



Chaudière Falls Redevelopment Project

John G. Cooke & Associates Ltd.

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Project Introduction

Energy Ottawa established ambitious plans to open the Chaudière Falls to the public for the first time in over a century. John G. Cooke & Associates Ltd. completed the design of two viewing platforms and preserved two century-old stone buildings to bring new views of the Chaudière Falls, located in downtown Ottawa. The project consisted of underwater sonar scanning, drone exploration of a collapsed building, and innovative structural design to meet the project objectives.



▲ Early 1900's (Ottawa Archives)



Project description, technical excellence & innovation

The Chaudière Falls was once considered a sacred site for First Nations and later became Ottawa's industrial hub for the lumber industry. Until completing this project, the area was closed to the public, and the two century-old stone buildings were left in disrepair. Energy Ottawa's mission was to open the Falls for the enjoyment of the public by constructing two viewing platforms and preserving two stone buildings.

John G. Cooke & Associates Ltd.'s role as the lead consultant was to provide the engineering to preserve the exterior stone walls of both buildings and design for two steel viewing platforms to overlook the water.

The roof and floor structure of one of the buildings collapsed in the early 2000's. Rather than demolish the remaining building, the client intended to preserve the exterior stone walls as a ruin to draw public interest to the site. The building was too dangerous to enter, given its mode of collapse and the outward pressure applied to the stone walls by the mass timber beams caused further concerns of the structural stability of the remaining walls. A plan to remove the collapsed structure was created, which minimized the risk of further damaging the building's stone shell and maintained high safety standards for the personnel performing the work.

In close collaboration with the contractor, drone technology was used to fly into the collapsed structure to create a visual map of the remains to aid with the removal procedures. Two mobile cranes were used to hoist the collapsed structure out of the building in a top-down manner, while installing temporary steel bracing to support the stone walls to ensure stability.

Erosion to the founding bedrock below the surface of the water was a concern given the rapid currents immediately downstream of the Falls. Underwater sonar scans were used to ensure the stability of the bedrock. Erosion had previously caused significant damage to the exterior wall of one building and in response, a new reinforced concrete wall was formed and poured on the water's edge to protect the building from further erosion.

The two viewing platforms are constructed with a galvanized steel superstructure and a Western Red Cedar deck. The larger viewing platform is cantilevered approximately 14 meters (46ft) over the water to provide unique views of the Falls. The viewing platforms were modelled in ETABS structural design software to provide an economical design while balancing serviceability requirements for vibration and deflection.



Level of complexity and project challenges

In addition to one of the stone buildings internal structural collapsing 20 years ago, both buildings had significant deterioration to the exterior walls. The stone walls were fully restored to preserve the buildings for future use. Stone conservation principles were used to match the existing properties of the mortar and stones. The individual stones in the wall had a severely high rate of deterioration due to the long term exposure of mist from the Falls and poor maintenance in the past. As a result, over 6,000 stones were replaced during the project. The replacement stones needed to be installed in small sections not to destabilize the already crumbling walls.

Bracing was installed inside the stone ruin to serves two purposes: to laterally brace the walls for gravity loads and to distribute lateral wind and seismic forces. Structural analysis was performed to use the existing unreinforced masonry walls to resist shear forces. The selected option was the most economical arrangement of structural steel, which satisfied the client's vision for the site. Preserving a ruin required judgement of the applicability to the Building Code, specifically for lateral seismic loading.

To meet the client's objectives, one of the viewing platforms was required to have a cantilevered projection of approximately 14 metres (46ft) over the water. Physical site constraints limited the size of the anchoring arm which resulted in rather high overturning forces. High-strength steel rods embedded deep into the concrete foundation were used to resolve the tension loads.



Meeting Client's Needs

The client's main project goals were to re-open the Chaudière Falls to the public by installing two viewing platforms and to stabilize the two stone buildings for public safety.

The two stone buildings were left in disrepair for many years and the extent to which the buildings could be salvaged was unknown. Of most concern was the building with the collapsed floors and roof. This building was too dangerous to enter so the building assessment was conducted with a crane and basket to confirm if the building could be preserved. Using unconventional investigation methods showed our client that our intentions were aligned with theirs, to best serve this historic site and how we could meet that intention within their budget.

Stone masonry construction is robust and can persevere through many changes in function and modifications, but as is the case with all construction types, maintenance is essential to its longevity. For the conservation and preservation of the buildings, the masonry was fully restored to stabilize the buildings and to ensure public safety on the site.

The owner had a vision for the viewing platforms and the primary goal was to bring the public closer to the Falls. We worked with the Owner to size the platforms to meet their vision while providing the most cost effective solution. Namely, an iterative design process was undertaken to optimize the design of the cantilever. A galvanized coating was provided to the steel as a cost effective solution to mitigate corrosion and future maintenance.



▲ Work in Progress
Hoisting the collapsed structure out of the building (JCAL 2018)

▲ Work in Progress – Masonry Restoration (JCAL 2019)

Environmental Benefits

The viewing platforms and stone buildings are adjacent to a hydroelectric facility which has been producing clean energy since 2017. Information billboards installed onsite by Energy Ottawa is one way the company is educating the public on sustainable resources. The viewing platforms and stone buildings help attract the public to the site to create awareness of clean energy. The viewing platforms also showcase the potential power of the Ottawa River to visitors of the site.

Preserving an existing building reduces the amount of waste that ends up in landfills and inherently has environmental benefits. The buildings are an example of the possibilities to preserve or restore rather than demolish.

A large quantity of replacement stones were required, however stones were salvaged and re-used if they were in good condition to minimize the amount of new materials. The original stones in the wall appear to have been quarried directly from the site. To best match these same properties, some replacement stones were used from the excavation of a nearby construction site of a new condominium. Re-using the stones on their native site reduced emissions related to processing the stones offsite.

Social and/or Economic Benefits

The Chaudiere Falls have been closed to the public for over a century and now the site provides a unique location in an urban environment for the public to reconnect with nature by providing views of the Chaudiere Falls. The completion of this project brings a new outdoor attraction to downtown Ottawa.

The area has a rich cultural history. The Falls area sacred meeting site for the Algonquin Anishinaabe First Nations and was the hub of the lumber industry in Ottawa at the turn of the century.

The restored building and preserved ruin stand as a reminder to visitors of the industrial history at the Chaudiere Falls. The buildings are two of very few buildings to survive the Great Fire of 1900 and are the only two vestiges of JR Booths lumber Empire. The buildings offer a glimpse at the infrastructure that fueled the growth of Ottawa. The viewing platforms offer a view of the “Kettle Falls” where Samuel de Champlain described in his journal that “water whirls about to such an extent, and in the middle boils so vigorously...”. Access had been cut off to public view by industrial development for over a century. Visitors can now reflect on the history of the Falls as a sacred meeting place, an obstacle to portage, a trade hub, and as a powerful force now harnessed for electricity.

