



# TORUS helps reduce roundabout design time by 68%

## Overview

When tasked with developing solutions for a complex intersection in Alberta's Foothills County, Watt Consulting turned to TORUS to design roundabouts. They were able to provide the client with different alternatives, and an ultimate solution of staged roundabouts, while reducing their design time by 68% and completing the project on time and on budget.

## Challenge

The project focused on Pine Creek Road, one of five roads intersecting Dunbow Road in Foothills County. This rural municipality just south of Calgary is one of the province's fastest growing districts. Increased traffic along Dunbow Road was resulting in long queues and impacting emergency vehicle access. Ongoing development in the area meant both short and long-term traffic management solutions were needed.

Pine Creek Road is the only access to the growing community of Heritage Lake. The intersection is also a critical link between two major highways, Deerfoot Trail and Macleod Trail, and with a newly developed fire station.

While the focus was on the Pine Creek Road intersection, Watt Consulting had to conceive of alternatives that would consider the complexity of access points to all current and future developments in the area. Any changes would have to be done in stages to ensure all routes remain open during construction, and that emergency vehicles have continuous unobstructed access.

An additional challenge was that speed limits on each side of Dunbow Road differ – 50 km/h on the west side and 80 km/h on the east. Plus, all the east-west entrances to the intersections had two lanes and the north-south routes had only one. This meant any proposed designs had to balance fastest path and entry and exit speeds, made more difficult by the angle of an existing side streets.

## Benefits of using TORUS



Quickly create and edit unique design approaches



Reduce design time by minimizing repetitive processes



Save different designs in the same file for quick comparison

Watt Consulting was asked to develop four possible solutions for the whole corridor. Two of these concepts—a signalized intersection concept and a two-lane roundabout concept—were selected by county staff for further analysis and development with detailed layouts, staging plans and construction costs. This process required that Watt Consulting created various roundabout designs—a time-consuming task when done manually since the process usually involves trial and error. With manual roundabout design, aspects like right of way, speed analysis, swept path analysis and sight lines can only be checked after a design is completed. If requirements are not met, the engineer must draw a new roundabout from scratch and redo all calculations.

## Watt Consulting created an overall access management plan that would provide traffic capacity for projected growth of more than 1,000 homes over 25 years in the area.

### Solution and Results

Watt Consulting turned to TORUS to design roundabouts that could account for all the complex variables of the intersections.

Traffic analysis had shown that a multi-lane roundabout design would be the best solution for the intersection, though the first stage of the project would entail constructing single-lane roundabouts.

TORUS helped easily create unique design approaches to both single- and multi-lane roundabouts. Since TORUS automatically generates updates to the geometry, they were able to quickly balance fastest path and entry and exit speeds with just a few iterations.

TORUS' design management tool allowed the company to save different designs in the same file to easily compare results, and to even make adjustments during presentations to the client.

The client ultimately chose the multi-lane roundabout design, with staging of single lane roundabouts as the

most viable and with the lowest construction cost. Watt Consulting created an overall access management plan that would provide traffic capacity for projected growth of more than 1,000 homes over 25 years in the area.

The project came in on time and on budget. In addition to providing the client with a viable solution, the overall time savings on the project resulted in Watt Consulting receiving even more work from the client.

“With TORUS it was possible to easily analyze path overlap and design entry and exit speeds. It gave me a good idea of right of way requirements right from the start.”

More than just a design tool, TORUS also helped Watt Consulting analyze and evaluate each roundabout, so they could focus more on the engineering aspects of the project.

Using vehicle swept path, TORUS automatically generates roundabout geometries and updates them when changes are made.

TORUS features include built in fastest-path analysis to evaluate the safety of the design. TORUS also notifies the user when parameters have exceeded range of values of design guidelines so any necessary adjustments can be made.

***“The best part of using TORUS was that we didn't have to delete and re-draw the roundabout if the analysis feedback advised us of going over maximum speed. We only needed to edit values and all geometry would update automatically.”***