

PART 1 - GENERAL

1.1 SECTION INCLUDES .1 Installation of new optional mooring system in the location and to the details included in Appendix "C" with references to the project specifications and drawings.

1.2 RELATED SECTIONS .1 Section 03 10 00 - Concrete Forming & Accessories.
.2 Section 03 20 00 - Concrete Reinforcing.
.3 Section 03 30 07 - Concrete Repairs.
.4 Section 05 55 00 - Metal Fabrications.

1.3 REFERENCES .1 American Society for Testing and Materials (ASTM)
.1 ASTM A252-10, Standard Specification for Welded and Seamless Steel Pipe Piles.
.2 ASTM A123/A23M-13, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
.2 Canadian Standards Association (CSA).
.1 CSA W59-13, Welded Steel Construction (metal arc welding).
.2 G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel Products.
.3 Tender specification and drawings for the fishway upgrade project at Bishop's Falls, October 2015. The project specification includes sections that are referenced throughout.

1.4 SHOP DRAWINGS .1 Submit shop drawings in accordance with 01 33 00-Submittal Procedures for review including reinforcing steel, pipe pile, anchors, miscellaneous metals, concrete mix design.
.2 Submit manufacturer's certification that materials will be manufactured and tested in accordance with this specification.

- .3 Submit methodology for construction of new mooring system including pipe pile installation methods, to the Departmental Representative at least three (3) weeks prior to the proposed start of work for approval.

1.5 MEASUREMENT FOR PAYMENT

- .1 Mooring System (OPTIONAL): the supply of all materials, labour, equipment and complete construction of the entire mooring system, as detailed on the drawings and specified within, will be measured as a lump sum item under Optional Mooring System on the Bid and Acceptance form. As this is an optional item, include all costs that would be specific to completing this work independent of the costs included for non-optional work items.
- .2 Include incidental to this item all cost to modify the original railing layout (as per project Drawing C4) at the entrance to Pool #5 to incorporate a drop-in-gate for access to the mooring block, as indicated on the sketches included in Appendix C.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Steel pipe pile to ASTM 252 Grade 2, minimum tensile strength 414 MPa, minimum yield strength 240 MPa. Fabricate full length piles to eliminate splicing during installation wherever possible.
- .2 Miscellaneous metals as per Section 05 50 00 - Metal Fabrication.
- .3 Reinforcing Steel as per Section 03 20 00 - Concrete Reinforcing.
- .4 Concrete and rock threaded anchors and bolts to F1554 Grade 36, Heavy Hex Nut A563, Washers F436, Hilti Hit-RE 500 epoxy adhesive, or approved equal.
- .5 Concrete materials as per Section 03 30 07 - Concrete Repairs.
- .6 Weld on lifting eye, hot dipped galvanized with

minimum working live load (WLL) of 3.75 tonnes. Dimensions as indicated on the drawings. Secure lifting eye with anchors/bolts as per size indicated on the drawings.

- .7 For steel designated to be primed and painted use one (1) coat of exterior oil ferrous metal primer and two (2) coats of alkyd/oil resin paint as specified. Paint materials for each coat to be product of a single manufacturer as specified, ensure previous coat of primer or paint is dry before second coat is applied.
- .1 Primer: Alkyd undercoat, exterior oil ferrous metal primer, similar to Pittsburgh 6-208 (Pittsburgh 6-212 or Pittsburgh 90-712, Low Voc option).
- .2 Paint: Alkyd/oil resin paint similar to Pittsburgh paints "Safety Yellow" Product ID 7-808, Paint to conform to CAN/CGSB-1.61-2004.

2.1 Concrete Mixes

- .1 Concrete mix to be in accordance with Section 03 30 07 - Concrete Repairs, Cast-in-Place Concrete for New Structures, Part 2.2 "Mixes" and Part 3.5.
- .2 The slump at point and time of discharge should be as required for the chosen placement method.
- .3 Admixtures: to approval of Departmental Representative. Use admixtures to correct deficiencies in mix or to improve placement of concrete.

PART 3 - EXECUTION

3.1 Pipe Pile Installation

- .1 Pipe pile shall be installed in the location shown on the drawing, coordinate location with Departmental Representative.
- .2 At least three (3) weeks prior to installing the pipe pile, the Contractor shall submit the details and specifications of proposed pile installation equipment to be used for the project. Pile installation equipment shall be capable to installing the pile to anticipated elevations as indicated on the drawings.
- .3 Clean and remove excess loose rocks and debris as

- required to advance pile to elevation indicated. Pipe pile to be installed open ended using top driving techniques combined with churn drilling methods if necessary, vibratory techniques or down hole drilling type procedures.
- .4 After advancing the pipe pile to the elevation or penetration indicated, clean out pipe by removing all soil and debris from inside of the pipe to toe of pipe pile. Drill socket for anchored pile beyond toe of pipe pile as indicated. The method used to construct the rock socket shall produce a side wall in the bedrock that is free from loose rock, smearing of fine grained materials or other contamination which may diminish the bond between the concrete and the wall of the bedrock. After socket has been drilled, thoroughly clean out inside of the surface of the socket. If muddy water is present, it shall be removed or replaced with clean water. The contractor shall select its own method of installing the steel pipe pile, sealing it into bedrock and drilling the rock socket.
- .5 The Contractor shall make all attempts necessary to obtain a dry pile hole prior to placing pile concrete. If in the opinion of the Departmental Representative that all attempts to achieve a dry pile hole have been taken and proven unsuccessful, placement of pile concrete underwater will be required. Obtain Departmental Representative's approval of construction methodology before placing concrete.
- .6 Place concrete in one continuous operation to full depth required. Provide sufficient supply of concrete to complete pour without interruption and supply complete equipment for every phase of operation. Concrete shall not be placed in water which is below 5°C. Provide temporary bracing to stabilize pipe pile as necessary during placement and curing of concrete to approval of the Departmental Representative.
- .7 Tremie Method of Placement:
- .1 Provide a tremie pipe which is watertight and sufficiently large to allow free flow of concrete. Diameter of tremie pipe to be not less than 125mm, unless approved otherwise by the Departmental Representative.
- .2 Provide a hopper at top of tremie pipe and means

to raise and lower tremie. Provide plug or foot valve at end of tremie pipe to permit filling pipe with concrete initially.

.3 Start placement with tremie pipe full of concrete. Keep bottom of pipe buried minimum 300mm in freshly placed concrete. Control rate of flow by increasing or decreasing depth of end in concrete.

.4 If seal is lost, allowing water to enter pipe, withdraw pipe immediately. Refill pipe, and continue placing as specified.

.7 Pumped Concrete Method:

.1 Follow procedures as for tremie method in placing concrete using discharge line from concrete pump as tremie pipe.

.2 Pump discharge line to have a minimum diameter of 125mm, unless approved otherwise by the Departmental Representative.

.8 Refer to Section 03 30 07 - Concrete Repairs for all other related concrete materials and execution.

3.2 Mass Concrete Block

.1 As per Section 03 30 07 - Concrete Repairs, Cast-in-Place Concrete for New Structures, part 3.5.

.2 In areas where an existing concrete surface is to receive new concrete, roughen surface of existing concrete to full amplitude of at least 5 mm and remove all loose material prior to application of bonding agent.

.3 The new concrete block shall be placed on competent bedrock material properly prepared to receive new concrete as per Section 03 30 07.

3.3 Miscellaneous Metals

.1 As per Section 05 50 00 - Metal Fabrications.

.2 All bolts, nuts, washers and fasteners to be hot dipper galvanized with zinc coating to ASTM A153/A153M, latest edition, unless otherwise noted.

.3 Dissimilar metals to be separated with isolation

coating by means of bituminous paint or an alternate isolation approved by the Contractor.

- .4 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Protect integrity of galvanized surfaces during any cleaning process.

3.4 Archival Photographs .1 Archival photographs are provided below for purpose of showing the approximate location of the new mooring devices. These photos are intended to give the contractor an appreciation of site conditions. Repairs have been ongoing to this structure over the years and the condition of some items may have likely worsened. Therefore, what is depicted in the photos may not be an accurate assessment of the present state of the fishway. These photos should in no way be considered a replacement to an actual site visit. Contractors are encouraged to visit the site as per Section 01 10 10 - General Instructions, part 1.7 of the project specification. Any interpretations and/or assumptions made with respect to these photos are the contractor's responsibility.



2009 - Existing Dam and Breakaway Wall



2009 - Looking upstream towards Pool No. 5 & 6, showing steep rock shoreline beyond



2009 - Downstream of concrete dam near fishway entrance at Pool No. 1. Partially installed steel bar diversion wall constructed over breakaway wall



2009 - Upstream riverbed during low flow conditions with exposed dam section and breakaway wall



2009 - Approximate location of new on-shore mooring block near entrance to Pool No. 5



2009 - Approximate location of new on-shore mooring block near entrance to Pool No. 5



2009 - Upstream riverbed during low water conditions