

INNOVATIVE SITE FEATURES

- Relocation of stream bed to historical pre-dam flow path using natural channel design principles. Key features include pools and riffles, crib wall, and seasonal and permanent wetlands.
- Remnant portions of the dam have been left in place, including the cast iron pipe that once delivered drinking water to the Town of Dundas. Two wells have also been left in place.
- Two lookouts have been created using portions of the railing from the dam in areas where steep slopes would have been hazardous.
- A small waterfall, uncovered during the creation of the by-pass channel while Spencer Creek was being restored, was left in place and now feeds a downstream wetland.
- The new pedestrian bridge was designed with a rustic look and located to allow Spencer Creek to migrate as all natural stream channels do, as well provide optimal upstream and downstream views of the valley.
- The access road that was created for construction purposes was converted to a trail now allowing visitors to the area better access to the stream for fishing etc.
- There was no waste created or transferred offsite with the exception of sediment showing elevated levels of mercury. All other material was re-used on site (e.g. bridge railings, dam structure). The old bridge deck is being stored for use in other conservation areas.



LESSONS LEARNED

Proponents for similar dam removal projects may want to consider some of the following to avoid delays and impacts to cost.

Good communication: Early consultation with the public and the approval agencies is essential in order to understand the additional requirements to the project beyond the technical aspects. Receiving input as the project proceeds will avoid surprises and costly expenditures.

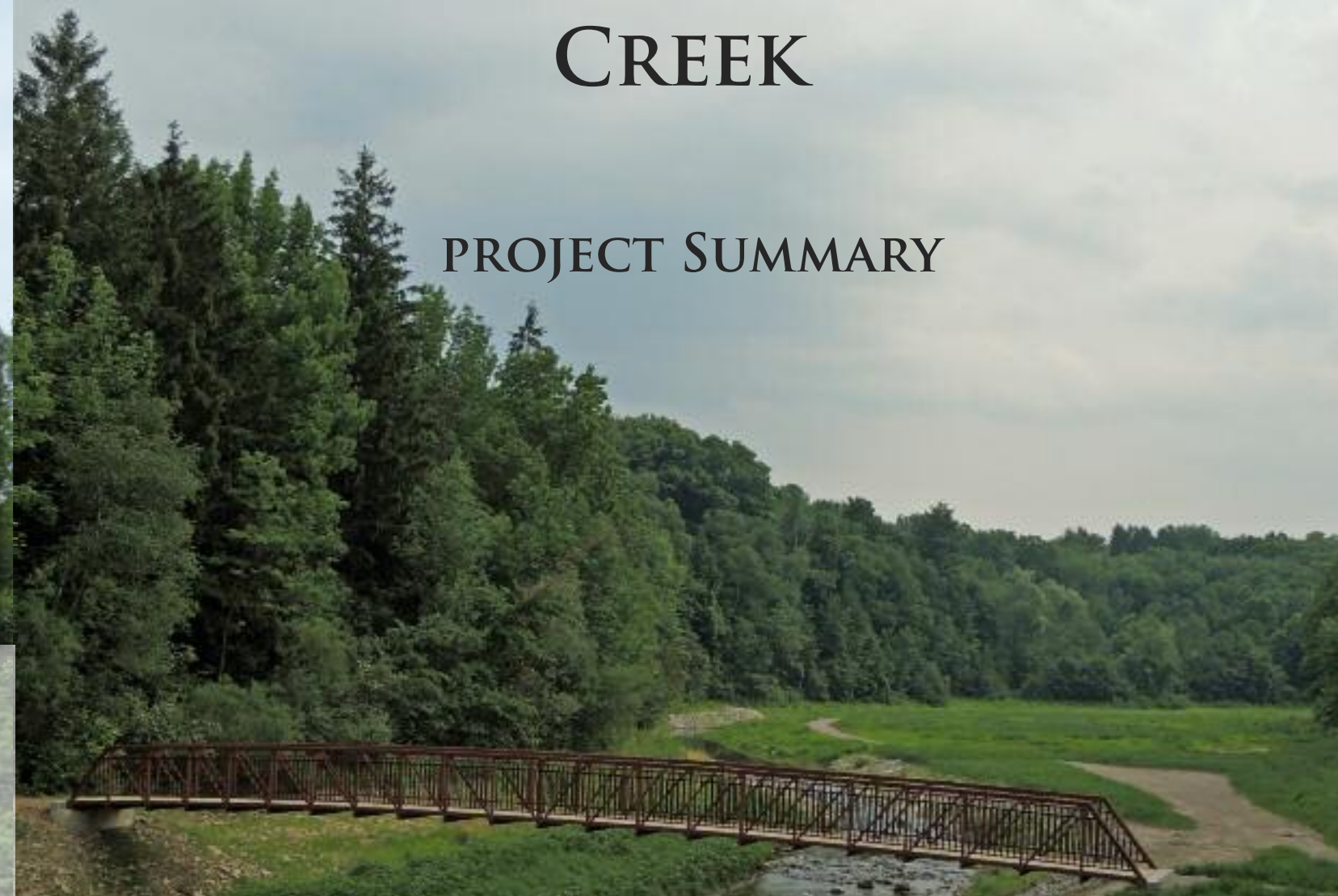
Technical Expertise: Dam removal and stream restoration is a complex undertaking involving many technical disciplines working together towards a common goal. It is essential that the selected contractor has significant experience in dam removal and stream restoration and that good communication is maintained as the project proceeds.

Approvals Process: The approvals process is in place to ensure that the project proceeds in compliance with a suite of legislative requirements. There are opportunities to work with the approval agencies but the process is not streamlined. Until streamlining is achieved dam removal in Ontario will continue to be a challenging and costly process.



CROOKS' HOLLOW DAM REMOVAL AND RESTORATION OF SPENCER CREEK

PROJECT SUMMARY



The History

The Crooks' Hollow Dam was located on Spencer Creek near the community of Greenville. The dam was situated amongst a series of historic dams that were built in the late 18th century to provide water power to a number of grist mills, sawmills and paper mills. The Crooks' Hollow Dam was constructed in 1916 to supply water to the community of Dundas, a function that ceased when a municipal water supply was established for Dundas. Between 1959 and 2001, the Dundas Valley Golf and Curling Club used the reservoir as a source of water for irrigation. The reservoir and surrounding lands were used for recreation including hiking, fishing and limited boating. In 2000, the ownership of the Crooks' Hollow Dam along with 9.9 hectares of land was transferred to the Hamilton Conservation Authority (HCA).

The Issue

Over the years, several dam condition assessments identified concerns relating to the integrity and stability of the dam. These studies, along with a Dam Stability and Assessment Study conducted in 2005, further confirmed the need to restore, modify or remove the dam to ensure its safety during major storm events.

PROJECT SUMMARY

EA Process

Responding to the need for action, in 2005, HCA initiated a Class Environmental Assessment (Class EA) to review the options for the dam. The review identified a number of alternatives and involved consultation with stakeholders, the neighbouring community and the public. The Class EA concluded that the dam should be removed to address safety concerns regarding the dam's deteriorated condition, eliminate long-term operating and maintenance costs and enhance local and downstream environmental conditions with no net long-term negative impacts to the environment. There were four Part II Order requests to the Ministry of the Environment (MOE) citing concerns for sediment management, cultural heritage significance and recreational enjoyment of the area.

Sediment Management Plan

In May 2009, the Class EA was approved by the Minister of the Environment with conditions that a Sediment Management Plan be developed to show how sediment will be managed during and after dam removal. A Sediment Management Plan was generated and supported by MOE in October 2010. Additional comments were accepted by MOE in May of 2012.

Public Process

As a first step in the removal of the dam and the restoration of Spencer Creek, HCA hosted three public meetings between February and June 2011. The first focused on a future vision for a restored Spencer Creek. The second public meeting focused on the process for dam removal and sediment management, options for stream restoration and bridge replacement, and the information generated in a Cultural Heritage Study. A final public meeting was held to present the final details of the design. These meetings allowed HCA to engage the community in a meaningful way by providing information, answering questions, offering up design options on various aspects of the work, obtaining feedback, and allowing the community to follow project progress. The clear message that was sent to HCA from the community was to make the site safe, keep it rustic while allowing access to and across the stream, and commemorate the historic uses of the area. This input influenced the project design and construction.

Detailed Design/Approvals Process

Detailed design was initiated in January 2011. In total, the project would need 8 separate approvals from 7 agencies. Although there was widespread support for the project the approvals process was challenging. This in part was as a result of the unique nature of the undertaking; it did not fit neatly into the approval processes. In the end, all of the agencies were able to come to terms with the objectives of the project (protecting public safety, restoring the environment, and building a self-sustaining environment that would require nominal capital investment in the future). All approvals were received by February 10, 2012.



Construction

Construction was initiated on February 14, 2012 and concluded on May 11, 2012. A construction sequence was devised that recognized time constraints such as fisheries timing guidelines, half load road restrictions, etc. The in-water works were accelerated and contingencies were put in place in the event of spring freshet flows. An access road was built through the site followed by a temporary by-pass channel. Flows were then diverted from Spencer Creek and restoration of the creek began that followed the principles of natural channel design.

Fish rescues were performed throughout the process as needed. The dam structure was dismantled, leaving remnant portions that were deemed safe. Key features constructed include returning the stream channel to its pre-dam configuration, installation of three riffle/pool sequences to maintain grade control and provide in-stream fish habitat, construction of a crib wall for bank protection that also affords fish habitat, and utilizing creative grading to establish a number of permanent and seasonal wetlands adjacent to the restored stream within the new floodplain.

Flows were returned to the restored stream over a period of one day. The bypass channel was filled and portions were left as depressions to create terrestrial habitat. The waterfall that was created in excavating the bypass channel was left in place to feed one of the existing wetlands. The site was re-vegetated with a number of native species suitable for this newly created environment. A pedestrian bridge was installed to maintain access to both sides of the stream. Finally, the access road was converted to a walking trail which will allow greater access to Spencer Creek and its floodplain area.

Monitoring

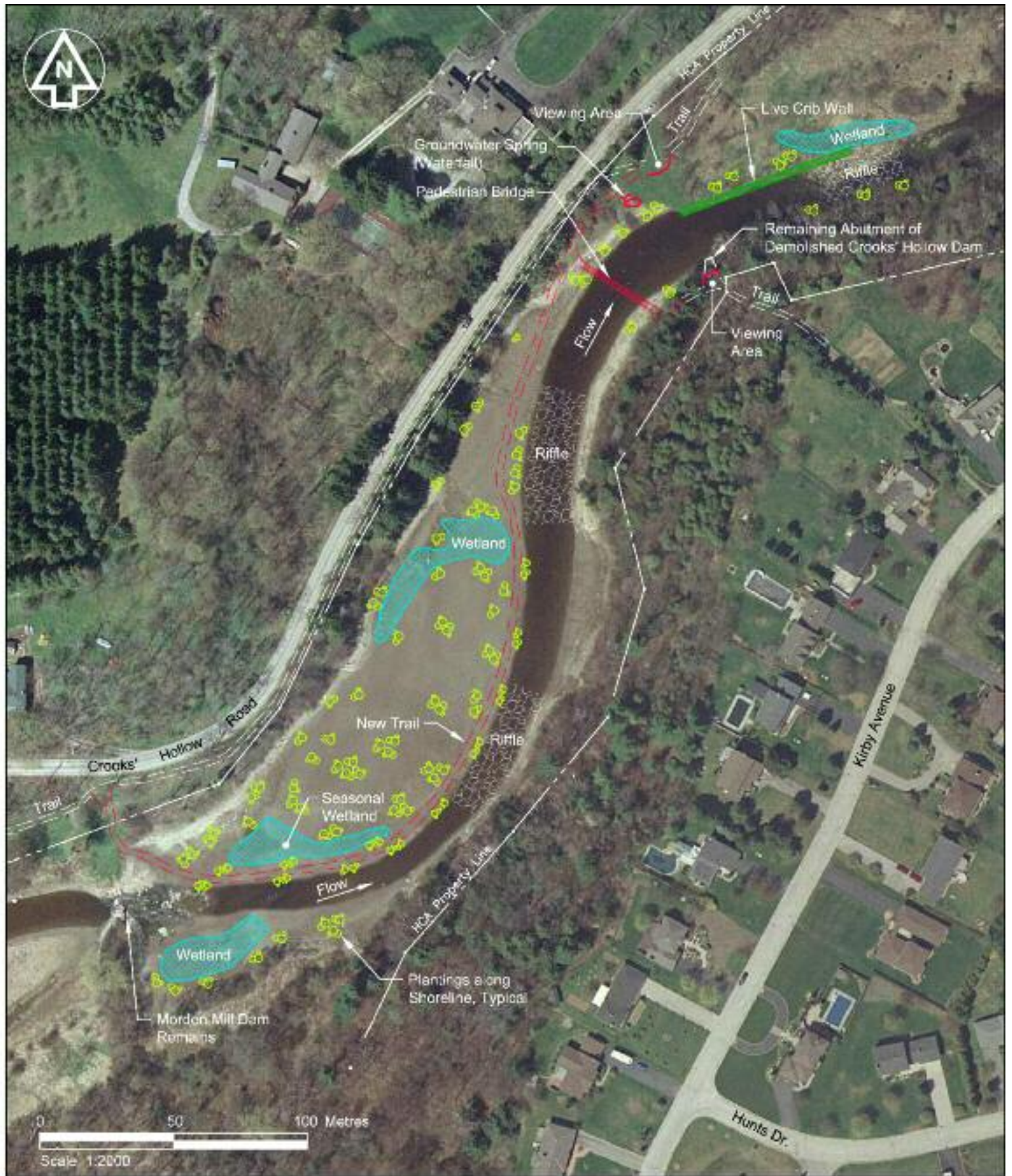
In keeping with the principle of adaptive environmental management, pre project monitoring was undertaken to set baseline conditions on stream form, water temperature and other water quality parameters. Some information has also been collected on aquatic and terrestrial flora and fauna. Follow up monitoring is planned over the next 5 years at predetermined locations for water quality assessment, stream form, and more generally throughout the site for aquatic and terrestrial features and functions.

Funding

Funding was provided by the City of Hamilton and the Ministry of Natural Resources under the Water and Erosion Control Infrastructure program. Total cost of the project for design and construction was \$1.4M.

PROJECT SUMMARY





Crooks' Hollow Dam Removal and Restoration of Spencer Creek



SITE FEATURES

Crib wall before



Crib wall after



Tadpoles



Leopard frog



Riffle



Riffle



Bridge



Morden's Dam

