SADDLE LAKE CREE NATION
Rethinking road design following spring flooding

By Esther Lambert

Source: Saddle Lake Cree Nation
THE SCIENCE

As flooding and landslides continue to cut off roads and major highways across Canada, Alberta has not been spared. The June 2013 floods highlighted the susceptibility of the province to impacts of intense rainfall and unseasonable snowmelt – an occurrence that resulted in $6 billion in damages. With projected extreme events such as floods, intense storms and droughts, the Prairies are at considerable risk for damage to roads and related infrastructure.

The Saddle Lake Cree Nation located in central Alberta is one community that faces seasonal flooding of the same areas almost every year. Some of these roads were built in the 1970s on black dirt with improper ditching and road structure to include lack of crown, proper compaction, and adequate gravel structure. Rebuilding these roads with climate in mind is helping to build the resilience of the community that relies on these transportation networks for access to essential services such as water treatment and delivery to households. The Nation’s roads are being reconstructed on a properly designed and constructed foundation and at a higher grade for better drainage and stability. New culverts have and will continue to be installed with adequate sizing to handle future storm events that consider climate change impacts.

THE TRIGGER

The design and subsequent iterative reconstruction of the NE2, SW7, and NW2 roads was triggered after an intense spring melt in 2017, which rendered roads impassable, preventing the transportation of water to residents. The roads are flooded nearly every spring and when there isn’t overland flooding, the roads themselves become saturated from spring melt as they have improper drainage (lack of ditching and undersized, damaged, or missing culverts) and road structure (lack of crown, proper compaction, inadequate gravel structure). NE2 Road, in particular becomes so saturated that the road structure fails, which blocks transportation. This represents a huge risk to the Nation as it is the only road that connects the community’s water treatment plant. The Nation declared a state of emergency and worked with Urban Systems Ltd., their civil engineering consultant, to access funding available through Indigenous Services, Canada’s Emergency Management Assistance Program’s non-structural mitigation program (EMAP) all supported by the “Mandatory Enhancements” policy. This funded the design and included some mitigative efforts to address drainage repair works, namely the ditching and raising of the road structures.

THE APPROACH

Saddle Lake has taken a proactive approach to climate resiliency through several projects, including road improvements. Following the state of emergency declaration, the Nation took control. The initial response was to deliver water to households as most of the houses depend on cisterns, which got contaminated by flood waters. Afterwards, the Director of Public Works and climate specialists from Urban Systems established which resiliency projects were worth pursuing, given the needs of the community. Every year, Saddle Lake does a capital investment plan to manage
their assets, so the projects included as part of the plan are prioritized. The project manager with Saddle Lake was able to influence the Council to approve the road improvement projects. The public was also informed and engaged before and during the construction process.

Road improvement works are ongoing. While the rehabilitation efforts funded under the Emergency Management Assistance Program went a long way in keeping NE2 Road accessible all year round, it was evident that more significant improvements were required. Through other climate analysis, it also came to light that the road was at risk of flooding due to rising lake levels from climate change. To fully rehabilitate the road, over $5 million was needed. The Nation spent three years and worked with four different funding groups to gain enough funding to fully implement rehabilitation of the road.

THE OUTCOME

The improved road drainage design features are expected to withstand increased projected precipitation of almost 30% in the next 100 years, resulting in a more resilient road infrastructure. Beyond the higher performance achieved by the rehabilitation, the new road will ensure the continuous ability to deliver potable water to residents of Saddle Lake Cree Nation, as well as other critical services.
The adjustments seek to address the risk of extreme events and the anticipated impact of climate change. The objective was to build a road system that is more resilient and better prepared for extreme hazards.

The full rehabilitation of NE2 Road is occurring in 2022. While the work pursued by Saddle Lake Cree Nation is considered a success story, it is important to highlight that the Nation had to pursue multiple levels of government for funding, demonstrating how significant the barrier to adequate capital dollars can be for First Nations' communities.

A WORD FROM SADDLE LAKE CREE NATION

In responding to the question about useful advice for other communities interested in implementing similar projects, Ken Large, Director of Public Works and Housing for Saddle Lake, raised an important point, that every First Nations community is different and each will have to consider its unique mix of challenges and opportunities. However, many First Nations and other municipalities face some broad issues, including funding scarcity, challenges in convincing the Council to fund specific initiatives, and maintaining long-term support for projects. Commenting that, “It is important to know the budgets and finances and how to keep programs surviving,” Mr. Large underscored the value of identifying funding sources to keep projects going for the long term.

He attributed the Nation’s success with Council to well-developed proposals that secured external funding. Such proposals typically highlight the urgency and need for the project, aligning its goals with that of the funder. Oftentimes, external expertise is required to accomplish this. In the case of Saddle Lake, it was the community that worked with Urban Systems and the First Nations Technical Services Advisory Group Inc.