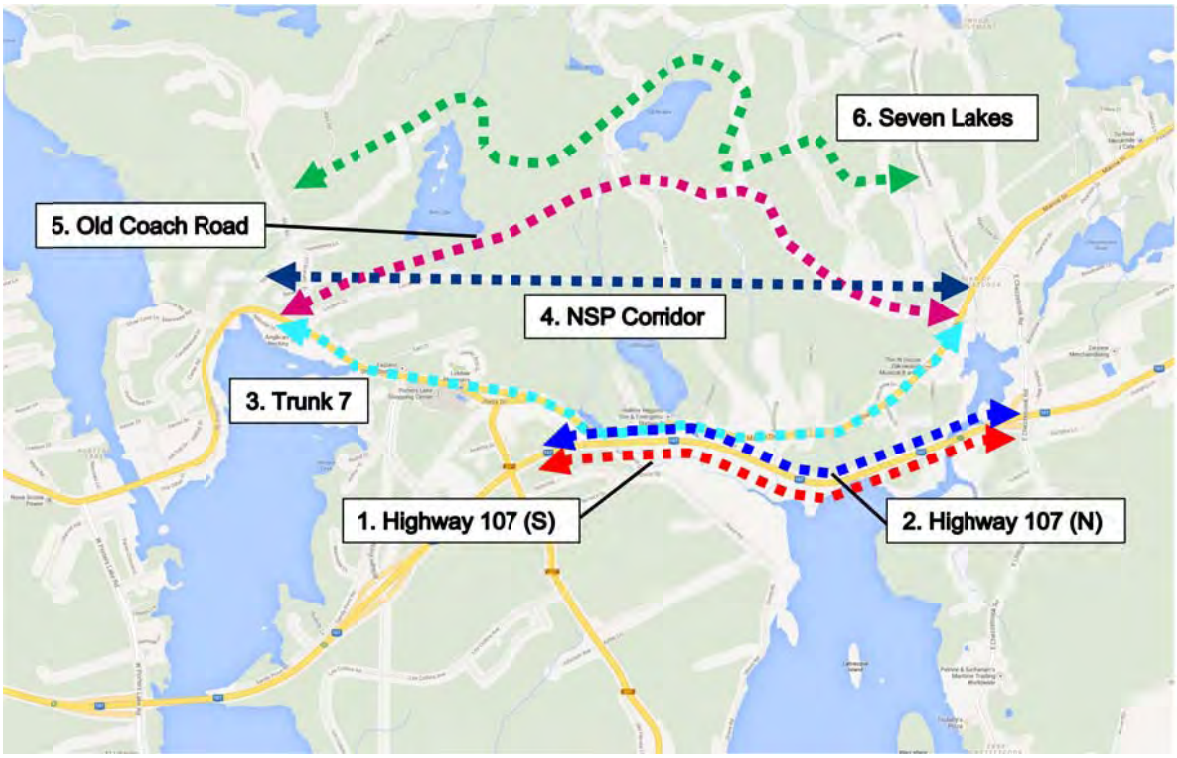

FINAL REPORT

Acadia Marsh Greenway Feasibility Study
Phase 1 Report: Evaluation of Candidate Options

August 2015

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1.0 Introduction

1.1 Background

WSP is currently preparing a feasibility study for the Shore Active Transportation Association (SATA) that investigates the potential for an active transportation (AT) facility connecting the missing Trans Canada Trail Gap between the Blueberry Run and the proposed Chezzetcook-Musquodoboit Trail on HRM's Eastern Shore.

The primary objectives of the study include the following:

1. Determine the best option for connecting the Blueberry Run and the proposed Chezzetcook-Musquodoboit Greenway based on a wide variety of key factors;
2. Preliminary planning, study, and design for the selected option that enables SATA and other stakeholders to determine the feasibility and sustainability of the facility and adequately inform next steps in the process of implementation.

The work plan established for the study has broken it down into two phases, one dedicated to achieving each of the two objectives. This report presents the findings of Phase 1 of the project, evaluating alignment options under consideration and providing a recommendation on which option is best suited to more detailed investigation as part of Phase 2.

1.2 Candidate Options

The candidate options under consideration as part of this Study include the following:

1. Highway 107 (South Side): AT Greenway along the south side of Highway 107 between Porters Lake and Exit 21.
2. Highway 107 (North Side): AT Greenway along the north side of Highway 107 between Porters Lake and Exit 21.
3. Trunk 7 Highway: AT facility within the ROW between Porters Lake and Trunk 7 (near Conrod Settlement Road).
4. Old Coach Road: AT facility on a former coach road alignment north of Porters Lake that is generally abandoned.
5. Nova Scotia Power Corridor: AT facility along the existing power corridor running between Porters Lake and Trunk 7 (near Conrod Settlement Road).
6. Seven Lakes Development Greenway: AT Greenway planned to be developed as part of the Seven Lakes residential development.

Review and evaluation of each option has been completed based on background research (property ownership, GIS mapping information, record drawings), site investigations, and stakeholder consultation.

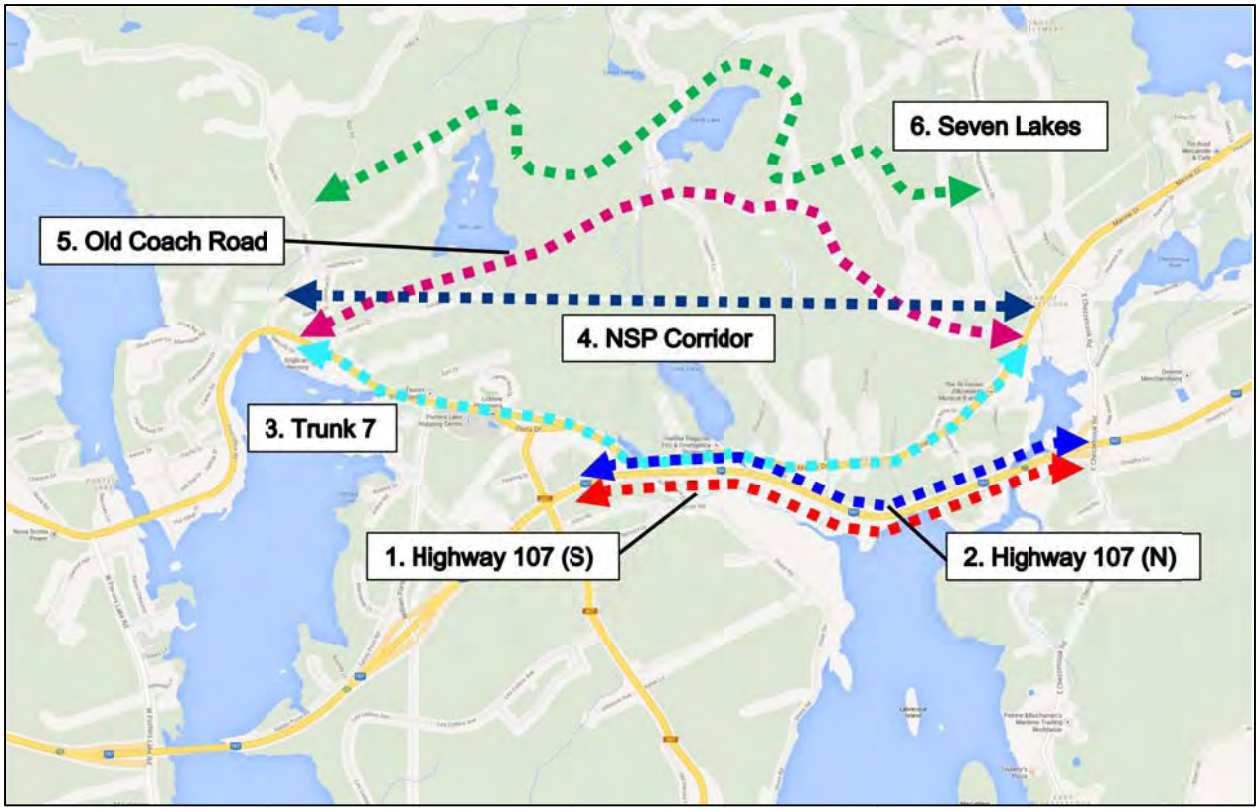


Figure 1-1: Alignment Options

1.3 Evaluation Criteria

A wide variety of criteria were used to evaluate the options under consideration. Criteria were identified and refined based on the Study Terms of Reference and consultation with the Project Steering Committee and stakeholders. Key evaluation criteria are summarized below:

User Experience	Policy / Planning Compliance	Constructability / Financial Implications
• User appeal (locals, visitors) • Cultural significance • Aesthetics • Safety / comfort	• Environmental impact • Connectivity • Conformance with AT planning objectives • Conformance with roadway policies	• Construction feasibility / cost • Land availability • Maintenance considerations • Funding potential

2.0 Background Review

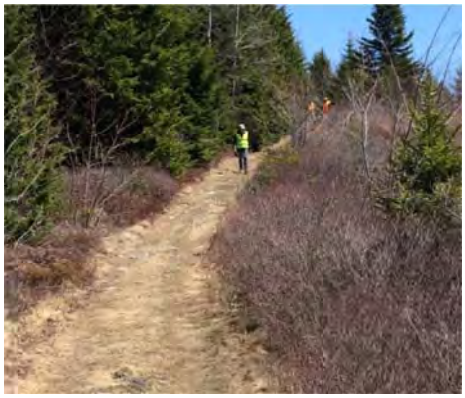
2.1 Data & Information

Digital mapping including property boundary information, Lidar topographical data, GIS layers, and aerial photography were obtained from HRM Business Intelligence & Data Services. Digital mapping was compiled to establish base drawings of the Study Area.

2.2 Site Investigations

WSP completed initial site investigations for options under consideration on Wednesday, May 6, 2015, along with representatives from SATA, Nova Scotia Departments of Transportation and Infrastructure Renewal (NSTIR) and Natural Resources (DNR), HRM Regional Trails, and Nova Scotia Trails. Candidate locations were explored on foot to review potential alignment options and observe the relevant opportunities and constraints expected to dictate the potential for each as an AT facility.



2.3 Review Previous Plans and Studies

In order to gain an appreciation for the context of the project and incorporate any pertinent information, a background review of the following documents was completed:

- *Making Connections: 2014-19 Halifax Active Transportation Priorities Plan* (Halifax Regional Municipality, 2014)
- *Active Transportation Plan: Porters Lake and Surrounding Communities* (Halifax Regional Municipality, 2014)
- *Concept Design / Cost Estimate: Trans Canada Trail, Chezzetcook Connector* (Stan Lewandowski, 2003)

- *Environmental Study of Chezzetcook Inlet Prior to Highway 107* (P. Lane & Associates, 1985)

2.4 Review Relevant Policy and Legislation

2.4.1 *Transportation Policy*

The Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) provided the following policies to be considered as part of this Study:

- *Trail Policy* (November 2012)
- *Trail Construction / Maintenance and Trail Crossings Policy* (November 2012)
- *Sidewalk Construction and Maintenance* (March 2011)
- *Paved Shoulder Widths for Active Transportation Policy* (December 2014)
- *Road Upgrading* (April 2011)

2.4.2 *Environmental Policy*

Environmental policy is important to consider as part of this Study, particularly due to the unique environment within the Study Area. A description of relevant environmental policy is provided in the following sections:

- *Halifax Regional Municipality 2014 Land Use By-Law for Planning Districts 8 & 9 (Lake Echo/ Porters Lake)*:
    - Halifax Regional Municipality (HRM) planning by-laws provide a riparian buffer of 20 metres, in which development cannot take place, for watercourses and wetlands that are contiguous with a watercourse. However, there are exceptions for development within the riparian buffer, including boardwalks, walkways and trails not exceeding 3 metres in width (Section 4.18, pg. 19). Therefore, if the proposed greenway is 3 metres wide or less, it could potentially be developed within 20 m of a watercourse/ wetland contiguous with a watercourse, as long as the applicable approvals are granted for crossing the watercourses and/or wetlands.

- *Nova Scotia Wetland Conservation Policy* (September 2011)
    - Wetlands in the Study Area are protected from alteration (including infilling) under the *Nova Scotia Wetland Policy*. When a wetland alteration cannot reasonably be avoided, an application to proceed with the alteration must be submitted though the Wetland Alteration Approval process. Alterations may be exempt from this process if the wetland is less than 0.01 hectares in total area or if a wetland is created by humans on upland habitat. There are several other exemptions included in the policy. If the proposed development will impact the wetlands, a wetland field delineation and functional assessment must be conducted in the field along with an alteration application, which must be approved by NSE.

      It is important to keep in mind that all salt marshes and wetlands known to support at-risk species under the federal Species at Risk Act or the Nova Scotia Endangered Species Act are wetlands of special significance (WSS). Government does not support or approve alterations of a WSS, unless the alterations are required to maintain, restore or enhance the WSS and are deemed to provide a necessary public function. Alterations that will impact two or

more hectares of wetland require assessment under the Environmental Assessment Act.

Another important consideration is wetland compensation requirements. DOE requires that any project altering a wetland must subsequently restore, create, or enhance another wetland as a means of balancing the overall impact on wetlands. It is difficult to estimate the costs to complete wetland compensation requirements due to a wide variation in of project types; however, DOE has indicated that recent restoration projects have cost between $3 and $10 per square metre of restored wetland ($30,000 to $100,000 per hectare)[1].

- *Nova Scotia Environment Act*
  - Under the Nova Scotia Environment Act any alteration to a watercourse, including the construction of a road crossing, requires approval by the Department of Environment prior to construction. Approval can be obtained from NSE through the submission of an application for approval. Field assessment is required prior to completing the approval application.

- Nova Scotia Department of Natural Resources Coastal Permit
  - Prior to building a structure below the ordinary high water mark (OHWM) of any coastal waters, a permit must be obtained from the Department of Natural Resources. This includes infilling and bank protection, which would have to be approved by NSDNR, and is also subject to review by the Department of Fisheries and Oceans (DFO). Infilling is generally not permitted, however it may be considered if the project is likely to result in a public benefit. In most cases, if infilling is approved by NSDNR, the proponent is required to purchase the infilled land. If bank protection takes place below the OHWM, including operation of machinery and placement of material, a permit must be obtained from NSDNR, and may be reviewed by DFO.

[1] *Wetland Compensation: What's Required and What Are My Options* (Nova Scotia Environment - https://www.novascotia.ca/nse/wetland/docs/Wetland_Compensation.pdf)

3.0 Stakeholder Consultation

Consultation sessions were held during February and March 2015 with several key stakeholders. The intent of these meetings was to introduce the project and identify opportunities and constraints related to each option. At each meeting, WSP provided a project overview, which was followed by questions and discussion that focused on the specific interests of each stakeholder to the project. The following sections summarize the information that was obtained from each stakeholder group.

3.1 Provincial Departments

3.1.1 *Nova Scotia Transportation and Infrastructure Renewal (NSTIR)*

Nova Scotia Transportation and Infrastructure Renewal (NSTIR) own and maintain provincial highways in the province, including Highway 107 and Trunk 7 in the Study Area. Since three of the options run directly adjacent to provincial highways, NSTIR is considered a major stakeholder. WSP's meeting with NSTIR's local Area Manager and Development Engineer focused on the following issues:

- Trail Development within Highway ROW: There are several issues that must be considered when attempting to place a trail within a highway ROW. Examples include user safety, road / trail maintenance, and impacts to drainage. Use of NSTIR right-of-way for trail uses requires a 'Work Within Highway Right-of-Way Permit', which is a type of agreement between NSTIR and a trail proponent (i.e. municipality, trails organization) that establishes the framework for trail operation including assignment of responsibility for key items such as maintenance, insurance, and liability. Trails developed within NSTIR right-of-way are not granted any ownership of the land (e.g. easement, lease) but rather are issued a permit or license to use the space.
- Future Expansion of Highway 107 Corridor: NSTIR has considered long-term plans for potentially expanding the Highway 107 Corridor in the Study Area. Though at this stage expansion is not explicitly planned, the north side of the highway has been identified as the likely location any future widening through most of the Study Area.
- At-Grade Crossing: At-grade crossing of provincial roadways may be required (not permitted on 100-Series highways). These crossings must meet NSTIR requirements for sight distance, location criteria, etc.
- Applicable Policies: NSTIR policies that must be considered include the *Trail Policy*, *Trail Construction / Maintenance and Trail Crossings Policy*, and the *Sidewalk Construction and Maintenance and Crossing Policy*.

3.1.2 *Nova Scotia Department of Natural Resources (DNR)*

Rails-to-trails facilities are developed through an agreement between DNR (administrator and provider of land base) and a local trail proponent. DNR was consulted as part of this process, as the proposed facility will link two sections of former railway corridor that are currently used or proposed for use as AT facilities.

3.2 Halifax Regional Municipality (HRM)

HRM's Project Planning and Design Services Department, which includes HRM Regional Trails and Transportation Planning, are responsible for the implementation of HRM's region-wide AT

Plan[2] and the local area AT Plan[3], the latter of which included the Acadia Marsh Greenway as a key recommendation. In this capacity, they are invested in reviewing and evaluating any proposed AT greenways to consider their fit with AT planning objectives. HRM Regional Trails also provides funding to local trails groups for the construction and maintenance of trails / greenways.

3.3 Trans Canada Trail

The Trans Canada Trail is currently in the midst of a major effort aimed at completing key gaps in the trail and connecting the facility across the country to coincide with the 150th anniversary of Canada's confederation in 2017. Consultation with representatives of the Trans Canada Trail from Nova Scotia Trails indicated the following:

- The primary goal of the TCT is to fill in key gaps by its 2017 deadline. To take advantage of current funding opportunities (potentially 50% or more), work must be complete by the end of 2016.
- Further funding may continue to be available after the deadline, but the structure and extent are unknown at this point.
- Options that score poorly for key criteria such as connectivity are not necessarily unsupportable by the TCT initiative. The TCT's criteria are fairly subjective and in many cases left up to individual communities to determine what is reasonably acceptable.

3.4 Nova Scotia Power

Nova Scotia Power has a major power corridor running from east to west approximately 1km north of Highway 107. The power corridor, which is located within an easement, provides a direct connection between Porters Lake (in the vicinity of Alps Road) and the east end of the Study Area. Development of a trail connection within the power corridor would require cooperation with Nova Scotia Power, who indicated that although there are no explicit standards and policies governing the development of trails within power corridors, each instance is handled on a case-by-case basis. The following are issues that must be considered:

- Ground Clearance Standard: Nova Scotia Power requires a minimum ground clearance height between the ground and transmission lines. Any changes to the ground profile resulting from trail construction would need to conform to these minimum standards.
- Liability Concerns: Though Nova Scotia Power will consider the use of its land for trail development in some instances, there is concern about potential liability issues due to increased access of the public and the presence of high voltage infrastructure.
- Safety: Operating heavy equipment during construction of the trail around / under transmission lines may have safety concerns.
- Land Ownership: Nova Scotia Power easements cross lands that are in many cases privately owned. Use of these lands is not necessarily permitted for all uses.

There are other examples of existing trails in Nova Scotia that are located within or adjacent to power corridors, a prime example being the Mainland North Linear Parkway Trail in Halifax.

[2] *Making Connections: 2014-19 Halifax Active Transportation Priorities Plan* (Halifax Regional Municipality, 2014)
[3] *Active Transportation Plan: Porters Lake and Surrounding Communities* (Halifax Regional Municipality, 2014)

3.5 Seven Lakes Development

Development of Seven Lakes, a 634-unit open space residential community north of Trunk 7 in Porters Lake, has been proposed to include a multi-use trail that will parallel the road internal to the development. The proposed trail will be approximately 5km in length (running east-west through the development), and will be built out in phases over approximately 10-20 years.

The Seven Lakes Development is expected to proceed incrementally, with roadway and greenway construction completed in phases coinciding with the development of residential properties. For this reason, connectivity of the AT link is not expected to be complete until full buildout of the development.

4.0 Evaluation Criteria

A wide variety of criteria were used to evaluate the options under consideration. Criteria were identified and refined based on the Study Terms of Reference and consultation with the Project Steering Committee and stakeholders. Evaluation criteria considered as part of this Study are summarized in Table 4-1. It is noted that the evaluation criteria have been modified from previously submitted versions in some cases to simplify the evaluation process.

Table 4-1: Summary of Evaluation Criteria

Criteria		Description
User Experience	Appeal to Local Users	• The extent to which the facility is attractive to local users for trips within the community.
	Appeal to Visitors	• The extent to which the facility may be expected to attract visitor traffic as a “destination trail”.
	Cultural Significance	• Level of exposure to local aspects of the community with historical importance.
	Interpretation Opportunities	• Potential opportunities to install interpretation signage in key locations to highlight areas of cultural significance.
	Aesthetics	• Overall aesthetical quality including sightlines and natural environment.
	Grades	• Conduciveness of the alignment to AT. Maximum grades of 5% (8% for short sections) are typically desired for AT facilities.
	User Safety / Comfort (Crime Prevention)	• User safety and comfort can be influenced considerably by the level of available visibility. Visibility through exposure to traffic and other users can limit the potential for criminal activity.
	User Safety / Comfort (Operational)	• Operational safety and comfort can be in influenced by alignment geometry, typically a key determinant in operational speed and sightlines. • Speeds and volumes of vehicular traffic, and the proximity of the alignment to traffic or driveway crossings.

Criteria		Description
Policy / Planning Compliance	Environmental Impact	• The potential level of conformance with environmental regulations.
	Connectivity with Origins/Destinations	• The extent to which the alignment connects key origins and destinations within the community and provides a viable alternative for utilitarian travel by active modes.
	Trans Canada Trail Greenway Objectives	• Conformance with TCT objectives such as connectivity, gap closure, AT-focus (non-motorized), and timelines.
	HRM Planning Objectives (Active Transportation)	• Conformance with planning objectives outlined in the regional (HRM) and local (Porters Lake) Active Transportation Plans.
	HRM Planning Objectives (Destination Greenway)	• Conformance with the specific recommendation in the local (Porters Lake) AT Plan for a destination greenway facility.
	NSTIR ROW Policy	• The potential level of conformance with NSTIR regulations with respect to the Provincial ROW.
	NS Blue Route Objectives	• The potential for integration of the alignment with the proposed Nova Scotia Blue Route facility.
	NS Power ROW Policy	• The potential level of conformance with NS Power regulations.
Constructability / Financial Implications	Construction Costs	• Estimated magnitude of cost to construct the facility.
	Constructability	• Preliminary assessment of the feasibility of constructing the facility based on physical constraints.
	Land Availability / Agreements	• Anticipated level of effort and cost required to acquire and necessary land or easements to facilitate construction of the facility.
	Bridge / Structure Requirements	• Quantity and complexity of bridges and retaining structures required to span watercourses and reinforce unstable terrain.
	Maintenance / Repair Costs	• Anticipated level of effort and cost required for ongoing maintenance and repair of the facility.

5.0 Overview of Connection Options

An overview of each of the six options under consideration is provided in the following sections. Description of each is structured around the evaluation criteria used in assessment of the options.

5.1 Highway 107 (South Side)

This option would run along the south side of Highway 107 between Exit 21 (East Chezzetcook Road) and Highway 207, potentially extending to Exit 20 (William Porter Connector). The alignment, approximately 4km in length, would fill in a significant gap in connectivity along the abandoned rail corridor, presenting opportunities for integration with the regional trails network and the Trans Canada Trail.

The area's Active Transportation Plan[4] recommended this alignment for consideration as a "destination greenway", citing its key advantages for connectivity, directness (between Trans Canada Trail sections), and the natural beauty afforded by the Chezzetcook Inlet to the south. The greenway was envisioned as a "Signature AT Facility" for Porters Lake and the Surrounding Communities, attracting visitors from near and far to experience the trail. Further, its length is considered well suited for walkers and cyclists to make a return trip comfortably from one end to the other, which when combined with its physical surroundings could make it an excellent destination trail for recreational pursuits.

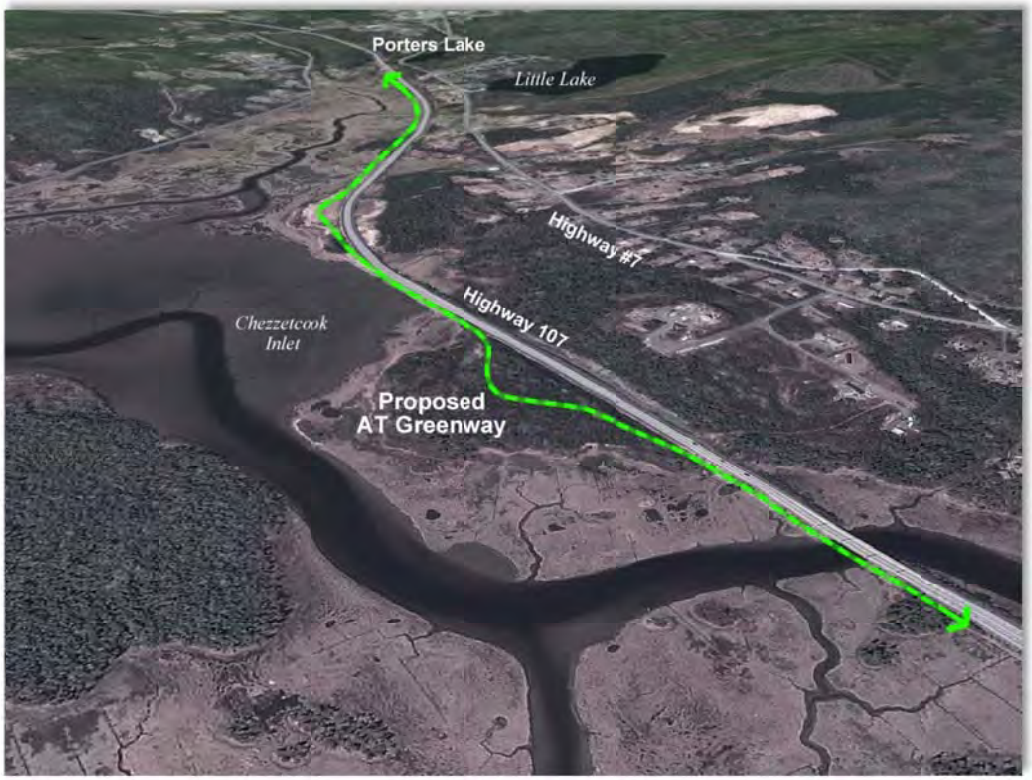


Figure 5-1: Proposed Highway 107 (South Side) Alignment
[Source: *Active Transportation Plan: Porters Lake and Surrounding Communities* (WSP, 2014)

[4] *Active Transportation Plan: Porters Lake and Surrounding Communities* (WSP, 2014)

5.1.1 *User Experience*

Appeal to Users

It is expected that this option would have strong appeal to both local users and visitors. It not only provides a good option for utilitarian uses for local residents, but also is also attractive from a recreational point of view. The relatively direct connectivity between the Blueberry Run and Chezzetcook-Musquodoboit Greenway would be beneficial for users of the Trans Canada Trail. Its length is appropriate for a return trip by foot or bicycle; integration of parking at either end of the facility would facilitate its use as a destination trail.

Cultural Significance / Aesthetics

A key advantage of this option that is expected to be attractive to users is its cultural significance and aesthetical value. The Chezzetcook Inlet has a rich local history – a key settlement area for early settlers to the region, it served an important role as the origin of natural resources (hay used for bricks) used for the construction of the City of Halifax. Vistas along the Head of Chezzetcook, providing wide views of the tidal watercourse and salt marsh, are much celebrated in the area. A greenway along this alignment would allow direct access to the unique natural environment, and would include many valuable opportunities for designated look-off areas and interpretation sites.

Chezzetcook Inlet

User Comfort / Safety

Topographically, the alignment is well suited to greenway development in terms of grades (see preliminary alignment profile in Figure A-2, Appendix A). Given that it follows a former rail corridor – for which minimal grade is an important consideration – this is not surprising. There do not appear to be any locations at which grades are in excess of 5%, which is the preferred maximum grade for AT facilities.

Available space varies considerably along the alignment, which dictates the potential flexibility in layout of the horizontal geometry. For example, sections that directly abut the highway and/or the salt marsh would likely require a fixed alignment close to the highway. Though beneficial from the perspective of visibility (for user safety), proximity to the highway can be detrimental to user comfort and safety. Exposure to vehicular traffic can be both a nuisance (noise) and a potential safety hazard.

5.1.2 *Policy / Planning Compliance*

Transportation Policy

Development within the ROW of a 100-Series provincial highway is not generally permitted, and the presence of AT facilities adjacent to freeways is very rare. However, given that the existing Highway 107 alignment was built directly on top of the former railway corridor in this location – which severed its continuity – it may be reasonable to expect that an exception is a possibility. NSTIR has indicated its support of the objective to improve non-motorized connectivity in the area[5], and has agreed to participate in the feasibility review process.

An important policy requirement that should be considered is that the facility must prohibit motorized vehicles due to its location within the ROW. This is particularly relevant in the Porters Lake area due to the prevalence of off highway vehicles (OHVs) and given that the adjacent Blueberry Run does permit OHVs.

Long-term Transportation Planning

NSTIR has considered long-term plans for potentially widening Highway 107 in the Study Area. Though at this stage expansion is not explicitly planned, the north side of the highway has been identified as the likely location of any future widening through most of the Study Area.

Environmental Policy

The proposed alignment crosses several watercourses and possibly wetlands including salt marshes (wetlands of special significance) and bogs. Environmental approvals that may be required if this route is selected include:

- Watercourse alterations
- Wetland alterations
- Coastal permits

It is important to consider that it is the mandate of the Provincial Government is to achieve zero loss of wetlands of special significance (WSS). Though under some circumstances it will permit development within a WSS, it is stipulated that the development must facilitate maintenance, restoration, or enhancement of the WSS, and that it must provide a necessary public function. Evaluation of the extent to which a given project meets these criteria is at the discretion of government officials. Nova Scotia Environment (DOE) Officials have completed preliminary evaluation of the Highway 107 options and have indicated that the department is willing to consider the possibility of such a facility, subject to more detailed analysis[6]. Contact with DOE Officials also indicated that any development should endeavour to limit impacts on the salt marsh to the extent possible.

Connectivity with Origins / Destinations

This option provides relatively good connectivity between origins and destinations in the area. Connection to the Blueberry Run – either through a direct greenway connection or on-street connection via Shore

[5] *Proposed Non-Motorized Trail South of Highway 107*, Correspondence from Darcey MacBain, P.Eng. (NSTIR Area Manager, Halifax East), May 30, 2014.
[6] Email Correspondence with Rachel Bower, Inspector Specialist III, Nova Scotia Environment, June 29, 2015

Road, Route 207, and Les Collins Avenue – would provide access to the core area of Porters Lake. The eastern terminus at East Chezzetcook Road would likely require an on-street connection of approximately 500m to connect to the Chezzetcook-Musquodoboit Greenway.

A downside of this option is that it is only accessible at either end of the Study Area. As a result, it may encourage residents to cross Highway 107 for access / egress.

Trailhead Opportunities

Given that there are no options for access except for at either end, provision of access and parking is critical. At the eastern terminus (Exit 21 interchange), there appears to be considerable terrain constraints in the southwest quadrant of the interchange that would limit the ability to place a trailhead directly adjacent to the eastbound off-ramp. However, Grady Road, which is located approximately 350m to the south, may provide an option for locating a trailhead.

At the west end of the alignment, a trailhead could be considered on Shore Road near the Route 207 intersection. Though Anne Marie Drive would be an ideal location, it is expected that property constraints would limit its potential. Porters Lake School is also an area that could be considered as a potential parking area to facilitate trail access.

Planning Objectives

This option is ideal in terms of meeting planning objectives. Recommended as part of the HRM-endorsed local AT Plan, its direct alignment is well suited to the connections as part of the TCT and Blue Route.

5.1.3 *Constructability / Financial Implications*

Land Availability / Agreements

This alignment option is located within the Highway 107 ROW. However, there are parcels owned privately south of the highway. In order to veer away from the highway where possible to introduce separation and expose users to the natural environment provided by the marshlands, it may be necessary to negotiate agreement(s) with private landowners. As a result, though the greenway can likely be built entirely within NSTIR ROW, the extent to which it can meander away from the highway would be dependent on the ability to negotiate with landowners.

Constructability

Constructability and construction cost considerations include the following:

- Much of the alignment is squeezed tightly between Highway 107 and the Chezzetcook Inlet. It will not likely be feasible to meet the minimum 20m environmental buffer in several locations.
- At least two bridge structures would be required across watercourses including a short span (approximately 15m) and a longer span (approximately 45m) bridge. It is expected that new dedicated structures would be required, the longer of which may require an intermediate pier. This could be challenging from an environmental perspective. Lightweight cantilever bridges – which would attach to

the existing structures – may be an option; however, this has not been explored in detail.

- A considerable amount of fill and slope stabilization may be required to bring the greenway up to grade in many locations.
- A high level cost review has been completed to provide a preliminary order of magnitude construction cost estimate. The cost review has been completed based on the following assumptions.
  - This estimate considers the approximately 2.8km section running between Anne Marie Drive and Exit 21.
  - 3m unpaved cross section
  - Two pre-fabricated steel bridge structures (15m and 45m span lengths)
  - Costs for land acquisition and wetland compensation that may be required have not been considered.
- A 35% contingency has been used to reflect the preliminary nature of this cost estimate.
- The results of the preliminary order of magnitude cost estimate indicate an anticipated construction cost in the order of $1.9M (See Table 5-1).

Table 5-1: Preliminary Order of Magnitude Cost Estimate: South Side of Highway 107

Description	Est. Qty.	Unit Cost	Total Cost
15m Pre-fabricated steel truss bridge (Incl. Footings)	1	$225,000	$225,000
45m Pre-fabricated steel truss bridge (Incl. Footings)	1	$450,000	$450,000
Extensive Infill Greenway Construction	1100m	$360/m	$396,000
Moderate Infill Greenway Construction	1100m	$220/m	$242,000
Minimal Infill Greenway Construction	600m	$140/m	$84,000
		Sub-Total	$1,397,400
		Contingency (35%)	$488,950
		Est. Cost (Excl. HST)	$1,885,950

Watercourse Crossing Locations

Maintenance / Repair Costs

Maintenance and repair considerations include the following:

- As a result of its close proximity to Highway 107, the greenway would likely be impacted by snow clearing operations and drainage. For safety reasons, there is potential that the greenway would need to be closed during winter months or following snow events.
- Located adjacent to the Chezzetcook Inlet, the greenway would be subject to tidal action and potentially major weather events that could cause damage.
- The responsibility for ongoing maintenance of the facility would need to be determined. In addition to repairs, routine maintenance such as snow clearing would be very resource intensive; it is possible that the greenway would need to be closed during winter months. As per NSTIR policy, the Province would not be responsible for maintenance activities. It is possible that Halifax Regional Trails Association (HRTA) funding could be used to fund maintenance activities.

Funding Potential

Given the ideal fit with planning objectives for the Trans Canada Trail and local AT Plan, it is expected that this option should be an attractive option for funding consideration from sources including the TCT and HRM. However, the significant amount of funds required to construct the greenway may present a significant challenge to its feasibility.

5.2 Highway 107 (North Side)

This option would run along the north side of Highway 107 between Exit 21 (East Chezzetcook Road) and the Blueberry Run Trail. The alignment would be approximately 3.5km in length. Similar to Option 1, it would fill in a significant gap in connectivity along the abandoned rail corridor, presenting opportunities for integration with the regional trails network and the Trans Canada Trail.

The proposed alignment was previously considered in 2003 in a concept design and cost estimate by Stan Lewandowski[7].

5.2.1 *User Experience*

Appeal to Users and Cultural Significance / Aesthetics

Overall, this option would be expected to have strong appeal to both local users and visitors as a destination trail due to its proximity to the Chezzetcook Inlet and the associated aesthetics. It is noted, however, that the presence of Highway 107 between the greenway and the Inlet would make it less favorable than the option on the south side of the highway due to impacted view planes and separation from natural elements.

User Comfort / Safety

Based on preliminary review of topography on the north side of Highway 107, it appears that suitable grades for a greenway would be achievable (see preliminary alignment profile in Figure A-2, Appendix A). Much of

[7] *Concept Design / Cost Estimate: Trans Canada Trail, Chezzetcook Connector* (Stan Lewandowski, 2003)

this alignment option would include more separation from Highway 107 (both horizontal and vertical), which could reduce the impact of vehicle noise and safety hazard.

North side of Highway 107

5.2.2 *Policy / Planning Compliance*

Transportation Policy

Transportation policy issues would be similar to those discussed for Option A in Section 5.1.2.

Long-term Transportation Planning

NSTIR has considered long-term plans for potentially widening Highway 107 in the Study Area. Though at this stage expansion is not explicitly planned, the north side of the highway has been identified as the likely location any future widening through most of the Study Area.

Environmental Policy

Environmental policy issues would be similar to those discussed for Option A in Section 5.1.2.

Connectivity with Origins / Destinations

Connectivity is a challenge for this option. Though direct connection to the Blueberry Run would be possible (without the need to cross Highway 107) at the west end, connection at the east end appears challenging due to a large watercourse crossing, wetland, and limited ROW just west of Exit 21.

5.2.3 *Constructability / Financial Implications*

Land Availability / Agreements

Land availability is similar to that discussed for the south side of Highway 107 in Section 5.1.3. In order to separate the greenway from the highway and improve view planes, the alignment will need to move outside of the Highway 107 ROW. As a result, though the greenway can likely be built entirely within NSTIR ROW, the extent to which it can meander away from the highway would be dependent on the ability to negotiate with landowners.

Connection at either end of the Study Area could potentially be facilitated using the former rail bed. At the west end of the Study Area, this would include connection via the existing terminus of the Blueberry Run. At the east end of the Study Area, there is a portion of former rail bed that runs along the Exit 21 WB on-ramp and connects directly to East Chezzetcook Road and the proposed Chezzetcook-Musquodoboit Trail. Use of these sections of rail bed would be expected to require issuance of Letter of Authority (LOA) from DNR and potentially acquisition of private lands.

Constructability

Constructability and construction cost considerations include the following:

- Between the west end of the Study Area and the first bridge crossing, constructability appears to be reasonable. The greenway would be cut into the large, steep, grassy embankment. However, watercourses, wetlands, and limited ROW would likely make extension of the greenway east of the first bridge more challenging.
- The cost to construct a greenway along an approximately 2.5km section of this alignment (between Stella Drive and the first bridge crossing) was estimated by Stan Lewandowski based a conceptual design at approximately $850,000 (2003 dollars).
- A high level cost review has been completed to provide a preliminary order of magnitude construction cost estimate. The cost review has been completed based on the following assumptions.
    - This estimate considers the approximately 2.8km section running between Anne Marie Drive and Exit 21.
    - 3m unpaved cross section
    - Costs for land acquisition and wetland compensation that may be required have not been considered.
    - Two pre-fabricated steel bridge structures (15m and 60m span lengths)
- A 35% contingency has been used to reflect the preliminary nature of this cost estimate.
- The results of the preliminary order of magnitude cost estimate indicate an anticipated construction cost in the order of $2.2M(See Table 5-2).

Table 5-2: Preliminary Order of Magnitude Cost Estimate: North Side of Highway 107

Description	Est. Qty.	Unit Cost	Total Cost
15m Pre-fabricated steel truss bridge (Incl. Footings)	1	$225,000	$225,000
60m Pre-fabricated steel truss bridge (Incl. Footings)	1	$700,000	$700,000
Extensive Infill Greenway Construction	1200m	$360/m	$432,000
Moderate Infill Greenway Construction	1300m	$220/m	$286,000
Minimal Infill Greenway Construction	150m	$140/m	$21,000
		Sub-Total	$1,666,400
		Contingency (35%)	582,400
		Est. Cost (Excl. HST)	$2,246,400

Maintenance / Repair Costs

Maintenance and repair considerations are consistent with those discussed in Section 5.1.3.

Watercourse Crossing Locations

5.3 Trunk 7

This option would run along Trunk 7 between Porters Lake and East Chezzetcook Road over a distance of approximately 3.5km. Trunk 7 is a 2-lane undivided arterial road with gravel shoulders. In the Study Area, the ROW varies between 20m and 30m; the cross section is summarized in Figure 5-2. With annual average daily traffic (AADT) volumes of approximately 5,000 vpd and a posted speed limit of 70km/h, Trunk 7 is considered as a Class “C” Arterial by NSTIR.

Trunk 7 at Drysdale Road

Trunk 7

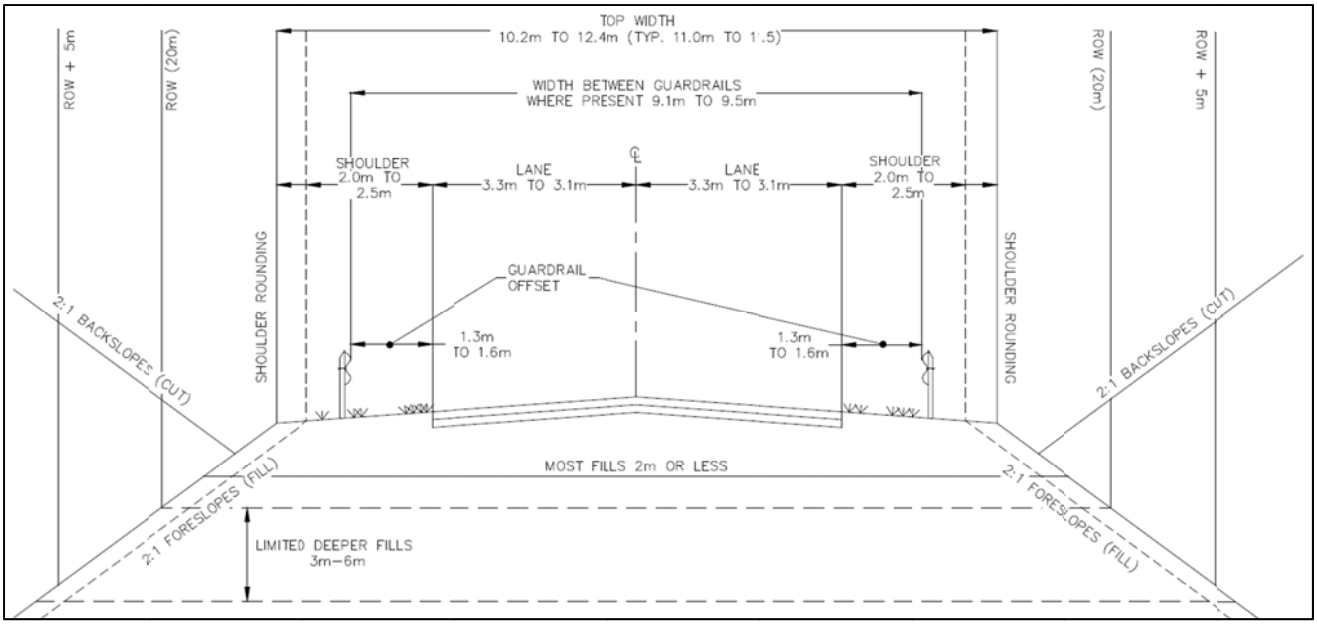


Figure 5-2: Trunk 7 Cross Section Dimensions (Preliminary)
[Information Source: Greg Chisholm (NSTIR Development Engineer – Central District)]

Based on the existing conditions on Trunk 7, the following have been considered as potential options for an AT facility:

Multi-use AT Greenway		• Greenway adjacent to the roadway that accommodates 2-way travel for active modes. • Minimum width = 3.0m, Desired width = 4.0m • Advantages: o Separation from vehicular traffic o Significantly increased comfort and safety for AT • Disadvantages: o ROW requirements and cost o Conflicts at driveways and intersections;
Paved Shoulders		• Widening of asphalt at roadway edges to provide additional paved space. • Desired minimum width = 1.0m – 1.5m • Advantages: o Added comfort and safety for AT, particularly cyclists; o Safety improvements for all users; • Disadvantages: o ROW requirements and cost; o Marginal improvement in comfort for pedestrians

5.3.1 *User Experience*

Appeal to Users

The appeal to users would vary considerably depending on the facility type. It is expected that a separated AT greenway along Trunk 7 would have strong appeal among local users – particularly for utilitarian AT trips – due to direct connectivity and continuous access along the corridor. It is noted, however, that the presence of many driveways along

the alignment would create conflict points for AT users that could introduce safety concerns and limit the utility of the facility.

Although the paved shoulder option would be quite advantageous for cyclists, overall it would not be expected to improve conditions significantly for pedestrians.

Cultural Significance / Aesthetics

Despite the functional advantages of Trunk 7 as an option, it would have minimal benefits from the perspective of cultural significance and aesthetics.

User Comfort / Safety

Running along an existing roadway, the alignment is expected to be well suited to an AT facility in terms of grades. In general, grades appear to be less than the 5% preferred maximum grade for AT facilities.

Available ROW for development of an AT greenway or paved shoulders is minimal. As a result, it may be challenging to install either option in a manner that maximizes user comfort and safety. For example, an AT greenway would likely have minimal separation for traffic lanes, and paved shoulders less than the desired width may be required.

Though beneficial from the perspective of visibility (for user safety), proximity to the highway can be detrimental to user comfort and safety. Exposure to vehicular traffic can be both a nuisance (noise) and a potential safety hazard.

5.3.2 *Policy / Planning Compliance*

Transportation Policy

Multi-use Greenway: Development of multi-use greenways adjacent to rural arterial roadways is very rare; however, it does not appear to conflict with any NSTIR policy. Due to its location within NSTIR ROW, a multi-use greenway would prohibit access by motorized vehicles.

Paved Shoulders: Paved shoulders for AT are included in NSTIR Policy #PO1063[8]. Although the paved shoulder width that can be accommodated depends on the amount of available right-of-way, NSTIR has established recommended paved shoulder widths based on the traffic speed and volume for a given roadway (See Table 5-3). Based on a posted speed limit of 70km/h and daily traffic volume of approximately 5,000 vpd, a paved shoulder width of 1.0m – 1.5m would be recommended under the policy. Addition of paved shoulders to Trunk 7 would need to be incorporated into NSTIR's road upgrade planning program, which operates on a 5-year timeframe.

[8] *Paved Shoulder Widths for Active Transportation Policy,* NSTIR Policy#PO1063 (December 2014)

Table 5-3: Paved Shoulder Width for Active Transportation
[Nova Scotia Transportation & Infrastructure Renewal *(2014)*]

Speed (km/h)	AADT < 1000	Paved Shoulder Width (m)			
		ASDT 1000 - 2000		ASDT > 2000	
		New Construction / Reconstruction[1]	Repaving[2]	New Construction / Reconstruction	Repaving
50	NA	1.2	1.0	1.2	1.0
60-70	NA	1.2	1.0	1.5	1.0
80	NA	1.5	1.0	1.75	1.5[3]

Notes:
1. New construction / reconstruction guidelines may apply to construction or repaving work areas where the existing subgrade is wide enough to meet the new construction shoulder standards (e.g. removing climbing lanes, narrowing lane width)
2. Repaving: No widening of subgrade is planned.
3. This may be unachievable due to subgrade constraints. Every effort will be made to have the shoulder as wide as possible, with a minimum of 1.0m. If 1.5m is unachievable, signage may be necessary.
4. No shoulder widening is recommended when pavement preservation, maintenance overlays, etc. are planned.
5. A minimum of 1.5m is required next to guardrail, curb or other fixed objects. On shoulders 1.5m or greater, add 0.2m to 0.5m in areas where there is a fixed object.

Environmental Policy

Environmental policy is not expected to be a major consideration, as major construction works such as widening of the subgrade would be kept to a minimum.

Connectivity with Origins / Destinations

This option provides relatively good connectivity between origins and destinations in the area. At the west end, Trunk 7 runs through Porters Lake and provides access to local destinations as well as to the Blueberry Run Trail. At the east end, connectivity to the Chezzetcook-Musquodoboit Greenway is not direct; users would need to use East Chezzetcook Road in the absence of an off-road connection.

Planning Objectives

The AT greenway option would fit reasonably well with AT planning objectives.

Although the addition of paved shoulders is recommended on this section of Trunk 7 as part of the Area's AT Plan and therefore is in accordance with overall AT planning objectives, it does not meet the objectives of the facility as a "destination trail" that are under consideration as part of this Study.

5.3.3 *Constructability / Financial Implications*

Land Availability / Agreements

This alignment option is located within the Trunk 7 ROW, which crosses many private driveways. Any modification of the sub-base to accommodate addition of an AT greenway or paved shoulders may impact adjacent landowners. Though it is expected that paved shoulders would be acceptable to adjacent property owners, opposition to a separated facility across properties and driveways would be likely.

Constructability

Constructability and construction cost considerations include the following:

- Multi-use Greenway: Construction of a multi-use greenway would be expected to require widening of the existing sub-base on one side of the roadway. Based on preliminary field investigations, there are

many constraints that would limit construction feasibility along much of the corridor including available ROW, steep side slopes, utility poles, and impacts on driveways / culverts. In some areas, it may be necessary to shift the facility between the north and south sides. The cost to construct an AT greenway is very challenging to estimate without a more detailed investigation, and includes a high level of uncertainty due to the many property owners that may be affected. However, in order to provide a sense of the anticipated cost, a unit rate cost for construction of an AT greenway of $500K – based on a review of other project costs in HRM and adjustment to account for local challenges that are anticipated – has been assumed. Based on this assumed unit rate, construction of an AT greenway along the 4km section between William Porter Connector and East Chezzetcook Road would be in the $2M range. It should be noted that this does not consider any property acquisition requirements, which could increase the cost of the project substantially.

- Paved Shoulders: It appears that there is adequate room along the majority of Trunk 7 to add asphalt to shoulders without the need to widen the roadway base. Construction of paved shoulders could be integrated into the next planned roadway upgrade works along this section. The cost to add paved shoulders can vary considerably based on a variety of physical factors (i.e. existing road/ROW width, pavement type/condition, ditch configuration, etc.). The cost is highly dependent on whether or not the work is incorporated into an overall resurfacing project or is a specific shoulder widening project. Unit cost (per km) estimates obtained from both NSTIR and HRM have indicated a range between $75,000 and $300,000 per km. Based on these rates, addition of paved shoulders on the 4km section between William Porter Connector and East Chezzetcook Road would be expected to have a cost in the range between $300K and $1.2M.

Maintenance / Repair Costs

Maintenance and repair considerations include the following:

- Multi-use Greenway: As a result of its close proximity to Trunk 7, the greenway would likely be impacted by snow clearing operations and drainage. For safety reasons, there is potential that the greenway would need to be closed during winter months or following snow events. The responsibility for ongoing maintenance of the facility would need to be determined. Snow clearing would not likely be completed. As per NSTIR policy, the Province would not be responsible for maintenance activities. It is possible that Halifax Regional Trails Association (HRTA) funding could be used to fund maintenance activities including ongoing repairs.
- Paved Shoulders: Maintenance operations for paved shoulders could be integrated relatively easily into existing operations. Maintainability of the shoulders would actually be expected to improve.

Funding Potential

Given the relatively good fit with AT planning objectives in the Study Area and the potential lack of viable alternate AT facility options, there is potential for NSTIR to consider paved shoulders during its next planned roadway upgrades to the corridor. However, given that it is not currently

considered in the Province's 5-Year Plan, the timelines required to complete the upgrades are likely not encouraging. HRM also has the ability to contribute funds to NSTIR projects in some instances.

5.4 Old Coach Road

This option would utilize the alignment of the abandoned 'Old Coach Road', a primitive roadway alignment used prior to construction of Trunk 7 presumably for horse-driven stagecoach travel. The alignment under consideration runs east-west approximately 3.5km between Loriann Drive and Higginbottom Road, located north of Trunk 7 just south of Bell Lake and Fiddle Lake.

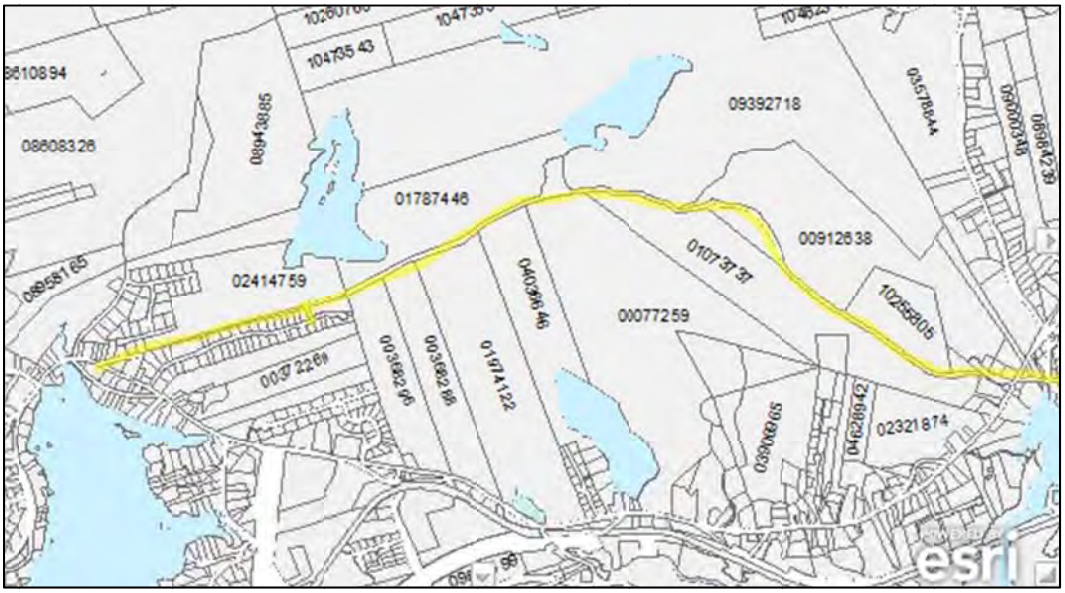


Figure 5-3: Old Coach Road Alignment

The Old Coach Road alignment, primarily owned by the Province, is expected to include a standard 66' (20m) ROW. Site investigations at the western end indicated that there are some sections that remain relatively intact; however, much of the alignment has overgrown with vegetation considerably.

Old Coach Road

5.4.1 *User Experience*

Appeal to Users

It is expected that the Old Coach Road alignment would be attractive as a recreational or nature trail due to its tranquil natural environment. However, due to its relatively indirect alignment and lack of proximity to key destinations in the Study Area, it may not be appealing to local users for utilitarian purposes. Though connections to Trans Canada Trail sections on either end are not ideal, they do not necessarily negate the alignment as a potential option for connection through the area.

Cultural Significance / Aesthetics

The remnants of an historical stagecoach route, Old Coach Road may provide some value in terms of cultural significance. Opportunities for interpretation could include displays describing Nova Scotia's historical use of stage coaches for transportation.

In terms of aesthetics, the alignment's natural wooded environment is an advantage. However, its setting is not unlike the many wilderness trails already established in the Province.

User Comfort / Safety

The Old Coach Road has rolling terrain, with provincial mapping indicating maximum grades in the 13% range (see preliminary alignment profile in Figure A-1, Appendix A). Though as a former stage coach road it would have been developed with grades in consideration to some extent, it would likely not have been built to railway or current roadway standards.

From the perspective of user safety, the remoteness of users contrasts with the other options. Lack of visibility may intimidate some from using the greenway alone.

5.4.2 *Policy / Planning Compliance*

Transportation Policy

Outside of granting permission for use of the corridor, there does not appear to be any transportation policy issues that would limit the ability to construct a greenway on the Old Coach Road alignment.

Environmental Policy

Field screening and preliminary assessment determined that several large watercourses and wetland crossings are expected. Environmental approvals that may be required if this route is selected include:

- Watercourse alterations
- Wetland alterations

Connectivity with Origins / Destinations

The Old Coach Road alignment would connect to Loriann Drive at the west end and Higginbottom Road at the east end. It appears that an intermediate connection may also be an option via Earl Court to provide more direct connectivity to the core area of Porters Lake. Connectivity is reasonable at the Porters Lake end; however, does not connect directly to the Blueberry Run alignment. The eastern terminus at Higginbottom Road would require an on-street connection via Trunk 7 to the

Chezzetcook-Musquodoboit Greenway or via Stage Coach Lane and across private property. Overall, the Old Coach Road option is located too far to the north to serve as an effective AT route on its own.

Trailhead Opportunities Trailhead options could be considered on Loriann Drive and Higginbottom Road.

Planning Objectives This would be considered primarily a recreational trail, and therefore would not be considered beneficial in terms of the regional active transportation planning objectives intended for this facility.

5.4.3 *Constructability / Financial Implications*

Land Availability / Agreements The alignment option is located within the Old Coach Road ROW, the majority of which is understood to be owned by the Province. At either end of the alignment, there are sections that may encroach directly on or run adjacent to private lands (e.g. north of Lorianne Drive, south of Bavaria Drive).

Constructability Constructability and construction cost considerations include the following:

- Construction of the greenway would likely be simplified by the presence of the basic roadway bed from the stage coach road. It is expected that there is a varied level of vegetation, ranging from very minor to very major overgrowth.
- It is expected that a standard appropriate for this facility would be 3m crusher dust trail.
- Design for a similar trail on a former coach road in HRM, recently completed by WSP, had an estimated construction cost of approximately $180,000 per km. Based on a comparison of the two alignments, the Old Coach Road in Porters Lake is expected to require more extensive clearing and earthwork to construct a trail. As a result, the unit rate has been adjusted to $220,000 per km. Based on this unit rate assumption, a trail on the approximately 4.9km Old Coach Road alignment would have a cost in the $1M range. This cost does not include consideration of any watercourse crossings that may be required, as well as any property acquisition or environmental compensation costs.

Maintenance / Repair Costs Maintenance and repair considerations include the following:

- The responsibility for ongoing maintenance of the facility would need to be determined. Snow clearing would not likely be completed. It is possible that Halifax Regional Trails Association (HRTA) funding could be used to fund maintenance activities including ongoing repairs.

Funding Potential There is limited potential that this option would be attractive for funding from HRM due to its lack of adherence with AT planning objectives. However, there may be potential for support from the TCT in the absence of any preferable connection options.

5.5 Nova Scotia Power Corridor

This option would utilize the Nova Scotia power corridor, which runs roughly parallel to the Old Coach Road alignment between Loriann Drive and Higginbottom Road over a distance of approximately 2.8km. The power corridor is a cleared easement approximately 30m wide that includes high voltage transmission lines mounted on wooden towers. The easement runs across several privately owned land parcels.

Unlike rail corridors, power corridors do not typically have relatively flat terrain, but rather tend to follow a direct alignment with less consideration of topography. The power corridor in the Study Area runs in a completely direct alignment, and as a result of the rolling terrain in the area, has extremely rugged surface topography that is unsuitable for the development of a greenway (see preliminary alignment profile in Figure A-1, Appendix A).

Nova Scotia Power Corridor

5.6 Seven Lakes Development Greenway:

'Seven Lakes' is a major residential development in Porters Lake that will ultimately include 634 units in an open space configuration. The development, currently in its early stages of construction, is expected to be built out in phases over the next approximately 10 years. Development plans include provision of a multi-use greenway that will run parallel to the main road in the development over a distance of approximately 5km.

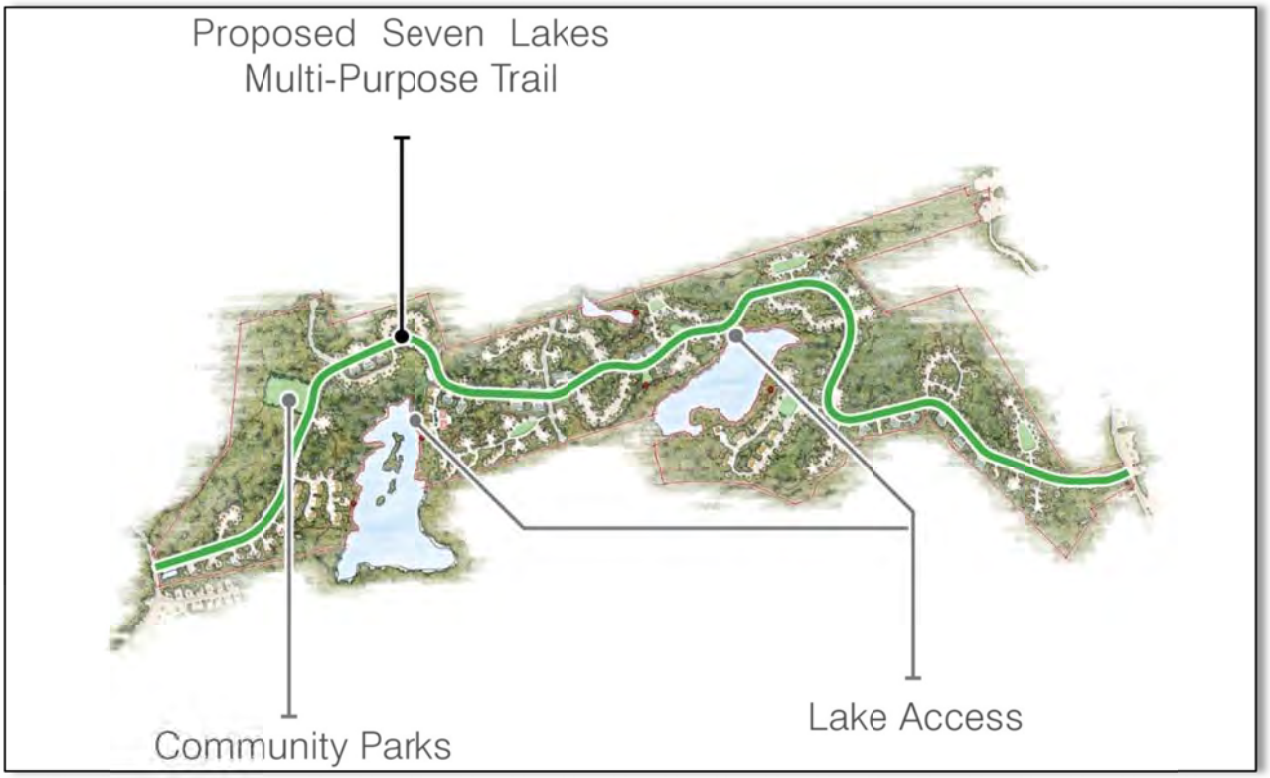


Figure 5-4: Seven Lakes Development

It is anticipated that Seven Lakes will be developed from both the west (via Alps Road) and east (via Conrod Settlement Road), ultimately converging in the centre of the development as part of the final phase. It is important to recognize that completion of a connected greenway will not likely occur until the overall development is complete, which may not occur for many years.

5.6.1 *User Experience*

Appeal to Users

Though the trail will be of particular benefit to residents of the Seven Lakes community, it could also serve as a destination trail for members of the overall community. The facility would be attractive for recreational use as part of either a return trip within the development or as part of a larger loop in conjunction with existing roads in the area.

Cultural Significance / Aesthetics

Cultural significance is not particularly prominent at this location; however, there is potential for excellent aesthetical value. There will be several parks and a considerable amount of green space within the development, which will create a scenic environment that can be enjoyed by a wide range of potential users.

User Comfort / Safety

The greenway, which will run adjacent to the development's main roadway, will likely be favourable in terms of grades. Running through a developed area, it should have a safe and inviting feeling. Traffic volumes and speeds would be expected to be moderate, which improve user safety and comfort.

5.6.2 *Policy / Planning Compliance*

Transportation Policy The greenway is being developed as per the development agreement between the developer and HRM.

Environmental Policy Environmental considerations have been accounted for as part of the development agreement between the developer and HRM.

Connectivity with Origins / Destinations The alignment would connect to Alps Road at the west end and Conrod Settlement Road at the east end. Connectivity is reasonable at the Porters Lake end; however, does not connect directly to the Blueberry Run alignment. The eastern terminus would require an on-street connection to the Chezzetcook-Musquodoboit Greenway via East Chezzetcook Road.

Overall, the Seven Lakes Greenway is located too far to the north to serve as an effective AT route on its own.

Trailhead Opportunities It is expected that trailhead opportunities could be relatively easily incorporated into the layout of the development.

Planning Objectives This option was recommended as part of the area's AT Plan to complement a primary east-west AT route closer to Porters Lake.

5.6.3 *Constructability / Financial Implications*

Land Availability / Agreements The greenway will be located exclusively on lands included in the Seven Lakes development. As a result, land constraints do not appear to be a concern.

Constructability Constructability should be relatively straightforward if integrated with design and development of the local roadway network as expected.

Funding Potential It is anticipated that a significant portion of the capital cost of the trail will be borne by the developer of the Seven Lakes community, with ongoing maintenance the responsibility of HRM.

6.0 Evaluation Summary and Recommendations

Each of the six potential options was reviewed based on the study evaluation criteria in order to assess their ability to meet project objectives while considering their potential feasibility. The evaluation process included both qualitative and quantitative elements. For the purposes of evaluation, Trunk 7 was considered separately based on (i) paved shoulders and (ii) AT greenway.

6.1 Evaluation Criteria

A wide variety of criteria were used to evaluate the options under consideration. Evaluation criteria (summarized in Section 4.0) were identified and refined based on the Study Terms of Reference and consultation with the Project Steering Committee and stakeholders.

6.2 Evaluation Matrix

An evaluation matrix was created in order to display the overall assessment of each option and enable comparison between categories. Each option was scored for each evaluation criteria based on a scale of 0 (least favorable) to 5 (most favorable). The evaluation matrix is provided in Table 6-2. For simplicity, the matrix has been formatted to a colour scale from green (most favorable) to red (least favorable), with yellow the intermediate shade.

Table 6-1: Evaluation Matrix (Non-weighted)

		Alignment Options Scored by Category						
		Highway 107 (South Side)	Highway 107 (North Side)	Trunk 7 (Paved Shoulders)	Trunk 7 (AT Greenway)	Old Coach Road	NS Power Corridor	Seven Lakes Development Greenway
User Experience	Appeal to Local Users	4	4	3	5	3	2	3
	Appeal to Visitors	5	5	3	5	2	2	2
	Cultural Significance	5	5	1	1	3	0	2
	Interpretation Opportunities	5	5	1	1	3	0	2
	Aesthetics	5	5	2	3	3	0	3
	Grades	4	4	4	4	3	0	4
	User Safety / Comfort (CPTED)	4	4	5	5	1	1	4
	User Safety / Comfort (Operational)	4	4	3	4	4	1	5
Policy / Planning Compliance	Environmental Impact	2	2	5	4	3	3	5
	Connectivity with Origins/Destinations	3	3	4	5	1	1	1
	Trans Canada Trail Greenway Objectives	5	5	4	5	2	2	2
	HRM Planning Objectives (Active Transportation)	5	5	4	5	1	1	3
	HRM Planning Objectives (Destination Greenway)	5	5	0	2	2	0	4
	NSTIR ROW Policy	2	1	4	3	5	5	5
	NS Blue Route Objectives	5	5	5	5	1	1	1
	NS Power ROW Policy	5	5	5	5	5	2	5
Constructability / Financial Implications	Construction Costs	2	1	4	2	3	3	5
	Constructability	3	2	5	2	4	1	5
	Land Availability / Agreements	3	2	5	2	4	3	5
	Bridge / Stucture Requirements	1	1	5	2	3	1	5
	Maintenance / Repair Costs	2	2	4	2	3	3	4

Recognizing that the evaluation criteria are not equally significant to the potential feasibility of the options under consideration, a weighted evaluation matrix was developed in order to provide a more representative comparison tool. Evaluation criteria were aggregated and assigned weighting factors as shown in Table 6-2. Weighting factors – assigned with the intent of highlighting the evaluation criteria most influential to the feasibility of the project – were developed by WSP and confirmed by the Project Steering Committee and key stakeholders.

It should be noted that the evaluation matrix is one of several tools that can be considered in the evaluation process. Though its results are useful in comparing each option, there are limitations. For example, constructability and anticipated cost have been considered as very influential factors in the evaluation process, while other important factors such as user experience and connectivity are comparatively less significant. This introduces a bias toward options that easier to construct, while important user focused criteria that influence the potential for use of the facility are less impactful.

Table 6-2: Evaluation Matrix (weighted)

	User Experience		Environmental Impact		Connectivity		Policy Compliance		Constructability		Maintenance		
Scale Factor =	15		15		10		15		35		10		TOTAL SCORE (/100)
	Base (/100)	Scaled (/15)	Base (/100)	Scaled (/15)	Base (/100)	Scaled (/10)	Base (/100)	Scaled (/15)	Base (/100)	Scaled (/35)	Base (/100)	Scaled (/10)	
Highway 107 (South Side)	90	13.5	40	6.0	60	6.0	90	13.5	45	15.8	40	4.0	**59**
Highway 107 (North Side)	90	13.5	40	6.0	60	6.0	87	13.0	30	10.5	40	4.0	**53**
Trunk 7 (Paved Shoulders)	55	8.3	100	15.0	80	8.0	73	11.0	95	33.3	80	8.0	**84**
Trunk 7 (AT Greenway)	70	10.5	80	12.0	100	10.0	83	12.5	40	14.0	40	4.0	**63**
Old Coach Road	55	8.3	60	9.0	20	2.0	53	8.0	70	24.5	60	6.0	**58**
NS Power Corridor	15	2.3	60	9.0	20	2.0	37	5.5	40	14.0	60	6.0	**39**
Seven Lakes Greenway	63	9.4	100	15.0	20	2.0	67	10.0	100	35.0	80	8.0	**79**

The results of the weighted matrix are summarized below:

- The two highest scoring options were paved shoulders on Trunk 7 (84 points) and the Seven Lakes Greenway (79 points). These options scored well due to high scores in constructability, which overshadowed their limited appeal in other less influential categories.
- The Trunk 7 AT greenway was the next highest score at 63 points. Although this option scored among the lowest in terms of constructability, it scored well in most of the remaining categories.
- With a total of 58 points, the Old Coach Road option scored decently in most categories, with the exception of connectivity.
- The options south and north of Highway 107 scored 59 and 53 points, respectively. These options score exceptionally well in terms of user experience and policy compliance due to their adherence to the desired objectives of the facility. However, the potential for high construction costs and environmental impacts reduced their overall score considerably.
- The Nova Scotia Power corridor scored poorly in nearly all categories and was a distant last place with a total of 39 points.

6.3 Evaluation Summary

Based on a review of the evaluation results and consideration of the factors discussed in Section 1.3, evaluation summaries for each option are provided below.

6.3.1 *Highway 107 (South Side)*

A destination greenway on the south side of Highway 107 was envisioned in the Area's AT Plan, and therefore it is the preferred option in terms of meeting project objectives. Relatively direct connectivity in the Trans Canada Trail gap as well as exposure to the exceptional scenery afforded by the Chezzetcook Inlet are the major advantages that make this option attractive as a destination trail. Though this option has relatively limited accessibility options due to its location south of a controlled access highway and separation from populated areas, its function as a destination greenway would not be expected to be hampered by these limitations.

Constructability, financial considerations, and environmental impacts appear to be major potential constraints for the south side of Highway 107. Construction of the facility would require a considerable amount of fill along sections of the highway, and space constraints between the highway and the Chezzetcook Inlet would likely impact protected wetlands. At least two major bridge structures spanning watercourses would be required, which impacts both costs and environmental concerns.

6.3.2 *Highway 107 (North Side)*

The north side of Highway 107 shares many of the advantages and disadvantages associated with the south side, and been considered in the past as a potential opportunity for greenway development. There are, however, key differences between the south side and the north side that should be considered. The most important factor is the physical separation of the facility from the natural environment and aesthetical value of the Chezzetcook Inlet. The highway would present a visual and physical barrier between the greenway and the Inlet; in order to maintain an alignment that provides favorable view planes, encroachment on several private land parcels would be required. Other key factors include the following:

- Through much of the Study Area, NSTIR has considered the north side of the Highway 107 as the likely site of any future roadway widening.
- Bridge requirements on the north side of Highway 107 are more extensive due to the need for a considerably longer bridge just west of the Exit 21 interchange.

6.3.3 *Trunk 7*

Opportunities considered on Trunk 7 include the addition of paved shoulders and construction of an AT greenway. There are key differences between the two options: paved shoulders would provide a benefit primarily to cyclists, while an AT greenway would be useful for all AT modes. Both of these options are favorable in terms of overall AT in the Study Area, but arguably achieve different objectives than those considered core to this study. Centrally located and accessible to a relatively large number of residents, the options on Trunk 7 would have the biggest impact on encouraging 'utilitarian' AT trips. They would also provide a relatively direct TCT and Blue Route connection. However, minimal separation between users and traffic on Trunk 7 and a lack of aesthetical or cultural value would limit the potential to be considered as a destination trail. Although paved shoulders could be added relatively cost effectively as part of future road improvements in the area, it is expected that construction of the AT greenway option would be very challenging. Due to the limited amount of ROW, difficult terrain along the ROW, and the large number of private driveways on the Study Section, constructing an AT greenway along the Trunk 7 is not considered practical at a reasonable cost.

6.3.4 *Old Coach Road*

The Old Coach Road option appears to be strong in terms of construction feasibility due to land availability; however, the lack of connectivity owed to its location north of Porters Lake limits its potential. Though it could function well as a recreational facility, its lack of connectivity would have limited benefits for utilitarian AT trips and as a connection in the TCT or Blue Route.

6.3.5 *Nova Scotia Power Corridor*

The Nova Scotia Power corridor is not considered a feasible alternative for an AT facility. In addition to physical constraints (e.g. harsh terrain) that would limit constructability, it does not provide an environment that would be expected to encourage AT in either recreational or utilitarian capacities.

6.3.6 *Seven Lakes Greenway*

The Seven Lakes development greenway appears to be the most technically feasible of all alternatives, which is not surprising given that it has been considered in detail and is proposed for construction. However, it does not meet many of the objectives related to AT user experience that were considered to be of key importance to this study, and it is not expected to be completed for several years.

6.4 Recommendations

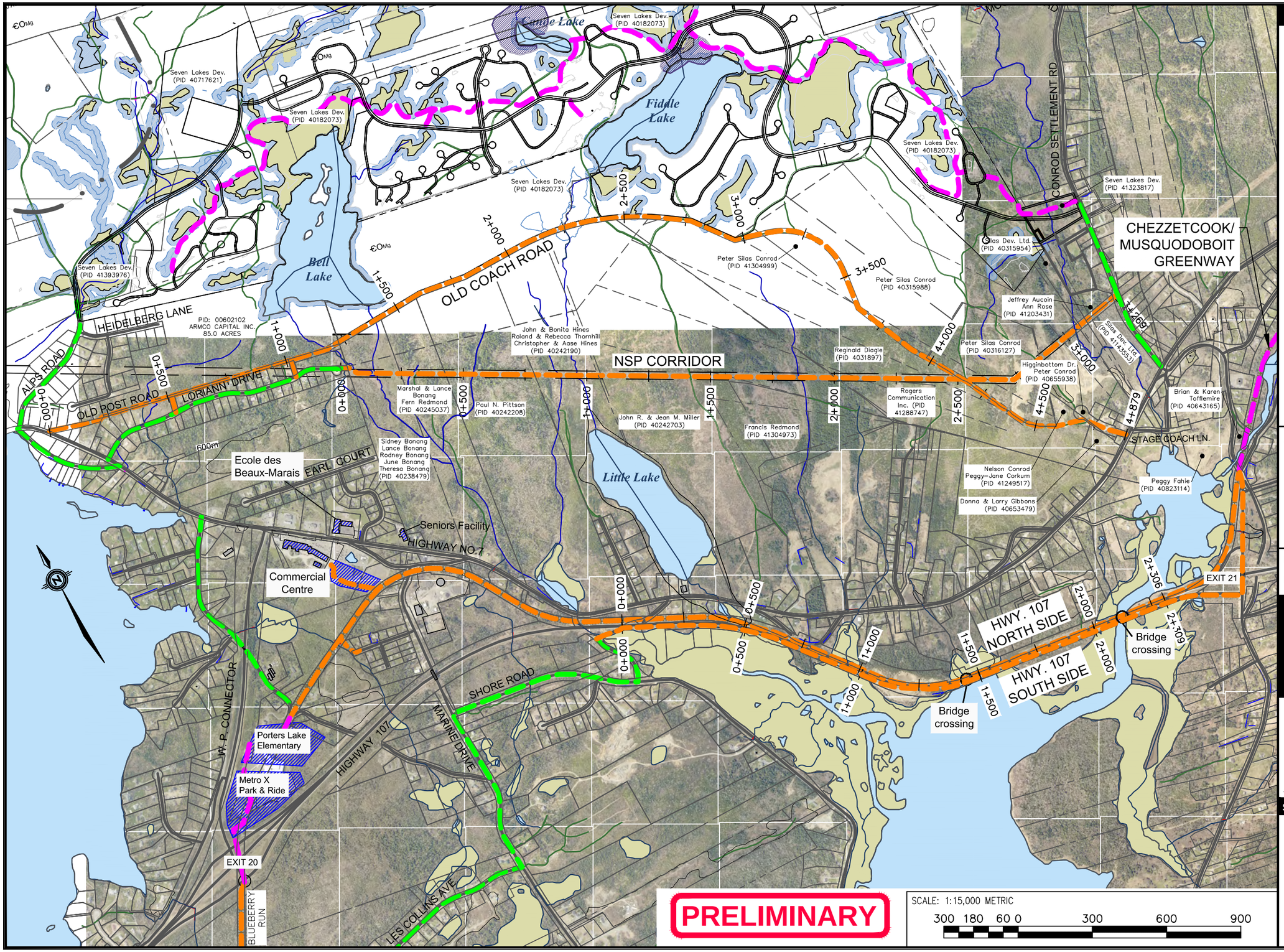
It is recommended that the proposed alignment on the south side of Highway 107 be further investigated as part of Phase 2 of this Feasibility Study. More detailed investigation will enable better understanding of the relevant constraints and opportunities. Of particular importance to the more detailed analysis will be consideration of environmental impact, connectivity with adjacent facilities, constructability and cost implications.

Although there are many constraints that could impact the feasibility of the Highway 107 south option, it is the option that most closely aligns with the objective of creating a destination greenway in the area and closing a key gap in the Trans Canada Trail. More detailed investigation of the selected option will aid in the ability to determine overall feasibility of the option.

6.5 Conclusion

The analyses included in the Phase 1 report provides the Project Steering Committee with information intended to assess the available connection options and determine which is preferred for further analysis as part of Phase 2 of this assignment. Endorsement of (or amendment to) these recommendations will follow through to Phase 2 of the project.

Appendix A
Conceptual Alignment and Profile Sketches



PRELIMINARY

SCALE: 1:15,000 METRIC

300 180 60 0 300 600 900

LEGEND

- PROPERTY BOUNDARY
- GREENWAY ALIGNMENT OPTION
- FUTURE TRAIL/GREENWAY
- POTENTIAL ON-STREET FACILITY
- KEY DESTINATION
- WETLAND (PROVINCIAL MAPPING)
- WATERCOURSE
- 20m RIPARIAN BUFFER
- WATER ROUTE
- EXISTING TRAIL/GRAVEL ROAD

Notes:

1. All property boundaries shown are approximate only and may not reflect changes made since 2007.
2. Proposed alignment layouts are conceptual and representative only.
3. Background aerial photography is for information purposes only and does not necessarily reflect the current existing condition.

Drawn: PSN

Engineer: MIC

FIGURE A-1

ACADIA MARSH GREENWAY FEASIBILITY STUDY

PLAN VIEW

HALIFAX

JUNE 15, 2015

SCALE: 1:15000

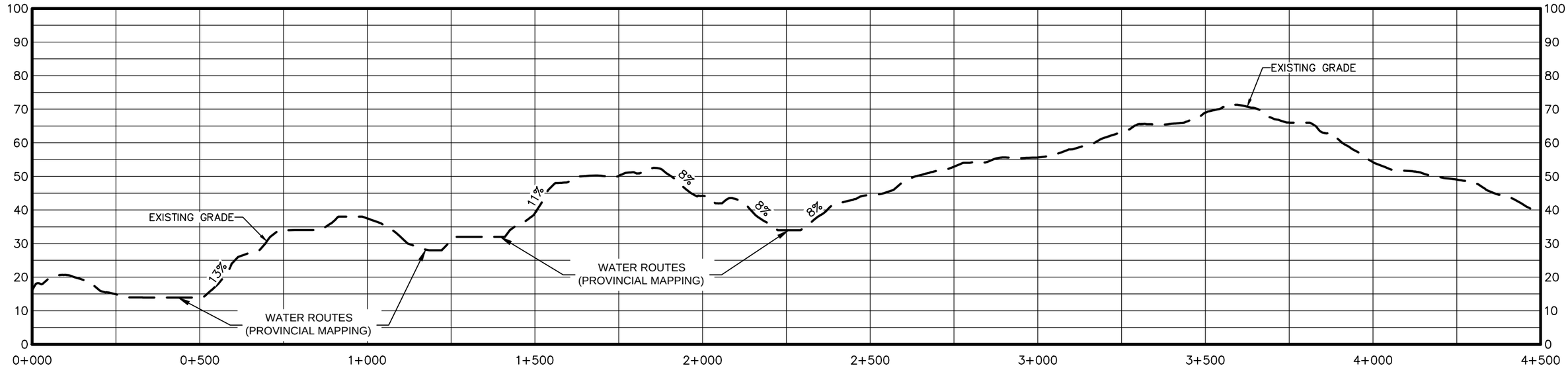
WSP

1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM

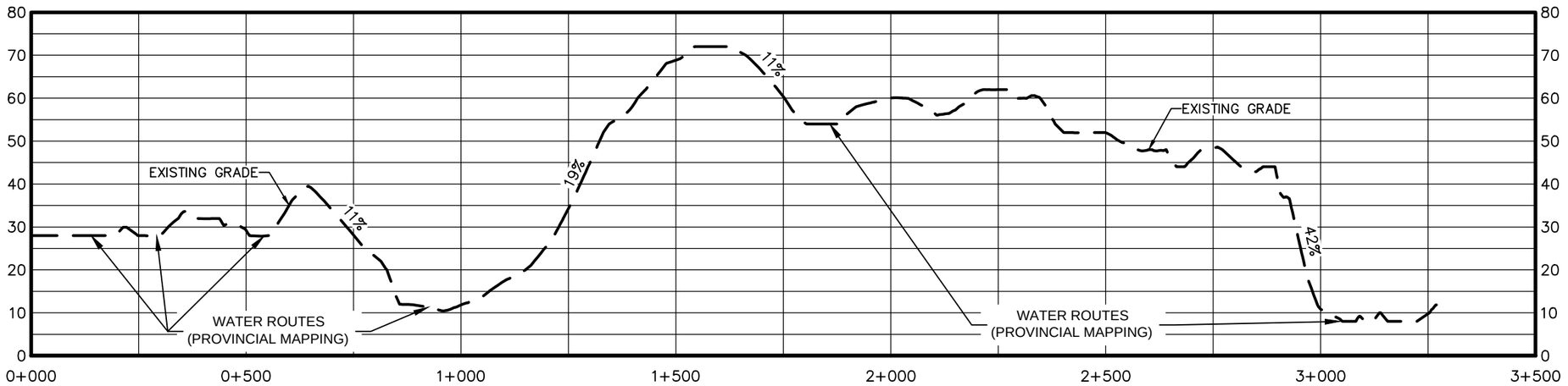
Sheet: Plan

FILE: K:\DARTMOUTH\2015\151-02137 SHORE\ATA_ACADIA MARSH GREENWAY, PORTERS LAKE\11_ DWG\11.7_TRAFFIC\151-02137 - OPTIONS WITH PROFILES.DWG

OLD COACH ROAD PROFILE



NOVA SCOTIA POWER CORRIDOR PROFILE



PRELIMINARY

Notes:

1. Existing profiles are approximate only.

Drawn: PSN

Engineer: MIC

FIGURE A-2

ACADIA MARSH GREENWAY FEASIBILITY STUDY

NSP CORRIDOR & OLD COAD RD. PROFILE VIEW

HALIFAX

JUNE 15, 2015

NOT TO SCALE

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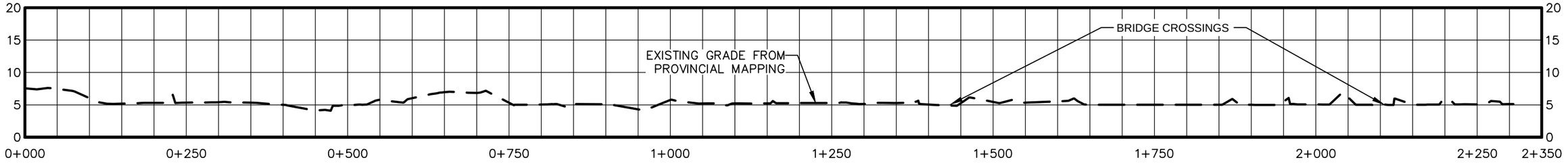
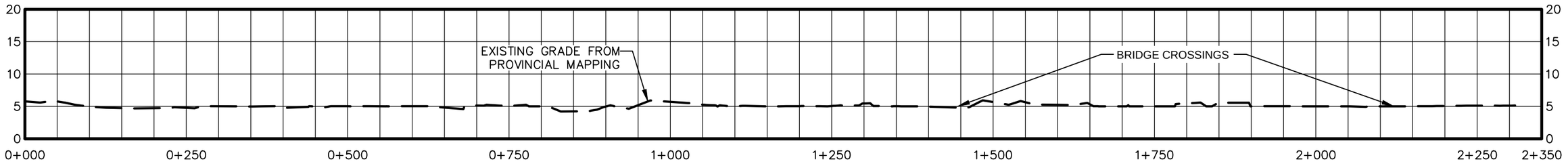
HIGHWAY 107 NORTH SIDE PROFILE



HIGHWAY 107 SOUTH SIDE PROFILE



Notes:

1. Existing profiles are approximate only.

Drawn: PSN

Engineer: MIC

FIGURE A-3

ACADIA MARSH GREENWAY FEASIBILITY STUDY

HIGHWAY 107 NORTH AND SOUTH PROFILE VIEW

HALIFAX

JUNE 15, 2015

NOT TO SCALE

PRELIMINARY

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