter A. Krusch Nature Preserve Trail Addition. All sections of this document work together to provide detailed information on the trail layout and the construction guidelines for each linear foot of the treadway.

Field Documentation Methodology

Field flagging was the primary method for identifying and documenting proposed trail alignments, drainage considerations, trail structures, and areas requiring specific construction treatments. GPS tracking was used in conjunction with the field flagging to capture these locations and provide an accurate reference for the proposed improvements. Together, these methods provide the framework for the key design considerations included in these trail planning documents.

A photographic log accompanies this report and provides a visual reference to conditions and proposed improvement areas. The photo log is organized by trail segment and includes images documenting terrain, drainage features, recommended trail locations, and other site-specific observations. These photographs support the planning recommendations by allowing reviewers, contractors, and stakeholders to better understand the existing conditions and proposed solutions.

Field flagging, GPS tracking and photographic documentation provide valuable reference points for implementation. Minor variations may occur during construction due to final layout adjustments, site conditions, and the dynamic nature of the forest environment.

Project Quantities

The table below summarizes the total number of construction items required for the construction and rehabilitation of the proposed trails. These quantities should be used for construction estimates.

Dragon Brook Trail Extension		
Item	Unit	Quantity
Corridor Clearing	Linear Foot	580
Erosion Control Mulch	Linear Foot	580
Sidehill Benching	Linear Foot	580
Bench	Each	2
Bridge	Linear Foot	15
850 Linear Feet		

Dragon Brook Trail Extension to the Birch		
Item	Unit	Quantity
Corridor Clearing	Linear Foot	1,247
Sidehill Benching	Linear Foot	1,247
Benches at the Birch	Each	3
Bridge	Linear Foot	27
1,247 Linear Feet		

Existing Woods Road and "Tukka" Relocation		
Item	Unit	Quantity
Corridor Clearing	Linear Foot	1,108
Sidehill Benching	Linear Foot	1,093
Bog Bridging	Linear Foot	56
Bridge	Linear Foot	22
3,559 Linear Feet		

I recommend that the Dragon Brook Trail Extension, the Dragon Brook Extension to the Birch, and the "Tukka" Relocation be constructed by a qualified contractor to ensure the work is completed efficiently and adheres to sustainable trail construction practices. Contractor support will help address the sidehill benching sections, drainage, and tread improvements, while volunteer efforts could be utilized for bridge construction and other smaller-scale trail features where appropriate.

Trail Construction Specifications Overview

The following trail construction specification categories define the anticipated field conditions, recommended trail improvements, and applicable construction approaches identified for the Peter A. Krusch Nature Preserve extension project. These definitions should provide a consistent framework for describing the construction methods to be used in the construction of this project.

Erosion Control Specification

Erosion control measures are trail construction practices used to manage water flow, reduce soil loss, and protect the long-term durability of the trail tread and surrounding landscape. Erosion control practices should follow applicable trail design standards and state guidance, including required best management practices for maintaining water quality, managing runoff, and protecting sensitive areas during construction and long-term

trail use. Erosion control measures may include the use of erosion control mulch, silt fencing, compost filter socks, and other stormwater BMPs to stabilize exposed soils, reduce sediment movement, slow runoff, and protect nearby water resources during and after trail construction.

Corridor Clearing

The trail corridor is defined as the edge of the clearing, with vegetation limits extending an equal distance on either side of the trail treadway. Determining the dimension of corridor clearing is directly tied to the user group and trail type. In general, the corridor is cleared an additional width of 1 foot to 2 feet either side of the trail tread.

Sidehill Benching (Full Bench Cut)

A full-bench cut is created by excavating across the hillside to form the desired trail tread. Excavate the entire treadway to compacted mineral soil at the desired width and grade, with a 2%-5% out-slope treadway.

Grade Reversal, Rolling grade dip, Knick

Frequent grade reversals are an essential aspect of sustainable trail layout and design. A grade reversal is created when the running grade of the trail either increases or decreases, levels off, creating a low area in which the water can drain off the trail, and then either the running grade increases or decreases. Simply stated, a grade reversal is a change in elevation with a low area in which water can drain off the trail. Grade reversals should be installed as frequently as possible based on soil types and running grade. Rolling grade dips and Knicks serve the same purpose as a grade reversal, but are installed into existing trails.

Tread definition and selective root removal

This work involves clearing leaf litter, stumps, and stones that impede access, resulting in a clearly defined and walkable trail tread. In sections where more than 50% of the surface is covered with stone, the scope expands to include repositioning loose rocks, reshaping or setting embedded stones, and leveling larger flat stones to establish a stable tread. Voids between stones are filled to ensure a smoother, safer walking surface. Selective root removal is performed using proper pruning techniques to minimize damage to surrounding vegetation.

Crush and Fill

Crush and fill is used to create a stable, durable tread by filling voids, smoothing irregularities, and reinforcing high-use or erosion-prone sections. This method involves placing angular, fist size stones or smaller into low spots and then filled on top with 6 inches of mineral soil. Crush and fill is taken from borrow pits onsite, hidden from view of the trail.

Bog Bridge

Bog Bridges are used for pedestrian-only trails where the terrain is flat, and there is no way to drain the water off the tread surface. Bog bridging elevates the treadway, providing dry footing and allowing soils surrounding the structure to stabilize, eventually leading to revegetation of the surrounding soil. As bog bridges are typically set in wet, muddy areas, they consist of a section of wooden planks set across base logs, placed end to end down the trail. Rot-resistant wood is preferred for bog bridges, typically Northern White Cedar, Locust, White Oak (planks), Hemlock, or Pressure Treated Lumber. The type of wood will determine the required dimensions for construction to avoid premature breakage. Generally speaking, you do not want the plank to flex more than approximately 1-inch with a 200-pound person.

Bridge Construction Specification

A bridge is a trail structure designed to provide a stable crossing over streams, drainage features, wetlands, or other trail obstacles while maintaining a sustainable trail alignment and minimizing impacts on surrounding

resources. Bridges are typically constructed to provide adequate clearance for water flow and natural processes while supporting safe and durable visitor use. Bridge design and construction methods vary depending on site conditions, span length, and anticipated use. Stream crossing structures should be designed in accordance with applicable standards, including the International Building Code (IBC) where appropriate, as well as any local, state, or permitting requirements. Materials, foundations, and decking systems should be selected based on durability, site conditions, and long-term maintenance considerations.

Trail Bench

Trail benches provide designated resting areas and are located in appropriate areas along the trail where terrain, views, or trail conditions support visitor use. Bench installations include a durable, natural-material structure placed on a stable, level bench pad with proper drainage and long-term maintenance issues. Benches are constructed at a comfortable seating height, typically 17-19 inches above the finished ground surface, with sufficient depth and width to provide a stable, functional resting area.

Photographic Documentation

The photo documentation can be found on the following pages.

Peter A. Krusch Trail Extension Planning Photo Documentation

Dragon Brook Trail Extension

Cambridge, Vermont



The Dragon Brook Trail extension will begin at the crest of the hill overlooking Dragon Brook on the existing trail.

Begin light benching and erosion-control mulch along the entire trail extension, approximately 580 linear feet.

Install a new bench overlooking the brook.



Peter A. Krusch Trail Extension Planning Photo Documentation

Dragon Brook Trail Extension

Cambridge, Vermont

Photo 2

Sweep the trail and full sidehill bench cut using the subtle cross slope throughout this section.

Continue erosion-control mulch along the entire trail extension, approximately 580 linear feet.



Sweep the trail and full sidehill bench cut throughout this section.

Continue erosion-control mulch along the entire trail extension, approximately 580 linear feet.

Install a 15 linear foot bridge over drainage swale.



Sweep the trail and full sidehill bench cut throughout this section.

Continue erosion-control mulch along the entire trail extension, approximately 580 linear feet.



Peter A. Krusch Trail Extension Planning Photo Documentation

Dragon Brook Trail Extension

Cambridge, Vermont

Photo 5

Install a new bench overlooking the brook.

Continue erosion-control mulch along the entire trail extension, approximately 580 linear feet.



Sweep the trail and full sidehill bench cut throughout this section.

Continue erosion-control mulch along the entire trail extension, approximately 580 linear feet.



Sweep the trail and full sidehill bench cut throughout this section.

End erosion-control mulch once you sweep away from the brook and approach the access road parking area.



Peter A. Krusch Trail Extension Planning Photo Documentation
End of the Dragon Brook Trail Extension to the Birch
Cambridge, Vermont



Peter A. Krusch Trail Extension Planning Photo Documentation

End of the Dragon Brook Trail Extension to the Birch

Cambridge, Vermont

Photo 1

Sweep the trail and full sidehill bench cut throughout this section. Incorporate grade reversals where appropriate.



Peter A. Krusch Trail Extension Planning Photo Documentation

End of the Dragon Brook Trail Extension to the Birch

Cambridge, Vermont

Photo 2

Sweep the trail and full sidehill bench cut throughout this section. Incorporate grade reversals where appropriate.



Sweep the trail and full sidehill bench cut throughout this section. Incorporate grade reversals where appropriate.

Install a 15 linear foot bridge over drainage swale.



Sweep the trail and full sidehill bench cut throughout this section. Incorporate grade reversals where appropriate.

Install a 15 linear foot bridge over drainage swale.



Install a 12 linear foot bridge over drainage swale.

Sweep the trail and full sidehill bench cut sweeping away from the birch roots and create a semi-circle.

Install new benches overlooking the birch.



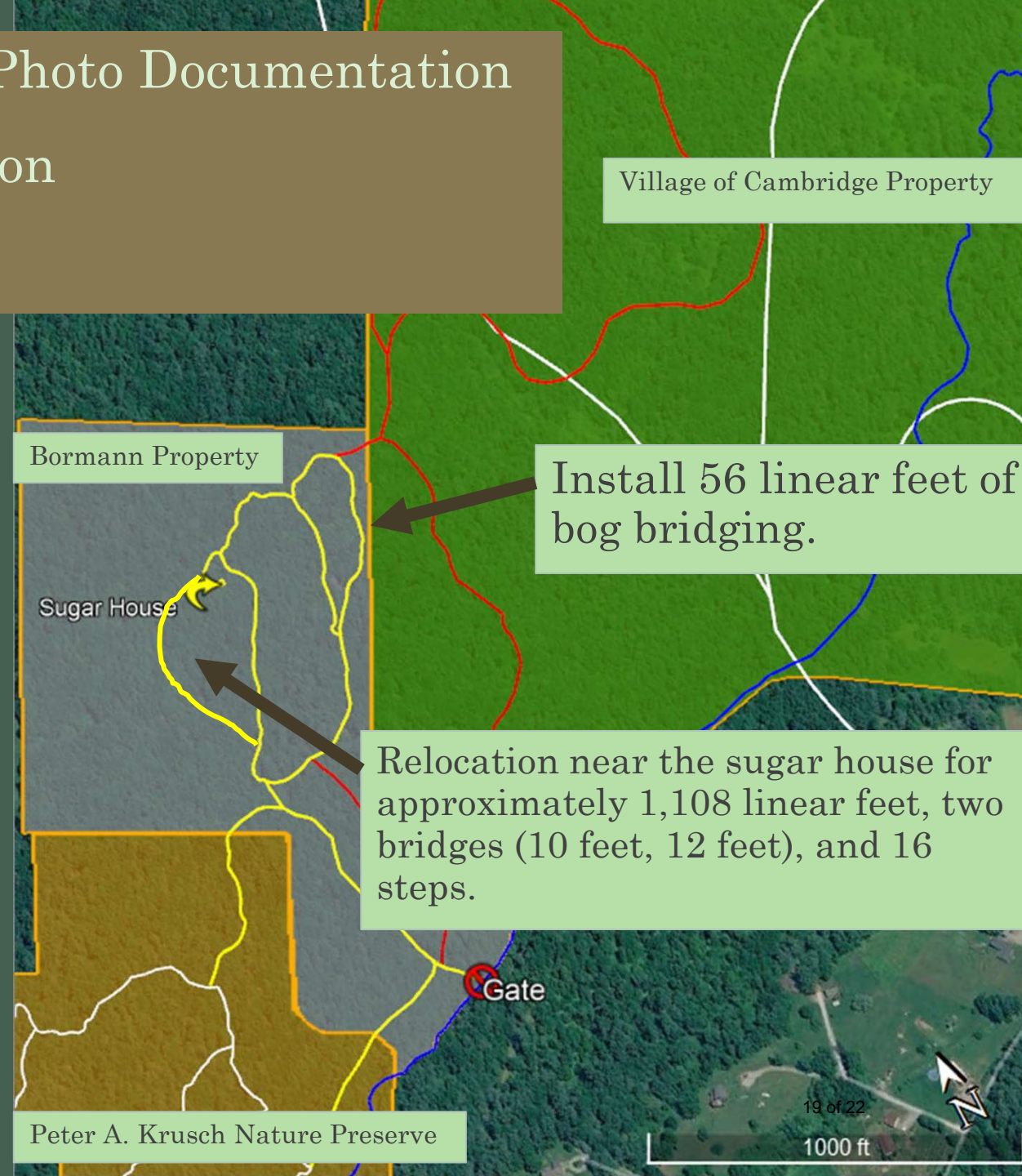
Peter A. Krusch Trail Extension Planning Photo Documentation

Existing Woods Road and “Tukka” Relocation

Cambridge, Vermont

Follow the existing woods road for the majority of this section.

This section will need approximately 56 linear feet of bog bridging, off-trail drainage, relocation of approximately 1,108 linear feet, two bridges (10 feet, 12 feet), and 16 steps.



Peter A. Krusch Trail Extension Planning Photo Documentation

Existing Woods Road and “Tukka” Relocation

Cambridge, Vermont

Photo 1

Follow the existing woods road and incorporate off-trail drainage at this location.

Have the contractor create the off-trail drainage while they are constructing the Dragon Brook Extension Trail.



Peter A. Krusch Trail Extension Planning Photo Documentation

Existing Woods Road and “Tukka” Relocation

Cambridge, Vermont

Photo 2

“Tukka” relocation
just past the sugar
house.

Install a total of 16
steps on this section
of the relocation.



Peter A. Krusch Trail Extension Planning Photo Documentation

Existing Woods Road and “Tukka” Relocation

Cambridge, Vermont

Photo 3

“Tukka” relocation.

Sweep the trail and full sidehill bench cut throughout this section. Incorporate grade reversals where appropriate.

Install a 12 linear foot bridge with guardrail over drainage swale.

