

2015 Comprehensive Detailed Inspection St. Andrews Lock and Dam (Bridge & Dam) Lockport, MB



Completion Date

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Client

Public Works and Government
Services Canada

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The St. Andrews Lock & Dam (SALD) facility, located in Lockport, Manitoba, was constructed in the early 20th century to facilitate commercial navigation from Lake Winnipeg to the City of Winnipeg by drowning the Lister Rapids during the navigation season. The facility is operated and maintained by Public Works and Government Services Canada (PWGSC) and consists of a dam, a navigation lock, a fish ladder, and a two-lane traffic bridge. Most operational features of the dam and lock for navigation purposes remain unchanged from its original opening date.

On November 16, 1990, the dam was declared to be a National Historic site by the Historic Sites and Monuments Board of Canada and has also been designated as a National Historic Civil Engineering Site by the Canadian Society for Civil Engineering. The SALD is thought to be the only surviving moveable dam of its type in the world and PWGSC is committed to its continued maintenance and operation going forward.

The dam and traffic bridge are inspected regularly above and below water according to the PWGSC Dam and Bridge Inspection Policies and Procedures. Following Associated Engineering's success in ranking first in Western Canada on the PWGSC standing offer for Civil Engineering Services, Associated Engineering's Winnipeg office was awarded the 2015 inspection program through a call-up opportunity.

In order to meet the technical requirements and project timelines, delivery of the assignment was a "One Company" collaborative effort led out of the Winnipeg office. Staff from other offices with specific technical expertise related to dam

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operations, structural/seismic evaluations, and bridge inspections were instrumental in completing the tasks to date and were key in production of the final deliverables.

The scope of the assignment was a comprehensive detailed inspection of the SALD. Specific tasks included:

- Inspection of the dam (fixed and moveable components) in accordance with the PWGSC 2010 Dam Inspection Manual. Inspection of the dam included underwater inspections by divers and a 3D sonar survey of the fixed dam components below the water level.
- Inspection of the traffic bridge in accordance with the PWGSC 2010 Bridge Inspection Manual.
- Structural and seismic evaluation of the traffic bridge in accordance with the CAN/CSA-S6-14 Canadian Highway Bridge Design Code.

Dam and Water Control

The dam contains five piers which, together with the two abutments, form six sluice spans each having a clear opening 36.6 m wide. The fixed dam components (i.e. concrete weir) is founded directly on limestone bedrock and is subject to scour along the downstream face of the dam. Water control above the elevation of the fixed dam is effected by a unique adaptation of a Camere-style moveable curtain system. The Camere-style curtains are made of narrow horizontal slats of wood hinged together and are raised or lowered into the water on moveable steel frames. There are a total of 89 moveable dam frames and curtains on the dam.

Navigation Lock

The navigation lock is 65.532 m x 14.935 m and is fitted with mitre gates.

Traffic Bridge

The current traffic bridge is 454 m long and carries Provincial Highway 44 across the Red River. The bridge is comprised of the following three distinct structure types:

- West Approach Spans (64.4 m span over River Road and 25.4 m span over the lock)
- Main Truss Spans (6 – 40.8 m spans housing the dam structure and 1 – 40.8 m land-based span)
- East Approach Spans (1 – 18.3 m, 2 – 12.2 m, and 3 – 6.1 m girder spans supported on a series of steel bents)

The traffic bridge is currently posted for a maximum GVW of 36 tonnes and the speed limit is restricted to 50 km/hr.