



CANADA

## Nairn Falls Upstream Cofferdam and Trestle



Overview of 128m long Trestle and Cofferdam retaining water for the replacement of the Nairn Falls Spillway

**Owner**

**Engineer**

WSP E&I Limited

**General contractor**

Soletanche Bachy Canada

**Dates of work**

2023/07 - 2024/04

### Main figures

**RCD**

63 EA. 0.6m diameter King Piles, Gate Piles and Combi Piles with 3m Rock Sockets

**Sheet piles/combi walls**

29 EA. Sheet Piles for Combi-Wall Cofferdam

**Temporary anchors**

9 EA. Tiedown Anchors - 30m long, 10m rock sockets

**Marine works**

128 m Trestle complete with operational mechanical gates and 13 complete Trestle Bent assemblies



Drilling Pipe Piles on Night Shift - Utilizing a Terex HC165 and 90ft of L23 vertical travel leads with a BRC35 drill to advance pipe pile for the trestle supports



Dewatered Cofferdam - Showcase Drilled Pipe Piles and Raker Supports, Operational Mechanical Gates retaining water from the Spanish River, Overhead Trestle

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### Description

The Nairn Falls Generating Station, a historic hydroelectric facility situated on the Spanish River in Northern Ontario, is undergoing a major overhaul due to the aging of its original infrastructure. Soletanche Bachy Canada has been entrusted by [REDACTED] with a critical component of this upgrade: the construction of an upstream cofferdam and trestle.

The project involves the complete reconstruction of the generating station and spillway, completed in several phases to ensure uninterrupted services to the surrounding communities. Soletanche Bachy Canada has been contracted with the construction of an upstream cofferdam and trestle. The cofferdam will serve as a temporary dam with operational mechanical gates to control water flow during construction, while the trestle will facilitate access to the river's opposite bank and an island between the spillway and the shoreline. The access will be a key component in transporting materials and equipment to and from the spillway during demolition and reconstruction.

### Ground conditions

The Trestle and Cofferdam is located within the Spanish River with a severely sloped and rocky. Due to the high flow of the river, it minimizes the collection of overburden on the riverbed with limited deposits within the cofferdam footprint. The severely sloped bedrock consisting of GREYWACKE bedrock exceeding 65 MPa required careful selection in the drill tooling to ensure efficient advancement of the pipe pile system. Considering the tight timeline, advancing through the bedrock quickly was of utmost importance.

The significantly sloped bedrock required that every sheet pile and mechanical gate received precise scribing to ensure the interface between the bedrock and sheet pile or mechanical gate was adequate. Coupled with an underwater tremie curb, this would limit the overall infiltration of water through the bedrock interface and allow for efficient and limited dewatering efforts during spillway demolition and reconstruction.

### Solution

Construction efforts began in August 2023, and with the clients dire need to complete the installation of the upstream cofferdam and trestle, the client relied heavily on Soletanche Bachy Canada's vast experience in this domain of work and continuously relied on Soletanche Bachy Canada to provide innovative solutions to the complex problems and design constraints presented on the project. Soletanche Bachy Canada did not shy away from the demanding efforts required to execute this project and mobilized to site one month after being awarded the scope.

Soletanche Bachy Canada was required to deliver the upstream cofferdam and trestle before a hard deadline imposed by the Department of Fisheries for a yearly in water works restriction between April and July. Missing the April deadline would have monumental impacts on the overall project's completion timeline, so Soletanche



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Commissioning of the Cofferdam with the installation of the mechanical gates

Bachy Canada adopted a 24/7 working schedule to ensure timely completion.

One of the project's unique features is the 'Y'-shaped trestle and cofferdam, which creates multiple access paths and assists in water diversion along the river. Working next to an active spillway presented distinct challenges, particularly due to constant variations in water elevations and flow occasionally exceeding 141 cubic meters per second. Soletanche Bachy Canada selected methodologies that enabled minimal exposure to the adverse watercourse which allowed construction to always progress efficiently. The project's complexity is further heightened by significant variations in the slope of the rocky riverbed.

### Sustainable development

First commissioned in 1915, the existing Nairn Falls power generating station and spillway have reached the end of their service life, prompting a comprehensive replacement project aimed at enhancing efficiency and reliability for renewable energy. The project involves the complete reconstruction of the generating station and spillway, completed in several phases to ensure uninterrupted services to the surrounding communities. Constructed within a high flow and environmentally sensitive area, SB Canada employed works and methodologies that would limit impact on the surrounding ecosystem. Utilizing a Reverse Circulation Drilling system allowed SB Canada to control spoils and discharge the material into sedimentation tanks to ensure that the watercourse remained unimpacted during the course of construction.

SB Canada developed a site-specific environmental plan to ensure appropriate measures are being taken, along with rigorous controls, to ensure that there are no adverse effects on the environment. The implemented controls were consistently monitored with added measures in place for higher risk activities.



Terex HC165 support crane installing engineered templates to limit exposure to adverse watercourse



Continued 24/7 efforts to advance trestle construction throughout the winter