



Atlantic Industries Limited

# PROJECT PROFILE



August 8, 2018

## Bolt-A-Plate Culvert ready for Northern BC extremes

In the Peace River area of Northern British Columbia, severe flooding had completely overwhelmed a 900 mm culvert and washed out busy Highway 97 at Grizzly Creek, near Chetwynd.

The BC Ministry of Transportation and Infrastructure (BC MoTI) contracted McElhanney Consulting Services Ltd. to review crossing replacement options. For this project's accelerated construction schedule they selected a Bolt-A-Plate Horizontal Ellipse structure from AIL.



### Project at a glance:

**Name:** Grizzly Creek

**Location:** Highway 97, south of Chetwynd, BC

**Owner:** BC MoTI

**Engineer:** McElhanney Consulting Services Ltd.

**Hydraulic Consultant:** NHC

**Product:** Bolt-A-Plate Horizontal Ellipse

**Application:** Stream Crossing Culvert Replacement

**Sector:** Northern

**Dimensions:** Span 5.6 m, Rise 3.6 m





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## Customized with steel armour plate invert

This mountainous area is characterized by extreme events with fast-moving water carrying cobble and boulder substrate. Northwest Hydraulic Consultants Ltd. (NHC) recommended additional armouring of the culvert invert plates to better withstand abrasion. We supported McElhanney in modifying our structure design to better handle this. A unique armour plate system was attached to the structure's lengthened plate bolts which had been flipped around to have the nuts on the inside. Once the plates were installed, protective steel angle iron caps were welded into place to protect the nuts and bolts.

## Other customizations that helped handle the extreme flows

Everyone on the multi-partner project team contributed to making this solution the best it could be to withstand future extreme weather events.

Due to the elliptical shape of the structure, we recommended flowable backfill for the lower invert zone to speed installation.

On NHC's advice, McElhanney designed robust, cast-in-place end collars and cut-off walls along with an energy-dissipating concrete outlet slope and rock plunge pool.

McElhanney also recommended and provided preliminary design of a V-shaped steel trash rack to deflect debris and prevent jams at the inlet end, while maintaining optimal flow capacity through the culvert. McElhanney completed the detailed design of the trash rack, which was locally fabricated by others.

All parties were very pleased with the result and especially appreciated that the new tricked-out culvert stood up to another extreme flooding event in 2016 without damage.

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