Asset Assessment 2023 – Asset Condition and Maintenance Assessments

Annex A
Appendix 5
Trail Condition and Maintenance Assessment Detail

Trail condition assessments are to be conducted using the Trail Inspection Manual for all Class "C" components. All others shall be inspected using the Parks Canada Agency Trails Infrastructure Standard. Data is managed using the Agency's asset information management system (Maximo).

1 Trail Condition Rating Methodology

The trail condition rating methodology is divided into three subject areas:

- Trail infrastructure, which includes engineered or built features of a trail;
- Trail components, related to the tread of the trail and the corridor on either side of the trail; and,
- Environmental and safety risks.

A detailed methodology for assessing each of these subjects is described in the following sections.

Overall Condition ratings only apply to trail infrastructure and components. Give a rating based on your holistic evaluation of the asset. The Overall Condition ratings are as follows:

- A – Good or normal maintenance: Excellent condition, no repairs warranted. There is normal wear and tear with no noticeable reduction in stability or performance. The asset is maintained through routine maintenance procedures.
- B – Minor or fair deterioration: Fair to good condition, repairs likely in 5–10 years. There is a slight loss of stability or performance, which will increase if corrective work is not done.
- C – Poor or significant deterioration: Inadequate to poor condition, repairs likely within 1–5 years. There is a loss of stability or performance. The original design standards are no longer being maintained. If corrective work is not done, rapid deterioration will occur.
- D – Closure or major deterioration: Critically inadequate, high priority for maintenance within 1 year. There is a critical loss of stability or performance. Operation of the asset is substandard and should be suspended. Other assets and components are exposed to an increase rate of deterioration or prone to failure as a result of this condition.

1.1 Inspecting Trail Infrastructure

All applicable trail-related engineered features/infrastructure must be inspected to identify any deficiencies. **Table 1** lists the 13 types of infrastructure to be inspected. For help determining the applicability of a structure, refer to **1.1.1 Trail Structure Classification**.

A systemic approach to effectively inspect trail infrastructure, as well as additional considerations per infrastructure type, are proposed below.

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Table 1: Types of Trail Infrastructure

ID	Infrastructure
1	Boardwalk
2	Bog bridge / plankwalk / puncheon
3	Bridge
4	Fence / barrier / railing (***stand alone***)
5	Ladder
6	Lookout / viewing platform
7	Retaining wall / crib wall
8	Rock fall protection
9	Signage
10	Stairs / steps
11	Turnpike / causeway / corduroy
12	Water diversion system *(including culvert, waterbar)*
13	Other infrastructure (please specify)

1.1.1 Trail Structure Classification

The PCA Trail Inspection manual only covers general and special inspections for **trails** and **Class C structures**. Inspections for Class A and Class B bridges and structures (identified by Asset Type in the Agency's asset information management system, Maximo) must be completed by personnel meeting the qualifications listed in the *Parks Canada Trail Infrastructure Standard*.[1]

Class C structures can be found on all types of trails. They must:

- not carry vehicular traffic;
- not qualify as a single load path structure;
    - **single load path structure:** a structure in which the failure of a primary component (e.g. girder, main cable) results in catastrophic or complete failure of the structure. Examples of structures with single load paths include cable cars, suspension and truss bridges.
- not be higher than 0.6 meters (based on the greatest distance from the deck/walking surface to the ground, adjacent surface, or bottom of watercourse);
- not be situated in a site where hazardous conditions could result in a loss of life, debilitating or disfiguring injury such as:

[1] Qualifications required are listed in the Parks Canada Agency Trail Infrastructure Standard, section 10.5.5 (10.5.5. Inspector Qualifications).

- fast flowing water for all or majority of the operating season (i.e. doesn't include cyclical spring run-off periods, flash flood events, etc.);
- dangerous streambeds (e.g. presence of large rocks, loose surfaces, steep banks);
- hazardous downstream conditions (e.g. waterfall, severe rapids, whirlpools);
- structures located near steep slopes (e.g. viewing platforms overlooking ravines or near cliffs).

1.1.2 Systemic Assessment Criteria for Trail Infrastructure

The following section outlines a series of checks and considerations to inspect each infrastructure type in terms of its individual parts and it's whole. Please note that this list is not exhaustive, it is only meant to outline a generalized systemic approach.

.1 Purpose & Intended Use

Assess the basis for the infrastructure.

- Determine whether the infrastructure is still warranted and purposeful.
- Establish whether the infrastructure successfully and sufficiently protect natural and cultural resources.

.2 Structure

Inspect the structure as a whole, as well as its structural components individually. Start with the skeleton of the infrastructure, which is often hidden from view. This might include, but not be limited to: stringers, joists, abutments, piers, pilings, and support posts. Inspect the foundation of the infrastructure and its anchors, especially where they join with the ground and immediate environment. Then, take a look at other components such as railings/barriers, walking surface, and more.

- Determine whether the structure is still in the condition it was built.
- Ensure all constructed components are functional and present.
  Are there missing components? (e.g.: fasteners/attachments, braces, railing support)
  Are gaps forming between structural components?
- Assess the stability, strength/sturdiness, and structural integrity of all components.
  Can it withstand visitor use and environmental forces? Horizontal and vertical forces?
  Does a component look to be sagging, bending, or vibrating beyond what might be considered normal flex or response when it is under stress?
  Are fasteners all tight? Any loose or missing bolts?
- Look for any sign of erosion or other issue that could compromise the foundation and affecting the stability and sturdiness of the infrastructure.
- Flag if the walking surface is abnormally slippery.
  Is the walking surface draining properly? Is it covered with organic debris?

- Examine the structure to ensure it is appropriately level, plumb, and planar wherever appropriate.

  Has the foundation and structure shifted (e.g.: up, down, rotation)?

Stonework includes various kinds of stone structures such as stone paving, stepping stones, stone steps, and stone retaining walls (these are covered by different infrastructure types). Stonework often relies on gravity and placement for stability without any extra joint material. As such, the strength and resilience of these structures is contingent on a solid and stable foundation as well as good contact points between stones where applicable. Over time, compaction and erosion can destabilize the stones and/or ground around them, increasing the risk of failure.

- Look carefully for any sign of instability, missing or loose fill, and/or cracks forming around the stones. Where joint material is used for binding, look for cracks and signs of movement.

  Is a stone wobbly when stepped on?
- Examine drainage patterns to ensure runoff water is being diverted appropriately above stonework where applicable.

  Are there gaps caused by erosion between the stones?

.3 Materials

Inspect the condition of materials, including fasteners for advanced signs of deterioration beyond normal wear & tear.

- Look for visual signs of defects or degradation (see **Table 2**).

  Are there signs of weathering, corrosion, rot, fraying, splitting, spalling, scaling, cracking, and/or other defects?

  Are there signs of insects (e.g.: termites, carpenter ants, powder post beetles) or animal damage (e.g.: beavers, porcupines) such as teeth marks, frass, saw dust, and wood chips?

  Are there signs of missing material parts or flaking of protective coating?
- Test the physical integrity of materials.

  Does the material look, feel, and sound like it is solid and in good shape?

  Can the material perform to its intended purpose, or will it be prone to failure?

  Are there signs of bending, sagging, warping, and/or other defects?
- Check for vegetation and/or organic matters on or in direct contact with the materials.

  Are there stains or discoloured areas indicating moisture issues or mold?

  Is organic matter impeding on proper drainage or the function of the infrastructure?

  Is organic matter accumulating between wooden planks of a walking surface? Is moss, algae, or slime growing on wood?

Table 2: Typical Defects For Material Type

Material Type	Most Common Material Defects	
Concrete	Cracking (large or small) Efflorescence (white staining) Exposed and/or corroded rebar	Pop out (small break away) Scaling (looks weathered) Spalling (pieces missing)
Fiberglass	Blistering Cracking	Discoloring Warping
Mortar/joint material	Cracking	Loose/missing material
Plastic	Cracking Deformations (sagging, buckling or bending)	Discoloring Weakening (brittle material)
Steel and other metals	Deformations (sagging, buckling or bending)	Corrosion (blistering or pitting) Flaking of coating Weak welding
Wood	Bulging (warped in shape) Cracking (large or small) Crushing	Deterioration (wear & abrasion) Rot/decay Splitting

Decay in wood from rot/fungus is most likely to occur at connections, splices, support points (where moisture tends to build) or around bolt holes (whenever a post-factory cut or hole is made).

.4 **Environmental Threats**

Inspect the immediate environment around the infrastructure to identify existing signs of degradation or potential hazards to the infrastructure and/or visitors from different natural forces, including climate change.

- Look out for hazardous trees (e.g.: standing dead or leaning tree, snags and broken limbs) that might fall on the infrastructure during a windstorm.
- Check streams/waterways and drainage patterns.
  - *Are there signs of high water flows that might hit the infrastructure during spring melt or heavy rains and cause flood damage?*
  - *Is water pooling on/near the infrastructure?*
  - *Are waterways upstream of the infrastructure obstructed by debris?*
  - *Is water drainage occurring like it should?*
  - *Is debris accumulating on or around the infrastructure?*
- Study erosion patterns and shifting soils.
  - *How stable is the ground near/under the infrastructure?*
  - *Are there signs of slumping/erosion/instability along embankments near the infrastructure?*
- Examine the approach and immediate space around the infrastructure for drainage and erosion issues.

Has the ramp up to an infrastructure eroded, creating a step?
Is there a dip with a puddle immediately before/after the infrastructure and/or around it?

.5 Visitor Experience and Safety

Consider visitor use and experience, as well as visitor safety in your inspection of all trail infrastructure.

- Examine patterns of visitor use on/around the infrastructure.
  How are visitors using it or moving through it?
  Are there social trails, and where do they go?
  What can be learned from the actions or movements of visitors?
- Identify any immediate or anticipated safety risk posed by the condition of infrastructure and/or its immediate environment.
- Check for any protruding fastener or other tripping hazard.
- Identify any accessibility issue and/or user inconvenience (e.g.: difficult high step).
- Identify acts of vandalism that might dramatically deter from a positive visitor experience.
- Record the significant presence of trash.

1.1.3 Additional Considerations Per Infrastructure Type

In addition to the systemic approach, other considerations unique to various infrastructure types are listed in the next pages.

Boardwalks, bog bridges, plank walks and puncheons are generally defined as elevated structures providing a means of passage across sensitive habitat, soft terrain (e.g. marsh, sand), bodies of standing water or to enhance the visitor experience and protect the surrounding environment. They differ from turnpikes / causeways / corduroy, which focus on raised tread structures.

.1 Boardwalks (Class C Only)

Boardwalks are the most engineered version of these structures. They usually sit on piers or piles that support stringers, a fixed plank deck, and often other features such as railings and toe guards. They can be made of different materials such as treated wood, fiberglass, metal, and concrete. Floating boardwalks—structures that are not static and move vertically with variations in water level—are part of this category.

- In case of doubt about the structure classification, inspect the infrastructure and note down your uncertainty. Remember, you should always report back any noticeable deficiencies.

- Inspect the structure approaches (start and end). If there is a step, determine if it was by design or not. Over time, the compaction or erosion of soil ramps can result in a lip/step that can be a tripping hazard and/or an accessibility barrier.
- Due to their frequent presence in wet environments, a special attention must be given to the physical condition of the materials.
- Check for organic matter between planks which can trap water/moisture and lead to early decay.
- If there is no toe guard (bottom rail) or railing, determine if it might improve visitor comfort, safety, and accessibility.

.2 Bog Bridge, Plank Walk, and Puncheons

Bog bridges, plank walks, and puncheons are typically rustic versions of boardwalks often made from locally-sourced wood and/or imported timber. These structures are typically built on buried/sinking sills and stringers that rest directly in contact with the ground. They often don't include features like perpendicular fixed plank deck, railings, and toe guards. This category also includes other similar construction (e.g.: gadbury), recognizing that the difference between each name tend to be in nomenclature only, varying from region to region.

- In case of doubt about the structure classification, inspect the infrastructure and note down your uncertainty. Remember, you should always report back any noticeable deficiencies.
- Inspect the structure approaches (start and end). If there is a step, determine if it was by design or not. Over time, the compaction or erosion of soil ramps can result in a lip/step that can be a tripping hazard and/or an accessibility barrier.
- Due to their frequent presence in wet environments, a special attention must be given to the physical condition of the materials.
- Check for organic matter between planks which can trap water/moisture and lead to early decay.
- If there is no toe guard (bottom rail) or railing, determine if it might improve visitor comfort, safety, and accessibility.

.3 Bridge (Class C Only)

The following inspection criteria apply to Class C bridges only - typically simple structures that are not substantial in size. See **1.1.1 Trail Structure Classification** for additional details. The inspections of all other classes of bridges must be completed by trained personnel as detailed in the *Parks Canada Trail Infrastructure Standard*.

- In case of doubt about the bridge classification, inspect the infrastructure and note down your uncertainty. Remember, you should always report back any noticeable deficiencies.

- Inspect the bridge approaches (start and end) as part of the bridge infrastructure. Over time, the compaction or erosion of soil ramps can result in a lip/step that can be a tripping hazard and/or an accessibility barrier.
- Check for organic matter between wooden planks (e.g.: leaves, needles) that accumulate moisture and accelerate degradation.
- If there is no toe guard (bottom rail) or railing, determine if it might improve visitor comfort, safety, and accessibility.

.4 Fence / Barrier / Railing (Standalone)

This includes all types of standalone infrastructure such as railings, barriers, guards, and fences that assist with user balance, prevent accidental falls (e.g.: from drop-offs), and/or protect resources by limiting access to certain areas and keeping visitors on trail. Gates and chicanes are also part of this category. However, any railing part of a bigger infrastructure should be addressed as part of the assessment for that infrastructure (e.g. bridge).

- Some railings, barriers, and fences are only designed as visual cues delineating the boundaries of allowed travel space and might not designed to support the weight of trail users. Report any sign of damage from misuse (e.g. users climbing on railings) that might warrant warning signage (e.g. do not lean on the fence).
- Flag social trails around and behind the structure where visitors might be circumventing its purpose (e.g. visitor safety, protection of resources).

.5 Ladder

Ladders include infrastructure used to gain/lose elevation over a near vertical distance, such as drilled rungs and wooden/metal structures of open steps held together by two long vertical stringers. Although ladders are not covered by the PCA Trail Infrastructure Standard, they should nonetheless be inspected.

- This type of infrastructure should not be found on a Type 1 or Type 2 trail. Write a special note if it is the case for the purpose of future reclassification.

.6 Lookout/Viewing Platform (Class C Only)

This includes only Class C built lookouts and viewing platforms. See **1.1.1 Trail Structure Classification** for additional details. Natural lookout features such as a rock promontory are not included, although these features might include a railing/barrier or pose a visitor safety risk that should be mitigated. The inspections of all other classes of lookout/viewing platform must be completed by trained personnel as detailed in the *Parks Canada Trail Infrastructure Standard*.

- Include notes about the railing of a structure as part of the lookout/viewing platform, instead of the standalone fence / barrier / railing.
- Check for organic matter between wooden planks (e.g.: leaves, needles) that accumulate moisture and accelerate degradation.

.7 Retaining Wall / Crib Wall

This includes any construction built to prevent movement of soil, retaining the back slope (upslope) or supporting the trail tread (downslope). This type of infrastructure is typically made of wood or rock. Although retaining walls are not covered by the PCA Trail Infrastructure Standard, they should nonetheless be inspected.

- Look carefully for any sign of instability, missing fill, and/or cracks forming around the stones or logs.

.8 Rock Fall Protection

This includes all types of rock fall protection such as sprayed concrete, anchored wire nets/mesh, and catch walls.

- Look for signs of erosion that might indicate slope instability, as well as any rock/particles seeping through the wire nets/mesh or catch walls.
- Look for flaking or other concrete material defects where applicable.
- Look for any sign of broken anchor points.
- Report the presence of rocks only held in place by the wire nets/mesh or catch walls.

.9 Signage

This includes all trail-related signage (e.g.: trailhead panel, interpretive sign, trail marker). Although interpretive signage is not covered by the PCA Trail Infrastructure Standard, they should nonetheless be inspected.

- **Legibility**: Make sure signage is still bright, clean, and usable—free of graffiti, vandalism, and/or degradation (e.g.: from ultraviolet damage) affecting legibility.
- **Visibility**: Ensure that signs are visible from all intended direction(s) and not obscured by vines, trees, or shrubs.
- **Tree attachment**: Check if signs are properly attached to trees (where applicable) with sufficient room between the sign and the bark for the tree to grow. A minimum of 2.5 cm (1 in) gap is strongly recommended. Note down any deformation to the sign(s).
- **Condition of structure or post**: Inspect the stability, sturdiness, and level of the signage structure or post where applicable. Refer to the systemic approach as needed.

.10 Stairs / Steps

This includes primary trail infrastructure that provide a means to change elevation and control erosion. **Stairs** are a series of continuous steps over a short horizontal distance, whereas **steps** are a set of spaced structures typically separated by short tread sections held in place by said steps.

- The recommended height of a step is 15–20 cm (6–8 in). A consistent rise is important.
- Pay attention of signs of visitor behaviour along/around stairs and steps. If each step is too high or low, or if the tread between step eroded away, you might notice evidence

that users are avoiding them. This behaviour can result in trail braiding and fall line channels for water to erode the infrastructure in the process.

- Rock steps that are too small are likely to be dislodged and should be tested and recorded accordingly.

Stepping stones are stones laid in a water channel to help users cross it. This type of structure is also included in this topic, although its purpose differs slightly.

- Test the stability of the stones.
- Check to ensure the structure is not undermining the flow of water downstream by design or because of accumulated debris.

.11 Turnpike / Causeway / Corduroy

This includes any infrastructure that elevates the tread of a trail section above problematic areas of the natural landscape—generally permanently or seasonally wet with low drainage. Terms like turnpike and causeway are used largely interchangeably, although a turnpike generally has log outer walls, whereas those of a causeway are rock. Both provide a dry, elevated natural surface tread through the muddy area and are constructed to allow drainage through the structure. For elevated infrastructure with a wood surface, see Boardwalk and Bog bridge, plank walk, and puncheon.

Corduroys are logs placed side-by-side directly on the ground perpendicular to the trail. This type of infrastructure used to be a common solution to manage soft soil, but required considerable maintenance. It is no longer considered sustainable.

- Check for proper cross drainage (ideally 90° from trail alignment). If the natural flow of water is impeded or dammed, it might eventually flow over the infrastructure and/or cause other forms of damage.
- Check if the treadway of the infrastructure is still crowned. Depressions or washed-out tread within the walls of a turnkpike or causeway may result in puddles and further damage. Exposed fill (rocks) or geotextile within the walls is also evidence of maintenance need.
- Test the stability of the rocks (where applicable). Check as well for gaps where rocks are intended to be congruous to hold the fill.

.12 Water Diversion System

This includes water diversion systems usually built from foreign materials, most notably waterbars and culverts. Rolling grade dips are inspected as part of the trail components.

- **Waterbars** are typically made of wood or rock and installed perpendicularly on steeper grades to catch and divert water off trail. They used to be a common solution to divert water out of the trail tread. However, they are no longer considered sustainable.
    - Always record the occurrence of a waterbar on trail.

- Pay attention to silt and debris on the uptrail side of the waterbar. Over time, it will tend to accumulate against the structure and fill up the lip meant to divert flowing water, especially if its gradient is too shallow. This effectively renders the waterbar ineffective if not maintained. Other debris on the outside edge of the trail can also impede proper drainage.
- Trail users tend to go around waterbars if they become an obstacle/high step. Keep an eye for trail braiding that create channels for water to continue flowing doing the trail.

- **Culverts** can be open (usually either rock or wood) or closed (metal, rock, wood, or plastic) drainage channels perpendicular to the trail. Closed culverts can easily be missed since they are typically buried below the trail tread. Although culverts are not covered by the PCA Trail Infrastructure Standard, they should nonetheless be inspected.
  - Check for inadequate armoring of entrance and exit.
  - Check for shallow gradient or culvert filled with silt or other organic matters.
  - Observe both sides of the trail and check for any obstructions to the natural flow of water and determine if the culvert is positioned appropriately to move the water past the trail (e.g.: is it at the right height and angle?).
  - Report any exposed closed culverts as the material is not typically made to sustain direct impact from user traffic.

.13 Other Infrastructure

Use this category to identify any other type of infrastructure not defined in previous issue IDs, including uncommon infrastructure (e.g.: chains), trail amenities (e.g.: benches, red chairs) and mountain biking technical trail features (TTF) built from wood and other imported materials. For dirt TFFs like berms and jumps, see Other trail component. Please specify the type of infrastructure in your notes.

1.2 Inspecting Trail Components

The entire length of the trail corridor, including the tread and other trail components, must be inspected to identify deficiencies and issues. **Table 3** lists applicable trail components that are likely to be found on trails.

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Table 3: Applicable Trail Components

ID	Trail Components
1	Corridor
2	Tread / Wearing Surface Material
3	Technical trail feature
4	Other trail component (please specify)

.1 Corridor

The area above and to the sides of the trail tread, also known as the clearing limits.

.2 Tread/Wearing Surface Material

The tread/wearing surface material is likely to change throughout the trail. Identify the surface material and the location (latitude and longitude) of any significant surface material changes. Typical surface materials are asphalt, chipwood, concrete, gravel, mixed and natural ground.

.3 Technical Trail Features

This includes all technical trail features (TFFs) such as berms, bumps, jumps, and rock gardens. Although TFFs are not covered by the PCA Trail Infrastructure Standard, they should nonetheless be recorded.

.4 Other Trail Component

Use this category to identify any other type of trail component issue not covered in previous categories.

1.2.1 Additional Considerations Per Component

Table 4 lists 12 categories covering the primary types of deficiencies likely to be found on trails.

If multiple trail component issues overlap, such as erosion (shape deformation) along a faulty alignment, report the most critical issue and note the other issues in the details when relevant. Beware of information overload, however. For instance, although environmental/safety risks are rarely divorced from trail component issues, they are often implied and do not always require repeating.

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Table 4: Applicable Defective Trail Components

ID	Trail Component Issues
1	Corridor | Deadfall / windfall
2	Corridor | Overgrown (based on trail type – Refer to **Table 5**)
3	Corridor | Revegetation/reclamation needed
4	Tread | Faulty alignment
5	Tread | Shape deformation (erosion, compaction, displacement, cracking)
6	Tread | Social trail / braids
7	Tread | Stone armouring
8	Tread | Surface slippery or soft
9	Tread | Tripping hazards (roots, rocks, etc)
10	Tread | Water on tread
11	Other trail component issue (please specify)

Additional considerations unique to various component issues are listed in the next pages.

.1 Corridor | Deadfall / Windfall

This category includes deadfall, windfall, and blowdowns, i.e.: downed or hung up trees and tree parts within the trail corridor. Fallen trees and limbs should be removed as soon as possible to encourage users to stay on the designated trail. Keep an eye for standing dead trees, leaners, and loose overhead debris such as limbs and tree tops (widowmakers) that may pose a risk to trail users. These hazards can be reported under Overhead hazard (rock fall, tree).

- Provide an estimate of the number, size, and location of downed trees to be removed to convey a sense of the complexity of the task, e.g.:
  - *small diameter tree on the ground across the tread*;
  - *jackstraw of 5 small diameter burnt trees hung up on live tree*.

.2 Corridor | Overgrown (Based On Type)

This includes vegetation encroachment (branches, shrubs, grasses) into the trail corridor, which includes the tread and the buffer zones that extend horizontally and vertically from it.

- Minimum clearing width and height specifications vary by trail type as well as user type (see **Table 5**).
- Ensure that no trimmed branches “poke” into the trail corridor.
- Ensure that trail intersections are properly maintained and clearly visible.
- Inspect sightlines, especially ahead of intersections, abrupt turns, and switchbacks to prevent user conflicts and human-wildlife conflicts. Remember to consider travel direction and speed based on user types.

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Table 5: Corridor Clearing Specifications Per Trail and User Type

		Type 1	Type 2	Type 3	Type 4
Pedestrian/Bicycle/ Snowshoeing	Width	2–3.5 m	2–3.5 m	1–2 m	N/A
	Height	3 m	3 m	0–3 m	N/A
Equestrian	Width	4 m +	2–4 m	1.5–2.5 m	N/A
	Height	3.5 m	3.5 m	3.5 m	N/A
Cross-country Skiing	Width	5 m +	2–4 m	1–2 m	N/A
	Height	3 m	3 m	3 m	N/A
For the complete list of trail specifications per type, see the *Parks Canada Trail Classification System*.					

.3 Corridor | Revegetation/Restoration Needed

This includes all instances of environmental sites in an undesirable condition, typically as a result of human intervention, where revegetation and/or restoration work is advisable. This work can help stabilize slopes and prevent washouts, fix damage resulting from a construction site, improve the experience of a trail, encourage users to stay on trail, and/or block access to social trails.

Restoration (returning a site to its natural, unimpaired condition) is sometimes limited to reclamation (stabilizing an environmental site to prevent further degradation) and/or rehabilitation (creating the conditions for environmental restoration to happen naturally).

- Take photographs and record as much details as you can on the work area, including soil type, surrounding vegetation, and type of approach recommended.
- Note if previous restoration work has not been successful.

.4 Tread | Faulty Alignment

This includes faulty trail alignment such as fall lines and/or trails that travel through areas that should be avoided for environmental or cultural resources considerations. As a general rule of thumb, a trail that breaks one of the five essential elements of sustainable trails (half rule, ten percent average, maximum sustainable grade, grade reversal, outslope) will likely have a faulty alignment.

- Consider site-specific factors such as user type, visitation, difficulty level, soil type, terrain, and annual rainfall amount that may be affecting that section of the trail.
- Look for signs of damage caused by the trail alignment (e.g.: fall line funnels water on the tread).

.5 Tread | Shape Deformation

This includes any type of deformation of the trail shape at the level of the surface, base, and/or foundation. Bases and foundations are compacted gravel, soil, or geosynthetic layers that support surface material. Extensive use, erosion, compaction (vertical force), displacement

(horizontal force), and natural forces such as freeze-thaw cycles are typical culprits of trail shape deformation.

- **Paved trails** have a surface made of asphalt or concrete. Use Stone armouring for paver blocks.
  - Look for defects such as cracks, fractures, breaks, missing pieces of pavement, potholes, ruts, and depressions.
  - Inspect the base/subbase for any sign of erosion under the surface.

- **Natural surface trails** have a surface made from any other local or imported natural material.
  - Look for any sign of erosion, washouts, gullies and ruts, deformation, and creep (slough and berm effect).
    - Slough: Accumulated material at the base of the backslope narrows the trail width and forces users off the optimal travel path.
    - Berm: Accumulated material at the edge of the trail forms a berm that impedes natural drainage.
  - Record any exposed and/or worn out geosynthetic fabric, grid, or layer.
  - Record any significant reduction in useable trail width due to a noted defect.

.6 Tread | Social Trail / Braids

This includes social trails and trail braids, both of which widen the footprint of the official trail or trail network. Social trails are paths created by users, often in the form of shortcuts, detours to a scenic viewpoint or natural feature, or trail extensions. Trail braids are often short detours around an obstacle or hazards such as a fallen tree or a puddle. Their environmental and visitor experience impact should be mitigated.

- Social trails and braids are generally indicative of another trail issue or an interest from visitors to gain access and experience a spectacular view, for instance. Be sure to record the probable cause and your recommendations for fixing it. In other words, how should the social trail be addressed? For example:
  - The trail issue (e.g.: a puddle) could be fixed and braids reclaimed to re-establish the intended tread width.
  - Shortcuts could be reclaimed and signage encouraging visitors to stay on trail should be installed as a temporary/permanent measure.
  - Under some circumstances, a social trail to a viewpoint could be formalized if it meets all requirements and considerations.

.7 Tread | Stone Armouring

This includes stone armouring and paving—the reinforcement of a travelling surface with embedded rocks and stones in the ground. For stepping stones to cross a water channel, see Stairs / steps.

- Look carefully for any sign of instability, missing or loose fill, uneven surface, signs of erosion and/or cracks and voids forming around the stones or pavers. Where joint material is used for binding, look for cracks and signs of movement.
- Examine drainage patterns to ensure water is being diverted off the tread.

.8 Tread | Surface Slippery or Soft

This includes slippery and/or soft surfaces that pose a danger to visitors and/or result in environmental damage through trail braiding. Defects can include, for example, muddy or "chewed up" surface, slick bare rocks, and sandy spots.

- Identify whether water is a potential cause of the defect and how it could be diverted off trail.
- Note down if trail braiding occurred in response to the defect, which will require additional restoration work.
- Pay attention to the soil type and recording your findings. Does it contain too much silt or clay?
- If possible, recommend potential fixes (such improving the tread surface or elevating the tread with a turnpike to keep it dry) or mitigation measures (such as seasonal closures).

.9 Tread | Tripping Hazard (Roots, Rocks, Etc)

This includes minor tripping hazards such as exposed roots, rocks (loose and protruding), holes, and more. These hazards are key indicators of degrading trail conditions due to factors such as erosion and tread compaction.

- Tripping hazards are a major concern for visitor safety on type 1 and 2 trails, whereas such obstacles are somewhat expected on a type 3 or 4. Adapt your level of reporting to the trail type. Use your best judgement.
- If possible, recommend a mitigation measure such as adding soil to cover the roots and fixing the erosion problem that led to their exposure.

.10 Tread | Water On Tread

This includes any instance of water trapped on the trail tread due to improper drainage. Defects include mud holes, water streaks and gullies, and standing water. A sustainable trail surface will be designed to shed water directly across the tread.

- Indicate if the trail section includes grade reversals or rolling grade dips that are not performing as intended.

- If possible, indicate the cause of the improper drainage (e.g. berm at the edge of the trail, fall line alignment, etc.).

.11 Other Trail Component Issue

Use this category to identify any other type of trail component issue not covered in previous categories.

1.3 Inspecting Environmental and Safety Risks

The trail and its immediate surroundings must be inspected to identify any indicators of visitor safety risks (existing or potential) or environmental hazards (to Parks Canada assets and/or the natural and cultural resources we protect). **Table 6** lists 7 primary risks to report.

Table 6: Applicable Environmental & Safety Risks Per Trail Type

ID	Environmental & Safety Risks
1	Erosion hazard
2	Fall hazard
3	Overhead hazard (rock fall, tree)
4	Water hazard
5	Wayfinding hazard
6	Wildlife hazard
7	Other risk (please specify)

1.3.1 Considerations Per Environmental & Safety Risk

Key inspection considerations for each environmental hazard and safety risk are listed in the following categories. This list is meant as a guideline and is not exhaustive of all safety or environmental risks that may be found.

.1 Erosion Hazard

This includes any sign or risk of erosion (e.g.: surface collapse, slope subsidence, landslide, riprap deficiency) of/near the trail.

- Report existing and potential hazards based on observations from the surrounding environment and deductions from known issues. For instance, under specific circumstances, we can infer that a trail too close to the edge of a limestone bluff or high river bank might erode in the future.
- Look for trail component issues that lead to a high volume of sediment in water channels.

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.2 Fall Hazard

This includes any fall hazards due to the presence of a vertical or near vertical drop-off adjacent to the trail tread where a mitigation measure (e.g.: barrier, warning sign) is not in place. This can be anything from an elevated boardwalk without a railing to a sinkhole or a cliff. Use fence / barrier / railing for existing fall protection infrastructure problems.

- Use your best judgment in evaluating fall hazard risks.
- Past accidents and near-misses can help identify where mitigation measures are necessary.

.3 Overhead Hazard (Rock Fall, Tree)

This includes any instance of existing or potential hazard overhead—usually rock fall or dangerous trees (widowmakers, hazardous or leaner trees). You may the category corridor | deadfall / windfall to flag trees currently impeding passage on the trail corridor.

- Pay attention to past and current indicators. Known areas include boulder fields, vertical rock faces, limestone bluffs and cliffs, and burned forests with standing dead trees.

.4 Water Hazard

This includes any water-related hazard where risks to visitors, Parks Canada assets, and/or the natural and cultural resources we protect are not mitigated by existing infrastructure. This includes fords, seasonal flooding, oceanic conditions and tides, and trails adjacent to deep or fast moving water.

- Use your best judgment in evaluating water hazard risks.
- Keep in mind seasonal patterns of water level, flow, and turbidity especially if the inspection is completed in late summer with lower water levels.
- Consider whether a trail infrastructure (e.g.: bridge) or trail re-route might help mitigate the hazard or not (e.g.: different fording location, inland bypasses).

.5 Wayfinding Hazard

This includes any instance where wayfinding (someone's capacity to orient and find their way) could be challenging for visitors. Inadequate signage such as an unmarked trail intersection or trailhead can lead to both visitor safety issues and environmental damage. This category does not apply to existing signage.

- The proliferation of social trails and the trampling of vegetation by visitors straying off trail, as well as past instances of visitors getting lost in the area, can be an indicator of a wayfinding hazard.
- Note that the quantity of marking/signage varies based on the trail type, from maximum information provided on type 1 to minimal/no information on types 3 and 4. Refer to the Parks Canada Trail Classification System for details.

.6 Wildlife Hazard

This includes a range of potential wildlife-related hazards that might pose (or have previously posed) a risk to the species in question and/or visitors.

- Inspect sightlines and keep in mind the speed of trail users for different permitted activities. Narrow sightlines can lead to surprise encounters.
- Note that minimum corridor clearing does not guarantee appropriate sightlines. Sharp turns might require additional attention.
- Pay attention to the presence of scats & tracks on/near the trail.
- Be aware of the proximity to known denning/nesting areas or key habitats (especially for species-at-risk).
- Review human-wildlife incident data before inspections and identify if there are problematic areas on trails.

.7 Other Hazard

Use this category to identify any other type of environmental or safety risk not defined in previous categories.

- Consult with local Visitor Safety staff to review incident data and identify if there are problematic areas on trails.

The Trail Inspection Manual and the Parks Canada Trail Infrastructure Standard will be supplied to the successful proponent.

2 Minimum Condition Assessment Metrics

Following the procedures detailed in the Trail Infrastructure Standard, the asset condition assessment program of work must include, at minimum, the metrics outlined below for each asset inspected. A data collection template, with descriptions of each field and instructions for use, will be provided to the successful Proponent(s).

Item No.	Data Point	Criteria
General Asset Information		
.1	Park/site name	Name of national park or national historic site.
.2	Asset name (as recorded in Maximo)	Asset name to match list of assets / asset data provided by PCA.
.3	Asset category	Asset category as recorded in list of assets / asset data provided by PCA.
.4	Asset type	Asset type as recorded in list of assets / asset data provided by PCA
.5	Asset # (Maximo ID number)	Unique number assigned to each asset for identification purposes.
.6	Latitude (Y)	For linear assets such as trails, the location taken will be the primary access point to the asset, and for non-linear assets

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Item No.	Data Point	Criteria
		the location will be either the access point (for large assets) or the approximate centre of the asset (for smaller assets).
.7	Longitude (X)	See above
.8	Assessment Date	Date that the physical assessment was completed.
.9	Assessor (Name of assessor)	Name of the person who conducted the assessment.
.10	Trail Classification	Trail Classification as recorded in list of assets / asset data provided by PCA
.11	Total Time Required for Assessment	Total time spent per trail conducting and recording assessments on all components and infrastructure.
Trail Infrastructure		
.12	Description	Name of infrastructure assessed, based on pre-defined list of components in Maximo and modified as needed.
.13	Infrastructure Type	Based on pre-defined list of infrastructure types
.14	Latitude (Y)	For linear infrastructure such as fencing, the location taken will be the primary access point to the infrastructure, and for non-linear infrastructure the location will be either the access point (for large infrastructure) or the approximate centre of the infrastructure (for smaller infrastructure).
.15	Longitude (X)	See above
.16	Remarks	Notes regarding materials present in the component, manufacturer/model name, condition of component and noted deficiencies.
.17	Visitor Use Patterns	Examine patterns of visitor use on/around the infrastructure.
.18	Ease of Use	Identify any accessibility issue and/or user inconvenience (e.g.: difficult high step).
.19	Environmental Threats	Inspect the immediate environment around the infrastructure to identify existing signs of degradation or potential hazards to the infrastructure and/or visitors from different natural forces, including climate change
.20	Overall Infrastructure Condition	Determine whether the structure is still in the condition it was built.
Trail Components		
.21	Trail Component Type	Based on pre-defined list of trail component types
.22	Trail Component Issue	Based on pre-defined list of trail component issues
.23	Latitude (Y)	For linear components such as tread/wearing surface material, the location taken will be the primary access point to the component, and for non-linear components the location will be either the access point (for large components) or the approximate centre of the component (for smaller components).

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Item No.	Data Point	Criteria
.24	Longitude (X)	See above
.25	Remarks	Provide additional details to help pinpoint and understand the issue, such as a description of the location, dimensions, a list of the components affected, etc.
.26	Overall Component Condition	Determine whether the component is still in the condition it was built.
Environmental and Safety Risks		
.27	Environmental and Safety Risk	Based on pre-defined list of Applicable Environmental and Safety Risks
.28	Latitude (Y)	For linear risks, the location taken will be the primary access point to the risk, and for non-linear risks the location will be either the access point (for large risks) or the approximate centre of the risk (for smaller risks).
.29	Longitude (X)	See above
.30	Remarks	Provide additional details to help pinpoint and understand the issue, such as a description of the location, dimensions, a list of the components affected, etc.
Visitor Experience		
.31	Trash	Record the significant presence of trash.
.32	Vandalism	Identify acts of vandalism that might dramatically deter from a positive visitor experience.
.33	Latitude (Y)	The location will be either the access point (for large occurrences) or the approximate centre of the occurrence (for smaller occurrences).
.34	Longitude (X)	See above
.35	Remarks	Provide additional details to help pinpoint and understand the issue, such as a description of the location, dimensions, a list of the components affected, etc.