

# Shuswap-North Okanagan (Sicamous-to-Armstrong) Rail Trail Corridor Maintenance Standards

**Technical Operational Committee**

Updated: February 22, 2022

**Inter-Jurisdictional Owners:**

Splatsin te Secwépemc

Columbia Shuswap Regional District

Regional District of North Okanagan

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



## **ACKNOWLEDGEMENT OF SOURCES**

These maintenance standards have been adapted from the [Okanagan Rail Trail Maintenance Standards](#) (Okanagan Rail Trail Committee, January 17, 2019) by permission with the intention of future connectivity and consistency between the two corridors. The Shuswap North Okanagan Rail Trail Technical Operational Committee is grateful for the work and support of the Okanagan Rail Trail Committee. Additional reference sources are listed at the end of this document.

## **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 Maintenance Standards" does not represent or limit Splitsin's Aboriginal rights, title or interests for the project area. Splitsin reserves the right to gather and produce further information, including identifying concerns about Splitsin's rights, title and interests in relation to the rail trail project initiative as this initiative moves forward into the future.

### **This draft was prepared by:**

Phil McIntyre-Paul, Senior Consultant, The Shuswap Trail Alliance for the Shuswap North Okanagan Rail Trail Technical Operational Committee

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



## Contents

SECTION 1 GENERAL.....	4
1.1 Purpose.....	4
1.2 General.....	4
1.3 Monitoring and Review.....	5
1.4 Safety and Risk Mitigation.....	5
1.5 Closures and Detours.....	6
1.6 Encroachments.....	6
SECTION 2 TRAIL CONDITIONS.....	6
2.1 Aggregate Trail.....	6
2.2 Asphalt Trail.....	7
2.3 Snow Removal.....	7
SECTION 3 STRUCTURES and FACILITIES.....	8
3.1 Bridges and Trestles.....	8
3.2 Ditches and Culverts.....	8
3.3 Fences, Gates, and Bollards.....	8
3.4 Furniture and Equipment.....	9
3.5 Signs.....	9
3.6 Lighting.....	9
3.7 Kiosks and Shelters.....	9
3.8 Toilet Facilities (temporary).....	10
3.9 Toilet Facilities (permanent).....	10
3.10 Parking Lots.....	10
SECTION 4 SITE CONDITIONS.....	10
4.1 Vegetation.....	10
4.2 Invasive/Noxious Weeds.....	11
4.3 Shoreline and Bank Erosion.....	11
4.4 Rockfall and Slope Stability.....	12
4.5 Litter and Vandalism.....	12
REFERENCES AND APPENDICES.....	12
Maintenance Summary, Schedule, & Costing Tables.....	15
Adaptive Management Monitoring Table.....	19

## SECTION 1 GENERAL

### 1.1 Purpose

To establish a consistent standard for physical condition, intended function, safety, and environmental quality of the Shuswap North Okanagan Rail Trail Corridor between Sicamous and Armstrong for the transportation, recreation, and health benefits of its intended uses.

### 1.2 General

- 1.2.1 The Owners (Splatsin te Secwépemc, Regional District of North Okanagan, and Columbia Shuswap Regional District) will enter into a mutual agreement to jointly fund, coordinate, and execute annual maintenance activities of the entire Rail Trail corridor through an annually approved budget with funding sources from a combination of revenue streams including lease, license agreements, and taxation.
- 1.2.2 These standards are to be read and interpreted within the legislated parameters of the Community Charter, the Local Government Act, other applicable legislation, as well as the bylaws and policies of the owner jurisdictions.
- 1.2.3 The Owners acknowledge Splatsin's efforts to lead this initiative are founded on the understanding the trail is located within Splatsin's core area of caretakership and forms part of the unceded Secwépemc territorial lands. Splatsin strives to assume the role as caretakers of their traditional lands on behalf of the Splatsin people and the Secwépemc Nation; for the benefit and use of the Secwépemc people and their neighbours now and in the future.
- 1.2.4 Coordination of annual maintenance budgets and activities will be mutually overseen by staff from the owner jurisdictions through the Shuswap North Okanagan Rail Trail Technical Operational Committee.
- 1.2.5 It is acknowledged that there are unique circumstances along the length of the corridor that may warrant an approach or practice that is not consistent or is different from that described in this document.
- 1.2.6 It is acknowledged that where there is a conflict between these standards and the standard or practice of an owner jurisdiction, the standard or practice to be followed shall be determined jointly by the Owners through mutual agreement.
- 1.2.7 It is understood that maintenance activities will be undertaken within the organizational capacity and financial resources of each owner jurisdiction.
- 1.2.8 Maintenance activities will be planned so work is completed before minor issues grow into major concerns.
- 1.2.9 For developed park land within the corridor, a maintenance and operation standards for that type of park land will be determined jointly by the owners through mutual agreement.

- 1.2.10 As possible, coordinate trail maintenance activity with appropriate site conditions and least sensitive impacts to environmental values, abutting agricultural operations and scheduled events.
- 1.2.11 Coordinate trans-boundary maintenance issues and activities with adjacent corridor owners to foster a consistent standard and minimize impacts to trail use on the corridor.
- 1.2.12 Management personnel from the owner jurisdictions' maintenance and operation departments will meet annually in the summer to discuss coordination of activities and changes or updates to these standards.
- 1.2.13 Make changes or updates to these standards as required, on an annual basis. Changes and updates shall be recommended by the Technical Operational Committee for consideration by the Shuswap North Okanagan Rail Trail Governance Advisory Committee.

### 1.3 Monitoring and Review

- 1.3.1 Conduct regular reviews and evaluations of the condition of the trail, the corridor, and the supporting infrastructure of the trail. Note that some elements of the corridor and trail have minimum frequency requirement for reviews, specified elsewhere in this document (e.g. bridges, culverts, ditches, rock slopes).
- 1.3.2 Document and submit completed monitoring reports to the Technical Operational Committee
- 1.3.3 Regular maintenance reviews should also include monitoring for environmental, cultural, and social adaptive management priorities along the corridor to determine if further corrective actions are required. (See Appendices: Adaptive Monitoring Table – Rail Trail Development Plan, Section 7.5)

### 1.4 Safety and Risk Mitigation

- 1.4.1 Comply with provincial legislation and regulations regarding occupational health and safety.
- 1.4.2 Follow corporate safety policies and safe work procedures.
- 1.4.3 Conduct safety inspections as part of all regular maintenance activities, after storm and flood events, and as part of annual trail inspections.
- 1.4.4 Conduct a certified Wildlife/Danger Tree Assessment (Parks) annually each spring, and as needed
- 1.4.5 Advise users of safety concerns as required in response to trail conditions, construction work or maintenance activity.
- 1.4.6 Remove or mitigate items of safety concern.
- 1.4.7 Post and maintain contact information for the public at key trailheads and on-line web pages, advising users of how and where to report issues of maintenance and bylaw enforcement.
- 1.4.8 Provide safety orientation to trail volunteers.

- 1.4.9 Require trail volunteers to indemnify trail owners and/or provide insurance covering them for personal injury, death, and property damage.

## 1.5 Closures and Detours

- 1.5.1 Employ trail closures and/or detours as necessary to ensure personal safety, undertake maintenance activity or host an event.
- 1.5.2 Post notices of closures or detours in standard print and digital media. Notices should advise users not to enter the trail for reasons of personal safety, maintenance activity or event.
- 1.5.3 Place and maintain appropriate signage and barriers to alert users and advise them accordingly of the closure or detour. Employ flag persons or other traffic control as necessary.

## 1.6 Encroachments

- 1.6.1 Address encroachment concerns as needed on an ongoing basis.
- 1.6.2 Ensure appropriate agreements are in place for approved encroachments.

# SECTION 2 TRAIL CONDITIONS

## 2.1 Aggregate Trail

- 2.1.1 As a minimum, conduct an annual visual review of the trail surface. Conditions to look for include potholes, settlement, ruts, and ridges.
- 2.1.2 Conduct grading, blading or compaction as required to provide a smooth and safe surface for permitted trail uses.
- 2.1.3 Import, place, grade, and compact imported aggregate as required where there is not enough existing material to provide a smooth surface. Use material that produces a durable surface and is compatible with existing surface material.
- 2.1.4 Conduct grading or blading as required to maintain or restore the trail crown (or tilt to one side) and to maintain positive drainage to the outer edge of the trail. (inside edge along lake/river)
- 2.1.5 Use hand tools and small equipment as required to provide a smooth transition where the gravel surface abuts bridge decks, curbs, sidewalks, and asphalt surfaces.
- 2.1.6 Keep surface free of rocks, branches, roots, debris and litter.
- 2.1.7 Conduct dust control at the discretion of the owner jurisdictions where there are chronic dust conditions that affect trail uses or dust-sensitive adjacent land uses.

- 2.1.8 Maintain a smooth transition to and from the trail surface for vehicle driveways and crossings of the rail trail

## 2.2 Asphalt Trail

NOTE: while the Shuswap North Okanagan Rail Trail is primarily an aggregate surface trail, asphalt aprons connect the aggregate trail to hard surface road crossings.

- 2.2.1 As a minimum, conduct an annual visual review of the trail surface, in the spring. Otherwise, set monitoring and review levels at the appropriate service level within the program. Conditions to look for include potholes, cracks, settlements, spalling and alligating.
- 2.2.2 Keep surface free of rocks, branches, debris, and litter.
- 2.2.3 Seal cracks wider than 25mm with appropriate sealant immediately after frost leaves the ground. Clean and rout cracks beforehand if required.
- 2.2.4 Fill potholes and large cracks deeper than 25mm with asphalt patch or appropriate compound. Clean voids and rout or treat bonding edges as required.
- 2.2.5 Level heaved and protruding surfaces higher than 25mm, or remove and replace with asphalt.
- 2.2.6 Remove extensively damaged sections of asphalt and re-surface with new hot asphalt, laid and rolled to full thickness. If the cause of the condition is structural or geotechnical in nature, remove and/or repair the base aggregate and/or sub-grade as required first.
- 2.2.7 Feather and pull shoulders as required to provide a smooth transition off the asphalt surface.
- 2.2.8 As required, sweep, brush or otherwise remove sand, gravel, sticks and debris from the surface.
- 2.2.9 Apply or re-apply lines and text on asphalt surfaces as necessary to maintain the visibility and function of the markings.
- 2.2.10 Maintain a smooth transition to and from the trail surface for vehicle driveways and crossings of the rail trail.

## 2.3 Snow Removal

- 2.3.1 At time of writing, the rail trail Owners' policy is for the trail to be primarily managed for unmaintained winter access (ungroomed snowshoe & ski; no snow removal). However, snow removal guidelines are provided for potential locations designated for snow removal in the future. Additional guidelines may be added in the future for Nordic trail grooming.
- 2.3.2 Plow, sweep or otherwise remove snow from trail and road crossings as required, with the objective of obtaining a layer of snow not exceeding 25mm in thickness. Give higher priority to road crossings and those sections of trail with higher volumes of use.
- 2.3.3 Apply sand where required to reduce the slipperiness of the trail surface. Give priority to road crossings, trail/sidewalk intersections, inclines, and shaded areas.

- 2.3.4 Avoid the use of de-icers (sodium-based salts prohibited) where non-storm event surface drainage runs into streams and lakes.
- 2.3.5 As a minimum, sweep, brush or otherwise remove winter sand and gravel from the trail surface each spring after likelihood of further winter sanding is required.

## SECTION 3 STRUCTURES and FACILITIES

### 3.1 Bridges and Trestles

- 3.1.1 As a minimum conduct an annual review of bridges and trestles. As a minimum visually check structures and components for deterioration, rot, broken members, loose hardware or fittings and that surfaces are smooth and free of objects, protrusions, and sharp edges.
- 3.1.2 Retain a structural engineer to conduct a professional review and assessment of bridges and trestles every 5 years, or as site and structural conditions warrant. Require the engineer to provide recommendations regarding updates to load limit, vehicle speed and user safety where warranted.
- 3.1.3 Post and maintain recommended load and speed limits on the structure.
- 3.1.4 Repair bridges and trestles, as required.

### 3.2 Ditches and Culverts

- 3.2.1 As a minimum conduct an annual visual review of ditches, culverts, and headwalls. Increase review frequency or adjust review timing as required in response to storm events and site-specific conditions.
- 3.2.2 Conduct ditching and ditch clean-out as required to maintain a clean and effective route for the passage of drainage and storm water.
- 3.2.3 Keep culverts free of branches, leaves, debris, and depositions of earth that may hinder water flow.

### 3.3 Fences, Gates, and Bollards

- 3.3.1 As a minimum conduct an annual visual review of fences, gates, and bollards.
- 3.3.2 Repair, reset or replace fence posts and bollards that are broken, bent, leaning, or missing.
- 3.3.3 Tighten fence cables and fabric as required.
- 3.3.4 Ensure gates and bollards are fully operational and capable of being secured as intended.



### 3.4 Furniture and Equipment

- 3.4.1 Furniture and equipment include such items as benches, tables, trash and recycling containers and bicycle racks.
- 3.4.2 As a minimum conduct an annual visual review of furniture and equipment.
- 3.4.3 Adjust or reset the connection to the ground, pad or footing to ensure furniture and equipment is level, plumb and stable.
- 3.4.4 Tighten or replace fittings and hardware to ensure furniture and equipment components are firm and secure.
- 3.4.5 Remove protrusions, burrs, and sharp edges to provide a smooth surface.
- 3.4.6 Repaint, refinish, or replace furniture, equipment and components that have been vandalized.
- 3.4.7 Replace furniture, equipment and components showing signs of wear and fatigue.
- 3.4.8 List of approved furniture and equipment includes: (See: SNO Rail Trail Amenity Standards)
  - still to be finalized

### 3.5 Signs

- 3.5.1 As a minimum conduct an annual visual review of all signs.
- 3.5.2 Update sign information as required to provide current information. (See: Shuswap North Okanagan Rail Trail Sign Guidelines)
- 3.5.3 Conduct minor repairs (e.g. reset posts to vertical, re-fix loose sign panels) as required.
- 3.5.4 Replace missing signs and damaged signs that cannot be repaired.
- 3.5.5 In response to the effects of weathering, use and/or vandalism replace signs that are not sufficiently clear and legible.

### 3.6 Lighting

- 3.6.1 As a minimum conduct an annual visual review of all lighting and crossing signals.
- 3.6.2 Operate and maintain roadway lighting and crossing signals in accordance with owner's standard practice for such infrastructure.

### 3.7 Kiosks and Shelters

- 3.7.1 As a minimum conduct an annual visual review of kiosks and shelters.
- 3.7.2 Repair, reset or replace posts and materials that are broken, bent, leaning, or missing.

- 3.7.3 Repaint, refinish, or replace components that have been vandalized.
- 3.7.4 Replace components showing signs of wear and fatigue.
- 3.7.5 Update kiosk sign information as required to provide current information.
- 3.7.6 At time of writing there are no kiosk or shelter structures along the corridor.

### 3.8 Toilet Facilities (temporary)

- 3.8.1 Provide temporary toilet facilities (e.g. portable toilets) at locations suited to public use and ease of maintenance access, as required.
- 3.8.2 Set and adjust maintenance schedule in response to facility condition.
- 3.8.3 Provide additional toilets and/or increase frequency of service as needed for events and seasonal peaks in trail activity.

### 3.9 Toilet Facilities (permanent)

- 3.9.1 Set and adjust maintenance schedule in response to facility condition.
- 3.9.2 At time of writing there are no permanent public toilet facilities along the corridor.

### 3.10 Parking Lots

- 3.10.1 As a minimum conduct an annual visual review of parking areas.
- 3.10.2 Maintain the surface of gravel parking lots as described above for gravel trail surfaces (see Section 2.1).
- 3.10.3 Maintain the surface of asphalt parking lots as described above for asphalt trail surfaces (see Section 2.2).
- 3.10.4 Plow snow from asphalt parking lot surfaces. This includes lots surfaced with reclaimed asphalt that has been treated and compacted to provide a plowable surface. (See Section 2.3 above)

## SECTION 4 SITE CONDITIONS

### 4.1 Vegetation

- 4.1.1 As a minimum conduct a visual review of corridor vegetation annually. Increase review frequency as required in response to seasonal and site-specific conditions.
- 4.1.2 Vegetation within the corridor shall be controlled for the following reasons:

- Invasive/noxious weed control (see Section 4.2)
- Control weed establishment and spread within the finished trail surface and shoulder
- Reduce or remove vegetative litter and dead vegetation to reduce fire fuel load
- Provide unobstructed drainage
- Provide unobstructed sight lines for roadway and driveway crossings, as well as at intersections with sidewalks and other trails
- Eliminate obstruction of signs
- Maintain safe sightlines for trail users
- Improve trail aesthetics
- Manage hazard trees, roots and branches
- Manage sites of undesirable human activity (e.g. camping, littering, vagrancy, dumping, vandalism)

4.1.3 Adhere to trail maintenance best practices for mowing, brushing, and pruning

4.1.4 Where possible and appropriate, mow the trail shoulder and vegetated surfaces a minimum of 0.5m from the edge of the travel surface of the trail, a minimum of once per year. Conduct additional mowing as required. Vegetation around signs and posts may require additional finishing by brushsaw.

4.1.5 Where possible and appropriate, brush a minimum of 1.0m from the edge of the travel surface of the trail (clear width), a minimum of once per year. Brush as required to maintain sight lines at intersecting paths, sidewalks, driveways, and roads. Exempt areas of riparian vegetation, wildlife habitat, erosion stabilization, landscaping, water features and difficult terrain.

4.1.6 Prune branches that overhang the trail to provide a vertical clearance for the intended uses of the trail. Adhere to trail maintenance best practices for pruning.

4.1.7 Cut and remove roots that cause deflections of the finished surface of the trail.

4.1.8 Cut and remove assessed danger trees and blow down after winter and storm events.

4.1.9 Remove cuttings and pruning from the trail surface at the end of each workday.

4.1.10 Monitor and maintain revegetation and habitat restoration areas according to the Trail Revegetation Plan and Landscape Design Guidelines

## 4.2 Invasive/Noxious Weeds

4.2.1 Refer to the owner jurisdiction's bylaw, policy, or plan regarding invasive and/or noxious weeds.

## 4.3 Shoreline and Bank Erosion

4.3.1 Conduct an annual visual review of shorelines and creek banks adjacent to the trail for indications of erosion, sloughing, undermining and scour.

4.3.2 Retain a qualified professional for more detailed inspection or assessment as required.

4.3.3 Repair shoreline and bank erosion, as required.

#### 4.4 Rockfall and Slope Stability

4.4.1 Conduct visual reviews of steep slopes and rock faces adjacent to the trail on a regular basis for indications of erosion, raveling, cracks and slope movement.

4.4.2 Retain a qualified professional for more detailed inspection or assessment as required.

4.4.3 Remove rock and debris from the trail surface.

4.4.4 Conduct rock scaling, as required and determined by qualified professional

#### 4.5 Litter and Vandalism

4.5.1 Regularly monitor trail corridor for litter and vandalism, including graffiti.

4.5.2 Provide and maintain trash and recycling containers at key access/egress locations.

4.5.3 For events provide additional containers or increased frequency of service.

4.5.4 Promptly react to and remedy incidences of vandalism, including graffiti removal.

## REFERENCES AND APPENDICES

[Okanagan Rail Trail Maintenance Standards](#) (Okanagan Rail Trail Committee, January 17, 2019)

[Shuswap North Okanagan Rail Trail Development Plan](#) (January 15, 2021)

[Shuswap Trails Environmental Screening Table 2015](#) (Version 2, August 2020)

[Shuswap Regional Trails Strategy](#) (November 2019)

[Recreation Sites and Trails BC](#) (Correspondence, February 04, 2022)

[Rails-to-Trails Conservancy: Trail Resources Online](#) (Various)

- [Rails-to-Trails Conservancy, Maintenance Practices and Costs of Rail Trails](#) (June 2015)
- [Ohio River Greenway \(Purdue Engineering\), November 2014, Best Practices in Trail Maintenance: A Manual by the Ohio River Greenway](#) (November 2014)
- [Albany-Hudson Electric Trail: Trail Maintenance Plan](#) (December 30, 2019)
- [Rails-to-Trails Conservancy: Maintenance Basics](#) (2001-2020) retrieved online at [www.railstotrails.org](http://www.railstotrails.org)
- [Rails-to-Trails Conservancy: Routine Trail Maintenance Costs Per Mile](#) (May 11, 2021)

This page blank for printing.



## Maintenance Summary, Schedule, & Costing Tables

Shuswap North Okanagan Rail Trail (Sicamous-to-Armstrong)											
Maintenance Standards: Schedule & Budget											
Updated: February 22, 2022											
Reference: <a href="#">Maintenance Standards - SNO Rail Trail</a>											
Section	Maintenance Activity	Optimal Frequency								Personnel	Notes: Technical
		Weekly	Monthly	Quarterly	Annually	Spring	Fall	After Storm	Other		
<b>SECTION 1 GENERAL</b>											
1.2.12	Maintenance Coordination Meeting				X						TOC
1.2.13	Update Maintenance Standards				X						TOC
1.3	Monitoring and Review	X	X	X	X				X		Trail Staff includes adaptive monitor and reporting
1.4.3	Safety Inspections	X			X				X		Trail Staff ongoing with waste management removal
1.4.4	Wildlife/Danger Tree Assessment				X	X			X		Trail Staff Certified Parks Standard
1.6.1	Encroachments									as needed	TOC address concerns
<b>SECTION 2 TRAIL CONDITIONS</b>											
<b>2.1 Aggregate Trail</b>											
2.1.1	Trail Surface Review (visual)				X						Trail Staff
2.1.2	Surface grading, blading, compaction									as needed	Contractor
2.1.3	Import aggregate - place, grade, compact									as needed	Contractor
2.1.4	Maintain crown or tilt to side - grade, blade									as needed	Contractor to maintain positive drainage
2.1.5	Smooth aggregate/asphalt transitions									as needed	Trail Staff bridge decks, curbs, road crossing aprons
2.1.6	Clear debris and litter				X	X			X		Trail Staff
2.1.7	Dust control									as needed	Contractor for chronic dust conditions
2.1.8	Smooth vehicle crossing transitions									as needed	Contractor
<b>2.2 Asphalt Trail</b>											
2.2.1	Asphalt trail surface review (visual)				X						Trail Staff
2.2.2	Clear debris and litter				X	X			X		Trail Staff
2.2.3	Seal cracks wider than 25mm									as needed	Contractor
2.2.4	Fill potholes and cracks > 25mm deep									as needed	Contractor
2.2.5	Level heaved surfaces > 25mm									as needed	Contractor
2.2.6	Remove/resurface damaged sections									as needed	Contractor
2.2.7	Feather/pull shoulders									as needed	Contractor to smooth transition off asphalt surface
2.2.8	Sweep sand, gravel, debris from surface									as needed	Trail Staff
2.2.9	Re-apply lines and text									as needed	Contractor
2.2.10	Smooth vehicle crossing transitions									as needed	Contractor
<b>2.3 Snow Removal</b>											
2.3.1	Plow/sweep/remove snow								X	if/as needed	Current Policy: Maintain for ungroomed use to max. 25 mm thickness
2.3.2	Apply sand								X	if/as needed	
2.3.5	Remove winter sand/gravel from trail								X	if/as needed	
<b>SECTION 3 STRUCTURES and FACILITIES</b>											
3.1.1	Bridge and Trestle Inspection (Visual)				X						Trail Staff non-structural visual inspection
3.1.2	Bridge and Trestle Assessment (QP)									every 5 yrs	PEng Professional review by Structural Engineer
3.1.4	Bridge and Trestle Repair									as needed	Contractor
3.2.1	Ditch/Culverts/Headwall Inspection				X	X			X	as needed	Trail Staff Visual review, after spring melt & storm

SECTION 3 STRUCTURES and FACILITIES											
3.1.1.	Bridge and Trestle Inspection (Visual)				X					Trail Staff	non-structural visual inspection
3.1.2	Bridge and Trestle Assessment (QP)								every 5 yrs	PEng	Professional review by Structural Engineer
3.1.4	Bridge and Trestle Repair								as needed	Contractor	
3.2.1	Ditch/Culverts/Headwall Inspection				X	X		X	as needed	Trail Staff	Visual review, after spring melt & storm
3.2.2	Ditch Maintenance (ditching/clean out)				X	X		X	as needed	Contractor	to maintain clean effective drainage
3.2.3	Culvert Clearing				X	X		X	as needed	Contractor	storm cleanup
3.3.1	Fences, Gates, and Bollards Inspection				X				as needed	Trail Staff	visual review
3.3.2	Repair/reset/replace fence & bollards								as needed	Contractor	broken, bent, leaning or missing posts
3.3.3	Tighten fence cables & fabric								as needed	Contractor	
3.4.2	Furniture and Equipment Inspection				X					Trail Staff	benches, tables, trash/recycling containers
3.4.3-8	Furniture adjust/reset/repair/replace								as needed	Contractor	
3.5.1	Sign Inspection				X					Trail Staff	
3.5.2-5	Signs - repair/replace/update								as needed	Trail Staff	
3.6.1	Lighting & Crossing Signal Inspection				X					Trail Staff	
3.6.2	Lighting & Crossing Signal Maintenance								as needed	Contractor	
3.7.1	Kiosks and Shelters Inspection				X					Trail Staff	
3.7.2-5	Kiosks and Shelters repair/reset/replace								as needed	Contractor	
3.8.1-3	Toilet Facilities (temporary)	X							as needed	Contractor	adjust for seasonal volumns
3.9.1	Toilet Facilities (permanent)	X							as needed	Contractor	adjust for seasonal volumns
3.10.1	Parking Lot Inspections				X					Trail Staff	
3.10.2-4	Parking Lot Maintenance								as needed	Contractor	address with trail surface and vegetation
<b>SECTION 4 SITE CONDITIONS</b>											
<b>4.1 Vegetation</b>											
4.1.2	Vegetation Review (Visual)				X				as needed	Trail Staff	adjust for seasonal/site-specific conditions
4.1.4	Mowing - trail shoulder				X2				as needed	Contractor	min. 0.5m from edge trail, if/as appropriate
4.1.4	Mowing - corridor (selected locations)				X2				as needed	Contractor	targeted areas (e.g. Enderby, trailheads)
4.1.4	Mowing - finish (around signs)				X2				as needed	Contractor	hand brush saw finish around signs, fencing
4.1.5	Brushing - clear width, sight lines				X	X			as needed	Contractor	min. 1.0m clear width; note exemptions
4.1.6	Prune - vertical clearance overhang				X	X			as needed	Contractor	min. 1.0m clear height
4.1.7	Root removal - trail surface				X	X			as needed	Contractor	
4.1.8	Tree removal - danger trees, blow down							X	as needed	Contractor	after winter and storms
4.2.1	Invasive/Noxious Weed Treatment								as needed	TOC	Splatsin/CSRD(CSISS)/RDNO
<b>4.3 Shoreline and Bank Erosion</b>											
4.3.1	Shoreline/Bank Erosion Inspection (Visual)				X			X		Trail Staff	after spring snowmelt & storm
4.3.2	Shoreline/Bank Erosion Assessment (QP)								as needed	QP	Qualified Professional detailed inspections
4.3.3	Shoreline/Bank Erosion repair								as needed	Contractor	
<b>4.4 Rockfall and Slope Stability</b>											
4.4.1	Rockfall/Slope Stability Inspection (Visual)				X	X				Trail Staff	
4.4.2	Rockfall/Slope Stability Inspection (QP)								as needed	QP	
4.4.3	Rock and debris removal								as needed	Trail Staff	
4.4.4	Rock scaling								as needed	Contractor	
<b>4.5 Litter and Vandalism</b>											
4.5.1	Litter and Vandalism Monitoring	X							ongoing	Trail Staff	includes graffiti; see general monitoring
4.5.2	Trash/Recycling pickup	X							ongoing	Trail Staff	include minor tidy up along corridor
4.5.4	Vandalism Response (including graffiti)								as needed	Trail Staff	prompt response including graffiti removal



## Maintenance Budget Projections. . .

Updated: February 22, 2022					Capital Repair	
Reference: <a href="#">Maintenance Standards - SNO Rail Trail</a>		Budget Projection				
Section	Maintenance Activity	Rate	per	Qty	Budget	Notes re: Costing Assumptions
<b>SECTION 1 GENERAL</b>						
1.2.12	Maintenance Coordination Meeting					internal jurisdictional cost
1.2.13	Update Maintenance Standards					internal jurisdictional cost
1.3	Monitoring and Review	\$575.00	day	2	\$1,150.00	1 person, travel, equipment
1.4.3	Safety Inspections					combined with Annual & waste remove
1.4.4	Wildlife/Danger Tree Assessment	\$575.00	day	2	\$1,150.00	1 person certified, travel, equipment
1.6.1	Encroachments					internal jurisdictional cost
<b>SECTION 2 TRAIL CONDITIONS</b>						
<b>2.1 Aggregate Trail</b>						
2.1.1	Trail Surface Review (visual)					combined with annual inspection above
2.1.2	Surface grading, blading, compaction				\$33,343.04	Combined Capital Replacement & Repair Reserve - Trail Surface
2.1.3	Import aggregate - place, grade, compact					
2.1.4	Maintain crown or tilt to side - grade, blade					
2.1.5	Smooth aggregate/asphalt transitions	\$920.00	day	5		
2.1.6	Clear debris and litter	\$920.00	day	15	\$13,800.00	2 prs crew - 10 km/day x 5 days x 3/year
2.1.7	Dust control					
2.1.8	Smooth vehicle crossing transitions					combine with surface grading above
<b>2.2 Asphalt Trail</b>						
2.2.1	Asphalt trail surface review (visual)					combined with annual inspection above
2.2.2	Clear debris and litter					combine with aggregate clearing above
2.2.3	Seal cracks wider than 25mm				\$23,873.20	Combined Capital Replacement & Repair Reserve - Road Crossings
2.2.4	Fill potholes and cracks > 25mm deep					
2.2.5	Level heaved surfaces > 25mm					
2.2.6	Remove/resurface damaged sections					
2.2.7	Feather/pull shoulders					
2.2.8	Sweep sand, gravel, debris from surface					
2.2.9	Re-apply lines and text					combined with road crossings above
2.2.10	Smooth vehicle crossing transitions					combined with road crossings above
<b>2.3 Snow Removal</b>						
2.3.1	Plow/sweep/remove snow					currently n/a
2.3.2	Apply sand					currently n/a
2.3.5	Remove winter sand/gravel from trail					currently n/a
<b>SECTION 3 STRUCTURES and FACILITIES</b>						
3.1.1.	Bridge and Trestle Inspection (Visual)					combined with annual inspection above
3.1.2	Bridge and Trestle Assessment (QP)	\$8,000.00	5 years	0.2	\$1,600.00	every 5 years, or as needed, 8 hr/bridge
3.1.4	Bridge and Trestle Repair				\$4,900.00	Capital Reserve - Bridges and Trestles
3.2.1	Ditch/Culverts/Headwall Inspection					combined with annual inspection above
3.2.2	Ditch Maintenance (ditching/clean out)				\$8,140.00	Capital Reserve - includes culvert repair
3.2.3	Culvert Clearing	\$500.00	culvert	6	\$3,000.00	avg 6/yr of 30 culverts over 5 years
3.3.1	Fences, Gates, and Bollards Inspection					combined with annual inspection above
3.3.2	Repair/reset/replace fence & bollards				\$6,326.40	Combined Capital Replacement & Repair Reserve - Fences and Barriers
3.3.3	Tighten fence cables & fabric					

3.4.2	Furniture and Equipment Inspection					combined with annual inspection above
3.4.3-8	Furniture adjust/reset/repair/replace					Capital Reserve - Trailheads & Side Dest
3.5.1	Sign Inspection					combined with annual inspection above
3.5.2-5	Signs - repair/replace/update				\$10,800.00	Capital Reserve - Signs
3.6.1	Lighting & Crossing Signal Inspection					combined with annual inspection above
3.6.2	Lighting & Crossing Signal Maintenance					combine with Asphalt - Road Crossings
3.7.1	Kiosks and Shelters Inspection					combined with annual inspection above
3.7.2-5	Kiosks and Shelters repair/reset/replace					combine with Parking Lot Maintenance
3.8.1-3	Toilet Facilities (temporary)					alternate to permanent costing
3.9.1	Toilet Facilities (permanent)	\$600.00	toilet	22	\$13,200.00	vault pump out avg 2 x/yr x 11 locations
3.10.1	Parking Lot Inspections					combined with annual inspection above
3.10.2-4	Parking Lot Maintenance				\$14,337.33	Capital Reserve - Trailheads & Side Dest
<b>SECTION 4 SITE CONDITIONS</b>						
<b>4.1 Vegetation</b>						
4.1.2	Vegetation Review (Visual)					combined with annual inspection above
4.1.4	Mowing - trail shoulder	\$125.00	hr	24	\$3,000.00	flail mower x 2 annual
4.1.4	Mowing - corridor (selected locations)	\$125.00	hr	12	\$1,500.00	brush rotary mower x 2 annual
4.1.4	Mowing - finish (around signs)	\$920.00	hr	8	\$7,360.00	2 prs crew x 2 annual
4.1.5	Brushing - clear width, sight lines	\$920.00	day	10	\$9,200.00	2 prs crew - incl annual + as needed
4.1.6	Prune - vertical clearance overhang	\$920.00	day	10	\$9,200.00	2 prs crew - incl annual + as needed
4.1.7	Root removal - trail surface	\$920.00	day	8	\$7,360.00	2 prs crew - annual spot locations
4.1.8	Tree removal - danger trees, blow down	\$920.00	day	8	\$7,360.00	2 prs crew - incl annual + as needed
4.1.10	Revegetation - monitor/maintenance					to be determined
4.2.1	Invasive/Noxious Weed Treatment					to be determined
<b>4.3 Shoreline and Bank Erosion</b>						
4.3.1	Shoreline/Bank Erosion Inspection (Visual)					combined with annual inspection above
4.3.2	Shoreline/Bank Erosion Assessment (QP)	\$2,000.00	day	2	\$4,000.00	avg. 2 days/year
4.3.3	Shoreline/Bank Erosion repair				\$120,000.00	Capital Replacement & Repair Reserve
<b>4.4 Rockfall and Slope Stability</b>						
4.4.1	Rockfall/Slope Stability Inspection (Visual)					combined with annual inspection above
4.4.2	Rockfall/Slope Stability Inspection (QP)	\$2,000.00	day	1	\$2,000.00	annual first 3 yrs; then every 5 yrs
4.4.3	Rock and debris removal	\$920.00	day	5	\$4,600.00	2 prs crew - annual & as needed
4.4.4	Rock scaling				\$10,285.00	Capital Replacement & Repair Reserve
<b>4.5 Litter and Vandalism</b>						
4.5.1	Litter and Vandalism Monitoring					combine with trash/recycle pickup
4.5.2	Trash/Recycling pickup	\$575.00	day	32	\$18,400.00	1 prs May-Oct=wklly, Nov-Apr=mthly
4.5.4	Vandalism Response (including graffiti)	\$245.00	incident	5	\$1,225.00	avg 5 incidents/year
<b>Sub-Total</b>					<b>\$345,709.97</b>	
Contingency Margin					10%	\$34,571.00
<b>TOTAL</b>					<b>\$380,280.96</b>	
Total/metre/year					\$6.91	assumes 50 km corridor
Routine (Basic) Corridor Inspection/Maintenance Sub-Total					\$92,905.00	Routine tasks only, incl mowing
Contingency Margin					10%	\$9,290.50
<b>Routein (Basic) Corridor Inspection/Maintenance TOTAL</b>					<b>\$102,195.50</b>	
Routine (Basic) Total/metre/year					\$2.04	

## Adaptive Management Monitoring Table

(See [Shuswap North Okanagan Rail Trail Development Plan](#), Section 7.5)

Using the Adaptive Management approach outlined in the [Shuswap Regional Trails Strategy](#), 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 priorities identified in the [Shuswap North Okanagan Rail Trail Development Plan](#). (Section 7.5)

**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 businesses and other community events	Community reports; parking congestion; increased wear on infrastructure	Redirected trailhead use, publicity materials, signage, addition of managed parking areas, improved infrastructure

See [Shuswap Trails Environmental Screening Table 2015](#) for full mitigation measures and guidelines.