

# Innovative and Unique: Mini-Roundabouts in Downtown Sundre, Alberta

Presenting Author

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Contributing Authors

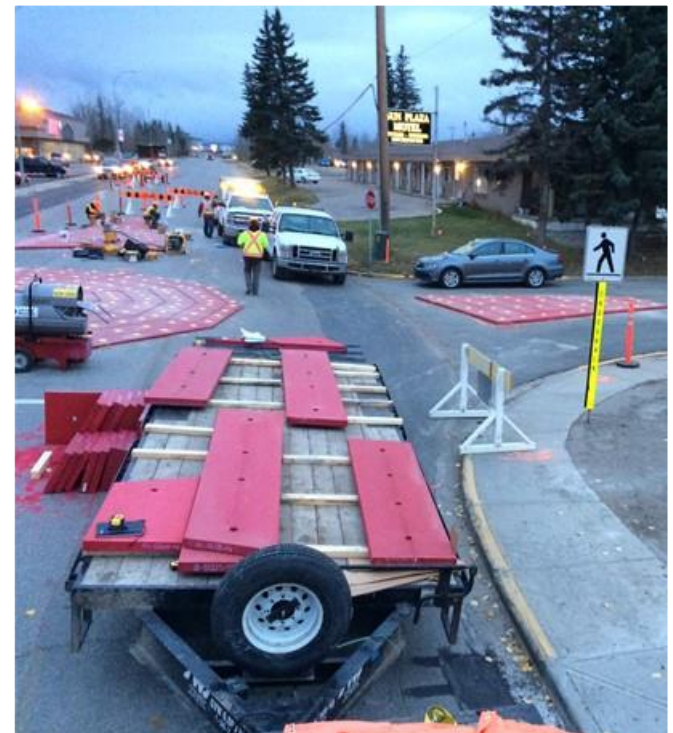
**Kirk Kwan** | Alberta Transportation

**Stuart Richardson** | Alberta Transportation

**Dindo Pangilinan** | CIMA+

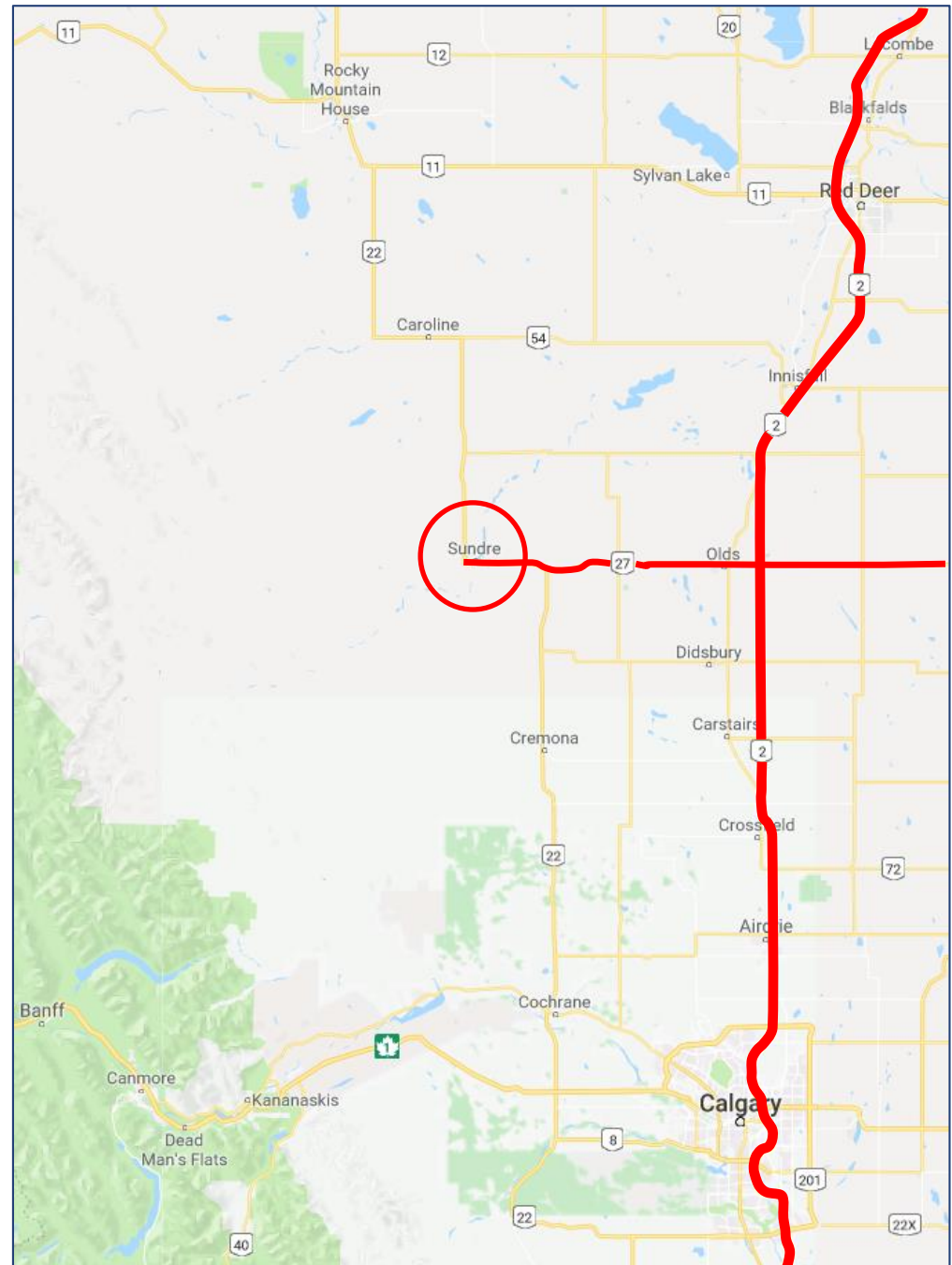
**René Rosvold** | CIMA+

CITE Annual Conference, Edmonton, AB  
June 2018



# Town of Sundre

- A town of about 2,700 in the foothills of the Rocky Mountains
- Highway 27 is a two-lane undivided provincial highway in Central Alberta that becomes a four-lane facility within the town



Google 2018

# Corridor Review Study

# Background

- Traffic in the curb lane on Highway 27 travels close to pedestrians in the narrow sidewalks, making them feel intimidated and sometimes damaging adjacent properties
- In 2015 the Town of Sundre expressed a desire rejuvenate the downtown area by slowing traffic along Highway 27 and making the corridor more inviting for pedestrians
- Central to this would be to reduce Highway 27 to two lanes by removing traffic from the curb lane, and to introduce landscaping and other features

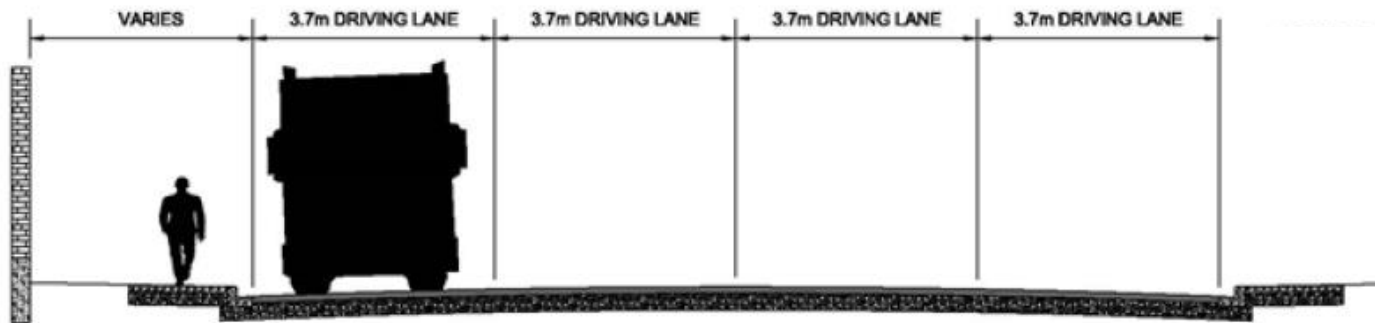
# Street Level in Sundre



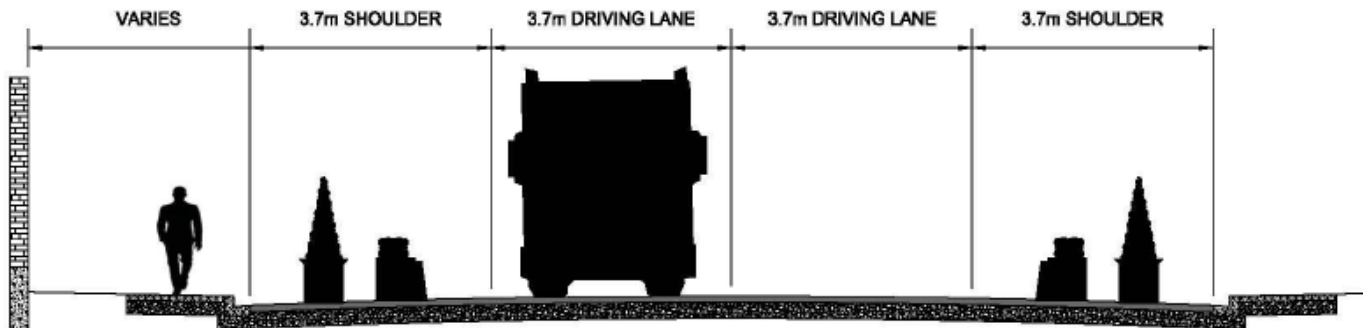
Google Oct. 2014

# Road Cross Sections

## Existing



## Proposed



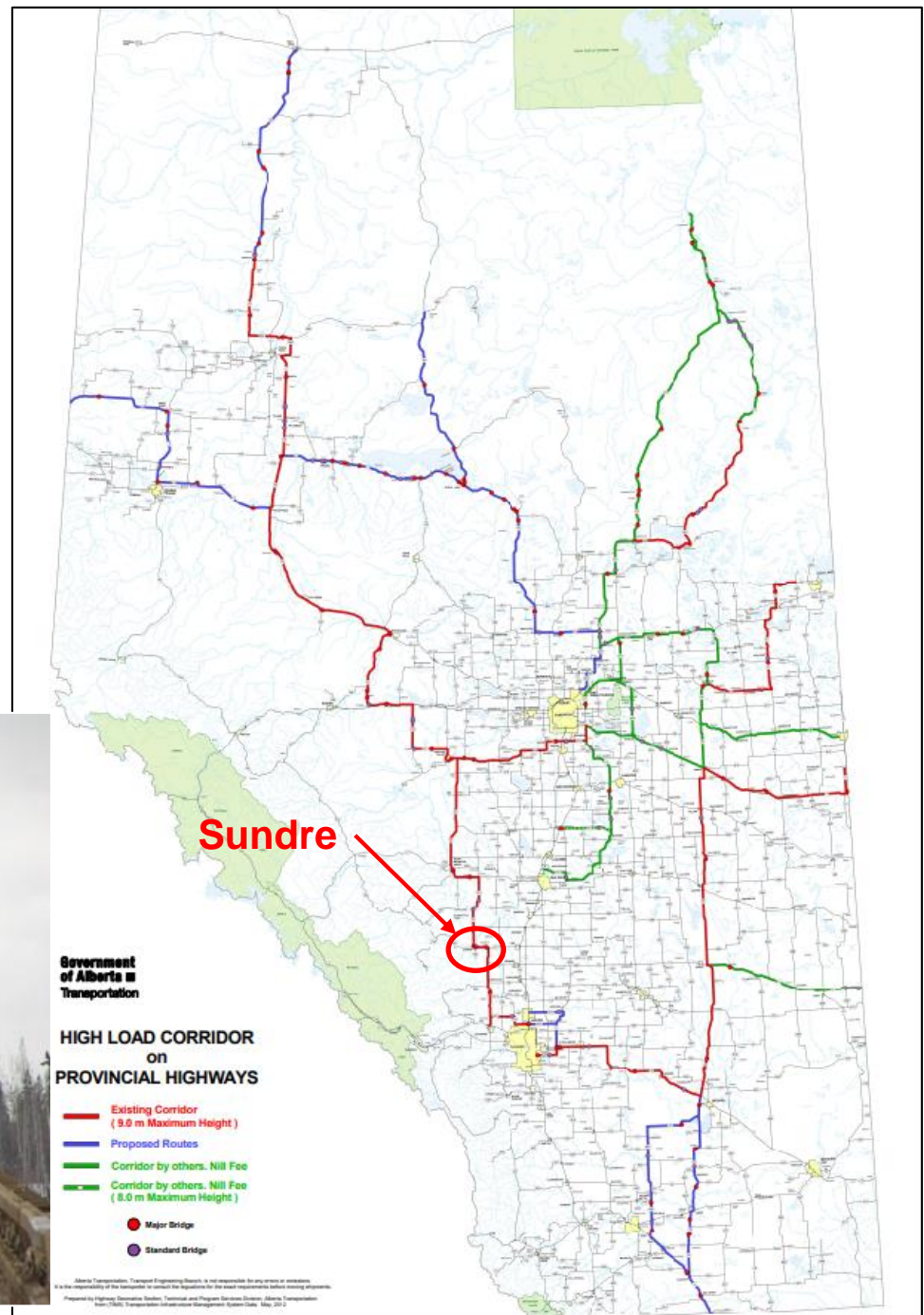
# Corridor Review Study

- A review was undertaken to identify alternatives that could improve conditions for pedestrians
  - Collect traffic data
  - Develop alternatives
  - Present to Town and County councils
  - Present to stakeholders (Chamber of Commerce, downtown business community and trucking industry)
  - Present to the general public
  - Return to Town Council for final decision
- Highway 27 is part of a provincial High Load Corridor, and there are lots of trucks and over-dimensional vehicles...



# High Load Corridors in Alberta

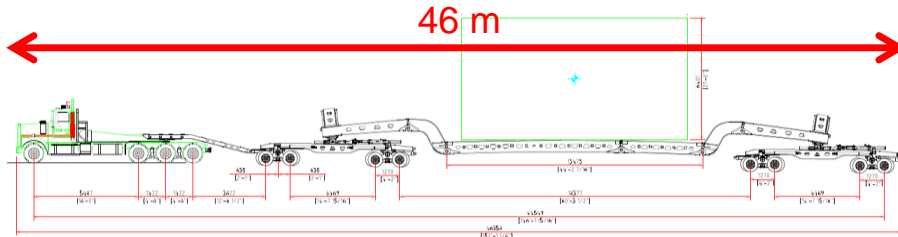
- A network of designated highways with overhead utility lines raised to accommodate loads up to 9 m high



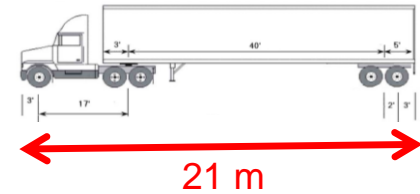


# Design Vehicles in Alberta

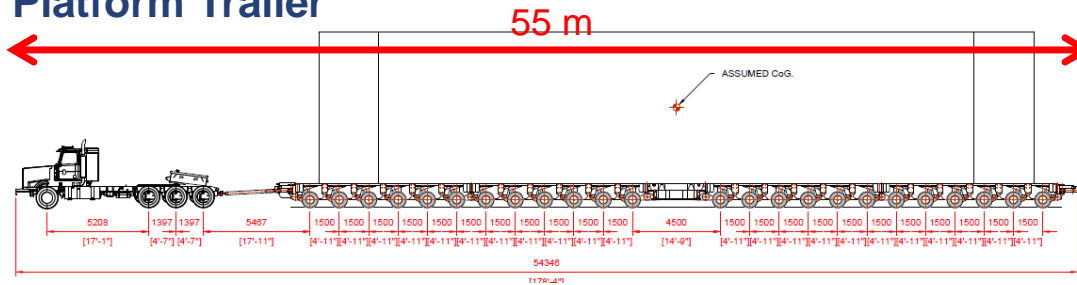
## Lowboy Heavy Hauler



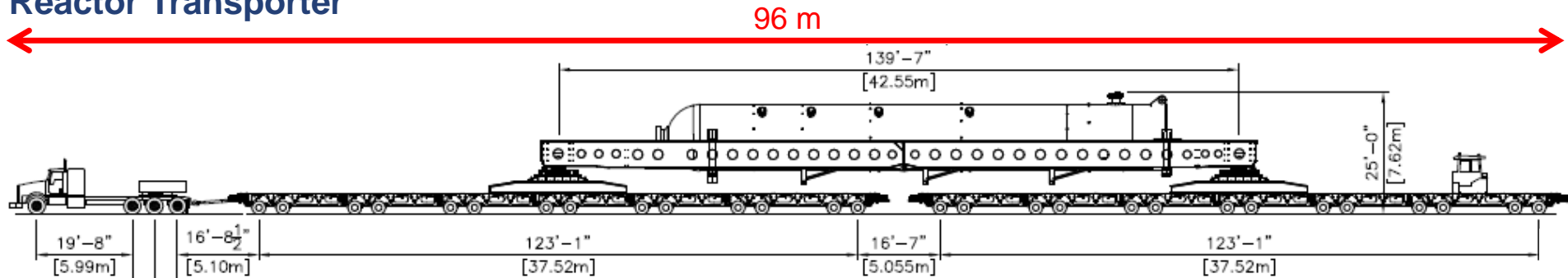
## Tractor Semi-Trailer



## Platform Trailer



## Reactor Transporter




# Public Open House and Survey




February 2016

**Open House Comment Sheet**



**Downtown Sundre**  
Highway 27 Corridor Review




Thank you for attending the Town of Sundre Open House to review options for the Highway 27 Corridor Improvements through Downtown Sundre. Your comments and concerns are an important part of the decision making process. Please use this form to let us know your thoughts on the proposed improvements.

This comment sheet may be handed in at the open house or sent via email to Stuart Richardson at [Stuart.Richardson@gov.ab.ca](mailto:Stuart.Richardson@gov.ab.ca) or by regular post Attention: Stuart Richardson, #401, #920-51 Street, Red Deer, AB T4N 0K8 or by Fax at 403.403.240-4810

Open House Session

- How did you hear about the Open House?

Please provide any comments you may have on each of the presented options and indicate your preferred option:



**Existing 4-lane cross-section**  
Comments:-

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**3-lane cross-section (Back to Back Left Turn Bay)**  
Comments:-

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**Open House Comment Sheet**



**2-lane cross-section (1 lane eastbound and 1 lane westbound)**  
Comments:-

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**2 & 3-lane cross-section (Center Street Signals Plus 3 Roundabouts)**  
Comments:-

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**2 & 3-lane cross-section (Centre Street Signals Plus 1 Roundabout)**  
Comments:-

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**Contact Information (Optional)**

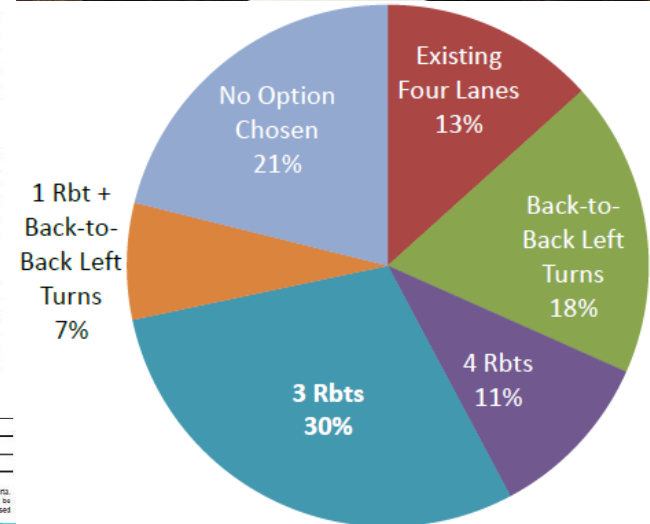
Name \_\_\_\_\_

Street / Avenue / RFR / Box# \_\_\_\_\_

Town / City \_\_\_\_\_ Distance \_\_\_\_\_ Postal Code \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

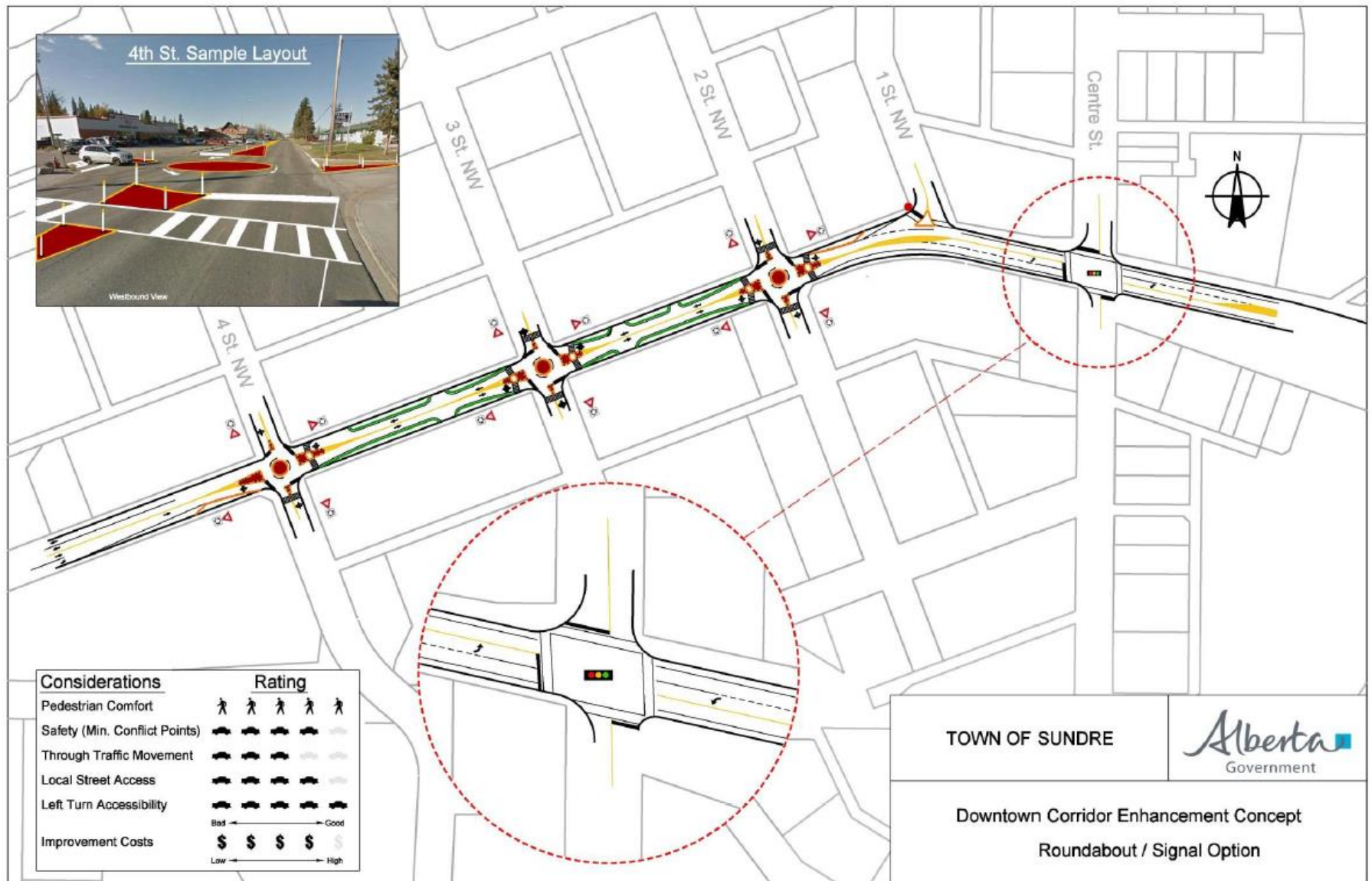
Personal information that you provide on this form is protected under the Freedom of Information and Protection of Privacy Act of Alberta. The personal information that is collected on this form relates directly to programs being undertaken by Alberta Transportation and may be used to reply to your questions and concerns supplied on this form. No other use will be made of this information and it will not be released.



# Preferred Alternative

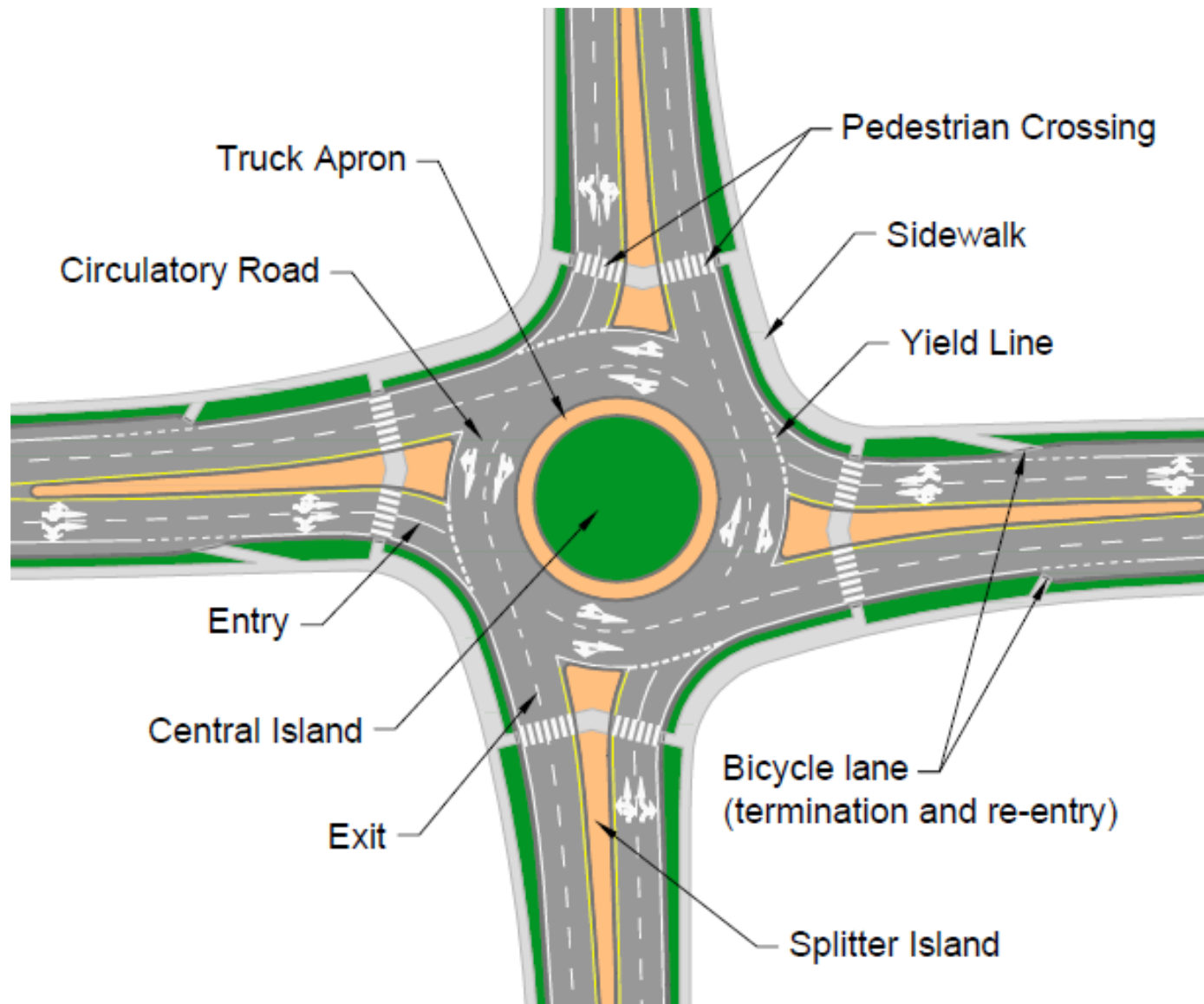
- Several alternatives were evaluated and presented
  - Do nothing (i.e. maintain corridor at 4 lanes)
  - Back-to-back left-turn lanes at the intersections vs. narrowing corridor to 2 lanes
  - Stop control, traffic signals (where warranted) or mini-roundabouts
- Treatments would be temporary, at least initially
- The preferred alternative consisted of
  - Reconfiguring the signalized intersection at Centre Street
  - Removing the curb lane using pavement markings or coloured asphalt, flexi-posts and/or planters
  - Installing 3 mini-roundabouts, using pavement markings or coloured asphalt and flexi-posts, at 2nd, 3rd and 4th Streets

# Preferred Alternative



# What is a Mini-Roundabout?

# Features of a Roundabout





# What is a Mini-Roundabout?

- Not necessarily a compact roundabout
- A mini-roundabout is defined as a roundabout with a fully-mountable central island
- Splitter islands may also be mountable
- Developed in the United Kingdom as a lower-cost alternative to regular roundabouts
- Commonly used there as a right-of-way control device (similar to an all-way stop, but more efficient)
- Existing intersection footprint is expanded a little or not at all in order to accommodate the same vehicles as before

# Typical UK Mini-Roundabout



**Mountable  
Central Island**

Reading, UK  
(photo reversed)

# UK Mini-Roundabout in the USA



Dimondale, MI

# New Type of Mini-Roundabout in the USA



Bel Air, MD



# New Type of Mini-Roundabout in the USA



# New Type of Mini-Roundabout in Canada



Caledon, ON



# Mini-Roundabouts on Highway 27

- First such installation in Alberta (and probably Canada)
- Since the central island is fully-mountable (and contains no signs or objects), mini-roundabouts are not suitable on high-speed facilities because they are not visible from a distance
- However in downtown Sundre mini-roundabouts can
  - Accommodate the same large vehicles as before within the existing intersection footprint
  - Slow traffic if designed appropriately
  - Improve side street access
  - Improve pedestrian crossings of Highway 27

# Challenges with Mini-Roundabouts

- Not as effective in slowing traffic as regular roundabouts
- Can be difficult to see from a distance, especially with poor weather conditions or when covered in snow
- Requires significant education and outreach efforts
  - Many drivers are unfamiliar with the rules of the road for roundabouts in general
  - Many drivers don't realize the central island of a mini-roundabout is mountable
  - Lots of tourists in summer in Sundre

# **Corridor Review Study – Cont'd**

# Corridor Review Study – Cont'd

- After Town Council approved the preferred alternative, the next steps were
  - Hold public information session
  - Finalize design of the corridor and mini-roundabouts
  - Obtain provincial funding
  - Construct pilot project

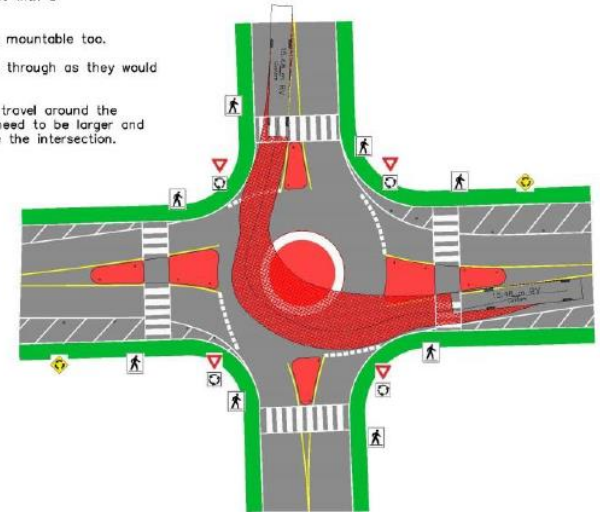
# Public Information Session



May 2017

## Mini-Roundabouts

- A mini-roundabout is a roundabout with a fully-mountable central island.
- Sometimes the splitter islands are mountable too.
- This allows large vehicles to travel through as they would with a regular intersection.
- At a roundabout vehicles have to travel around the central island, which means they need to be larger and sometimes require property outside the intersection.



## Motorists

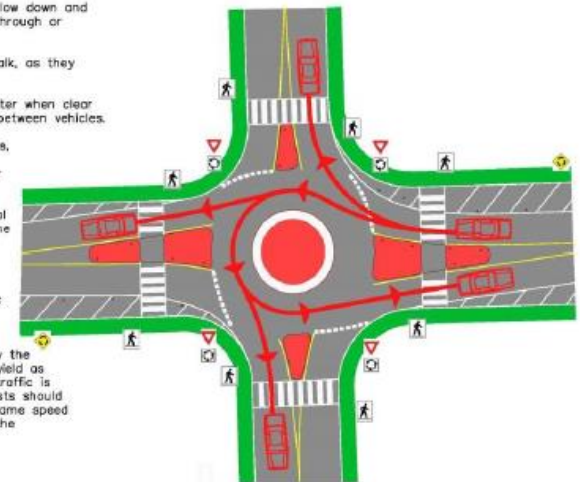
- When approaching a roundabout, slow down and decide whether you are travelling through or turning left or right.
- Yield to pedestrians in the crosswalk, as they have the right of way.
- Yield the circulating traffic and enter when clear or when there is a sufficient gap between vehicles.
- If an emergency vehicle approaches, exit the roundabout immediately and then pull over. Do not stop or pass in the roundabout.
- When exiting the roundabout, signal right and yield to pedestrians in the crosswalk.

## Cyclists

- Cyclists can either ride with traffic inside the roundabout or use the crosswalks appropriately.
- Cyclists who ride with traffic follow the same rules as vehicles and must yield as they enter the roundabout. Since traffic is slower inside the roundabout, cyclists should be able to travel at or near the same speed as motorists, staying in line with the circulating traffic.

## Pedestrians

- Cross only at crosswalks, and always stay on the designated walkways.
- Never cross to the central island.
- Cross the roundabout one approach at a time. Use the splitter island as a halfway point where you can check for approaching traffic.

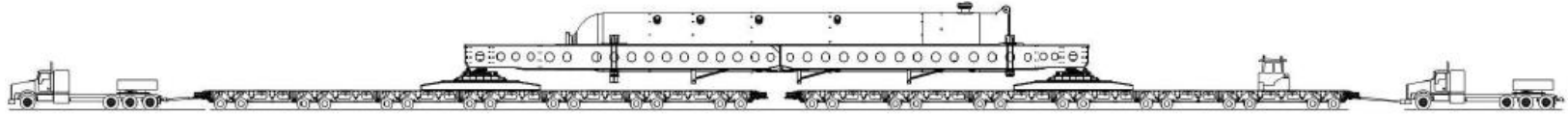


# Visualizations



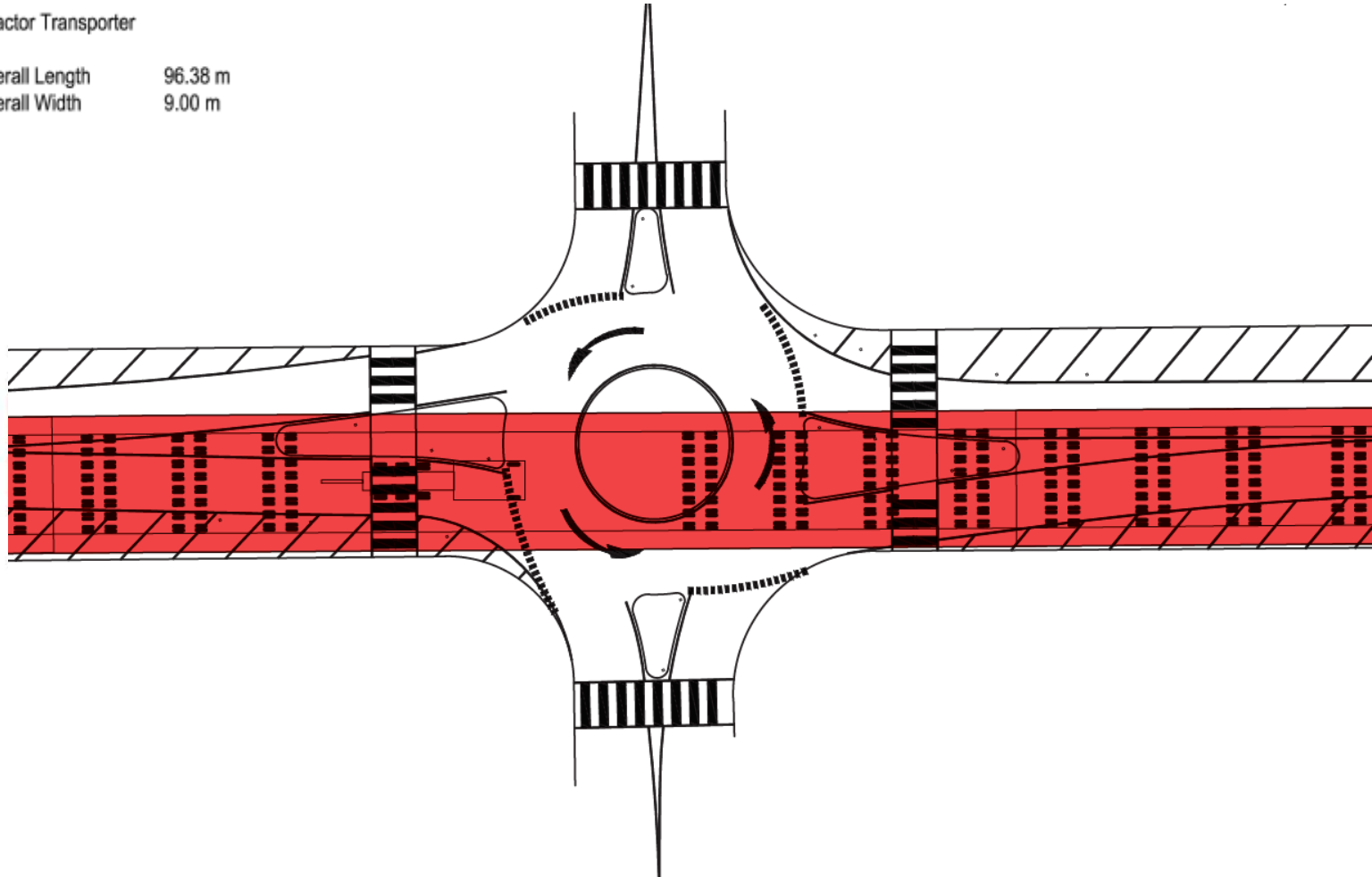


# Design Vehicle Movements



Reactor Transporter

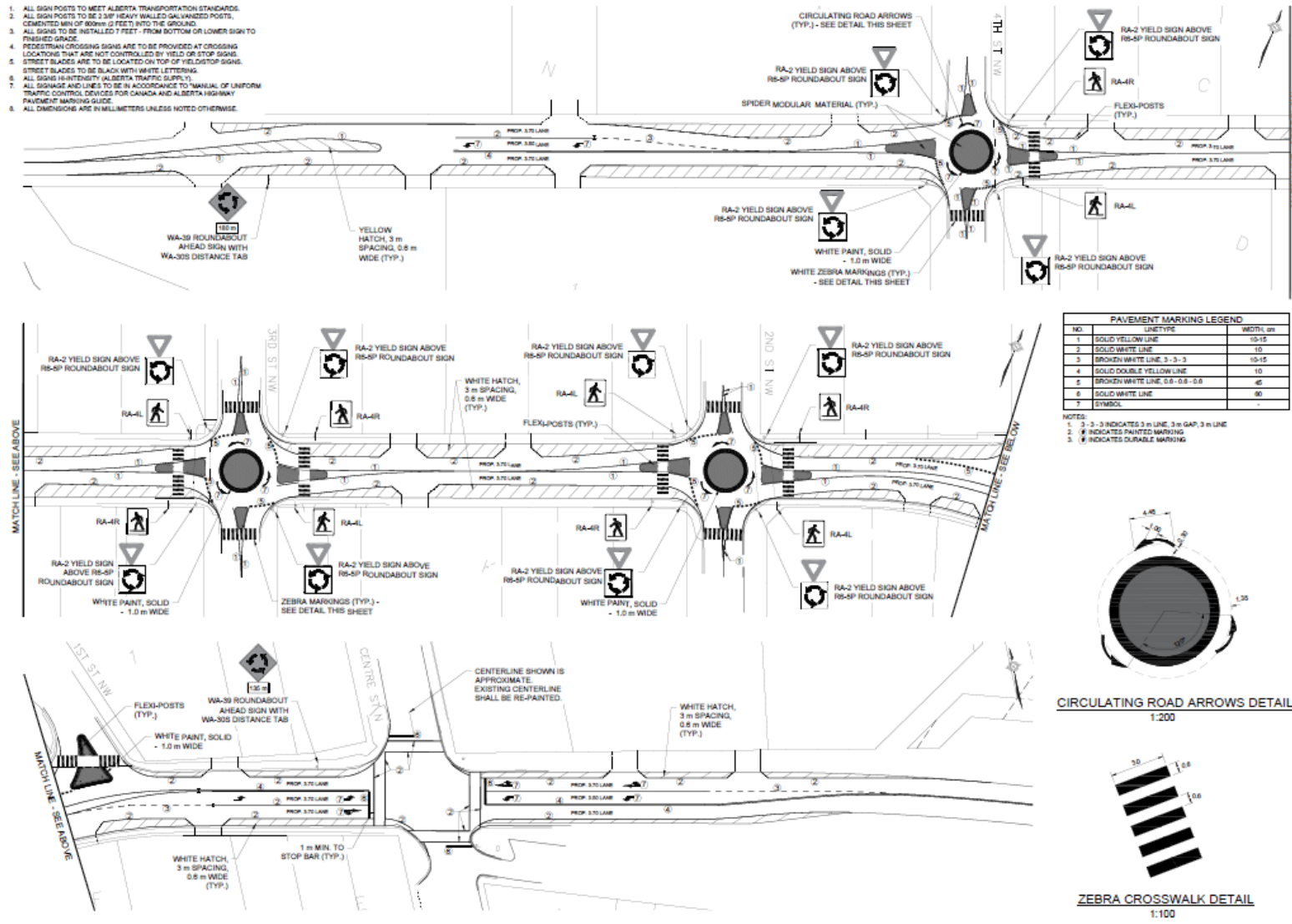
Overall Length 96.38 m  
Overall Width 9.00 m



# Signs and Markings

## NOTES:

1. ALL SIGN POSTS TO MEET ALBERTA TRANSPORTATION STANDARDS.
2. ALL SIGN POSTS TO BE 3" RUST FREE GALVANIZED POSTS, COMPLETED MIN OF 800mm (2 FEET) INTO THE GROUND.
3. ALL SIGNS TO BE INSTALLED 7 FEET - FROM BOTTOM OR LOWER SIGN TO FINISHED GRADE.
4. PEDESTRIAN CROSSING SIGNS ARE TO BE PROVIDED AT CROSSING LOCATIONS THAT ARE NOT CONTROLLED BY YIELD OR STOP SIGNS.
5. STREET BLADES ARE TO BE LOCATED ON TOP OF YIELD/STOP SIGNS. STREET BLADES TO BE BLACK WITH WHITE LETTERING.
6. ALL SIGNS IN ACCORDANCE WITH ALBERTA TRAFFIC SUPPLY.
7. ALL SIGNAGE AND LINES TO BE IN ACCORDANCE TO "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR CANADA AND ALBERTA HIGHWAY PAVEMENT MARKING GUIDE."
8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.



## LEGEND

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- OPPOSITE CONSTRUCTION BOUNDARY
- ROAD & ROAD SIGN



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ISO 50001:2018

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ISO 60001:2018

ISO 63001:2018

ISO 64001:2018

ISO 65001:2018

ISO 66001:2018

ISO 67001:2018

ISO 68001:2018

ISO 69001:2018

ISO 70001:2018

ISO 71001:2018

ISO 72001:2018

ISO 73001:2018

ISO 74001:2018

ISO 75001:2018

ISO 76001:2018

ISO 77001:2018

ISO 78001:2018

ISO 79001:2018

ISO 80001:2018

ISO 81001:2018

ISO 82001:2018

ISO 83001:2018

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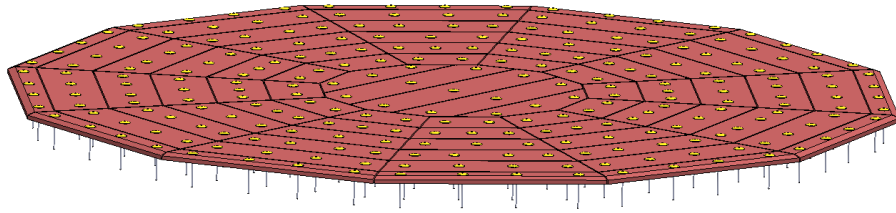
# Pilot Project

- The intent was the treatments would be temporary, at least initially
- When finalizing the design of the mini-roundabouts the thought was to paint the central islands and use modular curbs for the splitter islands
- If successful they, along with removing the curb lane, could be made permanent once the section of Highway 27 is reconstructed
- Concerns were raised with durability and how well the paint would control traffic speeds
- Then someone suggested using a modular product for the mini-roundabouts...

# Modular Mini-Roundabouts

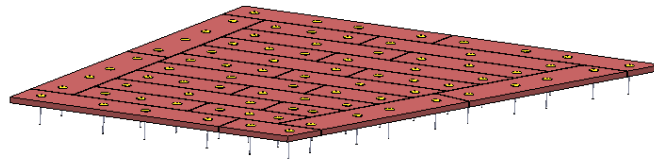
- The product selected was the “Spider Traffic Control System” made by ZKxKZ LLC
- Comprised of 3” high modular pieces of polyethylene-based plastic made from recycled milk jugs and tire crumb
- Intended for replacement of conventional mini-roundabouts made from asphalt and concrete, but at a lower cost and with more rapid installation
- System consists of precut and predrilled boards plus anchors, plugs anchor adhesive and fasteners delivered as a site-specific kit

# Modular Mini-Roundabout Islands



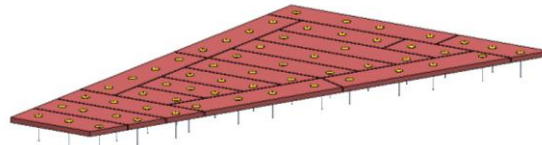
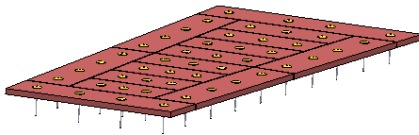
## Central island

- 10 m diameter
- 77 boards, 255 anchors



## Large splitter islands

- 40 boards, 130 anchors



## Small splitter islands

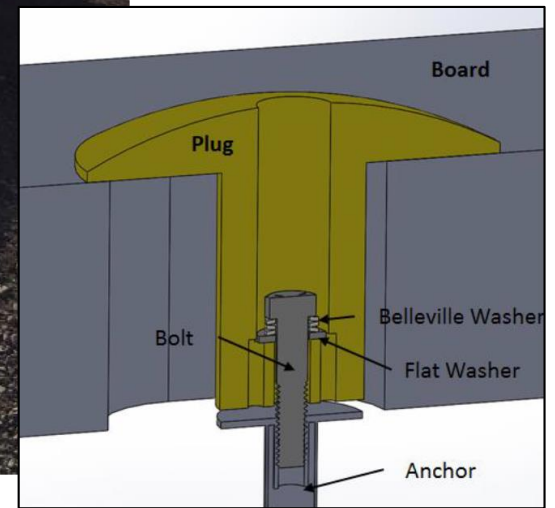
- 18 boards, 59 anchors

**3 mini-roundabouts = 1190 linear metres of boards and 1899 anchors**

# Mini-Roundabout Installation



# Boards and Anchors



# Installation

- Budget had been allocated so construction needed to happen in 2017
- Delays in procuring contractors and sub-contractors so late in year, delays because of sub-zero weather, and delays due to supplier issues
- Construction began in October 2017 with work on the side streets, reconstruction of sidewalks and introduction of pedestrian ramps at the intersections
- Mini-roundabout installation began shortly after

# Installation





# Installation





# Installation Challenges



**Existing Pavement**



**Weather Conditions**



**Traffic Accommodation**

# Opening December 2017





# Corridor Operations

- Most drivers “getting it”
- Some accidentally or purposely ran over the flexi-posts and central islands, at least initially
- Some drivers on Highway 27 assume they still have right-of-way priority all the time, even when side street traffic is already in the mini-roundabout
- At least speeds are low

# Video Interlude



# Ongoing Challenges



**Failed Anchor Plugs**



**Failed Flexi-Posts**



**Poor Markings**

# Project Successes

- Goal of slowing traffic along Highway 27 has been achieved
- Corridor more inviting for pedestrians
- Pedestrian crossings of Highway 27 facilitated
- Side street access improved
- Accommodates the same large vehicles as before
- Only one minor collision so far attributed to the mini-roundabouts

# Project Lessons Learned

- Stakeholder support absolutely critical
- The flexi-posts were subjected to too much loading (either from over-dimensional vehicles or from drivers intentionally running over them) and failed almost immediately
- Durable pavement markings should be used whenever possible
- Make sure existing surface is level before using modular products
- Install such products during warm weather
- Don't skimp on the public outreach and education





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# Mini-roundabouts still confusing Sundre drivers months after being installed

The 3 mini-roundabouts have many second guessing how to use them

By Dan McGarvey, CBC News Posted: Mar 01, 2018 5:00 AM MT | Last Updated: Mar 01, 2018 6:25 AM MT



This is one of three mini-roundabouts that have some in Sundre scratching their heads and trying to avoid collisions. They were installed to make life safer for pedestrians and slow down traffic passing through town. (Dan McGarvey/CBC)

## Stay Connected with CBC News



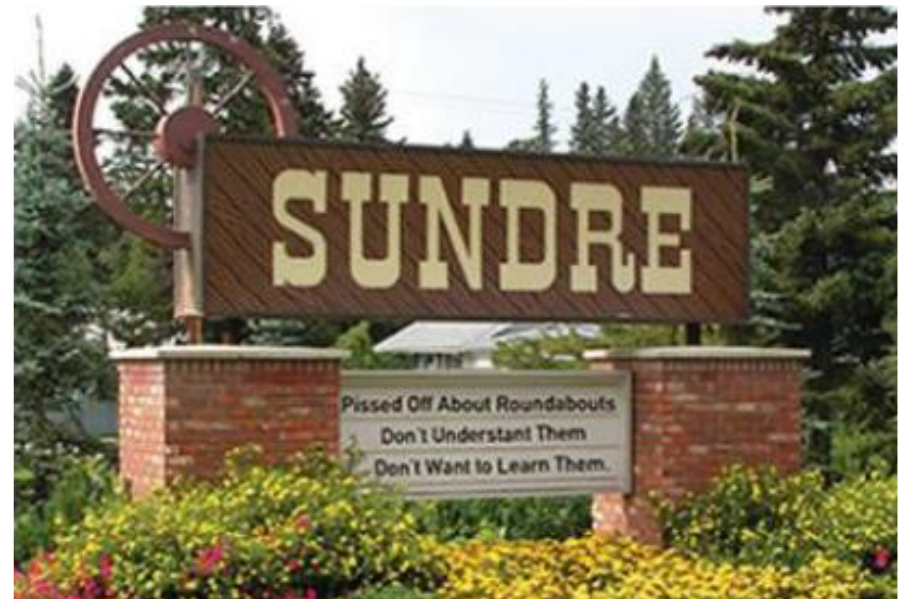
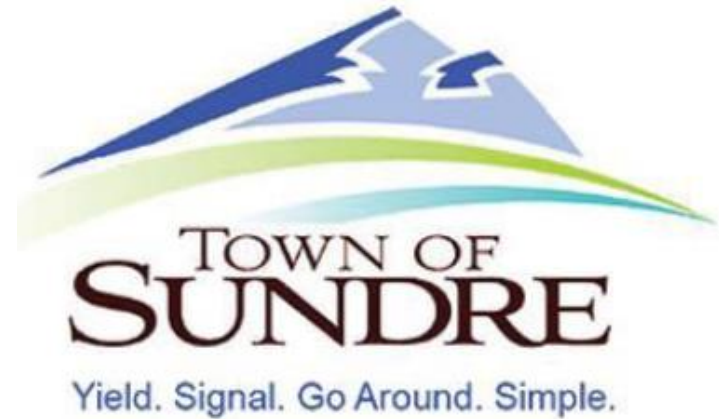
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Friday	Saturday	Sunday	Monday	Tuesday
-6°C	-6°C	-8°C	-7°C	0°C

[More Weather](#)

# Public Feedback



Thank you.  
**Questions?**