



MORRISON HERSHFIELD

# Rural Roadway Cycling Facilities

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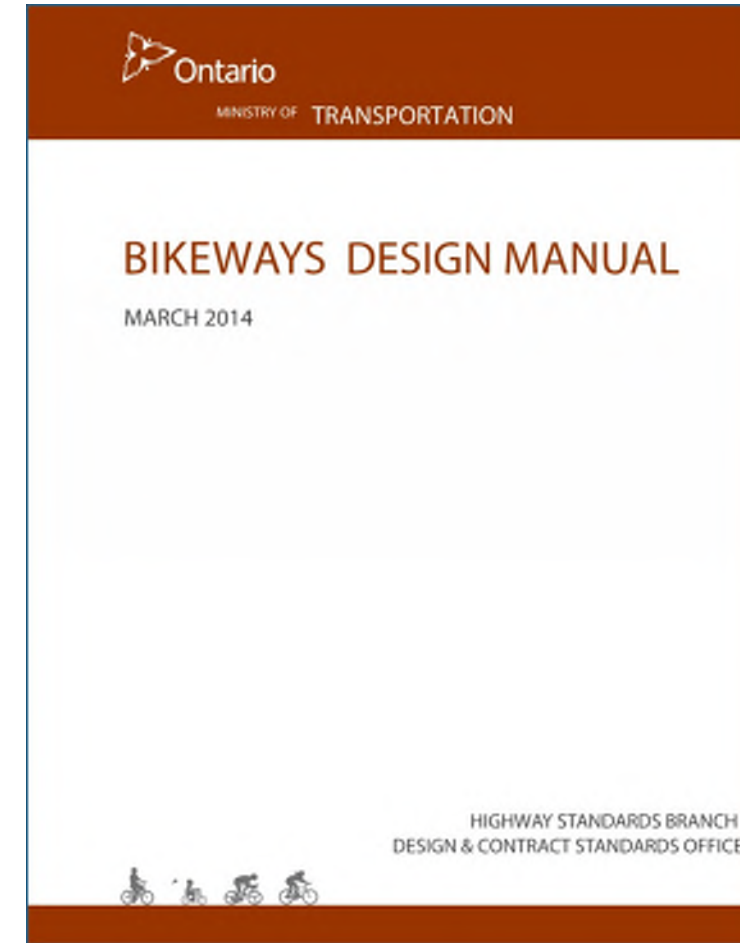
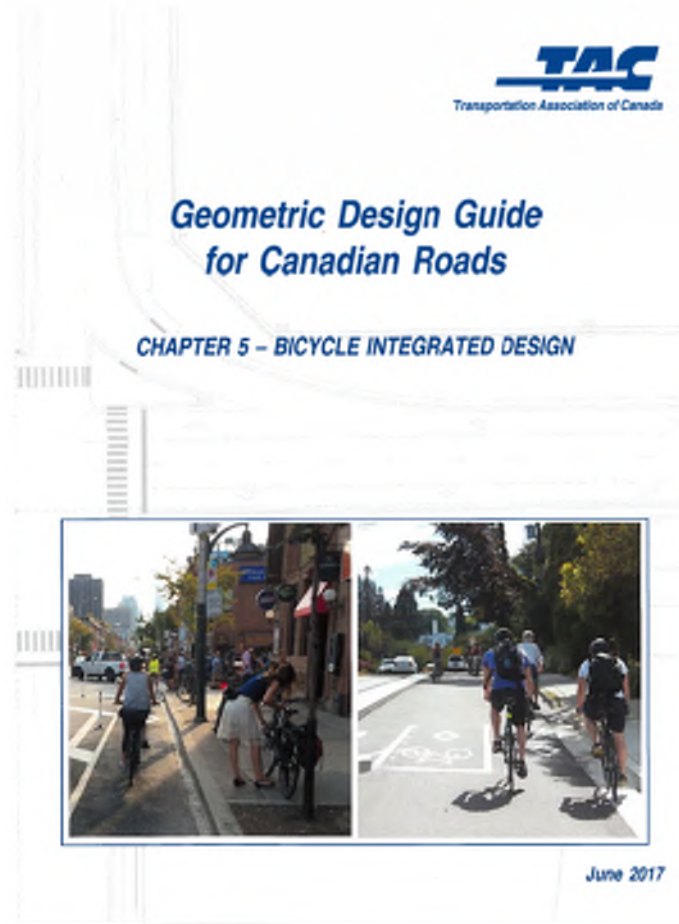
# Overview

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- Introduction to Ontario Cycling Infrastructure
- Cycling Standards and Approach/Justification
- Issues and Challenges of Implementing Cycling Facilities on Rural Roadways/Highways
- Example of rural cycling facility design and implementation

# Cycling Facilities

- Primarily 2 lane urban rural roads
- Due to travel speeds of motorized vehicles and traffic volumes, facilities are on shoulder or off-road (pathways)
- Focus on shoulder facilities



# Selection of Facility Type

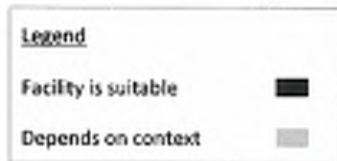
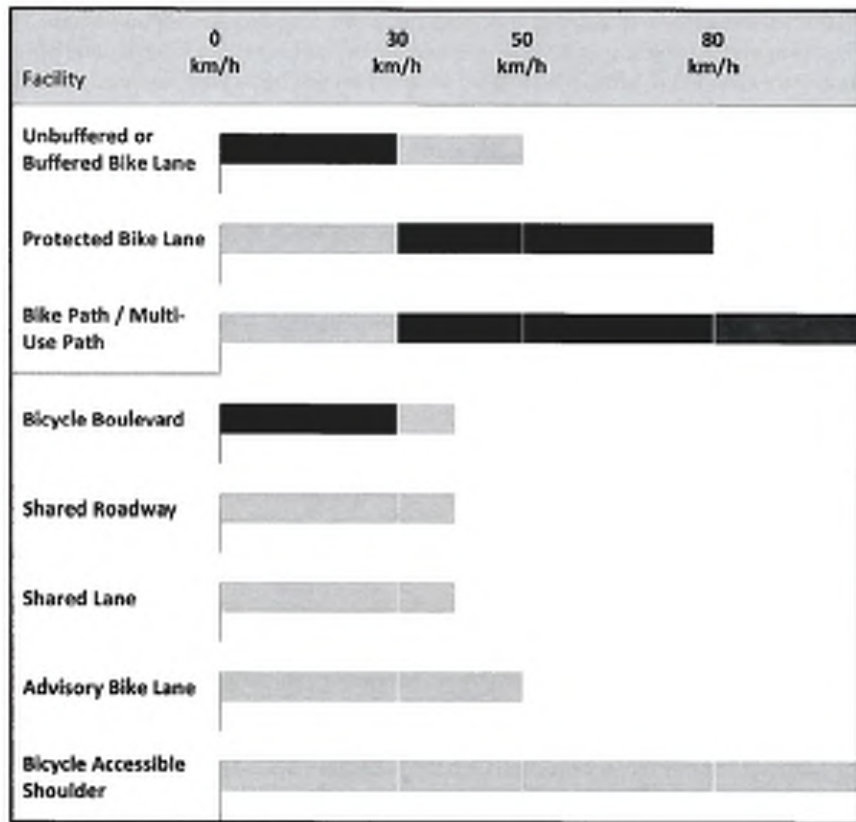
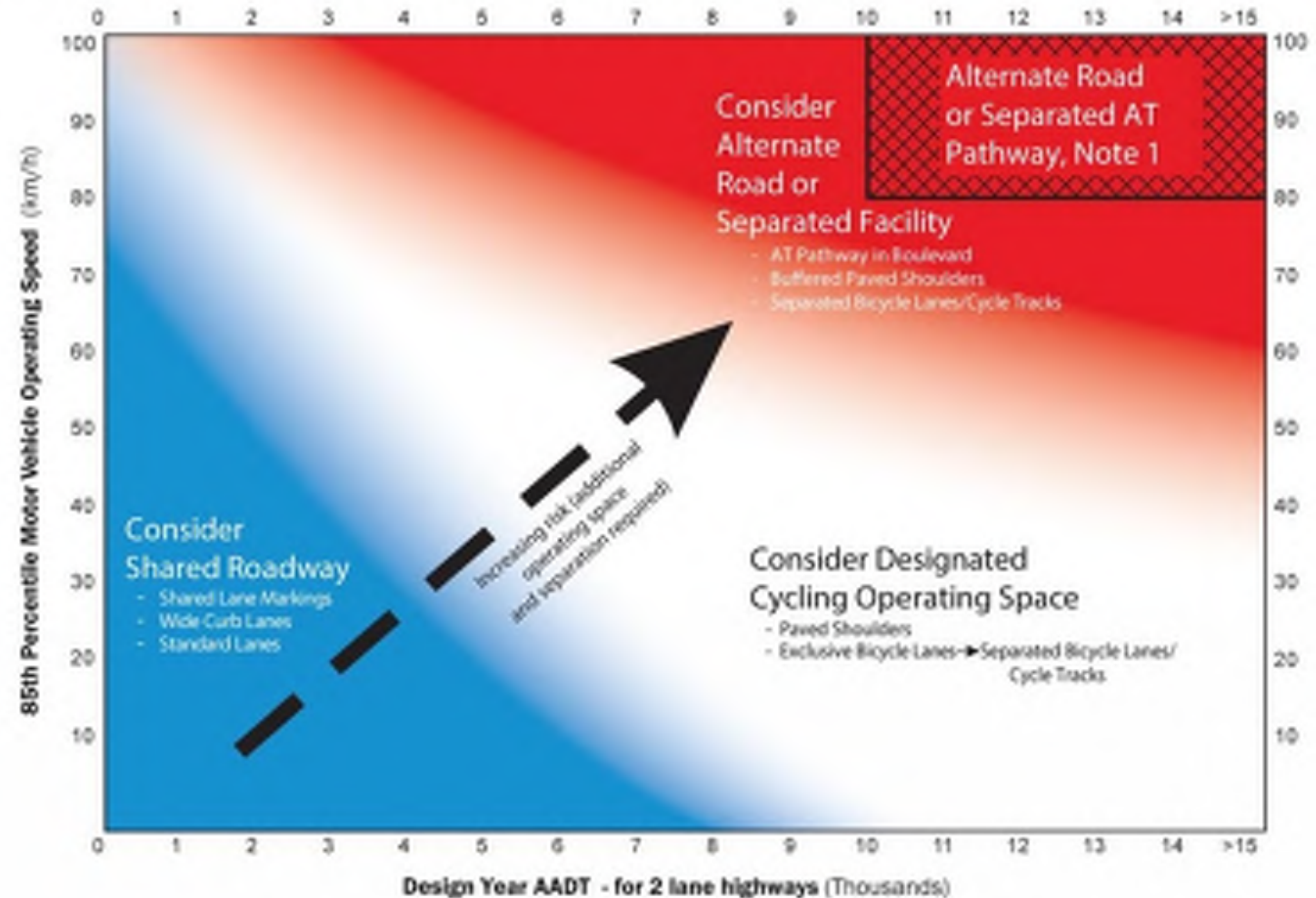


Figure 5.4.1: Bikeway Facilities, by Roadway Posted Speed

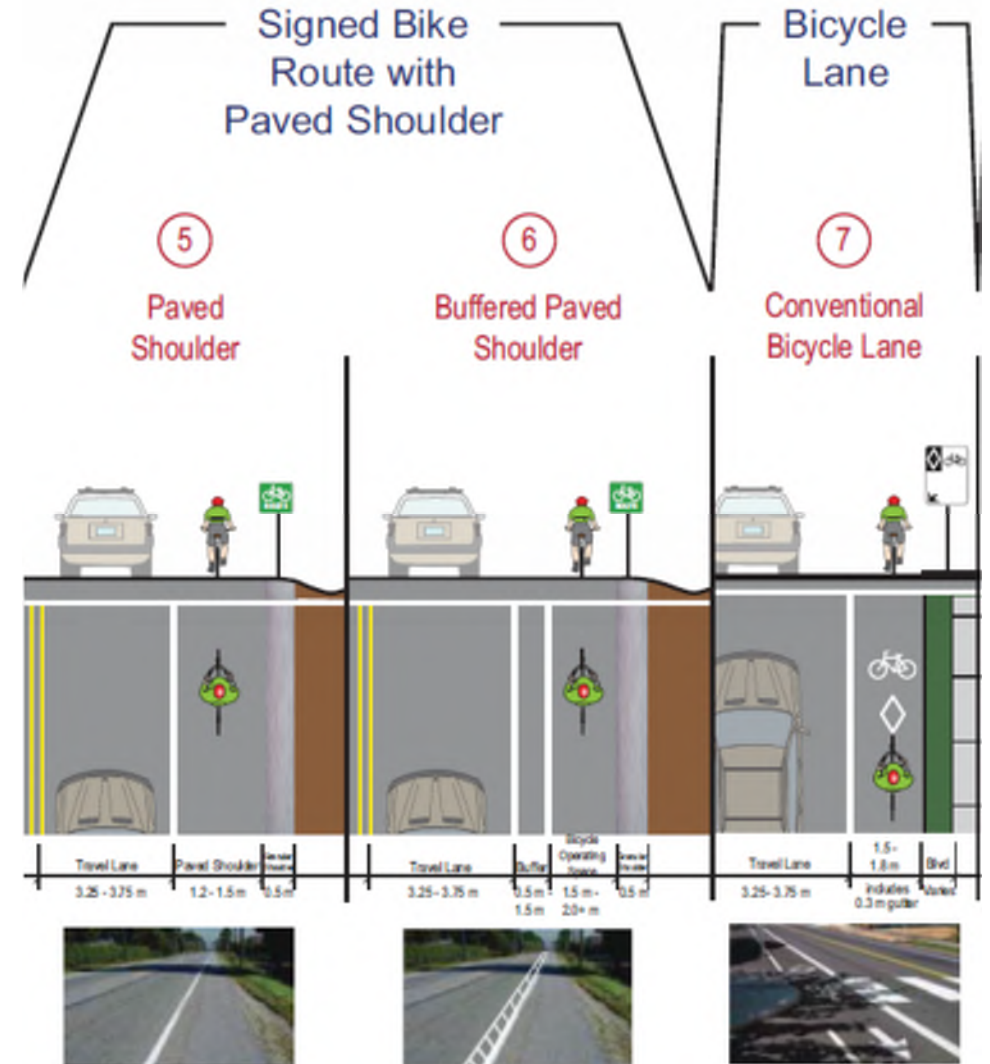
## STEP 1 of 3 Desirable Cycling Facility Pre-selection Nomograph



# Selection of Facility Type



Figure 4.9 – Signed Bike Route with Paved Shoulder, Sault St. Marie



# Cycling Facility Selection

## Application Heuristics

- Criteria based on roadway characteristics
- Technical as well as functional criteria
- Forms the basis of Justification Reporting

Table 3-1 – Summary of Application Heuristics

Primary Criteria
85 <sup>th</sup> percentile motor vehicle operating speeds
Motor vehicle volumes
Function of street/road/highway
Vehicle mix
Collision history
Sightlines and available space
Secondary Criteria
Anticipated users (skill, trip purpose)
Level of bicycle use
Costs/funding
Function of route within cycling facility network
Type of roadway improvement project
On-street parking (for urban situations)
Intersection/access density (for urban situations)

# Cycling Facility Selection

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- Operating Speed
  - Look at operating speed.
  - Differential between vehicles and cyclists
  - <50km/h consider shared lanes
  - >70 separated facility (buffer) or parallel route
- Vehicle Volumes
  - 2,000 – 10,000 vpd triggers formal cycling facility
- Function of Roadway
  - Collectors, arterial recommend cycling facility
- Vehicle Mix
  - Truck percentages, transit stops

# Cycling Facility Selection

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- Collision history
  - Vehicle run off road (ROR)
  - Existing cycling collisions
- Sightlines and available space
  - Roadway profile and presence of driveways, side roads
  - Shoulder widths, hazards
- Costs
  - Capital available for preferred facility
- Anticipated Users
  - Skill and trip purpose
  - Length of corridor/route may increase level of experience

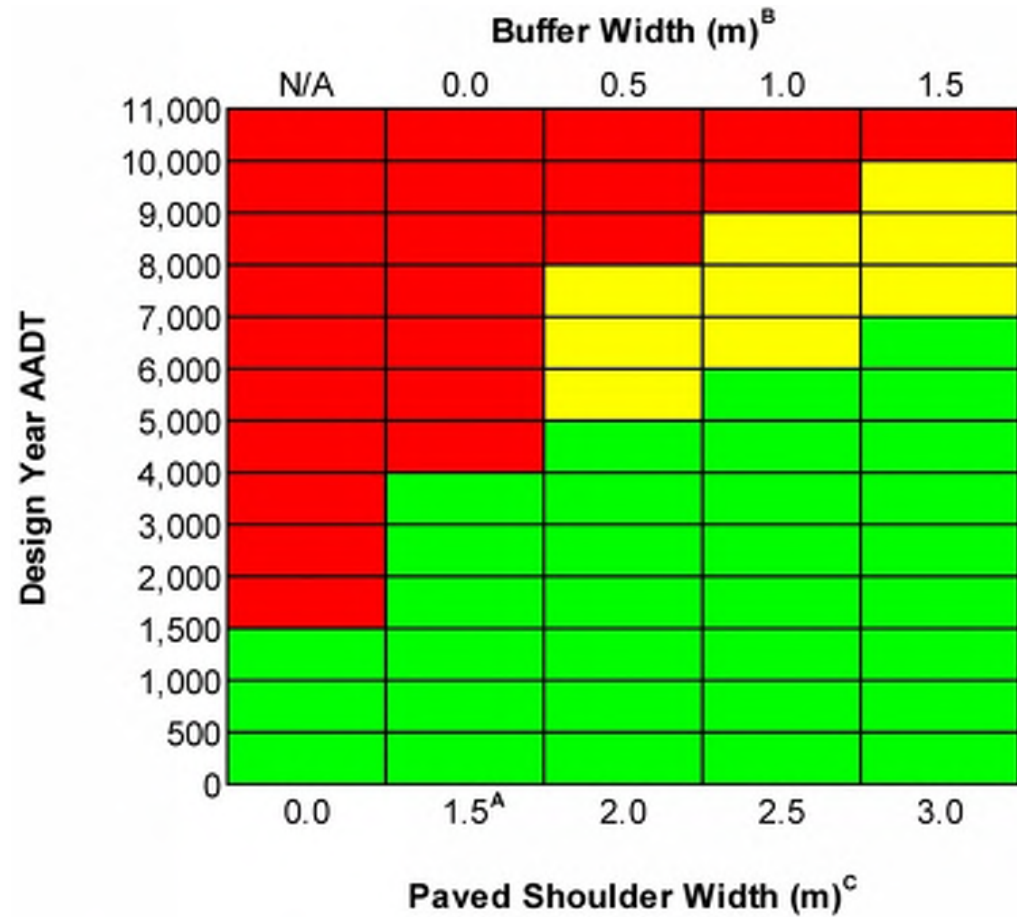


# Cycling Facility Selection

- Level of use
  - Existing cycling demand
  - >50 per hour paved shoulders and/or lanes may be appropriate
  - Schools, recreation facilities, shopping would suggest separated facilities
- Functional Route within network
  - Part of larger network (current or future)
  - Stand alone sections
- Roadway improvement projects
  - New Construction vs. retrofit



# Facilities Requirements



- Acceptable
- Acceptable with Shoulder Rumble Strips within Buffer Zone
- Not Recommended

Table 5.3.9: Design Domain: Width of Bicycle Accessible Shoulder

Parameter	Design Domain			
	Practical Lower Limit	Recommended Range		Practical Upper Limit
		Recommended Lower Limit	Recommended Upper Limit	
Width (m), bicycle accessible shoulder	1.5	1.8	3.0	3.0

Table 5.3.2: Design Domain: Width of Buffered Bike Lane

Parameter	Design Domain			
	Practical Lower Limit	Recommended Range		Practical Upper Limit
		Recommended Lower Limit	Recommended Upper Limit	
Width (m), buffered bike lane, including buffer	1.8	2.1	3.0	3.5
Width (m), bike lane component	1.5	1.8	2.1	2.1
Width (m), buffer pavement marking component	0.3 <sup>1</sup>	0.3 <sup>1</sup>	0.9	1.4

Note 1: A minimum buffer width of 0.6 m is required when bike lanes are adjacent to motor vehicle parking.

# Considerations with Shoulder Facilities

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- The following conditions apply to the design matrix:
  - In constrained locations within a corridor the minimum width may be reduced from 1.5m to 1.2m
  - Where 1.2m width is used a minimum 0.3m offset to barriers is required

# Cycling Lanes on Rural Roadways



# Issues and Challenges

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- Capital Programming
- Connectivity
- Entrances (approaches)
- Side road intersections
- Guide rail
- Narrow shoulders (less than required for cycling lane)
- Side slopes and barriers

# Issues and Challenges

- Programming of the infrastructure
  - Timing of work with rehabilitation cycle of the roadway
  - Add-on or retrofit shoulder work may not be as simple as paving shoulders



# Issues and Challenges

- Connectivity:

- Ability to build an entire corridor at once
- Is the section viable as a standalone route?
- Are there realistic start and end points for this route?

Side roads, trails, communities, etc.

- Consider deferring signing as cycling route
- Consider deferring painting buffer line



RB-92 (TAC)

(600 mm x 750 mm)

# Issues and Challenges

- Entrances (approaches):
  - Closely spaced high density of entrances not ideal
  - May opt out of rumble strips in buffer
- Side road intersections:
  - Establishing safe path of travel and guidance
  - Integration with turn lanes, tapers, slip-arounds

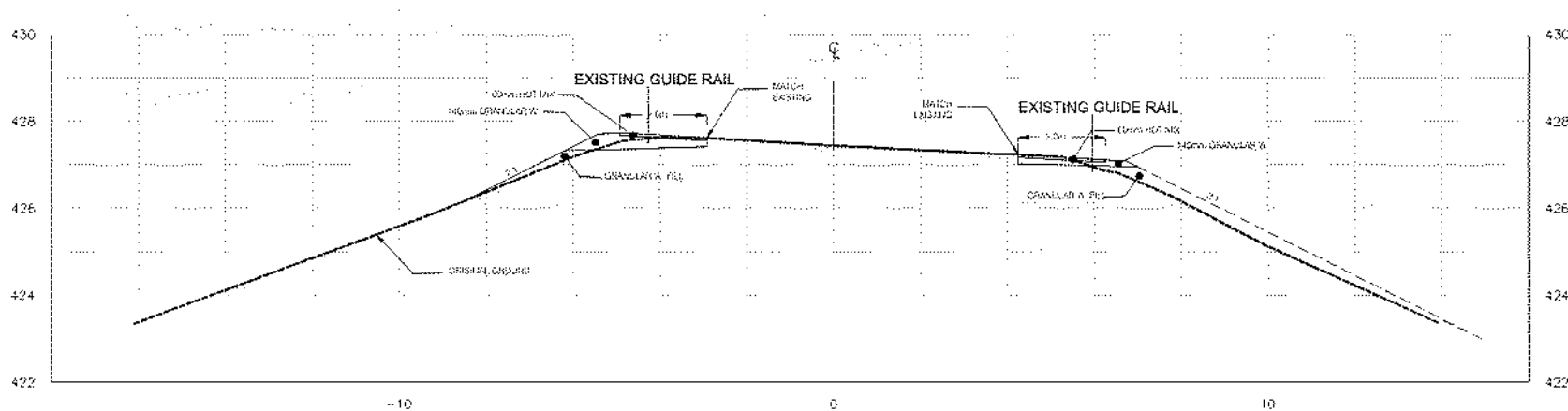
Need for consistency with treatments throughout the corridor.





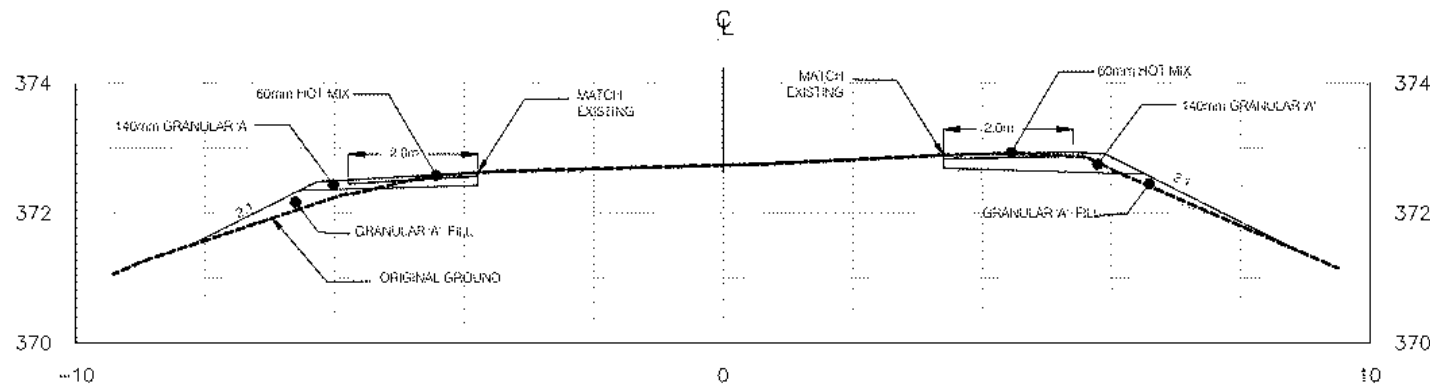
# Issues and Challenges

- Guide rail:
  - Often narrower platform
  - Additional cost to widen, impacts on ditching, property and utilities
  - Need to account for shy offset if already near minimum width



# Issues and Challenges

- Shoulder widths and material:
  - Length of issue, corridor wide, vs. isolated sections
  - Impacts of widening (cost, environmental, property, utilities...)
  - Options: narrow cycling lanes, remove rumble strips, remove buffer, Share the Road designation
  - Suitable shoulder material, disposal of excess materials



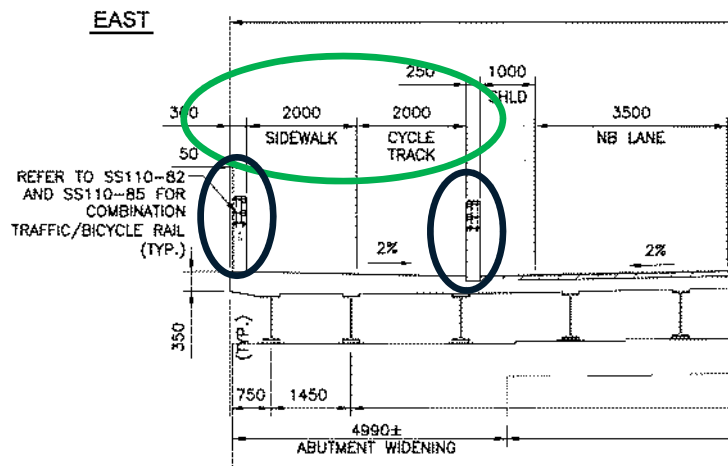
# Issues and Challenges

- Side slopes:
  - Consider steepness, height, hazards
  - Can consider flattening
  - Need to account for shy offset if already near minimum width

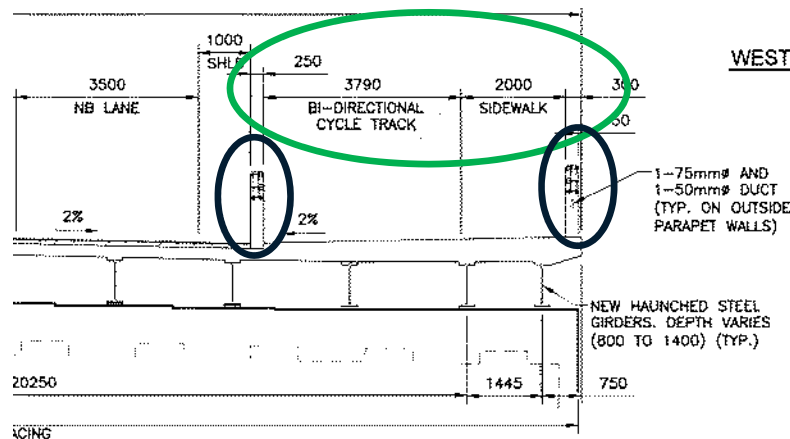


# Examples of Cycling Facilities on Bridges

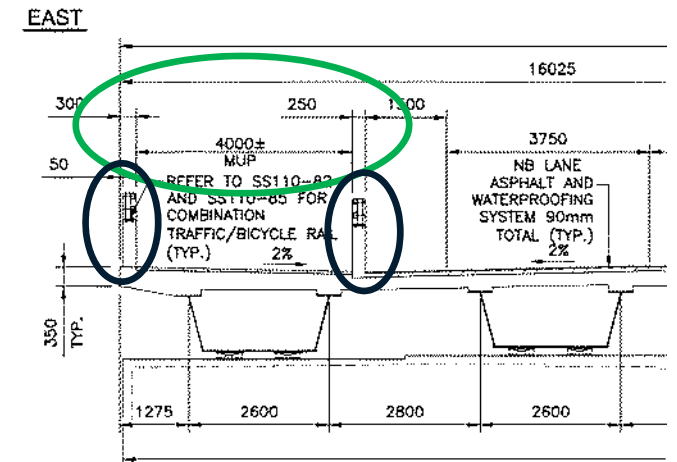
- Barriers:
  - Existing - need to account for shy offset if already near minimum width
  - Existing highway barriers are typically short for cyclists (need 1.4m)
  - Consideration for separation on bridges
  - Consideration of termination of barriers off the structure



Cycle Track and Sidewalk



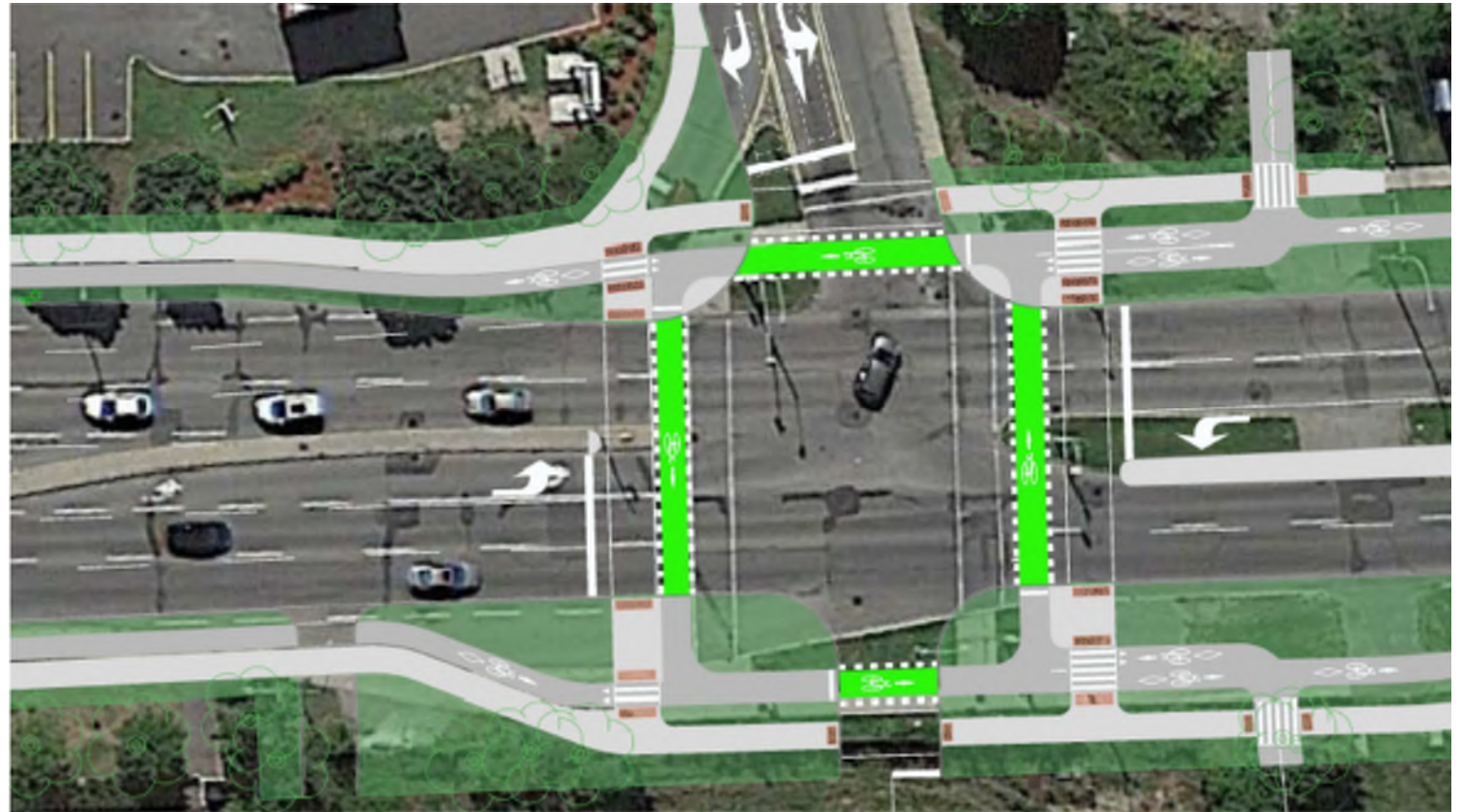
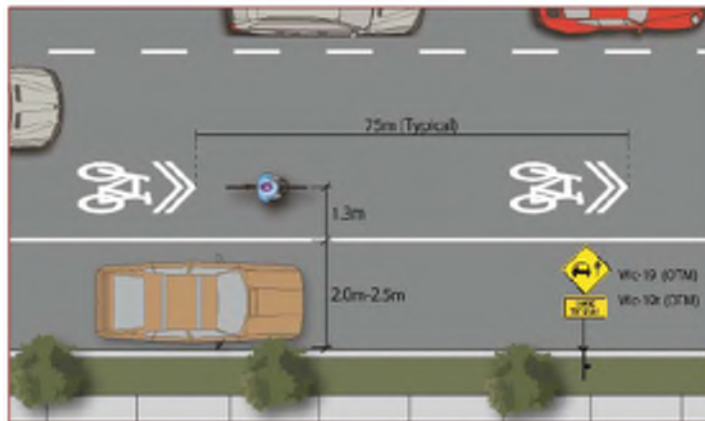
Bi-Directional Cycle Track and Sidewalk



Multi-Use Pathway

# Urban Sections Considerations

- Intersection proximity and signals
- Transit stops
- On-street parking



# Communication/Community Considerations

- Messaging to cyclists
- Amenities
  - Parking
  - Water
  - Showers
- Signage



Highway 17 typical shoulders prior to implementation of new Bike Lanes



Retrofit Bike Lanes during construction, prior to completion of painted buffer zone with rumble strips





## New Retrofit Bike Lanes along Trans-Canada Highway



Buffered Bike Lanes with rumble strip - part of the Great Lakes Waterfront Trail



New Bike lanes and highway rehabilitation with construction of new Right turn lane within Serpent River First Nation



Eastbound and westbound passing lanes have been successfully converted to Bike Lanes



# THANK YOU QUESTIONS

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