

F.L.O.W.
Consulting

BOUTOT BROOK CROSSING: CULVERT REPLACEMENT

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Client: Lindon Miller, NBDTI



Problem Statement

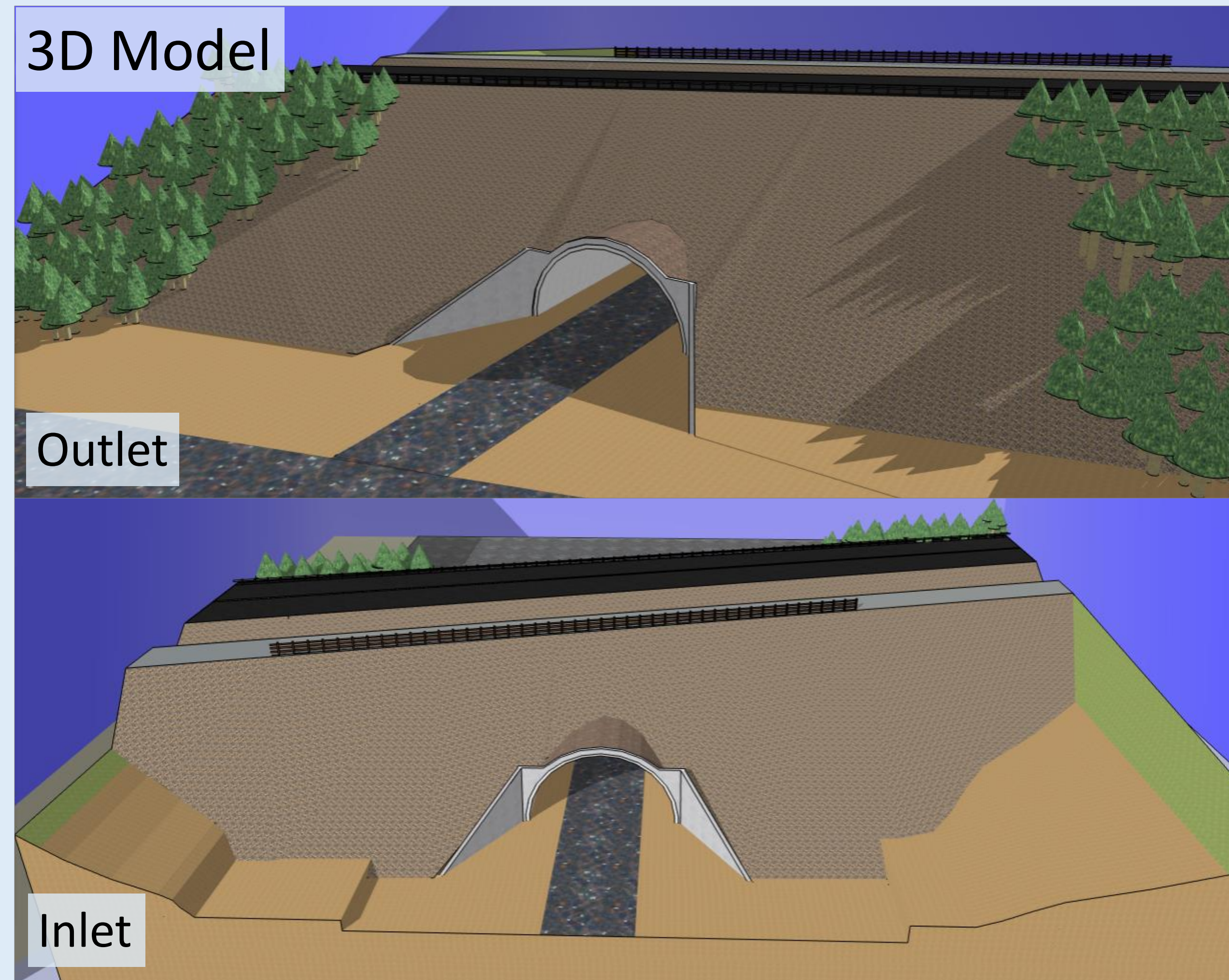
NBDTI is concerned there is a risk of a washout of the Boutot Brook No.1 twin box culvert within its expected service life, and subsequently the West River Road and the NB Trail, in Argosy, NB. The existing culvert periodically gets obstructed with accumulating sediment and must be regularly cleared out, resulting in annual maintenance costs ranging from \$40,000 to \$50,000. The heavy sediment flow blocks fish passage baffles and is abrasive to the concrete, exposing reinforcement.

Objective

To replace existing twin box culvert with an open-bottom concrete arch culvert to convey water from Boutot Brook to the Saint John River and to allow improved bed load passage through the structure.

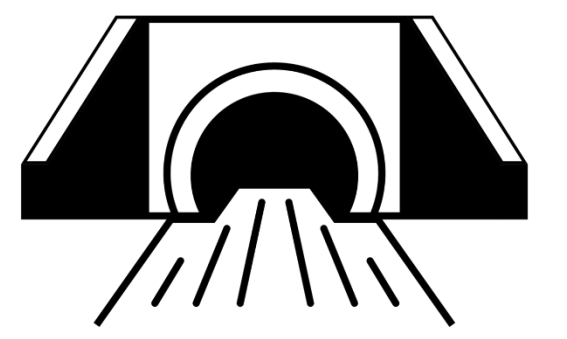


3D Model



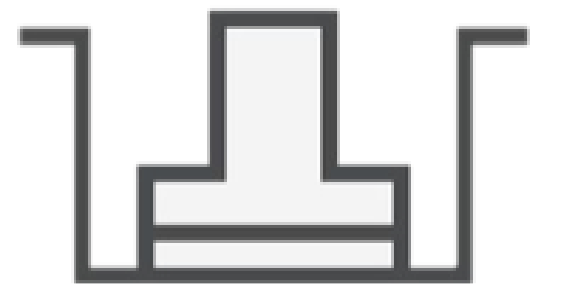
Structural Design

- 29 prefabricated BEBO arch sections: C36T/9
- Material: reinforced concrete
- Span: 10.97 m
- Rise: 7.11 m



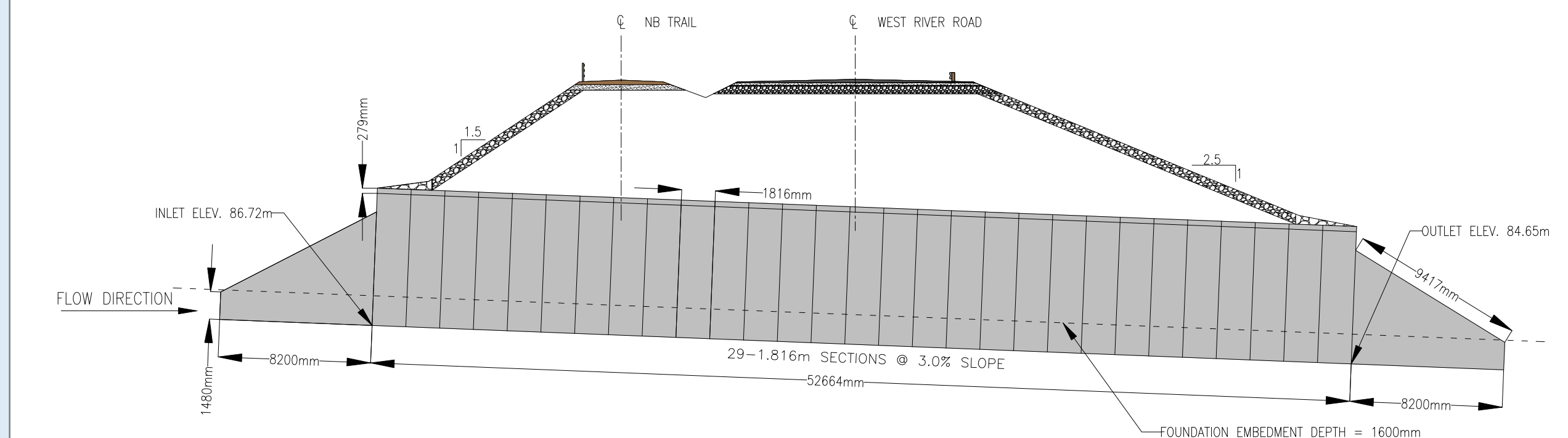
Foundation Design

- Cross-section: 3 m x 0.9 m
- Scour depth: 0.30 m
- Frost depth: 1.6 m
- 18-20M continuous & 25M @ 200 mm transverse reinforcement



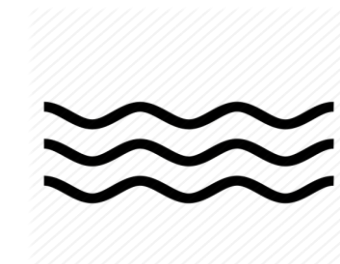
Profile Design

- Length: 52.66 m
- Slope: 3% (to match natural streambed slope)
- End treatments: wing walls and spandrel walls



Hydraulic Assessment

- Drainage area: 20.75 km²
- Design flow: 43.75 m³/s



Sustainability Assessment

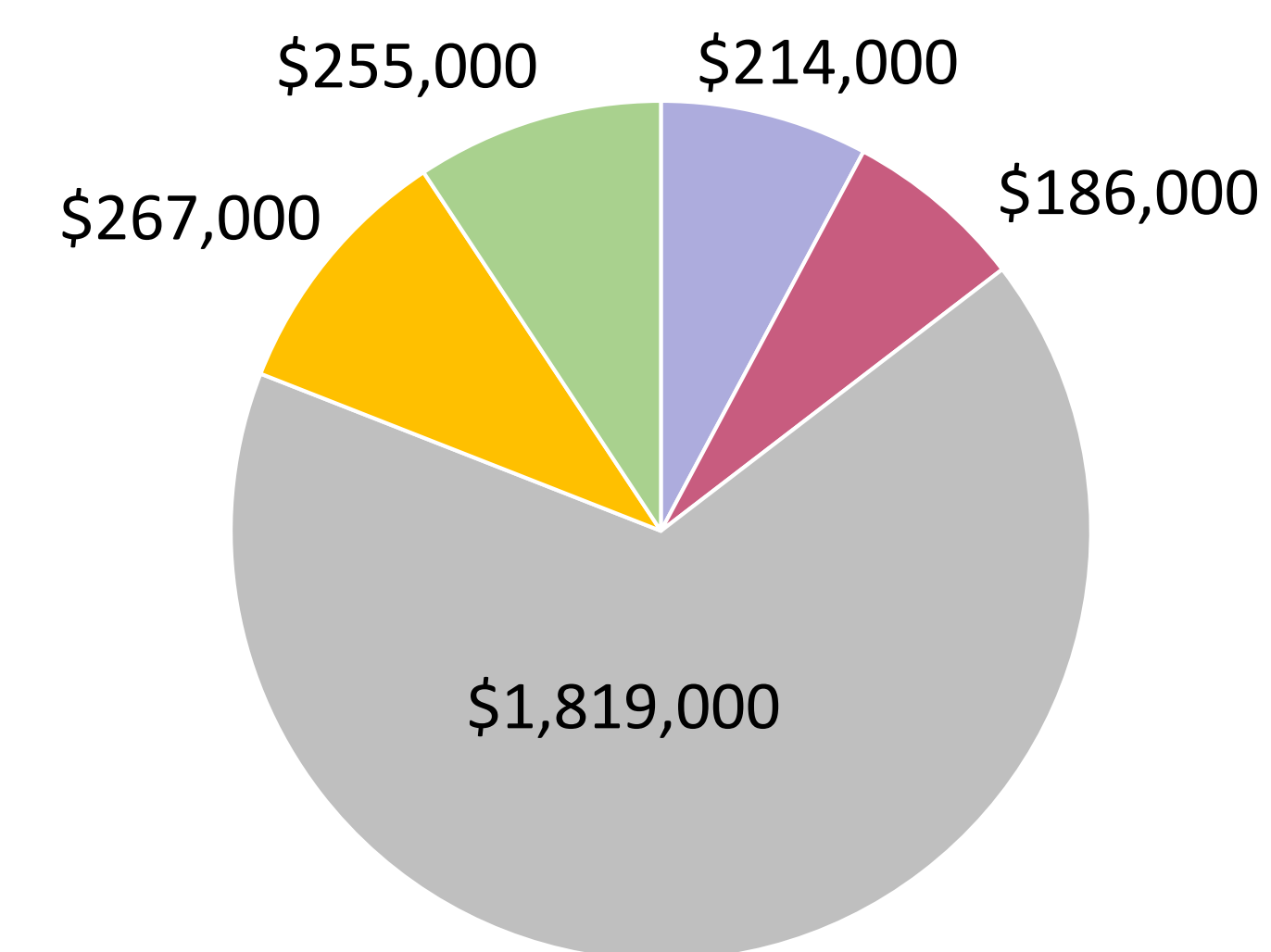
- Silver Envision rating
- Fish passage provided



Cost Estimate

- Total costs: \$2,801,000
- Life cycle costs: \$385,000

- Removal of culvert
- Site prep
- Structure
- Road & embankment
- Non-construction



Project Scope

- Considered alternatives
- Hydraulic analysis
- Scour analysis
- Foundation design
- Structural capacity
- Culvert profile
- Embankment design
- Debris protection
- Cost analysis
- Sustainability assessment

