Mary River Iron Mine
Nunavut Water Board Water License
Application Section 9
Representative Crossing Summary Sheet

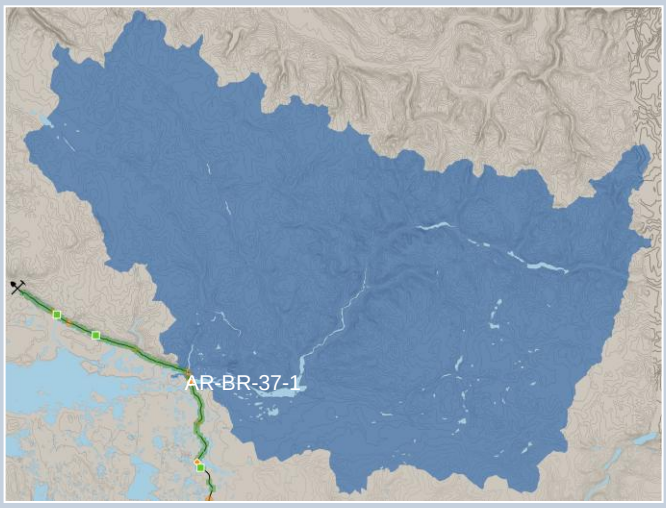
# AR-BR-37-1

Zone: 17W
Easting: 595447
Northing: 7894053
Station: 37+572

| | |
|---|---|
| Fish Habitat | Important fish habitat |
| Structure Design | No. Spans: To be determined by contractor<br>Span Lengths: minimum 10 m<br>Bridge Type: Temporary Multispan<br>Slope: 3.1 % |
| Drainage Area | 5601.0 km$^2$ |
| Design Flow | 10 yr 3 day delay = 423.48 m$^3$/s<br>200-yr = 2124.71 m$^3$/s |
| Downstream Velocity | |


## Description of Crossing Structure

The representative access road bridge crossing, AR-BR-37-1 is still in the conceptual design stage, but at a minimum will consist of 15 individual 10 metre spans utilizing either steel or precast concrete girders crossing the Ravn River. The Ravn River is a significant waterway in the area and is believed to maintain water flow year round. The river is considered navigable and is classified as a high importance fish habitat.




Representative Culvert
Representative Bridge
Culvert Locations
Bridge Locations
Drainage Area
Rail Alignment
Watercourses
Lakes

km
0 15 30

E337697-2000-07-124-0001

## Crossing Construction

The construction of access road bridge AR-BR-37-1 will occur over a period of up to two-weeks. The multispan structure will consist of a minimum of 15 spans with minimum span lengths of 10 m. The steel plate bridge deck will be 7.5 m in width and rest on bridge piers no wider than 10 m. Clearance from the normal water level will be 6 m. Bridge piers will be constructed of either rock filled cribs or bins which will be placed on the river bottom. No excavation of the river bed is anticipated for the placement of the bridge piers. Abutments will be constructed in a similar manner with a 2 m setback from the high-water mark of the river and a 2 m clearance from the river bank. No excavation of native material is anticipated for the abutments. Silt fencing will be placed on the banks to prevent sediment from entering the watercourse throughout construction.

No determination has been made regarding removal of the temporary bridge prior to the spring freshet to prevent potential damage during heavy flows.

Anticipated machinery required for the construction includes trucks, crane, and backhoe. Materials and machinery will be transported to and from the site on an access road or on the rail alignment. All construction activity will be restricted to the area within the identified construction right-of-way zone.




DILLON CONSULTING

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**Site Photos**

1

2

3

Photo 1 is an aerial image of the Ravn River of the crossing area. Photos 2 and 3 are taken at the approximate crossing location, looking downstream and across from the northern shore.

**Existing Conditions at Crossing Site**

The lands surrounding the Ravn River Crossing are relatively flat and are characterized by numerous ponds and small lakes. Approximately 9 km downstream of the crossing, the river enters Angajurjualuk Lake. This site is an important fish habitat and provides abundant, suitable habitat for both Arctic Char and the Ninespine stickleback. The river at this location has high potential as rearing habitat and as a migration corridor for both species. However it does not provide overwintering habitat for either species and only provides low spawning habitat potential for ninespine stickleback.

| | | |
|---|---|---|
| Navigability: | Navigable | |
| Width and Depth: | Bankflow width = 146m<br>Wetted width = 114m<br>Maximum Depth = >1m | |
| Substrate and Vegetation: | Channel Morphology: 50% Riffle, 20% Pool, 30% Rapid<br>Substrate Composition: 5%Fines, 15% Gravel, 50% Small Cobble, 20% Large Cobble, 10% Boulder<br>Stream Cover: N/A | |
| Channel Meander Pattern: | Floodplain Width (m): not measured<br>Channel Pattern: Meandering<br>Channel Confinement: Partially Confined<br>Channel Gradient: <0.5º | Bank Height (L/R; m): 0.0-3.0<br>Bank Shape (L/R): 20% undercut, 80% sloped<br>Bank Stability: Not determined |
| Fish Habitat : | The Ravn River provides abundant suitable habitat for both Arctic char and the ninespine stickleback species. | |

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| Predicted Environmental Impact | Proposed Mitigation |
|---|---|
| Direct loss of fish habitat from structure installation. | • If construction of the bridge crossing is determined to result in a Harmful Alteration, Disruption or Destruction (HADD) of fish habitat, DFO will determine appropriate measures to ensure "no net loss"<br>• Watercourse channel will be restored to the original stream flow characteristics following removal of the bridge |
| Potential for fish stranding or mortality during construction | • In water work will be limited to the placement of bridge piers; no significant changes to water levels are anticipated, fish mortality is not anticipated during pier placement.<br>• No Arctic char spawning habitat present, construction can occur during winter season as this part of the Ravn River is likely to freeze to bottom |
| Potential for barriers to fish passage | • Fish passage will be maintained (multispan bridge) for the duration of the life of the temporary bridge (1-2 years) |
| Potential for loss of riparian habitat within the footprint | • Restoration of riparian habitat following removal of abutments |
| Sediment effects and degradation of water quality due to sediment or other contaminants both at the crossing and downstream | • Construction will follow practices outlined in the Section 9.6 and Project EMS |
| Damage to stream banks from construction equipment increases the potential for erosion | • Operate machinery on land (above the HWM) and in a manner that minimizes disturbance to the banks of the watercourse.<br>• Install effective sediment and erosion control measures before starting work to prevent the entry of sediment into the watercourse. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.<br>• Banks and substrate will be restored to pre-construction condition. |
| Removal of vegetation at crossing locations. | • This removal should be kept to a minimum and within the right-of-way.<br>• Approaches will be designed and constructed so that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation.<br>• Any disturbed areas will be vegetated by planting and seeding native species and areas with be covered by mulch to prevent erosion and to help seeds germinate. The site will be maintained until site is stabilized by vegetation. |
| Direct or indirect impact from blasting. | • Blasting is not anticipated. |
| Potential for spills of fuel or other fluid from construction vehicles | • Adhere to contingency plans identified in the project EMS (DEIS, Volume 10).<br>• Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks. Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.<br>• Keep an emergency spill kit on site in case of fluid leaks or spills from machinery. |
| Solid waste could foul the local environment and attract scavengers (i.e. polar bears) | • Solid waste generated at the crossing site will be removed from the site and disposed of in accordance with applicable Nunavut regulations. |