

Town of Georges Brook / Milton Trail Assessment



Green Leaf Resources
December, 2019

DRAFT REPORT

Executive Summary

Green Leaf Resources was retained to complete a trail assessment for the community of George's Brook Milton. This includes the assessment of the railbed as well as other existing trails.

New potential trails were also scouted to provide a complete network that features the key natural and public assets of the Town.



As with other communities all across the Province, the abandoned railbed is a key community asset that is often under-utilized.

Additionally conflicting trail uses between ATV's and pedestrians is a common concern for planners and Town Councilors as they try to find a balance between traditional uses of the railbed and community growth.

This report will look at the necessary upgrades to improve the railbed within the Town boundary as well as construction costs for a complete trail network.

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Key Recommendations

There is a lot of information in this report that can help guide trail development objectives for the Town. We thought it was appropriate right at the outset to outline some key recommendations which are all alluded to throughout the report.

- 1) Initiate talks with the Parks and Natural Areas Division to determine what is required to lease the Railbed.
- 2) The future use of the railbed is a topic that warrants internal discussion by management, followed by public consultation. Ideally we would like to see the entire railbed within the Town boundary dedicated to non-motorized use only. We realize this may not be feasible. The point is that the discussion is had and decisions (town needs, safety issues) are made.



The railbed could be upgraded to a linear park like this one in CBS. They have banned ATV use in this area and upgraded the railbed to a multi-use non-motorized trail.

- 3) Take ownership of and preserve your coastal and riparian areas. This is a noted problem in the Town as residents extend their property into these protected green spaces. If the Town takes ownership of these green corridors they are in a much better position to protect and utilize them for the benefit of the residents.
- 4) One major challenge is that most tourists bypass the Town on their way to other trail destinations in Port Rexton and Bonavista. You simply cannot compete with the natural and cultural assets these communities have. That being said you are part of the Discovery Trail and you do have an opportunity to develop a high standard trail system that catches the eye of passersby and may encourage them to extend their stay in your area. Utilize this opportunity.
- 5) You are part of the Discovery Trail hence you should consider being part of “Hike Discovery” and engaging them for help in developing your trails. They have valuable experience and can help promote your network. No doubt a partnership with them will save valuable time and money.
- 6) With the assistance of an engineer inspect and outline all repairs to every bridge and street crossing. The bridges on the railbed in particular need attention.
- 7) Make sure all trails you develop are covered under your Town insurance.

- 8) Include in Town bylaws that all developments (residential, commercial) must accommodate the development of trail connections and park spaces to enhance and protect the trail network.
- 9) A local snowmobile association currently has an LTO for the railbed in the Town. We would suggest you discuss development plans with them and form a partnership as trail upgrades would benefit both groups.

A Trail Network for George's Brook Milton

As one of the newest municipalities in the Province, the Town of George's Brook Milton has a great opportunity to introduce a trail network that highlights its' key natural and public assets. Additionally as the Town plans for expansion, the trail network could be incorporate into future planning and development. So it's a great time to start talking about trails and open spaces and develop a plan that can be followed moving forward.

Many from the Town have been interested in developing a trail network and some general trail maps were already provided by interested parties. These were referenced and considered when developing an overall master trails map.

From our perspective the railbed that passes through the Town is a key trail asset. Not only does it connect George's Brook and Milton together, it is predominantly coastal – which is quite rare when you consider that most of the railbed within the Province is inland. So we started looking at a trails masterplan with the railbed as the central trail corridor. All other trails could connect to this “green corridor”.

Using the railbed as the starting point, we have developed a 20km interlocking network of trails which is quite suitable for a Town of this scale. All key natural, public space and tourism assets are connected to this network. The following table lists all the trails, their type, trail distance, and priority for development.

Trail	Type	Distance	Priority
Cormack Trail	Hiking Trail	4.2 km (loop)	Low
The Railbed	Multi-use	6 km (one-way)	High
Ryder's Brook Trail	Walking Trail & Hiking Trail	4 km (one-way)	Moderate
Georges' Brook Trail	Walking Trail	2.7 km (loop)	Low
Greeps Nest Trail	Hiking	2.5 km (one-way)	Moderate

Several factors were considered to determine which trails should be given priority. For example a trail designed solely with tourists in mind would be quite different than one constructed simply for the benefit of local residents. Trails were given a priority based on striking a balance

between both types of use. From a tourism perspective hikers like to visit distinctive landscapes that reflect a regions most distinguishing characteristics such as views, natural features, culture or heritage. Aside from the “wow” factor that a destination trail offers, it also has a high quality standard of design, amenities, and maintenance and has trained knowledgeable staff and volunteers supporting it.

Some may wonder why we are focusing on the Coastline and not on inland routes. This is solely based on what we know about the tourists visiting the Province. The 2016 exit survey stated that 51% of vacation visitors are couples with no children. They stayed on average 10.8 days in the Province. The survey went on to comment that:

“75% of all travel parties did some pleasure walking in/around communities while 60% went hiking/walking on trails. Visitors also marvel at the province’s natural wonders, with whale watching, seabird watching, wildlife viewing and iceberg viewing remaining among the most popular outdoor activities that visitors engage in.”

As the quote above confirms, most visitors want to see our spectacular coastline. Additionally geological observation nearly doubled since the 2011 survey – again an activity that’s predominantly done along the coast.

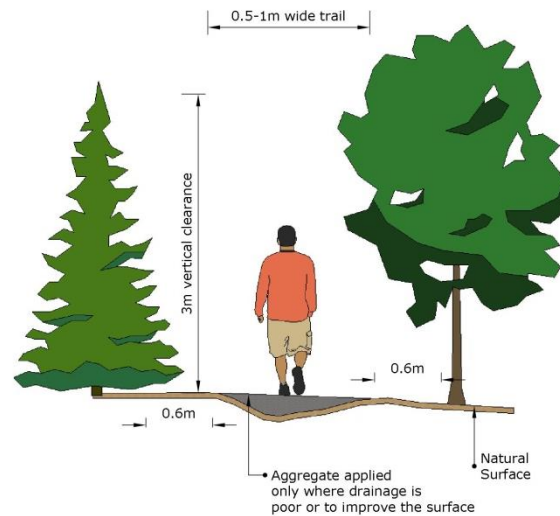
It’s not to say that other inland trails don’t have merit – they do; but generally speaking coastal hiking would be the main reason a visitor may choose to travel to a particular region. They may enjoy an inland hike while they are in an area but usually these hikes supplement their visit. In other words – inland hiking is rarely the reason why a visitor may choose to travel to a particular area.

As the table on the previous page outlines, we are proposing different types of trails to suit different types of activities. The following page provides a brief description of each trail type. The subsequent page provides a map that outlines the proposed network in its entirety.

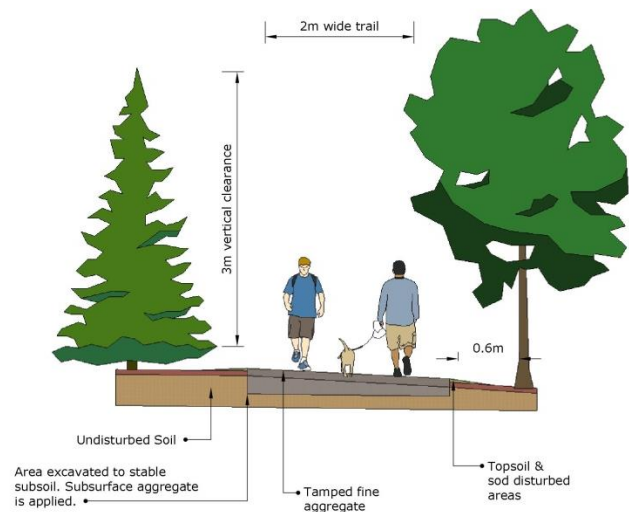
General Trail Classification

Here is a general guide to three kinds of non-motorized trails:

Top Image – Hiking Trail: Allows for single file hiking. These are typically nature trails with varying terrain and grades. The route utilizes the natural walking surface where feasible but requires some aggregate in poorly drained areas. The route is typically about 0.5m -1m wide with rustic stream crossings and steps along steep terrain. There will be some natural trip hazards but this is unavoidable.

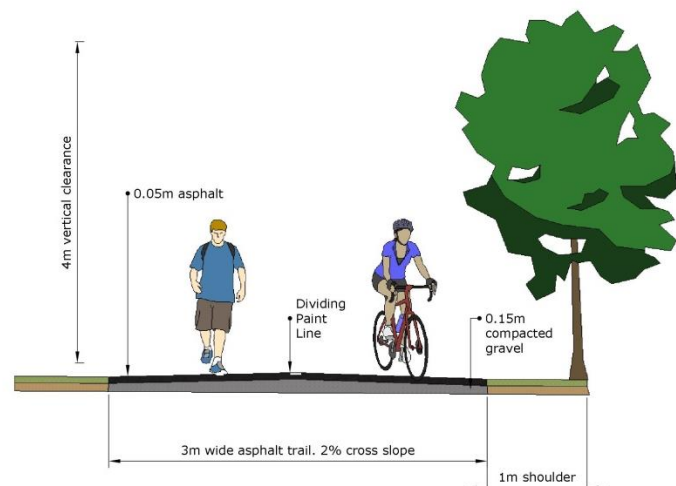


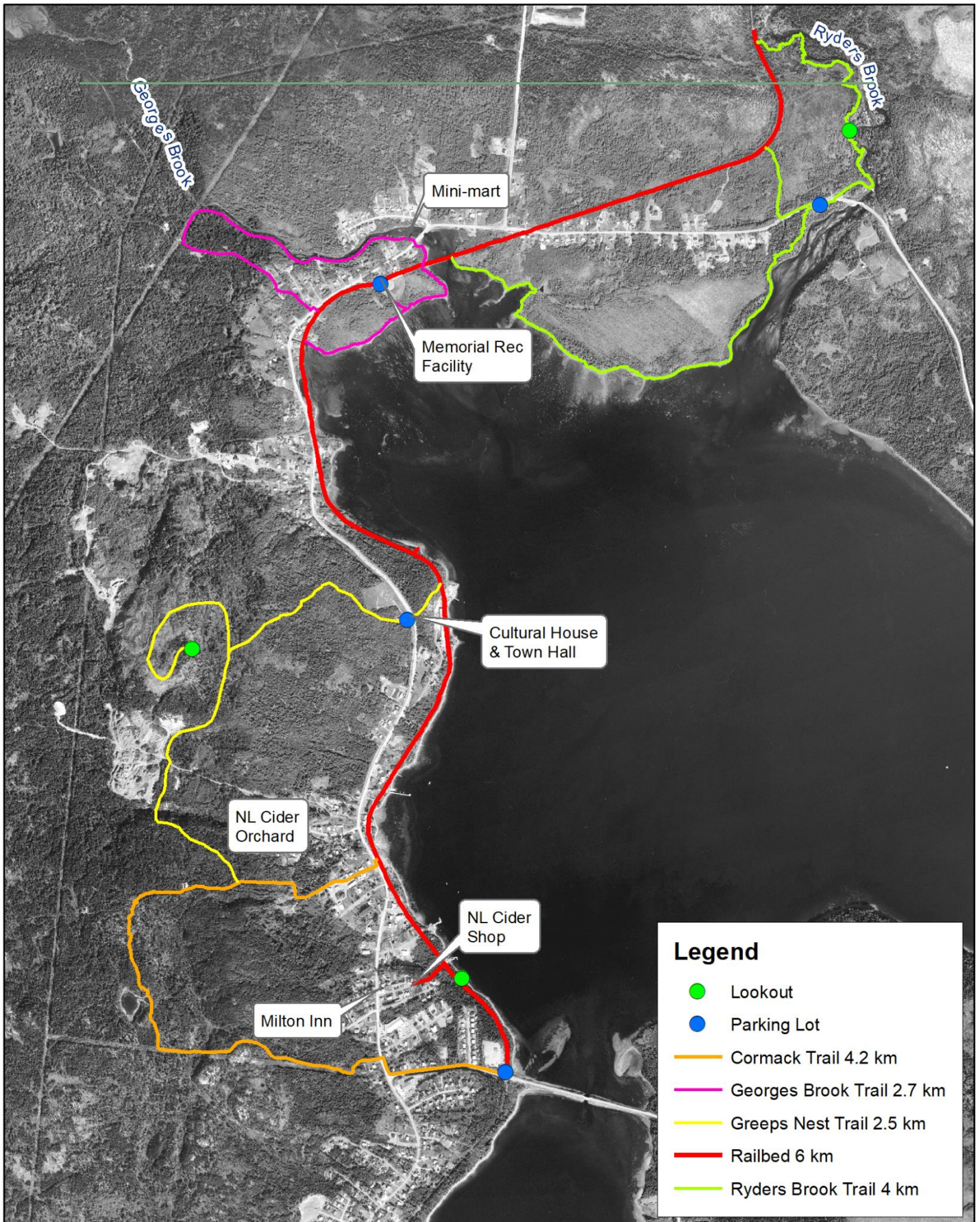
Middle Image – Walking Trail: These are core trails that allow for side-by-side walking. It usually consists of a granular surface and has gentle slopes not exceeding 10% and usually much less. The trail is about 2m wide and has a smooth surface with no natural trip hazards. Structures such as bridges are of a high quality.



Bottom Image – Multi-use Trails. This is the preferred trail design for the railbed through the Town. Can either be a compacted granular or 2" asphalt surface. A 3m wide surface is suggested.

These three sample designs help us understand that trail standards will increase as the use type increases. ATV paths require an even higher standard with a suggested trail width of 3.65m and maintained lines-of-sight of about 130m.





Challenges/Opportunities for Developing the Railbed in the Town

Before we outline some of the necessary upgrades for the railbed, here are some key points that merit discussion.

- 1) Currently the Railbed is owned by the Province meaning it is the Province's responsibility to maintain it and they currently would assume liability for it. That being said, it is an almost impossible task for them to manage and maintain hundreds of miles of T' Railway. It is also our understanding that the Railbed is also leased (or a License to Occupy has been obtained) by a local Snowmobile Association so it is possible that they have assumed liability for the railbed. In either case this should be examined more closely to determine who exactly is liable for the railbed in the Town.



ATV use on the railbed is evident. As communities grow, ATV use through Town becomes an issue that needs to be addressed with good public consultation.

- 2) There may be an opportunity for the Town to lease the segment of the railbed that falls within their Town boundary. As a result, the Town gains a green corridor that can be upgraded and maintained by Town staff. Town insurance would then cover any liability issues related to the T' Railway. An argument could also be made that by taking over responsibility of the railbed the Town would reduce their liability by providing a safer corridor.
- 3) Unknown to many, archives indicate that the T' railway comes with a protected buffer of green space that extends well beyond the edge of the track. As a result, the Town would not only gain the railbed surface, but a significant amount of green space as well. This is especially important for GBM since most of the railbed runs along the coastline which is a key natural Town asset.

- 4) The Town will have to address acceptable trail use for the T’Railway. Will ATV use be allowed to continue? What do Town residents want to see – An ATV trail or a linear pedestrian park? Trail uses will have a major impact on trail design and construction standards. It is our opinion that pedestrian and ATV use should never mix. Additionally major trail funders such as ACOA are not interested in funding ATV trails. It would be good to have some community input into this matter. Many growing communities are finding that residents want to see more walking/hiking trails and park spaces. As a result they are restricting trail use to non-motorized.



Securing the railbed through Town also secures access to the most scenic features of the community.

- 5) Perhaps a balance can be met to accommodate ATV’s and pedestrians. For example, where the railbed passes through the heart of Town, perhaps ATV use can be banned with alternate routes that bypass the heart of Town still available for ATV’s. This is a balanced approach that accommodates ATV’s but reserves pedestrian greenspace in the heart of Town. Although this may work for some communities, it doesn’t work for all.
- 6) There is always a concern where the railbed crosses a street. Most of these crossings are not marked or designed to accommodate all the different users that intersect these areas (vehicles, pedestrians, ATV’ers). As a result there are major safety and liability concerns at these locations.
- 7) Bridge repair can get expensive. So securing ownership of the railbed that passes through Town also means assuming the repair costs to upgrade the bridges. That being said, they are key connections in Town and they merit maintenance and repair.
- 8) Aside from ATV’s, pedestrians and cyclists also access the Railbed. The current Railbed is too narrow and the sight lines are too short to accommodate all of these users. Similar use conflicts in other communities have resulted in very serious accidents.
- 9) The Railbed has some deficiencies (e.g., potholes, washouts, missing bridges, poor drainage, clogged or damaged culverts) that require repairs.
- 10) The Trans Canada Trail which stretches from BC to Newfoundland promotes the main railbed as a snowmobile trail in the winter and a non-motorized trail in the summer.

They are the national proponent of the T'railway and they are a good resource when trying to obtain funding or assistance with marketing and promotion. That being said, they most likely will not support projects where ATV use is encouraged.

- 11) There are some great advantages to leasing the railbed from the Province such as:
- a. The T'railway would still retain Provincial Parks status so any liability is shared with the Province; however, the Town would have the authority to control trail use, enhance or beautify the railbed area and oversee it as part of the Town infrastructure.
 - b. The Town not only inherits the actual Railbed surface, but also all the land surrounding the railbed usually to a distance of 10m from either side of the trail centre line. That being said in some areas the railbed right-of-way expands to about 30m from either side of the railbed centre line. We have reviewed the old T'Railway blueprints for other Towns. These blueprints indicate that a considerable amount of land could potentially be secured by the Town if they choose to lease the main Railbed.
 - c. Developers and local residents have a tendency to take over sections of the railbed. In fact all over the Province small sections of railbed tend to disappear. If the Town had control over the railbed, they are in a position to manage this problem.
 - d. This would not create an increase in Town insurance costs. In fact if the Town were to properly manage the railbed, liability could potentially be reduced. Simply leaving the railbed "as is" does not necessarily free the Town from liability especially since ATV use is being encouraged. By taking control of this resource, the Town is in a better position to practice due diligence and control this valuable asset.

Challenges/Opportunities with Trail Development

Before we make any recommendations for each trail it is important to outline some of the challenges faced with trail development. This is not an inclusive list but it will help with future planning.



- 1) Existing Trails: All trails we inspected were either proposed new ones, or were existing trails developed in the past. As a result, trail construction methods, design, quality and trail materials used vary depending upon the trail. A quality trail network needs to be consistent no matter what trail the user is on. This means that significant funds will need to be invested in order to create a quality network that is consistent. This is especially important for trail signage.
- 2) Trail Layout: Trail design needs to consider the best way to align the trail with the landscape. For example it's much better to follow the contours of a slope to ascend it rather than simply climb straight up a hill.
- 3) New Trails: We see great potential for new trails that highlight the key natural assets within the community. Typically trails that have most appeal follow the coast and bodies of water.
- 4) Trail Ownership: It is assumed that you have LTO's (License to Occupy) for all existing trails; however we realize this is not always the case. New LTO applications will no doubt be required (perhaps for both existing and new trails). This should be looked at soon since these applications tend to take significant time. We also encountered lots of evidence of private land ownership. No trail development should take place without an approved LTO and/or a written letter of understanding between the Town and a private land owner.
- 5) Marketing and Promotion: Being a new Town there is a great opportunity to develop, brand and market the trails in the area in a consistent, exciting and attractive way. That being said, you are also part of the Discovery Trail and they already have a well established trail group that should be consulted.

Common Deficiencies & Upgrades on Most Trails in the Province

Stairs, Boardwalks and Lookouts

- a. Many trip and fall accidents occur on staircases. Many trail staircases across the Province are too steep, have inadequate tread widths, have loose/unleveled or deteriorated steps, inconsistent rises from each step to the next and inadequate safety rails. Consider installing rugged and durable staircases similar to what is suggested in this report.
- b. In many cases across the Province, some boardwalks seem unnecessary and should be removed and replaced with an aggregate surface and log or stone edging (where required). Wooden structures should be used only where necessary. An aggregate surface is more durable, requires less frequent maintenance, and eliminates potential trip and fall injuries from rotted, loose or damaged decking.
- c. Some new segments of trail will require a boardwalk. Consider the more rugged design outlined in this report.
- d. Avoid the construction of wooden lookouts as they require maintenance and eventual replacement. Leave lookout areas natural. There may be some exceptions to this rule. For example a wooden lookout near a central area that serves as a focal point for a trail network or as a key space designed to create an enhanced arrival experience would be appropriate.

Bridges

- a. Where possible consider the installation of large culverts instead of bridges.
- d. In other cases, bridges require upgrades or replacement. Follow a consistent bridge design for all new bridges. If installing a new bridge, seek the appropriate government approvals and engineer review/design.

Railings

- a. Any elevated boardwalk or bridge exceeding 3 feet in height or an elevated boardwalk that passes by a hazardous area (e.g., deep water or other hazards) should have a safety rail on both sides.

- b. When a safety rail is present a trail user will rely on it. It is important they are sturdy and at least 42 inches in height. Each railing should include a mid-rail about half way up the railing.
- c. Railings can also be installed in areas where there is a steep climb or to protect or block users from a particular hazard.

Trip Hazards

- a. A trip hazard is generally an immediate rise/fall in the walk surface and can include protruding rocks, stumps, raised decking and a poor transition where two walk surfaces meet (e.g., where granular meets a boardwalk decking).
- b. On a granular trail or any decking (boardwalk or lookout) no trip hazards are expected. The user is not watching every step like you would on more rugged terrain. Therefore no trip hazards should be present on a smooth granular trail surface.
- c. In many cases, trip hazards (rocks, bedrock) cannot be avoided since the landscape is so rugged. In these cases take reasonable steps to eliminate hazards. This may include raising the walk surface with aggregate and stone retaining in order to bury a trip hazard. In other instances the installation of steps would be an appropriate solution. That being said, it's impossible to eliminate trips hazards entirely.
- d. There should be a smooth transition where two surfaces meet. The natural or granular path should be level with the decking of bridges, lookouts or boardwalks.
- e. On a natural surface, remove trip hazards to a reasonable degree.

Trail Clearing and Grubbing

- a. In many cases, very little vegetation removal is required. Be selective when deciding how much to clear. Maintain a 2.5 m vertical clearance and a 1.5 m horizontal clearance. Allow for 0.5 m of clearance on either side of the walk surface.
- b. Follow proper pruning techniques when limbing branches and ensure that brush is completely removed from the walk right-of-way.
- c. If a granular surface is desired, grub away organic material and stumps from the walk surface area so it is prepared for subsurface aggregate. Apply typical cut and fill excavation techniques to create a relatively level surface.

Trail Surfaces

- a. Depending on the trail, varying surfaces are suggested. When the natural walk surface is pleasant, dry, and water can easily drain off it then it should be preserved. In some cases however, stone and aggregate is needed to improve the walk surface.
- b. Using varying sizes of aggregate raise the walk surface to eliminate a trip hazard or slippery surface, to improve surface drainage, to define the trail route, or to raise the trail surface above the surrounding landscape.
- c. When using aggregate choose stone that matches the surrounding landscape (if possible).
- d. A subsurface of 4" stone is suggested for areas where drainage is poor followed by a tamped class 'A' surface. For areas where drainage is good, the 4" subsurface may not be required.
- e. When improving a walk surface, grub out all organic material first so that you start with a stable foundation. Some choose to lay down filter fabric (geotextile fabric) before spreading the aggregate. This keeps the gravel in place and reduces the amount required.
- f. When raising the walk surface to "bury" a trip hazard, the new surface should be 3-5" above the hazard.

Drainage

Poor drainage is the single leading cause of trail deterioration. The goal is to get water off the walk surface as quickly as possible.

- a. The trail surface should be elevated above the surrounding surface. If not, water will be trapped on the trail.
- b. The natural trail surface will deteriorate over time especially if the route is frequently used. In these cases a granular surface may be needed.
- c. Water should flow off the trail so have a 2% cross slope.
- d. A combination of drainage features is needed in areas so that water can flow away from the trail. Install ditches in areas of poor drainage or in areas where runoff should be directed away from the route or through a culvert.
- e. Culverts are required on all the trails. Refer to the detail in this report for proper installation.

ATV's and Traditional Hunting

- a. ATV use can permanently scar a landscape and effort should be made to ensure ATV's do not access a tourism oriented trail.
- b. For existing trail segments that are shared with ATV's, the trail construction requirements should be altered (trail width, surface, sight lines). Signage would also warn both user types of any safety concerns.
- c. Although some hikers may find it interesting to come across a hunter along the trail, others may be concerned about this. It is our recommendation that no hunting be permitted anywhere near a hiking trail. Signage, public consultation and enforcement are suggested to implement this suggestion.

Hazardous Coastline

- a. Sometimes trails go too close to the coastline edge. Though the landscape appears stable in these areas, in fact could be completely undermined. Ensure new segments are constructed a safe distance from eroding coastline.
- b. Warning signage should be installed in areas where the coastline is hazardous. Users should be informed of the specific risk of going off the trail and encouraged to stay on the designated path. Warning signage needs to be specific.
- c. In some cases, rails, chain link fencing or other features could be installed to keep users on the trail or to block off access to a dangerous section.
- d. Almost every year there are avoidable accidents along coastal trails. About six months ago, a hiker fell over 100ft off a popular hiking trail in St. John's. Inform users of the risks and ensure that they stick to designated paths only.
- e. The key is knowing the condition of the coastline and keeping a reasonable distance away from questionable areas. Since the coastline changes regularly, you should inspect areas near the edge regularly.

Trail Amenities

- a. There are so many different styles of benches, garbage bins, picnic tables and other features across the trails in this Province. Users expect to see consistency along a network. Choose specific styles of amenities and install them on each tourism orientated trail.
- b. As current amenities get damaged or deteriorate, replace them with a new amenity of the approved style.
- c. Garbage bins and outhouses are major maintenance burdens and in most cases are not necessary - especially if you adopt a "pack in / pack out" policy.

Maps

A map outlining general recommendations for each trail is provided. Trail upgrades/construction is to be completed in conjunction with:

- a. The trail map provided.
- b. The information provided under the heading for each trail in this report.
- c. The information under this section entitled “Common Deficiencies and Upgrades Required on Most Trails in the Province”.

Cost Estimates

Under each trail section in this report general cost estimates are provided. The following notations apply to these cost estimates:

- a. These are order of magnitude cost estimates of +/-20% and do not include h.s.t.
- b. Estimates do not include any expenses incurred for planning and administration of projects – it’s simply an estimate for actual trail upgrades only.
- c. Depending on the type of labour arrangement, there may be additional expenses incurred for workers health and safety insurance, employment insurance and other associated labour costs.
- d. If a supplier of larch cannot be secured, other types of lumber can be used. This should be discussed with a trail planner to ensure appropriate lumber is purchased.
- e. If one is available in your community, it is always nice to consult with an engineer to design and build any structures (e.g., bridges, staircases, retaining structures). The details in this report are general guides.
- f. The prices do not include professional fees such as an engineer. These fees should be minimal. Seek a local engineer willing to offer an “in-kind” service.
- g. Trail managers will determine what equipment will be required to construct or upgrade each trail. Equipment costs are just a general estimate.
- h. Costs are based on the assumption that extensive effort is made to ensure the best route is developed. This reduces construction material costs significantly.

Construction Materials and Equipment

- a. Select appropriate building materials. We recommend using debarked larch logs as they are a very durable wood that blends nicely with the landscape. If at all possible avoid the use of spruce and especially fir as they have a short shelf life. Pressure treated lumber is another option but it doesn’t blend well with the landscape so a considerable effort

- should be made to purchase larch logs before exploring other alternatives. Consult with your local saw mill.
- b. An aggregate surface is the most durable one and is needed in areas where drainage is poor. It can be challenging to transport aggregate to remote areas so come up with creative ways to transport these essential materials.
 - c. Geotextile fabric has been used on many trail projects. Consider using this fabric in areas with poor drainage or in areas with a thick organic layer. This is an extra and optional material that is not included in the cost estimates.
 - d. All too often a trail project starts without collecting the needed materials and equipment first. With good planning, the needed materials and equipment should be collected and secured well before a project starts. Don't fall into the trap of leaving this up to the crew during the first week of work. This could result in weeks of lost time or at the very least reduced productivity.

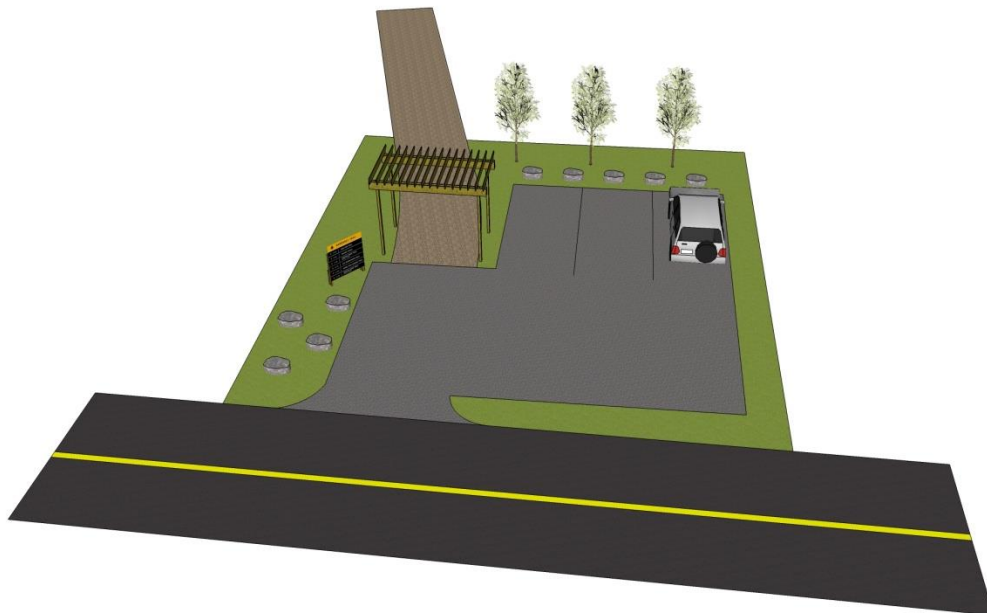
New Trail Routes – Trail Scouting and Layout

- a. The new trail routes we have outlined in this report merely outline a general right-of-way. Once the construction phase is underway, the final walk surface should be flagged in the field before the initial step of vegetation clearing is started. To flag the final route follow some of the suggestions outlined under this subheading.
- b. When securing an LTO (License to Occupy for each trail) discuss with Crown Lands the maximum possible trail corridor width that can be secured. This protects the trail but also gives trail "scouters" more flexibility when finalizing the route during construction.
- c. A secured "buffer" around the trail also protects it from clear cutting, unwanted trail use and protects trail aesthetics. If you can secure 25m from either side of the proposed trail route that would be great – 50m would be better. 100m would be even better but is unlikely.
- d) In many cases we certainly have a clear route to follow, but for other segments of trail have a trail scouter work ahead of the construction crew to identify the best possible route within the land secured through the License to Occupy.
- e) In advance of clearing the right-of-way, have a trail planner or "scouter" flag the final route. This means establishing an initial flag line and relocating and tying new flags as you make decisions about the route layout during construction. Flags should be tied close together so that turns and other changes to the direction of the route can be easily identified.
- f) Here is a key point: be patient when flagging the final path. Select the best possible trail surface that minimizes erosion and saturation. A poorly selected route can be a massive maintenance burden for years to come. Soils, slope and drainage are the main factors to consider when finalizing the route.

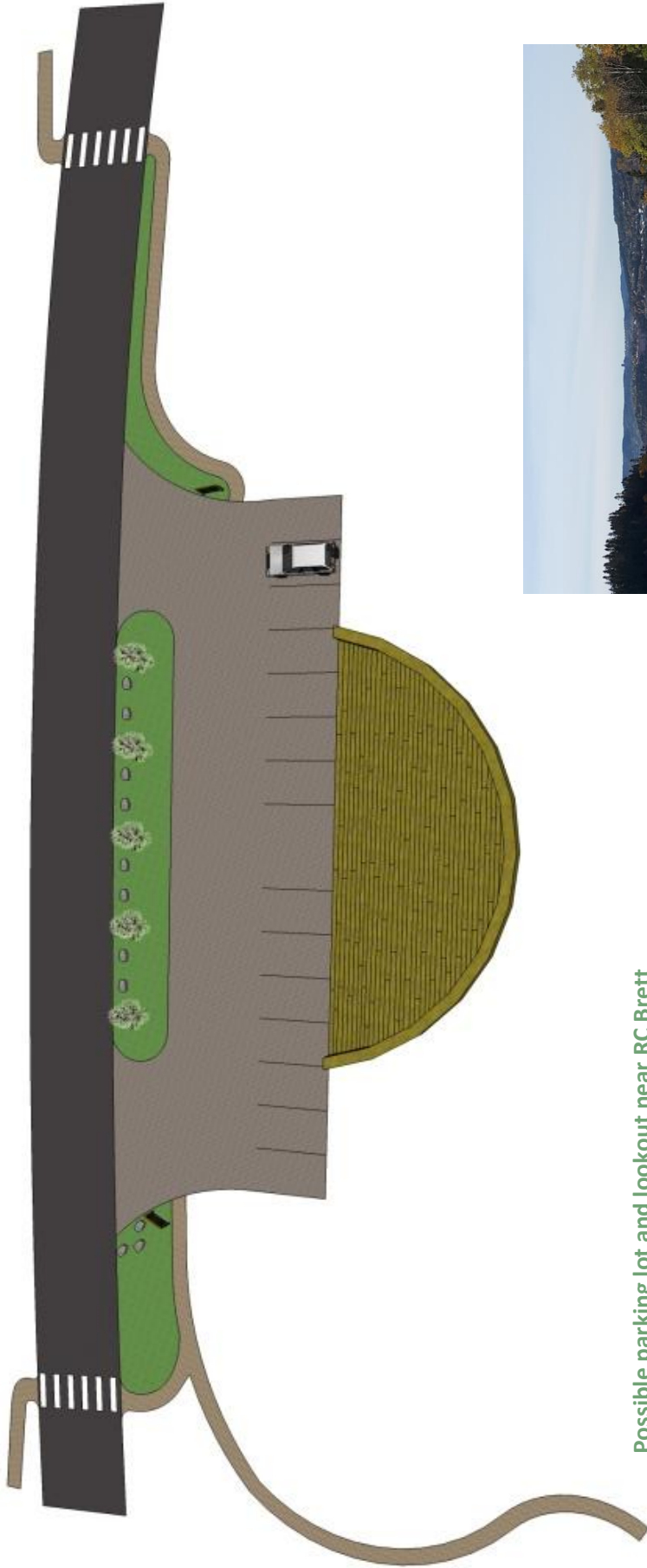
- g) Although the preliminary route we have identified takes these factors into consideration, it would still be advantageous for a crew member or foreman to walk in advance of the construction crew and flag the final route.
- h) It is reasonable to expect to spend several days in the field finalizing each kilometer of trail. Although this may seem like a long process it's an important one. We need a trail route that will withstand thousands of walkers for years to come.
- i) Avoid areas with organic soils. This is a common problem along trails throughout Newfoundland. These soils retain water and can easily create a trench like trail where water cannot escape. If these areas cannot be avoided, aggregate or other surface materials will be required to improve the surface. Keep this as minimal as possible.
- j) To reduce erosion, keep trail grades below 15% if at all possible. 10% or less is the most sustainable and should be the average grade of the whole trail. If descending a steep slope do not follow the "fall line" which is a straight line down a slope (the same route water would take). Instead, cut along the side of a slope. This requires more construction effort, but the trail will last significantly longer.
- k) IMBA (International Mountain Bicycling Association) suggests that when cutting along the side of a slope, the trail grade should not exceed half the grade of the side slope.
- l) If you have no other choice than to follow the fall line of a slope (this should be a rare occurrence), stairs or other surface structures may be needed.
- m) Avoid flat areas. Although easy to construct a trail on a flat area, it's a collection zone for water. The trail surface should always be higher than the surrounding area. If the trail has to go through a flat surface, elevate the trail using aggregate.
- n) Changes in grade are a good idea as it prevents water from flowing down a surface and causing accelerated erosion. So mix up the route to create frequent points where water can drain off.

Parking Lots

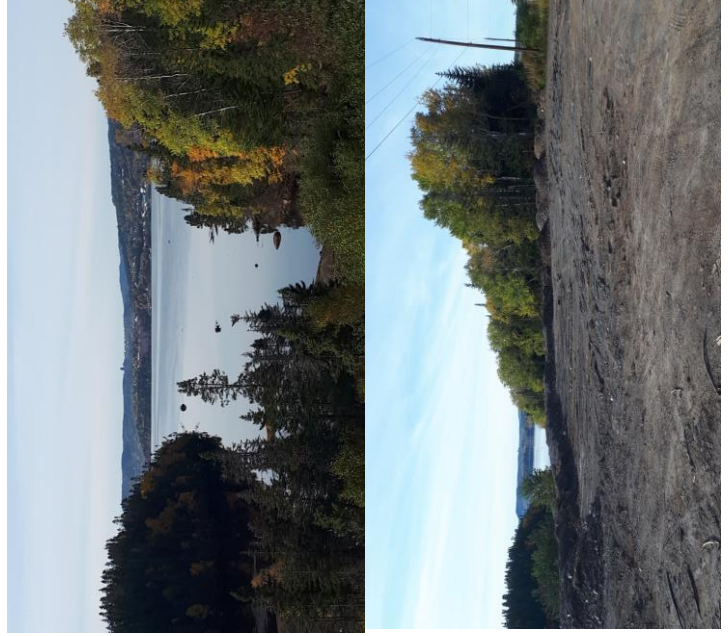
- a. Parking lots serve as the gateway for each trail. They should be attractive and safe.
- b. Most lots should have enough space for 3-5 vehicles.
- c. Each parking space should be about 9ft wide and 20ft long.
- d. Ensure lots are large enough that users don't have to back out onto any Town street.
- e. Have a clearly defined entrance and exit for each lot.
- f. Ensure the lot is graded with Class A and is free of potholes and ruts. Ditching may be required around the entrance /exit or around the perimeter. Ensure the lot is graded so that water will flow off it.
- g. Ensure a clear line of sight is maintained for exiting each lot. The driver should be able to see down the road in either direction. Ensure lots aren't located on a turn in the road or in an area where visibility is blocked when exiting.
- h. In most cases a trailhead map should be located on the parking lot.
- i. Have all lots professionally designed. We have merely provided a few concepts to consider.



Parking lot concept near Random Island causeway.



Possible parking lot and lookout near RC Brett Bridge. This site could potentially serve as the main gateway for the trail network.



Upgrading the Railbed

1) The trail will start near the Random Island Causeway. It is suggested that a parking lot suitable for 4 or 5 cars be constructed at this location. A trailhead sign, two benches and a garbage bin are also suggested for this area. See the conceptual design under the section entitled "Parking Lots".



Potholes are common throughout. Resurfacing is needed along the entire route.

2) Several natural lookout plateaus are present along the route. Construct 1m wide offshoot paths to these areas and install stone seating (basically large stones with two opposing flat sides). This creates little spaces that are very easy to maintain.



Illegal dumping at a natural lookout point. Clean up this area and install a simple lookout.

3) Potholes are a common deficiency across the entire 6 km of railbed that was inspected. The entire route will require resurfacing. Refer to the included maps which outline the location of all noted potholes. In some cases the potholes are so large it is clear that some ditching and perhaps a culvert should be installed.

4) Vegetation has intruded on the railbed right-of-way throughout. It is suggested that the railbed be upgraded to a 10' wide granular trail. Vegetation should be cleared to a distance of 3' on either side of the finished trail.



Railbed encroachment is very common along segments of the railbed where no clear ownership or management is established.

5) Developments around the railbed have encroached the railbed right-of-way. The first instance of this can be seen just before the 0.5m mark and the second just after the 0.5km mark. The Town taking ownership of the railbed is the first step in ensuring the remaining railbed is retained and future encroachment is prevented. Illegal dumping is another example of abuse of the railbed and this can be seen in several areas.

- 6) Around the 0.5km we suggest you construct an offshoot trail linking to Stringer's Lane where two Tourism assets (The NL Cider Company Tasting Room and the Milton Inn) are present. In fact your entire trail network should connect key tourism and community assets together.



Have an engineer inspect all bridges. Notice the erosion on the four corners of this bridge.

- 7) Just past the 1.0km mark, there are two ATV access points. This refers to an ATV trail that connects to the railbed. Although it seems unlikely that ATV use on the railbed will be banned, any ATV access points should be designed safely. Once the Town address the issue of ATV use within their borders, they can then decide which ATV access points to upgrade and which ones to close off.
- 8) The first bridge appears just past the 1.0km mark. Have all bridges inspected by a structural engineer. Although this bridge appears to be in reasonable condition, it will require some improvements. For example, there is surface erosion on all four corners of the bridge. Install rock boulders or log edging to retain these areas and backfill them with aggregate.

- 9) A wharf is present at the 1.350km mark. This could be an interesting asset to the trail network if this is a public wharf. Of course public safety and liability are factors to consider here.



- 10) Install a culvert and ditch in the poorly drained section of trail just past the 1.5km mark.

- 11) At around the 2.2km we would suggest constructing a connecting trail link to the Cultural House. See the section in this report entitled "Greeps Nest Trail".



Re-claim the right-of-way. This damaged area will require some rehabilitation.

- 12) There is nice beach access around the 2.4km mark. Construct a small trail to access this quaint beach area.
- 13) At the 2.5km mark the railbed surface requires some work including ditching

and resurfacing. Large backfilling uphill from the railbed has created quite a mess in this area. Some site rehabilitation is needed. This is another example of loss of the right-of-way when no clear ownership or management is in place.

- 14) At around the 3.4km mark the railbed hugs the coastline. As a result there is about 20' of eroded railbed edge. Install large rock boulders at this location to protect the edge.

- 15) The bridge at the 3.5km mark is in very poor condition. The concrete abutments are crumbling and the wooden decking is in poor shape with large gaps between the boards. As it stands now, this bridge is a liability and should be refurbished or replaced. Have it inspected by an engineer to determine the best course of action.

- 16) The area surrounding the 4km mark is quite scenic but needs some improvements. The 22m bridge in this area needs to be inspected. The decking on this bridge is poor and quite worn in spots. In some areas 2" decking is worn down to about 1" which is a serious safety concern. Additionally, the abutments are eroded and need replacement. With an upgraded bridge and the addition of park amenities, this could be a focal point along the trail.

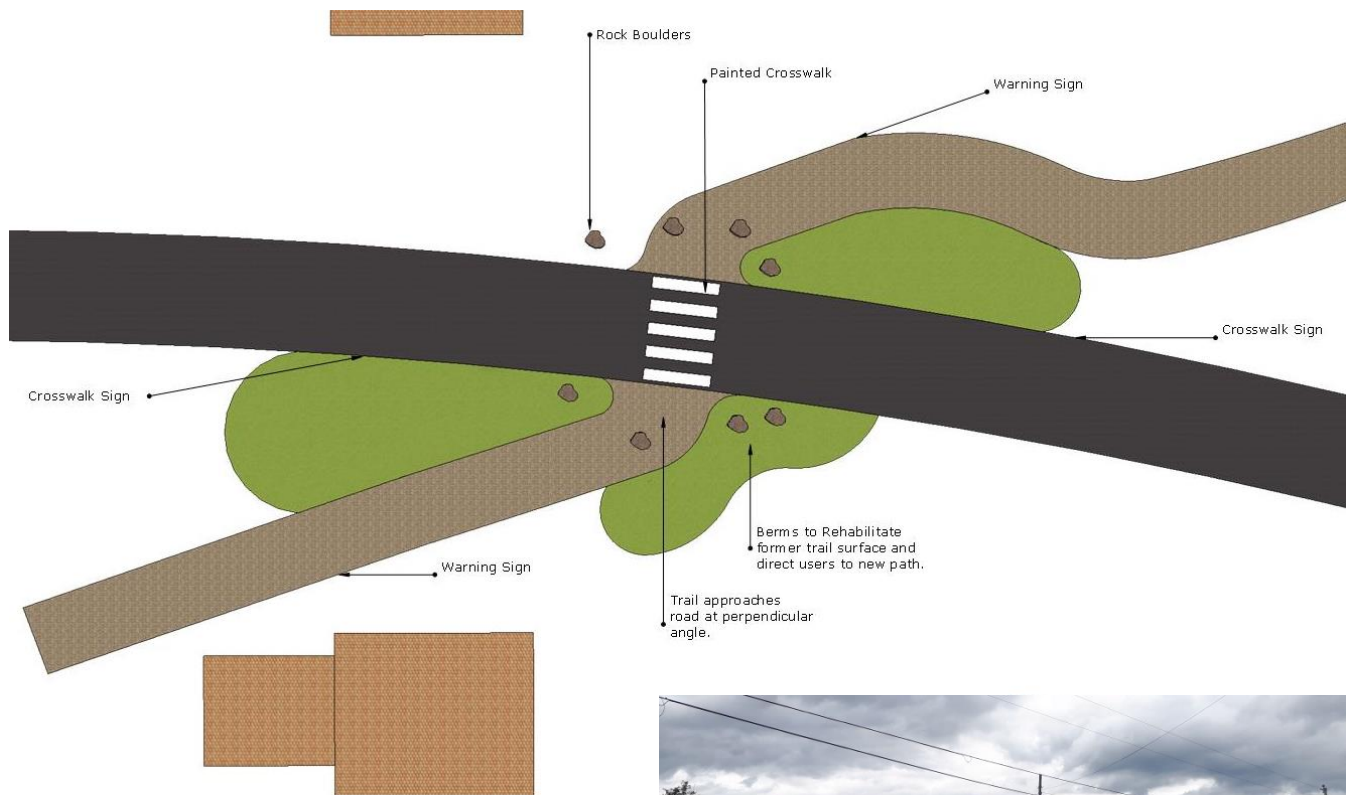
- 17) At the 4.5km mark the railbed crosses the main road at a very awkward angle. Trails should approach a street at a perpendicular angle. Reconstruct the trail here. Include rock bollards to slow ATV's down and install signage and a painted crosswalk. Signage is needed for both users of the trail and vehicular traffic. Ensure that the crossing is easily visible from a safe distance (so vehicular traffic can see it well in advance). See the images on the following page.



This bridge requires significant repairs.



Bridge at the 4.0km mark. Notice the worn decking that needs immediate attention.



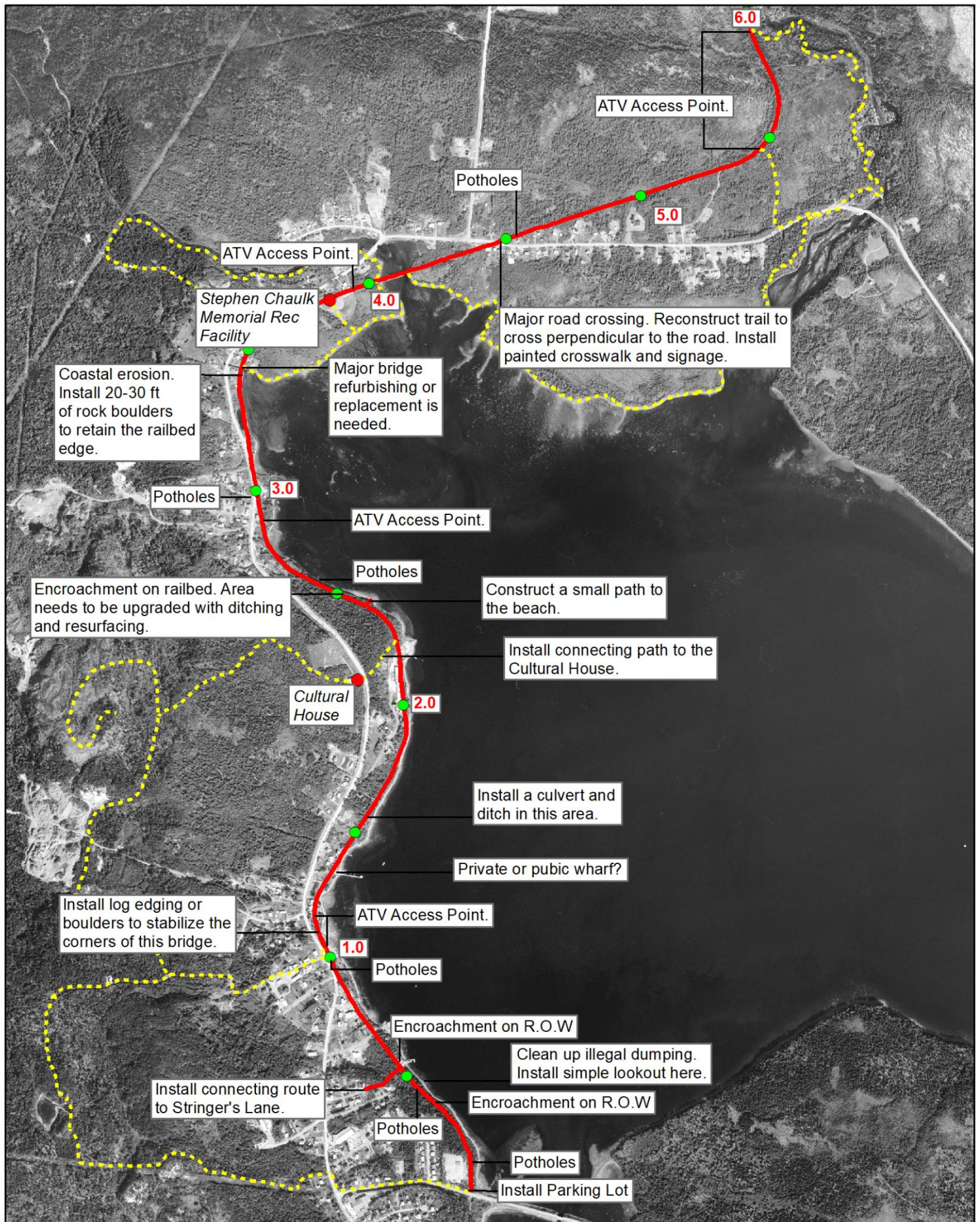
Right: The current road crossing requires modifications.

Top: A basic concept of a re-designed crossing Each crossing requires professional design.



18) The railbed continues past the intersection at the 4.5km mark to the 6km mark where it joins on to the proposed Ryder's Brook Trail. Aside from vegetation clearing and the resurfacing of the trail, no other major work is required. Although the railbed continues on past the 6km mark, we aren't suggesting it be upgraded any further past this.

19) The map on the following page, supports the key suggestions outlined for the railbed. The subsequent page outlines an approximate budget for upgrading this 6km section of the railbed.



Cost Estimates – The Railbed

Of course there are a lot of “unknowns” at this point but we will attempt to provide an approximate cost for upgrading the railbed as recommended.

Item	Quantity	Cost	Note
Class A aggregate	About 120 Loads	36,000	Used to elevate the walk, improve drainage and resurface the trail.
4” stone or similar fill materials	About 10 loads	3,500	For areas requiring major repairs and to raise the surface in poorly drained areas.
Rock Boulders	About 5 loads	1,500	Used for retaining the trail edge and as bollards. Use flat ones for trail seating.
Drainage Culverts	Sizes ranged from 300mm to 500mm. Need a minimum of 5. Should be at least 4m long	2,000	Use where needed to keep water off the walk surface. Mostly needed at road crossings.
Major Bridge Crossings	3 major crossings	80,000	Just a rough estimate. Requires engineer inspection.
Park Space Enhancements	Located along coastal open spaces along route	50,000	Landscaping, plantings and park amenities
Parking Lots	1 new near Random Island causeway	20,000	
Mini Excavator/Tamper/ATV, Drill, Other Equipment	12 weeks	20,000	
Labour	24 weeks	75,000	Trail upgrading labour only. Based on 4 person team
Crosswalks	1	10,000	
Engineering and Design Fees	Contract or Town Staff	15,000	For road crossings and bridge design/consultation
Project Management and Oversight	24 weeks	8,000	
TOTAL		\$ 321,000.00	(h.s.t. extra)

Ryders Brook Trail

- 1) This is a completely new trail and is a high priority for development since it accesses perhaps the most scenic and currently inaccessible areas in the community. Following Ryders Brook and the coastline, this trail connects to the railbed and to what we are proposing is the trail focal point near RC Brett Bridge on Route 232.
- 2) We would suggest that the trail segment that travels upstream (northward) be developed as a hiking trail (see the trail classification types mentioned on page 7). The section that heads towards the coast from the Ryders Brook Lookout would be constructed as a walking trail. We see this route as a key trail for visitors and residents alike.
- 3) Install a culvert where the trail starts and transitions from the railbed to the 1m wide trail.
- 4) The trail hugs the coastline as it heads east but it appears to cross along private land. This should be investigated further as it is very rare to see private land be developed and extended right to the water.
- 5) Just before the 0.5km mark the trail passes through some wetland which can't be avoided. Install boardwalk and two footbridges at this location.
- 6) As the route follows the coast towards the 1km mark, the soil become very peaty. Ensure the finished route is located safely away from the eroding coastal edge.



This trail has some of the most scenic views within the community.



This trail heading upstream should be constructed as a hiking trail (see page 7).



The wetland area around the 0.5km mark.

7) Two bird blinds were noticed between the 1 km and 1.5 km mark. Although hunting should not be permitted so close to the Town, it should be enforced at this location once the trail is built.



Bird blind along the proposed trail.

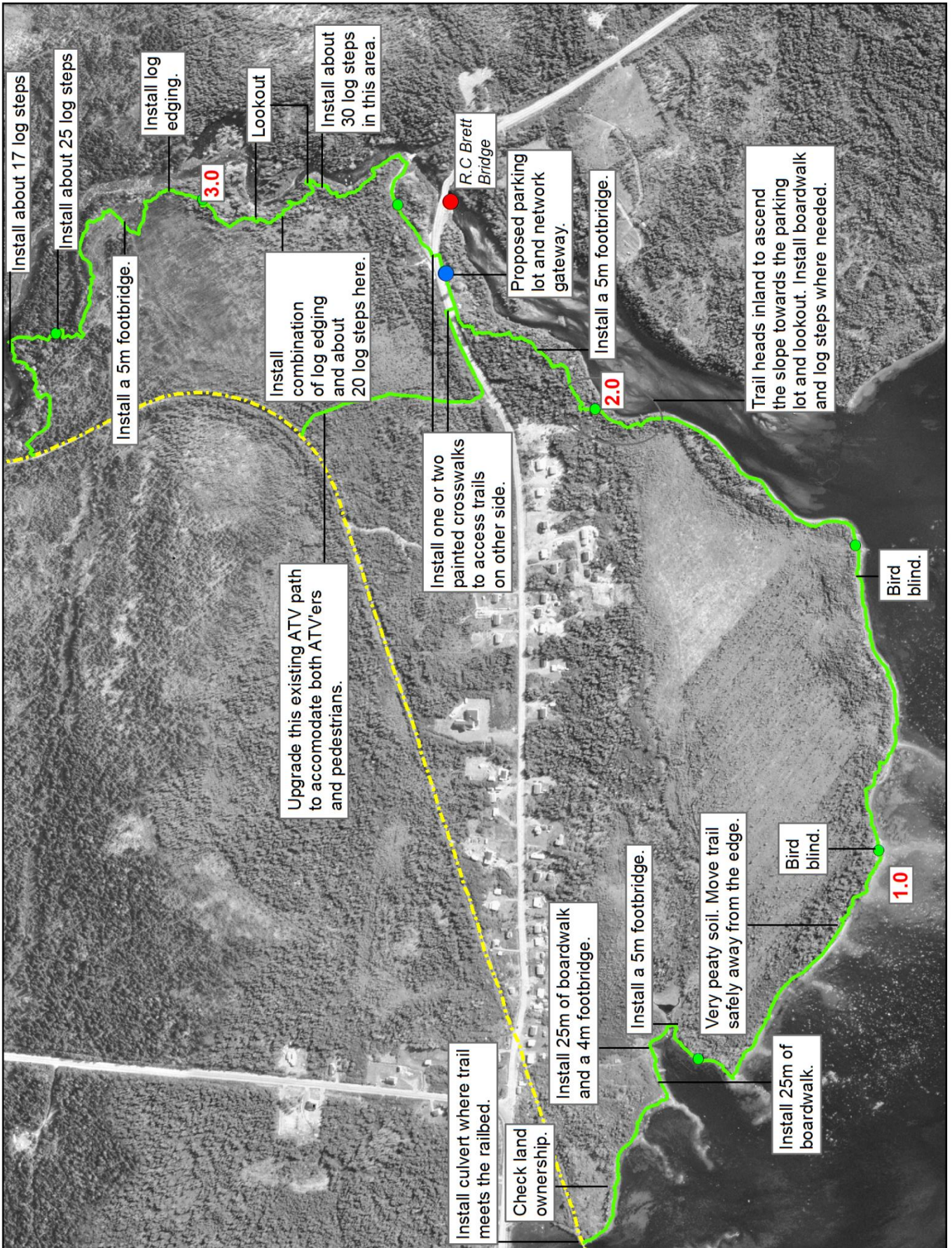
8) Around the 2km mark the trail needs to head inland in order to ascend the slope and connect to the parking lot and lookout. Some boardwalk, one footbridge and log steps are needed in this area.

9) One or two crosswalks to access the trails on the other side of route 232. Have the crosswalks professionally reviewed and designed. Perhaps only one crosswalk is required.

10) The trails on the north side of route 232 will change from a walking trail to a hiking trail. As the trail travels upstream, there are several great lookouts which can just be left natural.

11) From the 2.5km to the 3.5km mark there are a series of trail structures that will need to be installed. This includes footbridges, log steps, and log edging. Some samples of these structures are included in this report.

12) The trail will join onto the railbed at around the 3.7 km mark and follows the railbed back towards route 232 for about 500m. The route then follows an ATV path back to the parking lot. Upgrade this ATV path to accommodate both ATV'ers and pedestrians.



Cost Estimates – Ryders Brook Trail

Item	Quantity	Cost	Note
Class A aggregate	About 36 Loads	10,800	Used to elevate the walk, improve drainage and resurface the trail.
4" stone or similar fill materials	About 2 loads	600	For areas requiring major repairs and to raise the surface in poorly drained areas.
Rock Boulders	About 1 loads	400	Used for retaining the trail edge and as bollards. Use flat ones for trail seating.
Drainage Culverts	Need a minimum of 5. Should be at least 2 m long	800	Use where needed to keep water off the walk surface. Mostly needed at road crossings.
Footbridges	3 crossings	3,000	6x6 cribbing and stringers. 2x6 decking, misc lumber
Park Space Enhancements	Located along coastal open spaces along route	3,000	Landscaping, plantings and park amenities
Misc Lumber	For Boardwalks and railings.	5,000	6x6x8 stringers (40 pcs), 2x8 x8 decking. (80 pcs). Misc lumber
Larch logs	120 pcs	4,000	For log steps and log edging
Rebar 25M	1000ft	3,000	For bracing logs
Mini Excavator/Tamper/ATV, Drill, Other Equipment	12 weeks	20,000	
Labour	12 weeks	35,000	Trail upgrading labour only. Based on 4 person team
Crosswalks	1 or 2	10,000	
Project Management and Oversight	12 weeks	4,000	
TOTAL		\$ 99,600.00	(h.s.t. extra)

Georges Brook Trail

1) This is a completely new trail and is a lower priority for development. As the trail network is developed and expanded a trail along Georges Brook would make sense. Perhaps even better views and natural features can be found of the trail extended even further upstream.



A trail extending along Georges Brook would be an appealing addition to the network.

2) The trail starts at the Stephen Chaulk Memorial Recreation Facility and heads south towards the coast before veering east along the coastline to the mouth of Georges Brook. Some sections of the route already exist and just need some upgrading and site cleanup.

3) Just before the 0.5 km mark there is what appears to be a Pet Cemetery. Not sure if this was part of a community project or if it was just something done by local residents. The town should decide if they should bypass this or make it part of the network. We have assessed many trails across the Province, many of which have old cemeteries – but this is the first Pet cemetery we have ever encountered.



Most riparian areas are protected and reserved in legislation. Try to restore damaged riparian areas.

4) A small footbridge is also needed just past the 0.5 km mark.

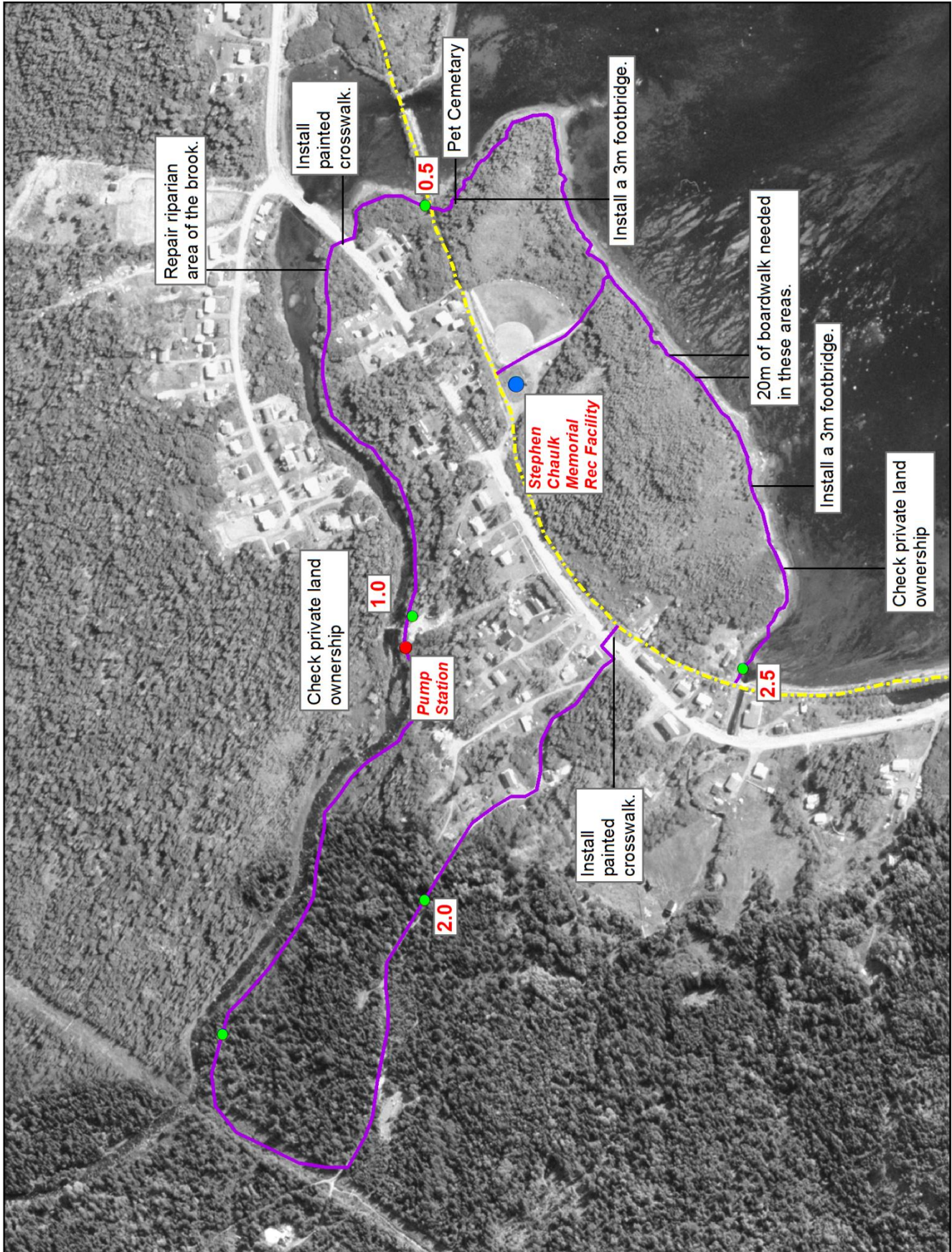
5) The trail crosses the main road at around the 0.6km mark. A well designed painted crosswalk should be installed at this location.

6) Some riparian areas along Georges Brook have been disturbed by nearby developments. This is especially evident near the road and parking lot for the Mini-mart. This is a very visible area and we would suggest that the riparian area be rehabilitated to improve the trail aesthetics and for the benefit of the brook.

7) We scouted the trail route right up to the 1 km mark by the pump house. Since the trail is within the floodplain of the brook you may need to install some elevated boardwalks in some areas (see the included design). The trail segment from the 1 km mark to past the 2

km mark has not yet been scouted. Follow the suggested route and apply the trail building techniques outlined in this report.

- 8) There are several areas where we question the property ownership. This could be a case where residents have simply developed beyond their boundary. In either case the Town should put forth effort to preserve the riparian area for the coast and for all the brooks/rivers. Where riparian areas have been disturbed, rehabilitation is suggested.
- 9) The trail crosses the main road again at around the 2.4 km mark. A well designed painted crosswalk should be installed at this location.
- 10) The trail returns to the coast at around the 2.5km mark. Some boardwalk and one footbridge are needed along this section.



Cost Estimates – Georges Brook Trail

Item	Quantity	Cost	Note
Class A aggregate	About 25 Loads	7,500	Used to elevate the walk, improve drainage and resurface the trail.
4" stone or similar fill materials	About 2 loads	600	For areas requiring major repairs and to raise the surface in poorly drained areas.
Rock Boulders	About 1 loads	400	Used for retaining the trail edge and as bollards. Use flat ones for trail seating.
Drainage Culverts	Need a minimum of 5. Should be at least 2 m long	800	Use where needed to keep water off the walk surface. Mostly needed at road crossings.
Footbridges	2 crossings	2,000	6x6 cribbing and stringers. 2x6 decking, misc lumber
Park Space Enhancements	Located along riparian open spaces along route	5,000	Landscaping, plantings and park amenities
Misc Lumber	For Boardwalks and railings.	5,000	6x6x8 stringers (30 pcs), 2x8 x8 decking. (60 pcs). Misc lumber
Mini Excavator/Tamper/ATV, Drill, Other Equipment	8 weeks	10,000	
Labour	8 weeks	23,000	Trail upgrading labour only. Based on 4 person team
Crosswalks	1 or 2	10,000	
Project Management and Oversight	8 weeks	2,000	
TOTAL		\$ 66,300.00	(h.s.t. extra)

Cormack Trail

1) We assessed a major portion of this trail and found that it doesn't appear to be well used. For this reason and considering the fact that it is an inland route, we have given it a lower development priority.



A quaint pond along the route.

2) Some significant vegetation removal is suggested as some sections of the route are well overgrown and have blowdown trees.

3) Currently there is no parking lot to access this trail. The proposed new parking lot for the railbed could be used as the trailhead. If that is the case, a new 500m segment should be developed along the shoulder of Random Island Road. Alternatively if it is deemed safe, the current road shoulder could be used (see map). In either case, you will need a crosswalk on Main Road.

4) There is a large collection of water on the trail segment just before the transmission line. Install a culvert and some ditching here. Upgrade the surface using aggregate.

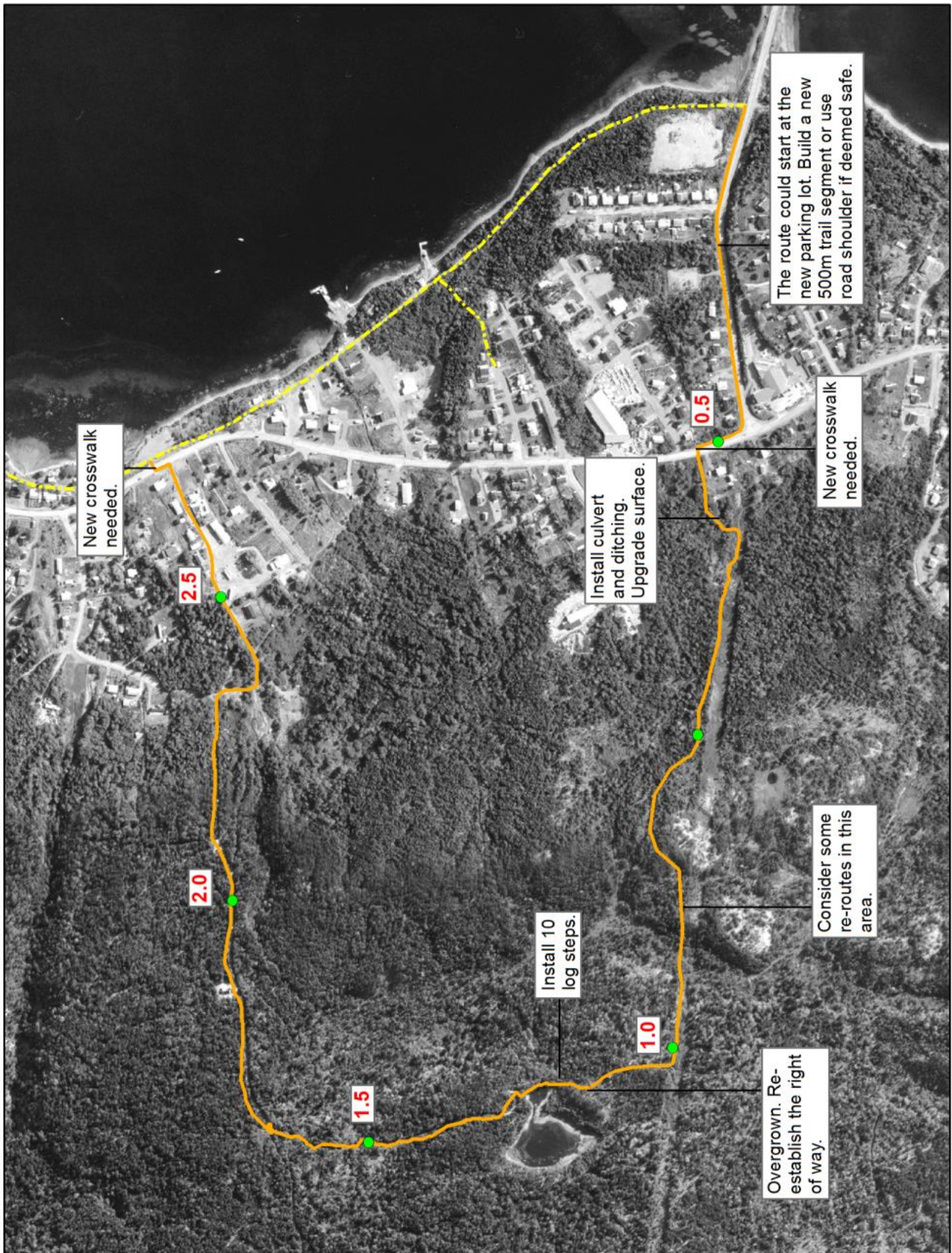
5) The next kilometer or so follows the transmission line. From a tourist perspective, this is not the ideal route. Additionally the route travels straight up the slope which is the same route water will take coming down. A durable trail route will follow the contours of a slope, changing direction as it travels uphill. When upgrading this trail, consider re-routing this section to create a more enjoyable and durable path. No doubt some new trail features (log steps, boardwalk ect...) will be needed.



The trail follows the transmission line here. Consider some re-routes.

6) As the trail leaves the transmission line and heads towards the pond, some major vegetation removal is needed to re-establish the path. Additionally some new trails structures such as log steps are needed in some areas.

7) As the trail leaves the pond the route transitions into a granular path. Very little work is required for the remaining trail as it follows well established routes. The trail crosses Main Road again at the 2.7 km mark and then re-connects to the railbed. A new crosswalk is needed at this location.

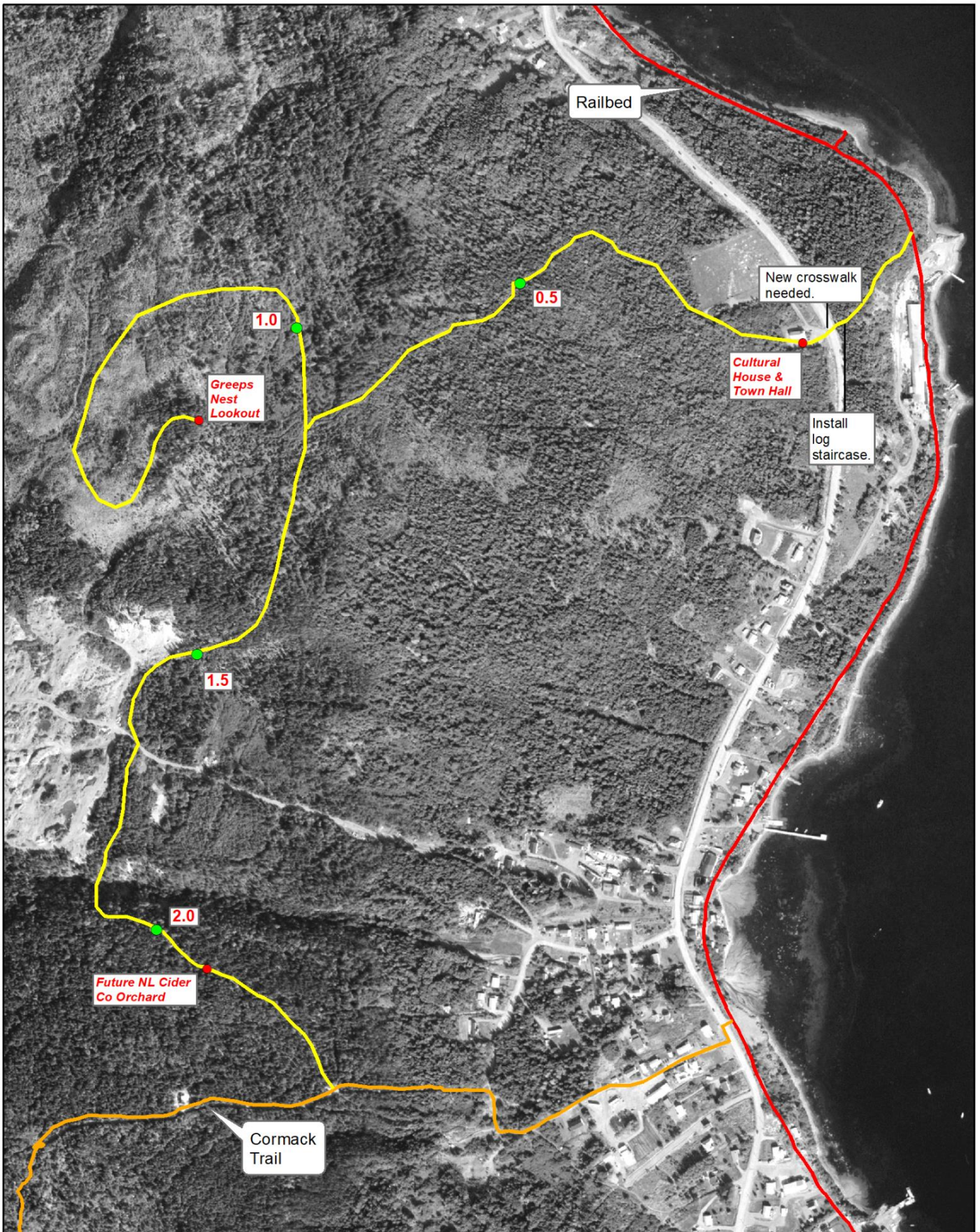


Cost Estimates – Cormack Trail

Item	Quantity	Cost	Note
Class A aggregate	About 5 Loads	1,500	Used to elevate the walk, improve drainage and resurface the trail where needed.
4" stone or similar fill materials	About 1 loads	300	For areas requiring major repairs and to raise the surface in poorly drained areas.
Rock Boulders	About 1 load	400	Used for retaining the trail edge and as bollards. Use flat ones for trail seating.
Drainage Culverts	Need a minimum of 5. Should be at least 1 m long	1,000	Use where needed to keep water off the walk surface. Mostly needed at road crossings.
Park Space Enhancements	Located along riparian open spaces along route	5,000	Landscaping, plantings and park amenities
Misc Lumber	For Boardwalks and railings.	5,000	6x6x8 stringers (30 pcs), 2x8 x8 decking. (60 pcs). Misc lumber
Larch logs	60 pcs	2,000	For log steps and log edging
Rebar 25M	600 ft	1,500	For bracing logs
Mini Excavator/Tamper/ATV, Drill, Other Equipment	8 weeks	10,000	
Labour	8 weeks	23,000	Trail upgrading labour only. Based on 4 person team
Crosswalks	2	10,000	
Project Management and Oversight	8 weeks	2,000	
TOTAL		\$ 61,700.00	(h.s.t. extra)

Greeps Nest Trail

- 1) Right now this route has not been field checked. It is just a conceptual route that we feel would enhance the network. It connects the railbed, to the Cultural House and Greeps Nest which is the highest point in Town. This is a great location for a lookout. The route continues on to pass through the Cider Company orchard. Once developed we anticipate this area will become quite an attractive destination especially during flowering season in the spring.
- 2) The trail could start at the existing parking lot for the Cultural House. A small segment will connect to the railbed across the street. A log staircase should be installed to ascend the slope to the railbed. Additionally a crosswalk is needed to cross Main Road.
- 3) Being a conceptual route at this stage we are sure you will encounter some property ownership issues that will require some route adjustments. An LTO for the entire route should be secured prior to any trail development.
- 4) As the trail approaches the NL Cider orchard near the 2km mark no major work is needed by the Town as we will have our own trails developed on the property.
- 5) A more detailed inspection of the proposed route is needed in order to determine the final cost for development. That being said, we would suggest that a "hiking trail" (see classification on page 7) be designed. We suspect the cost to be somewhere around \$50,000.



Developing a Signage/Guidance System

A clear and well-designed signage system is a critical and often under-valued aspect of any trail network. Signage needs to serve at least four main purposes:

- 1) **Inform:** Trailhead signage is critical and should be detailed. Include a trail map that clearly shows the route, the distances and the features to look out for along the trail. Trailhead signage should also include warnings of expected risks (be specific) and hiker courtesy's or trail rules. Identify acceptable trail use (bikers, hikers) and unacceptable uses (e.g., hunting). The trail map should show a north arrow and scale. Trail difficulty and safety information is also important. Include trail group contact and emergency contact information.
- 2) **Warn:** Often times trail users will post "Use at Own Risk" signage with the assumption that this will protect them from liability suits. That however is not true. These signs are too vague. For example is dangerous wildlife the risk? Or is coastal erosion or high cliffs the risk? Can users be exposed to rugged sections of trail which would warrant advanced warning? Is the landscape treacherous enough that users should be warned to stay on the designated path and not venture off it? Have specific warnings posted on your trailhead sign and along the trail where the actual risks are. Give advanced warning and on-site warning and be detailed so trail users can make an informed choice.
- 3) **Identify:** Appropriate identification of interesting trail features can add to the user's experience. Is there a cultural or historical feature that merits interpretation or identification? Identifying or labelling some natural features can also help users pinpoint their location on the trail. Avoid unnecessary signage – you don't need a sign for everything.
- 4) **Guide:** Signage needs to guide visitors to the trailhead and to trail information. Road signage strategically located along the main roads should be installed.

Guidance along a trail is also needed. Trail markers should be installed along the route to direct users to trail links off the main route. They should also be installed to reassure users that they are on the right path. Users will rely on these trail markers so ensure they are of the same style and design for every trail. They should also be detailed explaining how far they have travelled and how much further they have to go.

Clearly there is a lot of work to developing a signage plan. Done properly, this can heighten user satisfaction. Done poorly, and trail users become frustrated. Here are a few extra tips when developing your signs:

- a) Don't do it independently. Seek professional assistance especially when it comes to the design of the signs.
- b) Have a brand. Use consistent sign fonts, colors, layouts and design. This brand should carry out into all promotional items such as a website, guide book or trail maps.

- c) Manufacture quality signs. Many groups produce signs that deteriorate quickly over time. Consult with professionals to ensure you manufacture signs that will last.
- d) Simplify your signage. Avoid elaborate designs and too much text. In addition avoid posting a bunch of signs on the posts of trailhead signage. This detracts from the look. Consolidate all those signs into one effective trailhead sign.
- e) There is an advantage to developing tourism oriented signage for all tourism assets (e.g., museums, beaches) not just for trails.
- f) Take ownership of all trail promotional items and ensure that the branding is consistent.

It is also important to keep in mind that your Town falls within the borders of the Discovery Trail Tourism Association and their trail group "Hike Discovery". It may be advantageous to become part of that association and use their sign design standards.



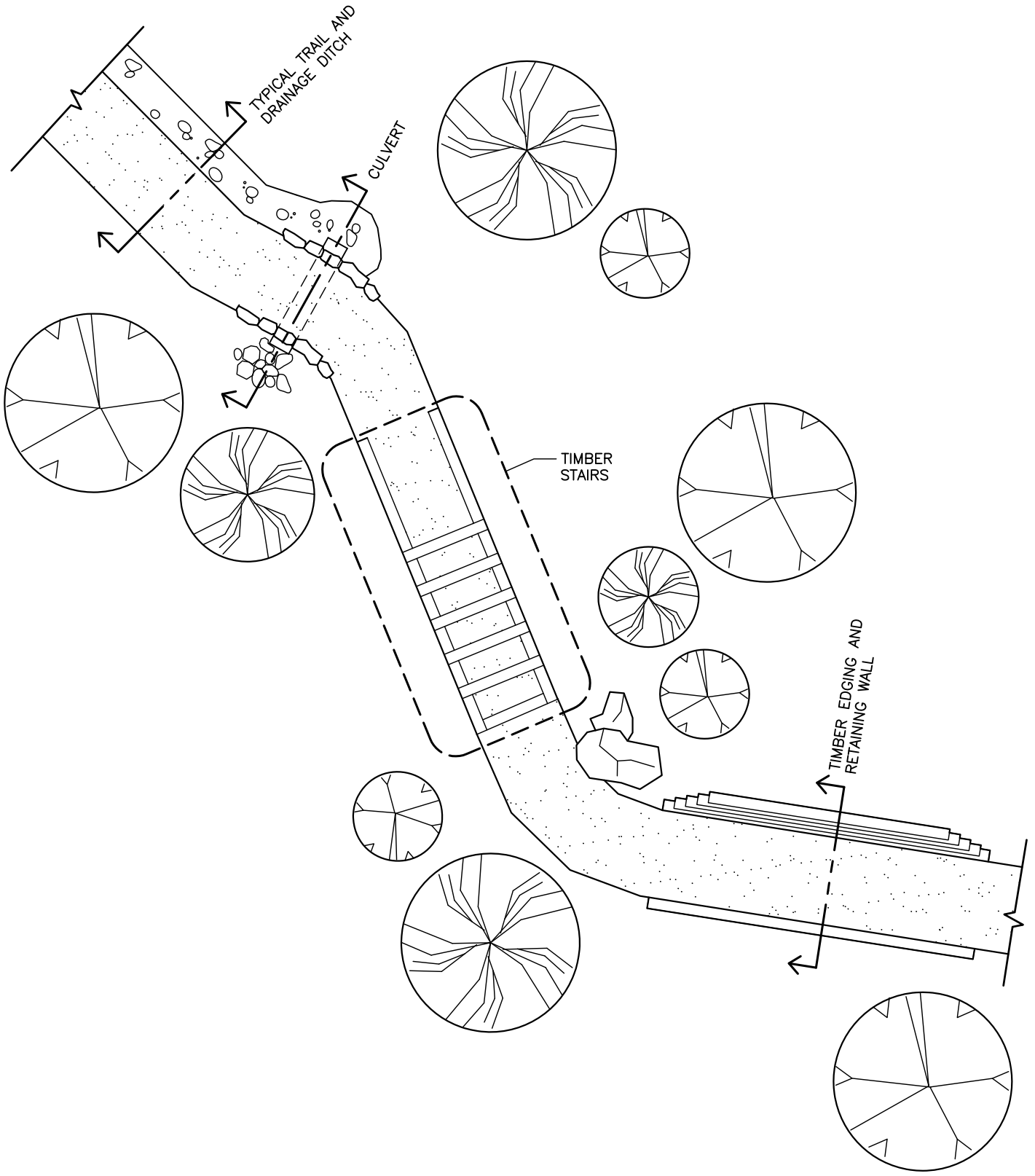
Next Steps

- 1) Before any trail upgrading takes place check property ownership for all routes. Obtain a license to occupy for routes owned by the Crown. Don't upgrade or promote a trail without confirming property ownership and ensuring that the trail is covered under Town insurance. If any segment of the trail passes through private land, have a signed access agreement with the land owner.
- 2) Consider joining the well-established Hike Discovery Trail Group. They have trail experience and are a tremendous asset. Seek partnerships with the community to aid in trail upgrading, maintenance and promotion.
- 3) Determine the level of upgrading and promotion to be completed and work on securing the required funds. Don't take on too much at once. Start with one or two trails. Focus on trails that have the greatest tourism value first.
- 4) Secure permits and approvals from the appropriate regulatory agencies. This may include but is not limited to:
 - a. Provincial Department of Environment and Conservation: Any works or undertakings within 15m of a body of water require approval from this department. This application will have to outline the walk route and identify details related to all proposed stream crossings.
 - b. Provincial Environmental Assessment Division: The Department of Municipal Affairs and Environment may determine that an environmental assessment be completed for this project. If so an initial environmental assessment application will be required. The division would then determine if this project has triggered a full blown environmental assessment. No need to apply to this department unless directed to from Crown Lands or Municipal Affairs. All that being said, an Environmental Assessment Registration will be required for any trail exceeding 10 km in length. Two trails that connect would be considered as one (from their perspective) so you may need to complete this process.
 - c. Federal Department of Fisheries and Oceans: Any workings that may affect fish habitat could require an application to this department (e.g., bridge construction).
 - d. Any signs to be installed along Provincially maintained roads requires approval from the Province.
- 5) Develop a maintenance plan for all trails that you intend to promote.

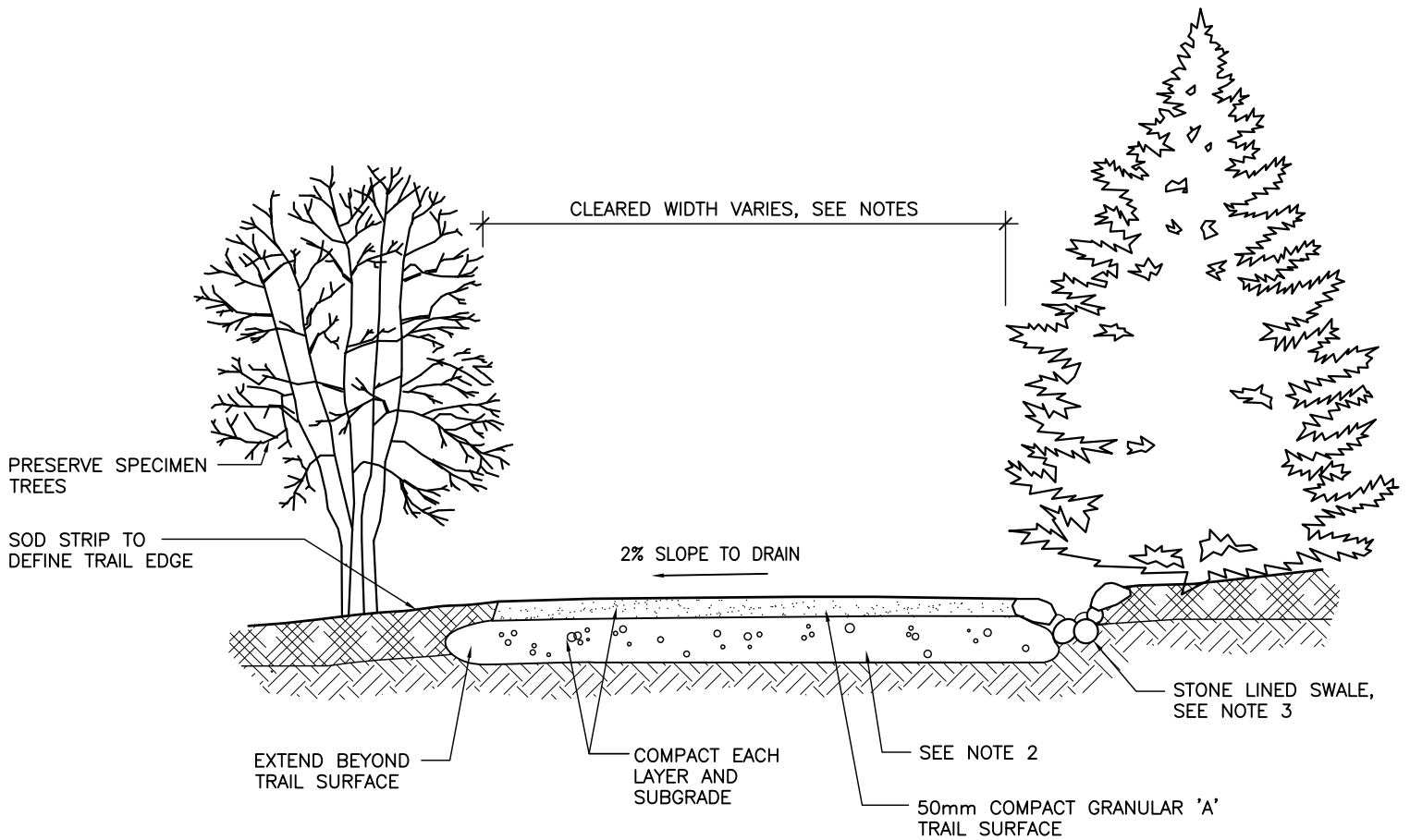
- 6) Have trail upgrading plans reviewed by a local engineer if one is available and willing to offer an in kind service. Suggestions in this report are merely guides and they should not be implemented without professional direction and review.
- 7) Prepare a trail signage brand that will be applied to all on and off-site signage. Also work on other promotional items and a strategy to market the trails.
- 8) Secure a construction team and upgrade the trails based on their priority. Seek professional oversight for crew orientation and periodic checkups.
- 9) Develop marketing and promotional items including trail maps and a website. Make sure they are designed in harmony with your established brand. Only advertise the trails that are upgraded, regularly maintained and that have the signage installed. As already mentioned “Hike Discovery” has already done the leg work on this so consider becoming a member.

Preparing For Construction

- 1) We suggest a four person crew with a lead hand, a carpenter and two laborers. You need to select a good lead hand that has a good understanding of the report contents and the suggested construction methods.
- 2) All too often trail structures that need to be built (boardwalks, bridges, rails ect...) are constructed based on the carpenters personal experience and knowledge. We would suggest the construction drawings in this report be followed closely as they are time tested structures that we know work well in the Province. Avoid making "new" styles or designing structures "on the spot". Try to stay close to the principals of trail construction highlighted in this document.
- 3) Have a clear construction plan in advance of hiring a crew. In the past we have seen weeks of time lost because no advance planning was in place.
- 4) Have all materials and equipment lined up, ordered and delivered before the crew starts work. Don't leave this up to the lead hand.
- 5) Some basic equipment includes an ATV and trailer (or side by side with a dump), a mini-excavator that can be rented on an "as needed" basis, a truck, chainsaw, brush saw, polaski or similar grubbing tool, shovels, rakes, pruning shears, drill set, generator, mallet and other basic hand tools.
- 6) Source local materials (logs, aggregate) before the trail crew starts. Have some delivered to selected drop off locations.
- 7) Adequate safety gear (PPE, fire extinguisher, first aid kit ect...) should be available at all work sites. Additionally, adequate safety training should be provided before any construction begins.
- 8) We would highly recommend a trail building orientation session with an experienced trail builder or planner. The crew should be taught basic trail building principals and techniques. This orientation could cover everything from selecting the best trail route to the construction of trail features. Safety orientation is also essential.



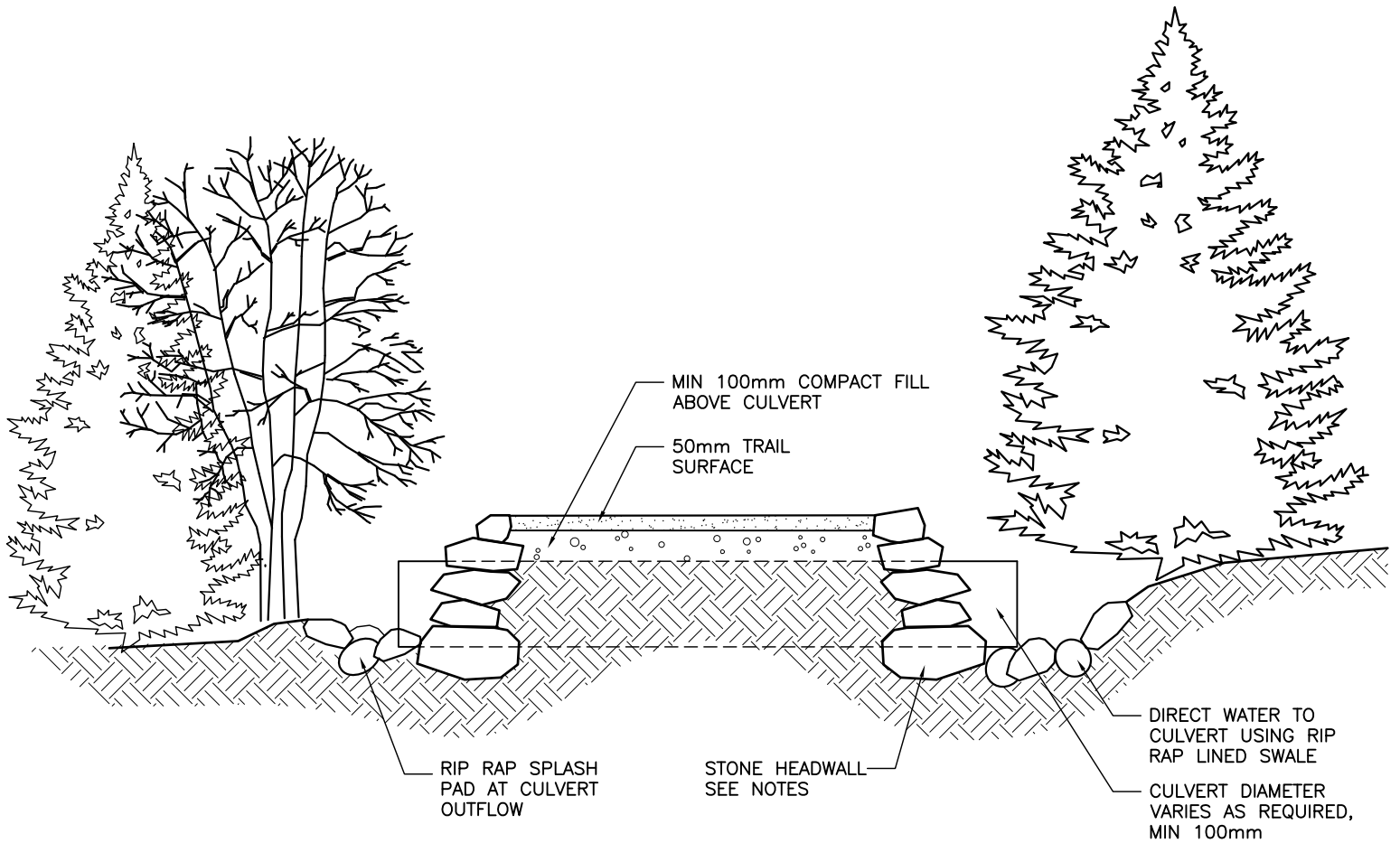
Typical Trail Features



Typical Trail Construction

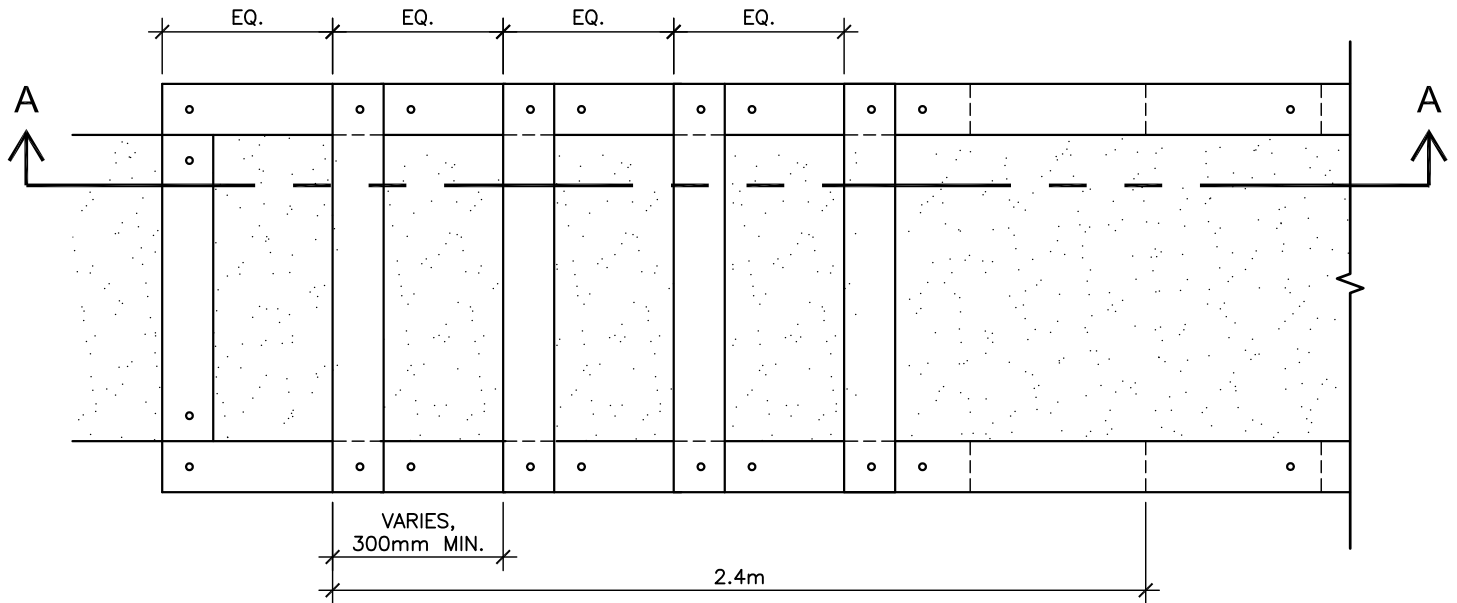
NOTES:

1. ENSURE POSITIVE DRAINAGE FROM TRAIL. MAINTAIN 1-2% CROSS SLOPE ALONG TRAIL.
2. WHERE REQUIRED IN WET AREAS PLACE 100mm OF FILL TO ELEVATE TRAIL SURFACE AND TO FACILITATE DRAINAGE
3. WHERE REQUIRED TO DIRECT WATER, USE A STONE LINED DITCH ADJACENT TO TRAIL. TOP OF DITCH TO BE TWICE AS WIDE AS BASE. PLACE STONES BY HAND. SEE CULVERT DETAILS
4. TRAIL SURFACE MAY VARY IN WIDTH FROM 0.3m TO 1.5m. CART STYLE PATHS ARE ALSO AN OPTION.
5. VERTICAL AND HORIZONTAL CLEARANCE OF VEGETATION SHOULD BE APPROXIMATELY 2.5m WIDE x 2.5m HIGH FOR CART STYLE PATHS AND 2.5m HIGH x 1.5m WIDE FOR FOOTPATHS.
6. DEFINE TRAIL EDGE USING TOPSOIL AND SOD OR SUITABLE SEED MIX

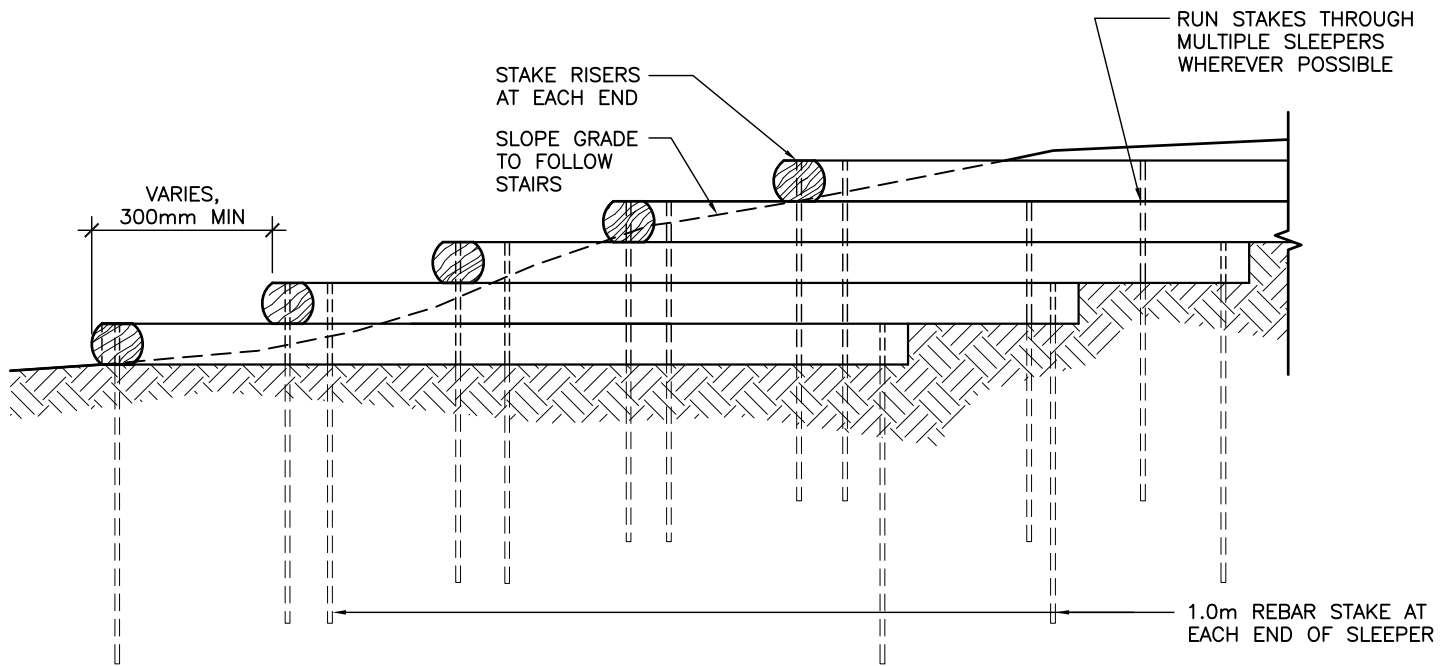


Section Through Culvert

1. AT CULVERT OUTFLOW CONSTRUCT A STONE PAD APPROXIMATELY 1.0m x 1.0m TO PREVENT EROSION
2. USE ANGULAR OR FLAT STONES FOR HEADWALL AND WHEREVER POSSIBLE CHOSE STONES THAT FIT TIGHTLY TOGETHER. USE STONES A MIN. OF 300mm LONG.
3. EXTEND CULVERT 100–200mm BEYOND HEADWALL.
4. ENSURE ADEQUATE SLOPE IN CULVERT TO MAINTAIN FLOW.



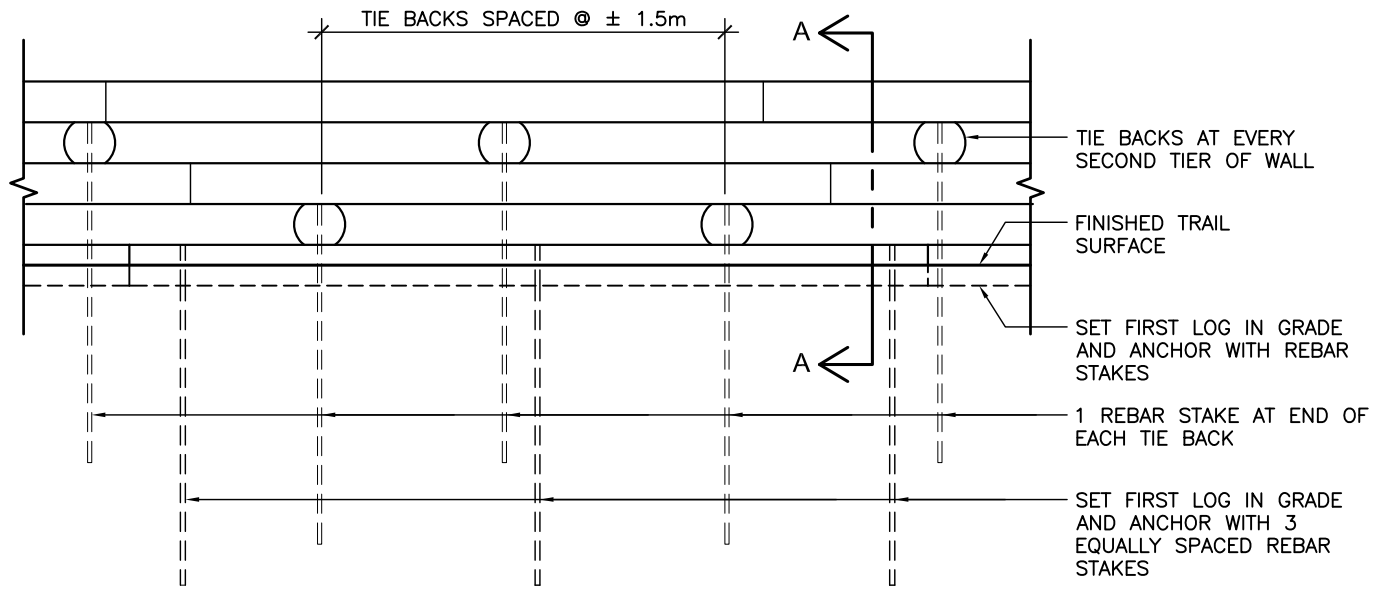
Stair Plan View



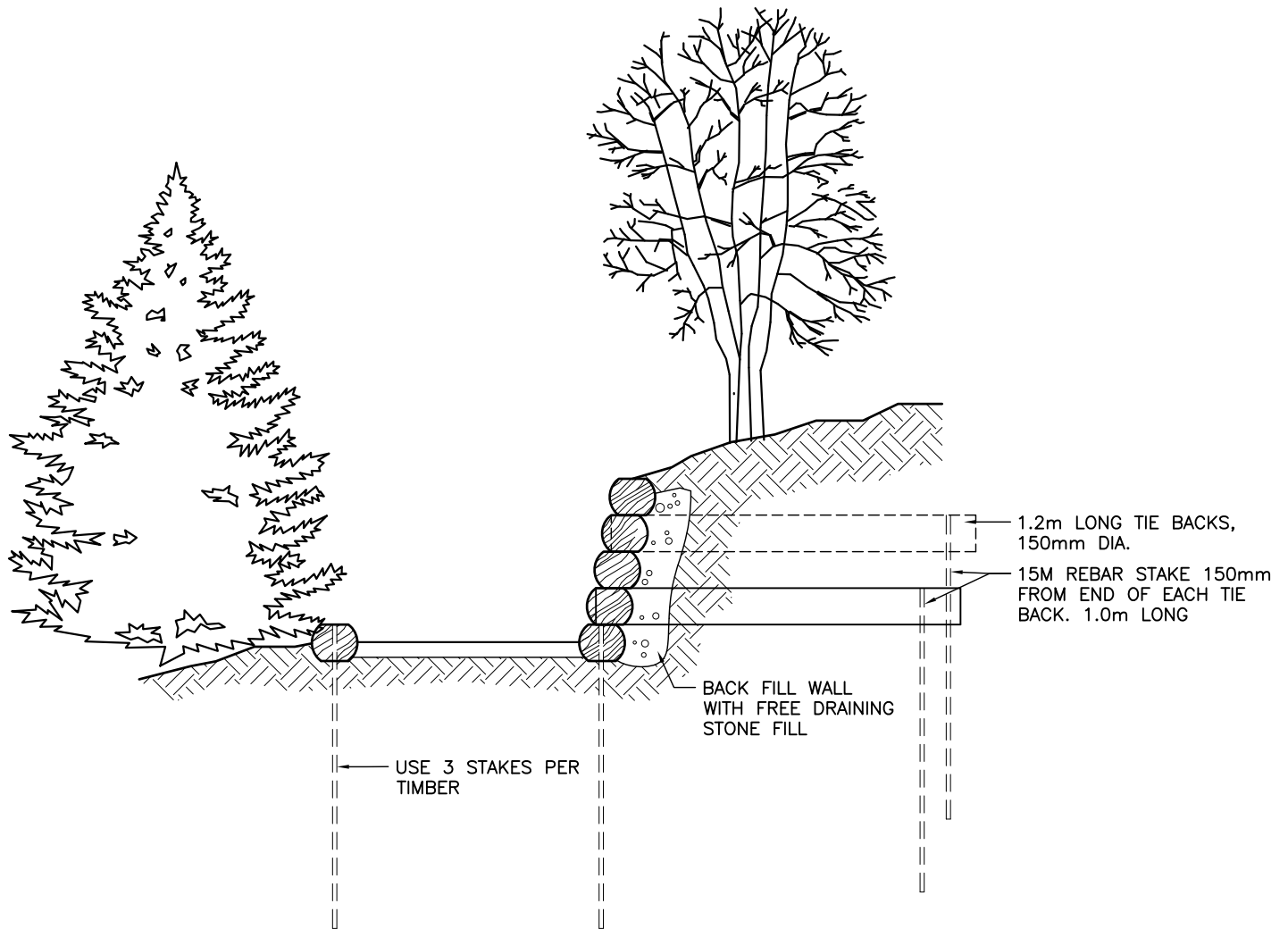
Section 'A'

NOTES:

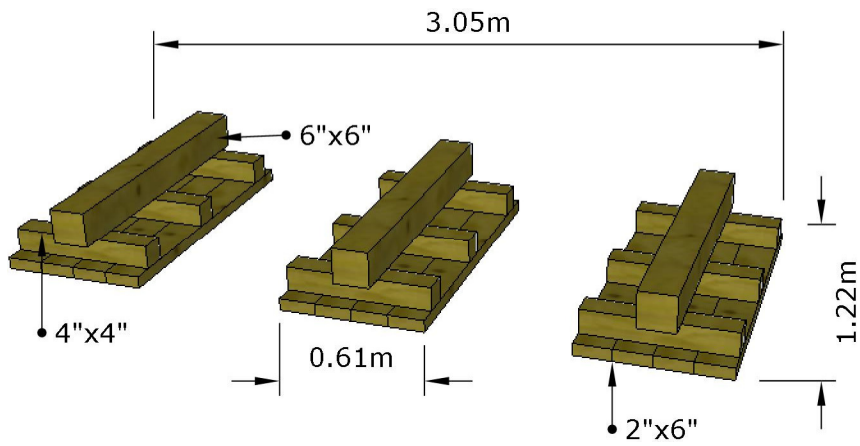
1. ALL STAIR TREADS ARE TO BE OF EQUAL DEPTH, MINIMUM 300mm.
2. EACH SLEEPER MUST BE STAKED WITH REBAR AT EACH END AND HAVE 1 INTERMEDIATE STAKE LOCATED APPROXIMATELY AT MID SLEEPER. ALTER LOCATION OF INTERMEDIATE STAKE AS REQUIRED TO AVOID OTHER STAKES.
3. BACKFILL AND COMPACT FILL BETWEEN SLEEPERS PRIOR TO CONSTRUCTING NEXT STEP
4. USE 20M REBAR FOR STAKES
5. FINISH EACH STEP WITH GRANULAR MATERIAL



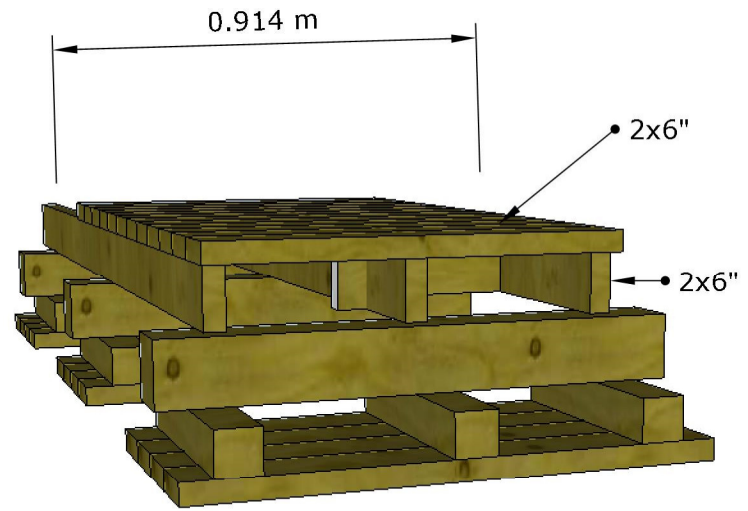
Retaining Wall Elevation



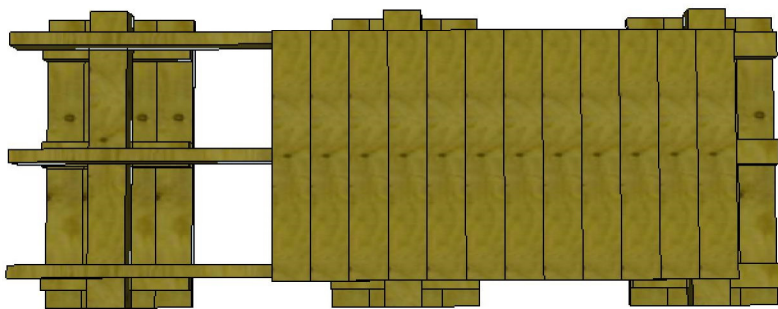
Section 'A'



Boardwalk Footings



Boardwalk Stringers and Decking



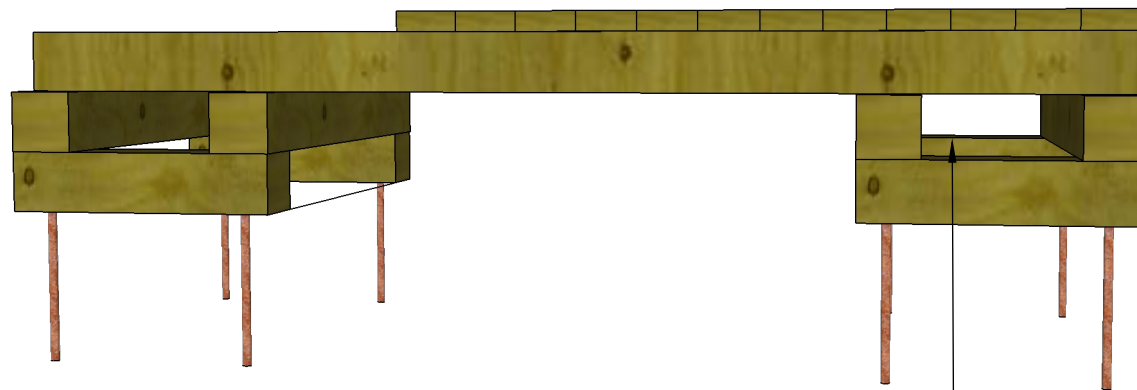
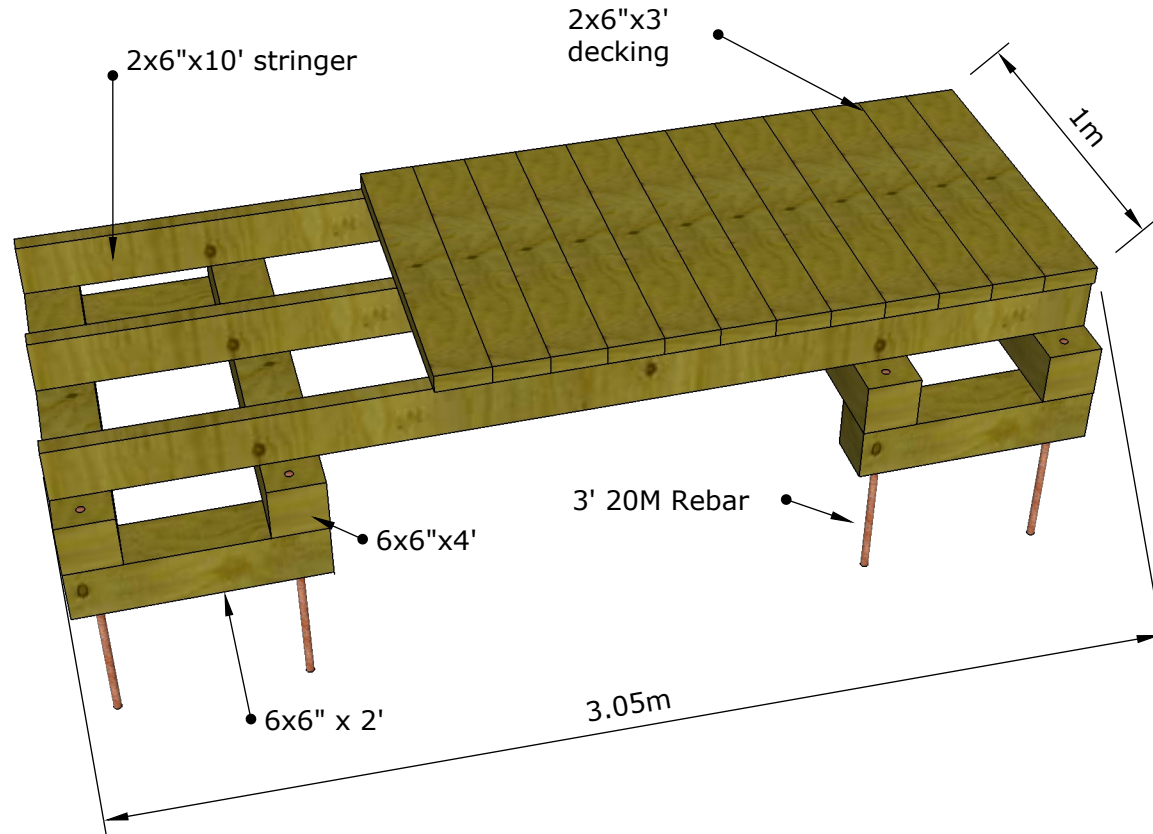
Plan View

Notes:

- 1) Don't use pressure treated wood if in environmentally sensitive areas.
- 2) Fasten all boards using wood screws.
- 3) Filter fabric and aggregate could also be applied under the footings in very poorly drained sites.
- 4) Adjust dimensions based on desired boardwalk width.

FLOATING BOARDWALK

Footbridge for a 1m Stream Crossing



Fill cribbing with
8" diameter rocks

Notes:

Secure all boards using wood screws.

Cribbing to be braced with rebar on all four corners.

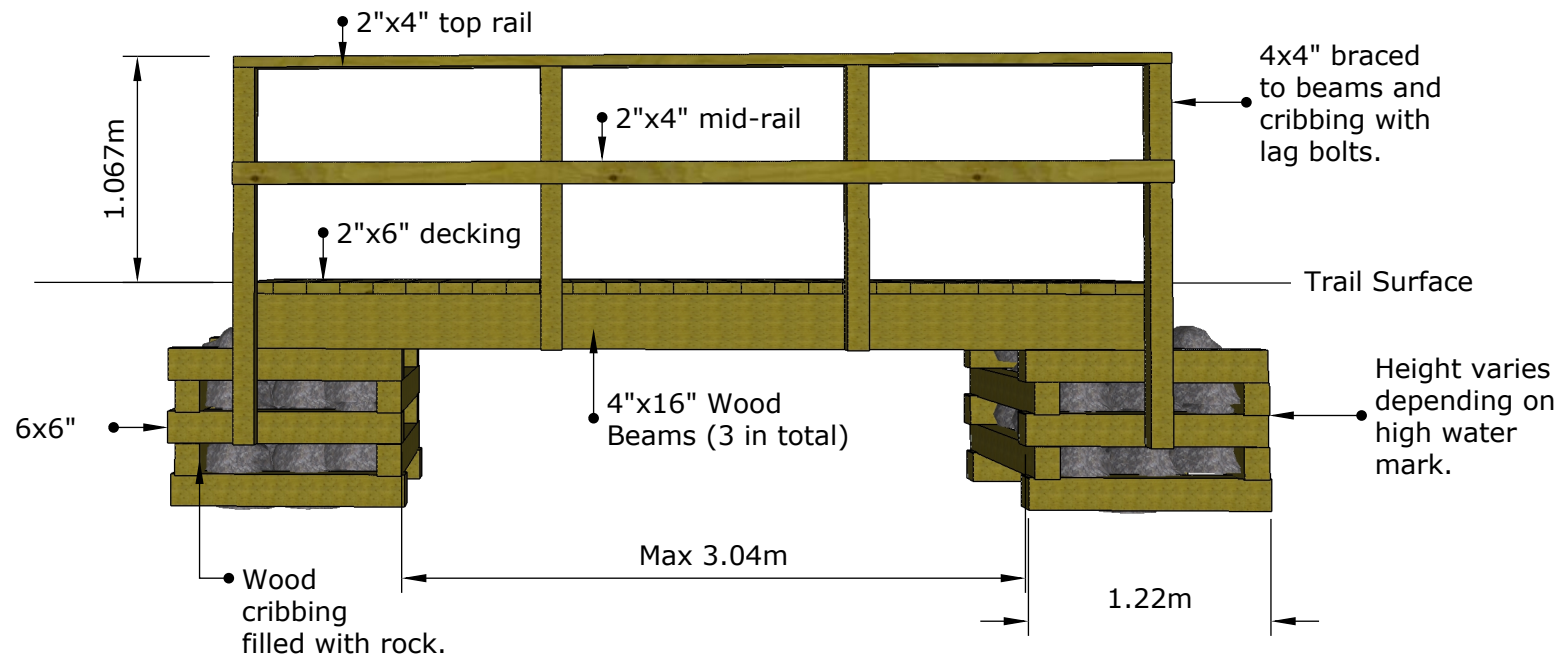
Fill cribbing and surroundings with large 8" diameter rock (average).

Final trail surface should be level with bridge decking and graded away from the bridge.

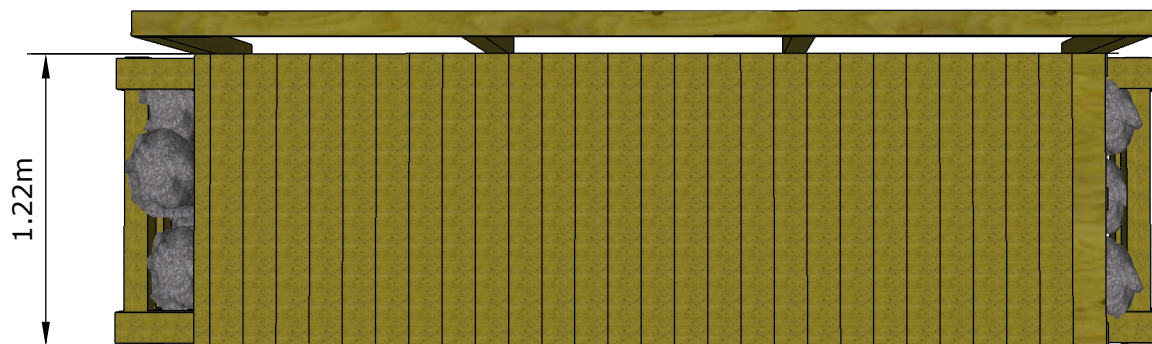
Cribbing height will vary depending on the stream bank depth, water flow and surrounding grades.

Ensure crossing approvals are obtained prior to construction.

BRIDGE



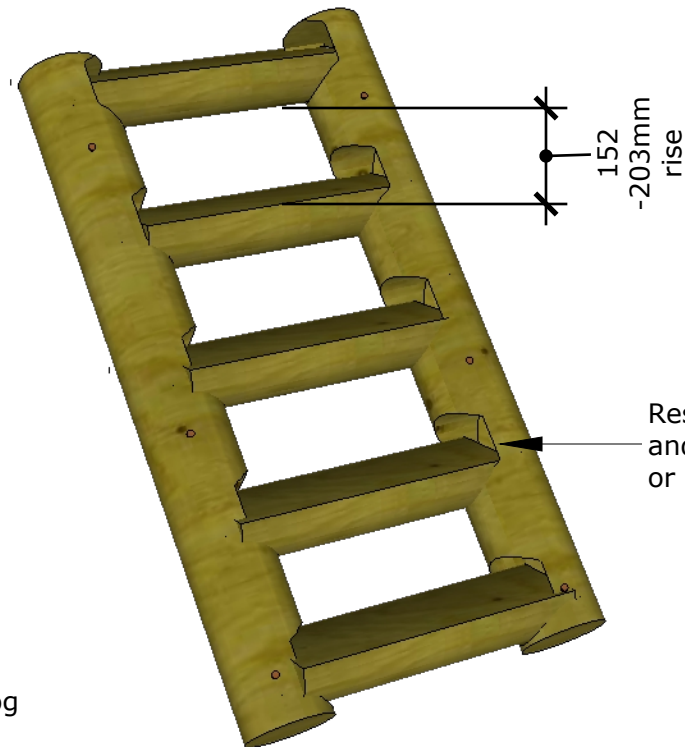
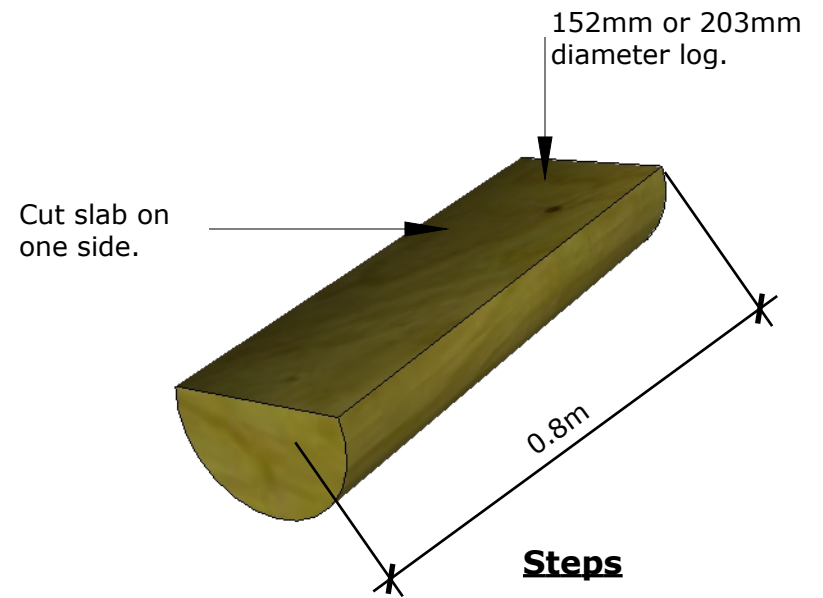
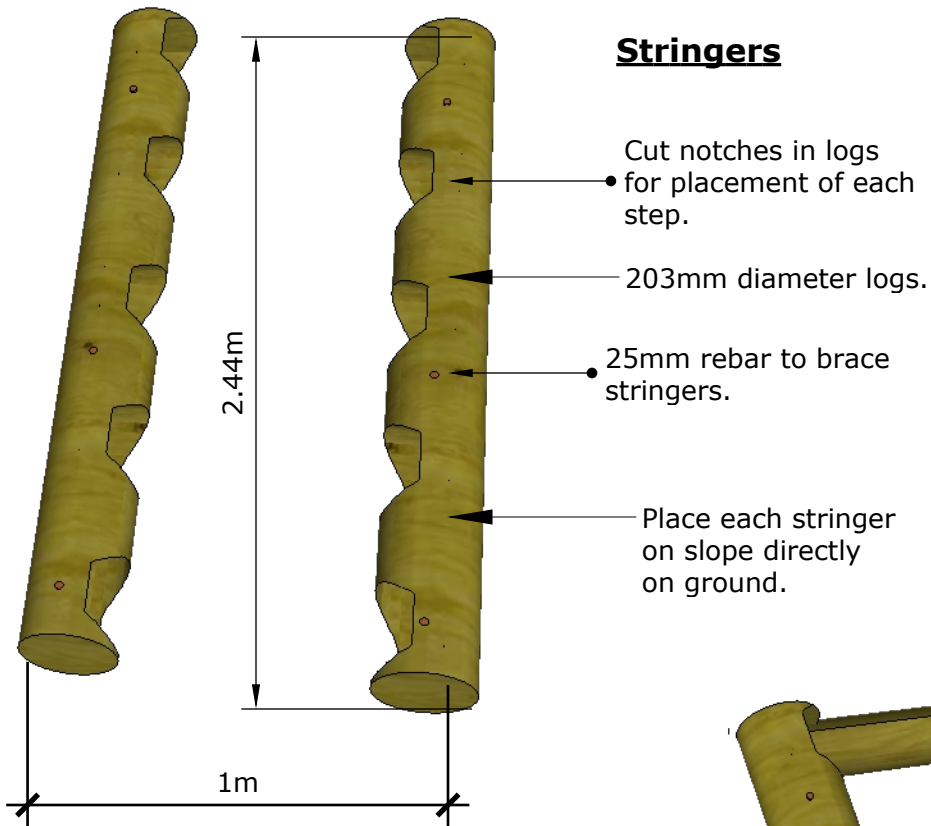
Bridge Side View



Bridge Plan View

Notes:

- 1) Don't use pressure treated wood if in environmentally sensitive areas.
- 2) Use heavy duty lag bolts and hardware sufficient for the size of the structure.
- 3) Consult with an engineer to confirm the design. This is just a guide.
- 4) Confirm bridge dimensions at each site.
- 5) Ensure abutments are out of the water and well above the high water mark.

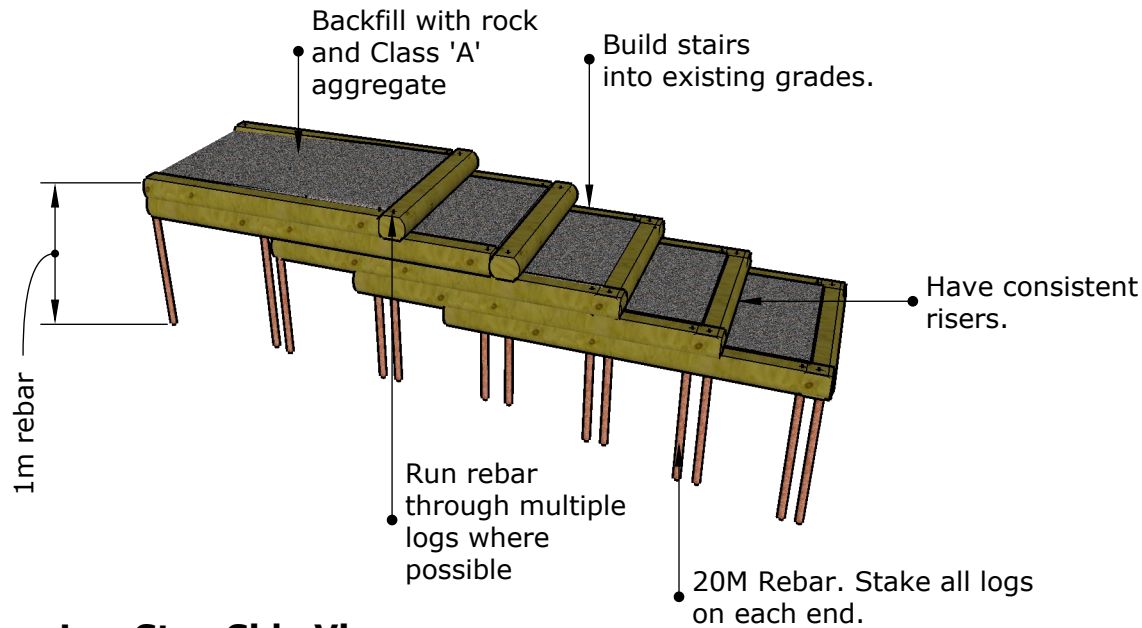


Notes:

- 1) All risers should be of equal depth.
- 2) Stringers should be staked with rebar.
- 3) Brace log steps with nail spikes.
- 4) Use debarked logs. Larch is preferred. Avoid fir.
- 5) Length will vary depending on the site.
- 6) Only use where needed to ascend steep grades. Log steps are preferred over log ladders.

LOG LADDER

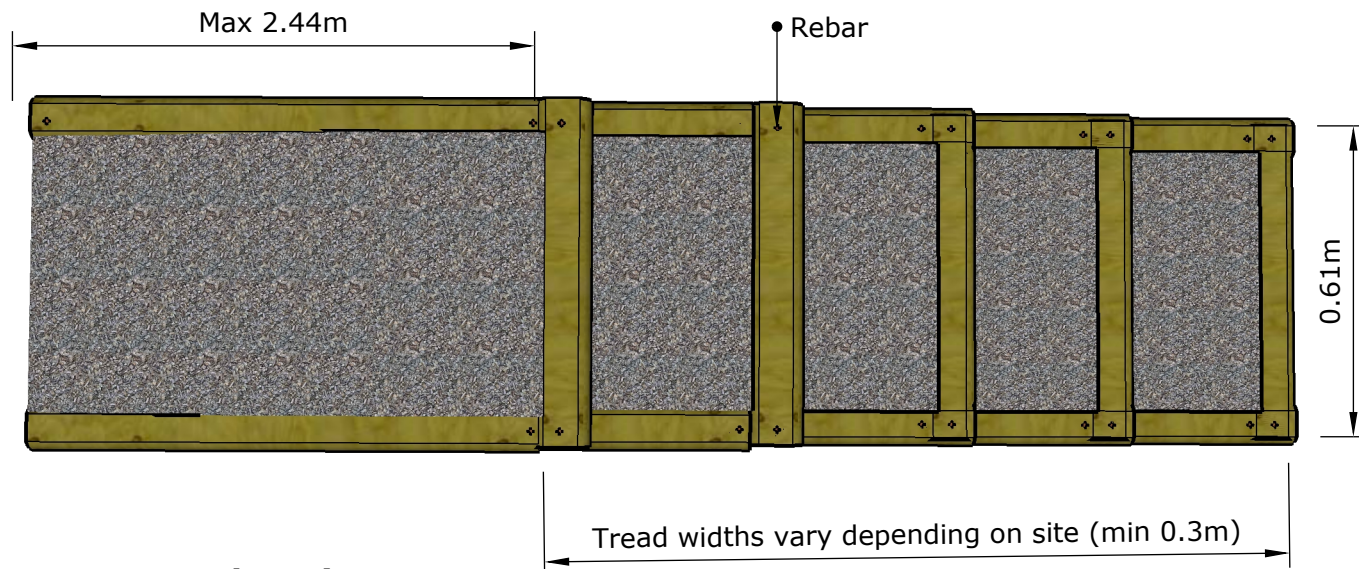
LOG STEPS FILLED WITH GRANULAR



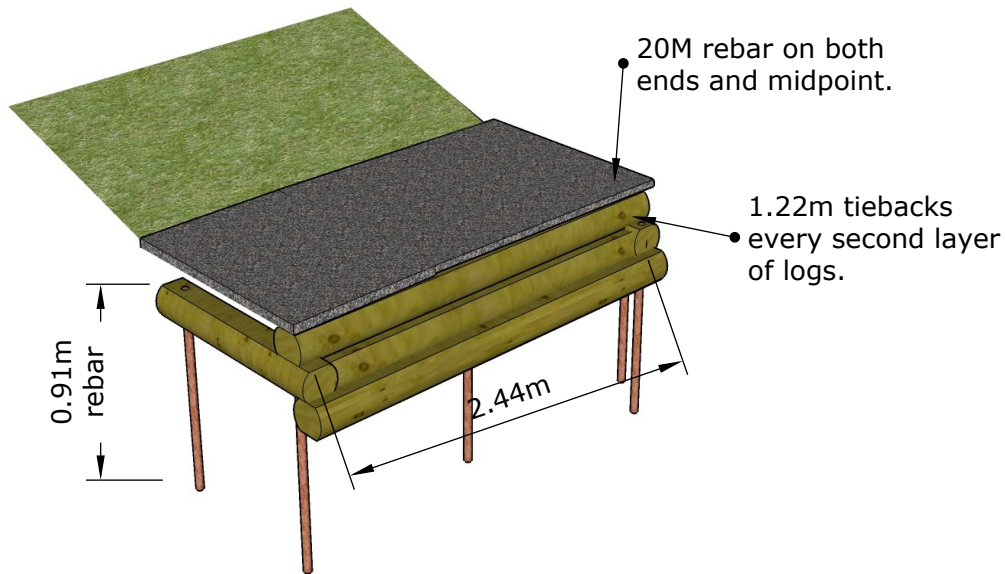
Log Step Side View

Notes:

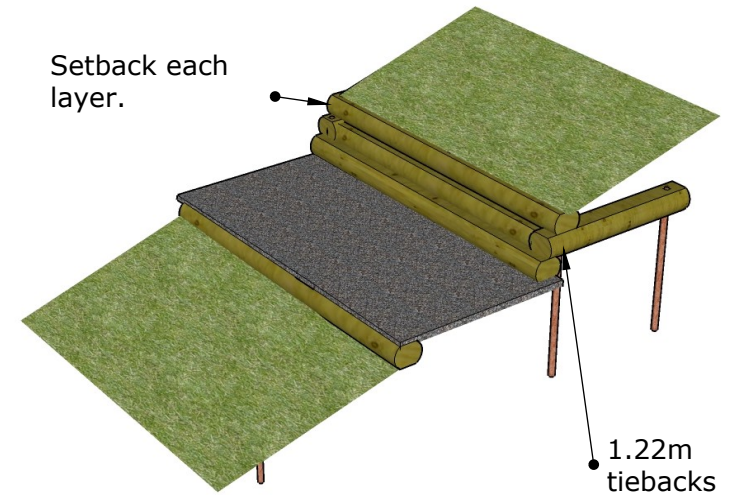
- 1) All stair risers should be of equal depth.
- 2) Tread width should vary depending on the site (minimum 0.3m)
- 3) Logs to be staked at each end with a mid stake for longer logs.
- 4) Use debarked logs with slabs cut on opposing sides. Larch is preferred. Avoid using fir.
- 5) Backfill each step with rock and topped with Class 'A'.
- 6) Start at bottom step and fill it before moving on to the next.



Log Step Plan View

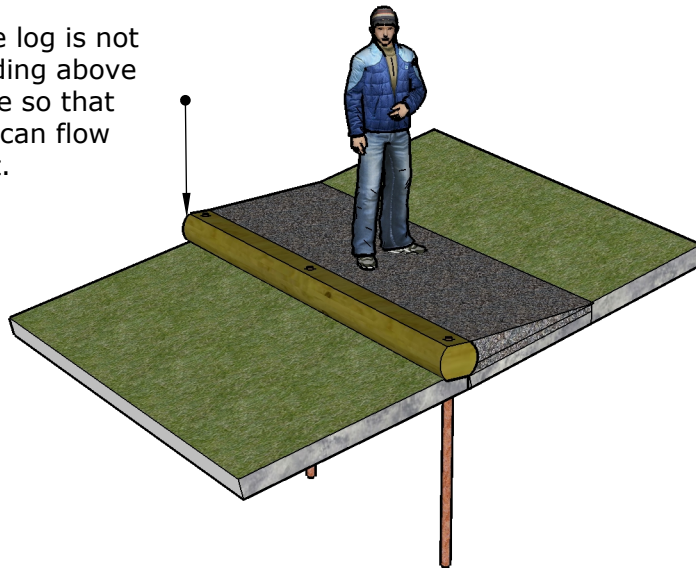


Retaining on Side Slope



Retaining -Cutting Into Slope

Ensure log is not extending above surface so that water can flow over it.

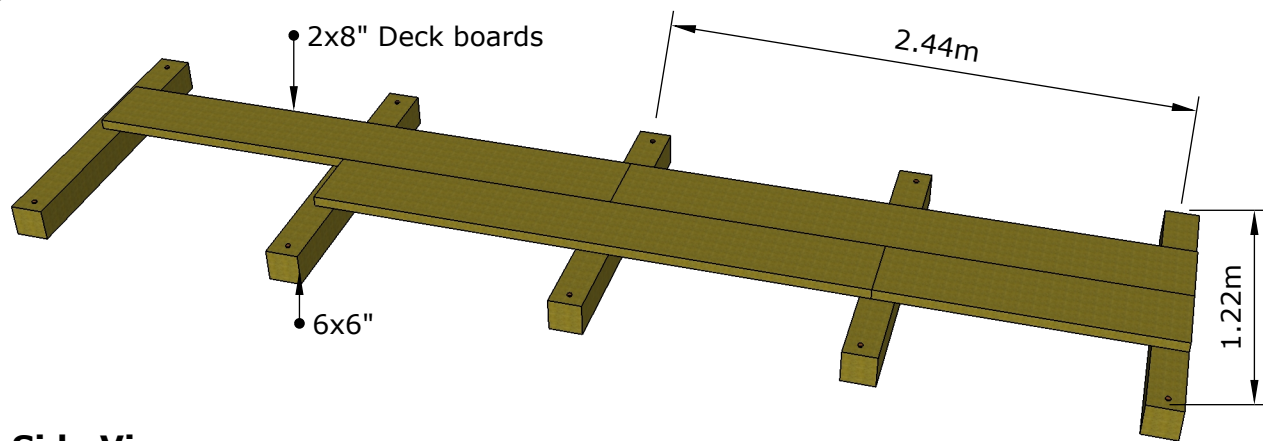


Single Log Edge Retaining

LOG EDGE RETAINING

Notes:

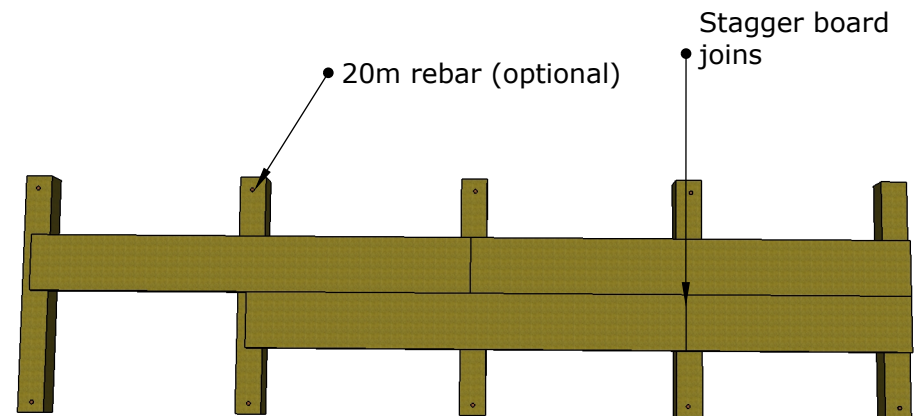
- 1) All logs should be of similar size.
- 2) Logs should not trap water on surface.
- 3) Logs to be staked at each end with a mid stake for longer logs.
- 4) Use debarked logs with slabs cut on opposing sides. Larch is preferred. Avoid using fir.
- 5) Backfill each layer with rock.
- 6) Filter fabric may be needed to retain backfill material.



Side View

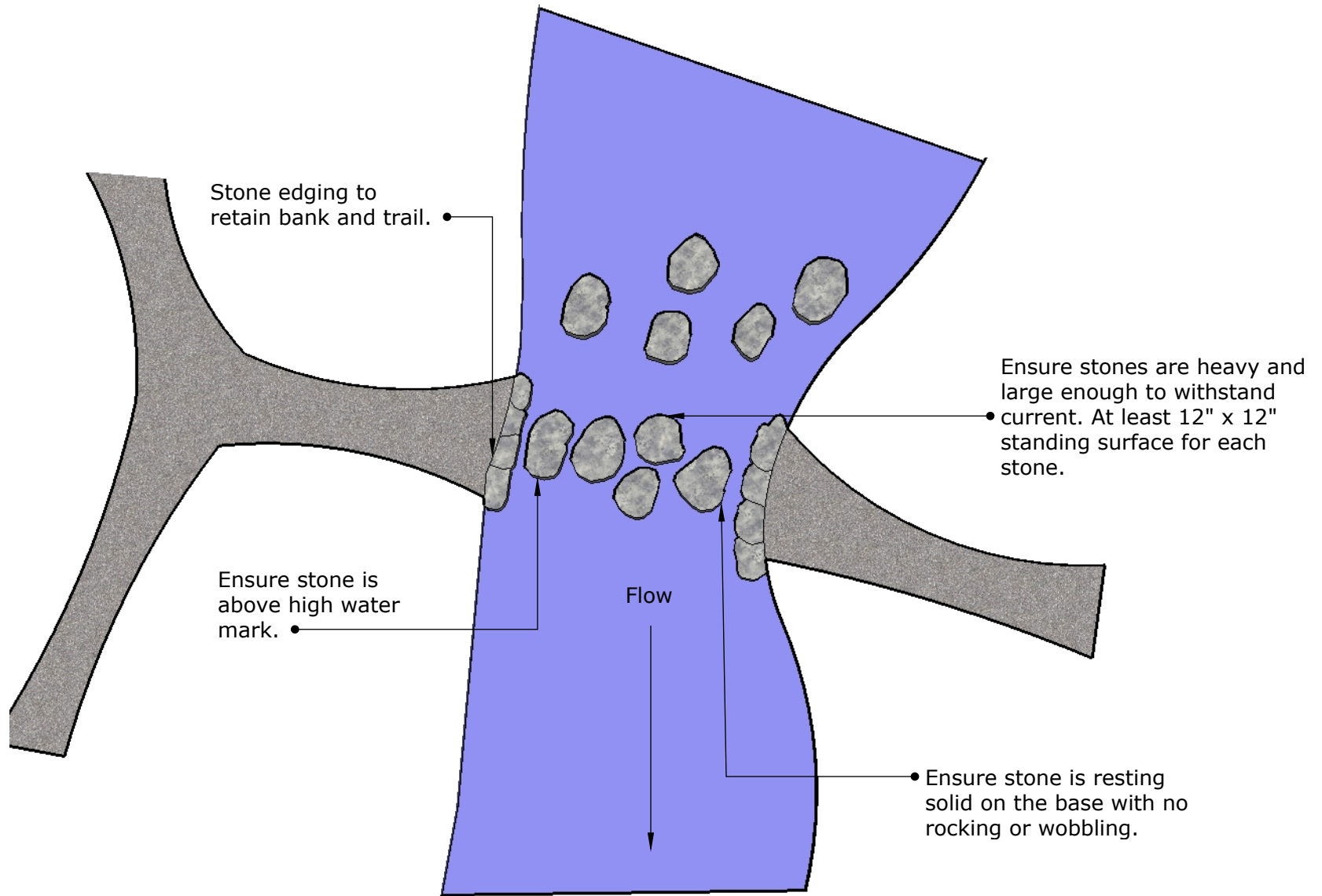
Notes:

- 1) Don't use pressure treated wood if in environmentally sensitive areas.
- 2) Fasten all boards using wood screws.
- 3) Filter fabric and aggregate could also be applied under the footings in very poorly drained sites.
- 4) Adjust dimensions based on desired boardwalk width.
- 5) Never build with a grade. If on a slope create steps from one section of boardwalk to the next.



Plan View

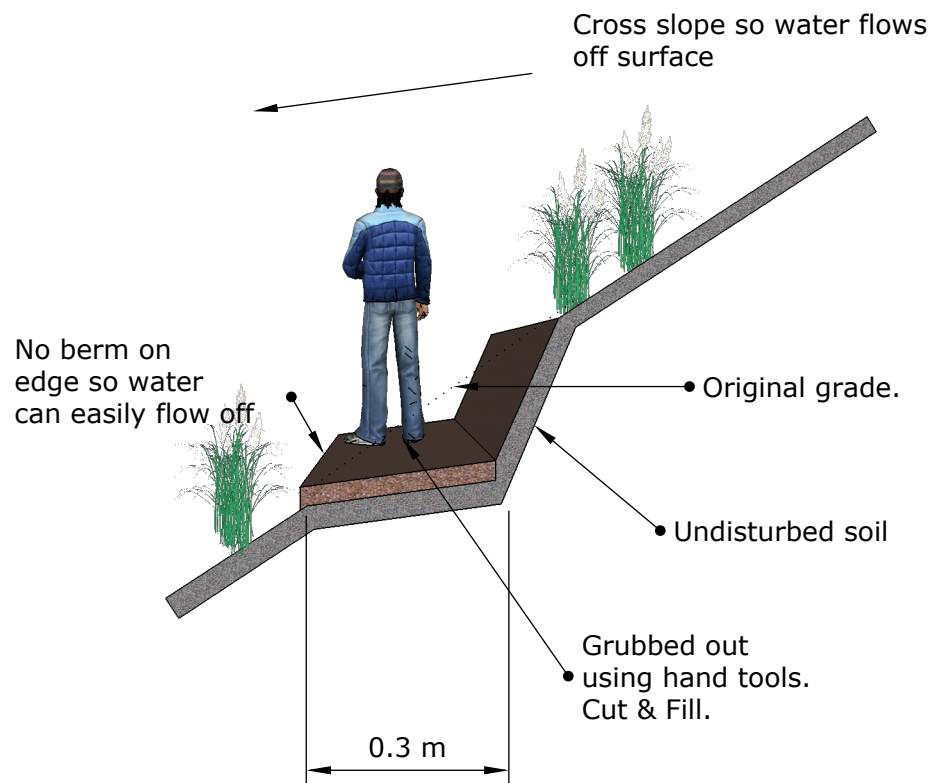
SINGLE FILE BOARDWALK



Notes:

- 1) Ensure each stone is placed at a "natural stride" distance apart.
- 2) Use only for short stream crossings that are shallow and have a slow flow.

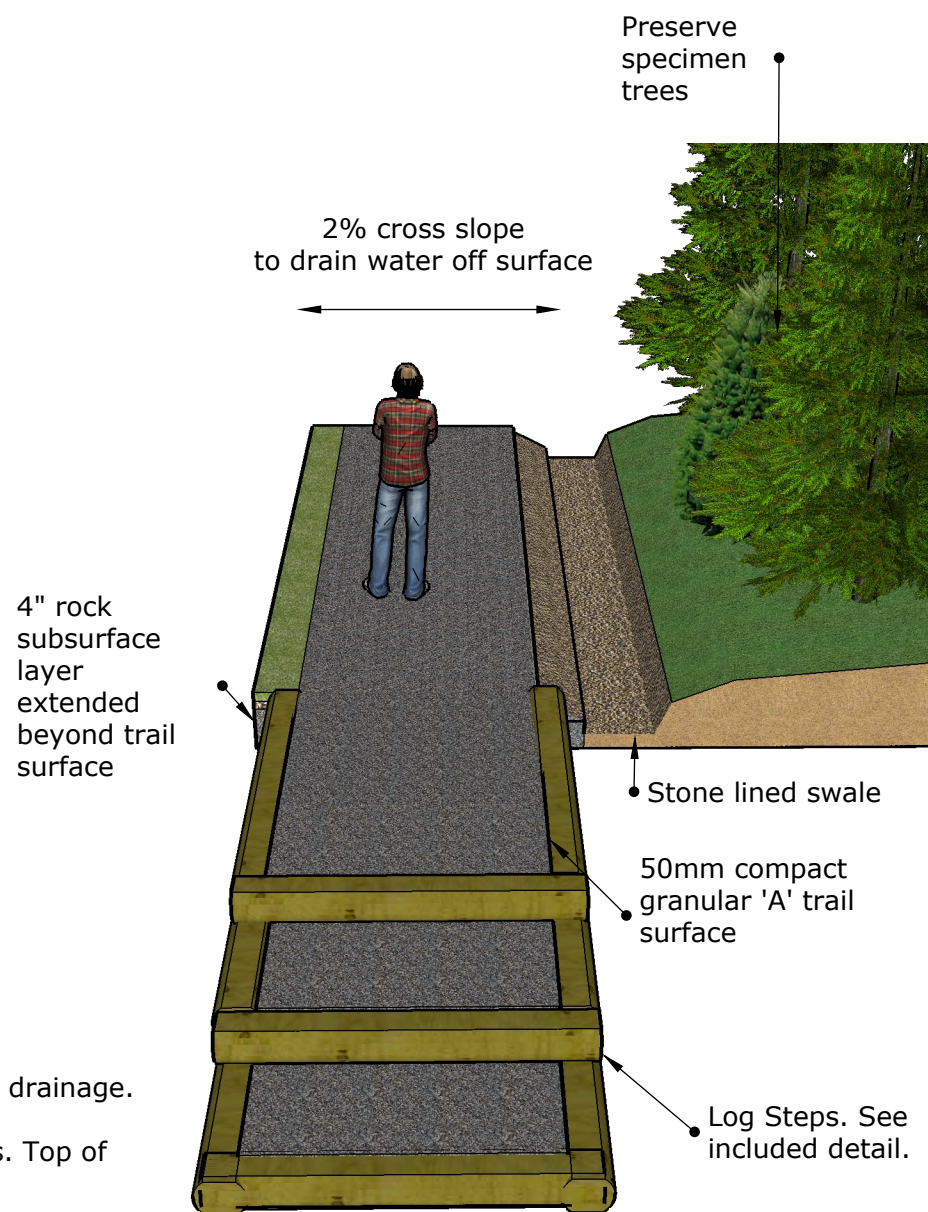
STEPPING STONE CROSSING



Natural Walking Surface Cutting into a Slope

Notes:

- 1) Maintain positive drainage with a 1-2% cross slope.
- 2) In poor drainage areas, elevate the surface to encourage good drainage.
- 3) Where required to direct water, install a ditch lined with stones. Top of ditch to be twice as wide as the base.
- 4) Maintain a 2.5 m vertical clearance of vegetation regardless of the trail width. For 0.3m wide footpaths, maintain a 1m wide horizontal clearance of vegetation.



Raised Granular Walking Surface