DRAFT - Appendix: Scope-specific Best Management Practices for Changes In and About a Stream under the WSA

This document is the Appendix to the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia guidance (General BMP document). **It is recommended that you read the General BMP Document and its companion *A User's Guide for Changes in and About a Stream* before reading this Appendix.**

You are expected to follow the General BMPs document for all General BMPs for all changes in and about a stream (CIAS) projects under the *Water Sustainability Act* (WSA) in addition to any Scope-specific BMPs that pertain to your project. This Appendix contains all Scope-specific BMPs.

IMPORTANT: Mandatory vs. Non-Mandatory
BMPs are widely accepted and recognized approaches that, when adopted and implemented, help individuals to avoid and mitigate potential adverse impacts to aquatic ecosystems, water quality and quantity, and public safety, infrastructure and property. It is recommended that you use provincial BMPs for your work planning as applicable.

BMPs should be interpreted as **non-mandatory guidance if they are NOT made mandatory by being required in a legal instrument** (term or condition in an authorization, change approval or order). If, however, they ARE referenced as a term or condition, then you **must adhere to any BMPs required in the legal instrument.**

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Note to reviewers

This document does not represent published guidance for use or distribution.

The information contained in this document is draft and is intended for the purpose of engagement and feedback only.

This draft document is currently undergoing internal review. Following engagement and review, draft content and format will be edited to incorporate feedback.

It is anticipated that the final version of this document will contain changes based on feedback received. The final version will be published to the Water Policies webpage: https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/water-policies.

The end date for submitting feedback is September 4, 2026. Feedback received after this date is welcome but may be delayed to future updates.

Limitations and Use

Using this Document

The approaches described in this document are not exhaustive and projects may require different methods tailored to site-specific characteristics. This document is not intended to take the place of professional judgment or experience and cannot be relied upon exclusively to satisfy investigations into environmental requirements of a specific site.

The government of B.C. (the Province) recommends that proponents consider these BMPs when planning CIAS work and to refer to them when preparing reports (e.g., an environmental management plan) as part of a CIAS submission, such as a change approval application or notice of authorized change. These BMPs consider issues that are relevant to decisions that are made under the WSA.

Nature of BMPs

Depending on the circumstances of the project proposal, clients may choose not to adopt these BMPs or may choose to modify BMPs to suit site-specific characteristics/needs. These included BMPs are not legislated requirements specified by a statute. However, these **BMPs may be given legal effect** by incorporation as **terms and conditions** of an authorizing instrument like a water licence or change approval. If a BMP is not incorporated through legislation or an authorizing instrument, then it is best understood as non-mandatory guidance.

IMPORTANT: Terms and Conditions
The statutory decision maker has the discretion to include terms and conditions in a legal instrument such as a change approval, water licence, use approval or order. A habitat officer has the discretion to issue terms and conditions for authorized changes. This document does not mandate how that discretion is to be exercised, whether BMPs should be specified, or

This document **supports, and does not replace, the requirements of the WSA** and its associated regulations. Individuals must ensure they are in accordance with **all applicable sections of WSA legislation** and must follow specific terms and conditions included in any authorizing instrument or order issued to them. Where a discrepancy occurs between what is described in legislation and what is described in this document, legislation takes precedence.

While this guidance document relates primarily to the WSA, instream works are also regulated by a number of other federal, provincial and municipal acts, regulations and bylaws. Some of these are referenced within this document. **It is an individual's responsibility to ensure they are compliant with all applicable legislation.**

To determine what sections of this document are applicable to their CIAS work, individuals may find it useful to retain the services of a qualified professional (QP) (e.g., with adequate training and knowledge of hydrology, biology, engineering and/or environmental policies in B.C.).

IMPORTANT: Minimizing BMP Content Overlap
The BMPs avoid repeating provisions as much as possible. It is recommended that you **carefully consider and read all General BMPs and relevant scope-specific BMPs before determining which apply to your project**.

Alternatives to Best Management Practices

While alternative practices may be explored, adherence to any cited BMPs becomes mandatory if you are issued a change approval, water licence, use approval or order with terms and conditions that require you to follow one or more of the BMPs, such as by incorporating them by reference. Following these BMPs can help a proponent meet the statutory requirements under the WSA and Water Sustainability Regulation (WSR), and help avoid impacts to stream values. However, given the diversity of CIAS activities and works, the following BMPs will not always be suitable. Alternatives to the BMPs may be explored if they meet the mandatory requirements within the legislation and do not contravene the terms and conditions of a change approval, water licence, use approval or order.

Guidance for Authorized Changes

Scope-specific BMPs include information for authorized changes under WSR Part 3.

Authorized change applications must meet all criteria specified in WSR Part 3 including scope-specific criteria under WSR Part 3 s. 39. Works that do not meet stated requirements must be authorized by change approval, authorization, or order. Authorized change works must comply with all terms and conditions including those that may be issued by a habitat officer.

If an statutory decision maker (SDM) considers that a proposed authorized change has the potential for significant adverse impact on the aquatic ecosystem or the nature of the stream, including the flow of water in the stream or the stream channel, then the SDM has authority under WSR s.37(2) to require the proponent to apply for and obtain a change approval or authorization despite meeting the criteria for an authorized change.

Common factors an SDM may consider in their determination of adverse impacts includes the work types, timing, and location of proposed activities, overlap with critical or sensitive habitat, watershed condition, channel condition, hydrology, and impacts to other water users or rightsholders.

More information on authorized changes can be found in scope-specific BMPs, the General BMP document, and the User's Guide.

Contact Us and More Information

More information on working around water in B.C. is available on the Province's water webpage or by contacting the FrontCounter BC office or regional offices. Regional offices may have additional region-specific guidance on making CIAS.

FrontCounter BC Contact Centre
Tel.: 1-877-855-3222 (Toll-Free)
Email: frontcounterbc@gov.bc.ca
Web: www.frontcounterbc.gov.bc.ca

Report an error: Contact livingwatersmart@gov.bc.ca to report an error.

Updates Over Time

New information and technologies will continue to shape BMPs and expectations for working around water. The Province will aim to update this document periodically to incorporate any new practices and requirements that may arise.

Amendments or updates to this document since release:

New Version #	Date Amended	Amendment Description
2026.01	TBD 2026	Updates to scope-specific BMPs.
NA		

Checklist: Best Management Practices for CIAS under WSA

The checklist below is intended as a planning tool to help you determine what best management practices (BMPs) can apply to your changes in and about a stream (CIAS) project under the WSA. You are expected to follow the General BMPs for all CIAS projects in addition to any Scope-specific BMPs that pertain to your project.

General BMPs		
Common practices that can generally be incorporated into all CIAS activities and works. Available in: Section 5 of the Requirements and Best Management Practices for Making CIAS in B.C. document.		
3.1	☐	Environmental Monitoring of Activities or Works
3.2	☐	Minimize Riparian Impacts
3.3	☐	Instream Isolation and Temporary Diversion of Flows
3.4	☐	Reduce Risks to Water Quality
3.5	☐	Erosion and Sediment Control
3.6	☐	Deleterious Substances and Spill Management
3.7	☐	Concrete Use
3.8	☐	Reduced Risk Timing Windows
3.9	☐	Salvage of Fish and/or Wildlife
3.10	☐	Whirling Disease Decontamination
3.11	☐	Invasive Species Prevention
3.12	☐	Restoration and Offsetting
3.13	☐	Long-term Monitoring and Adaptive Management

Scope-Specific BMPs		
Practices for specific types of CIAS activities and works unique to given project types. Refer to the BMPs that may apply to your project (in addition to the General BMPs listed above).		
A1	☐	Culvert Installation, Maintenance and Removal
A2	☐	Construction, Maintenance or Removal of Bridges
A3	☐	Pipeline Crossings
A4	☐	Piers, Docks and Wharves Construction, Maintenance or Removal
A5	☐	Boat Launches
A6	☐	Restoration or Maintenance of an Aquatic Ecosystem
A7	☐	Restoration or Maintenance of a Stream Channel
A8	☐	Stream Re-Alignment and Permanent Diversion
A9	☐	Streambank Erosion Protection
A10	☐	Storm Sewer Outfalls
A11	☐	Beaver and Beaver Dam Management
A12	☐	Fording

A1. Best Management Practices for Culvert Installation, Maintenance and Removal

This section describes best management practices (BMPs) for installing, maintaining, or removing culverts. It is a component of the Appendix to the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia (General BMP document). These Scope-specific BMPs are intended to be used with the General BMPs and any other Scope-specific BMP(s) applicable to the project.

IMPORTANT: Non-Mandatory vs. Mandatory
BMPs are widely accepted and recognized approaches that, when adopted and implemented, help individuals to avoid and mitigate potential adverse impacts to aquatic ecosystems, water quality and quantity, and public safety, infrastructure and property. It is recommended that you use provincial BMPs for your work planning as applicable.

BMPs should be interpreted as **non-mandatory guidance if they are NOT made mandatory by being required in a legal instrument** (term or condition in an authorization, change approval or order). If, however, they ARE referenced as a term or condition, then you **must adhere to any BMPs required in the legal instrument.**

1.0 Introduction

Culverts are usually made of concrete, plastic, or metal, and allow water to flow under infrastructure such as roads, railways, or trails. Improper sizing, construction, and installation can constrict or otherwise alter the flow of water within a stream, potentially leading to adverse impacts on fish passage (e.g., velocity barriers, backwatering, erosion, etc.) and fish and wildlife habitats and connectivity. For example, blocked or perched culverts can obstruct fish passage for years or can cause water to overtop infrastructure which can result in a washout that could deposit material downstream and alter valuable habitat. Culvert design, installation, maintenance, and removal need to be carefully considered especially in situations where sensitive aquatic species are present or there are increased risks from flooding.

1.1 Authorized Change

It may be possible to complete the installation, maintenance, or removal of a culvert as an authorized change if the design and work can be done in accordance with Part 3 of the Water Sustainability Regulation (WSR). Specifically, WSR s.39(1)(a) requires that certain criteria be met, including design specifications that must be followed, for the work to be considered an authorized change. The following sections of the WSR provide design specifications for culvert-related activities that must be followed. If the culvert design specifications **do not meet** the requirements, and the work is not authorized under another section of WSR Part 3, then the work must be legally authorized by a change approval, water licence, use approval, or order under the WSA.

Please refer to A Users Guide to Changes in and about a Stream for more detailed information on different types of authorizations and when they apply. Section 4.2 of the Users' Guide provides information on the types of authorized changes and the regulations that govern them, and Section 6.2 provides details on how to submit a notification. Authorized changes are subject to restrictions under WSR s.40 - s.45 unless specifically exempted from those requirements

Sections 39(1)(a), (p), and (v) under Part 3 of the WSR allow proponents to carry out culvert works as an authorized change **provided they meet all conditions set out in the regulation**.

- WSR s.39(1)(a): the installation, maintenance or removal of a culvert for crossing a stream for the **purposes of a road, trail or footpath**,
- WSR s.39(1)(p): the clearing of an obstruction from a bridge or culvert **by the Crown in right of British Columbia, a municipality or a regional district during a flood**
- WSR s.39(1)(v): the construction of a **temporary ford** for vehicular traffic across a stream (includes design of culvert)

A habitat officer may prescribe site-specific terms and conditions for notifications in addition to those terms and conditions issued through FrontCounter BC.

Proponents are expected to ensure that proposed works clearly meet the conditions of an authorized change under the regulation before proceeding by notification. Submitting works that do not meet these requirements may result in delays, enforcement action, or the need to obtain a change approval or authorization.

1.2 Elevation of an Authorized Change

If a statutory decision maker (SDM) considers that a proposed authorized change has the potential for significant adverse impact on the aquatic ecosystem or the nature of the stream, including the flow of water in the stream or the stream channel, then the SDM has authority under WSR s.37(2), to require the proponent to apply for and obtain a change approval or authorization despite meeting the criteria for an authorized change.

Elevation to a change approval may occur when the scale, design, or methods of the proposed works increase the potential for adverse impacts, including projects that involve one or more of the following:

- A culvert exceeds the low-impact scale, extent, and footprint intended for authorized change works
- Culvert design, diameter, length (i.e. stream enclosure), or gradient has the potential to result in adverse impacts to the aquatic ecosystem or to the nature of the stream
- Project design involves a dual or multi-culvert crossing.
- Arch culverts, box culverts, and similar crossings with open-bottom designs may require a change approval. Please note that these designs should also follow the BMPs for bridge crossings.
- Works involve long-term or permanent alterations to the stream channel, stream banks, or natural boundary, or there is modification to the channel morphology;
- Works may pose significant impacts to water quality, aquatic ecosystems, fish passage, sediment transport, public safety, or downstream infrastructure;
- A culvert project includes additional in-stream works;
- Measures to protect the culvert inlet and outlet exceed the footprint required to protect the structure and the stream channel against erosion;
- Fish passage characteristics are not maintained; and
- Proposed works do not meet all requirements of the WSR including those set out in s. 39(1) and s. 40-45.

Where these situations apply, a notification of authorized change may be insufficient and a change approval required.

Please note that each project is unique and specific information requirements or terms & conditions not described in this document may be required by the ministry. If you are unsure whether your project qualifies as an authorized change or requires a change approval, proponents are encouraged to discuss the proposal with FrontCounter BC prior to submission.

1.3 Additional Permissions

There are two types of authorized changes:

1. those that are regulated solely under the WSR (WSR s.39(1)); and,
2. those that are regulated in combination with other legislation (WSR s.39(2)-(6))

Culvert projects that are completed for forestry activities, oil and gas, or mining and are regulated under another enactment may be considered an authorized change, if carried out in accordance with that other enactment, and should be referred to the agencies that review and administer the applicable legislation. Additional requirements may also apply under other enactments including but not limited to the *Energy Resource Activities Act* and Energy Resource Road Regulation; the federal *Fisheries Act* and *Canadian Navigable Waters Act*; and local governments.

2.0 Project Planning and Design

Culvert installation, maintenance, and removal projects should be carefully planned and designed. Works should avoid unintended impacts to the stream, aquatic ecosystems, riparian habitat, nearby land and infrastructure, water users, and public safety. Installation of culverts should only be carried out where there is a clear need, particularly where stream crossings are required for public safety, infrastructure, or property. Alternatives to high-impact or large footprint culvert installations should be considered, such as clear span bridge or other low-impact crossing structures. Culvert removal, or 'daylighting' of streams, may be a component of restoration activities and can be beneficial for the stream channel and aquatic ecosystem; however, this activity requires planning and design for appropriate stabilization and restoration of the stream channel following removal.

Proponents should use their understanding of site conditions developed in this section to guide project design considerations.

Application Tip: For applications requiring a Change Approval, information used to inform and guide project design and objectives should be clearly described in your application package to support ministry review. For works proceeding under a notification, proponents are encouraged to apply the same approach in project design and supporting documentation, even where submission of this information is not required.

2.1 Project Rationale & Objectives

Proponents should establish a clear project rationale and objectives to support culvert works. A well-defined rationale helps demonstrate that a stream crossing is necessary, appropriate, and proportionate to the risks present, while clear objectives help guide the selection and design of appropriate measures.

The project rationale should be informed by an understanding of site conditions and identify the risks and benefits the project intends to address. It also provides a foundation for subsequent

considerations, including avoidance, site context, and selection of appropriate design approaches.

Application Tip: Including a clear project rationale as part of your application is strongly recommended, and in some cases, may be required by an SDM. Providing this information in your application can support efficient review and reduce the need for additional information requests. This information should clearly demonstrate how site conditions have been considered in developing the project rationale and informing design decisions. The level of detail should be sufficient to clearly explain the need for the project and be commensurate with the scale, scope and risk of the proposed works.

2.2 Mitigation Hierarchy – Avoidance

Avoiding impacts to streams and associated values is a key principle of the BC Environmental Mitigation Policy (EMP), which describes the mitigation hierarchy (Avoidance > Minimize > Restore On-Site > Offset).

In the context of culverts, this begins with confirmation that the culvert crossing installation or maintenance is necessary. Proponents should consider whether culvert works can be avoided by evaluating alternatives, associated risks, and whether less intrusive approaches could achieve the same objectives.

Where culverts are necessary, impact avoidance may be achieved through appropriate site selection, and consideration of stream morphology and habitat features such as:

- avoidance of sensitive habitats;
- avoidance of areas with in-stream morphological complexity, sinuosity, and braiding;
- selecting areas of existing disturbance; and/or
- minimizing the number of stream crossings required.

Where culvert works are warranted, works should be limited to the immediate stream crossing area, and disturbance of stable areas should be avoided. Maintaining natural stream processes, where practicable, is recommended.

Application Tip: Where avoidance is not feasible, your project rationale should clearly describe why the work is necessary and how the proposed approach has been selected to limit impacts to the stream channel and associated values. This rationale may include an options analysis of lower-impact alternatives considered before proceeding with design. Proponents should clearly demonstrate how avoidance was assessed and what factors were considered in selecting the proposed option.

2.3 Safety of People, Property and/or Infrastructure

Poorly designed or constructed culvert works can create significant risks to the safety of people, infrastructure, or property, both at the project site and downstream. These risks may arise from direct impacts at the site or from unintended changes in hydraulic conditions, including the transfer of energy and flow to other areas of the channel.

Understanding this broader context helps identify the level of risk to public safety, property, and environmental values, and supports the selection of works that are appropriate to site conditions, ecological values, and potential consequences.

Application Tip: The ministry seeks to ensure that culvert works are designed to an appropriate standard to avoid creating or exacerbating risks to public safety, infrastructure, property or the environment. The level of detail and supporting information provided in an application should be commensurate with the scale, complexity, and potential impact of the proposed works. Where applicable, inclusion of public safety considerations and how risks have been addressed may support review of the application.

2.4 Environmental and Ecological Considerations

Culvert works can affect aquatic and riparian ecosystems by altering habitat, natural channel processes, and connectivity. It is important that these works are planned and implemented in a manner that avoids or minimizes impacts to hydraulic and ecological function.

Proponents should consider both the direct and indirect effects of stream crossings on the surrounding environment, including potential changes to habitat availability, water quality, and natural dynamics of the channel and floodplain.

Where avoidance is not feasible, a clear understanding of the project context and site conditions is essential to effective planning and design. This includes the physical, hydraulic and ecological characteristics of the site, as well as the surrounding land use, infrastructure, water users, and other interests that may be affected by the proposed works.

Culvert works should avoid sensitive habitats and areas of habitat or stream complexity. Work in fish-bearing streams and those supporting listed species should be avoided during critical life stages. Fish-passage and connectivity of habitat for wildlife should be maintained following culvert works.

IMPORTANT: Adherence to General and Applicable Scope-Specific BMPs

You are expected to follow the General BMPs for all CIAS projects in addition to any Scope-specific BMPs that pertain to your project. Refer to the General BMPs in the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia document, and the other Scope-specific BMPs in the Appendix.

3.0 Best Management Practices

The following provisions represent BMPs for CIAS for installing, maintaining, or removing a culvert within a stream under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, **the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.**

Design

Design approaches should reflect how the proposed works will perform under expected current and future flow conditions, including during high flow events and changing channel conditions.

The selection of culvert work methods should be guided by the nature and scale of the objective being addressed, and the opportunity to maintain or enhance natural stream processes.

a) Culverts must only be planned where alternative crossing structures (e.g., clear span bridges or other open bottom structures) are not practical.
b) Culverts must be planned to avoid sensitive areas such as floodplains, meander bends, high quality fish habitat, braided streams, unstable areas and alluvial fans.
c) Culverts must be designed by a Qualified Professional.
d) Climate change impacts must be considered in the design process.
e) Culverts must be sized such that the high-water width of the stream is not reduced by the culvert.
f) Culverts must be sized and installed to safely convey stream flows under a range of low to high flow conditions and to pass expected debris. Multiple culverts (i.e. twin culverts) with a combined equivalent capacity of one larger culvert are not considered best practice as several small culverts increase risk of debris blockage.
g) Culverts must be appropriately sized in diameter and length to limit in-stream impact to only the extent required to safely achieve the crossing objective.
h) Culvert inlets and outlets must be protected from scouring by armouring erodible surfaces against erosive water forces (e.g., by using riprap or concrete headwalls).
i) Minimize in-stream footprint of erosion and scour protection for culvert inlets and outlets.
j) Culvert design must specify the culvert fill material compaction requirements (by the manufacturer or Qualified Professional) for the structural integrity of the culvert and to prevent piping (water flowing on the outside of the culvert).
k) Fish stream culverts must be designed to minimize and mitigate negative impacts to fish and wildlife passage during variable water levels. Fish stream culverts must be designed to provide fish passage at all water levels. The culvert outlet in reaches with fish must be submerged in all flow conditions.
l) Gradients must be designed such that embedded materials do not wash out of the culvert, excessive forces are not created at the culvert outlet, and fish passage is not negatively affected.
m) Culvert designs must consider gradient, length, culvert substrate, and fish passage features (e.g. baffles,) to minimize aquatic habitat loss and support fish passage where applicable.
n) Alternatives to installing culverts in fish bearing streams with gradients over 6% must be considered and rationale provided.
o) Cross drain culverts must be installed near the stream crossing to direct any water from drainage ditches away from the stream as practicable.

Construction

p) The construction area and access routes must be marked onsite prior to starting work and vegetation removal must be minimized and limited to only the areas to which the CIAS applies.
q) Where feasible, works should be carried out in the dry or under isolated flow conditions to minimize disturbance to the wetted channel and reduce sediment mobilization.
r) Disturbance to the channel bed and banks should be limited to the minimum required to complete the works. Over-excavation or unnecessary grading can increase instability and affect long-term performance.

s) Construction activities should not alter channel form in a manner that could result in flow constriction, redirection, or create erosion.

t) One piece of equipment may cross the stream and return once to support culvert construction where alternative crossings are not available. If minor rutting is anticipated, stream bank and bed protection must be used (e.g., swamp mats or logs). Areas of steep or erodible banks must be avoided.

u) For embedded culverts, a depression must be made within the structure down the center of the substrate to help confine flows and promote fish passage during low water conditions.

v) Backfill around the culvert must be placed and compacted in accordance with accepted engineering procedures.

Maintenance

w) Debris must be removed from culvert inlets to maintain the design capacity of the culvert and must use the least invasive and least sediment generating method possible.

x) If additional riprap reinforcement/armouring is required, placement must be limited to stabilize eroding areas around the inlet and outlet.

y) Minimize vegetation clearing around culverts to only what is necessary for sight lines.

Removal

z) After the culvert is removed, fill slopes must be pulled back to a suitable slope.

aa) Culvert removal must include design considerations for stabilization and restoration of the stream bed, banks, and in-stream features.

bb) Water bars or other similar measures must be installed across the deactivated road to direct water away from the stream.

Additional Resources

- Fish-stream Crossing Guidebook (Revised Edition), FLNRO, MoE and DFO, 2012
- Fish Passage Strategic Approach, FLNRO, MoE and DFO, 2014B.C. HabitatWizard tool
- Projects Near Water, Fisheries and Oceans Canada (DFO)
- Guidelines for Professional Services in the Forest Sector–Crossings V.2, Professional Engineers and Geoscientists of BC, Association of BC Forest Professionals, 2014
- Forest Service Bridge Design and Construction Manual, FLNRORD
- Stream Simulation: Planning and Design for Closed-Bottom Structures for Fish Streams, FLNRO, MoE, FP Innovations, 2017
- Streambed Simulation: Streambed Construction, Infill Methods, and Rewatering for Closed-Bottom Stream Crossings, FLNRO, MoE, FP Innovations, 2018
- Chapter 3.6: Culvert Design, Engineering Manual - Province of British Columbia
- Chapter 4: Design & Construction of Bridges & Major Culverts, Engineering Manual - Province of British Columbia
- Forest Road Engineering Guidebook (Second Edition), Province of British Columbia, 2002

Amendments

New Version #	Date Amended	Amendment Description
2026.01		Updated scope-specific BMPs and introduction, and addition of Project Planning and Design section.

Recommended Citation

For the use by WSA statutory decision makers during the water authorization process:

“Best Management Practices for Culvert Installation, Maintenance and Removal”. Appendix, Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia. Version 2026.01. Government of British Columbia.

A2. Best Management Practices for the Construction, Maintenance or Removal of Bridges

This section describes best management practices (BMPs) for installing, maintaining or removing bridges under the WSA. It is a component of the Appendix to the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia (General BMP document). These Scope-specific BMPs are intended to be used with the General BMPs and any other Scope-specific BMP(s) applicable to the project.

IMPORTANT: Non-Mandatory vs. Mandatory
BMPs are widely accepted and recognized approaches that, when adopted and implemented, help individuals to avoid and mitigate potential adverse impacts to aquatic ecosystems, water quality and quantity, and public safety, infrastructure and property. It is recommended that you use provincial BMPs for your work planning as applicable.

BMPs should be interpreted as **non-mandatory guidance if they are NOT made mandatory by being required in a legal instrument** (term or condition in an authorization, change approval or order). If, however, they ARE referenced as a term or condition, then you **must adhere to any BMPs required in the legal instrument.**

1.0 Introduction

Bridges in B.C. range from small crossings on remote roads to large spans across lake and river systems. They provide critical infrastructure that link communities together and provide routes for industry, tourism, recreation, and other services. Bridge activities, such as their construction, maintenance, or removal may negatively impact water quality, fish and wildlife populations and habitat, and riparian areas.

Arch culverts and similar crossings with open-bottom designs are treated as a bridge as they present similar impacts and risks as bridge crossings.

1.1 Authorized Change

It may be possible to complete certain bridge activities involving CIAS as a notice of authorized change if the work is done in accordance with Part 3 of the Water Sustainability Regulation (WSR).

The following sections of the WSR identify bridge related activities that qualify as authorized changes, provided the project meets the design and eligibility criteria set out in those sections:

- WSR s.39(1)(b): the construction, maintenance or removal of a clear span bridge
- WSR s.39(1)(n): the construction or maintenance of ice bridges, winter fords or snowfills
- WSR s.39(1)(p): the clearing of an obstruction from a bridge or culvert
- WSR s.39(1)(r): the repair or maintenance of the superstructure of a bridge, other than the bridge's foundation

Relevant Definitions and Context:

The following definitions and descriptions are provided to support interpretation of the sections listed above:

Clear span bridge (WSR s.36)

- "clear span bridge" means a single span structure without piers that spans a stream channel from top of bank to top of bank with the bridge abutments outside the stream channel;

Bridge components:

Bridges consist of a superstructure and a substructure.

- The **superstructure** includes the upper portions of the bridge that rest on the substructure and consists of the girders (e.g., steel, log stringers or concrete), the decking or driving surface (e.g., concrete, wood or steel), and rails.
- The **substructure** is the portion of the bridge that bears and supports the superstructure. The substructure may consist of caps (e.g., concrete or steel), log cribs, piles, concrete blocks, timbers, spread footings or steel towers, and associated riprap and fill material.

1.2 Works Not Eligible Under Authorized Change

If the design specifications do not meet the applicable requirements, and the work is not authorized under another section of WSR Part 3, then the work must be legally authorized by a change approval, water licence, use approval, or order under the *Water Sustainability Act*.

Works must also be carried out in accordance with all applicable sections of Part 3, including any terms and conditions specified by a habitat officer under s.44 in order to qualify as an authorized change.

Examples of bridges that **do not** meet the criteria in WSR s.39(1) include but are not limited to:

- structures with piers, pilings, or other supports within the stream channel or below the high water mark;
- riprap, armouring, or any other works below the high-water mark

Arch culverts and similar open bottom culverts do not typically meet the criteria for a clear span bridge and are therefore not an authorized change.

1.3 Elevation of an Authorized Change

Although certain bridge-related works are listed as authorized changes under WSR s.39, works with the potential to have a significant adverse impact on the nature of the stream, including the flow of water in the stream, or the stream channel, may be elevated by a WSA engineer or statutory decision maker to require a change approval under WSR s.37.

Elevation to a change approval may occur when the scale, design, or methods of the proposed works increase the potential for adverse impacts, including projects that involve one or more of the following:

- Alteration of the stream planform or channel morphology, including realignment, widening, deepening or straightening of the channel;

- Modifications with the potential to impact hydrology or sediment processes, such as changes to flow regime, water velocities, increased erosion potential, or changes to sediment transport;
- Works are of a scale, footprint, or duration that has the potential for significant adverse impacts on the nature of the stream, including stream flow or the stream channel. Where a proposed project includes one or more of the characteristics described above, proponents may wish to apply for a Change Approval.

If you are unsure whether your project qualifies for a notification or requires a Change Approval, proponents are encouraged to discuss the proposal with FrontCounter BC prior to submission Please note that each project is unique and specific information requirements or terms & conditions not described in this document may be required by a statutory decision maker. If uncertain whether a project meets notification criteria, the proponent should consult FrontCounter BC.

2.0 Project Planning & Design

Bridge crossings can influence natural stream processes, depending on their type, design, location, and construction methods. While some crossings, such as clear span structures, are intended to avoid direct interaction with the stream channel, others may alter flow, sediment transport, channel stability, and aquatic habitat. Careful consideration is needed when planning bridge crossings, including clarity in project rationale and objectives, thoughtful site selection, and attention to the safety of people, property, and infrastructure

Application Tip: To support application review, include information that shaped the project design and objectives. If work is proceeding as an authorized change, proponents are encouraged to apply the same approach in project design and supporting documentation, even where submission of this information is not required.

2.1 Project Rationale and Objectives

A well-defined rationale helps demonstrate that the proposed works are necessary and proportionate to the identified need, including the scale and function of the proposed crossing, while clear objectives (e.g., maintaining required access and safety while minimizing impacts to the stream and associated values) guide the selection and design of the most suitable crossing type and approach, including consideration of options that minimize interaction with the stream channel, such as clear-span bridges where feasible.

The project rationale should be informed by an understanding of site conditions, access requirements, and the potential impacts of the proposed works. It should clearly identify:

- the purpose of the crossing (e.g., access, safety, replacement of existing infrastructure);
- the rationale for the proposed location, considering access needs, project constraints, and available alternatives; and
- key factors influencing the proposed crossing design and configuration (e.g., terrain, hydrology, environmental values, and infrastructure requirements).

Application Tip: Including a clear project rationale as part of your application is strongly recommended, and in some cases may be required by a statutory decision maker. Providing this information can support efficient review and reduce the need for additional information requests. The level of detail should be commensurate with the scale, scope, and risk of the proposed works.

2.2 Mitigation Hierarchy – Avoidance

Avoiding impacts to streams and associated values is a key principle of the BC Environmental Mitigation Policy (EMP), which describes the mitigation hierarchy (Avoidance > Minimize > Restore On-Site > Offset).

In the context of new bridge crossings, this begins with confirming that a crossing is necessary before proceeding with design. While new crossings are often required to support access and infrastructure, proponents should consider whether the need for a new crossing can be avoided. This may include evaluating opportunities to use or upgrade existing crossings, share access, or otherwise meet project objectives without constructing a new crossing.

Where a crossing is required, proponents should consider whether impacts can be avoided or reduced through:

- site selection;
- minimizing interaction with the stream channel (e.g. clear span bridges),;and
- using less intrusive crossing designs (e.g. locating structural elements outside the active channel and high-water mark to the extent practicable).

As part of site selection, proponents should also consider whether the proposed crossing location avoids areas of higher risk or sensitivity, such as:

- braided channels or actively migrating reaches;
- meander bends and unstable banks;
- floodplains and alluvial fans, where crossing location may constrain natural floodplain function or increase erosion risk; and
- areas of important fish habitat or ecological significance.

Application Tip: Where avoidance is not feasible, your project rationale should clearly describe why intervention is necessary and how the proposed approach has been selected to limit impacts to the stream channel and associated values

2.3 Safety of People, Property and/or Infrastructure

Bridge crossings that are not appropriately designed, sited, or constructed can create risks to people, property, and infrastructure. These risks may arise from structural deficiencies or from changes to flow conditions and channel behaviour, such as increased velocities, backwatering, debris accumulation, or channel instability, which can affect nearby properties and infrastructure.

Safety considerations should therefore be integrated into bridge crossing planning and design. Proponents should consider how the crossing may interact with site conditions over time and whether it could introduce or increase risk to surrounding areas.

Application Tip: Include sufficient information in your application to demonstrate that potential risks to people, property, and infrastructure have been considered. The level of detail should align with the scale and complexity of the proposed works

2.4 Environmental/Ecological Considerations

An understanding of environmental and ecological conditions is important to inform bridge crossing planning and design. This includes the physical and hydraulic characteristics of the stream, as well as aquatic ecosystem values such as fish habitat, riparian condition, and other features that may be present at or near the proposed works.

Considering these conditions supports the selection of a crossing type, location, and design that is appropriate to the site and helps identify potential interactions with aquatic habitat and associated values.

Proponents should consider both the existing ecological conditions at the site and how the proposed crossing may interact with them over time. This understanding helps inform siting and design decisions that avoid or reduce adverse impacts to habitat availability, connectivity, and ecological function.

Bridge works should avoid sensitive habitats and areas of habitat or stream complexity. Work in fish-bearing streams and those supporting listed wildlife species should be avoided during critical life stages. Fish-passage and connectivity of habitat for wildlife should be maintained following bridge works.

Application Tip: Include clear information in your application describing the ecological conditions at the site and how they were considered in the design and siting of the proposed works to avoid or reduce adverse impacts. The level of detail should align with the scale and complexity of the project.

IMPORTANT: Adherence to General and Applicable Scope-Specific BMPs

You are expected to follow the General BMPs for all CIAS projects in addition to any Scope-specific BMPs that pertain to your project. Refer to the General BMPs in the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia document, and the other Scope-specific BMPs in the Appendix.

3.0 Best Management Practices

The following provisions represent BMPs for CIAS for installing, maintaining or removing a bridge within a stream under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, **the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.**

Design

a) All bridges should be designed and have the installation overseen by a Qualified Professional.

b) The location of the bridge crossing should be perpendicular to the flow and avoid braided sections of streams, floodplains, alluvial fans, and locations of bank instability.

c) The bridge should be designed to accommodate high flow events appropriate to the site, typically the 1 in 200-year maximum daily flow, and consider passage of flood debris and ice. Climate change impacts must also be considered in the design process.

d) Every effort should be made to utilize a clear span bridge and avoid placing bridge components (e.g., piers, piles etc.) in the water. Where this is unavoidable, instream structures must avoid spawning areas and other important fish habitat features.

e) To be considered a clear span bridge, the superstructure, substructure (including riprap) and road approaches must be located outside of the stream channel, **including excavations required to support construction**.

f) The bridge should be designed so that stormwater from the deck, fill slopes, approaches, and ditches is directed to the surrounding vegetated areas to prevent sediment and other deleterious substances from entering the stream. Splash guards can be used to prevent water from the deck entering the stream.

g) Cross drains should be planned back from the bridge approaches to minimize the amount of water directed into the approach ditches. Cross drain outlets and approach ditches near the bridge must be protected from erosion using riprap or vegetation.

h) Turnouts should be designed to prevent debris such as road materials from entering the stream and to minimize the amount of vegetation clearing required.

Construction

i) The construction area and access routes must be marked onsite prior to starting work and vegetation removal must be limited to only the areas required for construction.

j) Equipment should not cross the stream unless no practical alternative is available. Where a crossing is necessary, the number of crossings should be kept to a minimum, and measures should be taken to reduce disturbance to the stream bed and banks, particularly in steep or erodible areas.

k) If piles are being driven in or near fish-bearing water, additional exclusion measures (such as bubble curtains) should be taken to protect fish from vibrations and shock waves.

Maintenance

l) Drains and open joints should be adequately sealed prior to cleaning the bridge deck.

m) Decks, including curbs, sidewalks, medians, and drainage devices should be swept prior to power washing to remove as much material as possible. Debris and sediment cleaned from the bridge deck and drainage devices must be properly disposed, not swept into the stream.

n) Wash water should be directed past the ends of the deck towards vegetated areas to help sediment settle out before wash water reaches the stream. Cleaning agents must not be added to the water. Silt fences or other sediment control measures may be required to help slow the water and allow sediment to settle out.

o) Measures such as ground covers or vertical drapes (e.g., sheets of plastic or air-permeable cloth such as burlap or canvas) must be used prior to removal activities such as sand blasting to retain falling debris, blasting abrasives, rust, grease, and other deleterious substances.

p) Machinery used for bridge maintenance or repair must be operated from land.

Removal

q) Removed material should be placed outside the active floodplain. Material must be removed slowly to prevent a rush of water and sediment downstream.

r) During removal activities, bridge structures, materials or equipment should be lifted over the stream rather than dragged through.

s) Bridge timbers should be removed in one piece as practicable. If that is not possible, a containment system such as tarps should be installed to catch woody debris while the timbers are cut into manageable pieces.

t) Water bars or other similar measures should be installed across the deactivated road to direct water away from the stream.

Monitoring and Adaptive Management

u) Monitoring should focus on identifying any unintended adverse effects to the stream and surrounding environment associated with the crossing, including changes in erosion, sedimentation, or riparian disturbance.

v) Monitoring should confirm that the crossing is not resulting in unintended impacts to aquatic habitat or the natural functioning of the stream, with adaptive management applied where needed.

Additional Resources

- Fish-stream Crossing Guidebook (Revised Edition), FLNRO, MoE and DFO, 2012
- Guidelines for Professional Services in the Forest Sector–Crossings V.2, Professional Engineers and Geoscientists of BC, Association of BC Forest Professionals, 2014
- Forest Service Bridge Design and Construction Manual, FLNRORD
- Resource Road Engineering Publications and Permits, FLNRORD
- Treated Wood in Aquatic Environments, Western Wood Preservers Institute
- Projects Near Water, Fisheries and Oceans Canada (DFO)
- DFO and Port of Vancouver pile Driving Guidelines
- Forest Road Engineering Guidebook
- Best Management Practices for Pile Driving and Related Operations, BC Marine and Pile Driving Contractors Association, 2003

Amendments

New Version #	Date Amended	Amendment Description
2026.01	TBD 2026	Updated scope-specific BMPs and introduction, and addition of Project Planning and Design section.

Recommended Citation

For the use by WSA statutory decision makers during the water authorization process:
"Best Management Practices for the Construction, Maintenance or Removal of Bridges". Appendix, Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia. Version 2026.01. Government of British Columbia.

BMP NOT UPDATED

A3. Best Management Practices for Pipeline Crossings

This section describes best management practices (BMPs) for the construction or maintenance of pipeline crossings of streams and the different types of construction methods for CIAS under the WSA. It is a component of the Appendix to the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia (General BMP document). These Scope-specific BMPs are intended to be used with the General BMPs and any other Scope-specific BMP(s) applicable to the project.

IMPORTANT: Mandatory vs. Non-Mandatory
BMPs are widely accepted and recognized approaches that, when adopted and implemented, help individuals to avoid and mitigate potential adverse impacts to aquatic ecosystems, water quality and quantity, and public safety, infrastructure and property. It is recommended that you use provincial BMPs for your work planning as applicable.

BMPs should be interpreted as **non-mandatory guidance if they are NOT made mandatory by being required in a legal instrument** (term or condition in an authorization, change approval or order). If, however, they ARE referenced as a term or condition, then you **must adhere to any BMPs required in the legal instrument.**

Background

Pipelines are used to carry products such as oil, natural gas, water, sewage, and stormwater, either below or above ground and can range from short to long distances. Pipeline crossings have the potential to cause significant impacts on streams, including impacts to fish and wildlife populations, aquatic and riparian habitat, and water quality.

This document provides BMPs for three common methods used to construct pipeline stream crossings. These methods are described below and listed in order of general risk of impacting the aquatic environment (1 being the least risk, 3 being the highest risk), acknowledging that practical aspects and risk of each site must be considered on a case-by-case basis.

1. **Punch and bore method**: Excavation of a vertical bell hole or depression on either side of the stream and horizontal punching or boring under the stream channel to connect the two sides. It is typically used for smaller pipelines.
2. **Horizontal drilling method:** Similar to the punch and bore method, except a pressurized system is used to create a pilot hole from one side to the other and then the pipe pulled through.
3. **Open cut method:** Involves an open cut across a dry channel or isolated stream during construction.

Authorized Changes under WSR Part 3

It may be possible to carry out the construction or maintenance of a pipeline crossing as an authorized change if the work can be done in accordance with Part 3 of the Water Sustainability Regulation (WSR). WSR s.39(1)(c) outlines the criteria to be met for pipeline crossings to be considered authorized changes under WSA, including design specifications for the construction or maintenance of a pipeline crossing of a stream. If the design specifications for the proposed

crossing **would not meet** these requirements and the work is not authorized under another section of WSR Part 3, then the work will require a change approval, water licence, order or use approval in order to be authorized to proceed.

> WSR s.39(1)(c): the construction or maintenance of a pipeline crossing of a stream, if either of the following conditions is met:
>
> (i) the pipeline and associated works are installed in a dry stream channel at a depth so that the top of the pipe is at least 1 m below the lowest elevation of the bed of the stream;
>
> (ii) in the case of an aerial crossing, the crossing is constructed in accordance with the conditions of paragraph (b) for clear span bridges;

Additionally, under WSR s.39(5) CIAS can be an authorized change if the related CIAS activities are authorized by a permit issued under the Energy Resource Activities Act (ERAA), and the CIAS is made in accordance with applicable ERAA regulations and the conditions respecting CIAS stream included in the permit.

Oil and Gas Pipelines

Oil and gas pipelines must be constructed in adherence to the ERAA, the Pipeline Regulation, the Environmental Protection and Management Regulation, the Pipeline Crossing Regulation, the Emergency Management Regulation, and in regards to an interprovincial pipeline, the *Canadian Energy Regulator Act*.

Reminder that the B.C. Energy Regulator (BCER) is the single window regulator for all oil and gas activities in B.C. As such, **all oil and gas related CIAS must be processed by the Commission.** Contact the BCER for more information:

- Fort St. John: 250-794-5200
- Toll free: 1-800-663-7867
  Fax: 250-794-5390

Under WSR s.39(6) if a person making CIAS under WSR s.39(5) causes damage to an aquatic ecosystem, which damage is not authorized under ERAA or the permit referred to in that subsection, the person **must** report the damage to the BCER within 72 hours after the damage is caused, and take any action ordered under ERAA by an official, as defined in that Act, to repair the damage and restore the aquatic ecosystem.

Additional Permissions

Additional approvals or reviews may be required for pipelines (e.g., BCER, BC Utilities Commission, Technical Safety BC, Department of Fisheries and Oceans, and local governments). Projects on public land (e.g., Crown land) can require tenure or an authorization from the province to construct and maintain a pipeline.

IMPORTANT: Adherence to General and Applicable Scope-Specific BMPs

You are expected to follow the General BMPs for all CIAS projects in addition to any Scope-specific BMPs that pertain to your project. Refer to the General BMPs in the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia document, and the other Scope-specific BMPs in the Appendix.

Best Management Practices

The following provisions represent BMPs for CIAS for installing or maintaining a pipeline crossing under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, **the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.**

General

a) An emergency response plan must be developed prior to construction, detailing the measures to be taken in the event of a sediment release or spill of a deleterious substance. Staff must be trained on the requirements and implementation of the plan. The plan must include a list of spill response materials to be on-site prior to the start of construction and a list of emergency contacts. The plan must include a step-by-step process, including:
   i. stop work to contain sediment-laden water and other deleterious substances, and prevent further migration into the stream;
   ii. notify all applicable authorities;
   iii. promptly clean up and appropriately dispose of the sediment-laden water and deleterious substances;
   iv. ensure clean up measures do not result in further alteration of the stream bed and/or banks; and,
   v. provide a report to the applicable agencies describing the incident and measures taken to clean up the site.

b) The location of the pipeline crossing must be perpendicular to the flow and must avoid sensitive areas such as braided sections of streams, fish habitat, floodplains, meander bends, alluvial fans, and locations of bank instability.

c) If directional drilling or punch and bore methods are selected, a geotechnical review must be completed in addition to an assessment of potential groundwater impacts for high risk sites.

d) The construction area and access routes must be marked onsite prior to starting work and vegetation removal must be minimized and limited to only the areas required for construction.

e) One piece of equipment may cross the stream once, there and back, to support construction where alternative crossings are not available. If minor rutting is anticipated, stream bank and bed protection must be used (e.g., swamp mats or logs). Areas of steep or erodible banks must be avoided.

f) Equipment must be operated from land.

Punch and Bore Stream Crossing

g) Punch and bore construction can be performed at any time of the year provided that the risk of failure (i.e., risk of the punch or bore hole collapsing under the stream) is low and no instream works are required such as an equipment crossing.

h) The punch and bore path must be designed at an appropriate depth (minimum 1.2 metres) below the lowest elevation of the bed of the stream to prevent exposure due to natural scouring of the stream bed.

i) Bell holes must be excavated a minimum of thirty (30.0) metres back from the edge of the stream channel.

j) Riparian vegetation between the borehole entry and exit points must be left in place to the extent possible.

k) The stream must be monitored during punch and bore activities for signs of activity or equipment malfunction. If a concern is identified, work must stop immediately, and the emergency response plan must be activated immediately.

l) Sediment-laden water must be diverted to a vegetated area or settling basin when dewatering the bell holes.

m) Upon completion, bell holes must be backfilled to the natural grade.

Directional Drilling Stream Crossing

n) The drill path must be designed to an appropriate depth below the stream to minimize the risk of frac-out (i.e., excessive drilling pressure results in drilling mud propagating toward the surface) and prevent the pipeline from exposure due to natural scouring of the stream bed.

o) The fluid pressure and the stream must be monitored during all phases of construction to identify signs of a frac-out. If a frac-out is identified, work must stop immediately, and the emergency response plan must be activated immediately.

p) Drill entry and exit points must be far enough away from the banks of the streams to minimize impacts to these areas.

q) Riparian vegetation must be retained between the entry/exit points and the stream bank to the extent possible.

r) Drilling mud must be composed of materials that do not pose a risk to aquatic life. A list of all materials must be kept on site for inspection.

s) A dugout/settling basin must be constructed at the drilling exit site to contain drilling mud and prevent sediment and other deleterious substances from entering the stream. If this cannot be achieved, silt fences or other erosion and sediment control measures must be installed.

Open Cut Stream Crossing

t) Open cut stream crossings must be installed only in completely dry or frozen stream channels (i.e., no water flow present to the bottom of the site) or in isolation of any stream flow to prevent downstream sedimentation.

u) The pipeline must be buried to a depth greater than 1.2 metres below the lowest level of the original channel bottom.

v) If pumps are used to divert stream flow, they must be sized to accommodate the anticipated water volumes and contingency pumps must be available in case of break downs or precipitation events.

w) Pumps must be set in spill trays while working within thirty (30.0) metres of the water and monitored regularly to ensure they are operating continuously.

x) All pump intakes used for diverting water in a fish bearing stream must be screened.

y) When backfilling the trench, it must be done in the reverse order that the material was removed (e.g., material removed last is placed first). The trench must be covered and contoured with a layer of substrate similar to the surrounding stream bed substrate (with gravel-sized material or greater) to prevent scour or deposition around the pipeline.

Additional Resources

- Incident Reporting, BCER
- Environmental Protection and Management Guide, version 2.7, BCER
- Projects Near Water, Fisheries and Oceans Canada (DFO)
- Pipeline Associated Watercourse Crossings, 5th Edition, CEPA, 2017

- Pipeline components and pipelines, CSA Group

Amendments

New Version #	Date Amended	Amendment Description
NA	NA	NA

Recommended Citation

For the use by WSA statutory decision makers during the water authorization process:
"Best Management Practices for Pipeline Crossings". Appendix, Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia. Version 2026.01. Government of British Columbia.

BMP NOT UPDATED

A4. Best Management Practices for Piers, Docks and Wharves Construction, Maintenance or Removal

This section describes best management practices (BMPs) that aim to prevent harmful impacts to water quality, riparian and aquatic habitats, and fish and wildlife species during the construction, maintenance or removal of piers, docks and wharves. It is a component of the Appendix to the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia (General BMP document). These Scope-specific BMPs are intended to be used with the General BMPs and any other Scope-specific BMP(s) applicable to the project.

IMPORTANT: Mandatory vs. Non-Mandatory
BMPs are widely accepted and recognized approaches that, when adopted and implemented, help individuals to avoid and mitigate potential adverse impacts to aquatic ecosystems, water quality and quantity, and public safety, infrastructure and property. It is recommended that you use provincial BMPs for your work planning as applicable.

BMPs should be interpreted as **non-mandatory guidance if they are NOT made mandatory by being required in a legal instrument** (term or condition in an authorization, change approval or order). If, however, they ARE referenced as a term or

Background

The installation of piers, docks and wharves can impact aquatic and riparian habitat by shading riparian vegetation, removing riparian/foreshore vegetation, covering spawning habitat, removing rocks and logs that provide shelter, causing erosion and sedimentation from bank disturbance, introducing deleterious substances if improper building materials are used, and disrupting sensitive fish life stages. Considering potential impacts when developing designs and selecting locations for your project can help minimize potential impacts to fish, wildlife, and associated habitats. Note that piers and wharves generally include docks.

Authorized Change under WSR Part 3

It may be possible to complete certain pier or wharf activities involving CIAS, such as construction, maintenance or removal of a pier or wharf in a stream, as a notice of authorized change if the work is done in accordance with Part 3 of the Water Sustainability Regulation (WSR). For example, WSR s.39(1)(d) and (w) specifically outline the criteria to be met for these activities to be considered as an authorized change under WSR. If the specifications **do not meet** the requirements, and the work is not authorized under another section of WSR Part 3, or will occur in an environmentally sensitive area, the work will require a change approval, water licence, use approval or order.

- WSR s.39(1)(d): the construction, maintenance or removal of a pier or wharf in a stream, if the ebb and flow of water and the movement of material under the influence of waves or currents is not obstructed;
- WSR s.39(1)(w): the construction of a temporary diversion around or through a worksite for the purposes of constructing or maintaining bridge abutments, constructing or maintaining piers other than bridge piers, maintaining bridge piers or constructing works authorized under this section, if … (see WSR for specifications)

Additional Permissions

Additional requirements may also apply under federal, provincial, or local government enactments. For example, additional permission may be required when seeking to construct within areas with red or blue conservation status listed species (Conservation Data Centre). Additionally, the construction, maintenance or removal of piers, docks and wharves must occur in accordance with local government zoning bylaws, which may have specific restrictions.

IMPORTANT: Adherence to General and Applicable Scope-Specific BMPs

You are expected to follow the General BMPs for all CIAS projects in addition to any Scope-specific BMPs that pertain to your project. Refer to the General BMPs in the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia document, and the other Scope-specific BMPs in the Appendix.

Best Management Practices

The following provisions represent BMPs for the construction, maintenance or removal of piers, docks or wharves under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, **the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.**

a) The width of approach ramps is minimized.
b) Light permeable gratings are used to avoid shading of any riparian vegetation.
c) Works are designed to minimize the need for future dredging.
d) If old creosote-treated pilings are to be removed, they must be cut flush with the lake bottom leaving the buried portion of the piling in place.
e) If treated wood must be used, the wood is treated with water-based preservatives. To avoid the subsequent deposition of sawdust from treated wood into the aquatic environment, construction and fitting of treated wood must be cut to size on an upland area (dry area) rather than in place and over the water.
f) Where piers or trestles support mechanical or refueling equipment, an impermeable deck, a spill containment system, and a collection system for surface runoff must be constructed.
g) Marina floats constructed in areas with currents or prevailing winds must be constructed in a manner that prevents trapping surface debris and oily residue.
h) Floats or pile structures must not be placed over a bed of freshwater mussels.
i) Docks must be constructed to maintain a free flow of water currents beneath them and to prevent erosion and sediment deposition along the shore.
j) Docks must be constructed so they remain afloat at lowest expected flow.
k) Dock size does not exceed what is reasonably needed for the enjoyment of the benefit property or population.

Amendments

New Version #	Date Amended	Amendment Description
NA	NA	NA

Recommended Citation

For the use by WSA statutory decision makers during the water authorization process:

"Best Management Practices for Piers, Docks and Wharves Construction, Maintenance or Removal". Appendix, Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia. Version 2026.01. Government of British Columbia.

BMP NOT UPDATED

A5. Best Management Practices for Boat Launches

This section describes best management practices (BMPs) for constructing, maintaining, and removing boat launches under the WSA. It is a component of the Appendix to the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia (General BMP document). These Scope-specific BMPs are intended to be used with the General BMPs and any other Scope-specific BMP(s) applicable to the project.

IMPORTANT: Mandatory vs. Non-Mandatory
BMPs are widely accepted and recognized approaches that, when adopted and implemented, help individuals to avoid and mitigate potential adverse impacts to aquatic ecosystems, water quality and quantity, and public safety, infrastructure and property. It is recommended that you use provincial BMPs for your work planning as applicable.

BMPs should be interpreted as **non-mandatory guidance if they are NOT made mandatory by being required in a legal instrument** (term or condition in an authorization, change approval or order). If, however, they ARE referenced as a term or condition, then you **must adhere to any BMPs required in the legal instrument.**

Background

Boat launches are a common fixture of lakes and rivers so watercraft can be safely loaded into and out of water for fishing, recreation and other activities. Constructing boat launches typically involves instream activities including the removal of riparian vegetation and modifications to the shoreline and stream bed. The placement of fill or the construction of hardened launch surfaces in shallow waters can smother bottom-dwelling organisms, displace plants and animals, and alter local water currents and other important conditions of the aquatic environment. Launching watercraft can also introduce sediment, harmful chemicals, and invasive species into the aquatic environment, which can have long-term detrimental impacts.

Construction of new public and private boat launches often leads to environmental disturbance. For this reason, the construction of boat launches is typically discouraged unless no other boat launches, such as public boat launches, are reasonably accessible.

Additional Permissions

In addition to requiring permission to make a change in and about a stream (CIAS) under the *Water Sustainability Act* (such as a change approval, water licence or order), boat launch construction, maintenance or removal usually require a *Land Act* tenure if activities are to occur in Crown land, particularly if you do not own the immediate upland riparian property. Note that it is an offence for a person to construct on Crown land a building, structure, enclosure or other works, or do or perform any dredging, excavation or filling, without authorization of the minister (*Land Act* s.60(e)).

Additional requirements may also apply under the Riparian Areas Protection Regulation (in the regions of the province designated in the regulation), federal *Fisheries Act*, *Canadian Navigable Waters Act* and *Species at Risk Act*. Local government permitting may also be required.

IMPORTANT: Adherence to General and Applicable Scope-Specific BMPs

You are expected to follow the General BMPs for all CIAS projects in addition to any Scope-specific BMPs that pertain to your project. Refer to the General BMPs in the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia document, and the other Scope-specific BMPs in the Appendix.

Best Management Practices

The following provisions represent BMPs for considering reduced risk timing windows when planning for CIAS activities under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, **the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.**

Boat Launch Planning and Design

a) A Qualified Professional with expertise in boat launch impacts and design must be engaged early in the design process.

b) The boat launch must be designed to avoid sensitive areas, such as within the stream and stream channel, which include but are not limited to: lake inlet/outlet streams, spring and aquifer discharge zones, fish habitat (e.g., spawning, holding and rearing areas), habitat for species at risk, unstable/easily erodible areas, areas of unstable stream banks, and other geomorphically sensitive areas.

c) The location and layout of the boat launch must consider the seasonal and long-term changes in water levels, prevailing wind direction, water current, potential for ice, and avoid unstable areas such as eroding banks. Additional protection measures such as riprap and breakwaters may be needed, particularly for launches in rivers.

d) The boat launch design must consider requirements for future maintenance and include monitoring recommendations specific to dredging and instream vegetation removal. The boat launch design must allow for site access for future maintenance and repairs for long-term use.

e) Associated infrastructure must be located as far back from the edge of water as possible, ideally located a minimum of thirty (30.0) metres from the high-water mark. This includes but is not limited to parking areas, vehicle turn around space for typical trailers and tow vehicles, and signage.

Boat Launch Construction and Maintenance

f) The construction area and access routes should be marked onsite prior to starting work and existing vegetation left in place, as much as possible.

g) Natural materials such as rocks or logs located within the water removed to facilitate construction must be carefully relocated to an area with similar habitat conditions.

h) Ongoing maintenance activities must be minimized, including dredging and the cutting or removal of instream and riparian vegetation.

Boat Launch Removal

i) The removal of a boat launch must have the same level of planning as launch construction.

j) Actions are taken to avoid causing depressions in the river or lakebed that could strand fish.

Additional Resources

- B.C. HabitatWizard tool
- Approved Work Practices for Boat Launch Construction and Maintenance in BC Hydro Managed Freshwater Systems, BC Hydro
- Treated Wood in Aquatic Environments, Western Wood Preservers Institute

Amendments

New Version #	Date Amended	Amendment Description
NA	NA	NA

Recommended Citation

For the use by WSA statutory decision makers during the water authorization process:

"Best Management Practices for Boat Launches". Appendix, Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia. Version 2026.01. Government of British Columbia.

A6. Best Management Practices for the Restoration and Maintenance of Aquatic Ecosystems

This section describes best management practices (BMPs) for restoration and maintenance of aquatic ecosystems under the WSA. It is a component of the Appendix to the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia (General BMP document). These Scope-specific BMPs are intended to be used with the General BMPs and any other Scope-specific BMP(s) applicable to the project.

IMPORTANT: Mandatory vs. Non-Mandatory
BMPs are widely accepted and recognized approaches that, when adopted and implemented, help individuals to avoid and mitigate potential adverse impacts to aquatic ecosystems, water quality and quantity, and public safety, infrastructure and property. It is recommended that you use provincial BMPs for your work planning as applicable.

BMPs should be interpreted as **non-mandatory guidance if they are NOT made mandatory by being required in a legal instrument** (term or condition in an authorization, change approval or order). If, however, they ARE referenced as a term or condition, then you **must adhere to any BMPs required in the legal instrument.**

1.0 Introduction

Aquatic ecosystem restoration and maintenance efforts may include improvements to channel structure, instream complexity, riparian shading, fish passage, habitat diversity, and connectivity. These works can help restore ecosystem processes and improve habitat function for fish and other aquatic species.

Aquatic ecosystem maintenance may include works designed to maintain existing features and values at the site, maintain flow conveyance and connectivity, and improve or maintain water quality. Aquatic ecosystem restoration works include works designed to restore or increase the productive capacity of aquatic or riparian ecosystems. Restoration projects may include restoring aquatic habitats, improving fish and wildlife values, and introducing channel complexity (placement of large-woody debris, boulder clusters).

This document provides guidance for activities where the primary objective is restoration or maintenance of aquatic ecosystem values or functions. Works whose primary objective is channel conveyance or stability (even if they provide secondary ecological benefit), are addressed separately in the Restoration and Maintenance of a Stream Channel BMP. Proponents are advised to review both documents as works may be closely related.

1.1 Authorized Change

Restoration or maintenance of an aquatic ecosystem by eligible parties is described in WSR Part 3 Section 39(1)(g) and (j) as an authorized change, provided that all regulatory criteria are met.

> (g) the restoration or maintenance of a stream channel or the aquatic ecosystem by any of the following:

(i)the government of British Columbia, a government corporation or a government agent;
(ii)a municipality or regional district;
(iii)the trust council, a local trust committee, the executive committee and the Islands Trust Conservancy, as those terms are defined in the *Islands Trust Act*;
(iv)an improvement district, the Greater Vancouver Sewerage and Drainage District or the Greater Vancouver Water District;
(v)a diking authority within the meaning of the *Dike Maintenance Act*;
(vi)a first nation government within the meaning of section 69 of the Act;
(vii)the Westbank First Nation as defined in the agreement approved under the *Westbank First Nation Self-Government Act* (Canada);
(viii)the shíshálh Nation continued under the *shíshálh Nation Self-Government Act* (Canada);

(j) the restoration or maintenance of the aquatic ecosystem by the government of Canada;

Works are not conducted by an eligible party designated in regulation or works are otherwise unable to meet regulatory requirements require authorization through a change approval or authorization.

authorized changes may proceed via notification provided they meet all applicable regulatory requirements and comply with any terms and conditions set out by a habitat officer.

1.2 Elevation of an Authorized Change

Although aquatic ecosystem maintenance and restoration are listed as authorized changes under WSR s.39, works with the potential to have a significant adverse impact on the nature of the stream, including the flow of water in the stream or the stream channel, may be elevated by a WSA engineer or statutory decision maker to require a change approval under WSR s.37.

Elevation to a change approval may occur when the scale, design, or methods of the proposed works increase the potential for adverse impacts, including projects that involve one or more of the following:

- Alteration of the stream planform or channel morphology, including realignment, widening, deepening or straightening of the channel;
- Modifications with the potential to impact hydrology or sediment processes, such as changes to flow regime, water velocities, increased erosion potential, or changes to sediment transport;
- Removal of substrate beyond that required to reestablish flow conveyance and alleviate flood risk
- Introduction of new permanent or semi-permanent structures including erosion protection;
- Works are of a scale, footprint, or duration that has the potential for significant adverse impacts.

Please note that each project is unique and specific information requirements or terms & conditions not described in this document may be required by the ministry. If you are unsure whether your project qualifies as an authorized change or requires a change approval, proponents are encouraged to discuss the proposal with FrontCounter BC prior to submission.

2.0 Project Planning & Design

Aquatic ecosystem restoration and maintenance projects must be carefully planned and designed to ensure they deliver ecological benefits while avoiding unintended impacts to streams, aquatic ecosystems, riparian areas, public safety, and other water users.

Aquatic ecosystem restoration and maintenance objectives should aim to improve available instream and riparian habitats for fish and wildlife species. Project design should consider if and how the proposed work may result in unintended impacts to stream hydraulics, the aquatic ecosystem, and other species utilizing the habitat. The works should be designed to benefit as many of the native fish and wildlife species that use the stream as possible.

For projects that are eligible to proceed as an authorized change, proponents are expected to demonstrate that restoration activities are necessary, appropriate, low-risk, and consistent with the objectives of the *Water Sustainability Act*.

Application Tip: Notification submissions and change approval applications should include considerations used in project planning and design to clearly demonstrate how unintended project impacts have been assessed and mitigated. This may be in the form of a project rationale or options analysis that considers project benefits and alternative options to achieve the objective.

2.1 Project Rationale and Objectives

A well-defined rationale can help demonstrate that restoration and maintenance works are necessary and proportionate to the identified risk, while clear objectives (e.g., reducing risk to infrastructure or public safety while maintaining natural channel processes where practicable) can help guide the selection and design of appropriate measures and approaches, including consideration of options that avoid or limit disturbance to the stream and associated values where feasible.

A project rationale generally describes the basis for restoration and/or maintenance works, including the nature of the restoration, site conditions, and how potential impacts to other values have been assessed and mitigated. The level of detail may vary depending on the scale and complexity of the project.

A restoration or maintenance rationale should include:

- The existing condition of the stream or reach;
- Known or suspected habitat limitations (e.g., lack of cover, degraded substrate, disconnected habitat);
- The cause of habitat degradation (e.g., channelization, past land use, infrastructure constraints); and
- Why the proposed restoration actions are appropriate at the site.

Application Tip: Including a clear project rationale as part of your application is strongly recommended, and in some cases may be required by a statutory decision maker. Providing this information can support efficient review and reduce the need for additional information requests. The level of detail should be commensurate with the scale, scope, and risk of the proposed works.

2.2 Mitigation Hierarchy - Avoidance

Avoiding impacts to streams and associated values is a key principle of the Environmental Mitigation Policy (EMP), which describes the mitigation hierarchy (Avoidance > Minimize > Restore On-Site > Offset).

For aquatic ecosystem restoration and maintenance projects, avoidance considerations may include:

- Whether the proposed restoration activity could disturb stable, functioning habitat adjacent to degraded areas;
- Whether the proposed intervention could unintentionally destabilize the channel, banks, or substrate;
- Whether access routes, staging areas, or construction methods could be modified to avoid riparian disturbance; and
- Whether the project footprint can be reduced to the minimum area necessary to achieve restoration objectives.

Restoration and maintenance projects should avoid introducing new impacts in areas of intact habitat in order to address degradation elsewhere, unless clearly justified and supported by a Qualified Professional.

Application Tip: Where avoidance is not feasible, your project rationale should clearly describe why the work is necessary and how the proposed approach has been selected to limit impacts to the stream channel and associated values. This rationale may include an options analysis of lower-impact alternatives considered before proceeding with design. Proponents should clearly demonstrate how avoidance was assessed and what factors were considered in selecting the proposed option.

2.2 Safety of People, Property and/or Infrastructure

Although aquatic ecosystem restoration projects are typically ecological in focus, poorly designed or implemented works can pose risks to people, property, or infrastructure. These risks may arise from structural deficiencies of restoration structures or from changes to flow conditions and channel behaviour which can affect adjacent properties and infrastructure.

Safety considerations should therefore be integrated into restoration and maintenance planning and design. Proponents should consider how the proposed work may interact with site conditions over time and whether it could introduce or increase risk to surrounding areas.

Restoration and maintenance designs should remain stable under expected flow conditions and should avoid:

- Redirecting flows toward erodible banks, infrastructure, or private property;
- Increasing erosion, sediment mobilization, or flood risk;
- Undermining streambanks, crossings, utilities, or adjacent structures; and

Application Tip: Include sufficient information in your application to demonstrate that potential risks to people, property, and infrastructure have been considered. The level of detail should align with the scale and complexity of the proposed works.

2.3 Environmental/Ecological Considerations

An understanding of existing site conditions is important to inform restoration and maintenance planning and design. This includes identifying the physical, hydrologic, and biological characteristics of the system, as well as aquatic ecosystem values such as fish, wildlife and benthic habitat, and other features present at or near the proposed works.
Proponents should consider what ecological values are present at the site and how they function within the broader system, including their relative importance or sensitivity. This may include consideration of:

- the type, quality, and extent of aquatic and riparian habitat;
- the presence of fish and wildlife, including species of concern;
- habitat features such as pools, cover, spawning areas, or wetlands; and
- connectivity within the channel, floodplain, or wetland system.

This understanding should be used to inform the location and design of the proposed works. Proponents should consider how the proposed restoration and maintenance may interact with existing conditions and how changes influence ecological values over time.

Potential interactions may include:

- changes in habitat availability or distribution;
- alteration of habitat complexity or structure;
- changes in connectivity or access to habitat;
- effects on water quality or temperature; and
- changes in wetland extent, hydrology, or vegetation communities.

Stream and aquatic ecosystem responses may vary based on local conditions and may evolve over time, proponents should consider both immediate and longer-term effects when evaluating how ecological values may be affected.

Application Tip: Include clear information in your application describing the ecological conditions at the site and how they were considered in the design and location of the proposed works to avoid or reduce adverse impacts. The level of detail should align with the scale and complexity of the project.

IMPORTANT: Adherence to General and Applicable Scope-Specific BMPs

You are expected to follow the General BMPs for all CIAS projects in addition to any Scope-specific BMPs that pertain to your project. Refer to the General BMPs in the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia document, and the other Scope-specific BMPs in the Appendix.

3.0 Best Management Practices

The following provisions represent BMPs for CIAS for restoration and/or maintenance of an aquatic ecosystem under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, **the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.**

Design

a) Design and scale works appropriately to the site conditions, stream size and flow conditions;
b) Use natural materials consistent with the surrounding channel (e.g., native wood, clean gravel, live vegetation);
c) Avoid hard engineering approaches unless clearly justified;
d) Maintain fish passage and access during all flow conditions;
e) Design restoration and maintenance works to prevent the creation of barriers to fish migration or potential of fish stranding under low flow conditions;
f) Ensure assessment and mitigation of potential impacts to the stream, habitat, other fish and aquatic species, public safety, water users, and riparian areas have been considered in project planning and design;
g) Design restoration an maintenance works to enhance or restore stream function, habitat values, and biodiversity;
h) Improve habitat connectivity and fish and wildlife passage where appropriate
i) Design restoration and maintenance works to avoid impacts to and maintain connectivity to the active floodplain;
j) Consider a watershed approach to restoration and maintenance planning to address underlying causes of aquatic ecosystem disturbance.

Implementation

a) Avoid working in or disturbing of sensitive habitat, mitigate impacts where sensitive habitats are the subject of restoration activities;
b) Minimize disturbance to existing aquatic habitat;
c) Minimize riparian disturbance and retain mature vegetation wherever possible.
d) Ensure construction or maintenance access does not undermine embankments, footings, or utility supports.
e) Avoid unnecessary clearing of vegetation, removal of woody debris, or excavation of the stream banks and channel;
f) Prioritize natural, low-impact installation techniques for restoration works.
g) Use site isolation and erosion and sediment control measures to avoid introducing materials or flows that could impact water quality or endanger structures downstream.

h) Avoid disturbance of fish, amphibians, or benthic invertebrates;
i) Avoid creating localized bank instability with improperly placed structures or habitat features (woody debris, boulders);
j) Restoration materials like woody debris must be sufficiently anchored to avoid mobilization during high flows;
k) Avoid working during critical life stages for fish and/or wildlife and adhere to regional timing windows. Avoid seasons or conditions when fish and/or wildlife cannot be easily or safely salvaged;
l) Conduct instream work in a manner that limits disturbance of fine sediments;
m) Avoid unnecessary re-suspension of sediments during installation of habitat features;
n) Stabilize disturbed soils immediately following construction using natural materials (e.g., mulch, brush layering, erosion control mats), where appropriate;
o) Ensure all equipment is clean and free of fuel, oil, or hydraulic leaks prior to entering riparian and aquatic areas;
p) Do not clean equipment or dispose of construction materials within the stream or riparian area;
q) Large woody debris, materials and equipment must not be dragged through, or otherwise alter, stream banks or streambeds during installation or removal activities;
r) Consider partial or spot cleaning for maintenance works to reduce the extent of in-stream disturbance;
s) Remove only the accumulated material required in order to restore flow conveyance and alleviate flood risk during maintenance works;

Restoration

t) Maintain effective erosion and sediment control measures until complete re-vegetation of disturbed areas is achieved;
u) Restore stream substrate, channel, banks and other affected areas to their approximate original or improved configuration and composition of complexity (varying depth and velocity);
v) Any temporary fill material that has been added to the watercourse channel and floodplain must be removed and placed in location where it will not re-enter the stream;
w) Stabilize any waste soils or organic matter removed from the work site to prevent them from entering the watercourse;
x) Restore habitat features and channel structure; and
y) Revegetate all disturbed riparian areas using native vegetation species appropriate to the site conditions.

Additional Resources

- Guidelines for Reduced Risk Instream Work Windows, BC Government
- Watershed Restoration Project and Management Reports, BC Government
- Erosion and Sediment Control Association of BC Best Management Practices
- Guidelines for Planning Watershed Restoration Projects, Watershed Restoration Technical Circular No.1, BC Government, 1995
- Fish Habitat Rehabilitation Procedures, Watershed Restoration Technical Circular No. 9, BC Government, 1997
- Lands Near Water: Riparian Restoration and Enhancement (updated 2018)
- Stream, Riparian, and Watershed Restoration
- Stewardship Centre BC: Stewardship Practice Guides
- Stream Stewardship – A Guide for Planners and Developers (1993/94)

- The British Columbia Watershed Restoration Program: Summary of the Experimental Design, Monitoring and Restoration Techniques Workshop (Table 3) 1994
- Watershed Restoration Planning and Priority Setting: An Emphasis on Fish Habitat 2004
- Wetland Mitigation in Washington State Part 2: Developing Mitigation Plans, 2006.
- Projects Near Water, Fisheries and Oceans Canada (DFO)
- Timing windows to conduct projects in or around water, Fisheries and Oceans Canada (DFO)
- Mitigating the Impacts of Channel Maintenance in the Lower Fraser Valley, MOE, 2006
- Provincial Tree Replacement Criteria

Amendments

New Version #	Date Amended	Amendment Description
N/A	N/A	N/A

Recommended Citation

For the use by WSA statutory decision makers during the water authorization process:

"Best Management Practices for the Restoration and Maintenance of Aquatic Ecosystems". Appendix, Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia. Version 2026.01. Government of British Columbia.

A7. Best Management Practices for the Restoration and Maintenance of a Stream Channel

This section describes best management practices (BMPs) for restoration and maintenance of a stream channel under the WSA. It is a component of the Appendix to the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia (General BMP document). These Scope-specific BMPs are intended to be used with the General BMPs and any other Scope-specific BMP(s) applicable to the project.

IMPORTANT: Mandatory vs. Non-Mandatory
BMPs are widely accepted and recognized approaches that, when adopted and implemented, help individuals to avoid and mitigate potential adverse impacts to aquatic ecosystems, water quality and quantity, and public safety, infrastructure and property. It is recommended that you use provincial BMPs for your work planning as applicable.

BMPs should be interpreted as **non-mandatory guidance if they are NOT made mandatory by being required in a legal instrument** (term or condition in an authorization, change approval or order). If, however, they ARE referenced as a term or condition, then you **must adhere to any BMPs required in the legal instrument.**

1.0 Introduction

Restoration or maintenance of a stream channel is undertaken to maintain the hydraulic capacity, stability, and safety of streams whose function has been impaired by accumulated sediment, excessive vegetation growth, debris, or localized channel instability. Restoration and maintenance activities ensure the ability and capacity of the channel to carry adequate flow, improve water quality, and support fish, wildlife, and aquatic ecosystem values.

Restoration or maintenance works may be conducted by **eligible parties** under the WSR Part 3 s.39(1)(g) and (j). Restoration or maintenance projects proposed by proponents other than those listed as eligible parties in the WSR must apply for a change approval.

Stream channel maintenance refers to removal of debris, waste or garbage including discarded building materials and household waste and removal of sediment, vegetation, or woody debris. The objective of stream channel maintenance is to restore conveyance of flows and/or alleviate flood risk.

Stream channel restoration refers to works designed to restore aquatic or riparian habitats. Restoration work may include rehabilitating aquatic habitats, restoring fish access, introducing channel complexity (placement of large-woody debris, boulder clusters), and introducing pool and riffle sequences.

This document provides guidance for activities where the primary objective is restoration or maintenance of stream channel functions. Works whose primary objective is aquatic ecosystem restoration are addressed separately in the Restoration and Maintenance of an Aquatic Ecosystem BMP; because works may be closely related, proponents are advised to review both documents.

1.1 Authorized Change

Restoration or maintenance of an aquatic ecosystem by eligible parties is described in WSR Part 3 Section 39(1)(g) as an authorized change, provided that all regulatory criteria are met.

> (g)the restoration or maintenance of a stream channel or the aquatic ecosystem by any of the following:
>
> (i)the government of British Columbia, a government corporation or a government agent;
>
> (ii)a municipality or regional district;
>
> (iii)the trust council, a local trust committee, the executive committee and the Islands Trust Conservancy, as those terms are defined in the *Islands Trust Act*;
>
> (iv)an improvement district, the Greater Vancouver Sewerage and Drainage District or the Greater Vancouver Water District;
>
> (v)a diking authority within the meaning of the *Dike Maintenance Act*;
>
> (vi)a first nation government within the meaning of section 69 of the Act;
>
> (vii)the Westbank First Nation as defined in the agreement approved under the *Westbank First Nation Self-Government Act* (Canada);
>
> (viii)the shíshálh Nation continued under the *shíshálh Nation Self-Government Act* (Canada);

Works that are not conducted by an eligible party designated in regulation or that are otherwise unable to meet regulatory requirements require authorization through a change approval.

Authorized changes may proceed via notification provided they meet all applicable regulatory requirements and comply with any terms and conditions set out by a habitat officer.

1.2 Elevation of an Authorized Change

Although stream channel maintenance and restoration are listed as authorized changes under WSR s.39, works with the potential to have a significant adverse impact on the nature of the stream, including the flow of water in the stream, or the stream channel, may be elevated by a statutory decision maker to require a change approval under WSR s.37.

Elevation to a change approval may occur when the scale, design, or methods of the proposed works increase the potential for adverse impacts, including projects that involve one or more of the following:

- Alteration or re-establishment of the stream profile, planform or channel morphology, including realignment, grading, widening, deepening or straightening of the channel and/or banks;
- Modifications with the potential to impact hydrology or sediment processes, such as changes to flow regime, water velocities, increased erosion potential, or changes to sediment transport;
- Removal of substrate exceeding that required to reestablish flow conveyance and alleviate flood risk
- Bank or channel armouring or other erosion-protection structures
- Introduction of new permanent or semi-permanent structures such as grade control structures and weirs;

- Works are of a scale, footprint, or duration that has the potential for significant adverse impacts.

Please note that each project is unique and specific information requirements or terms & conditions not described in this document may be required by the ministry. If you are unsure whether your project qualifies as an authorized change or requires a change approval, proponents are encouraged to discuss the proposal with FrontCounter BC prior to submission.

1.3 Additional Permissions

A review and authorization under the federal *Fisheries Act* may also be required. If the work is in association with a dike, refer to the *Dike Maintenance Act*.

2.0 Project Planning & Design

Aquatic ecosystem restoration and maintenance projects must be carefully planned and designed to ensure they deliver ecological benefits while avoiding unintended impacts to streams, aquatic ecosystems, riparian areas, other water users, and public safety.

Proponents are expected to demonstrate that restoration activities are necessary, appropriate for the site conditions, and consistent with the objectives of the *Water Sustainability Act*.

The objective of restoration and maintenance focused works is to restore or maintain the functional condition of a stream channel, including, but not limited to:

- Removal of accumulated sediment or alluvium
- Clearing accumulated vegetation or instream debris
- Removal of man-made waste or garbage by machine
- Work required to restore conveyance of flows and alleviate imminent flooding hazards

To address the need for frequent stream channel maintenance, those planning works should consider the function of local watersheds to develop long-term solutions to flooding, and sediment or debris flow risks that eliminate or reduce the frequency of stream channel maintenance. These considerations may include:

- Control or reduction of up-stream sources of channel instability or sediment;
- Increased drainage density in the watershed;
- Construction of sediment traps, off-line detention or retention facilities; and
- Establishing functional riparian that includes shade trees and shrubs to shade out instream vegetation.

2.1 Project Rationale and Objectives

Proposals to remove sediment, debris, or vegetation from a stream should be supported by a rationale that demonstrates that the works are necessary and will serve a legitimate purpose. A well-defined rationale can help demonstrate that restoration and maintenance works are necessary and proportionate to the identified risk, while clear objectives (e.g., reducing risk to infrastructure or public safety while maintaining natural channel processes where practicable) can help guide the selection and design of appropriate measures and approaches, including consideration of options that avoid or limit disturbance to the stream and associated values where feasible.

A project rationale generally describes the basis for restoration and/or maintenance works, including the nature of the restoration, site conditions, and how potential impacts to stream function and aquatic ecosystem values have been assessed and mitigated. The level of detail may vary depending on the scale and complexity of the project.

A restoration or maintenance rationale should include:

- The existing condition of the stream or reach;
- The cause of stream channel degradation or sediment accumulation (e.g., channelization, past land use, infrastructure constraints); and
- Benefits of the proposed works and alternative solutions that were considered
- Whether the project objective is necessary to alleviate actual or imminently potential flooding or other hazards that would result in a public safety risk;
- How project planning and design has assessed and mitigated immediate and long-term disruption of riparian or stream habitats, or fish and wildlife populations; and
- Why the proposed restoration actions are appropriate at the site.

Application Tip: Including a clear project rationale as part of your application is strongly recommended, and in some cases may be required by a statutory decision maker. Providing this information can support efficient review and reduce the need for additional information requests. The level of detail should be commensurate with the scale, scope, and risk of the proposed works.

2.2 Mitigation Hierarchy - Avoidance

Avoiding impacts to streams and associated values is a key principle of the Environmental Mitigation Policy (EMP), which describes the mitigation hierarchy (Avoidance > Minimize > Restore On-Site > Offset).

Streams on which channel maintenance works are required frequently (i.e. seasonally, annually) to restore flow conveyance or alleviate flood risk may benefit from alternative approaches such as addressing watershed or channel conditions causing sediment, debris, or vegetation accumulation, or implementation of alternative management solutions such as sediment traps to avoid recurring in-stream disturbance.

For stream channel restoration and maintenance projects, avoidance considerations may include:

- Whether the proposed maintenance is necessary to address a risk to public safety, infrastructure, property, or the environment
- Whether the proposed work could disturb stable, functioning habitat adjacent to degraded areas;
- Whether the proposed work could unintentionally destabilize the channel, banks, or substrate;
- Whether access routes, staging areas, or construction methods could be modified to avoid riparian disturbance; and
- Whether the project footprint can be reduced to the minimum area necessary to achieve project objectives.

Restoration and maintenance projects should avoid introducing new impacts in areas of intact habitat in order to address degradation elsewhere, unless clearly justified and supported by a Qualified Professional.

Application Tip: Where avoidance is not feasible, your project rationale should clearly describe why the work is necessary and how the proposed approach has been selected to limit impacts to the stream channel and associated values. This rationale may include an options analysis of lower-impact alternatives considered before proceeding with design. Proponents should clearly demonstrate how avoidance was assessed and what factors were considered in selecting the proposed option.

2.2 Safety of People, Property and/or Infrastructure

Although aquatic ecosystem restoration projects are typically ecological in focus, poorly designed or implemented works can pose risks to people, property, or infrastructure. These risks may arise from structural deficiencies of restoration structures or from changes to flow conditions and channel behaviour which can affect adjacent properties and infrastructure.

Safety considerations should therefore be integrated into restoration and maintenance planning and design. Proponents should consider how the proposed work may interact with site conditions over time and whether it could introduce or increase risk to surrounding areas.

Restoration and maintenance designs should remain stable under expected flow conditions and should avoid:

- Redirecting flows toward erodible banks, infrastructure, or private property;
- Increasing erosion, sediment mobilization, or flood risk;
- Undermining streambanks, crossings, utilities, or adjacent structures; and

Application Tip: Include sufficient information in your application to demonstrate that potential risks to people, property, and infrastructure have been considered. The level of detail should align with the scale and complexity of the proposed works.

2.3 Environmental and Ecological Considerations

An understanding of existing site conditions is important to inform restoration and maintenance planning and design. This includes identifying the physical, hydrologic, and biological characteristics of the system, as well as aquatic ecosystem values such as fish, wildlife and benthic habitat, and other features present at or near the proposed works.

Proponents should consider what hydraulic and ecological values are present at the site and how they function within the broader system, including their relative importance or sensitivity. This may include consideration of:

- the type, quality, and extent of aquatic and riparian habitat;
- the presence of fish and wildlife, including species of concern;
- habitat features such as pools, cover, spawning areas, or wetlands;
- connectivity within the channel, floodplain, or wetland system.
- sediment processes and transport, flow regime, water velocities, and erosion potential; and
- dynamics of the channel and floodplain.

This understanding should be used to inform the location and design of the proposed works. Proponents should consider how the proposed stream channel restoration and maintenance may interact with existing conditions and how changes influence ecological values over time.

Potential interactions may include:

- changes in habitat availability or distribution;
- alteration of habitat complexity or structure;
- changes in connectivity or access to habitat;
- effects on water quality or temperature; and
- changes in wetland extent, hydrology, or vegetation communities.

Stream and aquatic ecosystem responses may vary based on local conditions and may evolve over time; proponents should consider both immediate and longer-term effects when evaluating how hydraulic and ecological values may be affected.

Application Tip: Include clear information in your application describing the hydraulic and ecological conditions at the site and how they were considered in the design and location of the proposed works to avoid or reduce adverse impacts. The level of detail should align with the scale and complexity of the project.

IMPORTANT: Adherence to General and Applicable Scope-Specific BMPs

You are expected to follow the General BMPs for all CIAS projects in addition to any Scope-specific BMPs that pertain to your project. Refer to the General BMPs in the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia document, and the other Scope-specific BMPs in the Appendix.

3.0 Best Management Practices

The following provisions represent BMPs for CIAS for restoration and/or maintenance of a stream channel under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.

Design

a) Design and conduct works to ensure sediment removal or vegetation clearing does not redirect flows or cause downstream erosion;
b) Design works to avoid undermining bridges, culverts, utilities, or dikes;
c) Ensure debris removal will not create sudden changes in flow regime;
d) Consider climate-related hydrologic changes in stream channel restoration designs
e) Consider a watershed approach to restoration and maintenance planning to address underlying causes of stream channel disturbance.

f) Where maintenance is required frequently (i.e. seasonally, annually) consider alternative approaches to managing sediment accumulation and maintaining flow conveyance.

Implementation

a) Minimized clearing of riparian vegetation. Avoid loss of established riparian vegetation contributing to shading and bank stability and retain wildlife trees;
b) Avoid removal of instream cover, overhanging vegetation, and habitat features (woody debris, boulders);
c) Prevent elimination of pool–riffle structure and channel complexity, restore channel structure and complexity following work where impacts are necessary;
d) Use site isolation and erosion and sediment control measures to avoid introducing materials or flows that could impact water quality or endanger structures downstream.
e) Avoid unnecessary clearing of vegetation, removal of woody debris, or excavation of the stream banks and channel;
f) Prioritize natural, low-impact installation techniques for restoration works.
g) Limit works to the minimum area necessary to achieve the project objective;
h) Avoid widening or straightening of the channel or altering channel profile or planform;
i) Avoid channel maintenance in sensitive or recovering areas;
j) Incorporate partial cleaning approaches to limit extent of in-stream disturbance;
k) Avoid work during critical life stages for fish and/or wildlife by adhering to regional timing windows. Avoid seasons or conditions when fish and/or wildlife cannot be easily or safely salvaged;
l) Limit sediment removal to material needed to alleviate flood or debris flow risk. Retain, where possible, existing instream and riparian vegetation and other features;
m) Avoid disturbance of stream banks to prevent instability, exposure of underlying soils, and release of sediment into the stream;
n) Remove excavated material and debris from the site or place it in a stable area above the high-water mark or active floodplain of the stream, as far as possible from the channel.
o) Use measures to protect excavated material from eroding and being reintroduced into the stream.
p) Operate machinery from stream banks and avoid use of machinery in the stream channel.
q) Where water-based operations are required, the placing of spuds, anchors or other
r) equipment outside the footprint of the project area (e.g., dredge area) must be avoided.
s) Topsoil must be protected from compaction and admixing. Replace topsoil over root
t) networks at a stable angle of repose without compaction at the completion of the work.

Restoration

a) Maintain or improve the existing channel complexity by retaining or restoring a diverse mix of instream structures and overhanging vegetation.
b) Retain or reinstate stream channel and habitat structural complexity where possible
c) Grade disturbed areas to a stable angle of repose and stabilize and revegetate after work is completed.
d) Protect disturbed soil on banks and areas adjacent to the stream from surface erosion by hydroseeding with a heavy mulch, tackifier, and seed mix; by installing erosion blankets; or by revegetating
e) Plant a diverse mix of native trees, shrubs, and herbaceous plants appropriate to the site conditions to revegetate and replace impacted riparian vegetation.

f) Restore all in-channel or active floodplain habitats that have been disturbed during the completion of works to a condition that is enhanced from their original state.

Additional Resources

- Guidelines for Reduced Risk Instream Work Windows, BC Government
- Watershed Restoration Project and Management Reports, BC Government
- Erosion and Sediment Control Association of BC Best Management Practices
- Guidelines for Planning Watershed Restoration Projects, Watershed Restoration Technical Circular No.1, BC Government, 1995
- Fish Habitat Rehabilitation Procedures, Watershed Restoration Technical Circular No. 9, BC Government, 1997
- Lands Near Water: Riparian Restoration and Enhancement (updated 2018)
- Stream, Riparian, and Watershed Restoration
- Stewardship Centre BC: Stewardship Practice Guides
- Stream Stewardship – A Guide for Planners and Developers (1993/94)
- The British Columbia Watershed Restoration Program: Summary of the Experimental Design, Monitoring and Restoration Techniques Workshop (Table 3) 1994
- Watershed Restoration Planning and Priority Setting: An Emphasis on Fish Habitat 2004
- Wetland Mitigation in Washington State Part 2: Developing Mitigation Plans, 2006.
- Projects Near Water, Fisheries and Oceans Canada (DFO)
- Timing windows to conduct projects in or around water, Fisheries and Oceans Canada (DFO)
- Mitigating the Impacts of Channel Maintenance in the Lower Fraser Valley, MOE, 2006
- Provincial Tree Replacement Criteria

Amendments

New Version #	Date Amended	Amendment Description
NA	NA	NA

Recommended Citation

For the use by WSA statutory decision makers during the water authorization process:

"Best Management Practices for the Restoration and Maintenance of a Stream Channel". Appendix, Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia. Version 2026.01. Government of British Columbia.

A8. Best Management Practices for Stream Re-alignment and Permanent Diversion

This section describes best management practices (BMPs) for stream re-alignment under the WSA. It is a component of the Appendix to the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia (General BMP document). These Scope-specific BMPs are intended to be used with the General BMPs and any other Scope-specific BMP(s) applicable to the project.

IMPORTANT: Non-Mandatory vs. Mandatory
BMPs are widely accepted and recognized approaches that, when adopted and implemented, help individuals to avoid and mitigate potential adverse impacts to aquatic ecosystems, water quality and quantity, and public safety, infrastructure and property. It is recommended that you use provincial BMPs for your work planning as applicable.

BMPs should be interpreted as **non-mandatory guidance if they are NOT made mandatory by being required in a legal instrument** (term or condition in an authorization, change approval or order). If, however, they ARE referenced as a term or condition, then you **must adhere to any BMPs required in the legal instrument.**

1.0 Introduction

Stream realignment and permanent diversion involve the construction of a new channel or the relocation or reconfiguration of an existing stream or wetland system, such that flow or water levels are intentionally redirected on a permanent basis.

These works can be complex and may result in long-term changes to:

- hydrology and flow pathways;
- channel form or wetland function;
- sediment processes (for channelized systems);
- riparian or wetland vegetation; and
- aquatic ecosystem structure and function.

1.1 Authorized Changes under WSR Part 3

Permanent stream realignment and permanent diversion works are not eligible as authorized changes under Part 3 of the *Water Sustainability Regulation* (WSR). Projects that include stream realignment and/or permanent diversion require a change approval, authorization, or order.

2.0 Project Planning & Design

Stream realignment and permanent diversion projects involve deliberate changes to flow pathways and system configuration. These works can influence hydrologic, geomorphic, and ecological processes both at the site and within the broader system.

If not properly planned and designed, these works may result in a range of physical and ecological risks, including:

- instability of the constructed channel or flow path;
- erosion, sediment deposition, or altered sediment transport;
- unintended changes to flow distribution or routing;
- loss of flow to groundwater or altered groundwater–surface water interactions;
- reduced connectivity to floodplains or wetlands; and
- degradation or loss of aquatic and riparian/wetland habitat.

These risks are often interrelated and may not be fully apparent at the time of construction, particularly where system response evolves over time.

The level of assessment and design should be commensurate with the scale, complexity, and potential consequences of the proposed works.

Application Tip: To support application review, include information that shaped the project design and objectives. If work is proceeding as an authorized change, proponents are encouraged to apply the same approach in project design and supporting documentation, even where submission of this information is not required.

2.1 Project Rationale and Objectives

Stream realignment and permanent diversion involve changes to flow pathways and hydrology, and can result in permanent alterations to how a stream or wetland functions. These works carry a degree of uncertainty in how the system will respond over time, with potential effects to ecological conditions, adjacent land and infrastructure, and downstream water users.

For this reason, these works should only be undertaken where there is a clear and well-supported rationale. A clear project rationale and defined objectives are also important to support the planning and design of these works and to inform how potential risks and impacts are considered.

Proponents should consider:

- the purpose of the works and what they are intended to achieve;
- the existing alignment and how it functions within the site and surrounding area;
- the nature of any conflicts between the existing system and the proposed use or condition; and
- the implications of altering the existing flow path or hydrology, including how system behaviour may change over time.

Project objectives should describe the intended end condition and how the realigned or diverted system is expected to function over time. This may include considerations such as:

- maintaining flow continuity and system stability;
- avoiding unintended loss or redirection of flows;
- maintaining wetland hydrology where applicable; and
- maintaining or supporting ecological connectivity and function, where practicable.

This understanding provides context for evaluating the proposed approach and supports consideration of opportunities to avoid or limit disturbance to the existing system.

Application Tip: Including a clear project rationale as part of your application is strongly recommended, and in some cases may be required by a statutory decision maker. The project rationale should describe the purpose of the works and the context in which realignment or diversion is being proposed, including relevant site constraints, existing system conditions, and the anticipated benefits associated with the proposed approach.

Providing this information can support efficient review and reduce the need for additional information requests. The level of detail should be commensurate with the scale, scope, and risk of the proposed works.

2.2 Mitigation Hierarchy – Avoidance

Avoiding impacts to streams and associated values is a key principle of the BC Environmental Mitigation Policy (EMP), which describes the mitigation hierarchy (Avoidance > Minimize > Restore On-Site > Offset).

In the context of stream re-alignment, this begins with confirming that re-alignment is necessary before proceeding with design.

Where a project rationale has been established, proponents should consider whether the intended outcomes can be achieved without realignment or diversion through approaches that maintain the existing system to the extent practicable.

This may include considering alternatives such as:

- modifying the location, layout, or design of proposed works to avoid the need to alter the existing alignment;
- accommodating natural processes within the existing corridor (e.g., setbacks or space for channel movement);
- restoring or improving function within the existing alignment; or
- addressing contributing factors such as drainage conditions or land use constraints.

In some cases, realignment or reconfiguration may be undertaken to restore channel complexity, connectivity, or function where the existing system has been historically modified or constrained (e.g., channelization or linearization). In these situations, proponents should consider how the proposed works improve upon existing conditions and align with restoration objectives.

Where realignment or diversion is proposed, proponents should consider how adverse impacts to the stream or wetland and associated values can be avoided or reduced through:

- focusing changes to areas where they are necessary for the intended outcome;
- avoiding disturbance to stable or functioning portions of the system;
- maintaining connectivity within the channel, floodplain, or wetland system; and
- limiting the extent and scale of changes to flow pathways and hydrology.

Proponents should also consider whether the proposed location and configuration avoid areas where realignment or diversion may be more likely to result in instability or unintended outcomes, such as:

- areas of active channel migration or instability;
- locations with highly permeable soils where loss of flow to groundwater may occur;
- zones of complex flow distribution, including side channels or wetlands; and
- areas of important ecological function or sensitivity

Application Tip: Where avoidance is not feasible, your project rationale should clearly describe why intervention is necessary and how the proposed approach has been selected to limit impacts to the stream channel and associated values

2.3 Safety of People, Property and/or Infrastructure

Stream realignment works, if not appropriately located, designed, or constructed, can create risks to people, property, and infrastructure. These risks may arise from changes to flow pathways, water levels, or other channel and wetland processes and may include resulting effects such as erosion, instability, unintended flow routing, or changes in drainage patterns that affect adjacent land, infrastructure, and downstream areas.

Because these works alter how a stream or wetland functions, and because system behaviour is influenced by local conditions, system response to realignment or relocation may differ from design expectations or evolve over time. This may influence conditions beyond the immediate project area, including during higher flow events or seasonal variability.

Safety considerations should therefore be integrated into project planning and design. Proponents should consider how the proposed works may interact with site conditions over time and whether they could introduce or increase risk to:

- adjacent land, infrastructure, or access routes;
- upstream or downstream areas through changes in flow conveyance or routing; and
- channel or wetland behaviour, including the potential for erosion, avulsion, or unintended flow paths.

Where applicable, designs should aim to avoid increasing risks to people, property, and infrastructure, while supporting system behaviour that is appropriate to the site conditions and project objectives. This may include accommodating natural channel movement or wetland dynamics, provided that such changes do not introduce unacceptable risks to adjacent land, infrastructure, or downstream areas

Application Tip: Include sufficient information in your application to demonstrate that potential risks to people, property, and infrastructure have been considered. The level of detail should align with the scale and complexity of the proposed works

2.4 Environmental/Ecological Considerations

An understanding of environmental and ecological conditions is important to inform stream realignment and diversion planning and design. This includes identifying the physical, hydrologic, and biological characteristics of the system, as well as aquatic ecosystem values such as fish habitat, riparian or wetland condition, and other features present at or near the proposed works. Proponents should consider what ecological values are present at the site and how they function within the broader system, including their relative importance or sensitivity. This may include consideration of:

- the type, quality, and extent of aquatic and riparian or wetland habitat;
- the presence of fish and wildlife, including species of concern;
- habitat features such as pools, cover, spawning areas, or wetlands; and
- connectivity within the channel, floodplain, or wetland system.

This understanding should be used to inform the siting and design of the proposed works. Proponents should consider how the proposed realignment or diversion may interact with existing conditions and how changes to flow pathways and hydrology may influence ecological values over time.

Potential interactions may include:

- changes in habitat availability or distribution;
- alteration of habitat complexity or structure;
- changes in connectivity or access to habitat;
- effects on water quality or temperature; and
- changes in wetland extent, hydrology, or vegetation communities.

Because system response may vary based on local conditions and may evolve over time, proponents should consider both immediate and longer-term effects when evaluating how ecological values may be affected.

Application Tip: Include clear information in your application describing the ecological conditions at the site and how they were considered in the design and siting of the proposed works to avoid or reduce adverse impacts. The level of detail should align with the scale and complexity of the project.

IMPORTANT: Adherence to General and Applicable Scope-Specific BMPs

You are expected to follow the General BMPs for all CIAS projects in addition to any Scope-specific BMPs that pertain to your project. Refer to the General BMPs in the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia document, and the other Scope-specific BMPs in the Appendix.

3.0 Best Management Practices

The following provisions represent BMPs for CIAS for re-alignment of a stream under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.

Design

a) A Qualified Professional should be retained to support the planning, design, and implementation of stream realignment or diversion works.
b) The proposed alignment or configuration should be informed by a site-specific understanding of hydrology, channel or wetland processes, and ecological conditions.
c) The design should consider how flow pathways and hydrology will function under a range of conditions, including seasonal variability and higher flow events.
d) Designs should consider uncertainty in system response and account for the potential for system behaviour to differ from design expectations or evolve over time.
e) The design should be supported by an assessment demonstrating that the proposed channel or flow path:
    a. has a reliable source of water under expected hydrologic conditions, including seasonal low flows; and
    b. will maintain flow or water levels consistent with design objectives, considering potential losses to groundwater and site permeability.

f) The proposed configuration should aim to maintain continuity of flow and avoid unintended loss, concentration, or redirection of water.
g) Where site conditions indicate potential for loss of flow to groundwater, the design should consider how flow continuity will be maintained.
h) The design should consider the potential for erosion, instability, or unintended flow paths and incorporate approaches, where appropriate, to reduce the likelihood of these outcomes.
i) The location and configuration of works should consider areas of existing instability, complex flow patterns, or sensitive hydrologic conditions, including wetlands and side channels.
j) Designs should aim to maintain connectivity within the channel, floodplain, and wetland system and avoid creating barriers or fragmentation of aquatic or riparian habitats.

k) Design approaches should aim to maintain key hydrologic and geomorphic processes, where appropriate, to support long-term system function.

l) The design should reflect ecological values identified at the site and consider how alignment, configuration, and construction approaches may avoid or reduce adverse impacts.
m) Alternative approaches should be considered during design, including opportunities to avoid realignment or diversion through relocation, redesign, or accommodation of natural processes within the existing system.
n) Design approaches should consider natural channel or wetland processes and, where appropriate, avoid unnecessarily constraining system behaviour. This may include accommodating natural channel movement or wetland dynamics, provided risks to adjacent land, infrastructure, and downstream areas are not increased.

o) Where realignment is undertaken for restoration purposes, the design should consider how the proposed works improve upon existing conditions and support long-term system function.

Construction and Implementation

p) Works should be carried out in accordance with applicable General BMPs, including erosion and sediment control, timing windows, and protection of riparian and wetland areas.
q) The extent of disturbance should be limited to the minimum area necessary to achieve the intended outcome.
r) Work areas should be isolated from flowing water and constructed in the dry where practicable, while maintaining downstream flow at all times.
s) Temporary flow diversion or isolation methods should be designed to safely convey flows and minimize disturbance to the stream or wetland.
t) The new channel or flow path should be fully constructed and stabilized prior to redirecting flow.
u) Flow redirection should be undertaken in a controlled manner, where practicable, with consideration of:
    i. channel or flow path stability;
    ii. sediment mobilization and turbidity;
    iii. unintended flow routing or bypass; and
    iv. overall system performance.
v) Particular attention should be given to conditions immediately following flow redirection, when the potential for instability or unintended outcomes may be elevated.
w) Existing channel segments or flow paths should be stabilized, decommissioned, or reconnected, as appropriate, to reduce the likelihood of erosion, unintended flow capture, or fragmentation.
x) Disturbance to riparian or wetland vegetation should be minimized, and disturbed areas should be stabilized and revegetated using appropriate native species following construction.

Monitoring and Adaptive Management

y) A Qualified Professional should monitor construction to confirm that works are implemented in accordance with the design intent and applicable requirements.
z) Monitoring should be carried out during and after construction to identify any unintended outcomes, including:
    i. erosion, instability, or channel adjustment;
    ii. unintended flow routing, flow loss, or changes in flow distribution;
    iii. sedimentation or turbidity; and
    iv. impacts to riparian or wetland areas.
aa) Monitoring should consider system performance under a range of conditions, including higher flow events where practicable.
bb) Monitoring should focus on confirming that system performance aligns with design intent and project objectives, including ecological function and target conditions defined during design, and identifying where adjustments may be required.

Additional Resources

- British Columbia Wetland Identification and Delineation Manual [Draft Standard for Field Testing]

Amendments

New Version #	Date Amended	Amendment Description
NA	NA	NA

Recommended Citation

For the use by WSA statutory decision makers during the water authorization process:

"Best Management Practices for Stream Re-alignment and Permanent Diversion". Appendix, Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia. Version 2026.01. Government of British Columbia.

A9. Best Management Practices for Streambank Erosion Protection

This section describes best management practices (BMPs) for bank erosion protection of streams and lakes for CIAS activities under the WSA. It is a component of the Appendix to the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia (General BMP document). These Scope-specific BMPs are intended to be used with the General BMPs and any other Scope-specific BMP(s) applicable to the project.

IMPORTANT: Mandatory vs. Non-Mandatory
BMPs are widely accepted and recognized approaches that, when adopted and implemented, help individuals to avoid and mitigate potential adverse impacts to aquatic ecosystems, water quality and quantity, and public safety, infrastructure and property. It is recommended that you use provincial BMPs for your work planning as applicable.

BMPs should be interpreted as **non-mandatory guidance if they are NOT made mandatory by being required in a legal instrument** (term or condition in an authorization, change approval or order). If, however, they ARE referenced as a term or condition, then you **must adhere to any BMPs required in the legal instrument.**

1.0 Introduction

Streambanks can be eroded by natural or human-caused sources. Natural sources of streambank erosion include wave and wind action, ice, non-cohesive soils, flood events, and groundwater; whereas human-caused erosion can result from activities such as land clearing near streams, vehicle use fording into streambanks and disturbing lakeshores, discharging concentrated flows without adequate scour protection, and wave action from boats.

Streambank erosion protection, also referred to as bank stabilization, includes a wide range of activities carried out to prevent or reduce bank erosion, maintain public safety, protect infrastructure, or restore damaged streambanks. These activities range include but are not limited to bio-engineering techniques, to bank armouring, to repair of existing erosion protection works, or and emergency erosion response works.

Methods to protect streambanks from erosion generally fall into these three categories:

1. **“Hard” engineering methods:** not limited to the placement of riprap, articulated concrete mats, geosynthetic reinforced soil (GRS) walls, groynes, and gabions;
2. “**Soft” engineering methods:** not limited to the placement of large woody debris, brush layers, tree revetments, live crib walls, tree/shrub planting, wattles, hydroseeding and rolled erosion control products (RECPs); and
3. A **combination** of hard and soft engineering techniques.

Riprap is a commonly used hard engineering bank protection material in B.C. The advantages of riprap are that it is typically durable, has a history of use, and is available in most of B.C. Challenges with riprap are that it changes the hydrology and geomorphology of water bodies, it "hardens" the stream channel bank and prevents natural stream flow and channel movement, alters the riparian vegetation, and may result in erosion concerns elsewhere on the stream by deflecting the water's energy to other locations on the stream channel. In some cases, depending on the stream, stream channel, and its aquatic ecosystem habitat values, mitigation for significant adverse impacts and, if not possible to address them, compensation for habitat loss may be required when hard engineering methods are used.

Soft engineering techniques are often encouraged because they promote riparian vegetation growth and the creation of fish habitat. The vegetation covers the soil and the roots help bind it together to prevent erosion, but soft engineering methods are often not suitable for steeper stream banks or high energy streams. A combination of hard and soft engineering techniques can be used and, depending on the approach, objectives, and lifespan, this can result in longer term streambank erosion protection with the addition of vegetation enhancements and the creation of fish habitat.

It is strongly recommended that anyone planning to undertake a streambank erosion protection project retain Qualified Professionals to oversee the design and construction of the project. The physical, hydrological, and biological properties of the stream and stream channel must be considered when planning these projects.

1.1 Authorized Changes under WSR Part 3

It may be possible to complete certain streambank erosion protection works as a notice of authorized change if the work is done in accordance with Part 3 of the Water Sustainability Regulation (WSR).

The following sections of the WSR identify erosion protection related activities that qualify as authorized changes, provided the project meets the design and eligibility criteria set out in those sections:

- WSR s.39(1)(k): the repair or maintenance of existing dikes or existing erosion protection works to their original state, if the dikes or works were functional during the previous year;
- WSR s.39(1)(o): the construction or placement, under the direction of the Crown in right of British Columbia, a municipality or a regional district, or an agent of any of them, of erosion protection works or flood protection works during a declaration of a state of provincial emergency or declaration of a state of local emergency, made under the *Emergency and Disaster Management Act*, that involves flooding;

1.2 Works Not Eligible Under Authorized Change

If the proposed works do not meet the applicable requirements, and the work is not authorized under another section of WSR Part 3, then the work must be legally authorized by a change approval, water licence, use approval, or order under the *Water Sustainability Act*.

Works must also be carried out in accordance with all applicable sections of Part 3, including any terms and conditions specified by a habitat officer under s.44 in order to qualify as an authorized change.

Examples of erosion protection works that **do not** meet the criteria in WSR s.39(1) include but are not limited to:

- repair or maintenance of erosion protection works that were not functional during the previous year (WSR s.39(1)(k));
- works that extend beyond repair or maintenance to the original state, including expansion of the existing footprint or placement of additional materials outside the previously established limits;
- construction of new erosion protection works except where undertaken during a declared provincial or local state of emergency in accordance with WSR s.39(1)(o).

Where erosion or flood protection works are required in **urgent situations that are not subject to a declaration under the *Emergency and Disaster Management Act***, proponents should not proceed under WSR s.39(1)(o) and are encouraged to contact FrontCounter BC to determine the appropriate authorization pathway.

1.3 Elevation of an Authorized Change

If an statutory decision maker (SDM) considers that a proposed authorized change has the potential for significant adverse impact on the aquatic ecosystem or the nature of the stream, including the flow of water in the stream or the stream channel, then the SDM has authority under WSR s.37(2), to require the proponent to apply for and obtain a change approval or authorization despite meeting the criteria for an authorized change.

Elevation to a change approval may occur when the scale, design, or methods of the proposed works increase the potential for adverse impacts. This may include works that alter the stream channel or bank form, affect flow or sediment processes, or change how water and erosion interact with the surrounding area, particularly where those changes have the potential to concentrate, focus, or redirect erosion or hydraulic effects toward specific adjacent or downstream areas, including neighbouring properties or infrastructure.

If you are unsure whether your project qualifies for a notification or requires a change approval, proponents are encouraged to discuss the proposal with FrontCounter BC prior to submission Please note that each project is unique and specific information requirements or terms & conditions not described in this document may be required by the ministry. If uncertain whether a project meets notification criteria, the proponent should consult FrontCounter BC.

1.4 Additional Permissions

Approval under the federal *Fisheries Act* may also be required. If the work is in association with a dike, refer to the *Dike Maintenance Act*.

IMPORTANT: Adherence to General and Applicable Scope-Specific BMPs

You are expected to follow the General BMPs for all CIAS projects in addition to any Scope-specific BMPs that pertain to your project. Refer to the General BMPs in the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia document, and the other Scope-specific BMPs in the Appendix.

2.0 Project Planning and Design

Bank erosion is a natural part of how streams function and change over time. However, erosion can also be accelerated or exacerbated by human activities such as land development, vegetation removal, or alterations to flow and sediment regimes. Efforts to stop or control erosion can interfere with natural processes and should only be carried out where there is a clear need, particularly where erosion poses a risk to public safety, infrastructure, property, or environmental values. For this reason, erosion protection projects should be carefully planned and designed. Erosion protection works should address clearly identified risks while avoiding unintended impacts to the stream, aquatic ecosystems, riparian habitat, nearby land and infrastructure, water users, and public safety

Application Tip: For applications requiring a change approval, information used to inform and guide project design and objectives, should be clearly described in your application package to support ministry review. For works proceeding under a notification, proponents are encouraged to apply the same approach in project design and supporting documentation, even where submission of this information is not required.

2.1 Project Rationale and Objectives

A well-defined rationale can help demonstrate that erosion protection works are necessary and proportionate to the identified risk, while clear objectives (e.g., reducing risk to infrastructure or public safety while maintaining natural channel processes where practicable) can help guide the selection and design of appropriate protection measures and approaches, including consideration of options that avoid or limit disturbance to the stream channel and associated values where feasible.

A project rationale generally describes the basis for erosion protection works, including the nature of the erosion, site conditions, and the risks it presents. The level of detail may vary depending on the scale and complexity of the situation, ranging from site observations confirming erosion and risk, to more detailed assessment of erosion processes and contributing factors. This understanding supports decisions about whether intervention is warranted, where it should occur, and what type of approach may be suitable.

In applying this understanding, proponents should consider:

- the purpose of the works (e.g., protection of infrastructure, public safety, or environmental values);
- the nature and extent of erosion, including whether it is active or likely to pose future risk;
- the underlying causes and drivers of erosion, where understood (e.g., natural channel processes, altered hydrology, vegetation removal); and
- the risks being addressed, including potential consequences if no action is taken.

Application Tip: Including a clear project rationale as part of your application is strongly recommended, and in some cases may be required by a statutory decision maker. Providing this information can support efficient review and reduce the need for additional information requests. The level of detail should be commensurate with the scale, scope, and risk of the proposed works.

2.2 Mitigation Hierarchy – Avoidance

Avoiding impacts to streams and associated values is a key principle of the BC Environmental Mitigation Policy (EMP), which describes the mitigation hierarchy (Avoid → Minimize → Restore On-Site → Offset).

In the context of erosion protection, this begins with confirming whether intervention is warranted. Not all erosion requires active protection, particularly where it is not actively progressing, where no infrastructure or valued feature is at risk, or where risks can be addressed through alternative approaches. Proponents should consider whether erosion-related risks can be managed without direct bank protection works.

This may include evaluating whether risk can be avoided or reduced through measures such as setbacks, managed retreat, relocation or modification of infrastructure, or sediment and drainage management (e.g., addressing upstream erosion sources, slope instability, or altered runoff), as well as other approaches that maintain natural channel processes.

In some situations, erosion observed at a specific location may be influenced by broader upstream or reach-scale conditions rather than a localized issue. In these cases, localized erosion protection measures may have limited effectiveness over the long term or may address only part of the underlying problem. Proponents should consider whether the proposed works are likely to address the cause of erosion or primarily provide site-specific or short-term protection.

Where intervention is warranted, proponents should consider how impacts to the stream and associated values can be avoided or limited through:

- focusing works on areas of active erosion or demonstrated risk;
- avoiding disturbance to stable channel sections and adjacent riparian areas;
- selecting approaches that minimize alteration of channel form and natural processes; and
- limiting the extent, footprint, and intensity of in-channel works where practicable.

Proponents should also consider whether the location and extent of proposed works avoid areas of higher sensitivity or risk, where erosion protection may be less effective, short-lived, or may increase the risk of impacts elsewhere, such as:

- actively migrating reaches or zones of channel instability;
- meander bends or areas prone to ongoing erosion and deposition;
- floodplains and alluvial fans, where works may constrain natural processes or increase risk elsewhere; and
- areas of important fish habitat or ecological significance.

- reach-scale or system-wide instability, where localized protection may be unlikely to address underlying erosion processes or may transfer erosion impacts downstream or across the channel.

Application Tip: Where avoidance is not feasible, clearly describe why intervention is necessary and how the proposed approach has been selected to limit impacts to the stream channel and associated values.

2.3 Safety of People, Property, and Infrastructure

Protection of public safety is an important consideration in the planning, design, and implementation of erosion protection works. While erosion itself may pose risks to infrastructure, access, and adjacent land uses, erosion protection works that are poorly located, designed, or constructed can introduce additional hazards, including unintended changes to flow patterns or localized scour that may compromise the stability of the works or adjacent areas.

Proponents should consider how proposed works may influence existing conditions and whether they may increase risk to people, infrastructure, or property. This includes consideration of how risks may change as a result of the works, both at the site and elsewhere within the channel or downstream.

Where erosion protection works are proposed, proponents should consider:

- the proximity of works to infrastructure, public access routes, and occupied or frequently used areas;
- the potential consequences of unintended performance or failure of the works, including mechanisms such as flanking, toe scour, or undermining;
- how works may alter flow patterns, velocities, or sediment transport in ways that could increase risk to people, property, or infrastructure; and
- how site conditions, such as steep or unstable banks, confined channels, or debris transport, may influence the likelihood or consequences of failure.

Public safety considerations should also extend to construction and maintenance activities. Proponents should consider how risks to workers and the public will be managed during construction, including equipment access, site stability, and interaction with flowing water.
Where applicable, erosion protection works should be designed to:

- reduce the likelihood of unintended or hazardous outcomes, including during higher flow conditions;
- avoid creating new risks to public access, adjacent land uses, or downstream areas; and
- maintain the safe and reliable function of infrastructure and access routes

In some cases, erosion at a given location may reflect broader reach-scale or system-wide conditions rather than a localized issue. Where this occurs, localized erosion protection measures may have limited effectiveness or may transfer erosion or flow-related impacts to adjacent or downstream areas. Proponents should consider whether the scale of the proposed works is appropriate to the nature of the erosion being addressed and how the works may interact with processes beyond the immediate project area.

Application Tip: The ministry seeks to ensure that erosion protection works are designed to an appropriate standard to avoid creating or exacerbating risks to people, property, and infrastructure. Where applicable, inclusion of public safety considerations and how risks have been addressed may support review of the application. The level of detail and supporting

information provided in an application should be commensurate with the scale, complexity, and potential impact of the proposed works.

2.4 Environment and Ecological Considerations

An understanding of environmental and ecological conditions is important to inform the planning and design of erosion protection works. This includes the physical and hydraulic characteristics of the stream, patterns of erosion and sediment movement, and aquatic ecosystem values such as fish habitat, riparian condition, and other features present at or near the proposed works.

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Considering these conditions helps inform the selection and design of appropriate erosion protection measures and supports the identification of potential interactions with the stream channel and associated values

Proponents should consider both existing ecological conditions and how proposed works may interact with them over time, including changes to erosion processes, sediment dynamics, and channel–floodplain interaction. This includes consideration of both direct and indirect effects, such as potential loss or simplification of near-bank habitat, changes to channel function, and impacts to ecological connectivity

Erosion protection works should avoid sensitive habitats and areas of channel or habitat complexity where practicable. Work in fish-bearing streams and those supporting listed species should avoid critical life stages where possible. Natural channel processes, including sediment transport and bank dynamics, should be maintained to the extent practicable to support habitat function and connectivity

Application Tip: Include clear information in your application describing the ecological conditions at the site and how they were considered in the design and siting of the proposed works to avoid or reduce adverse impacts. The level of detail should align with the scale and complexity of the project.

3.0 Best Management Practices

The following provisions represent BMPs for CIAS activities for streambank erosion protection projects under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.

Planning and Design

a) A qualified engineering professional licensed by the regulatory body, Engineers and Geoscientists BC (egbc.ca), should be retained where streambank erosion protection works are used to safeguard homes or critical infrastructure, to develop a design which specifies the type, size, and placement of the erosion protection works. The Qualified Professional designing the streambank erosion protection project must also have sufficient hydrological training and experience to be able to predict flows and to specify correctly selected and

sized project materials and features (such as adequate for anticipated flows, wave action and/or ice).

b) The project area should be limited to streambank areas that are actively eroding or at high risk of eroding.

c) Impacts to other areas of the stream from the hard or soft engineering of streambanks should be considered, including the potential for redistribution of erosion or flow-related effects to adjacent or downstream areas.

d) Riprap and other hard engineering methods should be suitably designed for the anticipated flows, wave action and/or ice.

e) Riprap used should be hard, angular, resistant to weathering and be comprised of a variety of sizes to prevent any gaps.

f) Riprap should be placed over a permeable non-woven geotextile.

g) Soft engineering techniques should be incorporated into hard engineering plans to the extent possible, such as the incorporation of root wads, large woody debris, live stakes, pocket planting, or brush layers.

h) Installation of riprap should generally occur at a similar slope as the stream bank to maintain a uniform bank slope and stream channel. Geosynthetic reinforced soil (GRS) walls, gabion baskets and similar engineered structures may be better suited for steeper slopes.

i) Streambank erosion protection measures should be designed to avoid constricting the channel width or flow, infill fish habitat (e.g., outlet pools), or create a barrier to fish passage.

j) Rolled erosion control products should be considered to provide immediate erosion protection and bank stability where easily mobilized soils are exposed, until the vegetation is established.

k) Erosion protection measures should be designed to minimize the potential for failure mechanisms such as flanking at tie-ins, toe scour, or undermining.

l) Where erosion protection works are implemented in areas influenced by upstream anthropogenically impacted drainage conditions, proponents should consider whether measures to address contributing factors (e.g., slope instability, or drainage) are required to support effective long-term performance.

m) Erosion protection works should be designed to avoid or minimize encroachment into the active channel and to limit impacts to riparian vegetation where practicable.

n) Where vegetation-based or nature-based erosion protection approaches are used, proponents should consider whether the expected rate of establishment and performance is appropriate for the level of risk being addressed.

o) Where applicable, design of erosion protection works should consider anticipated changes in hydrologic conditions over time, including potential increases in flow magnitude or frequency.

p) Erosion protection works should avoid reducing effective channel width or altering flow conditions in a manner that could increase flow velocities and erosion risk elsewhere.

Construction and Maintenance

q) The construction area and access routes should be marked onsite prior to starting work and any vegetation removal must be minimized and limited to only the areas required for construction.

r) Equipment should be operated from land wherever practicable.

s) Particular care should be taken at upstream and downstream tie-in locations to ensure continuity with existing bank conditions and to reduce the risk of flanking or localized erosion.

t) Riprap should be placed by an excavator and not end dumped.

u) Following construction, where erosion protection relies on vegetation establishment or other nature-based approaches, temporary stabilization measures should be implemented where there is a risk of erosion during the establishment period. Proponents should consider the time required for establishment and site-specific conditions, including flow and seasonal variability.

v) Where vegetation-based or hybrid erosion protection measures are used, proponents should consider requirements for establishment, maintenance, and adaptive management to ensure long-term performance.

Additional Resources

- B.C. Water Quality Guidelines
- Fish Habitat Rehabilitation Procedures, Watershed Technical Circular No. 9, B.C. Government, 1997
- Rehabilitation and Enhancement of Aquatic Habitat Guide v1.0, DFO
- Riprap Design and Construction Guide, MELP, 2000
- Soil Bioengineering Techniques for Riparian Restoration, Polster Environmental Services Ltd., 2002
- Society for Ecological Restoration
- Bioengineering for Streambank Erosion Control, US Army Corps of Engineers, 1997

Amendments

New Version #	Date Amended	Amendment Description
2026.01		Updated scope-specific BMPs and introduction, and addition of Project Planning and Design section.

Recommended Citation

For the use by WSA statutory decision makers during the water authorization process:

"Best Management Practices for Streambank Erosion Protection". Appendix, Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia. Version 2026.01. Government of British Columbia.

A10. Best Management Practices for Storm Sewer Outfalls

This section describes best management practices (BMPs) to mitigate impacts to streams associated with storm sewer outfall construction and maintenance under the WSA. It is a component of the Appendix to the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia (General BMP document). These Scope-specific BMPs are intended to be used with the General BMPs and any other Scope-specific BMP(s) applicable to the project.

IMPORTANT: Mandatory vs. Non-Mandatory
BMPs are widely accepted and recognized approaches that, when adopted and implemented, help individuals to avoid and mitigate potential adverse impacts to aquatic ecosystems, water quality and quantity, and public safety, infrastructure and property. It is recommended that you use provincial BMPs for your work planning as applicable.

BMPs should be interpreted as **non-mandatory guidance if they are NOT made mandatory by being required in a legal instrument** (term or condition in an authorization, change approval or order). If, however, they ARE referenced as a term or condition, then you **must adhere to any BMPs required in the legal instrument.**

1.0 Introduction

This BMP is specific to storm sewer outfalls and does not address broader storm sewer management approaches. Typically, storm sewer outfalls are the outlets of urban or rural storm sewer systems that flow into streams. Storm sewer outfalls are the direct links between upland land use (e.g., industry, development, or agriculture) and streams. Consequently, they can have significant impacts to aquatic species and the aquatic environment by altering the amount of water and/or the water quality entering the stream. Water quality can be impacted by the introduction of deleterious substances from upland areas.

It is highly recommended that proponents undertaking storm sewer projects consult with a Qualified Professional to incorporate BMPs into the design of the entire storm system with the goal to reduce the volume and rate of water discharged to a stream and avoid impacts to water quality. Efforts should be made to manage as much storm water on-site as possible (e.g., infiltration, retention ponds) to avoid the need to construct a new storm sewer outfall. The owner of the storm sewer outfall is ultimately responsible for the storm sewer discharge, including any deleterious substances, and any damage caused to the stream and stream channel (e.g., erosion).

1.1 Authorized Changes under WSR Part 3

It may be possible to carry out the construction or maintenance of storm sewer outfalls as an authorized change if the work meets the requirements set out in Part 3 of the Water Sustainability Regulation (WSR).

Please refer to A Users Guide to Changes in and about a Stream for more detailed information on different types of authorizations and when they apply. Section 4.2 of the Users' Guide provides information on the types of authorized changes and the regulations that govern them, and Section

6.2 provides details on how to submit a notification. Authorized changes are subject to restrictions under WSR s.40 - s.45 unless specifically exempted from those requirements

WSR s.39(1)(l) outlines the criteria to be met for storm sewer outfalls to be considered authorized changes under WSR, including design specifications for the construction, maintenance, and usage of storm sewer outfalls.

If the design specifications for the proposed storm sewer outfall does not meet WSR requirements, and the work is not authorized under another section of WSR Part 3, then the work will require a change approval, water licence, order, or use approval in order to be authorized to proceed.

> WSR s.39(1)(l): the construction or maintenance of storm sewer outfalls, if both the following conditions are met:
>
> > (i) the storm sewer outfall is designed by an engineering professional;
> >
> > (ii) the storm sewer outfall is constructed, maintained and used in a manner that does not obstruct the flow of water in the stream or cause erosion of the stream channel;

A habitat officer may prescribe site-specific terms and conditions for authorized change notifications in addition to those terms and conditions issued through FrontCounter BC.

Proponents are expected to ensure that proposed works clearly meet both the intent and specific conditions of an authorized change under the regulation before proceeding by notification. Submitting works that do not meet these requirements may result in delays, enforcement action, or the need to obtain a change approval or authorization.

1.3 Elevation of an Authorized Change

If an statutory decision maker (SDM) considers that a proposed authorized change has the potential for significant adverse impact on the aquatic ecosystem or the nature of the stream, including the flow of water in the stream or the stream channel, the SDM has authority under WSR s.37(2) to require the proponent to apply for and obtain a change approval or authorization despite meeting the criteria for an authorized change.

Elevation to a change approval may occur when the scale, design, or methods of the proposed works increase the potential for adverse impacts, including projects that involve one or more of the following:

- The proposed works are of a scale, extent, and footprint that may increase potential for significant adverse impacts.
- Storm sewer outfall design has the potential to result in adverse impacts to the aquatic ecosystem or to the nature of the stream.
- Works involve long-term or permanent alterations to the stream channel, stream banks, or natural boundary, or there is modification to the channel planform.
- Works may pose significant impacts to water quality, aquatic ecosystems, fish passage, sediment transport, public safety, or downstream infrastructure.
- The storm sewer outfall installation or maintenance project includes additional in-stream works not included in WSR Part 3.

- Design lacks measures to protect the stream channel against erosion.
- The storm sewer outfall is located on a designated Sensitive Stream or interacts with sensitive habitat.
- Fish passage characteristics are not maintained; and
- Proposed works do not meet all requirements of the WSR including those set out in s. 39(1) and s. 40-45.

Where these situations apply, a notification of authorized change may be insufficient and a change approval required.

Please note that each project is unique and specific information requirements or terms & conditions not described in this document may be required by the ministry. If uncertain whether a project meets notification criteria, the proponent should consult FrontCounter BC.

Additional Permissions

Additional approvals from other enactments or local governments may be required. Projects on public land (e.g., Crown land) typically require tenure or an authorization from the province to construct and maintain a stormwater pipe and outfall. In addition, the project may require a review or approval under other legislation, e.g., the *Environmental Management Act*.

2.0 Project Planning and Design

Proponents should use their understanding of site conditions developed in this section to guide project design considerations.

Storm sewer outfalls should be planned and designed to minimize their hydrologic, geomorphic, and ecological footprint on receiving watercourses. Project design should prioritize on-site infiltration, retention, reuse, or dispersion practices. Storm sewer outfalls may be proposed where these approaches are not feasible or insufficient to manage runoff volumes and rates consistent with pre-development conditions.

Storm sewer outfall designs must consider the volume and velocity, including peak flow conditions, of anticipated discharge to the receiving stream. The design must ensure the stream has capacity to handle anticipated flows without adverse impacts such as erosion, scour, or impacts to water quality. Storm sewer outfall discharge should also meet or exceed standards in the British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife and Agriculture.

Application Tip: For applications requiring a Change Approval, information used to inform and guide project design and objectives should be clearly described in your application package to support ministry review. For works proceeding under a notification, proponents are encouraged to apply the same approach in project design and supporting documentation, even where submission of this information is not required.

2.1 Project Rationale & Objectives

Proponents should establish a clear project rationale and objectives to support storm sewer outfall works. A well-defined rationale helps demonstrate that the work is necessary, appropriate, and proportionate to the risks present, while clear objectives help guide the selection and design of appropriate measures.

The project rationale should be informed by an understanding of site conditions and identify the risks and benefits the project intends to address. It also provides a foundation for subsequent considerations, including avoidance, site context, and selection of appropriate design approaches.

Application Tip: Including a clear project rationale as part of your application is strongly recommended, and in some cases, may be required by an SDM. Providing this information in your application can support efficient review and reduce the need for additional information requests. This information should clearly demonstrate how site conditions have been considered in developing the project rationale and informing design decisions. The level of detail should be sufficient to clearly explain the need for the project and be commensurate with the scale, scope and risk of the proposed works.

2.2 Mitigation Hierarchy – Avoidance

Avoiding impacts to streams and associated values is a key principle of the BC Environmental Mitigation Policy (EMP), which describes the mitigation hierarchy (Avoidance > Minimize > Restore On-Site > Offset).

In the context of storm sewer outfalls, this begins with confirmation that the installation or maintenance is necessary. Proponents should consider whether storm sewer outfall installation works can be avoided. Outfalls should only be proposed where on site infiltration, retention, reuse, or dispersion practices are not feasible or insufficient to manage runoff volumes and rates consistent with pre-development conditions.

Avoidance considerations may include, but are not limited to:

- Whether stormwater runoff can be managed on-site through infiltration, retention, reuse, or dispersion, thereby eliminating or substantially reducing the need for an outfall;
- Whether drainage to ground-based systems (e.g. rain gardens, infiltration galleries, soakaways, rock pits, constructed infiltration areas) is feasible given local soil, groundwater, and site constraints;
- Whether low-impact development (LID) or green infrastructure measures can be implemented at the source to reduce runoff volumes and peak flows;
- Whether land-use planning or site layout adjustments (e.g., reduced impervious area, modified grading, setbacks) could reduce stormwater generation;
- Whether alternative discharge locations exist that would reduce environmental and safety risk, such as discharging to a more stable reach or a less sensitive receiving environment; and
- Whether existing or informal drainage pathways can be improved or formalized in a manner that avoids concentrating flows at a single new discharge point.

In evaluating avoidance, decision makers may also consider whether the proposed outfall would:

- introduce runoff to a stream reach that currently receives little or no developed drainage;
- transfer drainage-related impacts downstream rather than addressing them at the source; or
- incrementally contribute to cumulative erosion, flooding, or habitat degradation within the watershed.

Avoidance does not require the elimination of all stormwater discharges in all circumstances. However, proponents are generally expected to demonstrate that:

- stormwater runoff volumes and rates have been reduced as much as feasible prior to discharge; and
- a stormwater outfall is proposed only after reasonable alternatives have been assessed and found to be impracticable or insufficient.

Where avoidance opportunities have been constrained by site conditions, existing development, or safety considerations, the rationale for proceeding with an outfall should be clearly articulated and supported by appropriate technical or planning information.

Where storm sewer outfalls are necessary, impact avoidance may be achieved through appropriate site selection, and consideration of stream morphology and habitat features such as:

- avoidance of sensitive habitats;
- avoidance of areas with in-stream morphological complexity, sinuosity, and braiding;
- selecting areas of existing disturbance; and/or
- minimizing the number of storm sewer outfalls required.

Where storm sewer outfall works are warranted, works should be limited to the immediate stream tie-in area, and disturbance of stable areas should be avoided. Maintaining natural stream processes, where practicable, is recommended.

Application Tip: Where avoidance is not feasible, your project rationale should clearly describe why the work is necessary and how the proposed approach has been selected to limit impacts to the stream channel and associated values. This rationale may include an options analysis of lower-impact alternatives considered before proceeding with design. Proponents should clearly demonstrate how avoidance was assessed and what factors were considered in selecting the proposed option.

2.3 Safety of People, Property and/or Infrastructure

Poorly designed or constructed storm sewer outfall works can create significant risks to the safety of people, infrastructure, or property, both at the project site and downstream. These risks may arise from direct impacts at the site or from unintended changes in hydraulic conditions, including the transfer of energy and flow to other areas of the channel.

Understanding this broader context helps identify the level of risk to public safety, property, and environmental values, and supports the selection of works that are appropriate to site conditions, ecological values, and potential consequences.

The ministry seeks to ensure that storm sewer outfall works are designed to an appropriate standard to avoid creating or exacerbating risks to people, property, and infrastructure. The level of detail and supporting information provided in an application should be commensurate with the scale, complexity, and potential impact of the proposed works.

2.4 Environmental and Ecological Considerations

Where avoidance is not feasible, a clear understanding of the project context and site conditions is essential to effective planning and design. This includes the physical, hydraulic and ecological characteristics of the site, as well as the surrounding land use, infrastructure, water users, and other interests that may be affected by the proposed works.

Storm sewer outfall works can affect aquatic and riparian ecosystems by altering habitat, natural channel processes, and water quality. It is important that these works are planned and implemented in a manner that avoids or minimizes impacts to ecological values and function.

Proponents should consider both the direct and indirect effects of storm sewer outfalls on the surrounding environment, including potential changes to habitat availability, water quality, and natural dynamics of the channel and floodplain.

Storm sewer outfall works should avoid sensitive habitats and areas of habitat or stream complexity. Work in fish-bearing streams and those supporting listed species should be avoided during critical life stages. Fish-passage and connectivity of habitat for wildlife should be maintained following storm sewer outfall works.

IMPORTANT: Adherence to General and Applicable Scope-Specific BMPs

You are expected to follow the General BMPs for all CIAS projects in addition to any Scope-specific BMPs that pertain to your project. Refer to the General BMPs in the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia document, and the other Scope-specific BMPs in the Appendix.

Best Management Practices

The following provisions represent BMPs for designing, installing, and maintaining a storm sewer outfall under the WSA pertaining to CIAS. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, **the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.**

Design

a) Storm sewer outfalls must be designed by an engineering professional.

b) The outfall must be located where it will minimize impacts to stream water quality, riparian vegetation, stream channel, and fish and wildlife habitat. It must avoid areas of unstable banks, steep slopes, alluvial fans, and meander bends and be designed so that it does not constrict the flow of the stream.

c) The storm sewer outfall design must include appropriate water energy dissipation for the anticipated peak and minimum flows. The footprint of the headwall, riprap apron and other energy dissipators must be minimized and avoid encroachment into the stream and onto the stream channel. The stormwater pipe and outfall must be designed to discharge to the stream at a maximum angle of 45 degrees to the downstream flow.

d) The outlet must be designed to retain and hold as much sediment and debris as practicable.

e) Access for monitoring and maintenance must be considered during the design process.

f) A maintenance plan must be developed that includes a procedure to remove sediment and other debris from the headwall apron and/or energy dissipator on a regular basis to prevent material washing into the stream and stream channel.

g) The stormwater pipe outlet must be protected (e.g., screened) to prevent animals or people from gaining access to the pipe.

h) The outfall must be located where it minimizes direct and indirect impacts to other properties or services downstream.

Construction and Maintenance

i) The construction area and access routes should be marked onsite prior to starting work and vegetation removal must be minimized and limited to only the areas required for construction.

j) Equipment must be operated from land.

k) If the outfall drains an urban area, it is recommended that the sediment be sampled for metals, chlorides, hydrocarbons, and other contaminants to determine appropriate action.

l) If additional riprap reinforcement/armouring is required, placement must be limited to stabilize eroding areas around the headwall and aprons.

Additional Resources

- Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development, ENV
- Stormwater Planning – A Guidebook for British Columbia, MWLAP, 2002
- Best Management Practices Guide for Stormwater, Greater Vancouver Sewerage and Drainage District, 1999

Amendments

New Version #	Date Amended	Amendment Description
2026.01		Updated scope-specific BMPs and introduction, and addition of Project Planning and Design section.

Recommended Citation

For the use by WSA statutory decision makers during the water authorization process:
"Best Management Practices for Storm Sewer Outfalls". Appendix, Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia. Version 2026.01. Government of British Columbia.

A11. Best Management Practices for Beaver and Beaver Dam Management

This section describes best management practices (BMPs) to help land managers address seasonal flooding caused by beavers and their dams while minimizing impacts to fish, wildlife and the aquatic habitat. It is a component of the Appendix to the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia (General BMP document). These Scope-specific BMPs are intended to be used with the General BMPs and any other Scope-specific BMP(s) applicable to the project.

IMPORTANT: Mandatory vs. Non-Mandatory
BMPs are widely accepted and recognized approaches that, when adopted and implemented, help individuals to avoid and mitigate potential adverse impacts. BMPs are widely accepted and recognized approaches that, when adopted and implemented, help individuals to avoid and mitigate potential adverse impacts to aquatic ecosystems, water quality and quantity, and public safety, infrastructure and property. It is recommended that you use provincial BMPs for your work planning as applicable.

BMPs should be interpreted as **non-mandatory guidance if they are NOT made mandatory by being required in a legal instrument** (term or condition in an authorization, change approval or order). If, however, they ARE referenced as a term or condition, then you **must adhere to any BMPs required in the legal instrument.**

1.0 Introduction

Beavers and their dams support water reserves for fish and aquatic wildlife habitat and play an important role in creating off-channel habitat which support ecological diversity and natural successional changes in streams. Despite being “natural engineers”, their dams can also cause significant problems related to flooding and drainage, and in some instances fish passage and adult fish migration (especially during low water conditions when stream flows do not overtop the dam). Beavers, if left on site, will usually repair any breach to their dams in the short-term.

Coexistence solutions and allowing beaver dams to remain where appropriate are strongly encouraged. Beaver dam alteration and/or removal can result in significant damage to streams and stream corridors, such as:

- a sudden release of water and sediment/debris, such as a flush of silty water, that can impact downstream fish spawning and rearing habitat;
- rapid reduction of pond depth which can strand or kill fish, amphibians, and other animals;
- erosion of downstream channels and banks which may affect property and infrastructure; and
- potential contamination of downstream wells; and
- potential impacts to surface water users.

To disturb, molest or destroy a beaver house, den or dam is an offence under Section 9 of the *Wildlife Act* unless you are a trapper licensed under that Act or otherwise exempt under the Act, the Wildlife Regulation, or possess a permit under the *Wildlife Act*. Dam alteration or removal is

permitted under the *Wildlife Act* "to provide irrigation or drainage under lawful authority for the protection of property." If altering or removing a dam as permitted under the *Wildlife Act* meets the definition of a Change in and About a Stream (CIAS), an approval under the WSA is required unless the activity is carried out in accordance with WSR s.39(1)(u).

1.1 Authorized Change under WSR Part 3

It may be possible to remove a beaver dam as a notice of authorized change if the work is done in accordance with Part 3 of the WSR.

WSR s.39(1)(u) specifically outlines the criteria to be met for beaver dam removal to be considered as an authorized change under WSR. Under WSR s. 44, a habitat officer may prescribe site-specific terms and conditions for notifications in addition to those terms and conditions issued through FrontCounter BC.

- WSRs.39(1)(u): the removal of a beaver dam under section 9 of the *Wildlife Act*, if the removal is carried out in such a manner that downstream flooding and erosion do not occur.

Proponents are expected to ensure that proposed works clearly meet the conditions of an authorized change under the regulation before proceeding by notification. Submitting works that do not meet these requirements may result in delays, enforcement action, or the need to obtain a change approval or authorization. If the specifications **do not meet** the requirements or description in WSR s.39(1)(u), but a change in and about a stream is occurring, the work will require a change approval, water licence, use approval or order, as appropriate.

2.0 Project Planning

Beaver dam alterations or removal work should occur during the appropriate least risk timing window in order to reduce the risk of harm to beavers and fish and fish habitat. The regional freshwater least risk timing windows should be referred to during the planning stage.

Special circumstances (e.g., ice-free conditions later in the fall, increased risk to the public or critical infrastructure) may warrant dam removal during non-preferred periods. Application for variances to the timing window should include supporting information, including justification for an exception from the timing window and known fisheries information.

Where there is no immediate risk of flooding or damage to infrastructure, pond levelling devices should be considered where practicable to avoid unnecessary removal of beaver dams. Pond levelling devices should be designed by a qualified professional and should include a plan for maintenance to ensure the device remains functional and performs as intended.

Application Tip: A submission of a notice of authorized change under WSR Part 3 should include supporting documentation and justification for the proposed works with respect to:

- Location
- Size of dam (length, height) to be modified or removed
- Approximate dimensions of head pond
- Pond leveller design and dimensions (where applicable)
- Dates when works will occur
- Method of removal
- Level of risk to existing buildings, roads, or services threatened with flooding due to dam removal

IMPORTANT: Adherence to General and Applicable Scope-Specific BMPs

You are expected to follow the General BMPs for all CIAS projects in addition to any Scope-specific BMPs that pertain to your project. Refer to the General BMPs in the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia document, and the other Scope-specific BMPs in the Appendix.

3.0 Best Management Practices

The following provisions represent BMPs for beaver and beaver dam management as it relates to CIAS under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, **the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.**

Preventing Beaver Dam Construction on Streams

a) Wire fencing to exclude beavers from upland vegetation must be used. Fence mesh openings must:
   i. be small enough to prevent entry by beaver kits (<15 cm);
   ii. high enough that a beaver would not be able to reach over in winter (with accumulated snow);
   iii. be buried to a depth of 15cm or deep enough that beavers cannot dig under; or,
   iv. be applied directly to individual trees to prevent beavers from accessing trunks.

b) Culvert inlets must be installed with double-walled wire cages with mesh size large enough to pass adult salmonids.

Removing Beaver Dams

c) Beaver dam removal must only occur during the time-period specified in the *Wildlife Act* permit or authorization.

d) Where more than one dam on the same watercourse will be modified or removed, begin with the one furthest downstream. Allow the associated pond to drain to the target level before modifying or removing the next dam upstream.

e) Where fish passage remains possible, alternatives to fully removing a beaver dam must be employed. For example, the insertion of a perforated PVC culvert with an end cap through the dam to act as a pond leveler on streams (Figure 1).

f) Beavers must be removed before the removal of a beaver dam. Where beaver removal is necessary, a licensed nuisance trapper or registered trapline holder must be hired to effect removal of the beaver.

g) Lactating female beavers must be released as soon as possible if live-trapped during the summer.

h) Relocation of beavers must be avoided unless relocation is recommended by an appropriately qualified professional.

i) Explosives must not be used in beaver dam removal.

j) If impacts to fish (e.g. stranding) may occur due to dam removal, a fish salvage must be conducted by a qualified professional. A Scientific Fish Collection Permit is required for the handling and transportation of fish.

k) Draw down of beaver ponds must not lead to the stranding of fish.

l) Beaver dam removal must be performed using non-mechanized approaches (i.e. removal by hand) where applicable.
m) Install effective sediment and erosion control measures to prevent introducing sediment into the stream.
n) Dam removal must be performed gradually to prevent sudden water flows and sediment release.
o) In removing the dam, gradually increase the size of the opening as water drops to the desired level in the upstream pond.
p) Measures must be taken to ensure that turbidity does not exceed the BC Water Quality Guidelines: 8 NTU above background during short-term (e.g., 24 hour) clear flow conditions or long-term (e.g., 30 day) mean turbidity 2 NTU above background during clear flow conditions.
q) Work must be suspended if the sediment control measures are ineffective and result in the introduction of sediment into the stream. In the event of sediment release into a stream, proponents are directed to immediately stabilize and mitigate the release.
r) Avoid disturbing riparian vegetation by utilizing existing trails, roads, or cut lines to access the dam.
s) All equipment used on site should be in good repair and free of grease and oil leaks.
t) The width of the breach opening should not exceed the width of the original stream channel, to prevent bank erosion and flooding of adjacent properties.
u) Material removed from the dam must be side-cast so that it cannot re-enter the stream.
v) After removal is complete, disturbed banks should be stabilized by planting and seeding to reduce erosion risk, preferably with native trees, shrubs, or grasses; planted areas may be covered with mulch to prevent erosion and help seeds germinate.

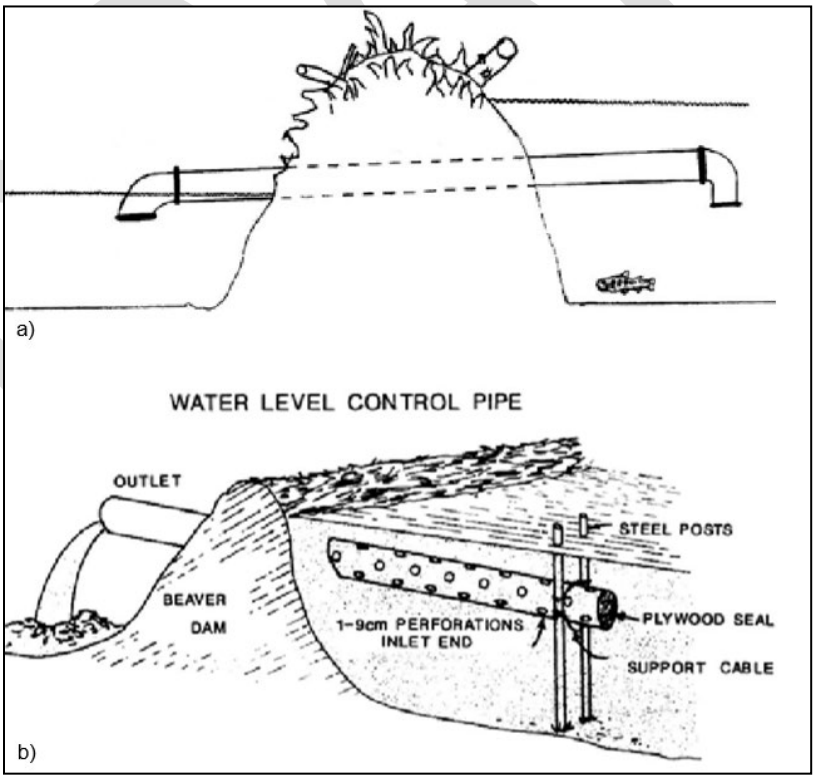

Figure 1: Examples of pond levelling structures: a) beaver siphon and b) perforated culvert. Constructed ditch factsheet. 2005. Drainage Management Guide – No. 16. British Columbia Ministry of Agriculture, Food and Fisheries. p.2.

Additional Resources

- Projects Near Water, Fisheries and Oceans Canada (DFO)
- Code of practice: Beaver dam breaching and removal, DFO

Amendments

New Version #	Date Amended	Amendment Description
2026.01		Updated scope-specific BMPs and introduction, and addition of Project Planning and Design section.

Recommended Citation

For the use by WSA statutory decision makers during the water authorization process:
"Best Management Practices for Beaver and Beaver Dam Management". Appendix, Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia. Version 2026.01. Government of British Columbia.

BMP NOT UPDATED

A12. Best Management Practices for Fording

This section describes best management practices (BMPs) for minimizing potential impacts to aquatic resources through the proper construction and use of ford stream crossings. It is a component of the Appendix to the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia (General BMP document). These Scope-specific BMPs are intended to be used with the General BMPs and any other Scope-specific BMP(s) applicable to the project.

IMPORTANT: Non-Mandatory vs. Mandatory
BMPs are widely accepted and recognized approaches that, when adopted and implemented, help individuals to avoid and mitigate potential adverse impacts to aquatic ecosystems, water quality and quantity, and public safety, infrastructure and property. It is recommended that you use provincial BMPs for your work planning as applicable.

BMPs should be interpreted as **non-mandatory guidance if they are NOT made mandatory by being required in a legal instrument** (term or condition in an authorization, change approval or order). If, however, they ARE referenced as a term or condition, then you **must adhere to any BMPs required in the legal instrument.**

Background

Fording is when streams are crossed, without altering the stream bed or stream banks, by vehicles or equipment, without the use of bridges or similar structures. In some cases, fords may be necessary when no other practical options exist for one-time or limited access routes. Three typical scenarios where fording can occur are for temporary access across a dry stream channel, a frozen stream channel, and across flowing water. Authorizing agencies do not encourage fords to be established as structures to facilitate regular and high frequency crossings. Preference should be given to using bridges, culverts, or dry fording rather than fording in streams with flowing water. Construction of fords on fish-bearing streams is strongly discouraged.

Inappropriate uses of fords can significantly impact water quality and aquatic ecosystems. Risks of using ford stream crossings include but are not limited to: destabilization of stream banks and beds, compaction of stream beds and damage to spawning habitat, the introduction of deleterious substances (sediment, hydrocarbons, etc.), loss of riparian habitat, alteration to channel shape and water flow resulting in barriers to fish migration, and direct harm or disruption to sensitive fish life stages.

Authorized Changes under Part 3 WSR

It may be possible to carry out fording as an authorized change if it can occur in accordance with Part 3 of the Water Sustainability Regulation (WSR). Specifically, WSR s.39(1)(n) and (v) of the WSR outline the types of fording that are generally considered as authorized changes. If the design specifications **do not meet** the requirements, and the work is not authorized under another section of WSR Part 3, the work will require a change approval, water licence, use approval or

order. Additional requirements may also apply under other enactments including the federal *Fisheries Act*.

- WSR s.39(1)(n): the construction or maintenance of ice bridges, winter fords or snowfills
- WSR s.39(1)(v): the construction of a temporary ford for vehicular traffic across a stream

IMPORTANT: Adherence to General and Applicable Scope-Specific BMPs

You are expected to follow the General BMPs for all CIAS projects in addition to any Scope-specific BMPs that pertain to your project. Refer to the General BMPs in the Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia and the other Scope-specific BMPs in the Appendix.

Best Management Practices

The following provisions represent BMPs for CIAS for fording a stream under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, **the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.**

Design

a) Fords must only be considered for short-term access with low frequency crossings where an existing crossing is not available. Fords must not be installed for use by the public and public exclusion measures may need to be considered.

b) Dry or frozen fording must be chosen as the preferred approach over fording in flowing water where practicable.

c) Existing crossings must be used wherever possible to reduce the number of fords.

d) Fords created during frozen conditions must maintain natural water flow levels and avoid freezing to the bottom of the channel, to maintain fish passage.

e) Fords created during frozen conditions must use clean snow, clean ice, logs, or timbers to create a driveable surface. Logs or timbers can be used to protect stream banks as required.

f) The location of the ford crossing must exclude sites that require realigning, dredging, infilling, grading, or excavating the channel or stream bank, diverting the stream, or sites that are susceptible to erosion.

g) The location of the ford must be perpendicular to the stream, at a narrow section of the stream, at a shallow location with preference being given to sites that require the least amount of vegetation removal within the riparian area. Plans must allow for a maximum width of one lane within the riparian area.

h) Ford crossings must be avoided wherever possible on: fish-bearing streams, meander bends, braided streams, alluvial fans, or any other area that is inherently unstable; areas near sensitive habitat; and locations that may result in the erosion and scouring of the stream bed.

i) Protective material must be used to prevent disturbance of channel bed and banks (e.g., rig matting or logs). The protective material must be installed immediately prior to use and removed immediately afterwards.

j) The bed and banks of the stream at the fording site must be stable and non-erodible with preference given to natural bedrock or coarse rock to avoid areas of fine sediment.

k) Fording sites must not contain gravel bars or deep channel sections requiring the manipulation or excavation of channel materials.

l) For fords in flowing water, an area must be selected with a natural water depth that is sufficiently shallow to allow passage of vehicles/equipment and to maintain a water depth that allows fish passage.

m) Fords must be removed at the earliest opportunity prior to breakup as to not pose a risk to fish, wildlife, or habitat.

Construction

n) Water from approach ditches must be directed away from the stream as practicable.

o) Construction fords used for installing bridges or culverts are to be limited to one crossing over and one crossing back across the stream by one single piece of equipment.

Use and Decommissioning

p) Where a ford is installed, a program of short-term monitoring and maintenance must be developed and implemented.

q) A very slow and steady pace must be maintained when crossing and rapid acceleration must be avoided while on the approaches or in the water.

r) Decommissioning and restoring fording sites must be performed immediately after use is completed and prior to heavy rains or the onset of thawing conditions.

s) When the ford is no longer in use, any material that was used to accommodate fording activities must be removed manually where possible.

Additional Resources

- Fish-stream Crossing Guidebook (Revised Edition), FLNRO, MoE and DFO, 2012
- Projects Near Water, Fisheries and Oceans Canada (DFO)
- B.C. HabitatWizard tool
- Engineering Manual: Ford Design & Construction on Non-Fish Streams, FLNRORD

Amendments

New Version #	Date Amended	Amendment Description
NA	NA	NA

Recommended Citation

For the use by WSA statutory decision makers during the water authorization process:

"Best Management Practices for Fording". Appendix, Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia. Version 2026.01. Government of British Columbia.