Fish Habitat Design, Operation and Reclamation Workbook and Worksheets for Placer Mining in the Yukon Territory

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This document is available online at:
www.yukonplacersecretariat.ca/howto_prepare_project_proposal.html

Or in hard copy format from:
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Yukon Water Board Office, 106-419 Range Road, Whitehorse, Yukon, Y1A 3V1

Disclaimer

The Fish Habitat Design, Operation and Reclamation Workbook is designed to support the *Watershed Authorizations for Works or Undertakings affecting Fish Habitat for Specified Streams in the Yukon Territory*; in the event of an inconsistency between the workbook and these *Fisheries Act* authorizations, the authorizations will prevail.

Before You Begin

This workbook and associated worksheets are provided to assist with compiling information to support project proposals for submission to the Yukon Environmental and the Socio-economic Assessment Board (YESAB) and the Yukon Water Board (YWB). Once completed, the worksheets must be submitted for review as a component of both the YESAB and Yukon Water Board applications.

The guidance provided focuses on the requirements of the *Authorizations for Works or Undertakings affecting Fish Habitat for Specified Streams in the Yukon Territory* (Federal *Fisheries Act*) for watersheds in the Yukon (herein referred to as Watershed Authorizations). Please note that this workbook and associated worksheets may undergo revisions in the future, and users are encouraged to ensure that they use the current version.

In order to achieve compliance with the Watershed Authorizations, the placer mining proposal must meet the requirements outlined in this workbook for the watershed type and specific habitat suitability type at the location where the activities are to occur (see Yukon Placer Fish Habitat Suitability Maps).

In addition to this workbook and worksheets, the following documents provide the required information to support the development and submission of proposals for placer mining activities. All supporting documents are available online through the Yukon Placer Secretariat web page, www.yukonplacersecretariat.ca/howto_prepare_project_proposal.html or through the web addresses given for the specific documents.

1. ***Authorization for Works or Undertakings affecting Fish Habitat for Specified Streams in the Yukon Territory***
   www.yukonplacersecretariat.ca/placer_authorizations.html – Provides the legal authority, with respect to placer mining, to carry on a work, undertaking or activity that results in the permanent alteration and destruction of fish habitat. Also specifies sediment discharge standards for placer mine effluent and the sensitivity category of the watershed (i.e. Category A or B). Please note that the death of fish is not authorized.
2. **Yukon Placer Fish Habitat Suitability Maps**
   www.yukonplacersecretariat.ca/maps.html – Identifies the watershed sensitivity and habitat suitability of the watercourse where placer mining activities are proposed to occur.
3. **Guidebook of Mitigation Measures for Placer Mining in the Yukon**
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Note: Complete and submit only the worksheets that are relevant to your operation.

Note: There are no Watershed Authorizations in place for the Liard and Alsek watersheds. Applications for review, forms and process to apply for a placer mine in the Liard or Alsek watershed can be obtained from the Yukon Placer Secretariat, contact information can be found online at, www.yukonplacersecretariat.ca/index.html.

For assistance completing the worksheets please contact the Yukon Placer Secretariat (contact information is available at, www.yukonplacersecretariat.ca/index.html) or the Yukon Government Client Services & Inspections office in your mining district (contact information is available at, www.emr.gov.yk.ca/cmi/cmi_district_offices.html).

If Your Project Does Not Comply With The Requirements

Placer mine operators are encouraged to design proposals that comply with the requirements described in this workbook. However, if the proposal is not able to achieve these requirements and the operator would like to proceed with the regulatory review process, an application for site-specific review should be submitted to Fisheries and Oceans Canada (DFO) for consideration **prior to the submission of the proposal to the YESAB and the YWB**.

When a proposal is submitted for site-specific review, DFO will review the information to determine whether a site-specific authorization is required. In some cases, DFO may recommend measures to avoid or mitigate the harm to fish and fish habitat to allow the application to proceed under the Watershed Authorization.

Applications for site-specific review, forms and process to apply can be obtained from the Yukon Placer Secretariat, contact information can be found online at, www.yukonplacersecretariat.ca/index.html. Should it be determined that a site-specific authorization is required, a more detailed application, including a fish habitat offsetting plan and a letter of credit, will have to be submitted to DFO. Information on the site-specific authorization application process, offsetting plans, and letters of credit can be found on DFO's Projects Near Water website, www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/application-eng.html.

Quick Reference Table

The quick reference table provides the page number of the specific section of the workbook that applies to fish habitat design, operation and reclamation requirements for placer mining works or undertakings proposed for a particular habitat suitability type. For additional information operators are encouraged to refer to the Guidebook of Mitigation Measures for Placer Mining in the Yukon.

High Habitat Suitability Watercourses (Chinook Salmon Production)

High Habitat Suitability Watercourses (Chinook Salmon Production)

Before You Begin

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Note: Complete and submit only the worksheets that are relevant to your operation.

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For assistance completing the worksheets please contact the Yukon Placer Secretariat (contact information is available at, www.yukonplacersecretariat.ca/index.html) or the Yukon Government Client Services & Inspections office in your mining district (contact information is available at, www.emr.gov.yk.ca/cmi/cmi_district_offices.html).

If Your Project Does Not Comply With The Requirements

Placer mine operators are encouraged to design proposals that comply with the requirements described in this workbook. However, if the proposal is not able to achieve these requirements and the operator would like to proceed with the regulatory review process, an application for site-specific review should be submitted to Fisheries and Oceans Canada (DFO) for consideration **prior to the submission of the proposal to the YESAB and the YWB**.

When a proposal is submitted for site-specific review, DFO will review the information to determine whether a site-specific authorization is required. In some cases, DFO may recommend measures to avoid or mitigate the harm to fish and fish habitat to allow the application to proceed under the Watershed Authorization.

Applications for site-specific review, forms and process to apply can be obtained from the Yukon Placer Secretariat, contact information can be found online at, www.yukonplacersecretariat.ca/index.html. Should it be determined that a site-specific authorization is required, a more detailed application, including a fish habitat offsetting plan and a letter of credit, will have to be submitted to DFO. Information on the site-specific authorization application process, offsetting plans, and letters of credit can be found on DFO's Projects Near Water website, www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/application-eng.html.

Fish Habitat Design, Operation and Reclamation Requirements for High Habitat Suitability Watercourses (Chinook Salmon Production)

High habitat suitability watercourses are defined as watercourses that provide spawning habitat for salmon or critical migratory corridors required to access salmon spawning habitat. Typically, the distribution of this habitat type is the most limited in watersheds. High habitat suitability watercourses require effective management of mining activities to provide protection from potentially harmful effects resulting from development activities and to achieve conservation and protection of habitats. As such, **placer mining works, undertakings or activities will be highly restricted in this habitat type**.

In **all cases**, any placer mining works, undertakings or activities (other than those listed in the following operational requirements) that are likely to result in the permanent alteration or destruction of, High habitat suitability watercourses require a site-specific review. If the proposed activity is deemed to be acceptable, a site-specific authorization will be issued by Fisheries and Oceans Canada. All applications for a site-specific authorization must include a fish habitat offsetting plan and letter of credit (see "If your project does not comply with the requirements" section at the beginning of this document).

SUMMARY OF GENERAL RESTRICTIONS IN HIGH HABITAT SUITABILITY WATERCOURSES

Activity Type / Operation	Restrictions in High Habitat Suitability Watercourses
Effluent Discharge	Discharge of sediment concentrations above background levels not authorized
Riparian Zone	Work within 30 metres from the high water mark not authorized.
Fords	Construction of new Fords not authorized.
Diversion Channels	Construction of diversion channels not authorized.
In-stream Works	In-stream works are not authorized.

Note: The table above summarizes those placer mining activities which are not authorized by the Watershed Authorizations and will require a site-specific review (see "If your project does not comply with the requirements" section at the beginning of this document).

To determine how to proceed, please answer the following questions regarding a work, undertaking or activity in or around High habitat suitability watercourses.

Do you propose to undertake placer mining activities in, or within, 30 metres of a watercourse? Activities may include discharging effluent, constructing stream crossings, clearing riparian vegetation, constructing channel diversions, or withdrawing water.

NO: No further review pursuant to the *Fisheries Act* is required.

YES: Proceed to Step A, Project Information.

High Habitat Suitability Watercourses (Chinook Salmon Production)

A. Project Information

The first step in compiling a project proposal that involves activities proposed to occur in or around fish habitat areas is the completion of the Project Location Worksheet (Appendix A).

Note: The Project Location Worksheet (Appendix A) is required for all applications.

A1. On the Project Location Worksheet enter the stream name, the watershed name (as per Yukon Placer Fish Habitat Suitability Maps), identify the watershed sensitivity and habitat suitability classification for the reaches you proposed to work in, provide a short description of the location, describe the proposed duration of activities and include a copy of a map of the specific location of the site.

Once the sections noted above are completed on the Project Location Worksheet, proceed to the next question.

Do you propose to discharge effluent from your mine site?

NO: Proceed to Step C, Riparian Zones.
YES: Proceed to Step B, Settling Pond Discharge.

Note: Discharge of sediment concentrations above background levels is not authorized in High habitat suitability watercourses.

B. Settling Pond Discharge (effluent concentration)

Point source sediment discharges from gold recovery processes are typically managed through the use of settling facilities. Typically only total recirculation systems will be considered as discharge of sediment concentrations above background levels is not authorized in High habitat suitability watercourses. For more information on settling pond design and operation, recirculation systems, and settling pond reclamation refer to the Guidebook of Mitigation Measures for Placer Mining in the Yukon (herein referred to as the Guidebook).

Water quality objectives and sediment discharge standards for High habitat suitability watercourses are identified in the Watershed Authorizations for the specific watershed you propose to work in. Please verify your specific discharge standard in the respective watershed you plan to work in (specifically if any exemptions exist) prior to proceeding with your application.

B1. Record the Compliance Level on the Project Location Worksheet (Appendix A).

Once the effluent discharge standards are recorded on the Project Location Worksheet proceed to the next question.

Do you propose to construct works other than diversion channels within the Riparian Zone (see Step C for the definition of the Riparian Zone) – this could include stripping, construction of reservoirs, construction of settling ponds, etc.?

NO: Proceed to Step D, Diversion Channels
YES: Proceed to Step C, Riparian Zone

C. Riparian Zones

The Riparian Zone is defined as the portion of the stream bank (either vegetated or not) immediately adjacent to the stream channel. Riparian Zones are measured from the high

water mark on each bank of the watercourse and follow the pattern/morphology of the channel.

The designated Riparian Zone in High habitat suitability watercourses is **30 metres**.

The Riparian Zone designation applies to all High habitat suitability watercourses. The only activity permitted within the Riparian Zone is the clearing of surface vegetation to create a corridor to provide access to the stream (typically for water acquisition purposes). The maximum width of the corridor is to be no more than **3 metres**. Riparian Zones must be staked out by the operator prior to development.

Do you propose clearing of surface vegetation or subsurface works in the Riparian Zone? (this could include stripping, construction of reservoirs, construction of settling ponds, etc.)

NO: Proceed to Step D, Diversion Channels.

YES: Not authorized by the Watershed Authorizations, see "If your project does not comply with the requirements" section at the beginning of this document. Proceed to next question.

Do you propose to construct a new stream crossing (Ford)?

NO: Proceed to next question.

YES: Not authorized by the Watershed Authorizations, see "If your project does not comply with the requirements" section at the beginning of this document. Proceed to next question.

Do you propose to clear surface vegetation only?

NO: Proceed to next question.

YES: Not authorized by the Watershed Authorizations, see "If your project does not comply with the requirements" section at the beginning of this document. Proceed to next question.

D. Diversion Channels

It is unlikely that the construction of a diversion channel will be permitted in High habitat suitability watercourses. Operators wishing to propose construction of a diversion channel in High habitats must first prepare a detailed design of the diversion channel and, if required, a detailed fish habitat offsetting plan. Ultimately, the proposal will need to clearly demonstrate how harm to fish and fish habitat will be avoided mitigated and offset in a manner that will maintain or improve the productivity of fisheries. (see "If your project does not comply with the requirements" section at the beginning of this document).

Do you propose to use an Existing Ford?

NO: Proceed to next question.

YES: Proceed to Step E, Watercourse Crossings, then E1, Use of Existing Ford.

Do you propose to construct a New Ford?

NO: Proceed to Step F, Water Acquisition.

YES: Not authorized by the Watershed Authorizations, see "If your project does not comply with the requirements" section at the beginning of this document. Proceed to next question.

E. Watercourse Crossings (Fords)

Fording is defined as the crossing of creeks, streams and / or rivers at locations where a bridge, causeway or elevated embankment does not exist or is not utilized by a vehicle or equipment. Fording typically involves driving directly through a watercourse, across the banks and bed. In some instances, Fording locations (Fords) have been "improved" or constructed through watercourses by way of adding materials such as rocks or gravel, the modification of approaches, or the modification of the bed of a watercourse.

E1. Use of Existing Ford

Use of existing Fords is often the least preferred option for crossing watercourses however it is recognized that there are instances where it is the only viable option. Refer to the Guidebook for additional information on Fords. The following measures should be adhered to when utilizing existing Fords.

NOTE: Use of existing Fords in High habitat suitability watercourses is only permitted within the timing window of reduced risk of any given year. Please refer to, www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html for timing windows specific to your location. Identify if you intend to use existing Fords on the Project Location Worksheet (Appendix A).

- Ensure water depth is sufficiently shallow to allow passage of vehicle / equipment.
- Plan your activities in advance to minimize the number of crossings required.
- Avoid crossing during extreme rain or flood events.
- Access approaches at 90° to the bank, when entering or exiting the Ford.
- Maintain speed at a very slow and steady pace throughout the crossing.
- Avoid rapid acceleration while on approaches or while in the water.

Do you propose to withdraw water from a High habitat suitability watercourse?

NO: Proceed to Step G, In-stream Works.
YES: Proceed to Step F, Water Acquisition.

F. Water Acquisition

Acquisition of water is required for processing materials during placer mining. Effective water management is a key consideration at all placer mine sites. The following requirements must be achieved to meet compliance with the respective Watershed Authorizations.

F1. Water Intake Screens

In order to meet the requirement of the *Fisheries Act*, all water intakes must be screened. A general summary of screening requirements are provided in the Guidebook.

NOTE: The objective behind the installation of intake screens is to prevent the death of fish caused by the acquisition of water. If screens of the correct mesh size are deployed between a watercourse and the intake to a water reservoir or gravity feed ditch, it is not necessary to screen the pump intake that removes water from within these structures provided these structures do not already contain fish. In the case of total recirculation systems, the operator shall ensure that any areas where fish could enter the system have barriers to prevent the entry of fish.

G. In-stream Works

In-stream works are defined as works that occur within the high water mark of a watercourse, but do not include diversion channels or Fords. Some in-stream works can lead to effects on fish and fish habitat such as erosion/scouring, sediment inputs, loss of habitat area, changes in channel morphology, blockages to passage, and reduced productivity.

No physical works are permitted within a watercourse under the auspices of a Watershed Authorization in habitats of High suitability. Should in-stream works be contemplated in these areas, operators must apply to Fisheries and Oceans Canada for a site-specific review of proposed in-stream works prior to proceeding (see “If your project does not comply with the requirements” section at the beginning of this document).

High Habitat Suitability Watercourses (Chinook Salmon Production)

Areas of Special Consideration

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When a proposal is submitted for site-specific review, DFO will review the information to determine whether a site-specific authorization is required. In some cases, DFO may recommend measures to avoid or mitigate the harm to fish and fish habitat to allow the application to proceed under the Watershed Authorization.

Applications for site-specific review, forms and process to apply can be obtained from the Yukon Placer Secretariat, contact information can be found online at, www.yukonplacersecretariat.ca/index.html. Should it be determined that a site-specific authorization is required, a more detailed application, including a fish habitat offsetting plan and a letter of credit, will have to be submitted to DFO. Information on the site-specific authorization application process, offsetting plans, and letters of credit can be found on DFO's Projects Near Water website, www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/application-eng.html.

Fish Habitat Design, Operation and Reclamation Requirements for Areas of Special Consideration

Areas of Special Consideration (ASC) are defined as watercourses that contain ecologically or culturally important fisheries or aquatic resources. Watercourses assigned this designation may include habitats for rare or locally significant species or areas which directly support subsistence, traditional, commercial or recreational fisheries.

Areas of Special Consideration (ASC) may be established for either anadromous or non-anadromous species of fish.

In **all cases**, any placer mining works, undertakings or activities (other than those listed in the following operational requirements) that are likely to result in the permanent alteration or destruction of ASC habitat require a site-specific review. If the proposed activity is deemed to be acceptable, a site-specific authorization will be issued by Fisheries and Oceans Canada. Sediment discharge standards for ASC vary and are listed by watercourse in the relevant Authorization. An application for a site-specific authorization must include a fish habitat offsetting plan and letter of credit (see "If your project does not comply with the requirements" section at the beginning of this document).

SUMMARY OF GENERAL RESTRICTIONS ON IN ASC

Activity Type / Operation	Restrictions in Areas of Special Consideration
Effluent Discharge	Sediment discharge standards for ASC vary and are listed by watercourse in the relevant Authorization
Riparian Zone	Work within 30 metres from the high water mark not authorized.
Fords	Construction of new Fords not authorized.
Diversion Channels	Construction of diversion channels not authorized.
In-stream Works	In-stream works not authorized.

Note: The table above summarizes those placer mining activities which are not authorized by the Watershed Authorizations and will require a site-specific review (see "If your project does not comply with the requirements" section at the beginning of this document).

To determine how to proceed, please answer the following questions regarding a work, undertaking or activity in or around ASC.

Do you propose to undertake placer mining activities in, or within, 30 metres of a watercourse? Activities may include discharging effluent, constructing stream crossings, clearing riparian vegetation, constructing channel diversions, or withdrawing water.

NO: No further review pursuant to the *Fisheries Act* is required.
YES: Proceed to Step A, Project Information.

A. Project Information

The first step in compiling a project proposal that involves activities proposed to occur in or around fish habitat areas is the completion of the Project Location Worksheet (Appendix A).

Note: The Project Location Worksheet (Appendix A) is required for all applications.

A1. On the Project Location Worksheet enter the stream name, the watershed name (as per Yukon Placer Fish Habitat Suitability Maps), identify the watershed sensitivity and habitat suitability classification for the reaches you proposed to work in, determine if any reaches are designated as "previous/prior development", provide a short description of the location, describe the proposed duration of activities and include a copy of a map of the specific location of the site.

Once the sections noted above are completed on the Project Location Worksheet, proceed to the next question.

Do you propose to discharge effluent from your mine site?

NO: Proceed to Step C, Riparian Zones.
YES: Proceed to Step B, Settling Pond Discharge.

B. Settling Pond Discharge (effluent concentration)

Point source sediment discharges from gold recovery processes are typically managed through the use of settling facilities. The action level approach is a key element of the risk-based approach to sediment management for Yukon placer mining. For more information on the action level approach or settling pond design, operation, recirculation systems, and settling pond reclamation refer to the Guidebook of Mitigation Measures for Placer Mining in the Yukon (herein referred to as the Guidebook).

Water quality objectives and sediment discharge standards for ASC are identified in the Watershed Authorizations for the specific watershed you propose to work in. Please verify your specific discharge standard in the respective watershed you plan to work in prior to proceeding with your application.

B1. Record the Design Target, Action Level and Compliance Level on the Project Location Worksheet (Appendix A).

Once the effluent discharge standards are recorded on the Project Location Worksheet proceed to the next question.

Do you propose to construct works other than diversion channels within the Riparian Zone (see Step C for the definition of the Riparian Zone) – this could include stripping, construction of reservoirs, construction of settling ponds, etc.?

NO: Proceed to Step D, Diversion Channels
YES: Proceed to Step C, Riparian Zone

C. Riparian Zones

The Riparian Zone is defined as the portion of the stream bank (either vegetated or not) immediately adjacent to the stream channel.

The designated Riparian Zone in ASC is **30 metres**, measured from the ordinary high water mark on each bank of the watercourse and following the pattern/morphology of the channel.

The Riparian Zone designation applies to all ASC. The only activity permitted within the Riparian Zone, under the Watershed Authorizations, is the clearing of surface vegetation to create a corridor to provide access to the stream (typically for water acquisition purposes). The maximum width of the corridor is to be no more than **3 metres**. Riparian Zones must be staked out by the operator prior to development.

Do you propose to conduct surface or subsurface works in the Riparian Zone? (this could include stripping, construction of reservoirs, construction of settling ponds, etc.)

NO: Proceed to Step D, Diversion Channels.

YES: Not authorized by a Watershed Authorization, please refer to "If your project does not comply with the requirements" section at the beginning of this document. Proceed to next question.

Do you propose to clear surface vegetation only?

NO: Proceed to next question.

YES: Not authorized by a Watershed Authorization, please refer to "If your project does not comply with the requirements" section at the beginning of this document. Proceed to next question.

D. Diversion Channels

Construction of a diversion channel will be considered in ASC on a case-by-case basis and will require a site-specific review by Fisheries and Oceans Canada. It is likely that stringent operating restrictions will be required in these areas. Operators wishing to propose construction of a diversion channel in ASC must first prepare a detailed design of the diversion channel and, if required, a detailed fish habitat offsetting plan. Ultimately, the proposal will need to clearly demonstrate how harm to fish and fish habitat will be avoided, mitigated and offset in a manner will maintain or improve the productivity of fisheries. (see "If your project does not comply with the requirements" section at the beginning of this document).

Do you propose to use an Existing Ford?

NO: Proceed to next question.

YES: Proceed to Step E, Watercourse Crossings, then E1, Use of Existing Ford.

Do you propose to construct a new stream crossing (Ford)?

No: Proceed to Step F, Water Acquisition.

YES: Not authorized by the Watershed Authorizations, please refer to "If your project does not comply with the requirements" section at the beginning of this document. Proceed to next question.

E. Watercourse Crossings (Fords)

Fording is defined as the crossing of creeks, streams and / or rivers at locations where a bridge, causeway or elevated embankment does not exist or is not utilized by a vehicle or equipment. Fording typically involves driving directly through a watercourse, across the banks and bed. In some instances, Fording locations (Fords) have been "improved" or constructed through watercourses by way of adding materials such as rocks or gravel, the modification of approaches, or the modification of the bed of a watercourse.

E1. Use of Existing Ford

Use of existing Fords is often the least preferred option for crossing watercourses however it is recognized that there are instances where it is the only viable option. Refer to the Guidebook for additional information on Fords. The following measures should be adhered to when utilizing existing Fords.

Note: Use of existing Fords in ASC may be restricted to a timing window of reduced risk. Please refer to, www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html for timing windows specific to your location and fish species present. Identify if you intend to use existing Fords on the Project Location Worksheet (Appendix A).

- Ensure water depth is sufficiently shallow to allow passage of vehicle / equipment.
- Plan your activities in advance to minimize the number of crossings required.
- Avoid crossing during extreme rain or flood events.
- Access approaches at 90° to the bank, when entering or exiting the Ford.
- Maintain speed at a very slow and steady pace throughout the crossing.
- Avoid rapid acceleration while on approaches or while in the water.

Do you propose to withdraw water from a watercourse designated as an ASC?

NO: Proceed to Step G, In-stream Works.
YES: Proceed to Step F, Water Acquisition.

F. Water Acquisition

Acquisition of water is required for processing materials during placer mining. Effective water management is a key consideration at all placer mine sites. The following requirements must be achieved to meet compliance with the respective Watershed Authorization.

F1. Water Intake Screens

In order to meet the requirement of the *Fisheries Act*, all water intakes must be screened. A general summary of the screening requirements are provided in the Guidebook.

Note: The objective behind the installation of intake screens is to prevent the death of fish caused by the acquisition of water. If screens of the correct mesh size are deployed between a watercourse and the intake to a water reservoir or gravity feed ditch, it is not necessary to screen the pump intake that removes water from within these structures provided these structures do not already contain fish. In the case of total recirculation systems, the operator shall ensure that any areas where fish could enter the system have barriers to prevent the entry of fish.

G. In-stream Works

In-stream works are defined as works that occur within the high water mark of a watercourse, but do not include diversion channels or Fords. Some in-stream works can lead to effects on fish and fish habitat such as erosion/scouring, sediment inputs, loss of habitat area, changes in channel morphology, blockages to passage, and reduced productivity.

No physical works are permitted within a watercourse under the auspices of a Watershed Authorization in ASC. Should in-stream works be contemplated in these areas, operators must apply to Fisheries and Oceans Canada for a site-specific review of proposed in-stream works prior to proceeding (see “If your project does not comply with the requirements” section at the beginning of this document).

Areas of Special Consideration

Moderate–High Habitat Suitability Watercourses

Moderate–High Habitat Suitability Watercourses

Before You Begin

This workbook and associated worksheets are provided to assist with compiling information to support project proposals for submission to the Yukon Environmental and the Socio-economic Assessment Board (YESAB) and the Yukon Water Board (YWB). Once completed, the worksheets must be submitted for review as a component of both the YESAB and Yukon Water Board applications.

The guidance provided focuses on the requirements of the *Authorizations for Works or Undertakings affecting Fish Habitat for Specified Streams in the Yukon Territory* (Federal *Fisheries Act*) for watersheds in the Yukon (herein referred to as Watershed Authorizations). Please note that this workbook and associated worksheets may undergo revisions in the future, and users are encouraged to ensure that they use the current version.

In order to achieve compliance with the Watershed Authorizations, the placer mining proposal must meet the requirements outlined in this workbook for the watershed type and specific habitat suitability type at the location where the activities are to occur (see Yukon Placer Fish Habitat Suitability Maps).

In addition to this workbook and worksheets, the following documents provide the required information to support the development and submission of proposals for placer mining activities. All supporting documents are available online through the Yukon Placer Secretariat web page, www.yukonplacersecretariat.ca/howto_prepare_project_proposal.html or through the web addresses given for the specific documents.

1. ***Authorization for Works or Undertakings affecting Fish Habitat for Specified Streams in the Yukon Territory***
   www.yukonplacersecretariat.ca/placer_authorizations.html – Provides the legal authority, with respect to placer mining, to carry on a work, undertaking or activity that results in the permanent alteration and destruction of fish habitat. Also specifies sediment discharge standards for placer mine effluent and the sensitivity category of the watershed (i.e. Category A or B). Please note that the death of fish is not authorized.
2. **Yukon Placer Fish Habitat Suitability Maps**
   www.yukonplacersecretariat.ca/maps.html – Identifies the watershed sensitivity and habitat suitability of the watercourse where placer mining activities are proposed to occur.
3. **Guidebook of Mitigation Measures for Placer Mining in the Yukon**
   www.yukonplacersecretariat.ca/infocentre.html – Provides technical information related to best management practices, mitigation measures, and design considerations to achieve compliance with the Watershed Authorizations and to assist with proposal development.

Note: Complete and submit only the worksheets that are relevant to your operation.

Note: There are no Watershed Authorizations in place for the Liard and Alsek watersheds. Applications for review, forms and process to apply for a placer mine in the Liard or Alsek watershed can be obtained from the Yukon Placer Secretariat, contact information can be found online at, www.yukonplacersecretariat.ca/index.html.

For assistance completing the worksheets please contact the Yukon Placer Secretariat (contact information is available at, www.yukonplacersecretariat.ca/index.html) or the Yukon Government Client Services & Inspections office in your mining district (contact information is available at, www.emr.gov.yk.ca/cmi/cmi_district_offices.html).

If Your Project Does Not Comply With The Requirements

Placer mine operators are encouraged to design proposals that comply with the requirements described in this workbook. However, if the proposal is not able to achieve these requirements and the operator would like to proceed with the regulatory review process, an application for site-specific review should be submitted to Fisheries and Oceans Canada (DFO) for consideration **prior to the submission of the proposal to the YESAB and the YWB**.

When a proposal is submitted for site-specific review, DFO will review the information to determine whether a site-specific authorization is required. In some cases, DFO may recommend measures to avoid or mitigate the harm to fish and fish habitat to allow the application to proceed under the Watershed Authorization.

Applications for site-specific review, forms and process to apply can be obtained from the Yukon Placer Secretariat, contact information can be found online at, www.yukonplacersecretariat.ca/index.html. Should it be determined that a site-specific authorization is required, a more detailed application, including a fish habitat offsetting plan and a letter of credit, will have to be submitted to DFO. Information on the site-specific authorization application process, offsetting plans, and letters of credit can be found on DFO's Projects Near Water website, www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/application-eng.html.

Fish Habitat Design, Operation and Reclamation Requirements for Moderate–High Habitat Suitability Watercourses

Moderate–High habitat suitability watercourses are defined as watercourses that are highly suitable for rearing juvenile Chinook salmon. Typically these watercourses provide locally desirably conditions for feeding, growth and development. These watercourses also provide habitats that are highly suitable for a broad range of adult and juvenile resident fish species.

Please use the following instructions and information to complete the worksheets relevant to your proposal (located in Appendix A to H). The completed worksheets will be submitted as part of your project description to the Yukon Environmental and Socio Economic Assessment Board (YESAB) and your application to the Yukon Water Board (YWB)

SUMMARY OF GENERAL RESTRICTIONS IN MODERATE–HIGH HABITAT SUITABILITY WATERCOURSES

Activity Type / Operation	Restrictions in Moderate–High Habitat Suitability Watercourses
Riparian Zone	Designated Riparian Zone is 20 metres from the high water mark. Conditions and reclamation requirements apply to clearing surface vegetation within the Designated Riparian Zone. Sub-surface works not authorized.
Fords	Construction of new Fords not authorized. Mitigative measures should be applied to use of existing Fords.
Diversion Channels	Construction of Seasonal and Temporary diversion channels not authorized. Construction of Permanent diversion channels subject to design restrictions and construction and reclamation requirements.
In-stream Works	In-stream settling facilities, in-stream reservoirs, stream as a conduit not authorized.

Note: The table above summarizes those placer mining activities which are not authorized by the Watershed Authorizations and will require a site-specific review (see "If your project does not comply with the requirements" section at the beginning of this document).

To determine how to proceed, please answer the following questions regarding a work, undertaking or activity in or around Moderate–High habitat suitability watercourses.

Do you propose to undertake placer mining activities in, or within, 30 m of a watercourse? Activities may include discharging effluent, constructing stream crossings, clearing riparian vegetation, constructing channel diversions, or withdrawing water.

NO: No further review pursuant to the *Fisheries Act* is required.
YES: Proceed to Step A, Project Information.

Moderate–High Habitat Suitability Watercourses

A. Project Information

The first step in compiling a project proposal that involves activities proposed to occur in or around fish habitat areas is the completion of the Project Location Worksheet (Appendix A).

Note: The Project Location Worksheet (Appendix A) is required for all applications.

A1. On the Project Location Worksheet enter the stream name, the watershed name (as per Yukon Placer Fish Habitat Suitability Maps), identify the watershed sensitivity and habitat suitability classification for the reaches you proposed to work in, if any reaches are designated as "previous/prior development", a short description of the location, the proposed duration of activities and a copy of a map of the specific location of the site.

Does the Previous Development designation apply to your project?

NO: Proceed to the next question.

YES: See below.

Historical Development

If your project falls within a "Historical Development" zone, the requirements for settling pond discharge, riparian zones, seasonal or temporary diversions, watercourse crossings, water acquisition and in-stream works that normally apply to Moderate–Moderate habitat suitability watercourses will apply to your operation.

Note: Permanent diversion channels and all reclamation work must conform to the requirements for Moderate–High habitat suitability watercourses.

Current Development or Extensive Development

If your project falls within a "Current Development" or "Extensive Development" zone, the requirements for settling pond discharge, riparian zones, seasonal or temporary diversions, watercourse crossings, water acquisition and in-stream works that normally apply to Moderate–Low habitat suitability watercourses will apply to your operation.

Note: Permanent diversion channels and all reclamation work must conform to the requirements for Moderate–High habitat suitability watercourses.

A2. Based on the previous development type, please select the appropriate Operation and Restoration standard on the Project Location Worksheet.

Once the sections noted above are completed on the Project Location Worksheet, proceed to the next question.

Do you propose to discharge effluent from your mine site?

NO: Proceed to Step C, Riparian Zones.

YES: Proceed to Step B, Settling Pond Discharge.

B. Settling Pond Discharge (effluent concentration)

Point source sediment discharges from gold recovery processes are typically managed through the use of settling facilities. The action level approach is a key element of the risk-based approach to sediment management for Yukon placer mining. For more information on the action level approach or settling pond design, operation, recirculation systems, and settling pond reclamation refer to the Guidebook.

Water quality objectives and sediment discharge standards for settling ponds in Moderate–High habitat suitability watercourses are identified in the Watershed Authorizations for the specific watershed you propose to work in. Please ensure to verify your specific discharge standard in the respective watershed you plan to work in (specifically if any exemptions exist) prior to proceeding with your application.

B1. Record the Design Target, Action Level and Compliance Level on the Project Location Worksheet (Appendix A).

Once the effluent discharge standards are recorded on the Project Location Worksheet proceed to the next question.

Do you propose to construct works other than diversion channels within the Riparian Zone (see Step C for the definition of the Riparian Zone) – this could include stripping, construction of reservoirs, construction of settling ponds, etc.?

NO: Proceed to Step D, Diversion Channels

YES: Proceed to Step C, Riparian Zone

C. Riparian Zones

The Riparian Zone is defined as the portion of the stream bank (either vegetated or not) immediately adjacent to the stream channel.

The designated Riparian Zone in Moderate–High habitat suitability watercourses is **20 metres**, measured from the ordinary high water mark on each bank of the watercourse and following the pattern/morphology of the channel.

The Riparian Zone designation applies to original (un-modified) channels, previously reclaimed channels and Permanent Diversion Channels.

Activities proposed within the Riparian Zone must comply with the surface vegetation clearing provisions outlined below. The only other activity permitted within the Riparian Zone is the clearing of surface vegetation within a corridor to provide access to the stream (typically for water acquisition purposes). The maximum width of the corridor is to be no more than **3 metres**. Riparian Zones must be staked out by the operator prior to development.

Do you propose clearing of surface vegetation or subsurface works in the Riparian Zone? (this could include stripping, construction of reservoirs, construction of settling ponds, etc.)

NO: Proceed to Step D, Diversion Channels.

YES: Proceed to next question.

Do you propose to construct a new stream crossing (Ford)?

NO: Proceed to next question.

YES: Review Step E, Watercourse Crossings, prior to proceeding to next question.

Moderate–High Habitat Suitability Watercourses

Do you propose to clear surface vegetation only?

NO: The proposal includes both clearing of surface vegetation and subsurface works - please refer to "If your project does not comply with the requirements" section at the beginning of this document. Proceed to next question.

YES: Proceed to Step C1, Surface Vegetation Clearing.

C1. Surface Vegetation Clearing

If surface vegetation clearing is proposed within the Riparian Zone, refer to the conditions identified in the table below and use the information to fill out the Riparian Zone / Bank Modification Worksheet (Appendix B).

Under Vegetation Clearing record the following:

- Record the Habitat Suitability Type where vegetation clearing in the Riparian Zone is proposed.
- Record the Designated Riparian Zone (see the beginning of this section).
- Record the Proposed Duration of Vegetation Clearing prior to reclamation (cannot exceed restriction in table below).
- Record the Total Length of Proposed Vegetation Clearing in the Riparian Zone (cannot exceed restriction in table below).
- Record the Width of Proposed Vegetation Clearing in the Riparian Zone.
- From the table below record the Minimum Vegetation Setback from Stream.
- Record the width of the Proposed Vegetation Setback from Stream (cannot be less than the minimum setback distance).
- Record the Required Reclamation Works for Vegetation (see table below).
- In space provided on Appendix B, draw a diagram of the proposed location where vegetation clearing in the Riparian Zone is planned (include north arrow, flow direction and use symbols identified on worksheet to compose your diagram).

Conditions and Reclamation Required When Proposing Surface Vegetation Clearing in Riparian Zones in Moderate–High Habitat Suitability Watercourses

Design Component (Vegetation Clearing)	Requirement
Minimum Vegetated Setback from Stream	5.0 metres
Maximum Length of Clearing	100 metres
Minimum Space Between Cleared Areas	500 metres
Maximum Duration Prior to Reclamation	5 years
Reclamation Requirement (surface)	Full topsoil coverage
Reclamation Requirement (vegetation)	30% live staking

Do you propose a Seasonal, Temporary or Permanent relocation of a channel?

NO: Proceed to step E, Watercourse Crossings.

YES: Proceed to step D, Diversion Channels.

D. Diversion Channels

Design and construction of a diversion channel is required if the proposal includes Seasonal, Temporary or Permanent relocation of a watercourse or channel. It is the responsibility of the applicant to ensure that when transferring water into a diversion channel, it is completed in such a manner as to avoid stranding of fish in the dewatered channel. If it is likely that stranding of fish will occur in a dewatered channel, the applicant should retain a qualified professional to conduct a fish salvage prior to dewatering the channel.

Provided the diversion channel design proposal meets the conditions identified in the following sections, the diversion channel may be constructed pursuant to the respective Watershed Authorization. Specific criteria related to channel design and restoration requirements are described in the following sections while general information regarding design, construction and reclamation of diversion channels is provided in the Guidebook.

If you are unable to achieve the requirements described in the following sections please see “If your project does not comply with the requirements” section at the beginning of this document.

D1. Original Channel and Site Parameters Worksheet

On the Original Channel and Site Parameters Worksheet (Appendix C), record the information for the original channel (pre-diversion conditions). Refer to the Guidebook reference sections identified on the worksheet to assist you with the data collection and entry process.

Note: The above worksheet must be completed prior to proceeding with the following steps.

Do you propose a Seasonal relocation of a channel? (A Seasonal Channel is in place for a period of less than one year and is replaced before winter).

NO: Proceed to next question.
YES: Not permitted in Moderate–High habitat suitability watercourses. Proceed to next question.

Do you propose a Temporary relocation of a channel? (A Temporary Channel is in place for a period of less than five years).

NO: Proceed to next question.
YES: Not permitted in Moderate–High habitat suitability watercourses. Proceed to next question.

Do you propose a Permanent relocation of a channel? (A Permanent Channel is in place for a period of five years or more).

NO: Proceed to next question.
YES: Proceed to Step D4, Permanent Diversion Channels.

D4. Permanent Diversion Channels

Permanent diversion channels are defined as a constructed channel that will convey stream flow for a period of over five years. All permanent diversion channels must include provisions for construction of fish habitat features. Refer to the channel design considerations in the Guidebook for more information on permanent diversion channels. You will need to complete and submit the Channel Design Flood Estimate Worksheet

Moderate–High Habitat Suitability Watercourses

(Appendix D3), the Channel Design Method Worksheet (Appendix E) and the Fish Habitat Features Worksheet (Appendix F) for your Permanent Diversion Channel to the YESAB and the YWB.

Flood design interval for Permanent Diversion Channels in Moderate–High habitat suitability is **1:50**.

D4a. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the flood design interval (line 1).

D4b. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the information required and complete the calculations. Refer to the Guidebook reference sections identified on the worksheet to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Flood Estimate Worksheet with your submission to the YESAB and the YWB.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following steps.

D4c. Selecting a Channel Design Method

The selection of a channel design method for channel construction is dependent upon the site geography, channel conditions and channel type. The design method selected is used to define the diversion channel dimensions and drop structure requirements.

The Channel Design Method table provides a list of recommendations to guide the selection of a suitable channel design method.

Design Method	Parameter	Condition
Channel Replication	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	> 2%
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Limited to none
	Valley Type	Incised or entrenched
	Channel Stability	Stable (if original channel is diversion it must have been in place for >10 Years)
	Note: Optional when channel gradient is < 2%	
Floodplain Design	Channel Duration	Permanent
	Channel Gradient	< 2%
	Channel Material in Diversion	All
	Diversion Channel Length	At least 2/3 length of original channel
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Can be used in areas with no floodplain when relocation site has space to support floodplain	
Regime Channel	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	All
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Use when site data is insufficient to use other methods	

Select a Channel Design Method based on the criteria listed in the table above.

In the following steps you will need to use a specific worksheet for the Channel Design Method you have selected: Channel Replication Worksheet (Appendix E1); Floodplain

Design Worksheet (Appendix E2); or Regime Channel Worksheet (Appendix E3). Do not proceed until you have selected a Channel Design Method.

Note: Each diversion channel planned requires only one channel design method.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections as it contains the information necessary to complete the Channel Design Method Worksheet.

D4d. On the Channel Design Method Worksheet you have selected, enter the information required and complete the design calculations. Refer to the Guidebook reference sections identified on the worksheets to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Method Worksheet with your submission to the YESAB and the YWB.

The following tables identify design restrictions and fish habitat reclamation requirements for Permanent Diversion Channels which must be incorporated to be in compliance with the respective Watershed Authorization.

Design Restrictions for Permanent Diversion Channels

Design Component (Permanent Diversion)	Criteria
Overall Length of Diversion Channel	< 500 metres
Conveyance (flood design) Capacity	1:50
Channel Design	As per channel design worksheets
Fish Habitat Features	As per reclamation tables

Note: In the next step you will need to refer to the Original Channel and Site Parameters Worksheet (Appendix C) in order to select the appropriate category of the original channel type (Pool-riffle, Dune-riffle, Plane-bed, Step-pool or Cascade Channel). For more information on channel types, see the Guidebook.

CONSTRUCTION AND RECLAMATION REQUIREMENTS FOR PERMANENT DIVERSION CHANNELS

Pool-riffle / Dune-riffle and Plane-bed Channel Type	
Fish Habitat Features	**Spacing Requirements** (multiply the number in this column by the width of the channel in metres)
Rock Island (channel width < 5 metres)	5
Boulder Grouping (channel width > 5 metres)	3
Anchored or Buried Trees	10
Top Soil Spreading	Continuous (both banks)
Willow Staking	Continuous (both banks)
Transplanting	At sharp bends
Rip-rap	Based on channel design method

Note: Topsoil spreading is to occur for the full width of the Riparian Zone (20 metres), willow planting is to be completed to a width of 5 metres from the bank, willow planting / transplanting is not required for the floodplain design method.

CONSTRUCTION AND RECLAMATION REQUIREMENTS FOR PERMANENT DIVERSION CHANNELS

Step-pool and Cascade Channel Type	
Fish Habitat Features	**Spacing Requirements** (multiply the number in this column by the width of the channel in metres)
Rock Island (channel width < 5 metres)	4
Boulder Grouping (channel width > 5 metres	3
Anchored or Buried Trees	8
Top Soil Spreading	Continuous (both banks)
Willow Staking	Continuous (both banks)
Transplanting	At sharp bends only
Rip-rap	Based on channel design method

Note: Topsoil spreading is to occur for the full width of the Riparian Zone (20 metres), willow planting is to be completed to a width of 5 metres from the bank, willow staking / transplanting is not required for the floodplain design method.

D4e. Use the information above to complete the Fish Habitat Feature Worksheet (Appendix F) to identify the type, spacing and relative location of the fish habitat features. Draw a diagram of the diversion channel (include north arrow, flow direction and reclaimed Riparian Zone) (use symbols identified on worksheet to compose your diagram).

Once the Fish Habitat Feature Worksheet is completed, proceed to the next question.

Do you propose to use an Existing Ford?

NO: Proceed to next question.
YES: Proceed to Step E, Watercourse Crossings, then E1, Use of Existing Ford.

Do you propose to construct a New Ford?

NO: Proceed to Step F, Water Acquisition.
YES: Not authorized by the Watershed Authorizations, see "if your project does not comply with requirements " section at the beginning of this document.

E. Watercourse Crossings (Fords)

Fording is defined as the crossing of creeks, streams and / or rivers at locations where a bridge, causeway or elevated embankment does not exist or is not utilized by a vehicle or equipment. Fording typically involves driving directly through a watercourse, across the banks and bed. In some instances, Fording locations (Fords) have been "improved" or constructed through watercourses by way of adding materials such as rocks or gravel, the modification of approaches, or the modification of the bed of a watercourse.

E1. Use of Existing Ford

Use of existing Fords is often the least preferred option for crossing watercourses however it is recognized that there are instances where it is the only viable option. Refer to the Guidebook for additional information on Fords. The following measures should be adhered to when utilizing existing Fords.

Note: Please identify if you intend to use Existing Fords on the Project Location Worksheet (Appendix A).

- Ensure water depth is sufficiently shallow to allow passage of vehicles / equipment.
- Plan your activities in advance to minimize the number of crossings required.
- Avoid crossing during extreme rain or flood events.
- Access approaches at 90° to the bank, when entering or exiting the Ford.
- Maintain speed at a very slow and steady pace throughout the crossing.
- Avoid rapid acceleration while on approaches or while in the water.

Do you propose to withdraw water from a Moderate–High habitat suitability watercourse?

NO: Proceed to Step G, In-stream Works.
YES: Proceed to Step F, Water Acquisition.

F. Water Acquisition

Acquisition of water is required for processing materials during placer mining. Effective water management is a key consideration at all placer mine sites. The following requirements must be achieved to meet compliance with the respective Watershed Authorization.

F1. Water Intake Screens

In order to meet the requirements of the *Fisheries Act*, all water intakes must be screened. A general summary of the screening requirements are provided in the Guidebook.

Note: The objective behind the installation of intake screens is to prevent the death of fish caused by the acquisition of water. If screens of the correct mesh size are deployed between a watercourse and the intake to a water reservoir or gravity feed ditch, it is not necessary to screen the pump intake that removes water from within these structures provided these structures do not already contain fish. In the case of total recirculation systems, the operator shall ensure that any areas where fish could enter the system have barriers to prevent the entry of fish.

G. In-stream Works

In-stream works are defined as works that occur within the high water mark of a watercourse, but do not include diversion channels or Fords. Some in-stream works can lead to effects on fish and fish habitat such as erosion/scouring, sediment inputs, loss of habitat area, changes in channel morphology, blockages to passage, and reduced productivity.

Do you propose to carry out in-stream works within a watercourse? In-stream works may include small dugouts or wing dams to facilitate water acquisition, in-stream settling facilities, in-stream reservoirs, and use of a stream channel as a conduit to transport process water to out-of-stream settling ponds.

NO: Review complete – proceed with submission of all completed worksheets along with your project description to the YESAB and your application for water use license to the YWB.

YES: Proceed to Step G1, Severity of Effects Assessment.

G1. Severity of Effects Assessment and Risk Management Decisions for In-stream Works

Moderate–High Habitat Suitability Watercourses

In-stream settling facilities, in-stream reservoirs, and use of a stream channel as a conduit to transport process water to out-of-stream settling ponds are not authorized under the auspices of a Watershed Authorization in habitats of Moderate–High habitat suitability watercourses.

Certain physical works that pose a low risk to fish and fish habitat are authorized in Moderate–High habitat suitability watercourses provided that design conditions are met. Physical works authorized are limited to the construction of small dugouts or wing dams to facilitate water acquisition.

The following table is to be used to evaluate the risk of proposed in-stream works in Moderate–High habitat suitability watercourses. The design elements of the proposed works must achieve a risk score of no higher than the maximum risk score identified to be in compliance with the respective Watershed Authorization.

The maximum permitted score in this habitat suitability zone is **twelve**.

Moderate–High Habitat Suitability Watercourses

Design Component	Range	Risk Score
Channel Width Constriction	>30% channel constriction	N/A
	5% - 30% of the channel	2
	< 5%	1
Above and Below the Structure – Difference in Water Surface Level	>2.0 metres	N/A
	0.3 – 2.0 metres	2
	< 0.3 metres	1
Material Type	Fine (silt-sand)	N/A
	Compactable (fine gravel and sand)	2
	Metal/ riprap/ structure	1
Construction Method	Moderately compacted/ placement	2
	Compacted shallow lift (or rip-rap, gabions, or boulders)	1
Amount of In-water Work	Completely in water	3
	Partially in water (more than ½)	2
	In dry	1
Structure Height	Above bank full	3
	Between bank full and channel bed	2
	Below channel bed	1
MAXIMUM PERMITTED SCORE FOR IN-STREAM WORKS		**12**

Calculate and record your total score and maximum permitted score on the Severity of Effects Assessment for In-stream Works Worksheet (Appendix G1), and record details of proposed in-stream works on the In-stream Works Worksheet (Appendix G2). Proceed with submission of proposal.

Moderate–Moderate Habitat Suitability Watercourses (Includes Tributaries to Small Lakes)

Moderate–Moderate Habitat Suitability Watercourses (Includes Tributaries to Small Lakes)

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In order to achieve compliance with the Watershed Authorizations, the placer mining proposal must meet the requirements outlined in this workbook for the watershed type and specific habitat suitability type at the location where the activities are to occur (see Yukon Placer Fish Habitat Suitability Maps).

In addition to this workbook and worksheets, the following documents provide the required information to support the development and submission of proposals for placer mining activities. All supporting documents are available online through the Yukon Placer Secretariat web page, www.yukonplacersecretariat.ca/howto_prepare_project_proposal.html or through the web addresses given for the specific documents.

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Note: Complete and submit only the worksheets that are relevant to your operation.

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For assistance completing the worksheets please contact the Yukon Placer Secretariat (contact information is available at, www.yukonplacersecretariat.ca/index.html) or the Yukon Government Client Services & Inspections office in your mining district (contact information is available at, www.emr.gov.yk.ca/cmi/cmi_district_offices.html).

If Your Project Does Not Comply With The Requirements

Placer mine operators are encouraged to design proposals that comply with the requirements described in this workbook. However, if the proposal is not able to achieve these requirements and the operator would like to proceed with the regulatory review process, an application for site-specific review should be submitted to Fisheries and Oceans Canada (DFO) for consideration **prior to the submission of the proposal to the YESAB and the YWB**.

When a proposal is submitted for site-specific review, DFO will review the information to determine whether a site-specific authorization is required. In some cases, DFO may recommend measures to avoid or mitigate the harm to fish and fish habitat to allow the application to proceed under the Watershed Authorization.

Applications for site-specific review, forms and process to apply can be obtained from the Yukon Placer Secretariat, contact information can be found online at, www.yukonplacersecretariat.ca/index.html. Should it be determined that a site-specific authorization is required, a more detailed application, including a fish habitat offsetting plan and a letter of credit, will have to be submitted to DFO. Information on the site-specific authorization application process, offsetting plans, and letters of credit can be found on DFO's Projects Near Water website, www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/application-eng.html.

Fish Habitat Design, Operation and Reclamation Requirements for Moderate–Moderate Habitat Suitability Watercourses (Includes Tributaries to Small Lakes)

Moderate–Moderate habitat suitability watercourses are defined as watercourses that are suitable for rearing juvenile Chinook salmon, although the habitat parameters and conditions are not as restricted as Moderate–High habitat suitability watercourses within the watershed. These watercourses are also highly suitable for a broad range of adult and juvenile resident fish species. The Moderate–Moderate habitat suitability classification also applies to Tributaries to Small Lake Trout Lakes (< 600 hectares).

Please use the following instructions and information to complete the worksheets relevant to your proposal (located in Appendix A to H). The completed worksheets will be submitted as part of your project description to the Yukon Environmental and Socio Economic Assessment Board (YESAB) and your application to the Yukon Water Board (YWB).

SUMMARY OF GENERAL RESTRICTIONS IN MODERATE–MODERATE HABITAT SUITABILITY WATERCOURSES

Activity Type / Operation	Restrictions in Moderate–Moderate Habitat Suitability Watercourses
Riparian Zone	Designated Riparian Zone is 10 metres from the high water mark. Conditions and reclamation requirements apply to clearing surface vegetation and sub-surface works within the Designated Riparian Zone.
Fords	Construction of new Fords subject to design and construction restrictions and reclamation requirements. Mitigative measures should be applied to use of existing Fords.
Diversion Channels	Construction of Seasonal diversion channels not authorized. Construction of Temporary and Permanent diversion channels subject to design restrictions and construction and reclamation requirements.
In-stream Works	In-stream settling facilities, in-stream reservoirs, stream as a conduit not authorized.

Note: The table above summarizes those placer mining activities which are not authorized by the Watershed Authorizations and will require a site-specific review (see "If your project does not comply with the requirements" section at the beginning of this document).

To determine how to proceed, please answer the following questions regarding a work, undertaking or activity in or around Moderate–Moderate habitat suitability watercourses.

Do you propose to undertake placer mining activities in, or within, 30 metres of a watercourse? Activities may include discharging effluent, constructing stream crossings, clearing riparian vegetation, constructing channel diversions, or withdrawing water.

NO: No further review pursuant to the *Fisheries Act* is required.

YES: Proceed to Step A, Project Information.

A. Project Information

The first step in compiling a project proposal that involves activities proposed to occur in or around fish habitat areas is the completion of the Project Location Worksheet (Appendix A).

Note: The Project Location Worksheet (Appendix A) is required for all applications.

A1. On the Project Location Worksheet enter the stream name, the watershed name (as per Yukon Placer Fish Habitat Suitability Maps), identify the watershed sensitivity and habitat suitability classification for the reaches you proposed to work in, if any reaches are designated as "previous/prior development", a short description of the location, the proposed duration of activities and a copy of a map of the specific location of the site.

Does the Previous Development designation apply to your project?

NO: Proceed to the next question.
YES: See below.

Historical Development

If your project falls within a "Historical Development" zone, the requirements for settling pond discharge, riparian zones, seasonal or temporary diversions, watercourse crossings, water acquisition and in-stream works that normally apply to Moderate–Low habitat suitability watercourses will apply to your operation.

Note: Permanent diversion channels and all reclamation work must conform to the requirements for Moderate–Moderate habitat suitability watercourses.

Current Development or Extensive Development

If your project falls within a "Current Development" or "Extensive Development" zone, the requirements for settling pond discharge, riparian zones, seasonal or temporary diversions, watercourse crossings, water acquisition and in-stream works that normally apply to Low habitat suitability watercourses will apply to your operation.

Note: Permanent diversion channels and all reclamation work must conform to the requirements for Moderate–Moderate habitat suitability watercourses.

A2. Based on the previous development type, please select the appropriate Operation and Restoration standard on the Project Location Worksheet.

Once the sections noted above are complete on the Project Location Worksheet, proceed to the next question.

Do you propose to discharge effluent from your mine site?

NO: Proceed to Step C, Riparian Zones.
YES: Proceed to Step B, Settling Pond Discharge.

B. Settling Pond Discharge (effluent concentration)

Point source sediment discharges from gold recovery processes are typically managed through the use of settling facilities. The action level approach is a key element of the risk-based approach to sediment management for Yukon placer mining. For more information on the action level approach or settling pond design, operation, recirculation systems, and settling pond reclamation refer to the Guidebook of Mitigation Measures for Placer Mining in the Yukon (herein referred to as the Guidebook).

Water quality objectives and sediment discharge standards for settling ponds in Moderate–Moderate habitat suitability watercourses are specified in the Watershed Authorizations for the specific watershed you propose to work in. Please ensure to verify your specific discharge standard in the respective watershed you plan to work in (specifically if any exemptions exist) prior to proceeding with your application.

B1. Record the Design Target, Action Level and Compliance Level on the Project Location Worksheet (Appendix A).

Once the effluent discharge standards are recorded on the Project Location Worksheet proceed to the next question.

Do you propose to construct works other than diversion channels within the Riparian Zone (see Step C for the definition of the Riparian Zone) – this could include stripping, construction of reservoirs, construction of settling ponds, etc.?

NO: Proceed to Step D, Diversion Channels
YES: Proceed to Step C, Riparian Zone

C. Riparian Zones

The Riparian Zone is defined as the portion of the stream bank (either vegetated or not) immediately adjacent to the stream channel.

The designated Riparian Zone in Moderate–Moderate habitat suitability watercourses is **10 metres**, measured from the ordinary high water mark on each bank of the watercourse and following the pattern/morphology of the channel.

The Riparian Zone designation applies to original (un-modified) channels, previously reclaimed channels and Permanent Diversion Channels.

Note: The Riparian Zone provisions set out below are NOT required for Seasonal or Temporary Diversion Channels.

Activities proposed within the Riparian Zone must comply with the surface vegetation clearing and bank modification provisions outlined below. The only other activity permitted within the Riparian Zone is the clearing of surface vegetation within a corridor to provide access to the stream (typically for water acquisition purposes). The maximum width of the corridor is to be no more than **5 metres**. Riparian Zones must be staked out by the operator prior to development.

Do you propose clearing of surface vegetation or subsurface works in the Riparian Zone? (this could include stripping, construction of reservoirs, construction of settling ponds, etc.)

NO: Proceed to Step D, Diversion Channels.
YES: Proceed to next question.

Do you propose to construct a new stream crossing (Ford)?

NO: Proceed to next question.
YES: Review Step E, Watercourse Crossings, prior to proceeding to next question.

Do you propose to clear surface vegetation only?

NO: The proposal includes both clearing of surface vegetation and subsurface works, proceed to Step C1, Surface Vegetation Clearing, followed by C2, Bank Modification.

YES: Proceed to Step C1, Surface Vegetation Clearing.

C1. Surface Vegetation Clearing

If vegetation clearing is proposed to occur within the Riparian Zone, fill out the appropriate sections of the Riparian Zone / Bank Modification Worksheet (Appendix B).

Under Vegetation Clearing record the following:

- Record the Habitat Suitability Type where vegetation clearing in the Riparian Zone is proposed.
- Record the Designated Riparian Zone (see the beginning of this section).
- Record the Proposed Duration of Vegetation Clearing prior to reclamation (cannot exceed restriction in table below).
- Record the Total Length of Proposed Vegetation Clearing in the Riparian Zone (cannot exceed restriction in table below).
- Record the Width of Proposed Vegetation Clearing in the Riparian Zone.
- From the table below record the Minimum Vegetation Setback from Stream.
- Record the width of the Proposed Vegetation Setback from Stream (cannot be less than the minimum setback distance).
- Record the Required Reclamation Works for Vegetation (see table below).
- In space provided on Appendix B draw a diagram of the proposed location where vegetation clearing in the Riparian Zone is planned (include north arrow, flow direction and use symbols identified on worksheet to compose your diagram).

Conditions and Reclamation Required When Proposing Surface Vegetation Clearing in Riparian Zones in Moderate–Moderate Habitat Suitability Watercourses

Design Component (Vegetation Clearing)	Requirement
Minimum Vegetated Setback from Stream	3.0 metres
Maximum Length of Clearing	200 metres
Minimum Space Between Cleared Areas	300 metres
Maximum Duration Prior to Reclamation	5 years
Reclamation Requirement (surface)	Full topsoil coverage
Reclamation Requirement (vegetation)	30% live staking

If proposing bank modification activities, proceed to step C2.

C2. Bank Modification

Bank Modification includes any subsurface works proposed in the Riparian Zone.

If bank modification is proposed to occur within the Riparian Zone, fill out the appropriate sections of the Riparian Zone / Bank Modification Worksheet (Appendix B).

Note: If your proposal includes bank modification related to the construction of a Ford, see step E for design conditions and requirements prior to proceeding.

Under Bank Modification record the following:

- Record the Habitat Suitability Type where bank modification in the Riparian Zone is proposed.
- Record the Designated Riparian Zone (see the beginning of this section).
- Record the Proposed Duration of Bank Modification prior to reclamation (cannot exceed restriction in table below).
- Record the Total Length of Proposed Bank Modification in the Riparian Zone (cannot exceed restriction in the table below).
- Record the Width of Proposed Bank Modification.
- From the table below record the Minimum Setback Distance from Stream.
- Record the width of Proposed Setback Distance from Stream (cannot be less than the minimum setback distance).
- Record the Required Reclamation Works for Bank Modification (see table below).
- In space provided on Appendix B draw a diagram of the proposed location where bank modification is planned (use symbols identified on worksheet to compose your diagram. Draw the location of any new Fords proposed (see step E for restrictions)

Conditions and Reclamation Requirements When Proposing Bank Modification in Riparian Zones in Moderate–Moderate Habitat Suitability Watercourses

Design Component (Bank Modification)	Requirement
Minimum Bank Setback From Stream	5.0 metres
Maximum Length of Excavation	50 metres
Minimum Space Between Bank Modification Areas	300 metres
Maximum Duration Prior to Reclamation	5 years
Required Reclamation Works (grading)	To pre-excavation grade
Required Reclamation Works (surface)	Full topsoil coverage
Required Reclamation Works (vegetation)	30% live staking

Note: The "Minimum Bank Setback From Stream" provision identified above does NOT apply to the construction of watercourse crossings (Fords). If your proposal includes the construction of a Ford, please see step E.

Once the Riparian Zone / Bank Modification Worksheet is completed, proceed to the next question.

Do you propose a Seasonal, Temporary or Permanent relocation of a channel?

NO: Proceed to step E, Watercourse Crossings.
YES: Proceed to step D, Diversion Channels.

D. Diversion Channels

Design and construction of a diversion channel is required if the proposal includes Seasonal, Temporary or Permanent relocation of a watercourse or channel. It is the responsibility of the applicant to ensure that when transferring water into a diversion channel, it is completed in such a manner as to avoid stranding of fish in the dewatered channel. If it is likely that stranding of fish will occur in a dewatered channel, the applicant should retain a qualified professional to conduct a fish salvage prior to dewatering the channel.

Provided the diversion channel design proposal meets the conditions identified in the following sections, the diversion channel may be constructed pursuant to the respective Watershed Authorization. Specific criteria related to channel design and restoration requirements are described in the following sections while general information regarding design, construction and reclamation of diversion channels is provided in the Guidebook.

In order for a diversion channel to meet the requirements of the Watershed Authorization, you must ensure that your proposed channel design achieves a total risk score of less than or equal to the maximum risk score threshold identified on the following Risk Scoring Tables. If your design exceeds this score you may wish to redesign your proposed channel in order to meet the maximum risk score, thus meeting the requirements of the Watershed Authorization. If you are unable to meet the maximum risk score, see “If your project does not comply with the requirements” section at the beginning of this document.

D1. Original Channel and Site Parameters Worksheet

On the Original Channel and Site Parameters Worksheet (Appendix C), record the information for the original channel (pre-diversion conditions). Refer to the Guidebook reference sections identified on the worksheet to assist you with the data collection and entry process.

Note: The above worksheet must be completed prior to proceeding with the following steps.

Do you propose a Seasonal relocation of a channel? (A Seasonal Channel is in place for a period of less than one year and is replaced before winter).

NO: Proceed to next question.
YES: Not permitted in Moderate–Moderate habitat suitability watercourses. Proceed to next question.

Do you propose a Temporary relocation of a channel? (A Temporary Channel is in place for a period of less than five years).

NO: Proceed to next question.
YES: Proceed to Step D3, Temporary Diversion Channels and Step D4, Permanent Diversion Channels.

Do you propose a Permanent relocation of a channel? (A Permanent Channel is in place for a period of five years or more).

NO: Proceed to next question.
YES: Proceed to Step D4, Permanent Diversion Channels.

D3. Temporary Diversion Channels

Temporary diversion channels in Moderate–Moderate habitat suitability watercourses are defined as a constructed channel that will convey stream flow for a period of less than five years. Although not required, construction of fish habitat features may be incorporated in the channel design to reduce the overall risk score. To achieve this condition the channel must incorporate the required fish habitat features (based on channel configuration). Refer to the channel design considerations in the Guidebook for more information on temporary diversion channels. You will need to complete and submit the Channel Design Flood Estimate Worksheet (Appendix D3) and the Channel Design Method Worksheet (Appendix E) for your Temporary Diversion Channel to the YESAB and the YWB.

Note: The Riparian Zone provisions do not apply to Temporary Diversion Channels.

Flood design interval for Temporary Diversion Channels in Moderate–Moderate habitat suitability is **1:10**.

Note: Temporary Diversion Channels can only be in place for 5 years and as such, your application should include worksheets for the construction of a Permanent Restoration Channel (Step D4).

D3a. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the flood design interval (line 1).

D3b. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the information required and complete the calculations. Refer to the Guidebook reference sections identified on the worksheet to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Flood Estimate Worksheet with your submission to the YESAB and the YWB.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following steps.

D3c. Selecting a Channel Design Method

The selection of a channel design method for channel construction is dependent upon the site geography, channel conditions and channel type. The design method selected is used to define the diversion channel dimensions and drop structure requirements.

The Channel Design Method table provides a list of recommendations to guide the selection of a suitable channel design method.

Design Method	Parameter	Condition
Channel Replication	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	> 2%
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Limited to none
	Valley Type	Incised or entrenched
	Channel Stability	Stable (if original channel is diversion it must have been in place for >10 Years)
	Note: Optional when channel gradient is < 2%	
Floodplain Design	Channel Duration	Permanent
	Channel Gradient	< 2%
	Channel Material in Diversion	All
	Diversion Channel Length	At least 2/3 length of original channel
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Can be used in areas with no floodplain when relocation site has space to support floodplain	
Regime Channel	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	All
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Use when site data is insufficient to use other methods	

Select a Channel Design Method based on the criteria listed in the table above.

Note: Each diversion channel planned requires only one channel design method.

In the following steps you will need to use a specific worksheet for the Channel Design Method you have selected: Channel Replication Worksheet (Appendix E1); Floodplain Design Worksheet (Appendix E2); or Regime Channel Worksheet (Appendix E3). Do not proceed until you have selected a Channel Design Method.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections.

D3d. On the Channel Design Method Worksheet you have selected, enter the information required and complete the design calculations. Refer to the Guidebook reference sections identified on the worksheets to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Method Worksheet with your submission to the YESAB and the YWB.

The following table is to be used when designing Temporary Diversion Channels. The channel design proposed must achieve a risk score of no higher than the maximum risk score identified to be in compliance with the respective Watershed Authorization.

Severity of Effects Assessment for Temporary Diversion Channels

Design Component	Range	Risk Score
Channel Gradient	3.51% to 5.0%	N/A
	1.51% to 3.5%	2
	0 to 1.5%	1
Length of Diversion Channel	1000 metres to 2000 metres	3
	500 metres to 1000 metres	2
	<500 metres	1
Relative Length of Diversion Channel	Shorter than original	1
	Equal or Longer than original	0
Permafrost in Diversion Channel	Present	N/A
	Absent	0
Primary Material in Diversion Channel	Silt / Sand	2
	Gravel / Cobble / Bedrock	1
Location of Diversion Channel	Perched (valley wall)	N/A
	Confined (valley floor)	2
	Incised (valley floor)	1
Fish Habitat Features (rock islands / boulder groupings only)	50% of total required for permanent channel	-1
MAXIMUM PERMITTED SCORE FOR TEMPORARY DIVERSION CHANNELS		**7**

D3e. Calculate your total score and maximum permitted score on the Severity of Effects Assessment for Temporary Diversion Channel Worksheet (Appendix D2), and record your total score on the Channel Design Flood Estimate Worksheet (Appendix D3).

D3f. Fish Habitat Features

If you have included fish habitat features in your proposed Temporary Diversion Channel you must select the appropriate spacing of features based on the Channel Type identified on the Original Channel and Site Parameters Worksheet. Refer to the fish habitat feature considerations in the Guidebook for more information. Use the following tables as a guide to fill out information requirements in the Fish Habitat Feature Worksheet (Appendix F).

FISH HABITAT RECLAMATION REQUIREMENTS FOR TEMPORARY DIVERSION CHANNELS

Pool-riffle / Dune-riffle and Plane-bed Channel Type	
Select Fish Habitat Feature Based on Diversion Channel Width	**Spacing Requirements (place feature every X channel width)**
Rock Island (channel width < 5 metres)	12
Boulder Grouping (channel width > 5 metres)	10
Rip-rap	Based on channel design method

FISH HABITAT RECLAMATION REQUIREMENTS FOR TEMPORARY DIVERSION CHANNELS

Step-pool and Cascade Channel Type	
Select Fish Habitat Feature Based on Diversion Channel Width	**Spacing Requirements (place feature every X channel width)**
Rock Island (channel width < 5 metres)	8
Boulder Grouping (channel width > 5 metres)	6
Rip-rap	Based on channel design method

D3g. Enter the required information on the Fish Habitat Feature Worksheet (Appendix F) to identify the type, spacing and relative location of the fish habitat features. Draw a diagram of the diversion channel (include north arrow, flow direction) (use symbols identified on worksheet to compose your diagram).

Note: If your Temporary Diversion Channel includes fish habitat features, and you propose to construct a crossing (new Ford) be sure to identify the location of the Ford on the Fish Habitat Features Worksheet (see step E2).

Proceed to following steps if:

- D4, constructing a Permanent Diversion Channel.
- E, proposing to construct a new stream crossing (Ford).
- F, proposing to acquire water.

D4. Permanent Diversion Channels

Permanent diversion channels are defined as a constructed channel that will convey stream flow for a period of over five years. All permanent diversion channels must include provisions for construction of fish habitat features. Refer to the channel design considerations in the Guidebook for more information on permanent diversion channels. You will need to complete and submit the Channel Design Flood Estimate Worksheet (Appendix D3), the Channel Design Method Worksheet (Appendix E) and the Fish Habitat Features Worksheet (Appendix F) for your Permanent Diversion Channel to the YESAB and the YWB.

Flood design interval for Permanent Diversion Channels in Moderate–Moderate habitat suitability is **1:20**.

D4a. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the flood design interval (line 1).

D4b. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the information required and complete the calculations. Refer to the Guidebook reference sections identified on the worksheet to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Flood Estimate Worksheet with your submission to the YESAB and the YWB.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following steps.

D4c. Selecting a Channel Design Method

The selection of a channel design method for channel construction is dependent upon the site geography, channel conditions and channel type. The design method selected is used to define the diversion channel dimensions and drop structure requirements.

The Channel Design Method table provides a list of recommendations to guide the selection of a suitable channel design method.

Design Method	Parameter	Condition
Channel Replication	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	> 2%
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Limited to none
	Valley Type	Incised or entrenched
	Channel Stability	Stable (if original channel is diversion it must have been in place for >10 Years)
	Note: Optional when channel gradient is < 2%	
Floodplain Design	Channel Duration	Permanent
	Channel Gradient	< 2%
	Channel Material in Diversion	All
	Diversion Channel Length	At least 2/3 length of original channel
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Can be used in areas with no floodplain when relocation site has space to support floodplain	
Regime Channel	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	All
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Use when site data is insufficient to use other methods	

Select a Channel Design Method based on the criteria listed in the table above.

Note: Each diversion channel planned requires only one channel design method.

In the following steps you will need to use a specific worksheet for the Channel Design Method you have selected (Channel Replication Worksheet (Appendix E1), Floodplain Design Worksheet (Appendix E2) or Regime Channel Worksheet (Appendix E3)). Do not proceed until you have selected a Channel Design Method.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections.

D4d. On the Channel Design Method Worksheet you have selected, enter the information required and complete the design calculations. Refer to the Guidebook reference sections identified on the worksheets to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Method Worksheet with your submission to the YESAB and the YWB.

The following tables identify design restrictions and fish habitat reclamation requirements for Permanent Diversion Channels which must be incorporated to be in compliance with the respective Watershed Authorization.

Design Restrictions for Permanent Diversion Channels

Design Component (Permanent Diversion)	Criteria
Overall Length of Diversion Channel	< 2000 metres
Conveyance (flood design) Capacity	1:20
Channel Design	As per channel design worksheets
Fish Habitat Features	As per reclamation tables

Note: In the next step you will need to refer to the Original Channel and Site Parameters Worksheet (Appendix C) in order to select the appropriate category of the original channel type (Pool-riffle, Dune-riffle, Plane-bed, Step-pool or Cascade Channel). For more information on channel types see the Guidebook.

CONSTRUCTION AND RECLAMATION REQUIREMENTS FOR PERMANENT DIVERSION CHANNELS

Pool-riffle / Dune-riffle and Plane-bed Channel Type	
Fish Habitat Features	**Spacing Requirements** (multiply the number in this column by the width of the channel in metres)
Rock Island (channel width < 5 metres)	5
Boulder Grouping (channel width > 5 metres)	4
Anchored or Buried Trees	14
Top Soil Spreading	Continuous (both banks)
Willow Staking	Inside bank, all meander bends
Transplanting	At sharp bends
Rip-rap	Based on channel design method

Note: Topsoil spreading is to occur for the full width of the Riparian Zone (10 metres), willow staking is to be completed to a width of 3 metres from the bank, willow staking / transplanting is not required for the floodplain design method.

CONSTRUCTION AND RECLAMATION REQUIREMENTS FOR PERMANENT DIVERSION CHANNELS

Step-pool and Cascade Channel Type	
Fish Habitat Features	**Spacing Requirements** (multiply the number in this column by the width of the channel in metres)
Rock Island (channel width < 5 metres)	5
Boulder Grouping (channel width > 5 metres)	3
Anchored or Buried Trees	12
Top Soil Spreading	Continuous (both banks)
Willow Staking	Inside bank, all meander bends
Transplanting	At sharp bends
Rip-rap	Based on channel design method

Note: Topsoil spreading is to occur for the full width of the Riparian Zone (10 metres), willow staking is to be completed to a width of 3 metres from the bank, willow staking / transplanting is not required for the floodplain design method.

D4e. Use the information above to complete the Fish Habitat Feature Worksheet (Appendix F), identify the type, spacing and relative location of the fish habitat features. Draw a diagram of the diversion channel (include north arrow, flow direction and reclaimed Riparian Zone) (use symbols identified on worksheet to compose your diagram).

Note: If you propose to construct a crossing (new Ford) be sure to identify the location of the Ford on the Fish Habitat Feature Worksheet (see section E2).

Once the Fish Habitat Feature Worksheet is completed, proceed to the next question.

Do you propose to use an Existing Ford?

NO: Proceed to next question.
YES: Proceed to Step E, Watercourse Crossings, then E1, Use of Existing Ford.

Do you propose to construct a New Ford?

NO: Proceed to Step F, Water Acquisition.
YES: Proceed to Step E, Watercourse Crossings.

E. Watercourse Crossings (Fords)

Fording is defined as the crossing of creeks, streams and / or rivers at locations where a bridge, causeway or elevated embankment does not exist or is not utilized by a vehicle or equipment. Fording typically involves driving directly through a watercourse, across the banks and bed. In some instances, Fording locations (Fords) have been "improved" or constructed through watercourses by way of adding materials such as rocks or gravel, the modification of approaches, or the modification of the bed of a watercourse.

E1. Use of Existing Ford

Use of existing Fords is often the least preferred option for crossing watercourses however it is recognized that there are instances where it is the only viable option. Refer to the Guidebook for additional information on Fords. The following measures should be adhered to when utilizing existing Fords.

Note: Please identify if you intend to use Existing Fords on the Project Location Worksheet (Appendix A).

- Ensure water depth is sufficiently shallow to allow passage of vehicle / equipment.
- Plan your activities in advance to minimize the number of crossings required.
- Avoid crossing during extreme rain or flood events.
- Access approaches at 90° to the bank, when entering or exiting the Ford.
- Maintain speed at a very slow and steady pace throughout the crossing.
- Avoid rapid acceleration while on approaches or while in the water.

E2. Construction of New Fords

Construction of new Fords should be limited to locations or applications where deemed to be absolutely necessary. More permanent or high use locations should employ the construction and use of a bridge as the primary crossing structure where possible. For more information on construction of stream crossings refer to the Guidebook.

The location of new Fords must be identified when proposed for original channels, Temporary Channels (with fish habitat features), and Permanent Diversion Channels. The new Ford proposed must achieve the design, construction and reclamation requirements identified in the table below to be in compliance with the respective Watershed Authorization.

Design and Construction Restrictions and Reclamation Requirements for New Fords

Design Component (Construction of New Ford)	Requirement
Approach Angle	90° to bank
Maximum Width of Approach Zone Clearing (surface)	7 metres
Minimum Watercourse Distance Between Ford Sites OR Not to exceed more than	2000 metres 2 Fords every 4000 metres
Site Selection (Watercourse)	Shallow water depth
Site Selection (Approach / Bank Composition)	Gravel / Cobble
Construction	Equipment to work from bank
Maximum Width of Bank Grading (subsurface)	7 metres
Approach Surface Ground Coverage	Gravel / Cobble
Construction Timing	Low water period
Reclamation	Full topsoil coverage and willow staking

E2a. If the construction of a new Ford is proposed for an original channel or previously restored channel, identify the location of the new Ford(s) on the Riparian Zone / Bank Modification Worksheet (see step C, Riparian Zones and Appendix B).

E2b. If the construction of a new Ford is proposed for a Temporary Diversion Channel (with fish habitat features) or a Permanent Diversion Channel, identify the location of the new Ford(s) on the Fish Habitat Feature Worksheet (Appendix F).

Once the location and specification of the new Ford is identified on either the completed Riparian Zone / Bank Modification Worksheet or the Fish Habitat Feature Worksheet proceed to the next question.

Do you propose to withdraw water from a Moderate–Moderate habitat suitability watercourse?

NO: Proceed to Step G, In-stream Works.
YES: Proceed to Step F, Water Acquisition.

F. Water Acquisition

Acquisition of water is required for processing materials during placer mining. Effective water management is a key consideration at all placer mine sites. The following requirements must be achieved to meet compliance with the respective Watershed Authorization.

F1. Water Intake Screens

In order to meet the requirements of the *Fisheries Act*, all water intakes must be screened. A general summary of the screening requirements are provided in the Guidebook.

Note: the objective behind the installation of intake screens is to prevent the death of fish caused by the acquisition of water. If screens of the correct mesh size are deployed between a watercourse and the intake to a water reservoir or gravity feed ditch, it is not necessary to screen the pump intake that removes water from within these structures provided these structures do not already contain fish. In the case of total recirculation systems, the operator shall ensure that any areas where fish could enter the system have barriers to prevent the entry of fish.

Do you propose to carry out in-stream works within a watercourse? In-stream works may include small dugouts or wing dams to facilitate water acquisition, in-stream settling facilities, in-stream reservoirs, and use of a stream channel as a conduit to transport process water to out-of-stream settling ponds.

NO: Proceed to next question.

YES: Proceed to Step G, In-stream Works.

G. In-stream Works

In-stream works are defined as works that occur within the high water mark of a watercourse, but do not include diversion channels or Fords. Some in-stream works can lead to effects on fish and fish habitat such as erosion/scouring, sediment inputs, loss of habitat area, changes in channel morphology, blockages to passage, and reduced productivity.

Do you propose to carry out in-stream works within a watercourse? In-stream works may include small dugouts or wing dams to facilitate water acquisition, in-stream settling facilities, in-stream reservoirs, and use of a stream channel as a conduit to transport process water to out-of-stream settling ponds.

NO: Review complete – proceed with submission of all completed worksheets along with your project description to the YESAB and your application for water use license to the YWB.

YES: Proceed to Step G1, Severity of Effects Assessment.

G1. Severity of Effects Assessment and Risk Management Decisions for In-stream Works

Moderate–Moderate Habitat Suitability Watercourses

In-stream settling facilities, in-stream reservoirs, and use of a stream channel as a conduit to transport process water to out-of-stream settling ponds are not authorized under the auspices of an Watershed Authorization in Moderate–Moderate habitat suitability watercourses.

Moderate–Moderate Habitat Suitability Watercourses (Includes Tributaries to Small Lakes)

Certain physical works that pose a low risk to fish and fish habitat are authorized in Moderate–Moderate habitat suitability watercourses provided that design conditions are met. Physical works authorized are limited to the construction of a small dugouts or wing dams to facilitate water acquisition.

The following table is to be used to evaluate the risk of proposed in-stream works in Moderate–Moderate habitat suitability watercourses. The design elements of the proposed works must achieve a risk score of no higher than the maximum risk score identified to be in compliance with the respective Watershed Authorization.

Design Component	Range	Risk Score
Channel Width Constriction	>30% channel constriction	3
	5% - 30% of the channel	2
	< 5%	1
Above and Below the Structure – Difference in Water Surface Level	>2.0 metres	3
	0.3 – 2.0 metres	2
	< 0.3 metres	1
Material Type	Fine (silt-sand)	N/A
	Compactable (fine gravel and sand)	2
	Metal/ riprap/ structure	1
Construction Method	Non-compaction/ dumped	3
	Moderately compacted/ placement	2
	Compacted shallow lift (or rip-rap, gabions, or boulders)	1
Amount of In-water Work	Completely in water	3
	Partially in water (more than ½)	2
	In dry	1
Structure Height	Above bank full	3
	Between bank full and channel bed	2
	Below channel bed	1
MAXIMUM PERMITTED SCORE FOR IN-STREAM WORKS		**12**

Calculate and record your total score and maximum permitted score on the Severity of Effects Assessment for In-stream Works Worksheet (Appendix G1), and record details of proposed in-stream works on the In-stream Works Worksheet (Appendix G2). Please ensure to include the completed In-stream Works Worksheets (Appendices G1 and G2) with your submission to the YESAB and the YWB.

Moderate–Low Habitat Suitability Watercourses (Includes Tributaries to Large Lakes)

Moderate–Low Habitat Suitability Watercourses (Includes Tributaries to Large Lakes)

Before You Begin

This workbook and associated worksheets are provided to assist with compiling information to support project proposals for submission to the Yukon Environmental and the Socio-economic Assessment Board (YESAB) and the Yukon Water Board (YWB). Once completed, the worksheets must be submitted for review as a component of both the YESAB and Yukon Water Board applications.

The guidance provided focuses on the requirements of the *Authorizations for Works or Undertakings affecting Fish Habitat for Specified Streams in the Yukon Territory* (Federal *Fisheries Act*) for watersheds in the Yukon (herein referred to as Watershed Authorizations). Please note that this workbook and associated worksheets may undergo revisions in the future, and users are encouraged to ensure that they use the current version.

In order to achieve compliance with the Watershed Authorizations, the placer mining proposal must meet the requirements outlined in this workbook for the watershed type and specific habitat suitability type at the location where the activities are to occur (see Yukon Placer Fish Habitat Suitability Maps).

In addition to this workbook and worksheets, the following documents provide the required information to support the development and submission of proposals for placer mining activities. All supporting documents are available online through the Yukon Placer Secretariat web page, www.yukonplacersecretariat.ca/howto_prepare_project_proposal.html or through the web addresses given for the specific documents.

1. ***Authorization for Works or Undertakings affecting Fish Habitat for Specified Streams in the Yukon Territory***
   www.yukonplacersecretariat.ca/placer_authorizations.html – Provides the legal authority, with respect to placer mining, to carry on a work, undertaking or activity that results in the permanent alteration and destruction of fish habitat. Also specifies sediment discharge standards for placer mine effluent and the sensitivity category of the watershed (i.e. Category A or B). Please note that the death of fish is not authorized.
2. **Yukon Placer Fish Habitat Suitability Maps**
   www.yukonplacersecretariat.ca/maps.html – Identifies the watershed sensitivity and habitat suitability of the watercourse where placer mining activities are proposed to occur.
3. **Guidebook of Mitigation Measures for Placer Mining in the Yukon**
   www.yukonplacersecretariat.ca/infocentre.html – Provides technical information related to best management practices, mitigation measures, and design considerations to achieve compliance with the Watershed Authorizations and to assist with proposal development.

Note: Complete and submit only the worksheets that are relevant to your operation.

Note: There are no Watershed Authorizations in place for the Liard and Alsek watersheds. Applications for review, forms and process to apply for a placer mine in the Liard or Alsek watershed can be obtained from the Yukon Placer Secretariat, contact information can be found online at, www.yukonplacersecretariat.ca/index.html.

For assistance completing the worksheets please contact the Yukon Placer Secretariat (contact information is available at, www.yukonplacersecretariat.ca/index.html) or the Yukon Government Client Services & Inspections office in your mining district (contact information is available at, www.emr.gov.yk.ca/cmi/cmi_district_offices.html).

If Your Project Does Not Comply With The Requirements

Placer mine operators are encouraged to design proposals that comply with the requirements described in this workbook. However, if the proposal is not able to achieve these requirements and the operator would like to proceed with the regulatory review process, an application for site-specific review should be submitted to Fisheries and Oceans Canada (DFO) for consideration **prior to the submission of the proposal to the YESAB and the YWB**.

When a proposal is submitted for site-specific review, DFO will review the information to determine whether a site-specific authorization is required. In some cases, DFO may recommend measures to avoid or mitigate the harm to fish and fish habitat to allow the application to proceed under the Watershed Authorization.

Applications for site-specific review, forms and process to apply can be obtained from the Yukon Placer Secretariat, contact information can be found online at, www.yukonplacersecretariat.ca/index.html. Should it be determined that a site-specific authorization is required, a more detailed application, including a fish habitat offsetting plan and a letter of credit, will have to be submitted to DFO. Information on the site-specific authorization application process, offsetting plans, and letters of credit can be found on DFO's Projects Near Water website, www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/application-eng.html.

Fish Habitat Design, Operation and Reclamation Requirements for Moderate–Low Habitat Suitability Watercourses (Includes Tributaries to Large Lakes)

Moderate–Low habitat suitability watercourses are defined as watercourses suitable for rearing juvenile Chinook salmon, although utilization may be limited at times due to environmental factors or conditions. These watercourses are typically highly suitable for non-anadromous resident fish species such as Arctic grayling. The Moderate-Low habitat suitability classification also applies to Tributaries to Large Lake Trout Lakes (> 600 hectares).

Please use the following instructions and information to complete the worksheets relevant to your proposal (located in Appendix A to H). The completed worksheets will be submitted as part of your project description to the Yukon Environmental and Socio Economic Assessment Board (YESAB) and your application to the Yukon Water Board (YWB).

SUMMARY OF GENERAL RESTRICTIONS ON WORKS OR UNDERTAKINGS IN MODERATE–LOW HABITAT SUITABILITY WATERCOURSES

Activity Type / Operation	Restriction in Moderate–Low Habitat Suitability Watercourses
Riparian Zone	Designated Riparian Zone is 5 metres from the high water mark. Conditions and reclamation requirements apply to clearing surface vegetation and sub-surface works within the Designated Riparian Zone.
Fords	Construction of new Fords subject to design and construction restrictions and reclamation requirements. Mitigative measures should be applied to use of existing Fords.
Diversion Channels	Construction of diversion channels subject to design restrictions and construction and reclamation requirements.
In-stream Works	In-stream reservoirs constructed with cross channel dams not authorized. Conditions apply to construction of in-stream works. Construction of in-stream settling facilities or to use a stream channel as a conduit is conditional and may not be permitted.

To determine how to proceed, please answer the following questions regarding a work, undertaking or activity in or around Moderate–Low habitat suitability watercourses.

Do you propose to undertake placer mining activities in, or within, 30 m of a watercourse? Activities may include discharging effluent, constructing stream crossings, clearing riparian vegetation, constructing channel diversions, or withdrawing water.

NO: No further review pursuant to the *Fisheries Act* is required.

YES: Proceed to Step A, Project Information.

A. Project Information

The first step in compiling a project proposal that involves activities proposed to occur in or around fish habitat areas is the completion of the Project Location Worksheet (Appendix A).

Note: The Project Location Worksheet (Appendix A) is required for all applications.

A1. On the Project Location Worksheet enter the stream name, the watershed name (as per Yukon Placer Fish Habitat Suitability Maps), identify the watershed sensitivity and habitat suitability classification for the reaches you proposed to work in, if any reaches are designated as "previous/prior development", a short description of the location, the proposed duration of activities and a copy of a map of the specific location of the site.

Does the Previous Development designation apply to your project?

NO: Proceed to the next question.
YES: See below.

Historical Development, Current Development or Extensive Development

If your project falls within a "Historical Development", "Current Development" or "Extensive Development" zone, the requirements for settling pond discharge, riparian zones, seasonal or temporary diversions, watercourse crossings, water acquisition and in-stream works that normally apply to Low habitat suitability watercourses will apply to your operation. Please note that permanent diversion channels and all reclamation work must conform to the requirements for Moderate–Low habitat suitability watercourses.

A2. Based on the previous development type, please select the appropriate Operation and Restoration standard on the Project Location Worksheet.

Once the sections noted above are complete on the Project Location Worksheet, proceed to the next question.

Do you propose to discharge effluent from your mine site?

NO: Proceed to Step C, Riparian Zones.
YES: Proceed to Step B, Settling Pond Discharge.

B. Settling Pond Discharge (effluent concentration)

Point source sediment discharges from gold recovery processes are typically managed through the use of settling facilities. The action level approach is a key element of the risk-based approach to sediment management for Yukon placer mining. For more information on the action level approach or settling pond design, operation, recirculation systems, and settling pond reclamation refer to the Guidebook of Mitigation Measures for Placer Mining in the Yukon (herein referred to as the Guidebook).

Water quality objectives and sediment discharge standards for settling ponds in Moderate–Low habitats are specified in the Watershed Authorizations for the specific watershed you propose to work in. Please ensure to verify your specific discharge standard in the respective watershed you plan to work in (specifically if any exemptions exist) prior to proceeding with your application.

B1. Record the Design Target, Action Level and Compliance Level on the Project Location Worksheet (Appendix A).

Once the effluent discharge standards are recorded on the Project Location Worksheet proceed to the next question.

Do you propose to construct works other than diversion channels within the Riparian Zone (see Step C for the definition of the Riparian Zone) – this could include stripping, construction of reservoirs, construction of settling ponds, etc.?

NO: Proceed to Step D, Diversion Channels
YES: Proceed to Step C, Riparian Zone

C. Riparian Zones

The Riparian Zone is defined as the portion of the stream bank (either vegetated or not) immediately adjacent to the stream channel.

The designated Riparian Zone in Moderate–Low habitat suitability watercourses is **5 metres**, measured from the ordinary high water mark of the watercourse and following the pattern/morphology of the channel.

The Riparian Zone designation applies to original (un-modified) channels, previously reclaimed channels and Permanent Diversion Channels.

Note: The Riparian Zone provisions set out below are NOT required for Seasonal or Temporary Diversion Channels.

Activities proposed within the Riparian Zone must comply with the surface vegetation clearing and bank modification provisions outlined below. The only other activity permitted within the Riparian Zone is the clearing of surface vegetation within a corridor to provide access to the stream (typically for water acquisition purposes). The maximum width of the corridor is to be no more than **7 metres**. Riparian Zones must be staked out by the operator prior to development.

Do you propose clearing of surface vegetation or subsurface works in the Riparian Zone?

NO: Proceed to Step D, Diversion Channels.
YES: Proceed to next question.

Do you propose to construct a new stream crossing (Ford)?

NO: Proceed to next question.
YES: Review Step E, Watercourse Crossings, prior to proceeding to next question.

Do you propose to clear surface vegetation only?

NO: The proposal includes both clearing of surface vegetation and subsurface works, proceed to Step C1, Surface Vegetation Clearing, followed by C2, Bank Modification.
YES: Proceed to Step C1, Surface Vegetation Clearing.

C1. Surface Vegetation Clearing

If vegetation clearing is proposed to occur within the Riparian Zone, fill out the appropriate sections of the Riparian Zone / Bank Modification Worksheet (Appendix B).

Under Vegetation Clearing record the following:

- Record the Habitat Suitability Type where vegetation clearing in the Riparian Zone is proposed.
- Record the Designated Riparian Zone (see the beginning of this section).
- Record the Proposed Duration of Vegetation Clearing prior to reclamation (cannot exceed restriction in table below).
- Record the Total Length of Proposed Vegetation Clearing in the Riparian Zone (cannot exceed restriction in table below).
- Record the Width of Proposed Vegetation Clearing in the Riparian Zone.
- From the table below record the Minimum Vegetation Setback from Stream.
- Record the width of the Proposed Vegetation Setback from Stream (cannot be less than the minimum setback distance).
- Record the Required Reclamation Works for Vegetation (see table below).
- In space provided on Appendix B, draw a diagram of the proposed location where vegetation clearing in the Riparian Zone is planned (include north arrow, flow direction and use symbols identified on worksheet to compose your diagram).

Conditions and reclamation required when proposing surface Vegetation Clearing in Riparian Zones in Moderate-Low habitat suitability watercourses.

Conditions and Reclamation Required When Proposing Surface Vegetation Clearing in Riparian Zones in Moderate–Low Habitat Suitability Watercourses

Design Component (Vegetation Clearing)	Requirement
Minimum Vegetated Setback from Stream	1.0 metre
Maximum Length of Clearing	300 metres
Minimum Space Between Cleared Areas	100 metres
Maximum Duration Prior to Reclamation	5 years
Reclamation Requirement (surface)	Full topsoil coverage
Reclamation Requirement (vegetation)	30% live staking

If proposing bank modification activities, proceed to step C2.

C2. Bank Modification

Bank Modification includes any subsurface works proposed in the Riparian Zone.

If bank modification is proposed to occur within the Riparian Zone, fill out the appropriate sections of the Riparian Zone / Bank Modification Worksheet (Appendix B).

Note: If your proposal includes bank modification related to the construction of a Ford, see step E for design conditions and requirements prior to proceeding.

Under Bank Modification record the following:

- Record the Habitat Suitability Type where bank modification in the Riparian Zone is proposed.
- Record the Designated Riparian Zone (see the beginning of this section).
- Record the Proposed Duration of Bank Modification prior to reclamation (cannot exceed restriction in table below).
- Record the Total Length of Proposed Bank Modification in the Riparian Zone (cannot exceed restriction in the table below).
- Record the Width of Proposed Bank Modification.
- From the table below record the Minimum Setback Distance from Stream.
- Record the width of Proposed Setback Distance from Stream (cannot be less than the minimum setback distance).
- Record the Required Reclamation Works for Bank Modification (see table below).
- In space provided on Appendix B, draw a diagram of the proposed location where bank modification is planned (use symbols identified on worksheet to compose your diagram. Draw the location of any new Fords proposed (see step E for restrictions)

Conditions and Reclamation Required When Proposing Bank Modification in Riparian Zones in Moderate–Low Habitat Suitability Watercourses

Design Component (Bank Modification)	Requirement
Minimum Bank Setback From Stream	3.0 metres
Maximum Length of Excavation	100 metres
Minimum Space Between Bank Modification Areas	300 metres
Maximum Duration Prior to Reclamation	5 years
Reclamation Requirement (grading)	To pre-excavation grade
Reclamation Requirement (surface)	Full topsoil coverage
Reclamation Requirement (vegetation)	30% live staking

Note: The "Minimum Bank Setback From Stream" provision identified above does NOT apply to the construction of watercourse crossings (Fords). If your proposal includes the construction of a Ford, please see step E.

Once the Riparian Zone / Bank Modification Worksheet is completed, proceed to the next question.

Do you propose a Seasonal, Temporary or Permanent relocation of a channel?

NO: Proceed to step E, Watercourse Crossings.
YES: Proceed to step D, Diversion Channels.

D. Diversion Channels

Design and construction of a diversion channel is required if the proposal includes Seasonal, Temporary or Permanent relocation of a watercourse or channel. It is the responsibility of the applicant to ensure that when transferring water into a diversion channel, it is completed in such a manner as to avoid stranding of fish in the dewatered channel. If it is likely that stranding of fish will occur in a dewatered channel, the applicant should retain a qualified professional to conduct a fish salvage prior to dewatering the channel.

Provided the diversion channel design proposal meets the conditions identified in the following sections, the diversion channel may be constructed pursuant to the respective Watershed Authorization. Specific criteria related to channel design and restoration requirements are described in the following sections while general information regarding design, construction and reclamation of diversion channels is provided in the Guidebook.

In order for a diversion channel to meet the requirements of the Watershed Authorization, you must ensure that your proposed channel design achieves a total risk score of less than or equal to the maximum risk score threshold identified on the following Risk Scoring Tables. If your design exceeds this score you may wish to redesign your proposed channel in order to meet the maximum risk score, thus meeting the requirements of the Watershed Authorization. If you are unable to meet the maximum risk score, see “If your project does not comply with the requirements” section at the beginning of this document.

D1. Original Channel and Site Parameters Worksheet

On the Original Channel and Site Parameters Worksheet (Appendix C), record the information for the original channel (pre-diversion conditions). Refer to the Guidebook reference sections identified on the worksheet to assist you with the data collection and entry process.

Note: The above worksheet must be completed prior to proceeding with the following steps.

Do you propose a Seasonal relocation of a channel? (A Seasonal Channel is in place for a period of less than one year and is replaced before winter).

NO: Proceed to next question.
YES: Proceed to Step D2, Seasonal Diversion Channels and either Step D3, Temporary Diversion Channels or Step D4, Permanent Diversion Channels.

Do you propose a Temporary relocation of a channel? (A Temporary Channel is in place for a period of less than five years).

NO: Proceed to next question.
YES: Proceed to Step D3, Temporary Diversion Channels and Step D4, Permanent Diversion Channels.

Do you propose a Permanent relocation of a channel? (A Permanent Channel is in place for a period of five years or more).

NO: Proceed to next question.

YES: Proceed to Step D4, Permanent Diversion Channels.

D2. Seasonal Diversion Channels

Seasonal diversion channels are defined as a constructed channel that will convey stream flow for no more than one operating season. This diversion channel type may not be used to convey stream flow between late fall and the following spring of any given year. Refer to the channel design considerations in the Guidebook for more information on Seasonal Diversion Channels. You will need to complete and submit the Channel Design Flood Estimate Worksheet (Appendix D3) and the Channel Design Method Worksheet (Appendix E) for your Seasonal Diversion Channel to the YESAB and the YWB.

Note: Riparian Zone provisions do not apply to Seasonal Diversion Channels.

Flood design interval for Seasonal Diversion Channels in Moderate–Low habitat suitability is **1:1**.

Note: Stream flow in Seasonal Diversion Channels must be returned to a Temporary or Permanent Restoration Channel at the end of the mining season. Your application should include worksheets for construction of a Temporary or Permanent Restoration Channel (Steps D3 and D4).

D2a. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the flood design interval (line 1).

The following table is to be used to assess the total risk when designing a seasonal diversion channel. The channel design proposed must achieve a risk score of no higher than the maximum risk score identified.

Severity of Effects Assessment for Seasonal Diversion Channels

Design Component	Range	Risk Score
Channel Gradient	3.51% to 5.0%	3
	1.51% to 3.5%	2
	0 to 1.5%	1
Length of Diversion Channel	1000 metres to 2000 metres	2
	<1000 metres	1
Relative Length of Diversion Channel	Shorter than original	1
	Equal or Longer than original	0
Permafrost in Diversion Channel	Present	3
	Absent	0
Primary Material in Diversion Channel	Silt / Sand	2
	Gravel / Cobble / Bedrock	1
Location of Diversion Channel	Perched (valley wall)	4
	Confined (valley floor)	2
	Incised (valley floor)	1
MAXIMUM PERMITTED SCORE FOR SEASONAL DIVERSION CHANNELS		**11**

D2b. Calculate your total score and maximum permitted score on the Severity of Effects Assessment for Seasonal Diversion Channel Worksheet (Appendix D1), and record your total score on the Channel Design Flood Estimate Worksheet (Appendix D3).

D2c. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the information required and complete the calculations. Refer to the Guidebook reference sections identified on the worksheet to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Flood Estimate Worksheet with your submission to the YESAB and the YWB.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following steps.

D2d. Selecting a Channel Design Method

The selection of a channel design method for channel construction is dependent upon the site geography, channel conditions and channel type. The design method selected is used to define the diversion channel dimensions and drop structure requirements.

The Channel Design Method table provides a list of recommendations to guide the selection of a suitable channel design method.

Design Method	Parameter	Condition
Channel Replication	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	> 2%
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Limited to none
	Valley Type	Incised or entrenched
	Channel Stability	Stable (if original channel is diversion it must have been in place for >10 Years)
	Note: Optional when channel gradient is < 2%	
Floodplain Design	Channel Duration	Permanent
	Channel Gradient	< 2%
	Channel Material in Diversion	All
	Diversion Channel Length	At least 2/3 length of original channel
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Can be used in areas with no floodplain when relocation site has space to support floodplain	
Regime Channel	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	All
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Use when site data is insufficient to use other methods	

Select a Channel Design Method based on the criteria listed in the table above.

Note: Each diversion channel planned requires only one channel design method.

In the following steps you will need to use a specific worksheet for the Channel Design Method you have selected: Channel Replication Worksheet (Appendix E1); Floodplain Design Worksheet (Appendix E2); or Regime Channel Worksheet (Appendix E3). Do not proceed until you have selected a Channel Design Method.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections.

D2e. On the Channel Design Method Worksheet you have selected, enter the information required and complete the design calculations. Refer to the Guidebook reference sections identified on the worksheets to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Method Worksheet with your submission to the YESAB and the YWB.

Note: A plan for a Seasonal Diversion Channel must be accompanied by plans for a Temporary and / or Permanent Diversion Channel (See sections D3 and / or D4).

Once the Channel Design Method Worksheet is completed, proceed to Step D3, Temporary Diversion Channels or D4, Permanent Diversion Channels.

D3. Temporary Diversion Channels

Temporary diversion channels are defined as a constructed channel that will convey stream flow for a period of one to five years. Although not required, construction of fish habitat features may be incorporated in the channel design to reduce the overall risk score. To achieve this condition the channel must incorporate the required fish habitat features (based on channel configuration). Refer to the channel design considerations in the Guidebook for more information on temporary diversion channels.

You will need to complete and submit the Channel Design Flood Estimate Worksheet (Appendix D3) and the Channel Design Method Worksheet (Appendix E) for your Temporary Diversion Channel to the YESAB and the YWB.

Note: The Riparian Zone provisions do not apply to Temporary Diversion Channels.

Flood design interval for Temporary Diversion Channels in Moderate–Low habitat suitability is **1:5**.

Note: Temporary Diversion Channels can only be in place for 5 years and as such, your application should include worksheets for the construction of a Permanent Restoration Channel (Step D4).

D3a. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the flood design interval (line 1).

The following table is to be used when designing Temporary Diversion Channels. The channel design proposed must achieve a risk score of no higher than the maximum risk score identified to be in compliance with the respective Watershed Authorization.

Severity of Effects Assessment for Temporary Diversion Channels

Design Component	Range	Risk Score
Channel Gradient	3.51% to 5.0%	3
	1.51% to 3.5%	2
	0 to 1.5%	1
Length of Diversion Channel	2000 metres to 5000 metres	3
	500 metres to 2000 metres	2
	<500 metres	1
Relative Length of Diversion Channel	Shorter than original	1
	Equal or Longer than original	0
Permafrost in Diversion Channel	Present	2
	Absent	0
Primary Material in Diversion Channel	Silt / Sand	2
	Gravel / Cobble / Bedrock	1
Location of Diversion Channel	Perched (valley wall)	4
	Confined (valley floor)	2
	Incised (valley floor)	1
Fish Habitat Features (rock islands / boulder groupings only)	30% of total required for permanent channel	-1
MAXIMUM PERMITTED SCORE FOR TEMPORARY DIVERSION CHANNELS		**10**

D3b. Calculate your total score and maximum permitted score on the Severity of Effects Assessment for Temporary Diversion Channel Worksheet (Appendix D2), and record your total score on the Channel Design Flood Estimate Worksheet (Appendix D3).

D3c. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the information required and complete the calculations. Refer to the Guidebook reference sections identified on the worksheet to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Flood Estimate Worksheet with your submission to the YESAB or the YWB.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections.

D3d. Selecting a Channel Design Method

The selection of a channel design method for channel construction is dependent upon the site geography, channel conditions and channel type. The design method selected is used to define the diversion channel dimensions and drop structure requirements.

The Channel Design Method table provides a list of recommendations to guide the selection of a suitable channel design method.

Design Method	Parameter	Condition
Channel Replication	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	> 2%
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Limited to none
	Valley Type	Incised or entrenched
	Channel Stability	Stable (if original channel is diversion it must have been in place for >10 Years)
	Note: Optional when channel gradient is < 2%	
Floodplain Design	Channel Duration	Permanent
	Channel Gradient	< 2%
	Channel Material in Diversion	All
	Diversion Channel Length	At least 2/3 length of original channel
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Can be used in areas with no floodplain when relocation site has space to support floodplain	
Regime Channel	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	All
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Use when site data is insufficient to use other methods	

Select a Channel Design Method based on the criteria listed in the table above.

Note: Each diversion channel planned requires only one channel design method.

In the following steps you will need to use a specific worksheet for the Channel Design Method you have selected: Channel Replication Worksheet (Appendix E1); Floodplain Design Worksheet (Appendix E2); or Regime Channel Worksheet (Appendix E3). Do not proceed until you have selected a Channel Design Method.

D3e. Fish Habitat Features

If you have included fish habitat features in your proposed Temporary Diversion Channel you must select the appropriate spacing of features based on the Channel Type identified on the Original Channel and Site Parameters Worksheet. Refer to the fish habitat feature considerations in the Guidebook for more information. Use the following tables as a guide to fill out information requirements in the Fish Habitat Feature Worksheet (Appendix F).

FISH HABITAT RECLAMATION REQUIREMENTS FOR TEMPORARY DIVERSION CHANNELS

Pool-riffle / Dune-riffle and Plane-bed Channel Type

Select Fish Habitat Feature Based on Diversion Channel Width	**Spacing Requirements (place feature every X channel width)**
Rock Island (channel width < 5 metres)	18
Boulder Grouping (channel width > 5 metres)	16
Rip-rap	Based on channel design method

FISH HABITAT RECLAMATION REQUIREMENTS FOR TEMPORARY DIVERSION CHANNELS

Step-pool and Cascade Channel Type

Select Fish Habitat Feature Based on Diversion Channel Width	**Spacing Requirements (place feature every X channel width)**
Rock Island (channel width < 5 metres)	15
Boulder Grouping (channel width > 5 metres)	9
Rip-rap	Based on channel design method

D3f. Enter the required information on the Fish Habitat Feature Worksheet (Appendix F) to identify the type, spacing and relative location of the fish habitat features. Draw a diagram of the diversion channel (include north arrow, flow direction) (use symbols identified on worksheet to compose your diagram).

Note: If your Temporary Diversion Channel includes fish habitat features, and you propose to construct a crossing (new Ford) be sure to identify the location of the Ford on the Fish Habitat Features Worksheet (see step E2).

Proceed to following steps if:
- D4, constructing a Permanent Diversion Channel.
- E, proposing to construct a new stream crossing (Ford).
- F, proposing to acquire water.

D4. Permanent Diversion Channel

Permanent diversion channels are defined as a constructed channel that will convey stream flow for a period of over five years. All permanent diversion channels must include provisions for construction of fish habitat features. Refer to the channel design considerations in the Guidebook for more information on permanent diversion channels. You will need to complete and submit the Channel Design Flood Estimate Worksheet (Appendix D3), the Channel Design Method Worksheet (Appendix E) and the Fish Habitat Features Worksheet (Appendix F) for your Permanent Diversion Channel to the YESAB and the YWB.

Flood design interval for Permanent Diversion Channels in Moderate–Low habitat suitability is **1:10**.

D4a. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the flood design interval (line 1).

D4b. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the information required and complete the calculations. Refer to the Guidebook reference sections identified on the worksheet to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Flood Estimate Worksheet with your submission to the YESAB and the YWB.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following steps.

D4c. Selecting a Channel Design Method

The selection of a channel design method for channel construction is dependent upon the site geography, channel conditions and channel type. The design method selected is used to define the diversion channel dimensions and drop structure requirements.

The Channel Design Method table provides a list of recommendations to guide the selection of a suitable channel design method.

Design Method	Parameter	Condition
Channel Replication	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	> 2%
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Limited to none
	Valley Type	Incised or entrenched
	Channel Stability	Stable (if original channel is diversion it must have been in place for >10 Years)
	Note: Optional when channel gradient is < 2%	
Floodplain Design	Channel Duration	Permanent
	Channel Gradient	< 2%
	Channel Material in Diversion	All
	Diversion Channel Length	At least 2/3 length of original channel
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Can be used in areas with no floodplain when relocation site has space to support floodplain	
Regime Channel	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	All
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Use when site data is insufficient to use other methods	

Select a Channel Design Method based on the criteria listed in the table above.

Note: Each diversion channel planned requires only one channel design method.

In the following steps you will need to use a specific worksheet for the Channel Design Method you have selected: Channel Replication Worksheet (Appendix E1); Floodplain Design Worksheet (Appendix E2); or Regime Channel Worksheet (Appendix E3). Do not proceed until you have selected a Channel Design Method.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections.

D4d. On the Channel Design Method Worksheet you have selected, enter the information required and complete the design calculations. Refer to the Guidebook reference sections identified on the worksheets to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Method Worksheet with your submission to the YESAB and the YWB.

The following tables identify design restrictions and fish habitat reclamation requirements for Permanent Diversion Channels which must be incorporated to be in compliance with the respective Watershed Authorization.

Design Restrictions for Permanent Diversion Channels

Design Component (Permanent Diversion)	Criteria
Overall Length of Diversion Channel	< 5000 metres
Conveyance (flood design) Capacity	1:10
Channel Design	As per channel design worksheets
Fish Habitat Features	As per reclamation tables

Note: In the next step you will need to refer to the Original Channel and Site Parameters Worksheet (Appendix C) in order to select the appropriate category of the original channel type (Pool-riffle, Dune-riffle, Plane-bed, Step-pool or Cascade Channel). For more information on channel types, see the Guidebook.

CONSTRUCTION AND RECLAMATION REQUIREMENTS FOR PERMANENT DIVERSION CHANNELS

Pool-riffle / Dune-riffle and Plane-bed Channel Type

Fish Habitat Features	Spacing Requirements (multiply the number in this column by the width of the channel in metres)
Rock Island (channel width < 5 metres)	6
Boulder Grouping (channel width > 5 metres)	4
Anchored or Buried Trees	20
Top Soil Spreading	Continuous (both banks)
Willow Staking	Inside bank, alternating meander bends
Transplanting	At sharp bends
Rip-rap	Based on channel design method

CONSTRUCTION AND RECLAMATION REQUIREMENTS FOR PERMANENT DIVERSION CHANNELS

Step-pool and Cascade Channel Type	
Fish Habitat Features	**Spacing Requirements** (multiply the number in this column by the width of the channel in metres)
Rock Island (channel width < 5 metres)	5
Boulder Grouping (channel width > 5 metres)	3
Anchored or Buried Trees	14
Top Soil Spreading	Continuous (both banks)
Willow Staking	Inside bank, alternating meander bends
Transplanting	At sharp bends
Rip-rap	Based on channel design method

Note: Topsoil spreading is to occur for the full width of the Riparian Zone (5 metres), willow planting is to be completed to a width of 3 metres from the bank, willow staking / transplanting is not required for the floodplain design method.

D4e. Use the information above to complete the Fish Habitat Feature Worksheet (Appendix G) to identify the type, spacing and relative location of the fish habitat features. Draw a diagram of the diversion channel (include north arrow, flow direction and reclaimed Riparian Zone) (use symbols identified on worksheet to compose your diagram).

Note: If you propose to construct a crossing (new Ford) be sure to identify the location of the Ford on the Fish Habitat Feature Worksheet (see section E2).

Once the Fish Habitat Feature Worksheet is completed, proceed to the next question.

Do you propose to use an Existing Ford?

NO: Proceed to next question.
YES: Proceed to Step E, Watercourse Crossings, then E1, Use of Existing Ford.

Do you propose to construct a New Ford?

NO: Proceed to Step F, Water Acquisition.
YES: Proceed to Step E, Watercourse Crossings.

E. Watercourse Crossings (Fords)

Fording is defined as the crossing of creeks, streams and / or rivers at locations where a bridge, causeway or elevated embankment does not exist or is not utilized by a vehicle or equipment. Fording typically involves driving directly through a watercourse, across the banks and bed. In some instances, Fording locations (Fords) have been “improved” or constructed through watercourses by way of adding materials such as rocks or gravel, the modification of approaches, or the modification of the bed of a watercourse.

E1. Use of Existing Ford

Use of existing Fords is often the least preferred option for crossing watercourses however it is recognized that there are instances where it is the only viable option. Refer to the Guidebook for additional information on Fords. The following measures should be adhered to when utilizing existing Fords.

Note: Please identify if you intend to use Existing Fords on the Project Location Worksheet (Appendix A).

- Ensure water depth is sufficiently shallow to allow passage of vehicle / equipment.
- Plan your activities in advance to minimize the number of crossings required.
- Avoid crossing during extreme rain or flood events.
- Access approaches at 90° to the bank, when entering or exiting the Ford.
- Maintain speed at a very slow and steady pace throughout the crossing.
- Avoid rapid acceleration while on approaches or while in the water.

E2. Construction of New Fords

Construction of new Fords should be limited to locations or applications where deemed to be absolutely necessary. More permanent or high use locations should employ the construction and use of a bridge as the primary crossing structure where possible. For more information on construction of stream crossings refer to the Guidebook.

The location of new Fords must be identified when proposed for original channels, Temporary Channels (with fish habitat features), and Permanent Diversion Channels. The new Ford proposed must achieve the design, construction and reclamation requirements identified in the table below to be in compliance with the respective Watershed Authorization.

Design and Construction Restrictions and Reclamation Requirements for New Fords

Design Component (Construction of New Ford)	Requirement
Approach Angle	90° to bank
Maximum Width of Approach Zone Clearing (surface)	10 metres
Minimum Watercourse Distance Between Ford Sites OR Not to exceed more than	800 metres 3 Fords every 2000 metres
Site Selection (Watercourse)	Shallow water depth
Site Selection (Approach / Bank Composition)	Gravel / Cobble
Construction	Equipment to work from bank
Maximum Width of Bank Grading (subsurface)	10 metres
Approach Surface Ground Coverage	Gravel / Cobble
Construction Timing	Low water period
Reclamation	Full topsoil coverage

Note: The above design considerations are not required for Construction of Fords in Seasonal Diversion Channels.

E2a. If the construction of a new Ford is proposed for an original channel or previously restored channel, identify the location of the new Ford(s) on the Riparian Zone / Bank Modification Worksheet (see step C, Riparian Zones and Appendix B).

E2b. If the construction of a new Ford is proposed for a Temporary Diversion Channel (with fish habitat features) or a Permanent Diversion Channel, identify the location of the new Ford(s) on the Fish Habitat Feature Worksheet. (Appendix F).

Once the location and specification of the new Ford is identified on either the completed Riparian Zone / Bank Modification Worksheet or the Fish Habitat Feature Worksheet proceed to the next question.

Do you propose to withdraw water from a Moderate–Low habitat suitability watercourse?

NO: Proceed to Step G, In-stream Works.
YES: Proceed to Step F, Water Acquisition.

F. Water Acquisition

Acquisition of water is required for processing materials during placer mining. Effective water management is a key consideration at all placer mine sites. The following requirements must be achieved to meet compliance with the respective Watershed Authorization.

F1. Water Intake Screens

In order to meet the requirement of the *Fisheries Act*, all water intakes must be screened. A general summary of the screening requirements are provided in the Guidebook.

Note: The objective behind the installation of intake screens is to prevent the death of fish caused by the acquisition of water. If screens of the correct mesh size are deployed between a watercourse and the intake to a water reservoir or gravity feed ditch, it is not necessary to screen the pump intake that removes water from within these structures provided these structures do not already contain fish. In the case of total recirculation systems, the operator shall ensure that any areas where fish could enter the system have barriers to prevent the entry of fish.

Do you propose to carry out in-stream works within a watercourse? In-stream works may include small dugouts or wing dams to facilitate water acquisition, in-stream settling facilities, in-stream reservoirs, and use of a stream channel as a conduit to transport process water to out-of-stream settling ponds.

NO: Proceed to next question.
YES: Proceed to Step G, In-stream Works.

G. In-stream Works

In-stream works are defined as works that occur within the high water mark of a watercourse, but do not include diversion channels or Fords. Some in-stream works can lead to effects on fish and fish habitat such as erosion/scouring, sediment inputs, loss of habitat area, changes in channel morphology, blockages to fish passage, and reduced productivity.

Do you propose to carry out in-stream works within a watercourse? In-stream works may include small dugouts or wing dams to facilitate water acquisition, in-stream settling facilities, in-stream reservoirs, and use of a stream channel as a conduit to transport process water to out-of-stream settling ponds.

NO: Review complete – proceed with submission of all completed worksheets along with your project description to the YESAB and your application for water use license to the YWB.

YES: Proceed to Step G1, Severity of Effects Assessment.

G1. Severity of Effects Assessment and Risk Management Decisions for In-stream Works

Moderate–Low Habitat Suitability Watercourses

In-stream settling facilities and use of a stream channel as a conduit to transport process water to out-of-stream settling ponds may be authorized under the auspices of a Watershed Authorization in Moderate–Low habitat suitability watercourses under strictly specified conditions. In order to determine whether your site qualifies, complete the flowchart found in Section I below and record this information on the Worksheet for In-stream Settling Ponds and Use of Stream Channels as Conduit (Appendix H).

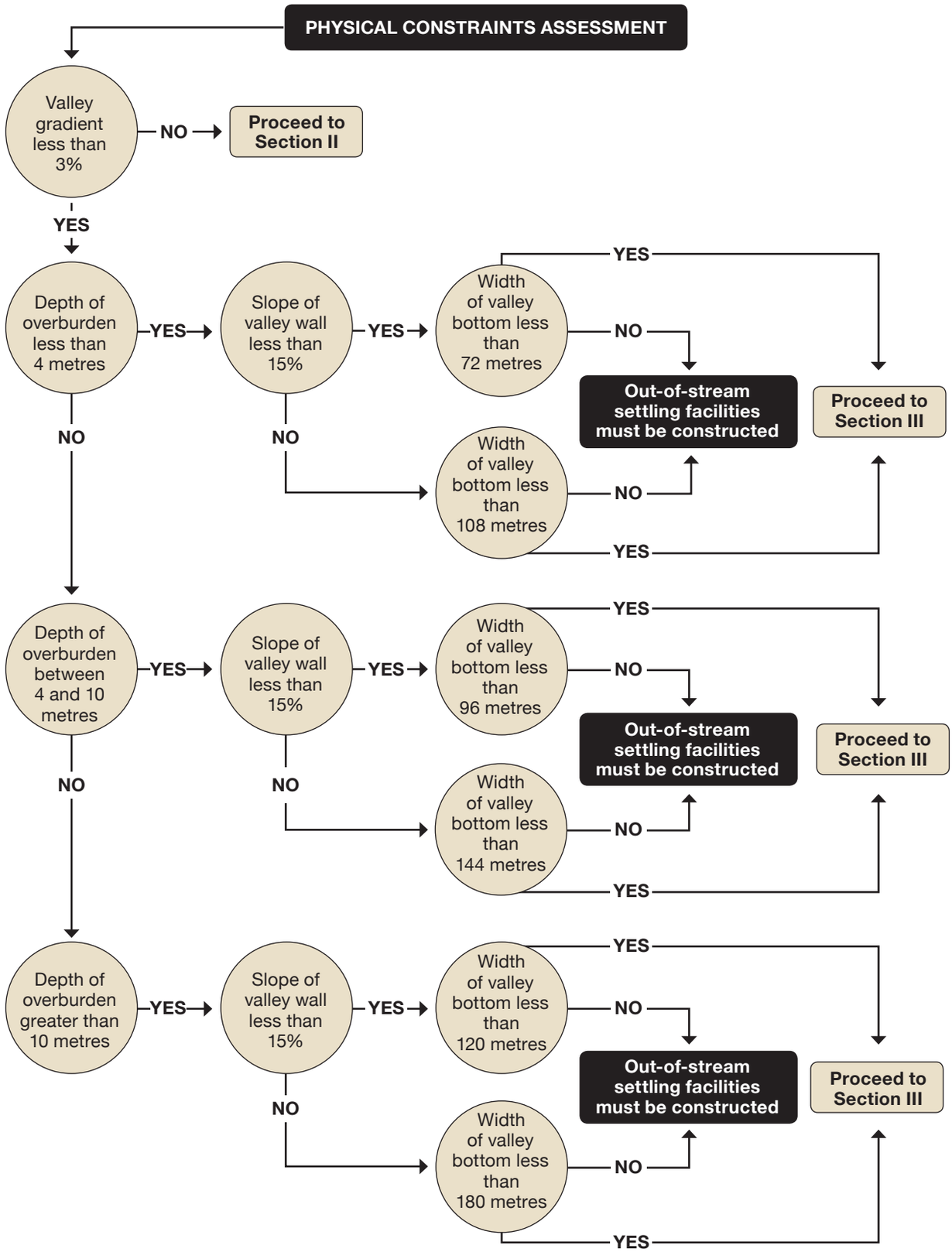
In-stream reservoirs constructed with cross-channel dams are not authorized under Watershed Authorizations in Moderate–Low habitat suitability watercourses, unless a previously authorized in-stream settling pond is used for this purpose prior to stream channel restoration. Operators may apply to Fisheries and Oceans Canada for a site-specific review of plans to construct in-stream reservoirs using cross-channel dams.

SECTION I

Use the following flowchart to evaluate whether your site is suitable for construction of in-stream settling facilities or the use of a stream channel as a conduit.

Note: Authorization to construct in-stream settling facilities or to use a stream channel as a conduit is conditional and these works may not be permitted. Depending upon the scale of operation or size of earth-moving equipment out-of-stream settling facilities may be required in proximity to working areas.

Flowchart for In-stream Settling Ponds and Use of Stream Channels as Conduit



SECTION II

The valley bottom you intend to mine is not ideal for the construction of settling ponds, due to its steep gradient. Use of the stream channel as a conduit for transporting process water to the nearest suitable site for out-of-stream settling ponds may be permitted.

Do you have the right to construct settling facilities on placer claims immediately below your working area where the valley gradient is less than or equal to 3%, and the habitat classification remains Moderate–Low or Low?

NO: Your project may not meet the conditions of a Watershed Authorization, see "If your project does not comply with the requirements" section at the beginning of this document.

YES: Use the flowchart in Section I to evaluate whether the site below your working area is suitable for construction of out-of-stream settling facilities.

SECTION III

The valley bottom you intend to mine cannot accommodate an out-of-stream settling facility, due to its narrow width. If you have the right to construct out-of stream settling facilities on placer claims immediately below your working area, and the habitat classification remains Moderate–Low or Low, use of the stream as a conduit for transporting process water to this downstream location may be permitted. If not, construction of in-stream settling ponds may be permitted. The following conditions apply to construction of these in-stream works:

- Construction and maintenance of a pre-settling pond is mandatory;
- If it is likely that stranding of fish will occur in a dewatered channel, the applicant should retain a qualified professional to conduct a fish salvage prior to dewatering the channel.;
- Only compactable material (fine gravel and sand) may be used as core material in dam construction, while coarse material should be used on the surfaces to prevent erosion;
- Material must be placed in shallow (< 0.3 metre) lifts and compacted when dams are constructed;
- Sluicing must be terminated if stream flows increase to bank-full width in response to rainfall events;
- Settling ponds must be mechanically cleaned and equipped with well–armoured spillways in order to maintain stability during spring freshet; or
- A stable bypass channel must be constructed to protect the settling pond cells from high flows during spring freshet; and
- Stream channel restoration must commence once these in-stream works are no longer required for current mining activities.

The following table is to be used to evaluate the risk of proposed in-stream works in Moderate–Low habitat suitability watercourses. The design elements of the proposed works must achieve a risk score of no higher than the maximum risk score identified to be in compliance with the respective Watershed Authorization.

Note: In-stream settling ponds must be constructed from compactable material that is placed and compacted in shallow lifts.

Design Component	Range	Risk Score
Channel Width Constriction	>30% channel constriction	3
	5% - 30% of the channel	2
	< 5%	1
Above and Below the Structure – Difference in Water Surface Level	>2.0 metres	3
	0.3 – 2.0 metres	2
	< 0.3 metres	1
Material Type	Fine (silt-sand)	N/A
	Compactable (fine gravel and sand)	2
	Metal/ riprap/ structure	1
Construction Method	Non-compaction/ dumped	3
	Moderately compacted/ placement	2
	Compacted shallow lift (or rip-rap, gabions, or boulders)	1
Amount of In-water Work	Completely in water	3
	Partially in water (more than ½)	2
	In dry	1
Structure Height	Above bank full	3
	Between bank full and channel bed	2
	Below channel bed	1
MAXIMUM PERMITTED SCORE FOR IN-STREAM WORKS		**14**

Calculate and record your total score and maximum permitted score on the Severity of Effects Assessment for In-stream Works Worksheet (Appendix G1), and record details of proposed in-stream works on the In-stream Works Worksheet (Appendix G2). Please ensure to include the completed In-stream Works Worksheets (Appendices G1 and G2) with your submission to the YESAB and the YWB.

Moderate–Low Habitat Suitability Watercourses (Includes Tributaries to Large Lakes)

Low Habitat Suitability Watercourses (Including Tributaries to Lake Trout Lakes)

Low Habitat Suitability Watercourses (Including Tributaries to Lake Trout Lakes)

Before You Begin

This workbook and associated worksheets are provided to assist with compiling information to support project proposals for submission to the Yukon Environmental and the Socio-economic Assessment Board (YESAB) and the Yukon Water Board (YWB). Once completed, the worksheets must be submitted for review as a component of both the YESAB and Yukon Water Board applications.

The guidance provided focuses on the requirements of the *Authorizations for Works or Undertakings affecting Fish Habitat for Specified Streams in the Yukon Territory* (Federal *Fisheries Act*) for watersheds in the Yukon (herein referred to as Watershed Authorizations). Please note that this workbook and associated worksheets may undergo revisions in the future, and users are encouraged to ensure that they use the current version.

In order to achieve compliance with the Watershed Authorizations, the placer mining proposal must meet the requirements outlined in this workbook for the watershed type and specific habitat suitability type at the location where the activities are to occur (see Yukon Placer Fish Habitat Suitability Maps).

In addition to this workbook and worksheets, the following documents provide the required information to support the development and submission of proposals for placer mining activities. All supporting documents are available online through the Yukon Placer Secretariat web page, www.yukonplacersecretariat.ca/howto_prepare_project_proposal.html or through the web addresses given for the specific documents.

1. ***Authorization for Works or Undertakings affecting Fish Habitat for Specified Streams in the Yukon Territory***
   www.yukonplacersecretariat.ca/placer_authorizations.html – Provides the legal authority, with respect to placer mining, to carry on a work, undertaking or activity that results in the permanent alteration and destruction of fish habitat. Also specifies sediment discharge standards for placer mine effluent and the sensitivity category of the watershed (i.e. Category A or B). Please note that the death of fish is not authorized.
2. **Yukon Placer Fish Habitat Suitability Maps**
   www.yukonplacersecretariat.ca/maps.html – Identifies the watershed sensitivity and habitat suitability of the watercourse where placer mining activities are proposed to occur.
3. **Guidebook of Mitigation Measures for Placer Mining in the Yukon**
   www.yukonplacersecretariat.ca/infocentre.html – Provides technical information related to best management practices, mitigation measures, and design considerations to achieve compliance with the Watershed Authorizations and to assist with proposal development.

Note: Complete and submit only the worksheets that are relevant to your operation.

Note: There are no Watershed Authorizations in place for the Liard and Alsek watersheds. Applications for review, forms and process to apply for a placer mine in the Liard or Alsek watershed can be obtained from the Yukon Placer Secretariat, contact information can be found online at, www.yukonplacersecretariat.ca/index.html.

For assistance completing the worksheets please contact the Yukon Placer Secretariat (contact information is available at, www.yukonplacersecretariat.ca/index.html) or the Yukon Government Client Services & Inspections office in your mining district (contact information is available at, www.emr.gov.yk.ca/cmi/cmi_district_offices.html).

If Your Project Does Not Comply With The Requirements

Placer mine operators are encouraged to design proposals that comply with the requirements described in this workbook. However, if the proposal is not able to achieve these requirements and the operator would like to proceed with the regulatory review process, an application for site-specific review should be submitted to Fisheries and Oceans Canada (DFO) for consideration **prior to the submission of the proposal to the YESAB and the YWB**.

When a proposal is submitted for site-specific review, DFO will review the information to determine whether a site-specific authorization is required. In some cases, DFO may recommend measures to avoid or mitigate the harm to fish and fish habitat to allow the application to proceed under the Watershed Authorization.

Applications for site-specific review, forms and process to apply can be obtained from the Yukon Placer Secretariat, contact information can be found online at, www.yukonplacersecretariat.ca/index.html. Should it be determined that a site-specific authorization is required, a more detailed application, including a fish habitat offsetting plan and a letter of credit, will have to be submitted to DFO. Information on the site-specific authorization application process, offsetting plans, and letters of credit can be found on DFO's Projects Near Water website, www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/application-eng.html.

Fish Habitat Design, Operation and Reclamation Requirements for Low Habitat Suitability Watercourses

Low habitat suitability watercourses (formally Freshwater Fisheries Production Zones) are areas within watercourses that are utilized by a variety of fish species and are typically relatively abundant within a watershed. As a function of gradient and distance from Chinook salmon production areas these streams are likely not utilized by rearing juvenile Chinook salmon, but may be highly suitable for and used by non-anadromous resident fish species. The requirements and operational restrictions defined for Low habitat suitability watercourses will also apply to watercourses designated as Tributaries to Lake Trout Lakes.

When a Previous Development Designation results in a watercourse, including tributaries to Lake Trout Lakes, receiving a Low habitat suitability classification the requirements for settling pond discharge, riparian zones, seasonal or temporary diversions, watercourse crossings, water acquisition and in-stream works defined for Low habitat suitability watercourses will apply. Please note that permanent diversion channels and all reclamation work must conform to the requirements that normally apply to the original habitat suitability classification, i.e. before the Previous Development Designation was applied.

Please use the following instructions and information to complete the worksheets relevant to your proposal (located in Appendix A to H). The completed worksheets will be submitted as part of your project description to the Yukon Environmental and Socio Economic Assessment Board (YESAB) and your application to the Yukon Water Board (YWB).

SUMMARY OF GENERAL RESTRICTIONS ON WORKS OR UNDERTAKINGS IN LOW HABITAT SUITABILITY WATERCOURSES

Activity Type / Operation	Restriction in Low Habitat Suitability Watercourses
Riparian Zone	Designated Riparian Zone is 1 metre from the high water mark. Conditions and reclamation requirements apply to clearing surface vegetation and sub-surface works within the Designated Riparian Zone.
Fords	Construction of new Fords subject to design and construction restrictions and reclamation requirements. Mitigative measures should be applied to use of existing Fords.
Diversion Channels	Construction of diversion channels subject to design restrictions and construction and reclamation requirements.
In-stream Works	Conditions apply to construction of in-stream works. Construction of in-stream settling facilities or to use a stream channel as a conduit is conditional and may not be permitted.

To determine how to proceed, please answer the following questions regarding a work, undertaking or activity in or around Low habitat suitability watercourses.

Do you propose to undertake placer mining activities in, or within, 30 m of a watercourse? Activities may include discharging effluent, constructing stream

crossings, clearing riparian vegetation, constructing channel diversions, or withdrawing water.

NO: No further review pursuant to the *Fisheries Act* is required.
YES: Proceed to Step A, Project Information.

A. Project Information

The first step in compiling a project proposal that involves activities proposed to occur in or around fish habitat areas is the completion of the Project Location Worksheet (Appendix A).

Note: The Project Location Worksheet (Appendix A) is required for all applications.

A1. On the Project Location Worksheet enter the stream name, the watershed name (as per Yukon Placer Fish Habitat Suitability Maps), identify the watershed sensitivity and habitat suitability classification for the reaches you proposed to work in, if any reaches are designated as "previous/prior development", a short description of the location, the proposed duration of activities and a copy of a map of the specific location of the site.

Once the sections noted above are complete on the Project Location Worksheet, proceed to the next question.

Do you propose to discharge effluent from your mine site?

NO: Proceed to Step C, Riparian Zones.
YES: Proceed to Step B, Settling Pond Discharge.

B. Settling Pond Discharge (effluent concentration)

Point source sediment discharges from gold recovery processes are typically managed through the use of settling facilities. The action level approach is a key element of the risk-based approach to sediment management for Yukon placer mining. For more information on the action level approach or settling pond design, operation, recirculation systems, and settling pond reclamation refer to the Guidebook of Mitigation Measures for Placer Mining in the Yukon (herein referred to as the Guidebook).

Water quality objectives and sediment discharge standards for settling ponds in Low habitat suitability watercourses are specified in the Watershed Authorizations for the specific watershed you propose to work in. Please ensure to verify your specific discharge standard in the respective Low habitat suitability watercourses you plan to work in (specifically if any exemptions exist) prior to proceeding with your application.

B1. Record the Design Target, Action Level and Compliance Level on the Project Location Worksheet (Appendix A).

Once the effluent discharge standards are recorded on the Project Location Worksheet proceed to the next question.

Do you propose to construct works other than diversion channels within the Riparian Zone (see Step C for the definition of the Riparian Zone) – this could include stripping, construction of reservoirs, construction of settling ponds, etc.?

NO: Proceed to Step D, Diversion Channels
YES: Proceed to Step C, Riparian Zone

C. Riparian Zones

The Riparian Zone is defined as the portion of the stream bank (either vegetated or not) immediately adjacent to the stream channel.

The designated Riparian Zone in Low habitat suitability watercourses is **1 meter**, measured from the ordinary high water mark on each bank of the watercourse and following the pattern/morphology of the channel.

The Riparian Zone designation applies to original (un-modified) channels, previously reclaimed channels and Permanent Diversion Channels.

Note: The Riparian Zone provisions set out below are NOT required for Seasonal or Temporary Diversion Channels.

Activities proposed within the Riparian Zone must comply with the surface vegetation clearing and bank modification provisions outlined below. The only other activity permitted within the Riparian Zone is the clearing of surface vegetation within a corridor to provide access to the stream (typically for water acquisition purposes). The maximum width of the corridor is to be no more than **7 metres**. Riparian Zones must be staked out by the operator prior to development.

Do you propose clearing of surface vegetation or subsurface works in the Riparian Zone? (this could include stripping, construction of reservoirs, construction of settling ponds, etc.)

NO: Proceed to Step D, Diversion Channels.
YES: Proceed to next question.

Do you propose to construct a new stream crossing (Ford)?

NO: Proceed to next question.
YES: Review Step E, Watercourse Crossings, prior to proceeding to next question.

Do you propose to clear surface vegetation only?

NO: The proposal includes both clearing of surface vegetation and subsurface works, proceed to Step C1, Surface Vegetation Clearing, followed by C2, Bank Modification.
YES: Proceed to Step C1, Surface Vegetation Clearing.

C1. Surface Vegetation Clearing

If vegetation clearing is proposed to occur within the Riparian Zone, fill out the appropriate sections of the Riparian Zone / Bank Modification Worksheet (Appendix B).

Under Vegetation Clearing record the following:

- Record the Habitat Suitability Type where vegetation clearing in the Riparian Zone is proposed.
- Record the Designated Riparian Zone (see the beginning of this section).
- Record the Proposed Duration of Vegetation Clearing prior to reclamation (cannot exceed restriction in table on the following page).

- Record the Total Length of Proposed Vegetation Clearing in the Riparian Zone (cannot exceed restriction in table below).
- Record the Width of Proposed Vegetation Clearing in the Riparian Zone.
- From the table below record the Minimum Vegetation Setback from Stream.
- Record the width of the Proposed Vegetation Setback from Stream (cannot be less than the minimum setback distance).
- Record the Required Reclamation Works for Vegetation (see table below).
- In space provided on Appendix B, draw a diagram of the proposed location where vegetation clearing in the Riparian Zone is planned (include north arrow, flow direction and use symbols identified on worksheet to compose your diagram).

Conditions and Reclamation Required When Proposing Surface Vegetation Clearing in Riparian Zones in Low Habitat Suitability Watercourses

Design Component (Vegetation Clearing)	Requirement
Minimum Vegetated Setback from Stream	To stream bank
Maximum Length of Clearing	400 metres
Minimum Space Between Cleared Areas	100 metres
Maximum Duration Prior to Reclamation	5 years
Reclamation Requirement (surface)	Full topsoil coverage

If proposing bank modification activities, proceed to step C2.

C2. Bank Modification

Bank Modification includes any subsurface works proposed in the Riparian Zone.

If bank modification is proposed to occur within the Riparian Zone, fill out the appropriate sections of the Riparian Zone / Bank Modification Worksheet (Appendix B).

Note: If your proposal includes bank modification related to the construction of a Ford, see step E for design conditions and requirements prior to proceeding.

Under Bank Modification record the following:

- Record the Habitat Suitability Type where bank modification in the Riparian Zone is proposed.
- Record the Designated Riparian Zone (see the beginning of this section).
- Record the Proposed Duration of Bank Modification prior to reclamation (cannot exceed restriction in table on the following page).
- Record the Total Length of Proposed Bank Modification in the Riparian Zone (cannot exceed restriction in the table on the following page).

- Record the Width of Proposed Bank Modification.
- From the table below record the Minimum Setback Distance from Stream.
- Record the width of Proposed Setback Distance from Stream (cannot be less than the minimum setback distance).
- Record the Required Reclamation Works for Bank Modification (see table below).
- In space provided on Appendix B, draw a diagram of the proposed location where bank modification is planned (use symbols identified on worksheet to compose your diagram. Draw the location of any new Fords proposed (see step E for restrictions)

Conditions and Reclamation Required When Proposing Bank Modification in Riparian Zones in Low Habitat Suitability Watercourses

Design Component (Bank Modification)	Requirement
Minimum Bank Setback From Stream	To stream bank
Maximum Length of Excavation	300 metres
Minimum Space Between Bank Modification Areas	300 metres
Maximum Duration Prior to Reclamation	5 years
Reclamation Requirement (grading)	To pre-excavation grade
Reclamation Requirement (surface)	Full topsoil coverage
Reclamation Requirement (vegetation)	10% live staking

Note: The "Minimum Bank Setback From Stream" provision identified above does NOT apply to the construction of watercourse crossings (Fords). If your proposal includes the construction of a Ford, please see step E.

Once the Riparian Zone / Bank Modification Worksheet is completed, proceed to the next question.

Do you propose a Seasonal, Temporary or Permanent relocation of a channel?

NO: Proceed to step E, Watercourse Crossings.
YES: Proceed to step D, Diversion Channels.

D. Diversion Channels

Design and construction of a diversion channel is required if the proposal includes Seasonal, Temporary or Permanent relocation of a watercourse or channel. It is the responsibility of the applicant to ensure that when transferring water into a diversion channel, it is completed in such a manner as to avoid stranding of fish in the dewatered channel. If it is likely that stranding of fish will occur in a dewatered channel, the applicant should retain a qualified professional to conduct a fish salvage prior to dewatering the channel.

Provided the diversion channel design proposal meets the conditions identified in the following sections, the diversion channel may be constructed pursuant to the respective Watershed Authorization. Specific criteria related to channel design and restoration requirements are described in the following sections while general information regarding design, construction and reclamation of diversion channels is provided in the Guidebook.

In order for a diversion channel to meet the requirements of the Watershed Authorization, you must ensure that your proposed channel design achieves a total risk score of less than or equal to the maximum risk score threshold identified on the following Risk Scoring Tables. If your design exceeds this score you may wish to redesign your proposed channel in order to meet the maximum risk score, thus meeting the requirements of the Watershed Authorization. If you are unable to meet the maximum risk score, see "If your project does not comply with the requirements" section at the beginning of this document.

D1. Original Channel and Site Parameters Worksheet

On the Original Channel and Site Parameters Worksheet (Appendix C), record the information for the original channel (pre-diversion conditions). Refer to the Guidebook reference sections identified on the worksheet to assist you with the data collection and entry process.

Note: The above worksheet must be completed prior to proceeding with the following steps.

Do you propose a Seasonal relocation of a channel? (A Seasonal Channel is in place for a period of less than one year and is replaced before winter).

NO: Proceed to next question.

YES: Proceed to Step D2, Seasonal Diversion Channels and either Step D3, Temporary Diversion Channels or Step D4, Permanent Diversion Channels.

Do you propose a Temporary relocation of a channel? (A Temporary Channel is in place for a period of less than five years).

NO: Proceed to next question.

YES: Proceed to Step D3, Temporary Diversion Channels and Step D4, Permanent Diversion Channels.

Do you propose a Permanent relocation of a channel? (A Permanent Channel is in place for a period of five years or more).

NO: Proceed to next question.

YES: Proceed to Step D4, Permanent Diversion Channels.

D2. Seasonal Diversion Channels

Seasonal diversion channels are defined as a constructed channel that will convey stream flow for no more than one operating season. This diversion channel type may not be used to convey stream flow between late fall and the following spring of any given year. Refer to the channel design considerations in the Guidebook for more information on seasonal diversion channels. You will need to complete and submit the Channel Design Flood Estimate Worksheet (Appendix D3) and the Channel Design Method Worksheet (Appendix E) for your Seasonal Diversion Channel to the YESAB and the YWB.

Note: Riparian Zone provisions do not apply to Seasonal Diversion Channels.

Flood design interval for Seasonal Diversion Channels in Low habitat suitability is **1:1**.

Note: Stream flow in Seasonal Diversion Channels must be returned to a Temporary Diversion Channel or a Permanent Restoration Channel at the end of the mining season. Your application should include worksheets for construction of a Temporary or Permanent Restoration Channel (Step D3 and D4).

D2a. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the flood design interval (line 1).

The following table is to be used to asses the total risk when designing a seasonal diversion channel. The channel design proposed must achieve a risk score of no higher than the maximum risk score identified.

Severity of Effects Assessment for Seasonal Diversion Channels

Design Component	Range	Risk Score
Channel Gradient	3.51% to 5.0%	3
	1.51% to 3.5%	2
	0 to 1.5%	1
Length of Diversion Channel	1000 metres to 2000 metres	2
	<1000 metres	1
Relative Length of Diversion Channel	Shorter than original	1
	Equal or Longer than original	0
Permafrost in Diversion Channel	Present	3
	Absent	0
Primary Material in Diversion Channel	Silt / Sand	2
	Gravel / Cobble / Bedrock	1
Location of Diversion Channel	Perched (valley wall)	4
	Confined (valley floor)	2
	Incised (valley floor)	1
MAXIMUM PERMITTED SCORE FOR SEASONAL DIVERSION CHANNELS		**13**

D2b. Calculate your total score and maximum permitted score on the Severity of Effects Assessment for Seasonal Diversion Channel Worksheet (Appendix D1), and record your total score on the Channel Design Flood Estimate Worksheet (Appendix D3).

D2c. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the information required and complete the calculations. Refer to the Guidebook reference sections identified on the worksheet to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Flood Estimate Worksheet with your submission to the YESAB and the YWB.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following steps.

D2d. Selecting a Channel Design Method

The selection of a channel design method for channel construction is dependent upon the site geography, channel conditions and channel type. The design method selected is used to define the diversion channel dimensions and drop structure requirements.

The Channel Design Method table provides a list of recommendations to guide the selection of a suitable channel design method.

Design Method	Parameter	Condition
Channel Replication	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	> 2%
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Limited to none
	Valley Type	Incised or entrenched
	Channel Stability	Stable (if original channel is diversion it must have been in place for >10 Years)
	Note: Optional when channel gradient is < 2%	
Floodplain Design	Channel Duration	Permanent
	Channel Gradient	< 2%
	Channel Material in Diversion	All
	Diversion Channel Length	At least 2/3 length of original channel
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Can be used in areas with no floodplain when relocation site has space to support floodplain	
Regime Channel	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	All
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Use when site data is insufficient to use other methods	

Select a Channel Design Method based on the criteria listed in the table above.

Note: Each diversion channel planned requires only one channel design method.

In the following steps you will need to use a specific worksheet for the Channel Design Method you have selected: Channel Replication Worksheet (Appendix E1); Floodplain Design Worksheet (Appendix E2); or Regime Channel Worksheet (Appendix E3). Do not proceed until you have selected a Channel Design Method.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections.

D2e. On the Channel Design Method Worksheet you have selected, enter the information required and complete the design calculations. Refer to the Guidebook reference sections identified on the worksheets to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Method Worksheet with your submission to the YESAB and the YWB.

Note: A plan for a Seasonal Diversion Channel must be accompanied by plans for a Temporary and / or Permanent Diversion Channel (See sections D3 and / or D4).

Once the Channel Design Method Worksheet is completed, proceed to Step D3, Temporary Diversion Channels or D4, Permanent Diversion Channels.

D3. Temporary Diversion Channels

Temporary diversion channels are defined as a constructed channel that will convey stream flow for a period of one to five years. Although not required, construction of fish habitat features may be incorporated in the channel design to reduce the overall risk score. To achieve this condition the channel must incorporate the required fish habitat features (based on channel configuration). Refer to the channel design considerations in the Guidebook for more information on temporary diversion channels. You will need to complete and submit the Channel Design Flood Estimate Worksheet (Appendix D3) and the Channel Design Method Worksheet (Appendix E) for your Temporary Diversion Channel to the YESAB and the YWB.

Note: The Riparian Zone provisions do not apply to Temporary Diversion Channels.

Flood design interval for Temporary Diversion Channels in Low habitat suitability is **1:2**.

Note: Temporary Diversion Channels can only be in place for 5 years and as such, your application should include worksheets for the construction of a Permanent Restoration Channel (Step D4).

D3a. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the flood design interval (line 1).

The following table is to be used when designing Temporary Diversion Channels. The channel design proposed must achieve a risk score of no higher than the maximum risk score identified to be in compliance with the respective Watershed Authorization.

Severity of Effects Assessment for Temporary Diversion Channels

Design Component	Range	Risk Score
Channel Gradient	3.51% to 5.0%	3
	1.51% to 3.5%	2
	0 to 1.5%	1
Length of Diversion Channel	2000 metres to 5000 metres	3
	500 metres to 2000 metres	2
	<500 metres	1
Relative Length of Diversion Channel	Shorter than original	1
	Equal or Longer than original	0
Permafrost in Diversion Channel	Present	2
	Absent	0
Primary Material in Diversion Channel	Silt / Sand	2
	Gravel / Cobble / Bedrock	1
Location of Diversion Channel	Perched (valley wall)	4
	Confined (valley floor)	2
	Incised (valley floor)	1
Fish Habitat Features (rock islands / boulder groupings only)	30% of total required for permanent channel	-1
MAXIMUM PERMITTED SCORE FOR TEMPORARY DIVERSION CHANNELS		**12**

D3b. Calculate your total score and maximum permitted score on the Severity of Effects Assessment for Temporary Diversion Channel Worksheet (Appendix D2), and record your total score on the Channel Design Flood Estimate Worksheet (Appendix D3).

D3c. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the information required and complete the calculations. Refer to the Guidebook reference sections identified on the worksheet to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Flood Estimate Worksheet with your submission to the YESAB or the YWB.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections.

D3d. Selecting a Channel Design Method

The selection of a channel design method for channel construction is dependent upon the site geography, channel conditions and channel type. The design method selected is used to define the diversion channel dimensions and drop structure requirements.

The Channel Design Method table provides a list of recommendations to guide the selection of a suitable channel design method.

Design Method	Parameter	Condition
Channel Replication	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	> 2%
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Limited to none
	Valley Type	Incised or entrenched
	Channel Stability	Stable (if original channel is diversion it must have been in place for >10 Years)
	Note: Optional when channel gradient is < 2%	
Floodplain Design	Channel Duration	Permanent
	Channel Gradient	< 2%
	Channel Material in Diversion	All
	Diversion Channel Length	At least 2/3 length of original channel
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Can be used in areas with no floodplain when relocation site has space to support floodplain	
Regime Channel	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	All
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Use when site data is insufficient to use other methods	

Select a Channel Design Method based on the criteria listed in the table above.

Note: Each diversion channel planned requires only one channel design method.

In the following steps you will need to use a specific worksheet for the Channel Design Method you have selected: Channel Replication Worksheet (Appendix E1); Floodplain Design Worksheet (Appendix E2); or Regime Channel Worksheet (Appendix E3). Do not proceed until you have selected a Channel Design Method. Only one channel design method is required.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections.

D3e. On the Channel Design Method Worksheet you have selected, enter the information required and complete the design calculations. Refer to the Guidebook reference sections identified on the worksheets to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Method Worksheet with your submission to the YESAB and the YWB.

D3f. Fish Habitat Features

If you have included fish habitat features in your proposed Temporary Diversion Channel you must select the appropriate spacing of features based on the Channel Type identified on the Original Channel and Site Parameters Worksheet. Refer to the fish habitat feature considerations in the Guidebook for more information. Use the following tables as a guide to fill out information requirements in the Fish Habitat Feature Worksheet (Appendix F).

FISH HABITAT RECLAMATION REQUIREMENTS FOR TEMPORARY DIVERSION CHANNELS

Pool-riffle / Dune-riffle and Plane-bed Channel Type	
Select Fish Habitat Feature Based on Diversion Channel Width	**Spacing Requirements (place feature every X channel width)**
Rock Island (channel width < 5 metres)	20
Boulder Grouping (channel width > 5 metres)	16
Rip-rap	Based on channel design method

FISH HABITAT RECLAMATION REQUIREMENTS FOR TEMPORARY DIVERSION CHANNELS

Step-pool and Cascade Channel Type	
Select Fish Habitat Feature Based on Diversion Channel Width	**Spacing Requirements (place feature every X channel width)**
Rock Island (channel width < 5 metres)	18
Boulder Grouping (channel width > 5 metres)	12
Rip-rap	Based on channel design method

D3g. Enter the required information on the Fish Habitat Feature Worksheet (Appendix F) to identify the type, spacing and relative location of the fish habitat features. Draw a diagram of the diversion channel (include north arrow, flow direction) (use symbols identified on worksheet to compose your diagram).

Note: If your Temporary Diversion Channel includes fish habitat features, and you propose to construct a crossing (new Ford) be sure to identify the location of the Ford on the Fish Habitat Features Worksheet (see step E2).

Proceed to following steps if:

- D4, constructing a Permanent Diversion Channel.
- E, proposing to construct a new stream crossing (Ford).
- F, proposing to acquire water.

D4. Permanent Diversion Channels

Permanent diversion channels are defined as a constructed channel that will convey stream flow for a period of over five years. All permanent diversion channels must include provisions for construction of fish habitat features. Refer to the channel design considerations in the Guidebook for more information on permanent diversion channels. You will need to complete and submit the Channel Design Flood Estimate Worksheet (Appendix D3), the Channel Design Method Worksheet (Appendix E) and the Fish Habitat Features Worksheet (Appendix F) for your Permanent Diversion Channel to the YESAB and the YWB.

Flood design interval for Permanent Diversion Channels in Low habitat suitability is **1:5**.

D4a. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the flood design interval (line 1).

D4b. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the information required and complete the calculations. Refer to the Guidebook reference sections identified on the worksheet to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Flood Estimate Worksheet with your submission to the YESAB and the YWB.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following steps.

D4c. Selecting a Channel Design Method

The selection of a channel design method for channel construction is dependent upon the site geography, channel conditions and channel type. The design method selected is used to define the diversion channel dimensions and drop structure requirements.

The Channel Design Method table provides a list of recommendations to guide the selection of a suitable channel design method.

Design Method	Parameter	Condition
Channel Replication	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	> 2%
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Limited to none
	Valley Type	Incised or entrenched
	Channel Stability	Stable (if original channel is diversion it must have been in place for >10 Years)
	Note: Optional when channel gradient is < 2%	
Floodplain Design	Channel Duration	Permanent
	Channel Gradient	< 2%
	Channel Material in Diversion	All
	Diversion Channel Length	At least 2/3 length of original channel
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Can be used in areas with no floodplain when relocation site has space to support floodplain	
Regime Channel	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	All
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Use when site data is insufficient to use other methods	

Select a Channel Design Method based on the criteria listed in the table above.

Note: Each diversion channel planned requires only one channel design method.

In the following steps you will need to use a specific worksheet for the Channel Design Method you have selected: Channel Replication Worksheet (Appendix E1); Floodplain Design Worksheet (Appendix E2); or Regime Channel Worksheet (Appendix E3). Do not proceed until you have selected a Channel Design Method.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections.

D4d. On the Channel Design Method Worksheet you have selected, enter the information required and complete the design calculations. Refer to the Guidebook reference sections identified on the worksheets to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Method Worksheet with your submission to the YESAB and the YWB

The following tables identify design restrictions and fish habitat reclamation requirements for Permanent Diversion Channels which must be incorporated to be in compliance with the respective Watershed Authorization.

Design Restrictions for Permanent Diversion Channels	
Design Component (Permanent Diversion)	**Criteria**
Overall Length of Diversion Channel	< 5000 metres
Conveyance (flood design) Capacity	1:5
Channel Design	As per channel design worksheets
Fish Habitat Features	As per reclamation tables

Note: In the next step you will need to refer to the Original Channel and Site Parameters Worksheet (Appendix C) in order to select the appropriate category of the original channel type (Pool-riffle, Dune-riffle, Plane-bed, Step-pool or Cascade Channel). For more information on channel types, see the Guidebook.

CONSTRUCTION AND RECLAMATION REQUIREMENTS FOR PERMANENT DIVERSION CHANNELS

Pool-riffle / Dune-riffle and Plane-bed Channel Type	
Fish Habitat Features	**Spacing Requirements** **(multiply the number in this column by the width of the channel in metres)**
Rock Island (channel width < 5 metres)	10
Boulder Grouping (channel width > 5 metres)	6
Anchored or Buried Trees	Not Required
Top Soil Spreading	Continuous (both banks)
Willow Staking	At sharp bends
Transplanting	Not Required
Rip-rap	Based on channel design method

Note: Willow staking is to be completed to a width of 1 metre from the bank but is not required for the floodplain design method.

CONSTRUCTION AND RECLAMATION REQUIREMENTS FOR PERMANENT DIVERSION CHANNELS

Step-pool and Cascade Channel Type	
Fish Habitat Features	**Spacing Requirements** (multiply the number in this column by the width of the channel in metres)
Rock Island (channel width < 5 metres)	8
Boulder Grouping (channel width > 5 metres)	5
Anchored or Buried Trees	Not Required
Top Soil Spreading	Continuous (both banks)
Willow Staking	At sharp bends
Transplanting	Not Required
Rip-rap	Based on channel design method

Note: Willow staking is to be completed to a width of 1 metre from the bank but is not required for the floodplain design method.

D4e. Use the information above to complete the Fish Habitat Feature Worksheet (Appendix F) to identify the type, spacing and relative location of the fish habitat features. Draw a diagram of the diversion channel (include north arrow, flow direction and reclaimed Riparian Zone) (use symbols identified on worksheet to compose your diagram).

Note: If you propose to construct a crossing (new Ford) be sure to identify the location of the Ford on the Fish Habitat Feature Worksheet (see section E2).

Once the Fish Habitat Feature Worksheet is completed, proceed to the next question.

Do you propose to use an Existing Ford?

NO: Proceed to next question.
YES: Proceed to Step E, Watercourse Crossings, then E1, Use of Existing Ford.

Do you propose to construct a New Ford?

NO: Proceed to Step F, Water Acquisition.
YES: Proceed to Step E, Watercourse Crossings.

E. Watercourse Crossings (Fords)

Fording is defined as the crossing of creeks, streams and / or rivers at locations where a bridge, causeway or elevated embankment does not exist or is not utilized by a vehicle or equipment. Fording typically involves driving directly through a watercourse, across the banks and bed. In some instances, Fording locations (Fords) have been “improved” or constructed through watercourses by way of adding materials such as rocks or gravel, the modification of approaches, or the modification of the bed of a watercourse.

E1. Use of Existing Ford

Use of existing Fords is often the least preferred option for crossing watercourses however it is recognized that there are instances where it is the only viable option. Refer to the Guidebook for additional information on Fords. The following measures should be adhered to when utilizing existing Fords.

NOTE: Please identify if you intend to use Existing Fords on the Project Location Worksheet (Appendix A).

- Ensure water depth is sufficiently shallow to allow passage of vehicle / equipment.
- Plan your activities in advance to minimize the number of crossings required.
- Avoid crossing during extreme rain or flood events.
- Access approaches at 90° to the bank, when entering or exiting the Ford.
- Maintain speed at a very slow and steady pace throughout the crossing.
- Avoid rapid acceleration while on approaches or while in the water.

E2. Construction of New Fords

Construction of new Fords should be limited to locations or applications where deemed to be absolutely necessary. More permanent or high use locations should employ the construction and use of a bridge as the primary crossing structure where possible. For more information on construction of stream crossings refer to the Guidebook.

The location of new Fords must be identified when proposed for original channels, Temporary Channels (with fish habitat features), and Permanent Diversion Channels. The new Ford proposed must achieve the design, construction and reclamation requirements identified in the table below to be in compliance with the respective Watershed Authorization.

Design and Construction Restrictions and Reclamation Requirements for New Fords

Design Component (Construction of New Ford)	Requirement
Approach Angle	90° to bank
Maximum Width of Approach Zone Clearing (surface)	10 metres
Minimum Watercourse Distance Between Ford Sites OR Not to exceed more than	300 metres 4 Fords every 1000 metres
Site Selection (Watercourse)	Shallow water depth
Site Selection (Approach / Bank Composition)	Gravel / Cobble
Construction	Equipment to work from bank
Maximum Width of Bank Grading (subsurface)	10 metres
Approach Surface Ground Coverage	Gravel / Cobble
Construction Timing	Low water period
Reclamation	Full topsoil coverage

Note: The above design considerations are not required for Construction of Fords in Seasonal Diversion Channels.

E2a. If the construction of a new Ford is proposed for an original channel or previously restored channel, identify the location of the new Ford(s) on the Riparian Zone / Bank Modification Worksheet (see step C, Riparian Zones and Appendix B).

E2b. If the construction of a new Ford is proposed for a Temporary Diversion Channel (with fish habitat features) or a Permanent Diversion Channel, identify the location of the new Ford(s) on the Fish Habitat Feature Worksheet. (Appendix F).

Once the location and specification of the new Ford is identified on either the completed Riparian Zone / Bank Modification Worksheet or the Fish Habitat Feature Worksheet proceed to the next question.

Do you propose to withdraw water from a Low habitat suitability watercourse?

NO: Proceed to Step G, In-stream Works.
YES: Proceed to Step F, Water Acquisition.

F. Water Acquisition

Acquisition of water is required for processing materials during placer mining. Effective water management is a key consideration at all placer mine sites. The following requirements must be achieved to meet compliance with the respective Watershed Authorization.

F1. Water Intake Screens

In order to meet the requirement of the *Fisheries Act*, all water intakes must be screened. A general summary of the screening requirements are provided in the Guidebook.

Note: The objective behind the installation of intake screens is to prevent the death of fish caused by the acquisition of water. If screens of the correct mesh size are deployed between a watercourse and the intake to a water reservoir or gravity feed ditch, it is not necessary to screen the pump intake that removes water from within these structures provided these structures do not already contain fish. In the case of total recirculation systems, the operator shall ensure that any areas where fish could enter the system have barriers to prevent the entry of fish.

F2. Water Withdrawals

Do you propose to withdraw the total stream flow all or some of the time you are using water for mining purposes?

NO: Proceed to the next question.
YES: It is the responsibility of the applicant to ensure that when withdrawing water for mining purposes, it is completed in such a manner as to avoid stranding of fish in the dewatered channel. If it is likely that stranding of fish will occur in a dewatered channel, the applicant should retain a qualified professional to conduct a fish salvage prior to dewatering the channel. More information on fish salvage requirements is available from Fisheries and Oceans Canada.

Do you propose to carry out in-stream works within a watercourse? In-stream works may include small dugouts or wing dams to facilitate water acquisition, in-stream settling facilities, in-stream reservoirs, and use of a stream channel as a conduit to transport process water to out-of-stream settling ponds.

No: Proceed to Next Question.
YES: Proceed to Step G, In-stream Works.

G. In-stream Works

In-stream works are defined as works that occur within the high water mark of a watercourse, but do not include diversion channels or Fords. Some in-stream works can lead to effects on fish and fish habitat such as erosion/scouring, sediment inputs, loss of habitat area, changes in channel morphology, blockages to passage, and reduced productivity.

Do you propose to carry out in-stream works within a watercourse? In-stream works may include small dugouts or wing dams to facilitate water acquisition, in-stream settling facilities, in-stream reservoirs, and use of a stream channel as a conduit to transport process water to out-of-stream settling ponds.

NO: Review complete – proceed with submission of all completed worksheets along with your project description to the YESAB and your application for water use license to the YWB.

YES: Proceed to Step G1, Severity of Effects Assessment.

G1. Severity of Effects Assessment and Risk Management Decisions for In-stream Works

Low Habitat Suitability Watercourses

In-stream settling facilities and use of a stream channel as a conduit to transport process water to out-of-stream settling ponds may be authorized under the auspices of a Watershed Authorization in Low habitat suitability watercourses under strictly specified conditions. In order to determine whether your site qualifies, complete the flowchart found in Section I below and record this information on the Worksheet for In-stream Settling Ponds and Use of Stream Channels as Conduit (Appendix H).

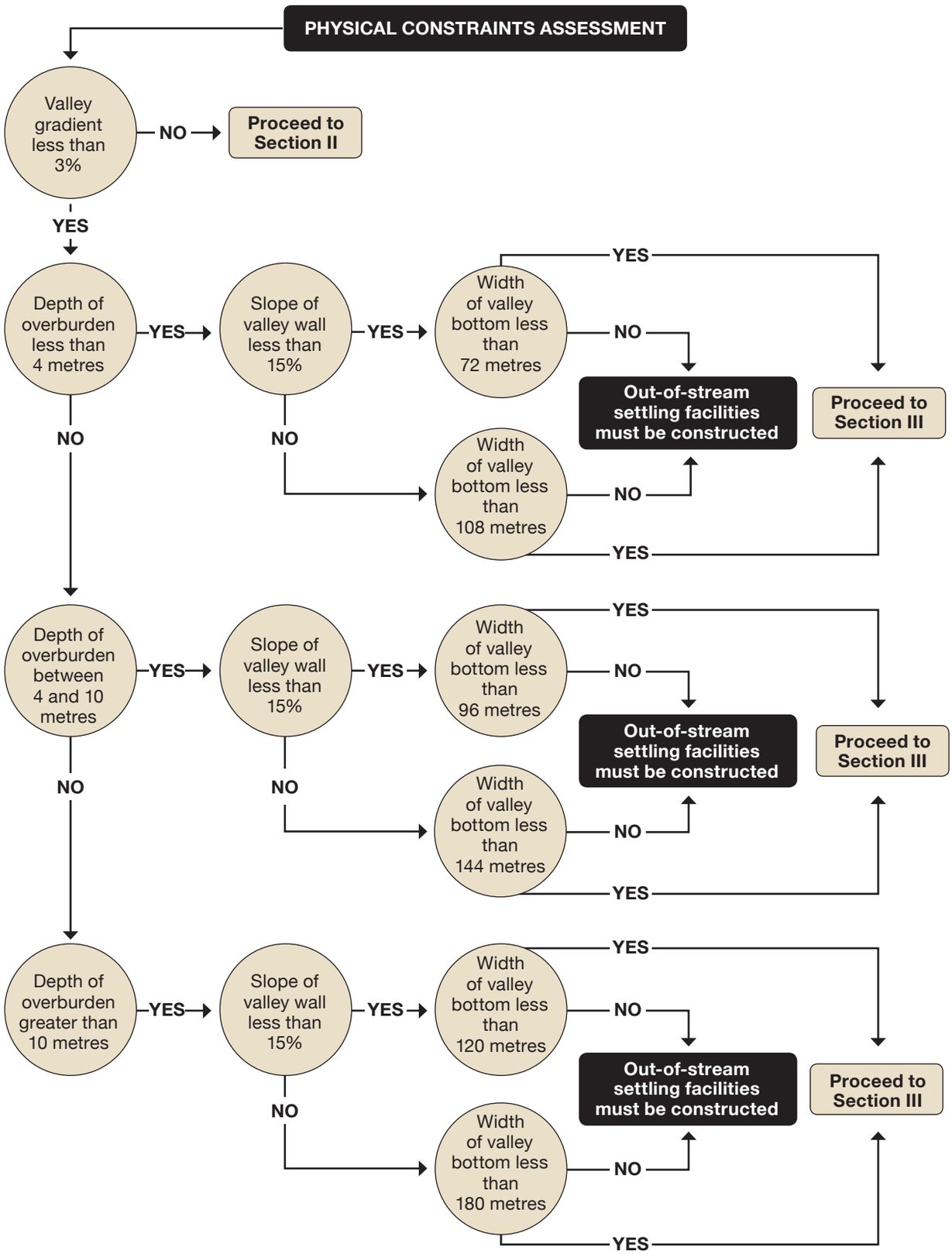
In-stream reservoirs constructed with cross-channel dams are authorized under Watershed Authorizations in Low habitat suitability watercourses.

SECTION I

Use the following flowchart to evaluate whether your site is suitable for construction of in-stream settling facilities or the use of a stream channel as a conduit.

Note: Authorization to construct in-stream settling facilities or to use a stream channel as a conduit is conditional and these works may not be permitted. Depending upon the scale of operation or size of earth-moving equipment out-of-stream settling facilities may be required in proximity to working areas.

Flowchart for In-stream Settling Ponds and Use of Stream Channels as Conduit



SECTION II

The valley bottom you intend to mine is not ideal for the construction of settling ponds, due to its steep gradient. Use of the stream channel as a conduit for transporting process water to the nearest suitable site for out-of-stream settling ponds may be permitted.

Do you have the right to construct settling facilities on placer claims immediately below your working area where the valley gradient is less than or equal to 3%, and the habitat classification remains either Low or Moderate–Low?

NO: Your project may not meet the conditions of a Watershed Authorization, see "If your project does not comply with the requirements" section at the beginning of this document.

YES: Use the flowchart in Section I to evaluate whether the site below your working area is suitable for construction of out-of-stream settling facilities.

SECTION III

The valley bottom you intend to mine cannot accommodate an out-of-stream settling facility, due to its narrow width. If you have the right to construct out-of stream settling facilities on placer claims immediately below your working area, and the habitat classification remains either a Low or Moderate–Low, use of the stream as a conduit for transporting process water to this downstream location may be permitted. If not, construction of in-stream settling ponds may be permitted. The following conditions apply to construction of these in-stream works:

- Construction and maintenance of a pre-settling pond is mandatory;
- If it is likely that stranding of fish will occur in a dewatered channel, the applicant should retain a qualified professional to conduct a fish salvage prior to dewatering the channel.;
- Only compactable material (fine gravel and sand) may be used as core material in dam construction, while coarse material should be used on the surfaces to prevent erosion;
- Material must be placed in shallow (< 0.3 metre) lifts and compacted when dams are constructed;
- Sluicing must be terminated if stream flows increase to bank-full width in response to rainfall events;
- Settling ponds must be mechanically cleaned and equipped with well–armoured spillways in order to maintain stability during spring freshet; or
- A stable bypass channel must be constructed to protect the settling pond cells from high flows during spring freshet; and
- Stream channel restoration must commence once these in-stream works are no longer required for current mining activities.

The following table is to be used to evaluate the risk of proposed in-stream works in Low habitat suitability watercourses. The design elements of the proposed works must achieve a risk score of no higher than the maximum risk score identified to be in compliance with the respective Watershed Authorization.

Note: In-stream settling ponds must be constructed from compactable material that is placed and compacted in shallow lifts.

Low Habitat Suitability Watercourses (Including Tributaries to Lake Trout Lakes)

Design Component	Range	Risk Score
Channel Width Constriction	>30% channel constriction	3
	5% - 30% of the channel	2
	< 5%	1
Above and Below the Structure – Difference in Water Surface Level	>2.0 metres	3
	0.3 – 2.0 metres	2
	< 0.3 metres	1
Material Type	Fine (silt-sand)	3
	Compactable (fine gravel and sand)	2
	Metal/ riprap/ structure	1
Construction Method	Non-compaction/ dumped	3
	Moderately compacted/ placement	2
	Compacted shallow lift (or rip-rap, gabions, or boulders)	1
Amount of In-water Work	Completely in water	3
	Partially in water (more than ½)	2
	In dry	1
Structure Height	Above bank full	3
	Between bank full and channel bed	2
	Below channel bed	1
MAXIMUM PERMITTED SCORE FOR IN-STREAM WORKS		**16**

Calculate and record your total score and maximum permitted score on the Severity of Effects Assessment for In-stream Works Worksheet (Appendix G1), and record details of proposed in-stream works on the In-stream Works Worksheet (Appendix G2). Please ensure to include the completed In-stream Works Worksheets (Appendices G1 and G2) with your submission to the YESAB and the YWB.

Water Quality Zone Watercourses

Water Quality Zone Watercourses

Before You Begin

This workbook and associated worksheets are provided to assist with compiling information to support project proposals for submission to the Yukon Environmental and the Socio-economic Assessment Board (YESAB) and the Yukon Water Board (YWB). Once completed, the worksheets must be submitted for review as a component of both the YESAB and Yukon Water Board applications.

The guidance provided focuses on the requirements of the *Authorizations for Works or Undertakings affecting Fish Habitat for Specified Streams in the Yukon Territory* (Federal *Fisheries Act*) for watersheds in the Yukon (herein referred to as Watershed Authorizations). Please note that this workbook and associated worksheets may undergo revisions in the future, and users are encouraged to ensure that they use the current version.

In order to achieve compliance with the Watershed Authorizations, the placer mining proposal must meet the requirements outlined in this workbook for the watershed type and specific habitat suitability type at the location where the activities are to occur (see Yukon Placer Fish Habitat Suitability Maps).

In addition to this workbook and worksheets, the following documents provide the required information to support the development and submission of proposals for placer mining activities. All supporting documents are available online through the Yukon Placer Secretariat web page, www.yukonplacersecretariat.ca/howto_prepare_project_proposal.html or through the web addresses given for the specific documents.

1. ***Authorization for Works or Undertakings affecting Fish Habitat for Specified Streams in the Yukon Territory***
   www.yukonplacersecretariat.ca/placer_authorizations.html – Provides the legal authority, with respect to placer mining, to carry on a work, undertaking or activity that results in the permanent alteration and destruction of fish habitat. Also specifies sediment discharge standards for placer mine effluent and the sensitivity category of the watershed (i.e. Category A or B). Please note that the death of fish is not authorized.
2. **Yukon Placer Fish Habitat Suitability Maps**
   www.yukonplacersecretariat.ca/maps.html – Identifies the watershed sensitivity and habitat suitability of the watercourse where placer mining activities are proposed to occur.
3. **Guidebook of Mitigation Measures for Placer Mining in the Yukon**
   www.yukonplacersecretariat.ca/infocentre.html – Provides technical information related to best management practices, mitigation measures, and design considerations to achieve compliance with the Watershed Authorizations and to assist with proposal development.

Note: Complete and submit only the worksheets that are relevant to your operation.

Note: There are no Watershed Authorizations in place for the Liard and Alsek watersheds. Applications for review, forms and process to apply for a placer mine in the Liard or Alsek watershed can be obtained from the Yukon Placer Secretariat, contact information can be found online at, www.yukonplacersecretariat.ca/index.html.

For assistance completing the worksheets please contact the Yukon Placer Secretariat (contact information is available at, www.yukonplacersecretariat.ca/index.html) or the Yukon Government Client Services & Inspections office in your mining district (contact information is available at, www.emr.gov.yk.ca/cmi/cmi_district_offices.html).

If Your Project Does Not Comply With The Requirements

Placer mine operators are encouraged to design proposals that comply with the requirements described in this workbook. However, if the proposal is not able to achieve these requirements and the operator would like to proceed with the regulatory review process, an application for site-specific review should be submitted to Fisheries and Oceans Canada (DFO) for consideration **prior to the submission of the proposal to the YESAB and the YWB**.

When a proposal is submitted for site-specific review, DFO will review the information to determine whether a site-specific authorization is required. In some cases, DFO may recommend measures to avoid or mitigate the harm to fish and fish habitat to allow the application to proceed under the Watershed Authorization.

Applications for site-specific review, forms and process to apply can be obtained from the Yukon Placer Secretariat, contact information can be found online at, www.yukonplacersecretariat.ca/index.html. Should it be determined that a site-specific authorization is required, a more detailed application, including a fish habitat offsetting plan and a letter of credit, will have to be submitted to DFO. Information on the site-specific authorization application process, offsetting plans, and letters of credit can be found on DFO's Projects Near Water website, www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/application-eng.html.

Fish Habitat Design, Operation and Reclamation Requirements for Water Quality Zone Watercourses

Water quality zones are those areas within watercourses that are inaccessible to fish but provide water flow and contribute nutrients to downstream habitats. Water Quality zones are identified on an individual basis based on confirmed permanent barriers to fish passage. Permanent barriers include creeks that flow underground, waterfalls, and significant velocity barriers, but do not include temporary structures such as culverts, beaver dams or log jams.

Please use the following instructions and information to complete the worksheets relevant to your proposal (located in Appendix A to H). The completed worksheets will be submitted as part of your project description to the Yukon Environmental and Socio Economic Assessment Board (YESAB) and your application to the Yukon Water Board (YWB).

SUMMARY OF GENERAL RESTRICTIONS ON WORKS OR UNDERTAKINGS IN WATER QUALITY ZONES

Activity Type / Operation	Restriction in Water Quality Zones
Riparian Zone	No Designated Riparian Zone. Berm required between active mining and watercourse.
Fords	Construction of new Fords subject to design and construction restrictions and reclamation requirements. Mitigative measures should be applied to use of existing Fords.
Diversion Channels	Construction of diversion channels subject to design restrictions and construction and reclamation requirements.
In-stream Works	Conditions apply to construction of in-stream works. Construction of in-stream settling facilities or to use a stream channel as a conduit is conditional and may not be permitted.

To determine how to proceed, please answer the following questions regarding a work, undertaking or activity in or around Water Quality Zones.

Do you propose to undertake placer mining activities in, or within, 30 m of a watercourse? Activities may include discharging effluent, constructing stream crossings, clearing riparian vegetation, constructing channel diversions, or withdrawing water.

NO: No further review pursuant to the *Fisheries Act* is required.
YES: Proceed to Step A, Project Information.

A. Project Information

The first step in compiling a project proposal that involves activities proposed to occur in or around fish habitat areas is the completion of the Project Location Worksheet (Appendix A).

Note: The Project Location Worksheet (Appendix A) is required for all applications.

A1. On the Project Location Worksheet enter the stream name, the watershed name (as per Yukon Placer Fish Habitat Suitability Maps), identify the watershed sensitivity and habitat suitability classification for the reaches you proposed to work in, if any reaches are designated as "previous/prior development", a short description of the location, the proposed duration of activities and a copy of a map of the specific location of the site.

Once the sections noted above are complete on the Project Location Worksheet, proceed to the next question.

Do you propose to discharge effluent from your mine site?

NO: Proceed to Step C, Riparian Zones.
YES: Proceed to Step B, Settling Pond Discharge.

B. Settling Pond Discharge (effluent concentration)

Point source sediment discharges from gold recovery processes are typically managed through the use of settling facilities. The action level approach is a key element of the risk-based approach to sediment management for Yukon placer mining. For more information on the action level approach or settling pond design, operation, recirculation systems, and settling pond reclamation refer to the Guidebook of Mitigation Measures for Placer Mining in the Yukon (herein referred to as the Guidebook).

Water quality objectives and sediment discharge standards for settling ponds in Water Quality Zones are specified in the Watershed Authorizations for the specific watershed you propose to work in. Please ensure to verify your specific discharge standard in the respective watershed you plan to work in (specifically if any exemptions exist) prior to proceeding with your application. In Water Quality Zones the discharge standard is set to maintain acceptable water quality in downstream habitats of greater sensitivity. Standards are specific to each watershed and are therefore defined in each individual authorization.

B1. Record the Design Target, Action Level and Compliance Level on the Project Location Worksheet (Appendix A).

Once the effluent discharge standards are recorded on the Project Location Worksheet proceed to the next question.

Do you propose to construct works other than diversion channels within the Riparian Zone (see Step C for the definition of the Riparian Zone) – this could include stripping, construction of reservoirs, construction of settling ponds, etc.

NO: Proceed to Step D, Diversion Channels
YES: Proceed to Step C, Riparian Zone

C. Riparian Zones

The Riparian Zone is defined as the portion of the stream bank (either vegetated or not) immediately adjacent to the stream channel. Riparian Zones are measured from the high water mark on each bank of the watercourse and follow the pattern/morphology of the channel.

No setback is required in Water Quality Zones; however a berm that is sufficient to prevent surface runoff and associated sediment from entering the watercourse must be constructed between the mine site and the watercourse.

Do you propose clearing of surface vegetation or subsurface works in the Riparian Zone? (this could include stripping, construction of reservoirs, construction of settling ponds, etc.)

NO: Proceed to Step D, Diversion Channels.
YES: Proceed to next question.

Do you propose to construct a new stream crossing (Ford)?

NO: Proceed to next question.
YES: Review Step D, Watercourse Crossings, prior to proceeding to next question.

Do you propose to clear surface vegetation only?

NO: The proposal includes both clearing of surface vegetation and subsurface works, proceed to Step C1, Surface Vegetation Clearing, followed by C2, Bank Modification.
YES: Proceed to Step C1, Surface Vegetation Clearing.

C1. Surface Vegetation Clearing

There are no restrictions on vegetation clearing in Water Quality Zones. Works or undertakings are authorized to occur up to the berm on the stream bank.

D. Diversion Channels

Design and construction of a diversion channel is required if the proposal includes Seasonal, Temporary or Permanent relocation of a watercourse or channel.

Provided the diversion channel design proposal meets the conditions identified in the following sections, the diversion channel may be constructed pursuant to the respective Watershed Authorization. Specific criteria related to channel design and restoration requirements are described in the following sections while general information regarding design, construction and reclamation of diversion channels is provided in the Guidebook.

D1. Original Channel and Site Parameters Worksheet

On the Original Channel and Site Parameters Worksheet (Appendix C), record the information for the original channel (pre-diversion conditions). Refer to the Guidebook reference sections identified on the worksheet to assist you with the data collection and entry process.

Note: The above worksheet must be completed prior to proceeding with the following steps.

Do you propose a Seasonal relocation of a channel? (A Seasonal Channel is in place for a period of less than one year and is replaced before winter).

NO: Proceed to next question.
YES: Proceed to Step D2, Seasonal Diversion Channels and either Step D3, Temporary Diversion Channels or Step D4, Permanent Diversion Channels.

Do you propose a Temporary relocation of a channel? (A Temporary Channel is in place for a period of less than five years).

NO: Proceed to next question.
YES: Proceed to Step D3, Temporary Diversion Channels and Step D4, Permanent Diversion Channels.

Do you propose a Permanent relocation of a channel? (A Permanent Channel is in place for a period of five years or more).

NO: Proceed to next question.

YES: Proceed to Step D4, Permanent Diversion Channels.

D2. Seasonal Diversion Channels

Seasonal diversion channels are defined as a constructed channel that will convey stream flow for no more than one operating season. This diversion channel type may not be used to convey stream flow between late fall and the following spring of any given year. Refer to the channel design considerations in the Guidebook for more information on seasonal diversion channels. You will need to complete and submit the Channel Design Flood Estimate Worksheet (Appendix D3) and the Channel Design Method Worksheet (Appendix E) for your Seasonal Diversion Channel to the YESAB and the YWB.

Note: Riparian Zone provisions do not apply to Seasonal Diversion Channels.

Flood design interval for Seasonal Diversion Channels in Water Quality Zones is **1:1**.

Note: Stream flow in Seasonal Diversion Channels must be returned to a Temporary or Permanent Restoration Channel at the end of the mining season. Your application should include worksheets for construction of a Temporary or Permanent Restoration Channel (Step D3 and D4).

D2a. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the flood design interval (line 1).

Seasonal Diversion Channels must be less than 2000 metres in length.

D2b. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the information required and complete the calculations. Refer to the Guidebook reference sections identified on the worksheet to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Flood Estimate Worksheet with your submission to the YESAB and the YWB.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following steps.

D2c. Selecting a Channel Design Method

The selection of a channel design method for channel construction is dependent upon the site geography, channel conditions and channel type. The design method selected is used to define the diversion channel dimensions and drop structure requirements.

The Channel Design Method table provides a list of recommendations to guide the selection of a suitable channel design method.

Design Method	Parameter	Condition
Channel Replication	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	> 2%
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Limited to none
	Valley Type	Incised or entrenched
	Channel Stability	Stable (if original channel is diversion it must have been in place for >10 Years)
	Note: Optional when channel gradient is < 2%	
Floodplain Design	Channel Duration	Permanent
	Channel Gradient	< 2%
	Channel Material in Diversion	All
	Diversion Channel Length	At least 2/3 length of original channel
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Can be used in areas with no floodplain when relocation site has space to support floodplain	
Regime Channel	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	All
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Use when site data is insufficient to use other methods	

Select a Channel Design Method based on the criteria listed in the table above.

Note: Each diversion channel planned requires only one channel design method.

Water Quality Zone Watercourses

In the following steps you will need to use a specific worksheet for the Channel Design Method you have selected: Channel Replication Worksheet (Appendix E1); Floodplain Design Worksheet (Appendix E2); or Regime Channel Worksheet (Appendix E3). Do not proceed until you have selected a Channel Design Method. Only one channel design method is required.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections.

D2d. On the Channel Design Method Worksheet you have selected, enter the information required and complete the design calculations. Refer to the Guidebook reference sections identified on the worksheets to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Method Worksheet with your submission to the YESAB and the YWB.

Note: A plan for a Seasonal Diversion Channel must be accompanied by plans for a Temporary and / or Permanent Diversion Channel (See sections D3 and / or D4).

Once the Channel Design Method Worksheet is completed, proceed to Step D3, Temporary Diversion Channels or D4, Permanent Diversion Channels.

D3. Temporary Diversion Channels

Temporary diversion channels are defined as a constructed channel that will convey stream flow for a period of one to five years. Refer to the channel design considerations in the Guidebook for more information on temporary diversion channels. You will need to complete and submit the Channel Design Flood Estimate Worksheet (Appendix D3) and the Channel Design Method Worksheet (Appendix E) for your Temporary Diversion Channel to the YESAB and the YWB.

Note: The Riparian Zone provisions do not apply to Temporary Diversion Channels.

Flood design interval for Temporary Diversion Channels in Water Quality Zones is **1:2**.

Note: Temporary Diversion Channels can only be in place for 5 years and as such, your application should include worksheets for the construction of a Permanent Restoration Channel (Step D4).

D3a. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the flood design interval (line 1).

D3b. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the information required and complete the calculations. Refer to the Guidebook reference sections identified on the worksheet to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Flood Estimate Worksheet with your submission to the YESAB or the YWB.

D3c. Selecting a Channel Design Method

The selection of a channel design method for channel construction is dependent upon the site geography, channel conditions and channel type. The design method selected is used to define the diversion channel dimensions and drop structure requirements.

The Channel Design Method table provides a list of recommendations to guide the selection of a suitable channel design method.

Design Method	Parameter	Condition
Channel Replication	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	> 2%
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Limited to none
	Valley Type	Incised or entrenched
	Channel Stability	Stable (if original channel is diversion it must have been in place for >10 Years)
	Note: Optional when channel gradient is < 2%	
Floodplain Design	Channel Duration	Permanent
	Channel Gradient	< 2%
	Channel Material in Diversion	All
	Diversion Channel Length	At least 2/3 length of original channel
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Can be used in areas with no floodplain when relocation site has space to support floodplain	
Regime Channel	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	All
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Use when site data is insufficient to use other methods	

Select a Channel Design Method based on the criteria listed in the table above.

Note: Each diversion channel planned requires only one channel design method.

In the following steps you will need to use a specific worksheet for the Channel Design Method you have selected: Channel Replication Worksheet (Appendix E1); Floodplain Design Worksheet (Appendix E2); or Regime Channel Worksheet (Appendix E3). Do not proceed until you have selected a Channel Design Method.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections.

D3d. On the Channel Design Method Worksheet you have selected, enter the information required and complete the design calculations. Refer to the Guidebook reference sections identified on the worksheets to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Method Worksheet with your submission to the YESAB and the YWB.

D4. Permanent Diversion Channels

Permanent diversion channels are defined as a constructed channel that will convey stream flow for a period of over five years. Refer to the channel design considerations in the Guidebook for more information on permanent diversion channels. You will need to complete and submit the Channel Design Flood Estimate Worksheet (Appendix D3) and the Channel Design Method Worksheet (Appendix E) for your Permanent Diversion Channel to the YESAB and the YWB.

Flood design interval for Permanent Diversion Channels in Water Quality Zones is **1:5**.

D4a. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the flood design interval (line 1).

D4b. On the Channel Design Flood Estimate Worksheet (Appendix D3), enter the information required and complete the calculations. Refer to the Guidebook reference sections identified on the worksheet to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Flood Estimate Worksheet with your submission to the YESAB and the YWB.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following steps.

D4c. Selecting a Channel Design Method

The selection of a channel design method for channel construction is dependent upon the site geography, channel conditions and channel type. The design method selected is used to define the diversion channel dimensions and drop structure requirements.

The Channel Design Method table provides a list of recommendations to guide the selection of a suitable channel design method.

Design Method	Parameter	Condition
Channel Replication	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	> 2%
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Limited to none
	Valley Type	Incised or entrenched
	Channel Stability	Stable (if original channel is diversion it must have been in place for >10 Years)
	Note: Optional when channel gradient is < 2%	
Floodplain Design	Channel Duration	Permanent
	Channel Gradient	< 2%
	Channel Material in Diversion	All
	Diversion Channel Length	At least 2/3 length of original channel
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Can be used in areas with no floodplain when relocation site has space to support floodplain	
Regime Channel	Channel Duration	Seasonal or Temporary or Permanent
	Channel Gradient	All
	Channel Material in Diversion	Similar or Coarser than Original (not in seasonal channel)
	Diversion Channel Length	Any
	Floodplain	Narrow to Wide
	Valley Type	Narrow to Wide
	Channel Stability	Any
	Note: Use when site data is insufficient to use other methods	

Select a Channel Design Method based on the criteria listed in the table above.

Note: Each diversion channel planned requires only one channel design method.

In the following steps you will need to use a specific worksheet for the Channel Design Method you have selected: Channel Replication Worksheet (Appendix E1); Floodplain Design Worksheet (Appendix E2); or Regime Channel Worksheet (Appendix E3). Do not proceed until you have selected a Channel Design Method. Only one channel design method is required.

Note: The Channel Design Flood Estimate Worksheet must be completed prior to proceeding with the following sections.

D4d. On the Channel Design Method Worksheet you have selected, enter the information required and complete the design calculations. Refer to the Guidebook reference sections identified on the worksheets to assist with the data collection, entry and calculation process. Please ensure to include the completed Channel Design Method Worksheet with your submission to the YESAB and the YWB

The following tables identify design restrictions for Permanent Diversion Channels which must be incorporated to be in compliance with the respective Watershed Authorization.

Design Restrictions for Permanent Diversion Channels	
Design Component (Permanent Diversion)	**Criteria**
Overall Length of Diversion Channel	< 5000 metres
Conveyance (flood design) Capacity	1:5
Channel Design	As per channel design worksheets
Fish Habitat Features	None Required

Note: In the next step you will need to refer to the Original Channel and Site Parameters Worksheet (Appendix C) in order to select the appropriate category of the original channel type (Pool-riffle, Dune-riffle, Plane-bed, Step-pool or Cascade Channel). For more information on channel types, see the Guidebook.

CONSTRUCTION AND RECLAMATION REQUIREMENTS FOR PERMANENT DIVERSION CHANNELS

Pool-riffle / Dune-riffle and Plane-bed Channel Type	
Reclamation Feature	**Spacing Requirements** **(multiply the number in this column by the width of the channel in metres)**
Top Soil Spreading	Continuous (both banks)
Rip-rap	Based on channel design method

CONSTRUCTION AND RECLAMATION REQUIREMENTS FOR PERMANENT DIVERSION CHANNELS

Step-pool and Cascade Channel Type	
Reclamation Feature	**Spacing Requirements** **(multiply the number in this column by the width of the channel in metres)**
Top Soil Spreading	Continuous (both banks)
Rip-rap	Based on channel design method

Once the Channel Design Method Worksheet (Appendix E1, E2 or E3) is completed, proceed to the next question.

Do you propose to use an Existing Ford?

NO: Proceed to next question.
YES: Proceed to Step E, Watercourse Crossings, then E1, Use of Existing Ford.

Do you propose to construct a New Ford?

NO: Proceed to Step F, Water Acquisition.
YES: Proceed to Step E, Watercourse Crossings.

E. Watercourse Crossings (Fords)

Fording is defined as the crossing of creeks, streams and / or rivers at locations where a bridge, causeway or elevated embankment does not exist or is not utilized by a vehicle or equipment. Fording typically involves driving directly through a watercourse, across the banks and bed. In some instances, Fording locations (Fords) have been “improved” or constructed through watercourses by way of adding materials such as rocks or gravel, the modification of approaches, or the modification of the bed of a watercourse.

E1. Use of Existing Ford

Use of existing Fords may be used in Water Quality Zones. Refer to the Guidebook for additional information on Fords. The following measures should be adhered to when utilizing existing Fords.

Note: Please identify if you intend to use Existing Fords on the Project Location Worksheet (Appendix A).

Refer to the Guidebook for additional information on Fords. The following measures should be adhered to when utilizing existing Fords.

- Ensure water depth is sufficiently shallow to allow passage of vehicle / equipment.
- Plan your activities in advance to minimize the number of crossings required.
- Avoid crossing during extreme rain or flood events.
- Access approaches at 90° to the bank, when entering or exiting the Ford.
- Maintain speed at a very slow and steady pace throughout the crossing.
- Avoid rapid acceleration while on approaches or while in the water.

E2. Construction of New Fords

The construction of new Fords is authorized in Water Quality Zones.

The location of new Fords must be identified when proposed for original channels, Temporary Channels (with fish habitat features), and Permanent Diversion Channels. The new Ford proposed must achieve the design, construction and reclamation requirements identified in the table below to be in compliance with the respective Watershed Authorization.

Design and Construction Restrictions and Reclamation Requirements for New Fords

Design Component (Construction of New Ford)	Requirement
Approach Angle	90° to bank
Maximum Width of Approach Zone Clearing (surface)	No restrictions
Minimum Watercourse Distance Between Ford Sites	No restrictions
Site Selection (Watercourse)	Shallow water depth
Site Selection (Approach / Bank Composition)	Gravel / Cobble
Construction	Equipment to work from bank
Maximum Width of Bank Grading (subsurface)	No restrictions
Approach Surface Ground Coverage	Gravel / Cobble
Construction Timing	Low water period
Reclamation	Full topsoil coverage and willow staking

Note: The above design considerations are not required for Construction of Fords in Seasonal or Temporary Diversion Channels.

E2a. If the construction of a new Ford is proposed for an original channel or previously restored channel, identify the location of the new Ford(s) on the Riparian Zone / Bank Modification Worksheet (see step C, Riparian Zones and Appendix B).

E2b. If the construction of a new Ford is proposed for a Permanent Diversion Channel, identify the location on the Riparian Zone / Bank Modification Worksheet. Proceed to the next question.

Do you propose to withdraw water from a Water Quality Zone?

NO: Proceed to Step G, In-stream Works.
YES: Proceed to Step F, Water Acquisition.

F. Water Acquisition

Acquisition of water is required for processing materials during placer mining. Effective water management is a key consideration at all placer mine sites. The following requirements must be achieved to meet compliance with the respective Watershed Authorization.

F1. Water Intake Screens

Intake pipes do **NOT** require screens in Water Quality Zones.

G. In-stream Works

In-stream works are defined as works that occur within the high water mark of a watercourse, but do not include diversion channels or Fords. Some in-stream works can lead to effects on fish and fish habitat such as erosion/scouring, sediment inputs, loss of habitat area, changes in channel morphology, blockages to passage, and reduced productivity.

Do you propose to carry out in-stream works within a watercourse? In-stream works may include small dugouts or wing dams to facilitate water acquisition, in-stream settling facilities, in-stream reservoirs, and use of a stream channel as a conduit to transport process water to out-of-stream settling ponds.

NO: Review complete – proceed with submission of all completed worksheets along with your project description to the YESAB and your application for water use license to the YWB.

YES: Proceed to Step G1, Severity of Effects Assessment.

G1. Severity of Effects Assessment and Risk Management Decisions for In-stream Works

Water Quality Zones

In-stream settling facilities and use of a stream channel as a conduit to transport process water to out-of-stream settling ponds are authorized under the auspices of a Watershed Authorization in Water Quality Zones under certain conditions. In order to determine whether your site qualifies, complete the flowchart found in Section I below and record this information on the Worksheet for In-stream Settling Ponds and Use of Stream Channels as Conduit (Appendix H).

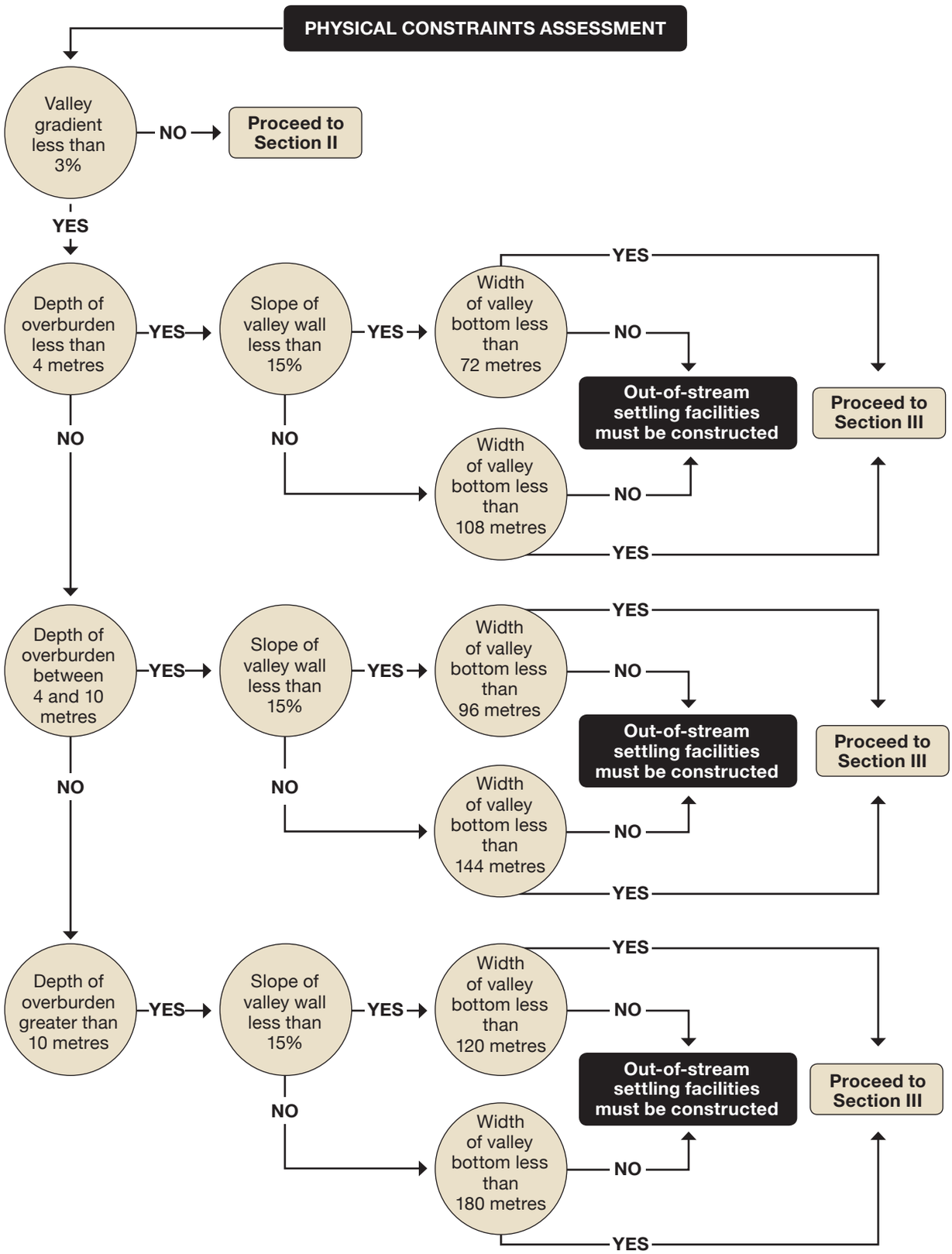
In-stream reservoirs constructed with cross-channel dams are authorized under Watershed Authorizations in Water Quality Zones.

SECTION I

Use the following flowchart to evaluate whether your site is suitable for construction of in-stream settling facilities or the use of a stream channel as a conduit.

Note: Authorization to construct in-stream settling facilities or to use a stream channel as a conduit is conditional and these works may not be permitted. Depending upon the scale of operation or size of earth-moving equipment out-of-stream settling facilities may be required in proximity to working areas.

Flowchart for In-stream Settling Ponds and Use of Stream Channels as Conduit



SECTION II

The valley bottom you intend to mine is not ideal for the construction of settling ponds, due to its steep gradient. Use of the stream channel as a conduit for transporting process water to the nearest suitable site for out-of-stream settling ponds may be permitted.

Do you have the right to construct settling facilities on placer claims immediately below your working area where the valley gradient is less than or equal to 3%, and the habitat classification remains either Water Quality Zone, Low or Moderate–Low?

NO: Your project may not meet the conditions of a Watershed Authorization, see "If your project does not comply with the requirements" section at the beginning of this document.

YES: Use the flowchart in Section I to evaluate whether the site below your working area is suitable for construction of out-of-stream settling facilities.

SECTION III

The valley bottom you intend to mine cannot accommodate an out-of-stream settling facility, due to its narrow width. If you have the right to construct out-of stream settling facilities on placer claims immediately below your working area, and the habitat classification remains either Water Quality Zone, Low or Moderate–Low, use of the stream as a conduit for transporting process water to this downstream location may be permitted. If not, construction of in-stream settling ponds may be permitted. The following conditions apply to construction of these in-stream works:

- Construction and maintenance of a pre-settling pond is mandatory;
- If it is likely that stranding of fish will occur in a dewatered channel, the applicant should retain a qualified professional to conduct a fish salvage prior to dewatering the channel.;
- Only compactable material (fine gravel and sand) may be used as core material in dam construction, while coarse material should be used on the surfaces to prevent erosion;
- Material must be placed in shallow (< 0.3 metre) lifts and compacted when dams are constructed;
- Sluicing must be terminated if stream flows increase to bank-full width in response to rainfall events;
- Settling ponds must be mechanically cleaned and equipped with well–armoured spillways in order to maintain stability during spring freshet; or
- A stable bypass channel must be constructed to protect the settling pond cells from high flows during spring freshet; and
- Stream channel restoration must commence once these in-stream works are no longer required for current mining activities.

The following table is to be used to evaluate the risk of proposed in-stream works in Water Quality Zones. The design elements of the proposed works must achieve a risk score of no higher than the maximum risk score identified to be in compliance with the respective Watershed Authorization.

Note: In-stream settling ponds must be constructed from compactable material that is placed and compacted in shallow lifts.

Water Quality Zone Watercourses

Design Component	Range	Risk Score
Channel Width Constriction	>30% channel constriction	3
	5% - 30% of the channel	2
	< 5%	1
Above and Below the Structure – Difference in Water Surface Level	>2.0 metres	3
	0.3 – 2.0 metres	2
	< 0.3 metres	1
Material Type	Fine (silt-sand)	3
	Compactable (fine gravel and sand)	2
	Metal/ riprap/ structure	1
Construction Method	Non-compaction/ dumped	3
	Moderately compacted/ placement	2
	Compacted shallow lift (or rip-rap, gabions, or boulders)	1
Amount of In-water Work	Completely in water	3
	Partially in water (more than ½)	2
	In dry	1
Structure Height	Above bank full	3
	Between bank full and channel bed	2
	Below channel bed	1
MAXIMUM PERMITTED SCORE FOR IN-STREAM WORKS		**17**

Calculate and record your total score and maximum permitted score on Severity of Effects Assessment for In-stream Works Worksheet (Appendix G1), and record details of proposed in-stream works on the In-stream Works Worksheet (Appendix G2). Please ensure to include the completed In-stream Works Worksheets (Appendices G1 and G2) with your submission to the YESAB and the YWB.

Appendices