



McElhanney



Environmental Management Plan for Dore River Erosion Protection

March 2022 | Revision 0

Submitted to: Regional District of Fraser Fort George
Prepared by McElhanney Ltd.

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**Your Challenge.
Our Passion.**

Environmental Management Plan For Dore River Erosion Protection

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March 2022

Document Reference No. 2341-21107-01

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Limitations of Report

This EMP was prepared for the exclusive use of the RDFFG, its assignees and representatives. It is intended to outline performance-based environmental requirements, standard protocols and mitigation measures implemented during erosion protection works occurring in 2022 and 2023 on the Dore River. In developing this report, McElhanney has relied in good faith on information provided by the RDFFG.

McElhanney accepts no responsibility for any deficiency or inaccuracy contained in this report as a result of our reliance on the aforementioned information. The guidance and findings documented in this report have been prepared for the specific application to this project. This report has been developed in a manner consistent with the level of care normally exercised by environmental professionals currently practicing under similar conditions in BC. This report may be revised, at the request of the RDFFG, should new information discovered in future work from other investigations, require amendments prior to any reliance upon the information presented herein.

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1. Introduction

McElhanney Ltd. (McElhanney) was retained by the Regional District of Fraser Fort George (RDFFG) to prepare this Environmental Management Plan (EMP) for proposed erosion protection works on the Dore River, downstream from Highway 16, just north of McBride, BC (as shown in *Figure 1*). Two significant flooding events occurred in 2020 and resulted in considerable loss of property for private landowners. Substantial bank erosion occurred between the Highway 16 bridge and the Canadian National (CN) Railway (*Figure 1*) bridge during one of these events. Multiple properties on Dorval Road, adjacent to the right (southeast) stream bank lost considerable portions of their property.

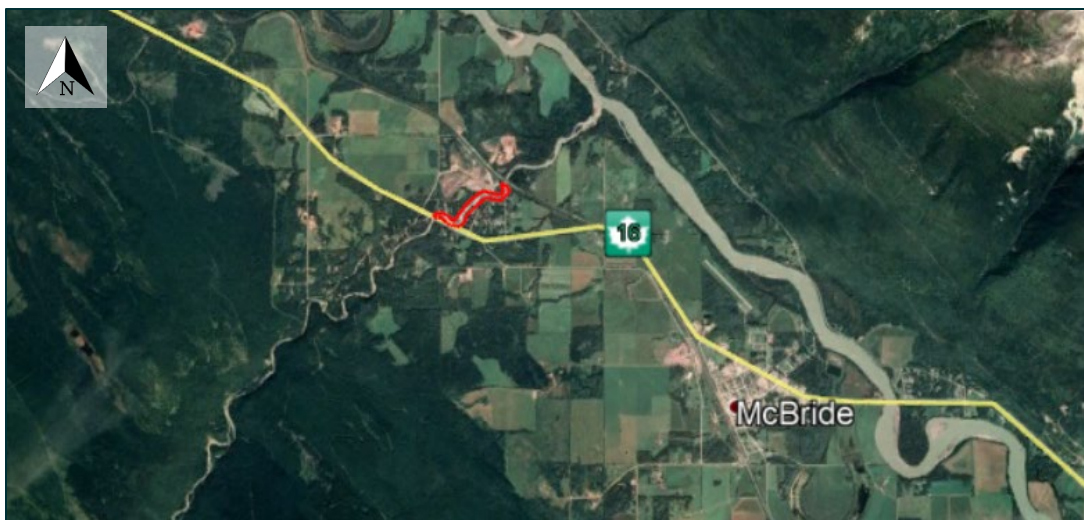


Figure 1. Overview of project site (red outline symbolizes the approximate project area).

This EMP will be used in support of provincial and federal regulatory requirements as well as providing a basis for a Construction Environmental Management Plan (CEMP) for the works. It will specifically address the environmental values of the project area, construction considerations with potential impacts on the environment, and best management practices (BMPs) to apply prior to and during construction.

2. Project Description

The RDFFG has contracted a design that will see 975 lineal meters of riprap installed along the banks of the Dore River between Hwy 16 and the railway crossing. Significant loss of land occurred on riverfront properties along Dorval Road. Riprap armoring will protect these properties from ongoing erosion and therefore prevent additional sedimentation into the river. Rock placement has been focused in 5 locations based on flow predictions in hydrotechnical modeling and existing erosion. Design drawings have been included in *Appendix A*.

Figure 2 below illustrates the proposed placements for erosion protection. The 100 kg riprap to be placed in Sites A, C, and F will provide erosion protection to private landowners on Dorval Road. Site B will have 100 kg riprap protecting the riverbank and will also be keyed back into the bank to provide erosion protection should the river's course naturally meander in that direction. Site E is along the bank of an elevated side channel that will be willow staked for the length of the channel to provide some erosion protection without hardening the bank. Because the channel at Site D is narrower, and on the outside bend, riprap in this section will be 250 kg to accommodate increased flows.



Figure 2. Overview of proposed project.

An 85 m section of Area A was previously riprapped by others. It is unknown if the rock in this area is of the same thickness or size as the rock prescribed throughout the project. Once construction begins, this will be investigated by the engineer. The existing rock may need to be augmented to meet design specifications or may be deemed adequate and left as-is.

2.1. PROJECT TIMING

Work is expected to occur between late summer 2022 and winter 2023. This includes time required for site preparation of the upper riverbanks above the water level prior to construction, and revegetation after the work is complete. At this time, the RDFFG plans to start the in-stream portion of the project installation during winter 2022-2023 within the requested extension to the least-risk timing window (January 1 to March 15) under frozen conditions. Work is expected to be completed in 12 weeks. Instream live stakes will be installed in winter, as the rock is being installed, and the remainder of revegetation will occur in spring or fall immediately following rock installation. All work must be completed prior to Oct 1, 2023.

2.2. PRELIMINARY CONSTRUCTION SEQUENCE

The design drawings have been included in [Appendix A](#). Works will be undertaken by RDFFG contractors. The following sequence is expected, but may be changed based the Contractor's work plan and permit requirements (order of events may change with no impact to overall project):

- If required, install turbidity curtain, and conduct fish salvage;
- Working from above, an excavator will pull back the upper riverbank slope and contour the slope to the proper grade;



- Install geotextile fabric, rock riprap, and instream willow live stakes;
- If installed, remove site isolation (turbidity curtain); and
- Revegetate remaining disturbed work areas as per design.

2.3. SITE ACCESS

Site access is via several pre-determined access routes through public, private, and MoTI ROW. Access is limited to the pre-determined access routes only.

2.4. APPLICABLE LEGISLATION

All work must comply with the conditions of regulatory agency approvals and permits obtained to proceed with construction activities, as well as MoTI Standard Specifications (2020). This section outlines the federal and provincial legislation applicable to the project, which includes:

- *Canadian Environmental Protection Act;*
- *Fisheries Act;*
- *Hazardous Products Act;*
- *Migratory Birds Convention Act;*
- *Species at Risk Act;* and
- *Transportation of Dangerous Goods Act.*

Applicable provincial environmental protection legislation include:

- *Heritage Conservation Act;*
- *Environmental Management Act;*
- *Spill Reporting Regulation;*
- *Water Sustainability Act;* and
- *Wildlife Act.*

Approvals are required from the provincial (*Water Sustainability Act*) and federal (*Fisheries Act*) regulatory agencies prior to starting work. Where work will be conducted within the wetted channel, a Scientific Fish Collection Permit will be required if in-water isolation of the streambank work area may entrap fish. The agencies may require that additional environmental provisions beyond those listed in the EMP be incorporated into project approvals as a result of their Changes In and About a Stream review process. Copies of the EMP and all approvals must be kept on-site for the duration of the project.

3. Roles and Responsibilities

3.1. PROJECT ORGANIZATION

The RDFFG is the Project Owner and McElhanney is the Engineer of Record. A Contractor will be selected through competitive tender to construct the project as per the design drawings supplied within the Tender Package. The Contractor will engage an Appropriately Qualified Professional (AQP) to provide oversight of project compliance with the environmental protection requirements of the project.



3.2. PROJECT OWNER

The RDFFG owns and has the ultimate responsibility for the Project and safety for the users of the infrastructure.

Responsibilities include the following:

- Obtain Project Approvals, as required by regulatory agencies.
- Incorporate standard terms and conditions, and contract-specific environmental stewardship roles and responsibilities, in contract and subcontract agreements.
- Incorporate environmental protection requirements and information into contract agreements, and confirm that appropriate site-specific environmental permits, procedures, training, and records are reviewed and accepted before the Contractor's site activities begin.
- Confirm that the overall, job-specific environmental protection goals are fully and continuously implemented for full project compliance.
- Appoint a qualified Environmental Auditor to liaise with the Contractor's environmental monitor and audit project adherence to environmental requirements as per EMP, CEMP, and environmental legislation and regulations.

3.3. ENVIRONMENTAL AUDITOR

The role of the Environmental Auditor is to verify that project work activities comply with environmental legislation and ensure that contractual obligations and the conditions set out in regulatory permitting are achieved.

Duties and responsibilities of the Environmental Auditor include the following:

- Attend project kickoff and construction meetings (in person or via phone) as needed.
- Verify that project environmental permits are obtained and are available onsite, and that project execution complies with these permits.
- Review the Contractor's completed CEMP, procedures, and site-specific plans for compliance with the EMP.
- Liaise with the Contractor's Environmental Monitor and audit project adherence to environmental requirements as per EMP, CEMP and environmental legislation and regulations, and applicable project permits.
- Coordinate and communicate with regulatory agencies, interested, and potentially affected general-public stakeholders.
- Facilitate environmental regulatory agency inspections should these occur; this includes accompanying the inspector, providing the inspector with the necessary documentation, and addressing issues identified during the inspection.
- Assist in emergency situations or incidents to minimize adverse environmental effects.



3.4. THE CONTRACTOR

The Contractor will be responsible for the following:

- Retain an AQP (as defined by SS165) to prepare a CEMP for the construction activities associated with the project.
- Understand and implement project activities without compromise to the environment.
- Update the CEMP as necessary during the implementation of the work to address changes in work plan or activities and submit revised drafts to the RDFFG for approval.
- Comply with all regulatory authorizations, approvals, permits, acts, and bylaws associated with the project.
- Ensure that staff are adequately orientated and trained on CEMP contents and implementation of procedures and best management practices (BMP).
- Ensure that all wastes generated, hazardous and non-hazardous, are disposed of in accordance with the British Columbia Ministry of Environment and Climate Change Strategy Regulations.

3.5. ENVIRONMENTAL MONITOR

Qualified Environmental Monitors (EMs) will be retained by the Contractor to oversee that project construction activities comply with environmental provisions as defined in applicable legislation, regulations, guidelines, contract documents and specifications, the EMP, the CEMP, industry and agency BMPs. All EMs for the Project must be AQPs with relevant experience in environmental monitoring of similar types of projects.

The EM will observe, record, and report on all activities and document any changes made to the CEMP prior to, during, and following construction, as necessary. EM tasks, in part, are to:

- Monitor and report on a regular basis, to ensure project adherence to environmental requirements as per EMP, CEMP and environmental legislation and regulations.
- Monitor, evaluate, and report on the effectiveness of work practices, procedures, and mitigation measures implemented.
- Review all erosion and sediment control measures/structures and monitor and report on effectiveness.
- Review of fuel handling and storage practices, and spill response provisions.
- Monitor and report on work in or around environmentally sensitive areas, special erosion protection zones, and fish or riparian habitat.
- Monitor and report on compliance with environmental legislation and regulations (provincial and federal).
- Monitor and report on the performance of the Contractor with respect to environmental protection and compliance.
- Inform the contractor on upcoming environmental concerns, as weather changes and work activities progress.
- Attend (in person or via phone) construction meetings as necessary to discuss environmental issues, concerns, suggested solutions, and up-coming measures that are needed to allow for Project execution.



- The EM must be available throughout the duration of the work to represent the Contractor in all matters related to the protection of the environment and, in particular, be available to attend all key meetings at which environmental protection measures are to be discussed.

Other tasks may include providing active bird nest surveys prior to vegetation removal, monitoring impacts of construction activity on species at risk in the area and addressing any wildlife issues that may arise.

Higher risk activities associated with the project where the EM should be on-site includes, but is not limited to:

- Inspection of equipment and vehicles for leaks or spills;
- Work undertaken within the wetted perimeter of the Dore River;
- Any work with the potential to cause major adverse impacts to the Dore River;
- Clearing and grubbing activities within 30 m of the Dore River; and
- Regular inspection of erosion and sediment control measures, particularly during heavy or prolonged precipitation.

In the event of an environmental incident, the EM must immediately report the incident to the appropriate authority (when required by statute), the Contractor's Project Manager, and RDFFG Project Manager.

4. Environmental Setting

Dore River (watershed code: 100-834900) is a 40 km long tributary of the Upper Fraser River, located in the eastern part of the Robson Valley area of the Omineca Region. The Dore River watershed covers 419 km², originating in the alpine and is partially fed by glacier runoff. The most dominant land cover in the watershed are barren (31%), coniferous forest (43%), and snow/glacier (11%).

4.1. FISH & INSTREAM WORK WINDOWS

Fish species listed as either present in adjacent parts of the Fraser River (1.7 km downstream from the Site) and or present in the Habitat Wizard stream report for Dore River include Bull Trout (*Salvelinus confluentus*), Mountain Whitefish (*Prosopium williamsoni*), Rainbow Trout (*Oncorhynchus mykiss*), and Chinook salmon (*Oncorhynchus tshawytscha*). *Table 2* lists the Instream Work Window for streams containing these fish species. Exemption from these limits will be requested to allow some flexibility to the construction timing.



Table 2. Instream Work Windows (Reduced Risk Windows) for Dore River fish species, including potential species, for the Kalum Forest District (Kalum and Nass Timber Supply Areas).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bull Trout						15		15				
Chinook salmon						15	15					
Rainbow trout				15			15					
Mountain whitefish						1			15			

NOTE: White (non-shaded) areas indicate the reduced risk work windows.

4.2. FISH HABITAT

Based on the DFO aquatic species at risk map there are no species at risk or critical habitat areas identified in the Dore River. Overall, while gravel areas are present, there is a lack of overhead cover and undercut banks and combined with the naturally high turbidity of the river, the observed fish spawning habitat at Dore River is expected to be of poor quality (Canada 2019a, 2019b). Pools that may provide overwintering habitat are present along Site B and Site D, however shallow runs between the pools are likely to freeze, leaving pools isolated (McElhanney, 2021). Rearing habitat is present throughout the site. While mature forest is present along the river edge through much of the site, there is limited overhanging vegetation or cover provided by these trees. The littoral area was devoid of vegetation.

4.3. BIRD NESTING WINDOWS

Vegetation removal will occur within the least risk window and all trees will be felled away from the stream to avoid impacting the channel during construction. Any tree that falls into the channel will be lifted out (not dragged) to protect remaining vegetation and the stream channel. If clearing cannot be avoided outside of the least risk window, a breeding bird nest survey should be conducted by an AQP to identify active nests and apply appropriate site- and species-specific No Work Zone buffers, as required.

5. Potential Environmental Impacts

A review of the project was undertaken to identify potential environmental impacts and mitigation measures associated with the proposed erosion and scour protection works. The construction activities that are likely to impact environmental values are:

- Placement of riprap;
- Sloping the banks;
- Site access for machinery use; and
- Spills/leaks from machinery.

These works were then compared to DFO's Pathways of Effects for determination of impacts to habitat (Table 3). We determined the risk for all pathways to be low and mitigable.



Table 3 Potential Environmental Impacts

Impact	Risk Assessment	Mitigation
Fish Mortality	Low	Work will be performed, to the fullest extent possible, in isolation of flowing water. Otherwise, clean rock will be placed slowly, and precisely into the wetted channel using an excavator with bucket and thumb. If fish entrapment is probable, then fish in the project area will be removed from site prior to construction and relocated outside of the isolated instream work area.
Riparian Habitat	Low	Minimize amount of vegetation clearing required to access the site; revegetate as soon as possible after construction is complete. Avoid damaging or removing mature trees.
Change in sediment concentrations	Low	Work will be performed, to the fullest extent possible, in the dry. Erosion and sediment control measures will be implemented, and the site monitored by an AQP.
Potential mortality of fish/eggs/ova from equipment	Low	Inspect for presence of redds beforehand. Do not commence works if a redd is located. Not a known spawning area, so no eggs are expected to be present.
Change in access to habitat/migration	Low	No change expected to habitat/migration access.

6. Construction Environmental Management Plan (CEMP)

The Contractor is responsible for providing a CEMP prepared and/or signed by an AQP. The CEMP will describe in detail the prescriptive measures to mitigate environmental concerns associated with the project.

This section specifies the general mitigation measures and other environmental requirements to be implemented by the Contractor during the project. Compliance is required with both this EMP, SS165, and all regulatory agency requirements. As required by the *Water Sustainability Act* Section 11 Change Approval, the CEMP must be prepared and signed by an AQP and shall be submitted for review and acceptance by the Assistant Water Manager at least fifteen (15) working days in advance of commencement of those changes.

BMPs and procedures for the protection of the environment will be carried out in accordance with the MoTI Vol. 1 2020 Standard Specifications for Highway Construction Section 165 'Protection of the Environment' (SS 165), specifications within this EMP and all applicable provincial and federal standards.

Guidance documents that may be applicable to the project are listed below. This list should not be considered exhaustive. The Contractor is responsible for ensuring that all appropriate BMPs and guidance documents are evaluated whether listed herein or not, and that appropriate measures are employed.

- MoTI SS 165 – Protection of the Environment (MoTI 2020);
- Omineca Region - Reduced Risk In-stream Work Windows and Measures, Ministry of Water, Land and Air Protection, (MWLAP 2005);



- Requirements and Best Management Practices for Making Changes In and About A Stream in British Columbia. Version 2022-01. Government of British Columbia.
- Approved Water Quality Guidelines; Ministry of Environment (MOE 2014a);
- Canadian Council of Ministers of the Environment (CCME) Environmental Quality Guidelines for the Protection of Aquatic Life (CCME 1999);
- Environmental Guidelines for Urban and Rural Land Development in British Columbia (MOE 2014b);
- Land Development Guidelines for the Protection of Aquatic Habitat (Fisheries and Oceans Canada 1993);
- National Guide to Erosion and Sediment Control on Roadway Projects (Transportation Association of Canada 2005);
- A Field Guide to Fuel Handling, Transportation and Storage (MWLAP 2002);
- Environmental Best Practices for Highway Maintenance Activities (MoTI 2018).

6.1. SITE ISOLATION, FISH SALVAGE, AND WATER QUALITY MONITORING

It is anticipated that water levels will be low, and mainly frozen at the time of construction, which will minimize the amount of in-water work. The Contractor's CEMP must outline how the works will be undertaken in a manner which prevents the harmful alteration, disruption, or destruction of fish habitat.

Where rip rap placement is required in the water, without excavation, individual clean rocks may be placed by an excavator in a manner which prevents generation of excessive sediment, and which allows transient fish to escape the area. If the proposed plan includes no isolation of the work area, there must be a clear plan outlining how the British Columbia Approved Water Quality Guidelines for Aquatic Life will be monitored and implemented (BC ECCS 2021). If site isolation is to be installed, details of installation, monitoring and fish salvage are to be provided. The CEMP must also provide a contingency plan, to be implemented if the proposed plan is deemed ineffective. Monitoring by the AQP will occur throughout the project duration, specifically during in-stream work activity, to ensure compliance with BC water quality guidelines and all agency Approvals.

6.2. EROSION AND SEDIMENT CONTROL

All works will be undertaken in a manner which avoids or minimizes erosion problems and the discharge of deleterious substances into any watercourse. The Contractor is responsible for preparing and implementing an Erosion and Sediment Control Plan (ESCP) for the project. The Contractor will provide a site ESCP to the RDFFG for review a minimum of 15 days prior to commencing any work site activity. The plan must consider, at a minimum:

- A schedule for the proposed activities, as they pertain to the ESCP;
- A description of construction procedures to be used to limit the potential for erosion and sediment production, including estimates of work areas where applicable (e.g., volume of material in a proposed stockpile site), description of construction equipment to be used, and staging of operations;
- A description of the site-specific measures for runoff and drainage management;



- A description of the site-specific mitigation measures and design information for erosion prevention and control;
- A description of mitigative measures for ensuring acceptable water quality in the Dore River;
- A written commitment of on-site equipment and materials for an emergency erosion, sediment and drainage control situations that may arise;
- A description of the specific monitoring procedures during all stages of the project.

The Contractor will incorporate all permanent soil erosion control features into the project at the earliest practical time, as outlined in the accepted work schedule. The Contractor is also responsible for temporary ESC measures, including inspection of the integrity of these measures during adverse weather conditions, or when construction operations are proceeding in Environmentally Sensitive Areas (ESA). Control measures must be capable of continuous operation during working and non-working hours. Any deficiencies observed in ESC measures must be immediately corrected.

6.3. VEGETATION MANAGEMENT

Retain existing vegetation wherever possible. All disturbed areas will be seeded as soon as practical, once construction is complete. Grass seed may vary through the Sites. Areas that are currently lawn on private land may be seeded with a lawn seed and may be left un-mulched. Areas previously undisturbed will be seeded with an appropriate reclamation grass seed mixture, suitable for the climate and region. The Contractor may choose to use a hydroseed application or may choose to hand seed and apply straw mulch. If the area is not revegetated immediately after construction, adequate ESC measures will be put in place and the site will be monitored throughout the winter for erosion until it is revegetated in the spring.

Replanting will vary by Site, dependant on existing conditions and land use. Areas to be cleared for machine access will be replanted with similar species. Plant stock will be sourced as local as possible, and/or will be appropriate for the biogeoclimatic zone and region. Planting will most likely include spruce tree seedlings and shrub seedlings such as rose or thimbleberry and will match existing areas. On private land, some areas may be left as lawn and/or vegetated with ornamental species. Previously forested areas that require clearing for machine access will be replanted at a density of 1 plant per 1 m². Sites that are previously disturbed will be revegetated to a density of 1 plant per 3 m² or match existing site conditions.

As part of the CEMP, the Contractor will inventory vegetation types and densities removed or impacted at each Site so that the appropriate level of revegetation may occur. The final monitoring report will document the number and density of trees planted in each area, so they can be followed for survival.

6.4. INCLEMENT WEATHER AND WORK STOPPAGE

The CEMP should include provisions to modify, relocate, or cease works within the project area during periods of inclement weather. Should a work stoppage occur, the Contractor must ensure that all mitigative and environmental protection measures have been implemented to safeguard the environment and the project.

6.5. EQUIPMENT, FUEL HANDLING, AND SPILL CONTINGENCY

The following is a list of BMPs associated with refueling and the storage of fuel for construction works to minimize the risk of spills.



- Equipment working on this project will be clean and free of leaks. It is preferable that machines working within the wetted area of the streams use biodegradable hydraulic fluids.
- Refueling and fuel storage will be located a minimum of 30 m from the edge of the watercourse on flat ground or ground that slopes away from the stream.
- Spill kits will be available at all refuelling areas, and on all heavy equipment to allow immediate response to spills. All onsite staff should be trained in refuelling practices, handling requirements, and spill kit location plus deployment.
- Fuel must be properly stored within tidy-tanks or in approved secondary containment facilities. Small fuel tanks must be stored within containment areas or spill trays capable of containing 125% of the volume of the liquid.
- Pumps, generators, or other small equipment will be placed on a spill tray when working near water.

6.5.1. Spill Response and Reporting

A spill response and reporting procedure will be defined by the Contractor as part of the CEMP and will be submitted to the RDFFG for review 14 days prior to the commencement of work. Spills should be reported to the Construction Supervisor and EM as soon as possible. Any spill entering a waterbody must be reported to Emergency Management BC (EMBC) at 1-800-663-3456. Spills of fuels onto land greater than 100 L in volume must also be reported to EMBC.

7. Monitoring and reporting

7.1. ENVIRONMENTAL MONITORING

The Contractor must have an AQP on site at all times during in-stream works and/or during work considered to be high environmental risk. Weekly observations and monitoring records must be kept and will be presented in a final Post-Construction Monitoring Report. Brief weekly updates will be provided to the environmental auditor (on behalf of the RDFFG).

The final monitoring report will summarize construction activity, monitoring records, aquatic species protection measures, and site replanting/revegetation efforts. The report must detail the number, species and density of vegetation planted at each Site. This report is to be signed by the primary AQP who completed the monitoring, and must be provided to the RDFFG within 60 days of the completion of the project in-stream construction activity.



8. References

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APPENDIX A – ENGINEERED DESIGN

Refer to IFT Drawing Package

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