

# WAYTKP!

Shuswap North Okanagan Rail Trail (Sicamous-to-Armstrong)

## TRAIL DEVELOPMENT PLAN

Updated: January 15, 2021

Prepared by: Phil McIntyre-Paul (The Shuswap Trail Alliance) & Thomas Simkins (Urban Systems Ltd.)

For the Shuswap North Okanagan Rail Trail Inter-Jurisdictional Governance Committee (Splatsin, Columbia Shuswap Regional District, Regional District of North Okanagan and respective Municipal/Electoral Areas)



We gratefully acknowledge the support of the Province of British Columbia.



### Contributing Partners:



*The Shuswap North Okanagan Rail Trail is in the Splatsin unceded territory of the Secwépemc Nation.*

WAYTKP means "Hello to many"



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**Client:** The Shuswap North Okanagan Rail Trail Inter-Jurisdictional Governance Committee (Splatsin to Secwépemc, Columbia Shuswap Regional District, Regional District of North Okanagan and respective Municipal/Electoral Areas)

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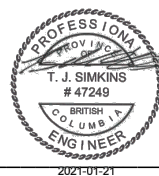
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**With Special Thanks:** The Shuswap North Okanagan Rail Trail Development Plan draws extensively on the Okanagan Rail Trail Development Plan (April 2015) with permission, and acknowledges with gratitude the work and support of the ORT Inter-Jurisdictional Team and the Okanagan Rail Trail Initiative leadership.



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## Splatsin te Secwépemc Statement

*"First, aboriginal title encompasses the right to exclusive use and occupation of land, second, aboriginal title encompasses the right to choose to what use the land can be put, subject to the ultimate limit that those uses cannot destroy the ability of the land to sustain future generations of aboriginal peoples; and third, the lands held pursuant to aboriginal title have an inescapable economic component"*

*([Delgamuukw v. British Columbia](#) 1997, para 166)*

The Secwépemc people have occupied the south-central part of British Columbia for at least 10,000 years with Secwépemcúlecw (territory) extending from the Columbia River Valley on the east slope of the Rocky Mountains to the Fraser River on the west and from the upper Fraser River in the north to the Arrow Lakes in the south. Secwépemcúlecw covers a vast area; approximately 180,000 square km.

Splatsin is the southern most community of the Secwépemc Nation. Splatsin's area of caretaker responsibility within Secwépemcúlecw extends east into the Columbia Basin, north to the Mica Creek area, south to Kettle Falls, Washington USA, and as far west as Monte Lake BC.

Splatsin are the Yucwmenlúcwu (caretakers) of our area of responsibility within Secwépemcúlecw. Our rich oral history shows that Splatsinac (Splatsin people) hold intimate knowledge of our territorial lands. This is supported by ethnographic, historical and genealogical records.

Splatsin asserts Aboriginal rights and title in our area of caretakership within Secwépemcúlecw. This includes rights to the land, water and ecology of our territory and we continue to hold the right to govern, manage and care for these resources. We have cared for the lands, waters and forests in our territory for thousands of years on behalf of our nation and our people.

Our caretaker responsibilities, or Yucwminmen, are a deeply embedded aspect of Secwépemc law and way of life. These responsibilities guide us in our role as stewards of the land. Splatsinac have a duty to protect and maintain the resources of Secwépemcúlecw for current and future generations. Our stewardship allows us to continue our way of life, which is constitutionally protected under s. 35(1) of the Constitution Act, 1982.

Recently, British Columbia has indicated that it is committed to implementing the United Nations Declaration on the Rights of Indigenous Peoples which affirms Indigenous peoples have the right to the lands, territories and resources which they have traditionally owned and occupied, including the right to determine what development occurs on those lands. Article 32 of the United Nations Declaration on the Rights of Indigenous Peoples reaffirms that Indigenous peoples have the right to determine and develop priorities and strategies for the development or use of their territorial lands and resources.

Splatsin has been a leading partner in the Rail Trail initiative. This project has brought both government and non-government groups together to collaboratively develop the 50 km Sicamous-to-Armstrong rail corridor in South Central British Columbia into a route for non motorized travel. The construction of a rail trail system will promote a healthy, active lifestyle. The common core values of the project are sustainability and ecological protection.



Splatsin’s engagement and efforts to lead this initiative are founded on the understanding that these 50 km of trail are located within Splatsin’s core area of caretakership and form part of our unceded Secwépemc territorial lands. Splatsin strives to assume our role as caretakers of our traditional lands on behalf of the Splatsin people and the Secwépemc Nation; for the benefit and use of the Secwépemc people and our neighbours now and in the future.

### Splatsin Acknowledgement of Rights, Title, and Interests

The Secwepemc people have never ceded or surrendered any part of Secwépemcúlecw and therefore remain the true title holders to their homelands. The information contained in this document titled "Shuswap North Okanagan Rail Trail Development Plan" does not represent or limit Splatsin’s Aboriginal rights, title or interests for the project area. Splatsin reserves the right to gather and produce further information, including identifying concerns about Splatsin’s rights, title and interests in relation to the rail trail project initiative as this initiative moves forward into the future.



Kukpi7 (Chief) Wayne Christian  
Splatsin te Secwépemc



Photo: Splatsin Kukpi7 (Chief) Wayne Christian chairs the Rail Trail Governance Advisory Committee

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## 1. Executive Summary

### 1.1. Project Scope

The Spltasin te Secwépemc (Spltasin), the Columbia Shuswap Regional District (CSRD) and Regional District of North Okanagan (RDNO) are working together in partnership to construct a 50km non-motorized greenway trail for walking and cycling along the rail corridor between the communities of Sicamous and Armstrong. The Shuswap North Okanagan Rail Trail, known also as the Sicamous to Armstrong Rail Trail, will connect the communities of Sicamous, Electoral Area E of the CSRD, Electoral Area F of the RDNO, Enderby, Grindrod, Spltasin, Spallumcheen, and Armstrong through Spltasin Territory, traversing a stunning and varying scenic landscape of lakes, rivers, creeks, mountains and agriculture farmland. The trail will provide opportunities for recreation, tourism, active transportation, economic development, healthy communities, and will foster indigenous relationships by preserving cultural assets and promoting indigenous values. In the long-term, the trail will connect with the Okanagan Rail Trail between Vernon and Kelowna, and establish a viable route between Sicamous and Osoyoos.

### 1.2. Trail Development

The Shuswap North Okanagan Rail Trail Development Plan has been prepared to ensure success in improving pedestrian and cyclist accessibility, destination tourism benefits and longer-term healthy community objectives for all of the communities along the corridor, while attempting to balance the realities of identified technical challenges and limited resources within the rural context.

The multi-use trail will be developed to a basic standard, as a continuous route between Sicamous and Armstrong. The finished surface will consist of crushed and compacted aggregate, suitable for pedestrian and off-road bicycle use, as well as universal mobility access. An average 3.5 metre tread width will be constructed (minimum 3 metre in areas of topographic constraint to maximum 4 metre width where feasible) to maintain consistency with the Okanagan Rail Trail between Vernon and Kelowna, and other Rail Trail corridors within the Province of BC. Included in the development of this basic standard of trail will be road crossings, signage, access barriers, safety barriers, and support infrastructure to provide a basic level of safe and accessible use by pedestrians and cyclists. This phase of the project does not include plans to surface the trail with asphalt, though this was studied and may be desirable in the future.

Targeted use includes two-way pedestrian, bicycle and universal mobility access (including hand bicycles, wheel chairs, and mobility scooters). Motorized vehicles are not permitted on the corridor except for maintenance/emergency vehicles and legitimate accessibility aides. Pedal assist E-bikes (Type 1) will be allowed. Dogs on leash will be allowed. After considerable study, equestrian use will not be allowed at this time.

Projected trail user trip numbers for the Sicamous-to-Armstrong rail trail are unknown at this point. But based on the Okanagan Rail Trail (ORT), 588,000 user trips were recorded using the ORT in the first year. The ORT services a population of approximately 185,000, about 10 times that of the populations along the Shuswap North Okanagan Rail Trail corridor (21,000). Based on population alone, it might be reasonable to anticipate 50-100,000 users per year.



In addition to the core elements of trail construction, this costing addresses substantial erosion issues along Mara Lake and Shuswap River, the requirement of a major pedestrian/bicycle overpass of Highway 97A at Stepney Road, and several key trailheads and side destinations. The trail construction costs alone are consistent with similar rail trail greenway projects including the Okanagan Rail Trail. The addition of erosion mitigation and the highway overpass add substantially to the overall costs.

To better understand these costs and facilitate a staged approach to construction adaptable to available funds over time, a capital construction and costing framework is proposed as follows:

1. **Stage One: Protect the Corridor** – targets immediate erosion mitigation strategies needed to stop the loss of the existing rail bed to wave erosion and flooding along Mara Lake and Shuswap River. Estimate cost for this stage is \$3,500,000 (\$5,000,000 with recommended 40% allowance for engineering and contingency).
2. **Stage Two: Make It Safe** – targets basic priorities necessary to make the trail safe and functional for public access. This includes addressing steep slope, bridges, missing culverts, road crossings, fencing, and signage. Estimate cost for this stage is \$2,000,000 (\$3,250,000 with recommended 40% allowance for engineering and contingency).
3. **Stage Three: Build the Surface** – targets construction of the crushed and compacted aggregate trail surface, along with repairs to culverts where needed and accommodation of agricultural crossings. Estimate cost for this stage is \$7,000,000 (\$9,800,000 with recommended 40% allowance for engineering and contingency).
4. **Stage Four: Finish the Trail** – targets completion of the Sicamous-to-Armstrong rail trail through construction of the Highway 97A pedestrian/bicycle overpass, trailhead parking and amenities, interpretive signage, access to side destinations and final surfacing. Estimate cost for this stage is \$4,000,000 (\$5,800,000 with recommended 40% allowance for engineering and contingency).

Further variations can be made to this framework to meet available funding and grant opportunities.

### 1.5. Schedule

The timing for construction and opening of the initial phase of the trail is contingent on funding availability. Moving forward with detailed design and construction work is dependent on successful implementation of a funding strategy that includes Provincial/Federal partnership support and a community investment campaign, and will ultimately be at the discretion of the Councils and Boards of the partnering owner jurisdictions.

With the funding strategy commencing in the fall of 2020, it is possible that construction will start in 2021. Early construction would address protection of the corridor and safety as outlined above. Full funding could see the trail completed within two years, and staged funding over three to four years.

The Rail Trail Technical Operational Committee will work closely with the Governance Advisory Committee during the fundraising campaign to explore opportunities to potentially advance certain components of the project.



## 1.6. Next Steps

The preparation of this Trail Development Plan with Class C cost projections is a key step in the process to convert the existing rail bed into a functioning regional trail. Following the completion of this plan, several additional steps have been identified to progress the project towards design and construction.

1. Commence the funding strategy, including grant applications and community fundraising
2. Complete Agricultural Land Commission review
3. Prepare final plans for road crossings, parking, and trail head amenities with local governments
4. Prepare detail design and construction and submit final permitting (Heritage Inspection, Environmental, MoTI)
5. Contract procurement and implementation

## 2. Introduction

Splatsin Kukpi7 & Tkwamipla7 (Chief and Council) are working together with the CSRD and the RDNO area and municipal leadership to develop the entire 50 km abandoned Sicamous-to-Armstrong rail corridor in South Central British Columbia, as a continuous non-motorized greenway for walking & cycling.

The goals of this initiative are to protect environmental and cultural values, promote communication and strengthened relationships between respective communities and residents, and create new tourism, community health, and sustainable transportation benefits for the region – including linking with the recently opened Vernon-Kelowna Rail Trail greenway and 200 km south to Osoyoos in order to realize the full tourism value of this unprecedented opportunity.

Since June 2019, a team of consulting engineers, planners, archeologists, cultural specialists, agrologists, and environmental scientists have reviewed all aspects of the conversion of the rail bed into a functioning trail. The project team has studied the corridor’s physical characteristics to determine a basic trail development concept, identify associated qualifications and construction risks, and develop a planning level cost estimate (Class C).

As well, Secwépemc values and interests are being reviewed to guide community-to-community relationship building, public education, and long-term management of the corridor.

## 3. Project Background

In August 2009, CP Rail began the formal process of discontinuing the line between Sicamous and Armstrong.

In 2014, Splatsin leadership successfully negotiated with CP Rail to purchase 11.7 hectares (29 acres) of the discontinued railway corridor between Sicamous and Armstrong. In January 2015, Splatsin Kukpi7 & Tkwamipla7 (Chief and Council) invited municipal and regional leadership to join them in developing an agreement to work together to acquire the remaining sections of the corridor from CP Rail and develop a plan for its future.

Splatsin, regional and municipal leadership confirmed their intention to work together cooperatively to acquire the Okanagan Shuswap Railway through a jointly signed Memorandum-of-Understanding. And in



March 2017, the Province of BC announced a commitment of \$2.17 million dollars toward the remaining purchase cost of \$6.5 million dollars. The RDNO and CSRD agreed to split the unfunded cost on a 50:50 basis, each paying \$2.17 million dollars.

In December 2017, the RDNO and the CSRD successfully concluded the purchase of the remaining sections of the CP Rail corridor. To ensure the corridor remains contiguous, the three owner jurisdictions (i.e. Splitsin, RDNO & CSRD) have agreed that the corridor will be developed, operated and maintained for its use as a continuous non-motorized recreational trail in the near future, particularly pedestrian and bicycle transportation, as well as future potential use as a continuous multi-modal regional transportation corridor.

The Splitsin, RDNO, and CSRD have established a 2-part inter-jurisdictional Governance body through which the three orders of government representing 12 jurisdictional members will develop and manage the rail trail greenway. The Governance body consists of: 1) a politically accountable Governance Committee for policy, planning and decision-making; and 2) a Technical Operational Committee to organize, implement and manage corridor development and long-term management.

On March 25, 2019 a grant through the BC Rural Dividend Program for \$500,000 was awarded to the CSRD on behalf of the inter-jurisdictional partners, leveraging \$300,000 assembled by the District of Sicamous & CSRD Electoral Area E's Economic Opportunities Fund, to launch project management, technical design work, permitting, and preparation of tender ready documents for capital development. The Inter-jurisdictional partners gratefully acknowledge the support of the Province of British Columbia for this project.

A lease agreement between CP Rail and the regional governments (CSRD/RDNO) will accommodate a final 1.1 km section adjacent to the still active CP Rail spur into the City of Armstrong.

In total, the corridor is approximately 50 km from the Sicamous Narrows on the south side of the Trans Canada Highway to the City of Armstrong at the corner of Pleasant Valley Road and Smith Drive:

- 1.5 km within the District of Sicamous
- 0.8 km within the Splitsin IR#3
- 9.3 km within the CSRD Electoral Area E
- 23.7 km within the RDNO Electoral Area F
- 2.1 km within the City of Enderby
- 3.1 km within the Splitsin IR#2
- 8.65 km within the Township of Spallumcheen
- 1.1 km adjacent to the still active CP Rail within the Township of Spallumcheen & City of Armstrong

### 3.1. Purpose of the Trail Development Plan (Scope)

The purpose of this plan is to provide the Trail Development Concept and conceptual budgetary cost estimates (Class C) with associated qualifications and risks for the Shuswap North Okanagan (Sicamous-to-Armstrong) Rail Trail Corridor necessary to: 1) prepare detailed design plans, 2) guide the capital funding



strategy and take advantage of targeted grant opportunities, 3) apply for required agency permits, 4) move forward with capital construction implementation, and 5) realize the full social/economic opportunities of the corridor for the Splitsin and communities within the CSRD and RDNO.

### 3.2. Project Team

Under direction of the Shuswap North Okanagan Rail Trail Technical Operational Committee a team of professional consultants were engaged to assist with the development of the Trail Development Plan.

- Project Management & Administration – The Shuswap Trail Alliance (Phil McIntyre-Paul – Project Manager, Tracy Lundberg-Schmidf & Mary Scheidegger – Administrative Support)
- Lead Technical Consultant (Civil Engineering and Traffic Engineering) – Urban Systems Ltd. (Thomas Simikins P.Eng)
- Agricultural Assessment & ALC Liaison – Associated Environmental Consultants Inc. (Melanie Piorecky, P.Ag.)
- Archeological Overview Assessments & Heritage Permit - Yucwmenlúcwu (Caretakers of the Land) LLP - - Splitsin Development Corporation (Adam Perdue, BA; Luke Kowalski, BA; Rob Wondrasek)
- Brand Development & Design – Toliver Design & Creative 55 (Kari Wilkinson)
- Bridge Assessment & Design – Bourcet Engineering (April Creighton, P.Eng.)
- Cultural Heritage Overview Assessment – Splitsin Title & Rights (Kayla Gunner, B.A., Researcher)
- Environmental – Western Water Associates Ltd. (Trina Koch, R.P.Bio; Gina Le Bel, B.Sc. B.I.T; Douglas Geller, M.Sc. P.Geo.)
- Erosion (Lake and River Shoreline Protection) – Waters Edge Engineering Ltd. (Tara Hirsekorn, P.Eng.; Kalie Smith, MSc, EIT; Ken Langedyk, P.Eng.)
- Geotechnical – Fletcher Paine Associates Ltd. (Salem M. Bsat, MSc, EngL; Terry Eddy, P.Eng)
- GIS Mapping - Columbia Shuswap Regional District GIS Department & Urban Systems Ltd. (David Major; Suzanne Fordyce)
- Land Valuation & Crossing Agreement Recommendations – Kent-MacPherson (Jordan Hettinga, B.Sc., RI)
- Lease, License, and Encroachment Agreements – CSRD/RDNO (Sharen Berger)
- Legal – Lidstone & Company (Lynda Stokes, LL.B)
- Steep Slope Assessment - Fletcher Paine Associates Ltd. (Salem M. Bsat, MSc, EngL; Terry Eddy, P.Eng; Robert Scherz, P.Eng.)
- Stormwater Water Management – TRUE Consulting (Dan Miller, P.Eng.; Robert Boger, EIT)
- Survey – Browne Johnson Land Surveyors (Mark Mason, BCLS)

Splitsin and regional government staff provide ongoing technical oversight and direction, support for consultation meetings, and liaison reporting with the Governance Advisory Committee.

## 4. Vision – Unfolding the True Story

**The Shuswap North Okanagan (Sicamous-to-Armstrong) Rail Trail Vision:** to protect environmental, agricultural, and Secwépemc cultural values, and create tourism and transportation benefits for the region, through the development of the entire abandoned Sicamous-to-Armstrong rail corridor as a continuous non-motorized greenway for walking & cycling (in the immediate short term) – and to link with the Vernon-Kelowna Rail Trail greenway and 200 km south to Osoyoos in order to realize the full tourism value of this unprecedented opportunity. ([“Three Sections; One Vision”](#))



Photo: Splatina, CSRD, & RDNO Governance leadership sign the Rail Trail joint Memorandum-of-Understanding to work together.

**Strengthening Relationships and Unfolding the True Story** within Secwépemc Nation territory is fundamental to this approach in the North. It is an initiative being led by Splatina leadership in partnership with municipal/regional leadership; and seen as complimenting/linking with the Okanagan Rail Trail efforts to the south. The parties intend for the relationship created by the Memorandum of Understanding and the opportunity to work together in pursuing the Okanagan Shuswap Railway to promote communication and strengthen relationships between their respective communities and residents. ([MoU, 2015](#))



## 4.1. Strategic Goals

Agreement on the vision & goals of the corridor has been articulated through the MoU, Terms-of-Reference, joint presentations to Provincial and Federal Leadership, and to the public through the Acquisition FAQ Sheets and subsequent media releases. (See [Splatsin Discussion Brief, 2015](#), [MoU 2015](#), [Pacific Caucus Briefing & Presentation, July 2016](#); [ToR 2016](#), [Acquisition FAQ May 2017](#), Media Releases [2017](#) & [2018](#))

The strategic vision and goals for the Shuswap North Okanagan Rail Trail include the following:

- a commitment to work together cooperatively ([MoU 2015](#))
- unfolding the true story within Secwépemc territory and promoting communication and strengthened relationships between Secwépemc & municipal/regional communities and residents ([MoU 2015](#), [Pacific Caucus Briefing & Presentation, July 11, 2016](#), [Acquisition FAQ May 2017](#))
- the protection of sensitive environmental and cultural sites along the corridor ([MoU 2015](#));
- creation of tourism and transportation benefits for the region ([Splatsin Discussion Brief, 2015](#))
- revitalization of Splatsin culture and connections back to the land ([Splatsin Discussion Brief, 2015](#))
- maximizing the recreational and economic potential of the corridor ([Acquisition FAQ May 2017](#));
- acknowledge agricultural values and the role of the Agricultural Land Commission (ToR 2019)
- maintaining a continuous corridor for both walking & cycling recreation (and active transportation) in the near term, and potential use as a flexible multi-modal transportation corridor in the future, for the joint benefit of the jurisdictions ([MoU 2015](#), [ToR 2016](#), [Acquisition FAQ May 2017](#))
- linking with the Okanagan Nation Territory and the Vernon-Kelowna Rail Trail greenway and the Kelowna-to-Osoyoos greenway trail initiative in the south, in order to realize increased tourism value. (See: [“Three Sections; One Vision”](#), [Pacific Caucus Briefing & Presentation, July 2016](#))



Photo: Rail Trail corridor north of Mara Hall

## 4.2. Milestones to Date

**CP Rail Discontinuance** – In August 2009, CP Rail began the formal process of discontinuing the line between Sicamous and Armstrong. Initially no agreement was reached to purchase the line by either private expressions-of-interest or provincial and municipal governments. As a result, CP formally discontinued the northern segment (mile: 0.3 to 16.4) in November 2012 and the southern segment (mile: 16.4 to 31.63) in April 2014. (See: [CP Fact Sheet, June 2014](#); [Acquisition FAQ May 2017](#))

**Splatsin Acquisition** – In 2014, Splatsin leadership successfully negotiated with CP Rail to purchase 11.7 hectares (29 acres) of the discontinued railway corridor between Sicamous and Armstrong. This includes a 1.5 kilometre section south of Sicamous along the shores of Mara Lake, and a 6 kilometre section south of Enderby. The agreement was an important acknowledgement of the Splatsin’s role as primary caretaker of the land in the region and the title and rights of the Secwépemc in their traditional territory through which the abandoned rail corridor runs. (See: [Splatsin Discussion Brief, 2015](#))

**Agreement to Work Together** – Splatsin Chief and Council recognized the long-term tourism and transportation potential for the corridor, as well as the opportunity to revitalize Splatsin culture and connections back to the land. In January 2015, they invited municipal and regional leadership to join them in developing an agreement to work together to acquire the remaining sections of the corridor from CP Rail and develop a plan for its future. (See: [Splatsin Discussion Brief, 2015](#))

Splatsin, regional and municipal leadership confirmed their intention to work together cooperatively to acquire the railway corridor between Sicamous and Armstrong through a jointly signed Memorandum-of-Understanding. (See: [MoU 2015](#)) An Inter-Jurisdictional Negotiating Team was appointed and Terms-of-Reference developed to jointly acquire the remainder of the rail corridor from the CPR. (See: [ToR 2016](#))

**Provincial Support/Regional Alternative Approval Process** – In March 2017, the Province of BC announced a commitment of \$2.17 million dollars toward the remaining purchase cost of \$6.5 million dollars. The RDNO and CSRD agreed to split the unfunded cost on a 50:50 basis, each paying \$2.17 million dollars. Both received elector authorization to borrow funds through an alternative approval process in July 2017, with the balance coming from the Sicamous/Area E Economic Opportunity Fund (\$250,000), and the Revelstoke/Area B Economic Opportunity Fund (\$100,000). (See: [Media Release, April 2017](#))

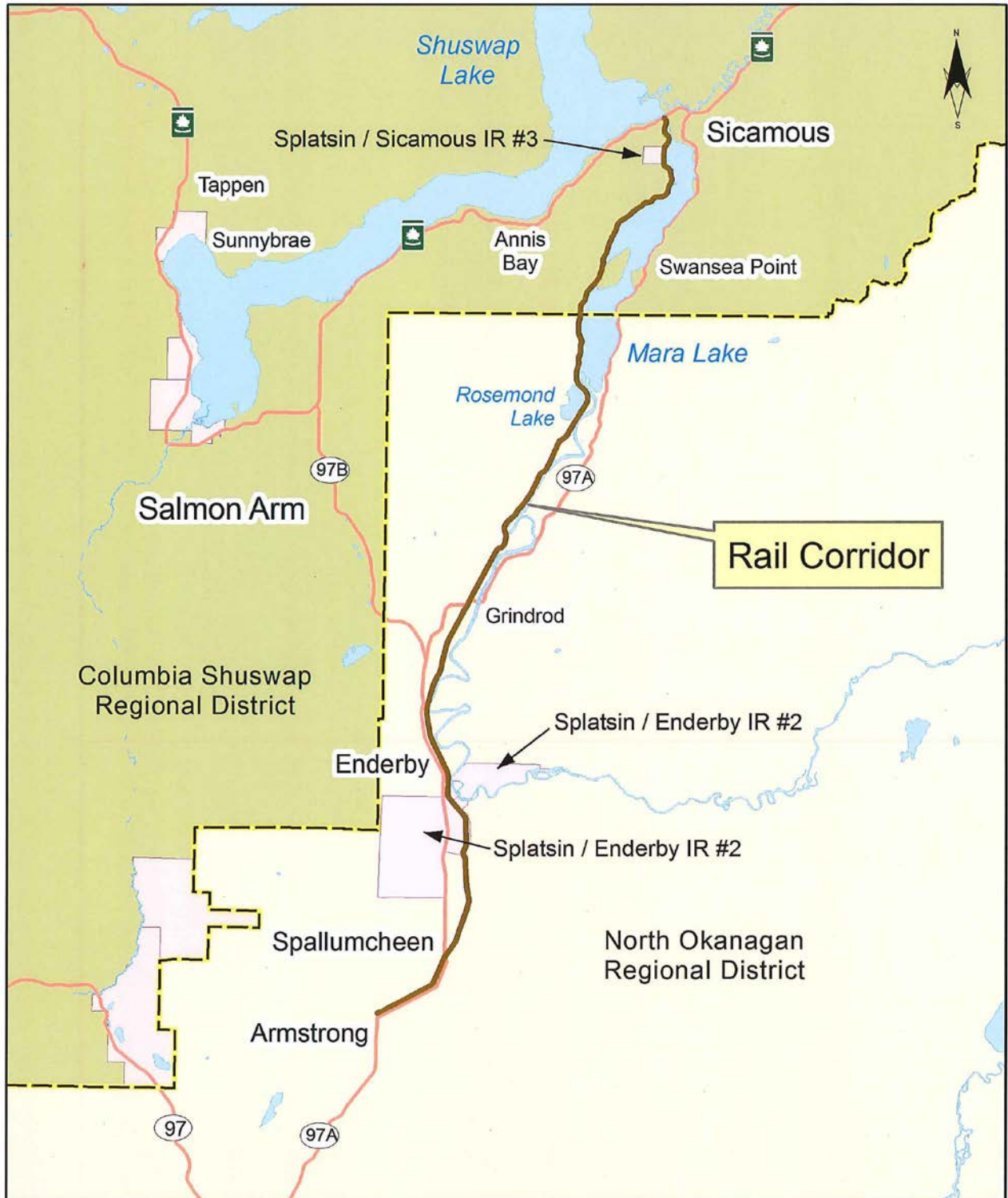
**RDNO/CSRD Acquisition** – In December 2017, the RDNO and the CSRD successfully concluded the purchase of the remaining sections of the CP Rail corridor, excluding the sections owned by the Splatsin, after a legal and environmental examination of the property coming back as being satisfactory. (See: [Media Release, Jan 2018](#))

**Joint Agreement to Develop, Operate and Maintain** – To ensure the corridor remains contiguous, the three owner jurisdictions (i.e. Splatsin, RDNO & CSRD) have agreed that the corridor will be developed, operated and maintained for its use as a continuous recreational trail in the near future, particularly pedestrian and bicycle transportation, as well as future potential use as a continuous multi-modal regional transportation corridor. Further, the owner jurisdictions will covenant with each other under the terms of a statutory right of way agreement for public access over those sections of the corridor that they own, to maintain it (and not encumber it) in perpetuity for these ultimate uses. (See: [Acquisition FAQ May 2017](#))

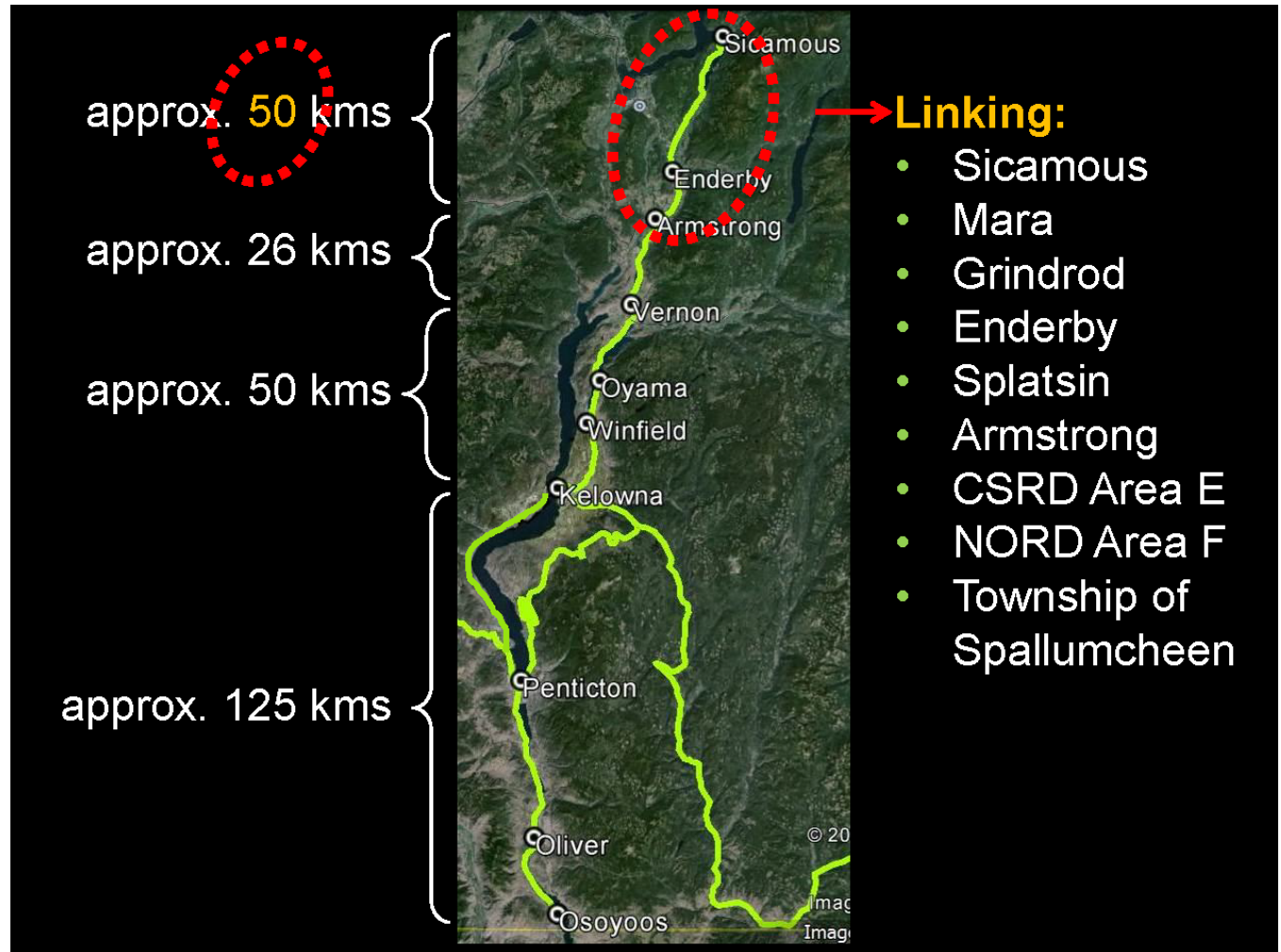


**Capital Funding** – Splatins, Regional, and Municipal partners are now seeking Capital funding to realize full construction of the 50 kilometre Shuswap North Okanagan Rail Trail greenway corridor between Sicamous and Armstrong in British Columbia.

### 4.3. Overview Map



#### 4.4. Sicamous-to-Osoyoos



Linking with the Okanagan Nation Territory and the Vernon-Kelowna Rail Trail greenway and the Kelowna-to-Osoyoos greenway trail initiative in the south, is a long-term goal in order to realize increased community health and economic resilience value through sustainable destination tourism. (See: [“Three Sections; One Vision”, Pacific Caucus Briefing & Presentation, July 2016](#))

## 5. Trail Management

### 5.1. Governance Structure

A 2-part inter-jurisdictional structure has been created consisting of:

- 1) a politically accountable *Governance Advisory Committee* for policy decision-making relative to the planning, development, management and governance of the Rail Trail Corridor, the Secwépemc Nation as represented by Splat sin in their role as caretakers of this land, CSR D (including Area E, Salmon Arm, & Sicamous), and RDNO (including Area F, Armstrong, Enderby, & Spallumcheen) leadership;

And 2) a **Technical Operational Committee** to organize, implement and manage corridor development and maintenance. The Technical Operational Committee includes staff from the Inter-Jurisdictional government partners, and dedicated operational management and administrative support.

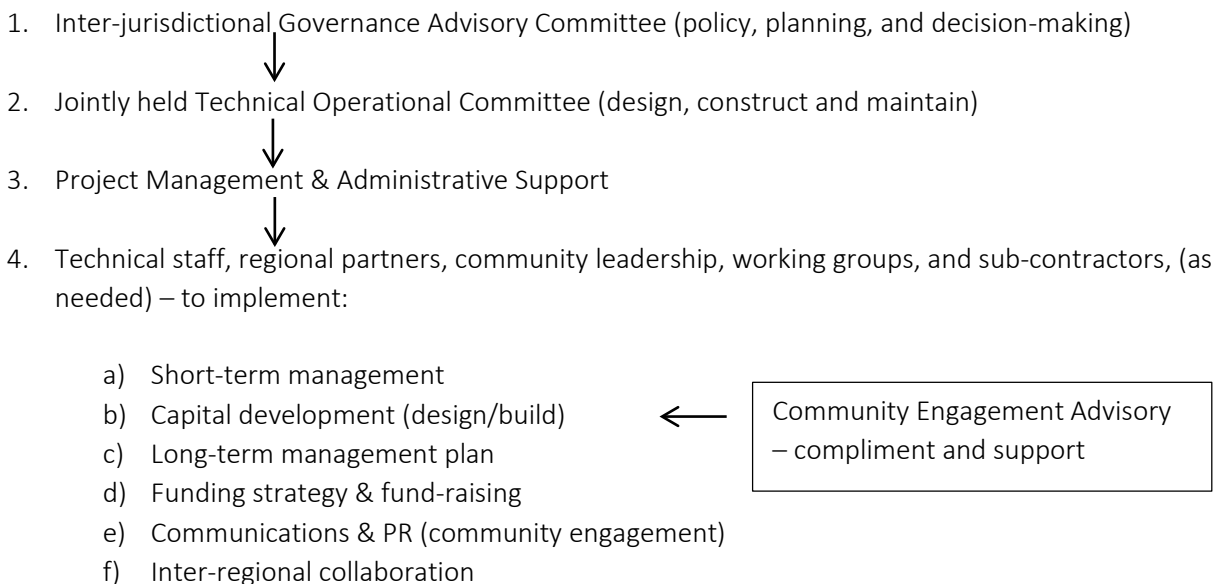
Full-time operational management and administrative support is critical to successful implementation. The inter-jurisdictional partners have contracted the Shuswap Trail Alliance to provide these services, including secretarial support for the Governance Advisory and Technical Operational Committee, project planning and management services to the Technical Operational Committee, and communications, fund raising, and community engagement support.

As well, technical and organizational support is provided by regional partners, local government staff, community leadership, and sub-contractors, including the Shuswap Trail Alliance and the Shuswap Regional Trails Strategy Roundtable.

A **Community Engagement Advisory** has been established representing regional organizations and leadership to compliment and support the work of the Governance Advisory and Technical Operational Committee. Its purpose is to build a robust coalition of project stakeholders that collectively advise, assist, and advocate for the Rail Trail Corridor, inter-jurisdictional Owner/Partners, and vision through relationship-building, collaboration, investment partnerships, advice on technical direction and community preparedness, communications and PR, and connection with communities throughout the wider region and province.

It is anticipated the advisory will evolve into a “Friends of . . .” trail stewardship advisory supporting the long-term management and promotion of the Rail Trail and connection with the wider region and province.

The organizational structure:



## 5.2. Memorandum-of-Understanding and Terms-of-Reference:

A Memorandum-of-Understanding and Terms-of-Reference for the Inter-Jurisdictional Structure was developed and adopted by the three jurisdictional parties to guide the work of the Governance and Technical committees in 2019. (See [MoU](#) & [ToR](#) 2019)

## 5.3. Statutory Right-of-Way

The owner jurisdictions (Splatins, CSRD, RDNO) will covenant with each other under the terms of a statutory right of way agreement for public access over those sections of the corridor that they own, to maintain it (and not encumber it) in perpetuity for these ultimate uses.

## 5.4. Key Management Goals

The development strategy for the rail corridor will address the following. . .

- a. Protection of sensitive habitat and natural environments along the corridor
- b. Protection of archeological and culturally significant sites along the corridor
- c. Preservation and protection of agricultural values along the corridor
- d. Prevention of vandalism, garbage, noise, & unwanted use for adjacent property owners
- e. Long-term access and safety for pedestrian and bicycle use
- f. Connections to local community amenities, destinations, and routes
- g. Potential future co-use for alternative transportation solutions (rails-with-trails and highway ROWs)
- h. Link with Okanagan leadership to create a continuous greenway corridor to Osoyoos  
(See: [Splatins Discussion Brief, 2015](#))

Ongoing management of the Shuswap North Okanagan Rail Trail will include:

- A shared co-management agreement between the three owner jurisdictions (Splatins, CSRD, RDNO)
- Ongoing monitoring & adaptation (see below)
- A system of communications, feedback, and response for partner governments, stakeholders, adjacent property owners, and trail users
- Adoption of an Agricultural Code of Ethics
- Invasive species management

## 5.5. Adaptive Management Planning

An Adaptive approach for planning and managing the rail trail will address identified risks and concerns, consistent with the approach agreed to by regional partners through the Shuswap Regional Trails Strategy. (See: [Shuswap Regional Trails Strategy](#), Updated Nov 2019)

Adaptive Management Planning is a structured process used to guide land management decision-making where the outcome of an action or actions on an ecosystem (or other value) is uncertain. It includes setting limits of acceptable change, ongoing monitoring and adaptive responses over time.

Indicators and acceptable limits of change in the rail trail long-term management plan are used to monitor environmental, cultural, agricultural, and social concerns identified during development planning. Appropriate corrective action is taken when identified limits are passed. Corrective adaptation can include increased education, signage, barriers to movement, bylaw presence, technical solutions, policy changes, or other means.

A dedicated reporting system will allow adjacent landowners and the public to report issues directly to the Splatins, CSRD and RDNO (the Owners), and a Management and Maintenance Plan outlines measures, limits, monitoring, and potential corrective actions.

## 5.6. Regional Planning & the Shuswap Regional Trails Strategy

The Shuswap North Okanagan Rail Trail is located in Splatins unceded territory of the Secwépemc Nation and developed under the Shuswap Trails Protocol of the Shuswap Regional Trails Strategy. It is an integrated priority of community and regional strategic plans along the corridor, including the Shuswap Regional Trails Strategy collaboratively managed through a regional trails roundtable administered by the Shuswap Trail Alliance with facilitation support from the Fraser Basin Council.

The purpose of the Shuswap Regional Trails Strategy is to protect, enhance and recognize trails as an integral part of the Shuswap lifestyle, culture and economy. The strategy ensures trails are appropriately authorized, mapped, developed, maintained, and promoted. It also works to protect and promote First Nations interests, reduce and repair ecological damage from all trail use, and manage land access appropriately.

The strategy's process also serves to demonstrate collaborative management between all orders of government, industry sectors and stewardship groups. It aims to provide stability and security to all user groups, businesses, and the orders of government who invest in them. Secwépemc, Regional, and Municipal governments in the Shuswap and North Okanagan have agreed through a signed joint Letter-of-Understanding to adopt this approach.

The Shuswap North Okanagan Rail Trail vision and management goals are consistent with the values and approach of the Shuswap Regional Trails Strategy Protocol: to work together in a spirit of respect, cooperation, and stewardship, understood by Secwépemc leadership as Y'icwetsutce (taking care of the land, its resources, and recognizing indigenous title and rights).

The strategy covers the entire Shuswap watershed, involving many jurisdictions including Secwépemc, provincial, and the Columbia Shuswap, Thompson-Nicola, and North Okanagan regional districts and some of their member municipalities. It acknowledges the many existing plans and land uses within the Shuswap watershed that directly or indirectly affect trails and their management, and guides their development and maintenance including comprehensive and official community plans, Secwépemc, municipal, and regional economic development and tourism strategies, healthy communities, age friendly and active transportation strategies, and parks and trails master plans. These provide a strategic thread on which the trails strategy and related projects like the rail trail greenway are based.

Ongoing consultative planning with Splatins, municipal, township, and regional leadership will continue during detail design, construction and long-term management to ensure the Rail Trail exists in harmony

with surrounding neighbourhoods and compliments long-range transportation and infrastructure plans. See detailed summary of priorities in the Trail Development section following.

(See: [Shuswap Regional Trails Strategy](#), Updated Nov 2019)

## 5.7. Management Phases

(Timeframe will depend on available funding, longer = more expensive)

1. Technical Planning (Plan/Permit) – 2020 – 2021
2. Capital Development (Design/Build) – 2021 – 2023
3. Long-Term Management (Maintain/Promote) – 2023 +

## 5.8. Managing Short-Term Liability

Short-term risk management liability is the responsibility of the inter-jurisdictional owners. These include informational signage, existing structures, preventative maintenance and repairs. CSRD and RDNO budgeting is being allocated for these short-term needs. As part of the negotiations, CP Rail undertook an environmental assessment of the Lands. During the assessment, contamination was identified in three small sections of the corridor (identified areas). CP Rail has offered to provide BC Ministry of Environment (MoE) Instruments, in this case Certificates of Compliance (CoCs), for the identified areas. The CoCs will provide a relatively high standard of due diligence for the sections to which they apply. Any issues identified by the CoCs will be the responsibility of CP Rail to mitigate as part of its sale agreement, and are scheduled for completion by December 2021. All other environmental issues are the responsibility of the Inter-Jurisdictional owners.

## 5.9. Communications Strategy

The Sicamous-to-Armstrong Rail Trail inter-jurisdictional Owners agree to uphold a high standard of communication between the Governance Committee, the Technical Operational Committee and the elected bodies of the owner jurisdictions and stakeholders, including the general public, related to the design, development, ongoing management and maintenance of the Sicamous-to-Armstrong Rail Trail.

All communications will uphold the shared vision for the Sicamous-to-Armstrong Rail Trail as articulated through the joint inter-jurisdictional leadership meetings, including the desire to strengthen relationships and unfold the true story within Secwépemc Nation territory fundamental to the vision.

To this end a communications strategy has been adopted to address key internal (inter-jurisdictional leadership, technical staff, agency, consultant, and community leadership) and external (public, trail users, adjacent property owners) audiences regarding the design, development, and long-term management of the Rail-Trail corridor. (See: [Communications Policy & Strategy](#), July 2019)

## 5.10. Planning Research and Informed Decision-Making

The rail trail development plan is informed by best-practices research from trails throughout North America and the globe. Well designed, signed, managed, and promoted active transportation and greenway trails have been shown to provide significant benefits to local communities including improved



health, economic opportunity, reduced environmental impacts, and climate change resilience. Much of this research has been assembled by regional leadership including the Shuswap Trail Alliance, the Okanagan Rail Trail Initiative Society, Greater Vernon's Ribbons-of-Green Trails Society, the Thompson Okanagan Tourism Association, Recreation Sites and Trails BC, the Province of BC's Active Transportation Strategy, and others. (See: [The Shuswap Regional Trails Strategy](#), [Okanagan Rail Trail Economic Impact 2014](#), and the [Thompson Okanagan Tourism Association Rail Trails Tourism Strategy 2016](#).)

As part of the development of this plan, a survey of 36 existing rail trails in British Columbia, Canada, and the U.S. was conducted, including 8 direct interviews with trail managers, and ongoing correspondence with leadership from the Okanagan Rail Trail Initiative, the Markin-MacPhail Westside Legacy Trail from Invermere to Fairmont, Trails BC and the Trans Canada Trail, the Thompson Okanagan Tourism Association (Rail Trails Tourism Strategy), and Recreation Sites and Trails BC's Provincial Trails Manager.

### 5.11. Funding Investment Strategy

Capital development funding is a challenge. Municipal/regional resources are limited. Community and municipal/regional leadership have worked together for the last 11 years to acquire the rail corridor. Local tax funds have been committed to secure the corridor. The rural limits of the partner communities and governments is acknowledged. Capital development of the Rail Trail will need investing partners.

Current Federal-Provincial Infrastructure grant partnerships strongly support the values, objectives and outcomes of the rail trail. Recent discussions suggest Provincial/Federal investment partnerships may be possible. A funding investment strategy is under development to secure the needed capital.

COVID-19 resilience and recovery will have a significant impact on appropriate approaches and the communities' ability to support the initiative, but also raises the importance of the Rail Trail as an important economic and healthy community development opportunity in the wake of the COVID-19 pandemic.

Corridor lease and crossing agreement revenues have been committed to support planning and short-term management needs, but are limited.

Provincial and Federal funding partnerships are a priority. They will be critical to activate the full potential of the corridor as an internationally recognized tourism destination within the wider Shuswap-Okanagan Rail Trail Corridor between Sicamous and Osoyoos.

The jurisdictional partner owners have agreed to jointly resource and manage the corridor once constructed.

## 6. Consultation & Community Engagement

Design consultation has included input from adjacent property, businesses, and agricultural landowners, licensees, and land managers, as well as general community consultations. Secwépemc Nation, Provincial, Regional, and Municipal leadership have provided direction to these plans, as well as key tenure stakeholders.



the CSRD and RDNO respectively. Further communications and public engagement will continue as capital development proceeds.

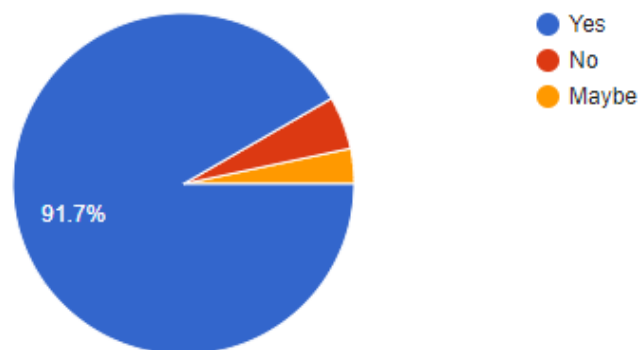
Input has also included additional meetings, emails and discussions with various groups, listed below. As well, the Owners have published regular news releases and information bulletins via social media, on behalf of the partners. A dedicated [website](#), email, and direct phone line have been set up. The website also included links to background documentation, updates, news releases, and an online public survey. These tools are to receive feedback about the rail trail. Relevant feedback is documented and shared with the Committee and considered in trail planning.



Of 240 responses to the online survey to date, 91.7% indicate support for the development of the rail trail. While the online survey results are only anecdotal, they are consistent with research findings on the Okanagan Rail Trail prior to construction, and echoed in the results of the Alternative Approval Process to purchase the rail corridor in 2017 (less than 1% indicated opposition in both the CSRD and the RDNO).

In general, do you support development of a trail in the Shuswap-North Okanagan corridor?

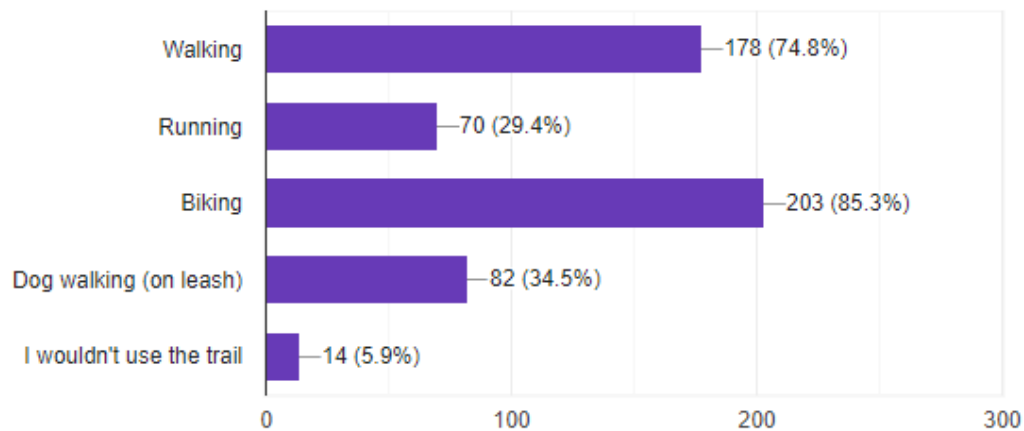
240 responses



Washrooms, parking areas, and garbage cans were identified as the top three amenities to be considered. Respondents indicated using the trail in multiple ways with bicycling and walking taking top spots. Again, this is consistent with research findings on the Okanagan Rail Trail corridor.

The first goal is to establish a basic, compacted gravel surface that follows the discontinued rail line. As a condition of the purchase and sale of the corridor, no motorized vehicles are permitted (except service & emergency vehicles). How do you see yourself using the trail? (select all that apply)

238 responses



Groups and organizations communicated with to date include:

- Armstrong-Spallumcheen Trail Society
- BC Parks - Shuswap Tourism
- Chambers of Commerce (Sicamous, Enderby, Armstrong-Spallumcheen)
- Community Futures Shuswap & North Okanagan
- Mailings to property owners
- Ministry of Forest Lands and Natural Resource Operations and Rural Development
- Ministry of Transportation and Infrastructure
- Municipal staff at meetings in Armstrong, Spallumcheen, Enderby, and Sicamous
- North Okanagan Agricultural Advisory
- North Okanagan Historical Society
- Okanagan Rail Trail Society
- Recreation Sites and Trails BC
- Secwépemc Lakes Tourism Initiative
- Secwépemc Landmarks and Trailhead Sign Project
- Shuswap Regional Trails Roundtable
- Shuswap Trail Alliance
- Shuswap Tourism



- Spallumcheen Agricultural Roundtable
- Splat-sin Development Corporation
- Splat-sin te Secwépemc
- The RDNO Trail Committee
- Thompson Okanagan Tourism Association
- Greater Vernon Ribbons-of-Green Trails Society

#### 6.4. Community Engagement Advisory

A Community Engagement Advisory has been established representing regional organizations and leadership to compliment and support the work of the Governance Advisory and Technical Operational Committee. Its purpose is to build a robust coalition of project stakeholders that collectively advise, assist, and advocate for the Rail Trail Corridor, inter-jurisdictional Owner/Partners, and vision through relationship-building, collaboration, investment partnerships, advice on technical direction and community preparedness, communications and PR, and connection with communities throughout the wider region and province.

Participation includes leadership representation from the Rail Trail Governance Advisory and all Secwépemc, Tourism, Economic Development, Community Arts & Culture, Trail Stewardship, Historic, Health, Education, Business, Industry organizations and jurisdictions with a vested interest in the development, management, and promotion of the Rail Trail Vision.

The Community Engagement Advisory functions as a working group accountable to the joint Rail Trail Inter-Jurisdictional Owners reporting to the Technical Operational Committee and Governance Advisory Committee. It is administered and facilitated by the Shuswap Trail Alliance on behalf of the Rail Trail Governance Advisory Committee.

It is anticipated the advisory will evolve into a “Friends of . . .” trail stewardship advisory supporting the long-term management and promotion of the Rail Trail and connection with the wider region and province. The regional collaborative structure of the Shuswap Trail Alliance provides the organizational framework to support the advisory.

#### 6.5. Ministry of Transportation

Consultation meetings with Ministry of Transportation and Infrastructure (MoTI) staff are ongoing as the rail trail is developed into a viable active transportation corridor between Sicamous and Armstrong.

Key issues being addressed include:

- **Temporary bridge access** - to allow temporary access to north sidewalk of existing Bruhn Bridge (create a gravel path under the bridge and stairs up to the pedestrian sidewalk on the north side of the bridge, then off again down to the Sicamous wharf parking area), should we implement the Rail Trail prior to the start of the Bruhn Bridge expansion. Note: once Bruhn Bridge expansion begins, MoTI staff will work with the Rail Trail partners to connect the rail trail greenway into the Active Transportation components of the bridge.

- **Temporary trailhead parking** – to allow temporary use of the MoTI owned property directly adjacent to km 0 of the Rail Trail in Sicamous for a small graded trailhead parking area (should rail trail construction proceed prior to the bridge expansion).
- **Road Crossings** - to review and approve Active Transportation pedestrian/bicycle crossing warrants for the rural road crossings along the rail trail corridor.
- **Grindrod Highway Crossing** – to review and approve a pedestrian/bicycle crossing at this 50 km/hour location. Discussions to date and the warrant suggest a pedestrian activated flasher with advanced flashers due to sight lines. A half signal is an option that could be considered during detailed design if more desirable.
- **Stepney Rd Highway Crossing** - to review and approve a pedestrian/bicycle overpass at this 100 km/hr location until such time that an alternative solution is possible during future highway development.

As well, the Rail Trail Inter-Governance partners are working with MoTI to address accommodation of the rail trail corridor in future highway development plans between Sicamous and Armstrong. These include the Highway 1 Bruhn Bridge development and Highway 97A development plans.

## 6.6. Ministry of Forests, Lands, Natural Resource Operations and Rural Development

Ongoing meetings with the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLNRORD) staff are addressing Section 11 notification requirements for shoreline erosion, steep slope, storm water management, and work in and around water; process for review and permitting of upland dock applications; managing trail access with adjacent lands and recreation sites, in particular Rosemond Lake Recreation Site; forestry road access; and the potential for establishing linear parkland between the rail trail corridor and Mara Lake foreshore.

## 6.7. Ministry of Environment/BC Parks

On-site field discussions have been held with BC Parks staff to assess the anticipated increase of use at Mara Point Provincial Park at km 3.3 of the Rail Trail. Adaptive monitoring will include environmental, cultural, and recreational values of the park. Anticipated management strategies include improved educational signage and the potential addition of a vault toilet and bear-proof garbage at the park entrance within the rail trail corridor to reduce impacts within the marine park.

## 6.8. Municipal and Regional Governments

Needs of local governments along the rail trail corridor (District of Sicamous, CSRD Electoral Area E, RDNO Electoral Area F, City of Enderby, Splatins, Township of Spallumcheen, City of Armstrong) are addressed both through representation at the Governance Advisory Committee, and at the Technical level. Technical meetings with local government staff along the rail trail corridor have identified specific issues and priorities related to development of the Rail Trail within each respective jurisdiction. These include issues such as trailhead connectivity, parking, stormwater management, utility and waterworks crossings, road safety, and enhancing long-term benefits. (See details in Section 13.) Ongoing consultative planning with Splatins, municipal, township, and regional leadership will continue during detail design, construction and long-term management to ensure the Rail Trail exists in harmony with surrounding neighbourhoods and

compliments long-range transportation and infrastructure plans. See detailed summary of priorities in the Trail Development section following.

## 6.9. Inter-Regional and Provincial Legacy Trail Links

Inter-regional and provincial greenway legacy trail initiatives throughout the province have been consulted, including the [Okanagan Rail Trail](#), the [Thompson Okanagan Tourism Association's Rail Trails Tourism Strategy](#), and the [Recreation Sites and Trails BC Provincial Trail Strategy](#). Through the Shuswap Trail Alliance and Shuswap Regional Trails Strategy, ongoing discussions and collaboration with greenway trail corridor leadership have continued to champion a linked corridor between Sicamous and Osoyoos. Discussions have included the Shuswap Trail Alliance, Armstrong-Spallumcheen Trails Society, Greater Vernon Ribbons-of-Green Trails Society, the Okanagan Rail Trail Initiative, the Trail of the Okanagans Initiative, Trails BC, Thompson Okanagan Tourism Association, and Splatstn te Secwépemc, Okanagan, Regional, and Municipal leadership. These discussions are ongoing.

## 7. Trail Concept

### 7.1. Vision

The long term vision of the corridor is to protect environmental, agricultural, and Secwépemc cultural values, and create tourism and transportation benefits for the region, through the development of the entire abandoned Sicamous-to-Armstrong rail corridor as a continuous non-motorized greenway for walking & cycling (in the immediate short term) – and to link with the Vernon-Kelowna Rail Trail greenway and 200 km south to Osoyoos in order to realize the full tourism value of this unprecedented opportunity.

The multi-use trail will be developed to a basic standard width of 4.6m wide; narrower in areas of constraint (3.0-3.5m), and accommodate four-season multi use (i.e. pedestrian, cyclists, and ungroomed snowshoe & ski). The trail will also be designed for universal accessibility where practical.

Included in the development of this basic standard trail are road crossings, signage, access barriers, trail heads, destination locations, agricultural protection, erosion protection, steep slope, drainage and support infrastructure to provide a basic level of safe and accessible use by appropriate users.

### 7.2. Assumptions

During the scoping of this trail development, a number of assumptions had to be made. It is expected that as the project moves through design and construction that these assumptions will be confirmed.

The following key assumptions were made for the purpose of preparing this report:

- The corridor will be publicly accessible and continuous.
- In order to limit potential impacts to the environment, archaeological sites, and adjacent land owners, the trail will follow the route of the discontinued rail line where practical.
- The existing rail alignment was constructed within the legal property lines of the purchase corridor.
- The trail will be developed to a basic standard.
- The trail will not be paved as part of the initial phase of development.

- Removal of railway infrastructure and environmental remediation of contaminated sites is the responsibility of CP Rail as a condition of its sale of the corridor.
- Given the preliminary nature of the planning and design process to date, the plans and sections used to communicate the scope and intent of the trail development are conceptual in nature. More detailed surveys, plans, and sections will need to be undertaken prior to construction of the trail.
- Existing materials will be utilized where possible and practical.
- Road crossings will require approval from local jurisdictions and MoTI.
- A full storm water master plan has not been completed and significant drainage improvements were not assumed in the development plan. However; replacement of existing infrastructure and onsite grading during construction will occur to ensure effective drainage.
- Locations along the trail are prone to flooding, specifically along Mara Lake and Rosemond Lake. It was assumed raising the entire trail to the flood construction level is not feasible or practical so only areas below the estimated 25-year event have been considered.

### 7.3. Trail Use

The flat grade, limited road crossings, and connections to communities and recreational destinations make the rail trail corridor suitable for many different types of use. The trail will be four-season multi-use (i.e. pedestrian, cyclists, and ungroomed snowshoe & ski), designed for universal accessibility where practical (including hand bicycles, wheel chairs, and mobility scooters). Motorized vehicles are not permitted on the corridor except for maintenance/emergency vehicles and legitimate accessibility aides. Pedal assist E-bikes (Type 1) will be allowed. Dogs on leash will be allowed. After considerable study, equestrian use will not be allowed at this time due to anticipated user numbers, safety, and infrastructure limitations. Ongoing use will be monitored as part of the adaptive management approach.

Projected trail user trip numbers for the Sicamous-to-Armstrong rail trail are unknown at this point. But based on the Okanagan Rail Trail (ORT), 588,000 user trips were recorded using the ORT in the first year. The ORT services a population of approximately 185,000, about 10 times that of the populations along the Shuswap North Okanagan Rail Trail corridor (21,000). Based on population alone, it might be reasonable to anticipate 50-100,000 users per year.

### 7.4. Maintenance Plan

The jurisdictional partner Owners have agreed to jointly resource and manage the corridor once constructed. Determining who will undertake the maintenance is a matter of consideration by each jurisdiction. There are numerous possibilities including each jurisdiction being responsible for its own section or a single jurisdiction maintaining the entire corridor or combination. The possibility of contracting out the maintenance also merits consideration. The Technical Operational and Governance Advisory Committee are working to develop an operating model for the corridor. Ongoing monitoring and maintenance of the trail condition is important to ensure safety, quality of user experience, and protection of the corridor. The Technical Operational and Governance Committees have committed to develop a basic maintenance plan for the corridor. Issues to be addressed include: who is responsible for maintenance of the trail, types and frequency of maintenance activities, and conditions assessments of



structures, drainage, and signage. The frequencies of maintenance activities are based on volume and types of users, management objectives, environmental impact, and availability of funding.

The following types of maintenance should be considered:

- Gravel surface – restoration of the trail surface by grading. Imported or local materials may be required to fill ruts, low spots, or to address drainage problems;
- Ditching and drainage – inspection and maintenance of drainage includes the repair of erosion damage, the cleaning of ditches and culverts, and assessment for potential for drainage problems;
- Weed control/deadfall – maintenance of trail side vegetation, brush clearing, danger tree assessments and removal of wind/deadfall;
- Trash/waste collection – regular removal of litter and garbage from trailhead and along the trail;
- Structure – regular inventory and inspection of structures such as bridges, trestles, and erosions control by a professional in the field related to the structure;
- Signs – inspection of signs to ensure placement, visibility, and currency;
- Facility maintenance – inspection of initial and future trail facilities (e.g. kiosks, washrooms, bench, tables) to ensure they are in good condition; and
- Rock fall and scaling – inspection of the rock cuts and adjacent areas for rock fall which may affect the travel surface. A professional geotechnical engineer should be engaged to inspect all rock faces adjacent to the trail determine whether scaling is required and the scope.



### 7.5. Monitoring & Adaptation

Using the Adaptive Management approach outlined in the Shuswap Regional Trails Strategy (see above), the Shuswap North Okanagan Rail Trail between Sicamous-to-Armstrong will identify, monitor, and correct as needed concerns related to all aspects of the corridor maintenance and management. The following table lists example priorities to be developed within the maintenance and management plan. Mitigation measures can include minimizing removal of vegetation during construction, use of existing rail bed for trail materials, invasive plant inventories, staying on established trails, obeying signs and area closures, keeping dogs on leash and avoiding wildlife harassment, educating trail users on appropriate behaviour, conducting inventories, and restrictions and closures. Monitoring can include annual maintenance inspections, site inventories, trail counters and cameras, and public feedback.

Category/Value	Potential Effects	Indicators/Limits	Corrective Actions
Environment – Riparian	Reduced quality of fish and riparian habitat and vegetation; shoreline bank erosion	Loss of vegetation; increase of invasive plants; increased soil exposure, disturbance, and compaction; bank erosion and siltation	Increased user education, signage, barriers & fencing, invasive plant removal, rehabilitation, seasonal or permanent closures
Environment - Wildlife	Physiological and behavioural disruption from increased human (and dog) presence	Increased proportion of encounters resulting in alarm response; declining wildlife inventory trends; dog leash non-compliance	Increased user education, signs, use restrictions, seasonal closures
Environment – Fire	Increased threat of wildfire	Observations of use during high fire risk; signs of fires; fire restriction non-compliance	Increased education, temporary signage, monitoring and reporting by local stewards, restrictions & closures
Secwépemc - Cultural Sites & Values	Damage to cultural features, decline in food & medicine plants, reduced access to land	Damage reports; increased soil exposure; disturbance off trail in known harvest areas	Increased user education, signage, barriers & fencing, area closures, rehabilitation. Potential for enhancement as well-strategic pruning of certain plants as part of maintenance to promote growth as an example.
Social - Agriculture	Harvest loss; disruption to operations; stress on livestock; spread of invasive plants	Trespass reports; damage to crops from trail use; dog leash non-compliance; Increase of invasive plants	Increased user education, signage, barriers & fencing, invasive plant removal, use restrictions, area closures
Social – Residents	Noise, garbage, vandalism, blocked access to property	Disturbance reports; litter; property damage; parking congestion	Increased user education, signage, barriers & fencing, restrictions, closures
Social – Municipalities	Congestion, displaced parking, disruption to	Community reports; parking congestion;	Redirected trailhead use, publicity materials,

	businesses and other community events	increased wear on infrastructure	signage, addition of managed parking areas, improved infrastructure
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See [Shuswap Trails Environmental Screening Table 2015](#) for full mitigation measures and guidelines.

## 7.6. Trail User Safety & Emergency Services

The rail trail will be managed under the joint parks and trails safety policies of the CSRD and RDNO on behalf of the Inter-Jurisdictional owners (Splatins, CSRD and RDNO). In addition to the regular maintenance and adaptive monitoring program, trailhead wayfinding signage will state “Recreational Trail: Use At Own Risk”, and provide the 911 Emergency Services contact number. Signage will also identify potential hazards including rock fall and poison ivy.

Regional emergency services are initiated through the 911 call system.

A copy of the Rail Trail Development Plan and Management & Maintenance Plan will be given to local emergency service and volunteer search & rescue personnel for review and pre-incident planning, including the RCMP, BC Ambulance Service, Shuswap Volunteer Search & Rescue, Vernon Search & Rescue, and the Royal Canadian Marine Search and Rescue 106 (Shuswap and Mara Lake).

Additional Emergency Services support includes:

- Access to regional online rail trail mapping
- Access to rail trail corridor bollard and gate keys
- Reporting and debriefing with emergency service and technical committee staff

## 8. Trail Development

### 8.1. Trail Development Maps

A series of trail development maps have been created with input from professionals in the various areas, input from the Technical Operations Committee, and staff at each owner jurisdictions. The maps illustrate the trail extent, identified road crossings, trail heads, side destinations, agricultural mitigation fencing, unique trail sections, administrative and legal boundaries. The trail development maps are included in [Appendix A](#)

### 8.2. Surveys

Development of the rail trail is primarily on the existing rail bed with a goal of limiting disturbance to the adjacent natural vegetation within the corridor. As a result, the need for a legal survey of the entire corridor is not required. Legal and topographic surveys have been limited to site specific locations, as needed. These include a survey of the Sicamous Narrows between km 0.0 and 1.5 to support encroachment agreements within the District of Sicamous, and the development of a Riparian Areas Protection Regulation assessment and Shoreline Protection Enhancement Area plan for this section, and legal survey of the Coom Bay vehicle routes within the expanded Rail Trail property. Additional site-specific surveys required for construction will be incorporated into the detailed engineering design stage, including

the Highway 97 crossings, and erosion stabilization on the Shuswap River. Survey requirements for encroachment agreement requests are generally the responsibility of the adjacent property owner.

### 8.3. Kilometre Markers & Intervals

Kilometre and half-kilometre interval markers have been temporarily installed along the full length of the rail corridor to assist in technical planning. Upon completion of the rail trail, permanent kilometre markers will be installed to aid trail users.

### 8.4. Typical Sections

The ideal trail design width depends on a range of criteria, including adjacent land uses, the type and volume of users, and constraints. For the safety and enjoyment of all users, a wider trail is desirable. The typical section chosen for the trail is 3.0–4.6 m width, generally to a similar standard as the Okanagan Rail Trail between Vernon and Kelowna. [See Appendix B.](#)

The 4.6 metre width meets the recommended British Columbia Active Transportation Design Guidelines for a multi-use recreation trail, which states a shared multi-use pathway desirable width is 3.0-4.0 metres with a constrained width of 2.7 metres. The additional 0.6 metres allows for a 4.0 metre paved top with 0.3m shoulders in future if desirable. The travel portions of the trail should be kept clear of any lateral obstruction such as signs, benches, garbage receptacles.

Side slopes along a multi-use trails can present a hazard to users. The British Columbia Active Transportation Design Guidelines suggest the shoulder width be expanded to 1.5m or safety rail be installed where:

- Slope is steeper than 1:1 and drop is greater than 0.3m; or
- Slope is steeper than 2:1 and drop is greater than 1.2m.

The wider shoulder or safety rail is desirable but not likely economically feasible. This should be considered on a case-by-case scenario during design. Cost considerations for additional shoulder width or safety rail has not been included in the development plan.

There are however, locations where a 4.6 metre surface is unachievable where the corridor narrows through ‘cut’ sections between lakefront and steep slopes. Widening these sections to achieve a consistent 4.6 metres is not economically feasible. In these locations the trail width may be reduced to a minimum 3.0 metres with signage notifying users of the narrowed path in advance.

[Appendix B](#) illustrates the typical sections described above.



Figure 1 : Typical Section

### 8.5. Adjacent Land Use

Design of the Rail Trail includes working with neighbouring agricultural, business and private properties. A variety of *Encumbrance Agreements* permit special use like access across the Rail Trail property to reach farms and homes. They ensure the safety and interests of adjacent owners, the Rail Trail property, and trail users are appropriately managed. (See Encumbrance Agreements below)

**Adjacent Agriculture** – considers things like farm crossings, irrigation, and invasive plant



Figure 2: Adjacent Agriculture Section

**Adjacent Businesses** – considers things like safety, access, and lease arrangements



*Figure 3: Adjacent Industrial Section*

**Adjacent Properties** – considers things like access, crossing, and structural agreements



*Figure 4: Adjacent Properties Section*

*Illustrations: Urban Systems Ltd.*

## 8.6. Encroachment Agreements

The rail trail owners are jointly administering encroachment agreements. A review of encumbrances across the Sicamous-to-Armstrong rail trail corridor by Kent-MacPherson Real Estate Appraisal provided recommendations regarding agreement fees and terms. The owners are developing a standardized set of terms and fees to ensure: fair, equitable, and efficient agreements for adjacent property owners; the development of the rail corridor is not compromised; and that Splatins’s interests are recognized and acknowledged in the co-management of the project.

Encroachment agreements are available for corporate utilities, local governments utilities, recreational land lease lots, industrial and commercial uses, private water systems, domestic waterlines, crossings within the agricultural land reserve for irrigation and vehicles, licences for agricultural purposes (grazing etc.), vehicle crossings for residential, commercial and multi-family developments, licence and upland consent agreements for docks within the District of Sicamous, and existing structures such as retaining walls.

Technical Trail Crossing Guidelines have been developed to assist encroachment agreement applicants. They outline technical requirements to build the trail, keep people safe, manage risks, protect the natural environment and Secwépemc cultural values, and ensure appropriate agreements are in place that are consistent and meet all jurisdictional regulations. (See: Encroachment Technical Guidelines)

## 8.7. Trail Surface Options

The primary surface will be compacted aggregate, but the benefits of hard surfacing has been researched.

A Type 1 raised paved surface tread for high-use was originally recommended to ensure the greatest success in improving pedestrian and cyclist accessibility, destination tourism benefits, and longer-term healthy community objectives. Targeted use to include two-way pedestrian, bicycle, and mobility access (wheel-chairs, mobility scooters). A minimum 3-meter tread width is recommended. This would maintain consistency with other Rail Trail and Legacy Greenway corridors within the Province of British Columbia.



*Type 1 Trail, Hard Surface tread sample – South Slokan Rail Trail*

Research suggests potentially higher economic benefit from extended paved surface greenway routes connecting rural communities. A study of the extensive bicycle touring system in Quebec suggest the highest use and overnight revenues are in rural communities connected by dedicated, paved bicycle corridors. This is an important consideration given the goal to improve economic resilience for the rural communities along the rail corridor. More recent trends in cycle touring, however, include an increase in “gravel grinders” – touring bicycles equipped with hybrid tires and designed for a variety of surfaces.

Opportunity to conduct a preliminary construction cost assessment using paved surface for the Sicamous-to-Armstrong Rail Trail Corridor was realized in 2015 with the completion of the Enderby-Splatsin Riverwalk Extension & Enhancement Plan (2015), and a per/metre costing has been assessed in this plan.

Alternatively, a raised highly-compacted gravel crush tread chosen in many areas, including the Okanagan Rail Trail between Vernon and Kelowna, has shown good results. Lower overall construction costs make this a good option, particularly as part of a phased approach where capital funds are limited.



*Type 2 Trail, highly compacted aggregate surface tread – Okanagan Rail Trail*

Construction techniques and material specifications must be taken into consideration when assessing cost/benefit. Lower cost and quality aggregate and poor sub-surface preparation contribute to higher maintenance costs. Interviews with other provincial rail trails consistently provided similar advice – construct to the highest standard possible in order to avoid expensive repairs in the future.

The Okanagan Rail Trail opened in 2018. After two seasons, the construction and material specifications used continue to hold up well. Reports from both trail management and trail users affirm the high quality standard. Reports also affirm the highly compacted surface is versatile for a wider range of pedestrian and bicycle use, and can be maintained with a reasonable schedule of surface maintenance.

While the life span of paved surface trails is longer than aggregate, maintenance costs can be high too. A recent assessment of rail trail surfacing treatment options for Recreation Sites and Trails BC concluded: “Generally speaking, asphalt surfacing is significantly higher in initial capital cost than an aggregate top surface, additionally the long term maintenance and rehabilitation costs can be substantially higher. Because of this the practice of applying a compacted high fines surfacing aggregate with frequent (2-5 years) maintenance is deemed a more practical, cost effective solution.” (p. 7, [Rail Trail Surfacing Treatment Options to RSTBC, USL, June 2016](#))



Finally, the success of the Okanagan Rail Trail is affirmed in public feedback provided both online and at public open houses during Shuswap North Okanagan Rail Trail development planning. While a small number of experienced cycle tourists reflected on the superior quality and attraction of paved long-distance pathways to maximize destination travel attraction, many cyclists expressed satisfaction with the aggregate surface of the Okanagan Rail Trail. And in the case of pedestrian use, the more natural feel of aggregate was clearly favoured. The ORT compacted surface also appears to be meeting universal accessibility goals.

**Surfacing recommendation** – given the success demonstrated by the Okanagan Rail Trail, preference expressed during public input, and the significant erosion, flood, and highway crossing technical costs – the recommendation is to cost for a highly compacted aggregate surface. Adding paved surfacing is an option to consider for future application as the full Sicamous-to-Osoyoos corridor is connected and longer distance cycle touring becomes more viable.

## 8.8. Access Control and Safety

Access control of the corridor and the safety of the public are both important short and long-term considerations. Access control will be implemented at key access points such as road crossings through use of barricades (e.g. gates, fencing, and bollards). Access control (chain link and page wire fence) to maintain users on the trail and separated from adjacent industrial and agricultural properties is considered on site by site basis. The objective of the access control is to prevent unintended use of the trail such as unauthorized motorized vehicles and trespassing outside the corridor. Considerations for access by maintenance and emergency vehicles will always be made.

For the most part, there is existing fence or topographic barriers along the corridor that delineates the old rail property from adjacent property. The provision of new or replacement fencing along property lines, to delineate private property, deter trespassing or enhance fencing that already exists, is not included in the scope of work or budget for the project except for:

- Several agricultural sites per ALC requirements and request – page wire fence
- Adjacent to Sure Crop Feeds – concrete barrier with chain link fence with privacy screening
- Adjacent to North Enderby Timber – chain link fence with privacy screening
- Adjacent to 1.1 km section from Lansdowne Road to Armstrong - chain link fencing

As with fencing in other applications in the community, the provision of fencing for these purposes is at the initiative of the party requesting the fence. Safety fencing along some areas of potential risks to the public safety has been considered (e.g. at the top of steep cut slopes along Mara Lake) and an allowance has been provided in the budget for such fencing subject to future review and determination. (See Adaptive Management)

## 8.9. Road Crossings

There are approximately 54 road and driveway crossings along the trail corridor. As part of the development plan all crossing locations have been identified and required upgrades have been suggested. The crossings have been grouped into five categories: Type 1 through Type 5 which are site specific crossings. The upgrades range from ‘do nothing’ to pedestrian flashers and pedestrian controlled signals

with advanced warning flashers. These typical crossings are illustrated in [Appendix E](#) and the assigned classifications for each crossing is identified, except for do nothing which is illustrated on the Development Maps in [Appendix A](#).

The Transportation Association of Canada (TAC) Pedestrian Crossing Control Guide and Bikeway Traffic Control Guidelines were referenced to determine the treatment for each crossing. However, it should be noted that limited traffic data such as Annual Average Daily Traffic (AADT) has been reviewed at this stage of conceptual development. It is recommended that these crossings be technically reviewed and updated using field survey, the most updated available traffic data, and comply with the jurisdiction standards during detailed design and construction.

There are four site specific crossings which are classified as Type 4 or higher:

- Highway 97 Crossing at Stepney Road – the trail crosses Highway 97 at Stepney Road. Initial discussions with the MoTI indicate an at grade crossing is not desirable due to high vehicle volumes and posted speeds. The Ministry does have long term plans to four-lane this section and there are recommendations to accommodate the trail under a new bridge structure for Fortune Creek. However, the Ministry has indicated this could be beyond 10-15 years and they are in the early planning stages. As an interim solution a pedestrian overpass is being considered and an allowance has been included in the estimate. It is recommended early conceptual design be completed to get more accurate budget numbers.
- Stepney Crossing Road – higher traffic volumes, industrial/agricultural use and vehicle speeds suggest a pedestrian flasher is warranted at this crossing.
- Highway at Grindrod Westside Road – the trail crosses Highway 97 at Grindrod Westside Road. The highway has a posted speed limit of 50km/hr through Grindrod and a speed of 30 km/hr is recommended around the curve where the crossing is located. Initial discussions with the Ministry suggest a pedestrian activated flasher or half signal with advanced warning flashers would be acceptable due to the lower vehicle speeds.
- Cliff Ave – the trail crosses Cliff Ave just west of the Shuswap River crossings. Although the crossing warrant requires crosswalk with side-mounted signs it is recommended the crossing be improved to a pedestrian activated flasher due to sight lines and proximity to the bridge.
- Howard Ave – the crossing at Howard Ave is between two atypical intersections with the through road from Evergreen Street onto Howard Ave. It is our understanding from conversations with City of Enderby staff that this intersection is likely to be impacted by future MoTI and the detailed design crossing should be coordinated accordingly. For costing purposes this intersection is assumed to require a pedestrian activated flasher with advanced warning flashers

Consistency of crossings is important to ensure trail users and vehicles know what to expect as the various crossing along the corridor. It is recommended that in most scenarios the trail users have the right of way and the vehicles are stop-controlled. There are scenarios where the trail users will be required to give right of way to the vehicles (i.e. crossings directly adjacent to Highway 97). Each crossing will be developed during detailed design.

### 8.10. Trail-to-Trail Junctions

Where a junction or transition of trails occurs, especially where the existing Riverwalk meets the new multi-use extension along the rail grade, a series of bollard posts is used to slow, stop, and/or filter users. This is accompanied by applicable signage. Wherever possible, trail junctions will be given names in Secwepemctsin.



*Trail-to-Trail sample shown above: Galloping Goose trail, Victoria*

### 8.11. Universal Design & Accessibility Standards

The trail will be designed for universal accessibility where practical and to reasonable standards for the anticipated level of service of a rural compacted aggregate trail. Technical engineering design will adhere to best practices in accessible design for the built environment to ensure the Rail Trail corridor, trailhead, and facilities are accessible and safe to use for persons with a range of physical, sensory, or cognitive disabilities, as defined in the Accessible Design for the Built Environment published by the Canadian Standards Association Group in 2018. (See [Codes & Standards B651-18](#), including Annex D which provides guidance for the design of outdoor trails, and Annex E which provides references for accessible outdoor recreational environments to supplement the information and guidance provided in Annex D.)

See: [British Columbia Active Transportation Design Guide \(2019 Edition\)](#), pp. 32 - 40

### 8.12. Environment, Climate Change Resilience, and Energy Efficiency Standards

Engineering design and construction contract bids will meet or exceed current best-practice guidelines for environmental compensation, climate change resilience, and energy efficient construction. As well, the completed Rail Trail will decrease greenhouse gas emissions through increased non-motorized pedestrian, cycling and mobility accessible active transportation infrastructure.

### 8.13. Approvals/Notifications

Jurisdictional authorizations for the Shuswap North Okanagan Rail Trail include Splatstsin te Secwépemc, Provincial, Regional/Municipal and relevant land management agencies (MFLNRORD, DFO, MoTI).

All work conducted around water is conducted according to Provincial and Federal environmental management standards. Appropriate notifications will be required. The regulatory context includes the Fisheries Act (permit required), Water Sustainability Act BC (permit required), Wildlife Act (BC), Species at Risk Act (Canada), and Migratory Birds Convention Act (Canada). 6 – 9 months should be allowed to meet permitting requirements. (See Environmental Considerations below for further regulatory details.)

As well, an application has been submitted to the Agricultural Land Commission regarding sections of the Rail Trail corridor within the Agricultural Land Reserve and is currently under review. Application includes consultation with adjacent agricultural operators. See Agricultural Plan below, and [Appendix D](#).

Additional approvals, notifications, and permits that will be submitted include:

- Heritage Inspection Permit – currently submitted by Splatsin Development Corporation – Yucwmenlúcwu Archaeological staff
- Municipal Development Charges – to be confirmed
- Ministry of Transportation and Infrastructure Permits – for road crossing warrants
- Ministry of Forest Lands and Natural Resources and Rural Development – Section 11 notifications

## 9. Environmental Considerations

Western Water Associates Ltd. (WWAL) was engaged to provide environmental considerations to support the Development Plan. Their work includes regulatory requirements, identifies aquatic permitting, and instream work timing windows, and provides recommendations for future assessment, permitting and reporting prior to development.

### 9.1. Environmentally Sensitive Areas

A desktop assessment of the corridor was conducted to identify environmentally sensitive sections along the alignment, and to prioritize sections for action into the future. Environmental sensitivities along the rail trail corridor were classified based on need for regulatory permitting, alignments close to sensitive aquatic and terrestrial habitats and proximity to Agricultural Land Reserve. The purpose of this assessment was to support future environmental planning and identify mitigation necessary prior to construction to prevent impacts. Figures depicting Environmentally Sensitive Areas (ESAs) along the rail trail corridor are attached as [Appendix C](#). Colour-coding on the figures are defined below:

**Red** – Red areas indicate the most sensitive sections where environmental assessment and management plans are recommended during planning and construction of any upgrades to the corridor. Specifically, highly sensitive areas are considered:

- Within 30 m of a mapped watercourse, including stream, creek, wetland, river and lakeshore;
- Where masked occurrences of a species at risk have been reported by the BC Conservation Data Centre. This sensitive data is provided by the BC Conservation Data Centre in confidence, and the location and details of these occurrences is not publicly shared so is not labelled on the maps.

**Yellow** – Yellow areas indicate sections considered moderately sensitive, where environmental considerations may be necessary during planning and construction of upgrades to the corridor to avoid environmental effects. Specifically, yellow sensitive areas are considered:

- Where occurrences of a species at risk have been reported by the BC Conservation Data Centre<sup>1</sup> that is not masked from the public;
- Agricultural Land Reserve (ALR) adjacent to the corridor.

**Green** – Green areas indicate sections considered least sensitive; however, since many habitats in the Okanagan and Shuswap regions support rare or endangered species and ecosystems, general environmental sensitivities may be considered during planning and prior to construction in these sections, although no permits or approvals are likely required. For example, the rail corridor traverses along Mara Lake which is known to provide habitat to the blue-listed chiselmouth (*Acrocheilus alutaceus*). Mitigation planning prior to construction will help to identify sensitive features and make site-specific recommendations to prevent impacts.

BC species listing definitions: Red listed: Any species or ecosystem that is at risk of being lost (extirpated, endangered or threatened). Blue Listed: Any species or ecosystem that is of special concern. COSEWIC definitions: Endangered (E) – a wildlife species that no longer exists. Threatened (T): A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction. Special Concern (SC): A wildlife species that is likely to become threatened or endangered of a combination of biological characteristics and identified threats.

## 9.2. Regulatory Considerations

The regulatory requirements in the following subsections have been considered for the Shuswap North Okanagan Rail Trail (Sicamous to Armstrong).

## 9.3. Development Permits

Municipal development permits (DP's) are not expected to be required for rail trail development at this time. However, DP's may be required for certain projects that involve altering private crossings that extend across the rail trail, like those along Sicamous Narrows.

## 9.4. Riparian Areas Protection Regulation

Riparian Areas Protection Regulation (RAPR) process under Section 12 of the *Fish Protection Act* is triggered when development requiring a DP, building permit, or rezoning, is proposed within 30 m of the high water mark of a waterbody that supports fish or is connected to fish-bearing habitat. RAPR defines riparian setbacks for development based on channel width, channel orientation, and potential riparian vegetation height. Development under RAPR is broadly defined; for example, "development" includes any disturbance of vegetation or soil, and construction of trails or structures. In some municipal jurisdictions, a RAPR assessment is required for any development within 30 m of a stream or lake to determine the Streamside Protection and Enhancement Area (SPEA) setback. If SPEA setbacks cannot be met with proposed designs, then Department of Fisheries and Oceans Canada (DFO) must be consulted and authorization under the *Fisheries Act* may be required.

If development which triggers a DP is proposed on private crossings within 30 m of a water body, like those along Sicamous Narrows, a RAPR report would be required. Government bodies are exempt from RAPR; however, not all local governments observe this in the same way. The RDNO and CSRD may request DPs for municipal works such as upgrades to the trail and would therefore trigger the need for RAPR assessment. RAPR is not required for development within 30 m of a water body where the rail trail corridor is located on the Splitsin First Nation reserve, south of Enderby. RAPR Reports take about one month to be assessed by the province and may require amendments, which increase the length of time it takes to receive DP approval.

## 9.5. Water Sustainability Act

The *Water Sustainability Act (WSA)* is provincial legislation that protects and manages the use and diversion of both surface and ground water resources. Under Section 11 of the *WSA*, any activities that result in changes in or about a stream require notification or approval, which is usually accompanied by an environmental assessment detailing expected impacts to the aquatic and riparian habitat, mitigation strategies and environmental monitoring during construction. Rail trail development includes the replacement and/or repair of numerous culverts which can be permitted under one *WSA* notification. Works occurring below the top of bank, below the high water mark or above a water body require a *WSA* approval. Bridge replacements or repairs, and shoreline stabilization along Mara Lake, Shuswap River and/or Rosemond Lake will be required (See Sections 3.1 and 3.2). These modifications will trigger the need for a *WSA* Approval to permit the works. *WSA* Notifications take a maximum of 45 days to process once the application is deemed complete, and *WSA* Approvals take a maximum of 140 days.

## 9.6. Foreshore Inventory Mapping

Foreshore Inventory Mapping (FIM) provides baseline information for future decisions regarding shoreline developments and a detailed accounting of existing shoreline development. The mapping provides information on shoreline, including land use, shore type, existing riparian conditions, and anthropogenic alterations. The Aquatic Habitat Index is used to calculate the ranking for each section of shoreline (Schleppe 2009). The class ranking system goes from Very High, High, Moderate, Low and Very Low. Mara Lake and the Shuswap river throughout the project area have a combination Very High, High, Moderate and Low quality rankings with no areas mapped as Very Low. FIM Mapping for the Shuswap River Watershed is found online at the Shuswap Watershed Atlas website (<https://cmnmaps.ca/SHUSWAP>).

## 9.7. Agricultural Land Commission

Applications to the Agricultural Land Commission under Section 34 (6) of the *Agricultural Land Act* are required when there is dedication of a right of way, construction, or new use of an existing right of way for a recreational trail through Agricultural Land Reserve (ALR). Guidelines provided by the Commission and local government bylaws work to minimize the potential for conflict between farm and non-farm uses (including recreation) adjacent to ALR. Best practices include maintaining a minimum separation distance between non-farm uses and ALR (e.g. 15 m), and incorporating trespass-inhibiting vegetation, earth berms, and fencing. Also no-build/no-disturb covenants are occasionally requested to maintain this buffer. Apart from the trail along the west side of Mara Lake the rail trail corridor is surrounded by ALR land. Approximately 31.5 km (about 65 %) of the corridor traverses through designated ALR and requires liaison with the Commission. (See Agricultural Plan below)



## 9.8. Federal Fisheries Act

The Canadian *Fisheries Act* is the federal legislation affecting all fish, fish habitat and water quality. The *Act* prevents anyone from causing serious harm to fish and requires a Request for Review to Department of Fisheries and Oceans Canada (DFO) prior to work. DFO Project Reviews take about one month to process. If the project is deemed to have the potential to cause harmful alteration, disruption and destruction (HADD) of fish habitat, DFO will request an application for Authorization, at which time measures to avoid or mitigate serious harm will be required. DFO Authorizations can take over four months to process.

## 9.9. Species at Risk Act

The portion of the corridor traversing the Splatins First Nation reserve will be subject to federal legislation, including the *Species at Risk Act* for any species or their habitats that occur on Schedule 1 of the Act. Liaison with Indigenous and Northern Affairs Canada (INAC) may also be necessary.

## 9.10. Aquatic Habitat Considerations

The aquatic habitat considerations in the following subsections support proposed upgrades to bridges and culverts, shorelines and private crossings along the rail trail corridor.

## 9.11. Bridge and Culvert Upgrades

Four bridge crossings and 15 existing culverts and 13 new culverts will be considered for upgrade prior to opening the Rail Trail, including resurfacing and installation of railings on the bridges and replacing or reinforcing culverts. Areas within 30 m of a culvert or bridge crossing is considered most sensitive (red). The environmental assessments, including site visits, have been completed to allow for preparation of an Environmental Management Plan (EMP) and permit applications (WSA Approvals, Notifications and DFO Project Review) to support upgrades to these crossings. Upgrades to the culverts and bridges are exempt from RAPR and DPs.

## 9.12. Shoreline Stabilization

Approximately 35 km of the rail trail corridor runs adjacent to the shores of Mara Lake, Rosemond Lake and the Shuswap River. Sections of the corridor that are within 30m of one of these water bodies are considered most sensitive (red); however, further consideration of shore-spawning habitat sensitivity are necessary using FIM mapping. These mapping files have been requested from RDNO and CSRD.

Repairs to subgrade and erosion protection at or below the high-water mark in lakeshore areas or top of bank along riverine areas will require WSA Approvals that are supported by environmental assessment and EMPs for construction. Lakeshore stabilization is exempt from DPs and RAPR.

Least-risk work windows apply for all in-water construction in lakes, rivers and tributaries, especially in areas where foreshore protocols indicate shore-spawning habitat. In some cases, work outside of the least-risk window can be completed if construction is isolated and out of the water. The most conservative work timing window for Mara Lake and Rosemond Lake is from June 1- Sept 30, which assumes shore spawning is occurring within the worksite. The work timing window for salmonids in Shuswap River is July 15 – August 15.

### 9.13. Shuswap Narrows RAPR

WWAL is in the process of completing a RAPR Assessment of 1.5 km of the rail trail corridor where it is located along the west side of the Sicamous Narrows at the north end of Mara Lake in Sicamous, BC. The RAPR Report includes detailed descriptions of nineteen private crossings that connect residential properties connect to docks, which extend into the narrows. WWAL completed the field work for this assessment on July 21, 2020, accompanied by an Environmental Scientist from Splat-sin Development Corporation – Yucwmenlúcwu. The RAPR Report is due by the end of August, 2020 and will provide residents with private crossings with useful reporting and mapping deliverables that can be used towards future DP permits.

### 9.14. Archaeology Considerations

The Rail Trail Corridor is in an area of significant archaeological importance as it is located in the core area of Splat-sin’s unceded traditional territory.

The land and water between Sicamous and Armstrong provided Splat-sinac (Splat-sin people) opportunities for settlement, hunting, berry picking, fishing and travel, forming one part of their seasonal rounds. Splat-sin and Yucwmenlúcwu staff are identifying sites of traditional and archeological significance along the proposed rail trail corridor before upgrades begin so impacts to sites can be avoided. (See Archaeology and Cultural Heritage Overview Assessment below.)

### 9.15. CP Rail Certificates of Compliance

Removal of railway infrastructure and environmental remediation of contaminated sites is the responsibility of CP Rail as a condition of its sale of the corridor to the RDNO and CSRD. Compliance monitoring and any remediation required is to be completed by December 2021. This may influence scheduled construction in some locations depending on findings.

### 9.16. Environmental Adaptive Planning:

The Shuswap Regional Trails Strategy outlines an adaptive planning format based on a protocol of collaboration, respect, and stewardship. All Secwépemc and Regional/Municipal governments have signed a Letter-of-Understanding agreeing to adopt this approach. (See Adaptive Management above.)

### 9.17. Compensation Planning

Most of the Rail Trail corridor utilizes existing rail-bed and is not anticipated to require significant additional impacts to the surrounding environment. Where repairs and upgrades are required, it is anticipated an overall improvement to environmental impact will be realized. Compensation plans to offset unavoidable environmental impacts will be built into the detail design on a site-specific basis.



## 9.18. Environmental References

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## 10. Splitsin Culture and Values in Secwépemc Territory

### 10.1. Archeological Overview Assessment

In July of 2019 a preliminary field reconnaissance was undertaken, with an archaeologist making a visual inspection of the project and identifying areas of high, moderate and low potential for containing archaeological resources. A map of these areas has been made and will be used by Splitsin Archaeologists to identify areas that require further assessment once a finalized footprint has been prepared for any ancillary facilities (washrooms, pads for signage, etc.) located off the old rail bed. Low potential areas will require no further work in regards to the Archaeology Impact Assessment (AIA), while high potential areas will require the implementation of a shovel testing program to test for buried archaeological resources. Medium potential areas will be visually inspected and based on this inspection, may also be subjected to a subsurface testing program. Application for a Section 14 Heritage Inspection Permit is underway.

### 10.2. Cultural Heritage Overview Assessment

The purpose of the Shuswap North Okanagan Rail Trail Cultural Heritage Overview Assessment (CHOA) is to help inform and guide the Technical Operational Committee in the development and management of the Rail Trail greenway. The CHOA provides a history of Splitsin culture and use of their territory, and it outlines concerns and recommendations regarding the protection of Splitsin culturally significant sites.

The CHOA for the Shuswap North Okanagan Rail Trail presents the results of documentary research, the review of interviews, and the review of the Traditional Use Site Studies. Through this work Splitsin staff have identified that the rail trail project area was and continues to be an area of high cultural usage, as part of transportation corridors, as numerous resource gathering locations, as camping and village locations, as training locations and as spiritual sites. The Shuswap River has been a transportation corridor for generations of Splitsin Peoples as they move throughout their territory while they conduct their seasonal round. Splitsin research indicates that there are medicinal plants, food plants, food animals and food fish in the culturally, spiritually and ecologically significant sites that are located within or near the

Project area. Furthermore, when the project footprint is considered in a larger geographical context, it is known that the Splatsinac have used and continue to use areas ranging far beyond the Project area.

To date, the following recommendations have been made as a result of this research. That Splatsin and the Rail Trail Technical Operational Committee will continuously work together to:

- protect Culturally Significant Sites in the project area;
- work with Splatsin to install plaques, kiosks and signs explaining the history and culture of the Splatsin people and territory;
- install signs demonstrating that the Rail Trail is in Splatsin Territory;
- protect the water and the fish in Mara Lake, Rosemond Lake, the Shuswap River and in Fortune Creek;
- implement a Wildlife Corridor Study to determine the risk of disruption to wildlife migration corridors;
- focus on the protection of all watersheds.

Further additions will be made to these recommendations after three focus group sessions (postponed due to COVID-19) are conducted, including a field trip with Splatsin Knowledge Keepers and community members.

Note: Documentation and mapping is maintained internally by Splatsin staff. Protected knowledge contained in the research is only shared in confidence by Splatsin staff through their participation on the joint Technical Operational Committee to guide the rail trail development and management.

## 11. Agricultural Plan

The portion of the Sicamous-to-Armstrong Trail corridor that is ALR is approximately 35 km of the total 51-km, which comprises 105 property titles adjacent to the corridor, an additional 64 properties that are not directly adjacent but potentially affected, and 47 titles in the ALR and the corridor that are owned by RDNO and CSRD. By property (not area) approximately 60% are used for hay production, forage, and corn, and the remainder for cattle (6%), dairy (9%), hobby farms and vacant land. The notable difference in agricultural production along this trail relative to the Okanagan Rail Trail is the lack of fruit trees, but there is production of crops that have intensive, short harvest periods. Specifically, corn harvest happens over three days in the fall and requires big machinery that is expensive to rent. The application of manure as fertilizer is also practiced, again with big machinery used over a short period. The machines cross the trail as frequently as 10 times per hour during harvest or manure application. The solutions to these issues will be property specific and are being worked out with the landowner, the Shuswap Trail Alliance, the Technical Operational Committee and will be finalized with the Owner. (see Adapted Crossing)

No ALR land will be disturbed adjacent to the existing Sicamous-to-Armstrong rail corridor (railway right-of-way). No temporary work space or other disturbance will be required on ALR land. However, the construction and use of the rail trail has potential for indirect effects on agricultural production and/or properties. The potential effects and associated mitigation measures during trail construction and subsequent use are described in the full Agricultural Assessment report, [Appendix D](#).

All construction activities will be restricted to the corridor, and no access through farm land is proposed. Construction activities are not anticipated to impact agricultural works and all crossings will remain open and accessible during construction. Equipment will operate temporarily within the corridor, which will cause noise, vibration, and/or dust disturbance. Construction activities may cause the spread of invasive species identified within and near the project area.

The mitigation measures to be implemented during the construction phase include:

- Notify landowners in the ALR about the construction project and anticipated timing of construction activities.
- Provide an opportunity for landowners to comment on the project to the Technical Operational Committee and ALC. A letter has been sent to the landowners with contact information.
- Follow the Environmental Management Plan with guidance for weed, noise and dust control by Western Water Associates environmental consultants.

The BC *Weed Control Act* (R.S.B.C. 1996, c. 487) states that any noxious weed species must be controlled by the owner of the land on which it occurs. To reduce the transfer or establishment of weeds, the following mitigation measures will be undertaken:

- Ensure all vehicles accessing the site are clean and free of weeds and any associated seeds before entering or leaving the worksite.
- Replant disturbed areas with native species, where appropriate, to discourage the establishment of weed species.
- Develop and implement a rehabilitation plan for areas with yellow-flag iris to safely remove and dispose of the plant.
- Implement weed management procedures to restore the disturbed areas to a reasonable functioning ecological condition.

Potential effects on agricultural land during trail use include potential conflict with landowners from trespassing, damage to crops, theft and vandalism, harassment of livestock, gates being opened or closed, fire, obstruction of access, and disruption of privacy. Potential effects during trail use also include dust deposition, drainage issues, litter, introduction and/or spread of invasive or noxious weed species, spraying to manage invasive species, and liability. General issues and resolutions that have been communicated specific to the trail and landowners in the ALR are listed the full Agricultural Assessment Report with mitigation measures.

Mitigation measures are based on the experience of other greenway trails through the ALR and typical conditions, guidance from the ALC, and guidance for trails in farm and ranch areas (AgriService BC 2019). In addition to mitigation measures listed below, the Committee will take an adaptive management approach to managing the trail, which has proven successful on trails in the Shuswap that are managed with support through the Shuswap Trail Alliance. (See Adaptive Management above) Adaptation can include increased education and/or bylaw presence, barriers to movement, signage and other means.

Mitigation measures to be implemented during trail use are listed here:



- Develop a *Code of Conduct* or rules of the trail to inform trail users of etiquette in agricultural areas
- Install permanent signage along the trail at appropriate locations. The general types of trail signs will include trail etiquette, map of the trail and amenities, educational, and advertising.
- Post advisory signs during times of sensitive agricultural operations, such as harvesting, use of large machinery and manure application.
- Establish a system to reduce potential for conflict during short, intensive harvesting and manure spreading windows in places where large machinery crosses the trail. This will be site specific and may include railway crossing boom barrier or other method, to be determined with the landowner, the Technical Operational Committee and the Owners.
- The Technical Operational Committee will work with the Ministry of Transportation and Infrastructure to ensure crossings and road access off the highway and across the trail are safe.
- Retain and maintain existing buffers between the trail and agricultural land. Buffers include vegetation, elevation differences, ditches and existing fencing within the corridor.
- Install signage at gate locations within the trail corridor stating whether to keep gates closed or open.
- A dogs-on-leash policy will apply to the whole corridor. Signage to this effect will be at every trailhead entrance, road crossing and in locations where there is greater risk of interaction with livestock (e.g. near the dairy farm locations).
- Enforce local government bylaws regarding no smoking and no fires along the trail. Place fire hazard signs at trailheads to warn users of fire risks.
- Enforce local government bylaws regarding no hunting along the trail.
- Provide parking at trailheads and make it clear that parking should not obstruct farm access points.
- Install and maintain trashcans, washrooms, drinking water, benches, and tables. Describe the location of this infrastructure on maps and at trailheads.
- Remove garbage on a regular basis.
- Provide inspection and maintenance of drainage on a regular basis. Repair erosion damage and clear ditches and culverts.
- Provide agricultural landowners with contact information in the event of problems or concerns relating to the trail. The dedicated Shuswap Trail Alliance phone line and website for feedback will be kept for the foreseeable future as a mechanism of communication.
- RDNO will continue to manage invasive species through mechanical, chemical and cultural efforts (e.g. education about how not to spread weed seeds), and PlayCleanGo will be used as trailhead signage and concepts used in trail management. Documenting treatment and infestations will be a means to monitor invasive species management success. Organic producers in the ALR will create an arrangement with the RDNO to ensure chemical control used does not compromise their organic status. (See following)

## 12. Invasive Species Management & PlayCleanGo

In general, the vegetation on and adjacent to the rail corridor is a combination of native, agronomic and invasive species. Columbia Shuswap Invasive Species Society, in conjunction with RDNO, has documented the types and locations of invasive species present along the northern portion of the corridor along Mara



Lake (the ALR area) (See [Columbia Shuswap Invasive Species Society Report](#), 2018, [RDNO Rail Corridor Invasive Plant Inventory](#), 2018, [Leafy Spurge Site Details](#)).

A priority noxious weed for RDNO is Cypress spurge (bolded), which is being managed through spraying. Management of invasive species will continue once the trail is built and will be the responsibility of the corresponding owners.

However, the PlayCleanGo program will be used as trailhead signage and concepts used in trail management. PlayCleanGo is a program initiated by the Invasive Species Council of BC and will be managed in partnership with the Columbia Shuswap Invasive Species Society. It is an education and outreach campaign that encourages outdoor recreation while promoting changes in behaviour to slow or stop the spread of invasive species. It is designed to foster actions that interrupt recreational pathways of spreading invasive plant species.

In the ALR section, RDNO will continue to manage invasive species through mechanical, chemical and cultural efforts (e.g. education about how not to spread weed seeds). Organic producers in the ALR will create an arrangement with the RDNO to ensure chemical control used does not compromise their organic status, i.e. is far enough away from the property.

### 13. Municipalities, Township, Regional Districts

Ongoing consultative planning with Splat-sin, municipal, township, and regional leadership will continue during detail design, construction and long-term management to ensure the Rail Trail exists in harmony with surrounding neighbourhoods and compliments long-range transportation and infrastructure plans. Specific considerations for developing the Rail Trail Corridor within municipalities, township, and regional electoral areas include:

- targeting already established destination community hubs as primary access/egress points in Sicamous, Grindrod, Enderby, Splat-sin, and Armstrong;
- supporting connections within each of the jurisdictions including a parallel pathway along Highway 97 to Grindrod Park, extension of the Jim Watt Riverwalk in Enderby, connector pathway to the Splat-sin Community Centre, and integration into the Township of Spallumcheen and City of Armstrong trails master plans, the Enderby-Splat-sin Active Transportation Strategy, and District of Sicamous Age Friendly greenway trail system;
- providing support to develop adequate additional parking for trail users in these primary trailhead destinations and directing day-use away from existing commercial parking, in particular Askew's Foods in Sicamous and Armstrong. Strategies include supporting municipalities to establish enhanced destination parking, wayfinding signage, online and print marketing, maps, and local education;
- supporting the District of Sicamous' vision to develop a separate pedestrian bridge connecting the northern end of the rail trail directly into the Sicamous Main Street at Riverside Avenue;
- conducting community impact assessments for the smaller communities of Mara and Grindrod to better understand and manage anticipated trailhead parking;

- ensuring that effective and consultative planning for safe road crossings, adequate parking, and trail head amenities within the City of Enderby is completed prior to the start of construction, including addressing parking capacity within the already busy Belvedere Park area;
- linking the rail trail plan into the Armstrong Spallumcheen Parks and Recreation Trails Master plan and the Spallumcheen Trails and Cycling Active Transportation Network Plan;
- supporting the City of Armstrong linking the rail trail into their growing active transportation greenway system at the corner of Pleasant Valley Road and Smith Drive;
- supporting community economic development efforts to implement community and business readiness programs in each of the communities along the rail trail corridor;
- working with municipal staff to implement safe road crossing systems in Enderby and Armstrong;
- establishing appropriate agreements with each of the municipalities and township (includes private waterworks districts within the Township of Spallumcheen, utility access within the District of Sicamous, and utility crossings within the City of Enderby) to support civic operations and infrastructure;
- accommodating commercial, agricultural, and private crossings at various locations along the rail trail;
- coordination on storm water, flood, and culvert management and upgrades, including the Meighan Creek Bypass beneath the rail trail adjacent to Pleasant Valley Road in Armstrong.
- and once the Sicamous-to-Armstrong rail trail is constructed, to work with Armstrong, Spallumcheen, RDNO, and Vernon to connect with the Okanagan Rail Trail;

Planning will involve outreach and engagement with key stakeholders and partners, including Splat-sin, municipalities, township, and regional leadership, to ensure the Rail Trail exists in harmony with surrounding neighbourhoods and compliments long-range transportation and infrastructure plans.

Future considerations include adaptive monitoring and management of the rail trail greenway with each jurisdiction; development planning with MoTI at Bruhn Bridge on Highway 1, Highway 97A development through the City of Enderby and Splat-sin's Spallumcheen IR#2, and Lansdowne-to-Stepney Road on Highway 97A; and potential future development of alternative multi-modal transportation opportunities.

## 14. Construction Methods and Considerations

The existing corridor has been cleared of railway rails, ties, spikes, crossings, and railway equipment. CP is still completing its environmental remediation and monitoring at this time. The existing rail bed, while it varies throughout, is approximately 3.0 metres wide at the top shoulder of the track.

A construction project with this length and scope requires many considerations and assumptions as the corridor varies significantly over its length. Below is a summary of construction considerations made for the initial development and budgeting of the trail:

### 14.1. Alignment

It has been assumed the current alignment is within the corridor's property lines and that the trail will be built following the same horizontal alignment. There are a several locations, for example behind SureCrop Feeds where the current alignment is encumbered by their trucking and fill station, where the alignment

may be moved or built adjacent to the existing rail bed. There are also locations where the trail will be shifted or built to one side where constrained such as Mara Lake or behind North Enderby Timber where erosion sites have been identified.

## 14.2. Trail Sections

To achieve the desired 4.6 metre width, the existing 3.0-metre-wide section will need to be widened. This process is best described with the typical construction sections in [Appendix B](#). The rail way was generally built on fill material which provides the opportunity to combine cutting and blending materials onsite to achieve the desired width. This process was successfully used on the Okanagan Rail Trail to reduce the need for import material. However, in sections where cutting would create a negative effect on ditching, drainage, or flood elevations, the width could be achieved by building an extended shoulder using import or approved native material. Alternatively, these sections could be left at a reduced width 3.0 meters minimum as a cost conscious solution.

There are also locations along Mara Lake where the trail is identified as being inundated annually. Considerations should be made to raise the trail in these locations to a reasonable elevation, see Waters Edge memo dated July 27 attached in [Appendix F](#). Note the Waters Edge memo precedes the Technical Committees decision to raise the trail to a minimum 25-year flood elevation. At this time, it has been assumed the minimum desirable trail elevation is 349.8m and costing to raise location to this has been included. It is recommended these areas be constructed to a minimum width of 3 metres to reduce the cost of imported materials.

Once the width of the subgrade is adequate, it will need to be graded and compacted to ensure the structure is adequate and sufficient drainage is achieved. Finally, 100mm thickness of high fines 19mm crush aggregate can be placed, prepared and compacted.

## 14.3. Geotechnical Considerations

Previous experience on the Okanagan Rail Trail suggests the existing rail structure, once blended, graded, and compacted is adequate as a trail subgrade. If unsuitable materials are encountered during construction geotechnical recommendations should be obtained.

The finished trail surface is important to the user experience and longevity of the trail. While the existing subgrade materials are suitable as a subbase, an additional 100mm thickness surface of high fines 19mm crushed aggregate is recommended where paving is not considered. 19mm crushed aggregate with high fines provides a good running surface accessible to a large number of user groups such as walkers, joggers, bicyclists, strollers, wheel chair/electric personal assistive mobility devices, compactible with the natural environment, economical, and durable.

Should paving be considered it is recommended that the surface be adjusted to 19mm minus clean road base to ensure effective drainage.

A geotechnical field investigation and report has been scoped and is scheduled to occur once a Heritage Permit is in place and excavation can occur within the corridor. An initial geotechnical site reconnaissance was completed in the fall 2019, see [Appendix G](#). In general, the rail trail is in fair to good condition

throughout its length in terms of subgrade strength. There are portions along the trail that have fallen into disrepair due to failing retention structures, wave actions, poor ditching, and embankment failures. Based on the Fletcher Paine Associates work to date, it is expected a similar trail structure to the Okanagan Rail Trail would be appropriate.

#### 14.4. Ballast

The original rail base was surfaced with approximately 200mm of ballast, and currently, there are portions of the rail ballast which have been maintained. Ballast is a uniform large rock material approximately 50-75mm and is difficult to reuse as is.

Several options can be considered for the ballast:

- Remove and Dispose – this method is expensive and disposal location are not readily available.
- Crush and Reuse – it may be viable to crush and reuse the ballast as acceptable surface material if blended properly or as fill material. The viability of crushing the ballast needs to be further explored; however, previous discussions with local contractors suggest it is economically viable. Further testing to determine the quality of material (e.g. hardness, gradation) produced by crushing would be required.
- Blending with Subgrade – ballast can be blended with the subgrade during the widening process. This method was effective on the Okanagan Rail Trail. It should be noted the ballast on the Shuswap North Okanagan Rail Trail corridor was better maintained and the volume of ballast may be more than acceptable to blend. In these areas it is recommended the ballast be used to armor the side slopes on of the trail.

In preparation of construction costing it has assumed the ballast will be blended in the subgrade and disposed on the trail slopes as armor. No costs for removal or crushing and reuse have been considered.

#### 14.5. Erosion Control

The trail corridor is adjacent to several key bodies of water which include Mara Lake, Rosemond Lake, and Shuswap River. As part of the development planning Waters Edge was engaged to assess Mara Lake and Rosemond Lake for existing and potential erosion issues and present a solution for identified erosion on the Shuswap River (km 32.75 behind North Enderby Timber, and km 37.5), along with typical treatment options. See [Appendix F](#) Waters Edge Memo dated July 27<sup>th</sup> “Sicamous to Armstrong Rail Trail – Information to Assist Cost Estimate” for a summary of the field investigations.

Where referenced, risk assessments refer to the potential of further erosion to the trail bed and surface.

##### **Mara Lake and Rosemond Lake:**

Due to high water levels in 2020, inspection on Mara Lake and Rosemond Lake could only be completed from the lake side by boat on May 15, 2020. Note the Waters Edge memo precedes the Technical Committees decision to raise the trail to a minimum 25-year flood elevation. A secondary site visit was completed July 22, 2020 specifically to assist with costing despite high water-water conditions which made it challenging to fully assess the shoreline conditions and treatment types. A future assessment is planned at lower water levels to evaluate erosion on Mara Lake and Rosemond Lake to understand the extent of



erosion and supplement the current data and recommendations. No survey sections are available and no riprap sizing has been finalized at this time. Below are the key considerations and cost implications for erosion on Mara Lake and Rosemond Lake:

- Consider constructing the trail at the narrower end of the recommended 3.0-4.6m width along Mara Lake and Rosemond Lake. Large portions of the trail are constrained and maintaining the existing vegetation is critical to protecting the trail from future erosion.
- Significant lengths flood on a regular basis due to the low elevation of the trail surface (e.g. between Mara and Rosemond Lake.) The flood construction level for Mara Lake is approximately 351.1m, well above significant portions of the trail. It is not likely practicable or cost effective to raise the trail to the flood construction level. Considerations should be made regarding the costs and risk of the trail being inundated. We recommend the trail be raised in the lower sections to a reasonable flood event. At this time, we have considered the estimated 25-year return period flood elevation of 349.8m for pricing purposes, with the crest elevation of a wave-break feature above this. Where the trail is raised it should be kept to a minimum 3.0m width.
- One of four treatment types were assigned for costing purposes: full riprap, partial riprap, alternative structural/geotechnical solution, raise trail.

Table A below provides the identified length of treatment from approximately km 0 to km 15 for cost estimate purposes; the estimates contain a significant margin of error due to lack of visibility during the on-land site visit and lack of known elevations:

**Table A: Lengths and generic treatment types along Mara Lake and Rosemond Lake shoreline**

Proposed treatment type (Generic)	Length of Shoreline (m)
Full riprap with a key trench at toe	1,519
Partial riprap	3,094
Alternative structural/geotechnical solution	300
Raise Trail*	3,750

\*Lengths corresponding to “Raise Trail” are those having a trail surface elevation below 349.8m, approximately a 1 in 25-year lake level. Note these lengths are approximate LiDAR. These can overlap with other treatments types.



**Shuswap River km 32.75 – Behind North Enderby Timber:**

A site visit along the Shuswap River at km 32.75 was completed April 27, 2020 to examine possible solutions to the three erosion spots noted behind North Enderby Timber totaling 40m. Potential solutions and approximate costs were discussed with the project biologist as shown in the Table B below:

**Table B: Options considered and approximate costs for erosion on Shuswap River (km 32.75)**

Option	Advantage	Disadvantage	Final Risk	Approximate Cost Estimate (+/-30%)
Sheet pile wall with riprap in front	Full trail width, can restore trail edge and maintain straight trail	Vertical wall reflects flow/energy downstream (could cause further erosion)	Moderate	\$320,000
Full riprap – key-in toe trench	Can maintain straight trail	Working in water, long reach excavator required	High	\$320,000
Move trail over and 2HL1V riprap (move approximately 3m)	Could create viewpoint(s)	Trail not straight, may impact North Enderby Timber	Moderate	\$384,000
Lock block/gabion wall	Can maintain straight trail	Must be keyed-in below water, clay base can have freeze thaw issues	High	\$320,000
Over-steepened riprap (1H:1V) (no key trench)	Short-term protection/busy time	Unstable, short-term, continual monitoring required	Very High	\$240,000
Leave as-is	Low cost, preferred from environmental standpoint	Unstable, public safety risk, erosion will continue	Very High	Approx. \$3,200 (signage, fencing, vegetation)

Based on risk tolerance and conversation with the project biologist the full riprap sections is recommended at these locations.

**Shuswap River km 37.5 – Trail Slip**

A 170m section of trail at km 37.5 has a 1m scarp along the middle of the trail. This was not identified in the original scope and concept design has not been completed at this section. An initial investigation has been completed and suggests the cause of failure may be a global geotechnical issue. The failure appears to run along a clay seam potentially 10-15m deep which can become saturated and cause the slip which is seen today. Field evidence indicates this section of trail has been repaired in the past 3-5 times. Several options are being considered; however, it is unlikely a permanent solution is going to be feasible and a softer approach such as repair trail, add geotextile to provide additional strength and monitor is the best solution.

The approach taken in the development plan is conservative and further discussions regarding risk tolerance and prioritization is appropriate.

### Costs/Budget

The magnitude of costs on a project such as this with significant shoreline lengths can be economically unfeasible. The trail section along Mara Lake and Rosemond Lake has significant sections of erosion or high potential erosion areas as indicated in Table A. Mara Lake fluctuates upwards of 4 meters during annual runoff and greater than 6 meters during flooding events. Normally, a traditional riprap rock structure would be designed for shore protection and the structure would have an embedded rock toe, be sufficiently thick, and extend the full length of affected shore slope to provide rigorous, long-term protection, generally as shown in [Appendix F](#) (no survey or material sizing has been finalized). The section shown, or similar engineered solutions, would cost over \$3,000 per linear meter and is likely not an economically feasible solution.

It is recommended the owners consider a risk management and benefit approach which looks at the highest priority and most vulnerable areas which need to be repaired or protected within the budget and consider reducing width and moving the trail over where appropriate. Alternatives should be explored to balance risk-tolerance and cost; this can be done following the site assessment to be completed at lower water levels, when the shore is visible. Should this approach be acceptable, it is suggested the sites be prioritized and further detail and costing be completed. At this time a budget of \$4,550,000 has been allocated for erosion protection along Mara Lake and Rosemond Lake, this excludes costs for raising the trail to the 1:25 year flood elevations.

### 14.6. Storm Water

TRUE consulting was retained to prepare a Stormwater Management Report to summarize a field investigation, storm infrastructure condition assessment, and to provide preliminary recommendations to assist in preliminary project costing. The TRUE consulting report is provided in [Appendix H](#).

A field investigation was conducted June 8<sup>th</sup>-10<sup>th</sup> along the entire corridor. The conditions were mostly dry apart from KM 15.20 – 15.90 where the Mara Lake was spilling onto the trail.

Four bridges were assessed according to hydrological factors such as stream cross section, depth of flow, debris, location of piers, and bridge freeboard. There are no specific recommendations for the bridges related to hydrological factors; however, it should be noted the elevation of the bridge between Mara Lake

and Rosemond Lake is below the 20-year flood elevation. A condition assessment was completed by Bourcet Engineering and a summary is provided in the Bridge Section of this report.

Twenty-nine culverts were located and assessed in the field, each culvert and preliminary recommendations for rehabilitation and/or replacement were provided. A culvert sheet for each is provided in the report along with a summary table.

In addition to the culverts located in the field, several stormwater issues were identified by TRUE as well as information provided to the Shuswap Trail Alliance. These sites have been identified and additional culverts and ditching have been included in the costing to address these issues.

Costing has been included for all high (12) and medium (3) priority culvert replacements as well as locations of identified issues requiring new (13) culverts. A minimum size of 600mm diameter or larger with inlet and outlet headwalls has been used for pricing purposes; however, hydraulic analysis should be completed during detail design to confirm site specific culvert size. Costs for general maintenance such as cleaning culverts and minor ditching has not been included.

### 14.7. Steep Slope

Fletcher Paine Associates was engaged to provide preliminary assessment of the rail trail corridor for potential steep slope hazards and provide risks associated with rockfall and debris slides that may impact public safety. Preliminary recommendations are provided in [Appendix I](#) and summarized below.

A field reconnaissance was carried out by Fletcher Pain Associates following a desktop aerial photography review. It was determined there are no potential rockfall or debris slides south of Station 14+460. The following table outlines the sections identified as potential risk, level of risk, and recommended mitigation measure.

**Table C: Identified Steep Slope Sections, Risk Level and Mitigation**

Station	Station	Level of Risk	Hazard	Recommended Mitigation
3+680	4+200	Low to Moderate	Rockfall	Scale the rock face
4+450	4+560	Low to Moderate	Rockfall	Scale the rock face
4+560	4+660	High	Rockfall	Scale the rock face to reduce to moderate risk
4+760	4+835	Moderate	Rockfall	Scale the reduce to low risk
5+600	5+600	Low	Earth/Talus	Clean ditch
5+930	5+960	Moderate	Rockfall	Scale the rock face
12+700	12+710	Low	Rockfall	None
13+600	13+900	Low to Moderate	Rockfall	Scale the rock Face
13+900	14+000	Moderate to High	Rockfall Spalling/sliding	Heavy scaling
14+000	14+100	Low	rock	Clean ditch
14+380	14+460	Moderate to High	Rockfall	Heavy scaling

The level of risk is defined below:



**Low Risk** - This category implies that the hazard risk to public safety is minimal and no mitigative action is recommended. This does not mean “no” risk and the public should be provided some information along the trail as discussed elsewhere in this report.

**Moderate Risk** - A moderate risk implies that there is a hazardous condition that requires heightened attention by trail users and some mitigation is recommended.

**High Risk** - A high hazard risk indicates that the trail should not be opened prior to carrying out mitigative measures to reduce risk of harm to the public.

The mitigation measures recommended are intended to reduce the public exposure to risk but do not remove risk in its entirety. As part of the development plan mitigation measures for all High, Moderate to High, and Moderate priority sections have been included. Costs for signage at each section has also been included.

Rock scaling is a difficult mitigation measure to estimate as each section or portion of sections can vary dependent on access, competence of rock, and past maintenance measures. For costing purposes similar level of effort per linear meter of the Okanagan Rail Trail was used. These costs should be confirmed or refined during detailed design through discussions with an experienced contractor.

## 14.8. Bridges

The trail corridor between Armstrong and Sicamous has four bridges that were part of the Canadian Pacific Railway Line. The bridges are located at kilometers 17 (Rosemond Lake), 40, 42 (Stepney Crossing Road, and 49 (Fortune Creek). All four bridges are wood constructed with creosote timbers, piles, and pile caps with treated wood retaining wall abutments.

On April 20, 2020 Bourcet Engineering performed visual inspection on all four bridges. The bridges were found to be in moderate conditions, with upgrades required. The Bourcet Engineering memo dated July 17<sup>th</sup>, 2020, (see [Appendix J](#)) recommends all bridge decks be replaced to provide a safe surface along with handrails. The memo also recommends remediation works such as all abutments be replaced and any members that have moss or mildew on them require minor remediation. A follow up detailed report and construction drawings for each bridge will be provided during detail design.

## 15. Amenities

### 15.1. Trailheads

Primary trailhead access/egress points will target already established destination community hubs of Sicamous, Grindrod, Enderby, Splatins, and Armstrong. Ideally, trailheads double as centralized tourism experience destinations gaining the greatest economic benefits when tied directly into community main-streets, amenities, and businesses.

Connectivity into municipal greenway active transportation systems and trailhead development in the District of Sicamous, City of Enderby, Splatins, and City of Armstrong have already been identified by municipal staff and is reflected in Official Community Plans and strategies. Future development support will be needed by these communities to realize the full potential of the rail trail as a trailhead destination

hub. Limited parking has been highlighted in Sicamous, Enderby, and Armstrong. Room exists within the rail corridor to develop additional parking capacity quickly within the City of Enderby.

This plan identifies two temporary trailhead-parking areas. One at km 0.0 to address parking issues prior to the development of the new Highway 1 Bruhn Bridge which will accommodate a pedestrian/bicycle connector into Sicamous. In the interim, a walkway connector to the existing bridge from km 0.0 and into Sicamous Wharf park is proposed. At the southern end, a temporary parking area is proposed within the rail corridor property adjacent to Stepney Road to serve as a preliminary parking area prior to completion of the Highway 97 pedestrian/bicycle overpass. This would serve to provide the City of Armstrong and Township of Spallumcheen residents with an early access option while capital development of the overpass is completed.

Additional trailhead access points identified during community consultation were noted as needing solutions to manage early signs of trail access and parking. These locations (Mara Hall, and Stepney X Road) are both acknowledged as requiring careful planning with the local community to ensure they address concerns of congestion, safety, noise, and conflicts with local rural lifestyle. Additional locations of concern will be monitored to deter parking and redirect to the primary destination hubs.

The municipalities are actively reviewing their community plans identifying priorities for future trailhead development that will increase the benefit potential of the rail trail in their community. The District of Sicamous has identified the need for a dedicated pedestrian/bicycle bridge across Sicamous Narrows connecting the Rail Trail directly into the town core at Main Street effectively making the town a trailhead. Enderby and Splatkin have worked together to develop a joint Active Transportation Strategy that incorporates the rail trail into a community-to-community greenway trail system. The City of Armstrong is working to link the rail trail directly into their main street and the community’s growing active transportation greenway trail system. This is consistent with research findings on other successful rail trail corridors where the pathway tying directly into the main street of the community increase the social health and economic benefits to that community.

This development plan is intended to compliment, integrate, and support these future planning efforts.

Three basic types of trailhead are outlined for cost projection purposes:

Trailhead Type	Amenities
Type 1 - Large	50 stalls – include vault toilet, bear-proof garbage, wood fence, signage, gravel surface, wheel stops
Type 2 - Medium	25 stalls – include vault toilet, bear-proof garbage, wood fence, signage, gravel surface, wheel stops
Type 3 - Small	10 stalls – include vault toilet, bear-proof garbage, wood fence, signage, gravel surface, wheel stops

*See Development Map for proposed locations.*

## 15.2. Side Destinations

Along with primary trailheads within established destination community hubs, the trail will promote connectivity to existing trail systems and parks. These include side destinations accessible along the trail corridor including the Mara Point Provincial Park and Rosemond Lake Recreation Site. Both have significant ecological and cultural values within Secwépemc territory, and have been identified as priority locations to ensure trail use is managed positively. Again, adaptive monitoring and response working in partnership with Splat-sin and Provincial land managers will be key.

Additionally, side destinations along the trail corridor are identified and recommended as a key tool in enhancing user experiences, connecting with local communities, and helping to manage trail use in residential areas, agricultural farmland, and sensitive habitats.

Side destinations also serve as additional locations to install amenities like vault toilets and animal-proof garbage containers. Seeking intervals between trailhead hubs and destinations that provide for a progressive range of options when walking and cycling is desirable.

Five basic side destination types are outlined for cost projection purposes:

Side Destination Type	Amenities
Type 1	Basic mineral surface (soil) path and signage to side destination (e.g. foreshore beach area)
Type 2	Basic path and signage + view point bench
Type 3	Basic path and signage + view point bench, Vault Toilet, Bear-proof garbage
Type 4	Basic path and signage + view point bench, Vault Toilet, Bear-proof garbage, and picnic table
Type 5	Community trail connection – 3 metre wide aggregate surface pathway

*See Development Map for proposed locations.*

Proposed Type 5 community connections include access to Sicamous via the existing Bruhn Bridge, Grindrod Park, Enderby Riverwalk, and Splat-sin Centre.

## 15.3. Toilet and Garbage

Interviews with other rail trail and greenway programs around the province, nationally, and internationally suggested trail users will adapt to expectations set by amenity infrastructure for a given trail or trail system. More garbage containers can sometimes lead to a higher assumption that garbage is taken care of resulting in litter in areas where no container is installed. Less containers seem to result in a higher self-reliance shown by trail users. A basic level of amenity service, however, is required to manage trail use particularly where longer distances and wider user demographics are anticipated.

The development plan proposes a starting approach that recognizes needing to keep annual maintenance costs efficient while meeting the needs of a wide range of trail users. 11 vault toilets and 12 bear-proof garbage containers are proposed in the initial development, complimenting existing amenities in the primary trailhead hubs of Sicamous, Grindrod, Enderby, and Armstrong. Additional locations have been noted for adaptive monitoring and potential future installation.

#### 15.4. Signage

Signage for the trail will include regulatory, advisory, and information signs and will follow the Manual on Uniform Traffic Control Devices (MUTCD) standards. For trail wayfinding, a hybrid design will be developed integrating the Shuswap Regional Trail Sign Standards with the Okanagan Rail Trail sign program to provide consistency of basic information for both visitors and local trail users, and allowing for integration into an extended rail trail branding system with the Okanagan Rail Trail and corridor to Osoyoos, as it develops. The Shuswap Trail Sign Standards are based on the Provincial trail standards assuring a high level of consistency and recognition for visitors through the province.

Utilization of Secwépemc language signs will also be used, where appropriate (e.g. Stop/Est'il). It is also expected that trailheads and points of interest will incorporate Secwépemc language, values, and history interpretation into their design. Direction from the Cultural Heritage Overview Assessment include:

- installing plaques, kiosks and signs explaining the history and culture of the Splatstsin people and territory;
- installing signs demonstrating that the Rail Trail is in Splatstsin Territory.

As well, Secwépemc leadership are currently implementing a major landmarks initiative that includes development of protocols with knowledge keepers to re-establish contemporary landmarks and trailhead posts throughout the Shuswap watershed in collaboration with local communities. The Shuswap North Okanagan Rail Trail provides a unique opportunity to educate and engage trail users in the contemporary and traditional values used to govern and care for the lands within Secwepemcúlcw. (See the Secwépemc Landmarks and Trailhead Sign Project.)

The PlayCleanGo program will be used as trailhead signage. PlayCleanGo is a program initiated by the Invasive Species Council of BC and will be managed in partnership with the Columbia Shuswap Invasive Species Society. It is an education and outreach campaign that encourages outdoor recreation while promoting changes in behaviour to slow or stop the spread of invasive species. It is designed to foster actions that interrupt recreational pathways of spreading invasive plant species.

Upon completion of the rail trail, permanent kilometre markers will be installed to aid trail users.

(See: MoTI Sign Standards, Provincial Trail Sign Standards, Shuswap Trail Sign Standards, Okanagan Rail Trail, PlayCleanGo Program – Columbia Shuswap Invasive Species Society)

#### 15.5. Trail Counters

Ten trail counter locations have been included in development costing. This is consistent with the Okanagan Rail Trail that includes ongoing trail use counts as part of section-by-section monitoring. Trail



counters upload automatically to the website and have been proven to provide an important ongoing baseline of information for planning, assessment, adaptive monitoring, and promotion of the rail trail.

## 16. Budgetary Capital Costs – Class ‘C’ Estimate

The key objective of the Trail Development plan was to complete a reasonable amount of investigation to develop a conceptual plan and budgetary capital cost estimate for public input and to provide Councils and Boards with adequate information to approve the plan for future funding opportunities.

A Class ‘C’ cost estimate, as defined by the Engineers and Geoscientists British Columbia (formerly Association of Professional Engineers and Geoscientists of British Columbia) Budget Guidelines, has been completed and reflects the anticipated costs to design, procure, and construct the Shuswap North Okanagan Rail Trail as outlined above. A Class ‘C’ cost estimate is the appropriate level to use at this stage for budgeting purposes and setting funding targets. The estimate is prepared with limited site information, is based on probable conditions affecting the project and represents the summation of all identifiable project component costs. Class ‘C’ cost estimates are used for program planning, to establish a more specific definition of client needs and to obtain approval in principle. A contingency allowance of 40% including engineering and other contingencies during construction is appropriate for this class of estimate.

The estimated capital cost to construct the trail is \$17 million (\$23.8 million with recommended 40% allowance for engineering and contingency). This estimate does not include GST. See Table D below for a breakdown of the estimate cost. [Appendix K](#) provides a further detailed breakdown.

While the trail construction costs alone are consistent with similar rail trail projects including the Okanagan Rail Trail, the costing to address substantial erosion issues along Mara Lake and Shuswap River (\$5.7 million), and the requirement of a major pedestrian/bicycle overpass of Highway 97A at Stepney Road (\$2.5 million), add substantially to the overall costs.

To better understand these costs and facilitate a staged approach to construction adaptable to available funds over time, a capital construction and costing framework is proposed as follows:

1. **Stage One: Protect the Corridor** – targets immediate erosion mitigation strategies needed to stop the loss of the existing rail bed to wave erosion and flooding along Mara Lake and Shuswap River. Estimated cost for this stage is \$3,500,000 (\$5,000,000 with recommended 40% allowance for engineering and contingency).
2. **Stage Two: Make It Safe** – targets basic priorities necessary to make the trail safe and functional for public access. This includes addressing steep slope, bridges, missing culverts, road crossings, fencing, and signage. Estimate cost for this stage is \$2,000,000 (\$3,250,000 with recommended 40% allowance for engineering and contingency).
3. **Stage Three: Build the Surface** – targets construction of the crushed and compacted aggregate trail surface, along with repairs to culverts where needed and accommodation of agricultural crossings. Estimate cost for this stage is \$7,000,000 (\$9,800,000 with recommended 40% allowance for engineering and contingency).

4. **Stage Four: Finish the Trail** – targets completion of the Sicamous-to-Armstrong rail trail through construction of the Highway 97A pedestrian/bicycle overpass, trailhead parking and amenities, interpretive signage, access to side destinations and final surfacing. Estimate cost for this stage is \$4,000,000 (\$5,800,000 with recommended 40% allowance for engineering and contingency).

**Table D: Shuswap North Okanagan Rail Trail - Class 'C' Estimate Summary by Stage**

Item	Total Amount
Stage 1: Protect the Corridor	\$ 3,563,889
Stage 2: Make it Safe	\$ 2,316,805
Stage 3: Build the Surface	\$ 7,011,882
Stage 4: Finish the Trail	\$ 4,153,675
<b>Subtotal</b>	\$ 17,046,250
<b>40% Contingency and Engineering Allowance</b>	\$ 6,818,500
<b>Total</b>	\$ 23,864,750

The breaking of the full project costing into stages increases overall costs, but allows for implementation over time as funding is secured. Further variations can be made to this framework to strategically target funding and grant opportunities. Lower engineering and contingency allowances can be realized within a tighter construction schedule.

## 17. Schedule

The timing for construction and opening of the initial phase of the trail is contingent on funding availability. Moving forward with detailed design and construction work is dependent on successful implementation of a funding strategy that includes Provincial/Federal partnership support and a community investment campaign, and will ultimately be at the discretion of the Council and Boards of the partnering owner jurisdictions.

With the funding strategy commencing in the fall of 2020, it is possible that construction will start in 2021. Early construction would address protection of the corridor and safety as outlined above. Full funding could see the trail completed within two years, and staged funding over three to four years.

The Rail Trail Technical Operational Committee will work closely with the Governance Advisory Committee during the fundraising campaign to explore opportunities to potentially advance certain components of the project.

## 18. Long-Term Corridor Development

By acquiring the corridor, the communities have made a long-term commitment for ultimate development of the rail corridor as a public multi-modal regional transportation corridor. Part of that long-term commitment is ensuring potential future uses of the corridor are accommodated during any proposed surplus land disposal and other short term planning.

Light Rail Transit (LRT) has been considered as a possible long-term regional mode of transportation along the corridor. To ensure future use as a LTR corridor it is important that the communities consider encumbrances are limited and right of way requirements are maintained.

As part of the concept development, the required right of way width to allow an LRT service and an adjacent trail were considered. A minimum 20 metre corridor of flat land is recommended for a regional LRT corridor.

[Appendix L](#) illustrates the typical sections investigated for future LRT. Neither a field nor desktop investigation of the constructability or design criteria of an LRT system along the corridor has been completed.

## 19. Next Steps

The preparation of this Trail Development Plan with Class C cost projections is a key step in the process to convert the existing rail bed into a functioning regional trail. Following the completion of this plan, several additional steps have been identified to progress the project towards design and construction.

1. Commence the funding strategy, including grant applications and community fundraising
2. Complete Agricultural Land Commission review
3. Prepare final plans for road crossings, parking, and trail head amenities with local governments
4. Prepare detail design and construction and submit final permitting (Heritage Inspection, Environmental, MoTI)
5. Contract procurement and implementation

## 20. References

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- Terms-of-Reference (CSRD, Splantsin, RDNO, March 2016)
- [Thompson Okanagan Regional Rail Trails Tourism Strategy 2016-2022 \(TOTA 2016\)](#)
- [Typical Crossing Details](#) submitted by Urban Systems (August 2020)

## 21. Appendices

- [Appendix A - Trail Concept Maps](#)
- [Appendix B - Typical Sections](#)
- [Appendix C - Environmental](#)
- [Appendix D - Agricultural](#)
- [Appendix E - Typical Road Crossings](#)
- [Appendix F - Erosion Control](#)
- [Appendix G - Geotechnical](#)
- [Appendix H - Storm Water](#)
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