Haliburton Highlands Land Trust

Protecting the land we love for future generations

Trail Building Basics
A Resource for HHLT Partners in Conservation

This document is meant to be an introductory guide to trail construction. For greater detail, see online and other resources provided to assist in the next steps in your trail building project.

Glebe Park, Haliburton. Rick Whitteker 2019

Why build trails?

As a Partner in Conservation, the motivation for building trails might include being able to access more remote parts of your property, accessing unique habitats, a place to walk for exercise, an opportunity to spend time in nature with your family, improved ability to monitor changes on your property including forest health, viewing of wildlife, and monitoring species at risk.

Building trails is both an art and a science. The art comes from finding what are called positive control points. These are features on your property you would like to visit on your walks or unique spots you would like family and guests to see. These points could be areas of distinct habitat, creeks and other watercourses, rock faces, lookouts, boulders, or glacial erratics. Unique forest features like tree burls, large diameter trees, woodpecker holes or other evidence of wildlife can be incorporated into the trail route. Exploring and knowing your property will be an important first step in deciding where your trail should go.

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Unique looking trees can add variety to your trails. Variety of trails in Haliburton County. Rick Whitteker. 2016-2022

Things to Consider

The science of trail building comes from you understanding of concepts like fall line, contouring and erosion, all related to the management of surface water on your property. Like many of us, water always takes the path of least resistance. The science of trail design will help reduce the maintenance needed to keep the trails in good shape. Sustainable trail building will be very aware of minimizing impacts on sensitive environments, perhaps avoiding some areas completely that may be negatively impacted by human activity.

Trail building can be laborious, so approach your trail project in stages. Working in pairs will be safer and allow the sharing of ideas and problem-solving strategies. Trail work parties are a great way to get lots done in a short period of time.

Things to consider when building your trails.

1. For most public trails, a trail designer needs to know who is going to use the trail. For private trails, trail users will likely simply include friends and family and perhaps larger group events by invitation. If you plan to access your property by ATV, this will have a significant influence on the width and tread of the trial.
2. Keeping water off you trail. To minimize disturbance to your trail, you must build it with water in mind. Water movement across a trail is usually fine, water running down a trail will cause problems. Water pooling is mucky and can be hazardous.
3. Wildlife and plants add interest to you trail but minimizing your disturbance to their habitat is important. Avoiding sensitive plant areas like wetlands is a sustainable approach to trail building. Only cut trails to the width that is needed. The narrower the better.

4. Know your soils. Soils with a mixture of sand, silt and clay are the best. The tread or surface of the trail needs to be down to the mineral soil below the humus layer to compact properly and develop into a stable tread.

There's an App for that!

To plan your route, finding the features on your property that you would like incorporated into the trail would be a first step. Knowing where your property line ends and begins will be important to avoid straying on to other private property or Crown land. Keep your trails out of sight from other property owners or public land to help reduce the chance of trespassing.

Unique features can be marked as a waypoint on a GPS and flagged for visual confirmation. Once the features are marked as waypoints, you can use the "Go To" function to flag out the best route between features. There are also many Apps that can be useful for trail design, layout, building and managing risk.

A hiking grade of 10 degrees or less is best to minimize the wear on the tread and the wear on the knees and ankles. There is a clinometer app that can easily be downloaded for free that will help you estimate the terrain grade.

Digging into the details

Basic Terms

- Contour - area of equal elevation on the land which is represented by lines on a topographical map.
- Tread - part of the trail you travel on.
- Berm - built-up material on the downhill side of the trail or mid trail to redirect water flow.
- Slough - stuff that collapses on to the tread from the uphill side of the trail.
- Fall line - natural flow direction of water on a slope.
- Sheet flow - flow of water across a trail in sheets on steep slopes.

Contouring is a strategy of building a trail following the natural contour of the land. For example, on a hillside, the trail can gently traverse the terrain with a side slope allowing water to flow across a trail instead of altering its course and running down the trail. Sheet flow across a trail will have minimal impact on the trail if that flow is not impeded by downside berm.

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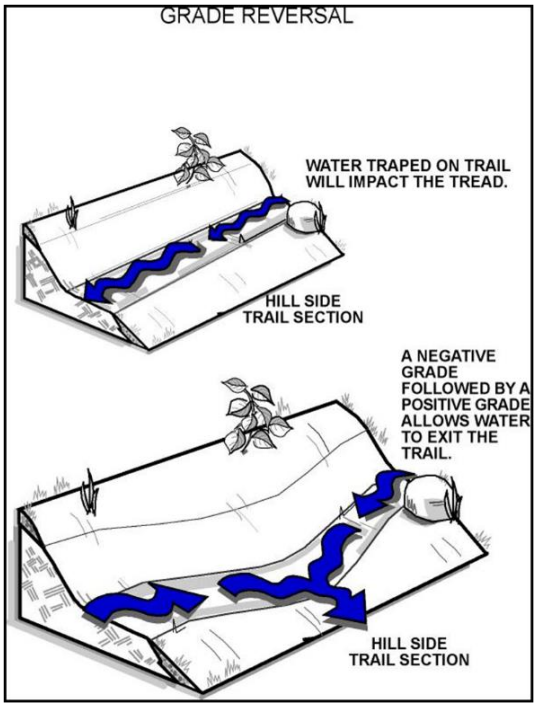
If you must rake or dig up material from the higher upside of the trail to make it level, a berm may be necessary to hold the material in place. Using rocks as berms will allow water to flow through the gaps between the rocks and escape downhill. Solid berms like tree trunks can block the flow of water causing pooling.



Technique for keeping water off the trail. Credit: International Mountain Biking Association (IMBA)

To avoid slough from building up on the trail, rake the uphill side so that it is on a 45-degree angle and not a sharp edge of soil to avoid material collapsing onto the tread.

If you can't avoid the fall line, route your trail uphill for short distances to allow water to runoff at the point the trail heads uphill. This is called a grade reversal. A grade reversal is a temporary reversing of the trail slope. On a downhill trail there is a short uphill portion, before continuing downhill. You can also add a small hill or bump in the trail with mineral soil obtained from the area near the trail. This can also divert water towards the downhill slope.

Avoid building trails on the natural water fall line. This will only lead to erosion and rutting of the trail.

Use the side sloping terrain to build the trail following the natural contour of the land. This will take more work but will avoid water damage and extra maintenance. A direct route downhill can become a watercourse.

Historically, a common technique for moving water off a trail was a water bar. The idea was to create an obstacle on the trail which diverted the water off. The obstacle might be a log, a row of rocks, or even a built-up berm of dirt. This technique can still work if the water bar is set at the proper angle. When water rushing down a trail hits a bar causing a sharp redirection, it will stop or significantly slow down and deposit the sediment it is carrying. This sediment will build up and eventually clog the bar, allowing future water to overflow it. Water bars are seldom used for this reason.

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When building your trail, look for evidence of running water like disturbed leaves or exposed soil- these are areas where water flow builds up momentum and need to be factored into your trail design.

Low lying, wet areas should be avoided. If necessary, boardwalks can be built over short sections. Using 8"X 8" squared off timber on the ground, 2" X 8" rough cut hemlock will work well on top. Boards 6-10 feet long can be used. Longer than 10 feet and the top boards can get springy and potentially unsafe to walk on. Make sure to allow for minimum spacing of at least 1 centimeter between boards to allow water to drain. Width of the boardwalk should be at least 24 inches, designed for walking only.

Boardwalk at the Eagle's Nest trails in Bancroft. Rick Whitteker 2023

Maintenance

It is a good idea to walk your trails in a heavy rain to see where the water is going and to make changes to the trail if necessary. Regular walks on your trails will help you to notice small repairs before they become bigger problems. Full canopy trails will take less maintenance, as less plant growth will occur in the understory of mature forests. Open meadow trails will need brushing back at least twice a year in the warmer months.

Windstorms or just windy weather can leave a lot of debris across trails which will need cleanup to make the trails easier to walk on.

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Resources

Art and Science of Trails. https://howtowilderness.com/2011/11/29/art-and-science-of-trails/

Top 5 things to consider when building a nature trail on your property. https://extension.oregonstate.edu/forests/health-managment/top-5-things-consider-when-building-nature-trail-your-property

YouTube- there are many videos here to help with specific techniques in trail building.

For trail building questions, workshops and services contact local (Bancroft) trail builder Dave Naulls at dave@endocycle.com

For all things trails go to the Ontario Trails Council website at www.ontariotrails.on.ca

Natural Trail Surfaces by Design: Physical and Human Essentials of Sustainable, Enjoyable Trails by Troy Scott Parker - https://www.natureshape.com/pubs/nstbd.html