



McElhanney



CANADIAN CONSULTING
engineer



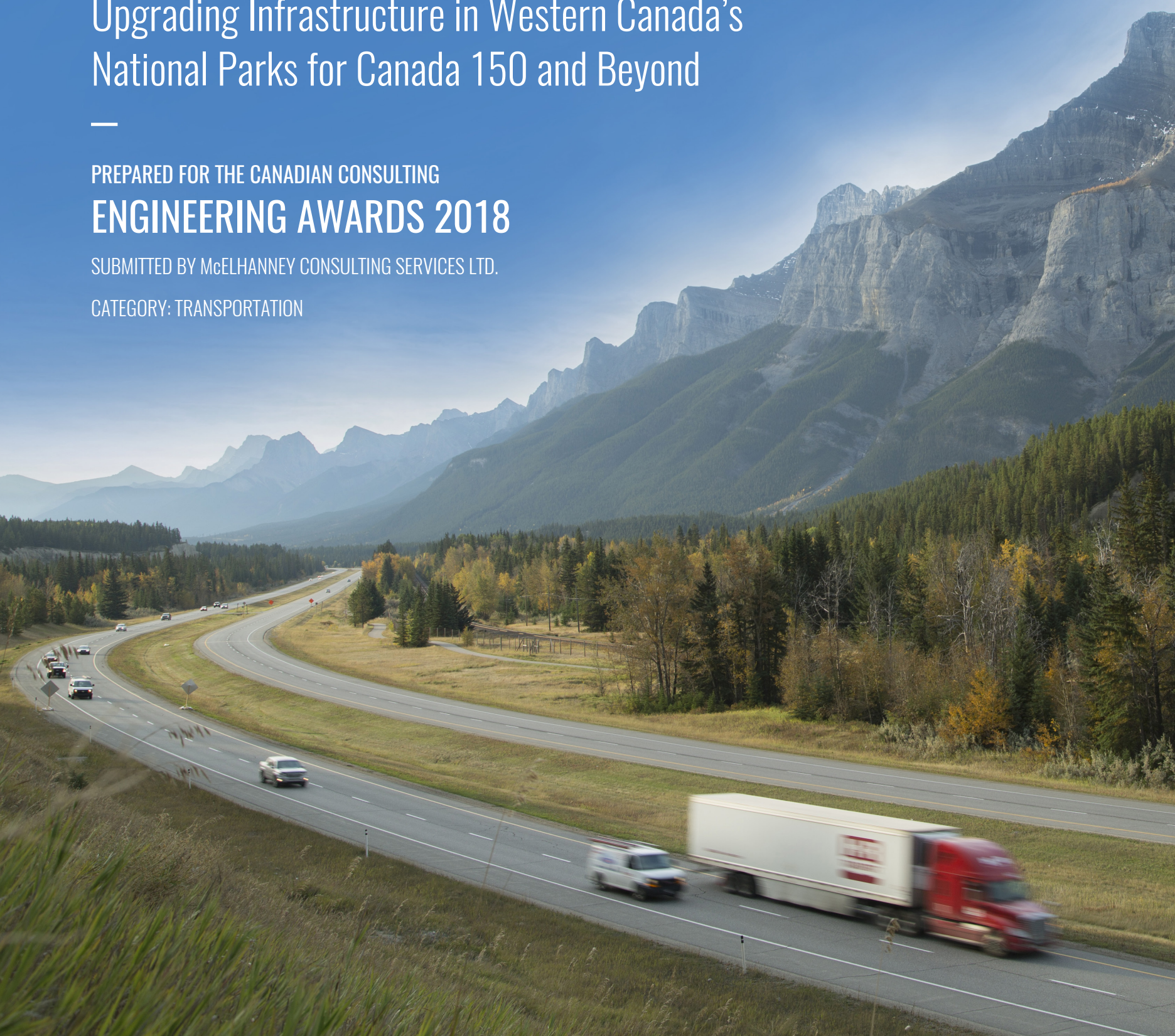
ASSOCIATION OF CONSULTING
ENGINEERING COMPANIES
BRITISH COLUMBIA

Upgrading Infrastructure in Western Canada's National Parks for Canada 150 and Beyond

PREPARED FOR THE CANADIAN CONSULTING
ENGINEERING AWARDS 2018

SUBMITTED BY McELHANNEY CONSULTING SERVICES LTD.

CATEGORY: TRANSPORTATION

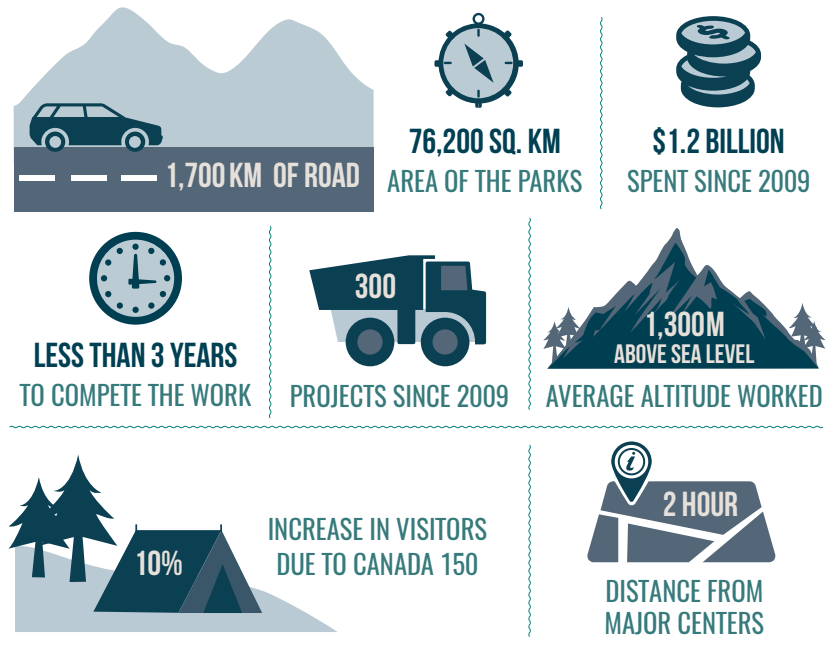


FULL PROJECT DESCRIPTION



PROJECT SUMMARY

McElhanney provided transportation design consultation to Parks Canada Agency for their Canada 150 infrastructure upgrades. This included safety improvements for motorists and wildlife, visitor experience enhancements, and transportation developments. With an annual \$175-200 million budget and a national celebration close at hand, we completed these upgrades in a limited timeframe and with a mind for environmental preservation. At its close, these projects readied the parks for the upcoming milestone and increased park visitors.



Assignment Area: National Parks West & North





INNOVATION

In 2017, Canada celebrated its 150th birthday, and Parks Canada Agency (PCA) took part in the preparations, with the Federal Government announcing a \$2.3 billion investment program in 2014 to rehabilitate deteriorating infrastructure assets in Canadian National Parks. This funding program quadrupled PCA's previous annual budget of \$50 million. Thanks to our longstanding relationship of 10 years, PCA knew we could assist with this opportunistic undertaking.

We provided transportation design to address numerous objectives for the Canada 150 infrastructure upgrades program, such as safety improvements for vehicles and wildlife, visitor experience enhancements, and road and bridge upgrades. The Trans-Canada Highway is Canada's most important roadway, connecting us from coast to coast. The largest and most challenging task was the Trans-Canada Highway (TCH) Twinning at the Great Divide (the BC/AB border) which we overcame through the development of innovative solutions; some of which are mentioned below.

PCA's mandate to protect and preserve the natural environment can offer a challenge when performing infrastructure upgrades, but not for McElhanney. We helped PCA develop design standards and policies for environmental best management practices, and we prepared their Environmental Protection Plan documents that did not exist before. These policies and plans are now in use and are fundamental in determining how work is completed within Canada's environmentally sensitive National Parks.

Gravel is a scarce commodity in Canada's National Parks and a necessary element to many of the projects we have worked on. We have been able to source material from within the National Parks, as per PCA's guidelines, by use of gravel pits our team had identified within the National Parks. But we didn't stop there – we thought long-term and put together a five-year plan where the output material from one project can be recycled and reused as the input material for the next. Proudly, PCA is using our program templates within other departments.

PCA does not have a network-wide asset management system. We created a database for PCA that summarizes all of their assets with conditions, descriptions, costs, repair work required and order of priority. We also created a policy that allows PCA to annually update the database, generate necessary reports, and determine asset condition work for future work.

McElhanney is committed to delivering excellence, and we rose above and beyond to do so on this project.

COMPLEXITY

A major factor to consider in any PCA project is the remoteness of the assignment locations. Each assignment here was located about two hours from any major city centre or rural area. Our team was confronted with significant design and construction challenges to complete the highway twinning given the topography, high water table, and short construction season within Western Canada's National Parks. The terrain and remote locations come with their challenges, but we faced them. For example, there was an avalanche in the parks on Hwy 93N, km 16, and PCA called us for help. We deployed construction crews immediately to clear the snow, and within two short hours the highway was open to traffic.

With the Canada 150 deadline approaching, we had to move quickly, and one of our goals was to complete this project with the least disruption to park visitors or other motorists. We simulated a traffic model to reflect how the highway and adjacent roads would perform during construction and based on different seasons. With summer being both peak for construction season and traffic, we decided it would be best to work at night. While this did mitigate much of the traffic issues, we faced other challenges, such as wildlife disturbance and the need to pay our workers extra to work through the late hours. But with such a short construction season in Canada, we knew it would be the best option for our client and the road users.



SOCIAL AND/OR ECONOMIC BENEFITS

With a long history working alongside PCA, McElhanney has completed many projects which have improved our National Parks system. One such project is the annual accident and collision assessment. We incorporated data from these assessments to make road safety improvements to the Trans-Canada Highway during construction. Vast safety improvements have meant fewer animal-vehicle collisions, fewer fatalities, and provision of additional improvements over and above the project objectives.

With our wildlife overpasses and fencing designs, the parks have seen an 84% reduction in ungulate wildlife-vehicle collisions and a 14% reduction in carnivore wildlife-vehicle collisions. Each of these collisions is estimated to cause between \$10,000 and \$100,000 of economic damage – up to \$1.3 million in the event of a motorist fatality. With a final cost of approximately \$800,000 for only one wildlife crossing, the addition has already paid for itself 20 times over thanks to the reduction in collisions.

As well as safety improvements, the highway itself performs better. Twinning the Trans-Canada Highway through the National Parks has resulted in a 43% reduction in total travel time and an 84% decrease in the average delay time per vehicle. PCA highways have the function of moving people and goods, meaning the increased traffic flow results in more tourism, more transportation of commercial goods, and, therefore, a greater economy within the parks and our nation.



REDUCTION IN UNGULATE
WILDLIFE-VEHICLE COLLISIONS



REDUCTION IN CARNIVORE
WILDLIFE-VEHICLE COLLISIONS



REDUCTION IN TOTAL TRAVEL TIME
THROUGH THE MOUNTAIN PARKS



DECREASE IN THE AVERAGE
DELAY TIME PER VEHICLE

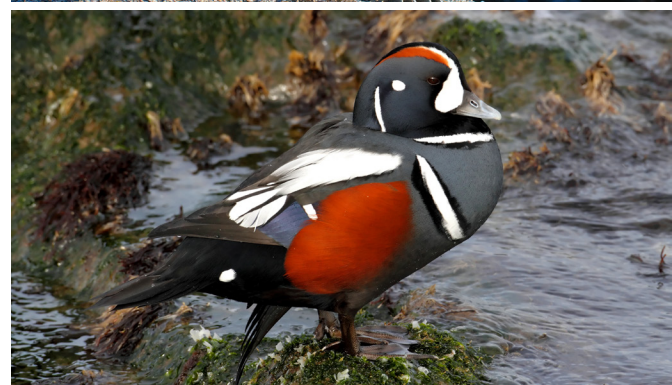


ENVIRONMENTAL BENEFITS

Canada's National Parks are home to stunning natural landscapes and countless wildlife species, attracting millions of visitors from all over the world every year. For Canada 150, more visitors than ever were expected to come and take in the magnificent sights, and PCA and McElhanney worked together to protect and preserve this natural beauty for them and the generations to come.

McElhanney knows care must be taken during construction to minimize disturbing plants, wildlife, fish, and migratory birds and to prevent the introduction of non-native plant species. Wildlife overpasses and fencing have been instrumental in reducing wildlife-vehicle collisions on the highway, as well as increasing wildlife habitat connectivity. Meanwhile, upgraded culverts and channels have reintroduced long lost species, like the mountain whitefish at Taylor Creek in Banff National Park, and the first federally listed endangered tree in Canada, the whitebark pine, was left untouched throughout the project. We have also taken care to preserve the Rocky Mountain Goat saltlicks while twinning the Trans-Canada Highway, and we designed bridges and other assets around the endangered Harlequin Duck species to ensure their migratory flight paths remain undisturbed.

As for those rehabilitated gravel pits, we blended them back into the environment, so they match with their beautiful natural surroundings. McElhanney strives for the best in environmental preservation.



MEETING CLIENT'S NEEDS

When the Canada 150 project was announced, PCA knew they needed a consultant they could trust implicitly to complete the necessary work for their infrastructure upgrades, and they chose McElhanney as their trusted advisors. They knew we could and would deliver a top tier product.

McElhanney acted as an expert to PCA on this program. But in order to get this work in the first place, we helped PCA put together funding request submissions, which was a huge undertaking. Without these funds, work could never have taken place. Normally, only 20% of submissions for funding are granted, but on this project, 100% of our submissions won. Thanks to this, we became known as the over-deliverers – a title we will gladly accept.

Perhaps our greatest feat for PCA was our ability to deliver such a large scale and timely program while working in a world-renowned UNESCO heritage site. The Canadian Rocky Mountains are recognized and renowned for their scenic splendor, and recognition from UNESCO means they are strictly regulated with a high level of protection and conservation efforts. McElhanney was able to complete the Canada 150 preparations within these parameters, and assisted PCA in the creation of their new Environmental Protection Plan policy, which is now in use as their policy document for all contractors and consultants working in Canada's National Parks.

When work was completed, our Western Canadian Parks were ready for the big celebration.

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Please pass on thanks to your dedicated staff for understanding the importance of accommodating park visitors and through traffic, especially during this exciting time of Canada celebrating its 150th birthday. Your team members' positivity, availability and willingness to assist the park in dealing with operational issues such as avalanche debris as well as creek and river erosion has proven most helpful and timely.

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Melanie Kwong, Superintendent, Lake Louise, Yoho & Kootenay Field Unit, Parks Canada

Terry McGuire P Eng, Project Coordinator, Phase IV TCH Twinning

